



**TURCK**

**Industrial  
Automation**

**SENSORS**

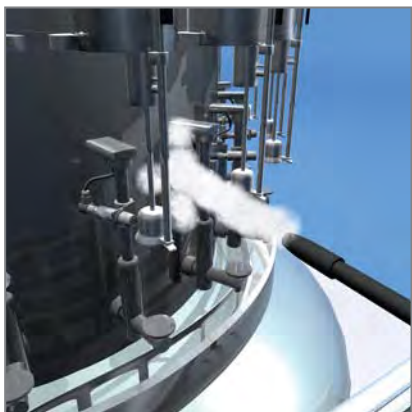
***Sense it! Connect it! Bus it! Solve it!***





# Sensors

# Sensors



# The company



## The company

TURCK is one of the leading companies in the field of industrial automation. With more than 2.600 employees in 27 countries as well as sales partners in further 60 states, the sensor, fieldbus, connection and interface specialist is globally represented. With superior products and tailor-made solutions for factory and process automation, TURCK has been setting new standards for over 40 years. TURCK's early international orientation

dates back to 1975, marked by the foundation of TURCK INC. in Minneapolis; USA. With state-of-the-art production facilities in Germany, Switzerland, the USA, Mexico and China, TURCK is able to adapt itself to local market conditions worldwide.



## The product portfolio

TURCK offers the full range of solutions for factory and process automation with over 15,000 products from the fields of sensor, interface, connection and fieldbus technology. Examples for the company's innovative leadership are inductive *uprox*<sup>®</sup>+ factor 1 sensors, the modular IP67 I/O system BL67 as well as *excom*<sup>®</sup> the compact remote I/O system for the Ex-area.

Whether for machine & system engineering, the automotive sector, transport & handling, food & beverage or for chemical and pharmaceutical industries: TURCK products enhance the availability of your systems with absolutely reliable technologies. Our products lower the costs for purchase, storage, installation and operational safety through effective standardization.





### Service and Support

We want to offer our customers simply the best – promptly, reliably and flexibly! Based on 40 years of experience and extensive know-how, we support our customers with efficient service, from a first analysis up to tailor-made solutions for your application.

and support improves the availability of systems in all industrial areas. Our express delivery service and a comprehensive e-support system round off the TURCK portfolio.

We aim at enhancing the efficiency and productivity of production processes. The excellent quality of our products



### Product data base

www.turck.com helps you to find products and solutions fast, seven days a week, at any place worldwide and in nine different languages.

Around 13,000 products are clearly structured, completely documented and ready for download. We provide all necessary information for your application. Our online platform guides you through the information and to the products you need. Find out for your self! www.turck.com

# Sensors

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### Sensors – the full range

The catalog features more than 3000 devices for proximity, photoelectric, flow and position sensing. No matter the requirements on design, function or material quality, TURCK offers first-class products and high-efficiency solutions.

For an **overview over the full product range** please see page 5. Each chapter contains a table providing details about product **Designs and variants**. If you are looking for special application solutions, please refer to **Sensors for special applications**. Should you already know the type code or the ID number of a sensor, refer to the **Type index** on page 932. It leads you to the desired product.

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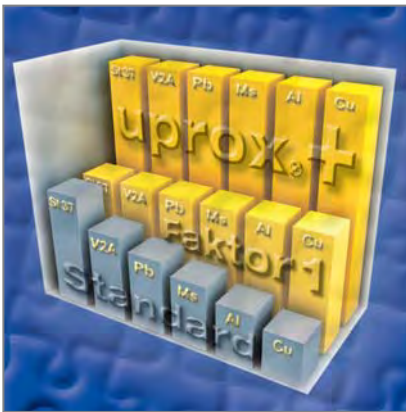
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# At a glance

## uprox®+ Inductive factor 1 sensors



### The new generation of inductive sensors

The deployment of inductive sensors faces complex and continuously growing demands of modern industrial automation. An end-to-end solution is required, ranging from construction, purchase and system engineering to operation and maintenance.

TURCK demonstrates impressively how to optimize process cost and to improve the efficiency and availability of systems with the *uprox®+* factor 1 sensors. The *uprox®+* sensors operate with innovative non-ferritic coils and circuit boards, offering completely new application possibilities compared to conventional sensors with ferrite core and wound coil.

All inductive sensors of the new *uprox®+* generation operate with highest switching distances, without reduction factor (i.e. same operating distance for all metals), are weld resistant, feature an extended temperature range, excellent EMC properties and are easily mounted.

Advantages for the user: Only a few *uprox®+* sensors are needed to cover a broad range of applications. Standardization is thus guaranteed, purchase and logistics are simplified and the variety of types as well as the costs are reduced to a manageable amount.

The sensors are available as standard versions in chrome-plated brass barrels or in stainless steel housings with LPC front cap and special double lip seal for heavy use or sudden temperature changes. These are typical ambient conditions faced in cleaning processes of the food and tooling industry. The teflon-coated brass versions offer extra protection against sparks and weld-splatter as experienced in the automotive industry during car body welding.

The sensors are accommodated in a rugged, rectangular plastic housing, needing little space while offering high switching distances. We also offer other rectangular designs with relocatable active face.

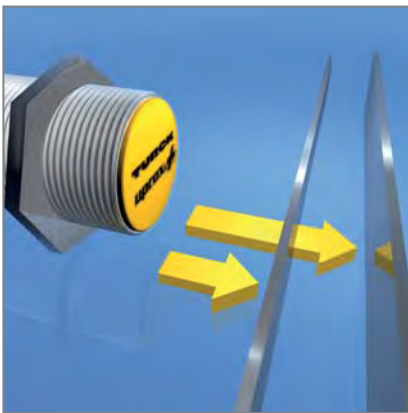
# Our strengths ...



## Factor 1

The innovative *uprox*®+ sensors set new benchmarks in metal detection. Thanks to the non-ferritic coil and circuit-board the sensors operate without reduction factor. Materials such as iron, stainless

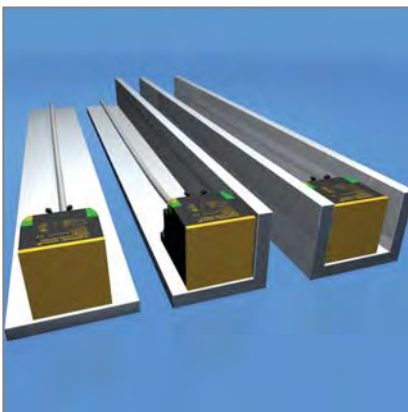
steel, copper, aluminium and brass are detected at the same distance and with the highest precision. Any application can therefore profit from the unique power spectrum of the *uprox*®+ sensors.



## Highest switching distance

The new *uprox*®+ sensors have the same switching distance. Owing to their novel patented coil technology, the switching distance is up to 250 % higher than that of conventional inductive sensors with

ferrite core. This means, that the *uprox*®+ sensors outclass any standard sensor of the same size in terms of switching distance and other features.

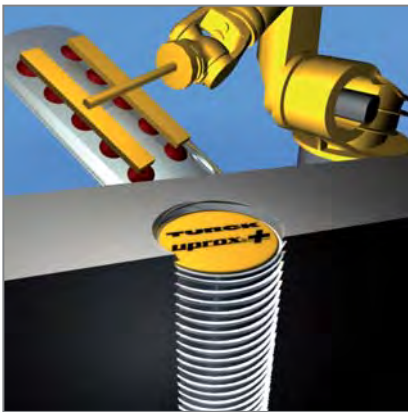


## Partly-flush mounting of non-flush mountable sensors

The mounting flexibility of rectangular *uprox*®+ sensors opens up many new application possibilities. All non-flush mountable rectangular *uprox*®+ sensors allow 4-side embedded mounting with reduced switching distance. Thus, additional mechanical components and ac-

cessories are not needed, making installation not only cheaper but also quicker and easier. The unique flexibility of non-flush mountable sensors is achieved through integrated pre-damping protection: This allows the sensors to be mounted to the upper edge of the barrel.

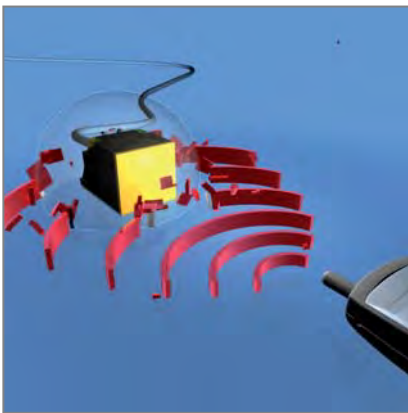




### Recessed mounting of flush sensors

The new *uprox*®+ sensors only require small metal-free zones. No matter which sensor type, flush mounting is possible without compromises. The sensors are

screwed in with a half turn to protect them against mechanical damage. This guarantees safe operation in all mounting positions!



### Excellent EMC properties and magnetic field resistance

*uprox*®+ sensors fulfill the EN 60947-5-2 requirements and pass tests successfully according to EN 61000-4-6 „conducted interferences“. They are also immune to

strong magnetic fields, occurring for instance during electrical welding processes or near lifts and electrical furnaces.



### High tightness and resistance

A special double lip seal in the front cap and at the connector insert prevent the ingress of liquids even during high pressure cleaning cycles. *uprox*®+ sensors thus exceed the requirements of pro-

tection class IP68 and IP69K by far. The threaded barrel and the front cap of the WD series are made of materials that are resistant to all common acid and alkaline cleaning agents and disinfectants.

# Your advantages ...

## Your advantages ...



### Efficient standardization

A single *uprox*®+ sensor replaces many conventional sensor types. Purchase and logistics as well as end-user service are simplified.

- The widest possible application range is achieved with only a few sensor versions

- Low average prices because special devices are not required
- Minimized training effort due to a lean product line



### Maximum freedom

*uprox*®+ extends the capability of sensor technology and provides considerable more leeway for the development of new machines and systems:

- Many possible solutions are achieved with only a few device types

- Great flexibility in machine planning through avoidance of construction errors and targeted elimination of unnecessary conflicts between mechanical and electrical construction
- Easy mounting



### Extremely service-friendly

*uprox*®+ sensors can be mounted in many ways and are easy to maintain:

- Convenient adjustment thanks to highest switching distances
- Maximum freedom for commissioning achieved through safe operating

conditions in recessed and partially embedded mounting positions

- Minimum maintenance and staff training due to a reduced variety of sensor types

# ventajas



## High system availability

*uprox*®+ sensors minimize downtimes of machines and systems:

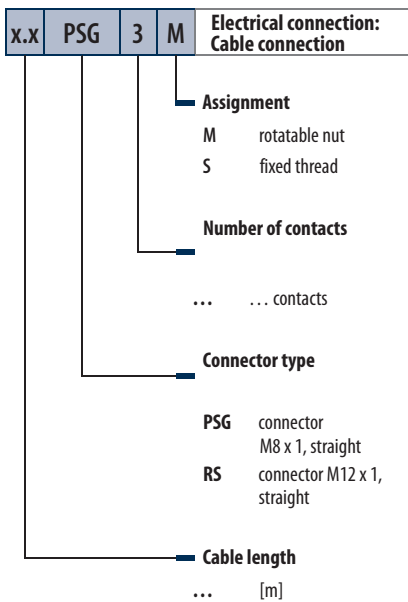
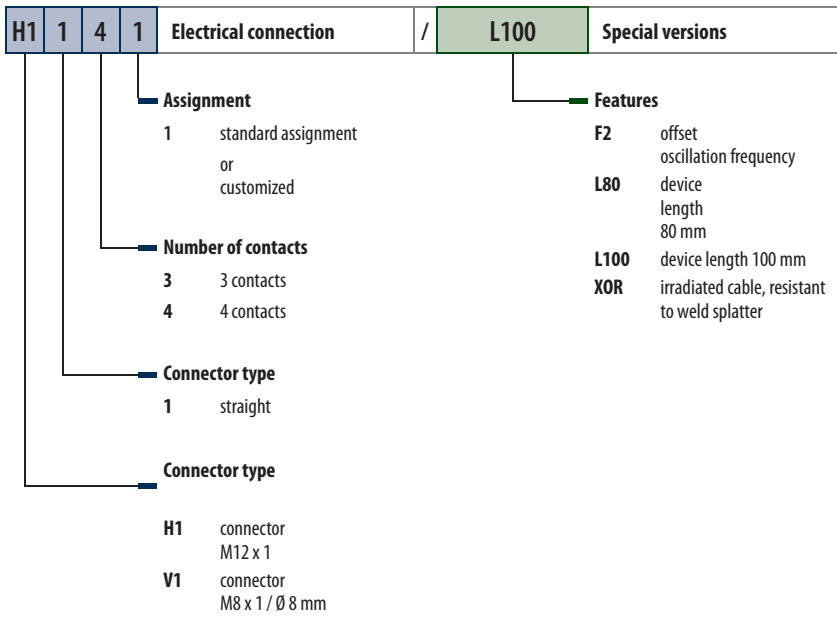
- Less mechanical damage through recessed mounting
- Protection against ingress of liquids during cleaning processes
- Prevention of downtimes due to the excellent resistance of the materials used against acid and alkaline cleaning agents and disinfectants
- Short downtimes through high availability of spare parts at lowest costs

# Type code

B	i	4	U	Functional principle	-	M12	.	Design	-	A	P	6	X	Electrical version	-
				<p><b>Special functions</b></p> <p><b>U</b> uprox® or uprox®+ factor 1 sensors</p> <p><b>Rated operating distance</b></p> <p>... [mm]</p> <p><b>Functional principle</b></p> <p><b>i</b> inductive</p> <p><b>Fitting</b></p> <p><b>B</b> flush</p> <p><b>N</b> non-flush</p>				<p><b>Additional information</b></p> <p><b>E</b> long-sized housing</p> <p><b>M</b> medium-sized housing</p> <p><b>S</b> lateral active face</p> <p><b>TC</b> terminal chamber with straight/angled cable outlet</p> <p><b>WD</b> wash down applications</p> <p><b>Housing</b></p> <p><b>CK40, CP40, QV40</b> rectangular, 40 x 40 mm flexible active face</p> <p><b>EG</b> threaded barrel, stainless steel Ø in [mm]</p> <p><b>EM</b> threaded barrel, stainless steel, teflon-coated, Ø in [mm]</p> <p><b>EGT</b> smooth barrel, stainless steel, different diameters</p> <p><b>EH</b> smooth barrel, plastic, Ø in [mm]</p> <p><b>K</b> threaded barrel, chrome-plated brass, Ø in [mm]</p> <p><b>MT</b> threaded barrel, teflon-coated brass Ø in [mm]</p> <p><b>Q</b> rectangular housing</p>					<p><b>Indication</b></p> <p><b>X</b> LED</p> <p><b>X...</b> number of LEDs or multicolor LED</p> <p><b>Voltage range</b></p> <p><b>4</b> 10...65 VDC, ☉</p> <p><b>44</b> 10...55 VDC, ☉</p> <p><b>6</b> 10...30 VDC, ☉</p> <p><b>Output mode</b></p> <p><b>P</b> PNP</p> <p><b>N</b> NPN</p> <p><b>D</b> 2-wire DC, non-polarized</p> <p><b>Output function</b></p> <p><b>A</b> working current NO</p> <p><b>R</b> closed current NC</p> <p><b>V</b> changeover contact</p>		

☉ = short circuit protected





# Designs and variants

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## EH6.5

## EG08

## M12

## M18

### Design

smooth barrel 6.5 mm

threaded barrel M8 x 1

threaded barrel M12 x 1

threaded barrel M18 x 1

### Switching distance

2 mm,   
6 mm,

2 mm,   
6 mm,

2 mm,   
4 mm,   
5 mm,   
10 mm,

5 mm,   
8 mm,   
10 mm,   
15 mm,

### Electrical connection

connector, M8 x 1  
cable

connector, M8 x 1  
connector, M12 x 1  
cable

connector, M12 x 1  
connector, M8 x 1  
cable  
terminal chamber, removable  
cage clamp terminals

connector, M12 x 1  
cable  
terminal chamber, removable  
cage clamp terminals

### Output

3-wire DC PNP  
3-wire DC NPN

3-wire DC PNP  
3-wire DC NPN

2-wire DC  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC PNP  
4-wire DC NPN

2-wire DC  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC PNP  
4-wire DC NPN



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**M30**

**Q8SE**

**Q08**

**Q10S**

**Design**





threaded barrel M30 x 1.5

rectangular Q8SE,  
8 x 8 x 40 mm

rectangular Q08,  
20 x 8 x 32 mm


rectangular Q10S,  
16 x 10.2 x 27.8 mm

**Switching distance**

10 mm,   
15 mm,   
15 mm,   
30 mm, 

4 mm, 

8 mm, 

5 mm, 

**Electrical connection**

connector, M12 x 1  
cable  
terminal chamber, removable  
cage clamp terminals

connector, M8 x 1  
cable  
cable with connector

connector, Ø 8 mm  
cable

cable  
cable with connector

**Output**

2-wire DC  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC PNP  
4-wire DC NPN

3-wire DC PNP  
3-wire DC NPN

3-wire DC PNP  
3-wire DC NPN

3-wire DC PNP  
3-wire DC NPN

# Designs and variants

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	<b>Q12</b>	<b>CK40</b>	<b>QV40</b>	<b>CP40</b>
<b>Design</b>	rectangular Q12, 26 x 12 x 40 mm	rectangular CK40, 40 x 40 x 65 mm	rectangular QV40, 40 x 40 x 65 mm	rectangular CP40, 40 x 40 x 114 mm
<b>Switching distance</b>	5 mm,	15 mm, 20 mm, 30 mm, 35 mm, 50 mm,	20 mm, 35 mm, 50 mm,	20 mm, 30 mm, 50 mm,
<b>Electrical connection</b>	connector, M8 x 1 connector, M12 x 1 cable	connector, M12 x 1	connector, M12 x 1	terminal chamber
<b>Output</b>	3-wire DC PNP 3-wire DC NPN 4-wire DC PNP	2-wire DC 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN	3-wire DC PNP	3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN






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**Q80**

**K90SR**

<b>Design</b>	rectangular Q80, 80 x 40 x 92 mm	rectangular K90SR, 75 x 60 x 130 mm
<b>Switching distance</b>	50 mm,  75 mm, 	100 mm, 
<b>Electrical connection</b>	connector, M12 x 1	connector, M12 x 1 terminal chamber
<b>Output</b>	3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN	4-wire DC PNP 4-wire DC NPN

## uprox®+ compact rectangular design

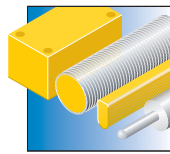


The mounting flexibility of the rectangular uprox®+ sensors opens up many new application possibilities. All variable non-flush rectangular uprox®+ sensors are 4-side embeddable with reduced switching distance. Thus additional mechanical components and accessories are not required. As a result, installation is cost-effective, quicker and easier.

### Features

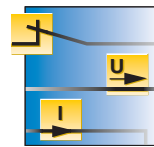
- Partial embedding of non-flush rectangular sensors
- Highest switching distance
- Factor 1, all metals
- Excellent EMC properties and magnetic field resistance

### Properties



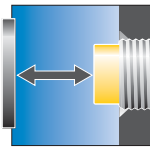
#### Design

From the small space-saving Q8SE to the standardized Q12 version



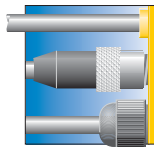
#### Electrical versions

3/4-wire NO/NC as well as antivalent PNP/NPN output



#### Switching distances

High switching distances between 4 and 12 mm on all metals



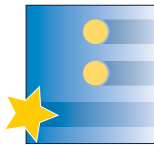
#### Electrical connections

Connection cable 2 m, plug connections M12, M8 or Ø 8 mm as well as M8 pigtail



#### Materials

Rugged and chemical resistant plastic and metal housings




#### Special features

High protection class IP68  
Side-by-side, space-saving installation

## Q8SE – 3-wire DC













### General data

**Dimensions** 8 x 8 x 40 mm  
**Switching distance** 4 mm,   
**Operating voltage** 10...30 VDC

**Ambient temperature** -30...+85 °C  
**Material housing** PP

Lateral active face

### Types and data – selection table

Type	Output	Electrical connection	Material cable		
NI4U-Q8SE-RP6X-V1131	 , PNP	connector, M8 x 1	-	w003	d001
NI4U-Q8SE-RP6X-0,3-PSG3M	 , PNP	cable with connector	PUR 0.3 m	w003	d002
NI4U-Q8SE-RP6X	 , PNP	cable	PUR 2 m	w006	d003
NI4U-Q8SE-AP6X-V1131	 , PNP	connector, M8 x 1	-	w001	d001
NI4U-Q8SE-AP6X-0,3-PSG3M	 , PNP	cable with connector	PUR 0.3 m	w001	d002
NI4U-Q8SE-AP6X	 , PNP	cable	PUR 2 m	w004	d003
NI4U-Q8SE-AN6X-V1131	 , NPN	connector, M8 x 1	-	w002	d001
NI4U-Q8SE-AN6X	 , NPN	cable	PUR 2 m	w005	d003

## Q08 – 3-wire DC



### General data

**Dimensions** 20 x 8 x 32 mm  
**Switching distance** 8 mm,   
**Operating voltage** 10...30 VDC

**Ambient temperature** -25...+70 °C  
**Material housing** GD-Zn

### Types and data – selection table

Type	Output	Electrical connection	Material cable	w	d
BI8U-Q08-RP6X2	PNP	cable	PUR	w006	d004
BI8U-Q08-AP6X2-V1131	PNP	connector, Ø 8 mm	-	w001	d005
BI8U-Q08-AP6X2	PNP	cable	PUR	w004	d004
BI8U-Q08-AN6X2-V1131	NPN	connector, Ø 8 mm	-	w002	d005
BI8U-Q08-AN6X2	NPN	cable	PUR	w005	d004

## Q10S – 3-wire DC



#### General data

#### Dimensions

16 x 10.2 x 27.8 mm

#### Switching distance

5 mm,

#### Operating voltage

10...30 VDC

#### Ambient temperature

-30...+85 °C

#### Material housing

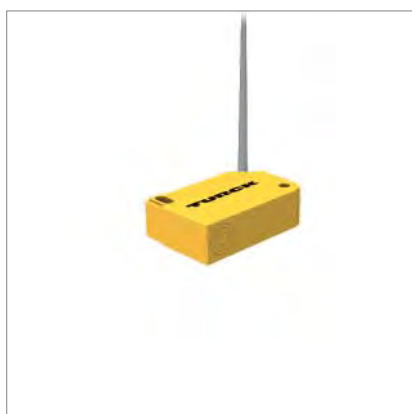
PP

Lateral active face

### Types and data – selection table

Type	Output	Electrical connection	Material cable	w	d
NI5U-Q10S-AP6X-0,3-PSG3M	PNP	cable with connector	PUR 0.3 m	w001	d006
NI5U-Q10S-AP6X	PNP	cable	PUR 2 m	w004	d007
NI5U-Q10S-AN6X-0,3-PSG3M	NPN	cable with connector	PUR 0.3 m	w002	d006
NI5U-Q10S-AN6X	NPN	cable	PUR 2 m	w005	d007

## Q12 – 3-wire DC



#### General data

#### Dimensions

26 x 12 x 40 mm

#### Switching distance

5 mm,

#### Operating voltage

10...30 VDC

#### Ambient temperature








-25...+70 °C

#### Material housing

PA



### Types and data – selection table

Type	Output	Electrical connection	Material cable	w	d
BI5U-Q12-AP6X2-V1131/F2	 , PNP	connector, M8 x 1	-	w001	d008
BI5U-Q12-AP6X2-V1131	 , PNP	connector, M8 x 1	-	w001	d008
BI5U-Q12-AP6X2-H1141	 , PNP	connector, M12 x 1	-	w001	d009
BI5U-Q12-AP6X2	 , PNP	cable	PUR 2 m	w004	d010
BI5U-Q12-AN6X2-V1131	 , NPN	connector, M8 x 1	-	w002	d008
BI5U-Q12-AN6X2-H1141	 , NPN	connector, M12 x 1	-	w002	d009
BI5U-Q12-AN6X2	 , NPN	cable	PUR 2 m	w005	d010

## Q12 – 4-wire DC



### General data

#### Dimensions

26 x 12 x 40 mm

#### Switching distance

5 mm, 

#### Output

, PNP

#### Operating voltage

10...30 VDC

#### Ambient temperature

-25...+70 °C

#### Material housing

PA

### Types and data – selection table

Type	Electrical connection	Material cable	w	d
BI5U-Q12-VP6X2/F2	cable	PUR 2 m	w007	d010
BI5U-Q12-VP6X2-H1141	connector, M12 x 1	-	w008	d009
BI5U-Q12-VP6X2	cable	PUR 2 m	w007	d010

## uprox®+ large rectangular design

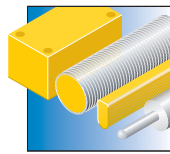


The mounting flexibility of the rectangular *uprox*®+ sensors open up many new application possibilities. All variable non-flush rectangular *uprox*®+ sensors are 4-side embeddable with reduced switching distance. Thus additional mechanical components and accessories are not required. As a result, installation is cost-effective, quicker and easier.

### Features

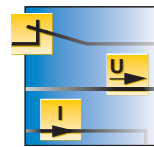
- Highest switching distance
- Factor 1
- Excellent EMC properties and magnetic field resistance
- Partial embedding of non-flush rectangular sensors

### Properties



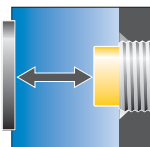
#### Design

From the 40 x 40 mm standard version CK 40 to the Ø 90 mm big size K90SR



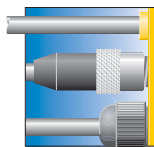
#### Electrical versions

3/4-wire NO/NC as well as antivalent PNP/NPN output



#### Switching distances

Large switching distances between 20 mm and max.100 mm on all metals



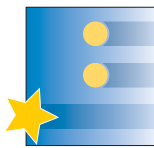
#### Electrical connections

Available with 2 m cable or M12 x 1 plug connection



#### Materials

Rugged plastic housing for harsh and uncompromizing application conditions



#### Special features

Protection class IP68  
High luminance corner LEDs  
Variable orientation of active face in 5 directions

## CK40 – 2-wire DC



### General data

<b>Dimensions</b>	40 x 40 x 65 mm
<b>Output</b>	—, 2-wire
<b>Electrical connection</b>	connector, M12 x 1

<b>Operating voltage</b>	10...65 VDC
<b>Ambient temperature</b>	-25...+70 °C
<b>Material housing</b>	PBT

Mechanical switches are replaced by a simple 2-wire connection and system diagnostics by short-circuit monitoring and wire-break detection.

### Types and data – selection table

Type	Switching distance	w	d
BI15U-CK40-AD4X-H1144	15 mm,	w009	d011
NI35U-CK40-AD4X-H1144	35 mm,	w009	d012

## CK40 – 3-wire DC



### General data

<b>Dimensions</b>	40 x 40 x 65 mm
<b>Electrical connection</b>	connector, M12 x 1

<b>Operating voltage</b>	10...30 VDC
<b>Material housing</b>	PBT

Variable orientation of active face in 5 directions

### Types and data – selection table

Type	Switching distance	Output	Ambient temperature	w	d
BI30U-CK40-AP6X2-H1141	30 mm,	—, PNP	-10...+60 °C	w001	d012
BI30U-CK40-AN6X2-H1141	30 mm,	—, NPN	-10...+60 °C	w002	d012
BI20U-CK40-AP6X2-H1141	20 mm,	—, PNP	-30...+85 °C	w001	d011
BI20U-CK40-AN6X2-H1141	20 mm,	—, NPN	-30...+85 °C	w002	d011
NI50U-CK40-AP6X2-H1141	50 mm,	—, PNP	-30...+85 °C	w001	d012
NI50U-CK40-AN6X2-H1141	50 mm,	—, NPN	-30...+85 °C	w002	d012

Wiring diagrams on page 832 ff


Dimension drawing on page 842 ff

Accessories on page 736 ff

## CK40 – 4-wire DC





### General data

**Dimensions** 40 x 40 x 65 mm  
**Switching distance** 50 mm,   
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...65 VDC  
**Ambient temperature** -30...+85 °C  
**Material housing** PBT

Variable orientation of active face in 5 directions


### Types and data – selection table

Type	Output	w	d
NI50U-CK40-VP4X2-H1141	 , PNP	w008	d012
NI50U-CK40-VN4X2-H1141	 , NPN	w010	d012

## QV40 – 3-wire DC



### General data

**Dimensions** 40 x 40 x 65 mm  
**Output** , PNP  
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...30 VDC  
**Material housing** PBT

Variable orientation of active face in 5 directions

### Types and data – selection table

Type	Switching distance	Ambient temperature	w	d
BI20U-QV40-AP6X2-H1141	20 mm, 	0...+70 °C	w001	d013
NI50U-QV40-AP6X2-H1141	50 mm, 	-30...+85 °C	w001	d013
NI35U-QV40-AP6X2-H1141	35 mm, 	-30...+85 °C	w001	d013



## CP40 – 3-wire DC



### General data

<b>Dimensions</b>	40 x 40 x 114 mm	<b>Operating voltage</b>	10...30 VDC
<b>Electrical connection</b>	terminal chamber	<b>Material housing</b>	PBT

Variable orientation of active face in 9 directions

### Types and data – selection table

Type	Switching distance	Output	Ambient temperature	w	d
BI30U-CP40-AP6X2	30 mm,	, PNP	-10...+60 °C	w011	d014
BI30U-CP40-AN6X2	30 mm,	, NPN	-10...+60 °C	w012	d014
BI20U-CP40-AP6X2	20 mm,	, PNP	-30...+85 °C	w011	d014
BI20U-CP40-AN6X2	20 mm,	, NPN	-30...+85 °C	w012	d014
NI50U-CP40-AP6X2	50 mm,	, PNP	-30...+85 °C	w011	d014
NI50U-CP40-AN6X2	50 mm,	, NPN	-30...+85 °C	w012	d014

## CP40 – 4-wire DC



### General data

<b>Dimensions</b>	40 x 40 x 114 mm	<b>Operating voltage</b>	10...65 VDC
<b>Switching distance</b>	50 mm,	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	terminal chamber	<b>Material housing</b>	PBT

Variable orientation of active face in 9 directions

### Types and data – selection table

Type	Output	w	d
NI50U-CP40-VP4X2	, PNP	w014	d014
NI50U-CP40-VN4X2	, NPN	w013	d014

Wiring diagrams on page 832 ff

Dimension drawing on page 842 ff

Accessories on page 736 ff

## Q80 – 3-wire DC



### General data

<b>Dimensions</b>	80 x 40 x 92 mm	<b>Ambient temperature</b>	-25...+70 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	PBT
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output	w	d
BI50U-Q80-AP6X2-H1141	50 mm,	—, PNP	w001	d015
BI50U-Q80-AN6X2-H1141	50 mm,	—, NPN	w002	d015
NI75U-Q80-AP6X2-H1141	75 mm,	—, PNP	w001	d015
NI75U-Q80-AN6X2-H1141	75 mm,	—, NPN	w002	d015

## Q80 – 4-wire DC



### General data

<b>Dimensions</b>	80 x 40 x 92 mm	<b>Ambient temperature</b>	-25...+70 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	PBT
<b>Operating voltage</b>	10...65 VDC		

### Types and data – selection table

Type	Switching distance	Output	w	d
BI50U-Q80-VP4X2-H1141	50 mm,	—, PNP	w008	d015
BI50U-Q80-VN4X2-H1141	50 mm,	—, NPN	w010	d015
NI75U-Q80-VP4X2-H1141	75 mm,	—, PNP	w008	d015
NI75U-Q80-VN4X2-H1141	75 mm,	—, NPN	w010	d015

## K90 – 4-wire DC



### General data

**Dimensions** 75 x 60 x 130 mm  
**Switching distance** 100 mm,   
**Operating voltage** 10...65 VDC

**Ambient temperature** -30...+85 °C  
**Material housing** PBT

### Types and data – selection table

Type	Output	Electrical connection	w	d
NI100U-K90SR-VP4X2-H1141	 , PNP	connector, M12 x 1	w008	d017
NI100U-K90SR-VP4X2	 , PNP	terminal chamber	w014	d016
NI100U-K90SR-VN4X2-H1141	 , NPN	connector, M12 x 1	w010	d017
NI100U-K90SR-VN4X2	 , NPN	terminal chamber	w013	d016

## uprox®+ cylindrical design

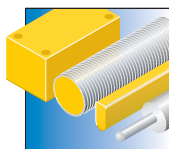


All sensors of the uprox®+ series owe many new features to their novel multi-coil system, providing them with distinct advantages over conventional inductive sensors. The Ø 6.5 mm standard types are available as chrome-plated versions (M12, M18, M30 x 1.5) or as stainless steel versions (EH6.5, EG08, EM12, EM18 and EM30) and excel in maximum operating distances, eliminated reduction factors, high magnetic-field immunity, excellent EMC properties and versatile mounting modes.

### Features

- Recessed mounting of flush sensors
- Embedding up to the barrel edge of non-flush mountable sensors
- Excellent EMC properties and magnetic field resistance
- Highest switching distance
- Factor 1, all metals

### Properties



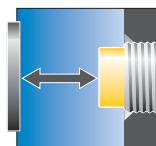
#### Design

From the small Ø 6.5 mm smooth barrel to the large threaded barrel version M30 x 1.5



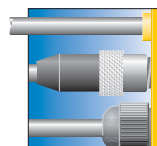
#### Electrical versions

3/4-wire NO/NC as well as antivalent PNP/NPN output



#### Switching distances

From 2 mm flush to 30 mm non-flush, on all metals



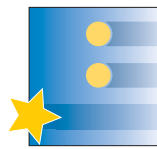
#### Electrical connections

Available with 2 m cable, M12 x 1 or M8 x 1 plug connection



#### Materials

Threaded barrels available as nickel-plated brass or stainless steel versions



#### Special features

Protection class IP68  
Different thread sizes for individual requirements

## EH6.5 – 3-wire DC – M8 x 1 plug connection



<b>General data</b>			
<b>Dimensions</b>	Ø6.5 x 49 mm	<b>Operating voltage</b>	10...30 VDC
<b>Electrical connection</b>	connector, M8 x 1	<b>Material housing</b>	V2A (1.4301)

### Types and data – selection table

Type	Switching distance	Output	Ambient temperature	w	d
BI2U-EH6,5-AP6X-V1131	2 mm,	, PNP	-30...+85 °C	w001	d018
BI2U-EH6,5-AN6X-V1131	2 mm,	, NPN	-30...+85 °C	w002	d018
NI6U-EH6,5-AP6X-V1131	6 mm,	, PNP	0...+70 °C	w001	d019
NI6U-EH6,5-AN6X-V1131	6 mm,	, NPN	0...+70 °C	w002	d019

## EH6.5 – 3-wire DC – Cable connection



<b>General data</b>			
<b>Electrical connection</b>	cable	<b>Material housing</b>	V2A (1.4301)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PUR 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Ambient temperature	w	d
BI2U-EH6,5-AP6X	Ø6.5 x 41.6 mm	2 mm,	, PNP	-30...+85 °C	w004	d020
BI2U-EH6,5-AN6X	Ø6.5 x 41.6 mm	2 mm,	, NPN	-30...+85 °C	w005	d020
NI6U-EH6,5-AP6X	Ø6.5 x 42 mm	6 mm,	, PNP	0...+70 °C	w004	d021
NI6U-EH6,5-AN6X	Ø6.5 x 42 mm	6 mm,	, NPN	0...+70 °C	w005	d021

Wiring diagrams on page 832 ff

Dimension drawing on page 842 ff

Accessories on page 736 ff

## EG08 – 3-wire DC – M8 x 1 plug connection



<b>General data</b>			
<b>Dimensions</b>	Ø8 x 49 mm	<b>Operating voltage</b>	10...30 VDC
<b>Electrical connection</b>	connector, M8 x 1	<b>Material housing</b>	V2A (1.4301)

### Types and data – selection table

Type	Switching distance	Output	Ambient temperature	w	d
BI2U-EG08-RP6X-V1131	2 mm,	, PNP	-30...+85 °C	w003	d022
BI2U-EG08-AP6X-V1131	2 mm,	, PNP	-30...+85 °C	w001	d022
BI2U-EG08-AN6X-V1131	2 mm,	, NPN	-30...+85 °C	w002	d022
NI6U-EG08-RP6X-V1131	6 mm,	, PNP	0...+70 °C	w003	d023
NI6U-EG08-AP6X-V1131	6 mm,	, PNP	0...+70 °C	w001	d023
NI6U-EG08-AN6X-V1131	6 mm,	, NPN	0...+70 °C	w002	d023

## EG08 – 3-wire DC – M12 x 1 plug connection



<b>General data</b>			
<b>Dimensions</b>	Ø8 x 57 mm	<b>Operating voltage</b>	10...30 VDC
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V2A (1.4301)

### Types and data – selection table

Type	Switching distance	Output	Ambient temperature	w	d
BI2U-EG08-RP6X-H1341	2 mm,	, PNP	-30...+85 °C	w015	d024
BI2U-EG08-AP6X-H1341	2 mm,	, PNP	-30...+85 °C	w001	d024
BI2U-EG08-AN6X-H1341	2 mm,	, NPN	-30...+85 °C	w002	d024
NI6U-EG08-RP6X-H1341	6 mm,	, PNP	0...+70 °C	w015	d025
NI6U-EG08-AP6X-H1341	6 mm,	, PNP	0...+70 °C	w001	d025
NI6U-EG08-AN6X-H1341	6 mm,	, NPN	0...+70 °C	w002	d025



## EG08 – 3-wire DC – Cable connection



<b>General data</b>		<b>Material housing</b>	V2A (1.4301)
<b>Dimensions</b>	Ø8 x 41.6 mm	<b>Material cable</b>	PUR 2 m
<b>Electrical connection</b>	cable		
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output	Ambient temperature	w	d
BI2U-EG08-AP6X	2 mm,	, PNP	-30...+85 °C	w004	d026
BI2U-EG08-AN6X	2 mm,	, NPN	-30...+85 °C	w005	d026
NI6U-EG08-AP6X	6 mm,	, PNP	0...+70 °C	w004	d027
NI6U-EG08-AN6X	6 mm,	, NPN	0...+70 °C	w005	d027

## M12 – 2-wire DC – M12 x 1 plug connection



<b>General data</b>		<b>Operating voltage</b>	10...65 VDC
<b>Dimensions</b>	Ø12 x 62 mm	<b>Ambient temperature</b>	0...+70 °C
<b>Output</b>	, 2-wire	<b>Material housing</b>	CuZn-Cr
<b>Electrical connection</b>	connector, M12 x 1		

### Types and data – selection table

Type	Switching distance	w	d
BI2U-M12E-AD4X-H1144	2 mm,	w009	d028
NI5U-M12E-AD4X-H1144	5 mm,	w009	d029

## M12 – 2-wire DC – Cable connection



### General data

<b>Dimensions</b>	Ø12 x 64 mm
<b>Output</b>	—, 2-wire
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...65 VDC

<b>Ambient temperature</b>	0...+70 °C
<b>Material housing</b>	CuZn-Cr
<b>Material cable</b>	PVC 2 m

### Types and data – selection table

Type	Switching distance	w	d
BI2U-M12E-AD4X	2 mm,	w016	d030
NI5U-M12E-AD4X	5 mm,	w016	d031

## M12 – 3-wire DC – M8 x 1 plug connection



### General data

<b>Dimensions</b>	Ø12 x 52 mm
<b>Electrical connection</b>	connector, M8 x 1
<b>Operating voltage</b>	10...30 VDC

<b>Ambient temperature</b>	-30...+85 °C
<b>Material housing</b>	CuZn-Cr

### Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-M12-AP6X-V1131	4 mm,	—, PNP	w001	d032
BI4U-M12-AN6X-V1131	4 mm,	—, NPN	w002	d032
NI10U-M12-AP6X-V1131	10 mm,	—, PNP	w001	d033
NI10U-M12-AN6X-V1131	10 mm,	—, NPN	w002	d033

## M12 – 3-wire DC – M12 x 1 plug connection



### General data

<b>Dimensions</b>	Ø12 x 52 mm	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output	w	d
Bi4U-M12-RP6X-H1141	4 mm,	, PNP	w015	d034
Bi4U-M12-AP6X-H1141	4 mm,	, PNP	w001	d034
Bi4U-M12-AN6X-H1141	4 mm,	, NPN	w002	d034
NI10U-M12-RP6X-H1141	10 mm,	, PNP	w015	d035
NI10U-M12-AP6X-H1141	10 mm,	, PNP	w001	d035
NI10U-M12-AN6X-H1141	10 mm,	, NPN	w002	d035

## M12 – 3-wire DC – Cable connection



### General data

<b>Dimensions</b>	Ø12 x 54 mm	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PVC 2 m

### Types and data – selection table

Type	Switching distance	Output	w	d
Bi4U-M12-RP6X	4 mm,	, PNP	w006	d036
Bi4U-M12-AP6X	4 mm,	, PNP	w004	d036
Bi4U-M12-AN6X	4 mm,	, NPN	w005	d036
NI10U-M12-RP6X	10 mm,	, PNP	w006	d037
NI10U-M12-AP6X	10 mm,	, PNP	w004	d037
NI10U-M12-AN6X	10 mm,	, NPN	w005	d037

Wiring diagrams on page 832 ff

Dimension drawing on page 842 ff

Accessories on page 736 ff

## M12 – 4-wire DC – M12 x 1 plug connection



**General data**

**Electrical connection** connector, M12 x 1  
**Operating voltage** 10...55 VDC

**Ambient temperature** -30...+85 °C  
**Material housing** CuZn-Cr

### Types and data – selection table

Type	Dimensions	Switching distance	Output	w	d
BI4U-M12E-VP44X-H1141	Ø12 x 62 mm	4 mm,	, PNP	w017	d028
BI4U-M12E-VN44X-H1141	Ø12 x 62 mm	4 mm,	, NPN	w010	d028
BI4U-M12-VP44X-H1141 L80	Ø12 x 80 mm	4 mm,	, PNP	w017	d038
BI4U-M12-VP44X-H1141 L100	Ø12 x 100 mm	4 mm,	, PNP	w017	d039
NI10U-M12E-VP44X-H1141	Ø12 x 62 mm	10 mm,	, PNP	w017	d029
NI10U-M12E-VN44X-H1141	Ø12 x 62 mm	10 mm,	, NPN	w010	d029

## M12 – 4-wire DC – Cable connection



**General data**

**Dimensions** Ø12 x 64 mm  
**Electrical connection** cable  
**Operating voltage** 10...55 VDC

**Ambient temperature** -30...+85 °C  
**Material housing** CuZn-Cr  
**Material cable** PVC 2 m

### Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-M12E-VP44X	4 mm,	, PNP	w007	d030
BI4U-M12E-VN44X	4 mm,	, NPN	w018	d030
NI10U-M12E-VP44X	10 mm,	, PNP	w007	d031
NI10U-M12E-VN44X	10 mm,	, NPN	w018	d031

## M18 – 2-wire DC – M12 x 1 plug connection



### General data

**Dimensions** Ø18 x 61.5 mm  
**Output** —, 2-wire  
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...65 VDC  
**Ambient temperature** -25...+70 °C  
**Material housing** CuZn-Cr

### Types and data – selection table

Type	Switching distance	w	d
B15U-M18M-AD4X-H1144	5 mm,	w009	d040
NI10U-M18M-AD4X-H1144	10 mm,	w009	d041

## M18 – 2-wire DC – Cable connection



### General data

**Dimensions** Ø18 x 64 mm  
**Output** —, 2-wire  
**Electrical connection** cable  
**Operating voltage** 10...65 VDC

**Ambient temperature** -25...+70 °C  
**Material housing** CuZn-Cr  
**Material cable** PVC 2 m

### Types and data – selection table

Type	Switching distance	w	d
B15U-M18M-AD4X	5 mm,	w016	d042
NI10U-M18M-AD4X	10 mm,	w016	d043

## M18 – 3-wire DC – M12 x 1 plug connection



### General data

<b>Electrical connection</b>	connector, M12 x 1	<b>Ambient temperature</b>	-30...+85 °C
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI8U-M18E-AP6X-H1141	Ø18 x 72 mm	8 mm,	—, PNP	CuZn-Cr	w001	d045
BI8U-M18E-AN6X-H1141	Ø18 x 72 mm	8 mm,	—, NPN	CuZn-Cr	w002	d045
BI8U-M18-RP6X-H1141	Ø18 x 52 mm	8 mm,	⊥, PNP	CuZn-Cr	w015	d044
BI8U-M18-AP6X-H1141	Ø18 x 52 mm	8 mm,	—, PNP	CuZn-Cr	w001	d044
BI8U-M18-AN6X-H1141	Ø18 x 52 mm	8 mm,	—, NPN	CuZn-Cr	w002	d044
BI8U-EM18E-AP6X-H1141	Ø18 x 72 mm	8 mm,	—, PNP	V2A (1.4301)	w001	d045
BI8U-EM18-AP6X-H1141	Ø18 x 52 mm	8 mm,	—, PNP	V2A (1.4301)	w001	d044
BI8U-EM18-AN6X-H1141	Ø18 x 52 mm	8 mm,	—, NPN	V2A (1.4301)	w002	d044
NI15U-M18E-AP6X-H1141	Ø18 x 72 mm	15 mm,	—, PNP	CuZn-Cr	w001	d047
NI15U-M18E-AN6X-H1141	Ø18 x 72 mm	15 mm,	—, NPN	CuZn-Cr	w002	d047
NI15U-M18-RP6X-H1141	Ø18 x 52 mm	15 mm,	⊥, PNP	CuZn-Cr	w015	d046
NI15U-M18-AP6X-H1141	Ø18 x 52 mm	15 mm,	—, PNP	CuZn-Cr	w001	d046
NI15U-M18-AN6X-H1141	Ø18 x 52 mm	15 mm,	—, NPN	CuZn-Cr	w002	d046
NI15U-EM18E-AP6X-H1141	Ø18 x 72 mm	15 mm,	—, PNP	V2A (1.4301)	w001	d047
NI15U-EM18-AP6X-H1141	Ø18 x 52 mm	15 mm,	—, PNP	V2A (1.4301)	w001	d046
NI15U-EM18-AN6X-H1141	Ø18 x 52 mm	15 mm,	—, NPN	V2A (1.4301)	w002	d046

## M18 – 3-wire DC – Cable connection















### General data

<b>Electrical connection</b>	cable	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PVC 2 m
<b>Ambient temperature</b>	-30...+85 °C		



### Types and data – selection table

Type	Dimensions	Switching distance	Output	w	d
BI8U-M18E-AP6X	Ø18 x 64 mm	8 mm, 	 , PNP	w004	d042
BI8U-M18-RP6X	Ø18 x 54 mm	8 mm, 	 , PNP	w006	d048
BI8U-M18-AP6X	Ø18 x 54 mm	8 mm, 	 , PNP	w004	d048
BI8U-M18-AN6X	Ø18 x 54 mm	8 mm, 	 , NPN	w005	d048
NI15U-M18-AP6X	Ø18 x 54 mm	15 mm, 	 , PNP	w004	d049
NI15U-M18-AN6X	Ø18 x 54 mm	15 mm, 	 , NPN	w005	d049









## M18 – 4-wire DC – M12 x 1 plug connection



#### General data

<b>Dimensions</b>	Ø18 x 61.5 mm	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	10...55 VDC		

### Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-M18M-VP44X-H1141	8 mm, 	 , PNP	w017	d040
BI8U-M18M-VN44X-H1141	8 mm, 	 , NPN	w010	d040
NI15U-M18M-VP44X-H1141	15 mm, 	 , PNP	w017	d041
NI15U-M18M-VN44X-H1141	15 mm, 	 , NPN	w010	d041

## M18 – 4-wire DC – Cable connection



#### General data

<b>Dimensions</b>	Ø18 x 64 mm	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	10...55 VDC	<b>Material cable</b>	PVC 2 m

### Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-M18M-VP44X	8 mm,	, PNP	w007	d042
BI8U-M18M-VN44X	8 mm,	, NPN	w018	d042
BI8U-M18E-VP44X	8 mm,	, PNP	w007	d042
NI15U-M18M-VP44X	15 mm,	, PNP	w007	d043
NI15U-M18M-VN44X	15 mm,	, NPN	w018	d043

## M30 – 2-wire DC – M12 x 1 plug connection



#### General data

#### Dimensions

Ø30 x 62 mm

#### Output

, 2-wire

#### Electrical connection

connector, M12 x 1

#### Operating voltage

10...65 VDC

#### Ambient temperature

-25...+70 °C

#### Material housing

CuZn-Cr

### Types and data – selection table

Type	Switching distance	w	d
BI10U-M30-AD4X-H1144	10 mm,	w009	d050
NI15U-M30-AD4X-H1144	15 mm,	w009	d051

## M30 – 2-wire DC – Cable connection



#### General data

#### Dimensions

Ø30 x 64 mm

#### Output

, 2-wire

#### Electrical connection

cable

#### Operating voltage

10...65 VDC

#### Ambient temperature

-25...+70 °C


#### Material housing

CuZn-Cr

#### Material cable

PVC 2 m

### Types and data – selection table

Type	Switching distance	w	d
BI10U-M30-AD4X	10 mm, 	w016	d052
NI15U-M30-AD4X	15 mm, 	w016	d053

## M30 – 3-wire DC – M12 x 1 plug connection















### General data

**Electrical connection** connector, M12 x 1

**Ambient temperature** -30...+85 °C

**Operating voltage** 10...30 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI15U-M30E-AP6X-H1141	Ø30 x 77 mm	15 mm, 	—, PNP	CuZn-Cr	w001	d054
BI15U-M30-RP6X-H1141	Ø30 x 62 mm	15 mm, 	⊥, PNP	CuZn-Cr	w015	d050
BI15U-M30-AP6X-H1141	Ø30 x 62 mm	15 mm, 	—, PNP	CuZn-Cr	w001	d050
BI15U-M30-AN6X-H1141	Ø30 x 62 mm	15 mm, 	—, NPN	CuZn-Cr	w002	d050
BI15U-EM30-AP6X-H1141	Ø30 x 62 mm	15 mm, 	—, PNP	V2A (1.4301)	w001	d050
BI15U-EM30-AN6X-H1141	Ø30 x 62 mm	15 mm, 	—, NPN	V2A (1.4301)	w002	d050
NI30U-M30E-AP6X-H1141	Ø30 x 77 mm	30 mm, 	—, PNP	CuZn-Cr	w001	d055
NI30U-M30-RP6X-H1141	Ø30 x 62 mm	30 mm, 	⊥, PNP	CuZn-Cr	w015	d051
NI30U-M30-AP6X-H1141	Ø30 x 62 mm	30 mm, 	—, PNP	CuZn-Cr	w001	d051
NI30U-M30-AN6X-H1141	Ø30 x 62 mm	30 mm, 	—, NPN	CuZn-Cr	w002	d051
NI30U-EM30-AP6X-H1141	Ø30 x 62 mm	30 mm, 	—, PNP	V2A (1.4301)	w001	d051
NI30U-EM30-AN6X-H1141	Ø30 x 62 mm	30 mm, 	—, NPN	V2A (1.4301)	w002	d051

**w** Wiring diagrams on page 832 ff

**d** Dimension drawing on page 842 ff

**a** Accessories on page 736 ff

## M30 – 3-wire DC – Cable connection



<b>General data</b>			
<b>Dimensions</b>	Ø30 x 64 mm	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	cable	<b>Material cable</b>	PVC 2 m
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output	Material housing	w	d
BI15U-M30-AP6X	15 mm,	—, PNP	CuZn-Cr	w004	d052
BI15U-M30-AN6X	15 mm,	—, NPN	CuZn-Cr	w005	d052
BI15U-EM30-AP6X	15 mm,	—, PNP	V2A (1.4301)	w004	d052
NI30U-M30-RP6X	30 mm,	—, PNP	CuZn-Cr	w006	d053
NI30U-M30-AP6X	30 mm,	—, PNP	CuZn-Cr	w004	d053
NI30U-M30-AN6X	30 mm,	—, NPN	CuZn-Cr	w005	d053

## M30 – 4-wire DC – M12 x 1 plug connection



<b>General data</b>			
<b>Dimensions</b>	Ø30 x 62 mm	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	10...55 VDC		

### Types and data – selection table

Type	Switching distance	Output	w	d
BI15U-M30-VP44X-H1141	15 mm,	—, PNP	w017	d050
BI15U-M30-VN44X-H1141	15 mm,	—, NPN	w010	d050
NI30U-M30-VP44X-H1141	30 mm,	—, PNP	w017	d051
NI30U-M30-VN44X-H1141	30 mm,	—, NPN	w010	d051

## M30 – 4-wire DC – Cable connection



### General data

**Dimensions** Ø30 x 64 mm  
**Electrical connection** cable  
**Operating voltage** 10...55 VDC

**Ambient temperature** -30...+85 °C  
**Material housing** CuZn-Cr  
**Material cable** PVC 2 m

### Types and data – selection table

Type	Switching distance	Output	w	d
BI15U-M30-VP44X	15 mm,	, PNP	w007	d052
BI15U-M30-VN44X	15 mm,	, NPN	w018	d052
NI30U-M30-VP44X	30 mm,	, PNP	w007	d053
NI30U-M30-VN44X	30 mm,	, NPN	w018	d053

## uprox®+ teflon-coated sensors for the automotive industry

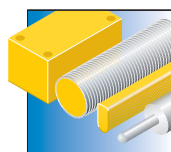


The uprox®+ sensors in teflon-coated threaded barrels are the perfect choice for the rough ambient conditions of the automotive industry. The TF80i coating protects efficiently against weld splatter and drill cuttings and the non-ferritic coil system makes the sensors resistant to strong magnetic fields.

### Features

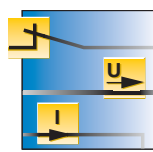
- TF80i coating
- High magnetic field immunity
- Excellent EMC immunity
- Factor 1, all metals
- Highest switching distance

### Properties



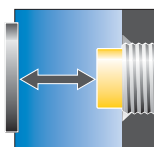
#### Design

Threaded barrel versions M8 x 1, M12 x 1, M18 x 1 and M30 x 1.5



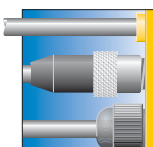
#### Electrical versions

2/3-wire devices with NO output PNP/NPN



#### Switching distances

From 2 mm flush to 30 mm non-flush, on all metals



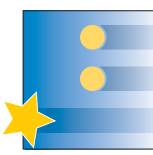
#### Electrical connections

Available with M12 x 1 plug connection or M12 x 1 pigtail



#### Materials

TF80i coating protects against weld splatter or drill cuttings



#### Special features

Protection class IP68  
Approved for almost all automotive plants

## EG08 – 3-wire DC – M12 x 1 plug connection



<b>General data</b>		<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	Ø8 x 57 mm	<b>Material housing</b>	V2A (1.4301) -T
<b>Output</b>	—, PNP		
<b>Electrical connection</b>	connector, M12 x 1		

### Types and data – selection table

Type	Switching distance	Ambient temperature	w	d
BI2U-EGT08-AP6X-H1341	2 mm,	-30...+85 °C	w001	d024
NI6U-EGT08-AP6X-H1341	6 mm,	0...+70 °C	w001	d056

## M12 – 2-wire DC – M12 x 1 pigtail



<b>Type</b>	BI2U-MT12E-AD4X-0,3-RS4.23/XOR	<b>Ambient temperature</b>	0...+70 °C
<b>Dimensions</b>	Ø12 x 64 mm	<b>Material housing</b>	CuZn-T
<b>Switching distance</b>	2 mm,	<b>Material cable</b>	PVC 0.3 m
<b>Output</b>	—, 2-wire	<b>Wiring diagram</b>	w009
<b>Electrical connection</b>	connector, M12 x 1	<b>Dimension drawing</b>	d057
<b>Operating voltage</b>	10...65 VDC		

## M12 – 3-wire DC – M12 x 1 plug connection



<b>General data</b>		<b>Ambient temperature</b>	-30...+85 °C
<b>Dimensions</b>	Ø12 x 52 mm	<b>Material housing</b>	CuZn
<b>Electrical connection</b>	connector, M12 x 1		
<b>Operating voltage</b>	10...30 VDC		

Wiring diagrams on page 832 ff

Dimension drawing on page 842 ff

Accessories on page 736 ff



### Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-MT12-AP6X-H1141	4 mm,	, PNP	w001	d058
BI4U-MT12-AN6X-H1141	4 mm,	, NPN	w002	d058
NI10U-MT12-AP6X-H1141	10 mm,	, PNP	w001	d059
NI10U-MT12-AN6X-H1141	10 mm,	, NPN	w002	d059

## M18 – 2-wire DC – M12 x 1 plug connection



#### General data

<b>Dimensions</b>	Ø18 x 61.5 mm	<b>Operating voltage</b>	10...65 VDC
<b>Output</b>	, 2-wire	<b>Ambient temperature</b>	-25...+70 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	CuZn-T

### Types and data – selection table

Type	Switching distance	w	d
BI5U-MT18M-AD4X-H1144	5 mm,	w009	d040
NI10U-MT18M-AD4X-H1144	10 mm,	w009	d060

## M18 – 2-wire DC – M12 x 1 pigtail



<b>Type</b>	BI5U-MT18M-AD4X-0,3-RS4.23/XOR	<b>Ambient temperature</b>	-25...+70 °C
<b>Dimensions</b>	Ø18 x 64 mm	<b>Material housing</b>	CuZn-T
<b>Switching distance</b>	5 mm,	<b>Material cable</b>	PVC 0.3 m
<b>Output</b>	, 2-wire	<b>Wiring diagram</b>	w009
<b>Electrical connection</b>	connector, M12 x 1	<b>Dimension drawing</b>	d061
<b>Operating voltage</b>	10...65 VDC		

## M18 – 3-wire DC – M12 x 1 plug connection



<b>General data</b>			
<b>Dimensions</b>	Ø18 x 52 mm	<b>Ambient temperature</b>	-30...+85 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	CuZn-T
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-MT18-AP6X-H1141	8 mm,	—, PNP	w001	d062
BI8U-MT18-AN6X-H1141	8 mm,	—, NPN	w002	d062
NI15U-MT18-AP6X-H1141	15 mm,	—, PNP	w001	d063
NI15U-MT18-AN6X-H1141	15 mm,	—, NPN	w002	d063

## M30 – 2-wire DC – M12 x 1 plug connection



<b>General data</b>			
<b>Dimensions</b>	Ø30 x 62 mm	<b>Operating voltage</b>	10...65 VDC
<b>Output</b>	—, 2-wire	<b>Ambient temperature</b>	-25...+70 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	CuZn-T

### Types and data – selection table

Type	Switching distance	w	d
BI10U-MT30-AD4X-H1144	10 mm,	w009	d064
NI15U-MT30-AD4X-H1144	15 mm,	w009	d065

Wiring diagrams on page 832 ff

Dimension drawing on page 842 ff

Accessories on page 736 ff

## M30 – 2-wire DC – M12 x 1 pigtail



<b>Type</b>	BI10U-MT30-AD4X-0,3-RS4.23/XOR	<b>Ambient temperature</b>	-25...+70 °C
<b>Dimensions</b>	Ø30 x 64 mm	<b>Material housing</b>	CuZn-T
<b>Switching distance</b>	10 mm,	<b>Material cable</b>	PVC 0.3 m
<b>Output</b>	, 2-wire	<b>Wiring diagram</b>	w009
<b>Electrical connection</b>	connector, M12 x 1	<b>Dimension drawing</b>	d066
<b>Operating voltage</b>	10...65 VDC		

## M30 – 3-wire DC – M12 x 1 plug connection



<b>General data</b>		<b>Ambient temperature</b>	-30...+85 °C
<b>Dimensions</b>	Ø30 x 62 mm	<b>Material housing</b>	CuZn-T
<b>Electrical connection</b>	connector, M12 x 1		
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output		
BI15U-MT30-AP6X-H1141	15 mm,	, PNP	w001	d064
BI15U-MT30-AN6X-H1141	15 mm,	, NPN	w002	d064
NI30U-MT30-AP6X-H1141	30 mm,	, PNP	w001	d065
NI30U-MT30-AN6X-H1141	30 mm,	, NPN	w002	d065

**w** Wiring diagrams on page 832 ff

**d** Dimension drawing on page 842 ff

**a** Accessories on page 736 ff

## uprox®+ for the food industry

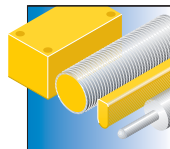


The uprox®+ sensors for the food industry feature a rugged V4A stainless steel housing with laser-engraved type label and resist temperatures of -40 °C to +100 °C easily. A special double lip seal prevents the ingress of liquids. The materials used are resistant to detergents and disinfectants. The fluid-tight housing and the excellent EMC properties of the electronics ensure failsafe operation in harsh industrial production environments.

### Features

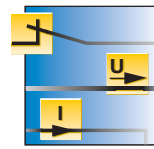
- High tightness and resistance
- Factor 1, all metals
- Rugged stainless steel housing
- High protection classes IP68 and IP69K
- Highest switching distance

### Properties



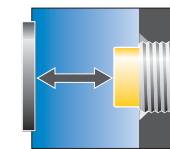
#### Design

Threaded barrel  
M12 x 1, M18 x 1 and  
M30 x 1.5



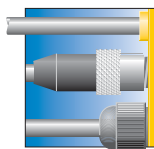
#### Electrical versions

3-wire NO contact  
PNP/NPN



#### Switching distances

From 4 mm flush to  
30 mm non-flush, on  
all metals



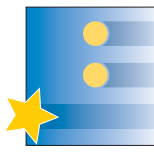
#### Electrical connections

Available with  
M12 x 1 plug con-  
nection, 2 m cable or  
terminal chamber



#### Materials

Rugged V4A stainless  
steel housing  
Chemical-resistant LCP  
front cap  
Sealed PP connector  
insert



#### Special features

High protection classes  
IP68 and IP69K,  
laser-engraved type  
code,  
Ecolab certificate

## M12 – 3-wire DC – M12 x 1 plug connection



### General data

<b>Dimensions</b>	Ø12 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC		

Pressure resistant up to 20 bar

### Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-EM12WD-AP6X-H1141	4 mm,	—, PNP	w001	d034
BI4U-EM12WD-AN6X-H1141	4 mm,	—, NPN	w002	d034
NI10U-EM12WD-AP6X-H1141	10 mm,	—, PNP	w001	d067
NI10U-EM12WD-AN6X-H1141	10 mm,	—, NPN	w002	d067

## M12 – 3-wire DC – Cable connection



### General data

<b>Dimensions</b>	Ø12 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 20 bar

### Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-EM12WD-AP6X	4 mm,	—, PNP	w004	d068
BI4U-EM12WD-AN6X	4 mm,	—, NPN	w005	d068
NI10U-EM12WD-AP6X	10 mm,	—, PNP	w004	d069
NI10U-EM12WD-AN6X	10 mm,	—, NPN	w005	d069

Wiring diagrams on page 832 ff

Dimension drawing on page 842 ff

Accessories on page 736 ff

## M12 – 3-wire DC – Terminal chamber



### General data

#### Dimensions

Ø12 x 80 mm

#### Output

—, PNP

#### Electrical connection

terminal chamber,  
removable cage clamp  
terminals

#### Operating voltage

10...30 VDC

#### Ambient temperature

-40...+100 °C

#### Material housing

V4A (1.4404)

Removable terminal strip and variable cable outlet

### Types and data – selection table

Type	Switching distance	w	d
BI4U-EM12WDTC-AP6X	4 mm,	w011	d070
NI10U-EM12WDTC-AP6X	10 mm,	w011	d071

## M18 – 3-wire DC – M12 x 1 plug connection



### General data

#### Dimensions

Ø18 x 52 mm

#### Electrical connection

connector, M12 x 1

#### Operating voltage

10...30 VDC

#### Ambient temperature

-40...+100 °C

#### Material housing

V4A (1.4404)

Pressure resistant up to 15 bar

### Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-EM18WD-AP6X-H1141	8 mm,	—, PNP	w001	d044
BI8U-EM18WD-AN6X-H1141	8 mm,	—, NPN	w002	d044
NI15U-EM18WD-AP6X-H1141	15 mm,	—, PNP	w001	d072
NI15U-EM18WD-AN6X-H1141	15 mm,	—, NPN	w002	d072



## M18 – 3-wire DC – Cable connection



### General data

**Dimensions** Ø18 x 52 mm  
**Electrical connection** cable  
**Operating voltage** 10...30 VDC

**Ambient temperature** -40...+100 °C  
**Material housing** V4A (1.4404)  
**Material cable** PP 2 m

Pressure resistant up to 15 bar

### Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-EM18WD-AP6X	8 mm,	— , PNP	w004	d073
BI8U-EM18WD-AN6X	8 mm,	— , NPN	w005	d073
NI15U-EM18WD-AP6X	15 mm,	— , PNP	w004	d074
NI15U-EM18WD-AN6X	15 mm,	— , NPN	w005	d074

## M18 – 3-wire DC – Terminal chamber



### General data

**Dimensions** Ø18 x 81 mm  
**Output** —|, PNP  
**Electrical connection** terminal chamber, removable cage clamp terminals

**Operating voltage** 10...30 VDC  
**Ambient temperature** -40...+100 °C  
**Material housing** V4A (1.4404)

Removable terminal strip and variable cable outlet

### Types and data – selection table

Type	Switching distance	w	d
BI8U-EM18WDTC-AP6X	8 mm,	w011	d075
NI15U-EM18WDTC-AP6X	15 mm,	w011	d076

w Wiring diagrams on page 832 ff

d Dimension drawing on page 842 ff

a Accessories on page 736 ff

## M30 – 3-wire DC – M12 x 1 plug connection



### General data

<b>Dimensions</b>	Ø30 x 62 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC		

Pressure resistant up to 10 bar

### Types and data – selection table

Type	Switching distance	Output	w	d
BI15U-EM30WD-AP6X-H1141	15 mm,	— , PNP	w001	d050
BI15U-EM30WD-AN6X-H1141	15 mm,	— , NPN	w002	d050
NI30U-EM30WD-AP6X-H1141	30 mm,	— , PNP	w001	d077
NI30U-EM30WD-AN6X-H1141	30 mm,	— , NPN	w002	d077

## M30 – 3-wire DC – Cable connection



### General data

<b>Dimensions</b>	Ø30 x 66 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 10 bar

### Types and data – selection table

Type	Switching distance	Output	w	d
BI15U-EM30WD-AP6X	15 mm,	— , PNP	w004	d078
BI15U-EM30WD-AN6X	15 mm,	— , NPN	w005	d078
NI30U-EM30WD-AP6X	30 mm,	— , PNP	w004	d079
NI30U-EM30WD-AN6X	30 mm,	— , NPN	w005	d079

## M30 – 3-wire DC – Terminal chamber



### General data

#### Dimensions

Ø30 x 95 mm

#### Output

—, PNP

#### Electrical connection

terminal chamber,  
removable cage clamp  
terminals

#### Operating voltage

10...30 VDC

#### Ambient temperature


-40...+100 °C

#### Material housing

V4A (1.4404)

Removable terminal strip and variable cable outlet

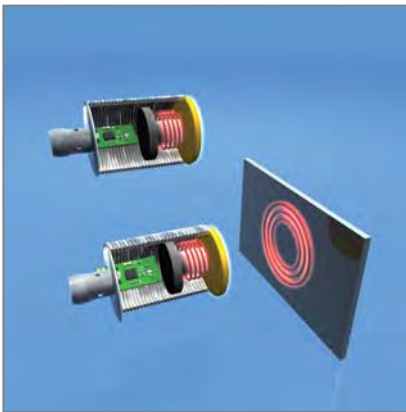
### Types and data – selection table

Type	Switching distance	w	d
BI15U-EM30WDTC-AP6X	15 mm, 	w011	d080
NI30U-EM30WDTC-AP6X	30 mm, 	w011	d081



# At a glance

## Inductive sensors - complete product range



### Inductive sensors – complete product range

Inductive sensors are designed for contactless and wear-free detection of metal targets. They are extremely resistant to environmental influences, very reliable, feature high switching frequencies and are durable.

There are as many application possibilities as sensor types: The sensors detect motion states at machines, open/close position of grippers and pincers or are applied for parts inspection.

The entire program of inductive sensors comprises factor 1 sensors *uprox*<sup>®</sup> and *uprox*<sup>®</sup>+ as well as versions with conventional ferrite core technology.

Nearly all types are flush as well as non-flush mountable. Moreover, the product portfolio offers very flexible non-flush mountable sensors that can also be recessed or flush mounted.

Only extremely resistant housing materials are used to comply with the demanding ambient conditions of applications.

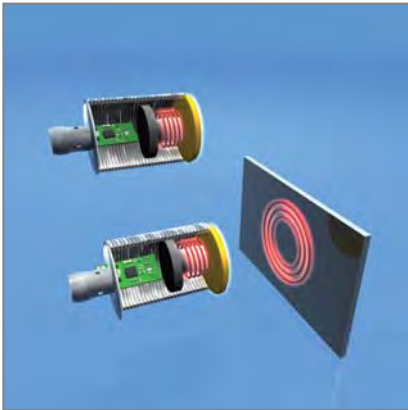
We offer of course all standard connection technologies and electrical output types.

Special applications often require special sensors. Most requirements such as factor 1, magnetic field immunity and protection class IP68/IP69K are fulfilled by standard *uprox*<sup>®</sup>+ sensors.

To achieve optimum performance, you find the matching sensors and functional description for all applications in the TURCK product portfolio.

- Ring sensors
- Slot sensors
- Dual sensors for valve control
- Analog inductive sensors
- Inductive sensors for underwater applications
- Pressure-resistant inductive sensors
- Selective inductive sensors
- and many more

# Our strengths - Your advantages



## Wear-free operation

Inductive proximity switches are designed for wear-free and contactless detection of metal objects. For this purpose they use a high-frequency electromagnetic AC field that interacts with the target. With conventional inductive sensors this field is generated by an LC resonant circuit with a ferrite coil. Eddy currents

are induced in the metal target. They withdraw energy from the field which in turn leads to a decrease of the oscillating amplitude. The decrease is detected and analysed by the inductive sensor. For more information on inductive sensors please see chapter *uprox*<sup>®</sup>+ inductive factor 1 sensors.



## Extensive product range

TURCK customers can choose from a broad range of standard products. The entire range of sensors and accessories holds the perfect solution for your individual application and meets increasing requirements in the long term. Nearly

all types are flush as well as non-flush mountable. Moreover, the product portfolio offers very flexible non-flush mountable sensors for recessed or flush mounting. The devices are available as standard products ex stock.



## Inductive sensors for special applications

Special applications often require special sensors. Most requirements such as factor 1, magnetic field immunity and protection classes IP68/IP69K are fulfilled by standard *uprox*<sup>®</sup>+ sensors. To achieve optimum performance, you find the matching sensors and functional descriptions

for all applications in the TURCK product portfolio. Ring, slot, dual sensors for valve control, sensors with analog output, with extended temperature range, for underwater use, pressure resistant inductive sensors and sensors with selective properties.

# advantages



## Many different designs

Many designs are available and each is optimally adjusted to different application conditions. From the small rectangular 5 x 5 x 25 mm to the big 90 x 130 x 60 mm version with extremely large switching distance. Also available are sensor sizes ranging from M4 to PG36 thread-

ed barrels as well as Ø 3 mm to Ø 40 mm smooth barrels. Nearly all types are flush as well as non-flush mountable. The product portfolio also includes very flexible non-flush mountable sensors for recessed or flush mounting.



## Application compliant housing materials

Only extremely resistant housing materials are used. In order to comply with the ambient conditions of individual applications, we offer sensors with different housing materials: Plastic versions PA,

PP, PBT or ABS, brass (threaded barrel), chrome-plated or teflon coated, stainless steel in different qualities up to high-quality V4A, 1.4404.



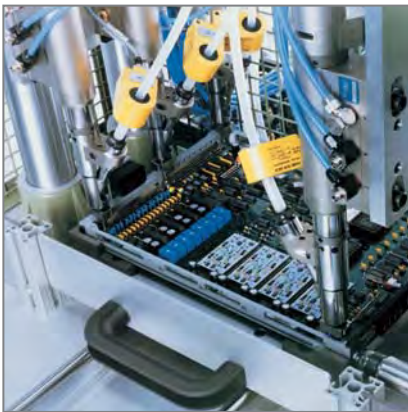
## Many different output and connection possibilities

We offer all connection types available on the market: Ø 8 mm, M8, M12, 1/2" and 7/8" plug connections, cable in different lengths and jacket qualities (standard length 2 m) pigtail - preassembled with M8 or M12 plug connections, terminal chamber - the new innovative TC ver-

sion with removable terminal block and variable cable outlet. All standard electrical versions are available: NAMUR, 2, 3 and 4-wire DC, PNP/NPN output or 2-wire AC/DC. Also available are fieldbus capable dual sensors for DeviceNet™ or AS-interface®.



# For special applications



## Ring sensors

TURCK ring sensors with integrated electronics are compact and universally mountable. They are applied in many different systems such as in assembly lines or component feeding systems to detect small metal parts. The *uprox*<sup>®</sup>+ TS12 is an

innovative replacement for various ring sensors. Only one sensor is needed to operate applications with different tube diameters.

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## Slot sensors

The slot sensors are U-shaped and the active face is located between the two arms. If an object passes through the slot, the sensor is actuated.

Slot sensors detect laterally approaching targets regardless of their distance to the active face.

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## Dual sensors for rotary actuators

In the chemical, petro-chemical and food industry, position control on rotary actuators is of great importance. TURCK dual sensors detect the end position of rotary actuators reliably.

Simple mounting and cable routing of TURCK dual sensors reduce the expenses for installation considerably.

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ons



**Sensors with analog output**

Inductive sensors with analog output accomplish simple control tasks. They provide a current, voltage or frequency signal that is proportional to the target's distance.

The output signal provided by TURCK analog sensors is linear to the distance of the target over the entire sensing range.

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**Extended temperature range**

The product portfolio even includes sensors for applications with ambient temperatures of -60 °C or +250 °C. These TURCK sensors are typically used in deep freezing systems, outdoors, in metal

foundries, in drying furnaces of varnishing stations or the glass industry for.

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**Inductive sensors for underwater applications**

TURCK offers sensors in fully pressure and seawater tight housings for subsea applications. They are made for continuous use under water. Mounted in M18 threaded barrels made of plastic, they can even be applied at water depths of up to 500 m.

Also included in the TURCK product portfolio are CP40 sensors. They are fully encapsulated in the SG40/2 housing. In addition, they feature large switching distances, are IP68 rated and are made for water depths of up to 50 m. They are mostly applied in locks, weirs and offshore areas.

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# For special applications



## Pressure-resistant sensors

We offer application optimized pressure resistant as well as high-pressure resistant devices. The *uprox*<sup>®</sup>+ WashDown sensors resist pressures up to 20 bar. The unique *uprox*<sup>®</sup> advantages are combined in one single product, such as largest switching distance, factor 1 and protection classes IP68/IP69K.

The high pressure resistant sensors are incorporated in a stainless steel housing and are ideally suited for hydraulic systems. Special gaskets and additional outer seals at the front as well as an O-ring enable the application in high pressure systems of up to 500 bar.

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## Magnetic-inductive sensors

Magnetic-inductive sensors are typically applied in pig trap systems or used for gate monitoring. Since magnetic-inductive sensors are actuated by external magnetic fields, even the smaller types achieve large switching distances.

In combination with the actuation magnet DMR31-15-5, the M12 sensors attain a rated switching distance of 90 mm.

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## Selective sensors

TURCK's sensor series NF, FE and NF/FE with distinctive function are particularly suited for applications in which ferritic metals have to be distinguished from non-ferritic metals. They distinguish be-

tween workpiece and tool or between workpieces made of different materials and perform simple coding tasks.

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ons

# Type code

B	i	.	4	U	Functional principle	-	M12	.	Design	-	A	P	6	X	Electrical version	-
					<b>Special functions</b>											
					FE selective behaviour: ferrite only											
					U <i>uprox</i> <sup>®</sup> or <i>uprox</i> <sup>®</sup> + factor 1 sensors											
					NF selective behaviour: non-ferrite only											
					R ring sensor,											
					<b>Rated operating distance</b>											
					... or slot width ring diameter [mm]											
					<b>Options</b>											
					D high-pressure resistant											
					<b>Functional principle</b>											
					i inductive											
					<b>Fitting</b>											
					B flush											
					N non-flush											
					S slot sensor											
					<b>Additional information</b>											
					D climate-proof											
					E long-sized housing											
					K short-sized housing											
					M medium-sized housing											
					S lateral active face											
					SK terminal chamber, angled cable outlet											
					SR, TC terminal chamber with straight/angled cable outlet											
					WD wash down resistant to aggressive cleaning agents Protection class IP68/69K											
					<b>Housing</b>											
					CA25 rectangular, 25 x 25 flexible active face											
					Q, QN rectangular, height in mm											
					CA40, CK40, CP40, QV40 rectangular, 40 x 40, flexible active face											
					CP80 cubic, 80 x 80											
					DSC, DSU dual sensor for monitoring of rotary actuators height in mm											
					EG, EM threaded barrel, stainless steel, Ø in [mm]											
					GS threaded barrel, metal, lateral active face, Ø in [mm]											
					EH, H smooth barrel, metal, Ø in [mm]											
					HS smooth barrel, metal, lateral active face, Ø in [mm]											
					K smooth barrel, plastic, or slot-shaped											
					G, M threaded barrel, metal Ø in [mm]											
					EGT, GT, MT threaded barrel, metal teflon-coated, Ø in [mm]											
					P, S threaded barrel, plastic Ø in [mm], housing style 'S' also available as ring sensor BI/NI...R											
					TS tube sensor detection of small parts, height in mm											
					W ring sensor, height in mm											
					<b>Indication</b>											
					X LED											
					X... number of LEDs or multicolor LED											
					<b>Voltage range</b>											
					3 10...300 VDC / 20...250 VAC											
					4 10...65 VDC, ⊗											
					6 10...30 VDC, ⊗											
					7 10...30 VDC (TTL compatible)											
					30 10...300 VDC / 20...250 VDC, ⊗											
					31 10...300 VDC / 20...250 VAC, ⊗ max. 100 mA											
					41 10...55 VDC											
					44 10...55 VDC, ⊗											
					45 8.4...65 VDC, ⊗, load dump and EMC protected acc. to e1 approval											
					<b>Output mode</b>											
					D 2-wire DC, non-polarized											
					G 2-wire DC, polarized											
					N NPN											
					P PNP											
					Z, DZ 2-wire AC/DC											
					<b>Output function</b>											
					A working current NO											
					ASI AS-Interface <sup>®</sup> connection											
					DA dynamic output, working current NO											
					Dnet DeviceNet <sup>™</sup>											
					F working current NO / closed current NC, programmable via connection											
					LF analog output (frequency)											
					LI analog output (current)											
					LI-Exi analog output (current), intrinsically safe											
					LIU, SIU analog output (voltage and current)											
					LU analog output (current)											
					R closed current NC											
					Y0, Y1 output acc. to EN 60947-5-6 (NAMUR)											
					V changeover contact											

⊗ = short circuit protected

H1	1	4	1	Electrical connection:	/	L100	Special versions
----	---	---	---	------------------------	---	------	------------------

- Assignment**
  - 1 standard assignment or customized
- Number of contacts**
  - ... ... contacts
- Connector type**
  - 1 straight
  - 3 straight, with adapter
- Connector type**
  - B1 connector type 7/8"
  - B3 connector type 1/2"
  - H1 connector type M12 x 1
  - V1, V2 connector type M8 x 1 / Ø 8 mm

- Features**
  - 3G approval ATEX II 3 G
  - 3D approval ATEX II 3 D
  - 3GD approval ATEX II 3 G and II 3 D
  - L100 device length 100 mm
  - L80 device length 80 mm
  - S34 magnetic-field resistant
  - S97 extended temperature range: -40 °C
  - S100 extended temperature range: +100 °C
  - S120 extended temperature range: +120 °C
  - S139 seawater-proof housing
  - S369 CP40 housing fully encapsulated in SG40 protective housing, seawater-proof
  - S907 extended temperature range: +160 °C
  - S929 extended temperature range: -60 °C
  - S1102 extended temperature range: +250 °C

X.X	PSG	3	M	Pigtail: Cable connection
-----	-----	---	---	---------------------------

- Assignment**
  - M rotatable nut
  - S fixed thread
- ... contacts**
  - ... ... contacts
- Connector type**
  - PSG connector M8 x 1, straight
  - RS connector M12 x 1, straight rotatable nut
- Cable length**
  - ... [m]

...M	Cable connection
------	------------------

- Connection**
  - empty cable connection, 2 m  
Exceptions:  
TC, SK, SR, CP40, CP80 with terminal chamber connection
  - ...M cable length [m]

# Designs and variants

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## Q5SE

<b>Design</b>	rectangular Q5SE, 5 x 5 x 25 mm
<b>Switching distance</b>	0.8 mm,
<b>Electrical connection</b>	cable
<b>Output</b>	3-wire DC PNP

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## Q5,5

<b>Design</b>	rectangular Q5.5, 8 x 5.5 x 28 mm
<b>Switching distance</b>	2 mm, 3.5 mm,
<b>Electrical connection</b>	cable
<b>Output</b>	3-wire DC PNP 3-wire DC NPN

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## Q06

<b>Design</b>	rectangular Q06, 17.3 x 6 x 27.8 mm
<b>Switching distance</b>	3 mm,
<b>Electrical connection</b>	cable
<b>Output</b>	3-wire DC PNP 3-wire DC NPN

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## Q6,5

<b>Design</b>	rectangular Q6.5, 17 x 6.5 x 20 mm
<b>Switching distance</b>	1 mm, 2 mm,
<b>Electrical connection</b>	cable
<b>Output</b>	2-wire DC NAMUR 3-wire DC PNP

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**Q8SE**

**Q08**

**Q9,5**

**Q10**

**Design**

rectangular Q8SE,  
8 x 8 x 40 mm

rectangular Q08,  
20 x 8 x 32 mm

rectangular Q9.5,  
17 x 9.5 x 20 mm

rectangular Q10,  
25 x 10.8 x 42 mm

**Switching distance**

4 mm,

5 mm,   
7 mm,   
8 mm,

2 mm,

8 mm,

**Measuring range**

1...4 mm

**Electrical connection**

connector, M8 x 1  
cable

connector, Ø 8 mm  
connector, M8 x 1  
cable  
cable with connector

cable

connector, M8 x 1  
cable

**Output**

3-wire DC PNP  
3-wire DC NPN

2-wire DC NAMUR  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC PNP  
4-wire DC NPN  
4-wire DC Analog output

3-wire DC PNP

3-wire DC PNP  
3-wire DC NPN

# Designs and variants

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## Q10S

### Design

rectangular Q10S,  
16 x 10.2 x 27.8 mm

### Switching distance

2 mm,   
5 mm, 

### Internal ring diameter

### Measuring range

### Electrical connection

connector, M8 x 1  
cable  
cable with connector

### Output




2-wire DC NAMUR  
2-wire AC/DC  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC PNP  
4-wire DC NPN

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## Q12

rectangular Q12,  
26 x 12 x 40 mm

2 mm,   
5 mm,   
4 mm, 

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## TS12

rectangular TS12,  
17 x 12 x 80 mm



20 mm, 

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## Q14

rectangular Q14,  
30 x 14 x 52 mm

10 mm,   
20 mm, 

6.1 mm  
10.1 mm  
15.1 mm  
20.1 mm

3...8 mm

connector, M8 x 1  
connector, M12 x 1  
cable

2-wire DC NAMUR  
2-wire AC/DC  
3-wire DC PNP  
3-wire DC NPN  
3-wire DC Analog output  
4-wire DC Analog output



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**Q18**

**Q20**

**Q20L**

**Q25**

**Design**

rectangular Q18,  
18 x 18 x 29 mm

rectangular Q20,  
40 x 20 x 68 mm

rectangular Q20L,  
30 x 20 x 60 mm

rectangular Q25,  
25 x 25.5 x 38.5 mm

**Switching distance**

5 mm,

15 mm,

25 mm,

10 mm,

**Internal ring diameter**

30.1 mm

**Measuring range**

4...11 mm

10...50 mm  
15...85 mm

**Electrical connection**

cable

connector, M12 x 1  
cable

connector, M12 x 1

cable

**Output**

3-wire DC PNP  
3-wire DC NPN

2-wire DC NAMUR  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC Analog output

4-wire DC Analog output

3-wire DC PNP  
3-wire DC NPN

# Designs and variants

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


## CA25

**Design**

rectangular CA25,  
25 x 25 x 40 mm

**Switching distance**

10 mm,   
15 mm, 

**Electrical connection**

connector, M8 x 1  
connector, M12 x 1

**Output**

3-wire DC PNP

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## QN26

rectangular QN26,  
26 x 26 x 43 mm

10 mm, 

cable  
cable with connector, M12 x 1

2-wire DC

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## Q40

rectangular Q40,  
40 x 52.5 x 67 mm

22 mm, 

connector, M12 x 1

3-wire DC PNP

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## CA40

rectangular CA40,  
40 x 40 x 48 mm

20 mm, 

connector, M12 x 1

3-wire DC PNP  
3-wire DC NPN

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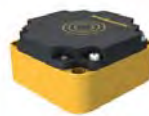
	<b>CK40</b>	<b>QV40</b>	<b>CP40</b>	<b>CQ40</b>
<b>Design</b>	rectangular CK40, 40 x 40 x 65 mm	rectangular QV40, 40 x 40 x 65 mm	rectangular CP40, 40 x 40 x 114 mm	rectangular CQ40, 40 x 40 x 52 mm
<b>Switching distance</b>	15 mm, 20 mm, 30 mm, 20 mm, 25 mm, 35 mm, 40 mm, 50 mm,	20 mm, 50 mm,	15 mm, 20 mm, 30 mm, 20 mm, 35 mm, 40 mm, 50 mm,	25 mm,
<b>Measuring range</b>	4...11 mm 5...25 mm		4...11 mm 5...25 mm	
<b>Electrical connection</b>	connector, 7/8" connector, 1/2" connector, M12 x 1	connector, M12 x 1	connector, M12 x 1 cable terminal chamber	connector, M12 x 1
<b>Output</b>	2-wire DC NAMUR 2-wire AC/DC 2-wire DC 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN 4-wire DC Analog output	3-wire DC PNP	2-wire DC NAMUR 2-wire AC/DC 2-wire DC 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN 4-wire DC Analog output	

# Designs and variants

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	<b>Q80</b>	<b>CP80</b>	<b>CQ80</b>	<b>K90</b>
<b>Design</b>	rectangular Q80, 80 x 40 x 92 mm	rectangular CP80, 80 x 41 x 80 mm	rectangular CQ80, 80 x 40 x 92 mm	rectangular K90SR, 75 x 60 x 130 mm
<b>Switching distance</b>	50 mm, 60 mm, 75 mm,	40 mm, 40 mm, 50 mm, 75 mm,	40 mm,	50 mm, 60 mm, 100 mm,
<b>Measuring range</b>	10...50 mm			
<b>Electrical connection</b>	connector, M12 x 1 cable	connector, M12 x 1 terminal chamber	connector, M12 x 1	connector, M12 x 1 terminal chamber
<b>Output</b>	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN 4-wire DC Analog output	2-wire DC NAMUR 2-wire AC/DC 4-wire DC PNP 4-wire DC NPN		2-wire DC NAMUR 4-wire DC NPN 2-wire AC/DC 4-wire DC PNP

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**Q130**

**M5 x 0.5**

**M8 x 1**

**M12 x 1**

**Design**

rectangular Q130,  
57 x 48 x 130 mm

threaded barrel M5 x 0.5

threaded barrel M8 x 1

threaded barrel M12 x 1

**Switching distance**

30 mm,

1 mm,

1.5 mm,   
2 mm,   
3 mm,   
4 mm,   
6 mm,   
78 mm

2 mm,   
2.5 mm,   
3 mm,   
4 mm,   
4 mm,   
5 mm,   
8 mm,   
10 mm,   
90 mm

**Measuring range**

0.25...1.25 mm

0.5...3 mm  
1...2.5 mm  
0.5...4 mm

**Electrical connection**

connector, 7/8"  
cable

connector, M8 x 1  
cable

connector, M8 x 1  
connector, M12 x 1  
cable

connector, 1/2"  
connector, M8 x 1  
connector, M12 x 1  
cable  
terminal chamber  
terminal chamber, removable  
cage clamp terminals

**Output**

2-wire AC/DC  
4-wire DC PNP  
4-wire DC NPN

2-wire DC NAMUR  
3-wire DC PNP  
3-wire DC NPN

2-wire DC  
2-wire AC/DC  
3-wire DC PNP  
2-wire DC NAMUR  
3-wire DC NPN  
4-wire DC PNP  
3-wire DC Analog output

2-wire DC NAMUR  
2-wire DC  
2-wire AC/DC  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC PNP  
4-wire DC NPN  
4-wire DC Analog output

# Designs and variants

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	<b>M18</b>	<b>M30</b>	<b>G47</b>	<b>EH03</b>
<b>Design</b>	threaded barrel M18 x 1	threaded barrel M30 x 1.5	threaded barrel G47	smooth barrel 3 mm
<b>Switching distance</b>	2 mm, 5 mm, 7 mm, 8 mm, 7 mm, 8 mm, 10 mm, 12 mm, 14 mm, 15 mm,	10 mm, 12 mm, 15 mm, 15 mm, 20 mm, 30 mm,	20 mm, 25 mm, 25 mm, 40 mm,	1 mm,
<b>Measuring range</b>	1...5 mm 2...4 mm 1...7 mm 0...40 mm 0...70 mm	3...8 mm 2...10 mm 2...12 mm		
<b>Electrical connection</b>	connector, 7/8" connector, 1/2" connector, M12 x 1 cable terminal chamber terminal chamber, removable cage clamp terminals	connector, 7/8" connector, 1/2" connector, M12 x 1 cable terminal chamber terminal chamber, removable cage clamp terminals	cable terminal chamber	cable
<b>Output</b>	2-wire DC NAMUR 2-wire DC 2-wire AC/DC 2-wire DC Analog output 3-wire DC PNP 3-wire DC NPN 3-wire DC Analog output 4-wire DC PNP 4-wire DC NPN 4-wire DC Analog output 4-wire DC PNP/Analog output	2-wire DC NAMUR 2-wire DC 2-wire AC/DC 2-wire DC Analog output 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN 4-wire DC Analog output 4-wire DC PNP/Analog output	2-wire DC NAMUR 2-wire AC/DC 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN	3-wire DC PNP 3-wire DC NPN

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**EH04**

**EH6.5**

**K11**

**K20**

	<b>EH04</b>	<b>EH6.5</b>	<b>K11</b>	<b>K20</b>
<b>Design</b>	smooth barrel 4 mm	smooth barrel 6.5 mm	smooth barrel 11 mm	smooth barrel 20 mm
<b>Switching distance</b>	1 mm,	1.5 mm, 2 mm, 3 mm, 6 mm,	2 mm, 5 mm,	5 mm, 10 mm, 12 mm,
<b>Measuring range</b>	0.1 ... 1.5 mm	0.25 ... 1.25 mm		
<b>Electrical connection</b>	connector, M8 x 1 connector, M12 x 1 cable	connector, M8 x 1 cable	cable terminal chamber	connector, M12 x 1 cable terminal chamber
<b>Output</b>	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN 4-wire DC Analog output	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN 3-wire DC Analog output	2-wire DC NAMUR 3-wire DC PNP	2-wire DC NAMUR 2-wire AC/DC 3-wire DC PNP 3-wire DC NPN

# Designs and variants

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**K34**

**Design** smooth barrel 34 mm

**Switching distance** 20 mm,

**Internal ring diameter**

**Electrical connection** cable terminal chamber

**Output** 4-wire DC PNP

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**K40**

**Design** smooth barrel 40 mm

**Switching distance** 15 mm,   
20 mm,   
30 mm,

**Electrical connection** terminal chamber

**Output** 2-wire AC/DC  
3-wire DC PNP  
3-wire DC NPN  
4-wire DC PNP  
4-wire DC NPN

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**W30**

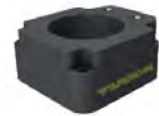
**Design** ring sensor W30

**Internal ring diameter** 30.1 mm  
6.1 mm  
10.1 mm  
15.1 mm  
20.1 mm

**Electrical connection** connector, M12 x 1

**Output** 3-wire DC PNP  
3-wire DC NPN

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**R-Q80**

**Design** ring sensor Q80

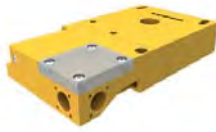
**Internal ring diameter** 50 mm  
65 mm

**Electrical connection** connector, M12 x 1

**Output** 3-wire DC PNP  
4-wire DC Analog output



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	<b>S32SR</b>	<b>S32 xL</b>	<b>K08</b>	<b>K09</b>
<b>Design</b>	ring sensor S32SR	ring sensor S32	slot sensor K08	slot sensor K09
<b>Slot width</b>			2 mm	5 mm
<b>Internal ring diameter</b>	20 mm 40 mm 65 mm	100 mm		
<b>Steel wire diameter (St37)</b>	0.4 mm 1 mm 2 mm	4 mm		
<b>Electrical connection</b>	terminal chamber	connector, M12 x 1	cable	cable
<b>Output</b>	4-wire DC PNP	4-wire DC PNP	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN	2-wire DC NAMUR

# Designs and variants

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



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	<b>K10</b>	<b>K30</b>	<b>DSC26</b>	<b>DSU35</b>
<b>Design</b>	slot sensor K10	slot sensor K30	dual sensor for valve monitoring DSC26	dual sensor for valve monitoring DSU35
<b>Switching distance</b>			4 mm, 	4 mm, 
<b>Slot width</b>	3.5 mm	15 mm		
<b>Electrical connection</b>	cable	cable	connector, M12 x 1 cable	connector, M12 x 1 cable terminal chamber
<b>Output</b>	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN	2-wire DC NAMUR 2-wire AC/DC 3-wire DC PNP 3-wire DC NPN	4-wire DC NAMUR 4-wire DC PNP	4-wire DC NAMUR 4-wire DC PNP 4-wire DC 2-wire 4-wire AC/DC

# s and variants

## Rectangular design

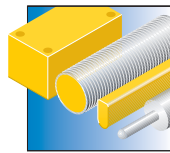


Rectangular inductive sensors fit to measure. The large switching distances provide excellent operational reliability. Only extremely resistant housing materials are used. They are quickly installed thanks to the optimally located mounting holes. All standard electrical output and connection types are available.

### Features

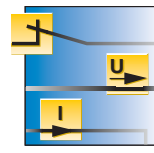
- Stable and resistant plastic housings
- Large switching distances
- Perfect mounting
- All connection types

### Properties



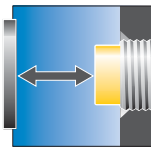
#### Design

From the small compact Q5SE to the big sized K90 Ø 90 mm version



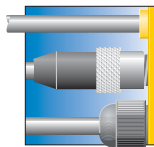
#### Electrical versions

NAMUR, 2/3 and 4-wire DC, 2-wire AC/DC



#### Switching distances

0.8 mm for exact position detection, 100 mm versions for long ranges



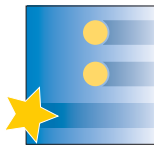
#### Electrical connections

All standard connection modes, cable, plug connection, terminal chamber and pigtail



#### Materials

Plastic and metal housings for all types of applications, rugged and chemical resistant



#### Special features

Factor 1  
Extended temperature range  
Approvals (et al. ATEX and SIL)

## Q5SE – 3-wire DC



<b>Type</b>	BI0,8-Q5SE-AP6X	<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	5 x 5 x 25 mm	<b>Material housing</b>	AL
<b>Switching distance</b>	0.8 mm	<b>Material cable</b>	PUR 2 m
<b>Output</b>	—, PNP	<b>Wiring diagram</b>	w004
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d082






Lateral active face

## Q5.5 – 3-wire DC



<b>General data</b>		<b>Material housing</b>	PP
<b>Dimensions</b>	8 x 5.5 x 28 mm	<b>Material cable</b>	PUR 2 m
<b>Electrical connection</b>	cable		
<b>Operating voltage</b>	10...30 VDC		


### Types and data – selection table

Type	Switching distance	Output		
BI2-Q5,5-AP6X	2 mm, 	—, PNP	w004	d083
BI2-Q5,5-AN6X	2 mm, 	—, NPN	w005	d083
NI3,5-Q5,5-AP6X	3.5 mm, 	—, PNP	w004	d083
NI3,5-Q5,5-AN6X	3.5 mm, 	—, NPN	w005	d083

## Q06 – 3-wire DC







**General data**

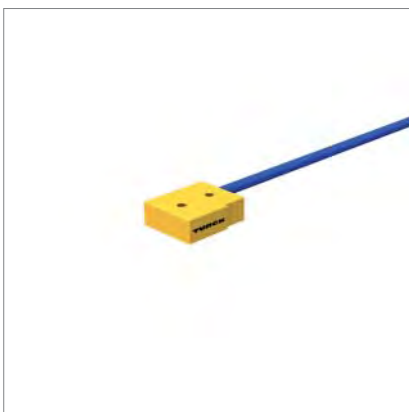
**Dimensions** 17.3 x 6 x 27.8 mm  
**Switching distance** 3 mm,   
**Electrical connection** cable

**Operating voltage** 10...30 VDC  
**Material housing** PBT  
**Material cable** PUR 2 m

**Types and data – selection table**

Type	Output		
BI3-Q06-AP6X2	 , PNP	w004	d084
BI3-Q06-AN6X2	 , NPN	w005	d084

## Q6.5 – NAMUR






**General data**

**Dimensions** 17 x 6.5 x 20 mm  
**Output** NAMUR  
**Electrical connection** cable

**Operating voltage** nom. 8.2 VDC  
**Material housing** PP GR-20  
**Material cable** PVC 2 m

**Types and data – selection table**

Type	Switching distance		
BI1-Q6,5-Y1	1 mm, 	w019	d085
NI2-Q6,5-Y1	2 mm, 	w019	d085

## Q6.5 – 3-wire DC



### General data

<b>Dimensions</b>	17 x 6.5 x 20 mm	<b>Operating voltage</b>	10...30 VDC
<b>Output</b>	—, PNP	<b>Material housing</b>	PP GR-20
<b>Electrical connection</b>	cable	<b>Material cable</b>	PUR 2 m

### Types and data – selection table

Type	Switching distance	w	d
B11-Q6,5-AP6/S34	1 mm,	w004	d085
NI2-Q6,5-AP6/S34	2 mm,	w004	d085

## Q8SE – 3-wire DC



### General data

<b>Dimensions</b>	8 x 8 x 40 mm	<b>Operating voltage</b>	10...30 VDC
<b>Switching distance</b>	4 mm,	<b>Material housing</b>	PP

Lateral active face

### Types and data – selection table

Type	Output	Electrical connection	Material cable	w	d
NI4U-Q8SE-AP6X-V1131	—, PNP	connector, M8 x 1	-	w001	d001
NI4U-Q8SE-AP6X	—, PNP	cable	PUR 2 m	w004	d003
NI4U-Q8SE-AN6X-V1131	—, NPN	connector, M8 x 1	-	w002	d001
NI4U-Q8SE-AN6X	—, NPN	cable	PUR 2 m	w005	d003


Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## Q08 – NAMUR



























<b>Type</b>	BI5-Q08-Y1X	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	20 x 8 x 32 mm	<b>Material housing</b>	GD-Zn
<b>Switching distance</b>	5 mm, 	<b>Material cable</b>	PVC 2 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d086

## Q08 – 3-wire DC



<b>General data</b>		<b>Material housing</b>	GD-Zn
<b>Dimensions</b>	20 x 8 x 32 mm		
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output	Electrical connection	Material cable		
BI8U-Q08-AP6X2-V1131	8 mm, 	 , PNP	connector, flange connector, Ø 8 mm	-	w001	d005
BI8U-Q08-AP6X2	8 mm, 	 , PNP	cable	PUR	w004	d004
BI8U-Q08-AN6X2-V1131	8 mm, 	 , NPN	connector, Ø 8 mm	-	w002	d005
BI8U-Q08-AN6X2	8 mm, 	 , NPN	cable	PUR	w005	d004
BI5U-Q08-AP6X2-V2131	5 mm, 	 , PNP	connector, M8 x 1	-	w001	d087
BI5U-Q08-AP6X2-V1131	5 mm, 	 , PNP	connector, Ø 8 mm	-	w001	d089
BI5U-Q08-AP6X2-1XOR-RS4	5 mm, 	 , PNP	cable with connector	PVC 1 m	w001	d088
BI5U-Q08-AP6X2-0,5XOR-RS4	5 mm, 	 , PNP	cable with connector	PVC 0.5 m	w001	d088
BI5U-Q08-AP6X2	5 mm, 	 , PNP	cable	PUR	w004	d086
BI5U-Q08-AN6X2-V1131	5 mm, 	 , NPN	connector, Ø 8 mm	-	w002	d089
BI5U-Q08-AN6X2	5 mm, 	 , NPN	cable	PUR	w005	d086



## Q08 – 4-wire DC



### General data

**Dimensions** 20 x 8 x 32 mm  
**Operating voltage** 10...30 VDC

**Material housing** GD-Zn

### Types and data – selection table

Type	Switching distance	Output	Electrical connection	Material cable	w	d
BI7-Q08-VP6X2-V1141	7 mm,	, PNP	connector, Ø 8 mm	-	w008	d089
BI7-Q08-VP6X2	7 mm,	, PNP	cable	PUR 2 m	w007	d086
BI7-Q08-VN6X2-V1141	7 mm,	, NPN	connector,, Ø 8 mm	-	w010	d089
BI7-Q08-VN6X2	7 mm,	, NPN	cable	PUR 2 m	w018	d086
BI5-Q08-VP6X2	5 mm,	, PNP	cable	PUR 2 m	w007	d086
BI5-Q08-VN6X2	5 mm,	, NPN	cable	PUR 2 m	w018	d086

## Q9.5 – 3-wire DC



**Type** NI2-Q9,5-AP6/S34  
**Dimensions** 17 x 9,5 x 20 mm  
**Switching distance** 2 mm,   
**Output** , PNP  
**Electrical connection** cable

**Operating voltage** 10...30 VDC  
**Material housing** PP GR-20  
**Material cable** PUR 2 m  
**Wiring diagram** w004  
**Dimension drawing** d090

## Q10 – 3-wire DC



### General data

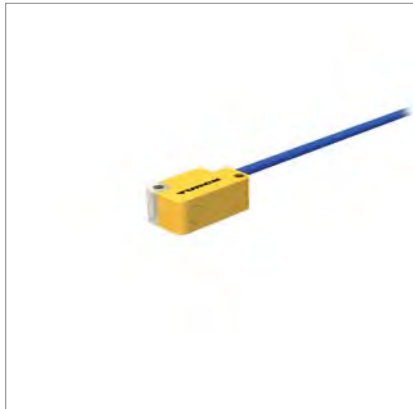
**Dimensions** 25 x 10.8 x 42 mm  
**Switching distance** 8 mm,

**Operating voltage** 10...30 VDC  
**Material housing** PBT

### Types and data – selection table

Type	Output	Electrical connection	Material cable		
BI8U-Q10-AP6X2-V1131	PNP	connector, M8 x 1	-	w001	d091
BI8U-Q10-AP6X2	PNP	cable	PUR 2 m	w004	d092
BI8U-Q10-AN6X2-V1131	NPN	connector, M8 x 1	-	w002	d091
BI8U-Q10-AN6X2	NPN	cable	PUR 2 m	w005	d092

## Q10S – NAMUR



**Type** BI2-Q10S-Y1X  
**Dimensions** 16 x 10.2 x 27.8 mm  
**Switching distance** 2 mm,

**Operating voltage** nom. 8.2 VDC  
**Material housing** PP  
**Material cable** PVC 2 m  
**Wiring diagram** w019  
**Dimension drawing** d007

Lateral active face

## Q10S – 3-wire DC



### General data

<b>Dimensions</b>	16 x 10.2 x 27.8 mm	<b>Material housing</b>	PP
<b>Operating voltage</b>	10...30 VDC		

Lateral active face

### Types and data – selection table

Type	Switching distance	Output	Electrical connection	Material cable	w	d
BI2-Q10S-AP6X-0,2-PSG3M	2 mm,	, PNP	connector, M8 x 1	PUR 0.2 m	w001	d006
BI2-Q10S-AP6X	2 mm,	, PNP	cable	PUR 2 m	w004	d007
BI2-Q10S-AN6X	2 mm,	, NPN	cable	PUR 2 m	w005	d007
NI5U-Q10S-AP6X-0,3-PSG3M	5 mm,	, PNP	cable with connector	PUR 0.3 m	w001	d006
NI5U-Q10S-AP6X	5 mm,	, PNP	cable	PUR 2 m	w004	d007
NI5U-Q10S-AN6X-0,3-PSG3M	5 mm,	, NPN	cable with connector	PUR 0.3 m	w002	d006
NI5U-Q10S-AN6X	5 mm,	, NPN	cable	PUR 2 m	w005	d007

## Q10S – 4-wire DC



### General data

<b>Dimensions</b>	16 x 10.2 x 27.8 mm	<b>Operating voltage</b>	10...30 VDC
<b>Switching distance</b>	2 mm,	<b>Material housing</b>	PP
<b>Electrical connection</b>	cable	<b>Material cable</b>	PUR 2 m

Lateral active face

### Types and data – selection table

Type	Output	w	d
BI2-Q10S-VP6X	, PNP	w007	d007
BI2-Q10S-VN6X	, NPN	w018	d007

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## Q10S – 2-wire AC/DC



<b>Type</b>	BI2-Q10S-AZ31X	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Dimensions</b>	16 x 10.2 x 27.8 mm	<b>Material housing</b>	PP
<b>Switching distance</b>	2 mm,	<b>Material cable</b>	PUR 2 m
<b>Output</b>		<b>Wiring diagram</b>	w020
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d007

Lateral active face

## Q12 – 3-wire DC

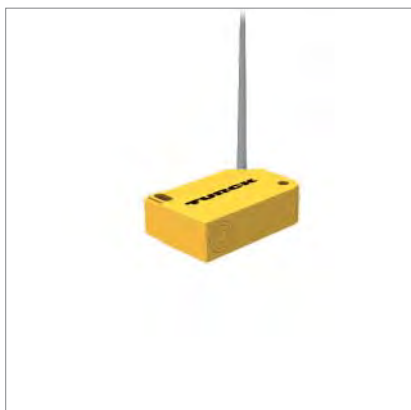


<b>General data</b>		<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	26 x 12 x 40 mm	<b>Material housing</b>	PA
<b>Switching distance</b>	5 mm,		

### Types and data – selection table

Type	Output	Electrical connection	Material cable		
BI5U-Q12-AP6X2-V1131	, PNP	connector, M8 x 1	-	w001	d008
BI5U-Q12-AP6X2-H1141	, PNP	connector, M12 x 1	-	w001	d009
BI5U-Q12-AP6X2	, PNP	cable	PUR 2 m	w004	d010
BI5U-Q12-AN6X2-V1131	, NPN	connector, M8 x 1	-	w002	d008
BI5U-Q12-AN6X2-H1141	, NPN	connector, M12 x 1	-	w002	d009
BI5U-Q12-AN6X2	, NPN	cable	PUR 2 m	w005	d010

## Q12 – 4-wire DC





### General data

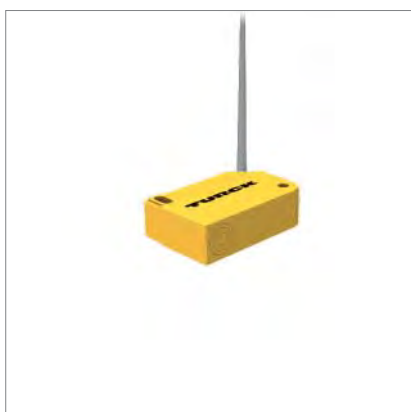
**Dimensions** 26 x 12 x 40 mm  
**Switching distance** 5 mm,   
**Electrical connection** cable

**Operating voltage** 10...30 VDC  
**Material housing** PA


### Types and data – selection table

Type	Output	Material cable	w	d
B15U-Q12-VP6X2 7M	 , PNP	PUR 7 m	w007	d010
B15U-Q12-VN6X2 7M	 , NPN	PUR 2 m	w018	d010

## Q12 – 2-wire AC/DC





### General data

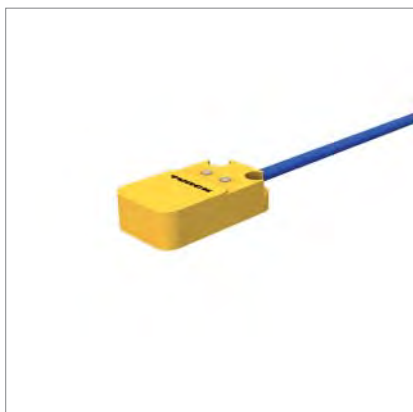
**Dimensions** 26 x 12 x 40 mm  
**Output**   
**Electrical connection** cable


**Operating voltage** 20...250 VAC /  
10...300 VDC  
**Material housing** PA  
**Material cable** PVC 2 m

### Types and data – selection table

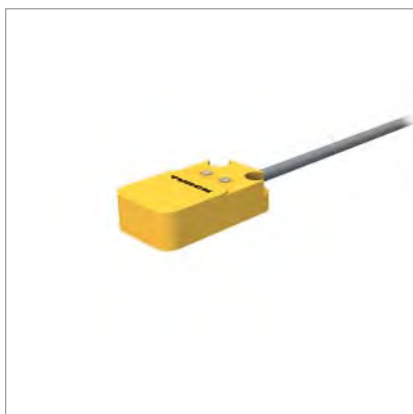
Type	Switching distance	w	d
B12-Q12-AZ31X	2 mm, 	w020	d093
N14-Q12-AZ31X	4 mm, 	w020	d093

## Q14 – NAMUR





















<b>Type</b>	BI10-Q14-Y1X	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	30 x 14 x 52 mm	<b>Material housing</b>	PBT
<b>Switching distance</b>	10 mm, 	<b>Material cable</b>	PVC 2 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d094

## Q14 – 3-wire DC

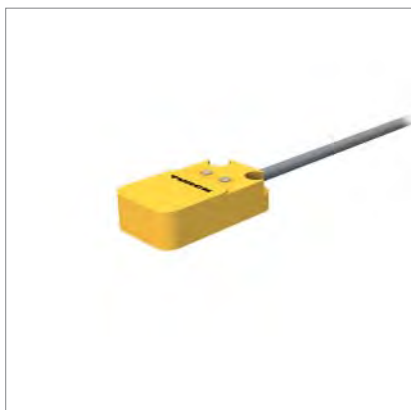


<b>General data</b>		<b>Material housing</b>	PBT
<b>Dimensions</b>	30 x 14 x 52 mm		
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Switching distance	Output	Electrical connection	Material cable		
BI10U-Q14-AP6X2-V1131	10 mm, 	 , PNP	connector, M8 x 1	-	w001	d095
BI10U-Q14-AP6X2	10 mm, 	 , PNP	cable	PUR 2 m	w004	d096
BI10U-Q14-AN6X2-V1131	10 mm, 	 , NPN	connector, M8 x 1	-	w002	d095
BI10U-Q14-AN6X2	10 mm, 	 , NPN	cable	PUR 2 m	w005	d096
NI20-Q14-AP6X2-V1131	20 mm, 	 , PNP	connector, M8 x 1	-	w001	d095
NI20-Q14-AP6X2	20 mm, 	 , PNP	cable	PUR 2 m	w004	d096
NI20-Q14-AN6X2-V1131	20 mm, 	 , NPN	connector, M8 x 1	-	w002	d095
NI20-Q14-AN6X2	20 mm, 	 , NPN	cable	PUR 2 m	w005	d096

## Q14 – 2-wire AC/DC



<b>Type</b>	BI10-Q14-ADZ32X2	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Dimensions</b>	30 x 14 x 52 mm	<b>Material housing</b>	PBT
<b>Switching distance</b>	10 mm,	<b>Material cable</b>	PUR 2 m
<b>Output</b>		<b>Wiring diagram</b>	w020
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d096

## Q18 – 3-wire DC



<b>General data</b>		<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	18 x 18 x 29 mm	<b>Material housing</b>	PBT
<b>Switching distance</b>	5 mm,	<b>Material cable</b>	PVC 2 m
<b>Electrical connection</b>	cable		

### Types and data – selection table

Type	Output		
NI5-Q18-AP6X	,PNP	w004	d097
NI5-Q18-AN6X	,NPN	w005	d097

## Q20 – NAMUR



### General data

<b>Dimensions</b>	40 x 20 x 68 mm
<b>Switching distance</b>	15 mm,
<b>Output</b>	NAMUR

<b>Operating voltage</b>	nom. 8.2 VDC
<b>Material housing</b>	PBT

### Types and data – selection table

Type	Electrical connection	Material cable	w	d
BI15-Q20-Y1X-H1141	connector, M12 x 1	-	w021	d098
BI15-Q20-Y1X	cable	PVC 2 m	w019	d099

## Q20 – 3-wire DC



### General data

<b>Dimensions</b>	40 x 20 x 68 mm
<b>Operating voltage</b>	10...30 VDC

<b>Material housing</b>	PBT
-------------------------	-----

### Types and data – selection table

Type	Switching distance	Output	Electrical connection	Material cable	w	d
BI15U-Q20-AP6X2-H1141	15 mm,	PNP	connector, M12 x 1	-	w001	d098
BI15U-Q20-AP6X2	15 mm,	PNP	cable	PUR 2 m	w004	d100
BI15U-Q20-AN6X2-H1141	15 mm,	NPN	connector, M12 x 1	-	w002	d098
BI15U-Q20-AN6X2	15 mm,	NPN	cable	PUR 2 m	w005	d100
NI25-Q20-AP6X2-H1141	25 mm,	PNP	connector, M12 x 1	-	w001	d098
NI25-Q20-AP6X2	25 mm,	PNP	cable	PUR 2 m	w004	d100
NI25-Q20-AN6X2-H1141	25 mm,	NPN	connector, M12 x 1	-	w002	d098
NI25-Q20-AN6X2	25 mm,	NPN	cable	PUR 2 m	w005	d100



## Q25 – 3-wire DC



### General data

<b>Dimensions</b>	25 x 25.5 x 38.5 mm	<b>Operating voltage</b>	10...30 VDC
<b>Switching distance</b>	10 mm,	<b>Material housing</b>	PBT
<b>Electrical connection</b>	cable	<b>Material cable</b>	PVC 2 m

### Types and data – selection table

Type	Output	w	d
NI10-Q25-AP6X	, PNP	w004	d101
NI10-Q25-AN6X	, NPN	w005	d101

## CA25 – 3-wire DC



### General data

<b>Dimensions</b>	25 x 25 x 40 mm	<b>Operating voltage</b>	10...30 VDC
<b>Output</b>	, PNP	<b>Material housing</b>	GD-CuZn

Variable orientation of active face in 5 directions

### Types and data – selection table

Type	Switching distance	Electrical connection	w	d
BI10U-CA25-AP6X2-V1131	10 mm,	connector, M8 x 1	w001	d102
BI10U-CA25-AP6X2-H1141	10 mm,	connector, M12 x 1	w001	d103
NI15U-CA25-AP6X2-V1131	15 mm,	connector, M8 x 1	w001	d102
NI15U-CA25-AP6X2-H1141	15 mm,	connector, M12 x 1	w001	d103

## QN26 – 3-wire DC





**General data**

**Dimensions** 26 x 26 x 43 mm  
**Switching distance** 10 mm,   
**Output** , 2-wire

**Operating voltage** 10...65 VDC  
**Material housing** PBT



Variable orientation of active face in 4 directions

### Types and data – selection table

Type	Electrical connection	Material cable		
BI10-QN26-AD4X/S90	cable	PUR 2 m	w022	d105
BI10-QN26-AD4X-0,15XOR-RS4.23/S100-S1589	cable with connector, M12 x 1	PUR 0.15 m	w009	d106
BI10-QN26-AD4X-0,15-RS4.23/S90	cable with connector, M12 x 1	PUR 0.15 m	w009	d104

## Q40 – 3-wire DC



**Type** NI22U-Q40-AP6X2-H1141  
**Dimensions** 40 x 52.5 x 67 mm  
**Switching distance** 22 mm,   
**Output** , PNP  
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...30 VDC  
**Material housing** PBT  
**Wiring diagram** w001  
**Dimension drawing** d107

Special versions, height-adjustable, for pressing tools

## CA40 – 3-wire DC



<b>General data</b>		<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	40 x 40 x 48 mm	<b>Material housing</b>	GD-AI
<b>Switching distance</b>	20 mm,		
<b>Electrical connection</b>	connector, M12 x 1		

Variable orientation of active face in 5 directions

### Types and data – selection table

Type	Output		
BI20U-CA40-AP6X2-H1141	, PNP	w001	d108
BI20U-CA40-AN6X2-H1141	, NPN	w002	d108

## CK40 – NAMUR



<b>General data</b>		<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	40 x 40 x 65 mm	<b>Material housing</b>	PBT
<b>Output</b>	NAMUR		
<b>Electrical connection</b>	connector, M12 x 1		

Variable orientation of active face in 5 directions

### Types and data – selection table

Type	Switching distance		
BI15-CK40-Y1X-H1141	15 mm,	w021	d109
NI20-CK40-Y1X-H1141	20 mm,	w021	d109

## CK40 – 2-wire DC



**General data**

**Dimensions** 40 x 40 x 65 mm  
**Output** —, 2-wire  
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...65 VDC  
**Material housing** PBT

Variable orientation of active face in 5 directions

### Types and data – selection table

Type	Switching distance	w	d
BI15U-CK40-AD4X-H1144	15 mm, 	w009	d011
BI15-CK40-AD4X-H1141	15 mm, 	w023	d109
NI35U-CK40-AD4X-H1144	35 mm, 	w009	d012
NI20-CK40-AD4X-H1141	20 mm, 	w023	d109

## CK40 – 3-wire DC





















**General data**

**Dimensions** 40 x 40 x 65 mm  
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...30 VDC  
**Material housing** PBT

Variable orientation of active face in 5 directions

Types and data – selection table

Type	Switching distance	Output	w	d
BI30U-CK40-AP6X2-H1141	30 mm, 	—, PNP	w001	d012
BI30U-CK40-AN6X2-H1141	30 mm, 	—, NPN	w002	d012
BI20U-CK40-AP6X2-H1141	20 mm, 	—, PNP	w001	d011
BI20U-CK40-AN6X2-H1141	20 mm, 	—, NPN	w002	d011
BI15U-CK40-AP6X2-H1141	15 mm, 	—, PNP	w001	d011
BI15U-CK40-AN6X2-H1141	15 mm, 	—, NPN	w002	d011
BI15-CK40-AP6X2-H1141	15 mm, 	—, PNP	w001	d011
BI15-CK40-AN6X2-H1141	15 mm, 	—, NPN	w002	d011
NI50U-CK40-AP6X2-H1141	50 mm, 	—, PNP	w001	d012
NI50U-CK40-AN6X2-H1141	50 mm, 	—, NPN	w002	d012
NI40U-CK40-AP6X2-H1141	40 mm, 	—, PNP	w001	d012
NI35U-CK40-AP6X2-H1141	35 mm, 	—, PNP	w001	d012
NI35U-CK40-AN6X2-H1141	35 mm, 	—, NPN	w002	d012
NI35-CK40-AP6X2-H1141	35 mm, 	—, PNP	w001	d011
NI25U-CK40-AP6X2-H1141	25 mm, 	—, PNP	w001	d012
NI25U-CK40-AN6X2-H1141	25 mm, 	—, NPN	w002	d012
NI20-CK40-AP6X2-H1141	20 mm, 	—, PNP	w001	d011
NI20-CK40-AN6X2-H1141	20 mm, 	—, NPN	w002	d011

CK40 – 4-wire DC



General data

Dimensions

40 x 40 x 65 mm

Operating voltage

10...65 VDC

Electrical connection















connector, M12 x 1

Material housing

PBT

Variable orientation of active face in 5 directions

**Types and data – selection table**

Type	Switching distance	Output	w	d
BI20U-CK40-VP4X2-H1141	20 mm, 	 , PNP	w008	d011
BI20U-CK40-VN4X2-H1141	20 mm, 	 , NPN	w010	d011
BI15U-CK40-VP4X2-H1141	15 mm, 	 , PNP	w008	d011
BI15U-CK40-VN4X2-H1141	15 mm, 	 , NPN	w010	d011
NI50U-CK40-VP4X2-H1141	50 mm, 	 , PNP	w008	d012
NI50U-CK40-VN4X2-H1141	50 mm, 	 , NPN	w010	d012
NI25U-CK40-VP4X2-H1141	25 mm, 	 , PNP	w008	d012

**CK40 – 2-wire AC/DC**



**General data**

**Dimensions**

40 x 40 x 65 mm

**Operating voltage**

20...250 VAC /  
10...300 VDC

**Output**






**Material housing**

PBT

Variable orientation of active face in 5 directions

**Types and data – selection table**

Type	Switching distance	Electrical connection	w	d
BI15U-CK40-ADZ30X2-B3131	15 mm, 	connector, 1/2"	w025	d113
BI15U-CK40-ADZ30X2-B1131	15 mm, 	connector, 7/8"	w024	d111
NI35U-CK40-ADZ30X2-B3131	35 mm, 	connector, 1/2"	w025	d112
NI35U-CK40-ADZ30X2-B1131	35 mm, 	connector, 7/8"	w024	d110

**CP40 – NAMUR**



**General data**

**Dimensions**

40 x 40 x 114 mm

**Operating voltage**

nom. 8.2 VDC

**Output**

NAMUR

**Material housing**




PBT

**Electrical connection**

terminal chamber

Variable orientation of active face in 9 directions


Types and data – selection table

Type	Switching distance	w	d
BI20-CP40-Y1X	20 mm, 	w026	d114
BI15-CP40-Y1X	15 mm, 	w026	d114
NI20-CP40-Y1X	20 mm, 	w026	d114

CP40 – 2-wire DC




General data

**Dimensions** 40 x 40 x 114 mm  
**Output** , 2-wire  
**Electrical connection** terminal chamber

**Operating voltage** 10...65 VDC  
**Material housing** PBT

Variable orientation of active face in 9 directions

Types and data – selection table

Type	Switching distance	w	d
BI15-CP40-AD4X	15 mm, 	w027	d114
NI20-CP40-AD4X	20 mm, 	w027	d114

CP40 – 3-wire DC




General data


**Dimensions** 40 x 40 x 114 mm  
**Operating voltage** 10...30 VDC

**Material housing** PBT
















Variable orientation of active face in 9 directions

 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 736 ff

**Types and data – selection table**

Type	Switching distance	Output	Electrical connection	w	d
BI30U-CP40-AP6X2	30 mm, 	—, PNP	terminal chamber	w011	d014
BI30U-CP40-AN6X2	30 mm, 	—, NPN	terminal chamber	w012	d014
BI20U-CP40-AP6X2	20 mm, 	—, PNP	terminal chamber	w011	d014
BI20U-CP40-AN6X2	20 mm, 	—, NPN	terminal chamber	w012	d014
BI15U-CP40-AP6X2	15 mm, 	—, PNP	terminal chamber	w011	d014
BI15U-CP40-AN6X2	15 mm, 	—, NPN	terminal chamber	w012	d014
BI15-CP40-AP6X2	15 mm, 	—, PNP	terminal chamber	w011	d014
BI15-CP40-AN6X2	15 mm, 	—, NPN	terminal chamber	w012	d014
NI50U-CP40-AP6X2-H1141	50 mm, 	—, PNP	connector, M12 x 1	w001	d115
NI50U-CP40-AP6X2	50 mm, 	—, PNP	terminal chamber	w011	d014
NI50U-CP40-AN6X2	50 mm, 	—, NPN	terminal chamber	w012	d014
NI40U-CP40-AP6X2	40 mm, 	—, PNP	terminal chamber	w011	d014
NI40U-CP40-AN6X2	40 mm, 	—, NPN	terminal chamber	w012	d014
NI20-CP40-AP6X2	20 mm, 	—, PNP	terminal chamber	w011	d014
NI20-CP40-AN6X2	20 mm, 	—, NPN	terminal chamber	w012	d014

**CP40 – 4-wire DC**



**General data**

**Dimensions**

40 x 40 x 114 mm

**Material housing**

PBT

**Operating voltage**

10...65 VDC

Variable orientation of active face in 9 directions



Types and data – selection table

Type	Switching distance	Output	Electrical connection	w	d
BI20U-CP40-VP4X2	20 mm,	, PNP	terminal chamber	w014	d014
BI20U-CP40-VN4X2	20 mm,	, NPN	terminal chamber	w013	d014
BI15U-CP40-VP4X2-H1141	15 mm,	, PNP	connector, M12 x 1	w008	d115
BI15U-CP40-VP4X2	15 mm,	, PNP	terminal chamber	w014	d014
BI15-CP40-VP4X2	15 mm,	, PNP	terminal chamber	w014	d014
BI15-CP40-VN4X2	15 mm,	, NPN	terminal chamber	w013	d014
NI50U-CP40-VP4X2	50 mm,	, PNP	terminal chamber	w014	d014
NI50U-CP40-VN4X2	50 mm,	, NPN	terminal chamber	w013	d014
NI40U-CP40-VP4X2-H1141	40 mm,	, PNP	connector, M12 x 1	w008	d115
NI40U-CP40-VP4X2	40 mm,	, PNP	terminal chamber	w014	d014
NI40U-CP40-VN4X2	40 mm,	, NPN	terminal chamber	w013	d014
NI35-CP40-VP4X2	35 mm,	, PNP	terminal chamber	w014	d014
NI35-CP40-VN4X2	35 mm,	, NPN	terminal chamber	w013	d014
NI20-CP40-VP4X2	20 mm,	, PNP	terminal chamber	w014	d014
NI20-CP40-VN4X2	20 mm,	, NPN	terminal chamber	w013	d014

CP40 – 2-wire AC/DC



General data

Dimensions

40 x 40 x 114 mm

Electrical connection

terminal chamber

Output

connection programmable

Material housing

PBT

Variable orientation of active face in 9 directions

Types and data – selection table

Type	Switching distance	Operating voltage	w	d
BI15U-CP40-FDZ30X2	15 mm,	20...250 VAC / 10...300 VDC	w028	d014
BI15-CP40-FZ3X2	15 mm,	20...250 VAC / 10...300 VDC	w028	d014
NI40U-CP40-FDZ30X2	40 mm,	20...250 VAC / 10...300 VDC	w028	d014
NI35-CP40-FZ3X2	35 mm,	20...250 VAC / 10...300 VDC	w028	d014
NI20NF-CP40-FZ3X2	20 mm,	20...250 VAC	w029	d116
NI20-CP40-FZ3X2	20 mm,	20...250 VAC / 10...300 VDC	w028	d014

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 736 ff

## QV40 – 3-wire DC



**General data**

**Dimensions** 40 x 40 x 65 mm  
**Output** —, PNP  
**Electrical connection** connector, M12 x 1

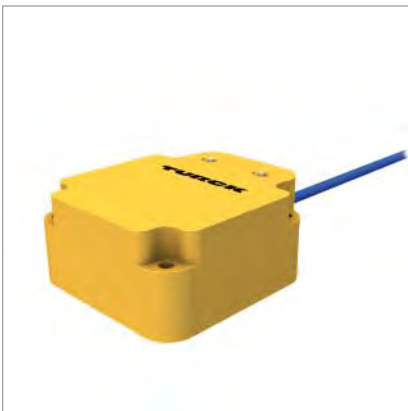
**Operating voltage** 10...30 VDC  
**Material housing** PBT

Variable orientation of active face in 5 directions

**Types and data – selection table**

Type	Switching distance	w	d
BI20U-QV40-AP6X2-H1141	20 mm,	w001	d013
NI50U-QV40-AP6X2-H1141	50 mm,	w001	d013

## Q80 – NAMUR



**General data**

**Dimensions** 80 x 40 x 92 mm  
**Output** NAMUR  
**Electrical connection** cable

**Operating voltage** nom. 8.2 VDC  
**Material housing** PBT  
**Material cable** PVC 2 m

**Types and data – selection table**

Type	Switching distance	w	d
BI50-Q80-Y1X	50 mm,	w019	d117
NI60-Q80-Y1X	60 mm,	w019	d117

## Q80 – 3-wire DC



### General data

<b>Dimensions</b>	80 x 40 x 92 mm	<b>Operating voltage</b>	10...30 VDC
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	PBT

### Types and data – selection table

Type	Switching distance	Output	w	d
BI50U-Q80-AP6X2-H1141	50 mm,	, PNP	w001	d015
BI50U-Q80-AN6X2-H1141	50 mm,	, NPN	w002	d015
NI75U-Q80-AP6X2-H1141	75 mm,	, PNP	w001	d015

## Q80 – 4-wire DC



### General data

<b>Dimensions</b>	80 x 40 x 92 mm	<b>Operating voltage</b>	10...65 VDC
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	PBT

### Types and data – selection table

Type	Switching distance	Output	w	d
BI50U-Q80-VP4X2-H1141/3GD	50 mm,	, PNP	w008	d015
BI50U-Q80-VP4X2-H1141	50 mm,	, PNP	w008	d015
BI50U-Q80-VN4X2-H1141	50 mm,	, NPN	w010	d015
NI75U-Q80-VP4X2-H1141	75 mm,	, PNP	w008	d015


Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## CP80 – NAMUR

























<b>Type</b>	NI40-CP80-Y1	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	80 x 41 x 80 mm	<b>Material housing</b>	PBT
<b>Switching distance</b>	40 mm, 	<b>Wiring diagram</b>	w026
<b>Output</b>	NAMUR	<b>Dimension drawing</b>	d118
<b>Electrical connection</b>	terminal chamber		

## CP80 – 4-wire DC



<b>General data</b>		<b>Material housing</b>	PBT
<b>Dimensions</b>	80 x 41 x 80 mm		
<b>Operating voltage</b>	10...65 VDC		

### Types and data – selection table

Type	Switching distance	Output	Electrical connection		
BI40-CP80-VP4X2-H1141	40 mm, 	 , PNP	connector, M12 x 1	w008	d119
BI40-CP80-VP4X2	40 mm, 	 , PNP	terminal chamber	w014	d120
BI40-CP80-VN4X2	40 mm, 	 , NPN	terminal chamber	w013	d120
NI75U-CP80-VP4X2-H1141	75 mm, 	 , PNP	connector, M12 x 1	w008	d119
NI75U-CP80-VP4X2	75 mm, 	 , PNP	terminal chamber	w014	d120
NI75U-CP80-VN4X2	75 mm, 	 , NPN	terminal chamber	w013	d120
NI50-CP80-VP4X2	50 mm, 	 , PNP	terminal chamber	w014	d120
NI50-CP80-VN4X2	50 mm, 	 , NPN	terminal chamber	w013	d120
NI40-CP80-VP4X2	40 mm, 	 , PNP	terminal chamber	w014	d120
NI40-CP80-VN4X2	40 mm, 	 , NPN	terminal chamber	w013	d120

## CP80 – 2-wire AC/DC



### General data

<b>Dimensions</b>	80 x 41 x 80 mm	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Output</b>	connection programmable	<b>Material housing</b>	PBT
<b>Electrical connection</b>	terminal chamber		

### Types and data – selection table

Type	Switching distance	w	d
BI40-CP80-FZ3X2	40 mm,	w028	d120
NI75U-CP80-FDZ30X2	75 mm,	w028	d120
NI50-CP80-FZ3X2	50 mm,	w028	d120
NI40-CP80-FZ3X2	40 mm,	w028	d120

## K90 – NAMUR



<b>Type</b>	NI50-K90SR-Y1	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	75 x 60 x 130 mm	<b>Material housing</b>	PBT
<b>Switching distance</b>	50 mm,	<b>Wiring diagram</b>	w026
<b>Output</b>	NAMUR	<b>Dimension drawing</b>	d121
<b>Electrical connection</b>	terminal chamber		

## K90 – 4-wire DC



**General data**

**Dimensions** 75 x 60 x 130 mm  
**Operating voltage** 10...65 VDC

**Material housing** PBT

### Types and data – selection table

Type	Switching distance	Output	Electrical connection	w	d
NI100U-K90SR-VP4X2-H1141	100 mm,	, PNP	connector, M12 x 1	w008	d017
NI100U-K90SR-VP4X2	100 mm,	, PNP	terminal chamber	w014	d016
NI100U-K90SR-VN4X2-H1141	100 mm,	, NPN	connector, M12 x 1	w010	d017
NI100U-K90SR-VN4X2	100 mm,	, NPN	terminal chamber	w013	d016
NI60-K90SR-VP4X2	60 mm,	, PNP	terminal chamber	w014	d016
NI60-K90SR-VN4X2	60 mm,	, NPN	terminal chamber	w013	d016

## K90 – 2-wire AC/DC




**Type** NI60-K90SR-FZ3X2  
**Dimensions** 75 x 60 x 130 mm  
**Switching distance** 60 mm,   
**Output** connection program-mable  
**Electrical connection** terminal chamber

**Operating voltage** 20...250 VAC / 10...300 VDC  
**Material housing** PBT  
**Wiring diagram** w028  
**Dimension drawing** d016



## Q130 – 4-wire DC



### General data

<b>Dimensions</b>	57 x 48 x 130 mm	<b>Operating voltage</b>	10...65 VDC
<b>Switching distance</b>	30 mm, 	<b>Material housing</b>	PBT
<b>Electrical connection</b>	cable	<b>Material cable</b>	PVC 2 m



### Types and data – selection table

Type	Output	w	d
NI30-Q130-VP4X2	 , PNP	w007	d122
NI30-Q130-VN4X2	 , NPN	w018	d122

## Q130 – 2-wire AC/DC



### General data

<b>Dimensions</b>	57 x 48 x 130 mm	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Switching distance</b>	30 mm, 	<b>Material housing</b>	PBT
<b>Output</b>			

### Types and data – selection table

Type	Electrical connection	Material cable	w	d
NI30-Q130-ADZ30X2-B1131	connector, 7/8"	-	w030	d123
NI30-Q130-ADZ30X2	cable	PVC 2 m	w031	d122

## Threaded barrel

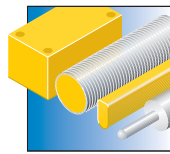


We offer threaded barrels for all types of applications, ranging from the 5 mm version up to the big size PG36. In order to comply with the ambient conditions of individual applications, most sensors are available in different housing materials. The range of accessories is broad and enhances the functionality of the sensors if needed.

### Features

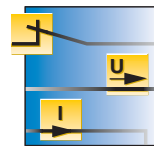
- Rugged 4-hole LED
- Different thread lengths
- Rugged housing materials
- Connection cable with approved jacket quality
- Many different electrical output functions

### Properties



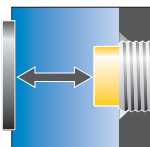
#### Design

All standard thread sizes M5 x 0.5, M8 x 1, M12 x 1, M18 x 1, M30 x 1.5 and PG36 (G47)



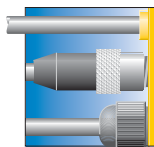
#### Electrical versions

NAMUR, 2/3 and 4-wire DC, 2-wire AC/DC



#### Switching distances

non-flush 1...25 mm  
and flush  
3 mm...25 mm



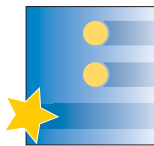
#### Electrical connections

Cable, plug connection, terminal chamber and pigtail



#### Materials

Chrome-plated brass (optionally teflon-coated), stainless steel or rugged plastic housings




#### Special features

Factor 1, all metals extended temperature range, approvals (et al. ATEX and SIL)



## M5 – NAMUR











<b>Type</b>	BI1-EG05-Y1	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	Ø5 x 30 mm	<b>Material housing</b>	V4A (1.4404)
<b>Switching distance</b>	1 mm, 	<b>Material cable</b>	PVC 2 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d124

## M5 – 3-wire DC



<b>General data</b>		<b>Material housing</b>	V4A (1.4404)
<b>Switching distance</b>	1 mm, 		
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable		
BI1-EG05-RP6X-V1331	Ø5 x 42.5 mm	 , PNP	connector, M8 x 1	-	w003	d125
BI1-EG05-RP6X	Ø5 x 30 mm	 , PNP	cable	PUR 2 m	w006	d126
BI1-EG05-AP6X-V1331	Ø5 x 42.5 mm	 , PNP	connector, M8 x 1	-	w001	d125
BI1-EG05-AN6X-V1331	Ø5 x 42.5 mm	 , NPN	connector, M8 x 1	-	w002	d125
BI1-EG05-AP6X	Ø5 x 30 mm	 , PNP	cable	PUR 2 m	w004	d126
BI1-EG05-AN6X	Ø5 x 30 mm	 , NPN	cable	PUR 2 m	w005	d126

## M8 – NAMUR



**General data**

**Output** NAMUR  
**Operating voltage** nom. 8.2 VDC

**Material housing** V2A (1.4301)

### Types and data – selection table

Type	Dimensions	Switching distance	Electrical connection	Material cable	w	d
BI1,5-GS880-Y1	Ø8 x 47 mm	1.5 mm,	cable	PVC 2 m	w019	d132
BI1,5-EG08K-Y1-H1341	Ø8 x 39 mm	1.5 mm,	connector, M12 x 1	-	w021	d127
BI1,5-EG08K-Y1	Ø8 x 23.6 mm	1.5 mm,	cable	PVC 2 m	w019	d130
BI1,5-EG08-Y1-H1341	Ø8 x 57 mm	1.5 mm,	connector, M12 x 1	-	w021	d128
NI3-EG08K-Y1-H1341	Ø8 x 39 mm	3 mm,	connector, M12 x 1	-	w021	d129
NI3-EG08K-Y1	Ø8 x 23.6 mm	3 mm,	cable	PVC 2 m	w019	d131

## M8 – 2-wire DC



**General data**

**Output** , 2-wire  
**Operating voltage** 10...55 VDC

**Material housing** V2A (1.4301)

### Types and data – selection table

Type	Dimensions	Switching distance	Electrical connection	Material cable	w	d
BI2-EG08-AG41X-H1341	Ø8 x 57 mm	2 mm,	connector, M12 x 1	-	w032	d024
BI2-EG08-AG41X	Ø8 x 41.6 mm	2 mm,	cable	PUR 2 m	w033	d026
NI4-EG08-AG41X	Ø8 x 41.6 mm	4 mm,	cable	PUR 2 m	w033	d133

## M8 – 3-wire DC – Cable connection



### General data

<b>Electrical connection</b>	cable	<b>Material housing</b>	V2A (1.4301)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PUR 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	Output	w	d
BI2U-EG08-AP6X	Ø8 x 41.6 mm	2 mm,	—/—, PNP	w004	d026
BI2U-EG08-AN6X	Ø8 x 41.6 mm	2 mm,	—/—, NPN	w005	d026
BI2-EG08K-AP6X	Ø8 x 23.6 mm	2 mm,	—/—, PNP	w004	d141
BI2-EG08K-AN6X	Ø8 x 23.6 mm	2 mm,	—/—, NPN	w005	d141
BI2-EG08-AP6X	Ø8 x 41.6 mm	2 mm,	—/—, PNP	w004	d026
BI2-EG08-AN6X	Ø8 x 41.6 mm	2 mm,	—/—, NPN	w005	d026
BI1,5U-EG08-AP6X	Ø8 x 41.6 mm	1.5 mm,	—/—, PNP	w004	d026
BI1,5U-EG08-AN6X	Ø8 x 41.6 mm	1.5 mm,	—/—, NPN	w005	d026
BI1,5-EG08K-AP6X	Ø8 x 23.6 mm	1.5 mm,	—/—, PNP	w004	d141
BI1,5-EG08K-AN6X	Ø8 x 23.6 mm	1.5 mm,	—/—, NPN	w005	d141
BI1,5-EG08-AP6X	Ø8 x 41.6 mm	1.5 mm,	—/—, PNP	w004	d026
BI1,5-EG08-AN6X	Ø8 x 41.6 mm	1.5 mm,	—/—, NPN	w005	d026
NI6U-EG08-AP6X	Ø8 x 41.6 mm	6 mm,	—/—, PNP	w004	d027
NI6U-EG08-AN6X	Ø8 x 41.6 mm	6 mm,	—/—, NPN	w005	d027
NI4U-EG08-AP6X	Ø8 x 41.6 mm	4 mm,	—/—, PNP	w004	d027
NI4U-EG08-AN6X	Ø8 x 41.6 mm	4 mm,	—/—, NPN	w005	d027
NI3-EG08K-AP6X	Ø8 x 23.6 mm	3 mm,	—/—, PNP	w004	d142
NI3-EG08K-AN6X	Ø8 x 23.6 mm	3 mm,	—/—, NPN	w005	d142
NI3-EG08-AP6X	Ø8 x 41.6 mm	3 mm,	—/—, PNP	w004	d133
NI3-EG08-AN6X	Ø8 x 41.6 mm	3 mm,	—/—, NPN	w005	d133



Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## M8 – 4-wire DC – M12 x 1 plug connection









































<b>Type</b>	BI2-EG08-VP6X-H1341	<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	Ø8 x 57 mm	<b>Material housing</b>	V2A (1.4301)
<b>Switching distance</b>	2 mm, 	<b>Wiring diagram</b>	w008
<b>Output</b>	 , PNP	<b>Dimension drawing</b>	d024
<b>Electrical connection</b>	connector, M12 x 1		



















## M8 – 3-wire DC – M12 x 1 plug connection



<b>General data</b>			
<b>Electrical connection</b>	connector, M12 x 1	<b>Operating voltage</b>	10...30 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing		
BI2U-EGT08-AP6X-H1341	Ø8 x 57 mm	2 mm, 	 , PNP	V2A (1.4301) -T	w001	d024
BI2U-EG08-RP6X-H1341	Ø8 x 57 mm	2 mm, 	 , PNP	V2A (1.4301)	w015	d024
BI2U-EG08-AP6X-H1341	Ø8 x 57 mm	2 mm, 	 , PNP	V2A (1.4301)	w001	d024
BI2U-EG08-AN6X-H1341	Ø8 x 57 mm	2 mm, 	 , NPN	V2A (1.4301)	w002	d024
BI2-EG08K-AP6X-H1341	Ø8 x 39 mm	2 mm, 	 , PNP	V2A (1.4301)	w001	d137
BI2-EG08K-AN6X-H1341	Ø8 x 39 mm	2 mm, 	 , NPN	V2A (1.4301)	w002	d137
BI2-EG08-AP6X-H1341	Ø8 x 57 mm	2 mm, 	 , PNP	V2A (1.4301)	w001	d024
BI2-EG08-AN6X-H1341	Ø8 x 57 mm	2 mm, 	 , NPN	V2A (1.4301)	w002	d024
BI1,5U-EGT08-AP6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , PNP	V2A (1.4301) -T	w001	d138
BI1,5U-EGT08-AN6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , NPN	V2A (1.4301) -T	w002	d138
BI1,5U-EG08-AP6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , PNP	V2A (1.4301)	w001	d024
BI1,5U-EG08-AN6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , NPN	V2A (1.4301)	w002	d024
BI1,5-EG08WD-AP6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , PNP	V2A (1.4301)	w001	d024
BI1,5-EG08WD-AN6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , NPN	V2A (1.4301)	w002	d024
BI1,5-EG08K-AP6X-H1341	Ø8 x 39 mm	1.5 mm, 	 , PNP	V2A (1.4301)	w001	d137
BI1,5-EG08K-AN6X-H1341	Ø8 x 39 mm	1.5 mm, 	 , NPN	V2A (1.4301)	w002	d137
BI1,5-EG08-AP6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , PNP	V2A (1.4301)	w001	d024
BI1,5-EG08-AN6X-H1341	Ø8 x 57 mm	1.5 mm, 	 , NPN	V2A (1.4301)	w002	d024

Type	Dimensions	Switching distance	Output	Material housing	w	d
NI6U-EG08-RP6X-H1341	Ø8 x 57 mm	6 mm, 	 , PNP	V2A (1.4301)	w015	d025
NI6U-EG08-AP6X-H1341	Ø8 x 57 mm	6 mm, 	 , PNP	V2A (1.4301)	w001	d025
NI6U-EG08-AN6X-H1341	Ø8 x 57 mm	6 mm, 	 , NPN	V2A (1.4301)	w002	d025
NI4U-EG08-AP6X-H1341	Ø8 x 57 mm	4 mm, 	 , PNP	V2A (1.4301)	w001	d025
NI4U-EG08-AN6X-H1341	Ø8 x 57 mm	4 mm, 	 , NPN	V2A (1.4301)	w002	d025
NI3-EG08K-AP6X-H1341	Ø8 x 39 mm	3 mm, 	 , PNP	V2A (1.4301)	w001	d139
NI3-EG08K-AN6X-H1341	Ø8 x 39 mm	3 mm, 	 , NPN	V2A (1.4301)	w002	d139
NI3-EG08-AP6X-H1341	Ø8 x 57 mm	3 mm, 	 , PNP	V2A (1.4301)	w001	d140
NI3-EG08-AN6X-H1341	Ø8 x 57 mm	3 mm, 	 , NPN	V2A (1.4301)	w002	d140

## M8 – 3-wire DC – M8 x 1 plug connection









































### General data

**Electrical connection** connector, M8 x 1

**Operating voltage** 10...30VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI2U-EGT08-AP6X-V1131	Ø8 x 49 mm	2 mm, 	 , PNP	V2A (1.4301) -T	w001	d022
BI2U-EG08-RP6X-V1131	Ø8 x 49 mm	2 mm, 	 , PNP	V2A (1.4301)	w003	d022
BI2U-EG08-AP6X-V1131	Ø8 x 49 mm	2 mm, 	 , PNP	V2A (1.4301)	w001	d022
BI2U-EG08-AN6X-V1131	Ø8 x 49 mm	2 mm, 	 , NPN	V2A (1.4301)	w002	d022
BI2-EG08K-AP6X-V1131	Ø8 x 31 mm	2 mm, 	 , PNP	V2A (1.4301)	w001	d134
BI2-EG08K-AN6X-V1131	Ø8 x 31 mm	2 mm, 	 , NPN	V2A (1.4301)	w002	d134
BI2-EG08-AP6X-V1131	Ø8 x 49 mm	2 mm, 	 , PNP	V2A (1.4301)	w001	d022
BI2-EG08-AN6X-V1131	Ø8 x 49 mm	2 mm, 	 , NPN	V2A (1.4301)	w002	d022
BI1,5U-EGT08-AP6X-V1131	Ø8 x 49 mm	1.5 mm, 	 , PNP	V2A (1.4301) -T	w001	d022
BI1,5U-EG08-AP6X-V1131	Ø8 x 49 mm	1.5 mm, 	 , PNP	V2A (1.4301)	w001	d022
BI1,5U-EG08-AN6X-V1131	Ø8 x 49 mm	1.5 mm, 	 , NPN	V2A (1.4301)	w002	d022
BI1,5-EG08K-AP6X-V1131	Ø8 x 31 mm	1.5 mm, 	 , PNP	V2A (1.4301)	w001	d134
BI1,5-EG08K-AN6X-V1131	Ø8 x 31 mm	1.5 mm, 	 , NPN	V2A (1.4301)	w002	d134
BI1,5-EG08-AP6X-V1131	Ø8 x 49 mm	1.5 mm, 	 , PNP	V2A (1.4301)	w001	d022
BI1,5-EG08-AN6X-V1131	Ø8 x 49 mm	1.5 mm, 	 , NPN	V2A (1.4301)	w002	d022
NI6U-EG08-RP6X-V1131	Ø8 x 49 mm	6 mm, 	 , PNP	V2A (1.4301)	w003	d023
NI6U-EG08-AP6X-V1131	Ø8 x 49 mm	6 mm, 	 , PNP	V2A (1.4301)	w001	d023
NI6U-EG08-AN6X-V1131	Ø8 x 49 mm	6 mm, 	 , NPN	V2A (1.4301)	w002	d023
NI4U-EG08-AP6X-V1131	Ø8 x 49 mm	4 mm, 	 , PNP	V2A (1.4301)	w001	d023











**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff



## Inductive sensors – Complete product range

### Threaded barrel

Type	Dimensions	Switching distance	Output	Material housing	w	d
NI4U-EG08-AN6X-V1131	Ø8 x 49 mm	4 mm, 	 , NPN	V2A (1.4301)	w002	d023
NI3-EG08K-AP6X-V1131	Ø8 x 31 mm	3 mm, 	 , PNP	V2A (1.4301)	w001	d135
NI3-EG08K-AN6X-V1131	Ø8 x 31 mm	3 mm, 	 , NPN	V2A (1.4301)	w002	d135
NI3-EG08-AP6X-V1131	Ø8 x 49 mm	3 mm, 	 , PNP	V2A (1.4301)	w001	d136
NI3-EG08-AN6X-V1131	Ø8 x 49 mm	3 mm, 	 , NPN	V2A (1.4301)	w002	d136

## M8 – 2-wire AC/DC – Terminal chamber



<b>Type</b>	BI2-EG08-AZ14X	<b>Operating voltage</b>	20...132 VAC / 10...140 VDC
<b>Dimensions</b>	Ø8 x 41.6 mm	<b>Material housing</b>	V2A (1.4301)
<b>Switching distance</b>	2 mm, 	<b>Material cable</b>	PUR 2 m
<b>Output</b>		<b>Wiring diagram</b>	w034
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d026

## M12 – NAMUR – M12 x 1 plug connection



<b>General data</b>		<b>Electrical connection</b>	connector, M12 x 1
<b>Dimensions</b>	Ø12 x 52 mm	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR		

### Types and data – selection table


Type	Switching distance	Material housing	w	d
BI2-M12-Y1X-H1141	2 mm, 	CuZn-Cr	w021	d034
BI2-EM12-Y1X-H1141	2 mm, 	V2A (1.4301)	w021	d034
NI5-M12-Y1X-H1141	5 mm, 	CuZn-Cr	w021	d035
NI5-EM12-Y1X-H1141	5 mm, 	V2A (1.4301)	w021	d035

## M12 – NAMUR – Cable connection



<b>General data</b>			
<b>Dimensions</b>	Ø12 x 34 mm	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR	<b>Material cable</b>	PVC 2 m
<b>Electrical connection</b>	cable		

### Types and data – selection table









Type	Switching distance	Material housing	<span style="background-color: #4CAF50; color: white; padding: 2px;">w</span>	<span style="background-color: #F44336; color: white; padding: 2px;">d</span>
BI2-P12-Y1X	2 mm, 	PA	w019	d144
BI2-G12-Y1X	2 mm, 	CuZn-Cr	w019	d145
NI5-P12-Y1X	5 mm, 	PA	w019	d144
NI5-G12-Y1X	5 mm, 	CuZn-Cr	w019	d143

## M12 – NAMUR – Terminal chamber



<b>General data</b>			
<b>Output</b>	NAMUR	<b>Operating voltage</b>	nom. 8.2 VDC

**Types and data – selection table**

Type	Dimensions	Switching distance	Electrical connection	Material housing	w	d
BI2-P12SK-Y1X	Ø12 x 70 mm	2 mm, 	terminal chamber	PA	w026	d149
BI2-G12SK-Y1X	Ø12 x 65 mm	2 mm, 	terminal chamber	CuZn-Cr	w026	d148
BI2-EM12WDTC-Y1X	Ø12 x 70 mm	2 mm, 	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w026	d147
BI2-EG12SK-Y1X	Ø12 x 65 mm	2 mm, 	terminal chamber	V2A (1.4301)	w026	d148
NI5-P12SK-Y1X	Ø12 x 70 mm	5 mm, 	terminal chamber	PA	w026	d149
NI5-G12SK-Y1X	Ø12 x 65 mm	5 mm, 	terminal chamber	CuZn-Cr	w026	d150
NI5-EM12WDTC-Y1X	Ø12 x 70 mm	5 mm, 	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w026	d146
NI5-EG12SK-Y1X	Ø12 x 65 mm	5 mm, 	terminal chamber	V2A (1.4301)	w026	d150

**M12 – 2-wire DC – M12 x 1 plug connection**

**General data**
**Output**

—, 2-wire








**Operating voltage**

10...65 VDC

**Electrical connection**

connector, M12 x 1

**Types and data – selection table**

Type	Dimensions	Switching distance	Material housing	w	d
BI2U-MT12E-AD4X-H1144	Ø12 x 62 mm	2 mm, 	CuZn-T	w009	d151
BI2U-M12E-AD4X-H1144	Ø12 x 62 mm	2 mm, 	CuZn-Cr	w009	d028
BI2-M12-AD4X-H1141	Ø12 x 52 mm	2 mm, 	CuZn-Cr	w023	d034
NI8-M12-AD4X-H1141	Ø12 x 52 mm	8 mm, 	CuZn-Cr	w023	d035
NI5U-MT12E-AD4X-H1144	Ø12 x 62 mm	5 mm, 	CuZn-T	w009	d152
NI5U-M12E-AD4X-H1144	Ø12 x 62 mm	5 mm, 	CuZn-Cr	w009	d029
NI4-M12-AD4X-H1141	Ø12 x 52 mm	4 mm, 	CuZn-Cr	w023	d035



## M12 – 2-wire DC – Cable connection



### General data

#### Output

—, 2-wire

#### Electrical connection

cable











#### Operating voltage

10...65 VDC

#### Material cable

PVC 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	Material housing	w	d
BI3-M12-AD4X	Ø12 x 54 mm	3 mm, 	CuZn-Cr	w016	d036
BI3-G12K-AD4X	Ø12 x 34 mm	3 mm, 	CuZn-Cr	w016	d145
BI2U-M12E-AD4X	Ø12 x 64 mm	2 mm, 	CuZn-Cr	w016	d030
BI2-S12-AD4X	Ø12 x 60 mm	2 mm, 	PA	w016	d153
BI2-M12-AD4X	Ø12 x 54 mm	2 mm, 	CuZn-Cr	w016	d036
NI8-M12-AD4X	Ø12 x 54 mm	8 mm, 	CuZn-Cr	w016	d037
NI8-G12K-AD4X	Ø12 x 34 mm	8 mm, 	CuZn-Cr	w016	d143
NI5U-M12E-AD4X	Ø12 x 64 mm	5 mm, 	CuZn-Cr	w016	d031
NI4-S12-AD4X	Ø12 x 64 mm	4 mm, 	PA	w016	d153
NI4-M12-AD4X	Ø12 x 54 mm	4 mm, 	CuZn-Cr	w016	d037

## M12 – 3-wire DC – M8 x 1 plug connection



### General data

#### Dimensions

Ø12 x 52 mm

#### Electrical connection

connector, M8 x 1

#### Operating voltage

10...30 VDC

#### Material housing

CuZn-Cr

Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-M12-AP6X-V1131	4 mm, 	—, PNP	w001	d032
BI4U-M12-AN6X-V1131	4 mm, 	—, NPN	w002	d032
NI10U-M12-AP6X-V1131	10 mm, 	—, PNP	w001	d033
NI10U-M12-AN6X-V1131	10 mm, 	—, NPN	w002	d033
























M12 – 3-wire DC – M12 x 1 plug connection



























General data

Electrical connection connector, M12 x 1      Operating voltage 10...30 VDC

Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI4U-MT12-AP6X-H1141	Ø12 x 52 mm	4 mm, 	—, PNP	CuZn-T	w001	d058
BI4U-MT12-AN6X-H1141	Ø12 x 52 mm	4 mm, 	—, NPN	CuZn-T	w002	d058
BI4U-M12-RP6X-H1141	Ø12 x 52 mm	4 mm, 	⊥, PNP	CuZn-Cr	w015	d034
BI4U-M12-AP6X-H1141	Ø12 x 52 mm	4 mm, 	—, PNP	CuZn-Cr	w001	d034
BI4U-M12-AN6X-H1141	Ø12 x 52 mm	4 mm, 	—, NPN	CuZn-Cr	w002	d034
BI4U-EM12WD-AP6X-H1141/3D	Ø12 x 52 mm	4 mm, 	—, PNP	V4A (1.4404)	w001	d034
BI4U-EM12WD-AP6X-H1141	Ø12 x 52 mm	4 mm, 	—, PNP	V4A (1.4404)	w001	d034
BI4U-EM12WD-AN6X-H1141	Ø12 x 52 mm	4 mm, 	—, NPN	V4A (1.4404)	w002	d034
BI4-M12E-AP6X-H1141	Ø12 x 62 mm	4 mm, 	—, PNP	CuZn-Cr	w001	d028
BI4-M12-AP6X-H1141	Ø12 x 52 mm	4 mm, 	—, PNP	CuZn-Cr	w001	d034
BI4-M12-AN6X-H1141	Ø12 x 52 mm	4 mm, 	—, NPN	CuZn-Cr	w002	d034
BI3U-S12-AP6X-H1141	Ø12 x 52 mm	3 mm, 	—, PNP	PBT	w001	d155
BI3U-S12-AN6X-H1141	Ø12 x 52 mm	3 mm, 	—, NPN	PBT	w002	d155
BI3U-MT12-AP6X-H1141	Ø12 x 52 mm	3 mm, 	—, PNP	CuZn-T	w001	d058
BI3U-MT12-AN6X-H1141	Ø12 x 52 mm	3 mm, 	—, NPN	CuZn-T	w002	d058
BI3U-M12EE-AP6X-H1141	Ø12 x 72 mm	3 mm, 	—, PNP	CuZn-Cr	w001	d157
BI3U-M12-AP6X-H1141	Ø12 x 52 mm	3 mm, 	—, PNP	CuZn-Cr	w001	d034
BI3U-M12-AN6X-H1141	Ø12 x 52 mm	3 mm, 	—, NPN	CuZn-Cr	w002	d034
BI3U-EM12-AP6X-H1141	Ø12 x 52 mm	3 mm, 	—, PNP	V2A (1.4301)	w001	d034
BI3U-EM12-AN6X-H1141	Ø12 x 52 mm	3 mm, 	—, NPN	V2A (1.4301)	w002	d034
BI2-M12E-AP6X-H1141	Ø12 x 62 mm	2 mm, 	—, PNP	CuZn-Cr	w001	d028
BI2-M12E-AN6X-H1141	Ø12 x 62 mm	2 mm, 	—, NPN	CuZn-Cr	w002	d028
BI2-M12-AP6X-H1141	Ø12 x 52 mm	2 mm, 	—, PNP	CuZn-Cr	w001	d034

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI2-M12-AN6X-H1141	Ø12 x 52 mm	2 mm, 	—, NPN	CuZn-Cr	w002	d034
BI2-G12K-AP6X-H1141	Ø12 x 42 mm	2 mm, 	—, PNP	CuZn-Cr	w001	d154
NI10U-MT12-AP6X-H1141	Ø12 x 52 mm	10 mm, 	—, PNP	CuZn-T	w001	d059
NI10U-MT12-AN6X-H1141	Ø12 x 52 mm	10 mm, 	—, NPN	CuZn-T	w002	d059
NI10U-M12E-AP6X-H1141	Ø12 x 62 mm	10 mm, 	—, PNP	CuZn-Cr	w001	d029
NI10U-M12-RP6X-H1141	Ø12 x 52 mm	10 mm, 	—, PNP	CuZn-Cr	w015	d035
NI10U-M12-AP6X-H1141	Ø12 x 52 mm	10 mm, 	—, PNP	CuZn-Cr	w001	d035
NI10U-M12-AN6X-H1141	Ø12 x 52 mm	10 mm, 	—, NPN	CuZn-Cr	w002	d035
NI10U-EM12WD-AP6X-H1141/3D	Ø12 x 52 mm	10 mm, 	—, PNP	V4A (1.4404)	w001	d067
NI10U-EM12WD-AP6X-H1141	Ø12 x 52 mm	10 mm, 	—, PNP	V4A (1.4404)	w001	d067
NI10U-EM12WD-AN6X-H1141	Ø12 x 52 mm	10 mm, 	—, NPN	V4A (1.4404)	w002	d067
NI8U-S12-AP6X-H1141	Ø12 x 52 mm	8 mm, 	—, PNP	PBT	w001	d155
NI8U-S12-AN6X-H1141	Ø12 x 52 mm	8 mm, 	—, NPN	PBT	w002	d155
NI8U-MT12-AP6X-H1141	Ø12 x 52 mm	8 mm, 	—, PNP	CuZn-T	w001	d059
NI8U-MT12-AN6X-H1141	Ø12 x 52 mm	8 mm, 	—, NPN	CuZn-T	w002	d059
NI8U-M12EE-AP6X-H1141	Ø12 x 72 mm	8 mm, 	—, PNP	CuZn-Cr	w001	d156
NI8U-M12-AP6X-H1141	Ø12 x 52 mm	8 mm, 	—, PNP	CuZn-Cr	w001	d035
NI8U-M12-AN6X-H1141	Ø12 x 52 mm	8 mm, 	—, NPN	CuZn-Cr	w002	d035
NI8U-EM12-AP6X-H1141	Ø12 x 52 mm	8 mm, 	—, PNP	V2A (1.4301)	w001	d035
NI8U-EM12-AN6X-H1141	Ø12 x 52 mm	8 mm, 	—, NPN	V2A (1.4301)	w002	d035
NI8-M12-AP6X-H1141	Ø12 x 52 mm	8 mm, 	—, PNP	CuZn-Cr	w001	d035
NI8-M12-AN6X-H1141	Ø12 x 52 mm	8 mm, 	—, NPN	CuZn-Cr	w002	d035
NI4-M12-AP6X-H1141	Ø12 x 52 mm	4 mm, 	—, PNP	CuZn-Cr	w001	d035
NI4-M12-AN6X-H1141	Ø12 x 52 mm	4 mm, 	—, NPN	CuZn-Cr	w002	d035

## M12 – 3-wire DC – Cable connection



































































### General data

Electrical connection cable

Operating voltage 10...30 VDC

**Types and data – selection table**

Type	Dimensions	Switching distance	Output	Material housing	Material cable	w	d
BI4U-M12-AP6X	Ø12 x 54 mm	4 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d036
BI4U-M12-AN6X	Ø12 x 54 mm	4 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d036
BI4U-EM12WD-AP6X	Ø12 x 52 mm	4 mm, 	 , PNP	V4A (1.4404)	PP 2 m	w004	d068
BI4U-EM12WD-AN6X	Ø12 x 52 mm	4 mm, 	 , NPN	V4A (1.4404)	PP 2 m	w005	d068
BI4-M12-AP6X	Ø12 x 54 mm	4 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d036
BI4-M12-AN6X	Ø12 x 54 mm	4 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d036
BI4-G12K-AP6X	Ø12 x 34 mm	4 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d145
BI4-G12K-AN6X	Ø12 x 34 mm	4 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d145
BI3U-S12-AP6X	Ø12 x 54 mm	3 mm, 	 , PNP	PBT	PVC 2 m	w004	d158
BI3U-S12-AN6X	Ø12 x 54 mm	3 mm, 	 , NPN	PBT	PVC 2 m	w005	d158
BI3U-M12-AP6X	Ø12 x 54 mm	3 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d036
BI3U-M12-AN6X	Ø12 x 54 mm	3 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d036
BI3U-EM12-AP6X	Ø12 x 54 mm	3 mm, 	 , PNP	V2A (1.4301)	PVC 2 m	w004	d036
BI3U-EM12-AN6X	Ø12 x 54 mm	3 mm, 	 , NPN	V2A (1.4301)	PVC 2 m	w005	d036
BI2-M12-AP6X	Ø12 x 54 mm	2 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d036
BI2-M12-AN6X	Ø12 x 54 mm	2 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d036
BI2-G12K-AP6X	Ø12 x 34 mm	2 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d145
BI2-G12K-AN6X	Ø12 x 34 mm	2 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d145
NI10U-M12-AP6X	Ø12 x 54 mm	10 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d037
NI10U-M12-AN6X	Ø12 x 54 mm	10 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d037
NI10U-EM12WD-AP6X	Ø12 x 52 mm	10 mm, 	 , PNP	V4A (1.4404)	PP 2 m	w004	d069
NI10U-EM12WD-AN6X	Ø12 x 52 mm	10 mm, 	 , NPN	V4A (1.4404)	PP 2 m	w005	d069
NI8U-S12-AP6X	Ø12 x 54 mm	8 mm, 	 , PNP	PBT	PVC 2 m	w004	d158
NI8U-S12-AN6X	Ø12 x 54 mm	8 mm, 	 , NPN	PBT	PVC 2 m	w005	d158
NI8U-M12-AP6X	Ø12 x 54 mm	8 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d037
NI8U-M12-AN6X	Ø12 x 54 mm	8 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d037
NI8U-EM12-AP6X	Ø12 x 54 mm	8 mm, 	 , PNP	V2A (1.4301)	PVC 2 m	w004	d037
NI8U-EM12-AN6X	Ø12 x 54 mm	8 mm, 	 , NPN	V2A (1.4301)	PVC 2 m	w005	d037
NI5-G12K-AP6X	Ø12 x 34 mm	5 mm, 	 , PNP	CuZn-Cr	PVC 2 m	w004	d143
NI5-G12K-AN6X	Ø12 x 34 mm	5 mm, 	 , NPN	CuZn-Cr	PVC 2 m	w005	d143
BI4-M12-AP6X 7M	Ø12 x 54 mm	4 mm, 	 , PNP	CuZn-Cr	PVC 7 m	w004	d036
BI4-M12-AN6X 7M	Ø12 x 54 mm	4 mm, 	 , NPN	CuZn-Cr	PVC 7 m	w005	d036

## M12 – 3-wire DC – Terminal chamber



### General data

Operating voltage 10...30 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Electrical connection	Material housing	w	d
BI4U-EM12WDTC-AP6X	Ø12 x 80 mm	4 mm,	PNP	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w011	d070
BI3U-P12SK-AP6X	Ø12 x 75 mm	3 mm,	PNP	terminal chamber	PA	w011	d161
BI3U-P12SK-AN6X	Ø12 x 75 mm	3 mm,	NPN	terminal chamber	PA	w012	d161
BI3U-EG12SK-AP6X	Ø12 x 75 mm	3 mm,	PNP	terminal chamber	V2A (1.4301)	w011	d160
BI3U-EG12SK-AN6X	Ø12 x 75 mm	3 mm,	NPN	terminal chamber	V2A (1.4301)	w012	d160
BI2-P12SK-AP6X	Ø12 x 75 mm	2 mm,	PNP	terminal chamber	PA	w011	d161
BI2-P12SK-AN6X	Ø12 x 75 mm	2 mm,	NPN	terminal chamber	PA	w012	d161
BI2-G12SK-AP6X	Ø12 x 75 mm	2 mm,	PNP	terminal chamber	CuZn-Cr	w011	d160
BI2-G12SK-AN6X	Ø12 x 75 mm	2 mm,	NPN	terminal chamber	CuZn-Cr	w012	d160
NI10U-EM12WDTC-AP6X	Ø12 x 80 mm	10 mm,	PNP	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w011	d071
NI8U-P12SK-AP6X	Ø12 x 75 mm	8 mm,	PNP	terminal chamber	PA	w011	d161
NI8U-P12SK-AN6X	Ø12 x 75 mm	8 mm,	NPN	terminal chamber	PA	w012	d161
NI8U-EG12SK-AP6X	Ø12 x 75 mm	8 mm,	PNP	terminal chamber	V2A (1.4301)	w011	d159
NI8U-EG12SK-AN6X	Ø12 x 75 mm	8 mm,	NPN	terminal chamber	V2A (1.4301)	w012	d159
NI5-P12SK-AP6X	Ø12 x 75 mm	5 mm,	PNP	terminal chamber	PA	w011	d161
NI5-P12SK-AN6X	Ø12 x 75 mm	5 mm,	NPN	terminal chamber	PA	w012	d161
NI5-G12SK-AP6X	Ø12 x 75 mm	5 mm,	PNP	terminal chamber	CuZn-Cr	w011	d159
NI5-G12SK-AN6X	Ø12 x 75 mm	5 mm,	NPN	terminal chamber	CuZn-Cr	w012	d159

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## M12 – 4-wire DC – M12 x 1 plug connection



**General data**

**Electrical connection** connector, M12 x 1      **Material housing** CuZn-Cr

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Operating voltage	w	d
BI4U-M12E-VP44X-H1141	Ø12 x 62 mm	4 mm,	, PNP	10...55 VDC	w017	d028
BI4U-M12E-VN44X-H1141	Ø12 x 62 mm	4 mm,	, NPN	10...55 VDC	w010	d028
BI4U-M12-VP44X-H1141 L80	Ø12 x 80 mm	4 mm,	, PNP	10...55 VDC	w017	d038
BI4U-M12-VP44X-H1141 L100	Ø12 x 100 mm	4 mm,	, PNP	10...55 VDC	w017	d039
BI4-M12-VN6X-H1141	Ø12 x 52 mm	4 mm,	, NPN	10...30 VDC	w010	d034
BI3U-M12E-VP4X-H1141	Ø12 x 62 mm	3 mm,	, PNP	10...65 VDC	w008	d028
BI3U-M12E-VN4X-H1141	Ø12 x 62 mm	3 mm,	, NPN	10...65 VDC	w010	d028
NI10U-M12E-VP44X-H1141	Ø12 x 62 mm	10 mm,	, PNP	10...55 VDC	w017	d029
NI10U-M12E-VN44X-H1141	Ø12 x 62 mm	10 mm,	, NPN	10...55 VDC	w010	d029
NI8U-M12E-VP4X-H1141	Ø12 x 62 mm	8 mm,	, PNP	10...65 VDC	w008	d029
NI8U-M12E-VN4X-H1141	Ø12 x 62 mm	8 mm,	, NPN	10...65 VDC	w010	d029
NI8-M12-VN6X-H1141	Ø12 x 52 mm	8 mm,	, NPN	10...30 VDC	w010	d035
NI8-M12-VP6X-H1141	Ø12 x 52 mm	8 mm,	, PNP	10...30 VDC	w008	d035
BI4-M12-VP6X-H1141	Ø12 x 52 mm	4 mm,	, PNP	10...30 VDC	w008	d034





















## M12 – 4-wire DC – Cable connection



**General data**

**Electrical connection** cable      **Material housing** CuZn-Cr

Types and data – selection table

Type	Dimensions	Switching distance	Output	Operating voltage	Material cable	w	d
BI4U-M12E-VP44X	Ø12 x 64 mm	4 mm, 	 , PNP	10...55 VDC	PVC 2 m	w007	d030
BI4U-M12E-VN44X	Ø12 x 64 mm	4 mm, 	 , NPN	10...55 VDC	PVC 2 m	w018	d030
BI4-M12-VP6X	Ø12 x 54 mm	4 mm, 	 , PNP	10...30 VDC	PVC 2 m	w007	d036
BI4-M12-VN6X	Ø12 x 54 mm	4 mm, 	 , NPN	10...30 VDC	PVC 2 m	w018	d036
NI10U-M12E-VP44X	Ø12 x 64 mm	10 mm, 	 , PNP	10...55 VDC	PVC 2 m	w007	d031
NI10U-M12E-VN44X	Ø12 x 64 mm	10 mm, 	 , NPN	10...55 VDC	PVC 2 m	w018	d031
BI4-M12-VP6X 7M	Ø12 x 54 mm	4 mm, 	 , PNP	10...30 VDC	PVC 7 m	w007	d036
BI4-M12-VN6X 7M	Ø12 x 54 mm	4 mm, 	 , NPN	10...30 VDC	PVC 7 m	w018	d036
NI8-M12-VN6X 7M	Ø12 x 54 mm	8 mm, 	 , NPN	10...30 VDC	PVC 7 m	w018	d037
NI8-M12-VP6X 7M	Ø12 x 54 mm	8 mm, 	 , PNP	10...30 VDC	PVC 7 m	w007	d037

M12 – 4-wire DC – Terminal chamber



General data

Dimensions

Ø12 x 75 mm

Electrical connection

terminal chamber

Operating voltage

10...65 VDC

Material housing

V2A (1.4301)

Types and data – selection table

Type	Switching distance	Output	w	d
BI3U-EG12SK-VP4X	3 mm, 	 , PNP	w014	d160
BI3U-EG12SK-VN4X	3 mm, 	 , NPN	w013	d160
NI8U-EG12SK-VP4X	8 mm, 	 , PNP	w014	d159
NI8U-EG12SK-VN4X	8 mm, 	 , NPN	w013	d159

## M12 – 2-wire AC/DC – 1/2" plug connection



**General data**

**Dimensions** Ø12 x 71 mm

**Output**



**Electrical connection** connector, 1/2"

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Material housing** CuZn-Cr

### Types and data – selection table

Type	Switching distance	w	d
BI2U-G12-ADZ32X-B3131	2 mm,	w035	d162
NI8U-G12-ADZ32X-B3131	8 mm,	w035	d163

## M12 – 2-wire AC/DC – Cable connection



**General data**

**Output**

**Electrical connection** cable

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Material cable** PVC 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	Material housing	w	d
BI2-S12-AZ31X	Ø12 x 60 mm	2 mm,	PA	w020	d153
BI2-M12-AZ31X	Ø12 x 64 mm	2 mm,	CuZn-Cr	w020	d030
NI4-S12-AZ31X	Ø12 x 64 mm	4 mm,	PA	w020	d153
NI4-M12-AZ31X	Ø12 x 64 mm	4 mm,	CuZn-Cr	w020	d164



## M18 – NAMUR – M12 x 1 plug connection



### General data

#### Dimensions

Ø18 x 52 mm

#### Output

NAMUR

### Electrical connection

connector, M12 x 1

#### Operating voltage

nom. 8.2 VDC

### Types and data – selection table

Type	Switching distance	Material housing	w	d
BI5-M18-Y1X-H1141	5 mm,	CuZn-Cr	w021	d044
BI5-EM18-Y1X-H1141	5 mm,	V2A (1.4305)	w021	d044
NI10-M18-Y1X-H1141	10 mm,	CuZn-Cr	w021	d046
NI10-EM18-Y1X-H1141	10 mm,	V2A (1.4301)	w021	d046

## M18 – NAMUR – Cable connection



### General data

#### Dimensions

Ø18 x 34 mm

#### Output

NAMUR

#### Electrical connection

cable

### Operating voltage

nom. 8.2 VDC

### Material cable

PVC 2 m

### Types and data – selection table

Type	Switching distance	Material housing	w	d
BI5-P18-Y1X	5 mm,	PA	w019	d165
BI5-G18-Y1X	5 mm,	CuZn-Cr	w019	d166
NI14-G18-Y1X	14 mm,	CuZn-Cr	w019	d167
NI10-P18-Y1X	10 mm,	PA	w019	d165
NI10-G18-Y1X	10 mm,	CuZn-Cr	w019	d167

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 736 ff

## M18 – NAMUR – Terminal chamber



**General data**

**Output** NAMUR      **Operating voltage** nom. 8.2 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Electrical connection	Material housing	w	d
BI5-P18SK-Y1X	Ø18 x 67 mm	5 mm,	terminal chamber	PA	w026	d171
BI5-G18SK-Y1X	Ø18 x 67 mm	5 mm,	terminal chamber	CuZn-Cr	w026	d170
BI5-EM18WDTC-Y1X	Ø18 x 71 mm	5 mm,	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w026	d168
BI5-EG18SK-Y1X	Ø18 x 67 mm	5 mm,	terminal chamber	V2A (1.4301)	w026	d170
NI10-P18SK-Y1X	Ø18 x 67 mm	10 mm,	terminal chamber	PA	w026	d171
NI10-G18SK-Y1X	Ø18 x 67 mm	10 mm,	terminal chamber	CuZn-Cr	w026	d172
NI10-EM18WDTC-Y1X	Ø18 x 71 mm	10 mm,	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w026	d169
NI10-EG18SK-Y1X	Ø18 x 67 mm	10 mm,	terminal chamber	V2A (1.4301)	w026	d172

## M18 – 2-wire DC – M12 x 1 plug connection










**General data**

**Output** —, 2-wire      **Operating voltage** 10...65 VDC

**Electrical connection** connector, M12 x 1

Types and data – selection table


Type	Dimensions	Switching distance	Material housing	w	d
BI7-M18-AD4X-H1141	Ø18 x 52 mm	7 mm, 	CuZn-Cr	w023	d044
BI5U-MT18M-AD4X-H1144	Ø18 x 61.5 mm	5 mm, 	CuZn-T	w009	d040
BI5U-M18M-AD4X-H1144	Ø18 x 61.5 mm	5 mm, 	CuZn-Cr	w009	d040
BI5-M18-AD4X-H1141	Ø18 x 52 mm	5 mm, 	CuZn-Cr	w023	d044
NI10U-MT18M-AD4X-H1144	Ø18 x 61.5 mm	10 mm, 	CuZn-T	w009	d060
NI10U-M18M-AD4X-H1144	Ø18 x 61.5 mm	10 mm, 	CuZn-Cr	w009	d041
NI8-M18-AD4X-H1141	Ø18 x 52 mm	8 mm, 	CuZn-Cr	w023	d046

## M18 – 2-wire DC – Cable connection



General data

Output

, 2-wire

Electrical connection

cable








Operating voltage

10...65 VDC

Material cable

PVC 2 m

Types and data – selection table

Type	Dimensions	Switching distance	Material housing	w	d
BI7-M18-AD4X	Ø18 x 54 mm	7 mm, 	CuZn-Cr	w016	d048
BI7-G18K-AD4X	Ø18 x 34 mm	7 mm, 	CuZn-Cr	w016	d166
BI5-S18-AD4X	Ø18 x 64 mm	5 mm, 	PA	w016	d173
BI5-M18-AD4X	Ø18 x 54 mm	5 mm, 	CuZn-Cr	w016	d048
NI10U-M18M-AD4X	Ø18 x 64 mm	10 mm, 	CuZn-Cr	w016	d043
NI8-S18-AD4X	Ø18 x 64 mm	8 mm, 	PA	w016	d173
NI8-M18-AD4X	Ø18 x 54 mm	8 mm, 	CuZn-Cr	w016	d049

## M18 – 3-wire DC – M12 x 1 plug connection



**General data**

**Electrical connection**















connector, M12 x 1

**Operating voltage**

10...30 VDC

**Types and data – selection table**

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI8U-MT18E-AP6X-H1141	Ø18 x 72 mm	8 mm,	—, PNP	CuZn-T	w001	d045
BI8U-MT18-AP6X-H1141	Ø18 x 52 mm	8 mm,	—, PNP	CuZn-T	w001	d062
BI8U-MT18-AN6X-H1141	Ø18 x 52 mm	8 mm,	—, NPN	CuZn-T	w002	d062
BI8U-M18E-AP6X-H1141	Ø18 x 72 mm	8 mm,	—, PNP	CuZn-Cr	w001	d045
BI8U-M18E-AN6X-H1141	Ø18 x 72 mm	8 mm,	—, NPN	CuZn-Cr	w002	d045
BI8U-M18-RP6X-H1141	Ø18 x 52 mm	8 mm,	⊢, PNP	CuZn-Cr	w015	d044
BI8U-M18-AP6X-H1141	Ø18 x 52 mm	8 mm,	—, PNP	CuZn-Cr	w001	d044
BI8U-M18-AN6X-H1141	Ø18 x 52 mm	8 mm,	—, NPN	CuZn-Cr	w002	d044
BI8U-EM18WD-AP6X-H1141/3GD	Ø18 x 52 mm	8 mm,	—, PNP	V4A (1.4404)	w001	d044
BI8U-EM18WD-AP6X-H1141	Ø18 x 52 mm	8 mm,	—, PNP	V4A (1.4404)	w001	d044
BI8U-EM18WD-AN6X-H1141/3GD	Ø18 x 52 mm	8 mm,	—, NPN	V4A (1.4404)	w002	d044
BI8U-EM18WD-AN6X-H1141	Ø18 x 52 mm	8 mm,	—, NPN	V4A (1.4404)	w002	d044
BI8-M18K-AP6X-H1141	Ø18 x 46 mm	8 mm,	—, PNP	CuZn-Cr	w001	d175
BI8-M18-AP6X-H1141	Ø18 x 52 mm	8 mm,	—, PNP	CuZn-Cr	w001	d044
BI8-M18-AN6X-H1141	Ø18 x 52 mm	8 mm,	—, NPN	CuZn-Cr	w002	d044
BI5U-S18-AP6X-H1141	Ø18 x 52 mm	5 mm,	—, PNP	PBT	w001	d176
BI5U-S18-AN6X-H1141	Ø18 x 52 mm	5 mm,	—, NPN	PBT	w002	d176
BI5U-MT18E-AP6X-H1141	Ø18 x 72 mm	5 mm,	—, PNP	CuZn-T	w001	d045
BI5U-MT18-AP6X-H1141	Ø18 x 52 mm	5 mm,	—, PNP	CuZn-T	w001	d062
BI5U-MT18-AN6X-H1141	Ø18 x 52 mm	5 mm,	—, NPN	CuZn-T	w002	d062
BI5U-M18-AP6X-H1141	Ø18 x 52 mm	5 mm,	—, PNP	CuZn-Cr	w001	d044
BI5U-M18-AN6X-H1141	Ø18 x 52 mm	5 mm,	—, NPN	CuZn-Cr	w002	d044
BI5U-EM18-AP6X-H1141	Ø18 x 52 mm	5 mm,	—, PNP	V2A (1.4301)	w001	d044
BI5U-EM18-AN6X-H1141	Ø18 x 52 mm	5 mm,	—, NPN	V2A (1.4301)	w002	d044
BI5-M18-AP6X-H1141	Ø18 x 52 mm	5 mm,	—, PNP	CuZn-Cr	w001	d044
BI5-M18-AN6X-H1141	Ø18 x 52 mm	5 mm,	—, NPN	CuZn-Cr	w002	d044
BI5-G18KK-AP6-H1141	Ø18 x 30 mm	5 mm,	—, PNP	CuZn-Cr	w001	d174
NI15U-MT18-AP6X-H1141	Ø18 x 52 mm	15 mm,	—, PNP	CuZn-T	w001	d063
NI15U-MT18-AN6X-H1141	Ø18 x 52 mm	15 mm,	—, NPN	CuZn-T	w002	d063
NI15U-M18-RP6X-H1141	Ø18 x 52 mm	15 mm,	⊢, PNP	CuZn-Cr	w015	d046
NI15U-M18-AP6X-H1141	Ø18 x 52 mm	15 mm,	—, PNP	CuZn-Cr	w001	d046
NI15U-M18-AN6X-H1141	Ø18 x 52 mm	15 mm,	—, NPN	CuZn-Cr	w002	d046
NI15U-EM18WD-AP6X-H1141/3D	Ø18 x 52 mm	15 mm,	—, PNP	V4A (1.4404)	w001	d072

Type	Dimensions	Switching distance	Output	Material housing	w	d
NI15U-EM18WD-AP6X-H1141	Ø18 x 52 mm	15 mm, 	—, PNP	V4A (1.4404)	w001	d072
NI15U-EM18WD-AN6X-H1141/3D	Ø18 x 52 mm	15 mm, 	—, NPN	V4A (1.4404)	w002	d072
NI15U-EM18WD-AN6X-H1141	Ø18 x 52 mm	15 mm, 	—, NPN	V4A (1.4404)	w002	d072
NI12U-S18-AP6X-H1141	Ø18 x 52 mm	12 mm, 	—, PNP	PBT	w001	d176
NI12U-S18-AN6X-H1141	Ø18 x 52 mm	12 mm, 	—, NPN	PBT	w002	d176
NI12U-MT18-AP6X-H1141	Ø18 x 52 mm	12 mm, 	—, PNP	CuZn-T	w001	d063
NI12U-MT18-AN6X-H1141	Ø18 x 52 mm	12 mm, 	—, NPN	CuZn-T	w002	d063
NI12U-M18E-AP6X-H1141	Ø18 x 72 mm	12 mm, 	—, PNP	CuZn-Cr	w001	d047
NI12U-M18-AP6X-H1141	Ø18 x 52 mm	12 mm, 	—, PNP	CuZn-Cr	w001	d046
NI12U-M18-AN6X-H1141	Ø18 x 52 mm	12 mm, 	—, NPN	CuZn-Cr	w002	d046
NI12U-EM18-AP6X-H1141	Ø18 x 52 mm	12 mm, 	—, PNP	V2A (1.4301)	w001	d046
NI12U-EM18-AN6X-H1141	Ø18 x 52 mm	12 mm, 	—, NPN	V2A (1.4301)	w002	d046
NI14-M18-AP6X-H1141	Ø18 x 52 mm	14 mm, 	—, PNP	CuZn-Cr	w001	d046
NI14-M18-AN6X-H1141	Ø18 x 52 mm	14 mm, 	—, NPN	CuZn-Cr	w002	d046















## M18 – 3-wire DC – Cable connection



### General data

Electrical connection cable      Operating voltage 10...30 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	Material cable	w	d
BI8U-M18-AP6X	Ø18 x 54 mm	8 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d048
BI8U-M18-AN6X	Ø18 x 54 mm	8 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d048
BI8U-EM18WD-AP6X	Ø18 x 52 mm	8 mm, 	—, PNP	V4A (1.4404)	PP 2 m	w004	d073
BI8U-EM18WD-AN6X	Ø18 x 52 mm	8 mm, 	—, NPN	V4A (1.4404)	PP 2 m	w005	d073
BI8-M18-AP6X	Ø18 x 54 mm	8 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d048
BI8-M18-AN6X	Ø18 x 54 mm	8 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d048
BI8-M18-AP6X 7M	Ø18 x 54 mm	8 mm, 	—, PNP	CuZn-Cr	PVC 7 m	w004	d048
BI8-M18-AN6X 7M	Ø18 x 54 mm	8 mm, 	—, NPN	CuZn-Cr	PVC 7 m	w005	d048
BI5U-S18-AP6X	Ø18 x 64 mm	5 mm, 	—, PNP	PBT	PVC 2 m	w004	d173
BI5U-S18-AN6X	Ø18 x 64 mm	5 mm, 	—, NPN	PBT	PVC 2 m	w005	d173
BI5U-M18-AP6X	Ø18 x 54 mm	5 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d048
BI5U-M18-AN6X	Ø18 x 54 mm	5 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d048
BI5U-EM18-AP6X	Ø18 x 54 mm	5 mm, 	—, PNP	V2A (1.4301)	PVC 2 m	w004	d048
BI5U-EM18-AN6X	Ø18 x 54 mm	5 mm, 	—, NPN	V2A (1.4301)	PVC 2 m	w005	d048

















 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 736 ff

## Inductive sensors – Complete product range

### Threaded barrel

Type	Dimensions	Switching distance	Output	Material housing	Material cable	w	d
BI5-M18-AP6X	Ø18 x 54 mm	5 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d048
BI5-M18-AN6X	Ø18 x 54 mm	5 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d048
BI5-G18K-AP6X	Ø18 x 34 mm	5 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d166
BI5-G18K-AN6X	Ø18 x 34 mm	5 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d166
NI15U-M18-AP6X	Ø18 x 54 mm	15 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d049
NI15U-M18-AN6X	Ø18 x 54 mm	15 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d049
NI15U-EM18WD-AP6X	Ø18 x 52 mm	15 mm, 	—, PNP	V4A (1.4404)	PP 2 m	w004	d074
NI15U-EM18WD-AN6X	Ø18 x 52 mm	15 mm, 	—, NPN	V4A (1.4404)	PP 2 m	w005	d074
NI12U-S18-AP6X	Ø18 x 64 mm	12 mm, 	—, PNP	PBT	PVC 2 m	w004	d173
NI12U-S18-AN6X	Ø18 x 64 mm	12 mm, 	—, NPN	PBT	PVC 2 m	w005	d173
NI12U-M18-AP6X	Ø18 x 54 mm	12 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d049
NI12U-M18-AN6X	Ø18 x 54 mm	12 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d049
NI12U-EM18-AP6X	Ø18 x 54 mm	12 mm, 	—, PNP	V2A (1.4301)	PVC 2 m	w004	d177
NI12U-EM18-AN6X	Ø18 x 54 mm	12 mm, 	—, NPN	V2A (1.4301)	PVC 2 m	w005	d177
NI10-G18K-AP6X	Ø18 x 34 mm	10 mm, 	—, PNP	CuZn-Cr	PVC 2 m	w004	d167
NI10-G18K-AN6X	Ø18 x 34 mm	10 mm, 	—, NPN	CuZn-Cr	PVC 2 m	w005	d167











## M18 – 3-wire DC – Terminal chamber



### General data

Operating voltage 10...30 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Electrical connection	Material housing	w	d
BI8U-EM18WDTC-AP6X	Ø18 x 81 mm	8 mm, 	—, PNP	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w011	d075
BI5U-P18SK-AP6X	Ø18 x 77 mm	5 mm, 	—, PNP	terminal chamber	PBT	w011	d179
BI5U-P18SK-AN6X	Ø18 x 77 mm	5 mm, 	—, NPN	terminal chamber	PBT	w012	d179
BI5U-EG18SK-AP6X	Ø18 x 77 mm	5 mm, 	—, PNP	terminal chamber	V2A (1.4301)	w011	d178
BI5U-EG18SK-AN6X	Ø18 x 77 mm	5 mm, 	—, NPN	terminal chamber	V2A (1.4301)	w012	d178
BI5-P18SK-AP6X	Ø18 x 77 mm	5 mm, 	—, PNP	terminal chamber	PA	w011	d179
BI5-P18SK-AN6X	Ø18 x 77 mm	5 mm, 	—, NPN	terminal chamber	PA	w012	d179
BI5-G18SK-AP6X	Ø18 x 77 mm	5 mm, 	—, PNP	terminal chamber	CuZn-Cr	w011	d178
BI5-G18SK-AN6X	Ø18 x 77 mm	5 mm, 	—, NPN	terminal chamber	CuZn-Cr	w012	d178
NI15U-EM18WDTC-AP6X	Ø18 x 81 mm	15 mm, 	—, PNP	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w011	d076

Type	Dimensions	Switching distance	Output	Electrical connection	Material housing	w	d
NI12U-P18SK-AP6X	Ø18 x 77 mm	12 mm,	, PNP	terminal chamber	PBT	w011	d179
NI12U-P18SK-AN6X	Ø18 x 77 mm	12 mm,	, NPN	terminal chamber	PBT	w012	d179
NI12U-EG18SK-AP6X	Ø18 x 77 mm	12 mm,	, PNP	terminal chamber	V2A (1.4301)	w011	d180
NI12U-EG18SK-AN6X	Ø18 x 77 mm	12 mm,	, NPN	terminal chamber	V2A (1.4301)	w012	d180
NI10-P18SK-AP6X	Ø18 x 77 mm	10 mm,	, PNP	terminal chamber	PA	w011	d179
NI10-P18SK-AN6X	Ø18 x 77 mm	10 mm,	, NPN	terminal chamber	PA	w012	d179
NI10-G18SK-AP6X	Ø18 x 77 mm	10 mm,	, PNP	terminal chamber	CuZn-Cr	w011	d180
NI10-G18SK-AN6X	Ø18 x 77 mm	10 mm,	, NPN	terminal chamber	CuZn-Cr	w012	d180

## M18 – 4-wire DC – M12 x 1 plug connection



### General data

**Electrical connection** connector, M12 x 1      **Material housing** CuZn-Cr

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Operating voltage	w	d
BI8U-M18M-VP44X-H1141	Ø18 x 61.5 mm	8 mm,	, PNP	10...55 VDC	w017	d040
BI8U-M18M-VN44X-H1141	Ø18 x 61.5 mm	8 mm,	, NPN	10...55 VDC	w010	d040
BI8-M18-VP6X-H1141	Ø18 x 52 mm	8 mm,	, PNP	10...30 VDC	w008	d044
BI8-M18-VN6X-H1141	Ø18 x 52 mm	8 mm,	, NPN	10...30 VDC	w010	d044
NI15U-M18M-VP44X-H1141	Ø18 x 61.5 mm	15 mm,	, PNP	10...55 VDC	w017	d041
NI15U-M18M-VN44X-H1141	Ø18 x 61.5 mm	15 mm,	, NPN	10...55 VDC	w010	d041
NI14-M18-VN6X-H1141	Ø18 x 52 mm	14 mm,	, NPN	10...30 VDC	w010	d046
NI14-M18-VP6X-H1141	Ø18 x 52 mm	14 mm,	, PNP	10...30 VDC	w008	d046

## M18 – 4-wire DC – Cable connection



**General data**

**Electrical connection** cable **Material housing** CuZn-Cr

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Operating voltage	Material cable	w	d
BI8U-M18M-VP44X	Ø18 x 64 mm	8 mm,	, PNP	10...55 VDC	PVC 2 m	w007	d042
BI8U-M18M-VN44X	Ø18 x 64 mm	8 mm,	, NPN	10...55 VDC	PVC 2 m	w018	d042
BI8-M18-VP4X 7M	Ø18 x 54 mm	8 mm,	, PNP	10...30 VDC	PVC 7 m	w007	d048
BI8-M18-VN4X 7M	Ø18 x 54 mm	8 mm,	, NPN	10...30 VDC	PVC 7 m	w018	d048
BI8-M18-VP6X	Ø18 x 54 mm	8 mm,	, PNP	10...30 VDC	PVC 2 m	w007	d048
BI8-M18-VN6X	Ø18 x 54 mm	8 mm,	, NPN	10...30 VDC	PVC 2 m	w018	d048
NI15U-M18M-VP44X	Ø18 x 64 mm	15 mm,	, PNP	10...55 VDC	PVC 2 m	w007	d043
NI15U-M18M-VN44X	Ø18 x 64 mm	15 mm,	, NPN	10...55 VDC	PVC 2 m	w018	d043
NI14-M18-VP4X 7M	Ø18 x 54 mm	14 mm,	, PNP	10...30 VDC	PVC 7 m	w007	d049
NI14-M18-VN4X 7M	Ø18 x 54 mm	14 mm,	, NPN	10...30 VDC	PVC 7 m	w018	d049

## M18 – 4-wire DC – Terminal chamber




**General data**

**Dimensions** Ø18 x 77 mm **Operating voltage** 10...65 VDC  
**Electrical connection** terminal chamber **Material housing** V2A (1.4301)



Types and data – selection table

Type	Switching distance	Output	w	d
BI5U-EG18SK-VP4X	5 mm, 	 , PNP	w014	d178
BI5U-EG18SK-VN4X	5 mm, 	 , NPN	w013	d178
NI12U-EG18SK-VP4X	12 mm, 	 , PNP	w014	d180
NI12U-EG18SK-VN4X	12 mm, 	 , NPN	w013	d180

### M18 – 2-wire AC/DC – 7/8" plug connection



**General data**

**Dimensions** Ø18 x 82 mm



**Operating voltage** 20...250 VAC /  
10...300 VDC

**Output** 

**Material housing** CuZn-Cr

**Electrical connection** connector, 7/8"

Types and data – selection table

Type	Switching distance	w	d
BI5U-G18-ADZ30X2-B1331	5 mm, 	w030	d181
NI12U-G18-ADZ30X2-B1331	12 mm, 	w030	d182

### M18 – 2-wire AC/DC – 1/2" plug connection



**General data**

**Dimensions** Ø18 x 82 mm


**Operating voltage** 20...250 VAC /  
10...300 VDC

**Output** 

**Material housing** CuZn-Cr

**Electrical connection** connector, 1/2"

**Types and data – selection table**

Type	Switching distance	w	d
BI5U-G18-ADZ30X2-B3331	5 mm, 	w030	d183
NI12U-G18-ADZ30X2-B3331	12 mm, 	w030	d184

**M18 – 2-wire AC/DC – Cable connection**



**General data**

**Output**











**Operating voltage**

20...250 VAC /  
10...300 VDC

**Electrical connection**

cable

**Types and data – selection table**

Type	Dimensions	Switching distance	Material housing	Material cable	w	d
BI5U-M18-ADZ30X2	Ø18 x 64 mm	5 mm, 	CuZn-Cr	PVC 2 m	w031	d185
BI5-S18-AZ3X	Ø18 x 64 mm	5 mm, 	PA	PVC 2 m	w031	d173
BI5-P18-AZ3/S139-S90	Ø18 x 80 mm	5 mm, 	POM	PUR 2 m	w031	d186
BI5-M18-AZ3X	Ø18 x 64 mm	5 mm, 	CuZn-Cr	PVC 2 m	w020	d185
NI12U-M18-ADZ30X2	Ø18 x 65 mm	12 mm, 	CuZn-Cr	PVC 2 m	w031	d187
NI8-S18-AZ3X	Ø18 x 64 mm	8 mm, 	PA	PVC 2 m	w031	d173
NI8-P18-AZ3/S139-S90	Ø18 x 80 mm	8 mm, 	POM	PUR 2 m	w031	d186
NI8-M18-AZ3X	Ø18 x 64 mm	8 mm, 	CuZn-Cr	PVC 2 m	w020	d043

**M30 – NAMUR – M12 x 1 plug connection**



**General data**

**Dimensions**

Ø30 x 62 mm

**Output**

NAMUR

**Electrical connection**

connector, M12 x 1

**Operating voltage**

nom. 8.2 VDC

Types and data – selection table



Type	Switching distance	Material housing	w	d
BI10-M30-Y1X-H1141	10 mm, 	CuZn-Cr	w021	d050
BI10-EM30-Y1X-H1141	10 mm, 	V2A (1.4301)	w021	d050
NI15-M30-Y1X-H1141	15 mm, 	CuZn-Cr	w021	d051
NI15-EM30-Y1X-H1141	15 mm, 	V2A (1.4301)	w021	d051

### M30 – NAMUR – Cable connection



<b>General data</b>		<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	Ø30 x 44 mm	<b>Material cable</b>	PVC 2 m
<b>Output</b>	NAMUR		
<b>Electrical connection</b>	cable		

Types and data – selection table









Type	Switching distance	Material housing	w	d
BI10-P30-Y1X	10 mm, 	PA	w019	d188
BI10-G30-Y1X	10 mm, 	CuZn-Cr	w019	d189
NI15-P30-Y1X	15 mm, 	PA	w019	d188
NI15-G30-Y1X	15 mm, 	CuZn-Cr	w019	d190

### M30 – NAMUR – Terminal chamber



<b>General data</b>		<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR		

### Types and data – selection table

Type	Dimensions	Switching distance	Electrical connection	Material housing	w	d
BI10-P30SK-Y1X	Ø30 x 72 mm	10 mm, 	terminal chamber	PA	w026	d191
BI10-G30SK-Y1X	Ø30 x 72 mm	10 mm, 	terminal chamber	CuZn-Cr	w026	d192
BI10-EM30WDTC-Y1X	Ø30 x 80 mm	10 mm, 	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w026	d194
BI10-EG30SK-Y1X	Ø30 x 72 mm	10 mm, 	terminal chamber	V2A (1.4301)	w026	d192
NI15-P30SK-Y1X	Ø30 x 72 mm	15 mm, 	terminal chamber	PA	w026	d191
NI15-G30SK-Y1X	Ø30 x 72 mm	15 mm, 	terminal chamber	CuZn-Cr	w026	d193
NI15-EM30WDTC-Y1X	Ø30 x 80 mm	15 mm, 	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w026	d195
NI15-EG30SK-Y1X	Ø30 x 72 mm	15 mm, 	terminal chamber	V2A (1.4301)	w026	d193

## M30 – 2-wire DC – M12 x 1 plug connection




### General data

#### Dimensions

Ø30 x 62 mm

#### Output

, 2-wire








#### Electrical connection

connector, M12 x 1

#### Operating voltage

10...65 VDC

### Types and data – selection table

Type	Switching distance	Material housing	w	d
BI10U-MT30-AD4X-H1144	10 mm, 	CuZn-T	w009	d064
BI10U-M30-AD4X-H1144	10 mm, 	CuZn-Cr	w009	d050
BI10-M30-AD4X-H1141	10 mm, 	CuZn-Cr	w023	d050
NI20-M30-AD4X-H1141	20 mm, 	CuZn-Cr	w023	d051
NI15U-MT30-AD4X-H1144	15 mm, 	CuZn-T	w009	d065
NI15U-M30-AD4X-H1144	15 mm, 	CuZn-Cr	w009	d051
NI15-M30-AD4X-H1141	15 mm, 	CuZn-Cr	w023	d051

## M30 – 2-wire DC – Cable connection



### General data

#### Output

—, 2-wire

#### Electrical connection

cable

#### Operating voltage

10...65 VDC

#### Material cable

PVC 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	Material housing	w	d
BI12-G30K-AD4X	Ø30 x 44 mm	12 mm,	CuZn-Cr	w016	d189
BI10U-M30-AD4X	Ø30 x 64 mm	10 mm,	CuZn-Cr	w016	d052
BI10-S30-AD4X	Ø30 x 64 mm	10 mm,	PA	w016	d196
BI10-M30-AD4X	Ø30 x 64 mm	10 mm,	CuZn-Cr	w016	d052
NI20-M30-AD4X	Ø30 x 64 mm	20 mm,	CuZn-Cr	w016	d053
NI20-G30K-AD4X	Ø30 x 44 mm	20 mm,	CuZn-Cr	w016	d190
NI15U-M30-AD4X	Ø30 x 64 mm	15 mm,	CuZn-Cr	w016	d053
NI15-S30-AD4X	Ø30 x 64 mm	15 mm,	PA	w016	d196
NI15-M30-AD4X	Ø30 x 64 mm	15 mm,	CuZn-Cr	w016	d053

## M30 – 3-wire DC – M12 x 1 plug connection



### General data

#### Dimensions

Ø30 x 62 mm























#### Electrical connection

connector, M12 x 1

#### Operating voltage

10...30 VDC

**Types and data – selection table**

Type	Switching distance	Output	Material housing	w	d
BI15U-MT30-AP6X-H1141	15 mm, 	—, PNP	CuZn-T	w001	d064
BI15U-MT30-AN6X-H1141	15 mm, 	—, NPN	CuZn-T	w002	d064
BI15U-M30-RP6X-H1141	15 mm, 	—, PNP	CuZn-Cr	w015	d050
BI15U-M30-AP6X-H1141	15 mm, 	—, PNP	CuZn-Cr	w001	d050
BI15U-M30-AN6X-H1141	15 mm, 	—, NPN	CuZn-Cr	w002	d050
BI15U-EM30WD-AP6X-H1141/3GD	15 mm, 	—, PNP	V4A (1.4404)	w001	d050
BI15U-EM30WD-AP6X-H1141	15 mm, 	—, PNP	V4A (1.4404)	w001	d050
BI15U-EM30WD-AN6X-H1141/3GD	15 mm, 	—, NPN	V4A (1.4404)	w002	d050
BI15U-EM30WD-AN6X-H1141	15 mm, 	—, NPN	V4A (1.4404)	w002	d050
BI15-M30-AP6X-H1141	15 mm, 	—, PNP	CuZn-Cr	w001	d050
BI15-M30-AN6X-H1141	15 mm, 	—, NPN	CuZn-Cr	w002	d050
BI10U-S30-AP6X-H1141	10 mm, 	—, PNP	PBT	w001	d197
BI10U-S30-AN6X-H1141	10 mm, 	—, NPN	PBT	w002	d197
BI10U-MT30-AP6X-H1141	10 mm, 	—, PNP	CuZn-T	w001	d064
BI10U-MT30-AN6X-H1141	10 mm, 	—, NPN	CuZn-T	w002	d064
BI10U-M30-AP6X-H1141	10 mm, 	—, PNP	CuZn-Cr	w001	d050
BI10U-M30-AN6X-H1141	10 mm, 	—, NPN	CuZn-Cr	w002	d050
BI10U-EM30-AP6X-H1141	10 mm, 	—, PNP	V2A (1.4301)	w001	d050
BI10U-EM30-AN6X-H1141	10 mm, 	—, NPN	V2A (1.4301)	w002	d050
BI10-M30-AP6X-H1141	10 mm, 	—, PNP	CuZn-Cr	w001	d050
BI10-M30-AN6X-H1141	10 mm, 	—, NPN	CuZn-Cr	w002	d050
NI30U-MT30-AP6X-H1141	30 mm, 	—, PNP	CuZn-T	w001	d065
NI30U-MT30-AN6X-H1141	30 mm, 	—, NPN	CuZn-T	w002	d065
NI30U-M30-RP6X-H1141	30 mm, 	—, PNP	CuZn-Cr	w015	d051
NI30U-M30-AP6X-H1141	30 mm, 	—, PNP	CuZn-Cr	w001	d051
NI30U-M30-AN6X-H1141	30 mm, 	—, NPN	CuZn-Cr	w002	d051
NI30U-EM30WD-AP6X-H1141/3D	30 mm, 	—, PNP	V4A (1.4404)	w001	d077
NI30U-EM30WD-AN6X-H1141/3D	30 mm, 	—, NPN	V4A (1.4404)	w002	d077
NI20U-S30-AP6X-H1141	20 mm, 	—, PNP	PBT	w001	d197
NI20U-S30-AN6X-H1141	20 mm, 	—, NPN	PBT	w002	d197
NI20U-MT30-AP6X-H1141	20 mm, 	—, PNP	CuZn-T	w001	d065
NI20U-MT30-AN6X-H1141	20 mm, 	—, NPN	CuZn-T	w002	d065
NI20U-M30-AP6X-H1141	20 mm, 	—, PNP	CuZn-Cr	w001	d051
NI20U-M30-AN6X-H1141	20 mm, 	—, NPN	CuZn-Cr	w002	d051
NI20U-EM30-AP6X-H1141	20 mm, 	—, PNP	V2A (1.4301)	w001	d051
NI20U-EM30-AN6X-H1141	20 mm, 	—, NPN	V2A (1.4301)	w002	d051
NI20-M30-AP6X-H1141	20 mm, 	—, PNP	CuZn-Cr	w001	d051
NI20-M30-AN6X-H1141	20 mm, 	—, NPN	CuZn-Cr	w002	d051

## M30 – 3-wire DC – Cable connection



### General data

Electrical connection cable      Operating voltage 10...30 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	Material cable	w	d
BI15U-M30-AP6X	Ø30 x 64 mm	15 mm,	—, PNP	CuZn-Cr	PVC 2 m	w004	d052
BI15U-M30-AN6X	Ø30 x 64 mm	15 mm,	—, NPN	CuZn-Cr	PVC 2 m	w005	d052
BI15U-EM30WD-AP6X	Ø30 x 66 mm	15 mm,	—, PNP	V4A (1.4404)	PP 2 m	w004	d078
BI15U-EM30WD-AN6X	Ø30 x 66 mm	15 mm,	—, NPN	V4A (1.4404)	PP 2 m	w005	d078
BI15-M30-AP6X	Ø30 x 64 mm	15 mm,	—, PNP	CuZn-Cr	PVC 2 m	w004	d052
BI15-M30-AN6X	Ø30 x 64 mm	15 mm,	—, NPN	CuZn-Cr	PVC 2 m	w005	d052
BI15-M30-AP6X 7M	Ø30 x 64 mm	15 mm,	—, PNP	CuZn-Cr	PVC 7 m	w004	d052
BI15-M30-AN6X 7M	Ø30 x 64 mm	15 mm,	—, NPN	CuZn-Cr	PVC 7 m	w005	d052
BI10U-S30-AP6X	Ø30 x 64 mm	10 mm,	—, PNP	PA	PVC 2 m	w004	d196
BI10U-S30-AN6X	Ø30 x 64 mm	10 mm,	—, NPN	PA	PVC 2 m	w005	d196
BI10U-M30-AP6X	Ø30 x 64 mm	10 mm,	—, PNP	CuZn-Cr	PVC 2 m	w004	d198
BI10U-M30-AN6X	Ø30 x 64 mm	10 mm,	—, NPN	CuZn-Cr	PVC 2 m	w005	d198
BI10U-EM30-AP6X	Ø30 x 64 mm	10 mm,	—, PNP	V2A (1.4301)	PVC 2 m	w004	d052
BI10U-EM30-AN6X	Ø30 x 64 mm	10 mm,	—, NPN	V2A (1.4301)	PVC 2 m	w005	d052
BI10-M30-AP6X	Ø30 x 64 mm	10 mm,	—, PNP	CuZn-Cr	PVC 2 m	w004	d052
BI10-M30-AN6X	Ø30 x 64 mm	10 mm,	—, NPN	CuZn-Cr	PVC 2 m	w005	d052
BI10-G30K-AP6X	Ø30 x 44 mm	10 mm,	—, PNP	CuZn-Cr	PVC 2 m	w004	d189
BI10-G30K-AN6X	Ø30 x 44 mm	10 mm,	—, NPN	CuZn-Cr	PVC 2 m	w005	d189
NI30U-M30-AP6X	Ø30 x 64 mm	30 mm,	—, PNP	CuZn-Cr	PVC 2 m	w004	d053
NI30U-M30-AN6X	Ø30 x 64 mm	30 mm,	—, NPN	CuZn-Cr	PVC 2 m	w005	d053
NI20U-S30-AP6X	Ø30 x 64 mm	20 mm,	—, PNP	PA	PVC 2 m	w004	d196
NI20U-S30-AN6X	Ø30 x 64 mm	20 mm,	—, NPN	PA	PVC 2 m	w005	d196
NI20U-M30-AP6X	Ø30 x 64 mm	20 mm,	—, PNP	CuZn-Cr	PVC 2 m	w004	d053
NI20U-M30-AN6X	Ø30 x 64 mm	20 mm,	—, NPN	CuZn-Cr	PVC 2 m	w005	d053
NI20U-EM30-AP6X	Ø30 x 64 mm	20 mm,	—, PNP	V2A (1.4301)	PVC 2 m	w004	d053
NI20U-EM30-AN6X	Ø30 x 64 mm	20 mm,	—, NPN	V2A (1.4301)	PVC 2 m	w005	d053

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## M30 – 3-wire DC – Terminal chamber



**General data**

**Operating voltage** 10...30 VDC

**Types and data – selection table**

Type	Dimensions	Switching distance	Output	Electrical connection	Material housing	w	d
BI15U-EM30WDTC-AP6X	Ø30 x 95 mm	15 mm,	—, PNP	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w011	d080
BI10U-P30SK-AP6X	Ø30 x 87 mm	10 mm,	—, PNP	terminal chamber	PA	w011	d201
BI10U-P30SK-AN6X	Ø30 x 87 mm	10 mm,	—, NPN	terminal chamber	PA	w012	d201
BI10U-EG30SK-AP6X	Ø30 x 87 mm	10 mm,	—, PNP	terminal chamber	V2A (1.4301)	w011	d199
BI10U-EG30SK-AN6X	Ø30 x 87 mm	10 mm,	—, NPN	terminal chamber	V2A (1.4301)	w012	d199
BI10-P30SR-AP6X	Ø30 x 115 mm	10 mm,	—, PNP	terminal chamber	ABS	w011	d202
BI10-P30SR-AN6X	Ø30 x 115 mm	10 mm,	—, NPN	terminal chamber	ABS	w012	d202
BI10-P30SK-AP6X	Ø30 x 87 mm	10 mm,	—, PNP	terminal chamber	PA	w011	d201
BI10-G30SK-AP6X	Ø30 x 87 mm	10 mm,	—, PNP	terminal chamber	CuZn-Cr	w011	d199
BI10-G30SK-AN6X	Ø30 x 87 mm	10 mm,	—, NPN	terminal chamber	CuZn-Cr	w012	d199
NI30U-EM30WDTC-AP6X	Ø30 x 95 mm	30 mm,	—, PNP	terminal chamber, removable cage clamp terminals	V4A (1.4404)	w011	d081
NI20U-P30SK-AP6X	Ø30 x 87 mm	20 mm,	—, PNP	terminal chamber	PA	w011	d201
NI20U-P30SK-AN6X	Ø30 x 87 mm	20 mm,	—, NPN	terminal chamber	PA	w012	d201
NI20U-EG30SK-AP6X	Ø30 x 87 mm	20 mm,	—, PNP	terminal chamber	V2A (1.4301)	w011	d200
NI20U-EG30SK-AN6X	Ø30 x 87 mm	20 mm,	—, NPN	terminal chamber	V2A (1.4301)	w012	d200
NI15-P30SR-AP6X	Ø30 x 115 mm	15 mm,	—, PNP	terminal chamber	ABS	w011	d202
NI15-P30SR-AN6X	Ø30 x 115 mm	15 mm,	—, NPN	terminal chamber	ABS	w012	d202
NI15-P30SK-AP6X	Ø30 x 87 mm	15 mm,	—, PNP	terminal chamber	PA	w011	d201
NI15-P30SK-AN6X	Ø30 x 87 mm	15 mm,	—, NPN	terminal chamber	PA	w012	d201
NI15-G30SK-AP6X	Ø30 x 87 mm	15 mm,	—, PNP	terminal chamber	CuZn-Cr	w011	d200
NI15-G30SK-AN6X	Ø30 x 87 mm	15 mm,	—, NPN	terminal chamber	CuZn-Cr	w012	d200





















## M30 – 4-wire DC – M12 x 1 plug connection



<b>General data</b>			
<b>Dimensions</b>	Ø30 x 62 mm	<b>Material housing</b>	CuZn-Cr
<b>Electrical connection</b>	connector, M12 x 1		

### Types and data – selection table





















Type	Switching distance	Output	Operating voltage		
BI15U-M30-VP44X-H1141	15 mm, 	 , PNP	10...55 VDC	w017	d050
BI15U-M30-VN44X-H1141	15 mm, 	 , NPN	10...55 VDC	w010	d050
BI15-M30-VP6X-H1141	15 mm, 	 , PNP	10...30 VDC	w008	d050
BI15-M30-VN6X-H1141	15 mm, 	 , NPN	10...30 VDC	w010	d050
NI30U-M30-VP44X-H1141	30 mm, 	 , PNP	10...55 VDC	w017	d051
NI30U-M30-VN44X-H1141	30 mm, 	 , NPN	10...55 VDC	w010	d051
NI20-M30-VP6X-H1141	20 mm, 	 , PNP	10...30 VDC	w008	d051
NI20-M30-VN6X-H1141	20 mm, 	 , NPN	10...30 VDC	w010	d051

## M30 – 4-wire DC – Cable connection



<b>General data</b>			
<b>Dimensions</b>	Ø30 x 64 mm	<b>Material housing</b>	CuZn-Cr
<b>Electrical connection</b>	cable		

















**Types and data – selection table**

Type	Switching distance	Output	Operating voltage	Material cable	w	d
BI15U-M30-VP44X	15 mm, 	 , PNP	10...55 VDC	PVC 2 m	w007	d052
BI15U-M30-VN44X	15 mm, 	 , NPN	10...55 VDC	PVC 2 m	w018	d052
BI15-M30-VN4X 7M	15 mm, 	 , NPN	10...30 VDC	PVC 7 m	w018	d052
BI15-M30-VP4X 7M	15 mm, 	 , PNP	10...30 VDC	PVC 7 m	w007	d052
BI15-M30-VN6X	15 mm, 	 , NPN	10...30 VDC	PVC 2 m	w018	d052
BI15-M30-VP6X	15 mm, 	 , PNP	10...30 VDC	PVC 2 m	w007	d052
NI30U-M30-VP44X	30 mm, 	 , PNP	10...55 VDC	PVC 2 m	w007	d053
NI30U-M30-VN44X	30 mm, 	 , NPN	10...55 VDC	PVC 2 m	w018	d053
NI20-M30-VP6X 7M	20 mm, 	 , PNP	10...30 VDC	PVC 7 m	w007	d053
NI20-M30-VN6X 7M	20 mm, 	 , PNP	10...30 VDC	PVC 7 m	w007	d053

**M30 – 4-wire DC – Terminal chamber**

**General data**
**Electrical connection** terminal chamber      **Operating voltage** 10...65 VDC

**Types and data – selection table**

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI10U-EG30SK-VP4X	Ø30 x 87 mm	10 mm, 	 , PNP	V2A (1.4301)	w014	d199
BI10U-EG30SK-VN4X	Ø30 x 87 mm	10 mm, 	 , NPN	V2A (1.4301)	w013	d199
BI10-P30SR-VP4X2	Ø30 x 115 mm	10 mm, 	 , PNP	ABS	w014	d203
BI10-P30SR-VN4X2	Ø30 x 115 mm	10 mm, 	 , NPN	ABS	w013	d203
NI20U-EG30SK-VP4X	Ø30 x 87 mm	20 mm, 	 , PNP	V2A (1.4301)	w014	d200
NI20U-EG30SK-VN4X	Ø30 x 87 mm	20 mm, 	 , NPN	V2A (1.4301)	w013	d200
NI15-P30SR-VP4X2	Ø30 x 115 mm	15 mm, 	 , PNP	ABS	w014	d203
NI15-P30SR-VN4X2	Ø30 x 115 mm	15 mm, 	 , NPN	ABS	w013	d203

## M30 – 2-wire AC/DC – 7/8" plug connection



### General data



**Dimensions** Ø30 x 80 mm

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Output**   
**Electrical connection** connector, 7/8"

**Material housing** CuZn-Cr

### Types and data – selection table

Type	Switching distance	w	d
B110U-G30-ADZ30X2-B1131	10 mm, 	w030	d204
NI20U-G30-ADZ30X2-B1131	20 mm, 	w030	d205

## M30 – 2-wire AC/DC – 1/2" plug connection



### General data

**Dimensions** Ø30 x 80 mm

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Output**   
**Electrical connection** connector, 1/2"

**Material housing** CuZn-Cr

### Types and data – selection table

Type	Switching distance	w	d
B110U-G30-ADZ30X2-B3131	10 mm, 	w030	d206
NI20U-G30-ADZ30X2-B3131	20 mm, 	w030	d207

## M30 – 2-wire AC/DC – Terminal chamber



**General data**

**Dimensions** Ø30 x 64 mm









**Operating voltage** 20...250 VAC /  
10...300 VDC

**Output** 

**Material cable** PVC 2 m

**Electrical connection** cable

**Types and data – selection table**

Type	Switching distance	Material housing		
BI10U-M30-ADZ30X2	10 mm, 	CuZn-Cr	w031	d208
BI10-S30-AZ3X	10 mm, 	PA	w031	d196
BI10-M30-AZ3X	10 mm, 	CuZn-Cr	w020	d052
NI20U-M30-ADZ30X2	20 mm, 	CuZn-Cr	w031	d209
NI15-S30-AZ3X	15 mm, 	PA	w031	d196
NI15-M30-AZ3X	15 mm, 	CuZn-Cr	w020	d053

## M30 – 2-wire AC/DC – Terminal chamber



**General data**

**Dimensions** Ø30 x 115 mm

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Output** connection programmable

**Material housing** ABS


**Electrical connection** Terminal chamber

**Types and data – selection table**

Type	Switching distance		
BI10-P30SR-FZ3X2	10 mm, 	w028	d203
NI15-P30SR-FZ3X2	15 mm, 	w028	d203

## G47 – NAMUR






<b>Type</b>	BI20-G47-Y1X	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	Ø47 x 70 mm	<b>Material housing</b>	CuZn-Cr
<b>Switching distance</b>	20 mm, 	<b>Material cable</b>	PVC 2 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d210

## G47 – 3-wire DC



<b>General data</b>		<b>Material housing</b>	CuZn-Cr
<b>Dimensions</b>	Ø47 x 70 mm	<b>Material cable</b>	PVC 2 m
<b>Electrical connection</b>	cable		
<b>Operating voltage</b>	10...65 VDC		

### Types and data – selection table

Type	Switching distance	Output		
BI20-G47-AP4X	20 mm, 	 , PNP	w004	d210
BI20-G47-AN4X	20 mm, 	 , NPN	w005	d210
NI25-G47-AP4X	25 mm, 	 , PNP	w004	d211
NI25-G47-AN4X	25 mm, 	 , NPN	w005	d211

## G47 – 4-wire DC



**General data**

**Electrical connection** terminal chamber  
**Operating voltage** 10...65 VDC

**Material housing** CuZn-Cr

**Types and data – selection table**

Type	Dimensions	Switching distance	Output	w	d
BI25-G47SR-VP4X2	Ø47 x 96 mm	25 mm,	, PNP	w014	d212
BI25-G47SR-VN4X2	Ø47 x 96 mm	25 mm,	, NPN	w013	d212
NI40-G47SR-VP4X2	Ø47 x 106 mm	40 mm,	, PNP	w014	d213
NI40-G47SR-VN4X2	Ø47 x 106 mm	40 mm,	, NPN	w013	d213

## G47 – 2-wire AC/DC



**General data**

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Material housing** CuZn-Cr

**Types and data – selection table**

Type	Dimensions	Switching distance	Output	Electrical connection	Material cable	w	d
BI25-G47SR-FZ3X2	Ø47 x 96 mm	25 mm,	connection programmable	terminal chamber	-	w028	d212
BI20-G47-AZ3X	Ø47 x 70 mm	20 mm,		cable	PVC 2 m	w031	d210
NI40-G47SR-FZ3X2	Ø47 x 106 mm	40 mm,	connection programmable	terminal chamber	-	w028	d213
NI25-G47-AZ3X	Ø47 x 70 mm	25 mm,		cable	PVC 2 m	w031	d211

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

## Smooth barrel

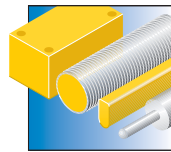


Compact 3 mm or robust  $\varnothing$  40 mm versions: The smooth barrels feature different switching distances, many connection possibilities and a high protection class required as a standard in the sector of industrial automation.

### Features

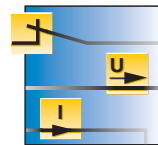
- Cable, plug connection or terminal chamber
- Mounting bracket included in delivery
- Electrical versions NAMUR, DC and AC/DC
- Stainless steel and plastic housings

### Properties



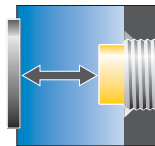
#### Design

from  $\varnothing$  3 mm for confined spaces up to  $\varnothing$  40 mm for animal feed applications



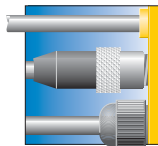
#### Electrical versions

NAMUR, 2/3 and 4-wire DC, 2-wire AC/DC



#### Switching distances

Large switching distances, optionally with factor 1, without reduction factor



#### Electrical connections

Cable, terminal chamber, M8 and M12 plug connections



#### Materials

Stainless steel sensors up to  $\varnothing$  6.5 mm diameter, bigger sizes in PA or PBT



#### Special features

$\varnothing$  4 mm and 6.5 mm with lateral active face, Integrated rotation speed control



## Ø 3 mm – 3-wire DC



### General data

<b>Dimensions</b>	Ø3 x 27 mm
<b>Switching distance</b>	1 mm,
<b>Electrical connection</b>	cable

<b>Operating voltage</b>	10...30 VDC
<b>Material housing</b>	V2A (1.4301)
<b>Material cable</b>	PUR 2 m

### Types and data – selection table

Type	Output		
BI1-EH03-AP7X	, PNP	w004	d214
BI1-EH03-AN7X	, NPN	w005	d214

## Ø 4 mm – NAMUR



### General data

<b>Dimensions</b>	Ø4 x 30 mm
<b>Switching distance</b>	1 mm,
<b>Output</b>	NAMUR
<b>Electrical connection</b>	cable

<b>Operating voltage</b>	nom. 8.2 VDC
<b>Material housing</b>	V4A (1.4404)
<b>Material cable</b>	PVC 2 m


### Types and data – selection table

Type		
BI1-HS540-Y1	w019	d216
BI1-EH04-Y1	w019	d215

## Ø 4 mm – 3-wire DC












**General data**

**Switching distance** 1 mm, 

**Operating voltage** 10...30 VDC

**Material housing** V4A (1.4404)

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BI1-HS540-RP6X	Ø4 x 30 mm	 , PNP	cable	PUR 2 m	w006	d219
BI1-HS540-AP6X	Ø4 x 30 mm	 , PNP	cable	PUR 2 m	w004	d219
BI1-HS540-AN6X	Ø4 x 30 mm	 , NPN	cable	PUR 2 m	w005	d219
BI1-EH04-RP6X-V1331	Ø4 x 42.5 mm	 , PNP	connector, M8 x 1	-	w003	d217
BI1-EH04-RP6X	Ø4 x 30 mm	 , PNP	cable	PUR 2 m	w006	d218
BI1-EH04-AP6X-V1331	Ø4 x 42.5 mm	 , PNP	connector, M8 x 1	-	w001	d217
BI1-EH04-AP6X	Ø4 x 30 mm	 , PNP	cable	PUR 2 m	w004	d218
BI1-EH04-AN6X-V1331	Ø4 x 42.5 mm	 , NPN	connector, M8 x 1	-	w002	d217
BI1-EH04-AN6X	Ø4 x 30 mm	 , NPN	cable	PUR 2 m	w005	d218

## Ø 6.5 mm – NAMUR



**General data**




**Output** NAMUR

**Electrical connection** cable

**Operating voltage** nom. 8.2 VDC

**Material cable** PVC 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	Material housing	w	d
BI1,5-HS865-Y1	Ø6.5 x 31.6 mm	1.5 mm, 	CuZn-Cr	w019	d221
BI1,5-EH6,5K-Y1	Ø6.5 x 23.6 mm	1.5 mm, 	V4A (1.4404)	w019	d220
NI3-EH6,5K-Y1	Ø6.5 x 23.6 mm	3 mm, 	V4A (1.4404)	w019	d222

## Ø 6.5 mm – 3-wire DC – M18 x 1 plug connection



### General data

#### Electrical connection

connector, M8 x 1

#### Operating voltage

10...30 VDC

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI2U-EH6,5-RP6X-V1131	Ø6.5 x 49 mm	2 mm,	, PNP	V2A (1.4301)	w003	d018
BI2U-EH6,5-AP6X-V1131	Ø6.5 x 49 mm	2 mm,	, PNP	V2A (1.4301)	w001	d018
BI2U-EH6,5-AN6X-V1131	Ø6.5 x 49 mm	2 mm,	, NPN	V2A (1.4301)	w002	d018
BI2-EH6,5K-RP6X-V1131	Ø6.5 x 31 mm	2 mm,	, PNP	V4A (1.4404)	w003	d223
BI2-EH6,5K-AP6X-V1131	Ø6.5 x 31 mm	2 mm,	, PNP	V4A (1.4404)	w001	d223
BI2-EH6,5K-AN6X-V1131	Ø6.5 x 31 mm	2 mm,	, NPN	V4A (1.4404)	w002	d223
BI2-EH6,5-AP6X-V1131	Ø6.5 x 49 mm	2 mm,	, PNP	V2A (1.4301)	w001	d018
BI2-EH6,5-AN6X-V1131	Ø6.5 x 49 mm	2 mm,	, NPN	V2A (1.4301)	w002	d018
BI1,5-EH6,5K-AP6X-V1131	Ø6.5 x 31 mm	1.5 mm,	, PNP	V4A (1.4404)	w001	d223
BI1,5-EH6,5K-AN6X-V1131	Ø6.5 x 31 mm	1.5 mm,	, NPN	V4A (1.4404)	w002	d223
BI1,5-EH6,5-AP6X-V1131	Ø6.5 x 49 mm	1.5 mm,	, PNP	V2A (1.4301)	w001	d018
BI1,5-EH6,5-AN6X-V1131	Ø6.5 x 49 mm	1.5 mm,	, NPN	V2A (1.4301)	w002	d018
NI6U-EH6,5-RP6X-V1131	Ø6.5 x 49 mm	6 mm,	, PNP	V2A (1.4301)	w003	d019
NI6U-EH6,5-AP6X-V1131	Ø6.5 x 49 mm	6 mm,	, PNP	V2A (1.4301)	w001	d019
NI6U-EH6,5-AN6X-V1131	Ø6.5 x 49 mm	6 mm,	, NPN	V2A (1.4301)	w002	d019
NI3-EH6,5K-AP6X-V1131	Ø6.5 x 31 mm	3 mm,	, PNP	V4A (1.4404)	w001	d224
NI3-EH6,5K-AN6X-V1131	Ø6.5 x 31 mm	3 mm,	, NPN	V4A (1.4404)	w002	d224
NI3-EH6,5-AP6X-V1131	Ø6.5 x 49 mm	3 mm,	, PNP	V2A (1.4301)	w001	d019
NI3-EH6,5-AN6X-V1131	Ø6.5 x 49 mm	3 mm,	, NPN	V2A (1.4301)	w002	d019

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## Ø 6.5 mm – 3-wire DC – Cable connection



### General data

Electrical connection	cable	Material cable	PUR 2 m
Operating voltage	10...30 VDC		

### Types and data – selection table

Type	Dimensions	Switching distance	Output	Material housing	w	d
BI2U-EH6,5-RP6X	Ø6.5 x 41.6 mm	2 mm,	, PNP	V2A (1.4301)	w006	d020
BI2U-EH6,5-AP6X	Ø6.5 x 41.6 mm	2 mm,	, PNP	V2A (1.4301)	w004	d020
BI2U-EH6,5-AN6X	Ø6.5 x 41.6 mm	2 mm,	, NPN	V2A (1.4301)	w005	d020
BI2-EH6,5K-RP6X	Ø6.5 x 23.6 mm	2 mm,	, PNP	V4A (1.4404)	w006	d225
BI2-EH6,5K-AP6X	Ø6.5 x 23.6 mm	2 mm,	, PNP	V4A (1.4404)	w004	d225
BI2-EH6,5K-AN6X	Ø6.5 x 23.6 mm	2 mm,	, NPN	V4A (1.4404)	w005	d225
BI2-EH6,5-AP6X	Ø6.5 x 41.6 mm	2 mm,	, PNP	V2A (1.4301)	w004	d020
BI2-EH6,5-AN6X	Ø6.5 x 41.6 mm	2 mm,	, NPN	V2A (1.4301)	w005	d020
BI1,5-HS865-AP6X	Ø6.5 x 31.6 mm	1.5 mm,	, PNP	CuZn-Cr	w004	d221
BI1,5-HS865-AN6X	Ø6.5 x 41.6 mm	1.5 mm,	, NPN	CuZn-Cr	w005	d221
BI1,5-EH6,5K-AP6X	Ø6.5 x 23.6 mm	1.5 mm,	, PNP	V4A (1.4404)	w004	d225
BI1,5-EH6,5K-AN6X	Ø6.5 x 23.6 mm	1.5 mm,	, NPN	V4A (1.4404)	w005	d225
NI6U-EH6,5-AP6X	Ø6.5 x 42 mm	6 mm,	, PNP	V2A (1.4301)	w004	d021
NI6U-EH6,5-AN6X	Ø6.5 x 42 mm	6 mm,	, NPN	V2A (1.4301)	w005	d021
NI3-EH6,5K-AP6X	Ø6.5 x 23.6 mm	3 mm,	, PNP	V4A (1.4404)	w004	d226
NI3-EH6,5K-AN6X	Ø6.5 x 23.6 mm	3 mm,	, NPN	V4A (1.4404)	w005	d226
NI3-EH6,5-AP6X	Ø6.5 x 42 mm	3 mm,	, PNP	V2A (1.4301)	w004	d021
NI3-EH6,5-AN6X	Ø6.5 x 42 mm	3 mm,	, NPN	V2A (1.4301)	w005	d021

## Ø 11 mm – NAMUR



### General data

<b>Dimensions</b>	Ø11 x 34 mm	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR	<b>Material housing</b>	PA
<b>Electrical connection</b>	cable	<b>Material cable</b>	PVC 2 m

Fixing clamp BS11 included in delivery

### Types and data – selection table

Type	Switching distance	w	d
BI2-K11-Y1	2 mm,	w019	d227
NI5-K11-Y1	5 mm,	w019	d227

## Ø 11 mm – 3-wire DC



### General data

<b>Output</b>	, PNP	<b>Material housing</b>	PA
<b>Operating voltage</b>	10...30 VDC		

Fixing clamp BS11 included in delivery

### Types and data – selection table

Type	Dimensions	Switching distance	Electrical connection	Material cable	w	d
BI2-K11SK-AP6X	Ø11 x 75 mm	2 mm,	terminal chamber	-	w011	d229
BI2-K11-AP6X	Ø11 x 54 mm	2 mm,	cable	PVC 2 m	w004	d228
NI5-K11SK-AP6X	Ø11 x 75 mm	5 mm,	terminal chamber	-	w011	d229
NI5-K11-AP6X	Ø11 x 54 mm	5 mm,	cable	PVC 2 m	w004	d228

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## Ø 20 mm – 3-wire DC



**General data**





**Switching distance** 10 mm, 

**Operating voltage** 10...30 VDC

**Material housing** PBT

Fixing clamp BS20 included in delivery

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
NI10-K20SK-AP6X	Ø20 x 77 mm	 , PNP	terminal chamber	-	w011	d231
NI10-K20SK-AN6X	Ø20 x 77 mm	 , NPN	terminal chamber	-	w012	d231
NI10-K20-AP6X	Ø20 x 54 mm	 , PNP	cable	PVC 2 m	w004	d230
NI10-K20-AN6X	Ø20 x 54 mm	 , NPN	cable	PVC 2 m	w005	d230

## Ø 20 mm – 2-wire AC/DC



**General data**

**Switching distance** 10 mm, 

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Output** 

**Material housing** PBT

Fixing clamp BS20 included in delivery

### Types and data – selection table

Type	Dimensions	Electrical connection	Material cable	w	d
NI10-K20SK-AZ3X	Ø20 x 77 mm	terminal chamber	-	w036	d231
NI10-K20-AZ3X	Ø20 x 79 mm	cable	PVC 2 m	w031	d232

## Ø 34 mm – 4-wire DC



### General data

Switching distance

20 mm,

Output

, PNP

Operating voltage

10...65 VDC

Material housing

PBT

Fixing clamp BS34.1 included in delivery

### Types and data – selection table

Type	Dimensions	Electrical connection	Material cable		
NI20-K34SR-VP4X2	Ø34 x 106 mm	terminal chamber	-	w014	d234
NI20-K34-VP4X	Ø34 x 80 mm	cable	PVC 2 m	w007	d233

## Ø 40 mm – 4-wire DC



### General data

Dimensions

Ø40 x 90 mm

Electrical connection

Terminal chamber

Operating voltage

10...65 VDC

Material housing

ABS

Fixing clamp BS40 included in delivery

### Types and data – selection table

Type	Switching distance	Output		
NI30-K40SR-VP4X2	30 mm,	, PNP	w014	d235
NI30-K40SR-VN4X2	30 mm,	, NPN	w013	d235
NI20-K40SR-VP4X2	20 mm,	, PNP	w014	d235
NI20-K40SR-VN4X2	20 mm,	, NPN	w013	d235

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

**Ø 40 mm – 2-wire AC/DC**



**General data**

**Dimensions**

Ø40 x 90 mm

**Operating voltage**

20...250 VAC /  
10...300 VDC

**Output**

connection programmable

**Material housing**

ABS

**Electrical connection**

terminal chamber

Fixing clamp BS40 included in delivery

**Types and data – selection table**

Type	Switching distance	w	d
NI30-K40SR-FZ3X2	30 mm,	w028	d235
NI20-K40SR-FZ3X2	20 mm,	w028	d235



**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

## Ring sensors

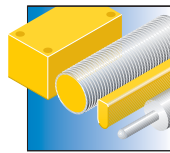


TURCK ring sensors are compact and universally mountable. They are applied in assembly lines or component feeding systems to detect small metal parts. The *uprox*<sup>®</sup>+ TS12 is an innovative replacement for various ring sensors, especially for applications with different tube diameters.

### Features

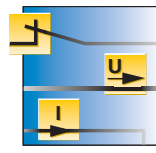
- Ring diameter 6...100 mm
- Static, dynamic and analog versions
- Integrated amplifier or separable combination of probe and amplifier
- High sensitivity, adjustable, up to Ø 0.1 mm wire diameter
- Compact design
- Innovative TS12 version from the *uprox*<sup>®</sup>+ factor 1 series

### Properties



#### Design

From the compact Q14 rectangular version to the well-proven S32.



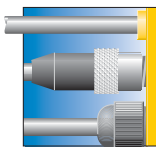
#### Electrical versions

3-wire NO contact or antivalent PNP/NPN switching  
Static, dynamic or analog



#### Measuring ranges

Ring diameters of Ø 6...100 mm detect steel balls of Ø 0.6 mm as well as wires of Ø 0.4 mm and larger



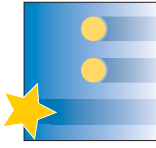
#### Electrical connections

M12 x 1 plug connection, terminal chamber, cable 2 m



#### Materials

Plastic housing in PBT, PA, ABS and POM



#### Special features

Versions with separate ring and amplifier  
S32 XL with 100 mm ring diameter

## TS12 – 3-wire DC





### General data

**Dimensions** 17 x 12 x 80 mm  
**Electrical connection** connector, M8 x 1

**Operating voltage** 10...30 VDC  
**Material housing** PBT

For small parts detection

### Types and data – selection table

Type	Output	w	d
NI20U-TS12-AP6X2-V1131	 , PNP	w001	d236
NI20U-TS12-AN6X2-V1131	 , NPN	w002	d236

## Q14 – 3-wire DC



### General data

**Dimensions** 30 x 14 x 62.5 mm  
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...30 VDC  
**Material housing** PBT

Tailback detection possible

### Types and data – selection table

Type	Internal ring diameter	Min. object size	Output	w	d
BI20R-Q14-AP6X2-H1141	20.1 mm	4mm	—, PNP	w001	d240
BI20R-Q14-AN6X2-H1141	20.1 mm	4mm	—, NPN	w002	d240
BI15R-Q14-AP6X2-H1141	15.1 mm	3mm	—, PNP	w001	d239
BI15R-Q14-AN6X2-H1141	15.1 mm	3mm	—, NPN	w002	d239
BI10R-Q14-AP6X2-H1141	10.1 mm	2mm	—, PNP	w001	d238
BI10R-Q14-AN6X2-H1141	10.1 mm	2mm	—, NPN	w002	d238
BI6R-Q14-AP6X2-H1141	6.1 mm	2mm	—, PNP	w001	d237
BI6R-Q14-AN6X2-H1141	6.1 mm	2mm	—, NPN	w002	d237

### Q14 – Voltage output 0...10 V



<b>Type</b>	BI20R-Q14-LU-H1141	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	30 x 14 x 62.5 mm	<b>Material housing</b>	PBT
<b>Internal ring diameter</b>	20.1 mm	<b>Wiring diagram</b>	w037
<b>Analog output</b>	0...10 V	<b>Dimension drawing</b>	d241
<b>Electrical connection</b>	connector, M12 x 1		

Tailback detection possible

### Q20 – 3-wire DC



<b>General data</b>		<b>Electrical connection</b>	connector, M12 x 1
<b>Dimensions</b>	40 x 20 x 68 mm	<b>Operating voltage</b>	10...30 VDC
<b>Internal ring diameter</b>	30.1 mm	<b>Material housing</b>	PBT
<b>Min. object size</b>	6 mm		

Tailback detection possible

## Types and data – selection table

Type	Output	w	d
BI30R-Q20-AP6X2-H1141	—, PNP	w001	d242
BI30R-Q20-AN6X2-H1141	—, NPN	w002	d242

## W30 – 3-wire DC – Dynamic output performance



## General data

## Dimensions

35 x 30 x 60 mm

## Electrical connection

connector, M12 x 1

## Operating voltage

10...30 VDC

## Material housing

PA

For the detection of small and fast moving parts


## Types and data – selection table

Type	Internal ring diameter	Min. object size	Output	w	d
BI30R-W30-DAP6X-H1141	30.1 mm	3 mm	—, PNP	w001	d247
BI30R-W30-DAN6X-H1141	30.1 mm	3 mm	—, NPN	w002	d247
BI20R-W30-DAP6X-H1141	20.1 mm	2 mm	—, PNP	w001	d246
BI20R-W30-DAN6X-H1141	20.1 mm	2 mm	—, NPN	w002	d246
BI15R-W30-DAP6X-H1141	15.1 mm	1.5 mm	—, PNP	w001	d245
BI15R-W30-DAN6X-H1141	15.1 mm	1.5 mm	—, NPN	w002	d245
BI10R-W30-DAP6X-H1141	10.1 mm	1 mm	—, PNP	w001	d244
BI10R-W30-DAN6X-H1141	10.1 mm	1 mm	—, NPN	w002	d244
BI6R-W30-DAP6X-H1141	6.1 mm	0.6 mm	—, PNP	w001	d243
BI6R-W30-DAN6X-H1141	6.1 mm	0.6 mm	—, NPN	w002	d243

## Q80 – 3-wire DC




**General data**

**Dimensions** 80 x 40 x 92 mm  
**Output** , PNP  
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...30 VDC  
**Material housing** PBT

Tailback detection possible


**Types and data – selection table**

Type	Internal ring diameter	Min. object size		
BI65R-Q80-AP6X2-H1141	65 mm	10 mm	w001	d249
BI50R-Q80-AP6X2-H1141	50 mm	8 mm	w001	d248

## S32SR – 4-wire DC





**General data**

**Dimensions** 100 x 32 x 175 mm  
**Output** , PNP  
**Electrical connection** terminal chamber


**Operating voltage** 10...55 VDC  
**Material housing** ABS

Tailback detection possible

**Types and data – selection table**

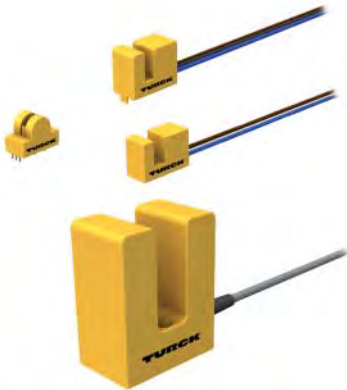
Type	Internal ring diameter		
NI65R-S32SR-VP44X	65 mm	w014	d252
NI40R-S32SR-VP44X	40 mm	w014	d251
NI20R-S32SR-VP44X	20 mm	w014	d250

**S32XL – 4-wire DC**

<b>Type</b>	NI100R-S32XL-VP44X-H1141	<b>Electrical connection</b>	connector, M12 x 1
<b>Dimensions</b>	137.5 x 32 x 180 mm	<b>Operating voltage</b>	10...55 VDC
<b>Internal ring diameter</b>	100 mm	<b>Material housing</b>	POM
<b>Min. object size</b>	10 mm / 4 mm	<b>Wiring diagram</b>	w017
<b>Output</b>	 , PNP	<b>Dimension drawing</b>	d253

Tailback detection possible

# Slot sensors



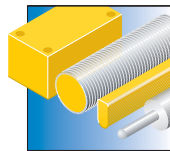
The slot sensors are U-shaped and the active face is located between the two arms. If a metal part passes through the slot, the sensor is actuated. Slot sensors detect laterally approaching targets regardless of their distance to the active face.

Slot sensors are thus applicable as limit value detectors on analog pointer instruments or on trailing chain capable conveyor systems, on which the positioning element may move due to the chain tolerance.

## Features

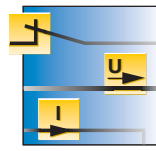
- Slot width 2 ... 15 mm
- Compact design for confined spaces
- High repeatability
- All versions available with NAMUR output (incl. SIL2)
- Robust plastic housings

## Properties



### Design

From the small K08 for confined spaces up to the K33 with large slot width



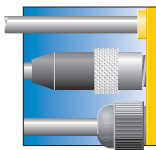
### Electrical versions

3 and 4-wire DC NAMUR



### Measuring ranges

Slot widths 2...15 mm



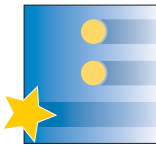
### Electrical connections

0.5 mm litz wires or 2 m PVC connection cable



### Materials

PA or PBT housings

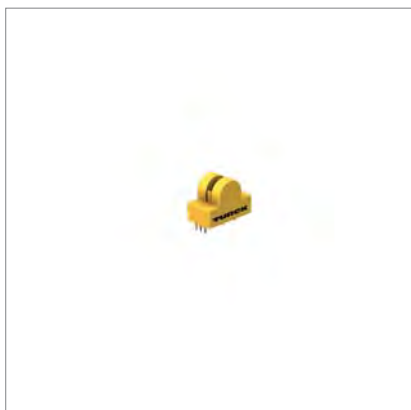


### Special features

ATEX approved and SIL2 qualified NAMUR devices

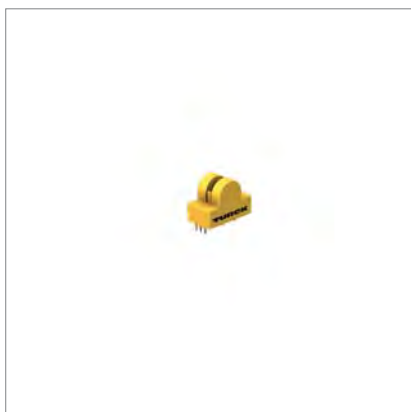


## K08 – NAMUR



<b>Type</b>	SI2-K08-Y1	<b>Operating voltage</b>	nom. 8.2VDC
<b>Dimensions</b>	15 x 8 x 11 mm	<b>Material housing</b>	Vestamide
<b>Slot width</b>	2 mm	<b>Material cable</b>	PVC 0.5 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d254

## K08 – 3-wire DC

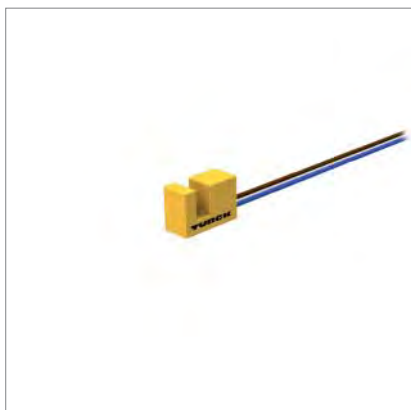


<b>General data</b>		<b>Operating voltage</b>	10...30VDC
<b>Dimensions</b>	15 x 8 x 11 mm	<b>Material housing</b>	Vestamide
<b>Slot width</b>	2 mm	<b>Material cable</b>	PVC 0.5 m
<b>Electrical connection</b>	cable		

### Types and data – selection table

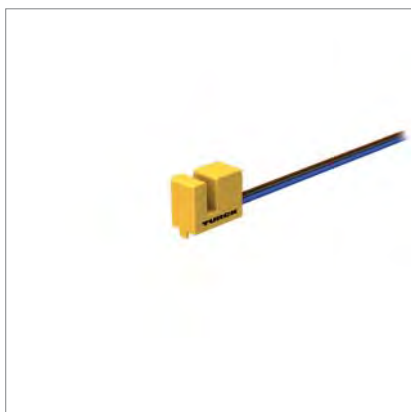
Type	Output	<span style="background-color: #008000; color: white; padding: 2px;">w</span>	<span style="background-color: #ff0000; color: white; padding: 2px;">d</span>
SI2-K08-AP7	PNP	w004	d255
SI2-K08-AN7	NPN	w005	d255

## K09 – NAMUR



<b>Type</b>	SI5-K09-Y1	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	9 x 14 x 20 mm	<b>Material housing</b>	PBT
<b>Slot width</b>	5 mm	<b>Material cable</b>	PVC 0.5 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d256

## K10 – NAMUR

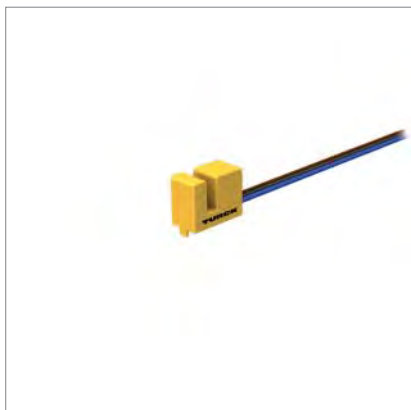


<b>General data</b>		<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	15 x 10 x 19 mm	<b>Material housing</b>	PBT
<b>Slot width</b>	3.5 mm	<b>Material cable</b>	PVC 0.5 m
<b>Output</b>	NAMUR		
<b>Electrical connection</b>	cable		

### Types and data – selection table



Type	<span style="background-color: green; color: white; padding: 2px;">w</span>	<span style="background-color: red; color: white; padding: 2px;">d</span>
SI3,5-K10-Y1	w019	d257
SI3,5-K10-Y1X	w019	d258

## M10 – 3-wire DC

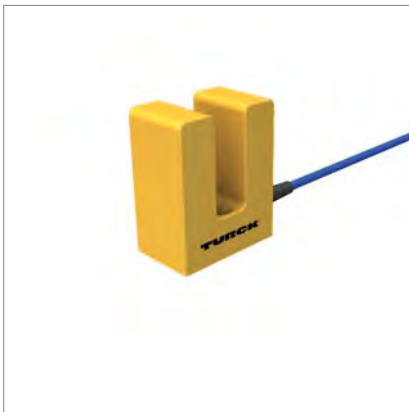


<b>General data</b>		<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	15 x 10 x 19 mm	<b>Material housing</b>	PBT
<b>Slot width</b>	3.5 mm	<b>Material cable</b>	PVC 0.5 m
<b>Electrical connection</b>	cable		

Types and data – selection table

Type	Output	w	d
SI3,5-K10-AP6X	 , PNP	w004	d259
SI3,5-K10-AN7	 , NPN	w005	d259

### K30 – NAMUR




<b>Type</b>	SI15-K30-Y1X	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	60 x 30 x 48 mm	<b>Material housing</b>	PBT
<b>Slot width</b>	15 mm	<b>Material cable</b>	PVC 2 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d260

### K30 – 3-wire DC



<b>General data</b>		<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	60 x 30 x 48 mm	<b>Material housing</b>	PBT
<b>Slot width</b>	15 mm	<b>Material cable</b>	PVC 2 m
<b>Electrical connection</b>	cable		

Types and data – selection table

Type	Output	w	d
SI15-K30-AP6X	 , PNP	w004	d260
SI15-K30-AN6X	 , NPN	w005	d260

## K30 – 2-wire AC/DC



**General data**

**Dimensions** 60 x 30 x 48 mm

**Slot width** 15 mm



**Electrical connection** cable

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Material housing** PBT

**Material cable** PVC 2 m

**Types and data – selection table**

Type	Output	w	d
SI15-K30-RZ3		w038	d261
SI15-K30-AZ3		w031	d261

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

## Dual sensors for rotary actuators

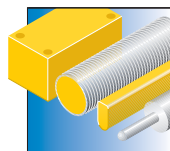


In the chemical, petro-chemical and food industry position control on rotary actuators is of great importance. TURCK dual sensors detect the end position of rotary actuators reliably. They are precisely tailored to the requirements of many different systems and application conditions. Simple mounting and cable routing of TURCK dual sensors reduce the expenses for installation.

### Features

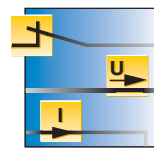
- Safe protection against environmental conditions
- High resistance to chemicals and cleaning agents
- Integrated valve control
- Bus-compatible
- Direct mounting on the rotary actuator
- Robust and impact-resistant
- Repairs of the drive system without disconnection of wiring
- Absolutely maintenance-free
- Broad product range of actuators and accessories
- Compliant with world wide standards like ATEX and SIL

### Properties



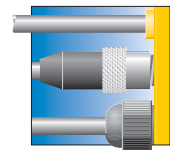
#### Design

Robust, impact-resistant and compact housing



#### Electrical versions

2, 3 and 4-wire DC  
2-wire AC/DC  
NAMUR



#### Electrical connections

Terminal chamber with pullable terminal strip, cable or M12 plug connection



#### Materials

Robust and chemical resistant PP housing



#### Special features

ATEX approved and SIL2 qualified NAMUR devices

## DSC26 – NAMUR



### General data

**Dimensions** 42 x 26 x 28 mm  
**Switching distance** 4 mm,   
**Output** NAMUR

**Operating voltage** nom. 8.2 VDC  
**Material housing** PP

For more details on actuators (pucks) and mounting accessories see chapter „Accessories“.

### Types and data – selection table

Type	Electrical connection	Material cable		
NI4-DSC26-2Y1X2-H1140	connector, M12 x 1	-	w040	d263
NI4-DSC26-2Y1X2	cable	PVC 2 m	w039	d262

## DSC26 – 3-wire DC




### General data

**Dimensions** 42 x 26 x 28 mm  
**Switching distance** 4 mm,   
**Output** , PNP

**Operating voltage** 10...30 VDC  
**Material housing** PP

For more details on actuators (pucks) and mounting accessories see chapter „Accessories“.

### Types and data – selection table

Type	Electrical connection	Material cable		
NI4-DSC26-2AP6X2-H1141	connector, M12 x 1	-	w041	d263
NI4-DSC26-2AP6X2	cable	PUR 2 m	w042	d262

## DSU35 – NAMUR



**General data**

**Switching distance** 4 mm, 



**Output** NAMUR

**Operating voltage** nom. 8.2 VDC

**Material housing** plastic, PA12-GF20

For more details on actuators (pucks) and mounting accessories see chapter „Accessories“.

**Types and data – selection table**

Type	Dimensions	Electrical connection	Material cable		
NI4-DSU35-2Y1X2-H1140	60 x 35.4 x 59 mm	connector, M12 x 1	-	w040	d265
NI4-DSU35-2Y1X2	60 x 35 x 59 mm	cable	PVC 2 m	w039	d264
NI4-DSU35TC-2Y1X2/S97	60 x 35 x 62 mm	terminal chamber	-	w043	d266
NI4-DSU35TC-2Y1X2/S933	60 x 35 x 62 mm	terminal chamber	-	w043	d266
NI4-DSU35TC-2Y1X2	60 x 35 x 62 mm	terminal chamber	-	w043	d266

## DSU35 – 3-wire DC



**General data**








**Switching distance** 4 mm, 

**Operating voltage** 10...65 VDC

**Material housing** plastic, PA12-GF20

For more details on actuators (pucks) and mounting accessories see chapter „Accessories“.

**Types and data – selection table**

Type	Dimensions	Output	Electrical connection	Material cable		
NI4-DSU35-2AP4X2-H1141	60 x 35.4 x 59 mm	 , PNP	connector, M12 x 1	-	w041	d265
NI4-DSU35-2AP4X2	60 x 35 x 59 mm	 , PNP	cable	PVC 2 m	w042	d264
NI4-DSU35TC-2AP4X2/3GD	60 x 35 x 62 mm	 , PNP	terminal chamber	-	w044	d266
NI4-DSU35TC-2AP4X2	60 x 35 x 62 mm	 , PNP	terminal chamber	-	w044	d266
NI4-DSU35TC-2AD4X2	60 x 35 x 62 mm	 , 2-wire	terminal chamber	-	w045	d266



## DSU35 – 2-wire AC/DC



### General data

**Switching distance** 4 mm, 



**Output** 2 x 

**Operating voltage** 20...250 VAC /  
10...300 VDC

**Material housing** plastic, PA12-GF20

For more details on actuators (pucks) and mounting accessories see chapter „Accessories“.

### Types and data – selection table

Type	Dimensions	Electrical connection	Material cable		
NI4-DSU35-2ADZ30X2	60 x 35 x 59 mm	cable	PVC 2 m	w046	d264
NI4-DSU35TC-2ADZ30X2	60 x 35 x 62 mm	terminal chamber	-	w047	d266

## DSU35 – Fieldbus compatible



### General data

**Dimensions** 60 x 35.4 x 59 mm


**Switching distance** 4 mm, 

**Electrical connection** connector, M12 x 1

**Material housing** plastic, PA12-GF20

For more details on actuators (pucks) and mounting accessories see chapter „Accessories“.

### Types and data – selection table

Type	Output	Operating voltage		
NI4-DSU35-2DNETX5-H1150	 , DeviceNet™	11...25 VDC	w049	d268
NI4-DSU35-2ASIX4-H1140	 , AS-i V2.1	18...33 VDC	w048	d267

## Sensors with analog output

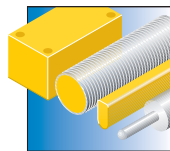


Inductive sensors with analog output provide a distance proportional current, voltage or frequency signal and are ideally suited for simple control tasks. They are used in many applications, requiring more than just simple digital position indication. Typical applications are for example tension control, winding/unwinding motion or separation of parts according to size and material.

### Features

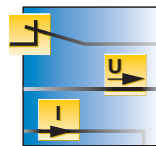
- High repeatability
- Large measuring ranges
- Current, voltage and frequency output
- Optionally adjustable switching output
- Many different designs
- High EMC protection
- Short-circuit and reverse-polarity protection
- All connection types

### Properties



#### Design

Compact rectangular, threaded and smooth barrels as well as ring shaped versions



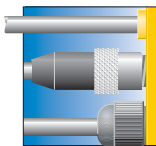
#### Electrical versions

0(2)...10 V or 0(4)...20 mA in 3/4-wire technology or 4...20 mA, 2-wire intrinsically safe



#### Measuring ranges

Highly precise measuring range 0.1...1.5 mm, large range 10...50 mm, ring sensors Ø 20, 50, 100 mm



#### Electrical connections

Cable, plug connection or terminal chamber



#### Materials

Plastic and metal housings for all types of applications, rugged and chemical-resistant



#### Special features

Sensors for the detection of metals  
ATEX approved versions

## Q08 – Voltage output 0...10 V and current output 0...20 mA



<b>Type</b>	BI7-Q08-LIU	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	20 x 8 x 32 mm	<b>Protection class</b>	IP67
<b>Measuring range</b>	1...4 mm,	<b>Material housing</b>	GD-Zn
<b>Repeatability</b>	1 % of measuring range	<b>Material cable</b>	PUR 2 m
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Wiring diagram</b>	w050
<b>Linearity deviation</b>	5% of full scale	<b>Dimension drawing</b>	d269

## Q14 – Voltage output 0...10 V and current output 0...20 mA



<b>General data</b>		<b>Linearity deviation</b>	3% of full scale
<b>Dimensions</b>	30 x 14 x 52 mm	<b>Operating voltage</b>	15...30 VDC
<b>Measuring range</b>	3...8 mm,	<b>Protection class</b>	IP67
<b>Repeatability</b>	1 % of measuring range	<b>Material housing</b>	PBT
<b>Analog output</b>	0...20 mA, 0...10 V		

### Types and data - selection table

Type	Electrical connection	Material cable		
BI10-Q14-LIU-V1141	connector, M8 x 1	-	w051	d270
BI10-Q14-LIU	cable	PUR 2 m	w050	d271

## Q14 – Ring sensor – Voltage output 0...10 V



<b>General data</b>		<b>Protection class</b>	IP67
<b>Repeatability</b>	1 % of measuring range	<b>Material housing</b>	PBT
<b>Analog output</b>	0...10 V		
<b>Operating voltage</b>	15...30 VDC		

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff


Accessories on page 736 ff

**Types and data - selection table**

Type	Dimensions	Electrical connection	Material cable	w	d
BI20R-Q14-LU-H1141	30 x 14 x 62.5 mm	connector, M12 x 1	-	w037	d241
BI20R-Q14-LU	30 x 14 x 52 mm	cable	PVC 2 m	w052	d272

**Q20 – Voltage output 0...10 V and 0...20 mA**




<b>General data</b>			
<b>Dimensions</b>	40 x 20 x 68 mm	<b>Linearity deviation</b>	3% of full scale
<b>Measuring range</b>	4...11 mm, 	<b>Operating voltage</b>	15...30 VDC
<b>Repeatability</b>	1% of measuring range	<b>Protection class</b>	IP67
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Material housing</b>	PBT

**Types and data – selection table**

Type	Electrical connection	Material cable	w	d
BI15-Q20-LIU-H1141	connector, M12 x 1	-	w051	d273
BI15-Q20-LIU	cable	PUR 2 m	w050	d274

**Q20 – 2 voltage outputs 0...10 V – Differentiation of metals**



<b>Type</b>	BI15-Q20-2LU-H1141/S950	<b>Electrical connection</b>	connector, M12 x 1
<b>Dimensions</b>	40 x 20 x 68 mm	<b>Operating voltage</b>	15...30 VDC
<b>Measuring range</b>	4...11 mm, 	<b>Protection class</b>	IP67
<b>Repeatability</b>	1% of measuring range	<b>Material housing</b>	PBT
<b>Analog output</b>	0...10 V	<b>Wiring diagram</b>	w053
<b>Linearity deviation</b>	3% of full scale	<b>Dimension drawing</b>	d273

## Q20L – Voltage output 0...10 V and current output 4...20 mA



<b>General data</b>			
<b>Repeatability</b>	0.5 % of measuring range	<b>Electrical connection</b>	connector, M12 x 1
<b>Analog output</b>	4...20 mA, 0...10 V	<b>Protection class</b>	IP67
<b>Operating voltage</b>	15...30 VDC	<b>Material housing</b>	PBT

More information on magnetic actuators in chapter „Accessories“.

### Types and data – selection table

Type	Dimensions	Measuring range	Linearity deviation	<span style="color: green;">w</span>	<span style="color: red;">d</span>
WIM70-Q20L100-LIU5-H1141	30 x 20 x 100 mm	15...85 mm,	8% of full scale	w051	d276
WIM40-Q20L60-LIU5-H1141	30 x 20 x 60 mm	10...50 mm,	2% of full scale	w051	d275

## CK40 – Voltage output 0...10 V and current output 0...20 mA



<b>General data</b>			
<b>Dimensions</b>	40 x 40 x 65 mm	<b>Operating voltage</b>	15...30 VDC
<b>Repeatability</b>	1 % of measuring range	<b>Protection class</b>	IP67
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Material housing</b>	PBT
<b>Electrical connection</b>	connector, M12 x 1		

Variable orientation of active face in 5 directions

### Types and data – selection table

Type	Measuring range	Linearity deviation	<span style="color: green;">w</span>	<span style="color: red;">d</span>
BI15-CK40-LIU-H1141	4...11 mm,	3% of full scale	w051	d277
NI25-CK40-LIU-H1141	5...25 mm,	5% of full scale	w051	d277



## CP40 – Voltage output 0...10 V and current output 0...20 mA



<b>General data</b>			
<b>Dimensions</b>	40 x 40 x 114 mm	<b>Operating voltage</b>	15...30 VDC
<b>Repeatability</b>	1 % of measuring range	<b>Protection class</b>	IP67
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Material housing</b>	PBT
<b>Electrical connection</b>	terminal chamber		


Variable orientation of active face in 9 directions

### Types and data – selection table

Type	Measuring range	Linearity deviation	w	d
BI15-CP40-LIU	4...11 mm, 	3% of full scale	w054	d278
NI25-CP40-LIU	5...25 mm, 	5% of full scale	w054	d278

## Q80 – Voltage output 0...10 V and current output 0...20 mA



<b>Type</b>	NI50-Q80-LIU-H1141	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	80 x 40 x 92 mm	<b>Protection class</b>	IP67
<b>Measuring range</b>	10...50 mm, 	<b>Material housing</b>	PBT
<b>Repeatability</b>	1 % of measuring range	<b>Electrical connection</b>	connector, M12 x 1
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Wiring diagram</b>	w051
<b>Linearity deviation</b>	5% of full scale	<b>Dimension drawing</b>	d279

## Q80 – 2 voltage outputs 0...10 V – Differentiation of metals



<b>Type</b>	BI50R-Q80-2LU-H1141/ S950	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	80 x 40 x 92 mm	<b>Protection class</b>	IP67
<b>Repeatability</b>	1 % of measuring range	<b>Material housing</b>	PBT
<b>Analog output</b>	0...10 V	<b>Wiring diagram</b>	w053
<b>Linearity deviation</b>	3% of full scale	<b>Dimension drawing</b>	d280
<b>Electrical connection</b>	connector, M12 x 1		


## S32XL – 2 voltage outputs 0...10 V – Differentiation of metals





<b>Type</b>	NI100R-S32XL-2LU-H1141/S950	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	137.5 x 32 x 180 mm	<b>Protection class</b>	IP67
<b>Repeatability</b>	1 % of measuring range	<b>Material housing</b>	POM
<b>Analog output</b>	0...10 V	<b>Wiring diagram</b>	w053
<b>Linearity deviation</b>	3% of full scale	<b>Dimension drawing</b>	d281
<b>Electrical connection</b>	connector, M12 x 1		

## M8 – Voltage output 0...10 V



<b>General data</b>		<b>Operating voltage</b>	15...30 VDC
<b>Measuring range</b>	0.25...1.25 mm, 	<b>Protection class</b>	IP67
<b>Repeatability</b>	1 % of measuring range	<b>Material housing</b>	V2A (1.4301)
<b>Analog output</b>	0...10 V		
<b>Linearity deviation</b>	3% of full scale		

### Types and data – selection table

Type	Dimensions	Electrical connection	Material cable		
BI1,5-EG08-LU-H1341	Ø8 x 57 mm	connector, M12 x 1	-	w037	d128
BI1,5-EG08-LU	Ø8 x 41.6 mm	cable	PUR 2 m	w052	d282

## M12 – Voltage output 0...10 V and current output 0...20 mA



**General data**

<b>Repeatability</b>	1 % of measuring range	<b>Protection class</b>	IP67
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	15...30 VDC		

**Types and data – selection table**

Type	Dimensions	Measuring range	Linearity deviation	Electrical connection	Material cable	w	d
BI4-M12-LIU-H1141	Ø12 x 62 mm	0.5...3 mm,	5 % of full scale	connector, M12 x 1	-	w051	d283
BI4-M12-LIU	Ø12 x 64 mm	0.5...3 mm,	5 % of full scale	cable	PVC 2 m	w050	d285
BI2-M12-LIU-H1141	Ø12 x 62 mm	1...2.5 mm,	3 % of full scale	connector, M12 x 1	-	w051	d283
BI2-M12-LIU	Ø12 x 64 mm	1...2.5 mm,	3 % of full scale	cable	PVC 2 m	w050	d285
NI5-M12-LIU-H1141	Ø12 x 62 mm	0.5...4 mm,	3 % of full scale	connector, M12 x 1	-	w051	d284
NI5-M12-LIU	Ø12 x 64 mm	0.5...4 mm,	3 % of full scale	cable	PVC 2 m	w050	d286

## M18 – Voltage output 0...10 V and current output 0...20 mA



**General data**

<b>Repeatability</b>	1 % of measuring range	<b>Protection class</b>	IP67
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	15...30 VDC		


**Types and data – selection table**

Type	Dimensions	Measuring range	Linearity deviation	Electrical connection	Material cable	w	d
BI8-M18E-LIU-H1141	Ø18 x 72 mm	1...5 mm,	5 % of full scale	connector, M12 x 1	-	w051	d287
BI8-M18-LIU	Ø18 x 64 mm	1...5 mm,	5 % of full scale	cable	PVC 2 m	w050	d185
BI5-M18E-LIU-H1141	Ø18 x 72 mm	2...4 mm,	3 % of full scale	connector, M12 x 1	-	w051	d287
BI5-M18-LIU	Ø18 x 64 mm	2...4 mm,	3 % of full scale	cable	PVC 2 m	w050	d185
NI10-M18E-LIU-H1141	Ø18 x 72 mm	1...7 mm,	5 % of full scale	connector, M12 x 1	-	w051	d288
NI10-M18-LIU	Ø18 x 64 mm	1...7 mm,	5 % of full scale	cable	PVC 2 m	w050	d289




## M18 – Current output 4...20 mA – Intrinsically safe



<b>Type</b>	BI8-M18-LI-EXI	<b>Operating voltage</b>	14...30 VDC
<b>Dimensions</b>	Ø18 x 64 mm	<b>Protection class</b>	IP67
<b>Measuring range</b>	1...5 mm, 	<b>Material housing</b>	CuZn-Cr
<b>Repeatability</b>	1 % of measuring range	<b>Material cable</b>	PVC 2 m
<b>Analog output</b>	4...20 mA	<b>Wiring diagram</b>	w055
<b>Linearity deviation</b>	5 % of full scale	<b>Dimension drawing</b>	d185
<b>Electrical connection</b>	cable		

## M18 – Voltage output 0...10 V and 3-wire PNP



<b>Type</b>	BI8-M18-LUAP6X	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	Ø18 x 54 mm	<b>Protection class</b>	IP67
<b>Measuring range</b>	1...5 mm, 	<b>Material housing</b>	CuZn-Cr
<b>Repeatability</b>	1 % of measuring range	<b>Material cable</b>	PVC 2 m
<b>Analog output</b>	0...10 V	<b>Wiring diagram</b>	w056
<b>Linearity deviation</b>	5 % of full scale	<b>Dimension drawing</b>	d290
<b>Electrical connection</b>	cable		



## M18 – Inductive linear position sensor – Output 0...10 V and 0...20 mA



<b>General data</b>		<b>Protection class</b>	IP67
<b>Repeatability</b>	1 % of measuring range	<b>Material housing</b>	CuZn-Cr
<b>Analog output</b>	4...20 mA, 0...10 V	<b>Material cable</b>	PVC 2 m
<b>Operating voltage</b>	15...30 VDC		
<b>Electrical connection</b>	cable		

Actuation via short-circuiting ring (included in delivery), blind hole or similar

**Types and data – selection table**

Type	Dimensions	Measuring range	Linearity deviation	w	d
WI70-M18-LIU5	Ø18 x 139 mm	0...70 mm, 	3% of full scale	w050	d292
WI40-M18-LIU5	Ø18 x 107.5 mm	0...40 mm, 	2% of full scale	w050	d291






**M30 – Voltage output 0...10 V and current output 0...20 mA**



**General data**


<b>Repeatability</b>	1 % of measuring range	<b>Protection class</b>	IP67
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Material housing</b>	CuZn-Cr
<b>Operating voltage</b>	15...30 VDC		

**Types and data – selection table**

Type	Dimensions	Measuring range	Linearity deviation	Electrical connection	Material cable	w	d
BI15-M30E-LIU-H1141	Ø30 x 77 mm	2...10 mm, 	5 % of full scale	connector, M12 x 1	-	w051	d054
BI15-M30-LIU	Ø30 x 64 mm	2...10 mm, 	5 % of full scale	cable	PVC 2 m	w050	d198
BI10-M30E-LIU-H1141	Ø30 x 77 mm	3...8 mm, 	3 % of full scale	connector, M12 x 1	-	w051	d054
BI10-M30-LIU	Ø30 x 64 mm	3...8 mm, 	3 % of full scale	cable	PVC 2 m	w050	d198
NI15-M30-LIU-H1141	Ø30 x 73 mm	2...12 mm, 	3 % of full scale	connector, M12 x 1	-	w051	d293


**M30 – Current output 4...20 mA – Intrinsically safe**



<b>Type</b>	BI15-M30-LI-EXI	<b>Operating voltage</b>	14...30 VDC
<b>Dimensions</b>	Ø30 x 64 mm	<b>Protection class</b>	IP67
<b>Measuring range</b>	2...10 mm, 	<b>Material housing</b>	CuZn-Cr
<b>Repeatability</b>	1 % of measuring range	<b>Material cable</b>	PVC 2 m
<b>Analog output</b>	4...20 mA	<b>Wiring diagram</b>	w055
<b>Linearity deviation</b>	5% of full scale	<b>Dimension drawing</b>	d198
<b>Electrical connection</b>	cable		


## M30 – Voltage output 0...10 V and 3-wire PNP



<b>Type</b>	BI15-M30-LUAP6X	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	Ø30 x 64 mm	<b>Protection class</b>	IP67
<b>Measuring range</b>	2...10 mm, 	<b>Material housing</b>	CuZn-Cr
<b>Repeatability</b>	1 % of measuring range	<b>Material cable</b>	PVC 2 m
<b>Analog output</b>	0...10 V	<b>Wiring diagram</b>	w056
<b>Linearity deviation</b>	5% of full scale	<b>Dimension drawing</b>	d294
<b>Electrical connection</b>	cable		


## Ø 4 mm – Voltage output 0...10 V and current output 0...20 mA



<b>Type</b>	BI1,5-EH04-0,3-M12-SIU-H1141	<b>Protection class</b>	IP67
<b>Dimensions</b>	Ø4 x 30 mm	<b>Material housing</b>	V4A (1.4404)
<b>Measuring range</b>	0.1...1.5 mm, 	<b>Material cable</b>	PVC 0.3 m
<b>Repeatability</b>	1 % of measuring range	<b>Wiring diagram</b>	w051
<b>Analog output</b>	0...20 mA, 0...10 V	<b>Dimension drawing</b>	d295
<b>Operating voltage</b>	15...30 VDC		
<b>Electrical connection</b>	cable with connector, M12 x 1		

## Ø 6.5 mm – Voltage output 0...10 V



<b>Type</b>	BI1,5-EH6,5-LU	<b>Operating voltage</b>	15...30 VDC
<b>Dimensions</b>	Ø6.5 x 41.6 mm	<b>Protection class</b>	IP67
<b>Measuring range</b>	0.25...1.25 mm, 	<b>Material housing</b>	V2A (1.4301)
<b>Repeatability</b>	1 % of measuring range	<b>Material cable</b>	PUR 2 m
<b>Analog output</b>	0...10 V	<b>Wiring diagram</b>	w052
<b>Linearity deviation</b>	3% of full scale	<b>Dimension drawing</b>	d296
<b>Electrical connection</b>	cable		

## Sensors with extended temperature range



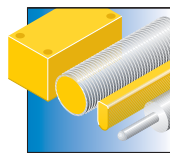
We offer many different sensors even for extreme ambient temperatures of -60 °C or +250 °C. These TURCK devices are typically used in deep freezing systems, outdoor applications, in metal foundries, the glass industry or in drying furnaces of varnishing stations used in the automotive industry.

Our climate-proof versions in stainless steel housings are excellently suited for humid environments affected by sudden temperature changes of up to 120 °C.

### Features

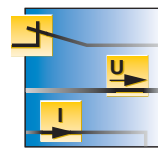
- Six different series for temperatures from - 60 °C up to +250 °C
- Product families comprising all housing types: M8, M12, M18, M30, 40 x 40, 80 x 80
- Specially sealed sensors for wet environments
- Different cable materials tailored to the temperature ranges
- Excellent EMC immunity

### Properties



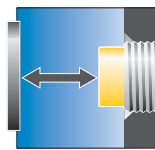
#### Design

Broad range of devices from the 8 mm threaded barrel up to the 80 x 80 mm rectangular version



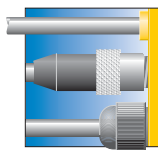
#### Electrical versions

NAMUR: - 40...+100°C,  
3/4-wire DC:  
-60 ...+250°C,  
2-wire AC:  
- 40 ... +120°C



#### Switching distances

7 mm for temperatures up to - 60 °C,  
40 mm for temperatures up to +250 °C



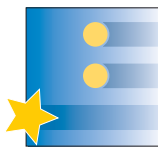
#### Electrical connections

Cable or M12 plug connection, sensors from +160 °C with external amplifier



#### Materials

Rugged, temperature resistant housing materials, application optimized cable qualities



#### Special features

WashDown,  
pressure resistant active face

## -60 °C – M12 – 3-wire DC – Cable connection



### General data

<b>Output</b>	— —, PNP	<b>Ambient temperature</b>	-60...+60 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4571)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	FEP 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	w	d
BI2-EM12WD-AP6/S929	Ø12 x 63 mm	2 mm,	w004	d297
NI4-EM12WD-AP6/S929	Ø12 x 67 mm	4 mm,	w004	d298

## -60 °C – M18 – 3-wire DC – Cable connection



### General data

<b>Output</b>	— —, PNP	<b>Ambient temperature</b>	-60...+60 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4571)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	FEP 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	w	d
BI5-EM18WD-AP6X/S929	Ø18 x 67 mm	5 mm,	w004	d299
NI7-EM18WD-AP6X/S929	Ø18 x 75 mm	7 mm,	w004	d300

## -40 °C – CP40 – NAMUR



**General data**

**Dimensions** 40 x 40 x 114 mm  
**Output** NAMUR  
**Electrical connection** terminal chamber

**Operating voltage** nom. 8.2 VDC  
**Ambient temperature** -40...+70 °C  
**Material housing** PBT

Variable orientation of active face in 9 directions

**Types and data – selection table**

Type	Switching distance	w	d
BI15-CP40-Y1X/S97	15 mm,	w026	d114
NI20-CP40-Y1X/S97	20 mm,	w026	d114

## -40 °C – CP40 – 4-wire DC



**General data**

**Dimensions** 40 x 40 x 114 mm  
**Output** , PNP  
**Electrical connection** terminal chamber

**Operating voltage** 10...65 VDC  
**Ambient temperature** -40...+70 °C  
**Material housing** PBT

Variable orientation of active face in 9 directions

**Types and data – selection table**

Type	Switching distance	w	d
BI15-CP40-VP4X2/S97	15 mm,	w014	d014
NI20-CP40-VP4X2/S97	20 mm,	w014	d014

## -40 °C – CP40 – 2-wire AC/DC



### General data

<b>Dimensions</b>	40 x 40 x 114 mm	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Output</b>	connection programmable	<b>Ambient temperature</b>	-40...+70 °C
<b>Electrical connection</b>	terminal chamber	<b>Material housing</b>	PBT

Variable orientation of active face in 9 directions

### Types and data – selection table

Type	Switching distance	w	d
BI15-CP40-FZ3X2/S97	15 mm,	w028	d014
NI20-CP40-FZ3X2/S97	20 mm,	w028	d014



## -40 °C – CP80 – NAMUR



<b>Type</b>	NI40-CP80-Y1/S97	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	80 x 41 x 80 mm	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching distance</b>	40 mm,	<b>Material housing</b>	PBT
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w026
<b>Electrical connection</b>	terminal chamber	<b>Dimension drawing</b>	d118


**-40 °C – CP80 – 4-wire DC**



<b>Type</b>	NI40-CP80-VP4X2/S97	<b>Operating voltage</b>	10...65 VDC
<b>Dimensions</b>	80 x 41 x 80 mm	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching distance</b>	40 mm, 	<b>Material housing</b>	PBT
<b>Output</b>	 , PNP	<b>Wiring diagram</b>	w014
<b>Electrical connection</b>	terminal chamber	<b>Dimension drawing</b>	d120

**-40 °C – CP80 – 2-wire AC/DC**



<b>Type</b>	NI40-CP80-FZ3X2/S97	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Dimensions</b>	80 x 41 x 80 mm	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching distance</b>	40 mm, 	<b>Material housing</b>	PBT
<b>Output</b>	connection program- mable	<b>Wiring diagram</b>	w028
<b>Electrical connection</b>	terminal chamber	<b>Dimension drawing</b>	d120



**-40 °C – M12 – NAMUR – Cable connection**



<b>General data</b>		<b>Ambient temperature</b>	-40...+70 °C
<b>Dimensions</b>	Ø12 x 34 mm	<b>Material housing</b>	PA
<b>Output</b>	NAMUR	<b>Material cable</b>	silicone 2 m
<b>Electrical connection</b>	cable		
<b>Operating voltage</b>	nom. 8.2 VDC		



Types and data – selection table

Type	Switching distance	w	d
BI2-P12-Y1X/S97	2 mm, 	w019	d144
NI5-P12-Y1X/S97	5 mm, 	w019	d144

**-40 °C – M12 – NAMUR – Terminal chamber**





General data

<b>Dimensions</b>	Ø12 x 70 mm	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	terminal chamber, removable cage clamp terminals	<b>Material housing</b>	V4A (1.4404)

Removable terminal strip and variable cable outlet

Types and data – selection table

Type	Switching distance	w	d
BI2-EM12WDTC-Y1X	2 mm, 	w026	d147
NI5-EM12WDTC-Y1X	5 mm, 	w026	d146

**-40 °C – M12 – 3-wire DC – M12 x 1 plug connection**



General data

<b>Dimensions</b>	Ø12 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC		


Pressure resistant up to 20 bar

 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 736 ff

### Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-EM12WD-AP6X-H1141	4 mm, 	 , PNP	w001	d034
BI4U-EM12WD-AN6X-H1141	4 mm, 	 , NPN	w002	d034
NI10U-EM12WD-AP6X-H1141	10 mm, 	 , PNP	w001	d067
NI10U-EM12WD-AN6X-H1141	10 mm, 	 , NPN	w002	d067

### -40 °C – M12 – 3-wire DC – Cable connection





#### General data

<b>Dimensions</b>	Ø12 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 20 bar


### Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-EM12WD-AP6X	4 mm, 	 , PNP	w004	d068
BI4U-EM12WD-AN6X	4 mm, 	 , NPN	w005	d068
NI10U-EM12WD-AP6X	10 mm, 	 , PNP	w004	d069
NI10U-EM12WD-AN6X	10 mm, 	 , NPN	w005	d069

### -40 °C – M12 – 3-wire DC – Terminal chamber





#### General data

<b>Dimensions</b>	Ø12 x 80 mm	<b>Operating voltage</b>	10...30 VDC
<b>Output</b>	 , PNP	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	terminal chamber, removable cage clamp terminals	<b>Material housing</b>	V4A (1.4404)

Removable terminal strip and variable cable outlet

Types and data – selection table

Type	Switching distance	w	d
BI4U-EM12WDTC-AP6X	4 mm, 	w011	d070
NI10U-EM12WDTC-AP6X	10 mm, 	w011	d071

**-40 °C – M18 – NAMUR – Cable connection**



<b>General data</b>			
<b>Dimensions</b>	Ø18 x 34 mm	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	NAMUR	<b>Material housing</b>	PA
<b>Electrical connection</b>	cable	<b>Material cable</b>	silicone 2 m
<b>Operating voltage</b>	nom. 8.2VDC		

Types and data – selection table

Type	Switching distance	w	d
BI5-P18-Y1X/S97	5 mm, 	w019	d165
NI10-P18-Y1X/S97	10 mm, 	w019	d165



**-40 °C – M18 – NAMUR – Terminal chamber**



<b>General data</b>			
<b>Dimensions</b>	Ø18 x 71 mm	<b>Operating voltage</b>	nom. 8.2VDC
<b>Output</b>	NAMUR	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	terminal chamber, removable cage clamp terminals	<b>Material housing</b>	V4A (1.4404)

Removable terminal strip and variable cable outlet

**Types and data – selection table**

Type	Switching distance	w	d
BI5-EM18WDTC-Y1X	5 mm, 	w026	d168
NI10-EM18WDTC-Y1X	10 mm, 	w026	d169

**-40 °C – M18 – 3-wire DC – M12 x 1 plug connection**




**General data**

<b>Dimensions</b>	Ø18 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC		

Pressure resistant up to 15 bar

**Types and data – selection table**

Type	Switching distance	Output	w	d
BI8U-EM18WD-AP6X-H1141	8 mm, 	— , PNP	w001	d044
BI8U-EM18WD-AN6X-H1141	8 mm, 	— , NPN	w002	d044
NI15U-EM18WD-AP6X-H1141	15 mm, 	— , PNP	w001	d072
NI15U-EM18WD-AN6X-H1141	15 mm, 	— , NPN	w002	d072

**-40 °C – M18 – 3-wire DC – Cable connection**



**General data**

<b>Dimensions</b>	Ø18 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 15 bar

Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-EM18WD-AP6X	8 mm, 	 , PNP	w004	d073
BI8U-EM18WD-AN6X	8 mm, 	 , NPN	w005	d073
NI15U-EM18WD-AP6X	15 mm, 	 , PNP	w004	d074
NI15U-EM18WD-AN6X	15 mm, 	 , NPN	w005	d074

-40 °C – M18 – 3-wire DC – Terminal chamber



General data

Dimensions

Ø18 x 81 mm

Output

, PNP

Electrical connection

terminal chamber,  
removable cage clamp  
terminals

Operating voltage

10...30 VDC

Ambient temperature


-40...+100 °C

Material housing

V4A (1.4404)

Removable terminal strip and variable cable outlet

Types and data – selection table

Type	Switching distance	w	d
BI8U-EM18WDTC-AP6X	8 mm, 	w011	d075
NI15U-EM18WDTC-AP6X	15 mm, 	w011	d076

-40 °C – M30 – NAMUR – Cable connection



General data

Dimensions

Ø30 x 44 mm

Output

NAMUR

Electrical connection

cable

Operating voltage

nom. 8.2 VDC

Ambient temperature

-40...+70 °C



Material housing

PA

Material cable

silicone 2 m

#### Types and data – selection table

Type	Switching distance	w	d
BI10-P30-Y1X/S97	10 mm, 	w019	d188
NI15-P30-Y1X/S97	15 mm, 	w019	d188

### -40 °C – M30 – NAMUR – Terminal chamber



#### General data

#### Dimensions

Ø30 x 80 mm

#### Output

NAMUR

#### Electrical connection

terminal chamber,  
removable cage clamp  
terminals

#### Operating voltage

nom. 8.2 VDC

#### Ambient temperature



-40...+100 °C

#### Material housing

V4A (1.4404)

Removable terminal strip and variable cable outlet

#### Types and data – selection table

Type	Switching distance	w	d
BI10-EM30WDTC-Y1X	10 mm, 	w026	d194
NI15-EM30WDTC-Y1X	15 mm, 	w026	d195

### -40 °C – M30 – 3-wire DC – M12 x 1 plug connection



#### General data

#### Dimensions

Ø30 x 62 mm

#### Electrical connection

connector, M12 x 1

#### Operating voltage

10...30 VDC

#### Ambient temperature

-40...+100 °C

#### Material housing

V4A (1.4404)

Pressure resistant up to 10 bar

Types and data – selection table

Type	Switching distance	Output	w	d
BI15U-EM30WD-AP6X-H1141	15 mm, 	 , PNP	w001	d050
BI15U-EM30WD-AN6X-H1141	15 mm, 	 , NPN	w002	d050
NI30U-EM30WD-AP6X-H1141	30 mm, 	 , PNP	w001	d077
NI30U-EM30WD-AN6X-H1141	30 mm, 	 , NPN	w002	d077

-40 °C – M30 – 3-wire DC – Cable connection



General data

<b>Dimensions</b>	Ø30 x 66 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 10 bar


Types and data – selection table

Type	Switching distance	Output	w	d
BI15U-EM30WD-AP6X	15 mm, 	 , PNP	w004	d078
BI15U-EM30WD-AN6X	15 mm, 	 , NPN	w005	d078
NI30U-EM30WD-AP6X	30 mm, 	 , PNP	w004	d079
NI30U-EM30WD-AN6X	30 mm, 	 , NPN	w005	d079

-40 °C – M30 – 3-wire DC – Terminal chamber



General data

<b>Dimensions</b>	Ø30 x 95 mm	<b>Operating voltage</b>	10...30 VDC
<b>Output</b>	 , PNP	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	terminal chamber, removable cage clamp terminals	<b>Material housing</b>	V4A (1.4404)



Removable terminal strip and variable cable outlet

 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 736 ff

**Types and data – selection table**

Type	Switching distance	w	d
BI15U-EM30WDTC-AP6X	15 mm, 	w011	d080
NI30U-EM30WDTC-AP6X	30 mm, 	w011	d081

**+100 °C – CP40 – NAMUR – Terminal chamber**





**General data**

**Dimensions** 40 x 40 x 114 mm  
**Output** NAMUR  
**Electrical connection** terminal chamber

**Operating voltage** nom. 8.2 VDC  
**Ambient temperature** -25...+100 °C  
**Material housing** PBT

Variable orientation of active face in 9 directions


**Types and data – selection table**

Type	Switching distance	w	d
BI15-CP40-Y1X/S100	15 mm, 	w026	d114
NI20-CP40-Y1X/S100	20 mm, 	w026	d114

**+100 °C – CP40 – 4-wire DC – Terminal chamber**



**General data**

**Dimensions** 40 x 40 x 114 mm  
**Output** , PNP  
**Electrical connection** terminal chamber

**Operating voltage** 10...65 VDC  
**Ambient temperature** -25...+100 °C  
**Material housing** PBT

Variable orientation of active face in 9 directions

**Types and data – selection table**

Type	Switching distance	w	d
BI15-CP40-VP4X2/S100	15 mm, 	w014	d014
NI20-CP40-VP4X2/S100	20 mm, 	w014	d014



## +100 °C – CP40 – 2-wire AC/DC – Terminal chamber





### General data

<b>Dimensions</b>	40 x 40 x 114 mm	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Output</b>	connection programmable	<b>Ambient temperature</b>	-25...+100 °C
<b>Electrical connection</b>	terminal chamber	<b>Material housing</b>	PBT


Variable orientation of active face in 9 directions

### Types and data – selection table

Type	Switching distance	w	d
BI15-CP40-FZ3X2/S100	15 mm, 	w028	d014
NI20-CP40-FZ3X2/S100	20 mm, 	w028	d014



## +100 °C – CP80 – NAMUR – Terminal chamber



<b>Type</b>	NI40-CP80-Y1/S100	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	80 x 41 x 80 mm	<b>Ambient temperature</b>	-25...+100 °C
<b>Switching distance</b>	40 mm, 	<b>Material housing</b>	PBT
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w026
<b>Electrical connection</b>	terminal chamber	<b>Dimension drawing</b>	d118


### +100 °C – CP80 – 4-wire DC – Terminal chamber



<b>Type</b>	NI40-CP80-VP4X2/S100	<b>Operating voltage</b>	10...65 VDC
<b>Dimensions</b>	80 x 41 x 80 mm	<b>Ambient temperature</b>	-25...+100 °C
<b>Switching distance</b>	40 mm, 	<b>Material housing</b>	PBT
<b>Output</b>	 , PNP	<b>Wiring diagram</b>	w014
<b>Electrical connection</b>	terminal chamber	<b>Dimension drawing</b>	d120


### +100 °C – CP80 – 2-wire AC/DC – Terminal chamber





<b>Type</b>	NI40-CP80-FZ3X2/S100	<b>Operating voltage</b>	20...250 VAC / 10...300 VDC
<b>Dimensions</b>	80 x 41 x 80 mm	<b>Ambient temperature</b>	-25...+100 °C
<b>Switching distance</b>	40 mm, 	<b>Material housing</b>	PBT
<b>Output</b>	connection program- mable	<b>Wiring diagram</b>	w028
<b>Electrical connection</b>	terminal chamber	<b>Dimension drawing</b>	d120

### +100 °C – M8 – 3-wire DC – Cable connection



<b>General data</b>		<b>Ambient temperature</b>	-25...+100 °C
<b>Dimensions</b>	Ø8 x 41.6 mm	<b>Material housing</b>	V2A (1.4301)
<b>Switching distance</b>	2 mm, 	<b>Material cable</b>	TPE 2 m
<b>Electrical connection</b>	cable		
<b>Operating voltage</b>	10...30 VDC		

Types and data – selection table





Type	Output	w	d
BI2-EG08-AP6X/S100	 , PNP	w004	d026
BI2-EG08-AN6X/S100	 , NPN	w005	d026

+100 °C – M12 – NAMUR – Cable connection



<b>General data</b>			
<b>Dimensions</b>	Ø12 x 34 mm	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR	<b>Ambient temperature</b>	-25...+100 °C
<b>Electrical connection</b>	cable		

Types and data – selection table

Type	Switching distance	Material housing	Material cable	w	d
BI2-P12-Y1/S100	2 mm, 	PA	PVC 2 m	w019	d301
BI2-EG12-Y1X/S100 7M	2 mm, 	V2A (1.4301)	PVC 7 m	w019	d145
NI5-P12-Y1/S100	5 mm, 	PA	PVC 2 m	w019	d301
NI5-EG12-Y1X/S100 7M	5 mm, 	V2A (1.4301)	PVC 7 m	w019	d143

+100 °C – M12 – NAMUR – Terminal chamber



<b>General data</b>			
<b>Dimensions</b>	Ø12 x 70 mm	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	terminal chamber, removable cage clamp terminals	<b>Material housing</b>	V4A (1.4404)


Removable terminal strip and variable cable outlet

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

**Types and data – selection table**

Type	Switching distance	w	d
BI2-EM12WDTC-Y1X	2 mm, 	w026	d147
NI5-EM12WDTC-Y1X	5 mm, 	w026	d146

**+100 °C – M12 – 3-wire DC – M12 x 1 plug connection**



**General data**

<b>Dimensions</b>	Ø12 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC		

Pressure resistant up to 20 bar

**Types and data – selection table**

Type	Switching distance	Output	w	d
BI4U-EM12WD-AP6X-H1141	4 mm, 	—, PNP	w001	d034
BI4U-EM12WD-AN6X-H1141	4 mm, 	—, NPN	w002	d034
NI10U-EM12WD-AP6X-H1141	10 mm, 	—, PNP	w001	d067
NI10U-EM12WD-AN6X-H1141	10 mm, 	—, NPN	w002	d067

**+100 °C – M12 – 3-wire DC – Cable connection**




**General data**

<b>Dimensions</b>	Ø12 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 20 bar

Types and data – selection table

Type	Switching distance	Output	w	d
BI4U-EM12WD-AP6X	4 mm, 	 , PNP	w004	d068
BI4U-EM12WD-AN6X	4 mm, 	 , NPN	w005	d068
NI10U-EM12WD-AP6X	10 mm, 	 , PNP	w004	d069
NI10U-EM12WD-AN6X	10 mm, 	 , NPN	w005	d069

+100 °C – M12 – 3-wire DC – Terminal chamber



General data

Dimensions

Ø12 x 80 mm

Output

, PNP

Electrical connection

terminal chamber,  
removable cage clamp  
terminals

Operating voltage

10...30 VDC

Ambient temperature



-40...+100 °C

Material housing

V4A (1.4404)

Removable terminal strip and variable cable outlet

Types and data – selection table

Type	Switching distance	w	d
BI4U-EM12WDTC-AP6X	4 mm, 	w011	d070
NI10U-EM12WDTC-AP6X	10 mm, 	w011	d071

+100 °C – M12 – 2-wire AC/DC



General data

Output



Electrical connection

cable

Operating voltage

20...250 VAC /  
10...300 VDC

Ambient temperature

-25...+100 °C


Material housing

PA

Material cable

PVC 2 m

**Types and data – selection table**

Type	Dimensions	Switching distance	w	d
BI2-S12-AZ31X/S100	Ø12 x 60 mm	2 mm, 	w020	d153
NI4-S12-AZ31X/S100	Ø12 x 64 mm	4 mm, 	w020	d153

**+100 °C – M18 – NAMUR – Cable connection**







**General data**

**Dimensions** Ø18 x 34 mm  
**Output** NAMUR  
**Electrical connection** cable

**Operating voltage** nom. 8.2 VDC  
**Ambient temperature** -25...+100 °C

**Types and data – selection table**

Type	Switching distance	Material housing	Material cable	w	d
BI5-P18-Y1/S100	5 mm, 	PA	PVC 2 m	w019	d302
BI5-EG18-Y1X/S100 7M	5 mm, 	V2A (1.4301)	PVC 7 m	w019	d166
NI10-P18-Y1/S100	10 mm, 	PA	PVC 2 m	w019	d302
NI10-EG18-Y1X/S100 7M	10 mm, 	V2A (1.4301)	PVC 7 m	w019	d167

**+100 °C – M18 – NAMUR – Terminal chamber**





**General data**

**Dimensions** Ø18 x 71 mm  
**Output** NAMUR  
**Electrical connection** terminal chamber, removable cage clamp terminals

**Operating voltage** nom. 8.2 VDC  
**Ambient temperature** -40...+100 °C  
**Material housing** V4A (1.4404)

Removable terminal strip and variable cable outlet

Types and data – selection table

Type	Switching distance	w	d
BI5-EM18WDTC-Y1X	5 mm, 	w026	d168
NI10-EM18WDTC-Y1X	10 mm, 	w026	d169

+100 °C – M18 – 3-wire DC – M12 x 1 plug connection







General data

<b>Dimensions</b>	Ø18 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC		

Pressure resistant up to 15 bar

Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-EM18WD-AP6X-H1141	8 mm, 	— —, PNP	w001	d044
BI8U-EM18WD-AN6X-H1141	8 mm, 	— —, NPN	w002	d044
NI15U-EM18WD-AP6X-H1141	15 mm, 	— —, PNP	w001	d072
NI15U-EM18WD-AN6X-H1141	15 mm, 	— —, NPN	w002	d072

+100 °C – M18 – 3-wire DC – Cable connection



General data

<b>Dimensions</b>	Ø18 x 52 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 15 bar

 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 736 ff

### Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-EM18WD-AP6X	8 mm, 	 , PNP	w004	d073
BI8U-EM18WD-AN6X	8 mm, 	 , NPN	w005	d073
NI15U-EM18WD-AP6X	15 mm, 	 , PNP	w004	d074
NI15U-EM18WD-AN6X	15 mm, 	 , NPN	w005	d074

### +100 °C – M18 – 3-wire DC – Terminal chamber




#### General data

#### Dimensions

Ø18 x 81 mm

#### Output

, PNP

#### Electrical connection

terminal chamber,  
removable cage clamp  
terminals

#### Operating voltage

10...30 VDC

#### Ambient temperature



-40...+100 °C

#### Material housing

V4A (1.4404)

Removable terminal strip and variable cable outlet

### Types and data – selection table

Type	Switching distance	w	d
BI8U-EM18WDTC-AP6X	8 mm, 	w011	d075
NI15U-EM18WDTC-AP6X	15 mm, 	w011	d076

### +100 °C – M18 – 2-wire AC/DC – Cable connection



#### General data

#### Dimensions

Ø18 x 64 mm

#### Output



#### Electrical connection

cable

#### Operating voltage

20...250 VAC /  
10...300 VDC

#### Ambient temperature

-25...+100 °C

#### Material housing


PA

#### Material cable

PVC 2 m



Types and data – selection table

Type	Switching distance	w	d
BI5-S18-AZ3X/S100	5 mm, 	w031	d173
NI8-S18-AZ3X/S100	8 mm, 	w031	d173

+100 °C – M30 – NAMUR – Cable connection







General data

**Dimensions** Ø30 x 44 mm  
**Output** NAMUR  
**Electrical connection** cable

**Operating voltage** nom. 8.2 VDC  
**Ambient temperature** -25...+100 °C

Types and data – selection table

Type	Switching distance	Material housing	Material cable	w	d
BI10-P30-Y1/S100	10 mm, 	PA	PVC 2 m	w019	d303
BI10-EG30-Y1X/S100 7M	10 mm, 	V2A (1.4301)	PVC 7 m	w019	d189
NI15-P30-Y1/S100	15 mm, 	PA	PVC 2 m	w019	d303
NI15-EG30-Y1X/S100 7M	15 mm, 	V2A (1.4301)	PVC 7 m	w019	d190

+100 °C – M30 – NAMUR – Terminal chamber




General data

**Dimensions** Ø30 x 80 mm  
**Output** NAMUR  
**Electrical connection** terminal chamber,  
removable cage clamp  
terminals

**Operating voltage** nom. 8.2 VDC  
**Ambient temperature** -40...+100 °C  
**Material housing** V4A (1.4404)

Removable terminal strip and variable cable outlet

**Types and data – selection table**

Type	Switching distance	w	d
BI10-EM30WDTC-Y1X	10 mm, 	w026	d194
NI15-EM30WDTC-Y1X	15 mm, 	w026	d195

**+100 °C – M30 – 3-wire DC – M12 x 1 plug connection**



**General data**

<b>Dimensions</b>	Ø30 x 62 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC		

Pressure resistant up to 10 bar

**Types and data – selection table**

Type	Switching distance	Output	w	d
BI15U-EM30WD-AP6X-H1141	15 mm, 	— , PNP	w001	d050
BI15U-EM30WD-AN6X-H1141	15 mm, 	— , NPN	w002	d050
NI30U-EM30WD-AP6X-H1141	30 mm, 	— , PNP	w001	d077
NI30U-EM30WD-AN6X-H1141	30 mm, 	— , NPN	w002	d077

**+100 °C – M30 – 3-wire DC – Cable connection**



**General data**

<b>Dimensions</b>	Ø30 x 66 mm	<b>Ambient temperature</b>	-40...+100 °C
<b>Electrical connection</b>	cable	<b>Material housing</b>	V4A (1.4404)
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PP 2 m

Pressure resistant up to 10 bar

Types and data – selection table

Type	Switching distance	Output	w	d
BI15U-EM30WD-AP6X	15 mm, 	 , PNP	w004	d078
BI15U-EM30WD-AN6X	15 mm, 	 , NPN	w005	d078
NI30U-EM30WD-AP6X	30 mm, 	 , PNP	w004	d079
NI30U-EM30WD-AN6X	30 mm, 	 , NPN	w005	d079

+100 °C – M30 – 3-wire DC – Terminal chamber



General data

Dimensions

Ø30 x 95 mm

Output

, PNP

Electrical connection

terminal chamber,  
removable cage clamp  
terminals

Operating voltage

10...30 VDC

Ambient temperature


-40...+100 °C

Material housing

V4A (1.4404)

Removable terminal strip and variable cable outlet

Types and data – selection table

Type	Switching distance	w	d
BI15U-EM30WDTC-AP6X	15 mm, 	w011	d080
NI30U-EM30WDTC-AP6X	30 mm, 	w011	d081

+100 °C – M30 – 2-wire AC/DC – Cable connection



General data

Dimensions

Ø30 x 64 mm

Output



Electrical connection

cable

Operating voltage

20...250 VAC /  
10...300 VDC

Ambient temperature

-25...+100 °C



Material housing

PA

Material cable


PVC 2 m

**Types and data – selection table**

Type	Switching distance	w	d
BI10-S30-AZ3X/S100	10 mm, 	w031	d196
NI15-S30-AZ3X/S100	15 mm, 	w031	d196

**+120 °C – Ø160 mm – 3-wire DC – Cable connection**





<b>Type</b>	NI100-Q160-AP44X/S120	<b>Ambient temperature</b>	-25...+120 °C
<b>Switching distance</b>	100 mm, 	<b>Material housing</b>	PP0
<b>Output</b>	—, PNP	<b>Material cable</b>	silicone 2 m
<b>Electrical connection</b>	cable	<b>Wiring diagram</b>	w004
<b>Operating voltage</b>	10...55 VDC	<b>Dimension drawing</b>	d304

**+120 °C – M12 – 3-wire DC – Cable connection**



<b>General data</b>	—, PNP	<b>Ambient temperature</b>	-25...+120 °C
<b>Output</b>	—, PNP	<b>Material housing</b>	V4A (1.4571)
<b>Electrical connection</b>	cable	<b>Material cable</b>	Teflon FEP 2 m
<b>Operating voltage</b>	10...30 VDC		

**Types and data – selection table**

Type	Dimensions	Switching distance	w	d
BI2-EM12D-AP6/S120	Ø12 x 63 mm	2 mm, 	w004	d297
NI4-EM12D-AP6/S120	Ø12 x 67 mm	4 mm, 	w004	d298

## +120 °C – M18 – 3-wire DC – Cable connection







### General data

**Output** , PNP  
**Electrical connection** cable  
**Operating voltage** 10...30 VDC

**Ambient temperature** -25...+120 °C  
**Material housing** CuZn-Cr  
**Material cable** silicone 2 m

### Types and data – selection table

Type	Dimensions	Switching distance		
BI5-M18-AP6X/S120	Ø18 x 87 mm	5 mm, 	w004	d305
NI8-M18-AP6X/S120	Ø18 x 97 mm	8 mm, 	w004	d306

## +120 °C – M18 – 4-wire DC – Cable connection



### General data

**Output** , PNP  
**Electrical connection** cable  
**Operating voltage** 10...30 VDC

**Ambient temperature** -25...+120 °C  
**Material housing** V4A (1.4571)  
**Material cable** Teflon FEP 2 m

### Types and data – selection table

Type	Dimensions	Switching distance		
BI5-EM18D-VP6X/S120	Ø18 x 95 mm	5 mm, 	w007	d307
NI7-EM18D-VP6X/S120	Ø18 x 103 mm	7 mm, 	w007	d308

### +120 °C – M18 – 2-wire AC – Cable connection







**General data**

<b>Output</b>	
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	20...250 VAC

<b>Ambient temperature</b>	-25...+120 °C
<b>Material housing</b>	CuZn-Cr
<b>Material cable</b>	silicone 2 m

**Types and data – selection table**

Type	Dimensions	Switching distance		
BI5-M18-AZ3X/S120	Ø18 x 87 mm	5 mm, 	w020	d305
NI8-M18-AZ3X/S120	Ø18 x 97 mm	8 mm, 	w020	d306

### +120 °C – M30 – 3-wire DC – Cable connection






**General data**

<b>Output</b>	 , PNP
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...30 VDC

<b>Ambient temperature</b>	-25...+120 °C
<b>Material housing</b>	CuZn-Cr
<b>Material cable</b>	silicone 2 m

**Types and data – selection table**

Type	Dimensions	Switching distance		
BI10-M30-AP6X/S120	Ø30 x 87 mm	10 mm, 	w004	d309
NI15-M30-AP6X/S120	Ø30 x 97 mm	15 mm, 	w004	d310

## +120 °C – M30 – 4-wire DC – Cable connection





### General data

**Output**  , PNP  
**Electrical connection** cable  
**Operating voltage** 10...30 VDC

**Ambient temperature** -25...+120 °C  
**Material housing** V4A (1.4571)  
**Material cable** Teflon FEP 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	w	d
BI10-EM30D-VP6X/S120	Ø30 x 100 mm	10 mm, 	w007	d311
NI15-EM30D-VP6X/S120	Ø30 x 110 mm	15 mm, 	w007	d312

## +120 °C – M30 – 2-wire AC – Cable connection



### General data

**Output**   
**Electrical connection** cable  
**Operating voltage** 20...250 VAC

**Ambient temperature** -25...+120 °C  
**Material housing** CuZn-Cr  
**Material cable** silicone 2 m

### Types and data – selection table

Type	Dimensions	Switching distance	w	d
BI10-M30-AZ3X/S120	Ø30 x 87 mm	10 mm, 	w020	d309
NI15-M30-AZ3X/S120	Ø30 x 97 mm	15 mm, 	w020	d310

### +160 °C – M18 – 3-wire DC – Cable connection







**General data**

**Output** , PNP  
**Electrical connection** cable  
**Operating voltage** 10...30 VDC

**Ambient temperature** -25...+160 °C  
**Material housing** V4A (1.4571)  
**Material cable** Teflon FEP 2 m

**Types and data – selection table**

Type	Dimensions	Switching distance		
BI5-EM18-AP6/S907	Ø18 x 95 mm	5 mm, 	w004	d313
NI8-EM18-AP6/S907	Ø18 x 103 mm	8 mm, 	w004	d314

### +160 °C – M30 – 3-wire DC – Cable connection





**General data**

**Output** , PNP  
**Electrical connection** cable  
**Operating voltage** 10...30 VDC

**Ambient temperature** -25...+160 °C  
**Material housing** V4A (1.4571)  
**Material cable** Teflon FEP 2 m


**Types and data – selection table**

Type	Dimensions	Switching distance		
BI10-EM30-AP6/S907	Ø30 x 100 mm	10 mm, 	w004	d315
NI15-EM30-AP6/S907	Ø30 x 110 mm	15 mm, 	w004	d316



## +250 °C – Q40 – Sensor




<b>Type</b>	NI25-CQ40/S1102 5M	<b>Material housing</b>	AL
<b>Dimensions</b>	40 x 40 x 52 mm	<b>Material cable</b>	Teflon FEP 5 m
<b>Switching distance</b>	25 mm, 	<b>Wiring diagram</b>	w057
<b>Electrical connection</b>	connector, M12 x 1	<b>Dimension drawing</b>	d317
<b>Ambient temperature</b>	0...+250 °C		

Amplifier EM30-AP6X2-H1141/S1102 required

## +250 °C – Q80 – Sensor



<b>Type</b>	NI40-CQ80/S1102 5M	<b>Material housing</b>	AL
<b>Dimensions</b>	80 x 40 x 92 mm	<b>Material cable</b>	Teflon FEP 5 m
<b>Switching distance</b>	40 mm, 	<b>Wiring diagram</b>	w057
<b>Electrical connection</b>	connector, M12 x 1	<b>Dimension drawing</b>	d318
<b>Ambient temperature</b>	0...+250 °C		

Amplifier EM30-AP6X2-H1141/S1102 required

## +250 °C – EM30 – Amplifier



<b>Type</b>	EM30-AP6X2-H1141/ S1102	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	—, PNP	<b>Material housing</b>	V4A (1.4571)
<b>Electrical connection</b>	connector, M12 x 1	<b>Wiring diagram</b>	w058
<b>Operating voltage</b>	10...30 VDC	<b>Dimension drawing</b>	d319

Required sensors Ni25-CQ40/S1102 5M or Ni40-CQ80/S1102 5M



## Inductive sensors for underwater applications

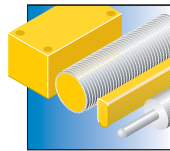


TURCK provides sensors in fully pressure and seawater tight housings for subsea applications. Mounted in M18 threaded barrels made of plastic, they can even be applied at water depths of up to 500 m. Also available are CP40 sensors, fully encapsulated in the SG40/2 housing for subsea use. These types feature a large switching distance, protection class IP68 and are made for (fresh) water depths of up to 50 m. They are mostly applied in locks, weirs and offshore plants.

### Features

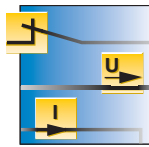
- For continuous use underwater
- M18 sensors for water depths of up to 500 m
- M18 sensors in protective CP40 housing for water depths of up to 50 m
- Application compliant housing materials
- ATEX approved versions

### Properties



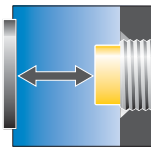
#### Design

M18 x 1 threaded barrel, Rectangular 40 x 40 mm, mounted in protective housing



#### Electrical versions

NAMUR, 3 and 4-wire DC



#### Switching distances

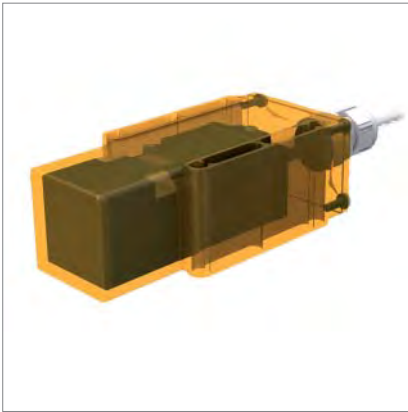
Threaded barrel 5 mm flush or 8 mm non-flush version, rectangular 35 mm non-flush





#### Materials

Seawater resistant longlife materials


## CP40



<b>Type</b>	NI35-CP40-VP4X2/S938-F/S1194 30M	<b>Operating voltage</b>	10...65 VDC
<b>Dimensions</b>	67 x 50 x 190 mm	<b>Material housing</b>	Ultem
<b>Switching distance</b>	35 mm, 	<b>Material cable</b>	PUR 30 m
<b>Output</b>	 , PNP	<b>Wiring diagram</b>	w007
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d320

## M18 – NAMUR



<b>Type</b>	NI8-P18-Y1/S139	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	Ø18 x 80 mm	<b>Material housing</b>	POM
<b>Switching distance</b>	8 mm, 	<b>Material cable</b>	PVC 2 m
<b>Output</b>	NAMUR	<b>Wiring diagram</b>	w019
<b>Electrical connection</b>	cable	<b>Dimension drawing</b>	d186

## M18 – 3-wire DC



<b>General data</b>		<b>Material housing</b>	POM
<b>Dimensions</b>	Ø18 x 80 mm	<b>Material cable</b>	PUR 2 m
<b>Electrical connection</b>	cable		
<b>Operating voltage</b>	10...30 VDC		

**Types and data – selection table**

Type	Switching distance	Output	w	d
BI5-P18-AP6/S139-S90	5 mm, 	 , PNP	w004	d186
BI5-P18-AN6/S139-S90	5 mm, 	 , NPN	w005	d186
NI8-P18-AP6/S139-S90	8 mm, 	 , PNP	w004	d186
NI8-P18-AN6/S139-S90	8 mm, 	 , NPN	w005	d186

**M18 – 2-wire AC/DC**



**General data**

**Dimensions**

Ø18 x 80 mm

**Operating voltage**

20...250 VAC /  
10...300 VDC

**Output**



**Material housing**

POM


**Electrical connection**

cable

**Material cable**

PUR 2 m

**Types and data – selection table**

Type	Switching distance	w	d
BI5-P18-AZ3/S139-S90	5 mm, 	w031	d186
NI8-P18-AZ3/S139-S90	8 mm, 	w031	d186

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

## Pressure-resistant sensors



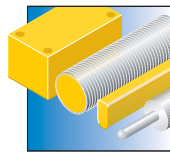
We offer pressure and high-pressure resistant sensors. The *uprox*<sup>®</sup>+ WashDown sensors resist pressures up to 20 bar. They combine the unique *uprox*<sup>®</sup> advantages, such as largest switching distance, factor 1 on all metals and protection classes IP68/IP69K.

The high-pressure resistant sensors are incorporated in a stainless steel housing and are ideally suited for hydraulic systems. Special gaskets and additional outer seals at the front as well as an O-ring enable the application in high pressure systems of up to 500 bar.

### Features

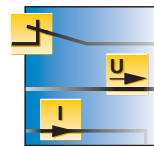
- M8 and M12 versions up to 20 bar
- M18 up to 15 bar
- M30 up to 10 bar
- *uprox*<sup>®</sup>+ WashDown sensors with largest switching distance
- Special high pressure resistant sensors up to 500 bar

### Properties



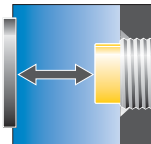
#### Design

Thread sizes M8 x 1, M12 x 1, M18 x 1 or M30 x 1.5



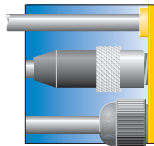
#### Electrical versions

NO and NC or anti-valent DC output functions



#### Switching distances

*uprox*<sup>®</sup>+ WashDown sensors up to 30 mm, high-pressure resistant sensors up to 2 mm



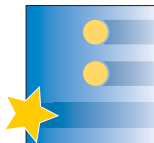
#### Electrical connections

Cable or M12 plug connection



#### Materials

Robust stainless steel threaded barrel with shape-stable plastic cap to protect the active face



#### Special features


Factor 1, all metals, temperature range -40 ... +100 °C



## M8 – 3-wire DC





**General data**

**Dimensions** Ø8 x 57 mm  
**Switching distance** 1.5 mm,   
**Electrical connection** connector, M12 x 1

**Operating voltage** 10...30 VDC  
**Material housing** V2A (1.4301)

Pressure resistant up to 20 bar

**Types and data – selection table**

Type	Output		
BI1,5-EG08WD-AP6X-H1341	 , PNP	w001	d024
BI1,5-EG08WD-AN6X-H1341	 , NPN	w002	d024

## M12 – 3-wire DC



















**General data**

**Dimensions** Ø12 x 52 mm  
**Operating voltage** 10...30 VDC

**Material housing** V4A (1.4404)

Pressure resistant up to 20 bar

### Types and data – selection table

Type	Switching distance	Output	Electrical connection	Material cable	w	d
BI4U-EM12WD-AP6X-H1141	4 mm, 	 , PNP	connector, M12 x 1	-	w001	d034
BI4U-EM12WD-AP6X	4 mm, 	 , PNP	cable	PP 2 m	w004	d068
BI4U-EM12WD-AN6X-H1141	4 mm, 	 , NPN	connector, M12 x 1	-	w002	d034
BI4U-EM12WD-AN6X	4 mm, 	 , NPN	cable	PP 2 m	w005	d068
NI10U-EM12WD-AP6X-H1141	10 mm, 	 , PNP	connector, M12 x 1	-	w001	d067
NI10U-EM12WD-AP6X	10 mm, 	 , PNP	cable	PP 2 m	w004	d069
NI10U-EM12WD-AN6X-H1141	10 mm, 	 , NPN	connector, M12 x 1	-	w002	d067
NI10U-EM12WD-AN6X	10 mm, 	 , NPN	cable	PP 2 m	w005	d069

## M12 – 4-wire DC



### General data

#### Dimensions

Ø12 x 62 mm

#### Output

, PNP

#### Electrical connection

connector, M12 x 1

#### Operating voltage



10...55 VDC

#### Material housing

V4A (1.4404)

Pressure resistant up to 20 bar

### Types and data – selection table

Type	Switching distance	w	d
BI4U-EM12EWD-VP44X-H1141	4 mm, 	w017	d028
NI10U-EM12EWD-VP44X-H1141	10 mm, 	w017	d152

## M18 – 3-wire DC



### General data

#### Dimensions

Ø18 x 52 mm

#### Operating voltage

















10...30 VDC

#### Material housing

V4A (1.4404)

Pressure resistant up to 15 bar

Types and data – selection table

Type	Switching distance	Output	Electrical connection	Material cable	w	d
BI8U-EM18WD-AP6X-H1141	8 mm, 	 , PNP	connector, M12 x 1	-	w001	d044
BI8U-EM18WD-AP6X	8 mm, 	 , PNP	cable	PP 2 m	w004	d073
BI8U-EM18WD-AN6X-H1141	8 mm, 	 , NPN	connector, M12 x 1	-	w002	d044
BI8U-EM18WD-AN6X	8 mm, 	 , NPN	cable	PP 2 m	w005	d073
NI15U-EM18WD-AP6X-H1141	15 mm, 	 , PNP	connector, M12 x 1	-	w001	d072
NI15U-EM18WD-AP6X	15 mm, 	 , PNP	cable	PP 2 m	w004	d074
NI15U-EM18WD-AN6X-H1141	15 mm, 	 , NPN	connector, M12 x 1	-	w002	d072
NI15U-EM18WD-AN6X	15 mm, 	 , NPN	cable	PP 2 m	w005	d074

M18 – 4-wire DC






General data

<b>Dimensions</b>	Ø18 x 61.5 mm	<b>Operating voltage</b>	10...55 VDC
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	V4A (1.4404)

Pressure resistant up to 15 bar

Types and data – selection table

Type	Switching distance	Output	w	d
BI8U-EM18MWD-VP44X-H1141	8 mm, 	 , PNP	w017	d040
BI8U-EM18MWD-VN44X-H1141	8 mm, 	 , NPN	w010	d040
NI15U-EM18MWD-VP44X-H1141	15 mm, 	 , PNP	w017	d060

## M18 – 3-Draht DC – High pressure resistant




**General data**

**Dimensions** Ø18 x 58 mm  
**Switching distance** 2 mm,   
**Output** , PNP

**Operating voltage** 10...30 VDC  
**Material housing** V2A (1.4305)

Pressure resistant up to 500 bar (S212) resp. 100 bar (S220)

### Types and data – selection table

Type	Electrical connection	Material cable		
BID2-G180-AP6/S220	cable	PVC 2 m	w004	d322
BID2-G180-AP6/S212	cable	PVC 2 m	w004	d322
BID2-G180-AP6-H1141/S220	connector, M12 x 1	-	w001	d321
BID2-G180-AP6-H1141/S212	connector, M12 x 1	-	w001	d321

## M30 – 3-wire DC



















**General data**

**Operating voltage** 10...30 VDC

**Material housing** V4A (1.4404)

Pressure resistant up to 10 bar

Types and data – selection table

Type	Dimensions	Switching distance	Output	Electrical connection	Material cable	w	d
BI15U-EM30WD-AP6X-H1141	Ø30 x 62 mm	15 mm, 	 , PNP	connector, M12 x 1	-	w001	d050
BI15U-EM30WD-AP6X	Ø30 x 66 mm	15 mm, 	 , PNP	cable	PP 2 m	w004	d078
BI15U-EM30WD-AN6X-H1141	Ø30 x 62 mm	15 mm, 	 , NPN	connector, M12 x 1	-	w002	d050
BI15U-EM30WD-AN6X	Ø30 x 66 mm	15 mm, 	 , NPN	cable	PP 2 m	w005	d078
NI30U-EM30WD-AP6X-H1141	Ø30 x 62 mm	30 mm, 	 , PNP	connector, M12 x 1	-	w001	d077
NI30U-EM30WD-AP6X	Ø30 x 66 mm	30 mm, 	 , PNP	cable	PP 2 m	w004	d079
NI30U-EM30WD-AN6X-H1141	Ø30 x 62 mm	30 mm, 	 , NPN	connector, M12 x 1	-	w002	d077
NI30U-EM30WD-AN6X	Ø30 x 66 mm	30 mm, 	 , NPN	cable	PP 2 m	w005	d079

M30 – 4-wire DC



General data

Dimensions

Ø30 x 62 mm

Output

, PNP

Electrical connection

connector, M12 x 1

Operating voltage

10...55 VDC

Material housing

V4A (1.4404)

Pressure resistant up to 10 bar

Types and data – selection table

Type	Switching distance	w	d
BI15U-EM30WD-VP44X-H1141	15 mm, 	w017	d050
NI30U-EM30WD-VP44X-H1141	30 mm, 	w017	d077

## Magnetic-inductive sensors

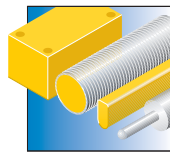


Magnetic-inductive sensors are typically applied in pig trap systems or used for gate monitoring. Since magnetic-inductive sensors are actuated by external magnetic fields, even the smaller types can operate at a large switching distance. When using the actuating magnet DMR31155, the M12 sensors attain a rated switching distance of 90 mm.

### Features

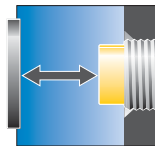
- Extremely long ranges
- Detection through non-magnetizable materials
- ATEX and SIL approved versions
- Rugged threaded barrels
- Broad selection of actuators

### Properties



#### Design

Threaded barrels  
M8 x 1 or M12 x 1



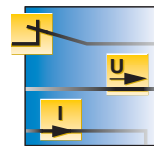
#### Switching distances

M8 sensors up to 78 mm and M12 sensors up to 90 mm, depending on the actuating magnet



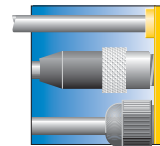
#### Materials

Robust threaded barrels, chrome-plated brass or stainless steel



#### Electrical versions

NAMUR, 2 or 3-wire DC



#### Electrical connections

2 m connection cable or M12 x 1 plug connection

## M8 – NAMUR





### General data

<b>Switching distance</b>	78 mm	<b>Operating voltage</b>	nom. 8.2 VDC
<b>Output</b>	NAMUR	<b>Material housing</b>	V2A (1.4301)

More information on actuating magnets in chapter „Accessories“.

Nominal switching distance 78 mm with magnet DMR31-15-5

### Types and data – selection table

Type	Dimensions	Electrical connection	Material cable		
BIM-EG08-Y1X-H1341	Ø8 x 57 mm	connector, M12 x 1	-	w021	d323
BIM-EG08-Y1X	Ø8 x 41.6 mm	cable	PVC 2 m	w019	d026

## M8 – 3-wire DC



### General data

<b>Switching distance</b>	78 mm	<b>Material housing</b>	V2A (1.4301)
<b>Operating voltage</b>	10...30 VDC		

More information on actuating magnets in chapter „Accessories“.

Nominal switching distance 78 mm with magnet DMR31-15-5

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BIM-EG08-AP6X-V1131	Ø8 x 49 mm	—, PNP	connector, M8 x 1	-	w001	d022
BIM-EG08-AP6X-H1341	Ø8 x 57 mm	—, PNP	connector, M12 x 1	-	w001	d323
BIM-EG08-AP6X	Ø8 x 41.6 mm	—, PNP	cable	PUR 2 m	w059	d026
BIM-EG08-AN6X-H1341	Ø8 x 57 mm	—, NPN	connector, M12 x 1	-	w002	d323
BIM-EG08-AN6X	Ø8 x 41.6 mm	—, NPN	cable	PUR 2 m	w005	d026

## M12 – NAMUR



### General data

**Switching distance**

90 mm

**Operating voltage**

nom. 8.2 VDC

**Output**

NAMUR

More information on actuating magnets in chapter „Accessories“.

Nominal switching distance 90 mm with magnet DMR31-15-5

### Types and data – selection table

Type	Dimensions	Electrical connection	Material housing	Material cable	w	d
BIM-M12E-Y1X-H1141	Ø12 x 62 mm	connector, M12 x 1	CuZn-Cr	-	w021	d151
BIM-EM12E-Y1X	Ø12 x 64 mm	cable	V2A (1.4301)	PVC 2 m	w019	d030



## M12 – 3-wire DC



### General data

**Switching distance** 90 mm      **Operating voltage** 10...65 VDC

More information on actuating magnets in chapter „Accessories“.

Nominal switching distance 90 mm with magnet DMR31-15-5

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material housing	Material cable	w	d
BIM-M12E-AN4X-H1141	Ø12 x 62 mm	—, NPN	connector, M12 x 1	CuZn-Cr	-	w002	d151
BIM-M12E-AN4X	Ø12 x 64 mm	—, NPN	cable	CuZn-Cr	PUR 2 m	w005	d030
BIM-EM12E-AP4X-H1141	Ø12 x 62 mm	—, PNP	connector, M12 x 1	V2A (1.4301)	-	w001	d151
BIM-EM12E-AP4X	Ø12 x 64 mm	—, PNP	cable	V2A (1.4301)	PVC 2 m	w004	d030

## Selective sensors

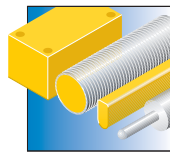


TURCK's sensor series NF, FE and NF/FE with distinctive function are particularly suited for applications in which ferritic metals have to be distinguished from non-ferritic metals. They distinguish for example between workpiece and tool or between workpieces made of different materials and perform simple coding tasks.

### Features

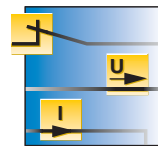
- Switching outputs for the detection of different materials
- NF with output for non-ferritic metals
- FE with output for ferritic metals
- Stainless steel housing
- Large switching distance also on non-ferritic metals
- High interference immunity

### Properties



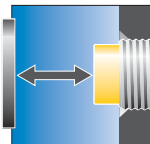
#### Design

Broad product range, 12, 18 and 30 mm threaded barrels as well as 40 x 40 mm rectangular types



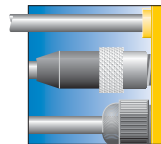
#### Electrical versions

3-wire DC for threaded barrels  
4-wire DC / 2-wire AC rectangular type



#### Switching distances

Detection of ferrous metals up to 5 mm, no distinction of metals up to 20 mm




#### Electrical connections

Threaded barrel with M12 plug connection, rectangular type with terminal chamber

## CP40 – 4-wire DC




### General data

**Dimensions** 40 x 40 x 114 mm  
**Switching distance** 20 mm,   
**Electrical connection** terminal chamber

**Operating voltage** 10...65 VDC  
**Material housing** PBT

Variable orientation of active face in 9 directions

### Types and data – selection table

Type	Output		
NI20NF-CP40-VP4X2	 , PNP	w014	d116
NI20NF-CP40-VN4X2	 , NPN	w013	d116

## M12 – 3-wire DC











### General data

**Electrical connection** connector, M12 x 1  
**Operating voltage** 10...30 VDC

**Material housing** V2A (1.4301)

### Types and data – selection table


Type	Dimensions	Switching distance	Output		
BI3NF-EM12HE-AP6X2-H1141	Ø12 x 62 mm	3 mm, 	 , PNP	w001	d151
BI3NF-EM12HE-AN6X2-H1141	Ø12 x 62 mm	3 mm, 	 , NPN	w002	d151
BI2,5FE-EM12FE-AP6X-H1141	Ø12 x 60 mm	2.5 mm, 	 , PNP	w001	d324

## M18 – 3-wire DC



**General data**

**Switching distance**

5 mm, 






**Electrical connection**

connector, M12 x 1

**Operating voltage**

10...30 VDC

**Types and data – selection table**

Type	Dimensions	Output	Material housing		
BI5NF-EM18HE-AP6X2-H1141	Ø18 x 72 mm	 , PNP	V2A (1.4301)	w001	d045
BI5NF-EM18HE-AN6X2-H1141	Ø18 x 72 mm	 , NPN	V2A (1.4301)	w002	d045
BI5FE-M18FE-AP6X-H1141	Ø18 x 70 mm	 , PNP	CuZn -0P	w001	d325

## M30 – 3-wire DC




**General data**

**Dimensions**

Ø30 x 77 mm

**Switching distance**

10 mm, 

**Electrical connection**

connector, M12 x 1





**Operating voltage**

10...30 VDC

**Material housing**

V2A (1.4301)

**Types and data – selection table**

Type	Output		
BI10NF-EM30HE-AP6X2-H1141	 , PNP	w001	d326
BI10NF-EM30HE-AN6X2-H1141	 , NPN	w002	d326

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff



# At a glance

## Capacitive sensors



### Capacitive sensors with high application potential

Capacitive sensors operate contactless, reactionless and wear-free. Both, electrically conductive and non-conductive materials are detected reliably. Capacitive sensors can thus be applied in systems in which inductive sensors would be inappropriate.

In addition to distance and position, capacitive sensors measure deflection, thickness, filling level, eccentricity, concentricity, deformation, wear and vibration.

The functional principle of capacitive sensors is based on the arrangement of two conductors (plates) separated by a dielectric (insulator). An electric field created through the potential difference between the two conductors is stored in the dielectric. The change of field strength (capacitance) in the dielectric is used as a measure. Non-conductive materials are detected through the change of field strength in the dielectric whereby a probe on the one hand and the ambient on the other hand represent the two conductors. Conductive materials are detected through the change of material as well as through the change of distance between the conductors.

The effective switching distances of capacitive sensors can vary considerably. A maximum switching distance is achieved with metallic objects. Reduction factors do not have to be observed as with con-

ventional inductive sensors. With regard to other materials, the switching distance is reduced in dependence to the dielectric constant of the target object. The higher the value the higher the switching distance. The switching distance of nearly all capacitive sensors can be adjusted with a potentiometer.

Capacitive sensors are laid out for temperature ranges between -25 and +70 °C by default. Special version are also available for temperatures up to +100 °C.

Based on the novel technology, the close-up range suppression of TURCK sensors works also with conductive clingage. TURCK also offers a solution for electromagnetic sensitivity. The product portfolio comprises sensors with EMC filter, making them insensitive to radiated and conducted HF interference and burst.

Capacitive sensors are available in cylinder and rectangular design. Alongside the standard plastic and metal versions, sensors enclosed in a Dyflor housing are also available for extra protection against chemically aggressive environments.

# Our strengths - your advantages



## Novel close-up range suppression

Capacitive sensors react to all materials with a permittivity greater than 1. This may lead to interferences during operation in the event of wetting, condensation or icing on the sensor surface. Residue and humidity may also lead to detection failures. In order to rule out this effect, a signal is produced with an electrode close

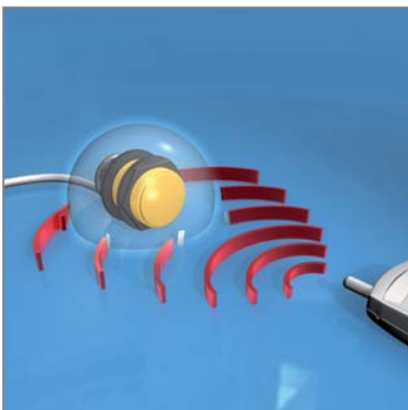
to the sensor surface, antagonizing the main signal. A zone is thus created near the electrode in which dirt and humidity are not detected by the sensor. Based on the novel technology, the close-up range suppression of TURCK sensors works also with conductive clingage.



## Wear-free detection of conducting and non-conducting materials.

Capacitive proximity sensors are designed for contactless and wear-free detection of electrically conducting and non-conducting objects. These all-rounders are thus suited for many applications. In addition to distance and

position, capacitive sensors measure deflection, thickness, eccentricity, concentricity, deformation, wear, vibration and above all filling levels of liquid and solid substances.



## All-round protection against interferences

Capacitive sensors work reliably and safe, even under rough environmental conditions. Special protective measures ensure failsafe operation of the sensors in ambients subject to high electromagnet-

ic interference. The sensors are also ESD immune. Automatic wetting compensation eliminates moreover interferences caused by wetting and condensation.



# advantages



## Rectangular design, high-performance technology within the smallest space

The rectangular devices offer high-quality components and high functionality in a rugged housing. These sensors moreover convince through easy and convenient mounting. The prescribed free

zones are considerably smaller, lowering the construction effort while enhancing the system availability. You save time and money.



## Cylindrical design, metal or plastic version

Whether metal or plastic housing, the product range of standard cylindrical sensors is large, offering devices with diameters between 12 mm and 40 mm. The flush mountable sensors generate an almost linear detection field.

Besides the usual reliability, capacitive TURCK sensors feature standard functions such as automatic wetting compensation, excellent EMC and ESD properties and they are flexibly mounted.

# For special applications



## High-temperature resistant sensors

A growing number of applications require sensors resisting temperatures beyond the standard range of -25 ... +70 °C. For this purpose TURCK has developed capacitive sensors which meet exactly these requirements.

The sensors feature temperature-resistant components as well as cleverly designed, fanless passive cooling concepts approved in demanding laboratory tests. These sensors resist temperatures in a range of -25 °C ...+100 °C

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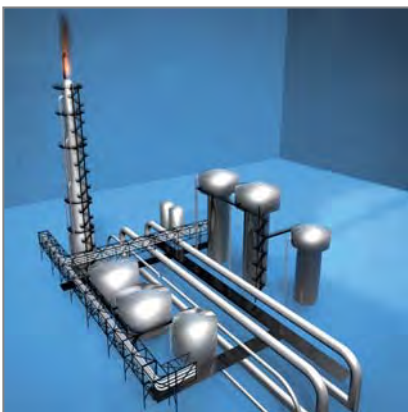
## AC 2-wire sensors

Capacitive AC 2-wire sensors are available as M12, M18, M30 and CK40 types.

The established wiring, normally two wires, can still be used. Cutting down on the amount of wiring saves time.

The 2-wire sensors can be used to replace mechanical switches in existing systems.

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## NAMUR sensors

NAMUR sensors are approved for zone 0 and 1. They are polarized 2-wire devices, changing their internal resistance depending on the attenuation (continuous linear/current characteristics). They can be connected to external switching amplifiers which convert current variations

into a binary output signal. The advantage: With an approved switching amplifier, they can be applied in Ex-areas and monitor wire-break and short-circuit.

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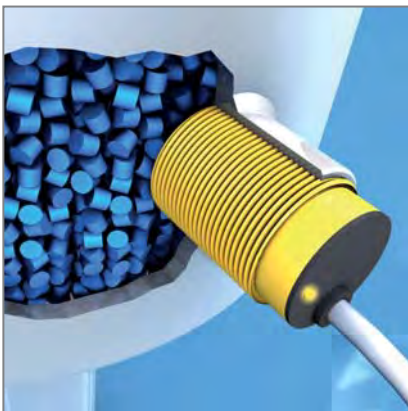
### BCF sensors for demanding applications

Conventional sensors do not operate reliably in demanding ambients. Residue and humidity on the active face may inhibit proper operation of the sensor. These problems are now ruled out with the new BCF series. Even conductive clingage are not a problem any more, thanks to the novel technology.

The sensors are immune to radiated and conducted HF interference, burst as well as electrostatic discharge (ESD).

- Suited for highly viscous media
- Increased EMI and RFI shielding

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### BCC sensors for level control

The BCC sensors blank out all interferences during the monitoring process. They are EMC and ESD immune. A laterally mounted shield and an integrated processing unit inhibit predamping when mounted in metal flanges. The full switching distance is thus available.

- Detection of smallest pellets
- Same switching distance, even when mounted in metal barrels
- Excellent EMC and ESD properties

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### Chemical-resistant sensors

The capacitive sensors (PVDF) are the ideal solution for any application of the pharmaceutical, chemical or food industry. They help to optimize all kinds of applications for instance in dairies, breweries, industrial bakeries, frozen food production, packaging and filling machinery.

PVDF materials belong to the group of fluoride plastics. They are extremely resistant due to the high fluorine content. They also feature a high creep strength under constant load as well as good heat and cold properties.

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# Type code

B	C	F	5	Functional principle	-	M12	K	Design	-	A	P	6	X2	Electrical version	-
				<p><b>Rated operating distance</b></p> <p>... distance <math>S_n</math> in [mm]</p> <p><b>Special functions</b></p> <p>C predamping protection</p> <p>F close-up range suppression</p> <p><b>Functional principle</b></p> <p>C capacitive</p> <p><b>Fitting</b></p> <p>B flush</p> <p>N non-flush</p>				<p><b>Additional information</b></p> <p>E long-sized housing</p> <p>F flat housing</p> <p>L length of housing</p> <p>K short-sized housing</p> <p>SR terminal chamber with straight or angled cable outlet</p> <p><b>Housing</b></p> <p>CP40 rectangular, (40 x 40 mm) active face flexible</p> <p>CP80 rectangular, (80 x 80 mm)</p> <p>K smooth barrel, plastic</p> <p>KT smooth barrel, plastic, teflon-coated</p> <p>M threaded barrel, metal, <math>\varnothing</math> in [mm]</p> <p>P plastic barrel, continuous thread</p> <p>PS threaded barrel, plastic, <math>\varnothing</math> in [mm]</p> <p>PT threaded barrel, plastic, teflon-coated</p> <p>Q rectangular, height and <math>\varnothing</math> in [mm]</p>					<p><b>Indication</b></p> <p>X LED</p> <p>X... multicolor LED</p> <p><b>Voltage range</b></p> <p>3 10...300 VDC / 20...250 VAC</p> <p>4 10...65 VDC, short-circuit proof</p> <p>6 10...30 VDC, short-circuit proof</p> <p><b>Output mode</b></p> <p>N NPN</p> <p>P PNP</p> <p>Z 2-wire AC/DC</p> <p><b>Output function</b></p> <p>A working current NO</p> <p>F working current NO/ closed current NC programmable via connection</p> <p>R closed current NC</p> <p>V changeover contact</p> <p>Y0, Y1 output acc. to EN 60947-5-6 (NAMUR)</p>		

H1	1	4	1	Electrical connection	/	S...	Special versions
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**Assignment**

1 standard assignment, or customized

**Number of contacts**

... ... contacts

**Connector type**

1 straight  
3 straight, with adapter

**Connector type**

B3 connector type 1/2"  
H1 connector M12 x 1  
V1 connector M8 x 1 / Ø 8 mm

**Features**

S90 PUR cable  
S100 extended temperature range  
S250 fixed settings  
3GD approval ATEX II 3 G and II 3D

...M	Connection
------	------------

**Connection**



empty cable connection, 2 m, exception SR, CP40, CP80  
...M cable length [m]

# Designs and variants

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### QF5.5

<b>Design</b>	rectangular QF5.5, 20.3 x 5.5 x 54 mm
<b>Switching distance</b>	5 mm,  10 mm, 
<b>Electrical connection</b>	cable
<b>Output</b>	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN

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### Q08

<b>Design</b>	rectangular Q08, 20 x 8 x 32 mm
<b>Switching distance</b>	5 mm, 
<b>Electrical connection</b>	connector, Ø 8 mm cable
<b>Output</b>	3-wire DC PNP 3-wire DC NPN

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### Q10

<b>Design</b>	rectangular Q10, 25 x 10.8 x 42 mm
<b>Switching distance</b>	8 mm, 
<b>Electrical connection</b>	connector cable
<b>Output</b>	3-wire DC PNP 3-wire DC NPN

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### Q14

<b>Design</b>	rectangular Q14, 30 x 14 x 55.5 mm
<b>Switching distance</b>	10 mm, 
<b>Electrical connection</b>	connector, M8 x 1 cable
<b>Output</b>	3-wire DC PNP 3-wire DC NPN

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	<b>Q20</b>	<b>Q20L60</b>	<b>CP40</b>	<b>CP80</b>
<b>Design</b>	rectangular Q20, 40 x 20 x 68 mm	rectangular Q20L60, 30 x 20 x 60 mm	rectangular CP40, 40 x 40 x 114 mm	rectangular CP80, 80 x 40.5 x 80 mm
<b>Switching distance</b>	20 mm,	10 mm,	20 mm,	50 mm,
<b>Electrical connection</b>	connector, M8 x 1 connector, M12 x 1 cable	connector, M12 x 1 cable	connector, M12 x 1 terminal chamber	connector, M12 x 1 terminal chamber
<b>Output</b>	3-wire DC PNP 3-wire DC NPN	3-wire DC PNP	2-wire AC 4-wire DC PNP 4-wire DC NPN	2-wire AC 4-wire DC PNP 4-wire DC NPN

# Designs and variants

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	<b>M12</b>	<b>M18</b>	<b>S185</b>	<b>M30</b>
<b>Design</b>	threaded barrel M12 x 1	threaded barrel M18 x 1	threaded barrel M18 x 1	threaded barrel M30 x 1.5
<b>Switching distance</b>	3 mm,	5 mm,	5 mm,	10 mm,
<b>Electrical connection</b>	cable	connector, 1/2" connector, M12 x 1 cable cable with connector, M12 x 1	cable	connector, 1/2" connector, M12 x 1 cable terminal chamber
<b>Output</b>	3-wire DC PNP 3-wire DC NPN	2-wire DC NAMUR 2-wire AC 3-wire DC PNP 3-wire DC NPN	3-wire DC PNP 3-wire DC NPN	2-wire DC NAMUR 2-wire AC 3-wire DC PNP 4-wire DC PNP 4-wire DC NPN







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**K34**

**K40**

<b>Design</b>	smooth barrel 34 mm	smooth barrel 40 mm
<b>Switching distance</b>	15 mm, 	20 mm, 
<b>Electrical connection</b>	connector, M12 x 1 cable terminal chamber	connector, M12 x 1 terminal chamber
<b>Output</b>	2-wire AC 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN	4-wire DC PNP 4-wire DC NPN

## Rectangular design



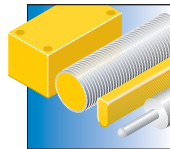
Rectangular shaped capacitive sensors are the compact solution for your facilities. The rugged housing and high-quality components provide additional options for installation and detection. The 8 mm Q08 as well as the variable CP80 convince through easy mounting and short blind zones.

The rectangular types thus simplify the assembly and enhance the operability of your systems.

### Features

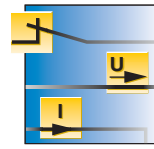
- Stable and resistant housings
- Large switching distances
- Excellent EMC immunity
- Easy to mount
- Connector and cable versions

### Properties



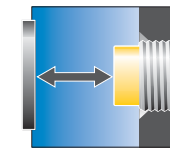
#### Design

From the small Q08 to the big sized CP80



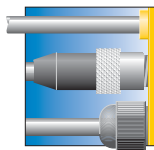
#### Electrical versions

3/4-wire DC, PNP/NPN



#### Switching distances

5 mm versions for close-range detection, 50 mm versions for long ranges



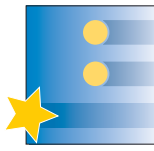
#### Electrical connections

2 m cable PVC/PUR, M8 x 1 plug connection, Ø 8 mm and M12 x 1



#### Materials

Rugged and chemical resistant plastic and metal housings



#### Special features

Fine adjustment via potentiometer

## Q08 – 3-wire DC – Fixed settings



### General data

<b>Dimensions</b>	20 x 8 x 32 mm
<b>Switching distance</b>	5 mm,
<b>Operating voltage</b>	10...30 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	GD-Zn
<b>Material active face</b>	PA

### Types and data – selection table

Type	Output	Electrical connection	Material cable		
BC5-Q08-RP6X2/S250	, PNP	cable	PVC 2 m	w006	d086
BC5-Q08-RP6X2-V1131/S250	, PNP	connector, Ø 8 mm	-	w003	d089
BC5-Q08-AP6X2/S250	, PNP	cable	PVC 2 m	w004	d086
BC5-Q08-AP6X2-V1131/S250	, PNP	connector, Ø 8 mm	-	w001	d089
BC5-Q08-AN6X2/S250	, NPN	cable	PVC 2 m	w005	d086
BC5-Q08-AN6X2-V1131/S250	, NPN	connector, Ø 8 mm	-	w002	d089

## Q10 – 3-wire DC – Fixed settings



### General data

<b>Dimensions</b>	25 x 10.8 x 42 mm
<b>Switching distance</b>	8 mm,
<b>Operating voltage</b>	10...30 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	PBT
<b>Material active face</b>	PBT

### Types and data – selection table

Type	Output	Electrical connection	Material cable		
BC8-Q10-RP6X2/S250	, PNP	cable	PVC 2 m	w006	d092
BC8-Q10-RP6X2-V1131/S250	, PNP	connector, M8 x 1	-	w003	d091
BC8-Q10-AP6X2/S250	, PNP	cable	PVC 2 m	w004	d092
BC8-Q10-AP6X2-V1131/S250	, PNP	connector, M8 x 1	-	w001	d091
BC8-Q10-AN6X2/S250	, NPN	cable	PVC 2 m	w005	d092
BC8-Q10-AN6X2-V1131/S250	, NPN	connector, M8 x 1	-	w002	d091

Wiring diagrams on page 832 ff

Dimension drawings on page 842 ff

Accessories on page 736 ff

## Q14 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	30 x 14 x 55.5 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	10 mm,	<b>Material housing</b>	PBT
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PBT
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Output	Electrical connection	Material cable	w	d
BC10-Q14-RP4X2	, PNP	cable	PUR 2 m	w006	d328
BC10-Q14-AP4X2-V1131	, PNP	connector, M8 x 1	-	w001	d327
BC10-Q14-AP4X2	, PNP	cable	PUR 2 m	w004	d328
BC10-Q14-AN4X2-V1131	, NPN	connector, M8 x 1	-	w002	d327
BC10-Q14-AN4X2	, NPN	cable	PUR 2 m	w005	d328

## Q20 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	40 x 20 x 68 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	20 mm,	<b>Material housing</b>	PBT
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PBT
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Output	Electrical connection	Material cable	w	d
BC20-Q20-RP4X2-V1131	, PNP	connector, M8 x 1	-	w003	d331
BC20-Q20-RP4X2-H1143	, PNP	connector, M12 x 1	-	w003	d329
BC20-Q20-RP4X2	, PNP	cable	PUR 2 m	w006	d330
BC20-Q20-AP4X2-H1141	, PNP	connector, M12 x 1	-	w001	d329
BC20-Q20-AP4X2	, PNP	cable	PUR 2 m	w004	d330
BC20-Q20-AN4X2-H1141	, NPN	connector, M12 x 1	-	w002	d329
BC20-Q20-AN4X2	, NPN	cable	PUR 2 m	w005	d330

## QF5.5 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	20.3 x 5.5 x 54 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	10 mm,	<b>Material housing</b>	PP
<b>Electrical connection</b>	cable	<b>Material active face</b>	PP
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PUR 2 m
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Output	w	d
BC10-QF5,5-AP6X2	, PNP	w004	d332
BC10-QF5,5-AN6X2	, NPN	w005	d332

## QF5.5 – 3-wire DC – Fixed settings



### General data

<b>Dimensions</b>	20.3 x 5.5 x 54 mm	<b>Protection class</b>	IP67
<b>Output</b>	, PNP	<b>Material housing</b>	PP
<b>Electrical connection</b>	cable	<b>Material active face</b>	PP
<b>Operating voltage</b>	10...30 VDC	<b>Material cable</b>	PUR 2 m
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Switching distance	w	d
BC5-QF5,5-AP6X2/S250	5 mm,	w004	d333
BC10-QF5,5-AP6X2/S250	10 mm,	w004	d333

## CP40 – 4-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	40 x 40 x 114 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	20 mm,	<b>Material housing</b>	PBT
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PBT
<b>Ambient temperature</b>	-25...+70 °C		

Variable orientation of active face in 9 directions

### Types and data – selection table

Type	Output	Electrical connection	w	d
BC20-CP40-VP4X2-H1141	, PNP	connector, M12 x 1	w008	d335
BC20-CP40-VP4X2	, PNP	terminal chamber	w014	d334
BC20-CP40-VN4X2	, NPN	terminal chamber	w013	d334

## CP80 – 4-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	80 x 40.5 x 80 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	50 mm,	<b>Material housing</b>	PBT
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PBT
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Output	Electrical connection	w	d
NCS0-CP80-VP4X2-H1141	, PNP	connector, M12 x 1	w008	d337
NCS0-CP80-VP4X2	, PNP	terminal chamber	w014	d336
NCS0-CP80-VN4X2	, NPN	terminal chamber	w013	d336

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

## Cylindrical design - metal

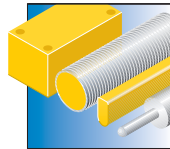


Cylindrically shaped capacitive sensors feature high switching distances and are available in a vast range of types. M12, M18 and M30 chrome-plated threaded barrels are available with connection cable or plug connection. Besides the usual reliability, capacitive sensors feature standard properties such as automatic wetting compensation, excellent EMC and ESD properties and more flexibility with respect to mounting.

### Features

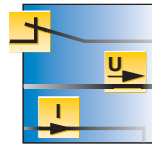
- Excellent reliability
- Automatic wetting compensation
- Excellent EMC properties
- ESD immunity
- Mounting flexibility

### Properties



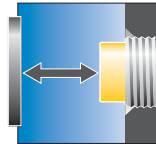
#### Design

Threaded barrel  
M12 x 1 and M30 x 1.5



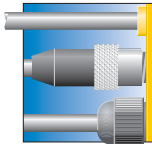
#### Electrical versions

3/4-wire NO/NC contact  
as well as antivalent  
PNP/NPN output



#### Switching distances

From 3 mm flush to  
10 mm non-flush on all  
metals and non-metals



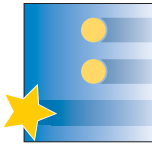
#### Electrical connections

2 m connection cable  
or M12 x 1 plug con-  
nection



#### Materials

Nickel-plated brass or  
stainless steel threaded  
barrel versions offer  
many application pos-  
sibilities



#### Special features

Fine adjustment via  
potentiometer



## M12 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø12 x 60 mm
<b>Switching distance</b>	3 mm,
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...30 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	CuZn-Cr
<b>Material active face</b>	ABS
<b>Material cable</b>	PVC 2 m

### Types and data – selection table

Type	Output	w	d
BC3-M12-RP6X	, PNP	w006	d338
BC3-M12-AP6X	, PNP	w004	d338
BC3-M12-AN6X	, NPN	w005	d338

## M18 – 3-wire DC – Fixed settings



### General data

<b>Dimensions</b>	Ø18 x 83 mm
<b>Switching distance</b>	5 mm,
<b>Electrical connection</b>	connector, M12 x 1
<b>Operating voltage</b>	10...65 VDC

<b>Ambient temperature</b>	-25...+70 °C
<b>Protection class</b>	IP67
<b>Material housing</b>	CuZn-Cr
<b>Material active face</b>	PBT

### Types and data – selection table

Type	Output	w	d
BC5-M18-RP4X-H1141/S250	, PNP	w015	d339
BC5-M18-AP4X-H1141/S250	, PNP	w001	d339
BC5-M18-AN4X-H1141/S250	, NPN	w002	d339

## M18 – 3-wire DC – Fine adjustment via potentiometer



**General data**

<b>Dimensions</b>	Ø18 x 74 mm
<b>Switching distance</b>	5 mm,
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...65 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	CuZn-Cr
<b>Material active face</b>	PBT
<b>Material cable</b>	PVC 2 m

**Types and data – selection table**

Type	Output	w	d
BC5-M18-RP4X	, PNP	w006	d340
BC5-M18-AP4X	, PNP	w004	d340
BC5-M18-AN4X	, NPN	w005	d340

## M30 – 3-wire DC – Fine adjustment via potentiometer



**General data**

<b>Switching distance</b>	10 mm,
<b>Operating voltage</b>	10...65 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	CuZn-Cr
<b>Material active face</b>	PA

**Types and data – selection table**

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BC10-M30K-VP4X-H1141	Ø30 x 60 mm	, PNP	connector, M12 x 1	-	w008	d341
BC10-M30K-VP4X	Ø30 x 62.5 mm	, PNP	cable	PVC 2 m	w007	d342
BC10-M30K-VN4X-H1141	Ø30 x 60 mm	, NPN	connector, M12 x 1	-	w010	d341
BC10-M30K-VN4X	Ø30 x 62.5 mm	, NPN	cable	PVC 2 m	w018	d342

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

## Cylindrical design - plastic



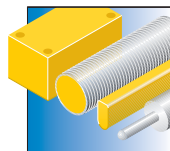
Cylindrically shaped capacitive sensors feature high switching distances and are available in a vast range of types. The standard types come in plastic housings and sizes from Ø 12 mm to Ø 40 mm, with connection cable, plug connection or terminal chamber.

Besides the usual reliability, capacitive sensors feature standard properties such as automatic wetting compensation, excellent EMC and ESD properties and more flexibility with respect to mounting.

### Features

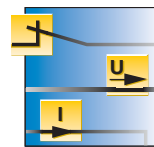
- Excellent reliability
- Automatic wetting compensation
- Excellent EMC properties
- ESD immunity
- Mounting flexibility

### Properties



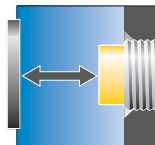
#### Design

Cylindrical versions  
M12 x 1, M18 x 1,  
M30 x 1.5, Ø 34 mm  
and Ø 40 mm



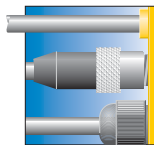
#### Electrical versions

3/4-wire NO/NC contact  
as well as antivalent  
PNP/NPN output



#### Switching distances

From 3 mm to 20 mm  
flush mountable on all  
metals and non-metals



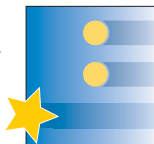
#### Electrical connections

2 m connection cable  
or M12 x 1 plug con-  
nection



#### Materials

Plastic housings PA, PBT,  
PVDF and ABS



#### Special features

Fine adjustment via  
potentiometer,  
protection class IP67

## S12 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø12 x 63 mm
<b>Switching distance</b>	3 mm,
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...30 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	PA
<b>Material active face</b>	PA
<b>Material cable</b>	PVC 2 m

### Types and data – selection table

Type	Output	w	d
BC3-S12-RP6X	, PNP	w006	d343
BC3-S12-AP6X	, PNP	w004	d343
BC3-S12-AN6X	, NPN	w005	d343

## S18 – 3-wire DC – Fixed settings



### General data

<b>Dimensions</b>	Ø18 x 83 mm
<b>Switching distance</b>	5 mm,
<b>Electrical connection</b>	connector, M12 x 1
<b>Operating voltage</b>	10...65 VDC

<b>Ambient temperature</b>	-25...+70 °C
<b>Protection class</b>	IP67
<b>Material housing</b>	PA
<b>Material active face</b>	PA


### Types and data – selection table

Type	Output	w	d
BC5-S18-RP4X-H1141/S250	, PNP	w015	d344
BC5-S18-AP4X-H1141/S250	, PNP	w001	d344
BC5-S18-AN4X-H1141/S250	, NPN	w002	d344

## S18 – 3-wire DC – Fine adjustment via potentiometer







### General data

Switching distance	5 mm, 
Operating voltage	10...65 VDC
Ambient temperature	-25...+70 °C

Protection class	IP67
Material housing	PA
Material active face	PA

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BC5-S18-RP4X-0,15-RS4	Ø18 x 70 mm	 , PNP	cable with connector, M12 x 1	PVC 0.15 m	w015	d346
BC5-S18-RP4X	Ø18 x 74 mm	 , PNP	cable	PVC 2 m	w006	d345
BC5-S18-AP4X	Ø18 x 74 mm	 , PNP	cable	PVC 2 m	w004	d345
BC5-S18-AN4X	Ø18 x 74 mm	 , NPN	cable	PVC 2 m	w005	d345

## S30 – 4-wire DC – Fine adjustment via potentiometer







### General data

Switching distance	10 mm, 
Operating voltage	10...65 VDC
Ambient temperature	-25...+70 °C

Protection class	IP67
Material housing	PA
Material active face	PA

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BC10-S30-VP4X-H1141	Ø30 x 71 mm	 , PNP	connector, M12 x 1	-	w008	d347
BC10-S30-VP4X	Ø30 x 62.5 mm	 , PNP	cable	PVC 2 m	w007	d348
BC10-S30-VN4X-H1141	Ø30 x 71 mm	 , NPN	connector, M12 x 1	-	w010	d347
BC10-S30-VN4X	Ø30 x 62.5 mm	 , NPN	cable	PVC 2 m	w018	d348

## K34 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø34 x 74.5 mm	<b>Ambient temperature</b>	-25...+70 °C
<b>Switching distance</b>	15 mm,	<b>Protection class</b>	IP67
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	PBT
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PBT

### Types and data – selection table

Type	Output	w	d
BC15-K34-AP4X-H1141	, PNP	w001	d349
BC15-K34-AN4X-H1141	, NPN	w002	d349

## K34 – 4-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø34 x 80 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	15 mm,	<b>Material housing</b>	PBT
<b>Electrical connection</b>	cable	<b>Material active face</b>	PBT
<b>Operating voltage</b>	10...65 VDC	<b>Material cable</b>	PVC 2 m
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Output	w	d
BC15-K34-VP4X	, PNP	w007	d350
BC15-K34-VN4X	, NPN	w018	d350

## KT34 – 4-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø34 x 80 mm
<b>Switching distance</b>	20 mm,
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...65 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	PVDF
<b>Material active face</b>	PVDF
<b>Material cable</b>	2 m

### Types and data – selection table

Type	Output	w	d
NC20-KT34-VP4X2	, PNP	w007	d351
NC20-KT34-VN4X2	, NPN	w018	d351

## K40SR – 4-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø40 x 90 mm
<b>Switching distance</b>	20 mm,
<b>Operating voltage</b>	10...65 VDC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	ABS
<b>Material active face</b>	ABS

### Types and data – selection table

Type	Output	Electrical connection	w	d
BC20-K40SR-VP4X2	, PNP	terminal chamber	w014	d352
BC20-K40SR-VN4X2-H1141	, NPN	connector, M12 x 1	w010	d353
BC20-K40SR-VN4X2	, NPN	terminal chamber	w013	d352



**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 736 ff

## High-temperature resistant sensors

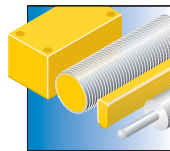


A growing number of applications require sensors resisting temperatures beyond the standard range of -25 ... +70 °C. For this purpose TURCK has developed capacitive sensors which meet exactly these requirements. The sensors feature temperature resistant components as well as cleverly designed passive cooling concepts, approved in demanding laboratory tests. These sensors resist temperatures from -25 °C to +100 °C.

### Features

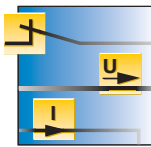
- For temperatures up to +100 °C
- Automatic wetting compensation
- Excellent EMC properties
- ESD immunity

### Properties



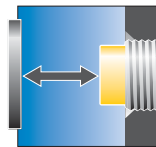
#### Design

Threaded barrel  
M12 x 1 and M18 x 1



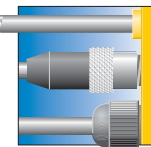
#### Electrical versions

3-wire DC and NAMUR



#### Switching distances

3 mm and 5 mm flush  
mounting



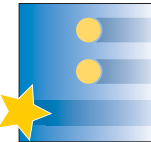
#### Electrical connections

2 m cable



#### Materials

Rugged, temperature  
resistant housing  
materials, application  
optimized cable quali-  
ties




#### Special features

Fixed settings via po-  
tentiometer,  
-25 °C to +100 °C


### +100°C – S12 – 3-wire DC



<b>Type</b>	BC3-S12-AP6X/S100	<b>Protection class</b>	IP67
<b>Dimensions</b>	Ø12 x 63 mm	<b>Material housing</b>	PA
<b>Switching distance</b>	3 mm, 	<b>Material active face</b>	PA
<b>Output</b>	—, PNP	<b>Material cable</b>	PUR 2 m
<b>Electrical connection</b>	cable	<b>Wiring diagram</b>	w004
<b>Operating voltage</b>	10...30 VDC	<b>Dimension drawing</b>	d343
<b>Ambient temperature</b>	-25...+100 °C		


### +100°C – S18 – NAMUR



<b>Type</b>	BC5-S18-Y1X/S100	<b>Protection class</b>	IP67
<b>Dimensions</b>	Ø18 x 74 mm	<b>Material housing</b>	PA
<b>Switching distance</b>	5 mm, 	<b>Material active face</b>	PA
<b>Output</b>	NAMUR	<b>Material cable</b>	silicone 2 m
<b>Electrical connection</b>	cable	<b>Wiring diagram</b>	w019
<b>Operating voltage</b>	8.2 VDC	<b>Dimension drawing</b>	d345
<b>Ambient temperature</b>	-25...+100 °C		

### +100°C – S185 – 3-wire DC



<b>General data</b>		<b>Protection class</b>	IP67
<b>Dimensions</b>	Ø18 x 74.5 mm	<b>Material housing</b>	PVDF
<b>Switching distance</b>	5 mm, 	<b>Material active face</b>	PVDF
<b>Electrical connection</b>	cable	<b>Material cable</b>	PVC 2 m
<b>Operating voltage</b>	10...65 VDC		
<b>Ambient temperature</b>	-25...+100 °C		

#### Types and data – selection table

Type	Output	w	d
BC5-S185-AP4X/S100	—, PNP	w004	d354
BC5-S185-AN4X/S100	—, NPN	w005	d354

 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 736 ff

## AC -2-wire sensors

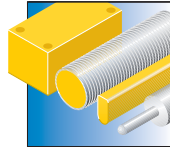


AC 2-wire sensors are easily installed, they replace mechanical switches in existing systems and simplify wiring. The established wiring, normally two wires, can still be used. Cutting down on the amount of wiring saves time.

### Features

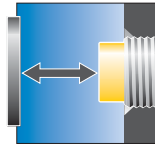
- Automatic wetting compensation
- Excellent EMC properties
- Large switching distances

### Properties



#### Design

Cylindrical  $\varnothing$  18, 30 and 34 mm, rectangular 40 x 40 and 80 x 80 mm



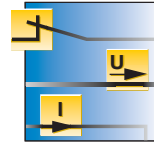
#### Switching distances

5 mm flush, 50 mm non-flush



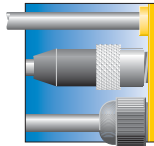
#### Materials

Chrome-plated brass and rugged plastic



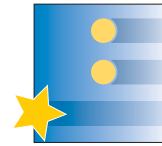
#### Electrical versions

2-wire AC, NO/NC or programmable version



#### Electrical connections

2 m connection cable, terminal chamber or 1/2-20 UNF plug connection



#### Special features

Fine adjustment via potentiometer, protection class IP67

## M18 – 2-wire AC – Fixed settings



### General data

<b>Dimensions</b>	Ø18 x 82 mm
<b>Switching distance</b>	5 mm,
<b>Electrical connection</b>	connector, 1/2"
<b>Operating voltage</b>	20...250 VAC

<b>Ambient temperature</b>	-25...+70 °C
<b>Protection class</b>	IP67
<b>Material housing</b>	CuZn-Cr
<b>Material active face</b>	PBT

### Types and data – selection table

Type	Output	w	d
BC5-M18-RZ3X-B3331/S250	, 2-wire	w061	d183
BC5-M18-AZ3X-B3331/S250	, 2-wire	w060	d183

## M18 – 2-wire AC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø18 x 74 mm
<b>Switching distance</b>	5 mm,
<b>Electrical connection</b>	cable
<b>Operating voltage</b>	20...250 VAC
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	CuZn-Cr
<b>Material active face</b>	PBT
<b>Material cable</b>	PVC 2 m


### Types and data – selection table

Type	Output	w	d
BC5-M18-RZ3X	, 2-wire	w062	d340
BC5-M18-AZ3X	, 2-wire	w031	d340

## S18 – 2-wire AC – Fine adjustment via potentiometer





**General data**

**Dimensions** Ø18 x 74 mm  
**Switching distance** 5 mm,   
**Electrical connection** cable  
**Operating voltage** 20...250 VAC  
**Ambient temperature** -25...+70 °C

**Protection class** IP67  
**Material housing** PA  
**Material active face** PA  
**Material cable** PVC 2 m

**Types and data – selection table**

Type	Output	w	d
BC5-S18-RZ3X	 , 2-wire	w038	d345
BC5-S18-AZ3X	 , 2-wire	w020	d345

## M30 – 2-wire AC – Fine adjustment via potentiometer







**General data**

**Switching distance** 10 mm,   
**Operating voltage** 20...250 VAC  
**Ambient temperature** -25...+70 °C

**Protection class** IP67  
**Material housing** CuZn-Cr

**Types and data – selection table**

Type	Dimensions	Output	Electrical connection	Material active face	Material cable	w	d
BC10-M30K-RZ3X-B3131	Ø30 x 71 mm	 , 2-wire	connector, 1/2"	-	-	w061	d355
BC10-M30K-RZ3X	Ø30 x 62.5 mm	 , 2-wire	cable	PA	PVC 2 m	w062	d342
BC10-M30K-AZ3X-B3131	Ø30 x 71 mm	 , 2-wire	connector, 1/2"	-	-	w060	d355
BC10-M30K-AZ3X	Ø30 x 62.5 mm	 , 2-wire	cable	PA	PVC 2 m	w031	d342

## S30 – 2-wire AC – Fine adjustment via potentiometer











### General data

Switching distance	10 mm, 
Operating voltage	20...250 VAC
Ambient temperature	-25...+70 °C

Protection class	IP67
Material housing	PA
Material active face	PA


### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BCF10-S30-RZ3X-B3131	Ø30 x 71 mm	 , 2-wire	connector, 1/2"	-	w063	d356
BCF10-S30-RZ3X	Ø30 x 62.5 mm	 , 2-wire	cable	PVC 2 m	w038	d348
BCF10-S30-AZ3X-B3131	Ø30 x 71 mm	 , 2-wire	connector, 1/2"	-	w025	d356
BCF10-S30-AZ3X	Ø30 x 62.5 mm	 , 2-wire	cable	PVC 2 m	w020	d348
BC10-S30-RZ3X-B3131	Ø30 x 71 mm	 , 2-wire	connector, 1/2"	-	w063	d356
BC10-S30-RZ3X	Ø30 x 62.5 mm	 , 2-wire	cable	PVC 2 m	w038	d348
BC10-S30-AZ3X-B3131	Ø30 x 71 mm	 , 2-wire	connector, 1/2"	-	w025	d356
BC10-S30-AZ3X	Ø30 x 62.5 mm	 , 2-wire	cable	PVC 2 m	w020	d348

## K34 – 2-wire AC – Fine adjustment via potentiometer




### General data

Dimensions	Ø34 x 80 mm
Switching distance	15 mm, 
Electrical connection	cable
Operating voltage	20...250 VAC
Ambient temperature	-25...+70 °C

Protection class	IP67
Material housing	PBT
Material active face	PBT
Material cable	PVC 2 m

### Types and data – selection table

Type	Output	w	d
BCF15-K34-RZ3X	 , 2-wire	w038	d350
BCF15-K34-AZ3X	 , 2-wire	w020	d350
BC15-K34-RZ3X	 , 2-wire	w038	d350
BC15-K34-AZ3X	 , 2-wire	w020	d350

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 736 ff

## P30SR – 2-wire AC – Fine adjustment via potentiometer



<b>Type</b>	BC10-P30SR-FZ3X2	<b>Ambient temperature</b>	-25...+70 °C
<b>Dimensions</b>	Ø30 x 115 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	10 mm,	<b>Material housing</b>	ABS
<b>Output</b>	connection programmable	<b>Material active face</b>	ABS
<b>Electrical connection</b>	terminal chamber	<b>Wiring diagram</b>	w029
<b>Operating voltage</b>	20...250 VAC	<b>Dimension drawing</b>	d357

## K34SR – 2-wire AC – Fine adjustment via potentiometer



<b>Type</b>	BC15-K34SR-FZ3X2	<b>Ambient temperature</b>	-25...+70 °C
<b>Dimensions</b>	Ø34 x 106 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	15 mm,	<b>Material housing</b>	PBT
<b>Output</b>	connection programmable	<b>Material active face</b>	PBT
<b>Electrical connection</b>	terminal chamber	<b>Wiring diagram</b>	w029
<b>Operating voltage</b>	20...250 VAC	<b>Dimension drawing</b>	d358

## CP40 – 2-wire AC – Fine adjustment via potentiometer




<b>Type</b>	BC20-CP40-FZ3X2	<b>Ambient temperature</b>	-25...+70 °C
<b>Dimensions</b>	40 x 40 x 114 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	20 mm,	<b>Material housing</b>	PBT
<b>Output</b>	connection programmable	<b>Material active face</b>	PBT
<b>Electrical connection</b>	terminal chamber	<b>Wiring diagram</b>	w029
<b>Operating voltage</b>	20...250 VAC	<b>Dimension drawing</b>	d334

Variable orientation of active face in 9 directions



## CP80 – 2-wire AC – Fine adjustment via potentiometer



<b>Type</b>	NC50-CP80-FZ3X2	<b>Ambient temperature</b>	-25...+70 °C
<b>Dimensions</b>	80 x 40.5 x 80 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	50 mm, 	<b>Material housing</b>	PBT
<b>Output</b>	connection programmable	<b>Material active face</b>	PBT
<b>Electrical connection</b>	terminal chamber	<b>Wiring diagram</b>	w029
<b>Operating voltage</b>	20...250 VAC	<b>Dimension drawing</b>	d336

## NAMUR sensors

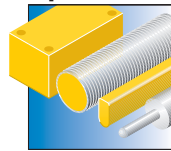


NAMUR sensors are approved for the zones 0 and 1. They are polarized 2-wire devices, changing their internal resistance in dependence on the attenuation (continuous linear/current characteristics). They can be connected to external switching amplifiers which convert current variations into binary output signals. The advantage: With an approved switching amplifier, they can be applied in Ex-areas as well as monitor wire-break and short-circuit continuously.

### Features

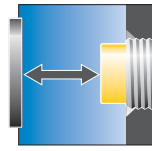
- Integrated sensor monitoring
- Automatic wetting compensation
- Excellent EMC properties
- Ex-area approved

### Properties



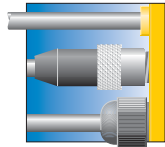
#### Design

Threaded barrel  
M18 x 1, M30 x 1.5 and  
rectangular QF5.5



#### Switching distances

5 mm and 10 mm, flush  
mountable



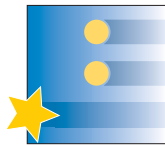
#### Electrical connections

2 m cable PVC and  
silicone



#### Materials

Polypropylene and  
polyamide housings




#### Special features

Fixed settings, ATEX  
and SIL approvals,  
extended temperature  
range


## QF5.5 – NAMUR – Fixed settings




<b>Type</b>	BC5-QF5,5-Y1X/S250	<b>Protection class</b>	IP67
<b>Dimensions</b>	20.3 x 5.5 x 54 mm	<b>Material housing</b>	PP
<b>Switching distance</b>	5 mm, 	<b>Material active face</b>	PP
<b>Output</b>	NAMUR	<b>Material cable</b>	PVC 2 m
<b>Electrical connection</b>	cable	<b>Wiring diagram</b>	w019
<b>Operating voltage</b>	nom. 8.2 VDC	<b>Dimension drawing</b>	d359
<b>Ambient temperature</b>	-25...+70 °C		

## S18 – NAMUR – Fine adjustment via potentiometer




<b>General data</b>		<b>Operating voltage</b>	nom. 8.2 VDC
<b>Dimensions</b>	Ø18 x 74 mm	<b>Protection class</b>	IP67
<b>Switching distance</b>	5 mm, 	<b>Material housing</b>	PA
<b>Output</b>	NAMUR	<b>Material active face</b>	PA
<b>Electrical connection</b>	cable		

### Types and data – selection table

Type	Ambient temperature	Material cable		
BC5-S18-Y1X/S100	-25...+100 °C	silicone 2 m	w019	d345
BC5-S18-Y1X	-25...+70 °C	PVC 2 m	w019	d345

## S30 – NAMUR – Fine adjustment via potentiometer



<b>Type</b>	BC10-S30-Y1X	<b>Protection class</b>	IP67
<b>Dimensions</b>	Ø30 x 62.5 mm	<b>Material housing</b>	PA
<b>Switching distance</b>	10 mm, 	<b>Material active face</b>	PA
<b>Output</b>	NAMUR	<b>Material cable</b>	PVC 2 m
<b>Electrical connection</b>	cable	<b>Wiring diagram</b>	w019
<b>Operating voltage</b>	nom. 8.2 VDC	<b>Dimension drawing</b>	d348
<b>Ambient temperature</b>	-25...+70 °C		

 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 736 ff

## BCF sensors with close-up range suppression

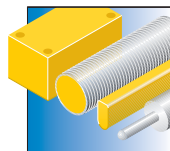


Thanks to the new switching technology in combination with optimized electrode and compensation features, the BCFs work reliably under difficult application conditions. Even conductive coatings are not a problem at all. To avoid HF cross-talk and other interferences, the potentiometer is located in a less sensitive area of the circuit, this applies to all capacitive TURCK sensors. Even applications that are subject to strong interferences do not require additional protective measures. All sensors of the BCF series are immune to radiated and conducted HF interference, burst as well as electrostatic discharge (ESD).

### Features

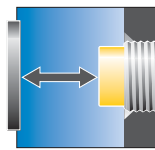
- Automatic wetting compensation
- Increased EMI and RFI shielding
- High protection class
- Novel close-up range suppression

### Properties



#### Design

Cylinders  $\varnothing 18$ ,  $\varnothing 30$  and  $\varnothing 34$  mm and rectangular Q20L60



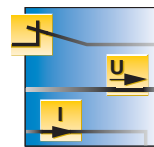
#### Switching distances

5 ... 15 mm, flush mounting



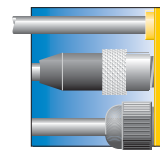
#### Materials

PA or PBT housings



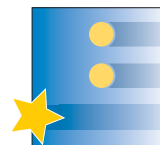
#### Electrical versions

2, 3 and 4-wire, PNP or NPN, NO or NC



#### Electrical connections

2 m cable PVC/PUR, M12 x 1 plug connection



#### Special features

Close-up range suppression  
EMC shielded

## BCF – S18 – 3-wire DC – Fixed settings



### General data

<b>Dimensions</b>	Ø18 x 83 mm	<b>Ambient temperature</b>	-25...+70 °C
<b>Switching distance</b>	5 mm,	<b>Protection class</b>	IP67
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	PA
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PA

### Types and data – selection table

Type	Output		
BCF5-S18-AP4X-H1141/S250	, PNP	w001	d344
BCF5-S18-AN4X-H1141/S250	, NPN	w002	d344

## BCF – S18 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	Ø18 x 74 mm	<b>Ambient temperature</b>	-25...+70 °C
<b>Switching distance</b>	5 mm,	<b>Protection class</b>	IP67
<b>Electrical connection</b>	cable	<b>Material housing</b>	PA
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PA

### Types and data – selection table

Type	Output	Material cable		
BCF5-S18-RP4X/S90	, PNP	PUR 2 m	w006	d345
BCF5-S18-RN4X	, NPN	PVC 2 m	w064	d345
BCF5-S18-AP4X/S90	, PNP	PUR 2 m	w004	d345
BCF5-S18-AP4X	, PNP	PVC 2 m	w004	d345
BCF5-S18-AN4X	, NPN	PVC 2 m	w005	d345

## BCF – S30 – 4-wire DC – Fine adjustment via potentiometer



**General data**

**Switching distance** 10 mm,

**Operating voltage** 10...65 VDC

**Ambient temperature** -25...+70 °C

**Protection class** IP67

**Material housing** PA

**Material active face** PA

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BCF10-S30-VP4X-H1141	Ø30 x 71 mm	, PNP	connector, M12 x 1	-	w008	d347
BCF10-S30-VP4X	Ø30 x 62.5 mm	, PNP	cable	PVC 2 m	w007	d348
BCF10-S30-VN4X-H1141	Ø30 x 71 mm	, NPN	connector, M12 x 1	-	w010	d347
BCF10-S30-VN4X	Ø30 x 62.5 mm	, NPN	cable	PVC 2 m	w018	d348

## BCF – K34 – 2-wire AC – Fine adjustment via potentiometer



**General data**

**Dimensions** Ø34 x 80 mm

**Switching distance** 15 mm,

**Electrical connection** cable

**Operating voltage** 20...250 VAC

**Ambient temperature** -25...+70 °C

**Protection class** IP67

**Material housing** PBT

**Material active face** PBT

**Material cable** PVC 2 m

### Types and data – selection table

Type	Output	w	d
BCF15-K34-RZ3X	, 2-wire	w038	d350
BCF15-K34-AZ3X	, 2-wire	w020	d350

## BCF – Q20L60 – 3-wire DC – Fine adjustment via potentiometer



### General data

<b>Dimensions</b>	30 x 20 x 60 mm	<b>Ambient temperature</b>	-25...+70 °C
<b>Switching distance</b>	10 mm,	<b>Protection class</b>	IP67
<b>Output</b>	, PNP	<b>Material housing</b>	PC
<b>Operating voltage</b>	10...65 VDC	<b>Material active face</b>	PC

### Types and data – selection table

Type	Electrical connection	Material cable		
BCF10-Q20L60-AP4X-H1141	connector, M12 x 1	-	w001	d361
BCF10-Q20L60-AP4X	cable	PVC 2 m	w004	d360

## BCC sensors for level control

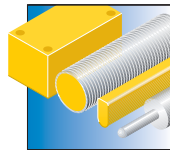


The BCC sensors blank out all interferences during the monitoring process and feature excellent EMC and ESD properties. A laterally mounted shield and an integrated processing unit inhibit predamping when mounted in metal flanges. The full switching distance is thus available.

### Features

- Automatic wetting compensation
- Excellent EMC properties
- High ESD immunity
- Detection of smallest pellets

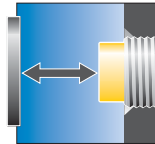
### Properties



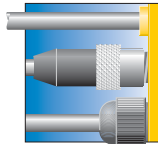
**Design**  
Threaded barrel,  
M30 x 1.5



**Electrical versions**  
3/4-wire NO/NC, PNP as well as antivalent PNP/NPN output



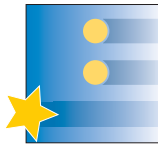
**Switching distances**  
10 mm, flush mounting



**Electrical connections**  
2 m cable, M12 x 1 plug connection



**Materials**  
Polyamide housing




**Special features**  
ESD immunity,  
lateral predamping protection



## BCF – S30 – 3-wire DC – Fine adjustment via potentiometer










### General data

Switching distance	10 mm, 
Operating voltage	10...65 VDC
Ambient temperature	-25...+70 °C

Protection class	IP67
Material housing	PA
Material active face	PA

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable		
BCC10-S30-VP4X-H1141	Ø30 x 71 mm	 , PNP	connector, M12 x 1	-	w008	d347
BCC10-S30-RP4X-H1143	Ø30 x 71 mm	 , PNP	connector, M12 x 1	-	w003	d347
BCC10-S30-RP4X	Ø30 x 62.5 mm	 , PNP	cable	PVC 2 m	w006	d348
BCC10-S30-AP4X-H1141	Ø30 x 71 mm	 , PNP	connector, M12 x 1	-	w001	d347
BCC10-S30-AP4X	Ø30 x 62.5 mm	 , PNP	cable	PVC 2 m	w004	d348

## Chemical-resistant sensors

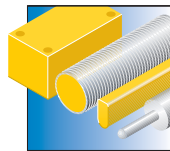


The capacitive sensors (PVDF) are the ideal solution for any application of the pharmaceutical, chemical or food industry. The broad range of functional features of TURCK sensors help to optimize all kinds of applications, for instance, in dairies, breweries, the manufacture of bakery products and frozen foods, or packaging and filling procedures. PVDF materials belong to the group of fluoride plastics. They are extremely resistant due to the high fluorine content. They also feature a high tracking resistance under constant load, good cold properties and excellent temperature resistance.

### Features

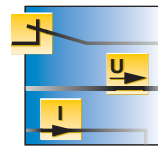
- Excellent chemical resistance
- Automatic wetting compensation
- Excellent EMC properties
- Large switching distances

### Properties



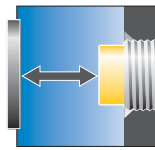
#### Design

Cylinders  $\varnothing 18$ ,  $\varnothing 30$  mm



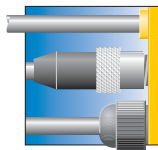
#### Electrical versions

3-wire NO contact or antivalent PNP/NPN switching, NAMUR



#### Switching distances

10 mm, flush mounting



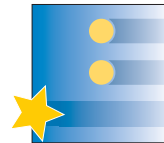
#### Electrical connections

2 m cable PVC or PUR



#### Materials

Threaded barrel, plastic  
PVDF





#### Special features

Chemical resistant


## S185 – 3-wire DC – Fine adjustment via potentiometer







<b>Type</b>	BC5-S185-AP4X	<b>Protection class</b>	IP67
<b>Dimensions</b>	Ø18 x 74.5 mm	<b>Material housing</b>	PVDF
<b>Switching distance</b>	5 mm, 	<b>Material active face</b>	PVDF
<b>Output</b>	 , PNP	<b>Material cable</b>	PVC 2 m
<b>Electrical connection</b>	cable	<b>Wiring diagram</b>	w004
<b>Operating voltage</b>	10...65 VDC	<b>Dimension drawing</b>	d354
<b>Ambient temperature</b>	-25...+70 °C		

## PT30 – 3-wire DC – Fine adjustment via potentiometer



<b>General data</b>		<b>Protection class</b>	IP67
<b>Dimensions</b>	Ø30 x 80 mm	<b>Material housing</b>	PVDF
<b>Switching distance</b>	10 mm, 	<b>Material active face</b>	PVDF
<b>Electrical connection</b>	cable	<b>Material cable</b>	PVC 2 m
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Output	Operating voltage		
BC10-PT30-Y0X	NAMUR	nom. 8.2 VDC	w019	d362
BC10-PT30-VP4X2	 , PNP	10...65 VDC	w007	d362
BC10-PT30-VN4X2	 , NPN	10...65 VDC	w018	d362



# At a glance

## Magnetic field sensors



### Magnetic field sensors for pneumatic cylinders

Magnetic field sensors are activated by magnetic fields and are especially suited for the detection of pistons in pneumatic cylinders. Based on the fact that magnetic fields can permeate non-magnetizable metals, sensors of this type detect a permanent magnet mounted on a piston through the aluminium wall of a cylinder.

Magnetic-inductive sensors from TURCK operate on a patented function principle. The sensing range is adjusted to a core width to rule out multiple switchpoints. Permanent magnets of different field strengths are thus reliably detected in all common cylinder types. The sensors operate wear-free, are rugged and short-circuit protected and feature protection class IP67.

The product range offers many solutions for standard applications, welding facilities as well as Ex-areas. TURCK also offers magnetic field sensors for analog detection tasks. They are easy to operate and even fulfill higher requirements equally reliable.

To monitor the piston position on all standard pneumatic cylinders, sensors from only one family are required, namely BIM-UNT and BIM-UNR. NAMUR sensors for explosion hazardous areas are also available.

BIM-UNT and BIM-UNR can be mounted directly on T- and C-groove cylinders. Matching accessories are available for round, tie-rod and dovetail cylinders, making the use of special versions with manual fine adjustment or external switchpoint setting redundant.

The family of universal magnetic field sensors for pneumatic cylinders is completed by the WIM45-UNT with analog current and voltage output. Already existing solutions with indirect analog detection can be replaced easily by this new type.

# Our strengths - Your advantages



## Universal magnetic field sensors

The piston position is monitored very comfortably on all standard pneumatic cylinders with the universal magnetic field sensors. But what's more, the new magnetic field sensors by TURCK not only support efficient standardization but also provide enormous potential in

terms of optimization, from construction over purchase and production up to system support for operators and service personnel. Use the unique performance spectrum of these sensors for effective cost reduction!



## High system availability

The universally applicable magnetic field sensors operate extremely reliable, even in rough production environments. This is guaranteed through excellent EMC immunity, protection class IP67 as well as the especially safe installation method of the sensors. We placed great emphasis

on practical functionality of the housings and solid mounting accessories. Magnetic field sensors thus withstand the rough ambient conditions of machine building without any problems. Use these benefits to optimize your production processes.



## Maximum freedom

Numerous connection possibilities, simple mounting and flexible accessories guarantee maximum freedom in planning with minimal mounting effort. From single switchpoint monitoring, over twin-sets, analog position detection up

to combined binary/analog monitoring: Profit from the extensive standard product range of TURCK magnetic field sensors providing more flexibility for your application.

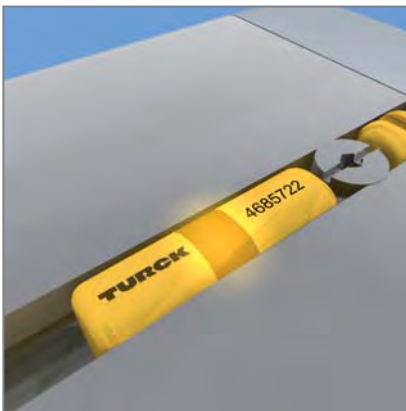
# advantages



## Safe installation

A pre-fixation lip enables one-handed mounting in the groove. Once inserted in the groove, the sensor is moved to its final position. Screwed tight with a wing screw near the cable exit prevents an uplift of the sensor when pulling the

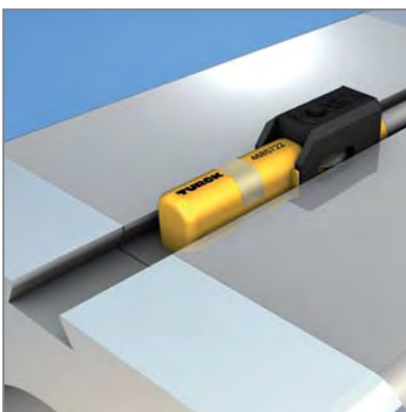
cable. The screw is made of tool steel alloy and thus extremely stable. For vibration-resistant mounting it is simply enough to tighten the screw with a quarter revolution, using a standard screw driver or a 1.5 mm Allen key.



## Compact design

With a total length of only 28 (UNT) resp. 18 mm (UNR) the standard sensors are the most compact devices on the market. The active face is located directly at the sensor end. This enables the piston position to be detected up to the end of compact short-stroke cylinders.

Thanks to the bright and all-round visible LED, the switching state is perfectly visible from any perspective and proves helpful when the sensors are aligned and mounted. The best mounting position is thus obtained.



## Optional accessories

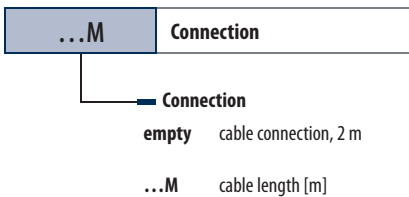
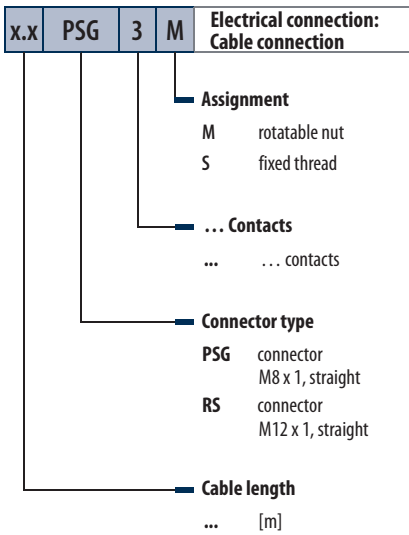
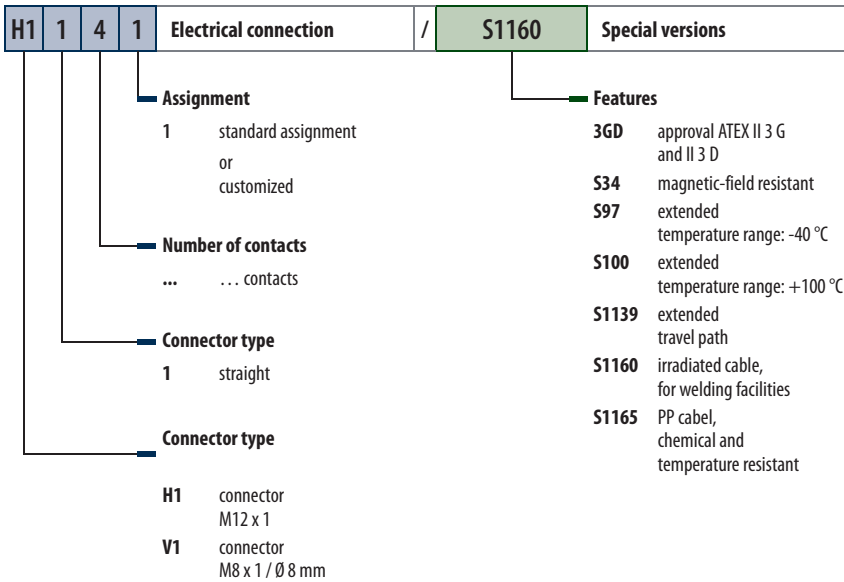
An extensive range of accessories round off the performance spectrum of the new, universally applicable magnetic field sensors. We offer mounting aids for all standard cylinders, adjustment and fixation tools, as well as the fixation clips for save cable routing. Due to a novel MR sensor

element all magnets in standard pneumatic cylinders can be detected safely and without multiple switchpoints. Thus exact position detection is possible, allowing you to benefit from the high level of flexibility.

# Type code

BIM	Functional principle	UNT	Housing	A	P	6	X	Electrical version	
<b>Functional principle</b> <b>BIM</b> magnetic-inductive/ magnetostrictive <b>WiM45</b> analog position detection magnetically actuated, 45 mm measuring range		<b>Housing</b> <b>IKT</b> for tie-rod and profile cylinders mounted with fixing clamp, active face centered <b>NST</b> for groove cylinders, mounted with fixing clamp, incl. accessories adaptable to dovetail and tie-rod cylinders active face centered <b>UNR</b> for C-groove cylinders without accessories, adaptable to other cylinder types with accessories <b>UNT</b> for T-groove cylinders without accessories, adaptable to other cylinder types with accessories <b>UNTL</b> long size, with analog output, for T-groove cylin- ders without accessories, adaptable to other cylinder types with accessories			<b>Indication</b> <b>X</b> 1 x LED <b>X...</b> number of LEDs or multicolor LED <b>Voltage range</b> <b>6</b> 10...30 VDC, ☉ <b>Output mode</b> <b>N</b> NPN <b>P</b> PNP <b>Output function</b> <b>A</b> working current NO <b>LIU</b> analog output (voltage and current), $U_b = 15...30$ VDC <b>AY1</b> digital (NAMUR acc. to EN 60947-5-6) <b>Y1</b> analog (NAMUR acc. to EN 60947-5-6)				





# Designs and variants

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









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	UNT	UNR	WIM	NST
<b>Design</b>	rectangular UNT, 5 x 6 x 28 mm	rectangular UNR, 2.9 x 4.6 x 18 mm	rectangular UNTL, 5 x 14.5 x 73 mm	rectangular NST, 17 x 14 x 28 mm
<b>Measuring range</b>			45 mm	
<b>Electrical connection</b>	cable connector, M12 x 1 connector, fixed thread, cable with connector, Ø 8 mm connector, rotatable thread, M8 x 1 connector, M8 x 1	cable connector, fixed thread, cable with connector, Ø 8 mm connector, rotatable thread, M8 x 1 connector, M12 x 1	cable with connector, M8 x 1 cable with connector, M12 x 1 connector, M12 x 1	connector, M12 x 1 connector, M8 x 1 cable
<b>Output</b>	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN 4-wire DC PNP 4-wire DC NPN	3-wire DC PNP 3-wire DC NPN	4-wire DC Analog output 4-wire DC PNP/analog output	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN
<b>Accessories cylindrical design</b>	 KLR1...  KLD...  KLZ...INT	 KLD...	 KLD...	 KLN3  KLN3  KLZ...INT und KLN3  KLN-SMC  KLF1  KLF2

# Standard variants

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Magnetic field sensors

	IKT
<b>Design</b>	rectangular IKT, 14.6 x 17 x 30 mm
<b>Electrical connection</b>	connector, M8 x 1 connector, M12 x 1 cable
<b>Output</b>	2-wire DC NAMUR 3-wire DC PNP 3-wire DC NPN
<b>Accessories cylindrical design</b>	 KLI... KLI... KLI...

## Magnetic field sensors - UNT series

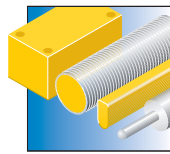


UNTs are mounted quickly and firmly. A pre-fixation lip enables one-handed mounting, even overhead. With the extended range of accessories, the sensors can be mounted on nearly all standard pneumatic cylinders. All standard connection types are available.

### Features

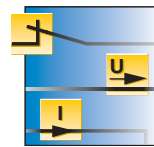
- Compact design
- Quickly and firmly mounted
- Excellent EMC immunity
- For T-groove cylinders without accessories
- Mounting accessories for all standard cylinders.
- Clearly visible LED
- Twin set for switchpoint monitoring

### Properties



#### Design

One type for all standard pneumatic cylinders



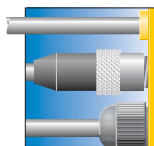
#### Electrical versions

NAMUR, 2, 3 and 4-wire DC



#### Measuring ranges

Reliable position detection on all standard pneumatic cylinders



#### Electrical connections

All standard connection types available, cable, connector or pigtail



#### Materials

Rugged PP housing for a wide range of applications

## UNT – Cable connection



### General data

<b>Dimensions</b>	5 x 6 x 28 mm	<b>Protection class</b>	IP67
<b>Electrical connection</b>	cable	<b>Material housing</b>	PP
<b>Switching frequency</b>	1 kHz	<b>Material active face</b>	PP

### Types and data – selection table

Type	Output	Operating voltage	Ambient temperature	Material cable	w	d
BIM-UNT-AP6X	—, PNP	10...30 VDC	-25...+70 °C	PUR 2 m	w059	d363
BIM-UNT-AP6X 7M	—, PNP	10...30 VDC	-25...+70 °C	PUR 7 m	w059	d363
BIM-UNT-AP6X/S1139	—, PNP	10...30 VDC	-25...+70 °C	PUR 2 m	w059	d363
BIM-UNT-AP6X/S1160	—, PNP	10...30 VDC	-25...+70 °C	TPU 2 m	w059	d363
BIM-UNT-AP6X/S100/S1165	—, PNP	10...30 VDC	-25...+100 °C	TPE 2 m	w059	d363
BIM-UNT-AP6X/3GD	—, PNP	10...30 VDC	-25...+70 °C	PUR 2 m	w059	d363
BIM-UNT-AN6X	—, NPN	10...30 VDC	-25...+70 °C	PUR 2 m	w005	d363
BIM-UNT-AG41X/S1139/S1160	—, 2-wire	10...55 VDC	-25...+70 °C	TPU 2 m	w065	d363
BIM-UNT-AG41X/S1139/S1160 7M	—, 2-wire	10...55 VDC	-25...+70 °C	TPU 7 m	w065	d363
BIM-UNT-AY1X/S1139	NAMUR	nom. 8.2 VDC	-25...+70 °C	PVC 2 m	w019	d363
BIM-UNT-AY1X/S1139 7M	NAMUR	nom. 8.2 VDC	-25...+70 °C	PVC 7 m	w019	d363

## UNT – Pigtail with M8 x 1 connector



### General data

<b>Dimensions</b>	5 x 6 x 28 mm	<b>Material housing</b>	PP
<b>Switching frequency</b>	1 kHz	<b>Material active face</b>	PP
<b>Ambient temperature</b>	-25...+70 °C	<b>Material cable</b>	PUR 0.3 m
<b>Protection class</b>	IP67		

**Types and data – selection table**

Type	Output	Electrical connection	Operating voltage	w	d
BIM-UNT-AP6X-0,3-PSG3S	—, PNP	connector, fixed thread, Ø 8 mm	10...30 VDC	w001	d364
BIM-UNT-AP6X-0,3-PSG3S/S1139	—, PNP	connector, fixed thread, Ø 8 mm	10...30 VDC	w001	d364
BIM-UNT-AN6X-0,3-PSG3S	—, NPN	connector, fixed thread, Ø 8 mm	10...30 VDC	w002	d364
BIM-UNT-AP6X-0,3-PSG3M	—, PNP	connector rotatable thread, M8 x 1	10...30 VDC	w001	d365
BIM-UNT-AP6X-0,3-PSG3M/S1139	—, PNP	connector rotatable thread, M8 x 1	10...30 VDC	w001	d365
BIM-UNT-AN6X-0,3-PSG3M	—, NPN	connector rotatable thread, M8 x 1	10...30 VDC	w002	d365

**UNT – Pigtail with M12 x 1 connector**



**General data**

<b>Dimensions</b>	5 x 6 x 28 mm	<b>Protection class</b>	IP67
<b>Electrical connection</b>	connector, M12 x 1	<b>Material housing</b>	PP
<b>Switching frequency</b>	1 kHz	<b>Material active face</b>	PP
<b>Ambient temperature</b>	-25...+70 °C		

**Types and data – selection table**

Type	Output	Operating voltage	Material cable	w	d
BIM-UNT-AP6X-0,3-RS4	—, PNP	10...30 VDC	PUR 0.3 m	w001	d366
BIM-UNT-AP6X-0,3-RS4/S1139	—, PNP	10...30 VDC	PUR 0.3 m	w001	d366
BIM-UNT-AP6X-0,3-RS4/S1160	—, PNP	10...30 VDC	TPU 0.3 m	w001	d366
BIM-UNT-AG41X-0,3-RS4.23/S1139/S1160	—, 2-wire	10...55 VDC	TPU 0.3 m	w032	d366
BIM-UNT-AY1X-0,3-RS4.21/S1139	NAMUR	nom. 8.2 VDC	PVC 0.3 m	w021	d366

**UNT – M12 x 1 or M8 x 1 connector**



**General data**

<b>Dimensions</b>	5 x 22 x 30 mm	<b>Protection class</b>	IP67
<b>Operating voltage</b>	10...30 VDC	<b>Material housing</b>	PP
<b>Switching frequency</b>	1 kHz	<b>Material active face</b>	PP
<b>Ambient temperature</b>	-25...+70 °C		

Types and data – selection table

Type	Output	Electrical connection	w	d
BIM-UNT-AP6X2-V1131	—, PNP	connector, M8 x 1	w001	d367
BIM-UNT-AP6X2-H1141	—, PNP	connector, M12 x 1	w001	d368
BIM-UNT-AN6X2-V1131	—, NPN	connector, M8 x 1	w002	d367
BIM-UNT-AN6X2-H1141	—, NPN	connector, M8 x 1	w002	d368

UNT – Twin set



General data

<b>Dimensions</b>	5 x 22 x 30 mm	<b>Protection class</b>	IP67
<b>Operating voltage</b>	10...30 VDC	<b>Material housing</b>	PP
<b>Switching frequency</b>	1 kHz	<b>Material active face</b>	PP
<b>Ambient temperature</b>	-25...+70 °C	<b>Material cable</b>	PUR 0.3 m

Types and data – selection table

Type	Output	Electrical connection	w	d
BIM-UNT-0,3-UNT-2AP6X3-V1141	—, PNP	connector, M8 x 1	w066	d369
BIM-UNT-0,3-UNT-2AP6X3-H1141	—, PNP	connector, M12 x 1	w066	d370
BIM-UNT-0,3-UNT-2AN6X3-H1141	—, NPN	connector, M12 x 1	w066	d370

## Magnetic field sensors UNR design

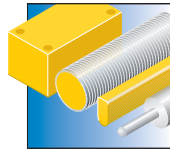


Magnetic field sensors for short-stroke cylinders and parallel grippers are very compactly designed. The all-round visible LED allows the switching state to be observed from any position. All standard connection types are available.

### Features

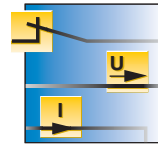
- Compact design
- For C-groove cylinders
- Quickly and firmly mounted
- Excellent EMC properties
- Clearly visible LED

### Properties



#### Design

Small size, length  
18 mm



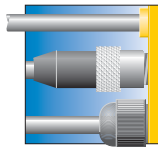
#### Electrical versions

3-wire DC outputs NPN/  
PNP switching



#### Measuring ranges

Reliable position detection on all standard pneumatic cylinders



#### Electrical connections

All standard connection types available, cable, connector or pigtail



#### Materials

Rugged PP housing for a wide range of applications



## UNR – 3-wire DC



### General data

<b>Dimensions</b>	2.9 x 4.6 x 18 mm	<b>Protection class</b>	IP67
<b>Operating voltage</b>	10...30 VDC	<b>Material housing</b>	PP
<b>Switching frequency</b>	0.3 kHz	<b>Material active face</b>	PP
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Output	Electrical connection	Material cable	w	d
BIM-UNR-AP6X-0,3-RS4	— / — / —, PNP	connector, M12 x 1	PUR 0.3 m	w001	d374
BIM-UNR-AP6X-0,3-PSG3S	— / — / —, PNP	connector, fixed thread, Ø 8 mm	PUR 0.3 m	w001	d372
BIM-UNR-AP6X-0,3-PSG3M	— / — / —, PNP	connector, rotatable thread, M8 x 1	PUR 0.3 m	w001	d373
BIM-UNR-AP6X 7M	— / — / —, PNP	cable	PUR 7 m	w059	d371
BIM-UNR-AP6X	— / — / —, PNP	cable	PUR 2 m	w059	d371
BIM-UNR-AN6X-0,3-RS4	— / — / —, NPN	connector, M12 x 1	PUR 0.3 m	w002	d374
BIM-UNR-AN6X-0,3-PSG3S	— / — / —, NPN	connector, fixed thread, Ø 8 mm	PUR 0.3 m	w002	d372
BIM-UNR-AN6X-0,3-PSG3M	— / — / —, NPN	connector, rotatable thread, M8 x 1	PUR 0.3 m	w002	d373
BIM-UNR-AN6X 7M	— / — / —, NPN	cable	PUR 7 m	w005	d371
BIM-UNR-AN6X	— / — / —, NPN	cable	PUR 2 m	w005	d371

## Magnetic field sensors - analog position gauging systems

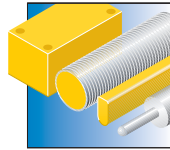


The universal magnetic field sensors for pneumatic cylinders are now also available with analog current and voltage output. The new analog sensor WIM45-UNTL by TURCK provides obvious advantages, especially in situations where additional flexibility and monitoring properties are required.

### Features

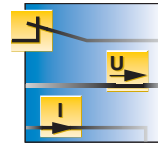
- Compact design
- Quickly and firmly mounted
- Inserted in the groove from the top
- Hardly affected by external magnetic fields
- Status of magnetic field displayed via 2 LEDs
- Measured value memory

### Properties



#### Design

One type for all standard pneumatic cylinders



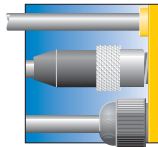
#### Electrical versions

Analog outputs  
4... 20 mA, 0...10 VDC,  
3-wire DC switching  
output



#### Measuring ranges

Analog position detection up to 45 mm on all standard pneumatic cylinders



#### Electrical connections

Standard connection with cable and M8/M12 connector



#### Materials

Rugged PA housing for a wide range of applications



#### Special features

Also available with combined analog and switching output in one device.

## UNTL – Current and voltage output



<b>General data</b>		<b>Protection class</b>	IP67
<b>Dimensions</b>	5 x 14,5 x 73 mm	<b>Material housing</b>	PA
<b>Analog output</b>	4...20 mA, 0...10 V	<b>Material active face</b>	PA
<b>Operating voltage</b>	15...30 VDC		
<b>Ambient temperature</b>	-25...+70 °C		

### Types and data – selection table

Type	Electrical connection	w	d
WIM45-UNTL-LIU5X2-0,3-PSG4M	cable with connector, M8 x 1	w051	d375
WIM45-UNTL-LIU5X2-0,3-RS4	cable with connector, M12 x 1	w051	d376

## UNTL – Twin set



<b>Type</b>	WIM45-UNTL-0,3-BIM-UNT-LUAP6X 4-H1141	<b>Ambient temperature</b>	-25...+70 °C
<b>Output</b>	—, PNP/analog output	<b>Protection class</b>	IP67
<b>Analog output</b>	0...10 V	<b>Material housing</b>	PA12-GF30 / PP
<b>Electrical connection</b>	connector, M12 x 1	<b>Material cable</b>	PUR 0.3 m
<b>Operating voltage</b>	15...30 VDC	<b>Wiring diagram</b>	w067
<b>Switching frequency</b>	1 kHz	<b>Dimension drawing</b>	d377

## Magnetic field sensors for harsh environments

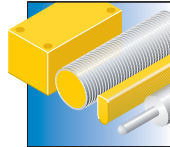


The rugged magnetic field sensors are particularly suited for harsh environments. With the extended range of accessories the sensors can be mounted on nearly all standard pneumatic cylinders. All standard connection types are available.

### Features

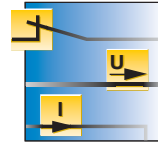
- Rugged design
- Many different mounting options
- Optional weld field immunity
- Excellent EMC properties

### Properties



#### Design

standard design suited for harsh environments.



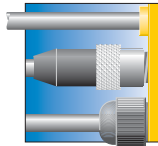
#### Electrical versions

NAMUR, 2/3-wire DC



#### Measuring ranges

Reliable position detection on all standard pneumatic cylinders



#### Electrical connections

All standard connection types available, cable, connector



#### Materials

Rugged PA12-GF30 resp. GD-ZN housing for a wide range of applications

## NST – NAMUR



### General data

<b>Dimensions</b>	17 x 14 x 28 mm	<b>Ambient temperature</b>	-25...+70 °C
<b>Output</b>	NAMUR	<b>Protection class</b>	IP67
<b>Operating voltage</b>	nom. 8.2 VDC	<b>Material housing</b>	PA
<b>Switching frequency</b>	1 kHz	<b>Material active face</b>	PA

### Types and data – selection table

Type	Electrical connection	Material cable	w	d
BIM-NST-Y1X-H1141	connector, M12 x 1	-	w021	d378
BIM-NST-Y1X	cable	PVC 2 m	w019	d379

## NST – 3-wire DC



### General data

<b>Dimensions</b>	17 x 14 x 28 mm	<b>Protection class</b>	IP67
<b>Operating voltage</b>	10...30 VDC	<b>Material housing</b>	PA
<b>Ambient temperature</b>	-25...+70 °C	<b>Material active face</b>	PA

### Types and data – selection table

Type	Output	Electrical connection	Switching frequency	Material cable	w	d
BIM-NST-AP6X-V1131	PNP	connector, M8 x 1	1 kHz	-	w001	d380
BIM-NST-AP6X-H1141/S34	PNP	connector, M12 x 1	0.02 kHz	-	w001	d381
BIM-NST-AP6X-H1141	PNP	connector, M12 x 1	1 kHz	-	w001	d378
BIM-NST-AP6X	PNP	cable	1 kHz	PVC 2 m	w059	d379
BIM-NST-AN6X-V1131	NPN	connector, M8 x 1	1 kHz	-	w002	d380
BIM-NST-AN6X-H1141/S34	NPN	connector, M12 x 1	0.02 kHz	-	w002	d381
BIM-NST-AN6X-H1141	NPN	connector, M12 x 1	1 kHz	-	w002	d378
BIM-NST-AN6X	NPN	cable	1 kHz	PVC 2 m	w005	d379

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 758 ff

## IKT – NAMUR



### General data

<b>Output</b>	NAMUR
<b>Operating voltage</b>	nom. 8.2 VDC
<b>Switching frequency</b>	1 kHz
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	GD-Zn
<b>Material active face</b>	PA

### Types and data – selection table

Type	Dimensions	Electrical connection	Material cable	w	d
BIM-IKT-Y1X-H1141	14.6 x 28 x 30 mm	connector, M12 x 1	-	w021	d382
BIM-IKT-Y1X	14.6 x 17 x 30 mm	cable	PVC 2 m	w019	d383

## IKT – 3-wire DC



### General data

<b>Operating voltage</b>	10...30 VDC
<b>Switching frequency</b>	1 kHz
<b>Ambient temperature</b>	-25...+70 °C

<b>Protection class</b>	IP67
<b>Material housing</b>	GD-Zn
<b>Material active face</b>	PA

### Types and data – selection table

Type	Dimensions	Output	Electrical connection	Material cable	w	d
BIM-IKT-AP6X-V1131	14.6 x 17 x 30 mm	—, PNP	connector, M8 x 1	-	w001	d384
BIM-IKT-AP6X-H1141	14.6 x 28 x 30 mm	—, PNP	connector, M12 x 1	-	w001	d382
BIM-IKT-AP6X	14.6 x 17 x 30 mm	—, PNP	cable	PVC 2 m	w059	d383
BIM-IKT-AN6X-V1131	14.6 x 17 x 30 mm	—, NPN	connector, M8 x 1	-	w002	d384
BIM-IKT-AN6X-H1141	14.6 x 28 x 30 mm	—, NPN	connector, M12 x 1	-	w002	d382
BIM-IKT-AN6X	14.6 x 17 x 30 mm	—, NPN	cable	PVC 2 m	w005	d383

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 758 ff





# At a glance

## Photoelectric sensors



### Photoelectric sensors – more solutions more advantages

Photoelectric sensors use visible or infrared light to detect many different objects, regardless of their quality and consistency. Unlike inductive or capacitive sensors, they cover larger measuring ranges.

The most common tasks are positioning, counting, sorting and classifying. They are mostly applied in the automotive industry, machine-building, assembly lines, storage and transport systems.

Photoelectric sensors operate on the principle of emitting and receiving light. A diode emits light which is either cut off or reflected by an object and the detection event is subsequently processed.

Photoelectric sensors are available as opposed mode, retroreflective mode, diffuse mode or fiber-optic systems.

Diffuse mode sensors detect the light beam reflected by an object. The sensing range of these sensors depends largely on the reflectivity factor of the object.

A retroreflective sensor, contains emitter and receiver in the same housing. A light beam is established between emitter, re-

flector and receiver. If an object cuts off the beam, the sensor reacts.

Opposed mode sensors operate similarly. Unlike retroreflective sensors, emitter and receiver are separate units covering greater sensing ranges.

Optic fibers made of glass or plastic pipe the light beam from the sensor to the object and back. Fiber optics are especially suited for confined spaces or demanding environmental conditions.

Whether standard or programmable multifunctional versions, compact devices or devices with external amplifier etc., each sensor has special features suited for different applications. TURCK not only offers the most comprehensive product range of photoelectric sensors and fiber optic systems, you also get individual service and support to find the optimal solution for your application.

# Our strengths - Your advantages



## QS30ELVC – High-End opposed mode sensor for clear-glass recognition

The QS30ELVC is a user-friendly powerful opposed mode sensor for detecting bright, transparent or opaque objects. PET bottles, glass jars and reflecting sur-

faces such as mirrors, LCDs with polarization coating are reliably detected. The sensor is insensitive to the reflections of the objects.



## QS30 H2O – High-power sensor for the detection of water

The QS30H2O detects water reliably. The photoelectric components are adjusted to the absorption band of water in the long-wave infrared spectrum. The emitted infrared beam permeates most plastic and glass containers but not water-based liquids, wood, metal or cardboard.

For damping and shaping the light beam in applications with low excess gain, like for example clear water in a transparent bottle, blinds are additionally available.



## Q20 series - Compact, powerful and versatile

The Q20 are not only versatile in terms of operating modes but equally powerful like bigger sensors. The plastic housings are fully encapsulated and excellently durable and tight.

Their compact design enables easy mounting even in confined spaces. Bores with integrated thread make the use of additional mounting nuts redundant.

# advantages



## Expert mode – Easy set-up – Teach-and-ready

The Expert sensors pave the way to simple system setup. The QS18 Expert is either configured via pushbutton at the sensor or remotely via teach line. Different configurations can be taught through certain pulse sequences, like for example the pushbutton lock.

The ON and OFF conditions are individually set in the static teach mode, whereas in dynamic teach mode the light and dark conditions are automatically taught during operation and the switching threshold is continuously updated while the sensor is working.



## D10 Expert – Innovative sensor for use with plastic fibers

The D10 Expert is a user-friendly fiber optic sensor suited for DIN rail mounting. The sensor works reliably, even in low contrast applications. Available are devices with, switching, two switching and analog/switching output.

down setting options as well as manual fine adjustment and external programming.

A big and well readable display resp. bargraph and LEDs support programming and monitoring during operation.

The expert version provides functions such as static and dynamic teaching, win-



## Ex area – Solutions for hazardous applications

TURCK provides the full range of performance even for explosion hazardous areas.

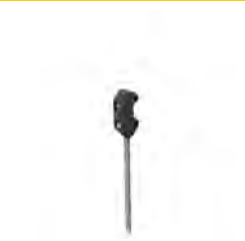
relevant norms such as EN 60947-5-6, EN 60079-0, part 1 and EN 60079-11.

The NAMUR sensors series MINI-BEAM® and Q45 are approved according to KEMA certificate 03 ATEX 1441 X ignition protection type Ex ia IIC T6 and fulfill all

Available are opposed and retroreflective mode, convergent and diffuse mode sensors as well as base units for fiber optics.

# Designs and variants

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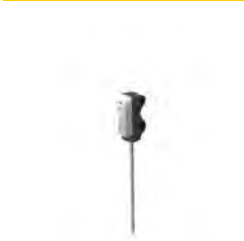
**Miniature VS1**

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**Miniature VS2**

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**Miniature VS3**

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**Miniature VS4**

<b>Design</b>	rectangular, 8.3 x 25.7 x 11.6 mm	rectangular, 12 x 25.1 x 4.7 mm	rectangular, 9 x 25.4 x 16.6 mm	rectangular, 4.75 x 25.4 x 12.5 mm
<b>Output function</b>	PNP	PNP	PNP	PNP
<b>Protection class</b>	IP67	IP67	IP67	IP67
<b>Ambient temperature</b>	-20...+55 °C	-20...+55 °C	-20...+55 °C	-20...+55 °C
<b>Operating mode</b>	convergent mode sensor	opposed mode sensor (emitter) opposed mode sensor (receiver) convergent mode sensor	retro-reflective sensor retro-reflective sensor with polarisation filter	opposed mode sensor (emitter) opposed mode sensor (receiver)
<b>Max. range</b>	20 mm	1200 mm	250 mm	1000 mm
<b>Light type</b>	red	red	red	red

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**Miniature T8**

**Miniature Q12**

**Compact M12**

**Compact QS18**

**Design**

threaded barrel,  
Ø16.3 x 15.8 mm

rectangular,  
8 x 26.6 x 12.4 mm,  
8 x 28.8 x 12.5 mm

threaded barrel,  
Ø12 x 67.5 mm  
Ø12 x 74 mm

rectangular,  
15 x 35 x 31 mm,  
15 x 41.5 x 27.7 mm,  
15 x 35 x 27.7 mm,  
15 x 35 x 21.1 mm,  
15 x 41.5 x 21.1 mm,  
15 x 34.5 x 21.1 mm,  
15 x 35 x 33.2 mm

**Output function**

PNP

pnp/npn

PNP

PNP

**Protection class**

IP67

IP67

IP67

IP67

**Ambient temperature**

-20...+55 °C

-20...+55 °C

-20...+60 °C  
0...+40 °C

-20...+70 °C  
-10...+50 °C  
0...+55 °C

**Operating mode**

opposed mode sensor  
(emitter)  
opposed mode sensor  
(receiver)  
diffuse mode sensor

opposed mode sensor  
(emitter)  
opposed mode sensor  
(receiver)  
retro-reflective sensor  
retro-reflective sensor with  
polarisation filter  
diffuse mode sensor with  
fixed-field background sup-  
pression

opposed mode sensor  
(emitter)  
opposed mode sensor  
(receiver)  
retro-reflective sensor  
retro-reflective sensor with  
polarisation filter  
diffuse mode sensor  
diffuse mode sensor with  
fixed-field background sup-  
pression

opposed mode sensor  
(emitter)  
opposed mode sensor  
(receiver)  
retro-reflective sensor  
retro-reflective sensor with  
polarisation filter  
diffuse mode sensor  
diffuse mode sensor with  
fixed-field background sup-  
pression  
diffuse mode sensor with  
adjustable background  
suppression  
convergent mode sensor

**Max. range**

2000 mm

2000 mm

5000 mm

30000 mm

**Light type**

red

red

red

IR  
red

# Designs and variants

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### Compact QS18 Expert

<b>Design</b>	rectangular, 15 x 35 x 31 mm, 15 x 35 x 21.1 mm
<b>Output function</b>	PNP
<b>Protection class</b>	IP67
<b>Ambient temperature</b>	-20...+70 °C
<b>Operating mode</b>	retro-reflective sensor with polarisation filter diffuse mode sensor convergent mode sensor
<b>Max. range</b>	3500 mm
<b>Light type</b>	IR red

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### Compact Q20

<b>Design</b>	rectangular, 12 x 32 x 20 mm, 12 x 42 x 20 mm
<b>Output function</b>	PNP
<b>Protection class</b>	IP67
<b>Ambient temperature</b>	-20...+60 °C
<b>Operating mode</b>	opposed mode sensor (emitter) opposed mode sensor (receiver) retro-reflective sensor retro-reflective sensor with polarisation filter diffuse mode sensor
<b>Max. range</b>	15000 mm
<b>Light type</b>	IR red

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### MINI-BEAM NAMUR

<b>Design</b>	rectangular, 12.3 x 30.7 x 66 mm, 12.3 x 30.7 x 84 mm, 12.3 x 30.7 x 51.8 mm, 12.3 x 30.7 x 69.8 mm
<b>Output function</b>	NAMUR
<b>Protection class</b>	IP67
<b>Ambient temperature</b>	-40...+70 °C
<b>Operating mode</b>	opposed mode sensor (emitter) opposed mode sensor (receiver) retro-reflective sensor retro-reflective sensor with polarisation filter diffuse mode sensor convergent mode sensor fibre optic sensor
<b>Max. range</b>	6000 mm
<b>Light type</b>	IR red

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### Compact QS30

<b>Design</b>	rectangular, 22 x 49 x 35 mm, 22 x 57 x 35 mm, 22 x 57 x 54.3 mm
<b>Output function</b>	pnp/npn
<b>Protection class</b>	IP67 IP68 / IP69K
<b>Ambient temperature</b>	-20...+60 °C -20...+70 °C -10...+55 °C -10...+50 °C
<b>Operating mode</b>	opposed mode sensor (emitter) opposed mode sensor (receiver) retro-reflective sensor retro-reflective sensor with polarisation filter diffuse mode sensor diffuse mode sensor with fixed-field background suppression diffuse mode sensor with adjustable background suppression
<b>Max. range</b>	300000 mm
<b>Light type</b>	IR red



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Photoelectric sensors

**Compact EZ-BEAM M18**

**Compact EZ-BEAM S18**

**Compact EZ-BEAM T18**

**Compact EZ-BEAM Q25**

<b>Design</b>	cylindrical/threaded, Ø18 x 59.2 mm, Ø18 x 78 mm, Ø18 x 83.8 mm, Ø18 x 65 mm	cylindrical/threaded, Ø18 x 78.7 mm, Ø18 x 88 mm, Ø18 x 69.5 mm, Ø18 x 59.2 mm, Ø18 x 84.1 mm, Ø18 x 65 mm	cylindrical/threaded, 30 x 41.5 x 30 mm, 30 x 54 x 30 mm	rectangular, 25 x 50.2 x 30 mm, 25 x 62.7 x 30 mm
<b>Output function</b>	PNP	PNP	PNP	PNP
<b>Protection class</b>	IP67	IP68 / IP69K IP67	IP68 / IP69K	IP68 / IP69K
<b>Ambient temperature</b>	-40...+70 °C	-40...+70 °C -10...+50 °C	-40...+70 °C	-40...+70 °C
<b>Operating mode</b>	opposed mode sensor (emitter) opposed mode sensor (receiver) retro-reflective sensor retro-reflective sensor with polarisation filter diffuse mode sensor with fixed-field background suppression	opposed mode sensor (emitter) opposed mode sensor (receiver) retro-reflective sensor retro-reflective sensor with polarisation filter diffuse mode sensor with fixed-field background suppression	opposed mode sensor (emitter) opposed mode sensor (receiver) retro-reflective sensor retro-reflective sensor with polarisation filter diffuse mode sensor with fixed-field background suppression	opposed mode sensor (emitter) opposed mode sensor (receiver) retro-reflective sensor with polarisation filter diffuse mode sensor with fixed-field background suppression
<b>Max. range</b>	20000 mm	20000 mm	20000 mm	20000 mm
<b>Light type</b>	IR red	IR red	IR red	IR red



# Designs and variants

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**Compact EZ-BEAM S30**

cylindrical/threaded,  
Ø30 x 68.7 mm,  
Ø30 x 77.5 mm

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**Compact EZ-BEAM T30**

cylindrical/threaded,  
40 x 51.5 x 45 mm,  
40 x 64 x 45 mm

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**Compact EZ-BEAM Q40**

rectangular,  
40 x 69.8 x 46 mm  
40 x 82.5 x 46 mm

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**Q45 NAMUR**

rectangular,  
54.1 x 44.5 x 87 mm,  
54.1 x 44.5 x 103 mm,  
44.5 x 87.6 x 54.1 mm,  
44.5 x 102.6 x 54.1 mm,  
44.5 x 87.6 x 56.4 mm,  
44.5 x 102.6 x 56.4 mm,  
44.5 x 87.6 x 60.5 mm,  
44.5 x 102.6 x 60.5 mm

**Design**

**Output function**

PNP

PNP

PNP

NAMUR

**Protection class**

IP68 / IP69K

IP68 / IP69K

IP68 / IP69K

IP67

**Ambient temperature**

-40...+70 °C

-40...+70 °C

-40...+70 °C

-40...+70 °C

**Operating mode**

opposed mode sensor (emitter)  
opposed mode sensor (receiver)  
retro-reflective sensor with polarisation filter  
diffuse mode sensor with fixed-field background suppression

opposed mode sensor (emitter)  
opposed mode sensor (receiver)  
retro-reflective sensor with polarisation filter  
diffuse mode sensor with fixed-field background suppression

opposed mode sensor (emitter)  
retro-reflective sensor with polarisation filter  
diffuse mode sensor with fixed-field background suppression

opposed mode sensor (emitter)  
opposed mode sensor (receiver)  
retro-reflective sensor  
retro-reflective sensor with polarisation filter  
diffuse mode sensor  
convergent mode sensor  
fibre optic sensor

**Max. range**

60000 mm

60000 mm

60000 mm

9000 mm

**Light type**

IR  
red

IR  
red

IR  
red





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**SLM – Slot sensor**

**Fiber optic sensor QS18F/FP**

**Fiber optic sensors FI22**

**Fiber optic sensor D10**

<b>Design</b>	slot sensor, 12 x 42 x 80 mm, 12 x 62 x 80 mm, 12 x 112 x 80 mm, 12 x 152 x 140 mm, 12 x 252 x 140 mm, 12 x 82 x 80 mm	rectangular, 15 x 35 x 36.9 mm, 15 x 49 x 36.9 mm, 15 x 34.5 x 27.5 mm, 15 x 41.5 x 27.5 mm, 15 x 49 x 27.5 mm	rectangular, 2 3 x 14.5 x 50 mm	rectangular, 10 x 35.9 x 68.1 mm, 10 x 35.9 x 84.4 mm, 10.5 x 35.9 x 68.1 mm, 10.5 x 35.9 x 84.4 mm
<b>Output function</b>	pnp/npn PNP	PNP	pnp/npn	pnp/npn PNP
<b>Protection class</b>	IP67	IP67	IP67	IP50
<b>Ambient temperature</b>	-20...+60 °C	-20...+70 °C	-10...+55 °C	-10...+55 °C -20...+55 °C
<b>Operating mode</b>	bifurcated retro-reflective sensor	fibre optic sensor	fibre optic sensor	fibre optic sensor
<b>Light type</b>	red	IR red	red	red green

# Designs and variants

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### Fiber optic sensors D12

### Fiber optic sensors R55F

<b>Design</b>	rectangular, 12 x 30 x 70 mm, 12 x 30 x 64 mm	rectangular, 30 x 25 x 85.4 mm, 30 x 25 x 97 mm
<b>Output function</b>	PNP pnp/npn	pnp/npn
<b>Protection class</b>	IP66	IP67
<b>Ambient temperature</b>	-20...+70 °C -40...+70 °C	-10...+55 °C
<b>Operating mode</b>	fibre optic sensor	fibre optic sensor
<b>Light type</b>	red	red green blue white



## Miniature sensors Q12, T8, VS1, VS2, VS3, VS4



We offer different types of miniature sensors. From the well-priced compact T8 with 8 mm thread, over the extremely small, powerful VS1, VS2, VS3 and VS4 rectangular series, up to the robust and universally applicable QS12 series.

Made for limited space conditions, these sensors cover the entire power spectrum in terms of operating modes, functionality, range and robustness.

### Features

- High performance series for limited spaces
- Short response time of 1 ms
- Easily aligned through a visible light beam
- LED indicating power-on and light detection
- 3-wire connection, adjustment of light and dark operation, PNP or NPN output
- Protection class IP67
- 2 m connection cable and 150 mm pigtail with M8 x 1 plug connection

### Type code miniature sensors

VS3	A	P	5	XLV	Q
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VS3	Series	A	P	Output	5	Operating voltage
	<b>Series</b> <b>Q12</b> rectangular 8 x 26.6 x 12.4 mm <b>T8</b> cylinder 15.8 x 16.3 mm <b>VS1</b> rectangular, 8.3 x 25.7 x 11.6 mm <b>VS2</b> rectangular 12 x 25.1 x 4.7 mm <b>VS3</b> rectangular 9 x 25.4 x 16.6 mm <b>VS4</b> rectangular 4.75 x 25.4 x 12.5 mm			<b>Output</b> <b>B</b> PNP/NPN <b>N</b> NPN <b>P</b> PNP		<b>Operating voltage</b> <b>5</b> 10 ... 30 VDC max. 20 mA <b>6</b> 10 ... 30 VDC max. 25 mA
				<b>Output function</b> <b>A</b> light operation <b>R</b> dark operation		

XLV	Operating mode	Q	Electrical connection
	<b>Operating mode</b> <b>CV</b> convergent mode <b>D</b> diffuse mode <b>E</b> opposed mode emitter <b>EV</b> emitter, visible red light <b>FF</b> diffuse mode, fixed field <b>L</b> opposed mode <b>LP</b> opposed mode, polarizing filter <b>LV</b> opposed mode, visible red light <b>R</b> opposed mode receiver <b>XLV</b> retroreflective mode polarizing filter <b>XLV</b> retroreflective mode visible red light <b>CR</b> chemical resistant housing		<b>Electrical connection</b> <b>Q</b> pigtail, connector M8 cable 150 mm, 3-pole <b>blank</b> cable connection, 2 m

## Q12 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, Elastomere
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	8 x 26.6 x 12.4 mm	<b>Light type</b>	red
<b>Protection class</b>	IP67	<b>Range</b>	0...2000 mm

A receiver is required.

### Types and data – selection table

Type	Electrical connection	w	d	e
Q126EQ	cable with connector, M8 x 1	w068	d386	e001
Q126E	cable	w068	d385	e001

## Q12 – Opposed mode sensor – Emitter – Chemical resistance



<b>Type</b>	Q126ECR	<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature</b>	-20...+55 °C
<b>Power-on, indicator</b>	LED	<b>Light type</b>	red
<b>Indication of excess gain type</b>	LED	<b>Range</b>	0...1500 mm
<b>Dimensions</b>	8 x 28.8 x 12.5 mm	<b>Wiring diagram</b>	w068
<b>Protection class</b>	IP67	<b>Dimension drawing</b>	d387
<b>Housing material</b>	plastic, PFA	<b>Excess gain curve</b>	e002
<b>Lens material</b>	plastic		

CR = Chemical resistant housing

A receiver is required.

## Q12 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, Elastomere
<b>Indication of excess gain type</b>	LED	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 450 Hz	<b>Ambient temperature Range</b>	-20...+55 °C
<b>Dimensions</b>	8 x 26.6 x 12.4 mm		0...2000 mm

An emitter is required.

### Types and data – selection table

Type	Output	Electrical connection	w	d	e
Q12RB6RQ	—, dark operation, pnp/npn	cable with connector, M8 x 1	w069	d386	e001
Q12AB6RQ	—, light operation, pnp/npn	cable with connector, M8 x 1	w069	d386	e001
Q12AB6R	—, light operation, pnp/npn	cable	w069	d385	e001
Q12RB6R	—, dark operation, pnp/npn	cable	w069	d385	e001

## Q12 – Opposed mode sensor – Receiver – Chemical resistance



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PFA
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Electrical connection</b>	cable
<b>Switching frequency</b>	≤ 450 Hz	<b>Ambient temperature Range</b>	-20...+55 °C
<b>Dimensions</b>	8 x 28.8 x 12.5 mm		0...1500 mm
<b>Protection class</b>	IP67		

CR = Chemical resistant housing

An emitter is required.

### Types and data – selection table

Type	Output	w	d	e
Q12AB6RCR	—, light operation, pnp/npn	w069	d387	e002
Q12RB6RCR	—, dark operation, pnp/npn	w069	d387	e002

## Q12 – Retroreflective sensor



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, Elastomere
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+55 °C
<b>Switching frequency</b>	≤ 700 Hz	<b>Light type</b>	red
<b>Dimensions</b>	8 x 26.6 x 12.4 mm	<b>Range</b>	0...1500 mm
<b>Protection class</b>	IP67		

A reflector is required.

### Types and data – selection table

Type	Output	Electrical connection	w	d	e
Q12AB6LVQ	—, light operation, pnp/npn	cable with connector, M8 x 1	w069	d386	e003
Q12RB6LVQ	—, dark operation, pnp/npn	cable with connector, M8 x 1	w069	d386	e003
Q12AB6LV	—, light operation, pnp/npn	cable	w069	d385	e003
Q12RB6LV	—, dark operation, pnp/npn	cable	w069	d385	e003

## Q12 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, Elastomere
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+55 °C
<b>Switching frequency</b>	≤ 700 Hz	<b>Light type</b>	red
<b>Dimensions</b>	8 x 26.6 x 12.4 mm	<b>Range</b>	0...1000 mm
<b>Protection class</b>	IP67		

A reflector is required.

### Types and data – selection table

Type	Output	Electrical connection	w	d	e
Q12AB6LPQ	—, light operation, pnp/npn	cable with connector, M8 x 1	w069	d389	e004
Q12RB6LPQ	—, dark operation, pnp/npn	cable with connector, M8 x 1	w069	d389	e004
Q12AB6LP	—, light operation, pnp/npn	cable	w069	d388	e004
Q12RB6LP	—, dark operation, pnp/npn	cable	w069	d388	e004

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## Q12 – Diffuse mode sensor with fixed-field



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, Elastomere
<b>Indication of excess gain type</b>	LED	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 700 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	8 x 26.6 x 12.4 mm	<b>Light type</b>	red

### Types and data – selection table

Type	Output	Electrical connection	Range	w	d	e
Q12AB6FF15	—, light operation, pnp/npn	cable	3...15 mm	w069	d385	e005
Q12AB6FF15Q	—, light operation, pnp/npn	cable with connector, M8 x 1	3...15 mm	w069	d386	e005
Q12RB6FF15	—, dark operation, pnp/npn	cable	3...15 mm	w069	d385	e005
Q12RB6FF15Q	—, dark operation, pnp/npn	cable with connector, M8 x 1	3...15 mm	w069	d386	e005
Q12AB6FF30	—, light operation, pnp/npn	cable	3...30 mm	w069	d385	e006
Q12AB6FF30Q	—, light operation, pnp/npn	cable with connector, M8 x 1	3...30 mm	w069	d386	e006
Q12RB6FF30	—, dark operation, pnp/npn	cable	3...30 mm	w069	d385	e006
Q12RB6FF30Q	—, dark operation, pnp/npn	cable with connector, M8 x 1	3...30 mm	w069	d386	e006
Q12AB6FF50	—, light operation, pnp/npn	cable	3...50 mm	w069	d385	e007
Q12RB6FF50	—, dark operation, pnp/npn	cable	3...50 mm	w069	d385	e007
Q12AB6FF50Q	—, light operation, pnp/npn	cable with connector, M8 x 1	3...50 mm	w069	d386	e007
Q12RB6FF50Q	—, dark operation, pnp/npn	cable with connector, M8 x 1	3...50 mm	w069	d386	e007

## Q12 – Diffuse mode sensor with fixed-field – Chemical resistance



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PFA
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Electrical connection</b>	cable
<b>Switching frequency</b>	≤ 700 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	8 x 28.8 x 12.5 mm	<b>Light type</b>	red
<b>Protection class</b>	IP67		

CR = Chemical-resistant housing



Types and data – selection table

Type	Output	Range	w	d	e
Q12AB6FF15CR	— / —, light operation, pnp/npn	3...13 mm	w069	d387	e008
Q12RB6FF15CR	— / —, dark operation, pnp/npn	3...13 mm	w069	d387	e008
Q12AB6FF30CR	— / —, light operation, pnp/npn	4...28 mm	w069	d387	e009
Q12RB6FF30CR	— / —, dark operation, pnp/npn	4...28 mm	w069	d387	e009
Q12AB6FF50CR	— / —, light operation, pnp/npn	5...48 mm	w069	d387	e010
Q12RB6FF50CR	— / —, dark operation, pnp/npn	5...48 mm	w069	d387	e010

T8 – Opposed mode sensor – Emitter



General data

<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Dimensions</b>	Ø16.3 x 15.8 mm	<b>Ambient temperature</b>	-20...+55 °C
<b>Protection class</b>	IP67	<b>Light type</b>	red
<b>Housing material</b>	plastic, ABS	<b>Range</b>	0...2000 mm

A receiver is required.

Types and data – selection table

Type	Electrical connection	w	d	e
T86EVQ	cable with connector, M8 x 1	w068	d391	e011
T86EV	cable	w068	d390	e011

## T8 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 666 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	Ø16.3 x 15.8 mm	<b>Range</b>	0...2000 mm

An emitter is required.

### Types and data – selection table

Type	Output	Electrical connection	w	d	e
T8AP6RQ	—, light operation, PNP	cable with connector, M8 x 1	w070	d391	e011
T8RP6RQ	—, dark operation, PNP	cable with connector, M8 x 1	w070	d391	e011
T8AP6R	—, light operation, PNP	cable	w070	d390	e011
T8RP6R	—, dark operation, PNP	cable	w070	d390	e011

## T8 – Diffuse mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 500 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	Ø16.3 x 15.8 mm	<b>Light type</b>	red

### Types and data – selection table

Type	Output	Electrical connection	Range	w	d	e
T8AP6D50	—, light operation, PNP	cable	0...50 mm	w070	d390	e012
T8AP6D50Q	—, light operation, PNP	cable with connector, M8 x 1	0...50 mm	w070	d391	e012
T8RP6D50	—, dark operation, PNP	cable	0...50 mm	w070	d390	e012
T8RP6D50Q	—, dark operation, PNP	cable with connector, M8 x 1	0...50 mm	w070	d391	e012
T8AP6D100	—, light operation, PNP	cable	0...100 mm	w070	d390	e012
T8AP6D100Q	—, light operation, PNP	cable with connector, M8 x 1	0...100 mm	w070	d391	e012
T8RP6D100	—, dark operation, PNP	cable	0...100 mm	w070	d390	e012
T8RP6D100Q	—, dark operation, PNP	cable with connector, M8 x 1	0...100 mm	w070	d391	e012

## VS1 – Convergent mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Electrical connection</b>	cable
<b>Switching frequency</b>	≤ 500 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	8.3 x 25.7 x 11.6 mm	<b>Light type</b>	red
<b>Protection class</b>	IP67		

### Types and data – selection table

Type	Output	Range	Focal distance	w	d	e
VS1AP5CV10	light operation, PNP	10 mm	10 mm	w151	d593	e013
VS1RP5CV10	dark operation, PNP	10 mm	10 mm	w151	d593	e013
VS1AP5CV20	light operation, PNP	20 mm	20 mm	w151	d593	e013
VS1RP5CV20	dark operation, PNP	20 mm	20 mm	w151	d593	e013

## VS2 – Opposed mode sensor – Emitter



<b>Type</b>	VS25EV	<b>Electrical connection</b>	cable
<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature</b>	-20...+55 °C
<b>Power-on, indicator</b>	LED	<b>Light type</b>	red
<b>Dimensions</b>	12 x 25.1 x 4.7 mm	<b>Range</b>	0...1200 mm
<b>Protection class</b>	IP67	<b>Wiring diagram</b>	w068
<b>Housing material</b>	plastic, ABS	<b>Dimension drawing</b>	d594
<b>Lens material</b>	plastic	<b>Excess gain curve</b>	e014

A receiver is required.

## VS2 – Opposed mode sensor – Receiver



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Electrical connection</b>	cable
<b>Switching frequency</b>	≤ 500 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	12 x 25.1 x 4.7 mm	<b>Range</b>	0...1200 mm
<b>Protection class</b>	IP67		

An emitter is required.

### Types and data – selection table

Type	Output	w	d	e
VS2AP5R	light operation, PNP	w070	d594	e014
VS2RP5R	dark operation, PNP	w070	d594	e014

## VS2 – Convergent mode sensor




<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 500 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	12 x 25.1 x 4.7 mm	<b>Light type</b>	red

### Types and data – selection table

Type	Output	Electrical connection	Focal distance	w	d	e
VS2RP5CV15	dark operation, PNP	cable	15 mm	w070	d595	e015
VS2AP5CV15Q	light operation, PNP	cable with connector, M8 x 1	15 mm	w070	d596	e015
VS2RP5CV15Q	dark operation, PNP	cable with connector, M8 x 1	15 mm	w070	d596	e015
VS2AP5CV15	light operation, PNP	cable	15 mm	w070	d595	e015
VS2AP5CV30	light operation, PNP	cable	30 mm	w070	d597	e015
VS2RP5CV30	dark operation, PNP	cable	30 mm	w070	d597	e015
VS2AP5CV30Q	light operation, PNP	cable with connector, M8 x 1	30 mm	w070	d598	e015
VS2RP5CV30Q	dark operation, PNP	cable with connector, M8 x 1	30 mm	w070	d598	e015

## VS3 – Retroreflective sensor



<b>Type</b>	VS3RP5XLV	<b>Lens material</b>	plastic
<b>Operating voltage</b>	10...30 VDC	<b>Electrical connection</b>	cable
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+55 °C
<b>Error message type</b>	LED	<b>Light type</b>	red
<b>Output</b>	 , dark operation, PNP	<b>Range</b>	250 mm
<b>Switching frequency</b>	≤ 500 Hz	<b>Wiring diagram</b>	w070
<b>Dimensions</b>	9 x 25.4 x 16.6 mm	<b>Dimension drawing</b>	d599
<b>Protection class</b>	IP67	<b>Excess gain curve</b>	e016
<b>Housing material</b>	plastic, ABS		

A reflector is required.






## VS3 – Retroreflective sensor with polarizing filter



<b>General data</b>		<b>Housing material</b>	plastic, ABS
<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	glass
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+55 °C
<b>Error message type</b>	LED	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 500 Hz	<b>Range</b>	250 mm
<b>Dimensions</b>	9 x 25.4 x 16.6 mm		
<b>Protection class</b>	IP67		

A reflector is required.

### Types and data – selection table

Type	Output	Electrical connection			
VS3RP5XLPQ	 , dark operation, PNP	connector, M8 x 1	w070	d600	e016
VS3AP5XLP	 , light operation, PNP	cable	w070	d599	e016

## VS4 – Opposed mode sensor – Emitter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PC
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	4.75 x 25.4 x 12.5 mm	<b>Light type</b>	red
<b>Protection class</b>	IP67	<b>Range</b>	0...1000 mm

A receiver is required.

### Types and data – selection table

Type	Electrical connection	w	d	e
VS4EVQ	cable with connector, M8 x 1	w068	d601	e014
VS4EV	cable	w068	d602	e014

## VS4 – Opposed mode sensor – Receiver



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PC
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 660 Hz	<b>Ambient temperature</b>	-20...+55 °C
<b>Dimensions</b>	4.75 x 25.4 x 12.5 mm	<b>Range</b>	0...1000 mm

An emitter is required.

### Types and data – selection table

Type	Output	Electrical connection	w	d
VS4RP5RQ	—, dark operation, PNP	cable with connector, M8 x 1	w070	d603
VS4RP5R	—, dark operation, PNP	cable	w070	d604
VS4AP5RQ	—, PNP	cable with connector, M8 x 1	w070	d603
VS4AP5R	—, PNP	cable	w070	d604

**w** Wiring diagrams on page 832 ff **d** Dimension drawing on page 842 ff **e** Excess gain curves on page 922 ff **a** Accessories on page 788 ff

## EZ-BEAM M18, S18, T18, Q25, S30, T30, Q40



EZ-BEAM sensors are compact, easy to install and integrate in any application, even under rough operating conditions.

Sensitivity adjustments are redundant for most of the types.

EZ-BEAM sensors are available in different sizes and designs, such as plastic and threaded barrel or rectangular versions. The operating modes are opposed, retro-reflective with/without polarizing filter as well as diffuse mode with background suppression.

### Features

- The well-priced high performance sensors are IP69K rated (most types)
- No sensitivity adjustments (most types)
- Auto-diagnostics with separate display for insufficient excess gain and alarm output
- Extended range of operating temperature -40 ... +70 °C
- Antivalent PNP/NPN output, AC versions available
- Blind for opposed mode sensors available

### Type code EZ-BEAM

Q25	S	P	6	LP	Q
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Q25	Series	S	Output function	P	Output
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#### Series

<b>M18</b>	thread, metal, Ø 18 mm
<b>Q25</b>	rectangular 25 x 50.2 x 30 mm
<b>Q40</b>	rectangular 40 x 40 x 46 mm
<b>S18</b>	thread, Ø 18 mm
<b>S30</b>	thread, plastic, Ø 30 mm
<b>T18</b>	thread Ø 18 mm, angled 30 x 54 x 30 mm
<b>T30</b>	thread Ø 30 mm, angled dimensions 40 x 64 x 45 mm

#### Output function

<b>S</b>	programmable*
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\*selectable light/dark operation or light operation and alarm

#### Output

<b>P</b>	PNP
<b>N</b>	NPN

6	Operating voltage	LP	Operating mode	Q	Electrical connection
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#### Operating voltage

<b>6</b>	10 ... 30 VDC
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#### Operating mode

<b>E</b>	opposed mode emitter
<b>R</b>	receiver
<b>D</b>	diffuse mode
<b>DL</b>	diffuse mode, long distance
<b>FF600</b>	diffuse mode, fixed field 0 ... 600 mm
<b>LP</b>	retroreflective mode polarizing filter
<b>L</b>	retroreflective mode infrared light
<b>ELD</b>	opposed mode laser emitter (only S18)

#### Electrical connection

<b>Q</b>	connector, M12 x 1
<b>blank</b>	cable connection, 2 m



## M18 – Opposed mode sensor – Emitter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Protection class</b>	IP67	<b>Light type</b>	IR
<b>Housing material</b>	metal, V2A (1.4305)	<b>Range</b>	0...20000 mm

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
M186EQ	Ø18 x 78 mm	connector, M12 x 1	w068	d606	e017
M186E	Ø18 x 59.2 mm	cable	w068	d605	e017

## S18 – Opposed mode sensor – Emitter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Range</b>	0...20000 mm
<b>Housing material</b>	plastic, PBT		

A receiver is required.

### Types and data – selection table

Type	Dimensions	Protection class	Electrical connection	Ambient temperature	Light type	Laser class	w	d	e
S186EQ	Ø18 x 78.7 mm	IP68 / IP69K	connector, M12 x 1	-40...+70 °C	IR	-	w068	d607	e017
S186ELDQ	Ø18 x 88 mm	IP67	connector, M12 x 1	-10...+50 °C	red	2 (EN 60825, IEC 60825)	w152	d608	e017
S186ELD	Ø18 x 69.5 mm	IP67	cable	-10...+50 °C	red	2 (EN 60825, IEC 60825)	w152	d609	e017
S186E	Ø18 mm	IP68 / IP69K	cable	-40...+70 °C	IR	-	w068	d610	e017

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## T18 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Protection class</b>	IP68 / IP69K	<b>Light type</b>	IR
<b>Housing material</b>	plastic, PBT	<b>Range</b>	0...20000 mm

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T186EQ	30 x 54 x 30 mm	connector, M12 x 1	w068	d612	e018
T186E	30 x 41.5 x 30 mm	cable	w068	d611	e018

## Q25 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Protection class</b>	IP68 / IP69K	<b>Light type</b>	IR
<b>Housing material</b>	plastic, PBT	<b>Range</b>	0...20000 mm

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q256EQ	25 x 62.7 x 30 mm	connector, M12 x 1	w068	d614	e017
Q256E	25 x 50.2 x 30 mm	cable	w068	d613	e017

## S30 – Opposed mode sensor – Emitter



### General data

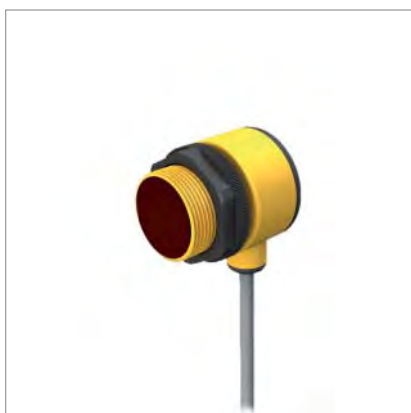
<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Protection class</b>	IP68 / IP69K	<b>Light type</b>	IR
<b>Housing material</b>	plastic, PBT	<b>Range</b>	0...60000 mm

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
S306EQ	Ø30 x 77.5 mm	connector, M12 x 1	w068	d616	e019
S306E	Ø30 x 68.7 mm	cable	w068	d615	e019

## T30 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Protection class</b>	IP68 / IP69K	<b>Light type</b>	IR
<b>Housing material</b>	plastic, PBT	<b>Range</b>	0...60000 mm

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T306EQ	40 x 64 x 45 mm	connector, M12 x 1	w068	d618	e020
T306E	40 x 51.5 x 45 mm	cable	w068	d617	e020

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## Q40 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Protection class</b>	IP68 / IP69K	<b>Light type</b>	IR
<b>Housing material</b>	plastic, PBT	<b>Range</b>	0...60000 mm

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q406EQ	40 x 82.5 x 46 mm	connector, M12 x 1	w068	d620	e019
Q406E	40 x 69.8 x 46 mm	cable	w068	d619	e019

## M18 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, V2A (1.4305)
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...20000 mm

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
M18SP6RQ	Ø18 x 78 mm	connector, M12 x 1	w153	d606	e017
M18SP6R	Ø18 x 59.2 mm	cable	w153	d605	e017

## S18 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...20000 mm

An emitter is required.

### Types and data – selection table

Type	Switching frequency	Dimensions	Electrical connection	w	d	e
S18SP6RQ	≤ 0.16 kHz	Ø18 x 78.7 mm	connector, M12 x 1	w153	d607	e017
S18SP6R	-	Ø18 x 59.2 mm	cable	w153	d610	e017

## T18 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...20000 mm

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T18SP6RQ	30 x 54 x 30 mm	connector, M12 x 1	w153	d612	e018
T18SP6R	30 x 41.5 x 30 mm	cable	w153	d611	e018

## Q25 – Opposed mode sensor – Receiver



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...20000 mm

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q25SP6RQ	25 x 62.7 x 30 mm	connector, M12 x 1	w153	d614	e017
Q25SP6R	25 x 50.2 x 30 mm	cable	w153	d613	e017

## S30 – Opposed mode sensor – Receiver



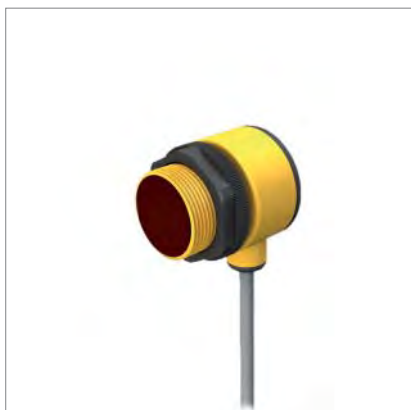
<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...60000 mm

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
S30SP6RQ	Ø30 x 77.5 mm	connector, M12 x 1	w153	d616	e019
S30SP6R	Ø30 x 68.7 mm	cable	w153	d615	e019

## T30 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...60000 mm

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T30SP6RQ	40 x 64 x 45 mm	connector, M12 x 1	w153	d618	e020
T30SP6R	40 x 51.5 x 45 mm	cable	w153	d617	e020

## Q40 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...60000 mm
<b>Dimensions</b>	40 x 40 x 46 mm		

An emitter is required.

### Types and data – selection table

Type	Electrical connection	w	d
Q40SP6RQ	connector, M12 x 1	w153	d620
Q40SP6R	cable	w153	d619

## M18 – Retroreflective sensor



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	metal, V2A (1.4305)
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	IR
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...2000 mm
<b>Protection class</b>	IP67		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
M18SP6LQ	Ø18 x 78 mm	connector, M12 x 1	w153	d606	e021
M18SP6L	Ø18 x 59.2 mm	cable	w153	d605	e021

## S18 – Retroreflective sensor



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	IR
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...2000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
S18SP6LQ	Ø18 x 78.7 mm	connector, M12 x 1	w153	d607	e021
S18SP6L	Ø18 x 59.2 mm	cable	w153	d610	e021



## T18 – Retroreflective sensor



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	IR
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...2000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T18SP6LQ	30 x 54 x 30 mm	connector, M12 x 1	w153	d612	e021
T18SP6L	30 x 41.5 x 30 mm	cable	w153	d611	e021

## M18 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	metal, V2A (1.4305)
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...2000 mm
<b>Protection class</b>	IP67		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
M18SP6LPQ	Ø18 x 78 mm	connector, M12 x 1	w153	d606	e021
M18SP6LP	Ø18 x 59.2 mm	cable	w153	d605	e021

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## S18 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...2000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
S18SP6LPQ	Ø18 x 78.7 mm	connector, M12 x 1	w153	d607	e021
S18SP6LP	Ø18 x 59.2 mm	cable	w153	d610	e021

## T18 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...2000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T18SP6LPQ	30 x 54 x 30 mm	connector, M12 x 1	w153	d612	e021
T18SP6LP	30 x 41.5 x 30 mm	cable	w153	d611	e021

## Q25 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...2000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q25SP6LPQ	25 x 62.7 x 30 mm	connector, M12 x 1	w153	d614	e021
Q25SP6LP	25 x 50.2 x 30 mm	cable	w153	d613	e021

## S30 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...6000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
S30SP6LPQ	Ø30 x 77.5 mm	connector, M12 x 1	w153	d616	e022
S30SP6LP	Ø30 x 68.7 mm	cable	w153	d615	e022

## T30 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...6000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T30SP6LPQ	40 x 64 x 45 mm	connector, M12 x 1	w153	d618	e022
T30SP6LP	40 x 51.5 x 45 mm	cable	w153	d617	e022

## Q40 – Retroreflective sensor with polarizing filter



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	50...6000 mm
<b>Protection class</b>	IP68 / IP69K		

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q40SP6LPQ	40 x 82.5 x 46 mm	connector, M12 x 1	w153	d620	e022
Q40SP6LP	40 x 69.8 x 46 mm	cable	w153	d619	e022

## M18 – Diffuse mode sensor with fixed-field



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, V2A (1.4305)
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
M18SP6FF25Q	Ø18 x 83.8 mm	connector, M12 x 1	0...25 mm	w153	d621	e023
M18SP6FF25	Ø18 x 65 mm	cable	0...25 mm	w153	d622	e023
M18SP6FF50	Ø18 x 65 mm	cable	0...50 mm	w153	d622	e024
M18SP6FF50Q	Ø18 x 83.8 mm	connector, M12 x 1	0...50 mm	w153	d621	e024
M18SP6FF100	Ø18 x 65 mm	cable	0...100 mm	w153	d622	e024
M18SP6FF100Q	Ø18 x 83.8 mm	connector, M12 x 1	0...100 mm	w153	d621	e024

## S18 – Diffuse mode sensor with fixed-field



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
S18SP6FF25Q	Ø18 x 84.1 mm	connector, M12 x 1	0...25 mm	w153	d623	e023
S18SP6FF25	Ø18 x 65 mm	cable	0...25 mm	w153	d624	e023
S18SP6FF50	Ø18 x 65 mm	cable	0...50 mm	w153	d624	e024
S18SP6FF50Q	Ø18 x 84.1 mm	connector, M12 x 1	0...50 mm	w153	d623	e024
S18SP6FF100	Ø18 x 65 mm	cable	0...100 mm	w153	d624	e024
S18SP6FF100Q	Ø18 x 84.1 mm	connector, M12 x 1	0...100 mm	w153	d623	e024

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## T18 – Diffuse mode sensor with fixed-field



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
T18SP6FF25Q	30 x 54 x 30 mm	connector, M12 x 1	0...25 mm	w153	d612	e023
T18SP6FF25	30 x 41.5 x 30 mm	cable	0...25 mm	w153	d611	e023
T18SP6FF50	30 x 41.5 x 30 mm	cable	0...50 mm	w153	d611	e024
T18SP6FF50Q	30 x 54 x 30 mm	connector, M12 x 1	0...50 mm	w153	d612	e024
T18SP6FF100	30 x 41.5 x 30 mm	cable	0...100 mm	w153	d611	e024
T18SP6FF100Q	30 x 54 x 30 mm	connector, M12 x 1	0...100 mm	w153	d612	e024

## Q25 – Diffuse mode sensor with fixed-field



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
Q25SP6FF25Q	25 x 62.7 x 30 mm	connector, M12 x 1	0...25 mm	w153	d614	e023
Q25SP6FF25	25 x 50.2 x 30 mm	cable	0...25 mm	w153	d613	e023
Q25SP6FF50	25 x 50.2 x 30 mm	cable	0...50 mm	w153	d613	e024
Q25SP6FF50Q	25 x 62.7 x 30 mm	connector, M12 x 1	0...50 mm	w153	d614	e024
Q25SP6FF100	25 x 50.2 x 30 mm	cable	0...100 mm	w153	d613	e024
Q25SP6FF100Q	25 x 62.7 x 30 mm	connector, M12 x 1	0...100 mm	w153	d614	e024

## S30 – Diffuse mode sensor with fixed-field

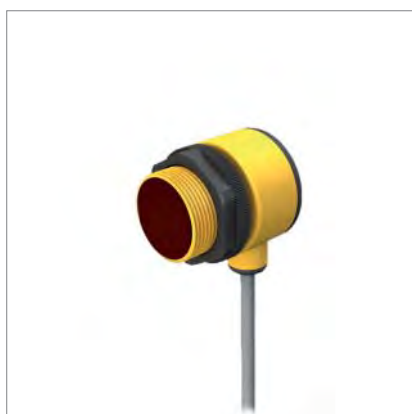


<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
S30SP6FF200	Ø30 x 68.7 mm	cable	0...200 mm	w153	d615	e025
S30SP6FF200Q	Ø30 x 77.5 mm	connector, M12 x 1	0...200 mm	w153	d616	e025
S30SP6FF400	Ø30 x 68.7 mm	cable	0...400 mm	w153	d615	e025
S30SP6FF400Q	Ø30 x 77.5 mm	connector, M12 x 1	0...400 mm	w153	d616	e025
S30SP6FF600	Ø30 x 68.7 mm	cable	0...600 mm	w153	d615	e026
S30SP6FF600Q	Ø30 x 77.5 mm	connector, M12 x 1	0...600 mm	w153	d616	e026

## T30 – Diffuse mode sensor with fixed-field



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
T30SP6FF200	40 x 51.5 x 45 mm	cable	0...200 mm	w153	d617	e025
T30SP6FF200Q	40 x 64 x 45 mm	connector, M12 x 1	0...200 mm	w153	d618	e025
T30SP6FF400	40 x 51.5 x 45 mm	cable	0...400 mm	w153	d617	e025
T30SP6FF400Q	40 x 64 x 45 mm	connector, M12 x 1	0...400 mm	w153	d618	e025
T30SP6FF600Q	40 x 64 x 45 mm	connector, M12 x 1	0...600 mm	w153	d618	e026
T30SP6FF600	40 x 51.5 x 45 mm	cable	0...600 mm	w153	d617	e026

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## Q40 – Diffuse mode sensor with fixed-field



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
Q40SP6FF200	40 x 69.8 x 46 mm	cable	0...200 mm	w153	d619	e025
Q40SP6FF200Q	40 x 82.5 x 46 mm	connector, M12 x 1	0...200 mm	w153	d620	e025
Q40SP6FF400	40 x 69.8 x 46 mm	cable	0...400 mm	w153	d619	e025
Q40SP6FF400Q	40 x 82.5 x 46 mm	connector, M12 x 1	0...400 mm	w153	d620	e025
Q40SP6FF600	40 x 69.8 x 46 mm	cable	0...600 mm	w153	d619	e026
Q40SP6FF600Q	40 x 82.5 x 46 mm	connector, M12 x 1	0...600 mm	w153	d620	e026

## M18 – Diffuse mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, V2A (1.4305)
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
M18SP6D	Ø18 x 59.2 mm	cable	0...100 mm	w153	d605	e027
M18SP6DQ	Ø18 x 78 mm	connector, M12 x 1	0...100 mm	w153	d606	e027
M18SP6DL	Ø18 x 59.2 mm	cable	2...300 mm	w153	d605	e027
M18SP6DLQ	Ø18 x 78 mm	connector, M12 x 1	2...300 mm	w153	d606	e027



## S18 – Diffuse mode sensor



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP68 / IP69K
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, PBT
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	connection programmable, PNP	<b>Ambient temperature</b>	-40...+70 °C
<b>Switching frequency</b>	≤ 160 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
S18SP6D	Ø18 x 59.2 mm	cable	0...100 mm	w153	d610	e027
S18SP6DQ	Ø18 x 78.7 mm	connector, M12 x 1	0...100 mm	w153	d607	e027
S18SP6DL	Ø18 x 59.2 mm	cable	2...300 mm	w153	d610	e027
S18SP6DLQ	Ø18 x 78.7 mm	connector, M12 x 1	2...300 mm	w153	d607	e027

## T18 – Diffuse mode sensor



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, PBT
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Output</b>	connection programmable, PNP	<b>Light type</b>	IR
<b>Switching frequency</b>	≤ 160 Hz	<b>Range</b>	0...500 mm
<b>Protection class</b>	IP68 / IP69K		

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
T18SP6DQ	30 x 54 x 30 mm	connector, M12 x 1	w153	d625	e028
T18SP6D	30 x 41.5 x 30 mm	cable	w153	d611	e028

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## Compact sensors M12



The M12 provide many functions incorporated in a rugged metal housing. With a diameter of only 12 mm, they can be mounted even in poorly accessible places. Even under rough operating conditions the IP67 rated sensors work convincingly powerfull, such as their bigger counterparts.

The operating modes are opposed, retroreflective with/without polarizing filter as well as diffuse mode with background suppression.

### Features

- M12 sensor series, threaded barrel, metal
- All operating modes
- Easily aligned through a visible red light beam
- LED indicating power-on and light detection
- PNP or NPN output
- Protection class IP67
- 2 m connection cable, M12 x 1 plug connection or cable with M12 x 1 plug connection

### Type code M12

M12	P	FF25	Q8
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M12	Series	P	Output	FF25	Operating mode
<b>Series</b> M12 thread, Ø 12 thread		<b>Output</b> N NPN P PNP		<b>Operating mode</b> D diffuse mode E opposed mode emitter FF25 diffuse mode fixed field 0...25 mm LP retroreflective mode polarizing filter LV retroreflective mode visible red light R receiver 6E1LD 10...30 VDC laser emitter, class 1 6E2LD 10...30 VDC, laser emitter, class 2	
<b>Q8</b> <b>Electrical connection</b>					
<b>Electrical connection</b> Q5 pigtail with connector, Ø 8 mm Q8 connector, M12 x 1 blank cable connection, 2 m					

## M12 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Error message type</b>	LED	<b>Light type</b>	red
<b>Protection class</b>	IP67	<b>Range</b>	0...5000 mm
<b>Housing material</b>	metal, CuZn		

A receiver is required.


### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
M12EQ8	Ø12 x 74 mm	connector, M12 x 1	w068	d627	e029
M12E	Ø12 x 67.5 mm	cable	w068	d626	e029

## M12 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, CuZn
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	 , PNP	<b>Range</b>	0...5000 mm
<b>Switching frequency</b>	≤ 500 Hz		

An emitter is required.


### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
M12PRQ8	Ø12 x 74 mm	connector, M12 x 1	w155	d627	e029
M12PR	Ø12 x 67.5 mm	cable	w155	d626	e029

## M12 – Retroreflective sensor






### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, CuZn
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 1 kHz	<b>Range</b>	0...3000 mm

A reflector is required.


### Types and data – selection table

Type	Dimensions	Electrical connection			
M12PLVQ8	Ø12 x 74 mm	connector, M12 x 1	w155	d627	e030
M12PLV	Ø12 x 67.5 mm	cable	w155	d626	e030

## M12 – Retroreflective sensor with polarizing filter




### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, CuZn
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 1 kHz	<b>Range</b>	0...1500 mm

A reflector is required.


### Types and data – selection table

Type	Dimensions	Electrical connection			
M12PLPQ8	Ø12 x 74 mm	connector, M12 x 1	w155	d627	e031
M12PLP	Ø12 x 67.5 mm	cable	w155	d626	e031

## M12 – Diffuse mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, CuZn
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 1 kHz	<b>Range</b>	0...400 mm


### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
M12PDQ8	Ø12 x 74 mm	connector, M12 x 1	w155	d627	e032
M12PD	Ø12 x 67.5 mm	cable	w155	d626	e032

## M12 – Diffuse mode sensor with fixed-field



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	metal, CuZn
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 1 kHz		

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
M12PFF25	Ø12 x 67.5 mm	cable	0...25 mm	w155	d626	e033
M12PFF25Q8	Ø12 x 74 mm	connector, M12 x 1	0...25 mm	w155	d627	e033
M12PFF50	Ø12 x 67.5 mm	cable	0...50 mm	w155	d626	e034
M12PFF50Q8	Ø12 x 74 mm	connector, M12 x 1	0...50 mm	w155	d627	e034
M12PFF75	Ø12 x 67.5 mm	cable	0...75 mm	w155	d626	e035
M12PFF75Q8	Ø12 x 74 mm	connector, M12 x 1	0...75 mm	w155	d627	e035

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## M12 – Opposed mode laser sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC
<b>Power-on, indicator</b>	LED
<b>Dimensions</b>	57 mm
<b>Protection class</b>	IP67

<b>Housing material</b>	metal, AL
<b>Lens material</b>	plastic
<b>Ambient temperature</b>	0...+40 °C
<b>Light type</b>	red

Combinable with all standard TURCK receivers; range depending on emitter used.

### Types and data – selection table

Type	Electrical connection	Laser class	w	d
M126E1LD	cable with connector	1 (EN 60825, IEC 60825)	w154	d628
M126E1LDQ	cable with connector, flange connector, Ø 8 mm	1 (EN 60825, IEC 60825)	w154	d629
M126E2LDQ	cable with connector, flange connector, Ø 8 mm	2 (EN 60825, IEC 60825)	w154	d629
M126E2LD	cable with connector	2 (EN 60825, IEC 60825)	w154	d628

**w** Wiring diagrams on page 832 ff **d** Dimension drawing on page 842 ff **e** Excess gain curves on page 922 ff **a** Accessories on page 788 ff

## Compact sensors QS18



The compact QS18 fit in almost any place. Equipped with standard bores and optionally available M18, they can replace M18 threaded barrel as well as rectangular shaped sensors without thread.

The QS18 are available in many operating modes and achieve an optical power exceeding by far the usual performance of sensors of this size.

### Features

- Universal rectangular design, flexible mounting
- Many operating modes, functions and application possibilities
- Response time less than 1 ms
- Rugged, fully encapsulated plastic housing, protected circuit
- Protection class IP67
- Bright LED display, all-round visibility
- 2 m connection cable, M12 x 1 plug connection, cable with M12 x 1 plug connection
- Blind for opposed mode sensors available
- Expert™ QS18E: Easy startup via pushbutton or remote via cable

### Type code QS18

QS18	V	P	6	LAF250	Q5
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QS18	Series	V	P	Output	6	Operating voltage
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**Series**  
**QS18** rectangular  
 height 35 mm, width 15 mm  
 depth 21...33 mm

**Output**  
**N** NPN  
**P** PNP

**Operating voltage**  
**6** 10...30 VDC

LAF250	Operating mode
--------	----------------

**Operating mode**

**AF100** diffuse mode adjustable field 20...100 mm

**CV15** C = convergent mode V = visible red light, focal distance 15 mm

**CV16** C = convergent mode V = visible red light focal distance 16 mm

**D** diffuse mode

**DB** diffuse mode, without blind zone

**DV** diffuse mode, visible red light

**E** emitter, opposed mode

**EB** emitter, opposed mode sensor range 3 m

**FF50** diffuse mode, fixed field 0...50 mm

**LAF** laser, diffuse mode adjustable field 30...150 mm, class 1

**Output function**  
**E** teach-in/NO  
**V** NO/NC

Q5	Electrical connection
----	-----------------------

**Electrical connection**

**Q** pigtail with connector, Ø 8 mm

**Q5** pigtail with connector, M12 x 1 connector, Ø 8 mm

**Q7** connector, Ø 8 mm

**Q8** connector, M12 x 1

**blank** cable connection, 2 m

**LAF250** laser, diffuse mode adjustable field 50...250 mm, class 2

**LD** laser, diffuse mode

**LE** laser emitter

**LE10** laser emitter, point

**LE11** laser emitter, vertical line

**LE12** laser emitter, horizontal line

**LE14** laser emitter, cross

**LLP** laser, retroreflective mode polarizing filter

**LP** retroreflective mode polarizing filter, visible red light

**LV** retroreflective mode visible red light,

**R** receiver, opposed mode

**RB** receiver, opposed mode range 3 m

**W** diffuse mode, wide angle



## QS18 – Opposed mode sensor – Emitter – M18 thread



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Dimensions</b>	15 x 35 x 31 mm	<b>Lens material</b>	plastic

A receiver is required.

### Types and data – selection table

Type	Electrical connection	Ambient temperature	Light type	Range	Laser class	w	d	e
QS186EQ8	connector, M12 x 1	-20...+70 °C	IR	0...20000 mm	-	w156	d630	e036
QS186LE11Q8	connector, M12 x 1	-10...+50 °C	red	0...2000 mm	1 (EN 60825, IEC 60825)	w158	d633	
QS186LE12Q8	connector, M12 x 1	-10...+50 °C	red	0...2000 mm	1 (EN 60825, IEC 60825)	w158	d633	
QS186LE11	cable	-10...+50 °C	red	0...2000 mm	1 (EN 60825, IEC 60825)	w157	d631	
QS186LE12	cable	-10...+50 °C	red	0...2000 mm	1 (EN 60825, IEC 60825)	w068	d631	
QS186E	cable	-20...+70 °C	IR	0...20000 mm	-	w068	d631	e036
QS186LE	cable	-10...+50 °C	red	0...30000 mm	1 (EN 60825, IEC 60825)	w157	d632	
QS186LEQ8	connector, M12 x 1	-10...+50 °C	red	0...30000 mm	1 (EN 60825, IEC 60825)	w158	d633	
QS186LE10Q8	connector, M12 x 1	-10...+50 °C	red	0...5000 mm	1 (EN 60825, IEC 60825)	w158	d633	
QS186LE14Q8	connector, M12 x 1	-10...+50 °C	red	0...5000 mm	1 (EN 60825, IEC 60825)	w158	d633	
QS186LE10	cable	-10...+50 °C	red	0...5000 mm	1 (EN 60825, IEC 60825)	w157	d631	
QS186LE14	cable	-10...+50 °C	red	0...5000 mm	1 (EN 60825, IEC 60825)	w157	d631	

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## QS18 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Dimensions</b>	15 x 35 x 27.7 mm	<b>Light type</b>	IR
<b>Protection class</b>	IP67	<b>Range</b>	0...3000 mm
<b>Housing material</b>	plastic, ABS		

A receiver is required.

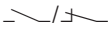
### Types and data – selection table

Type	Electrical connection	w	d	e
QS186EBQ8	connector, M12 x 1	w068	d634	e036
QS186EB	cable	w068	d635	e036

## QS18 – Opposed mode sensor – Receiver – M18 thread



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Dimensions</b>	15 x 35 x 31 mm
<b>Power-on, indicator</b>	LED	<b>Protection class</b>	IP67
<b>Error message type</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Indication of excess gain type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	 , PNP	<b>Ambient temperature</b>	-20...+70 °C
<b>Switching frequency</b>	≤ 400 Hz	<b>Range</b>	0...20000 mm

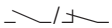
An emitter is required.

### Types and data – selection table

Type	Electrical connection	w	d	e
QS18VP6RQ8	connector, M12 x 1	w155	d630	e036
QS18VP6RQ8-02790	connector, M12 x 1	w155	d630	e036
QS18VP6R	cable	w155	d631	e036

## QS18 – Opposed mode sensor – Receiver



<b>General data</b>		<b>Dimensions</b>	15 x 35 x 27.7 mm
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	 , PNP	<b>Range</b>	0...3000 mm
<b>Switching frequency</b>	≤ 400 Hz		

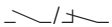
An emitter is required.

### Types and data – selection table

Type	Electrical connection	w	d	e
QS18VP6RBQ8	connector, M12 x 1	w155	d634	e036
QS18VP6RB	cable	w155	d635	e036

## QS18 – Retroreflective sensor



<b>General data</b>		<b>Protection class</b>	IP67
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	red
<b>Output</b>	 , PNP	<b>Range</b>	0...6500 mm
<b>Switching frequency</b>	≤ 800 Hz		
<b>Dimensions</b>	15 x 35 x 31 mm		

A reflector is required.

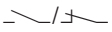
### Types and data – selection table

Type	Electrical connection	w	d	e
QS18VP6LVQ8	connector, M12 x 1	w155	d637	e037
QS18VP6LV	cable	w155	d636	e037

## QS18 – Retroreflective sensor with polarizing filter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 800 Hz	<b>Range</b>	50...3500 mm
<b>Dimensions</b>	15 x 35 x 31 mm		

A reflector is required.

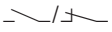
### Types and data – selection table

Type	Electrical connection	w	d	e
QS18VP6LPQ8	connector, M12 x 1	w155	d637	e037
QS18VP6LP	cable	w155	d636	e037

## QS18 – Retroreflective laser sensor with polarizing filter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-10...+50 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 700 Hz	<b>Range</b>	100...10000 mm
<b>Dimensions</b>	15 x 35 x 31 mm	<b>Laser class</b>	1 (EN 60825, IEC 60825)

Reflector included in scope of supply.

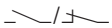
### Types and data – selection table

Type	Electrical connection	w	d	e
QS18VP6LLPQ8	connector, M12 x 1	w155	d637	e038
QS18VP6LLP	cable	w155	d636	e038

## QS18 – Diffuse mode sensor – M18 thread



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	 , PNP	<b>Light type</b>	IR
<b>Switching frequency</b>	≤ 800 Hz	<b>Range</b>	0...450 mm
<b>Dimensions</b>	15 x 35 x 31 mm		

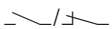
### Types and data – selection table

Type	Electrical connection	w	d	e
QS18VP6DQ8	connector, M12 x 1	w155	d637	e039
QS18VP6D	cable	w155	d636	e039

## QS18 – Diffuse mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Dimensions</b>	15 x 35 x 21.1 mm
<b>Power-on, indicator</b>	LED	<b>Protection class</b>	IP67
<b>Error message type</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Indication of excess gain type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	 , PNP	<b>Ambient temperature</b>	-20...+70 °C
<b>Switching frequency</b>	≤ 800 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Electrical connection	Range	w	d	e
QS18VP6W	cable	0...100 mm	w155	d638	e039
QS18VP6WQ8	connector, M12 x 1	0...100 mm	w155	d639	e039
QS18VP6DB	cable	0...450 mm	w155	d638	e039
QS18VP6DBQ8	connector, M12 x 1	0...450 mm	w155	d639	e039

## QS18 – Diffuse mode sensor with fixed-field



### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Error message type** LED

**Indication of excess gain type** LED

**Output** , PNP

**Switching frequency** ≤ 625 Hz

**Dimensions** 15 x 35 x 31 mm

**Protection class** IP67

**Housing material** plastic, ABS

**Lens material** plastic

**Ambient temperature** -20...+70 °C

**Light type** red

### Types and data – selection table

Type	Electrical connection	Range	w	d	e
QS18VP6FF50	cable	0...50 mm	w155	d631	e041
QS18VP6FF50Q8	connector, M12 x 1	0...50 mm	w155	d630	e041
QS18VP6FF100	cable	0...100 mm	w155	d631	e042
QS18VP6FF100Q8	connector, M12 x 1	0...100 mm	w155	d630	e042

## QS18 – Diffuse mode sensor with adjustable field



### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Error message type** LED

**Indication of excess gain type** LED

**Output** , PNP

**Switching frequency** ≤ 700 Hz

**Dimensions** 15 x 34.5 x 21.1 mm

**Protection class** IP67

**Housing material** plastic, ABS

**Lens material** plastic

**Light type** red

### Types and data – selection table

Type	Electrical connection	Ambient temperature	Range	Laser class	w	d	e
QS18VP6AF100	cable	0...+55 °C	1...100 mm	-	w155	d640	e043
QS18VP6AF100Q5	cable with connector, M12 x 1	0...+55 °C	1...100 mm	-	w155	d641	e043
QS18VP6LAF	cable	-10...+50 °C	1...150 mm	1 (EN 60825, IEC 60825)	w155	d640	e044
QS18VP6LAFQ5	cable with connector, M12 x 1	-10...+50 °C	1...150 mm	1 (EN 60825, IEC 60825)	w155	d641	e044
QS18VP6LAF250	cable	-10...+50 °C	1...250 mm	2 (EN 60825, IEC 60825)	w155	d640	e045
QS18VP6LAF250Q5	cable with connector, M12 x 1	-10...+50 °C	1...250 mm	2 (EN 60825, IEC 60825)	w155	d641	e045

## QS18 – Convergent mode sensor



### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Error message type** LED

**Indication of excess gain type** LED

**Output** , PNP

**Switching frequency** ≤ 800 Hz

**Dimensions** 15 x 35 x 33.2 mm

**Protection class** IP67

**Housing material** plastic, ABS

**Lens material** plastic

**Ambient temperature** -20...+70 °C

**Light type** red

### Types and data – selection table

Type	Electrical connection	Focal distance	w	d	e
QS18VP6CV15Q8	connector, M12 x 1	16 mm	w155	d643	e046
QS18VP6CV45Q8	connector, M12 x 1	43 mm	w155	d643	e046
QS18VP6CV15	cable	16 mm	w155	d642	e046
QS18VP6CV45	cable	43 mm	w155	d642	e046

## QS18 – Diffuse mode laser sensor – M18 thread



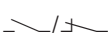
### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Error message type** LED

**Indication of excess gain type** LED

**Output** , PNP

**Switching frequency** ≤ 700 Hz

**Dimensions** 15 x 35 x 31 mm

**Protection class** IP67

**Housing material** plastic, ABS

**Lens material** plastic

**Ambient temperature** -10...+50 °C

**Light type** red

**Range** 0...300 mm

**Laser class** 1 (EN 60825, IEC 60825)

### Types and data – selection table

Type	Electrical connection	w	d	e
QS18VP6LDQ8	connector, M12 x 1	w155	d637	e040
QS18VP6LD	cable	w155	d636	e040

## QS18E – Retroreflective sensor with polarizing filter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	—, PNP	<b>Ambient temperature</b>	-20...+70 °C
<b>Switching frequency</b>	≤ 800 Hz	<b>Light type</b>	red
<b>Dimensions</b>	15 x 35 x 31 mm	<b>Range</b>	50...3500 mm

A reflector is required.

### Types and data – selection table

Type	Electrical connection	w	d	e
QS18EP6LP	cable	w159	d644	e037
QS18EP6LPQ8	connector, M12 x 1	w159	d645	e037

## QS18E – Diffuse mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	—, PNP	<b>Ambient temperature</b>	-20...+70 °C
<b>Switching frequency</b>	≤ 800 Hz	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
QS18EP6W	15 x 35 x 21.1 mm	cable	0...300 mm	w159	d646	e039
QS18EP6WQ8	15 x 35 x 21.1 mm	connector, M12 x 1	0...300 mm	w159	d647	e039
QS18EP6DB	15 x 35 x 21.1 mm	cable	0...500 mm	w159	d646	e039
QS18EP6DBQ8	15 x 35 x 21.1 mm	connector, M12 x 1	0...500 mm	w159	d647	e039
QS18EP6D	15 x 35 x 31 mm	cable	0...800 mm	w159	d644	e039
QS18EP6DQ8	15 x 35 x 31 mm	connector, M12 x 1	0...800 mm	w159	d645	e039



## QS18E – Convergent mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC
<b>Power-on, indicator</b>	LED
<b>Error message type</b>	LED
<b>Output</b>	$\neg$ , PNP
<b>Switching frequency</b>	≤ 800 Hz
<b>Dimensions</b>	15 x 35 x 31 mm

<b>Protection class</b>	IP67
<b>Housing material</b>	plastic, ABS
<b>Lens material</b>	plastic
<b>Ambient temperature</b>	-20...+70 °C
<b>Light type</b>	red

### Types and data – selection table

Type	Electrical connection	Focal distance	w	d	e
QS18EP6CV15Q8	connector, M12 x 1	16 mm	w159	d645	e046
QS18EP6CV45Q8	connector, M12 x 1	43 mm	w159	d645	e046
QS18EP6CV15	cable	16 mm	w159	d644	e046
QS18EP6CV45	cable	43 mm	w159	d644	e046

## Compact sensors Q20



The rectangular Q20 are quickly and easily mounted. Bores with integrated thread make the use of additional mounting nuts redundant.

Whether applied as opposed mode, retro-reflective or diffuse mode sensor, the compact Q20 are striking for their outstanding optical power and reliability. Their flat design enables easy mounting even in confined spaces.

### Features

- 3 mm thread bores, 25.4 mm distance inbetween
- Easily aligned through visible light beam (most types)
- Protection class IP67
- Excellent protection against interferences and crosstalk
- Antivalent transistor outputs (NO/NC), PNP/NPN depending on the type
- 2 m connection cable, M8 x 1 plug connection, cable with M8 x 1 plug connection, cable with M12 x 1 plug connection

### Type code Q20



#### Series

**Q20** rectangular dimensions  
12 x 32 x 20 mm (cable device)  
12 x 42 x 20 mm (plug-in device)

#### Output

**P** PNP  
**N** NPN

#### Operating mode

**E** opposed mode emitter  
**R** opposed mode receiver  
**EL** emitter, long range  
**RL** receiver, long range  
**LV** retroreflective mode visible red light  
**LP** retroreflective mode polarizing filter  
**DL** diffuse mode, long range  
**DXL** diffuse mode sensor extra long range  
**DV** diffuse mode, visible red light



#### Electrical connection

**Q** pigtail with connector, M8 x 1  
**Q5** pigtail with connector, M12 x 1  
**Q7** connector, M8 mm  
**blank** cable connection, 2 m

## Q20 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Protection class</b>	IP67	<b>Ambient temperature</b>	-20...+60 °C

A receiver is required.

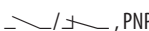
### Types and data – selection table

Type	Dimensions	Electrical connection	Light type	Range	w	d	e
Q20E	12 x 32 x 20 mm	cable	red	0...10000 mm	w068	d648	e047
Q20EQ	12 x 32 x 20 mm	cable with connector, M8 x 1	red	0...10000 mm	w068	d649	e047
Q20EQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	red	0...10000 mm	w068	d650	e047
Q20EQ7	12 x 42 x 20 mm	connector, M8 x 1	red	0...10000 mm	w068	d651	e047
Q20EL	12 x 32 x 20 mm	cable	IR	0...15000 mm	w068	d648	e047
Q20ELQ	12 x 32 x 20 mm	cable with connector, M8 x 1	IR	0...15000 mm	w068	d649	e047
Q20ELQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	IR	0...15000 mm	w068	d650	e047
Q20ELQ7	12 x 42 x 20 mm	connector, M8 x 1	IR	0...15000 mm	w068	d651	e047

## Q20 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Switching frequency</b>	≤ 600 Hz
<b>Power-on, indicator</b>	LED	<b>Protection class</b>	IP67
<b>Error message type</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Indication of excess gain type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	 , PNP	<b>Ambient temperature</b>	-20...+60 °C

An emitter is required.


**Types and data – selection table**

Type	Dimensions	Electrical connection	Range	w	d	e
Q20PRQ	12 x 32 x 20 mm	cable with connector, M8 x 1	0...10000 mm	w155	d649	e047
Q20PRQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	0...10000 mm	w155	d650	e047
Q20PRQ7	12 x 42 x 20 mm	connector, M8 x 1	0...10000 mm	w155	d651	e047
Q20PR	12 x 32 x 20 mm	cable	0...10000 mm	w155	d648	e047
Q20PRL	12 x 32 x 20 mm	cable	0...15000 mm	w155	d648	e047
Q20PRLQ	12 x 32 x 20 mm	cable with connector, M8 x 1	0...15000 mm	w155	d649	e047
Q20PRLQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	0...15000 mm	w155	d650	e047
Q20PRLQ7	12 x 42 x 20 mm	connector, M8 x 1	0...15000 mm	w155	d651	e047

**Q20 – Retroreflective sensor**



**General data**

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 600 Hz	<b>Range</b>	0...6000 mm

A reflector is required.

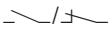
**Types and data – selection table**

Type	Dimensions	Electrical connection	w	d	e
Q20PLVQ7	12 x 42 x 20 mm	connector, M8 x 1	w155	d655	e048
Q20PLVQ	12 x 32 x 20 mm	cable with connector, M8 x 1	w155	d652	e048
Q20PLVQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	w155	d654	e048
Q20PLV	12 x 32 x 20 mm	cable	w155	d653	e048

## Q20 – Retroreflective sensor with polarizing filter






### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 600 Hz	<b>Range</b>	0...4000 mm

A reflector is required.

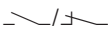
### Types and data – selection table

Type	Dimensions	Electrical connection			
Q20PLPQ7	12 x 42 x 20 mm	connector, M8 x 1	w155	d655	e049
Q20PLPQ	12 x 32 x 20 mm	cable with connector, M8 x 1	w155	d652	e049
Q20PLPQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	w155	d654	e049
Q20PLP	12 x 32 x 20 mm	cable	w155	d653	e049

## Q20 – Diffuse mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Switching frequency</b>	≤ 600 Hz
<b>Power-on, indicator</b>	LED	<b>Protection class</b>	IP67
<b>Error message type</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Indication of excess gain type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	 , PNP	<b>Ambient temperature</b>	-20...+60 °C

**Types and data – selection table**

Type	Dimensions	Electrical connection	Light type	Range	w	d	e
Q20PD	12 x 32 x 20 mm	cable	red	0...250 mm	w155	d653	e050
Q20PDQ	12 x 32 x 20 mm	cable with connector, M8 x 1	red	0...250 mm	w155	d652	e050
Q20PDQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	red	0...250 mm	w155	d654	e050
Q20PDQ7	12 x 42 x 20 mm	connector, M8 x 1	red	0...250 mm	w155	d655	e050
Q20PDL	12 x 32 x 20 mm	cable	red	0...800 mm	w155	d653	e051
Q20PDLQ	12 x 32 x 20 mm	cable with connector, M8 x 1	red	0...800 mm	w155	d652	e051
Q20PDLQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	red	0...800 mm	w155	d654	e051
Q20PDLQ7	12 x 42 x 20 mm	connector, M8 x 1	red	0...800 mm	w155	d655	e051
Q20PDXL	12 x 32 x 20 mm	cable	IR	0...1500 mm	w155	d653	e051
Q20PDXLQ	12 x 32 x 20 mm	cable with connector, M8 x 1	IR	0...1500 mm	w155	d652	e051
Q20PDXLQ5	12 x 32 x 20 mm	cable with connector, M12 x 1	IR	0...1500 mm	w155	d654	e051
Q20PDXLQ7	12 x 42 x 20 mm	connector, M8 x 1	IR	0...1500 mm	w155	d655	e051

**w** Wiring diagrams on page 832 ff **d** Dimension drawing on page 842 ff **e** Excess gain curves on page 922 ff **a** Accessories on page 788 ff

## Compact sensors QS30



The compact QS30 fit in almost any place. With an optionally available M30 thread and standard bores, they can replace M30 threaded barrel as well as rectangular sensors without thread

The QS30 series offers many operating modes, functions and application possibilities

### Features

- Universal rectangular design, flexible mounting
- Many operating modes, functions and application possibilities
- Pushbutton or external programming
- Easy-to-read status indication via 8-segment bargraph display
- Plastic housing, protection class IP67
- Bipolar digital outputs, PNP/NPN
- 30 ms switch-off delay (adjustable)
- 2 m connection cable or M12 x 1 plug connection

### Type code QS30

QS30	VR	3	FF600	Q
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QS30	Series	VR	Output	3	Operating voltage
	<p>Series</p> <p><b>QS30</b> rectangular 22 x 49 x 35 mm (cable device) 22 x 57 x 35 mm (plug-in device)</p>	<p>Output</p> <p><b>VR</b> relay output changeover contact NO/NC</p> <p><b>blank</b> PNP/NPN</p>	<p>Operating voltage</p> <p><b>3</b> 12...250 VDC, 24...250 VAC</p> <p><b>blank</b> 10...30 VDC</p>		

FF600	Operating mode
	<p>Operating mode</p> <p><b>AF</b> diffuse mode, adjustable field, bargraph display</p> <p><b>ARX</b> receiver, high-power light operation</p> <p><b>D</b> diffuse mode</p> <p><b>E</b> opposed mode emitter</p> <p><b>EDV</b> diffuse mode, teachable visible red light bargraph display</p> <p><b>ELVC</b> retroreflective mode, visible red light, clear-glass recognition, bargraph display</p> <p><b>EX</b> opposed mode emitter high-power</p> <p><b>EXH20</b> opposed mode emitter high-power, water detection</p> <p><b>FF600</b> diffuse mode, fixed field 0...600 mm</p> <p><b>LD</b> laser, diffuse mode bargraph display</p> <p><b>LDL</b> laser, diffuse mode, long distance, bargraph display</p>

<b>LLP</b>	laser, retroreflective mode polarizing filter bargraph display
<b>LLPC</b>	laser, retroreflective mode polarizing filter, clear-glass recognition, bargraph display
<b>LP</b>	retroreflective mode polarizing filter
<b>LV</b>	retroreflective mode
<b>R</b>	opposed mode receiver
<b>RRH20</b>	receiver, dark operation water detection
<b>RRX</b>	receiver, high-power dark operation
<b>RRXH20</b>	receiver, high-power dark operation water detection

Q	Electrical connection
	<p>Electrical connection</p> <p><b>Q</b> connector, M12 x 1</p> <p><b>Q5</b> pigtail with connector, M12 x 1</p> <p><b>blank</b> cable connection, 2 m</p>



## QS30 – Opposed mode sensor – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Error message type</b>	LED	<b>Light type</b>	IR
<b>Protection class</b>	IP67	<b>Range</b>	0...60000 mm
<b>Housing material</b>	plastic, ABS		

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d
QS30EQ	22 x 57 x 35 mm	connector, M12 x 1	w068	d657
QS30E	22 x 49 x 35 mm	cable	w068	d656

## QS30 – Opposed mode sensor – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	pnp/npn	<b>Range</b>	0...60000 mm

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d
QS30RQ	22 x 57 x 35 mm	connector, M12 x 1	w161	d657
QS30R	22 x 49 x 35 mm	cable	w161	d656

## QS30 – Retroreflective sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	red
<b>Output</b>	pnp/hpn		

A reflector is required.

### Types and data – selection table

Type	Switching frequency	Dimensions	Electrical connection	Ambient temperature	Range	w	d	e
QS30LV	≤ 250 Hz	22 x 49 x 35 mm	cable	-20...+70 °C	10...12000 mm	w161	d662	e053
QS30LVQ	≤ 250 Hz	22 x 57 x 35 mm	connector, M12 x 1	-20...+70 °C	10...12000 mm	w161	d663	e053
QS30ELVCQ	≤ 1000 Hz	22 x 57 x 35 mm	connector, M12 x 1	-10...+55 °C	100...2000 mm	w078	d664	
QS30ELVC	≤ 1000 Hz	22 x 49 x 35 mm	cable	-10...+55 °C	100...2000 mm	w078	d665	

## QS30 – Retroreflective laser sensor with polarizing filter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	red
<b>Output</b>	pnp/hpn	<b>Range</b>	0...8000 mm
<b>Protection class</b>	IP67		

A reflector is required.

### Types and data – selection table

Type	Switching frequency	Dimensions	Electrical connection	w	d	e
QS30LPQ	≤ 250 Hz	22 x 57 x 35 mm	connector, M12 x 1	w161	d663	e054
QS30LP	≤ 33 Hz	22 x 49 x 35 mm	cable	w161	d662	e054

## QS30 – Retroreflective laser sensor with polarizing filter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-10...+50 °C
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	red
<b>Output</b>	pnp/npn	<b>Range</b>	200...18000 mm
<b>Switching frequency</b>	≤ 1 kHz	<b>Laser class</b>	1 (EN 60825, IEC 60825)
<b>Protection class</b>	IP67		

Reflector included in scope of supply.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
QS30LLPQ	22 x 57 x 35 mm	connector, M12 x 1	w078	d664	e055
QS30LLPCQ	22 x 57 x 35 mm	connector, M12 x 1	w078	d664	e055
QS30LLP	22 x 49 x 35 mm	cable	w078	d665	e055
QS30LLPC	22 x 49 x 35 mm	cable	w078	d665	e055

## QS30 – Diffuse mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Output</b>	pnp/npn
<b>Power-on, indicator</b>	LED	<b>Protection class</b>	IP67
<b>Error message type</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Indication of excess gain type</b>	LED	<b>Lens material</b>	plastic

### Types and data – selection table

Type	Switching frequency	Dimensions	Electrical connection	Ambient temperature	Light type	Range	w	d	e
QS30D	≤ 250 Hz	22 x 49 x 35 mm	cable	-20...+70 °C	IR	2...1000 mm	w163	d662	e056
QS30DQ	≤ 250 Hz	22 x 57 x 35 mm	connector, M12 x 1	-20...+70 °C	IR	2...1000 mm	w163	d663	e056
QS30EDV	≤ 270 Hz	22 x 49 x 35 mm	cable	-10...+55 °C	red	2...1400 mm	w078	d665	e057
QS30EDVQ	≤ 270 Hz	22 x 57 x 35 mm	connector, M12 x 1	-10...+55 °C	red	2...1400 mm	w078	d664	e057

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## QS30 – Diffuse mode sensor with fixed-field



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	pnp/npn	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 250 Hz		

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
QS30FF200	22 x 49 x 35 mm	cable	0...200 mm	w163	d656	e058
QS30FF200Q	22 x 57 x 35 mm	connector, M12 x 1	0...200 mm	w163	d657	e058
QS30FF400	22 x 49 x 35 mm	cable	0...400 mm	w163	d656	e059
QS30FF400Q	22 x 57 x 35 mm	connector, M12 x 1	0...400 mm	w163	d657	e059
QS30FF600	22 x 49 x 35 mm	cable	0...600 mm	w163	d656	e060
QS30FF600Q	22 x 57 x 35 mm	connector, M12 x 1	0...600 mm	w163	d657	e060

## QS30 – Diffuse mode sensor with adjustable field



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-10...+55 °C
<b>Output</b>	pnp/npn	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 500 Hz	<b>Range</b>	50...300 mm

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
QS30AFQ	22 x 57 x 35 mm	connector, M12 x 1	w078	d664	e061
QS30AF	22 x 49 x 35 mm	cable	w078	d665	e061

## QS30 – Diffuse mode laser sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-10...+50 °C
<b>Output</b>	pnp/npn	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 1 kHz		

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	Laser class	w	d	e
QS30LDQ	22 x 57 x 35 mm	connector, M12 x 1	0...400 mm	1 (EN 60825, IEC 60825)	w078	d664	e062
QS30LD	22 x 49 x 35 mm	cable	0...400 mm	1 (EN 60825, IEC 60825)	w078	d665	e062
QS30LDL	22 x 49 x 35 mm	cable	0...800 mm	2 (EN 60825, IEC 60825)	w078	d665	e063
QS30LDLQ	22 x 57 x 35 mm	connector, M12 x 1	0...800 mm	2 (EN 60825, IEC 60825)	w078	d664	e063

## QS30 – Opposed mode sensor – Emitter – Water detection



<b>Type</b>	QS30EXH20Q5	<b>Electrical connection</b>	cable with connector, M12 x 1
<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature</b>	-20...+60 °C
<b>Power-on, indicator</b>	LED	<b>Light type</b>	IR
<b>Error message type</b>	LED	<b>Range</b>	0...4000 mm
<b>Output</b>	(emitter)	<b>Response time</b>	3 ms
<b>Dimensions</b>	22 x 57 x 54.3 mm	<b>Wiring diagram</b>	w160
<b>Protection class</b>	IP67	<b>Dimension drawing</b>	d660
<b>Housing material</b>	plastic, ABS		
<b>Lens material</b>	plastic		

## QS30 – Opposed mode sensor – Receiver – Water detection



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Protection class</b>	IP67
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Electrical connection</b>	cable with connector, M12 x 1
<b>Output</b>	—, dark operation, pnp/npn	<b>Ambient temperature</b>	-20...+60 °C
<b>Dimensions</b>	22 x 57 x 54.3 mm	<b>Response time</b>	3 ms

### Types and data – selection table

Type	Range	w	d
QS30RRH20Q5	0...2000 mm	w162	d661
QS30RRXH20Q5	0...4000 mm	w162	d661

## QS30 – Opposed mode sensor – Emitter – High Power



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature</b>	-20...+60 °C
<b>Power-on, indicator</b>	LED	<b>Light type</b>	IR
<b>Housing material</b>	plastic, ABS	<b>Range</b>	0...300000 mm
<b>Lens material</b>	plastic		

### Types and data – selection table

Type	Dimensions	Protection class	Electrical connection	w	d	e
QS30EXQ	22 x 57 x 35 mm	IP68 / IP69K	connector, M12 x 1	w160	d659	e052
QS30EX	22 x 49 x 35 mm	IP67	cable	w160	d658	e052

## QS30 – Opposed mode sensor – Receiver – High Power



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Switching frequency</b>	≤ 16 Hz
<b>Power-on, indicator</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	pnp/npn	<b>Range</b>	0...300000 mm

### Types and data – selection table

Type	Dimensions	Protection class	Electrical connection	w	d	e
QS30RRXQ	22 x 57 x 35 mm	IP68 / IP69K	connector, M12 x 1	w162	d659	e052
QS30ARXQ	22 x 57 x 35 mm	IP68 / IP69K	connector, M12 x 1	w162	d659	e052
QS30RRX	22 x 49 x 35 mm	IP67	cable	w162	d658	e052
QS30ARX	22 x 49 x 35 mm	IP67	cable	w162	d658	e052

## NAMUR sensors MINI-BEAM and Q45



The NAMUR sensors MINI-BEAM® and Q45 feature intrinsically safe amplifiers and are made for rough industrial applications. Conform to the NAMUR standard, light operating sensors are supplied with < 1 mA in dark state and with > 2.1 mA in light state.

Available are opposed and retroreflective mode, convergent and diffuse mode sensors and base units for fiber optics. NOTE: NAMUR sensors have to be operated via intrinsically safe switching amplifiers in areas subject to explosion hazards.

### Features

- Ex approval acc. to KEMA certificate 03 ATEX 1441 X ignition protection type Ex ia IIC T6
- acc. to EN 60947-5-6: 2000, EN 60079-0: 2006, part 1 and EN 60079-11: 2007 A1...A2
- Sensitivity exactly adjustable via a 15-turn potentiometer
- 2 m connection cable or M12 x 1 plug connection

### Type code NAMUR sensors

MI	AD	9	LVAG	Q
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MI	Series	AD	Output	9	Input
	<p>Series</p> <p>Q45 rectangular 44.5 x 87.6 x 56.4 mm</p> <p>MI MINI-BEAM, rectangular, 12.3 x 30.7 x 66 mm</p>	<p>Output</p> <p>AD 2-wire, NAMUR sensor</p>		<p>Input voltage supply via isolating switching amplifier</p> <p>9 5...15VDC</p>	

LVAG	Operating mode	Q	Electrical connection
	<p>Operating mode</p> <p>CV convergent mode, visible red light MINI-BEAM, 16 mm, Q45: 38 mm</p> <p>CV2 convergent mode, visible red light focal distance 43 mm</p> <p>CV4 convergent mode, visible red light focal distance 100 mm</p> <p>D diffuse mode</p> <p>DL diffuse mode, long distance</p> <p>E opposed mode emitter</p> <p>F basic device for glass fibers</p> <p>FP basic device for plastic fibers</p> <p>LP retroreflective mode polarizing filter</p> <p>LV retroreflective mode visible red light,</p> <p>LVAG retroreflective mode polarizing filter low contrast application</p> <p>R receiver</p> <p>W diffuse mode, divergent</p>	<p>Electrical connection</p> <p>Q connector, M12 x 1</p> <p>blank cable connection, 2 m</p>	



## Q45 – NAMUR – Emitter



### General data

<b>Operating voltage</b>	8.2 VDC
<b>Output</b>	(emitter)
<b>Protection class</b>	IP67
<b>Housing material</b>	plastic, PBT
<b>Lens material</b>	plastic
<b>Ambient temperature</b>	-40...+70 °C

<b>Light type</b>	IR
<b>Range</b>	0...6000 mm
<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection type</b>	Ex ia IIC T6
<b>Voltage</b>	nom. 8.2 VDC

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q459EQ	54.1 x 44.5 x 103 mm	connector, M12 x 1	w021	d667	e064
Q459E	54.1 x 44.5 x 87 mm	cable	w021	d666	e064

## Q45 – NAMUR – Receiver



### General data

<b>Operating voltage</b>	8.2 VDC
<b>Output</b>	light operation, NAMUR
<b>Switching frequency</b>	≤ 250 Hz
<b>Protection class</b>	IP67
<b>Housing material</b>	plastic, PBT
<b>Lens material</b>	plastic
<b>Ambient temperature</b>	-40...+70 °C

<b>Range</b>	0...6000 mm
<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection type</b>	Ex ia IIC T6
<b>Voltage</b>	nom. 8.2 VDC
<b>Actuated current consumption</b>	2.1 mA
<b>Non-actuated current consumption</b>	1 mA

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q45AD9RQ	54.1 x 44.5 x 103 mm	connector, M12 x 1	w021	d667	e064
Q45AD9R	54.1 x 44.5 x 87 mm	cable	w021	d666	e064

## Q45 – NAMUR – Retroreflective sensor



### General data

<b>Output</b>	light operation, NAMUR	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 100 Hz	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection class</b>	IP67	<b>Protection type</b>	Ex ia IIC T6
<b>Housing material</b>	plastic, PBT	<b>Voltage</b>	nom. 8.2 VDC
<b>Lens material</b>	plastic	<b>Actuated current consumption</b>	2.1 mA
<b>Ambient temperature</b>	-40...+70 °C	<b>Non-actuated current consumption</b>	1 mA

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
Q45AD9LV	44.5 x 87.6 x 54.1 mm	cable	80...9000 mm	w021	d666	e065
Q45AD9LVQ	44.5 x 102.6 x 54.1 mm	connector, M12 x 1	80...9000 mm	w021	d667	e065
Q45AD9LP	44.5 x 87.6 x 54.1 mm	cable	150...6000 mm	w021	d666	e065
Q45AD9LPQ	44.5 x 102.6 x 54.1 mm	connector, M12 x 1	150...6000 mm	w021	d667	e065

## Q45 – NAMUR – Diffuse mode sensor



### General data

<b>Operating voltage</b>	8.2 VDC	<b>Light type</b>	IR
<b>Output</b>	light operation, NAMUR	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Switching frequency</b>	≤ 100 Hz	<b>Protection type</b>	Ex ia IIC T6
<b>Protection class</b>	IP67	<b>Voltage</b>	nom. 8.2 VDC
<b>Housing material</b>	plastic, PBT	<b>Actuated current consumption</b>	2.1 mA
<b>Lens material</b>	plastic	<b>Non-actuated current consumption</b>	1 mA
<b>Ambient temperature</b>	-40...+70 °C		

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
Q45AD9D	54.1 x 44.5 x 87 mm	cable	0...300 mm	w021	d666	
Q45AD9DQ	54.1 x 44.5 x 103 mm	connector, M12 x 1	0...300 mm	w021	d667	
Q45AD9DL	54.1 x 44.5 x 87 mm	cable	0...1070 mm	w021	d666	e066
Q45AD9DLQ	54.1 x 44.5 x 103 mm	connector, M12 x 1	0...1070 mm	w021	d667	e066

## Q45 – NAMUR – Convergent mode sensor



<b>General data</b>			
<b>Output</b>	light operation, NAMUR	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 100 Hz	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection class</b>	IP67	<b>Protection type</b>	Ex ia IIC T6
<b>Housing material</b>	plastic, PBT	<b>Voltage</b>	nom. 8.2 VDC
<b>Lens material</b>	plastic	<b>Actuated current consumption</b>	2.1 mA
<b>Ambient temperature</b>	-40...+70 °C	<b>Non-actuated current consumption</b>	1 mA

### Types and data – selection table

Type	Dimensions	Electrical connection	Focal distance	w	d	e
Q45AD9CVQ	44.5 x 102.6 x 56.4 mm	connector, M12 x 1	38 mm	w021	d667	e067
Q45AD9CV4Q	44.5 x 102.6 x 56.4 mm	connector, M12 x 1	100 mm	w021	d667	e067
Q45AD9CV	44.5 x 87.6 x 56.4 mm	cable	38 mm	w021	d666	e067
Q45AD9CV4	44.5 x 87.6 x 56.4 mm	cable	100 mm	w021	d666	e067

## Q45 – NAMUR – Basic device for glass fibers



<b>General data</b>			
<b>Output</b>	light operation, NAMUR	<b>Light type</b>	IR
<b>Switching frequency</b>	≤ 100 Hz	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection class</b>	IP67	<b>Protection type</b>	Ex ia IIC T6
<b>Housing material</b>	plastic, PBT	<b>Voltage</b>	nom. 8.2 VDC
<b>Lens material</b>	plastic	<b>Actuated current consumption</b>	2.1 mA
<b>Ambient temperature</b>	-40...+70 °C	<b>Non-actuated current consumption</b>	1 mA

A glass fiber is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q45AD9FQ	44.5 x 102.6 x 60.5 mm	connector, M12 x 1	w021	d669	e068
Q45AD9F	44.5 x 87.6 x 60.5 mm	cable	w021	d668	e068

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## Q45 – NAMUR – Basic device for plastic fibers



<b>General data</b>			
<b>Output</b>	light operation, NAMUR	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 100 Hz	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection class</b>	IP67	<b>Protection type</b>	Ex ia IIC T6
<b>Housing material</b>	plastic, PBT	<b>Voltage</b>	nom. 8.2 VDC
<b>Lens material</b>	plastic	<b>Actuated current consumption</b>	2.1 mA
<b>Ambient temperature</b>	-40...+70 °C	<b>Non-actuated current consumption</b>	1 mA

A plastic fiber is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
Q45AD9FPQ	44.5 x 102.6 x 60.5 mm	connector, M12 x 1	w021	d669	e069
Q45AD9FP	44.5 x 87.6 x 60.5 mm	cable	w021	d668	e069

## MINI-BEAM – NAMUR – Emitter



<b>General data</b>			
<b>Output</b>	(emitter), NAMUR	<b>Light type</b>	IR
<b>Protection class</b>	IP67	<b>Range</b>	0...6000 mm
<b>Housing material</b>	plastic, PBT	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Lens material</b>	plastic	<b>Protection type</b>	Ex ia IIC T6
<b>Ambient temperature</b>	-40...+70 °C	<b>Voltage</b>	nom. 8.2 VDC

A receiver is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
MI9EQ	12.3 x 30.7 x 84 mm	connector, M12 x 1	w021	d671	e070
MI9E	12.3 x 30.7 x 66 mm	cable	w021	d670	e070

## MINI-BEAM – NAMUR – Receiver



<b>General data</b>			
<b>Indication of excess gain type</b>	LED	<b>Range</b>	0...6000 mm
<b>Output</b>	light operation, NAMUR	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Switching frequency</b>	≤ 100 Hz	<b>Protection type</b>	Ex ia IIC T6
<b>Protection class</b>	IP67	<b>Voltage</b>	nom. 8.2 VDC
<b>Housing material</b>	plastic, PBT	<b>Actuated current consumption</b>	2.1 mA
<b>Lens material</b>	plastic	<b>Non-actuated current consumption</b>	1.2 mA
<b>Ambient temperature</b>	-40...+70 °C		

An emitter is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
MIAD9RQ	12.3 x 30.7 x 84 mm	connector, M12 x 1	w021	d671	e070
MIAD9R	12.3 x 30.7 x 66 mm	cable	w021	d670	e070

## MINI-BEAM – NAMUR – Retroreflective sensor



<b>General data</b>			
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	red
<b>Output</b>	light operation, NAMUR	<b>Range</b>	0...5000 mm
<b>Switching frequency</b>	≤ 100 Hz	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection class</b>	IP67	<b>Protection type</b>	Ex ia IIC T6
<b>Housing material</b>	plastic, PBT	<b>Voltage</b>	nom. 8.2 VDC
<b>Lens material</b>	plastic	<b>Actuated current consumption</b>	2.1 mA
<b>Ambient temperature</b>	-40...+70 °C	<b>Non-actuated current consumption</b>	1.2 mA

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
MIAD9LVQ	12.3 x 30.7 x 84 mm	connector, M12 x 1	w021	d671	e071
MIAD9LV	12.3 x 30.7 x 66 mm	cable	w021	d670	e071

w Wiring diagrams on page 832 ff d Dimension drawing on page 842 ff e Excess gain curves on page 922 ff a Accessories on page 788 ff

## MINI-BEAM – NAMUR – Retroreflective sensor with polarizing filter



### General data

<b>Indication of excess gain type</b>	LED	<b>Light type</b>	red
<b>Output</b>	light operation, NAMUR	<b>Range</b>	0...2000 mm
<b>Switching frequency</b>	≤ 100 Hz	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Protection class</b>	IP67	<b>Protection type</b>	Ex ia IIC T6
<b>Housing material</b>	plastic, PBT	<b>Voltage</b>	nom. 8.2 VDC
<b>Lens material</b>	plastic	<b>Actuated current consumption</b>	2.1 mA
<b>Ambient temperature</b>	-40...+70 °C	<b>Non-actuated current consumption</b>	1.2 mA

A reflector is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
MIAD9LVAGQ	12.3 x 30.7 x 84 mm	connector, M12 x 1	w021	d671	e071
MIAD9LVAG	12.3 x 30.7 x 66 mm	cable	w021	d670	e071

## MINI-BEAM – NAMUR – Diffuse mode sensor



### General data

<b>Indication of excess gain type</b>	LED	<b>Light type</b>	IR
<b>Output</b>	light operation, NAMUR	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Switching frequency</b>	≤ 100 Hz	<b>Protection type</b>	Ex ia IIC T6
<b>Protection class</b>	IP67	<b>Voltage</b>	nom. 8.2 VDC
<b>Housing material</b>	plastic, PBT	<b>Actuated current consumption</b>	2.1 mA
<b>Lens material</b>	plastic	<b>Non-actuated current consumption</b>	1.2 mA
<b>Ambient temperature</b>	-40...+70 °C		

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	w	d	e
MIAD9D	12.3 x 30.7 x 66 mm	cable	0...380 mm	w021	d670	e072
MIAD9DQ	12.3 x 30.7 x 84 mm	connector, M12 x 1	0...380 mm	w021	d671	e072
MIAD9W	12.3 x 30.7 x 51.8 mm	cable	0...75 mm	w021	d672	e072
MIAD9WQ	12.3 x 30.7 x 69.8 mm	connector, M12 x 1	0...75 mm	w021	d673	e072

## MINI-BEAM – NAMUR – Convergent mode sensor



<b>General data</b>			
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	red
<b>Output</b>	light operation, NAMUR	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Switching frequency</b>	≤ 100 Hz	<b>Protection type</b>	Ex ia IIC T6
<b>Protection class</b>	IP67	<b>Voltage</b>	nom. 8.2 VDC
<b>Housing material</b>	plastic, PBT	<b>Actuated current consumption</b>	2.1 mA
<b>Lens material</b>	plastic	<b>Non-actuated current consumption</b>	1.2 mA
<b>Ambient temperature</b>	-40...+70 °C		

### Types and data – selection table

Type	Dimensions	Electrical connection	Focal distance	w	d	e
MIAD9CVQ	12.3 x 30.7 x 84 mm	connector, M12 x 1	16 mm	w021	d671	e073
MIAD9CV2Q	12.3 x 30.7 x 84 mm	connector, M12 x 1	43 mm	w021	d671	e073
MIAD9CV2	12.3 x 30.7 x 66 mm	cable	43 mm	w021	d670	e073
MIAD9CV	12.3 x 30.7 x 66 mm	cable	16 mm	w021	d670	e073

## MINI-BEAM – NAMUR – Basic device for glass fibers



<b>General data</b>			
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	IR
<b>Output</b>	light operation, NAMUR	<b>Ex approval acc. to conformity certificate</b>	KEMA 03ATEX 1441 X
<b>Switching frequency</b>	≤ 100 Hz	<b>Protection type</b>	Ex ia IIC T6
<b>Protection class</b>	IP67	<b>Voltage</b>	nom. 8.2 VDC
<b>Housing material</b>	plastic, PBT	<b>Actuated current consumption</b>	2.1 mA
<b>Ambient temperature</b>	-40...+70 °C	<b>Non-actuated current consumption</b>	1.2 mA

A glass fiber is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d	e
MIAD9FQ	12.3 x 30.7 x 84 mm	connector, M12 x 1	w021	d675	e074
MIAD9F	12.3 x 30.7 x 66 mm	cable	w021	d674	e074

## Slot sensors SLM



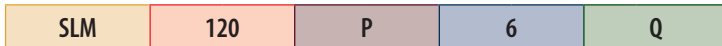
SLM slot sensors consist of a compact pair of opposed mode sensors hosted in a U-shaped die-cast metal housing. The sensors are thus well protected and easily mounted. Emitter-receiver alignment is not required.

Different designs with 8 slot widths from 10 mm to 220 mm are available for many applications. The sensitivity is adjusted via a single turn potentiometer.

### Features

- Compact slot design with integrated opposed mode sensor
- Rugged die-cast metal housing, IP67 rated
- 8 slot widths from 10 mm to 220 mm
- PNP, NPN or bipolar output (1 x NPN and 1 x PNP)
- Short response time of 0.5 ms
- Visible red beam
- Light or dark operation selectable via sealed switch.
- 2 m connection cable or M12 x 1 plug connection

### Type code SLM



Series

**SLM** slot sensor  
12 x 42 x 80 mm  
12 x 62 x 80 mm  
12 x 82 x 80 mm  
12 x 112 x 80 mm  
12 x 152 x 140 mm  
12 x 252 x 140 mm

Slot width

**120** slot width, mm  
8 slot widths 10...220 m

Output

**B** PNP/NPN  
**N** NPN  
**P** PNP



Operating voltage

**6** 10...30VDC

Electrical connection

**Q** connector, M12 x 1  
**blank** cable connection, 2 m



## SLM – Slot sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	metal/plastic, ZN
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 1 kHz	<b>Ambient temperature</b>	-20...+60 °C
<b>Protection class</b>	IP67	<b>Light type</b>	red

### Types and data – selection table

Type	Output	Dimensions	Electrical connection	Slot width	w	d
SLM10P6Q	—, PNP	12 x 42 x 80 mm	connector, M8 x 1	10 mm	w070	d677
SLM30P6Q	—, PNP	12 x 62 x 80 mm	connector, M8 x 1	30 mm	w070	d679
SLM80P6Q	—, PNP	12 x 112 x 80 mm	connector, M8 x 1	80 mm	w070	d681
SLM120P6Q	—, PNP	12 x 152 x 140 mm	connector, M8 x 1	120 mm	w070	d683
SLM50P6Q	—, PNP	12 x 82 x 80 mm	connector, M8 x 1	50 mm	w070	d685
SLM220P6Q	—, PNP	12 x 252 x 140 mm	connector, M8 x 1	220 mm	w070	d686
SLM10B6	—, pnp/npn	12 x 42 x 80 mm	cable	10 mm	w069	d676
SLM30B6	—, pnp/npn	12 x 62 x 80 mm	cable	30 mm	w069	d678
SLM80B6	—, pnp/npn	12 x 112 x 80 mm	cable	80 mm	w069	d680
SLM120B6	—, pnp/npn	12 x 152 x 140 mm	cable	120 mm	w069	d682
SLM220B6	—, pnp/npn	12 x 252 x 140 mm	cable	220 mm	w069	d684
SLM50B6	—, pnp/npn	12 x 82 x 80 mm	cable	50 mm	w069	d687

## Fiber optic sensors D10



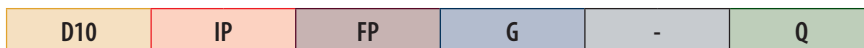
The D10 and D10 expert series provides user-friendly plastic fiber sensors for DIN rail mounting. Numerous possibilities for configuration and the slim design of only 10 mm make these sensors the perfect choice for demanding application conditions.

The user can select functions such as static, dynamic and single-point teach mode as well as manual fine adjustment, external programming and keylock. A big and well readable display resp. bargraph and LEDs support programming and monitoring during operation.

### Features

- High-power sensors for use with plastic fibers
- Extremely slim housing (10 mm) for DIN rail mounting
- Standard versions with bipolar switching output (1 x PNP and 1 x NPN)
- Expert version, optionally available with two analog outputs, one analog and one switching output, two separate switching outputs
- Teachable version with numeric and bargraph display
- Automatic crosstalk protection
- Adjustable switch-off delay
- Status indicated via red or green LED

### Type code D10



#### Series

**D10** basic device for plastic fibers  
DIN rail mounting  
10 x 36 x 61.3 mm

#### Output

**IP** expert: analog output 4...20 mA  
switching output, PNP, teach input  
numeric display

**DP** expert: 2 analog outputs,  
PNP, teach input  
numeric display

**UP** expert: analog output 0...10V  
switching output, PNP,  
teach input, numeric display

**B** switching output, bipolar, bargraph  
teach input

**A** switching output, bipolar,  
potentiometer

#### Fibers

**FP** plastic fiber



#### Lights

**G** green  
**blank** red

#### Response time

**Y** high-speed  
(higher switching frequency)

**blank** standard

#### Electrical connection

**Q** connector, Ø 8 mm  
**blank** cable connection, 2 m

## D10A – Basic unit for plastic fibers – Potentiometer



### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Indication of excess gain type** LED

**Output** , pnp/npn



**Protection class** IP50

**Housing material** plastic, ABS

**Ambient temperature** -10...+55 °C

A plastic fiber is required.

### Types and data – selection table

Type	Switching frequency	Dimensions	Electrical connection	Light type	 w	 d
D10AFPQ	≤ 1 kHz	10 x 35.9 x 84.4 mm	connector, Ø 8 mm	red	w069	d689
D10AFPYQ	≤ 2.5 kHz	10 x 35.9 x 84.4 mm	connector, Ø 8 mm	red	w069	d689
D10AFP	≤ 1 kHz	10 x 35.9 x 68.1 mm	cable	red	w069	d688
D10AFPY	≤ 2.5 kHz	10 x 35.9 x 68.1 mm	cable	red	w069	d688
D10AFPGQ	≤ 1 kHz	10 x 35.9 x 84.4 mm	connector, Ø 8 mm	green	w069	d689
D10AFPGYQ	≤ 2.5 kHz	10 x 35.9 x 84.4 mm	connector, Ø 8 mm	green	w069	d689
D10AFPG	≤ 1 kHz	10 x 35.9 x 68.1 mm	cable	green	w069	d688
D10AFPGY	≤ 2.5 kHz	10 x 35.9 x 68.1 mm	cable	green	w069	d688

## D10B – Basic device for plastic fibers – Teach input



### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Indication of excess gain type** LED chain

**Output** , pnp/npn

**Switching frequency** ≤ 2.5 kHz

**Protection class** IP50

**Housing material** plastic, ABS

**Ambient temperature** -10...+55 °C

A plastic fiber is required.

Types and data – selection table

Type	Dimensions	Electrical connection	Light type	w	d
D10BFPQ	10.5 x 35.9 x 84.4 mm	connector, Ø 8 mm	red	w164	d691
D10BFP	10.5 x 35.9 x 68.1 mm	cable	red	w164	d690
D10BFPGQ	10.5 x 35.9 x 84.4 mm	connector, Ø 8 mm	green	w164	d691
D10BFPG	10.5 x 35.9 x 68.1 mm	cable	green	w164	d690

D10Expert – Basic device for plastic fibers – Teach input









General data

Operating voltage	12...24 VDC
Power-on, indicator	LED
Switching frequency	≤ 10 kHz
Protection class	IP50

Housing material	plastic, ABS
Ambient temperature	-20...+55 °C
Light type	red

A plastic fiber is required.

Types and data – selection table

Type	Output	Dimensions	Electrical connection	Analog output	w	d
D10DPFPQ	2 x  , PNP	10.5 x 35.9 x 84.4 mm	connector, Ø 8 mm	-	w165	d693
D10UPFPQ	 , PNP	10.5 x 35.9 x 84.4 mm	connector, Ø 8 mm	0...10 V	w166	d693
D10IPFPQ	 , PNP	10.5 x 35.9 x 84.4 mm	connector, Ø 8 mm	4...20 mA	w166	d693
D10DPFP	2 x  , PNP	10.5 x 35.9 x 68.1 mm	cable	-	w165	d692
D10UPFP	 , PNP	10.5 x 35.9 x 68.1 mm	cable	0...10 V	w166	d692
D10IPFP	 , PNP	10.5 x 35.9 x 68.1 mm	cable	4...20 mA	w166	d692

**w** Wiring diagrams on page 832 ff **d** Dimension drawing on page 842 ff **e** Excess gain curves on page 922 ff **a** Accessories on page 788 ff

## Fiber optic sensors D12



The D12 and D12 Expert series feature sensors for glass and plastic fibers. The user-friendly sensors are only 12 mm wide and suited for DIN rail mounting. Each sensor features auto-diagnostics and an alarm function. A 7-segment LED bargraph indicates the signal strength at the input and output as well as the overload at the output. Antivalent NPN or PNP outputs are available.

The D12E expert version with integrated teach function enables optimal adjustment of sensitivity. Sensors of this type are thus especially suited for low-contrast applications, as well as the dynamic versions with automatic range control and continuous readjustment of the emitted luminous intensity.

### Features

- High-power sensor for use with plastic and glass fibers
- Robust design, IP66 rated
- Mounting on DIN rail
- Standard version with manual adjustment of sensitivity
- Expert version with automatic adjustment of sensitivity, selected via pushbutton or via external control cable
- Dynamic version with automatic range control and regulation of luminous intensity
- Alarm output for indication of insufficient excess gain
- PNP or NPN transistor output, antivalent
- Visible red light

### Type code D12

D12	DAB	6	FV	-	Q
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D12	Series	DAB	Output/Function	6	Input
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#### Series

**D12** basic device for glass and plastic fibers  
DIN rail mounting, dimensions  
12 x 30 x 64 mm (plastic fiber)  
12 x 30 x 70 mm (glass fiber)

#### Output/Function

**DAB** dynamic sensor with automatic range control, PNP/NPN  
**EN** expert: NPN, teach input  
**EP** expert: PNP, teach input  
**SN** NO/NC, NPN, potentiometer  
**SP** NO/NC, PNP, potentiometer

#### Input

**6** 10...30VDC

FV	Fibers	-	Specification	Q	Electrical connection
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#### Fibers

**FP** plastic fiber  
**FV** glass fiber

#### Specification

**H** extra high excess gain  
**Y** high-speed (higher frequency), no alarm output  
**Y1** off delay, high-speed (high frequency)  
no alarm output  
**blank** no specification

#### Electrical connection

**W/30** cable connection, 9 m  
**Q** pigtail with connector, Ø 8 mm  
**blank** cable connection, 2 m

## D12 – Basic unit for glass fibers – Potentiometer



### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Error message type** LED

**Indication of excess gain type** LED chain

**Output** , PNP

**Dimensions** 12 x 30 x 70 mm

**Protection class** IP66

**Housing material** plastic, ABS

**Ambient temperature** -20...+70 °C

**Light type** red

A glass fiber is required.

### Types and data – selection table

Type	Switching frequency	Electrical connection	w	d	e
D12SP6FVYQ	≤ 10 kHz	cable with connector, Ø 8 mm	w153	d695	e076
D12SP6FVY1Q	≤ 10 kHz	cable with connector, Ø 8 mm	w153	d695	e076
D12SP6FVQ	≤ 1 kHz	cable with connector, Ø 8 mm	w153	d695	e075
D12SP6FV	≤ 1 kHz	cable	w153	d694	e075
D12SP6FVY1	≤ 10 kHz	cable	w153	d694	e076
D12SP6FVH	≤ 1 kHz	cable	w153	d694	e075
D12SP6FVY	≤ 10 kHz	cable	w153	d694	e076

## D12 – Basic device for plastic fibers – Potentiometer



### General data

**Operating voltage** 10...30 VDC

**Power-on, indicator** LED

**Error message type** LED

**Indication of excess gain type** LED chain

**Output** , PNP

**Dimensions** 12 x 30 x 64 mm

**Protection class** IP66

**Housing material** plastic, ABS

**Ambient temperature** -20...+70 °C

**Light type** red

A plastic fiber is required.

Types and data – selection table

Type	Switching frequency	Electrical connection	w	d	e
D12SP6FPHQ	≤ 1 kHz	cable with connector, Ø 8 mm	w153	d697	e078
D12SP6FPYQ	≤ 10 kHz	cable with connector, f Ø 8 mm	w153	d697	e077
D12SP6FPY1Q	≤ 10 kHz	cable with connector, Ø 8 mm	w153	d697	e077
D12SP6FPQ	≤ 1 kHz	cable with connector, Ø 8 mm	w153	d697	e075
D12SP6FP	≤ 1 kHz	cable	w153	d696	e075
D12SP6FPY	≤ 10 kHz	cable	w153	d696	e077
D12SP6FPH	≤ 1 kHz	cable	w153	d696	e078
D12SP6FPY1	≤ 10 kHz	cable	w153	d696	e077

D12 – Basic device for glass fibers



General data

Operating voltage	10...30 VDC
Power-on, indicator	LED
Indication of excess gain type	LED
Output	—, pnp/npn
Switching frequency	≤ 10 kHz

Dimensions	12 x 30 x 70 mm
Protection class	IP66
Housing material	plastic, ABS
Ambient temperature	-40...+70 °C
Light type	red

A glass fiber is required.

Types and data – selection table

Type	Electrical connection	w	d
D12DAB6FVQ	cable with connector, Ø 8 mm	w167	d699
D12DAB6FV	cable	w167	d698

D12 – Dynamic basic device for plastic fibers



General data

Operating voltage	10...30 VDC
Power-on, indicator	LED
Indication of excess gain type	LED
Output	—, pnp/npn
Switching frequency	≤ 10 kHz

Dimensions	12 x 30 x 64 mm
Protection class	IP66
Housing material	plastic, ABS
Ambient temperature	-40...+70 °C
Light type	red

A plastic fiber is required.



Types and data – selection table

Type	Electrical connection	w	d
D12DAB6FPQ	cable with connector, Ø 8 mm	w167	d701
D12DAB6FP	cable	w167	d700

## D12 Expert – Basic device for glass fibers – Teach input



<b>Type</b>	D12EP6FV	<b>Housing material</b>	plastic, ABS
<b>Operating voltage</b>	10...30 VDC	<b>Electrical connection</b>	cable
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Indication of excess gain type</b>	7-digit LED	<b>Light type</b>	red
<b>Output</b>	—, PNP	<b>Wiring diagram</b>	w168
<b>Switching frequency</b>	≤ 2.5 kHz	<b>Dimension drawing</b>	d702
<b>Dimensions</b>	12 x 30 x 70 mm	<b>Excess gain curve</b>	
<b>Protection class</b>	IP66		

A glass fiber is required.

## D12Expert – Basic device for plastic fibers – Teach input



<b>Type</b>	D12EP6FP	<b>Housing material</b>	plastic, ABS
<b>Operating voltage</b>	10...30 VDC	<b>Electrical connection</b>	cable
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Indication of excess gain type</b>	7-digit LED	<b>Light type</b>	red
<b>Output</b>	—, PNP	<b>Wiring diagram</b>	w168
<b>Switching frequency</b>	≤ 2.5 kHz	<b>Dimension drawing</b>	d703
<b>Dimensions</b>	12 x 30 x 64 mm	<b>Excess gain curve</b>	
<b>Protection class</b>	IP66		

A plastic fiber is required.

## Fiber optic sensors FI22



The plastic fiber sensor FI22 operates reliably even in low-contrast applications.

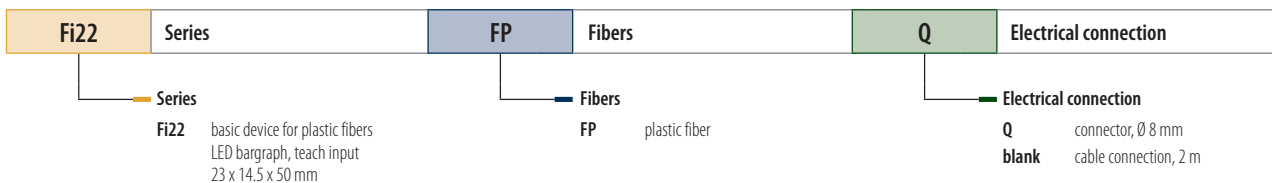
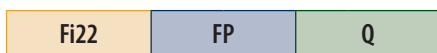
The expert version provides functions such as static, dynamic and single-point teach mode as well as manual fine adjustment, external programming and keylock. A large, well readable bargraph and bright LEDs support programming and monitoring during operation.

Owing to its compact design, the sensor can be mounted almost anywhere. It is simply snapped on with the supplied bracket. The housing is IP67 protected, allowing the sensor to be applied in polluted ambients.

### Features

- Compact plastic fiber sensor
- Protection class IP67
- 8-segment LED bargraph indicates the relative signal strength at the input, the contrast, the programming and alarm status.
- Automatic teach modes, including static, dynamic, and single-point programming as well as manual fine adjustment.
- PNP or NPN outputs
- Programmable 30 ms pulse expansion (switch-off delay)
- Flexible programming via two pushbuttons or remote via cable
- Visible red light

### Type code Fi22



## FI22 – Basic device for plastic fibers – Teach input



### General data

<b>Operating voltage</b>	10...30 VDC
<b>Power-on, indicator</b>	LED
<b>Output</b>	—, pnp/npn
<b>Switching frequency</b>	≤ 1 kHz
<b>Dimensions</b>	23 x 14.5 x 50 mm

<b>Protection class</b>	IP67
<b>Housing material</b>	plastic, ABS
<b>Ambient temperature</b>	-10...+55 °C
<b>Light type</b>	red

A plastic fiber is required.

### Types and data – selection table

Type	Electrical connection	w	d
FI22FPQ	connector, Ø 8 mm	w164	d705
FI22FP	cable	w164	d704

## Fiber optic sensors QS18F/FP



The QS18 series offers well-priced solutions, even for applications requiring fiber optics. Robust basic units are available for plastic as well as for glass fibers.

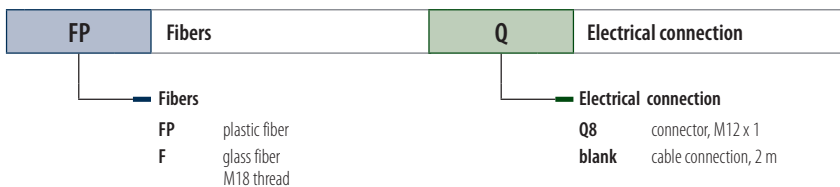
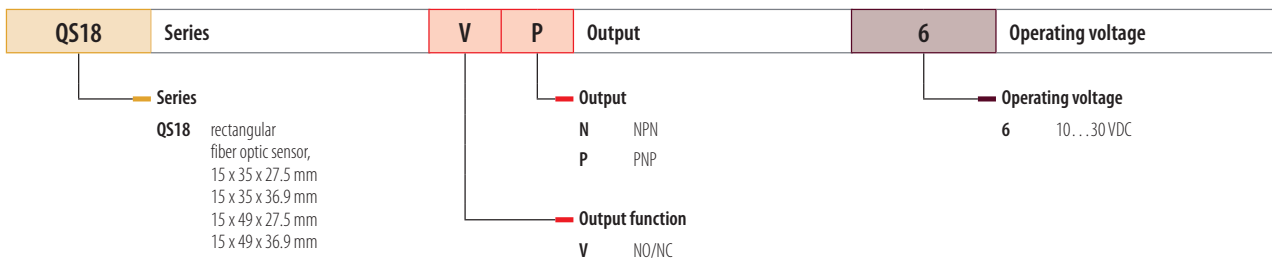
The sensitivity is adjusted via potentiometer. A green flashing LED indicates overload at the output. A yellow LED indicates the switching status and excess gain.

Owing to their functional design, the sensors are universally applicable and fit almost anywhere.

### Features

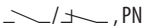
- Well-priced basic device for plastic and glass fibers
- Universal rectangular design and fit
- Versions with or without M18 thread
- Sensitivity adjusted via potentiometer
- Protection class IP67
- Indication of insufficient excess gain
- Bright LEDs, all-round visible
- Light/dark operation

### Type code QS18 ... F






## QS18F – Basic device for glass fibers – Potentiometer, M18 thread



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Switching frequency</b>	≤ 800 Hz
<b>Power-on, indicator</b>	LED	<b>Protection class</b>	IP67
<b>Error message type</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	 , PNP	<b>Light type</b>	IR

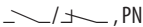
A glass fiber is required.

### Types and data – selection table

Type	Dimensions	Electrical connection			
QS18VP6FQ8	15 x 49 x 36.9 mm	connector, M12 x 1	w155	d707	e079
QS18VP6F	15 x 35 x 36.9 mm	cable	w155	d706	e079

## QS18FP – Basic device for plastic fibers – Potentiometer







<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Switching frequency</b>	≤ 800 Hz
<b>Power-on, indicator</b>	LED	<b>Protection class</b>	IP67
<b>Error message type</b>	LED	<b>Housing material</b>	plastic, ABS
<b>Indication of excess gain type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red

A plastic fiber is required.

### Types and data – selection table

Type	Dimensions	Electrical connection			
QS18VP6FPQ8	15 x 49 x 27.5 mm	connector, M12 x 1	w155	d709	e079
QS18VP6FP	15 x 34.5 x 27.5 mm	cable	w155	d708	e079

 Wiring diagrams on page 832 ff  Dimension drawing on page 842 ff  Excess gain curves on page 922 ff  Accessories on page 788 ff

## Fiber optic sensors R55F – Color mark sensor



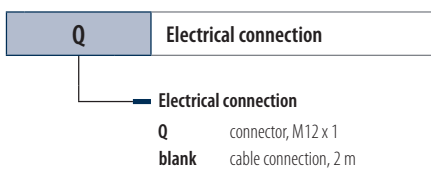
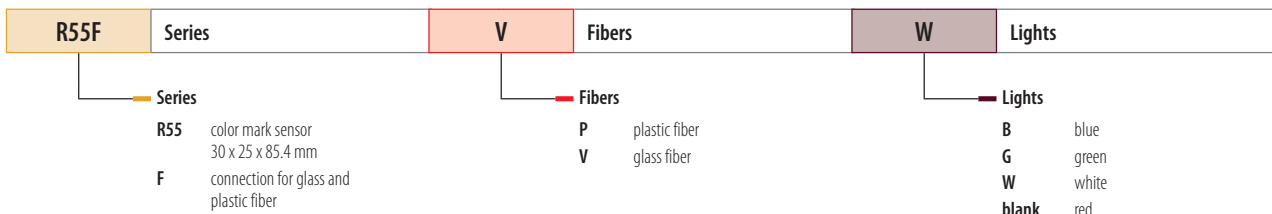
The R55F detects 16 greyscales reliably at up to 10,000 actuations per second. Green light is suited for most color mark applications. Blue light is ideally suited for the detection of yellow tones. For example, 20 % of yellow on newspaper is detected with it. Blue and green tones are detected with red light. White light is used for special applications.

The ON and OFF conditions for detection are individually defined in the static teach mode. In dynamic teach mode the light and dark conditions are automatically taught during operation and the switching threshold is continuously updated while the sensor is working. During commissioning and operation a good visible green LED chain indicates continuously the contrast quality and the switchpoint.

### Features

- Contrast sensor for color mark detection used with plastic and glass fibers
- Installed with bracket or on a 35 mm DIN rail
- Devices with green, blue, red and white light
- Static or dynamic teaching
- Adjustments: Light/dark operation, switch-off delay
- 4 LEDs for indication of light/dark operation, switching status and switch-off delay.
- Bipolar outputs NPN/PNP

### Type code R55F



## R55FV – Color mark sensor – Basic device for glass fibers



### General data

**Operating voltage** 10...30 VDC

**Indication of excess gain type** LED chain

**Output** —, pnp/npn

**Switching frequency** ≤ 10 kHz

**Protection class** IP67

**Housing material** plastic, polycarbonate/ABS

**Ambient temperature** -10...+55 °C

A glass fiber is required.

### Types and data – selection table

Type	Dimensions	Electrical connection	Light type	w	d
R55FVQ	30 x 25 x 97 mm	connector, M12 x 1	red	w078	d711
R55FV	30 x 25 x 85.4 mm	cable	red	w078	d710
R55FVGQ	30 x 25 x 97 mm	connector, M12 x 1	green	w078	d711
R55FVG	30 x 25 x 85.4 mm	cable	green	w078	d710
R55FVBQ	30 x 25 x 97 mm	connector, M12 x 1	blue	w078	d711
R55FVB	30 x 25 x 85.4 mm	cable	blue	w078	d710
R55FVWQ	30 x 25 x 97 mm	connector, M12 x 1	white	w078	d711
R55FVW	30 x 25 x 85.4 mm	cable	white	w078	d710

## R55FP – Color mark sensor – Basic device for plastic fibers



### General data

**Operating voltage** 10...30 VDC

**Indication of excess gain type** LED chain

**Output** —, pnp/npn

**Switching frequency** ≤ 10 kHz



**Protection class** IP67

**Housing material** plastic, polycarbonate/ABS

**Ambient temperature** -10...+55 °C

A plastic fiber is required.

**Types and data – selection table**

Type	Dimensions	Electrical connection	Light type	 w	 d
R55FPQ	30 x 25 x 97 mm	connector, M12 x 1	red	w078	d711
R55FP	30 x 25 x 85.4 mm	cable	red	w078	d710
R55FPGQ	30 x 25 x 97 mm	connector, M12 x 1	green	w078	d711
R55FPG	30 x 25 x 85.4 mm	cable	green	w078	d710
R55FPBQ	30 x 25 x 97 mm	connector, M12 x 1	blue	w078	d711
R55FPB	30 x 25 x 85.4 mm	cable	blue	w078	d710
R55FPWQ	30 x 25 x 97 mm	connector, M12 x 1	white	w078	d711
R55FPW	30 x 25 x 85.4 mm	cable	white	w078	d710



**w** Wiring diagrams on page 832 ff **d** Dimension drawing on page 842 ff **e** Excess gain curves on page 922 ff **a** Accessories on page 788 ff



# At a glance

## Inspection sensors



### Measurement and inspection systems - Adaptable, precise and fast

Sensors and light screens operating with innovative infrared, red light and laser technology fulfill the most sophisticated measurement and inspection tasks efficiently. Changes of distance, scan angles, backgrounds, profiles, shapes, edges, surfaces, reflexions and even colors are easily detected. The sensors operate contactless, at great distances, with high resolution, fast and uninfluenced by interferences of any kind.

Different methods for distance measurement are applied, namely optical triangulation, phase shifting or pulse counting. As a result, clear differences emerge with respect to resolution, repeatability and accuracy.

The fields of application for measurement and inspection sensors are nearly infinite, covering tasks such as distance measurement, color contrasts, filling levels, parts detection, position determination and job sequencing.

Switching and measuring light screens, the so called area sensors, are applied where single beam detection would fail. Light screens consist of many single

beams, detecting the quality of objects through the different switching states of each single beam.

Typical applications are package sizing and profiling in sorting plants, loop and sag detection at conveyor belts, parts counting, measuring of bores and workpieces, edge and center guiding, detection of cracks in tapes and tailback of parts on conveyor belts. In pick-to-light applications they regulate the job sequence in combination with optical and acoustic alerts.

For each application the best solution! TURCK offers the best solutions of a full-service provider for all measurement and inspection systems: You can draw from the extensive variety of our product portfolio which is unrivalled in its scope and diversity. In addition, you can rely on our experience and competence which stand the test in uncountable applications every day.

# Our strengths - Your advantages



## L-GAGE® LT3 – Laser sensor for distance measurement

LT3 laser sensors for distance measurement provide exceptional sensing ranges and accuracy. Diffuse mode versions achieve ranges of 0.3 to 3 m for grey targets and 0.3 m to 5 m for white targets. Retroreflective sensors achieve ranges of up to 50 m.

The LT3 is easily programmed via push-button. A resolution of up to 1 mm is

achieved depending on the adjusted response time and object color.

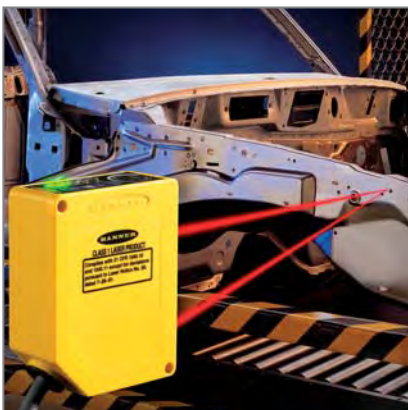
The sensor features a switching and an analog output, each with its individual measuring range. The scalable analog output automatically distributes the output signal over the entire programmed sensing range.



## R58E Expert – Registration mark sensor with automatic teach routines

The R58E with excellent color sensitivity is typically used for the registration of products and materials. It achieves excellent repeatability even in high-speed applications, thanks to a response time of 50  $\mu$ s.

The static teach mode is used to set output ON and output OFF individually. In dynamic teach mode the R58E adjusts the switchpoint automatically during operation through scanning the brightest and darkest events continuously.



## Q60 - Compact sensors with large ranges and background suppression

The compact Q60 with adjustable field and extended sensing range are attractively priced.

Objects with low reflectivity are detected reliably while objects located in the background are ignored.

The input/output timing as well as light/dark operation is adjusted via push-button or external control. The keylock provides additional protection. The cut-off point can be adjusted between 0.2 m and 2 m with a two-turn screw.

# advantages

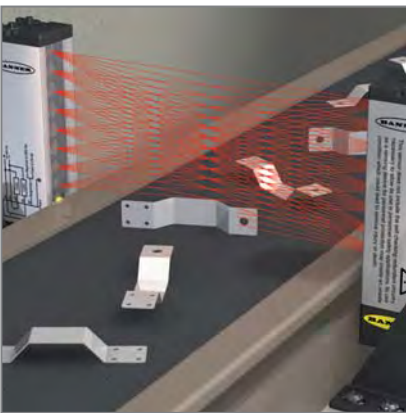


## EZ-ARRAY™ – Measuring light screen

The measuring light screen A-GAGE® EZ-ARRAY™ is ideal for product sizing and profiling, edge and center guarding, loop tension control and parts counting etc.

The narrowly arranged infrared beams detect objects of 5 mm width at a range

of 4 m. The height ranges from 150 mm to 1800 mm, edge resolution 2.5 mm. 14 measuring modes can be set such as, 3 scanning methods, 2 analog and 2 digital switching outputs as well as a serial output.

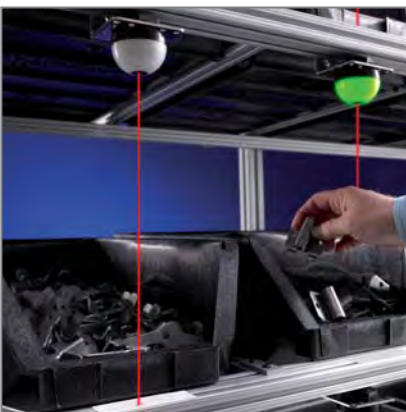


## LX – Light screen for very small and flat objects

The LX is a simple, cheap and very reliable alternative for the detection of very small or flat objects. Typical applications are piece counting or parcel handling on conveyor belts. Emitter and receiver generate a very precise optical grid. Very small but also very thin, flat objects are detected reliably, such as sheets of paper

or envelopes. Even irregularly shaped objects in random positions on a conveyor belt are detected.

The LX are available in three different lengths (2, 5, 9 m) and with two different ranges (75...200 resp. 150...2000 mm).



## Pick-to-light solutions – Control and monitoring of job sequences

Pick-to-light solutions control and monitor commissioning processes. An array of light beams in front of picking bins detect the hand of the operator. In addition, job lights indicate into which bin the operator has to reach next.

TURCK offers different pick-to-light solutions, also for direct mounting on picking bins. Purely visual, multicolor job lights are applied at places where the output signal of a sensor has to be monitored for example. The bright LEDs are also suitable for indication of machine states.

# Our Strengths - Your Advantages

## Our strengths - Your advantages



### PVA – Light screen for job sequencing

The PVA controls each single bin, making manual confirmation by the operator redundant. The system is easily installed through simple cable routing. Additional job lights are not necessary.

Job sequences are enhanced with the PVA system because operators are quickly trained, workflow errors are ruled out and as a result, the quality control can be reduced. Moreover, communication at multilingual workplaces is simplified and the safety of workflows is also improved.



### TL50 – General-purpose indicators

The TL50 tower lights are clearly visible, indicating the operating status throughout the entire production line. Each tower light is preassembled and preconfigured, featuring LEDs in different colors and with optional audible function. The tower lights are easily installed, no matter if mounted directly on the machine, in the cabinet or at critical control points within the production line.

Up to five different color lights are combinable in a single tower and can be on simultaneously.

The durable LED technology has a service life of more than 100,000 hrs. (11 years).

The volume of the audible alert is adjustable; max. sound pressure level 95 dB at 1 m distance.

advantages

# Designs and variants

Page 415



**Laser sensor PicoDot**

Page 417



**LED – Sensor Q50**

Page 421



**LED/Laser sensor Q60**

Page 425



**Registration mark sensor R58E**

<b>Design</b>	rectangular, 12.7 x 40.6 x 45.6 mm	rectangular, 19.7 x 60 x 49.8 mm, 25 x 50 x 50 mm, 15 x 50 x 50 mm, 31 x 58 x 77 mm	rectangular, 25 x 75 x 60 mm	rectangular, 30 x 58.9 x 80.1 mm
<b>Output function</b>	NPN PNP	NPN PNP PNP/analog output	pnp/npn Relay output	pnp/npn
<b>Protection class</b>	IP54 IP67	IP67 IP62	IP67	IP67
<b>Ambient temperature</b>	-10...+45 °C	-10...+55 °C -25...+55 °C	-20...+55 °C -10...+50 °C -10...+45 °C	-10...+55 °C
<b>Operating mode</b>	Convergent mode laser sensor (triangulation) Retroreflective laser sensor (triangulation) with polarizing filter	Diffuse mode sensor with adjustable foreground and background suppression retroreflective sensor colour sensor luminescence sensor	diffuse mode sensor with adjustable background suppression Diffuse mode laser sensor (time-of-fly) with adjustable background suppression	diffuse mode contrast sensor
<b>Max. range</b>	10600 mm	400 mm	2000 mm	
<b>Light type</b>	red	red IR white UV	red IR	red / green / blue





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Laser sensors LG5/LG10

Page 411



Laser sensors LT3/LT7

Page 427



Pick-to-Light – K50

Page 431



Pick-to-Light – Job sequencing PVA/PVD

Inspection sensors

<b>Design</b>	rectangular, 20.2 x 55.3 x 82.3 mm	rectangular, 35.3 x 68.5 x 87 mm, 42 x 93 x 95 mm	cylindrical/threaded, Ø50 mm	rectangular, 30 x 137.8 x 15 mm, 30 x 266.4 x 15 mm, 30 x 341.4 x 15 mm, 30 x 416.6 x 15 mm
<b>Output function</b>	NPN/analog output PNP/analog output	PNP/analog output pnp/npn	PNP	PNP NPN pnp/npn
<b>Protection class</b>	IP67	IP67	IP67	IP62
<b>Ambient temperature</b>	-10...+50 °C	0...+50 °C -10...+50 °C	-20...+50 °C	0...+50 °C
<b>Operating mode</b>	Diffuse mode laser sensor (tri-angulation)	Retroreflective laser sensor (time-of-flight) Diffuse mode laser sensor (time-of-fly) with adjustable background suppression	retro-reflective sensor with polarisation filter diffuse mode sensor with fixed-field background suppression	light screen
<b>Max. range</b>	125 mm	250000 mm	2000 mm	2000 mm
<b>Light type</b>	red	red IR	red IR	IR red

# Designs and variants

Page 447



**Light screen LX**

Page 451



**Light screen EZ-ARRAY™**

Page 435



**LED indicators EZ-LIGHT**

Page 441



**LED - Tower light TL50**

**Design**

rectangular,  
25.4 x 342 x 31.8 mm,  
25.4 x 189.6 x 31.8 mm,  
25.4 x 113.4 x 31.8 mm

rectangular,  
36 x 379 x 45.2 mm,  
36 x 529 x 45.2 mm,  
36 x 678 x 45.2 mm,  
36 x 828 x 45.2 mm,  
36 x 978 x 45.2 mm,  
36 x 1128 x 45.2 mm,  
36 x 1278 x 45.2 mm,  
36 x 1578 x 45.2 mm,  
36 x 1878 x 45.2 mm,  
36 x 227 x 45.2 mm,  
36 x 2178 x 45.2 mm,  
36 x 2478 x 45.2 mm

cylindrical/threaded,  
Ø 50 mm,  
Ø 18 x 61 mm,  
Ø 40 x 45 mm,  
Ø 30 mm

50 x 61.2 mm,  
50 x 101.9 mm,  
50 x 142.6 mm,  
50 x 183.3 mm,  
50 x 224 mm,  
50 x 92 mm,  
50 x 132.7 mm,  
50 x 173.4 mm,  
50 x 214.1 mm

**Output function**

pnp/hpn

PNP/analog output  
NPN/analog output

**Protection class**

IP67

IP65

IP67  
IP50

IP67  
IP50

**Ambient temperature**

-20...+70 °C

-40...+70 °C

-40...+50 °C

-40...+50 °C  
-20...+50 °C

**Operating mode**

light screen

light screen

**Max. range**

2000 mm

4000 mm

**Light type**

IR

IR

white  
green  
red / green  
red / yellow / green  
red / green / blue  
green / red / yellow / blue /  
white

red  
yellow  
white  
green / red  
green / red / yellow  
green / red / yellow / blue  
green / red / yellow / blue /  
white

# s and variants

# Laser sensors LG5/LG10



The compact laser gauging sensors LG5 and LG10 work according to the principle of optical triangulation. They are a well-priced and a versatile alternative for precision measurement at short to medium distances. Typical fields of application are the control of surface qualities, dimensional accuracy of components and distance measurement.

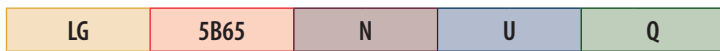
The sensors are available with switching and analog output. The limit values are separately programmable for each output via pushbutton. The minimum window size is 1 mm.

Response time, self-diagnostics with alarm output, status indication and hold function are included in the functional scope.

## Features

- Compact laser gauging system, working on the principle of optical triangulation, for short to medium distances
- No separate controller required
- Extremely slim beam for precise measurement of distance, height, thickness and other gauging applications
- Accuracy 3 µm (LG5) resp. 10 µm (LG10)
- Sensing ranges: 45 mm...60 mm or 75 mm...125 mm
- Digital switching and analog output in the same unit, individually programmable
- Simple and fast teaching via pushbutton

## Type code LG5/LG10



Series

**LG** laser sensor, rectangular  
20.2 x 55.3 x 82.3 mm

Measuring range

**5A65** measuring range 45 ... 60 mm  
focal point 70mm  
**5B65** measuring range 45 ... 60 mm  
focal point 53 mm  
**10A65** measuring range 75 ... 125 mm  
focal point 180 mm

Switching output

**P** PNP  
**N** NPN



Analog output

**U** analog output 0 ... 10V  
**I** analog output 4 ... 20 mA

Electrical connection

**Q** pigtail with connector, M12 x 1  
**blank** cable connection, 2 m

## LG5 – Range 45...60 mm – Focal point 70 mm



<b>General data</b>			
<b>Operating voltage</b>	12...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-10...+50 °C
<b>Output</b>	—, PNP/analog output	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 500 Hz	<b>Range</b>	45...60 mm
<b>Dimensions</b>	20.2 x 55.3 x 82.3 mm	<b>Laser class</b>	2 (EN 60825, IEC 60825)
<b>Protection class</b>	IP67	<b>Focal distance</b>	70 mm
<b>Housing material</b>	metal, ZN, black lacquer		

### Types and data – selection table

Type	Electrical connection	Analog output	Load	w	d	e
LG5A65PIQ	cable with connector, M12 x 1	4...20 mA	≤ 1000 Ω	w071	d392	e080
LG5A65PI	cable	4...20 mA	≤ 1000 Ω	w071	d392	e080
LG5A65PUQ	cable with connector, M12 x 1	0...10 V	≥ 2500 Ω	w071	d392	e080
LG5A65PU	cable	0...10 V	≥ 2500 Ω	w071	d392	e080

## LG5 – Range 45...60 mm – Focal point 53 mm



<b>General data</b>			
<b>Operating voltage</b>	12...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-10...+50 °C
<b>Output</b>	—, PNP/analog output	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 500 Hz	<b>Range</b>	45...60 mm
<b>Dimensions</b>	20.2 x 55.3 x 82.3 mm	<b>Laser class</b>	2 (EN 60825, IEC 60825)
<b>Protection class</b>	IP67	<b>Focal distance</b>	53 mm
<b>Housing material</b>	metal, ZN, black lacquer		

### Types and data – selection table

Type	Electrical connection	Analog output	Load	w	d	e
LG5B65PIQ	cable with connector, M12 x 1	4...20 mA	≤ 1000 Ω	w071	d392	e080
LG5B65PI	cable	4...20 mA	≤ 1000 Ω	w071	d392	e080
LG5B65PUQ	cable with connector, M12 x 1	0...10 V	≥ 2500 Ω	w071	d392	e080
LG5B65PU	cable	0...10 V	≥ 2500 Ω	w071	d392	e080

## LG10 – Range 75...125 mm – Focal point 180 mm



**General data**

<b>Operating voltage</b>	12...30 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-10...+50 °C
<b>Output</b>	—, PNP/analog output	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 500 Hz	<b>Range</b>	75...125 mm
<b>Dimensions</b>	20.2 x 55.3 x 82.3 mm	<b>Laser class</b>	2 (EN 60825, IEC 60825)
<b>Protection class</b>	IP67	<b>Focal distance</b>	180 mm
<b>Housing material</b>	metal, ZN, black lacquer		

**Types and data – selection table**

Type	Electrical connection	Analog output	Load	w	d	e
LG10A65PIQ	cable with connector, M12 x 1	4...20 mA	≤ 1000 Ω	w071	d392	e081
LG10A65PI	cable	4...20 mA	≤ 1000 Ω	w071	d392	e081
LG10A65PUQ	cable with connector, M12 x 1	0...10 V	≥ 2500 Ω	w071	d392	e081
LG10A65PU	cable	0...10 V	≥ 2500 Ω	w071	d392	e081

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**e** Excess gain curves on page 922 ff

# Laser sensors LT3/LT7



LT3/LT7 sensors use advanced time-of-flight technology. The laser emits one million pulses per second. The microprocessor records the time each pulse needs to travel to the target and back to the sensor. One thousand pulse times are averaged every millisecond and the value is transferred to the output.

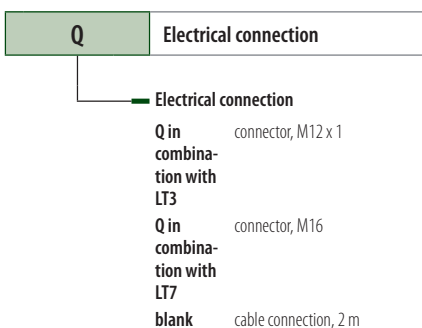
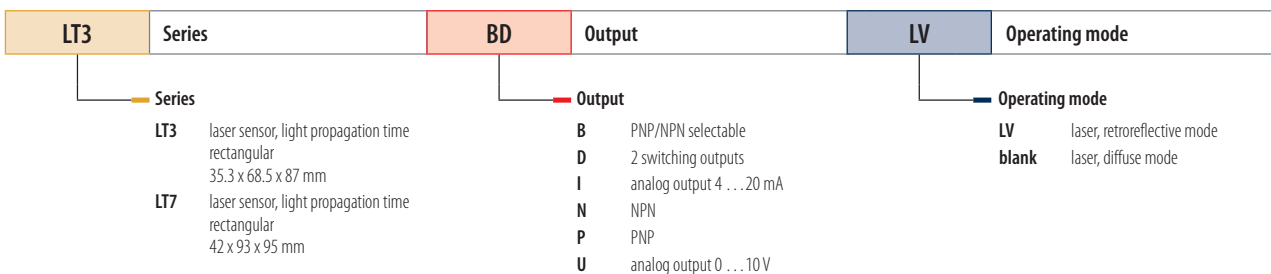
The long rangeability of the sensors enables very small parts or less prominent features to be detected, even if the LT sensor is mounted at a safe distance to the hazardous area.

The sensors are available with switching and analog output. Measuring and switching range are easily adjusted via pushbutton. A bright, visible laser spot simplifies the alignment.

## Features

- Measuring range adjusted via pushbutton
- Well-priced solution for long-range detection
- Measuring range up to 10 m in diffuse mode, up to 250 m in retroreflective mode
- Fast and easy programming via pushbutton, no potentiometer adjustments
- Switching and analog outputs
- Switching and measuring range independently adjustable

## Type code LT3/LT7





## LT3 – Retroreflective sensor



### General data

<b>Operating voltage</b>	12...24 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	0...+50 °C
<b>Switching frequency</b>	≤ 1 kHz	<b>Light type</b>	red
<b>Dimensions</b>	35.3 x 68.5 x 87 mm	<b>Range</b>	500...50000 mm
<b>Protection class</b>	IP67	<b>Laser class</b>	1 (EN 60825, IEC 60825)
<b>Housing material</b>	plastic, ABS		

### Types and data – selection table

Type	Output	Electrical connection	Analog output	w	d	e
LT3PILVQ	—, PNP/analog output	connector, M12 x 1	4...20 mA	w072	d394	e082
LT3PILV	—, PNP/analog output	cable	4...20 mA	w072	d393	e082
LT3BDLVQ	2x —, pnp/npn	connector, M12 x 1	-	w073	d394	e082
LT3BDLV	2x —, pnp/npn	cable	-	w073	d393	e082
LT3PULVQ	—, PNP/analog output	connector, M12 x 1	0...10 V	w072	d394	e082
LT3PULV	—, PNP/analog output	cable	0...10 V	w072	d393	e082

## LT3 – Diffuse-mode sensor



### General data

<b>Operating voltage</b>	12...24 VDC	<b>Lens material</b>	plastic
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	0...+50 °C
<b>Switching frequency</b>	≤ 1 kHz	<b>Light type</b>	red
<b>Dimensions</b>	35.3 x 68.5 x 87 mm	<b>Range</b>	300...5000 mm
<b>Protection class</b>	IP67	<b>Laser class</b>	2 (EN 60825, IEC 60825)
<b>Housing material</b>	plastic, ABS		

### Types and data – selection table

Type	Output	Electrical connection	Analog output	w	d	e
LT3PIQ	—, PNP/analog output	connector, M12 x 1	4...20 mA	w072	d394	e083
LT3PI	—, PNP/analog output	cable	4...20 mA	w072	d393	e083
LT3PUQ	—, PNP/analog output	connector, M12 x 1	0...10 V	w072	d394	e083
LT3PU	—, PNP/analog output	cable	0...10 V	w072	d393	e083
LT3BDQ	2x —, pnp/npn	connector, M12 x 1	-	w073	d394	e083
LT3BD	2x —, pnp/npn	cable	-	w073	d393	e083


w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

e Excess gain curves on page 922 ff


## LT7 – Retroreflective sensor



<b>Type</b>	LT7PLVQ	<b>Electrical connection</b>	connector, M16
<b>Operating voltage</b>	18...30 VDC	<b>Ambient temperature</b>	-10...+50 °C
<b>Power-on, indicator</b>	LED	<b>Light type</b>	IR
<b>Output</b>	2x  , PNP	<b>Range</b>	500...250000 mm
<b>Switching frequency</b>	≤ 400 Hz	<b>Laser class</b>	1 (EN 60825, IEC 60825)
<b>Dimensions</b>	42 x 93 x 95 mm	<b>Wiring diagram</b>	w074
<b>Protection class</b>	IP67	<b>Dimension drawing</b>	d395
<b>Housing material</b>	plastic, ABS	<b>Excess gain curve</b>	e084
<b>Lens material</b>	plastic		

## LT7 – Diffuse-mode sensor



<b>Type</b>	LT7PIDQ	<b>Electrical connection</b>	connector, M16
<b>Operating voltage</b>	18...30 VDC	<b>Ambient temperature</b>	-10...+50 °C
<b>Power-on, indicator</b>	LED	<b>Light type</b>	IR
<b>Output</b>	2x  , PNP/analog output	<b>Range</b>	500...10000 mm
<b>Switching frequency</b>	≤ 400 Hz	<b>Analog output</b>	4...20 mA
<b>Dimensions</b>	42 x 93 x 95 mm	<b>Laser class</b>	1 (EN 60825, IEC 60825)
<b>Protection class</b>	IP67	<b>Wiring diagram</b>	w074
<b>Housing material</b>	plastic, ABS	<b>Dimension drawing</b>	d395
<b>Lens material</b>	plastic	<b>Excess gain curve</b>	e085

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**e** Excess gain curves on page 922 ff

# PicoDot™ laser precision sensors



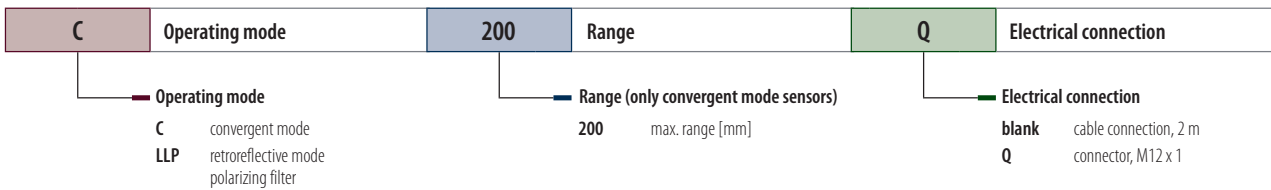
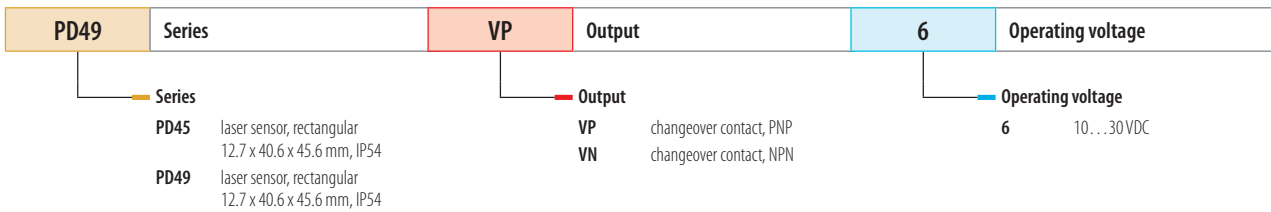
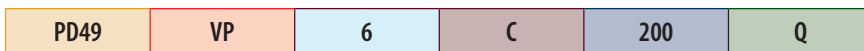
The laser precision sensors of the PicoDot™ series are available as convergent mode and retroreflective versions. The PicoDot™ convergent mode laser sensors detect the position of objects very precisely with high excess gain. The strength of retroreflective sensors lies in their long range operability.

The devices feature an antivalent PNP/NPN switching output. The sensitivity is adjusted via potentiometer. A yellow and a green LED indicate operational readiness, switching status, signal strength as well as short circuit or output overload.

## Features

- Fast laser sensor with narrow beam profile
- Convergent mode laser sensors for precise position detection, inspection and counting
- Retroreflective laser sensors for long range detection
- Sensitivity adjusted via potentiometer
- Antivalent switching outputs, PNP/NPN
- Light/dark operation
- Visible red light


## Type code PicoDot



## PicoDot – Convergent mode sensor



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-10...+45 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 2.5 kHz	<b>Laser class</b>	2 (EN 60825, IEC 60825)
<b>Dimensions</b>	12.7 x 40.6 x 45.6 mm		


### Types and data – selection table

Type	Protection class	Electrical connection	Focal distance	w	d	e
PD45VP6C200	IP54	cable	203 mm	w075	d396	e086
PD45VP6C200Q	IP54	cable with connector, M12 x 1	203 mm	w075	d397	e086
PD49VP6C200Q	IP67	cable with connector, M12 x 1	203 mm	w075	d397	e086
PD45VP6C100Q	IP54	cable with connector, M12 x 1	102 mm	w075	d397	e086
PD45VP6C100	IP54	cable	102 mm	w075	d396	e086

## PicoDot – Retroreflective sensor with polarizing filter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, ABS
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-10...+45 °C
<b>Output</b>	 , PNP	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 2.5 kHz	<b>Range</b>	200...10600 mm
<b>Dimensions</b>	12.7 x 40.6 x 45.6 mm	<b>Laser class</b>	2 (EN 60825, IEC 60825)

### Types and data – selection table

Type	Protection class	Electrical connection	w	d	e
PD49VP6LLPQ	IP67	cable with connector, M12 x 1	w075	d397	e087
PD45VP6LLPQ	IP54	cable with connector, M12 x 1	w075	d397	e087
PD45VP6LLP	IP54	cable	w075	d396	e087

## Triangulation sensor Q50



Q50 is a series of compact LED-based triangulation sensors. The high-performing sensors are a well-priced alternative to laser sensors for demanding measurement applications. Available are devices with switching, analog current or voltage output.

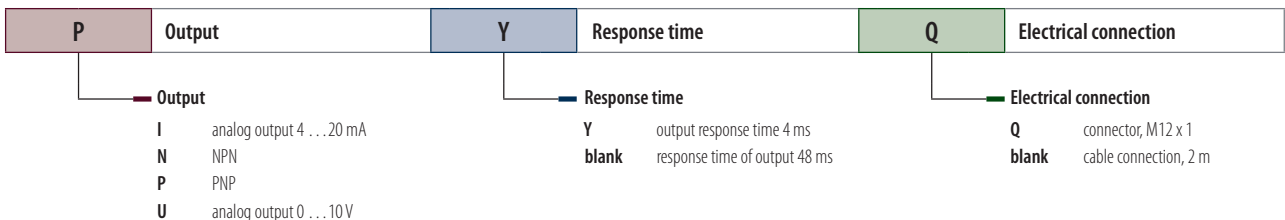
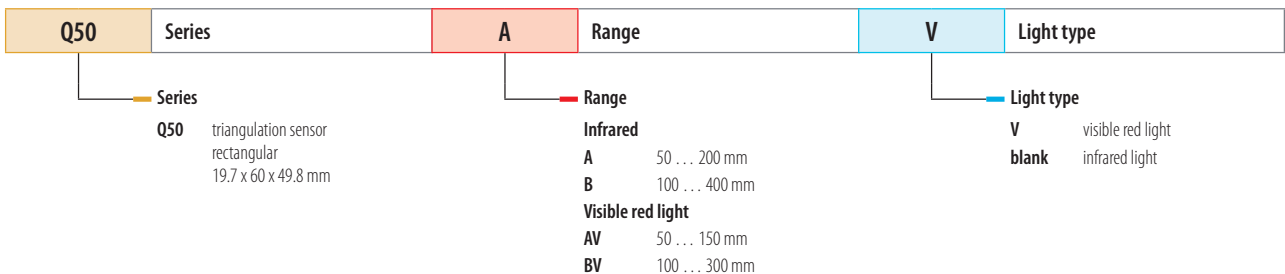
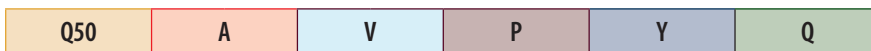
Pushbutton or remote programming of close and long distance measurement. Devices with switching output can be taught a measuring range with two switchpoints, or just one switchpoint, like sensors with background suppression.

The scalable analog output automatically distributes the output signal over the width of the programmed sensing window.

### Features

- Powerful LED-based triangulation sensor
- Versions with switching output (PNP/NPN) or with analog current or voltage output
- Measuring range 50...400 mm
- Foreground and background suppression
- Fast and easy programming via pushbutton
- Remote teach input
- Two bicolor status LEDs
- Visible red and infrared light
- Protection class IP67

### Type code Q50



## Q50 – Visible red light – Range 50...150 mm



<b>General data</b>			
<b>Dimensions</b>	19.7 x 60 x 49.8 mm	<b>Ambient temperature</b>	-10...+55 °C
<b>Protection class</b>	IP67	<b>Light type</b>	red
<b>Housing material</b>	plastic, ABS	<b>Range</b>	50...150 mm
<b>Lens material</b>	plastic		

### Types and data – selection table





Type	Operating voltage	Output	Switching frequency	Electrical connection	Analog output	w	d	e
Q50AVPQ	12...30 VDC	, PNP	≤ 7 Hz	connector	-	w076	d399	e088
Q50AVP	12...30 VDC	, PNP	≤ 7 Hz	cable	-	w076	d398	e088
Q50AVPYQ	12...30 VDC	, PNP	≤ 112 Hz	connector	-	w076	d399	e088
Q50AVPY	12...30 VDC	, PNP	≤ 112 Hz	cable	-	w076	d398	e088
Q50AVIQ	15...30 VDC	-	-	connector	4...20 mA	w077	d399	e089
Q50AVI	15...30 VDC	-	-	cable	4...20 mA	w077	d398	e089
Q50AVUQ	15...30 VDC	-	-	connector	0...10 V	w077	d399	e089
Q50AVU	15...30 VDC	-	-	cable	0...10 V	w077	d398	e089

## Q50 – Infrared light – Range 50...200 mm



<b>General data</b>			
<b>Dimensions</b>	19.7 x 60 x 49.8 mm	<b>Ambient temperature</b>	-10...+55 °C
<b>Protection class</b>	IP67	<b>Light type</b>	IR
<b>Housing material</b>	plastic, ABS	<b>Range</b>	50...200 mm
<b>Lens material</b>	plastic		

**Types and data – selection table**

Type	Operating voltage	Output	Switching frequency	Electrical connection	Analog output	w	d	e
Q50APQ	12...30 VDC	 , PNP	≤ 7 Hz	connector	-	w076	d399	e088
Q50AP	12...30 VDC	 , PNP	≤ 7 Hz	cable	-	w076	d398	e088
Q50APYQ	12...30 VDC	 , PNP	≤ 112 Hz	connector	-	w076	d399	e088
Q50APY	12...30 VDC	 , PNP	≤ 112 Hz	cable	-	w076	d398	e088
Q50AIQ	15...30 VDC	-	-	connector	4...20 mA	w077	d399	e089
Q50AI	15...30 VDC	-	-	cable	4...20 mA	w077	d398	e089
Q50AUQ	15...30 VDC	-	-	connector	0...10 V	w077	d399	e089
Q50AU	15...30 VDC	-	-	cable	0...10 V	w077	d398	e089





**Q50 – Visible red light – Range 100...300 mm**



**General data**

<b>Dimensions</b>	19.7 x 60 x 49.8 mm	<b>Ambient temperature</b>	-10...+55 °C
<b>Protection class</b>	IP67	<b>Light type</b>	red
<b>Housing material</b>	plastic, ABS	<b>Range</b>	100...300 mm
<b>Lens material</b>	plastic		

**Types and data – selection table**

Type	Operating voltage	Output	Switching frequency	Electrical connection	Analog output	w	d	e
Q50BVPQ	12...30 VDC	 , PNP	≤ 7 Hz	connector	-	w076	d399	e090
Q50BVP	12...30 VDC	 , PNP	≤ 7 Hz	cable	-	w076	d398	e090
Q50BVPYQ	12...30 VDC	 , PNP	≤ 112 Hz	connector	-	w076	d399	e090
Q50BVPY	12...30 VDC	 , PNP	≤ 112 Hz	cable	-	w076	d398	e090
Q50BVIQ	15...30 VDC	-	-	connector	4...20 mA	w077	d399	e091
Q50BVI	15...30 VDC	-	-	cable	4...20 mA	w077	d398	e091
Q50BVUQ	15...30 VDC	-	-	connector	0...10 V	w077	d399	e091
Q50BVU	15...30 VDC	-	-	cable	0...10 V	w077	d398	e091







## Q50 – Infrared light – Range 100...400 mm



### General data

<b>Dimensions</b>	19.7 x 60 x 49.8 mm	<b>Ambient temperature</b>	-10...+55 °C
<b>Protection class</b>	IP67	<b>Light type</b>	IR
<b>Housing material</b>	plastic, ABS	<b>Range</b>	100...400 mm
<b>Lens material</b>	plastic		

### Types and data – selection table

Type	Operating voltage	Output	Switching frequency	Electrical connection	Analog output	w	d	e
Q50BPQ	12...30 VDC	 , PNP	≤ 7 Hz	connector	-	w076	d399	e090
Q50BP	12...30 VDC	 , PNP	≤ 7 Hz	cable	-	w076	d398	e090
Q50BPYQ	12...30 VDC	 , PNP	≤ 112 Hz	connector	-	w076	d399	e090
Q50BPY	12...30 VDC	 , PNP	≤ 112 Hz	cable	-	w076	d398	e090
Q50BIQ	15...30 VDC	-	-	connector	4...20 mA	w077	d399	e091
Q50BI	15...30 VDC	-	-	cable	4...20 mA	w077	d398	e091
Q50BUQ	15...30 VDC	-	-	connector	0...10 V	w077	d399	e091
Q50BU	15...30 VDC	-	-	cable	0...10 V	w077	d398	e091

# Laser/LED sensors Q60



The Q60 series comprises sensors working with laser or visible red LED beam. They are long-range operating devices with programmable background suppression. Objects with low reflectivity are detected reliably while objects located just beyond the sensing field are ignored. The cutoff point is set via a two-turn adjusting screw.

Output timing, light/dark operate and keylock are programmed remotely or via two pushbuttons.

Configuration and operating status are indicated by seven LEDs in run mode. Five of the seven LEDs combine to form a single light bar indicating relative ON and OFF delay.

## Features

- Sensors with adjustable background suppression
- Measuring ranges 200 ... 2000 mm
- Easy setting of cutoff point
- Laser or LED sensors (infrared or visible red light)
- Easy programming via integrated pushbutton or remotely
- Light or dark operate
- Seven LEDs indicate configuration and operating status
- Rugged IP67 rated housing

## Type code Q60

Q60	BB	6	L	AF	1400	Q
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Q60	Series	BB	Output	6	Operating voltage
Series	Q60 laser /LED sensors rectangular 25 x 75 x 60 mm	Output	BB PNP/NPN bipolar VR relay output (changeover contact)	Operating voltage	6 10...30VDC 3 12...250VDC 24...250VAC

L	Sensor type	AF	Background suppression	1400	Max. range [mm]
Sensor type	L laser sensor blank LED sensor	Background suppression	AF adjustable field, infrared light AFV adjustable field, visible red light	Max. range [mm]	1400 max. range mm

Q	Electrical connection
Electrical connection	blank cable connection, 2 m Q connector, M12 x 1

## Q60 – Visible red light – Range 200...1000 mm



<b>General data</b>			
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Dimensions</b>	25 x 75 x 60 mm	<b>Ambient temperature</b>	-20...+55 °C
<b>Protection class</b>	IP67	<b>Light type</b>	red
<b>Housing material</b>	plastic, ABS	<b>Range</b>	200...1000 mm

### Types and data – selection table

Type	Operating voltage	Output	Switching frequency	Electrical connection	w	d	e
Q60BB6AFV1000Q	10...30 VDC	—, pnp/npn	≤ 250 Hz	connector, M12 x 1	w078	d400	e092
Q60BB6AFV1000	10...30 VDC	—, pnp/npn	≤ 250 Hz	cable	w078	d401	e092
Q60VR3AFV1000	12...250 VDC	—, relay output	≤ 33 Hz	cable	w079	d401	e092

## Q60 – Laser class 1 – Range 200...1400 mm



<b>General data</b>			
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Dimensions</b>	25 x 75 x 60 mm	<b>Light type</b>	red
<b>Protection class</b>	IP67	<b>Range</b>	200...1400 mm
<b>Housing material</b>	plastic, ABS	<b>Laser class</b>	1 (EN 60825, IEC 60825)

### Types and data – selection table

Type	Operating voltage	Output	Switching frequency	Electrical connection	Ambient temperature	w	d	e
Q60BB6LAF1400Q	10...30 VDC	—, pnp/npn	≤ 250 Hz	connector, M12 x 1	-10...+50 °C	w078	d400	e094
Q60BB6LAF1400	10...30 VDC	—, pnp/npn	≤ 250 Hz	cable	-10...+50 °C	w078	d401	e094
Q60VR3LAF1400	12...250 VDC	—, relay output	≤ 33 Hz	cable	-10...+45 °C	w079	d401	e094

## Q60 – Infrared light – Range 200...2000 mm



**General data**

<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Dimensions</b>	25 x 75 x 60 mm	<b>Ambient temperature</b>	-20...+55 °C
<b>Protection class</b>	IP67	<b>Light type</b>	IR
<b>Housing material</b>	plastic, ABS	<b>Range</b>	200...2000 mm

**Types and data – selection table**

Type	Operating voltage	Output	Switching frequency	Electrical connection	w	d	e
Q60BB6AF2000Q	10...30 VDC	—, pnp/npn	≤ 250 Hz	connector, M12 x 1	w078	d400	e093
Q60BB6AF2000	10...30 VDC	—, pnp/npn	≤ 250 Hz	cable	w078	d401	e093
Q60VR3AF2000	12...250 VDC	—, relay output	≤ 33 Hz	cable	w079	d401	e093

## Q60 – Laser class 2 – Range 200...2000 mm



**General data**

<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Dimensions</b>	25 x 75 x 60 mm	<b>Light type</b>	red
<b>Protection class</b>	IP67	<b>Range</b>	200...2000 mm
<b>Housing material</b>	plastic, ABS	<b>Laser class</b>	2 (EN 60825, IEC 60825)

**Types and data – selection table**

Type	Operating voltage	Output	Switching frequency	Electrical connection	Ambient temperature	w	d	e
Q60BB6LAF2000Q	10...30 VDC	—, pnp/npn	≤ 250 Hz	connector, M12 x 1	-10...+50 °C	w078	d400	e093
Q60BB6LAF2000	10...30 VDC	—, pnp/npn	≤ 250 Hz	cable	-10...+50 °C	w078	d401	e093
Q60VR3LAF2000	12...250 VDC	—, relay output	≤ 33 Hz	cable	-10...+45 °C	w079	d401	e093

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**e** Excess gain curves on page 922 ff

## Registration mark sensor R58E



The registration mark sensor R58 Expert detects all common color marks used for product and material registration. The sensor automatically selects one of the three integrated color LEDs (red, green, blue) to achieve the highest contrast ratio. The very fast response time of 50  $\mu$ s is perfectly suited for high-speed applications.

Contrast sensitivity, switching performance and delays are adjusted via integrated pushbuttons or remote via teach line. Static or dynamic teaching of switch ON/OFF delay.

### Features

- Registration mark sensor with tri-color light source
- Excellent color contrast sensitivity, detects 16 greyscales
- Vertical or horizontal light spot, depending on the model
- Light/dark operate, switch ON/OFF delay 30 ms, programmed via pushbutton or teach line
- Bipolar output PNP/NPN
- Highly visible 8-segment bargraph indicates signal strength, output status and setup.
- Rugged IP67 rated housing

### Type code R58



Series

**R58** registration mark sensor  
rectangular  
30 x 58.9 x 80.1 mm

Programming

**E** teachable

Scanning

**CRGB** convergent mode sensor,  
3 emitter LEDs, red, green, blue



Detection field

- 1 parallel detection field relative to the housing axis
- 2 vertical detection field relative to the housing axis

Electrical connection

**blank** cable connection, 2 m  
**Q** connector, M12 x 1

## R58E – Parallel detection field



### General data

<b>Operating voltage</b>	10...30 VDC
<b>Indication of excess gain type</b>	LED chain
<b>Output</b>	—, pnp/npn
<b>Switching frequency</b>	≤ 10 kHz
<b>Dimensions</b>	30 x 58.9 x 80.1 mm
<b>Protection class</b>	IP67

<b>Housing material</b>	metal, ZN
<b>Lens material</b>	plastic
<b>Ambient temperature</b>	-10...+55 °C
<b>Light type</b>	red / green / blue
<b>Focal distance</b>	10 mm

### Types and data – selection table

Type	Electrical connection	w	d
R58ECRQB1Q	connector, M12 x 1	w078	d403
R58ECRQB1	cable	w078	d402

## R58E – Vertical detection field



### General data

<b>Operating voltage</b>	10...30 VDC
<b>Indication of excess gain type</b>	LED chain
<b>Output</b>	—, pnp/npn
<b>Switching frequency</b>	≤ 10 kHz
<b>Dimensions</b>	30 x 58.9 x 80.1 mm
<b>Protection class</b>	IP67

<b>Housing material</b>	metal, ZN
<b>Lens material</b>	plastic
<b>Ambient temperature</b>	-10...+55 °C
<b>Light type</b>	red / green / blue
<b>Focal distance</b>	10 mm

### Types and data – selection table

Type	Electrical connection	w	d
R58ECRQB2Q	connector, M12 x 1	w078	d403
R58ECRQB2	cable	w078	d402

## Pick-to-Light sensors K50



The Pick-to-Light K50 are mounted to the bins. Integrated job lights indicate the pickup order of components. If the operator takes a component from a box, the sensor detects the operator's hand and sends a correspondent signal to the control unit. The control unit checks if the right component and the right amount has been removed from the box. If so, the job light of the current box is switched off and the job light of the next box turns on. Alarm and other signals can be programmed to indicate mispick.

### Features

- Sensors with integrated job light for removal control and bin-picking applications
- Compact design with sensor and integrated job light
- Job lights available in different colors
- Versions with pushbutton and passive triggering to confirm the removal
- NPN or PNP output
- Fully encapsulated IP67 build, suited for rough environments
- Protection against ambient light, immune to electromagnetic and high-frequency interferences

### Type code K50



#### Series

**K50** pick-to-light, Ø 50 mm, height 37.3 mm thread M30 x 1

#### Output function

**A** light operation  
**R** dark operation

#### Output

**P** PNP  
**N** NPN



#### Operating mode

**LP** retroreflective mode  
polarizing filter  
**FF50** diffuse mode  
fixed field 50 mm  
**PB** pushbutton

#### Colors

**G** green  
**R** red  
**X** single-color

#### Color signals

**C** request green - pick-up red - picking error red  
**D** request green - pick-up green - picking error OFF  
**E** request green - pick-up green - picking error red



#### Electrical connection

**blank** cable connection, 2 m  
**Q** connector, M12 x 1  
**QP** cable connection with connection, M12 x 1



## K50 – Pick-to-Light – Retroreflective sensor with polarizing filter



### General data

<b>Operating voltage</b>	12...30 VDC	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 160 Hz	<b>Ambient temperature</b>	-20...+50 °C
<b>Dimensions</b>	Ø50 x 37.3 mm	<b>Light type</b>	red
<b>Protection class</b>	IP67	<b>Range</b>	0...2000 mm
<b>Housing material</b>	plastic, PC		

Versions with one (GXD) or more colored signal lights (GRC/GRE) are available.

### Types and data – selection table

Type	Output	Electrical connection	w	d
K50RPLPGRCQ	dark operation, PNP	connector, M12 x 1	w080	d405
K50APLPGXDQP	light operation, PNP	cable with connector, M12 x 1	w080	d404
K50APLPGREQP	light operation, PNP	cable with connector, M12 x 1	w080	d404
K50RPLPGXDQP	dark operation, PNP	cable with connector, M12 x 1	w080	d404
K50RPLPGREQP	dark operation, PNP	cable with connector, M12 x 1	w080	d404

## K50 – Pick-to-Light – Diffuse mode sensor with fixed-field



### General data

<b>Operating voltage</b>	12...30 VDC	<b>Lens material</b>	plastic
<b>Switching frequency</b>	≤ 160 Hz	<b>Ambient temperature</b>	-20...+50 °C
<b>Dimensions</b>	Ø50 x 37.3 mm	<b>Light type</b>	IR
<b>Protection class</b>	IP67	<b>Range</b>	0...100 mm
<b>Housing material</b>	plastic, PC		

Versions with one (GXD) or more colored signal lights (GRC/GRE) are available.

Types and data – selection table

Type	Output	Electrical connection	w	d
K50APFF100GREQ	light operation, PNP	connector, M12 x 1	w080	d405
K50APFF100GXQD	light operation, PNP	connector, M12 x 1	w080	d405
K50APFF100GXQDP	light operation, PNP	cable with connector, M12 x 1	w080	d404
K50APFF100GREQP	light operation, PNP	cable with connector, M12 x 1	w080	d404
K50APFF100GRCQP	light operation, PNP	cable with connector, M12 x 1	w080	d404
K50RPF100GXQDP	dark operation, PNP	cable with connector, M12 x 1	w080	d404
K50RPF100GREQP	dark operation, PNP	cable with connector, M12 x 1	w080	d404

## K50 – Pick-to-Light – Pushbutton



**General data**

**Operating voltage** 12...30 VDC

**Output** , PNP

**Switching frequency** ≤ 160 Hz

**Dimensions** Ø50 x 37.3 mm

**Protection class** IP67

**Housing material** plastic, PC

**Electrical connection** cable with connector, M12 x 1

**Ambient temperature** -20...+50 °C

Versions with one (GXD) or more colored signal lights (GRE)

Types and data – selection table

Type	w	d
K50APPBGXDQP	w080	d404
K50APPBGREQP	w080	d404

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**e** Excess gain curves on page 922 ff

## Job sequencing PVA/PVD



PVA and PVD sensors are used for job sequencing and monitoring of bin-picking processes. Clearly visible job lights on each emitter and receiver guide the operators at the assembly lines through the parts assembly sequence. Failures such as missing or wrongly mounted parts are considerably reduced.

The following settings can be adjusted via DIP switch: PNP/NPN output, NO/NC output, steady/flashing job light; gate polarity for activation of job light. LEDs indicate setup and system failures.

### Features

- PVA: Opposed mode sensor, 2 m range; emitter and receiver with integrated job light; asynchronous emitter and receiver
- PVD: One-piece, compact sensor; automatic selection of diffuse or retroreflective mode; max. 2 m range with reflector; max. 400 mm in diffuse mode
- Protective mounting brackets are available

### Type code PVA & PVD



#### Series

**PVA** light screen for bin-picking sequences, two-part  
width: 15 mm, depth: 30 mm  
other heights  
PVA 100: 137.8 mm  
PVA 225: 266.4 mm  
PVA 300: 341.4 mm  
PVA 375: 416.6 mm

**PVD** light screen for bin-picking sequences, one-part  
width: 15 mm, depth: 30 mm  
other heights  
PVD 100: 137.8 mm  
PVD 225: 266.4 mm

#### Monitored field (height)

225 monitored field in mm

#### Output (PVA)

P PNP  
N NPN



#### Operating voltage (PVA)

6 10...30 VDC

#### Operating mode (PVA)

E emitter  
R receiver  
blank pair (emitter/receiver)


#### Electrical connection

blank cable connection, 2 m  
Q pigtail with connector, M12 x 1



## PVA – Pick-to-Light – Opposed mode sensor



### General data

<b>Operating voltage</b>	12...30 VDC	<b>Housing material</b>	metal, AL, black lacquer
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	0...+50 °C
<b>Output</b>	 , PNP	<b>Light type</b>	IR
<b>Protection class</b>	IP62	<b>Range</b>	0...2000 mm


### Types and data – selection table

Type	Switching frequency	Dimensions	Electrical connection	Detection zone height		
PVA100P6Q	≤ 250 Hz	30 x 137.8 x 15 mm	cable with connector, M12 x 1	100 mm	w081	d406
PVA100P6	≤ 250 Hz	30 x 137.8 x 15 mm	cable	100 mm	w081	d407
PVA225P6Q	≤ 125 Hz	30 x 266.4 x 15 mm	cable with connector, M12 x 1	225 mm	w081	d406
PVA225P6	≤ 125 Hz	30 x 266.4 x 15 mm	cable	225 mm	w081	d407
PVA300P6Q	≤ 100 Hz	30 x 341.4 x 15 mm	cable with connector, M12 x 1	300 mm	w081	d406
PVA300P6	≤ 100 Hz	30 x 341.4 x 15 mm	cable	300 mm	w081	d407
PVA375P6Q	≤ 80 Hz	30 x 416.6 x 15 mm	cable with connector, M12 x 1	375 mm	w081	d406
PVA375P6	≤ 80 Hz	30 x 416.6 x 15 mm	cable	375 mm	w081	d407

## PVD – Pick-to-Light – Diffuse / Retroreflective mode sensor



### General data

<b>Operating voltage</b>	12...30 VDC	<b>Housing material</b>	metal, AL, black lacquer
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	0...+50 °C
<b>Output</b>	 , pnp/npn	<b>Light type</b>	red
<b>Switching frequency</b>	≤ 2.5 Hz	<b>Range</b>	0...2000 mm
<b>Protection class</b>	IP62		

PVD can also be used as retroreflective sensor with reflector (range up to 2 m).

**Types and data – selection table**

Type	Dimensions	Electrical connection	Detection zone height	w	d
PVD225Q	30 x 266.4 x 15 mm	cable with connector, M12 x 1	240 mm	w082	d408
PVD225	30 x 266.4 x 15 mm	cable	240 mm	w082	d408
PVD100	30 x 137.8 x 15 mm	cable	111 mm	w082	d409
PVD100Q	30 x 137.8 x 15 mm	cable with connector, M12 x 1	111 mm	w082	d409

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**e** Excess gain curves on page 922 ff

## Multisegment LED indicators EZ-LIGHT



The EZ-LIGHT series provides a comprehensive selection of job lights, indicator lights, general-purpose indicators and touch switches for job sequencing and monitoring of pick-to-light and assembly processes. The rugged devices are suited for rough industrial applications and feature clearly visible status indicators.

The EZ-LIGHT indicators are programmed in a few steps and are easily mounted directly on the machine, in the cabinet or at critical control points. A great variety of designs, modules, functions and accessories offer perfect solutions for any task.

### Features

- Highly visible LED indicators, up to 5 colors available
- Optional audible alert
- Different designs and sizes
- Simple mounting and configuration

### Type code EZ-LIGHT

K50L	GRYBW	P	QP
------	-------	---	----

K50L	Series	GRYBW	LED colors/signals	P	Input
------	--------	-------	--------------------	---	-------

#### Series

<b>T8L</b>	cylinder, plastic Ø 16 mm thread Ø 8 mm
<b>M18</b>	cylinder, plastic thread, Ø 18 mm
<b>T18</b>	cylinder, plastic Ø 30 mm thread Ø 8 mm
<b>T30</b>	cylinder, plastic Ø 40 mm thread Ø 30 mm
<b>K30L</b>	cylinder, plastic Ø 30 mm thread Ø 22.5 mm
<b>K50L</b>	cylinder, plastic Ø 50 mm thread Ø 30 mm
<b>K80L</b>	rectangular, plastic 81 x 110 x 67 mm

#### LED colors

<b>G</b>	green
<b>R</b>	red
<b>Y</b>	yellow
<b>B</b>	blue
<b>W</b>	white
<b>X</b>	no other function
<b>2</b>	3 colors / 7 functions
<b>Audible signals</b>	
<b>A1Y</b>	continuous tone 75 dB
<b>A2Y</b>	pulsed tone
<b>AL1Y</b>	continuous tone 95 dB

#### Input

<b>P</b>	PNP
<b>N</b>	NPN

### QP

#### Electrical connection

#### Electrical connection

<b>blank</b>	pigtail cable connection, 2 m
<b>QP</b>	150 mm PVC cable connection with connector, M12 x 1, 5-pole
<b>Q</b>	connector, M12 x 1, 5-pole
<b>Q8</b>	connector, M12 x 1, 8-pole



## EZ-LIGHT – 1 LED color



<b>General data</b>			
<b>Operating voltage</b>	18...30 VDC	<b>Lens material</b>	plastic
<b>Dimensions</b>	Ø50 x 37.3 mm	<b>Electrical connection</b>	cable
<b>Protection class</b>	IP67	<b>Ambient temperature</b>	-40...+50 °C
<b>Housing material</b>	plastic, PC	<b>Response time</b>	250 ms

### Types and data – selection table

Type	Light type	w	d
K50LWXXP	white	w083	d410
K50LGXXP	green	w083	d410

## EZ-LIGHT – 2 LED colors



<b>General data</b>			
<b>Protection class</b>	IP67	<b>Ambient temperature</b>	-40...+50 °C
<b>Lens material</b>	plastic	<b>Response time</b>	250 ms

### Types and data – selection table

Type	Operating voltage	Dimensions	Housing material	Electrical connection	Light type	w	d
M18RGXPQ	10...30 VDC	Ø 18 x 61 mm	metal, CuZn	connector, M12 x 1	red / green	w083	d411
T18RGXPQ	10...30 VDC	53.6 x 33 mm	plastic, Polyester	connector, M12 x 1	red / green	w083	d412
T30RGXPQ	10...30 VDC	Ø 40 x 45 mm	plastic, Polyester	connector, M12 x 1	red / green	w083	d413
K30LGRXPQ	10...30 VDC	Ø 30 mm	plastic, PC	connector, M12 x 1	red / green	w085	d417
K50LGRXPQ	18...30 VDC	Ø 50 mm	plastic, PC	cable with connector, M12 x 1	red / green	w084	d414
T8LGRXPQ	10...30 VDC	-	plastic, Polyester	cable with connector	red / green	w085	d416
T8LGRXP	10...30 VDC	-	plastic, Polyester	cable, M12 x 1	red / green	w085	d415

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

e Excess gain curves on page 922 ff

## EZ-LIGHT – 3 LED colors



<b>General data</b>			
<b>Protection class</b>	IP67	<b>Ambient temperature</b>	-40...+50 °C
<b>Lens material</b>	plastic	<b>Response time</b>	250 ms

### Types and data – selection table

Type	Operating voltage	Dimensions	Housing material	Electrical connection	Light type	w	d
K50LGRYPQ	18...30 VDC	Ø 50 mm	plastic, PC	connector, M12 x 1	red / yellow / green	w083	d418
M18GRYPQ	10...30 VDC	Ø 18 x 61 mm	metal, CuZn	connector, M12 x 1	red / yellow / green	w083	d411
T18GRYPQ	10...30 VDC	53.6 x 33 mm	plastic, Polyester	connector, M12 x 1	red / yellow / green	w083	d412
T30GRYPQ	10...30 VDC	Ø 40 x 45 mm	plastic, Polyester	connector, M12 x 1	red / yellow / green	w083	d413
K30LGRYPQ	10...30 VDC	Ø30 mm	plastic, PC	connector, M12 x 1	red / yellow / green	w085	d417
K50LGRYP	18...30 VDC	Ø50 mm	plastic, PC	cable	red / yellow / green	w083	d410
K80LGRYPQ	18...30 VDC	109.5 x 66.3 x 80.8 mm	plastic, ABS	connector, M12 x 1	red / yellow / green	w083	d419
K50LGRBPQ	18...30 VDC	Ø50 mm	plastic, PC	connector, M12 x 1	red / green / blue	w083	d418

## EZ-LIGHT – 3 LED colors – 7 functions



<b>General data</b>			
<b>Protection class</b>	IP67	<b>Ambient temperature</b>	-40...+50 °C
<b>Lens material</b>	plastic	<b>Response time</b>	250 ms
<b>Electrical connection</b>	connector, M12 x 1		

Types and data – selection table

Type	Operating voltage	Dimensions	Housing material	Light type	w	d	e
K50LGRY2PQ	18...30 VDC	Ø50 mm	plastic, PC	red / yellow / green	w083	d418	e095
M18GRY2PQ	10...30 VDC	Ø18 x 61 mm	metal, CuZn	red / yellow / green	w083	d411	e095
K80LGRB2PQ	18...30 VDC	109.5 x 66.3 x 80.8 mm	plastic, ABS	red / green / blue	w083	d419	e095
K80LGRY2PQ	18...30 VDC	109.5 x 66.3 x 80.8 mm	plastic, ABS	red / yellow / green	w083	d419	e095

EZ-LIGHT – 5 LED colors



<b>General data</b>			
<b>Operating voltage</b>	18...30 VDC	<b>Ambient temperature</b>	-40...+50 °C
<b>Protection class</b>	IP67	<b>Light type</b>	green / red / yellow / blue / white
<b>Lens material</b>	plastic	<b>Response time</b>	250 ms

Types and data – selection table

Type	Dimensions	Housing material	Electrical connection	w	d
K50LGRYBWPQ8	Ø50 mm	plastic, PC	connector, M12 x 1	w086	d418
K80LGRYBWPQ8	109.5 x 66.3 x 80.8 mm	plastic, ABS	connector, M12 x 1	w086	d419
K50LGRYBWP	Ø50 mm	plastic, PC	cable	w086	d410

EZ-LIGHT – 3 LED colors – Continuous tone 75 dB



<b>General data</b>			
<b>Operating voltage</b>	18...30 VDC	<b>Ambient temperature</b>	-40...+50 °C
<b>Protection class</b>	IP50	<b>Light type</b>	green / red / yellow
<b>Lens material</b>	plastic	<b>Response time</b>	250 ms

Types and data – selection table

Type	Electrical connection	w	d
K50LGRA1YP	cable	w087	d420
K50LGRA1YPQ	connector, M12 x 1	w087	d421
K50LGRA1YPQP	cable with connector, M12 x 1	w087	d422
K80LGRA1YP	cable	w087	d423
K80LGRA1YPQ	connector, M12 x 1	w087	d424
K80LGRA1YPQP	cable with connector, M12 x 1	w087	d425

EZ-LIGHT – 3 LED colors – Pulsed signal 75 dB



General data

**Operating voltage** 18...30 VDC

**Protection class** IP50

**Lens material** plastic

**Ambient temperature** -40...+50 °C

**Light type** green / red / yellow

**Response time** 250 ms

Types and data – selection table

Type	Electrical connection	w	d
K50LGRA2YP	cable	w087	d420
K50LGRA2YPQ	connector, M12 x 1	w087	d421
K50LGRA2YPQP	cable with connector, M12 x 1	w087	d422
K80LGRA2YP	cable	w087	d423
K80LGRA2YPQ	connector, M12 x 1	w087	d424
K80LGRA2YPQP	cable with connector, M12 x 1	w087	d425

EZ-LIGHT – 3 LED colors – Continuous tone 95 dB



General data

**Operating voltage** 18...30 VDC

**Protection class** IP50

**Lens material** plastic

**Ambient temperature** -40...+50 °C

**Light type** green / red / yellow

**Response time** 250 ms

Types and data – selection table

Type	Electrical connection	w	d
K50LGRAL1YPQ	connector, M12 x 1	w087	d421
K80LGRAL1YPQ	connector, M12 x 1	w087	d424
K80LGRAL1YP	cable	w087	d423

## LED – Tower light TL50



TL50 tower lights indicate the operating status clearly throughout the entire production line. Each tower light is pre-assembled and preconfigured, featuring LEDs in different colors and with optional audible alert. The tower lights are easily installed, no matter if mounted directly on the machine, in the cabinet or at critical control points within the production line.

Up to five different color lights are combinable in a single tower and can be on simultaneously. The signal intensity of devices with audible alert is adjustable.

### Features

- Multicolor multisegment indicators
- Green, yellow, red, blue or white LEDs
- Optional audible alert with variable intensity (max. 95 dB)
- Longlife LED technology, low-power consumption
- Protection class IP67 (with audible function IP50)
- Water and oil-tight
- Insensitive to ambient lights, shock, vibration and electromagnetic interference
- Wide range of accessories for variable and easy mounting

### Type code TL50

TL50	BGYR	A	QP
------	------	---	----

TL50	Series	BGYR	LED colors	A	Audible alert
------	--------	------	------------	---	---------------

#### Series

**TL50** multifunction display TL50  
Ø 50 mm, different heights depending on number of LEDs  
**without audible alert**  
1) 61.2 mm  
2) 101.9 mm  
3) 142.6 mm  
4) 183.3 mm  
5) 224.0 mm  
**with audible alert**  
1) 92.0 mm  
2) 132.7 mm  
3) 173.4 mm  
4) 214.1 mm

#### LED colors

**B** blue  
**G** green  
**Y** yellow  
**R** red  
**W** white

#### Audible alert

**blank** without audible alert  
**A** with audible alert

QP	Electrical connection
----	-----------------------

#### Electrical connection

**blank** connection cable, 2 m  
**Q** connector, M12 x 1  
**QP** pigtail with connector, M12 x 1

## TL50 – 1 color



### General data

<b>Operating voltage</b>	18...30 VDC
<b>Dimensions</b>	50 x 61.2 mm
<b>Protection class</b>	IP67

<b>Housing material</b>	plastic, polycarbonate/ABS
<b>Ambient temperature</b>	-40...+50 °C
<b>Response time</b>	10 ms

### Types and data – selection table

Type	Electrical connection	Light type	w	d
TL50R	cable	red	w088	d426
TL50RQ	connector, M12 x 1	red	w088	d427
TL50RQP	cable with connector, M12 x 1	red	w088	d428
TL50YQ	connector, M12 x 1	yellow	w088	d427
TL50WQ	connector, M12 x 1	white	w088	d427

## TL50 – 2 colors



### General data

<b>Operating voltage</b>	18...30 VDC
<b>Dimensions</b>	50 x 101.9 mm
<b>Protection class</b>	IP67

<b>Housing material</b>	plastic, polycarbonate/ABS
<b>Ambient temperature</b>	-40...+50 °C
<b>Response time</b>	10 ms

### Types and data – selection table

Type	Electrical connection	Light type	w	d
TL50GR	cable	green / red	w088	d429
TL50GRQ	connector, M12 x 1	green / red	w088	d430
TL50GRQP	cable with connector, M12 x 1	green / red	w088	d431
TL50WRQ	connector, M12 x 1	white / red	w088	d430

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

e Excess gain curves on page 922 ff

## TL50 – 3 colors



**General data**

**Operating voltage** 18...30 VDC  
**Dimensions** 50 x 142.6 mm  
**Protection class** IP67

**Housing material** plastic, polycarbonate/ABS  
**Ambient temperature** -40...+50 °C  
**Response time** 10 ms

**Types and data – selection table**

Type	Electrical connection	Light type	w	d
TL50GYR	cable	green / red / yellow	w088	d432
TL50GYRQ	connector, M12 x 1	green / red / yellow	w088	d433
TL50GYRQP	cable with connector, M12 x 1	green / red / yellow	w088	d434
TL50YBRQ	connector, M12 x 1	yellow	w088	d433

## TL50 – 4 colors



**General data**

**Operating voltage** 18...30 VDC  
**Dimensions** 50 x 183.3 mm  
**Protection class** IP67  
**Housing material** plastic, polycarbonate/ABS

**Ambient temperature** -40...+50 °C  
**Light type** green / red / yellow / blue  
**Response time** 10 ms

**Types and data – selection table**

Type	Electrical connection	w	d
TL50BGRQ	connector, M12 x 1	w089	d435
TL50BGRQP	cable with connector, M12 x 1	w089	d436
TL50BGR	cable	w089	d437



## TL50 – 5 colors



### General data

#### Operating voltage

18...30 VDC

#### Dimensions

50 x 224 mm

#### Protection class

IP67

#### Housing material

plastic, polycarbonate/ABS

#### Ambient temperature

-40...+50 °C

#### Light type

green / red / yellow / blue / white

#### Response time

10 ms

### Types and data – selection table

Type	Electrical connection	w	d
TL50WBGYR	cable	w090	d438
TL50WBGYRQ	connector, M12 x 1	w090	d439
TL50WBGYRQP	cable with connector, M12 x 1	w090	d440

## TL50 – 1 color – Signal tone



### General data

#### Operating voltage

18...30 VDC

#### Dimensions

50 x 92 mm

#### Protection class

IP50

#### Housing material

plastic, polycarbonate/ABS

#### Ambient temperature

-20...+50 °C

#### Light type

red

#### Response time

10 ms

### Types and data – selection table

Type	Electrical connection	w	d
TL50RA	cable	w088	d441
TL50RAQ	connector, M12 x 1	w088	d442
TL50RAQP	cable with connector, M12 x 1	w088	d443

## TL50 – 2 colors – Signal tone



<b>General data</b>			
<b>Operating voltage</b>	18...30 VDC	<b>Ambient temperature</b>	-20...+50 °C
<b>Dimensions</b>	50 x 132.7 mm	<b>Light type</b>	green / red
<b>Protection class</b>	IP50	<b>Response time</b>	10 ms
<b>Housing material</b>	plastic, polycarbonate/ABS		

### Types and data – selection table

Type	Electrical connection	w	d
TL50GRAQP	cable with connector, M12 x 1	w088	d444
TL50GRAQ	connector, M12 x 1	w088	d445
TL50GRA	cable	w088	d446

## TL50 – 3 colors – Signal tone



<b>General data</b>			
<b>Operating voltage</b>	18...30 VDC	<b>Ambient temperature</b>	-20...+50 °C
<b>Dimensions</b>	50 x 173.4 mm	<b>Light type</b>	green / red / yellow
<b>Protection class</b>	IP50	<b>Response time</b>	10 ms
<b>Housing material</b>	plastic, polycarbonate/ABS		

### Types and data – selection table

Type	Electrical connection	w	d
TL50GYRA	cable	w089	d447
TL50GYRAQ	connector, M12 x 1	w089	d448
TL50GYRAQP	cable with connector, M12 x 1	w089	d449

## TL50 – 4 colors – Signal tone



### General data

#### Operating voltage

18...30 VDC

#### Dimensions

50 x 214.1 mm

#### Protection class

IP50

#### Housing material

plastic, polycarbonate/ABS

#### Ambient temperature

-20...+50 °C

#### Light type

green / red / yellow / blue

#### Response time

10 ms

### Types and data – selection table

Type	Electrical connection	w	d
TL50BGYRA	cable	w090	d450
TL50BGYRAQP	cable with connector, M12 x 1	w090	d451
TL50BGYRAQ	connector, M12 x 1	w090	d452

# Switching light screen LX



The LX switching light screen detects very small but also extremely flat objects, for example a sheet of paper or an envelope. Typical applications are counting tasks or parcel handling on conveyor belts. The two-piece system consists of an emitter and a receiver identical in size and range.

The distance between emitter and receiver can be up to 75 mm for short-range applications and 200 mm to 2 m for standard-range applications. High reliability and precision is achieved through a 5 ms switch-off delay.

## Features

- Switching light screen
- Multiple-beam infrared pattern
- Detects small and extremely flat objects of 5.6 or 9.5 mm
- Available in different sizes 113, 189, 342 mm
- Sensing ranges from 75 mm to 2 m
- Response time in 0.8 to 3.2 ms
- Simple wiring, synchronizing line is not required
- NPN and PNP transistor outputs
- Rugged IP67 rated housing
- Temperature range: -20...+70 °C

## Type code LX - Switching light screens



**Series**

**LX** switching light screen  
height: 31.8 mm, depth: 25.4 mm  
other heights  
LX3 = 113.4 mm  
LX6 = 189.6 mm  
LX9 = 265.8 mm  
LX12 = 342.0 mm  
LX15 = 418.2 mm  
LX18 = 494.4 mm  
LX21 = 570.6 mm  
LX24 = 646.8 mm

**Monitored field [height mm]**

3	67 mm
6	143 mm
9	218 mm
12	295 mm
15	371 mm
18	447 mm
21	523 mm
24	99 mm

**Sensor type**

R	receiver
E	emitter



**Resolution**

SR	minimum object size 5.6 mm
blank	minimum object size 9.5 mm

**Electrical connection**

Q	pigtail with connector, M12 x 1
blank	connection cable, 2 m

## LX – Emitter



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	Metal, AL
<b>Power-on, indicator</b>	LED	<b>Lens material</b>	plastic
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Protection class</b>	IP67	<b>Light type</b>	IR

### Types and data – selection table

Type	Dimensions	Electrical connection	Range	Detection zone height	w	d
LX12ESR	25.4 x 342 x 31.8 mm	cable	75...200 mm	295 mm	w091	d453
LX12ESRQ	25.4 x 342 x 31.8 mm	cable with connector, M12 x 1	75...200 mm	295 mm	w091	d453
LX6ESR	25.4 x 189.6 x 31.8 mm	cable	75...200 mm	143 mm	w091	d454
LX6ESRQ	25.4 x 189.6 x 31.8 mm	cable with connector, M12 x 1	75...200 mm	143 mm	w091	d454
LX3ESR	25.4 x 113.4 x 31.8 mm	cable	75...200 mm	67 mm	w091	d455
LX3ESRQ	25.4 x 113.4 x 31.8 mm	cable with connector, M12 x 1	75...200 mm	67 mm	w091	d455
LX12E	25.4 x 342 x 31.8 mm	cable	300...2000 mm	295 mm	w091	d453
LX12EQ	25.4 x 342 x 31.8 mm	cable with connector, M12 x 1	300...2000 mm	295 mm	w091	d453
LX6E	25.4 x 189.6 x 31.8 mm	cable	300...2000 mm	143 mm	w091	d454
LX6EQ	25.4 x 189.6 x 31.8 mm	cable with connector, M12 x 1	300...2000 mm	143 mm	w091	d454
LX3E	25.4 x 113.4 x 31.8 mm	cable	300...2000 mm	67 mm	w091	d455
LX3EQ	25.4 x 113.4 x 31.8 mm	cable with connector, M12 x 1	300...2000 mm	67 mm	w091	d455

## LX – Receiver



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	Metal, AL
<b>Error message type</b>	LED	<b>Lens material</b>	plastic
<b>Output</b>	—, pnp/npn	<b>Ambient temperature</b>	-20...+70 °C
<b>Protection class</b>	IP67		

Types and data – selection table

Type	Switching frequency	Dimensions	Electrical connection	Range	Detection zone height	w	d
LX12RSRQ	≤ 85 Hz	25.4 x 342 x 31.8 mm	cable with connector, M12 x 1	75...200 mm	295 mm	w092	d453
LX12RSR	≤ 85 Hz	25.4 x 342 x 31.8 mm	cable	75...200 mm	295 mm	w092	d453
LX6RSR	≤ 120 Hz	25.4 x 189.6 x 31.8 mm	cable	75...200 mm	143 mm	w092	d454
LX6RSRQ	≤ 120 Hz	25.4 x 189.6 x 31.8 mm	cable with connector, M12 x 1	75...200 mm	143 mm	w092	d454
LX3RSR	≤ 150 Hz	25.4 x 113.4 x 31.8 mm	cable	75...200 mm	67 mm	w092	d455
LX3RSRQ	≤ 150 Hz	25.4 x 113.4 x 31.8 mm	cable with connector, M12 x 1	75...200 mm	67 mm	w092	d455
LX12R	≤ 85 Hz	25.4 x 342 x 31.8 mm	cable	300...2000 mm	295 mm	w092	d453
LX12RQ	≤ 85 Hz	25.4 x 342 x 31.8 mm	cable with connector, M12 x 1	300...2000 mm	295 mm	w092	d453
LX6R	≤ 120 Hz	25.4 x 189.6 x 31.8 mm	cable	300...2000 mm	143 mm	w092	d454
LX6RQ	≤ 120 Hz	25.4 x 189.6 x 31.8 mm	cable with connector, M12 x 1	300...2000 mm	143 mm	w092	d454
LX3R	≤ 150 Hz	25.4 x 113.4 x 31.8 mm	cable	300...2000 mm	67 mm	w092	d455
LX3RQ	≤ 150 Hz	25.4 x 113.4 x 31.8 mm	cable with connector, M12 x 1	300...2000 mm	67 mm	w092	d455

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**e** Excess gain curves on page 922 ff

# Measuring light screen EZ-ARRAY™



The measuring light screen EZ-ARRAY is ideal for hole sizing, product sizing and profiling, edge and center guarding, loop tension control and parts counting.

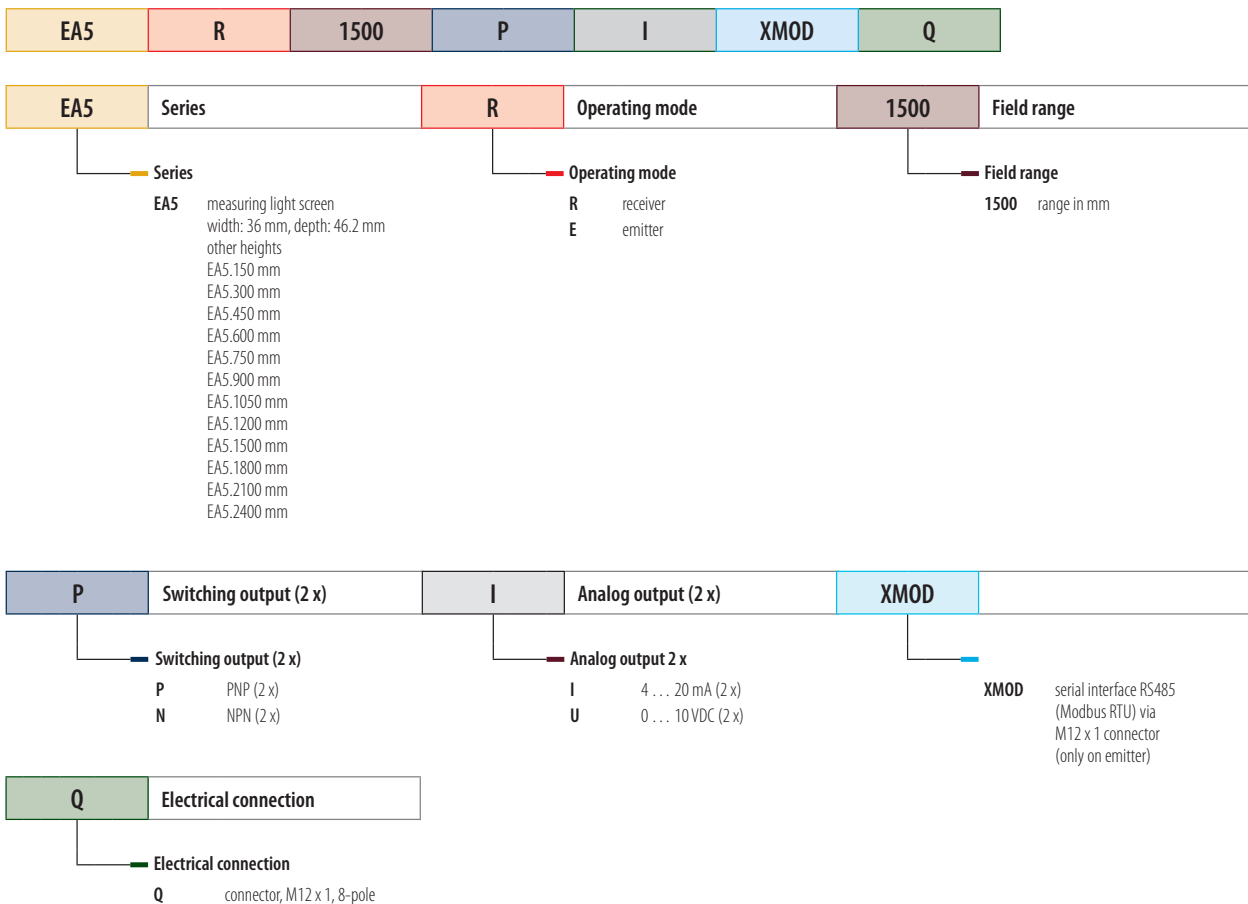
The controller functionality is integrated in the receiver and can be configured via 6 DIP switches. Status and alignment of emitter and receiver are indicated by a 3-digit display and LED bargraph. The light screen can be configured alternatively via RS485 interface at the receiver (software included in delivery).

The EZ-ARRAY can be adjusted to almost any application with a resolution limit above 5 mm. The functionality comprises first, last or middle beam blocked, number of beams blocked, invert and blanking.

## Features

- Measuring light screen with multiple operating modes
- Adjustable resolution 5 mm and higher
- Range up to 4 m
- Two-piece device with controller functionality integrated in receiver
- Configuration via DIP switch or software
- Serial interface RS485 Modbus-RTU
- Two switching outputs (PNP or NPN) and two analog outputs (0...10 V or 4...20 mA)
- Display and LED bargraph for status indication
- Temperature range -40...+70 °C
- Protection class IP65

## Type code EZ-ARRAY - Measuring light screens







## EZ-ARRAY – Emitter



### General data

<b>Operating voltage</b>	12...30 VDC	<b>Electrical connection</b>	connector, M12 x 1
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Protection class</b>	IP65	<b>Light type</b>	IR
<b>Housing material</b>	metal, AL, anodized	<b>Range</b>	400...4000 mm
<b>Lens material</b>	plastic		


### Types and data – selection table

Type	Dimensions	Detection zone height		
EA5E150Q	36 x 227 x 45.2 mm	150 mm	w093	d456
EA5E300Q	36 x 379 x 45.2 mm	300 mm	w093	d456
EA5E450Q	36 x 529 x 45.2 mm	450 mm	w093	d456
EA5E600Q	36 x 678 x 45.2 mm	600 mm	w093	d456
EA5E750Q	36 x 828 x 45.2 mm	750 mm	w093	d456
EA5E900Q	36 x 978 x 45.2 mm	900 mm	w093	d456
EA5E1050Q	36 x 1128 x 45.2 mm	1050 mm	w093	d456
EA5E1200Q	36 x 1278 x 45.2 mm	1200 mm	w093	d456
EA5E1500Q	36 x 1578 x 45.2 mm	1500 mm	w093	d456
EA5E1800Q	36 x 1878 x 45.2 mm	1800 mm	w093	d456
EA5E2100Q	36 x 2178 x 45.2 mm	2100 mm	w093	d456
EA5E2400Q	36 x 2478 x 45.2 mm	2400 mm	w093	d456

## EZ-ARRAY – Receiver – Switching and current output



### General data

<b>Operating voltage</b>	12...30 VDC	<b>Electrical connection</b>	connector, M12 x 1
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	IR
<b>Output</b>	2 x  , PNP/analog output	<b>Range</b>	400...4000 mm
<b>Protection class</b>	IP65	<b>Analog output</b>	4...20 mA
<b>Housing material</b>	metal, AL, anodized	<b>Load</b>	≤ 1350 Ω
<b>Lens material</b>	plastic		


Types and data – selection table

Type	Dimensions	Response time	Detection zone height	w	d
EA5R150PIXMODQ	36 x 227 x 45.2 mm	2.8 ms	150 mm	w094	d457
EA5R300PIXMODQ	36 x 379 x 45.2 mm	5 ms	300 mm	w094	d457
EA5R450PIXMODQ	36 x 529 x 45.2 mm	7.1 ms	450 mm	w094	d457
EA5R600PIXMODQ	36 x 678 x 45.2 mm	9.3 ms	600 mm	w094	d457
EA5R750PIXMODQ	36 x 828 x 45.2 mm	11.4 ms	750 mm	w094	d457
EA5R900PIXMODQ	36 x 978 x 45.2 mm	13.6 ms	900 mm	w094	d457
EA5R1050PIXMODQ	36 x 1128 x 45.2 mm	15.7 ms	1050 mm	w094	d457
EA5R1200PIXMODQ	36 x 1278 x 45.2 mm	17.9 ms	1200 mm	w094	d457
EA5R1500PIXMODQ	36 x 1578 x 45.2 mm	22.2 ms	1500 mm	w094	d457
EA5R1800PIXMODQ	36 x 1878 x 45.2 mm	26.5 ms	1800 mm	w094	d457
EA5R2100PIXMODQ	36 x 2178 x 45.2 mm	30.8 ms	2100 mm	w094	d457
EA5R2400PIXMODQ	36 x 2478 x 45.2 mm	35.1 ms	2400 mm	w094	d457

## EZ-ARRAY – Receiver – Switching and voltage output



General data

<b>Operating voltage</b>	15...30 VDC	<b>Electrical connection</b>	connector, M12 x 1
<b>Error message type</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Indication of excess gain type</b>	LED	<b>Light type</b>	IR
<b>Output</b>	2 x  , PNP/analog output	<b>Range</b>	400...4000 mm
<b>Protection class</b>	IP65	<b>Analog output</b>	0...10 V
<b>Housing material</b>	metal, AL, anodized	<b>Load</b>	≥ 2000 Ω
<b>Lens material</b>	plastic		

Types and data – selection table

Type	Dimensions	Response time	Detection zone height	w	d
EA5R150PUXMODQ	36 x 227 x 45.2 mm	2.8 ms	150 mm	w094	d457
EA5R300PUXMODQ	36 x 379 x 45.2 mm	5 ms	300 mm	w094	d457
EA5R450PUXMODQ	36 x 529 x 45.2 mm	7.1 ms	450 mm	w094	d457
EA5R600PUXMODQ	36 x 678 x 45.2 mm	9.3 ms	600 mm	w094	d457
EA5R750PUXMODQ	36 x 828 x 45.2 mm	11.4 ms	750 mm	w094	d457
EA5R900PUXMODQ	36 x 978 x 45.2 mm	13.6 ms	900 mm	w094	d457
EA5R1050PUXMODQ	36 x 1128 x 45.2 mm	15.7 ms	1050 mm	w094	d457
EA5R1200PUXMODQ	36 x 1278 x 45.2 mm	17.9 ms	1200 mm	w094	d457
EA5R1500PUXMODQ	36 x 1578 x 45.2 mm	22.2 ms	1500 mm	w094	d457
EA5R1800PUXMODQ	36 x 1878 x 45.2 mm	26.5 ms	1800 mm	w094	d457
EA5R2100PUXMODQ	36 x 2178 x 45.2 mm	30.8 ms	2100 mm	w094	d457
EA5R2400PUXMODQ	36 x 2478 x 45.2 mm	35.1 ms	2400 mm	w094	d457

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**e** Excess gain curves on page 922 ff



# At a glance

## Pressure sensors



### Pressure sensors – Reliability and flexibility on highest levels

Pressure is most commonly detected and monitored in applications of process and manufacturing industries. Equally complex are the demands on pressure sensors:

Whether applied in standard systems or exposed to extreme temperature changes, vibration, impacts or aggressive media: Each application requires a perfect solution in every respect. High-quality materials, flexible process connections, easy programming as well as highest accuracy and many display functions are therefore essential standards of electronic pressure measurement.

Pressure is not measured as a general physical property; a pressure value has rather a special reference. The positive and negative pressure is defined as the difference between the measured pressure and the atmospheric pressure. Therefore, most measuring devices require a reference terminal open to the atmosphere. This type of pressure is also described as relative pressure or gauge.

The absolute pressure however is related to a vacuum. In actual practice, the reference side of the measuring device is hermetically sealed. The pressure and temperature of gases are mainly regulated this way in industrial applications. With regard to differential pressure, the process pressure is connected to the reference side of the device. Filling levels, flow rates and leaks are detected by this means in systems.

Most electronic pressure sensors transduce the measured pressure in deformation force which is subsequently converted into an electrical signal by strain gauges, piezo-crystals, piezoresistive, capacitive or inductive measuring principles.

TURCK pressure sensors detect and measure absolute, relative pressure as reference pressures of liquids, gases and air in nearly all industrial applications and under the most diverse conditions. The **PK series** is especially designed for pneumatic and vacuum applications. Rugged, compact and at the same time lightweight designed, these sensors are made for handling and automation systems.

Ideally suited for demanding hydraulic and pneumatic systems are pressure sensors of the **PS series**. The devices are incorporated in a stainless steel housing and operate with a ceramic measuring cell. Different versions with switching and analog output as well as 4-digit 7-segment display are user friendly and easily integrated in your system. Open standards such as VDMA menu guide and IO-Link are also supported.

The **PT-series** features transmitter in robust cylindrical housings made of stainless steel, without display and with linear current or voltage output.

More information on the **PS series** on p. 456, **PK series** on p. 521 and **PT series** on p. 529.



# Our strengths...



## The full range of performance

The sensors of this series cover all important pressure ranges from -1...+600 bar with an accuracy of 0.5% f.s.. Bar, psi and further 12 standard pressure units can be selected for measurement. The 4-digit 7-segment LED display indicates the pressure status and makes programming more comfortable. The devices are available with two transistor switching

outputs or with one switching and one analog output. High EMC immunity and protection classes IP67/IP69K guarantee reliable operation, even under harsh conditions. All sensors are equipped with an IO-Link interface. Flexible integration and diagnostics is guaranteed, making the PS series a cost-effective solution.



## Clearly visible display

The 4-digit 7-segment display indicates the applied pressure during normal operation and is easily programmed. The sloped display allows the sensors to be mounted on top or in front according

to the position of the process connection. The read direction can be reversed by 180° degrees via software. Values are thus perfectly readable, even if the sensor is mounted horizontally.



## Flexible mounting

Inclined by 45° the display is well readable from any position and even from a great distance. After locking the pressure connection, the PS500 can be moved in any desired position because it is freely rotatable. Once the final position is ac-

quired, the device is fixed in place with a second coupling nut. Special mounting aids are not required. With a diameter of only 34 mm, several sensors can be mounted side by side in confined spaces.



### Easy programming

Thanks to the user friendly menu guide parameters such as switch and release points, output type, analog range and various other special functions are easily taught. The PS sensors are programmed with the buttons MODE and SET. Tools

are not needed to view the parameter values. To avoid accidental changes of programmed data, the ENTER button for storing the values is recessed. The button can only be pressed with a pointed object, such as a ball pen for example.



### Rugged design

The sensor body, process and electrical connection of the PS series are made of stainless steel. Based on proven ceramic component technology, these shock and vibration proof sensors operate safely and reliably even in harsh environments. All sensors feature excellent EMC proper-

ties and are IP67 or IP69K protected. Even in an undesired exceptional situation, safety comes first: Should the measuring cell burst, a patented medium-stop system prevents the discharge of liquids up to a pressure of 2400 bar, depending on the medium temperature.



# Your advantages...

## Your advantages...



### High system availability

The PS series excels in excellent EMC properties and is IP67 rated. Sensor body pressure and electrical connection are made of stainless steel and are therefore highly reliable and rugged. Should the measuring cell burst, a patented medium-stop system prevents the discharge of liquids

up to a pressure of 2400 bar, depending on the medium temperature.

- Excellent EMC properties
- Protection against mechanical impacts is provided through a rugged design
- Short down-times through high system availability and short replacement times



### Extremely service-friendly

Due to the extremely flexible mounting options, user-friendly operation and high accuracy, the sensors offer you distinct and calculable advantages.

- Upper sensor part rotatable by 360° (PS500 series)

- Minimum maintenance effort through streamlined product range.
- Simple operation via two finger-operated pushbuttons
- Failsafe operation through a recessed ENTER button for the storage of values



### Efficient standardization

A single sensor replaces many „conventional“ types. Even if a PS sensor is applied to measure only half of its nominal pressure, it will operate highly accurate, as required by the machine engineering industry. Standardization helps to reduce the inventory which pays off for the customer.

- Only a few sensor versions are needed to cover a large range of applications
- Reduced training effort due to simple and failsafe operation
- High system safety achieved through a rugged design



# ventajas



## Maximum freedom

Due to many solutions achievable with only a few devices, the new sensors of the PS series offer maximum planning freedom, while minimizing the mounting efforts.

- Upper sensor part rotatable by 360°
- Display rotatable by 180°
- Sloped display by 45°
- Bright illuminated LED display legible at long ranges
- Highest accuracy, 0.5 % f.s.
- Two switching outputs or a combination of switching and analog output
- IO-Link communication
- VDMA menu guide (optional)

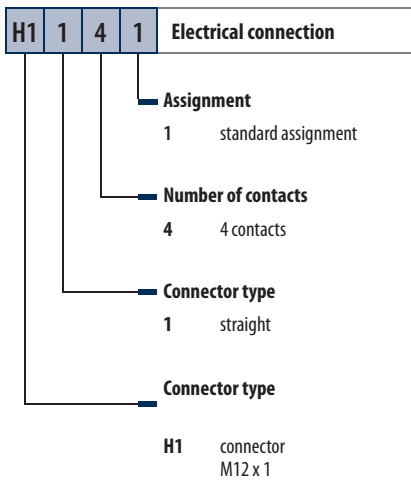
# Type code

PS	010V	Functional principle	-	5	01	Mechanical version	-	LI2U	PN	8	X	Electrical version	-
		<b>Measuring range</b> <b>01VR</b> Measuring range -1...0 bar g <sup>1)</sup> <b>001R</b> Measuring range 0...1 bar g <sup>1)</sup> <b>001V</b> Measuring range -1...1 bar g <sup>1)</sup> <b>003V</b> Measuring range -1...2.5 bar g <sup>1)</sup> <b>010V</b> Measuring range -1...10 bar g <b>016V</b> Measuring range -1...16 bar g <b>025V</b> Measuring range -1...25 bar g <b>040V</b> Measuring range -1...40 bar g <b>100R</b> Measuring range 0...100 bar g <b>250R</b> Measuring range 0...250 bar g <b>400R</b> Measuring range 0...400 bar g <b>600R</b> Measuring range 0...600 bar g <sup>2)</sup> <b>001A</b> Measuring range 0...1 bar a <sup>1) 3)</sup> <b>003A</b> Measuring range 0...2.5 bar a <sup>1) 3)</sup> <b>010A</b> Measuring range 0...10 bar a <sup>1) 3)</sup> <b>016A</b> Measuring range 0...16 bar a <sup>1) 3)</sup> <b>025A</b> Measuring range 0...25 bar a <sup>1) 3)</sup>			<b>Pressure connection</b> <b>01</b> G1/4" female thread <b>02</b> 1/4"-18NPT female thread <b>03</b> 1/4"-18NPT male thread <b>04</b> G1/4" male thread <b>05</b> 7/16" UNF male thread (only for design 6) <b>06</b> G3/4" male thread front-flush (only for design 6) <b>07</b> 1 1/2" Tri-Clamp (only for design 6) <b>08</b> G1/2" male thread manometer connection (only for design 5) <b>09</b> G1/2" male thread front-flush (only for design 6) <b>10</b> R 1/4" male thread <b>11</b> R 1/4" female thread  <b>Design</b> <b>3</b> adjustable, with display, non-rotatable sensor <b>5</b> adjustable, with display, rotatable sensor <b>6</b> adjustable, with display, non-rotatable sensor, diaphragm seal with front-flush			<b>Indication</b> <b>X...</b> LED display  <b>Voltage range</b> <b>8</b> 15 (18)...30 VDC  <b>Output mode</b> <b>PN</b> PNP/NPN output  <b>Output function</b> <b>2U</b> output 1: switching output output 2: switching output <b>LUU</b> output 1: switching output output 2: voltage output <b>LI2U</b> output 1: switching output output 2: current/switching output, reprogrammable					
		<b>Functional principle</b> <b>PS</b> pressure sensor  Special types for oxygen applications available on request!											

<sup>1)</sup> Not available for design/pressure connection 609

<sup>2)</sup> Not available for design 600

<sup>3)</sup> Not available for design 300



# Designs and variants

Page 467



**PS...-301**

G 1/4" female thread

**Mechanical connection**

connector, M12 x 1

**Electrical connection**

**Output 1 (PIN 4)**

switching output or IO-Link mode

**Output 2 (PIN 2)**

switching output  
analog or switching output  
analog output

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**PS...-302**

NPT1/4" - 18 female threads

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-303**

NPT 1/4" - 18 male thread

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-304**

G 1/4" male thread

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-310**

**Mechanical connection**

R1/4" female thread per DIN 2999

**Electrical connection**

connector, M12 x 1

**Output 1 (PIN 4)**

switching output or IO-Link mode

**Output 2 (PIN 2)**

switching output  
analog or switching output  
analog output

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**PS...-311**

R1/4" female thread per DIN 2999

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-501**

G 1/4" female thread

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-502**

NPT1/4" - 18 female threads

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

# Designs and variants

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**PS...-503**

NPT 1/4" - 18 male thread

**Mechanical connection**

connector, M12 x 1

**Electrical connection**

**Output 1 (PIN 4)**

switching output or IO-Link mode

**Output 2 (PIN 2)**

switching output  
analog or switching output  
analog output

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**PS...-504**

G 1/4" male thread

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-505**

7/16-20 UNF

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-508**

G 1/2" male threaded manometer acc. to DIN 3852-E

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output



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**PS...-510**

**Mechanical connection**

R1/4" female thread per DIN 2999

**Electrical connection**

connector, M12 x 1

**Output 1 (PIN 4)**

switching output or IO-Link mode

**Output 2 (PIN 2)**

switching output  
analog or switching output  
analog output

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**PS...-511**

R1/4" female thread per DIN 2999

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-606**

G 3/4" front flush

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

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**PS...-609**

G 1/2" front flush

connector, M12 x 1

switching output or IO-Link mode

switching output  
analog or switching output  
analog output

## PS300 series – For hydraulic applications

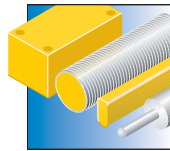


The PS300 series has been designed especially for hydraulic applications. The devices operate with a ceramic measuring cell. Available are versions with two switching outputs or one switching and one analog output. IO-Link communication is integrated as a standard. Highest process safety is achieved through a stainless steel housing, fully encapsulated electronics and protection class IP69K.

### Features

- IO-Link capable
- Measuring range -1...600 bar
- Fully encapsulated stainless steel housing
- Protection class IP69K
- VDMA menu guide (optional)
- Permanent indication of pressure (bar, psi, kPa, MPa, misc)
- Highest pressure resistance

### Properties



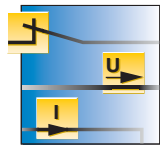
#### Design

Cylindrical design, non-rotatable, with display



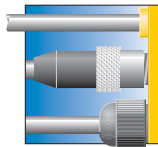
#### Measuring ranges

-1...600 bar relative pressure



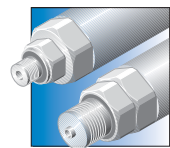
#### Electrical versions

IO-Link capable, dual-channel, switching, current or voltage output



#### Electrical connections

4-pole M12 x 1 plug connection



#### Mechanical connections

G1/4", 1/4" NPT, R1/4" male or female thread



#### Special features


Failsafe 3-key operation, VDMA menu guide (optional), IP67, fully encapsulated electronics





## G1/4" – Female – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient span <math>T_{k5}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	G 1/4" female thread


### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS01VR-301-2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w095	d458
PS001R-301-2UPN8X-H1141	0...1 bar rel.	5.5 bar	w095	d458
PS001V-301-2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w095	d458
PS003V-301-2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w095	d458
PS010V-301-2UPN8X-H1141	-1...10 bar rel.	50 bar	w095	d458
PS016V-301-2UPN8X-H1141	-1...16 bar rel.	80 bar	w095	d458
PS025V-301-2UPN8X-H1141	-1...25 bar rel.	120 bar	w095	d458
PS040V-301-2UPN8X-H1141	-1...40 bar rel.	200 bar	w095	d458
PS100R-301-2UPN8X-H1141	0...100 bar rel.	450 bar	w095	d458
PS250R-301-2UPN8X-H1141	0...250 bar rel.	600 bar	w095	d458
PS400R-301-2UPN8X-H1141	0...400 bar rel.	800 bar	w095	d458
PS600R-301-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d458

## G1/4" – Female – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/0...20/20...4/ 20...0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" female thread

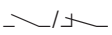
### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-301-LI2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w096	d458
PS001R-301-LI2UPN8X-H1141	0...1 bar rel.	5.5 bar	w096	d458
PS001V-301-LI2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w096	d458
PS003V-301-LI2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w096	d458
PS010V-301-LI2UPN8X-H1141	-1...10 bar rel.	50 bar	w096	d458
PS016V-301-LI2UPN8X-H1141	-1...16 bar rel.	80 bar	w096	d458
PS025V-301-LI2UPN8X-H1141	-1...25 bar rel.	120 bar	w096	d458
PS040V-301-LI2UPN8X-H1141	-1...40 bar rel.	200 bar	w096	d458
PS100R-301-LI2UPN8X-H1141	0...100 bar rel.	450 bar	w096	d458
PS250R-301-LI2UPN8X-H1141	0...250 bar rel.	600 bar	w096	d458
PS400R-301-LI2UPN8X-H1141	0...400 bar rel.	800 bar	w096	d458
PS600R-301-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d458



## G1/4" – Female – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" female thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS01VR-301-LUUPN8X-H1141	-1...0 bar rel.	5.5 bar	w097	d458
PS001R-301-LUUPN8X-H1141	0...1 bar rel.	5.5 bar	w097	d458
PS001V-301-LUUPN8X-H1141	-1...1 bar rel.	5.5 bar	w097	d458
PS003V-301-LUUPN8X-H1141	-1...2.5 bar rel.	12 bar	w097	d458
PS010V-301-LUUPN8X-H1141	-1...10 bar rel.	50 bar	w097	d458
PS016V-301-LUUPN8X-H1141	-1...16 bar rel.	80 bar	w097	d458
PS025V-301-LUUPN8X-H1141	-1...25 bar rel.	120 bar	w097	d458
PS040V-301-LUUPN8X-H1141	-1...40 bar rel.	200 bar	w097	d458
PS100R-301-LUUPN8X-H1141	0...100 bar rel.	450 bar	w097	d458
PS250R-301-LUUPN8X-H1141	0...250 bar rel.	600 bar	w097	d458
PS400R-301-LUUPN8X-H1141	0...400 bar rel.	800 bar	w097	d458
PS600R-301-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d458

 Wiring diagrams on page 832 ff

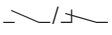
 Dimension drawing on page 842 ff

 Accessories on page 772 ff



## 1/4" NPT – Female – 2 switching outputs



### General data


<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient span <math>T_{k5}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	NPT1/4" - 18 female threads

### Types and data – selection table



Type	Measuring range	Admissible overpressure		
PS01VR-302-2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w095	d459
PS001R-302-2UPN8X-H1141	0...1 bar rel.	5.5 bar	w095	d459
PS001V-302-2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w095	d459
PS003V-302-2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w095	d459
PS010V-302-2UPN8X-H1141	-1...10 bar rel.	50 bar	w095	d459
PS016V-302-2UPN8X-H1141	-1...16 bar rel.	80 bar	w095	d459
PS025V-302-2UPN8X-H1141	-1...25 bar rel.	120 bar	w095	d459
PS040V-302-2UPN8X-H1141	-1...40 bar rel.	200 bar	w095	d459
PS100R-302-2UPN8X-H1141	0...100 bar rel.	450 bar	w095	d459
PS250R-302-2UPN8X-H1141	0...250 bar rel.	600 bar	w095	d459
PS400R-302-2UPN8X-H1141	0...400 bar rel.	800 bar	w095	d459
PS600R-302-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d459

## 1/4" NPT – Female – 1 switching and 1 current output



<b>General data</b>			
<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	NPT1/4" - 18 female threads


### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS01VR-302-LI2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w096	d459
PS001R-302-LI2UPN8X-H1141	0...1 bar rel.	5.5 bar	w096	d459
PS001V-302-LI2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w096	d459
PS003V-302-LI2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w096	d459
PS010V-302-LI2UPN8X-H1141	-1...10 bar rel.	50 bar	w096	d459
PS016V-302-LI2UPN8X-H1141	-1...16 bar rel.	80 bar	w096	d459
PS025V-302-LI2UPN8X-H1141	-1...25 bar rel.	120 bar	w096	d459
PS040V-302-LI2UPN8X-H1141	-1...40 bar rel.	200 bar	w096	d459
PS100R-302-LI2UPN8X-H1141	0...100 bar rel.	450 bar	w096	d459
PS250R-302-LI2UPN8X-H1141	0...250 bar rel.	600 bar	w096	d459
PS400R-302-LI2UPN8X-H1141	0...400 bar rel.	800 bar	w096	d459
PS600R-302-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d459

## 1/4" NPT – Female – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	NPT1/4" - 18 female threads

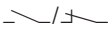
### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-302-LUUPN8X-H1141	-1...0 bar rel.	5.5 bar	w097	d459
PS001R-302-LUUPN8X-H1141	0...1 bar rel.	5.5 bar	w097	d459
PS001V-302-LUUPN8X-H1141	-1...1 bar rel.	5.5 bar	w097	d459
PS003V-302-LUUPN8X-H1141	-1...2.5 bar rel.	12 bar	w097	d459
PS010V-302-LUUPN8X-H1141	-1...10 bar rel.	50 bar	w097	d459
PS016V-302-LUUPN8X-H1141	-1...16 bar rel.	80 bar	w097	d459
PS025V-302-LUUPN8X-H1141	-1...25 bar rel.	120 bar	w097	d459
PS040V-302-LUUPN8X-H1141	-1...40 bar rel.	200 bar	w097	d459
PS100R-302-LUUPN8X-H1141	0...100 bar rel.	450 bar	w097	d459
PS250R-302-LUUPN8X-H1141	0...250 bar rel.	600 bar	w097	d459
PS400R-302-LUUPN8X-H1141	0...400 bar rel.	800 bar	w097	d459
PS600R-302-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d459



## 1/4" NPT – Male – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient span <math>T_{k5}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	NPT 1/4" - 18 male thread


### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS01VR-303-2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w095	d460
PS001R-303-2UPN8X-H1141	0...1 bar rel.	5.5 bar	w095	d460
PS001V-303-2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w095	d460
PS003V-303-2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w095	d460
PS010V-303-2UPN8X-H1141	-1...10 bar rel.	50 bar	w095	d460
PS016V-303-2UPN8X-H1141	-1...16 bar rel.	80 bar	w095	d460
PS025V-303-2UPN8X-H1141	-1...25 bar rel.	120 bar	w095	d460
PS040V-303-2UPN8X-H1141	-1...40 bar rel.	200 bar	w095	d460
PS100R-303-2UPN8X-H1141	0...100 bar rel.	450 bar	w095	d460
PS250R-303-2UPN8X-H1141	0...250 bar rel.	600 bar	w095	d460
PS400R-303-2UPN8X-H1141	0...400 bar rel.	800 bar	w095	d460
PS600R-303-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d460

## 1/4" NPT – Male – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	NPT 1/4" - 18 male thread

### Types and data – selection table


Type	Measuring range	Admissible overpressure	w	d
PS01VR-303-LI2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w096	d460
PS001R-303-LI2UPN8X-H1141	0...1 bar rel.	5.5 bar	w096	d460
PS001V-303-LI2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w096	d460
PS003V-303-LI2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w096	d460
PS010V-303-LI2UPN8X-H1141	-1...10 bar rel.	50 bar	w096	d460
PS016V-303-LI2UPN8X-H1141	-1...16 bar rel.	80 bar	w096	d460
PS025V-303-LI2UPN8X-H1141	-1...25 bar rel.	120 bar	w096	d460
PS040V-303-LI2UPN8X-H1141	-1...40 bar rel.	200 bar	w096	d460
PS100R-303-LI2UPN8X-H1141	0...100 bar rel.	450 bar	w096	d460
PS250R-303-LI2UPN8X-H1141	0...250 bar rel.	600 bar	w096	d460
PS400R-303-LI2UPN8X-H1141	0...400 bar rel.	800 bar	w096	d460
PS600R-303-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d460





## 1/4" NPT – Male – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	NPT 1/4" - 18 male thread

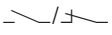
### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS01VR-303-LUUPN8X-H1141	-1...0 bar rel.	5.5 bar	w097	d460
PS001R-303-LUUPN8X-H1141	0...1 bar rel.	5.5 bar	w097	d460
PS001V-303-LUUPN8X-H1141	-1...1 bar rel.	5.5 bar	w097	d460
PS003V-303-LUUPN8X-H1141	-1...2.5 bar rel.	12 bar	w097	d460
PS010V-303-LUUPN8X-H1141	-1...10 bar rel.	50 bar	w097	d460
PS016V-303-LUUPN8X-H1141	-1...16 bar rel.	80 bar	w097	d460
PS025V-303-LUUPN8X-H1141	-1...25 bar rel.	120 bar	w097	d460
PS040V-303-LUUPN8X-H1141	-1...40 bar rel.	200 bar	w097	d460
PS100R-303-LUUPN8X-H1141	0...100 bar rel.	450 bar	w097	d460
PS250R-303-LUUPN8X-H1141	0...250 bar rel.	600 bar	w097	d460
PS400R-303-LUUPN8X-H1141	0...400 bar rel.	800 bar	w097	d460
PS600R-303-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d460



## G1/4" – Male – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	G 1/4" male thread


### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS01VR-304-2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w095	d461
PS001R-304-2UPN8X-H1141	0...1 bar rel.	5.5 bar	w095	d461
PS001V-304-2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w095	d461
PS003V-304-2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w095	d461
PS010V-304-2UPN8X-H1141	-1...10 bar rel.	50 bar	w095	d461
PS016V-304-2UPN8X-H1141	-1...16 bar rel.	80 bar	w095	d461
PS025V-304-2UPN8X-H1141	-1...25 bar rel.	120 bar	w095	d461
PS040V-304-2UPN8X-H1141	-1...40 bar rel.	200 bar	w095	d461
PS100R-304-2UPN8X-H1141	0...100 bar rel.	450 bar	w095	d461
PS250R-304-2UPN8X-H1141	0...250 bar rel.	600 bar	w095	d461
PS400R-304-2UPN8X-H1141	0...400 bar rel.	800 bar	w095	d461
PS600R-304-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d461



## G1/4" – Male – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" male thread


### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS01VR-304-LI2UPN8X-H1141	-1...0 bar rel.	5.5 bar	w096	d461
PS001R-304-LI2UPN8X-H1141	0...1 bar rel.	5.5 bar	w096	d461
PS001V-304-LI2UPN8X-H1141	-1...1 bar rel.	5.5 bar	w096	d461
PS003V-304-LI2UPN8X-H1141	-1...2.5 bar rel.	12 bar	w096	d461
PS010V-304-LI2UPN8X-H1141	-1...10 bar rel.	50 bar	w096	d461
PS016V-304-LI2UPN8X-H1141	-1...16 bar rel.	80 bar	w096	d461
PS025V-304-LI2UPN8X-H1141	-1...25 bar rel.	120 bar	w096	d461
PS040V-304-LI2UPN8X-H1141	-1...40 bar rel.	200 bar	w096	d461
PS100R-304-LI2UPN8X-H1141	0...100 bar rel.	450 bar	w096	d461
PS250R-304-LI2UPN8X-H1141	0...250 bar rel.	600 bar	w096	d461
PS400R-304-LI2UPN8X-H1141	0...400 bar rel.	800 bar	w096	d461
PS600R-304-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d461

## G1/4" – Male – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" male thread

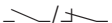
### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-304-LUUPN8X-H1141	-1...0 bar rel.	5.5 bar	w097	d461
PS001R-304-LUUPN8X-H1141	0...1 bar rel.	5.5 bar	w097	d461
PS001V-304-LUUPN8X-H1141	-1...1 bar rel.	5.5 bar	w097	d461
PS003V-304-LUUPN8X-H1141	-1...2.5 bar rel.	12 bar	w097	d461
PS010V-304-LUUPN8X-H1141	-1...10 bar rel.	50 bar	w097	d461
PS016V-304-LUUPN8X-H1141	-1...16 bar rel.	80 bar	w097	d461
PS025V-304-LUUPN8X-H1141	-1...25 bar rel.	120 bar	w097	d461
PS040V-304-LUUPN8X-H1141	-1...40 bar rel.	200 bar	w097	d461
PS100R-304-LUUPN8X-H1141	0...100 bar rel.	450 bar	w097	d461
PS250R-304-LUUPN8X-H1141	0...250 bar rel.	600 bar	w097	d461
PS400R-304-LUUPN8X-H1141	0...400 bar rel.	800 bar	w097	d461
PS600R-304-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d461



## R1/4" – Male – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999


### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS01VR-310-2UPN8X-H11141	-1...0 bar rel.	5.5 bar	w095	d462
PS001R-310-2UPN8X-H11141	0...1 bar rel.	5.5 bar	w095	d462
PS001V-310-2UPN8X-H11141	-1...1 bar rel.	5.5 bar	w095	d462
PS003V-310-2UPN8X-H11141	-1...2.5 bar rel.	12 bar	w095	d462
PS010V-310-2UPN8X-H11141	-1...10 bar rel.	50 bar	w095	d462
PS016V-310-2UPN8X-H11141	-1...16 bar rel.	80 bar	w095	d462
PS025V-310-2UPN8X-H11141	-1...25 bar rel.	120 bar	w095	d462
PS040V-310-2UPN8X-H11141	-1...40 bar rel.	200 bar	w095	d462
PS100R-310-2UPN8X-H11141	0...100 bar rel.	450 bar	w095	d462
PS250R-310-2UPN8X-H11141	0...250 bar rel.	600 bar	w095	d462
PS400R-310-2UPN8X-H11141	0...400 bar rel.	800 bar	w095	d462
PS600R-310-2UPN8X-H11141	0...600 bar rel.	900 bar	w095	d462

## R1/4" – Male – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

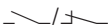
### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-310-LI2UPN8X-H11141	-1...0 bar rel.	5.5 bar	w096	d462
PS001R-310-LI2UPN8X-H11141	0...1 bar rel.	5.5 bar	w096	d462
PS001V-310-LI2UPN8X-H11141	-1...1 bar rel.	5.5 bar	w096	d462
PS003V-310-LI2UPN8X-H11141	-1...2.5 bar rel.	12 bar	w096	d462
PS010V-310-LI2UPN8X-H11141	-1...10 bar rel.	50 bar	w096	d462
PS016V-310-LI2UPN8X-H11141	-1...16 bar rel.	80 bar	w096	d462
PS025V-310-LI2UPN8X-H11141	-1...25 bar rel.	120 bar	w096	d462
PS040V-310-LI2UPN8X-H11141	-1...40 bar rel.	200 bar	w096	d462
PS100R-310-LI2UPN8X-H11141	0...100 bar rel.	450 bar	w096	d462
PS250R-310-LI2UPN8X-H11141	0...250 bar rel.	600 bar	w096	d462
PS400R-310-LI2UPN8X-H11141	0...400 bar rel.	800 bar	w096	d462
PS600R-310-LI2UPN8X-H11141	0...600 bar rel.	900 bar	w096	d462



## R1/4" – Male – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

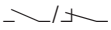
### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS01VR-310-LUUPN8X-H11141	-1...0 bar rel.	5.5 bar	w097	d462
PS001R-310-LUUPN8X-H11141	0...1 bar rel.	5.5 bar	w097	d462
PS001V-310-LUUPN8X-H11141	-1...1 bar rel.	5.5 bar	w097	d462
PS003V-310-LUUPN8X-H11141	-1...2.5 bar rel.	12 bar	w097	d462
PS010V-310-LUUPN8X-H11141	-1...10 bar rel.	50 bar	w097	d462
PS016V-310-LUUPN8X-H11141	-1...16 bar rel.	80 bar	w097	d462
PS025V-310-LUUPN8X-H11141	-1...25 bar rel.	120 bar	w097	d462
PS040V-310-LUUPN8X-H11141	-1...40 bar rel.	200 bar	w097	d462
PS100R-310-LUUPN8X-H11141	0...100 bar rel.	450 bar	w097	d462
PS250R-310-LUUPN8X-H11141	0...250 bar rel.	600 bar	w097	d462
PS400R-310-LUUPN8X-H11141	0...400 bar rel.	800 bar	w097	d462
PS600R-310-LUUPN8X-H11141	0...600 bar rel.	900 bar	w097	d462

## R1/4" – Female – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient span <math>T_{k5}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics $Al_2O_3$
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

### Types and data – selection table


Type	Measuring range	Admissible overpressure	w	d
PS01VR-311-2UPN8X-H11141	-1...0 bar rel.	5.5 bar	w095	d463
PS001R-311-2UPN8X-H11141	0...1 bar rel.	5.5 bar	w095	d463
PS001V-311-2UPN8X-H11141	-1...1 bar rel.	5.5 bar	w095	d463
PS003V-311-2UPN8X-H11141	-1...2.5 bar rel.	12 bar	w095	d463
PS010V-311-2UPN8X-H11141	-1...10 bar rel.	50 bar	w095	d463
PS016V-311-2UPN8X-H11141	-1...16 bar rel.	80 bar	w095	d463
PS025V-311-2UPN8X-H11141	-1...25 bar rel.	120 bar	w095	d463
PS040V-311-2UPN8X-H11141	-1...40 bar rel.	200 bar	w095	d463
PS100R-311-2UPN8X-H11141	0...100 bar rel.	450 bar	w095	d463
PS250R-311-2UPN8X-H11141	0...250 bar rel.	600 bar	w095	d463
PS400R-311-2UPN8X-H11141	0...400 bar rel.	800 bar	w095	d463
PS600R-311-2UPN8X-H11141	0...600 bar rel.	900 bar	w095	d463





## R1/4" – Female – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999


### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS01VR-311-LI2UPN8X-H11141	-1...0 bar rel.	5.5 bar	w096	d463
PS001R-311-LI2UPN8X-H11141	0...1 bar rel.	5.5 bar	w096	d463
PS001V-311-LI2UPN8X-H11141	-1...1 bar rel.	5.5 bar	w096	d463
PS003V-311-LI2UPN8X-H11141	-1...2.5 bar rel.	12 bar	w096	d463
PS010V-311-LI2UPN8X-H11141	-1...10 bar rel.	50 bar	w096	d463
PS016V-311-LI2UPN8X-H11141	-1...16 bar rel.	80 bar	w096	d463
PS025V-311-LI2UPN8X-H11141	-1...25 bar rel.	120 bar	w096	d463
PS040V-311-LI2UPN8X-H11141	-1...40 bar rel.	200 bar	w096	d463
PS100R-311-LI2UPN8X-H11141	0...100 bar rel.	450 bar	w096	d463
PS250R-311-LI2UPN8X-H11141	0...250 bar rel.	600 bar	w096	d463
PS400R-311-LI2UPN8X-H11141	0...400 bar rel.	800 bar	w096	d463
PS600R-311-LI2UPN8X-H11141	0...600 bar rel.	900 bar	w096	d463

## R1/4" – Female – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP69K / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-311-LUUPN8X-H11141	-1...0 bar rel.	5.5 bar	w097	d463
PS001R-311-LUUPN8X-H11141	0...1 bar rel.	5.5 bar	w097	d463
PS001V-311-LUUPN8X-H11141	-1...1 bar rel.	5.5 bar	w097	d463
PS003V-311-LUUPN8X-H11141	-1...2.5 bar rel.	12 bar	w097	d463
PS010V-311-LUUPN8X-H11141	-1...10 bar rel.	50 bar	w097	d463
PS016V-311-LUUPN8X-H11141	-1...16 bar rel.	80 bar	w097	d463
PS025V-311-LUUPN8X-H11141	-1...25 bar rel.	120 bar	w097	d463
PS040V-311-LUUPN8X-H11141	-1...40 bar rel.	200 bar	w097	d463
PS100R-311-LUUPN8X-H11141	0...100 bar rel.	450 bar	w097	d463
PS250R-311-LUUPN8X-H11141	0...250 bar rel.	600 bar	w097	d463
PS400R-311-LUUPN8X-H11141	0...400 bar rel.	800 bar	w097	d463
PS600R-311-LUUPN8X-H11141	0...600 bar rel.	900 bar	w097	d463

**w** Wiring diagrams on page 832 ff

**d** Dimension drawing on page 842 ff

**a** Accessories on page 772 ff

## PS500 series – For hydraulic and pneumatic applications

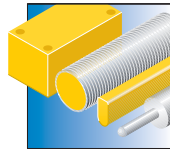


The PS500 sensors operate with ceramic measuring cells. Through pressure exerted on the ceramics a proportional signal is created and then electronically processed. Depending on the sensor version, the processed signal is either provided at a switching or an analog output. IO-Link communication is integrated as a standard. A rotatable sensor body, a large number of available thread types and an accuracy of 0.5% f.s. guarantee highest mounting flexibility and a save integration in the process.

### Features

- IO-Link capable
- Sensor rotatable by 360°
- 4-digit 7-segment display
- Measuring range -1...600 bar relative pressure
- Measuring range 0...25 bar absolute pressure
- Stainless steel housing
- Permanent display of pressure (bar, psi, kPa, MPa, misc)

### Properties



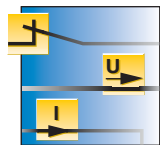
#### Design

Cylindrical design, rotatable by 360°, with display



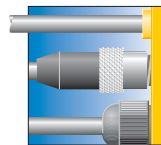
#### Measuring ranges

-1...600 bar relative and 0...25 bar absolute



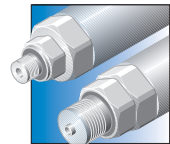
#### Electrical versions

IO-Link capable, dual-channel, switching, current or voltage output



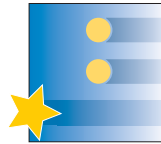
#### Electrical connections

4-pin M12 x 1 plug connection



#### Mechanical connections

G1/4", 1/4" NPT, R1/4" male or female thread, 7/16" UNF and G1/2" male thread



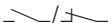
#### Special features

Fail-safe three-key operation, VDMA menu guide (optional), IP67



## G1/4" – Female – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	G 1/4" female thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS001R-501-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d464
PS001V-501-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d464
PS01VR-501-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d464
PS001A-501-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d464
PS003V-501-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d464
PS003A-501-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d464
PS010V-501-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d464
PS010A-501-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d464
PS016V-501-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d464
PS016A-501-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d464
PS025V-501-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d464
PS025A-501-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d464
PS040V-501-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d464
PS100R-501-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d464
PS250R-501-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d464
PS400R-501-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d464
PS600R-501-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d464

 Wiring diagrams on page 832 ff


 Dimension drawing on page 842 ff

 Accessories on page 772 ff

## G1/4" – Female – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" female thread


### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001A-501-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d464
PS001V-501-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d464
PS01VR-501-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d464
PS001R-501-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d464
PS003A-501-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d464
PS003V-501-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d464
PS010A-501-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d464
PS010V-501-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d464
PS016A-501-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d464
PS016V-501-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d464
PS025A-501-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d464
PS025V-501-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d464
PS040V-501-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d464
PS100R-501-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d464
PS250R-501-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d464
PS600R-501-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d464
PS400R-501-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d464



## G1/4" – Female – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" female thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS001A-501-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d464
PS001V-501-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d464
PS01VR-501-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d464
PS001R-501-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d464
PS003A-501-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d464
PS003V-501-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d464
PS010A-501-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d464
PS010V-501-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d464
PS016A-501-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d464
PS016V-501-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d464
PS025A-501-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d464
PS025V-501-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d464
PS040V-501-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d464
PS100R-501-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d464
PS250R-501-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d464
PS600R-501-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d464
PS400R-501-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d464

 Wiring diagrams on page 832 ff


 Dimension drawing on page 842 ff

 Accessories on page 772 ff

## 1/4" NPT – Female – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{k5}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	NPT1/4" - 18 female threads

### Types and data – selection table


Type	Measuring range	Admissible overpressure	w	d
PS001R-502-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d465
PS001V-502-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d465
PS01VR-502-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d465
PS001A-502-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d465
PS003V-502-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d465
PS003A-502-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d465
PS010V-502-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d465
PS010A-502-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d465
PS016V-502-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d465
PS016A-502-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d465
PS025V-502-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d465
PS025A-502-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d465
PS040V-502-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d465
PS100R-502-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d465
PS250R-502-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d465
PS400R-502-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d465
PS600R-502-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d465





## 1/4" NPT – Female – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	NPT1/4" - 18 female threads


### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS001A-502-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d465
PS001V-502-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d465
PS01VR-502-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d465
PS001R-502-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d465
PS003A-502-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d465
PS003V-502-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d465
PS010A-502-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d465
PS010V-502-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d465
PS016A-502-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d465
PS016V-502-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d465
PS025A-502-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d465
PS025V-502-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d465
PS040V-502-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d465
PS100R-502-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d465
PS250R-502-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d465
PS600R-502-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d465
PS400R-502-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d465

## 1/4" NPT – Female – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	NPT1/4" - 18 female threads

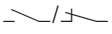
### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001A-502-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d465
PS001V-502-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d465
PS001R-502-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d465
PS01VR-502-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d465
PS003A-502-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d465
PS003V-502-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d465
PS010A-502-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d465
PS010V-502-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d465
PS016A-502-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d465
PS016V-502-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d465
PS025A-502-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d465
PS025V-502-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d465
PS040V-502-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d465
PS100R-502-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d465
PS250R-502-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d465
PS600R-502-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d465
PS400R-502-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d465



## 1/4" NPT – Male – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	NPT 1/4" - 18 male thread


### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS001R-503-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d466
PS001V-503-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d466
PS01VR-503-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d466
PS001A-503-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d466
PS003V-503-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d466
PS003A-503-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d466
PS010V-503-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d466
PS010A-503-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d466
PS016V-503-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d466
PS016A-503-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d466
PS025V-503-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d466
PS025A-503-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d466
PS040V-503-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d466
PS100R-503-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d466
PS250R-503-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d466
PS400R-503-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d466
PS600R-503-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d466

## 1/4" NPT – Male – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/0...20/20...4/ 20...0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	NPT 1/4" - 18 male thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001A-503-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d466
PS001V-503-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d466
PS01VR-503-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d466
PS001R-503-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d466
PS003A-503-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d466
PS003V-503-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d466
PS010A-503-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d466
PS010V-503-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d466
PS016A-503-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d466
PS016V-503-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d466
PS025A-503-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d466
PS025V-503-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d466
PS040V-503-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d466
PS100R-503-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d466
PS250R-503-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d466
PS600R-503-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d466
PS400R-503-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d466

## 1/4" NPT – Male – 1 switching and 1 voltage output



### General data

**Operating voltage** 18...30 VDC

**Protection type and class** IP67 / III

**Output 1 (PIN 4)** switching output or IO-Link mode

**Output 2 (PIN 2)** analogue output

**Output function**  , pnp/npn

**Switching point accuracy** 0.5% of full scale

**Repeatability** 0.1% of full scale

**Switching frequency** 180 Hz

**Voltage output, programmable** 0...10V/0...5V/  
1...6V/10...0V/  
5...0V/6...1V

**Accuracy (Lin. + Hys. + Rep.)** 0.5% of final value BSL

**Response time** 3 ms

**Temperature coefficient zero point T<sub>k0</sub>** 0.15% of full scale / 10 K

**Temperature coefficient span T<sub>ks</sub>** 0.15% of full scale / 10 K

**Medium temperature** -40...85 °C

**Ambient temperature** -40...80 °C

**Housing material** stainless-steel/  
plastic, 1.4305 (AISI 303)/PC  
**material pressure element** ceramics Al<sub>2</sub>O<sub>3</sub>

**Sealing material** FPM

**Electrical connection** connector, M12 x 1

**Mechanical connection** NPT 1/4" - 18 male thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001A-503-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d466
PS001V-503-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d466
PS001R-503-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d466
PS01VR-503-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d466
PS003A-503-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d466
PS003V-503-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d466
PS010A-503-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d466
PS010V-503-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d466
PS016A-503-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d466
PS016V-503-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d466
PS025A-503-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d466
PS025V-503-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d466
PS040V-503-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d466
PS100R-503-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d466
PS250R-503-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d466
PS600R-503-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d466
PS400R-503-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d466

w Wiring diagrams on page 832 ff

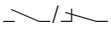
d Dimension drawing on page 842 ff

a Accessories on page 772 ff

## G1/4" – Male – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{k5}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	G 1/4" male thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001R-504-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d467
PS001V-504-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d467
PS01VR-504-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d467
PS001A-504-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d467
PS003V-504-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d467
PS003A-504-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d467
PS010V-504-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d467
PS010A-504-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d467
PS016V-504-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d467
PS016A-504-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d467
PS025V-504-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d467
PS025A-504-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d467
PS040V-504-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d467
PS100R-504-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d467
PS250R-504-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d467
PS400R-504-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d467
PS600R-504-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d467

## G1/4" – Male – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	— / —, pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" male thread


### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001A-504-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d467
PS001V-504-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d467
PS01VR-504-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d467
PS001R-504-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d467
PS003A-504-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d467
PS003V-504-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d467
PS010A-504-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d467
PS010V-504-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d467
PS016A-504-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d467
PS016V-504-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d467
PS025A-504-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d467
PS025V-504-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d467
PS040V-504-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d467
PS100R-504-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d467
PS250R-504-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d467
PS600R-504-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d467
PS400R-504-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d467

## G1/4" – Male – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/4" male thread

### Types and data – selection table

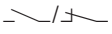
Type	Measuring range	Admissible overpressure	w	d
PS001A-504-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d467
PS001V-504-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d467
PS001R-504-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d467
PS01VR-504-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d467
PS003A-504-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d467
PS003V-504-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d467
PS010A-504-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d467
PS010V-504-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d467
PS016A-504-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d467
PS016V-504-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d467
PS025A-504-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d467
PS025V-504-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d467
PS040V-504-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d467
PS100R-504-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d467
PS250R-504-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d467
PS600R-504-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d467
PS400R-504-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d467





## 7/16" UNF – Male – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	7/16-20 UNF


### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS001R-505-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d468
PS001V-505-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d468
PS01VR-505-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d468
PS001A-505-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d468
PS003V-505-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d468
PS003A-505-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d468
PS010V-505-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d468
PS010A-505-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d468
PS016V-505-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d468
PS016A-505-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d468
PS025V-505-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d468
PS025A-505-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d468
PS040V-505-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d468
PS100R-505-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d468
PS250R-505-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d468
PS400R-505-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d468
PS600R-505-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d468

## 7/16" UNF – Male – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	7/16-20 UNF


### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001A-505-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d468
PS001V-505-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d468
PS001R-505-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d468
PS01VR-505-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d468
PS003A-505-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d468
PS003V-505-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d468
PS010A-505-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d468
PS016A-505-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d468
PS016V-505-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d468
PS025A-505-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d468
PS025V-505-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d468
PS040V-505-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d468
PS100R-505-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d468
PS250R-505-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d468
PS600R-505-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d468
PS400R-505-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d468



## 7/16" UNF – Male – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics $Al_2O_3$
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	7/16-20 UNF

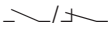
### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS01VR-505-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d468
PS001R-505-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d468
PS001V-505-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d468
PS001A-505-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d468
PS003V-505-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d468
PS003A-505-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d468
PS010V-505-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d468
PS010A-505-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d468
PS016V-505-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d468
PS016A-505-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d468
PS025V-505-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d468
PS025A-505-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d468
PS040V-505-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d468
PS100R-505-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d468
PS250R-505-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d468
PS400R-505-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d468
PS600R-505-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d468

## G1/2" – Male – Manometer connection – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	G 1/2" male threaded manometer acc. to DIN 3852-E


### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001R-508-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d469
PS001V-508-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d469
PS01VR-508-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d469
PS001A-508-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d469
PS003V-508-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d469
PS003A-508-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d469
PS010V-508-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d469
PS010A-508-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d469
PS016V-508-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d469
PS016A-508-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d469
PS025V-508-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d469
PS025A-508-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d469
PS040V-508-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d469
PS100R-508-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d469
PS250R-508-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d469
PS400R-508-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d469
PS600R-508-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d469



## G1/2" – Male – Manometer connection – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point T<sub>k0</sub></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span T<sub>ks</sub></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/0...20/20...4/ 20...0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/2" male threaded manometer acc. to DIN 3852-E


### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS001A-508-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d469
PS001V-508-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d469
PS01VR-508-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d469
PS001R-508-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d469
PS003A-508-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d469
PS003V-508-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d469
PS010A-508-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d469
PS010V-508-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d469
PS016A-508-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d469
PS016V-508-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d469
PS025A-508-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d469
PS025V-508-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d469
PS040V-508-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d469
PS100R-508-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d469
PS250R-508-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d469
PS600R-508-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d469
PS400R-508-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d469

## G1/2" – Male – Manometer connection – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	G 1/2" male threaded manometer acc. to DIN 3852-E

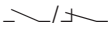
### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001A-508-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d469
PS001V-508-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d469
PS001R-508-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d469
PS01VR-508-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d469
PS003A-508-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d469
PS003V-508-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d469
PS010A-508-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d469
PS010V-508-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d469
PS016A-508-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d469
PS016V-508-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d469
PS025A-508-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d469
PS025V-508-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d469
PS040V-508-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d469
PS100R-508-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d469
PS250R-508-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d469
PS600R-508-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d469
PS400R-508-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d469

## R1/4" – Male – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001R-510-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d470
PS001V-510-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d470
PS01VR-510-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d470
PS001A-510-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d470
PS003V-510-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d470
PS003A-510-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d470
PS010V-510-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d470
PS010A-510-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d470
PS016V-510-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d470
PS016A-510-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d470
PS025V-510-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d470
PS025A-510-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d470
PS040V-510-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d470
PS100R-510-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d470
PS250R-510-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d470
PS400R-510-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d470
PS600R-510-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d470

## R1/4" – Male – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	, pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

### Types and data – selection table

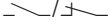
Type	Measuring range	Admissible overpressure	w	d
PS001A-510-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d470
PS001V-510-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d470
PS001R-510-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d470
PS01VR-510-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d470
PS003A-510-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d470
PS003V-510-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d470
PS010A-510-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d470
PS010V-510-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d470
PS016A-510-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d470
PS016V-510-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d470
PS025A-510-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d470
PS025V-510-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d470
PS040V-510-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d470
PS100R-510-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d470
PS250R-510-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d470
PS600R-510-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d470
PS400R-510-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d470



## R1/4" – Male – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-510-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d470
PS001R-510-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d470
PS001V-510-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d470
PS001A-510-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d470
PS003V-510-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d470
PS003A-510-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d470
PS010V-510-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d470
PS010A-510-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d470
PS016V-510-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d470
PS016A-510-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d470
PS025V-510-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d470
PS025A-510-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d470
PS040V-510-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d470
PS100R-510-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d470
PS250R-510-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d470
PS400R-510-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d470
PS600R-510-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d470

w Wiring diagrams on page 832 ff

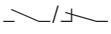
d Dimension drawing on page 842 ff

a Accessories on page 772 ff

## R1/4" – Female – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Medium temperature</b>	-40...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Ambient temperature</b>	-40...80 °C
<b>Output function</b>	 , pnp/npn	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching point accuracy</b>	0.5% of full scale	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>Sealing material</b>	FPM
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Response time</b>	3 ms	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999


### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS001R-511-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d471
PS001V-511-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d471
PS01VR-511-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d471
PS001A-511-2UPN8X-H1141	0...1 bar abs.	3 bar	w095	d471
PS003V-511-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d471
PS003A-511-2UPN8X-H1141	0...2.5 bar abs.	7 bar	w095	d471
PS010V-511-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d471
PS010A-511-2UPN8X-H1141	0...10 bar abs.	25 bar	w095	d471
PS016V-511-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d471
PS016A-511-2UPN8X-H1141	0...16 bar abs.	40 bar	w095	d471
PS025V-511-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d471
PS025A-511-2UPN8X-H1141	0...25 bar abs.	65 bar	w095	d471
PS040V-511-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d471
PS100R-511-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d471
PS250R-511-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d471
PS400R-511-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d471
PS600R-511-2UPN8X-H1141	0...600 bar rel.	900 bar	w095	d471



## R1/4" – Female – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Operating range</b>	4...20/ 0...20/ 20...4/ 20... 0 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999


### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS001A-511-LI2UPN8X-H1141	0...1 bar abs.	3 bar	w096	d471
PS001V-511-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d471
PS001R-511-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d471
PS01VR-511-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d471
PS003A-511-LI2UPN8X-H1141	0...2.5 bar abs.	7 bar	w096	d471
PS003V-511-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d471
PS010A-511-LI2UPN8X-H1141	0...10 bar abs.	25 bar	w096	d471
PS010V-511-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d471
PS016A-511-LI2UPN8X-H1141	0...16 bar abs.	40 bar	w096	d471
PS016V-511-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d471
PS025A-511-LI2UPN8X-H1141	0...25 bar abs.	65 bar	w096	d471
PS025V-511-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d471
PS040V-511-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d471
PS100R-511-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d471
PS250R-511-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d471
PS600R-511-LI2UPN8X-H1141	0...600 bar rel.	900 bar	w096	d471
PS400R-511-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d471

## R1/4" – Female – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Medium temperature</b>	-40...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Repeatability</b>	0.1% of full scale	<b>material pressure element</b>	
<b>Switching frequency</b>	180 Hz	<b>Sealing material</b>	FPM
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Electrical connection</b>	connector, M12 x 1
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL	<b>Mechanical connection</b>	R1/4" female thread per DIN 2999

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-511-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d471
PS001R-511-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d471
PS001V-511-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d471
PS001A-511-LUUPN8X-H1141	0...1 bar abs.	3 bar	w097	d471
PS003V-511-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d471
PS003A-511-LUUPN8X-H1141	0...2.5 bar abs.	7 bar	w097	d471
PS010V-511-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d471
PS010A-511-LUUPN8X-H1141	0...10 bar abs.	25 bar	w097	d471
PS016V-511-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d471
PS016A-511-LUUPN8X-H1141	0...16 bar abs.	40 bar	w097	d471
PS025V-511-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d471
PS025A-511-LUUPN8X-H1141	0...25 bar abs.	65 bar	w097	d471
PS040V-511-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d471
PS100R-511-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d471
PS250R-511-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d471
PS400R-511-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d471
PS600R-511-LUUPN8X-H1141	0...600 bar rel.	900 bar	w097	d471

**w** Wiring diagrams on page 832 ff

**d** Dimension drawing on page 842 ff

**a** Accessories on page 772 ff

## PS600 series – For viscous media or contamination

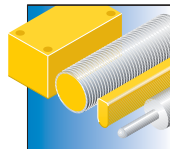


The PS600 series operates with a front-flush mounted diaphragm seal. Pressure applied on the stainless steel diaphragm is transmitted via the filling medium to the ceramic substrate of the measuring cell. Depending on the sensor type, the processed signal is either provided at a switching or an analog output. IO-Link is standard. Highest flexibility achieved with a front-flush or dead space free diaphragm and an accuracy of 0.5% f.s. guarantees save integration in the process.

### Features

- IO-Link capable
- Front-flush and dead space free process connections
- 4-digit 7-segment display
- Measuring range -1...400 bar relative pressure
- Measuring range 0...25 bar absolute pressure
- Stainless steel housing
- Permanent display of pressure (bar, psi, kPa, MPa, misc)

### Properties



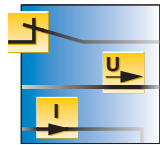
#### Design

Cylindrical design, non-rotatable, with display



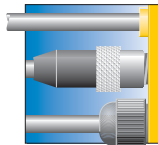
#### Measuring ranges

-1... 600 bar relative pressure



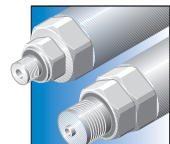
#### Electrical versions

IO-Link capable, dual-channel, switching, current or voltage output



#### Electrical connections

4-pole M12 x 1 plug connection



#### Mechanical connections

G1/2" and G3/4" front-flush process connections



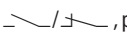
#### Special features

Failsafe 3-key operation, VDMA menu guide (optional), IP67, fully encapsulated electronics

## G3/4" – Front-flush diaphragm – 2 switching outputs



### General data

<b>Operating voltage</b>	15...30 VDC	<b>Response time</b>	3 ms
<b>Protection type and class</b>	IP67 / III	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient span <math>T_{ks}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	switching output	<b>Medium temperature</b>	-10...85 °C
<b>Output function</b>	 , pnp/npn	<b>Ambient temperature</b>	-40...80 °C
<b>Switching point accuracy</b>	0.5 % of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Repeatability</b>	0.1 % of full scale	<b>Electrical connection</b>	connector, M12 x 1
<b>Switching frequency</b>	180 Hz	<b>Mechanical connection</b>	G 3/4" front flush

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS01VR-606-2UPN8X-H1141	-1...0 bar rel.	3 bar	w095	d472
PS001R-606-2UPN8X-H1141	0...1 bar rel.	3 bar	w095	d472
PS001V-606-2UPN8X-H1141	-1...1 bar rel.	3 bar	w095	d472
PS003V-606-2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w095	d472
PS010V-606-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d472
PS016V-606-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d472
PS025V-606-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d472
PS040V-606-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d472
PS100R-606-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d472
PS250R-606-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d472
PS400R-606-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d472

w Wiring diagrams on page 832 ff


d Dimension drawing on page 842 ff

a Accessories on page 772 ff



## G3/4" – Front-flush diaphragm – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL
<b>Protection type and class</b>	IP67 / III	<b>Response time</b>	3 ms
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output function</b>	 , pnp/npn	<b>Medium temperature</b>	-10...85 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Ambient temperature</b>	-40...80 °C
<b>Repeatability</b>	0.1% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range</b>	4...20/0...20/20...4/ 20...0 mA	<b>Mechanical connection</b>	G 3/4" front flush

### Types and data – selection table


Type	Measuring range	Admissible overpressure		
PS01VR-606-LI2UPN8X-H1141	-1...0 bar rel.	3 bar	w096	d472
PS001R-606-LI2UPN8X-H1141	0...1 bar rel.	3 bar	w096	d472
PS001V-606-LI2UPN8X-H1141	-1...1 bar rel.	3 bar	w096	d472
PS003V-606-LI2UPN8X-H1141	-1...2.5 bar rel.	7 bar	w096	d472
PS010V-606-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d472
PS016V-606-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d472
PS025V-606-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d472
PS040V-606-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d472
PS100R-606-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d472
PS250R-606-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d472
PS400R-606-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d472





## G3/4" – Front-flush diaphragm – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL
<b>Protection type and class</b>	IP67 / III	<b>Response time</b>	3 ms
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output function</b>	 , pnp/npn	<b>Medium temperature</b>	-10...85 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Ambient temperature</b>	-40...80 °C
<b>Repeatability</b>	0.1% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Mechanical connection</b>	G 3/4" front flush

### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS001R-606-LUUPN8X-H1141	0...1 bar rel.	3 bar	w097	d472
PS01VR-606-LUUPN8X-H1141	-1...0 bar rel.	3 bar	w097	d472
PS001V-606-LUUPN8X-H1141	-1...1 bar rel.	3 bar	w097	d472
PS003V-606-LUUPN8X-H1141	-1...2.5 bar rel.	7 bar	w097	d472
PS010V-606-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d472
PS016V-606-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d472
PS025V-606-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d472
PS040V-606-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d472
PS100R-606-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d472
PS250R-606-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d472
PS400R-606-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d472

## G1/2" – Front-flush diaphragm – 2 switching outputs



### General data

**Operating voltage** 15...30 VDC

**Protection type and class** IP67 / III

**Output 1 (PIN 4)** switching output or IO-Link mode

**Output 2 (PIN 2)** switching output

**Output function** , pnp/npn

**Switching point accuracy** 0.5 % of full scale

**Repeatability** 0.1 % of full scale

**Switching frequency** 180 Hz

**Response time** 3 ms

**Temperature coefficient zero point  $T_{k0}$**  0.15% of full scale / 10 K

**Temperature coefficient span  $T_{kS}$**  0.15% of full scale / 10 K

**Medium temperature** -10...85 °C

**Ambient temperature** -40...80 °C

**Housing material** stainless-steel/  
plastic, 1.4305 (AISI 303)/PC

**Electrical connection** connector, M12 x 1

**Mechanical connection** G 1/2" front flush


### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PS010V-609-2UPN8X-H1141	-1...10 bar rel.	25 bar	w095	d473
PS016V-609-2UPN8X-H1141	-1...16 bar rel.	40 bar	w095	d473
PS025V-609-2UPN8X-H1141	-1...25 bar rel.	65 bar	w095	d473
PS040V-609-2UPN8X-H1141	-1...40 bar rel.	100 bar	w095	d473
PS100R-609-2UPN8X-H1141	0...100 bar rel.	250 bar	w095	d473
PS250R-609-2UPN8X-H1141	0...250 bar rel.	625 bar	w095	d473
PS400R-609-2UPN8X-H1141	0...400 bar rel.	900 bar	w095	d473



## G1/2" – Front-flush diaphragm – 1 switching and 1 current output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of final value BSL
<b>Protection type and class</b>	IP67 / III	<b>Response time</b>	3 ms
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analog or switching output	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output function</b>	 , pnp/npn	<b>Medium temperature</b>	-10...85 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Ambient temperature</b>	-40...80 °C
<b>Repeatability</b>	0.1% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range</b>	4...20/0...20/20...4/ 20...0 mA	<b>Mechanical connection</b>	G 1/2" front flush


### Types and data – selection table

Type	Measuring range	Admissible overpressure	 w	 d
PS010V-609-LI2UPN8X-H1141	-1...10 bar rel.	25 bar	w096	d473
PS016V-609-LI2UPN8X-H1141	-1...16 bar rel.	40 bar	w096	d473
PS025V-609-LI2UPN8X-H1141	-1...25 bar rel.	65 bar	w096	d473
PS040V-609-LI2UPN8X-H1141	-1...40 bar rel.	100 bar	w096	d473
PS100R-609-LI2UPN8X-H1141	0...100 bar rel.	250 bar	w096	d473
PS250R-609-LI2UPN8X-H1141	0...250 bar rel.	625 bar	w096	d473
PS400R-609-LI2UPN8X-H1141	0...400 bar rel.	900 bar	w096	d473



## G1/2" – Front-flush diaphragm – 1 switching and 1 voltage output



### General data

<b>Operating voltage</b>	18...30 VDC	<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.5% of full scale BSL
<b>Protection type and class</b>	IP67 / III	<b>Response time</b>	3 ms
<b>Output 1 (PIN 4)</b>	switching output or IO-Link mode	<b>Temperature coefficient zero point <math>T_{k0}</math></b>	0.15% of full scale / 10 K
<b>Output 2 (PIN 2)</b>	analogue output	<b>Temperature coefficient span <math>T_{kS}</math></b>	0.15% of full scale / 10 K
<b>Output function</b>	 , pnp/npn	<b>Medium temperature</b>	-10...85 °C
<b>Switching point accuracy</b>	0.5% of full scale	<b>Ambient temperature</b>	-40...80 °C
<b>Repeatability</b>	0.1% of full scale	<b>Housing material</b>	stainless-steel/ plastic, 1.4305 (AISI 303)/PC
<b>Switching frequency</b>	180 Hz	<b>Electrical connection</b>	connector, M12 x 1
<b>Voltage output, programmable</b>	0...10V/0...5V/ 1...6V/10...0V/ 5...0V/6...1V	<b>Mechanical connection</b>	G 1/2" front flush

### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PS010V-609-LUUPN8X-H1141	-1...10 bar rel.	25 bar	w097	d473
PS016V-609-LUUPN8X-H1141	-1...16 bar rel.	40 bar	w097	d473
PS025V-609-LUUPN8X-H1141	-1...25 bar rel.	65 bar	w097	d473
PS040V-609-LUUPN8X-H1141	-1...40 bar rel.	100 bar	w097	d473
PS100R-609-LUUPN8X-H1141	0...100 bar rel.	250 bar	w097	d473
PS250R-609-LUUPN8X-H1141	0...250 bar rel.	625 bar	w097	d473
PS400R-609-LUUPN8X-H1141	0...400 bar rel.	900 bar	w097	d473

**w** Wiring diagrams on page 832 ff

**d** Dimension drawing on page 842 ff

**a** Accessories on page 772 ff



# At a glance

## Pressure sensors - PK series



### Multifaceted pneumatic specialists

The PK pressure sensors are especially designed for pneumatic applications and are ideally suited for pick-and-place systems, labelling machines and hoists. The N version is manometer-shaped, features a display and a process connection on the

back side. The P version has a rotatable, cylindrical body with display. The processed signal is provided at the switching output. These sensors are only made for non-aggressive gas and compressed air applications.



### Compact design

The sensors are compact, rugged but at the same time lightweight and thus perfectly suited for handling and automation systems. They feature two switching outputs and are NO/NC programmable in hysteresis mode. The output configuration is easily reprogrammed for special requirements, such as monitoring of a pressure window, for example.

- For pressure and vacuum monitoring
- Compact sensors in cylindrical or manometer-like design
- 3-digit 7-segment display
- Display rotatable by 180°
- Excellent EMC properties
- One LED per output to indicate the switching status

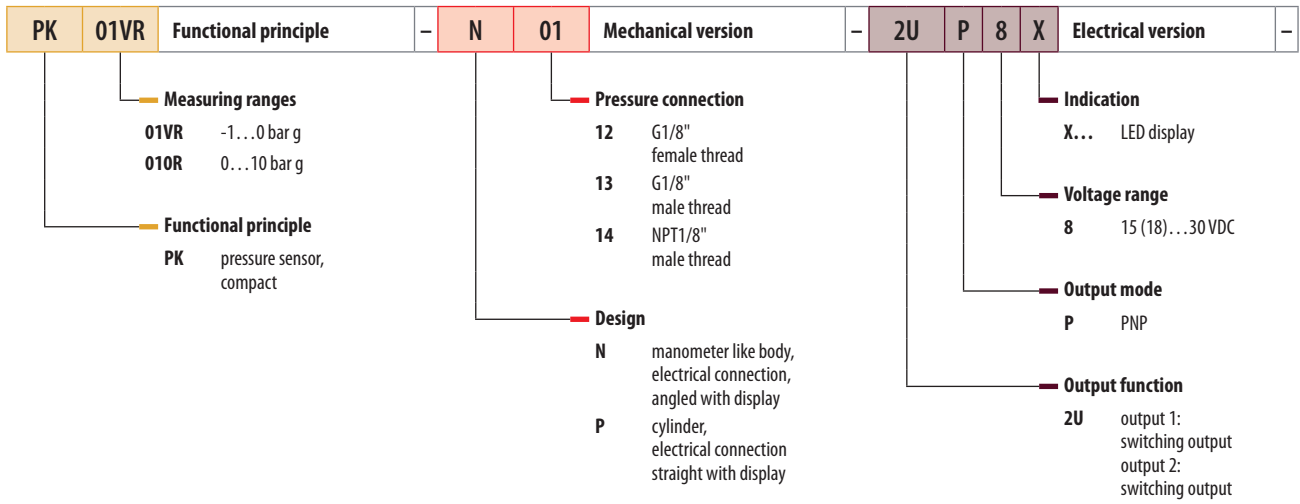


### Easy programming

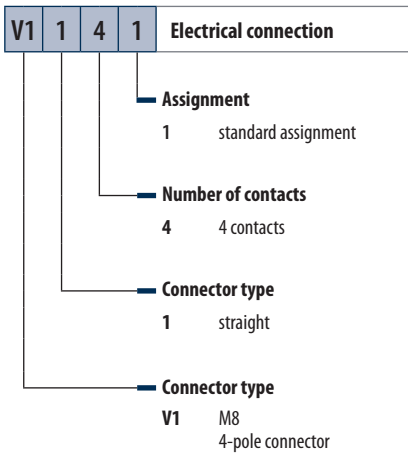
Thanks to the user friendly menu guide, parameters such as switch and release points, output type, analog range and

various special functions are easily taught. The buttons are finger-operated. Additional tools are not needed.

# Type code







## PK-N series – For pneumatic applications

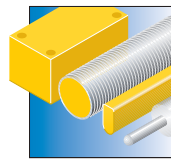


The PK-N pressure sensors operate with a piezo-resistive silicon cell. It is a silicon chip with direct medium contact. The N version is manometer-shaped, features a display and a process connection on the back side. The processed signal is provided at the switching output. These sensors are only made for non-aggressive gas and compressed air applications.

### Features

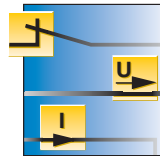
- Compact manometer-like design
- 3-digit 7-segment display
- For pressure and vacuum monitoring
- Display rotatable by 180°
- Excellent EMC properties

### Properties



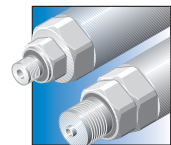
#### Design

Manometer-like design with display



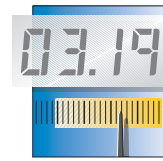
#### Electrical versions

Dual-channel with switching outputs



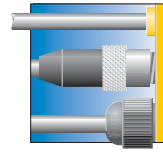
#### Mechanical connections

G1/4" female and 1/4"NPT male thread



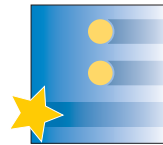
#### Measuring ranges

-1... 10 bar relative pressure



#### Electrical connections

4-pole M8 x 1 connector



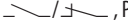
#### Special features

For pneumatic applications

## N12 – G1/8 – Female





### General data

<b>Operating voltage</b>	10.8...30 VDC
<b>Protection type and class</b>	IP65
<b>Output 1 (PIN 4)</b>	switching output
<b>Output 2 (PIN 2)</b>	switching output
<b>Output function</b>	 , PNP
<b>Switching point accuracy</b>	1 % of full scale

<b>Repeatability</b>	0.2 % of full scale
<b>Switching frequency</b>	400 Hz
<b>Medium temperature</b>	0...50 °C
<b>Ambient temperature</b>	-20...85 °C
<b>Electrical connection</b>	connector, M8 x 1
<b>Mechanical connection</b>	G1/8 female thread

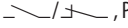
### Types and data – selection table

Type	Measuring range	Admissible overpressure	Housing material		
PK01VR-N12-2UP8X-V1141	-1...0 bar rel.	5 bar	plastic, ABS	w100	d477
PK010R-N12-2UP8X-V1141	0...10 bar rel.	16 bar	plastic, ABS	w100	d477
PK01VR-N12AL-2UP8X-V1141	-1...0 bar rel.	5 bar	aluminium, ABS	w100	d477
PK010R-N12AL-2UP8X-V1141	0...10 bar rel.	16 bar	aluminium, ABS	w100	d477

## N14 – 1/8" NPT – Male





### General data

<b>Operating voltage</b>	10.8...30 VDC
<b>Protection type and class</b>	IP65
<b>Output 1 (PIN 4)</b>	switching output
<b>Output 2 (PIN 2)</b>	switching output
<b>Output function</b>	 , PNP
<b>Switching point accuracy</b>	1 % of full scale
<b>Repeatability</b>	0.2 % of full scale

<b>Switching frequency</b>	400 Hz
<b>Medium temperature</b>	0...50 °C
<b>Ambient temperature</b>	-20...85 °C
<b>Housing material</b>	plastic, ABS
<b>Electrical connection</b>	connector, M8 x 1
<b>Mechanical connection</b>	NPT1/8" males thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure		
PK01VR-N14-2UP8X-V1141	-1...0 bar rel.	5 bar	w100	d477
PK010R-N14-2UP8X-V1141	0...10 bar rel.	16 bar	w100	d477

## PK-P series – For pneumatic applications

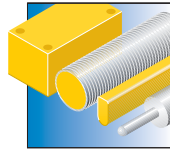


The PK-P pressure sensors operate with a piezo-resistive silicon cell. It is a silicon chip with direct medium contact. The P version has a rotatable, cylindrical body with display. These sensors are only made for non-aggressive gas and compressed air applications. The processed signal is provided at the switching output.

### Features

- Compact cylindrical design
- Rotatable sensor body
- 3-digit 7-segment display
- For pressure and vacuum monitoring
- Display rotatable by 180°
- Excellent EMC properties

### Properties



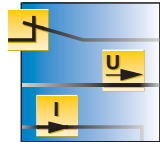
#### Design

Cylindrical version with laterally mounted display



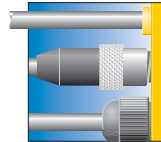
#### Measuring ranges

-1...10 bar relative pressure



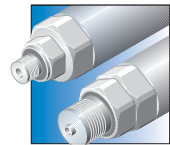
#### Electrical versions

Dual-channel with switching outputs



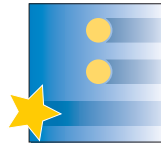
#### Electrical connections

4-pole M8 x 1 connector



#### Mechanical connections

G1/4" or 1/4" NPT male thread




#### Special features

For pneumatic applications

## P13 – G1/8" – Male



### General data

<b>Operating voltage</b>	10.8...30 VDC	<b>Switching frequency</b>	400 Hz
<b>Protection type and class</b>	IP65	<b>Medium temperature</b>	0...50 °C
<b>Output 1 (PIN 4)</b>	switching output	<b>Ambient temperature</b>	-20...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Housing material</b>	plastic, ABS
<b>Output function</b>	 , PNP	<b>Electrical connection</b>	connector, M8 x 1
<b>Switching point accuracy</b>	1 % of full scale	<b>Mechanical connection</b>	G1/8" male thread
<b>Repeatability</b>	0.2 % of full scale		


### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PK01VR-P13-2UP8X-V1141	-1...0 bar rel.	5 bar	w100	d478
PK010R-P13-2UP8X-V1141	0...10 bar rel.	16 bar	w100	d478

## P14 – 1/8" NPT – Male



### General data

<b>Operating voltage</b>	10.8...30 VDC	<b>Switching frequency</b>	400 Hz
<b>Protection type and class</b>	IP65	<b>Medium temperature</b>	0...50 °C
<b>Output 1 (PIN 4)</b>	switching output	<b>Ambient temperature</b>	-20...85 °C
<b>Output 2 (PIN 2)</b>	switching output	<b>Housing material</b>	plastic, ABS
<b>Output function</b>	 , PNP	<b>Electrical connection</b>	connector, M8 x 1
<b>Switching point accuracy</b>	1 % of full scale	<b>Mechanical connection</b>	NPT1/8" males thread
<b>Repeatability</b>	0.2 % of full scale		

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PK01VR-P14-2UP8X-V1141	-1...0 bar rel.	5 bar	w100	d478
PK010R-P14-2UP8X-V1141	0...10 bar rel.	16 bar	w100	d478



# At a glance

## Pressure sensors - PT series



### Compact pressure transmitters – Solutions

The pressure transmitters develop their full potential in applications requiring high operational safety and accuracy. Based on proven ceramic technology, these shock and vibration proof devices work reliably even in harsh environments. Thanks to the compact design, the sen-

sors can be applied in almost all areas of industrial automation. The patented medium-stop system prevents the discharge of liquids when burst pressure exceeds 40 bar. In normal operating mode it works as a peak pressure aperture.



### Made-to-measure solutions

The PT devices with diaphragm are a cost-efficient solution and a proven success regarding the control of filling levels at vessels. Other typical applications for pressure transmitters are machine tools, pneumatic systems and hydraulic power

units. The PT series proves its applicability in refrigeration technology and many other industrial fields with features such as operational safety, accuracy and temperature stability.



### Working reliably even under extreme conditions

Equipped with a ceramic measuring cell, a stainless steel body and a FPM O-ring, the PT pressure transmitters resist temperatures of up to 125 °C without any problems. The devices fulfill industrial standards and guarantee a long-term stable performance.

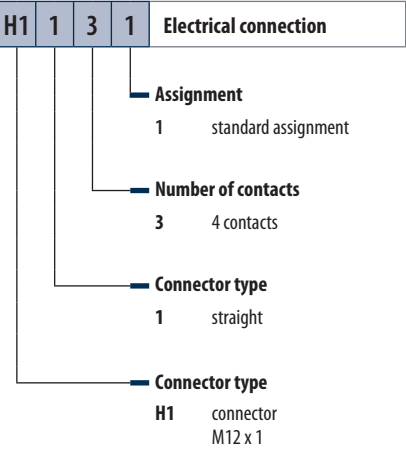
- Compact and rugged design
- Accuracy 0.6 % f.s.

- Stainless steel housing and pressure connection
- 1.4305 (AISI 303)
- Medium-stop system
- Protection class IP67
- Excellent EMC properties
- -1...+600 bar relative pressure
- 0...25 bar absolute pressure

# Type code

PT	010V	Functional principle	-	1	1	Mechanical version	-	LI	Electrical version	-
		<p><b>Measuring ranges</b></p> <p><b>01VR</b> -1...0 bar g</p> <p><b>001R</b> 0...1 bar g</p> <p><b>002R</b> 0...1.6 bar g</p> <p><b>003R</b> 0...2.5 bar g</p> <p><b>004R</b> 0...4 bar g</p> <p><b>006R</b> 0...6 bar g</p> <p><b>010R</b> 0...10 bar g</p> <p><b>016R</b> 0...16 bar g</p> <p><b>025R</b> 0...25 bar g</p> <p><b>040R</b> 0...40 bar g</p> <p><b>100R</b> 0...100 bar g</p> <p><b>160R</b> 0...160 bar g</p> <p><b>250R</b> 0...250 bar g</p> <p><b>400R</b> 0...400 bar g</p> <p><b>600R</b> 0...600 bar g</p> <p><b>001A</b> 0...1 bar a</p> <p><b>002A</b> 0...1.6 bar a</p> <p><b>003A</b> 0...2.5 bar a</p> <p><b>004A</b> 0...4 bar a</p> <p><b>006A</b> 0...6 bar a</p> <p><b>010A</b> 0...10 bar a</p> <p><b>016A</b> 0...16 bar a</p> <p><b>025A</b> 0...25 bar a</p> <p><b>Functional principle</b></p> <p>PT pressure transmitter</p>				<p><b>Pressure connection</b></p> <p><b>1</b> G1/4" female thread</p> <p><b>2</b> 1/4"-18 NPT female thread</p> <p><b>3</b> 1/4"-18 NPT male thread</p> <p><b>4</b> G1/4" male thread</p> <p><b>Design</b></p> <p><b>1</b> cylinder without display</p>			<p><b>Electrical version</b></p> <p><b>LI3</b> 4...20 mA (only PT series), 2-wire</p> <p><b>LU2</b> 0...10 V (only PT series), 3-wire</p>	





Pressure sensors

## PT-1 series – For temperatures up to +125 °C

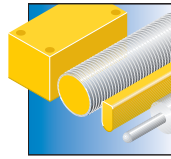


The PT1 pressure transmitters operate with ceramic measuring cells. They are cylindrically shaped, made of stainless and have no display. Depending on the type, the processed signal is output as 4...20 mA (2-wire) or 0...10 V (3-wire).

### Features

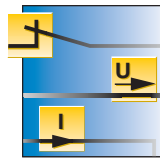
- Compact and rugged design
- Measuring range -1...600 bar relative pressure
- Temperature range - 40...+125°C
- 4...20 mA (2-wire) or 0...10 V (3-wire)
- Excellent EMC properties

### Properties



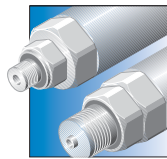
#### Design

Cylindrical design, non-rotatable, without display



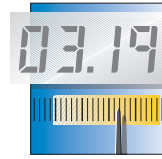
#### Electrical versions

Current output  
4...20 mA



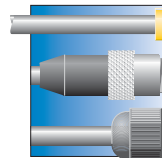
#### Mechanical connections

Female and male thread G1/4" and 1/4" NPT



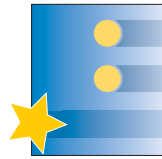
#### Measuring ranges

-1...600 bar relative pressure



#### Electrical connections

M12 x 1 plug connection, 3-pole



#### Special features

Media temperature  
-40...+125 °C, IP67

## G1/4" – Female – Current output (2-wire)



### General data

<b>Operating voltage</b>	8...33 VDC	<b>Temperature coefficient span <math>T_{KS}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Medium temperature</b>	-40...125 °C
<b>Operating range</b>	4...20 mA (2-wire)	<b>Ambient temperature</b>	-40...85 °C
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.3% of final value BSL	<b>Housing material</b>	stainless-steel/plastic, 1.4305 (AISI 303)/PC
<b>Calibration accuracy 0-point</b>	0.3% of final value	<b>material pressure element</b>	ceramics Al <sub>2</sub> O <sub>3</sub>
<b>Calibration accuracy, of final value</b>	0.3% of final value	<b>Sealing material</b>	FPM
<b>Response time</b>	3 ms	<b>Electrical connection</b>	connector, M12 x 1
<b>Temperature coefficient zero point <math>T_{K0}</math></b>	0.15% of full scale / 10 K	<b>Mechanical connection</b>	G 1/4" female thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PT001R-11-LI3-H1131	0...1 bar rel.	3 bar	w098	d474
PT002R-11-LI3-H1131	0...1.6 bar rel.	5 bar	w098	d474
PT003R-11-LI3-H1131	0...2.5 bar rel.	7 bar	w098	d474
PT004R-11-LI3-H1131	0...4 bar rel.	12 bar	w098	d474
PT006R-11-LI3-H1131	0...6 bar rel.	15 bar	w098	d474
PT010R-11-LI3-H1131	0...10 bar rel.	25 bar	w098	d474
PT016R-11-LI3-H1131	0...16 bar rel.	40 bar	w098	d474
PT025R-11-LI3-H1131	0...25 bar rel.	65 bar	w098	d474
PT040R-11-LI3-H1131	0...40 bar rel.	100 bar	w098	d474
PT060R-11-LI3-H1131	0...60 bar rel.	150 bar	w098	d474
PT100R-11-LI3-H1131	0...100 bar rel.	250 bar	w098	d474
PT160R-11-LI3-H1131	0...160 bar rel.	400 bar	w098	d474
PT250R-11-LI3-H1131	0...250 bar rel.	625 bar	w098	d474
PT400R-11-LI3-H1131	0...400 bar rel.	900 bar	w098	d474
PT600R-11-LI3-H1131	0...600 bar rel.	900 bar	w098	d474

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 772 ff

## G1/4" – Female – Voltage output (3-wire)



### General data

<b>Operating voltage</b>	11.4...33 VDC	<b>Temperature coefficient span <math>T_{KS}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Medium temperature</b>	-40...125 °C
<b>Operating range</b>	0...10 V (3-wire)	<b>Ambient temperature</b>	-40...85 °C
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.3% of final value BSL	<b>Housing material</b>	stainless-steel/plastic, 1.4305 (AISI 303)/PC
<b>Calibration accuracy 0-point</b>	0.3% of final value	<b>material pressure element</b>	ceramics $Al_2O_3$
<b>Calibration accuracy, of final value</b>	0.3% of final value	<b>Sealing material</b>	FPM
<b>Response time</b>	3 ms	<b>Electrical connection</b>	connector, M12 x 1
<b>Temperature coefficient zero point <math>T_{K0}</math></b>	0.15% of full scale / 10 K	<b>Mechanical connection</b>	G 1/4" female thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PT001R-11-LU2-H1131	0...1 bar rel.	3 bar	w099	d474
PT01VR-11-LU2-H1131	-1...0 bar rel.	3 bar	w099	d474
PT002R-11-LU2-H1131	0...1.6 bar rel.	5 bar	w099	d474
PT003R-11-LU2-H1131	0...2.5 bar rel.	7 bar	w099	d474
PT004R-11-LU2-H1131	0...4 bar rel.	12 bar	w099	d474
PT006R-11-LU2-H1131	0...6 bar rel.	15 bar	w099	d474
PT010R-11-LU2-H1131	0...10 bar rel.	25 bar	w099	d474
PT016R-11-LU2-H1131	0...16 bar rel.	40 bar	w099	d474
PT025R-11-LU2-H1131	0...25 bar rel.	65 bar	w099	d474
PT040R-11-LU2-H1131	0...40 bar rel.	100 bar	w099	d474
PT060R-11-LU2-H1131	0...60 bar rel.	150 bar	w099	d474
PT100R-11-LU2-H1131	0...100 bar rel.	250 bar	w099	d474
PT160R-11-LU2-H1131	0...160 bar rel.	400 bar	w099	d474
PT250R-11-LU2-H1131	0...250 bar rel.	625 bar	w099	d474
PT400R-11-LU2-H1131	0...400 bar rel.	900 bar	w099	d474
PT600R-11-LU2-H1131	0...600 bar rel.	900 bar	w099	d474

## 1/4" NPT – Male – Current output (2-wire)



### General data

<b>Operating voltage</b>	8...33 VDC	<b>Temperature coefficient span <math>T_{KS}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Medium temperature</b>	-40...125 °C
<b>Operating range</b>	4...20 mA (2-wire)	<b>Ambient temperature</b>	-40...85 °C
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.3% of final value BSL	<b>Housing material</b>	stainless-steel/plastic, 1.4305 (AISI 303)/PC
<b>Calibration accuracy 0-point</b>	0.3% of final value	<b>material pressure element</b>	ceramics $Al_2O_3$
<b>Calibration accuracy, of final value</b>	0.3% of final value	<b>Sealing material</b>	FPM
<b>Response time</b>	3 ms	<b>Electrical connection</b>	connector, M12 x 1
<b>Temperature coefficient zero point <math>T_{K0}</math></b>	0.15% of full scale / 10 K	<b>Mechanical connection</b>	NPT 1/4" - 18 male thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PT004R-13-LI3-H1131	0...4 bar rel.	12 bar	w098	d475
PT010R-13-LI3-H1131	0...10 bar rel.	25 bar	w098	d475
PT016R-13-LI3-H1131	0...16 bar rel.	40 bar	w098	d475
PT025R-13-LI3-H1131	0...25 bar rel.	65 bar	w098	d475
PT040R-13-LI3-H1131	0...40 bar rel.	100 bar	w098	d475
PT060R-13-LI3-H1131	0...60 bar rel.	150 bar	w098	d475
PT100R-13-LI3-H1131	0...100 bar rel.	250 bar	w098	d475
PT160R-13-LI3-H1131	0...160 bar rel.	400 bar	w098	d475
PT250R-13-LI3-H1141	0...250 bar rel.	625 bar	w098	d475
PT400R-13-LI3-H1141	0...400 bar rel.	900 bar	w098	d475
PT600R-13-LI3-H1141	0...600 bar rel.	900 bar	w098	d475

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 772 ff

## 1/4" NPT – Male – Voltage output (3-wire)



### General data

<b>Operating voltage</b>	11.4...33 VDC	<b>Temperature coefficient span <math>T_{KS}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Medium temperature</b>	-40...125 °C
<b>Operating range</b>	0...10 V (3-wire)	<b>Ambient temperature</b>	-40...85 °C
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.3% of final value BSL	<b>Housing material</b>	stainless-steel/plastic, 1.4305 (AISI 303)/PC
<b>Calibration accuracy 0-point</b>	0.3% of final value	<b>material pressure element</b>	ceramics $Al_2O_3$
<b>Calibration accuracy, of final value</b>	0.3% of final value	<b>Sealing material</b>	FPM
<b>Response time</b>	3 ms	<b>Electrical connection</b>	connector, M12 x 1
<b>Temperature coefficient zero point <math>T_{K0}</math></b>	0.15% of full scale / 10 K	<b>Mechanical connection</b>	NPT 1/4" - 18 male thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PT001R-13-LU2-H1141	0...1 bar rel.	3 bar	w099	d475
PT01VR-13-LU2-H1131	-1...0 bar rel.	3 bar	w099	d475
PT002R-13-LU2-H1131	0...1.6 bar rel.	5 bar	w099	d475
PT003R-13-LU2-H1131	0...2.5 bar rel.	7 bar	w099	d475
PT004R-13-LU2-H1131	0...4 bar rel.	12 bar	w099	d475
PT006R-13-LU2-H1131	0...6 bar rel.	15 bar	w099	d475
PT010R-13-LU2-H1131	0...10 bar rel.	25 bar	w099	d475
PT060R-13-LU2-H1131	0...60 bar rel.	150 bar	w099	d475
PT100R-13-LU2-H1131	0...100 bar rel.	250 bar	w099	d475
PT160R-13-LU2-H1131	0...160 bar rel.	400 bar	w099	d475
PT250R-13-LU2-H1131	0...250 bar rel.	625 bar	w099	d475
PT600R-13-LU2-H1131	0...600 bar rel.	900 bar	w099	d475
PT400R-13-LU2-H1131	0...400 bar rel.	900 bar	w099	d475

## G1/4" – Male – Current output (2-wire)



### General data

<b>Operating voltage</b>	8...33 VDC	<b>Temperature coefficient span <math>T_{KS}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Medium temperature</b>	-40...125 °C
<b>Operating range</b>	4...20 mA (2-wire)	<b>Ambient temperature</b>	-40...85 °C
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.3% of final value BSL	<b>Housing material</b>	stainless-steel/plastic, 1.4305 (AISI 303)/PC
<b>Calibration accuracy 0-point</b>	0.3% of final value	<b>material pressure element</b>	ceramics $Al_2O_3$
<b>Calibration accuracy, of final value</b>	0.3% of final value	<b>Sealing material</b>	FPM
<b>Response time</b>	3 ms	<b>Electrical connection</b>	connector, M12 x 1
<b>Temperature coefficient zero point <math>T_{K0}</math></b>	0.15% of full scale / 10 K	<b>Mechanical connection</b>	G 1/4" male thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PT01VR-14-LI3-H1131	-1...0 bar rel.	3 bar	w098	d476
PT001R-14-LI3-H1131	0...1 bar rel.	3 bar	w098	d476
PT002R-14-LI3-H1131	0...1.6 bar rel.	5 bar	w098	d476
PT003R-14-LI3-H1131	0...2.5 bar rel.	7 bar	w098	d476
PT004R-14-LI3-H1131	0...4 bar rel.	12 bar	w098	d476
PT006R-14-LI3-H1131	0...6 bar rel.	15 bar	w098	d476
PT010R-14-LI3-H1131	0...10 bar rel.	25 bar	w098	d476
PT016R-14-LI3-H1131	0...16 bar rel.	40 bar	w098	d476
PT025R-14-LI3-H1131	0...25 bar rel.	65 bar	w098	d476
PT040R-14-LI3-H1131	0...40 bar rel.	100 bar	w098	d476
PT060R-14-LI3-H1131	0...60 bar rel.	150 bar	w098	d476
PT100R-14-LI3-H1131	0...100 bar rel.	250 bar	w098	d476
PT160R-14-LI3-H1131	0...160 bar rel.	400 bar	w098	d476
PT250R-14-LI3-H1131	0...250 bar rel.	625 bar	w098	d476
PT400R-14-LI3-H1131	0...400 bar rel.	900 bar	w098	d476
PT600R-14-LI3-H1131	0...600 bar rel.	900 bar	w098	d476

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 772 ff

## G1/4" – Male – Voltage output (3-wire)



### General data

<b>Operating voltage</b>	11.4...33 VDC	<b>Temperature coefficient span <math>T_{KS}</math></b>	0.15% of full scale / 10 K
<b>Protection type and class</b>	IP67 / III	<b>Medium temperature</b>	-40...125 °C
<b>Operating range</b>	0...10 V (3-wire)	<b>Ambient temperature</b>	-40...85 °C
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.3% of final value BSL	<b>Housing material</b>	stainless-steel/plastic, 1.4305 (AISI 303)/PC
<b>Calibration accuracy 0-point</b>	0.3% of final value	<b>material pressure element</b>	ceramics $Al_2O_3$
<b>Calibration accuracy, of final value</b>	0.3% of final value	<b>Sealing material</b>	FPM
<b>Response time</b>	3 ms	<b>Electrical connection</b>	connector, M12 x 1
<b>Temperature coefficient zero point <math>T_{K0}</math></b>	0.15% of full scale / 10 K	<b>Mechanical connection</b>	G 1/4" male thread

### Types and data – selection table

Type	Measuring range	Admissible overpressure	w	d
PT01VR-14-LU2-H1131	-1...0 bar rel.	3 bar	w099	d476
PT001R-14-LU2-H1131	0...1 bar rel.	3 bar	w099	d476
PT002R-14-LU2-H1131	0...1.6 bar rel.	5 bar	w099	d476
PT003R-14-LU2-H1131	0...2.5 bar rel.	7 bar	w099	d476
PT004R-14-LU2-H1131	0...4 bar rel.	12 bar	w099	d476
PT006R-14-LU2-H1131	0...6 bar rel.	15 bar	w099	d476
PT010R-14-LU2-H1131	0...10 bar rel.	25 bar	w099	d476
PT016R-14-LU2-H1131	0...16 bar rel.	40 bar	w099	d476
PT025R-14-LU2-H1131	0...25 bar rel.	65 bar	w099	d476
PT040R-14-LU2-H1131	0...40 bar rel.	100 bar	w099	d476
PT060R-14-LU2-H1131	0...60 bar rel.	150 bar	w099	d476
PT100R-14-LU2-H1131	0...100 bar rel.	250 bar	w099	d476
PT160R-14-LU2-H1131	0...160 bar rel.	400 bar	w099	d476
PT250R-14-LU2-H1131	0...250 bar rel.	625 bar	w099	d476
PT400R-14-LU2-H1131	0...400 bar rel.	900 bar	w099	d476
PT600R-14-LU2-H1131	0...600 bar rel.	900 bar	w099	d476



**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 772 ff



# At a glance Temperature sensors



## Temperature sensors – Highly optimized specialists for any requirements

Temperature is a critical factor in many industrial processes and has to be monitored constantly in order to operate machines and systems safely and efficiently. A reliable and practical solution for temperature measurement are electronic temperature sensors and transmitters. Reliability is not just provided through high accuracy and repeatability but also through many available interfaces to the process and the operator.

surface temperatures in a range between +70 °C and +1000 °C. The distance-spot ratio is thereby of importance, indicating the diameter (S) of the spot at a given distance (D).

The TURCK product portfolio guarantees maximum flexibility for temperature measurement through numerous connection possibilities and output signals.



Temperature measurement in industrial applications is mainly implemented with resistance thermometers or thermoelements. Resistance thermometers detect temperature through the temperature-sensitive resistors. While the resistance of PTCs increases with the rise of temperature, NTCs behave opposite.

The intelligent sensors of the **TS series** fulfill all application specific requirements to the optimum through easy programming, flexible process connection and well readable displays. The compact sensors of the **TT/TC series** are available with integrated probe but also with standard M12 plug connection for separate probes. The infrared sensors of the **T-Gage series** measure temperatures contactless between 0 and +300 °C at wavelengths between 8 and 14 µm. A further important device of the product portfolio is the IP67 rated Pt100 resistance thermometer for temperatures between -50 and +500 °C. The temperature probes of the **TP-series** are available in different lengths and diameters. When using a thermowell for protection, the sensor can be adapted to critical application conditions.

Thermoelements are applied to detect temperatures up to +1700 °C and higher. A thermoelement consists of two different interconnected metals or semiconductors. A temperature difference between the two metals causes electric potential of corresponding magnitude at the interconnection. In practice, the temperature of a cold spot is detected with a separate probe from which the temperature of the hot spot is then deduced.

More information on the TS series on p. 542 ff., TT/TC series on p. 553 ff. and TP series on p. 561 ff.



Infrared sensors **M18T** (s. P. 568) are applied for non-contact measurement of

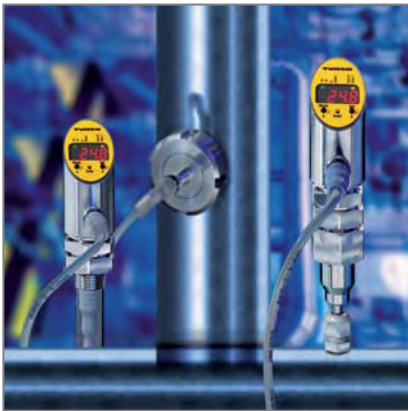
# Our strengths...



### Made-to-measure solutions

Due to its high accuracy of 0.2 K, the temperature sensors of the TS series handle a large spectrum of applications with only a few devices. Temperature is detected with a Pt100 directly connected to the M12 plug connection or via a standard connection cable. A range between -50 °C and +500 °C is covered and the 4-digit 7-segment LED display makes

programming easier. The devices are available with two transistor switching outputs or with one switching and one analog output. High EMC immunity and protection classes IP67/IP69K guarantee reliable operation, even under harsh conditions. All TS sensors are equipped with an IO-Link interface.



### Flexible mounting

Inclined by 45° the display is well readable from any position and even from a great distance. Horizontal mounting is also possible. The read direction is reversible by 180° degrees via software.

After locking the pressure connection, the TS500 can be rotated by 320° degrees

and moved in any desired position. Once the final position is attained, the device is fixed in place with a second coupling nut. Special mounting aids are not required. With a diameter of only 34 mm, several sensors can be mounted side by side in confined spaces.

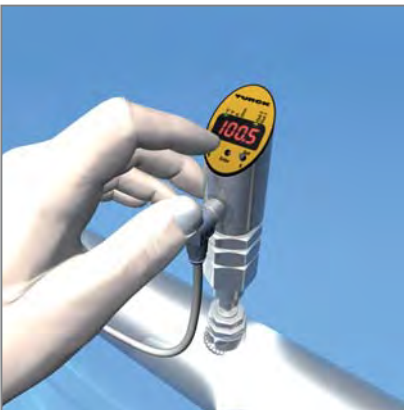


### Clearly visible display

The bright 4-digit 7-segment display indicates the temperature during normal operation and is easy to program. The sloped display allows the sensors to be mounted on top or in front according to the position of the process connection.

The read direction is reversible by 180° degrees via software. Values are thus perfectly readable, even if the sensor is mounted horizontally.

maths



**Easy programming**

Thanks to the user friendly menu guide the switch and release point, the output function, the analog range and various special functions are easily taught via pushbuttons.

The TS series is programmed with the buttons MODE and SET. Tools are not needed

to view the parameter values. To avoid accidental changes of programmed data, the ENTER button for storing the values is recessed. The button can only be pressed with a pointed object, such as a ball pen for example.



**Rugged design**

The sensor body, temperature and electrical connection are made of stainless steel. All sensors feature excellent EMC properties and are IP67 protected. Absolute operational safety is thus guaranteed even in rough production environ-

ments. The mineral-insulated probes are enormously flexible and temperature-resistant. Rugged TURCK connection cables provide the necessary security for connection.

# Your advantages...

## Your advantages...



### High system availability

The TS series excels in excellent EMC properties and is IP67 protected. Sensor body, temperature and electrical connection of the programmable devices are made of stainless steel and guarantee tremendous operational safety.

- Excellent EMC properties

- Protection against mechanical impacts thanks to the rugged design
- Minimum maintenance effort through optimized temperature coupling
- Short down-times through high system availability and short replacement times



### Extremely service-friendly

Flexible mounting options, user-friendliness and accuracy provide calculable advantages, such as:

- Minimum maintenance effort through optimized performance of the sensors and a streamlined product portfolio.
- Easy configuration and operation via pushbuttons

- Failsafe operation through a recessed button for storage of values
- Large and good readable display
- The upper part of the TS500 sensor is rotatable by 320°
- IO-Link communication
- VDMA menu guide (optional)



### Efficient standardization

A single sensor replaces many conventional types. The intelligent temperature sensors fulfill many different control tasks and reduce the number of required sensors considerably.

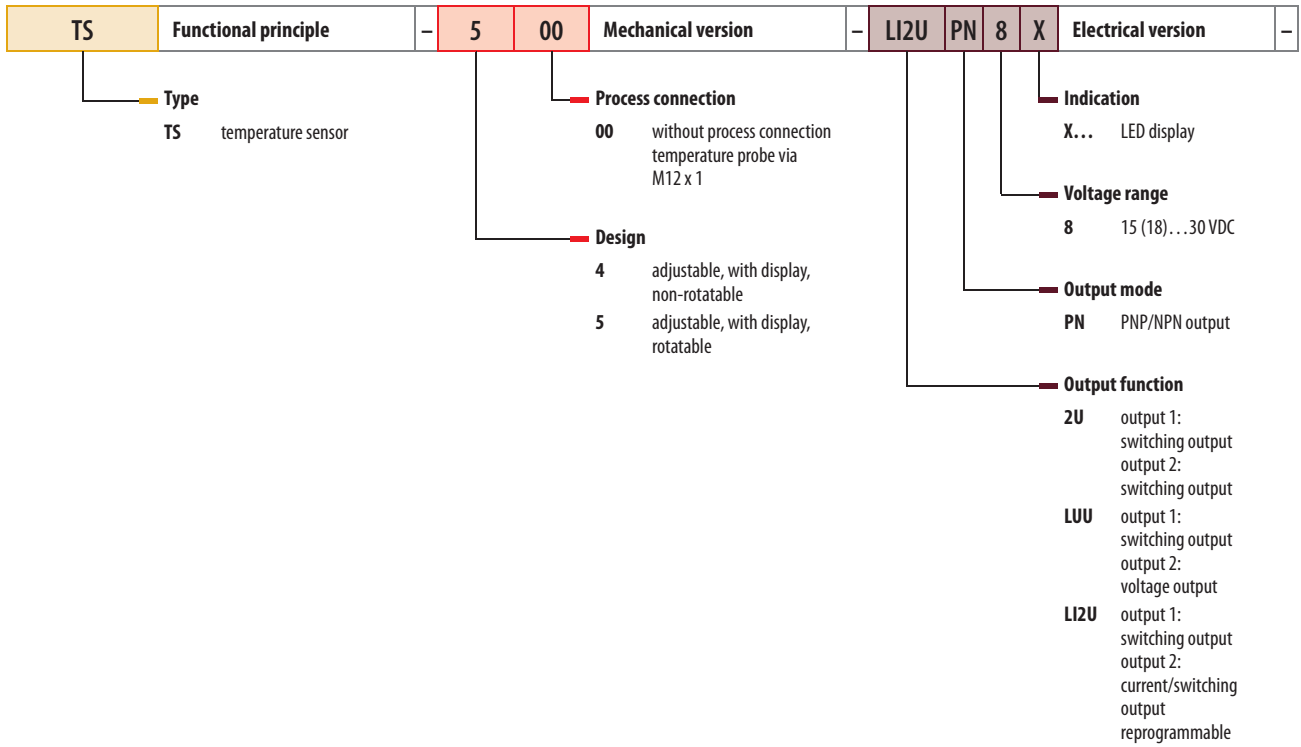
A reduced inventory pays off for you:

- Only a few sensors are needed to cover a large range of applications

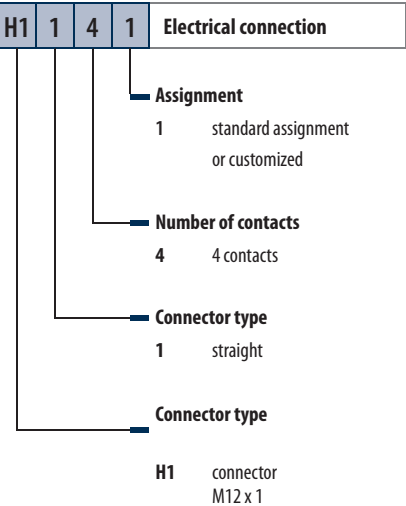
- Reduced training effort due to simple and failsafe operation
- High system safety achieved through a rugged design
- 4-pole standard M12 plug connection at the probe and processing unit

antades

# Type code







## TS400 series – Pt 100 probe (4-wire)

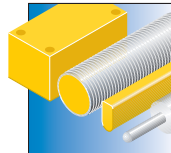


The TS400 processing units are incorporated in a non-rotatable, rugged stainless steel housing. Furthermore, they feature a standard M12 x 1 plug connection for TP probes. The bright 4-digit 7-segment display indicates the temperature during normal operation and guides the operator through the programming menu. Depending on the sensor type, they are available with switching outputs or a combination of switching and analog outputs. IO-Link communication is integrated as a standard.

### Features

- M12 x 1 plug connection for TP probes.
- Housing, temperature and electrical connection are made of stainless steel
- Highest flexibility through modular system
- Programming protection through recessed pushbutton and keylock
- Permanent display of temperature (°C, °F, K, Ω)
- Storage of max/min values

### Properties



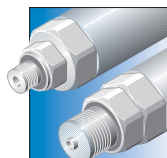
#### Design

Cylindrical, non-rotatable, with display



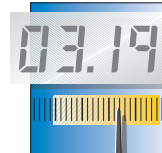
#### Electrical versions

IO-Link capable, dual-channel, switching, current or voltage output



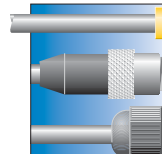
#### Mechanical connections

G1/2" for bores, mounted via clamping ring or thermowell depending on the probe



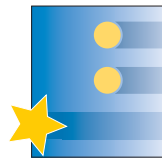
#### Measuring ranges

-50 ... +500 °C



#### Electrical connections

4-pole M12 x 1 plug connection



#### Special features

Failsafe 3-key operation, VDMA menu guide (optional), IP67, fully encapsulated electronics

## Pt100 processing unit – Switching and analog outputs (U/I)



### General data

**Temperature operating range** -50...500 °C

**Accuracy (Lin. + Hys. + Rep.)** 0.2 K

**Repeatability** 0.1 K

**Switching point accuracy** 0.2 K

**Release points** -50...499.8 °C

**Switching point** -49.8...500 °C

**Ambient temperature** -40...+80 °C

**Storage temperature** -40...+80 °C

**Protective measure** SELV; PELV according to EN 50178


**Voltage drop at** 2 V

**No-load current I<sub>0</sub>** 50 mA

**Switching frequency** 180 Hz

**Short-circuit protection** yes

**Reverse polarity protection** yes

**Output function**  programmable, pnp/npn

**Rated operational current** 0.2 A

**Protection class** IP67

**Protection class** III

**Housing material** stainless-steel/plastic, V2A (1.4305)

**Electrical connection** connector, M12 x 1



**Coupling nut wrench size** 30

**Vibration resistance** 20 g (9...2000 Hz), according to IEC 68-2-6

**Shock resistance** 50 g (11 ms) g (11 ms), according to IEC 61508

**Mechanical connection** G 1/2"

### Types and data – selection table

Type	Operating voltage	Current output	Voltage output	Load		
TS-400-2UPN8X-H1141	15...30 VDC	-	-	-	w101	d479
TS-400-LI2UPN8X-H1141	18...30 VDC	4...20 mA	-	0.5 kΩ	w102	d479
TS-400-LUUPN8X-H1141	18...30 VDC	-	0...10 V	-	w103	d479

## TS500 series fo Pt 100 probe (4-wire)

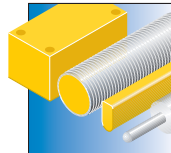


The TS500 processing units are rotatable by 320° and equipped with 4-digit 7-segment displays. A standard M12 x 1 plug connection at the rugged stainless steel housing enables the connection of a TP probe. The display indicates the temperature during normal operation and guides the operator through the programming menu. Depending on the sensor type, they are available with switching outputs or a combination of switching and analog outputs. IO-Link communication is integrated as a standard.

### Features

- Sensor rotatable by 320°
- M12 x 1 plug connection for TP probes
- Housing, temperature and electrical connection are made of stainless steel
- Highest flexibility through modular system
- Programming protection through recessed pushbutton and keylock
- Permanent display of temperature (°C, °F, K, Ω)
- Storage of max/min values

### Properties



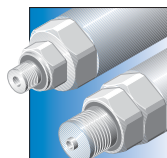
#### Design

Cylindrical, rotatable, with display



#### Electrical versions

IO-Link capable, dual-channel, switching, current or voltage output



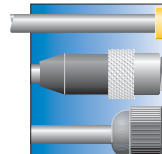
#### Mechanical connections

G1/2" male thread for bracket



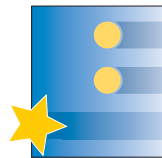
#### Measuring ranges

-50 ... +500 °C



#### Electrical connections

4-pole M12 x 1 plug connection



#### Special features

Failsafe 3-key operation, VDMA menu guide (optional), IP67, fully encapsulated electronics

## Rotatable Pt100 processing unit – Switching and analog outputs (U/I)



### General data

**Temperature operating range** -50...500 °C

**Accuracy (Lin. + Hys. + Rep.)** 0.2 K

**Repeatability** 0.1 K

**Switching point accuracy** 0.2 K

**Release points** -50...499.8 °C

**Switching point** -49.8...500 °C

**Ambient temperature** -40...+80 °C

**Storage temperature** -40...+80 °C

**Protective measure** SELV; PELV according to EN 50178


**Voltage drop at** 2 V

**No-load current I<sub>0</sub>** 50 mA

**Switching frequency** 180 Hz

**Short-circuit protection** yes

**Reverse polarity protection** yes

**Output function**  programmable, pnp/npn

**Rated operational current** 0.2 A

**Protection class** IP67

**Protection class** III

**Housing material** stainless-steel/plastic, V2A (1.4305)

**Electrical connection** connector, M12 x 1



**Coupling nut wrench size** 30

**Vibration resistance** 20 g (9...2000 Hz), according to IEC 68-2-6

**Shock resistance** 50 g (11 ms) g (11 ms), according to IEC 61508

**Mechanical connection** G 1/2"

### Types and data – selection table

Type	Operating voltage	Current output	Voltage output	Load		
TS-500-2UPN8X-H1141	15...30 VDC	-	-	-	w101	d480
TS-500-LI2UPN8X-H1141	18...30 VDC	4...20 mA	-	0.5 kΩ	w102	d480
TS-500-LUUPN8X-H1141	18...30 VDC	-	0...10 V	-	w103	d480



# At a glance

## Temperature sensors - TT/TC series



### Flexible temperature transmitter and sensor

The sensors of the TT/TC series detect temperature with a Pt100 4-wire probe. Available are compact devices with integrated probe but also with standard M12 connector for separate probes. The temperature transmitters of the TT series feature an analog output 4...20 mA (2-wire).

The devices of the TC series instead feature a switching output. Depending on the combination of sensor and probe, temperatures between -50 °C and +500 °C can be detected. Customer specific modification of the temperature range is possible.



### Cost-efficient transmitter solution

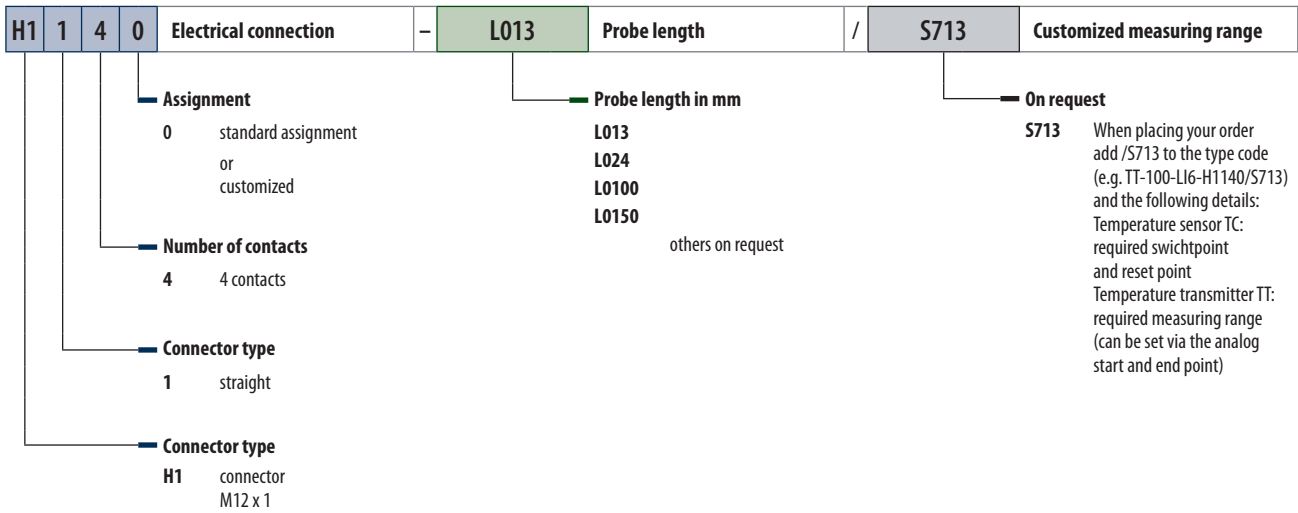
Temperature transmitters and switches of the TT/TC series are applied in places where transducers are not required and the customer needs highest flexibility regarding the choice of probe and thermowell:

- Temperature range between -50 °C and +500 °C
- Rugged stainless steel housing, IP67 protected
- Version with integrated probe or without probe
- Connection of separate probes via M12 connector
- Highest flexibility in choice of probe
- Further mounting aids are not required
- Analog output 4...20 mA (TT series) or switching output (TC series)

# Type code

<b>TT</b>	<b>Functional principle</b>	-	<b>103A</b>	<b>Mechanical version</b>	-	<b>G1/8</b>	<b>Process connection</b>	-
<p><b>Type</b></p> <p><b>TC</b> temperature switch</p> <p><b>TT</b> temperature transmitter</p>		<p><b>Housing</b></p> <p><b>100A</b> processor unit without probe, connection of probe via M12 x 1</p> <p><b>103A</b> processor unit with probe Ø 3 mm, process connection via standard thread accuracy class A</p> <p><b>206A</b> processor unit with probe Ø 6 mm, process connection via compression fitting thermowell, accuracy class A</p>			<p><b>Process connection (only devices with built-on probe)</b></p> <p><b>G1/8</b> G1/8" male thread (only 103)</p> <p><b>CF</b> connection compression fitting thermowell (only 206A)</p>			





## TT/TC series – Temperature transmitters and switches



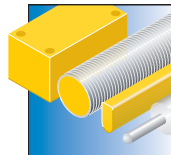
Devices of the TT and the TC series are available with or without probe. The types without probe take any Pt100 (4-wire) probe of the TP series.

The TT temperature transmitters are set to 0...+150 °C by default. The processed signal is provided via an analog current output, 4...20 mA (2-wire). The TC devices feature a switching output, switch and release point are set by default. Customized settings are available on request.

### Features

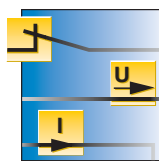
- Operating range -50...+500 °C
- Customized settings
- Transmitters with analog current output 4...20 mA (2-wire), default temperature range 0...+150 °C
- Sensor with PNP output (NO), customized switch and release point

### Properties



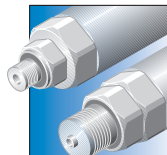
#### Design

Compact, cylindrical, Ø29 mm



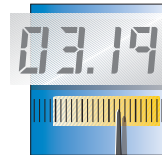
#### Electrical versions

Analog current output 4...20 mA (2-wire) or PNP switching output (NO)



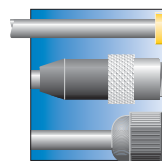
#### Mechanical connections

Standard thread, compression fitting or thermowell, depending on the probe



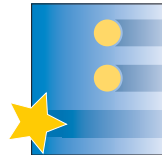
#### Measuring ranges

-50 ...+500 °C



#### Electrical connections

4-pole M12 x 1 plug connection



#### Special features

Customized temperature range, many connection possibilities for the probe

## Processing unit without probe – Current output (2-wire)



<b>Type</b>	TT-100-LI6-H1140	<b>Short-circuit protection</b>	yes
<b>Temperature operating range</b>	-50...+500 °C	<b>Reverse polarity protection</b>	yes
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.1% of final value BSL	<b>Load</b>	1.2 kΩ
<b>Ambient temperature</b>	-40...+85 °C	<b>Protection class</b>	IP67
<b>Storage temperature</b>	-40...+85 °C	<b>Housing material</b>	stainless steel, V4A 1.4401 (AISI 316)
<b>Measuring element</b>	for connection to probes of the TP series	<b>Pressure resistance</b>	100 bar
<b>Response time</b>	dependent on connected temperature sensor	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating voltage</b>	8...35 VDC	<b>Wiring diagram</b>	w104
<b>No-load current I<sub>0</sub></b>	20 mA	<b>Dimension drawing</b>	d481
<b>Current output</b>	4...20 mA		

## Transmitter with compact probe Ø 3 mm – Current output (2-wire)



<b>General data</b>		<b>Short-circuit protection</b>	yes
<b>Temperature operating range</b>	0...150 °C	<b>Reverse polarity protection</b>	yes
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.1% of final value BSL	<b>Load</b>	1.2 kΩ
<b>Ambient temperature</b>	-40...+85 °C	<b>Protection class</b>	IP67
<b>Storage temperature</b>	-40...+85 °C	<b>Housing material</b>	stainless steel, V4A 1.4401 (AISI 316)
<b>Measuring element</b>	Pt-100 platinum measuring element, DIN EN 60 751	<b>Sensor material</b>	stainless steel, AISI 316
<b>Accuracy</b>	Class A	<b>Pressure resistance</b>	100 bar
<b>Operating voltage</b>	8...35 VDC	<b>Electrical connection</b>	connector, M12 x 1
<b>No-load current I<sub>0</sub></b>	20 mA	<b>Mechanical connection</b>	G1/8" male thread
<b>Current output</b>	4...20 mA		

### Types and data – selection table

Type	Immersion depth	w	d
TT-103A-G1/8-LI6-H1140-L013	13 mm	w104	d482
TT-103A-G1/8-LI6-H1140-L024	24 mm	w104	d483

## Transmitter with rod-shaped probe Ø 6 mm – Current output (2-wire)




<b>General data</b>			
<b>Temperature operating range</b>	0...150 °C	<b>Short-circuit protection</b>	yes
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.1% of final value BSL	<b>Reverse polarity protection</b>	yes
<b>Ambient temperature</b>	-40...+85 °C	<b>Load</b>	1.2 kΩ
<b>Storage temperature</b>	-40...+85 °C	<b>Protection class</b>	IP67
<b>Measuring element</b>	Pt-100 platinum measuring element, DIN EN 60 751	<b>Housing material</b>	stainless steel, V4A 1.4401 (AISI 316)
<b>Accuracy</b>	Class A	<b>Sensor material</b>	stainless steel, AISI 316
<b>Operating voltage</b>	8...35 VDC	<b>Pressure resistance</b>	100 bar
<b>No-load current I<sub>0</sub></b>	20 mA	<b>Electrical connection</b>	connector, M12 x 1
<b>Current output</b>	4...20 mA	<b>Mechanical connection</b>	for compression ferrule fittings, protective tubing or direct mounting

### Types and data – selection table

Type	Immersion depth	w	d
TT-206A-CF-LI6-H1140-L0100	100 mm	w104	d484
TT-206A-CF-LI6-H1140-L0150	150 mm	w104	d485

## Processing unit without probe – Switching output



<b>General data</b>			
<b>Temperature operating range</b>	-50...500 °C	<b>Operating voltage</b>	15...30 VDC
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.1% of final value BSL	<b>Short-circuit protection</b>	yes
<b>Switching point accuracy</b>	0.5 °C	<b>Reverse polarity protection</b>	yes
<b>Switch point SP1</b>	customized	<b>Output function</b>	 , PNP
<b>Release point rP1</b>	customized	<b>Rated operational current</b>	0.1 A
<b>Ambient temperature</b>	-40...+85 °C	<b>Protection class</b>	IP67
<b>Storage temperature</b>	-40...+85 °C	<b>Housing material</b>	stainless steel, V4A 1.4401 (AISI 316)
<b>Measuring element</b>	for connection to probes of the TP series	<b>Pressure resistance</b>	100 bar
<b>Response time</b>	dependent on connected temperature sensor	<b>Electrical connection</b>	connector, M12 x 1

### Types and data – selection table

Type	w	d
TC-100-AP6-H1140	w105	d481
TC-100-AP6-H1140/S713	w105	d481

## Transmitter with compact probe Ø 3 mm – Switching output



### General data

<b>Temperature operating range</b>	0...150 °C	<b>Short-circuit protection</b>	yes
<b>Accuracy (Lin. + Hys. + Rep.)</b>	0.1% of final value BSL	<b>Reverse polarity protection</b>	yes
<b>Switching point accuracy</b>	0.5 °C	<b>Output function</b>	—, PNP
<b>Switch point SP1</b>	customized	<b>Rated operational current</b>	0.1 A
<b>Release point rP1</b>	customized	<b>Protection class</b>	IP67
<b>Ambient temperature</b>	-40...+85 °C	<b>Housing material</b>	stainless steel, V4A 1.4401 (AISI 316)
<b>Storage temperature</b>	-40...+85 °C	<b>Sensor material</b>	stainless steel, AISI 316
<b>Measuring element</b>	Pt-100 platinum measuring element, DIN EN 60 751	<b>Pressure resistance</b>	100 bar
<b>Accuracy</b>	Class A	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating voltage</b>	15...30 VDC	<b>Mechanical connection</b>	G1/8" male thread

### Types and data – selection table

Type	Immersion depth	w	d
TC-103A-G1/8-AP6-H1140-L013	13 mm	w105	d482
TC-103A-G1/8-AP6-H1140-L024	24 mm	w105	d483



# At a glance

## Temperature probes- TP series



### Highest possible flexibility

A temperature probe has to be flexible and robust. All Pt100 probes of the TP series are therefore mineral-insulated, equipped with a standard process connection and available ex-stock. Moreover TURCK Pt100 probes are provided in

4-wire technology. The power resistance is thus compensated and a possible influence on the measured value is avoided right from the start when using long cable connections between the probes and the processing units.



### High operational safety

The mineral-insulated probes from TURCK are characterized by enormous flexibility and temperature resistance.

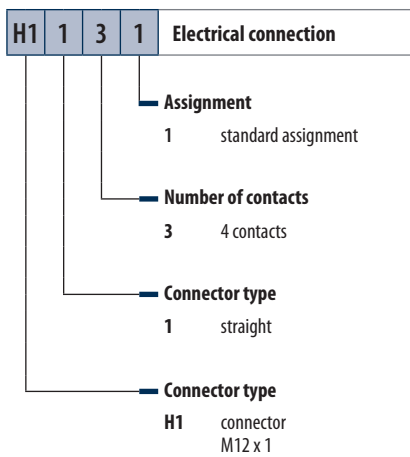
Further advantages:

- High accuracy
- Weldability (like a tube)
- Longevity even under extreme conditions (jacked cables oxidize only on one side and thus achieve double life cycles compared to tubes with the same wall thickness)

# Type code

<b>TP</b>	<b>Functional principle</b>	-	<b>103A</b>	<b>Mechanical version</b>	-	<b>G1/8</b>	<b>Process connection</b>	-
<p><b>Type</b> TP temperature probe</p>		<p><b>Housing</b></p> <p><b>103A</b> processor unit with probe Ø 3 mm, process connection via standard thread accuracy class A</p> <p><b>104A</b> process connection for food applications, probe Ø 4 mm, accuracy class A</p> <p><b>203A</b> for compression fitting/thermowell mounting probe Ø 3 mm, accuracy class A</p> <p><b>206A</b> for compression fitting/thermowell mounting probe Ø 6 mm,</p> <p><b>306A</b> cable probe Ø 6 mm</p>			<p><b>Process connection (only devices with built-on probe)</b></p> <p><b>DN25</b> DN25 für milk pipe connection DIN 11851</p> <p><b>CF</b> connection via compression fitting or thermowell</p> <p><b>G1/8</b> G1/8" male thread</p> <p><b>TR13/4</b> 3/4" Tri-Clamp</p>			





## Pt100 temperature probe in 4-wire technology



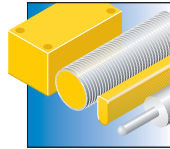
The core element of the TP series is a Pt 100 measuring resistor in 4-wire technology. All probes feature a standard M12 x 1 plug connection.

Resistance thermometers are used in places where temperatures must be detected and monitored to control and optimize processes. Typical applications are process plants, manufacturing facilities and units as well as air-conditioning systems.

### Features

- Pt100 probe acc. to DIN EN 60751
- Vibration and shock proof
- class A for temp. < 350 °C
- class B for temp. > 350 °C
- Connection to TS, TT and TC series as well as to IM34, BL20 and BL67

### Properties



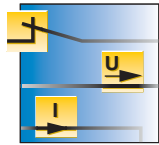
#### Design

All types with standard process connection, lengths, Ø 3/6 mm, freely selectable



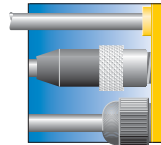
#### Measuring ranges

-50...+500 °C



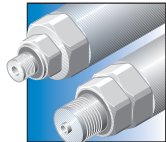
#### Electrical versions

Pt100 4-wire, other types on request



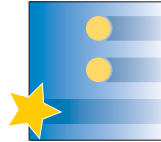
#### Electrical connections

4-pole M12 x 1 plug connection



#### Mechanical connections

Depending on the probe, standard thread, compression fitting or thermowell



#### Special features

Mineral insulated probe, IP68

## Compact probe – Ø 3 mm – Process connection



### General data

<b>Temperature operating range</b>	-50...120 °C	<b>Housing material</b>	stainless-steel/plastic, V4A (1.4404)
<b>Measuring element</b>	Pt-100 platinum measuring element, DIN EN 60 751	<b>Sensor material</b>	stainless steel, AISI 316L
<b>Accuracy</b>	class A	<b>Pressure resistance</b>	100 bar
<b>Response time</b>	t <sub>0.5</sub> = 1.5 s / t <sub>0.9</sub> = 6.0 s in water @ 0.2 m/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Reverse polarity protection</b>	yes	<b>Mechanical connection</b>	G1/8" male thread
<b>Protection class</b>	IP67		

### Types and data – selection table

Type	Immersion depth	w	d
TP-103A-G1/8-H1141-L013	13 mm	w106	d486
TP-103A-G1/8-H1141-L024	24 mm	w106	d487

## Standard rod-shaped probe – Ø 3 mm



### General data

<b>Temperature operating range</b>	-50...500 °C	<b>Protection class</b>	IP67
<b>Storage temperature</b>	-40...+85 °C	<b>Housing material</b>	stainless-steel/plastic, V4A (1.4404)
<b>Measuring element</b>	Pt-100 platinum measuring element, DIN EN 60 751	<b>Sensor material</b>	stainless steel, AISI 316L
<b>Accuracy</b>	class A	<b>Pressure resistance</b>	100 bar
<b>Response time</b>	t <sub>0.5</sub> = 1.5 s / t <sub>0.9</sub> = 6.0 s in water @ 0.2 m/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Reverse polarity protection</b>	yes	<b>Mechanical connection</b>	for compression ferrule fittings, protective tubing or direct mounting

### Types and data – selection table

Type	Immersion depth	w	d
TP-203A-CF-H1141-L100	100 mm	w106	d488
TP-203A-CF-H1141-L150	150 mm	w106	d489
TP-203A-CF-H1141-L250	250 mm	w106	d490
TP-203A-CF-H1141-L200	200 mm	w106	d489
TP-203A-CF-H1141-L300	300 mm	w106	d491

## Standard rod-shaped probe – Ø 6 mm



**General data**

**Temperature operating range** -50...500 °C

**Storage temperature** -40...+85 °C

**Measuring element** Pt-100 platinum measuring element, DIN EN 60 751

**Accuracy** class A

**Response time** t0.5 = 6 s/ t0.9 = 15 s in water @ 0.2 m/s

**Reverse polarity protection** yes

**Protection class** IP67

**Housing material** stainless-steel/plastic, V4A (1.4404)

**Sensor material** stainless steel, AISI 316L

**Pressure resistance** 100 bar

**Electrical connection** connector, M12 x 1

**Mechanical connection** for compression ferrule fittings, protective tubing or direct mounting

**Types and data – selection table**

Type	Immersion depth	w	d
TP-206A-CF-H1141-L100	100 mm	w106	d492
TP-206A-CF-H1141-L150	150 mm	w106	d493
TP-206A-CF-H1141-L200	200 mm	w106	d494
TP-206A-CF-H1141-L300	300 mm	w106	d495

## Cable probe – Ø 6 mm



**General data**

**Temperature operating range** -50...105 °C

**Measuring element** Pt-100 platinum measuring element, DIN EN 60 751

**Accuracy** class A

**Response time** t0.5 = 8 s/ t0.9 = 20 s in water @ 0.2 m/s

**Reverse polarity protection** yes

**Protection class** IP68

**Housing material** stainless steel, V2A (1.4301)

**Sensor material** rubber, TPE

**Pressure resistance** 15 bar

**Electrical connection** connector, M12 x 1

**Mechanical connection** for compression ferrule fittings, protective tubing or direct mounting

**Types and data – selection table**

Type	Immersion depth	w	d
TP-306A-CF-H1141-L1000	1000 mm	w106	d496
TP-306A-CF-H1141-L5000	5000 mm	w106	d497

**w** Wiring diagrams on page 832 ff

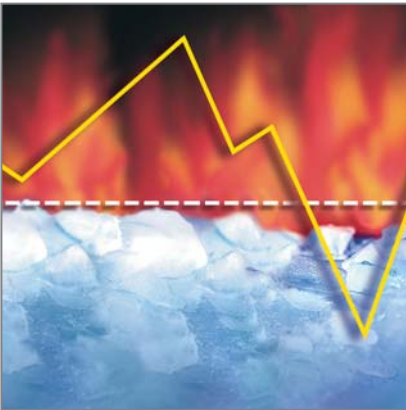
**d** Dimension drawing on page 842 ff

**a** Accessories on page 776 ff



# At a glance

## Temperature sensors - M18T series



### Resistant infrared sensors

Infrared sensors of the M18T series detect heat contactless in a range between 0...+300 °C. The sensors operate as receivers and the objects are the heat emitting sources. The thermal radiation of an object, between 8 and 14  $\mu\text{m}$ , is trans-

formed into an electrical signal by a thermopile and then converted into an output signal.

No matter which device you use, the switchpoint as well as the measuring range are easily taught.



### Non-contact detection of temperature

The rugged MT18 infrared sensors monitor hot objects such as bakery products, metals or bottles. They also monitor flame brazing, blasting or straightening processes and also hot glueing applied in packaging stations, book binding and product assembly.

- Temperature range 0...+300 °C
- Versions with analog output 0...10 V or switching output
- Easy teaching of measuring range or switchpoint.
- Compact and rugged stainless steel housing for harsh environments

## Infrared sensors M18T



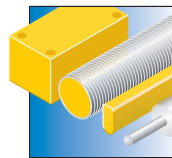
The sensors of the M18T series are essentially passive receivers and operate contactless. The thermal radiation of an object between 8 and 14  $\mu\text{m}$  is transformed into an electrical signal in a thermopile and then converted into an output signal. The distance-spot ratio D:S, specifying the spot size at a defined distance is important in this context. To monitor the surface temperature of the object optimally, this field should be covered completely by the object.

Available are devices with switching output (NO/ PNP) or with analog voltage output 0...10 V. Easy teaching of measuring range or switchpoint.

### Features

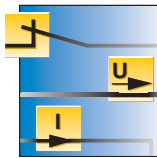
- Temperature range 0...+300 °C
- DS-ratio 6:1, 8:1 and 14:1
- Teaching via pushbutton or cable
- Switching PNP/NPN or analog output 0...10 V
- Version with analog output: PNP-alarm output signals end of measuring range at 10 V
- 2 m connection cable or M12 x 1 plug connection

### Properties



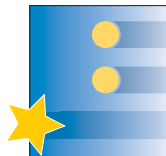
#### Design

Threaded barrel M18 x 1, stainless steel V2A, length 81.2 ... 96.6 mm



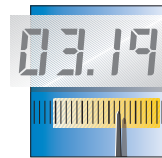
#### Electrical versions

5-wire DC with switching output (PNP/NO) or analog voltage output 0...10 V



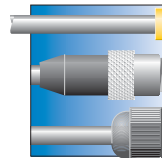
#### Special features

Sensors for different object sizes, spots and distances; distance-spot ration (D:S) 6:1, 8:1, 14:1



#### Measuring ranges

Detection of temperature changes between 0 ...+ 300 °C



#### Electrical connections

Connection cable 2 m (5 x 0.5 mm<sup>2</sup>) or 5-pole M12 x 1 plug connection




## M18T – Switching output



### General data

<b>Temperature operating range</b>	0...300 °C
<b>Switching point accuracy</b>	0.5 °C
<b>Operating voltage</b>	10...30 VDC
<b>Switching frequency</b>	20 Hz
<b>Short-circuit protection</b>	yes / cyclic

<b>Reverse polarity protection</b>	yes
<b>Output function</b>	 , pnp/npn
<b>Protection class</b>	IP67
<b>Housing material</b>	stainless steel, V2A (1.4301)

### Types and data – selection table


Type	Electrical connection	Cable quality	Cable cross section	w	d	e
M18TB6E	cable	PVC, 2 m	5 x 0.5 mm <sup>2</sup>	w107	d498	e096
M18TB6EQ	connector, M12 x 1	-	-	w107	d499	e096
M18TB8	cable	PVC, 2 m	5 x 0.5 mm <sup>2</sup>	w107	d500	e097
M18TB8Q	connector, M12 x 1	-	-	w107	d501	e097
M18TB14	cable	PVC, 2 m	5 x 0.5 mm <sup>2</sup>	w107	d502	e098
M18TB14Q	connector, M12 x 1	-	-	w107	d503	e098

## M18T – Analog voltage output



### General data

<b>Temperature operating range</b>	0...300 °C
<b>Switching point accuracy</b>	0.5 °C
<b>Operating voltage</b>	10...30 VDC
<b>Switching frequency</b>	20 Hz
<b>Voltage output</b>	0...10 V

<b>Short-circuit protection</b>	yes / cyclic
<b>Reverse polarity protection</b>	yes
<b>Output function</b>	 , PNP/analog output
<b>Protection class</b>	IP67
<b>Housing material</b>	stainless steel, V2A (1.4301)

### Types and data – selection table

Type	Electrical connection	Cable quality	Cable cross section	w	d	e
M18TUP8	cable	PVC, 2 m	5 x 0.5 mm <sup>2</sup>	w107	d500	e097
M18TUP8Q	connector, M12 x 1	-	-	w107	d501	e097
M18TUP6E	cable	PVC, 2 m	5 x 0.5 mm <sup>2</sup>	w107	d498	e096
M18TUP6EQ	connector, M12 x 1	-	-	w107	d499	e096
M18TUP14	cable	PVC, 2 m	5 x 0.5 mm <sup>2</sup>	w107	d502	e098
M18TUP14Q	connector, M12 x 1	-	-	w107	d503	e098

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

e Excess gain curves on page 922 ff



# At a glance

## Flow sensors



### Flow sensors – Monitoring of limit values and flow patterns

Flow sensors are applied in automated manufacturing to detect deviating flow speeds of gases and liquids quickly and reliably. They monitor coolant circuits, run-dry protection of pumps or control the flow of exhaust air ducts and air conditioning systems.

Flow sensors are not applied to perform precise measurements but to monitor limit values and flow patterns. In other words, the increase or decrease of flow speed. In this context, high repeatability is the most important feature.

The output signal can either be analog or binary, depending on whether continuous flow or a limit value is to be monitored.

TURCK insertion flow sensors operate on the thermo-dynamic principle: The flow speed is determined from thermal energy dissipated by a probe. The dissipated

heat quantity serves as a measure for the flow speed.

TURCK flow sensors are available as compact devices with integrated signal processor or as insertion or inline sensor with separate processing unit. Sensor and housing are available in different materials and with different connectivity. The connection technology is made for many different industrial application conditions.

- Standard sensors for factory automation
- Sensors for high temperatures and pressures
- Sensors for the food and pharmaceutical industries
- Chemical-resistant sensors
- Sensors for the Ex area
- Flow sensors for the control of gaseous media

# Our strengths...



## Monitoring of flow speeds and patterns

Flow monitoring of media plays an important role in many applications of factory and process automation. Cooling circuits, run-dry protection of pumps or the flow control of exhaust air ducts and air

conditioning systems are typical applications. Electronic flow sensors are increasingly applied to detect critical changes in flow and to signal them to a control unit.



## High repeatability

Flow sensors are mainly applied to control flow speeds. Precise and expensive measurement is not the aim but rather the control of limit values. High repeatability is therefore the most important feature. The sensors not only detect lim-

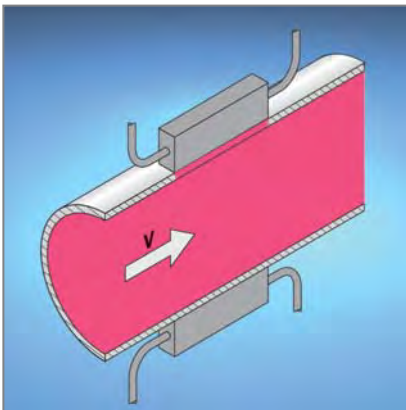
it values of flows but also flow patterns. That is, the increase or decrease of flow speed. The output signal can either be analog or binary, depending on whether continuous flow or a limit value is to be monitored.



## High performance in a compact housing

A great variety of types are available, such as insertion and inline flow sensors as well as compact sensors and sensors with downstreamed electronics. They are easily integrated in existing line configurations and are space saving alternatives for new constructions. In addition, cool-

ant circuits and temperature cycles but also dosage intervals such as applied in water purification systems are precisely monitored. Limit value monitoring as well as analog linearized switching outputs are available for these tasks.



### Calorimetric flow sensors

Calorimetric flow sensors work on the thermodynamic principle and are applied to monitor flow speeds of liquids and gases. Depending on the type, they also measure the media temperature. Short response times within seconds and

stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for flow rate monitoring in coolant circuits.



### Different designs and versions

You can choose between insertion and inline flow sensors as well as between compact devices and sensors with downstreamed electronic evaluation system. All sensors are easily integrated in existing line configurations and are space saving alternatives for new constructions. In

addition, coolant circuits and temperature cycles but also dosage intervals such as applied in water purification systems are precisely monitored. Limit value and analog switching outputs are available for these tasks.

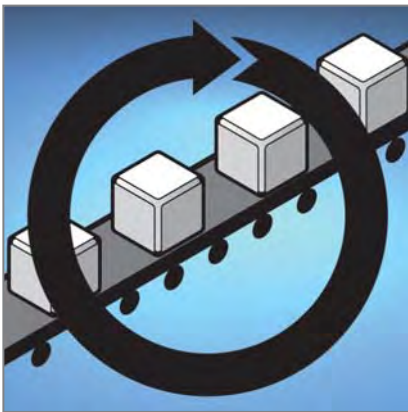


### The right solution for complex applications

Depending on the application, a broad range of different flow sensors is required. TURCK offers them in different material qualities, for liquid as well as for gaseous media. The product portfolio al-

so comprises flow sensors for the Ex-area, extremely chemical-resistant versions, high-temperature and pressure-resistant versions as well as sensors for the pharmaceutical and food industries.

# Your advantages...



## High system availability

Especially in rough environments of factory and process automation, flow meters proof their outstanding reliability. This is guaranteed through excellent EMC properties as well as protection class IP67. A practical housing, durable mounting aids

and a well readable LED chain are the main features considered in the design. Flow meters thus withstand the special ambient conditions of many applications easily. Use these benefits to optimize your production processes.



## Maximum freedom

Maximum planning freedom is provided with just a few device types in combination with numerous connection possibilities and many different mounting aids. From polling of single switchpoints over

analog output signals to a well readable display, even from a long distance: Profit from the extensive standard product range of TURCK flow meters providing more flexibility to your application.



## User-friendly operation

The compact flow sensors feature user-friendly potentiometers at the front for comfortable adjustment of the switch-point. The LED chain indicates the current flow state.

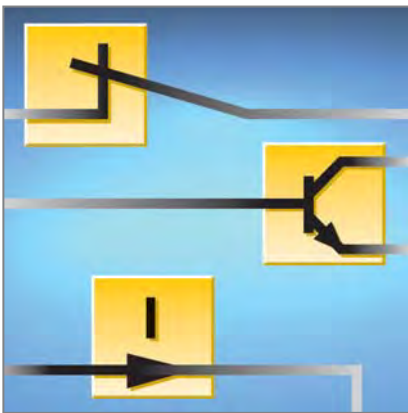


# Advantages



## Easy mounting

Unlike insertion sensors, inline types are installed in pipes. The pipe may be connected directly via cutting ring or a matching adapter. With insert nuts at the bottom the sensor can be mounted to a baseplate. Alternatively, the baseplate can be screwed to the housing to enable front mounting of the sensor.



## Many different output signals

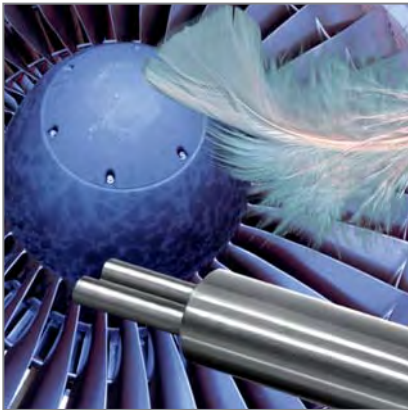
For further processing of output signals via control system, the flow sensors provide a standard PNP switching and a relay output as well as an analog 4...20 mA output. Parameters such as switchpoint, temperature, start and end value are adjusted with a potentiometer at sensors with analog output signal.



## Optimal servicability

Thanks to flexible mounting options, the user-friendly operation and adjustment, the well legible 3-digit 7-segment display and last but not least, the excellent repeatability, flow sensors offer calculable advantages.

# For special applications



## Sensors for gaseous media

TURCK offers special versions for monitoring gaseous media which are especially adjusted to the low thermal conductivity of gases. They are typically applied in air conditioning and ventilation systems, filling and coating lines as well as in motor ventilation and cabinets.



## Sensors for the Ex area

Flow sensors for areas exposed to gas and dust-explosion hazards are ATEX approved and can only be operated in combination with approved external signal processors [Ex ia]. Inline sensors are available for Ex zone 1 and Ex zone 0

and mounted with a T-piece or a weld-on adapter. The inline sensors for Ex zone 1 are mounted directly in pipes with cutting ring screws, ensuring a tight and pressure resistant connection.



## Chemical-resistant sensors

Stainless steel 1.4571 is often not resistant enough for aggressive media. Depending on the application, chemical resistant materials such as PTFE (teflon) and PVDF

(Dyflor), stainless steel alloy (Hastelloy) or titanium are used. These materials are highly resistant to many chemicals.





### Sensors for high temperatures and pressures

More and more applications require sensors that withstand temperatures outside the standard range. We offer sensors for extreme ambient temperatures of up to +120 °C and operating pressures of up to 500 bar. They are typically applied in pro-

duction lines and withstand rinsing with hot cleaning liquids or in plastics processing machines. These sensors are identified by D090 or D100 in the type code for high-temperature applications and D500 for high-pressure applications.



### Sensors for the food and pharmaceutical industry

The mechanics and electronics have to fulfill special requirements of the food and pharmaceutical industry. Food-safe connections such as Tri-Clamp or dairy screw connections (DIN11851) are conform to the 3A sanitary standard. The standard cleaning cycles CIP and SIP with rapid temperature changes impose se-

vere strain on the electronics and thus require special protective measures. For this reason the sensors are made of special steel 1.4404 and 1.4435. Customized connections such as GEA-Varivent or APV flanges are available as well as other metal based materials.

# Type code

FCS	Functional principle	-
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**Series flow sensors**

- FCl** calorimetric, inline
- FCS** calorimetric, insertion

G1/2	A4	Design	-
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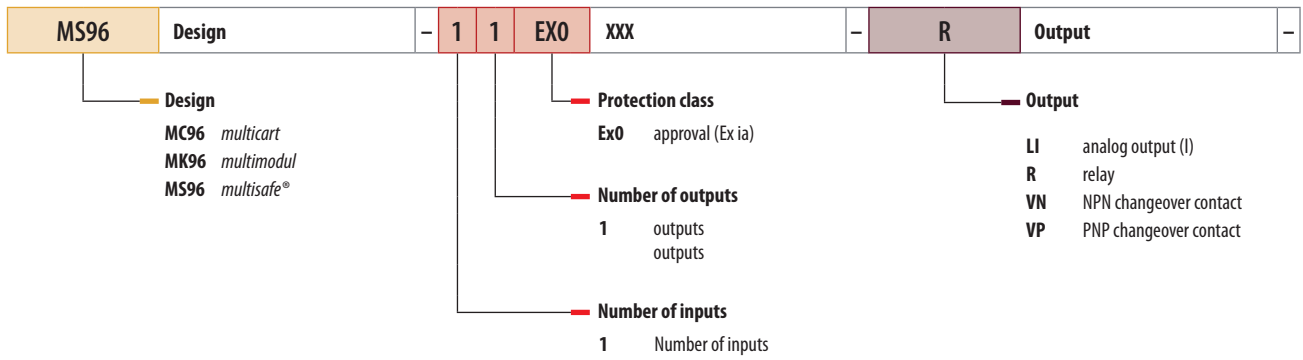
**Mechanical connection**

**Materials**

<p><b>50</b> Tri-Clamp, Ø 50.5 mm</p> <p><b>68</b> Varivent, Ø 68 mm</p> <p><b>10D08</b> compression fittings for smooth barrel, outer Ø 10 mm</p> <p><b>34D10</b> Tri-Clamp, Ø 34 mm (FCI with barrel Ø 10 mm)</p> <p><b>D03</b> gland, 4 mm barrel Ø</p> <p><b>D03</b> gland, 4 mm barrel Ø</p> <p><b>D04</b> male thread G1/4", 4 mm barrel Ø</p> <p><b>D06</b> female thread G1/4", 6 mm barrel Ø</p> <p><b>D09</b> female thread, 9 mm barrel Ø</p> <p><b>D15</b> male thread G1/2", 15 mm barrel Ø</p> <p><b>D20</b> male thread G3/4", 19 mm barrel Ø</p> <p><b>DN25</b> flange DN25/PN40 or Tri-Clamp DN25</p> <p><b>G1/4</b> thread G1/4",</p> <p><b>G1/2</b> thread G1/2",</p> <p><b>GL1/2</b> thread G1/2", long</p> <p><b>GL3/4</b> thread G3/4", long</p> <p><b>K20</b> smooth barrel Ø 20 mm</p> <p><b>M18</b> threaded barrel M18 x 1</p> <p><b>N1/2</b> thread 1/2 NPT</p> <p><b>N3/4</b> thread 3/4 NPT</p> <p><b>TCD04</b> gland, Ø 4 mm, inline sensor with 3.6 mm barrel Ø</p>	<p><b>A4</b> stainless steel A4 (1.4404 or 1.4571)</p> <p><b>A4P</b> sensor stainless steel A4 (1.4404 or 1.4571), housing plastic,</p> <p><b>CT</b> ceramics/PTFE (teflon)</p> <p><b>DY</b> PVDF (Dyflor)</p> <p><b>HA2P</b> sensor stainless steel A2 (1.4305), housing plastic with coupling nut</p> <p><b>HB2</b> Hastelloy B2 (2.4617)</p> <p><b>HC22</b> Hastelloy C22 (2.4603)</p> <p><b>HC4</b> Hastelloy C4 (2.4610)</p> <p><b>P</b> plastic housing</p> <p><b>T</b> PTFE (teflon)</p> <p><b>TN</b> titanium alloy (3.7235)</p>
--	--

A	P	8	X	Electrical version	-	H1	1	4	1	Electrical connection	/	L120	Special versions
				<p><b>Indication</b></p> <p>... X number of LEDs or multicolor LED</p> <p><b>Voltage range</b></p> <p>8 19.2...28.8 VDC</p> <p><b>Output mode</b></p> <p>N NPN</p> <p>P PNP</p> <p>R relay output</p> <p><b>Output function</b></p> <p>2A 2 x NO, working current</p> <p>A 1 x NO, working current</p> <p>R 1 x NC, closed current</p> <p>V changeover contact</p> <p>LI analog output (I)</p> <p>LIU NO/NC programmable, analog + I + PNP</p> <p>LU analog output (U)</p> <p>2U NO/NC programmable, 2 x PNP</p> <p>U NO/NC programmable,</p> <p>NA sensor with downstream electronics (processor units MC96, MK96, MS96)</p> <p>NAEX sensor for Ex zone 1 with downstream electronics (processor units MC96, MS96)</p> <p>NAEXO sensor for Ex zone 0 with downstream electronics (processor units MC96, MS96)</p>							<p><b>Assignment</b></p> <p>0 M12 x 1, connector (modified)</p> <p>1 M12 x 1, connector (standard)</p> <p>blank 2 m cable connection</p> <p><b>... Contacts</b></p> <p>4 4 contacts</p> <p><b>Connector type</b></p> <p>1 straight</p> <p><b>Connector type</b></p> <p>H1 connector type M12 x 1</p>		<p><b>Special versions</b></p> <p>A air-flow sensor gaseous media</p> <p>D003 process connection Varivent</p> <p>D014 process connection Tri-Clamp</p> <p>D024 material test certificate 3.1b</p> <p>D041 sensor and mounting block glued together</p> <p>D090 high-temperature version up to 100 °C</p> <p>D100 high-temperature version up to 120 °C</p> <p>D500 high-pressure version up to 500 bar</p> <p>L065 insertion depth 65 mm (incl. thread)</p> <p>L080 insertion depth 80 mm (incl. thread)</p> <p>L115 insertion depth 115 mm (incl. thread)</p> <p>L120 insertion depth 120 mm (incl. thread)</p> <p>L200 insertion depth 200 mm (incl. thread)</p> <p>M12 process connection female thread M12 x 1.5</p> <p>M16 process connection female thread M16 x 1.5</p> <p>5M cable connection, 5 m</p> <p>10M cable connection, 10 m</p> <p>24VDC supply voltage 24 VDC</p>

# Type code



L013

Operating voltage

— Operating voltage

24 VDC

115 VAC

230 VAC

# Designs and variants

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### Liquids – Insertion – Compact

liquids  
3...300 cm/s  
2...100 cm/s

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### Liquids – Insertion – Compact

liquids  
3...300 cm/s

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### Liquids – Insertion

liquids  
3...300 cm/s  
2...100 cm/s

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### Liquids – Inline – Compact

liquids  
4...30 l/min  
3...20 l/min  
0,1...6 l/min  
0,02...3 l/min  
0,01...1 l/min  
0,001...0,2 l/min

#### Medium

**Operating range water**

#### Oil operating range

**Operating range water**

#### Flow operating range

#### Mechanical connection

G 1/4"  
G 1/2"  
G 1/2" length  
NPT 1/2"  
Varivent  
Tri-Clamp 1 1/2"

G 1/4"  
G 1/2"  
G 1/2" length  
NPT 1/2"

NPT 1/2"  
G 1/4"  
G 1/2"  
G 1/2" length  
G 3/4"  
NPT 3/4"  
threaded tube connection per DIN11851  
Tri-Clamp 1 1/2"  
Varivent

G 3/4"  
G 1/2"  
G 1/4"  
G 1/4" female thread  
Tri-Clamp DN 10  
tube 4 mm

#### Medium temperature

-20...80 °C  
-10...80 °C

-20...80 °C

-20...80 °C  
-10...70 °C  
10...120 °C

-20...80 °C  
0...60 °C  
-20...60 °C

#### Sensor quality

AISI 316Ti  
PVDF  
AISI 316L

AISI 316Ti

AISI 316Ti  
PTFE  
AISI 316L

AISI 316Ti  
Al<sub>2</sub>O<sub>3</sub>/PTFE  
AISI 316L

#### Pressure resistance

5 bar  
10 bar  
100 bar

100 bar

5 bar  
10 bar  
100 bar

1 bar  
5 bar  
20 bar

#### Housing material

stainless steel  
plastic

plastic

stainless steel  
plastic

plastic



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**Liquids – Inline**

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**Gases – Insertion – Compact**

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**Gases – Insertion**

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**Gases – Inline – Compact**

<b>Medium</b>	liquids	air	air	air
<b>Air operating range</b>		0.5...30 m/s	0.5...30 m/s	0.5...40 m/s
<b>Oil operating range</b>	15...300 ml/min 90...1800 ml/min			
<b>Flow operating range</b>	0,005...0,15 l/min 0,03...0,9 l/min			
<b>Mechanical connection</b>	M12 x 1,5 M16 x 1,5	G 1" female thread per DIN 3852 G 1/2" length	G 1/2" length	G 1/4"
<b>Medium temperature</b>	-20...80 °C	-20...80 °C	10...120 °C -20...80 °C	-20...80 °C
<b>Sensor quality</b>	AISI 316Ti	AISI 303	AISI 303	AISI 316Ti
<b>Ex approval acc. to conformity certificate</b>				
<b>Pressure resistance</b>	10 bar 16 bar	3 bar 30 bar	30 bar	20 bar
<b>Housing material</b>	stainless steel	plastic	stainless steel	plastic

Flow sensors

# Designs and variants

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**Liquids – Insertion –  
Ex zone 1**

liquids

**Medium**

**Air operating range**

**Oil operating range**

3...200 cm/s

**Oil operating range**

**Operating range  
water**

1...100 cm/s

**Flow operating range**

**Mechanical  
connection**

G 1/4"  
G 1/2"  
NPT 1/2"  
G 1/2" length

**Medium temperature**

-20...85 °C

**Sensor quality**

AISI 316Ti

**Ex approval acc. to  
conformity certificate**

TÜV 99 ATEX 1518

**Pressure resistance**

60 bar

**Housing material**

stainless steel

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**Liquids – Inline –  
Ex zone 1**

liquids

25...300 ml/min  
150...1800 ml/min

0,01...0,15 l/min  
0,05...0,9 l/min

M12 x 1,5  
M16 x 1,5

-20...70 °C

AISI 316Ti

TÜV 96 ATEX 1101

6 bar

stainless steel

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**Gases – Insertion –  
Ex zone 1**

air

2...20 m/s

G 1/2" length

-20...85 °C

AISI 316Ti

TÜV 99 ATEX 1518

10 bar

stainless steel

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**Liquids – Insertion –  
Ex zone 0**

liquids

3...200 cm/s

1...100 cm/s

G 3/4"  
G 1/4"  
G 1/2"

-20...60 °C

AISI 316Ti

TÜV 99 ATEX 1517X

60 bar

stainless steel



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**Gases – Insertion –  
Ex zone 0**




<b>Medium</b>	air
<b>Air operating range</b>	2...20 m/s
<b>Mechanical connection</b>	G 1/2" length
<b>Medium temperature</b>	-20...60 °C
<b>Sensor quality</b>	AISI 316Ti
<b>Ex approval acc. to conformity certificate</b>	TÜV 99 ATEX 1517X
<b>Pressure resistance</b>	10 bar
<b>Housing material</b>	stainless steel

# Designs and variants

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
**MK96**

<b>Design</b>	terminal chambers
<b>Protection type</b>	
<b>Output function</b>	4 ... 20 mA, analog output  , NPN  , PNP  , relay output
<b>Design</b>	terminal chambers
<b>Protection class</b>	IP20
<b>Local admissible ambient temperature</b>	-20...+60 °C

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
**MS96**

<b>Design</b>	terminal chambers
<b>Protection type</b>	[Ex ia] IIC [Ex ib] IIC
<b>Output function</b>	 , relay output
<b>Design</b>	terminal chambers
<b>Protection class</b>	IP20
<b>Local admissible ambient temperature</b>	-20...+60 °C

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**MC96**

<b>Design</b>	Eurocard
<b>Protection type</b>	[Ex ia] IIC [Ex ib] IIC
<b>Output function</b>	 , relay output
<b>Design</b>	Eurocard
<b>Protection class</b>	IP20
<b>Local admissible ambient temperature</b>	-20...+60 °C -20...+40 °C

# s and variants

## Compact insertion devices for liquid media – stainless steel

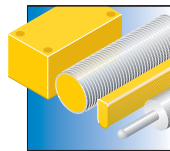


The compact devices incorporate sensor and signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. The sensors are available either with transistor, relay switching or analog current output. They are also available with different mechanical process connections.

### Features

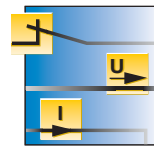
- Insertion flow sensor in a stainless steel housing
- Sensor and signal processor enclosed in the housing
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 1...300 cm/s
- Switchpoint freely adjustable within the operating range
- LED chain for status indication
- Transistor or relay output
- Chemical-resistant materials
- Pressure-resistant up to 100 bar

### Properties



#### Design

Compact insertion flow sensors, for all pipe diameters of DN20 and larger



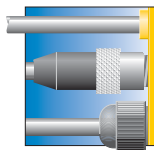
#### Electrical versions

PNP/NPN transistor output or relay output (NO)



#### Monitoring range

Adjustable to flow speeds between 1...300 cm/s



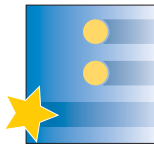
#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

Housing and sensor material stainless steel 1.4571 (A4)



#### Special features

Switchpoint adjusted via potentiometer, LED chain for status indication

## G1/4" – stainless steel A4 – M12 x 1 plug connection



### General data

<b>Operating voltage</b>	21...26 VDC
<b>Medium</b>	liquids
<b>Oil operating range</b>	3...300 cm/s
<b>Operating range water</b>	1...150 cm/s
<b>Medium temperature</b>	-20...80 °C

<b>Sensor quality</b>	AISI 316Ti
<b>Housing quality</b>	V4A (1.4571)
<b>Mechanical connection</b>	G 1/4"
<b>Electrical connection</b>	connector, M12 x 1
<b>Pressure resistance</b>	100 bar

### Types and data – selection table

Type	Output function	w	d
FCS-G1/4A4-AP8X-H1141	—, PNP	w108	d504
FCS-G1/4A4-ARX-H1140	—, relay output	w109	d504

## G1/2" – stainless steel A4 – M12 x 1 plug connection



### General data

<b>Operating voltage</b>	21...26 VDC
<b>Medium</b>	liquids
<b>Oil operating range</b>	3...300 cm/s
<b>Operating range water</b>	1...150 cm/s
<b>Medium temperature</b>	-20...80 °C

<b>Sensor quality</b>	AISI 316Ti
<b>Housing quality</b>	V4A (1.4571)
<b>Mechanical connection</b>	G 1/2"
<b>Electrical connection</b>	connector, M12 x 1
<b>Pressure resistance</b>	100 bar

### Types and data – selection table

Type	Output function	w	d
FCS-G1/2A4-AP8X-H1141	—, PNP	w108	d505
FCS-G1/2A4-AN8X-H1141	—, NPN	w110	d505

### G1/2" – Dyflor – M12 x 1 plug connection



<b>Type</b>	FCS-G1/2DY-AP8X-H1141	<b>Sensor quality</b>	PVDF
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	PVDF
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2"
<b>Oil operating range</b>	2...100 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...70 cm/s	<b>Pressure resistance</b>	5 bar
<b>Medium temperature</b>	-10...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d505

### G1/2" – Dyflor – Cable connection



<b>Type</b>	FCS-G1/2DY-AP8X	<b>Sensor quality</b>	PVDF
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	PVDF
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2"
<b>Oil operating range</b>	2...100 cm/s	<b>Electrical connection</b>	cable
<b>Operating range water</b>	1...70 cm/s	<b>Pressure resistance</b>	5 bar
<b>Medium temperature</b>	-10...80 °C	<b>Wiring diagram</b>	w111
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d506

### GL1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-GL1/2A4-AP8X-H1141	<b>Sensor quality</b>	AISI 316Ti
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2" length
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d507

## N1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-N1/2A4-AP8X-H1141	<b>Sensor quality</b>	AISI 316Ti
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	NPT 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d508

## Varivent – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-68A4-AP8X-H1141/D003	<b>Sensor quality</b>	AISI 316L
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	V4A (1.4404)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	Varivent
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	0...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d509

## 1 1/2" TriClamp – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-50A4-AP8X-H1141/D014	<b>Sensor quality</b>	AISI 316L
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	V4A (1.4404)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	Tri-Clamp 1 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	0...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d510

## Compact insertion devices for liquid media – plastic

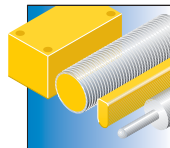


The compact devices incorporate sensor and signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. The sensors are available either with transistor, relay switching or analog current output. They are also available with different mechanical process connections.

### Features

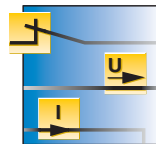
- Insertion flow sensor in a plastic housing
- Sensor and signal processor enclosed in the housing
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 1...300 cm/s
- Switchpoint freely adjustable within the operating range
- LED chain for status indication
- Transistor or relay output
- Chemical-resistant materials
- Pressure-resistant up to 100 bar

### Properties



#### Design

Compact insertion flow sensor, for pipe diameters of DN20 and larger



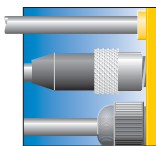
#### Electrical versions

PNP/NPN transistor output or relay output (change-over)



#### Monitoring range

Adjustable to flow speeds in a range between 1...300 cm/s



#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

plastic housing, sensor material stainless steel 1.4571 (A4)



#### Special features

Switchpoint adjusted via potentiometer, LED chain for status indication



## G1/4" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-G1/4A4P-AP8X-H1141	<b>Sensor quality</b>	AISI 316Ti
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	PBT
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/4"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d511

## G1/2" – stainless steel A4 – M12 x 1 plug connection





<b>Type</b>	FCS-G1/2A4P-AP8X-H1141	<b>Sensor quality</b>	AISI 316Ti
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	PBT
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d512

## G1/2" – stainless steel A4 – Cable connection




<b>General data</b>		<b>Housing quality</b>	PBT
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	cable
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C		
<b>Sensor quality</b>	AISI 316Ti		

Types and data – selection table

Type	Operating voltage	Output function	w	d
FCS-G1/2A4P-VRX/24VDC	19.2...28.8 VDC	 , relay output	w112	d513
FCS-G1/2A4P-AP8X/D092 1.5M	21...26 VDC	 , NPN	w110	d514


GL1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-GL1/2A4P-AP8X-H1141	<b>Sensor quality</b>	AISI 316Ti
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	PBT
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2" length
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	 , PNP	<b>Dimension drawing</b>	d515

GL1/2" – stainless steel A4 – Cable connection



<b>Type</b>	FCS-GL1/2A4P-VRX/230VAC	<b>Sensor quality</b>	AISI 316Ti
<b>Operating voltage</b>	195...264 VAC	<b>Housing quality</b>	PBT
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2" length
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	cable
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w113
<b>Output function</b>	 , relay output	<b>Dimension drawing</b>	d516

## N1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-N1/2A4P-AP8X-H1141	<b>Sensor quality</b>	AISI 316Ti
<b>Operating voltage</b>	21...26 VDC	<b>Housing quality</b>	PBT
<b>Medium</b>	liquids	<b>Mechanical connection</b>	NPT 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w108
<b>Output function</b>	—, PNP	<b>Dimension drawing</b>	d517

## Insertion flow sensors for liquid media

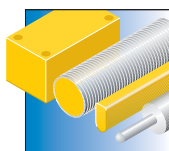


The insertion flow sensors are operated with an external signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. The sensors are available with transistor, relay or analog current output, depending on the signal processor used. They are also available with different mechanical process connections and probe lengths.

### Features

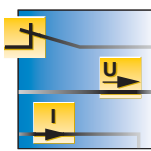
- Insertion flow sensors
- Separate sensor and signal processor
- Values adjusted and displayed at the signal processor
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 1...300 cm/s
- Switchpoint freely adjustable via potentiometer within the operating range
- Transistor, relay or current output
- High temperature version up to +120 °C
- Chemical resistant materials

### Properties



#### Design

Insertion flow sensors, ideal for pipe diameters of DN20 and larger



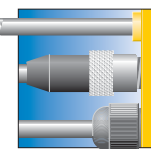
#### Electrical versions

Transistor, relay or analog current output 4...20 mA



#### Monitoring range

Adjustable to flow speeds in a range between 1...300 cm/s



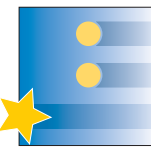
#### Electrical connections

Via A-coded M12 x 1 plug connection or sensor cable



#### Materials

Sensor material stainless steel 1.4571 (A4) or teflon (PTFE)



#### Special features

Pressure-resistant up to 100 bar, high-pressure version up to 500 bar, high-temperature version up to +120 °C

## G1/4" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-G1/4A4-NA-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/4"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d518

## G1/4" – Teflon – Cable connection



<b>Type</b>	FCS-G1/4T-NA	<b>Housing quality</b>	PTFE
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/4"
<b>Oil operating range</b>	2...100 cm/s	<b>Electrical connection</b>	FEP cable
<b>Operating range water</b>	1...70 cm/s	<b>Pressure resistance</b>	5 bar
<b>Medium temperature</b>	-10...70 °C	<b>Wiring diagram</b>	w115
<b>Sensor quality</b>	PTFE	<b>Dimension drawing</b>	d519

## G1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-G1/2A4-NA-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d520

## GL1/2 – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-GL1/2A4-NA-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2" length
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d521

## GL1/2 – Teflon – Cable connection



<b>Type</b>	FCS-GL1/2T-NA	<b>Housing quality</b>	PTFE
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 1/2" length
<b>Oil operating range</b>	2...100 cm/s	<b>Electrical connection</b>	FEP cable
<b>Operating range water</b>	1...70 cm/s	<b>Pressure resistance</b>	5 bar
<b>Medium temperature</b>	-10...70 °C	<b>Wiring diagram</b>	w115
<b>Sensor quality</b>	PTFE	<b>Dimension drawing</b>	d522

## G3/4" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-G3/4A4-NA-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	G 3/4"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d523

## N1/2" – stainless steel A4 – Cable connection



<b>Type</b>	FCS-N1/2A4-NA	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	NPT 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	PVC cable
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w115
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d524

## N3/4" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-N3/4A4-NA-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	NPT 3/4"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	100 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d525

## DN25 – Dairy screw connection – A4 – Cable connection



<b>Type</b>	FCS-DN25A4-NA/D100	<b>Housing quality</b>	V4A (1.4404)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	threaded tube connection per DIN11851
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	FEP cable
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	10...120 °C	<b>Wiring diagram</b>	w115
<b>Sensor quality</b>	AISI 316L	<b>Dimension drawing</b>	d526

## 1 1/2" TriClamp – stainless steel A4 – Cable connection



<b>Type</b>	FCS-50A4-NA/D014	<b>Housing quality</b>	V4A (1.4404)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	Tri-Clamp 1 1/2"
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	FEP cable
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	10...120 °C	<b>Wiring diagram</b>	w115
<b>Sensor quality</b>	AISI 316L	<b>Dimension drawing</b>	d527

## Varivent – stainless steel A4 – Cable connection



<b>Type</b>	FCS-68A4-NA/D011	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	Varivent
<b>Oil operating range</b>	3...300 cm/s	<b>Electrical connection</b>	PVC cable
<b>Operating range water</b>	1...150 cm/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	10...120 °C	<b>Wiring diagram</b>	w115
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d528



**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 786 ff

## Compact inline devices for liquid media

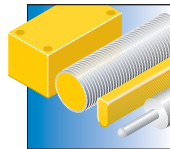


The compact inline devices incorporate sensor and signal processor. They have very fast response times and are suited for simple control tasks, such as monitoring low flow rates. For this purpose they are mounted directly in pipes. The integrated LED chain indicates the current flow state. The sensors are available either with transistor, relay switching or analog current output. They are also available with different mechanical process connections.

### Features

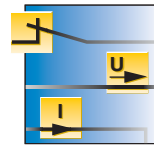
- Inline flow sensor in a plastic housing
- Sensor and signal processor enclosed in the housing
- Ideal for smaller pipe diameters of up to DN20
- Adjustable to flow rates between 0.001...30 l/min
- Switchpoint freely adjustable within the operating range
- LED chain for status indication
- Transistor, relay or analog current output
- No disturbing components, free pipe profile, no pressure loss
- Fast response times within seconds

### Properties



#### Design

Inline flow sensors, ideal for all pipe diameters of up to DN20.



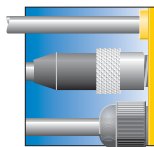
#### Electrical versions

PNP transistor, relay or analog current output 4...20 mA



#### Monitoring range

Adjustable to flow rates between 1 ml/min ... 30 l/min.



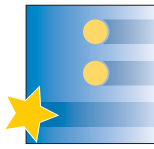
#### Electrical connections

M12 x 1 plug connection, A-coded



#### Materials

plastic housing, sensor material stainless steel 1.4571 (A4)



#### Special features

Switchpoint adjusted via potentiometer, LED chain for status indication

## 4 mm pipe connection – stainless steel A4 – M12 x 1 plug connection



<b>General data</b>		<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	tube 4 mm
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.001...0.2 l/min	<b>Pressure resistance</b>	1 bar
<b>Medium temperature</b>	0...60 °C	<b>Ambient temperature</b>	0...60 °C
<b>Sensor quality</b>	AISI 316Ti		

### Types and data – selection table

Type	Output function	w	d
FCI-TCDO4A4P-AP8X-H1141	—, PNP	w108	d529
FCI-TCDO4A4P-LIX-H1141	4...20 mA, analog output	w116	d530
FCI-TCDO4A4P-ARX-H1140	—, relay output	w109	d529

## TriClamp DN 10 – stainless steel A4 – M12 x 1 plug connection



<b>General data</b>		<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	Tri-Clamp DN 10
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.1...6 l/min	<b>Pressure resistance</b>	20 bar
<b>Sensor quality</b>	AISI 316L	<b>Ambient temperature</b>	0...60 °C

### Types and data – selection table

Type	Medium temperature	Output function	w	d
FCI-34D10A4P-ARX-H1140	-20...80 °C	—, relay output	w109	d531
FCI-34D10A4P-LIX-H1141	-20...60 °C	4...20 mA, analog output	w116	d532
FCI-34D10A4P-AP8X-H1141	-20...80 °C	—, PNP	w108	d531

### G1/4" – Male – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D04A4P-LIX-H1141	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	G 1/4"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.01...1 l/min	<b>Pressure resistance</b>	20 bar
<b>Medium temperature</b>	-20...80 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	4...20 mA, analog output	<b>Wiring diagram</b>	w116
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d533

### G1/4" – Female – Ceramics/Teflon – M12 x 1 plug connection



<b>General data</b>		<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	G 1/4" female thread
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.02...3 l/min	<b>Pressure resistance</b>	5 bar
<b>Medium temperature</b>	0...60 °C	<b>Ambient temperature</b>	0...60 °C
<b>Sensor quality</b>	Al <sub>2</sub> O <sub>3</sub> /PTFE		

#### Types and data – selection table

Type	Output function	w	d
FCI-D06CTP-ARX-H1140	—, relay output	w109	d534
FCI-D06CTP-LIX-H1141	4...20 mA, analog output	w116	d535
FCI-D06CTP-AP8X-H1141	—, PNP	w108	d534

### G1/4" – Male – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D10A4P-ARX-H1140	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	G 1/4"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.1...6 l/min	<b>Pressure resistance</b>	20 bar
<b>Medium temperature</b>	-20...80 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	—, relay output	<b>Wiring diagram</b>	w109
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d536

## G1/2" – Male – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D15A4P-AP8X-H1141	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	G 1/2"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	3...20 l/min	<b>Pressure resistance</b>	20 bar
<b>Medium temperature</b>	-20...80 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	—, PNP	<b>Wiring diagram</b>	w108
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d537

## G3/4" – Male – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D20A4P-AP8X-H1141	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	G 3/4"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	4...30 l/min	<b>Pressure resistance</b>	20 bar
<b>Medium temperature</b>	-20...80 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	—, PNP	<b>Wiring diagram</b>	w108
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d538

## Inline flow sensors for liquid media

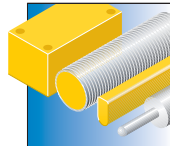


The inline flow sensors are operated with an external signal processor. For this purpose they are mounted directly in pipes. They have very fast response times and are suited for simple control tasks, such as monitoring low flow rates. The integrated LED chain indicates the current flow state. The sensors are available with transistor, relay or analog current output, depending on the signal processor used. They are also available with different mechanical process connections.

### Features

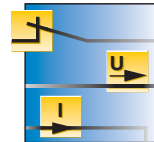
- Inline flow sensors
- Separate sensor and signal processor
- Values adjusted and displayed at the signal processor
- Ideal for small pipe diameters of up to DN10
- Adjustable to flow rates between 5...900 ml/min
- Switchpoint freely adjustable within the operating range
- Transistor, relay or current output
- No disturbing components, free pipe profile, no pressure loss
- Fast response times within seconds

### Properties



#### Design

Inline flow sensors, ideal for all pipe diameters of up to DN10



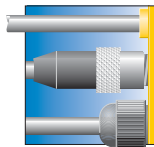
#### Electrical versions

Transistor, relay or analog current output 4...20 mA



#### Monitoring range

Adjustable to flow rates between 5 ... 900 ml/min



#### Electrical connections

M12 x 1 plug connection, A-coded



#### Materials

Sensor material stainless steel 1.4571 (A4) or Delrin



#### Special features

Pressure-resistant 5, 10, or 16 bar, temperature range -20...+80 °C

## M12x1.5 – Female – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D03A4-NA-H1141/M12	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	M12 x 1.5
<b>Oil operating range</b>	15...300 ml/min	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.005...0.15 l/min	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d539

## M16x1.5 – Female – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D09A4-NA-H1141/M16	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	M16 x 1.5
<b>Oil operating range</b>	90...1800 ml/min	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.03...0.9 l/min	<b>Pressure resistance</b>	16 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d540

## Compact insertion devices for gaseous media

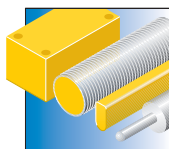


The compact devices incorporate sensor and signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. The sensors are available either with transistor, relay switching or analog current output. They are also available with different mechanical process connections.

### Features

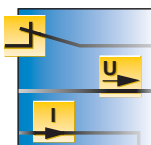
- Insertion flow sensor in a plastic housing
- Sensor and signal processor enclosed in the housing
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 0.5...30 m/s
- Switchpoint freely adjustable within the operating range
- LED chain for status indication
- Transistor, relay or analog current output
- Pressure-resistant up to 30 bar

### Properties



#### Design

Compact insertion flow sensors, ideal for all pipe diameters of DN20 and larger.



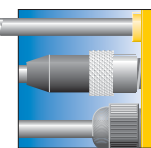
#### Electrical versions

PNP transistor, relay or current output  
4...20 mA



#### Monitoring range

Adjustable to flow speeds between 0.5 ... 30 m/s



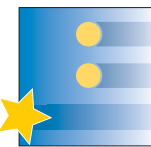
#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

Sensor material stainless steel 1.4571 (A4)



#### Special features

Switchpoint adjusted via potentiometer, LED chain for status indication, pressure-resistant up to 30 bar



## GL1/2" – stainless steel A2 – M12 x 1 plug connection



### General data

<b>Operating voltage</b>	21...26 VDC
<b>Medium</b>	air
<b>Air operating range</b>	0.5...30 m/s
<b>Medium temperature</b>	-20...80 °C
<b>Sensor quality</b>	AISI 303

<b>Housing quality</b>	PBT
<b>Mechanical connection</b>	G 1/2" length
<b>Electrical connection</b>	connector, M12 x 1
<b>Pressure resistance</b>	30 bar

### Types and data – selection table

Type	Output function	w	d
FCS-GL1/2A2P-AP8X-H1141/A	—, PNP	w108	d541
FCS-GL1/2A2P-LIX-H1141/A	4...20 mA, analog output	w116	d541

## G 1" – Female – Coupling nut – stainless steel A2 – M12 x 1 connector



<b>Type</b>	FCS-HA2P-VRX/230VAC/ AL115
<b>Operating voltage</b>	195...264 VAC
<b>Medium</b>	air
<b>Air operating range</b>	0.5...30 m/s
<b>Medium temperature</b>	-20...80 °C
<b>Output function</b>	—, relay output
<b>Sensor quality</b>	AISI 303

<b>Housing quality</b>	PBT-GF30-V0
<b>Mechanical connection</b>	G 1" female thread per DIN 3852
<b>Electrical connection</b>	cable
<b>Pressure resistance</b>	3 bar
<b>Wiring diagram</b>	w113
<b>Dimension drawing</b>	d543

## G 1" – Female – with coupling nut – stainless steel A2 – M12 x 1 plug connection



<b>Type</b>	FCS-HA2P-LIX-H1141/AL115
<b>Operating voltage</b>	21...26 VDC
<b>Medium</b>	air
<b>Air operating range</b>	0.5...30 m/s
<b>Medium temperature</b>	-20...80 °C
<b>Output function</b>	4...20 mA, analog output
<b>Sensor quality</b>	AISI 303

<b>Housing quality</b>	PBT
<b>Mechanical connection</b>	G 1" female thread per DIN 3852
<b>Electrical connection</b>	connector, M12 x 1
<b>Pressure resistance</b>	3 bar
<b>Wiring diagram</b>	w116
<b>Dimension drawing</b>	d542

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 786 ff

## Insertion flow sensors for gaseous media

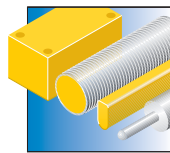


The insertion flow sensors are operated with an external signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. The sensors are available with transistor, relay or analog current output, depending on the signal processor used. They are also available with different mechanical process connections and probe lengths. In addition, we offer sensors for high-temperature applications.

### Features

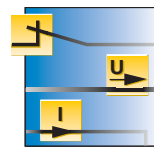
- Insertion flow sensors
- Separate sensor and signal processor
- Values adjusted and displayed at the signal processor
- Ideal for all pipe diameters of up to DN20
- Adjustable to flow speeds between 0.5...30 m/s
- Switchpoint freely adjustable within the operating range
- Transistor, relay or current output
- Pressure-resistant up to 30 bar

### Properties



#### Design

Insertion flow sensors, ideal for all pipe diameters of DN20 and larger.



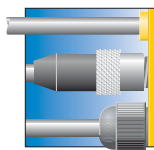
#### Electrical versions

Transistor, relay or analog current output 4...20 mA



#### Monitoring range

Adjustable to flow speeds between 0.5 ... 30 m/s



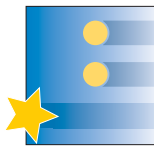
#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

Sensor material stainless steel 1.4571 (A4)



#### Special features

High-temperature version up to +120 °C

## GL1/2 – stainless steel A2 – M12 x 1 plug connection



<b>Type</b>	FCS-GL1/2A2-NA-H1141/A	<b>Mechanical connection</b>	G 1/2" length
<b>Medium</b>	air	<b>Electrical connection</b>	connector, M12 x 1
<b>Air operating range</b>	0.5...30 m/s	<b>Pressure resistance</b>	30 bar
<b>Medium temperature</b>	-20...80 °C	<b>Wiring diagram</b>	w114
<b>Sensor quality</b>	AISI 303	<b>Dimension drawing</b>	d544
<b>Housing quality</b>	V2A (1.4305)		

## GL1/2 – stainless steel A2 – Cable connection



<b>Type</b>	FCS-GL1/2A2-NA/A/D100	<b>Mechanical connection</b>	G 1/2" length
<b>Medium</b>	air	<b>Electrical connection</b>	FEP cable
<b>Air operating range</b>	0.5...30 m/s	<b>Pressure resistance</b>	30 bar
<b>Medium temperature</b>	10...120 °C	<b>Wiring diagram</b>	w115
<b>Sensor quality</b>	AISI 303	<b>Dimension drawing</b>	d545
<b>Housing quality</b>	V2A (1.4305)		

## Compact inline device for gaseous media

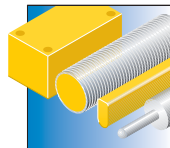


The compact devices incorporate sensor and signal processor. Inline sensors have very fast response times and are suited for simple control tasks, such as monitoring low flow rates. For this purpose they are mounted directly in pipes. The integrated LED chain indicates the current flow state. The sensors are available either with transistor, relay switching or analog current output. They are also available with different mechanical process connections.

### Features

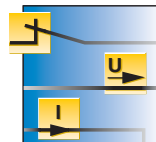
- Inline flow sensor in a plastic housing
- Sensor and signal processor enclosed in the housing
- Ideal for small pipe diameters of up to DN10
- Adjustable to flow speeds between 0.5 ... 40 m/s
- Switchpoint freely adjustable within the operating range
- LED chain for status indication
- Transistor or analog current output
- No disturbing components, free pipe profile, no pressure loss
- Fast response times within seconds

### Properties



#### Design

Inline flow sensors, ideal for all pipe diameters of up to DN10.



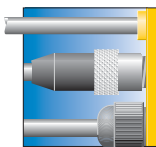
#### Electrical versions

Transistor or analog current output 4...20 mA



#### Monitoring range

Adjustable to flow speeds between 0.5 ... 40 m/s



#### Electrical connections

M12 x 1 plug connection, A-coded



#### Materials

plastic housing, sensor material stainless steel 1.4571 (A4)



#### Special features

Switchpoint adjustable via potentiometer, LED chain for status indication

## G1/4" – Male – stainless steel A4 – M12 x 1 plug connection




### General data

<b>Operating voltage</b>	21...26 VDC
<b>Medium</b>	air
<b>Air operating range</b>	0.5...40 m/s
<b>Medium temperature</b>	-20...80 °C
<b>Sensor quality</b>	AISI 316Ti

<b>Housing quality</b>	PBT
<b>Mechanical connection</b>	G 1/4"
<b>Electrical connection</b>	connector, M12 x 1
<b>Pressure resistance</b>	20 bar
<b>Ambient temperature</b>	0...60 °C

### Types and data – selection table

Type	Output function	w	d
FCI-D10A4P-AP8X-H1141/A	 , PNP	w108	d536
FCI-D10A4P-LIX-H1141/A	4 ... 20 mA, analog output	w116	d536

## Insertion flow sensors for liquid media – Ex zone 1

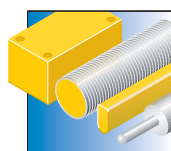


Insertion flow sensors for liquid media are also available for Ex zone 1. The devices are operated with an external Ex signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. The devices are available with transistor or relay output, depending on the type of signal processor used. They are also available with different mechanical process connections and probe lengths.

### Features

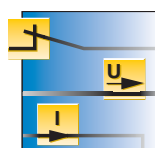
- Insertion flow sensor for Ex zone 1
- Separate sensor and signal processor
- Values adjusted and displayed at the Ex signal processor
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 1...200 cm/s
- Switchpoint freely adjustable via potentiometer within the operating range
- Transistor or relay output
- Pressure-resistant up to 60 bar
- High temperature version up to +120 °C
- High pressure version up to 500 bar
- Chemical-resistant materials

### Properties



#### Design

Insertion flow sensors, ideal for all pipe diameters of DN20 and larger.



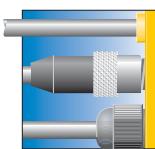
#### Electrical versions

Transistor or relay output



#### Monitoring range

Adjustable to flow speeds between 1...200 cm/s



#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

Sensor material stainless steel 1.4571 (A4)



#### Special features

For Ex zone 1, high-pressure version 500 bar max., high-temperature version +120 °C max.

## G1/4" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-G1/4A4-NAEX-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ib IIC	<b>Mechanical connection</b>	G 1/4"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w117
<b>Medium temperature</b>	-20...85 °C	<b>Dimension drawing</b>	d518
<b>Sensor quality</b>	AISI 316Ti		

## G1/4" – stainless steel A4 – Cable connection



<b>Type</b>	FCS-G1/4A4-NAEX	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ib IIC	<b>Mechanical connection</b>	G 1/4"
<b>Medium</b>	liquids	<b>Electrical connection</b>	PUR cable
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w118
<b>Medium temperature</b>	-20...85 °C	<b>Dimension drawing</b>	d546
<b>Sensor quality</b>	AISI 316Ti		

## G1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-G1/2A4-NAEX-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ib IIC	<b>Mechanical connection</b>	G 1/2"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w117
<b>Medium temperature</b>	-20...85 °C	<b>Dimension drawing</b>	d520
<b>Sensor quality</b>	AISI 316Ti		

## GL1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-GL1/2A4-NAEX-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ib IIC	<b>Mechanical connection</b>	G 1/2" length
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w117
<b>Medium temperature</b>	-20...85 °C	<b>Dimension drawing</b>	d521
<b>Sensor quality</b>	AISI 316Ti		

## N1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-N1/2A4-NAEX-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ib IIC	<b>Mechanical connection</b>	NPT 1/2"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w117
<b>Medium temperature</b>	-20...85 °C	<b>Dimension drawing</b>	d547
<b>Sensor quality</b>	AISI 316Ti		



**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 786 ff

## Inline flow sensors for liquid media – Ex zone 1

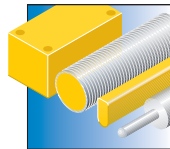


Inline flow sensors for liquid media are also available for Ex zone 1. The devices are operated with an external Ex signal processor. For this purpose they are mounted directly in pipes. They have very fast response times and are suited for simple control tasks, such as monitoring low flow rates. The integrated LED chain indicates the current flow state. A transistor or relay output are available, depending on the type of signal processor used. They are also available with different mechanical process connections.

### Features

- Inline flow sensors for Ex zone 1
- Separate sensor and signal processor
- Values adjusted and displayed at the Ex signal processor
- Ideal for small pipe diameters of up to DN10
- Adjustable to flow rates between 10 and 900 ml/min
- Switchpoint freely adjustable within the operating range
- Transistor or relay output
- No disturbing components, free pipe profile, no pressure loss
- Fast response times within seconds
- Pressure-resistant up to 6 bar

### Properties



#### Design

Inline flow sensors, ideal for all pipe diameters of up to DN10.



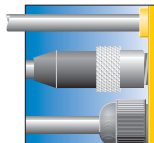
#### Electrical versions

Transistor or relay output



#### Monitoring range

Adjustable to flow rates between 10 ml/min ... 0.9 l/min



#### Electrical connections

M12 x 1 plug connection, A-coded



#### Materials

Sensor material stainless steel 1.4571 (A4)



#### Special features

Application in Ex zone 1, pressure resistant up to 6 bar

## M12x1.5 – Female – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D03A4-NAEX-H1141/ M12	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	M12 x 1.5
<b>Oil operating range</b>	25...300 ml/min	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.01...0.15 l/min.	<b>Pressure resistance</b>	6 bar
<b>Medium temperature</b>	-20...70 °C	<b>Wiring diagram</b>	w117
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d539

## M16x1.5 – Female – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCI-D09A4-NAEX-H1141/ M16	<b>Housing quality</b>	V4A (1.4571)
<b>Medium</b>	liquids	<b>Mechanical connection</b>	M16 x 1.5
<b>Oil operating range</b>	150...1800 ml/min	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0.05...0.9 l/min.	<b>Pressure resistance</b>	6 bar
<b>Medium temperature</b>	-20...70 °C	<b>Wiring diagram</b>	w117
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d540

## Insertion flow sensors for gaseous media – Ex zone 1

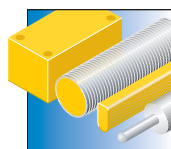


Insertion flow sensors for liquid media are also available for Ex zone 1. The devices are operated with an external Ex signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. A transistor or relay output are available, depending on the type of signal processor used. They are also available with different mechanical process connections and probe lengths.

### Features

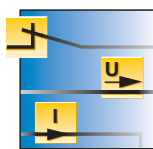
- Insertion flow sensor for Ex zone 1
- Separate sensor and signal processor
- Values adjusted and displayed at the Ex signal processor
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 2...20 m/s
- Switchpoint freely adjustable within the operating range
- Transistor or relay output
- Pressure-resistant up to 10 bar
- High temperature version up to +120 °C

### Properties



#### Design

Insertion flow sensors, ideal for all pipe diameters of DN20 and larger



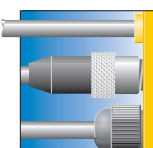
#### Electrical versions

Transistor or relay output



#### Monitoring range

Adjustable to flow speeds between 2...20 m/s



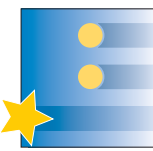
#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

Sensor material stainless steel 1.4571 (A4)



#### Special features

Application in Ex zone 1, pressure-resistant up to 10 bar

## GL1/2" – stainless steel A4 – Cable connection



<b>Type</b>	FCS-GL1/2A4-NAEX/A	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ib IIC	<b>Mechanical connection</b>	G 1/2" length
<b>Medium</b>	air	<b>Electrical connection</b>	PUR cable
<b>Air operating range</b>	2...20 m/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	-20...85 °C	<b>Wiring diagram</b>	w118
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d545

## GL1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-GL1/2A4-NAEX-H1141/A	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ib IIC	<b>Mechanical connection</b>	G 1/2" length
<b>Medium</b>	air	<b>Electrical connection</b>	connector, M12 x 1
<b>Air operating range</b>	2...20 m/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	-20...85 °C	<b>Wiring diagram</b>	w117
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d544

## Insertion flow sensors for liquid media – Ex zone 0

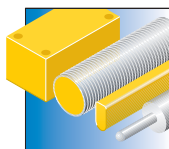


Insertion flow sensors for liquid media are also available for Ex zone 0. The devices are operated with an external Ex signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. A transistor or relay output are available, depending on the type of signal processor used. They are also available with different mechanical process connections and probe lengths.

### Features

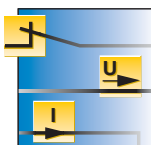
- Insertion flow sensor for Ex zone 0
- Separate sensor and signal processor
- Values adjusted and displayed at the Ex signal processor
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 1...200 cm/s
- Switchpoint freely adjustable via potentiometer within the operating range
- Transistor or relay output
- Pressure-resistant up to 60 bar
- Chemical resistant materials

### Properties



#### Design

Insertion flow sensors, ideal for all pipe diameters of DN20 and larger.



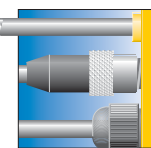
#### Electrical versions

Transistor or relay output



#### Monitoring range

Adjustable to flow speeds between 1...200 cm/s



#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

Sensor material stainless steel 1.4571 (A4)



#### Special features

Application in Ex zone 0, pressure-resistant up to 60 bar, high-pressure version up to 500 bar, high-temperature version up to +120 °C

## G1/4" – stainless steel A4 – Cable connection



<b>Type</b>	FCS-G1/4A4-NAEXO	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ia IIC	<b>Mechanical connection</b>	G 1/4"
<b>Medium</b>	liquids	<b>Electrical connection</b>	PUR cable
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w118
<b>Medium temperature</b>	-20...60 °C	<b>Dimension drawing</b>	d546
<b>Sensor quality</b>	AISI 316Ti		

## G1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-G1/2A4-NAEXO-H1141	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ia IIC	<b>Mechanical connection</b>	G 1/2"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w117
<b>Medium temperature</b>	-20...60 °C	<b>Dimension drawing</b>	d520
<b>Sensor quality</b>	AISI 316Ti		

## G1/2" – stainless steel A4 – Cable connection



<b>Type</b>	FCS-G1/2A4-NAEXO	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ia IIC	<b>Mechanical connection</b>	G 1/2"
<b>Medium</b>	liquids	<b>Electrical connection</b>	PUR cable
<b>Oil operating range</b>	3...200 cm/s	<b>Pressure resistance</b>	60 bar
<b>Operating range water</b>	1...100 cm/s	<b>Wiring diagram</b>	w118
<b>Medium temperature</b>	-20...60 °C	<b>Dimension drawing</b>	d548
<b>Sensor quality</b>	AISI 316Ti		

**G3/4" – stainless steel A4 – Cable connection**

<b>Type</b>	FCS-G3/4A4-NAEXO
<b>Protection type</b>	Ex ia IIC
<b>Medium</b>	liquids
<b>Oil operating range</b>	3...200 cm/s
<b>Operating range water</b>	1...100 cm/s
<b>Medium temperature</b>	-20...60 °C
<b>Sensor quality</b>	AISI 316Ti

<b>Housing quality</b>	V4A (1.4571)
<b>Mechanical connection</b>	G 3/4"
<b>Electrical connection</b>	PUR cable
<b>Pressure resistance</b>	60 bar
<b>Wiring diagram</b>	w118
<b>Dimension drawing</b>	d549



**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 786 ff

## Insertion flow sensors for gaseous media – Ex zone 0

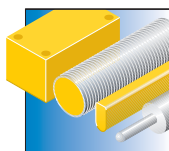


Insertion flow sensors for liquid media are also available for Ex zone 0. The devices are operated with an external Ex signal processor. They are mounted with a T-piece, a weld-on adapter or with a matching adapter block. The probe is inserted in the pipe and has direct contact with the medium. The integrated LED chain indicates the current flow state. The devices are available with transistor or relay output, depending on the type of signal processor used. They are also available with different mechanical process connections and probe lengths.

### Features

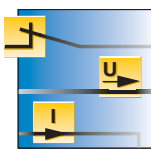
- Insertion flow sensor for Ex zone 0
- Separate sensor and signal processor
- Values adjusted and displayed at the Ex signal processor
- Ideal for all pipe diameters of DN20 and larger
- Adjustable to flow speeds between 2...20 m/s
- Switchpoint freely adjustable within the operating range
- Transistor or relay output
- Pressure-resistant up to 10 bar

### Properties



#### Design

Insertion flow sensors, ideal for all pipe diameters of DN20 and larger.



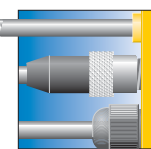
#### Electrical versions

Transistor or relay output



#### Monitoring range

Adjustable to flow speeds between 2...20 m/s



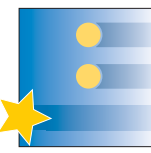
#### Electrical connections

Via A-coded M12 x 1 plug connection or connection cable



#### Materials

Sensor material stainless steel 1.4571 (A4)



#### Special features

Application in Ex zone 0, pressure-resistant up to 10 bar

## GL1/2" – stainless steel A4 – M12 x 1 plug connection



<b>Type</b>	FCS-GL1/2A4-NAEX0-H1141/A	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ia IIC	<b>Mechanical connection</b>	G 1/2" length
<b>Medium</b>	air	<b>Electrical connection</b>	connector, M12 x 1
<b>Air operating range</b>	2...20 m/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	-20...60 °C	<b>Wiring diagram</b>	w117
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d544

## GL1/2" – stainless steel A4 – Cable connection



<b>Type</b>	FCS-GL1/2A4-NAEX0/A	<b>Housing quality</b>	V4A (1.4571)
<b>Protection type</b>	Ex ia IIC	<b>Mechanical connection</b>	G 1/2" length
<b>Medium</b>	air	<b>Electrical connection</b>	PUR cable
<b>Air operating range</b>	2...20 m/s	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	-20...60 °C	<b>Wiring diagram</b>	w118
<b>Sensor quality</b>	AISI 316Ti	<b>Dimension drawing</b>	d545

# Signal processors for flow sensors

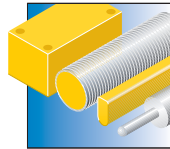


The MK96, MS96 and MC96F are used for power supply and signal processing of flow sensors. The switchpoints resp. operating range are adjusted via 2 potentiometers. The flow state is indicated continuously via a multicolor LED chain. The MS96 features moreover an output for temperature monitoring and an adjustable switch-off delay. The MC96 is designed as a 19" card to fit in 19" module racks. It features an output for temperature monitoring as well as a DIP switch to enable or disable the switch-on/off delay.

### Features

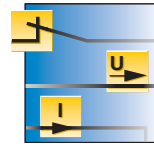
- Signal processors for the connection of insertion and inline flow sensors
- Separate sensor and signal processor
- Compact version with minimal space requirements
- Values adjusted and displayed at the signal processor
- Adjustment via potentiometer, easy handling
- Available types MK96, MS96, MC96
- MS96 and MC96 additionally with temperature monitoring
- Transistor, relay or analog current output

### Properties



#### Design

Modular housing MK96 for flow monitoring; modular housing MS96 and 19" card MC96 for flow and temperature monitoring



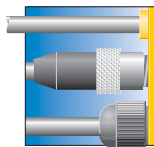
#### Electrical versions

MK96 with transistor, relay or current output; MS96 and MC96 with relay outputs for flow and temperature monitoring



#### Monitoring range

Depending on connected flow sensors



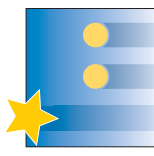
#### Electrical connections

MK96 and MS96 junction box; MC96 series plug connection 19" card



#### Materials

plastic housing, polycarbonate (ABS)



#### Special features

Simple adjustment via potentiometer, MS96 and MC96 additionally with temperature monitoring

## MK96 – Modular housing



### General data

#### Operating voltage

19.2...28.8 VDC

#### Design

terminal chambers

#### Housing material

Polycarbonate/ABS




#### Protection class

IP20

#### Local admissible ambient temperature

-20...+60 °C

### Types and data – selection table

Type	Output function	w	d
MK96-LI01	4 ... 20 mA, analog output	w119	d550
MK96-VN01	 , NPN	w120	d550
MK96-VP01	 , PNP	w121	d550
MK96-11-R/24VDC	 , relay output	w122	d550

## MS96 – Modular housing



### General data

#### Output function

, relay output

#### Design

terminal chambers

#### Housing material

Polycarbonate/ABS

#### Protection class

IP20

#### Local admissible ambient temperature

-20...+60 °C

### Types and data – selection table

Type	Operating voltage	w	d
MS96-12R/24VDC	19...29 VDC	w123	d551
MS96-12R/115VAC	92...127 VAC	w124	d551
MS96-12R/230VAC	184...265 VAC	w124	d551

**w** Wiring diagrams on page 832 ff

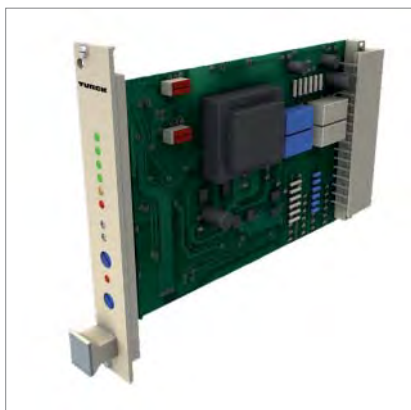
**d** Dimension drawings on page 842 ff

**a** Accessories on page 786 ff

## Signal processors

Signal processors for insertion and inline flow sensors

### MC96 – 19" card



<b>Type</b>	MC96-22-R/24VDC	<b>Protection class</b>	IP20
<b>Operating voltage</b>	19.2...28.8 VDC	<b>Local admissible ambient temperature</b>	-20...+60 °C
<b>Output function</b>	—, relay output	<b>Wiring diagram</b>	w125
<b>Design</b>	Eurocard	<b>Dimension drawing</b>	d552
<b>Housing material</b>	metal/plastic		

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 786 ff

## Signal processors for Ex flow sensors

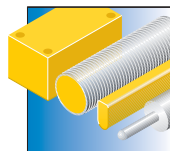


The MK96 and MS96 are used for power supply and signal processing of Ex flow sensors. The switchpoints resp. operating range are adjusted via 2 potentiometers. The flow state is indicated continuously via a multicolor LED chain. The MC96 is designed as a 19" card to fit in 19" module racks. In addition, they feature an output for temperature monitoring as well as an adjustable switch-on or off delay. The MS96 is additionally equipped with an adjustable switch-off delay.

### Features

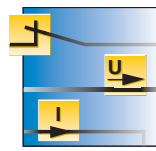
- [Ex ia] signal processors for Ex insertion and inline flow sensors
- Separate sensor and signal processor
- Compact version with minimal space requirements
- Values adjusted and displayed at the signal processor
- Adjustment via potentiometer, easy handling
- Available types MS96 and MC96
- MC96 additionally with temperature monitoring
- Transistor and relay output

### Properties



#### Design

Modular housing MS96 for flow monitoring; 19" card MC96 for flow and temperature monitoring



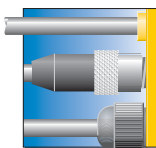
#### Electrical versions

MS96 with relay output for flow monitoring, and MC96 with relay outputs for flow and temperature monitoring



#### Monitoring range

Depending on connected flow sensor



#### Electrical connections

MS96 junction box; MC96 series plug connection 19" card



#### Materials

plastic housing, polycarbonate (ABS)



#### Special features

Simple adjustment via potentiometer, MC96 additionally with temperature monitoring



## MS96 – Modular housing



### General data

**Output function**

, relay output

**Protection class** IP20

**Design**

terminal chambers

**Local admissible ambient temperature** -20...+60 °C

**Housing material**

Polycarbonate/ABS

### Types and data – selection table

Type	Operating voltage	Protection type	w	d
MS96-11EX0-R/24VDC	21...28 VDC	[Ex ia] IIC	w126	d551
MS96-11EX0-R/230VAC	198...242 VAC	[Ex ia] IIC	w127	d551
MS96-11EX0-R/115VAC	99...121 VAC	[Ex ia] IIC	w127	d551
MS96-11EX-R/230VAC	207...253 VAC	[Ex ib] IIC	w127	d551
MS96-11EX-R/24VDC	22...26 VDC	[Ex ib] IIC	w126	d551
MS96-11EX-R/115VAC	104...127 VAC	[Ex ib] IIC	w127	d551

## MC96 – 19" card



### General data

**Operating voltage**

19.2...28.8 VDC

**Housing material**

metal/plastic

**Output function**

, relay output

**Protection class**

IP20

**Design**

Eurocard

### Types and data – selection table

Type	Local admissible ambient temperature	Protection type	w	d
MC96-12EX0-R/24VDC	-20...+60 °C	[Ex ia] IIC	w128	d552
MC96-12EX-R/24VDC	-20...+40 °C	[Ex ib] IIC	w128	d552

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

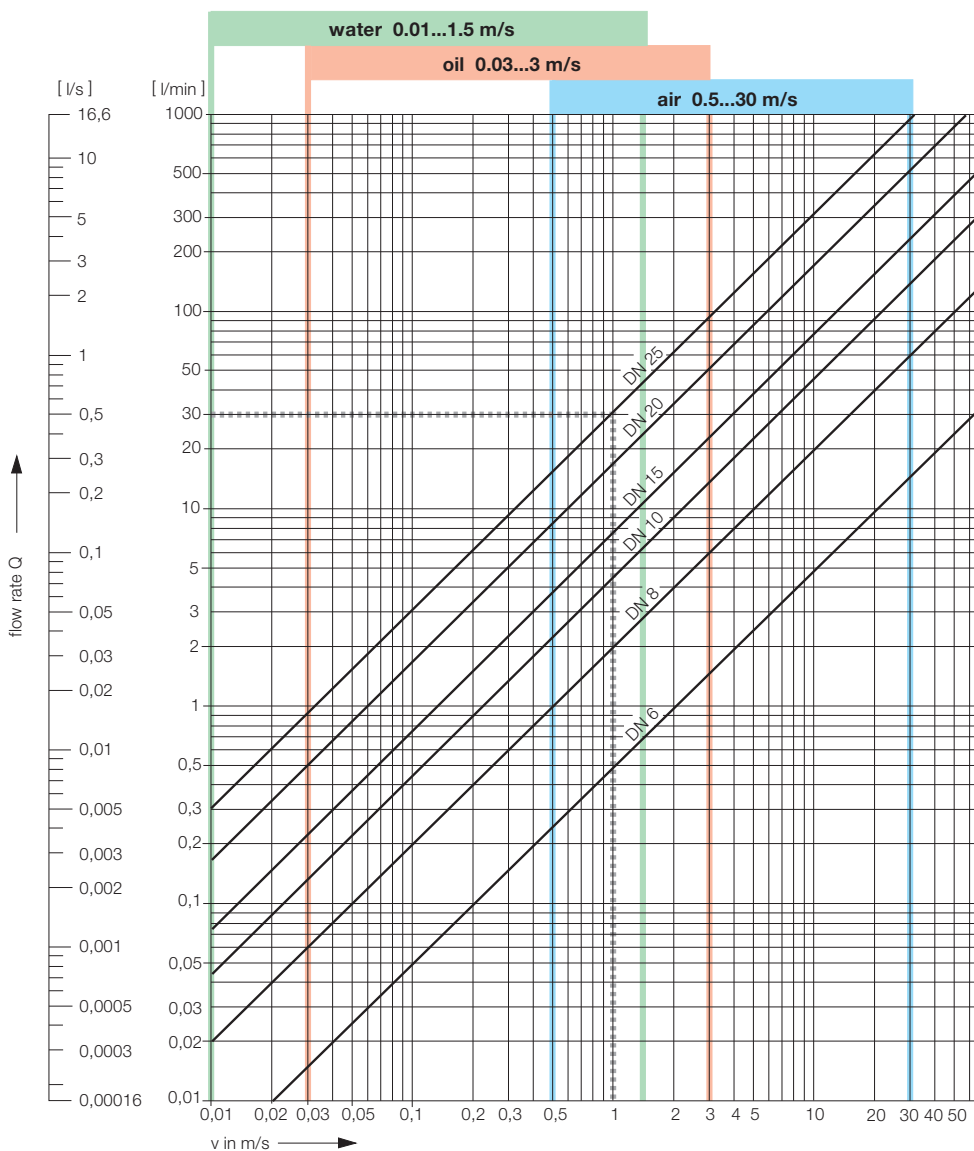
a Accessories on page 786 ff

# Nomograms

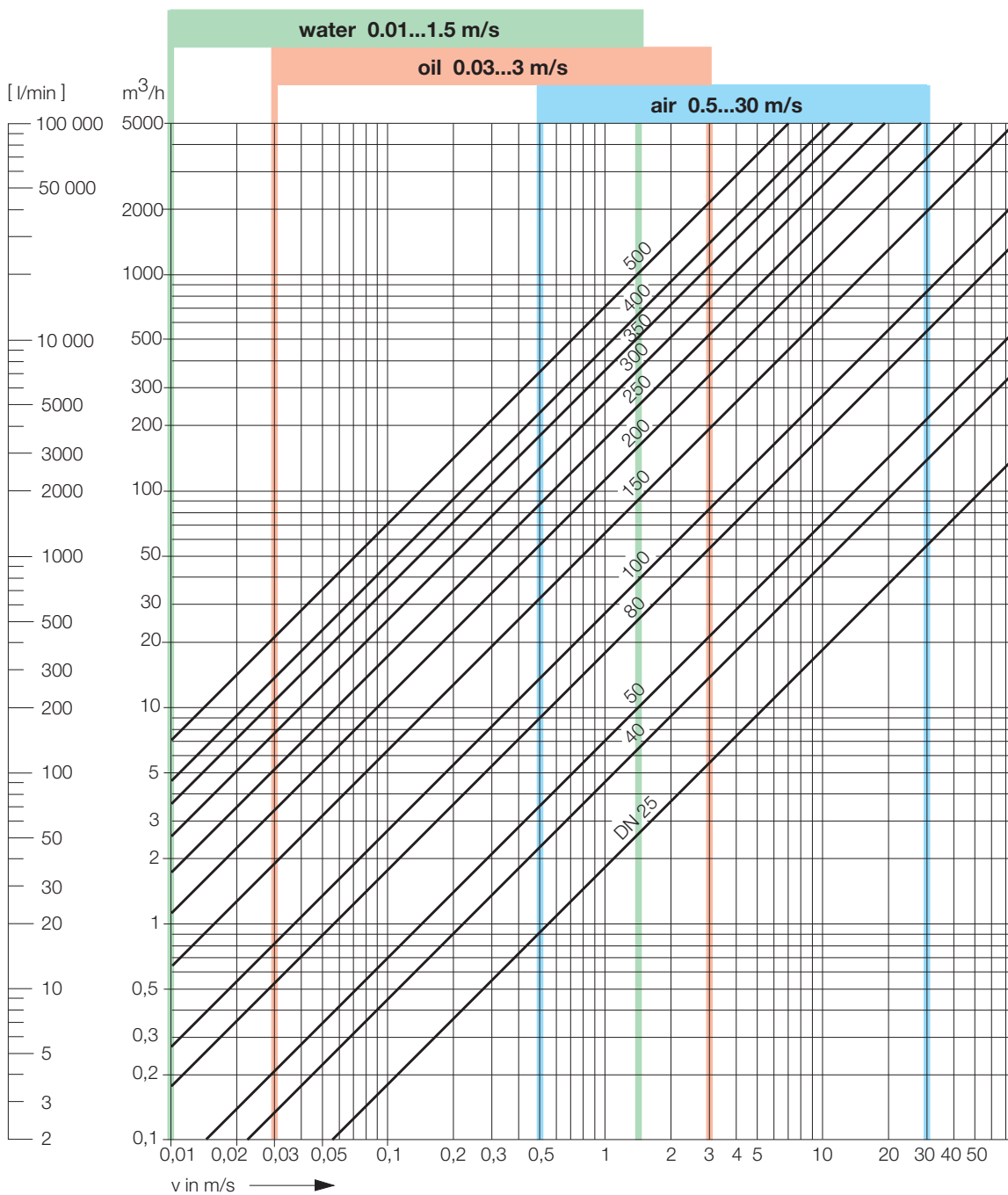
## Flow sensors

### Nomogram (pipe diameter DN 6...25)

The nomogram is used to convert volume flow rates (l/min) into flow speed (m/s) in relation to the pipe diameter (DN), as shown in the example below. If the flow speed is outside the detection range, the speed can be adjusted through changing the pipe diameter. For example: At a flow rate of 30 l/min and a pipe diameter of DN25, the flow speed is 1 m/s



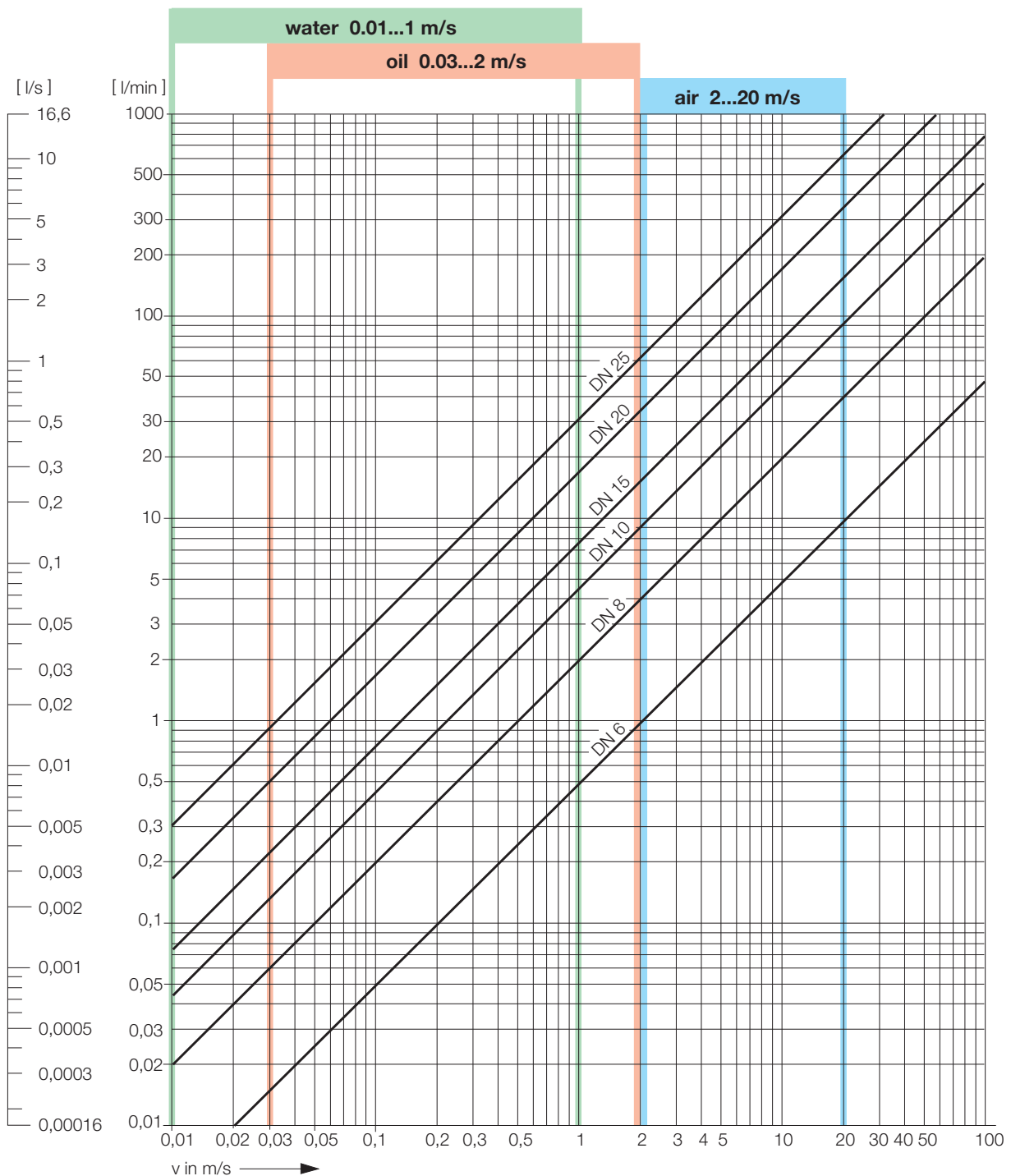
Nomogram (pipe diameter DN 25...500)



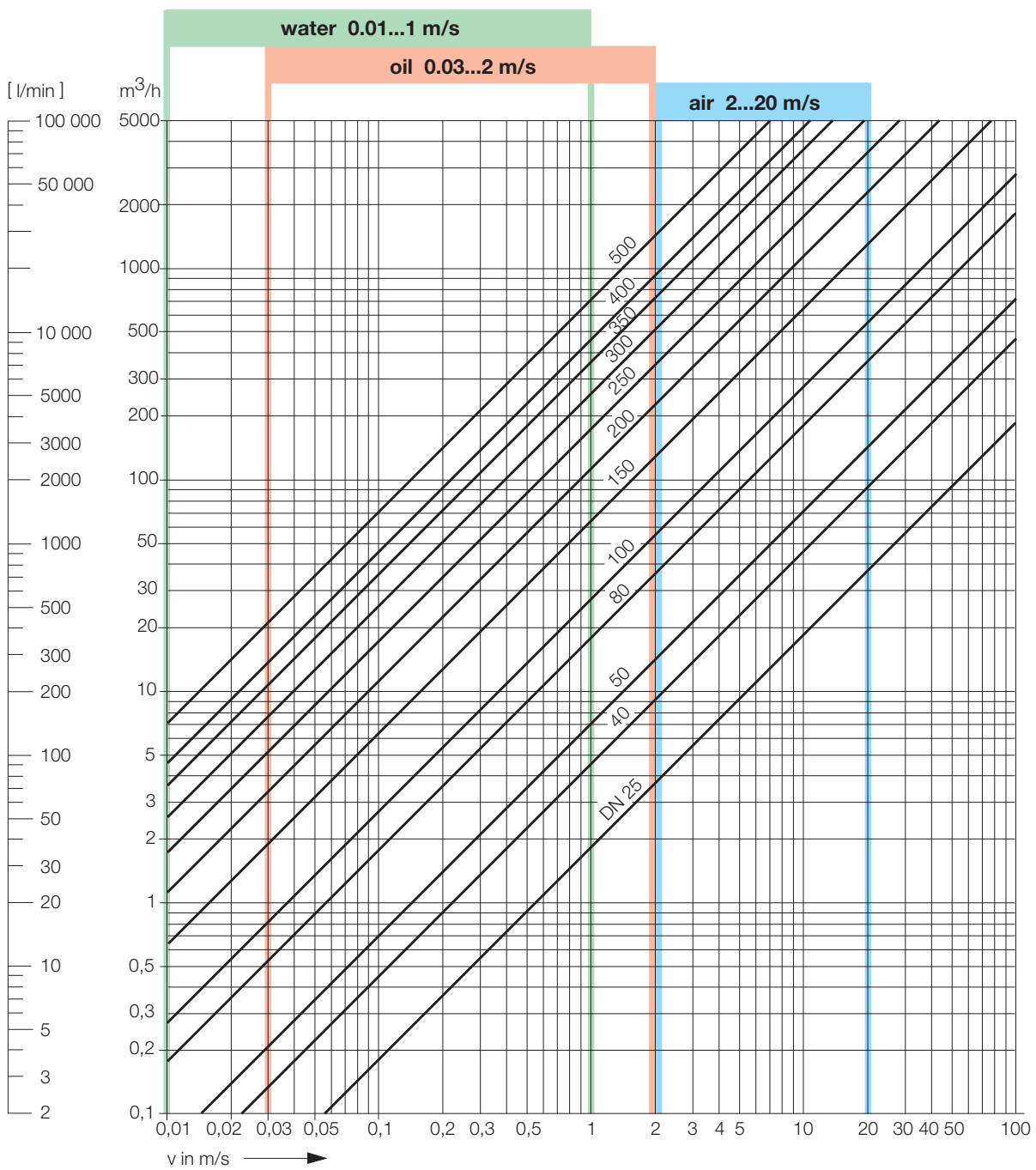
# Nomograms

## Flow sensors

Nomogram for Ex flow sensor (pipe diameters DN 6...25)



Nomogram for Ex flow sensors (pipe diameters DN 25...500)





# At a glance

## Flow meters



### Flow meters – Continuous and precise measuring of flow rates

In order to guarantee smooth operation and consistent quality, many processes require constant in and outflow of liquid or gaseous media. Flow sensors measure the speed and flow meters measure continuously the volume per time unit relative to the defined pipe cross-section.

Flow measurement requires high repeatability and accuracy. TURCK sensors apply different methods for electronic measurement of flow rates, such as the calorimetric, the magnetic-inductive as well as the Vortex principle.

TURCK flow meters indicate the flow rate via display and via an analog current output. The output signal can either be analog or binary, depending on whether continuous flow or a limit value is to be monitored. The programmable devices are characterized by a long service life and are thus almost maintenance-free.

The FTCl flow meters operate according to the thermodynamic principle. They are favourably priced and work reliably. Due to the different thermal conductivity

of media, the devices are preferably applied in water or water-glycol mixtures. Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for flow rate monitoring in cooling circuits.

FCMI flow meters operate according to the magnetic-inductive principle. They measure the flow rate of many low-conductive liquids. Blistering and non-abrasive solids content have only little influence on the measurement. The operating range between 0.2 and 80 l/min is ideal for all applications with small to medium flow rates.

FCVI vortex flow meters are insensitive to pressure and temperature changes and are thus suited for applications requiring a high repeatability. Flow rates between 2 and 20 l/min are detected with a repeatability of 2 % f.s. The extremely responsive and temperature-stable flow meter is preferably applied in return and coolant circuits.

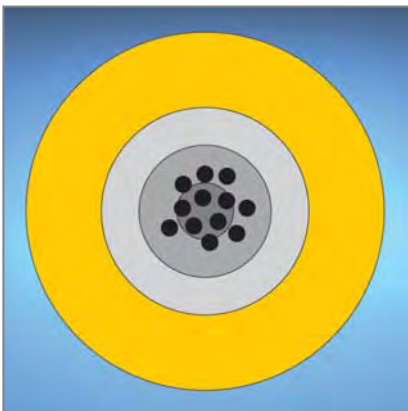
# Our strengths...



## Measuring and monitoring of flow rates

Flow monitoring of media plays an important role in many applications of factory and process automation. For example, the monitoring of coolant circuits, run-dry protection of pumps or the flow

control of exhaust air ducts and air conditioning systems. In order to detect critical changes in flow and to indicate them to a control unit, electronic flow sensors are increasingly applied.



## High repeatability

Unvarying processes and smooth operation require a constant inflow of media. Flow rate measuring in such processes thus requires high repeatability. TURCK flow meters indicate the flow rate via dis-

play and analog current output. The output signal can either be analog or binary, depending on whether continuous flow or a limit value is to be monitored.

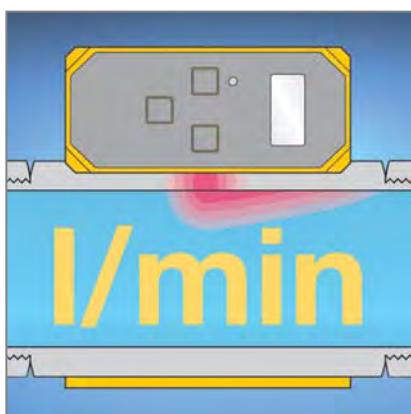


## High performance in a compact design

The combination of a highly precise measuring system and a compact housing is characteristic for inline flow meters made by TURCK. They are easily integrated in existing line configurations and are space saving alternatives for new constructions.

Not only coolant circuits and temperature cycles are precisely monitored but also dosage intervals, like in water purification systems. Limit value monitoring as well as an analog linearized switching output are available for these tasks.

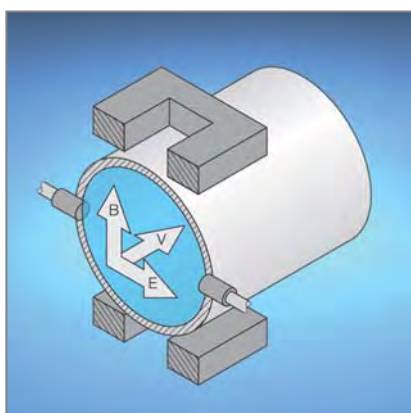




### Calorimetric flow meter

The FTCI flow meter working on the calorimetric principle measures and monitors either the media temperature or the flow rate. The FTCI is therefore suited for many different applications. Flow rates between 1 and 40 l/min are detected with

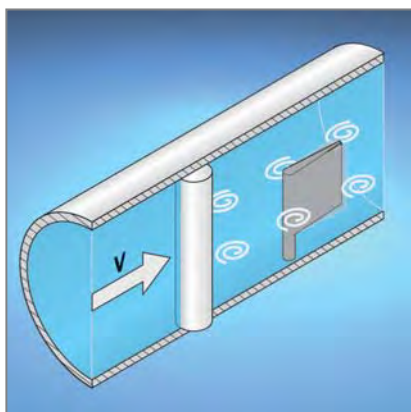
a repeatability of 10 % f.s. Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for flow rate monitoring in coolant circuits.



### Magnetic-inductive flow meter

The magnetic-inductive flow meter FCMI measures flow rates of low-conductive liquids. The FCMI is therefore suited for many different applications. Outstanding features of the magnetic-inductive

flow meter are a high measuring range dynamics and a repeatability of 2 % f.s. The operating range between 0.2 and 80 l/min is ideal for all applications with small to medium flow rates.



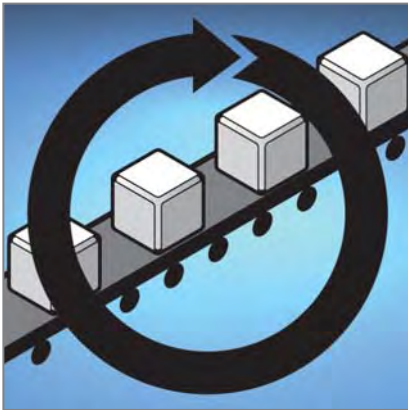
### Vortex flow meter

The FCVI vortex flow meter works on the principle of the Karman vortex street. It is thus especially suited for high-precision measurement of water flow rates. Flow rates between 2 and 20 l/min are detected with a measuring accuracy of 2 %

f.s. Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for flow rate monitoring in return and coolant circuits.

# Your advantages...

## Your advantages...



### High system availability

Especially in rough environments of factory and process automation, the inline flow meters proof their outstanding reliability. This is guaranteed through excellent EMC properties as well as protection class IP67. An application-optimized housing, durable mounting aids and a

well readable display are the main features considered in the design. Flow meters thus withstand the special ambient conditions of many applications without any problems. Use these benefits to optimize your production processes.



### Maximum planning freedom

Many solutions are implementable with only a few device types, numerous connection possibilities, simple mounting and flexible mounting aids. From polling of single switchpoints, over analog

output signals, to remote readable of displays, profit from the extensive standard product range of TURCK flow meters. They provide more flexibility to your application.



### User-friendly operation

The inline flow meters have two front panel buttons to perform adjustments. The menu and flow rates [l/min] are well readable on a 3-digit 7-segment display. Programming functions are only accessible with a code. Without the access code,

only the stored values of the switchpoints and parameters are displayed. Commissioning times are reduced and process safety is improved through a simply structured menu.

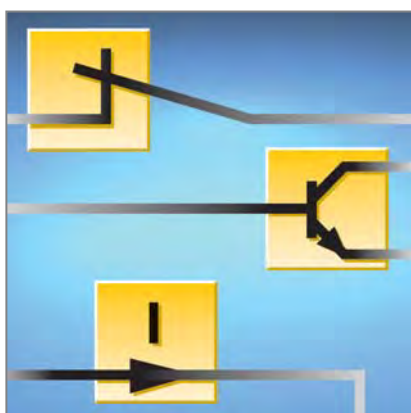
# Advantages



## Easy mounting

The inline flow meters are built in pipelines. The pipe may be connected directly via cutting ring or adapter. With a threaded bushing at the housing bottom the flow meters can be mounted on a base-

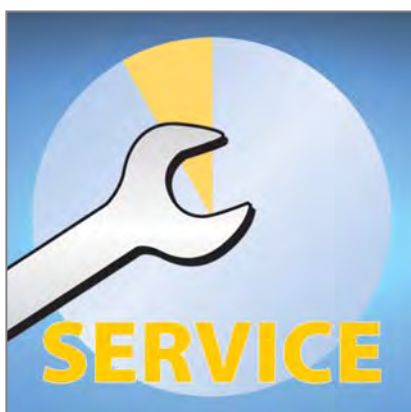
plate. Alternatively, the baseplate can also be mounted on the sensor. In combination with the baseplate the sensor can also be mounted at the front.



## Many different output signals

For further processing of output signals via control system, the flow meters provide a standard switching as well as an analog 4...20 mA output signal. Initial and end value are adjusted in the programming mode. Upon error in the measurement system, 2 mA are provided at

the output. If the direction of flow is opposed to the mounting direction, the flow rate is displayed as a negative value and the output current remains stable at 4 mA. The measuring range shown in the display is limited to -9.9 l/min.



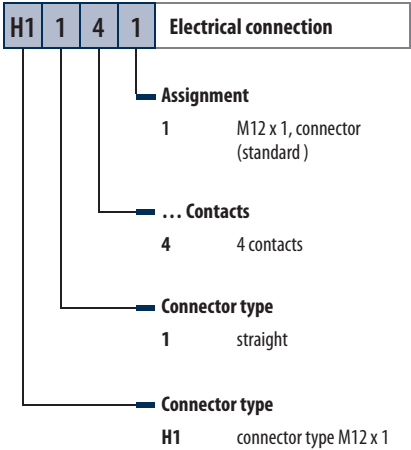
## High servicability

Thanks to the many application possibilities, user-friendly operation and adjustment, the well legible 3-digit 7-segment

display and last but not least the excellent repeatability, inline flow meters offer calculable advantages.

# Type code

<b>FCMI</b>	<b>Functional principle</b>	-	<b>10D08</b>	<b>DYA4P</b>	<b>Design</b>	-	<b>LIU</b>	<b>P</b>	<b>8</b>	<b>X</b>	<b>Electrical version</b>	-
	<p><b>Flow meters</b></p> <p><b>FTCI</b> calorimetric, inline with temperature monitoring</p> <p><b>FCMI</b> magnetic-inductive, inline</p> <p><b>FCVI</b> Vortex, inline</p>			<p><b>Materials</b></p> <p><b>A4</b> stainless steel A4 (1.4404 or 1.4571)</p> <p><b>DY</b> PVDF (Dyflor)</p> <p><b>P</b> plastic housing</p>						<p><b>Indication</b></p> <p><b>... X</b> number of LEDs or multicolor LED</p>		
				<p><b>Mechanical connection</b></p> <p><b>10D08</b> compression fittings for smooth barrel, outer Ø 10 mm</p> <p><b>10D10</b> compression fittings for smooth barrel, outer Ø 10 mm</p> <p><b>10R09</b> compression fittings for smooth barrel, outer Ø 10 mm</p> <p><b>15D15</b> compression fittings for smooth barrel, outer Ø 15 mm</p> <p><b>18D15</b> compression fittings for smooth barrel, outer Ø 18 mm</p>						<p><b>Voltage range</b></p> <p><b>8</b> 19.2...28.8 VDC</p>		
										<p><b>Output mode</b></p> <p><b>P</b> PNP</p>		
										<p><b>Output function</b></p> <p><b>LI</b> analog output (I)</p> <p><b>LIU</b> NO/NC programmable, analog + current + PNP</p> <p><b>2U</b> NO/NC programmable, 2 x PNP</p>		



# Designs and variants

Page 651



**FTCI-D10**

<b>Medium</b>	liquids
<b>Mechanical connection</b>	compression ferrule fittings for pipes $\varnothing$ 10 x 1 (EN10305-1)
<b>Flow operating range</b>	1...10 l/min
<b>Medium temperature</b>	-10...90 °C
<b>Sensor quality</b>	V4A (1.4571)
<b>Pressure resistance</b>	20 bar
<b>Housing material</b>	plastic

Page 651



**FTCI-D15**

<b>Medium</b>	liquids
<b>Mechanical connection</b>	compression ferrule fittings for pipes $\varnothing$ 15 x 1.5 (EN10305-1)
<b>Flow operating range</b>	2...20 l/min
<b>Medium temperature</b>	-10...90 °C
<b>Sensor quality</b>	AISI 316Ti
<b>Pressure resistance</b>	20 bar
<b>Housing material</b>	plastic

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**FTCI-D18**

<b>Medium</b>	liquids
<b>Mechanical connection</b>	compression ferrule fittings for pipes $\varnothing$ 18 x 1.5 (EN10305-1)
<b>Flow operating range</b>	4...40 l/min
<b>Medium temperature</b>	-10...90 °C
<b>Sensor quality</b>	AISI 316Ti
<b>Pressure resistance</b>	20 bar
<b>Housing material</b>	plastic

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**FCMI-D10**

<b>Medium</b>	liquids
<b>Mechanical connection</b>	compression ferrule fittings for pipes $\varnothing$ 10 x 1 (EN10305-1)
<b>Flow operating range</b>	0...40 l/min
<b>Medium temperature</b>	5...60 °C
<b>Sensor quality</b>	V4A (1.4571)/PVDF
<b>Pressure resistance</b>	10 bar
<b>Housing material</b>	plastic

# Standard variants

Page 655



**FCMI-D15**

<b>Medium</b>	liquids
<b>Mechanical connection</b>	compression ferrule fittings for pipes Ø 15 x 1.5 (EN10305-1)
<b>Flow operating range</b>	0...80 l/min
<b>Medium temperature</b>	5...60 °C
<b>Sensor quality</b>	V4A (1.4571)/PVDF
<b>Pressure resistance</b>	10 bar
<b>Housing material</b>	plastic

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**FCMI-3/4"**

<b>Medium</b>	liquids
<b>Mechanical connection</b>	G 3/4"
<b>Flow operating range</b>	0...75 l/min
<b>Medium temperature</b>	5...60 °C
<b>Sensor quality</b>	V4A (1.4571)/PVDF
<b>Pressure resistance</b>	10 bar
<b>Housing material</b>	plastic

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**FCVI-D10**

<b>Medium</b>	liquids
<b>Mechanical connection</b>	compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)
<b>Flow operating range</b>	2...20 l/min
<b>Medium temperature</b>	5...60 °C
<b>Sensor quality</b>	V4A (1.4571)/PVDF
<b>Pressure resistance</b>	10 bar
<b>Housing material</b>	plastic

## Flow meters for water and water-glycol mixtures



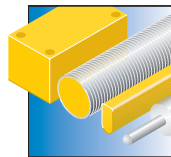
The FTCIs are particularly suited for flow rate monitoring in coolant circuits. Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for welding applications of the automotive industry. A 3-digit 7-segment display indicates the flow rate and the cooling capacity continuously.

To prevent icing, industrial air conditioning systems use water-glycol mixtures in secondary circuits. In order to provide a reliable indication of flow rate values, the glycol amount is adjusted at the flow meter. The devices are programmable via three pushbuttons at the front. Either the measured value or the sensor parameters are displayed, depending on the adjustment.

### Features

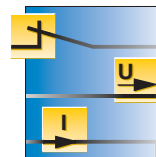
- Measurement of small to medium water flow rates and water-glycol mixtures
- Ideal for small pipe diameters of up to DN20
- Temperature monitoring
- Switchpoint freely adjustable within the operating range
- No disturbing built-ins, free pipe profile, no pressure loss
- Fast response times within seconds
- Adjustable to flow rates between 1...40 l/min
- Repeatability < 10 % f.s.
- Two transistor outputs or one transistor and one analog current output

### Properties



#### Design

Rugged plastic housing with display, ideal for small pipe diameters of up to DN20



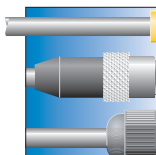
#### Electrical versions

Two PNP transistor outputs or one PNP transistor and one linear analog current output 4...20 mA



#### Measuring ranges

Adjustable to flow rates between 1 ... 40 l/min, repeatability < 10 % f.s.



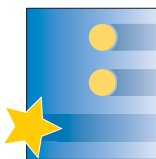
#### Electrical connections

M12 x 1 plug connection, A-coded



#### Materials

PBT housing, sensor made of stainless steel 1.4571 and FKM O-ring



#### Special features

Programmable switchpoint, output, hysteresis, switch ON/OFF delay, glycol amount, flow rate correction, averaging and access code



## 10 mm cutting ring



### General data

**Operating voltage** 21...26 VDC  
**Medium** liquids

**Flow operating range** 1...10 l/min  
**Medium temperature** -10...90 °C  
**Sensor quality** AISI 316Ti

**Housing quality** PBT  
**Mechanical connection** compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)

**Electrical connection** connector, M12 x 1  
**Pressure resistance** 20 bar  
**Ambient temperature** 0...60 °C

### Types and data – selection table

Type	Output function	w	d
FTCI-10D10A4P-LIUP8X-H1141	programmable, PNP/analog output	w129	d553
FTCI-10D10A4P-2UP8X-H1141	programmable, 2 x PNP	w130	d554

## 15 mm cutting ring



### General data

**Operating voltage** 21...26 VDC  
**Medium** liquids

**Flow operating range** 2...20 l/min  
**Medium temperature** -10...90 °C  
**Sensor quality** AISI 316Ti

**Housing quality** PBT  
**Mechanical connection** compression ferrule fittings for pipes Ø 15 x 1.5 (EN10305-1)

**Electrical connection** connector, M12 x 1  
**Pressure resistance** 20 bar  
**Ambient temperature** 0...60 °C

### Types and data – selection table

Type	Output function	w	d
FTCI-15D15A4P-LIUP8X-H1141	programmable, PNP/analog output	w129	d555
FTCI-15D15A4P-2UP8X-H1141	programmable, 2 x PNP	w130	d556

## 18 mm cutting ring



**General data**



**Operating voltage** 21...26 VDC  
**Medium** liquids

**Flow operating range** 4...40 l/min  
**Medium temperature** -10...90 °C  
**Sensor quality** AISI 316Ti

**Housing quality** PBT  
**Mechanical connection** compression ferrule fittings for pipes Ø 18 x 1.5 (EN10305-1)

**Electrical connection** connector, M12 x 1  
**Pressure resistance** 20 bar  
**Ambient temperature** 0...60 °C

**Types and data – selection table**

Type	Output function	w	d
FTCI-18D15A4P-LIUP8X-H1141	 programmable, PNP/analog output	w129	d557
FTCI-18D15A4P-2UP8X-H1141	 programmable, 2 x PNP	w130	d558

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 786 ff

## Compact devices for electrically conductive media

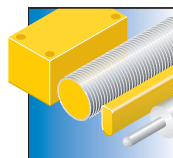


The FCMI's are designed for continuous measurement of many conductive liquids. The operating range covers small to medium flow rates. Operating on the magnetic-inductive principle, they are applied in many different areas to measure quantities and dosages of many different media. The strengths of the magnetic-inductive flow meters include a high measuring range dynamics and excellent repeatability. A 3-digit 7-segment display indicates the flow rate continuously. The devices are programmable via three pushbuttons at the front. Either the measured value or the sensor parameters are displayed, depending on the adjustment.

### Features

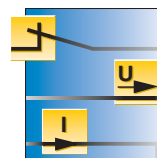
- Measurement of small to medium flow rates of conductive liquids  $> 20 \mu\text{S/cm}$
- Ideal for small pipe diameters of up to DN15
- Switchpoint freely adjustable within the operating range
- No disturbing built-ins, free pipe profile, no pressure loss
- Fast response times within seconds
- Adjustable to flow rates between 1...80 l/min
- Repeatability  $< 20\%$  f.s.
- Transistor and analog current output

### Properties



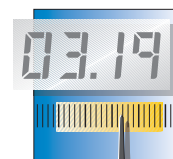
#### Design

Rugged plastic housing with display, ideal for small pipe diameters of up to DN15



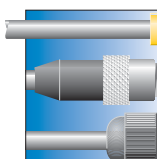
#### Electrical versions

Configurable PNP transistor output, linear analog current output 4...20 mA



#### Measuring ranges

Adjustable to flow rates between 1 ... 80 l/min, repeatability  $< 2\%$  f.s.



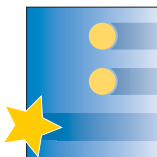
#### Electrical connections

M12 x 1 plug connection, A-coded



#### Materials

PBT housing, sensor material PVDF and stainless steel 1.4571



#### Special features

Programmable switchpoint, output, hysteresis, switch ON/OFF delay, averaging and access code

## 10 mm cutting ring



<b>Type</b>	FCMI-10D08DYA4P-LIUP8X-H1141	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0...40 l/min	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	5...60 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	— / — programmable, PNP/analog output	<b>Wiring diagram</b>	w129
<b>Sensor quality</b>	V4A (1.4571)/PVDF	<b>Dimension drawing</b>	d553

## 15 mm cutting ring



<b>Type</b>	FCMI-15D12DYA4P-LIUP8X-H1141	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	compression ferrule fittings for pipes Ø 15 x 1.5 (EN10305-1)
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0...80 l/min	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	5...60 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	— / — programmable, PNP/analog output	<b>Wiring diagram</b>	w129
<b>Sensor quality</b>	V4A (1.4571)/PVDF	<b>Dimension drawing</b>	d555

## G 3/4" – Male



<b>Type</b>	FCMI-3/4D12DYA4P-LIUP8X-H1141	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	G 3/4"
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	0...75 l/min	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	5...60 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	— / — programmable, PNP/analog output	<b>Wiring diagram</b>	w129
<b>Sensor quality</b>	V4A (1.4571)/PVDF	<b>Dimension drawing</b>	d559

## Flow meters for water applications

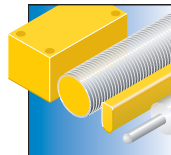


The Vortex flow meter FCVI is especially suited for applications with high demands on linearity and repeatability. The devices detect flow rates between 2 and 20 l/min with a repeatability of 2 % f.s. Short response times within seconds and stable values despite strong temperature fluctuation of the medium, make the FCVI especially suited for flow rate measurements of return and coolant circuits. A 3-digit 7-segment display indicates the flow rate continuously. The devices are programmed via three pushbuttons at the front. Either the measured value or the sensor parameters can be displayed, depending on the adjustment.

### Features

- Measurement of small to medium water flow rates
- Ideal for small pipe diameters of up to DN10
- Switchpoint freely adjustable within the operating range
- Fast response times within seconds
- Adjustable to flow rates between 2...20 l/min
- Repeatability < 2 % f.s.
- Transistor and analog current output

### Properties



#### Design

Robust plastic housing with display, ideal for small pipe diameters of up to DN10



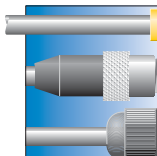
#### Electrical versions

Configurable PNP transistor output and linear analog current output 4...20 mA



#### Measuring ranges

Adjustable to flow rates between 2...20 l/min, repeatability < 2 % f.s.



#### Electrical connections

M12 x 1 plug connection, A-coded



#### Materials

PBT housing, sensor made of PVDF and stainless steel 1.4571





#### Special features

Programmable switchpoint, output, hysteresis, switch ON/OFF delay, averaging and access code

## 10 mm cutting ring



<b>Type</b>	FCVI-10R09DYA4P-LIUP8X-H1141	<b>Housing quality</b>	PBT
<b>Operating voltage</b>	21...26 VDC	<b>Mechanical connection</b>	compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)
<b>Medium</b>	liquids	<b>Electrical connection</b>	connector, M12 x 1
<b>Flow operating range</b>	2...20 l/min	<b>Pressure resistance</b>	10 bar
<b>Medium temperature</b>	5...60 °C	<b>Ambient temperature</b>	0...60 °C
<b>Output function</b>	 /  programmable, PNP/analog output	<b>Wiring diagram</b>	w129
<b>Sensor quality</b>	V4A (1.4571)/PVDF	<b>Dimension drawing</b>	d553





# At a glance

## Linear position sensors



### Linear position sensors - Inductive or magnetic position detection

Position measuring systems are available in most varying designs and for many different applications; from potentiometric position sensors, over magnetostrictive systems up to high-resolution glass scales. The increasing trend towards analog measurement aims at optimizing production processes, simplifying quality assurance and reducing production costs and failure rates.

High repeatability and linearity, simple installation, a rugged design and wear-free measurement, last but not least a large measuring range and short blind zones are the features which an industrial-suited position detection system should have.

The new LI series of inductive linear position sensors can replace expensive magnetostrictive position detection systems as well as cheap but susceptible potentiometers. Thanks to a new revolutionary measuring principle, position is not detected via a positioning magnet but via an inductive oscillating circuit. The sensors are thus completely immune to magnetic fields such as generated by large motors for example.

Injection moulding or metal processing are typical applications for LI sensors. Metal chips or external magnetic fields, both impair the functionality of positioning magnets heavily.

The LI series comprises three device types with different outputs: Current/voltage, high-end IO-Link and SSI. No matter the combination of sensor size and positioning element, the user always gets the optimum solution for short ranges of 100 mm as well as long ranges of up to 1000 mm.

The WIM-Q25L sensors are magnetically actuated and feature measuring ranges of up to 200 mm. Working on the basis of the Hall principle, they achieve high linearity and repeatability and have extremely short blind zones. The magnet of WIM type sensors is axially magnetized, allowing the sensors to be mounted directly on pneumatic cylinders, flow meters or lift valves.

# Our strengths - Your advantages



## Inductive linear position sensors

The new Li...-Q25L inductive linear position sensors operate on the basis of a completely new, revolutionary measuring principle, combining the positive features of standard measuring systems. Position is not detected via a positioning magnet but via an inductive oscillating circuit, making the devices completely

immune to magnetic fields, such as generated by large motors for example. The sensors operate wear-free, feature short blind zones and excellent EMC properties. The measuring range is adjusted via pushbutton. Thanks to the extremely short blind zones, the sensors are very compactly shaped.



## Rugged and leakproof housing

The aluminium cast housing and the high-quality plastic inlay provide high mechanical stability. Moreover, the sensors are perfectly resistant to most chemicals and oils and can be mounted in many ways. In combination with the extensive

range of accessories, they are safely, flexibly and easily mounted in your system. The housing is of course available in the proven quality and features protection class IP67.



## Short blind zones

Very short blind zones provide highest mounting flexibility for many different applications. Even when mounted in confined spaces, the entire measuring range is covered. The measuring range of the

devices with analog output is either pre-programmed or set via teach adapter within seconds. The teach-in process is comfortably controlled via LED at the sensor.

# advantages



## Flexible process connection

Different output types such as analog current or voltage but also SSI enable connection to the higher level control system. The signal is thus easily coupled to different fieldbuses via the TURCK re-

mote I/O systems for example. A standard M12 x 1 plug connection makes the use of other special connectors redundant. In addition, we also offer IO-Link operable devices.



## Highest accuracy

The standard version already achieves a very high degree of linearity and repeatability, sufficient for most applications. If the standard version should not comply with your demands in this respect, the high-end series does. Frequency converters, large motors, ferritic metals or permanent magnets are no problem at all. In-

ductive RLC coupling makes the sensors immune to magnetic fields and provides excellent EMC properties. Mechanical interferences are also hold off. The distance between sensor and positioning element as well as vibration and roughness in the guidance have no effect on the output signal.



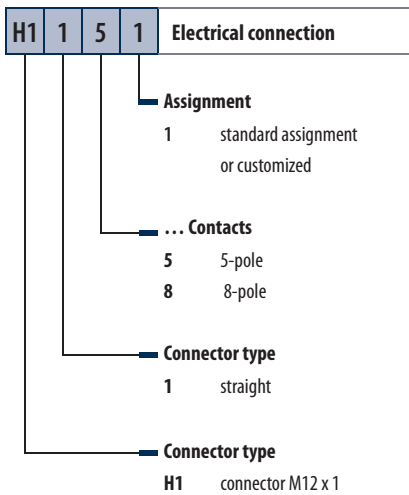
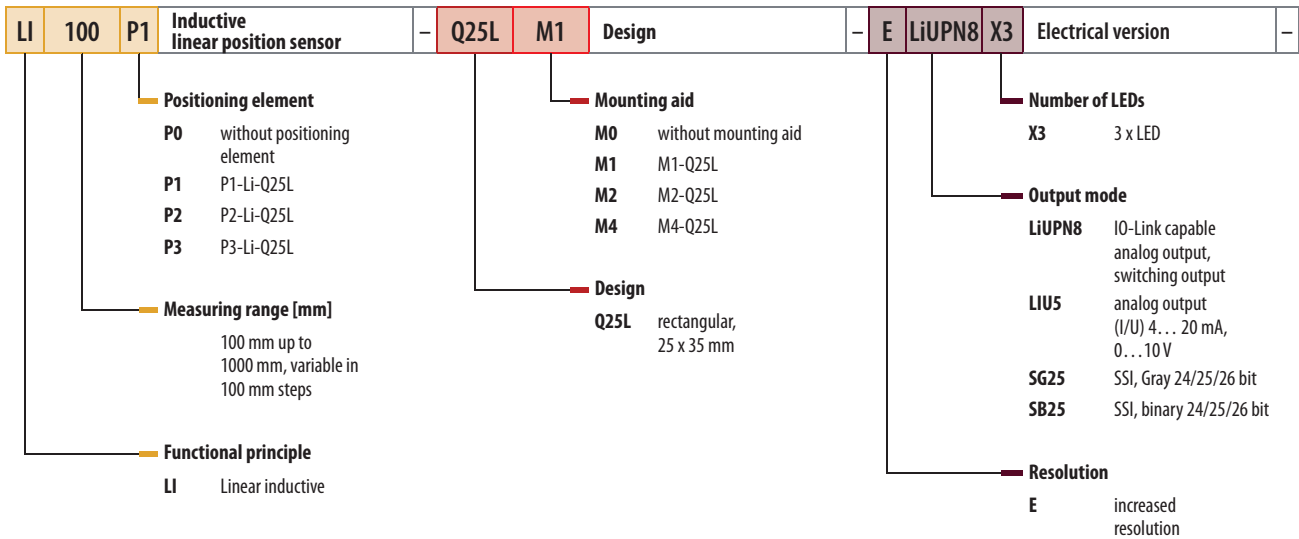
## Magnetic linear position sensors

The WIM-Q25L series of magnetically actuated linear position sensors features measuring ranges of up to 200 mm. Working on the basis of the Hall principle, they achieve high linearity and repeatability and have extremely short blind zones.

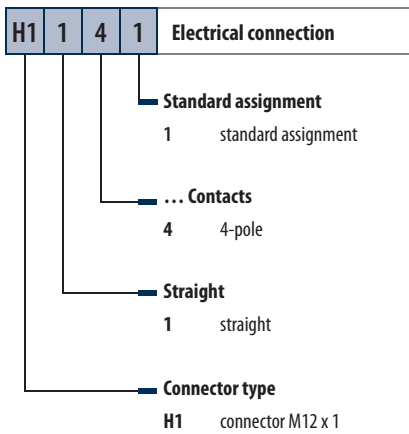
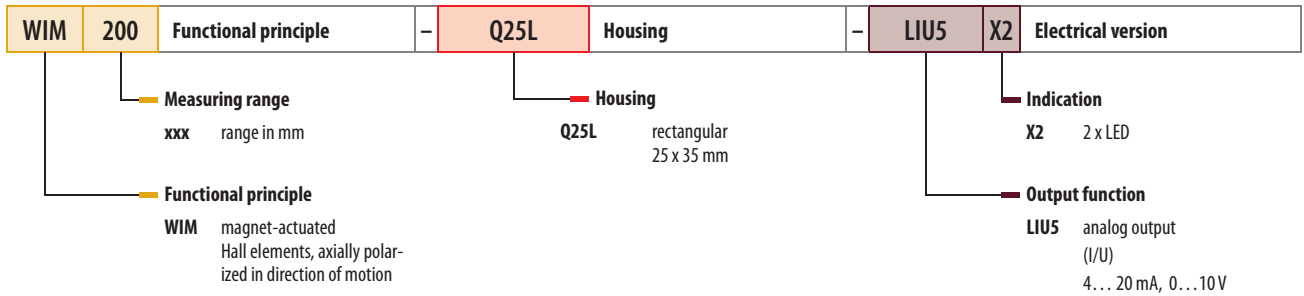
The Q25L sensor family is thus perfectly suited for applications requiring precise signal transmission over long distances, such as in pneumatic pumps, slides, blanking or moulding systems.

# Type code

## Inductive linear position sensors



Magnetic linear position sensors



Linear position sensors

## Inductive linear position sensors Li-Q25L

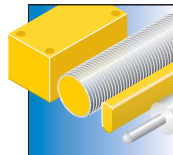


The new Li-Q25L series of linear position sensors offers devices ranging from 100 mm up to 1000 mm. They operate wear-free, feature short blind zones and excellent EMC properties. The measuring range is adjusted via pushbutton and thanks to the extremely short blind zones they are very compactly designed.

### Features

- Rugged aluminium strand cast housing
- Watertight polycarbonate inlay
- Many different mounting options
- Programmable measuring range
- Standard plug connection M12 x 1, 5-pole
- Measuring range indicated via LED
- Not affected by external magnetic fields
- Extremely short blind zones

### Properties



#### Design

Compact design, short blind zones



#### Measuring ranges

Smallest version 100 mm, largest 1000 mm



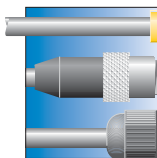
#### Materials

Aluminium strand cast housing with plastic inlay



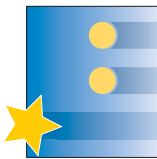
#### Electrical versions

Analog outputs 4...20 mA, 0...10 V, IO-Link, SSI interface



#### Electrical connections

M12 x 1 plug connection for simple installation



#### Special features

Teachable measuring range

## Q25L – Standard series with current and voltage output



### General data

<b>Resolution</b>	12 bit	<b>Temperature drift</b>	0.003% / K
<b>analog output</b>	4...20 mA, 0...10 V	<b>Operating voltage</b>	15...30 VDC
<b>Output function</b>	analog output	<b>Protection class</b>	IP67
<b>Electrical connection</b>	connector, M12 x 1	<b>Ambient temperature</b>	-25...+70 °C
<b>Linearity deviation</b>	0.1% of full scale	<b>Housing material</b>	aluminium

More information on positioning elements and mounting aids in chapter Accessories

### Types and data – selection table

Type	Dimensions	Measuring range	w	d
LI100P0-Q25LM0-LIU5X3-H1151	35 x 25 x 158 mm	100 mm	w131	d560
LI200P0-Q25LM0-LIU5X3-H1151	35 x 25 x 258 mm	200 mm	w131	d560
LI300P0-Q25LM0-LIU5X3-H1151	35 x 25 x 358 mm	300 mm	w131	d560
LI400P0-Q25LM0-LIU5X3-H1151	35 x 25 x 458 mm	400 mm	w131	d560
LI500P0-Q25LM0-LIU5X3-H1151	35 x 25 x 558 mm	500 mm	w131	d560
LI600P0-Q25LM0-LIU5X3-H1151	35 x 25 x 658 mm	600 mm	w131	d560
LI800P0-Q25LM0-LIU5X3-H1151	35 x 25 x 858 mm	800 mm	w131	d560
LI1000P0-Q25LM0-LIU5X3-H1151	35 x 25 x 1058 mm	1000 mm	w131	d560

## Q25L – High-end E series with SSI interface



### General data

<b>Resolution</b>	0,001 mm	<b>Operating voltage</b>	15...30 VDC
<b>Output function</b>	SSI, 25 Bit, Gray coded	<b>Protection class</b>	IP67
<b>Electrical connection</b>	connector, M12 x 1	<b>Ambient temperature</b>	-25...+70 °C
<b>Linearity deviation</b>	0.1% of full scale	<b>Housing material</b>	aluminium
<b>Temperature drift</b>	0.0001% / K		

More information on positioning elements and mounting aids in chapter Accessories

**Types and data – selection table**

Type	Dimensions	Measuring range	w	d
LI100P0-Q25LM0-ESG25X3-H1181	35 x 25 x 158 mm	100 mm	w132	d560
LI200P0-Q25LM0-ESG25X3-H1181	35 x 25 x 258 mm	200 mm	w132	d560
LI300P0-Q25LM0-ESG25X3-H1181	35 x 25 x 358 mm	300 mm	w132	d560
LI400P0-Q25LM0-ESG25X3-H1181	35 x 25 x 458 mm	400 mm	w132	d560
LI500P0-Q25LM0-ESG25X3-H1181	35 x 25 x 558 mm	500 mm	w132	d560
LI600P0-Q25LM0-ESG25X3-H1181	35 x 25 x 658 mm	600 mm	w132	d560
LI800P0-Q25LM0-ESG25X3-H1181	35 x 25 x 858 mm	800 mm	w132	d560
LI1000P0-Q25LM0-ESG25X3-H1181	35 x 25 x 1058 mm	1000 mm	w132	d560



**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 768 ff

## Magnetic linear position sensors WIM-Q25L

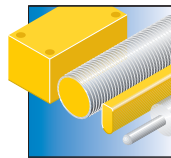


The WIM-Q25L series features magnetically actuated linear position sensors with measuring ranges of up to 200 mm. The sensors work on the basis of the Hall principle such as the compact analog magnetic field sensors WIM45. Typical features are high repeatability, linearity and extremely short blind zones. The Q25L sensor family is thus perfectly suited for applications requiring precise signal transmission over long distances, such as in pneumatic pumps, slides, blanking or moulding systems.

### Features

- Many different mounting options
- Measuring range indicated via LED
- Not affected by external magnetic fields
- Extremely short blind zones

### Properties



#### Design

4 lengths, compact housing, short blind zones



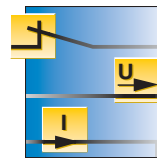
#### Measuring ranges

Smallest version 100 mm, largest 200 mm



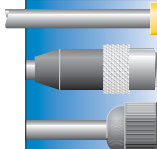
#### Materials

Strand cast aluminium with plastic inlay



#### Electrical versions

analog outputs 4...20 mA and 0...10 V



#### Electrical connections

M12 x 1 plug connection for simple installation

## Q25L



**General data**

<b>Repeatability</b>	0.1% of the measurement range	<b>Temperature drift</b>	0.006% / K
<b>analog output</b>	4...20 mA, 0...10 V	<b>Operating voltage</b>	15...30 VDC
<b>Output function</b>	analog output	<b>Protection class</b>	IP67
<b>Electrical connection</b>	connector, M12 x 1	<b>Ambient temperature</b>	-25...+70 °C
<b>Linearity deviation</b>	1% of full scale	<b>Housing material</b>	aluminium

More information on actuating magnets in chapter Accessories

**Types and data – selection table**

Type	Dimensions	Measuring range	<span style="background-color: green; color: white; padding: 2px;">w</span>	<span style="background-color: red; color: white; padding: 2px;">d</span>
WIM100-Q25L-LIU5X2-H1141	35 x 25 x 141 mm	100 mm	w051	d561
WIM125-Q25L-LIU5X2-H1141	35 x 25 x 166 mm	125 mm	w051	d561
WIM160-Q25L-LIU5X2-H1141	35 x 25 x 201 mm	160 mm	w051	d561
WIM200-Q25L-LIU5X2-H1141	35 x 25 x 241 mm	200 mm	w051	d561



# At a glance

## Encoders



### Encoders

Encoders measure rotation speed, sense, position, angle and length. For this purpose, they convert mechanical motion in electrical signals.

There are incremental and absolute encoders. Signal periods provided by incremental encoders are used as a measure for rotation speed or position. The dual-channel incremental encoder detects positions bidirectionally as well as the rotation sense of shafts.

With absolute encoders instead, each incremental angle is assigned a code pattern. The position is detected at any time, even in the event of power failure without having to perform a reference run. Single-turn encoders set back the coding to the initial value after each full revolution. Absolute encoders detect angles, positions and inclinations precisely. Tasks that are typically found in robotics, positioning and process technology.

Encoders are available as solid and hollow shaft types. Hollow shaft encoders can be mounted without couplings, brackets or other mounting aids. The hollow shaft encoder is shifted on the drive shaft, then clamped and if necessary fixed with a pin.

TURCK encoders are available in diverse mechanical designs, as versions for incremental or absolute position detection, as hollow or solid shafts and in various sizes with diameters from 24 mm to 102 mm. They fulfill different positioning tasks with a resolution of up to 14 bits (digital

devices) and of up to 36,000 pulses per revolution (incremental types).

If simple length measurements have to be performed such as cutting paper or fabrics to length, encoders with a prefixed measuring wheel are the right choice. They are reasonably priced and operate highly accurate.

Encoders with a prefixed draw-wire mechanism (1 to 40 m long) are the best solution for direct length measurements. Thanks to the excellent repeatability rating of 0.05 mm, they solve position control tasks highly precise in systems in which only complex equipment has been operated successfully until now. Whether applied to control the filling levels, position of pumps in tanks, alignment of elevating platforms or orientation of cranes: Just select an encoder of the right size and with the appropriate output configuration and combine it with a draw-wire mechanism of the right length.

# Our strengths - Your advantages



## Many different designs

We offer the appropriate encoder for almost any application. Incremental and absolute encoders in different sizes are available as hollow or solid shaft types. From miniature versions, over IP69K rated types, up to encoders for the heavy industry. A broad range of connection possibilities

provide tailor-made solutions for any application. Equally beneficial is the large range of available output types, making the connection to the control system very easy. Many of the devices are UL approved and also available with ATEX approval if desired.



## High-precision measurement

Whether optical or magnetic scanning, measured signals produced by TURCK encoders are always highly precise and provide the basis for high-resolution output signals and excellent repeatability. Incremental encoders achieve a maximum resolution of 36000 pulses per revolution, whereas absolute encoders achieve 17

bits per revolution at a maximum of 4096 revolutions.

Integrated temperature compensation ensures a stable signal quality for the entire operating temperature range. TURCK encoders can be applied wherever highest precision is required as a standard.



## Aging compensation

Encoders are made of high-quality component. In order to guarantee longterm durability, the devices also feature a so called aging compensation to neutralize

the loss of luminosity of the internal optical scanning. Downtimes produced by faulty encoder signals are thus prevented in the long run.

# advantages



## Rugged Safety-Lock™ and Safety-Lockplus™ design

The extremely rugged bearing assembly in Safety-Lock™ design provides high stability and protection against vibration and other mechanical strain exerted on the shaft. Blocked bearings, large distances between the bearings and extra strong outer bearings prevent interferences and

downtimes emerging as a result of intense load, to which mechanically complex applications are often exposed. The mechanically protected shaft seal Safety-Lockplus™ is a high-level and durable protection against adverse conditions.



## Large product range

NOTE: The product range of TURCK encoders offers nearly all combination possibilities and the largest possible number of variants. The type codes on the following pages provide the best overview over the product range and features.

A detailed description of the entire product range would exceed the scope of this catalog.

# Type code

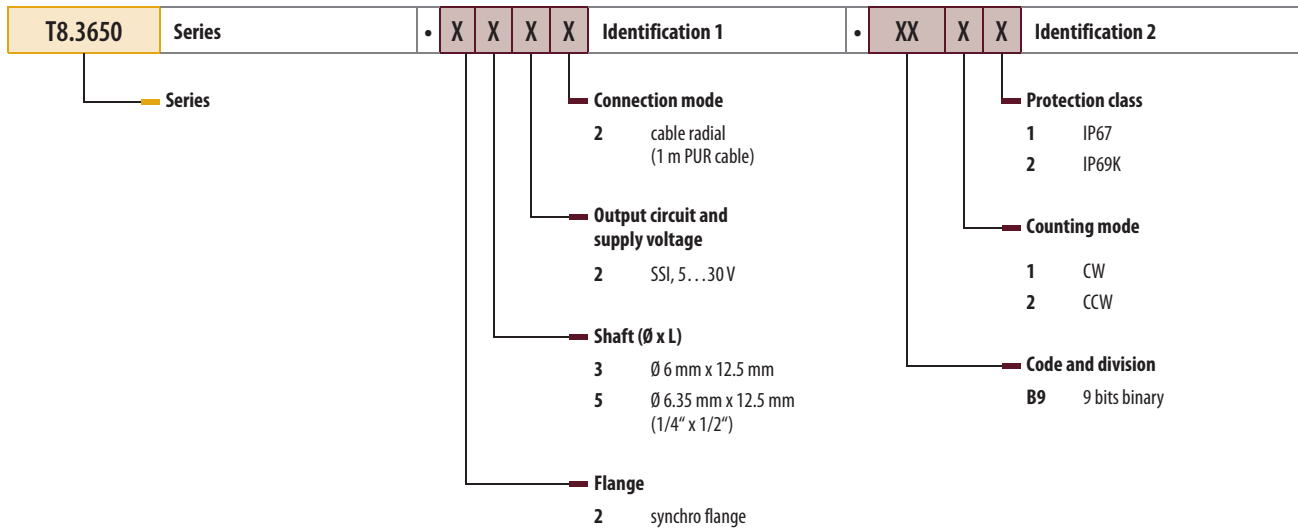
## Type code

Incremental, solid shaft, diameter 50 mm

<b>T8.5000</b>	Series	•	X	X	X	X	Identification 1	•	XXXX	Identification 2
	Series						<b>Connection mode</b> <b>1</b> cable axial (1 m PVC cable) <b>2</b> cable radial (1 m PVC cable) <b>3</b> 8-pole M12 connector axial <b>4</b> 8-pole M12 connector radial <b>7</b> 12-pole M23 connector axial <b>8</b> 12-pole M23 connector radial <b>Y</b> 10-pole mil.- connector radial  <b>Output circuit and supply voltage</b> <b>1</b> RS422 (with inverting function), power supply 5...30 V <b>2</b> push-pull (7272 with inverting function), power supply 5...30 V <b>4</b> RS422 (with inverting function), power supply 5 V <b>5</b> push-pull (with inverting function), power supply 10...30 V		<b>Pulse rate/rotation</b> 1, 5, 10, 12, 36, 100, 200, 250, 256, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2048, 2500, 3600, 4096, 5000 other pulse rates on request	
							<b>Flange</b> <b>5</b> synchro flange Ø 50.8 mm, IP67 <b>6</b> synchro flange Ø 50.8 mm, IP65 <b>7</b> clamping flange, metric, Ø 58 mm, IP67 <b>8</b> clamping flange, metric, Ø 58 mm, IP65 <b>A</b> synchro flange Ø 58 mm, IP67 <b>B</b> synchro flange Ø 58 mm, IP65 <b>C</b> square flange 63,5 mm (2.5"), IP67 <b>D</b> square flange 63,5 mm (2.5"), IP65		<b>Shaft (Ø x L)</b> <b>1</b> Ø 6 mm x 10 mm <b>2</b> Ø 1/4" x 5/8" (6.35 mm x 15.86 mm) <b>3</b> Ø 10 mm x 20 mm <b>4</b> Ø 3/8" x 5/8" (9.52 x 15,86 mm) <b>5</b> Ø 12 mm x 20 mm <b>6</b> Ø 8 mm x 15 mm	



Incremental, solid shaft, diameter 36 mm

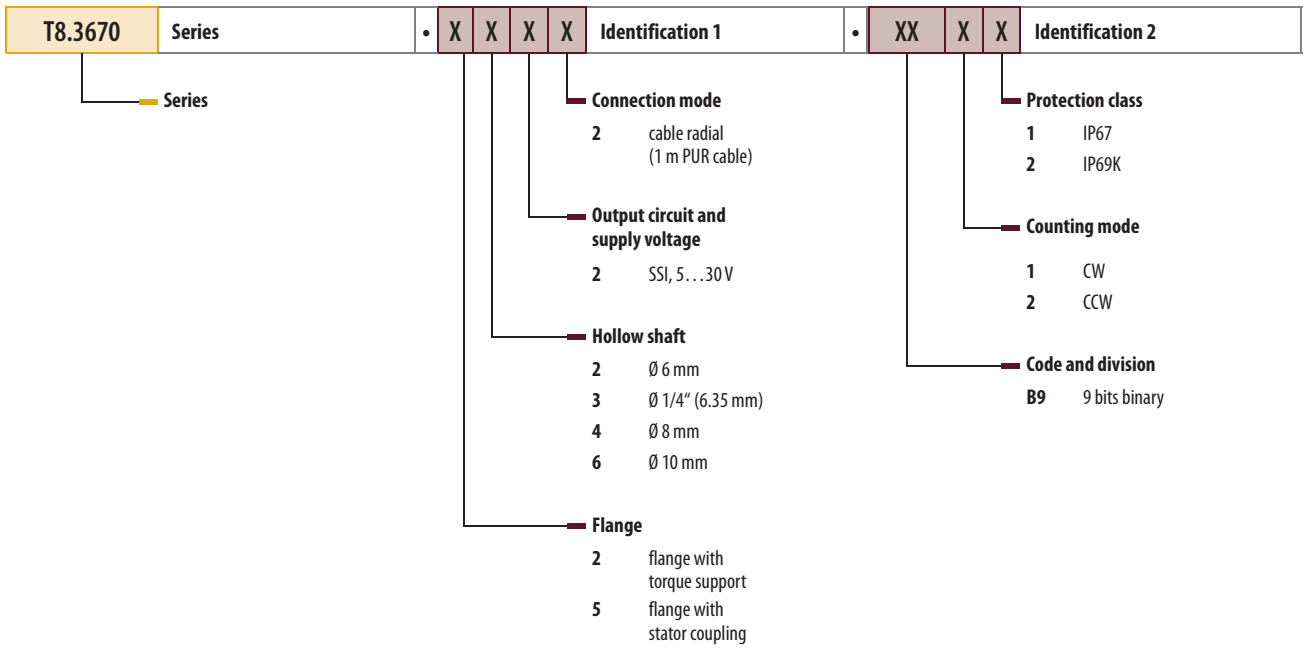


# Type code

Incremental, hollow shaft, diameter 50 mm

T8.5020	Series	•	X	X	X	X	Identification 1	•	X	X	X	X	Identification 2	
Series								<b>Connection mode</b> <b>1</b> cable radial (1 m PVC cable) <b>2</b> 8-pole M12 connector radial without mating connector <b>4</b> 12-pole M23 connector radial without mating connector <b>7</b> 10-pole mil.- connector radial  <b>Output circuit and supply voltage</b> <b>1</b> RS422 with inverting function power supply 5...30 V <b>2</b> push-pull 7272 with invert. function power supply 5...30 V <b>4</b> RS422 with inverting function-power supply 5...30 V <b>5</b> push-pull with inverting function power supply 10...30 V	<b>Pulse rate/rotation</b> 1, 5, 10, 12, 36, 100, 200, 250, 256, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 2000, 2048, 2500, 3600, 4096, 5000 other pulse rates on request					
		<b>Flange</b> <b>1</b> flange with torque support, IP67 <b>2</b> flange with torque support, IP65 <b>3</b> flange with mounting bracket, IP67 <b>4</b> flange with mounting bracket, IP65 <b>7</b> flange with stator coupling, Ø 65 mm, IP67 <b>8</b> flange with stator coupling, Ø 65 mm, IP65 <b>C</b> flange with stator coupling, Ø 63 mm, IP67 <b>D</b> flange with stator coupling, Ø 63 mm, IP65						<b>Hollow shaft</b> <b>1</b> Ø 6 mm <b>2</b> Ø 1/4" (6.35 mm) <b>3</b> Ø 10 mm <b>4</b> Ø 3/8" (9.52 mm) <b>5</b> Ø 12 mm <b>6</b> Ø 1/2" (12.75 mm) <b>7</b> Ø 5/8" (15.875 mm) <b>8</b> Ø 15 mm <b>9</b> Ø 8 mm <b>A</b> Ø 14 mm						

Incremental, hollow shaft, diameter 36 mm



# Type code

Absolute, solid shaft, diameter 58 mm

T8.58X3	Series	.	X	X	X	X	Identification 1	.	X	X	X	X	Identification 2
	<b>Series</b> 5 single turn 6 multiturn						<b>Connection mode</b> 1 cable axial (1 m PVC cable) 2 cable radial (1 m PVC cable) 3 12-pole M23 connector axial 4 12-pole M23 connector radial 5 8-pole M12 connector axial 6 8-pole M12 connector radial						<b>Options (service)</b> 1 no option 2 status LED 3 SET button and status LED <b>I/Os</b> 2 Input SET, DIR additional status output <b>Resolution</b> A 10 bit ST + 12 bit MT 1 11 bit ST + 12 bit MT 2 12 bit ST + 12 bit MT 3 13 bit ST + 12 bit MT 4 14 bit ST + 12 bit MT 7 17 bit ST + 12 bit MT <b>Code</b> B SSI, binary C BiSS, binary G SSI, Gray
	<b>Flange</b> 1 clamping flange Ø 58 mm, IP65 2 synchro flange Ø 58 mm, IP65 3 clamping flange Ø 58 mm, IP67 4 synchro flange Ø 58 mm, IP67 5 square flange, 2.5" (63.5 mm), IP65 7 square flange, 2.5" (63.5 mm), IP67 C flange with stator coupling, Ø 63 mm, IP67 D flange with stator coupling, Ø 63 mm, IP65 <b>Solid shaft</b> (Ø x L see table) 1 Ø 6 mm x 10 mm 2 Ø 10 mm x 20 mm 3 Ø 1/4" x 7/8" 5 Ø 3/8" x 7/8" 5 square flange, 2.5" (63.5 mm), IP65 7 square flange, 2.5" (63.5 mm), IP67 C flange with stator coupling, Ø 63 mm, IP67 D flange with stator coupling, Ø 63 mm, IP65						<b>Output circuit and supply voltage</b> 1 SSI or BiSS, 5 VDC 2 SSI or BiSS, 10...30 V 3 SSI or BiSS, and 2048 ppr SinCosSpur, 5 VDC 4 SSI or BiSS, and 2048 ppr SinCos, 10...30 VDC 5 SSI or BiSS, 5 VDC, with sensor output for voltage monitoring at encoder 6 SSI or BiSS and 2048 ppr SinCos, 5 VDC, with sensor output for voltage monitoring at encoder 7 SSI or BiSS and 2048 ppr incremental signals RS422, TTL comp., 5 VDC 8 SSI or BiSS and 2048 ppr incremental signals RS422, TTL comp., 10...30 VDC 9 SSI or BiSS and 2048 ppr incremental signals RS422, TTL comp., 5 VDC, with sensor output for voltage monitoring at encoder						

**Absolute, hollow shaft, diameter 58 mm**

<b>T8.58X3</b>	<b>Series</b>	.	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>Identification 1</b>	.	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>Identification 2</b>
	<p><b>Series</b></p> <p>7 single turn</p> <p>8 multiturn</p> <p><b>Flange</b></p> <p>1 flange with torque support, IP65</p> <p>2 flange with torque support, IP67</p> <p>3 flange with stator coupling TK65, IP65</p> <p>4 flange with stator coupling TK65, IP67</p> <p>5 flange with stator coupling TK63, IP65</p> <p>6 flange with stator coupling TK63, IP67</p> <p><b>Hollow shaft</b></p> <p>3 Ø 10 mm</p> <p>4 Ø 12 mm</p> <p>5 Ø 14 mm</p> <p>6 Ø 15 mm (blind hole, hollow shaft)</p> <p>8 Ø 9.52 mm (3/8")</p> <p>9 Ø 12,7 mm (1/2")</p>						<p><b>Connection mode</b></p> <p>2 cable radial (1 m PVC cable)</p> <p>4 12-pole M23 connector radial</p> <p>6 8-pole M12 connector radial</p> <p>E tangential cable outlet (1 m PVC cable)</p> <p><b>Output circuit and supply voltage</b></p> <p>1 SSI or BiSS, 5 VDC</p> <p>2 SSI or BiSS, 10...30 V</p> <p>3 SSI or BiSS and 2048 ppr SinCosSpur, 5 VDC</p> <p>4 SSI or BiSS and 2048 ppr SinCos, 10...30 VDC</p> <p>5 SSI or BiSS, 5 VDC, with sensor output for voltage monitoring at encoder</p> <p>6 SSI or BiSS and 2048 ppr SinCos, 5 VDC, with sensor output for voltage monitoring at encoder</p> <p>7 SSI or BiSS and 2048 ppr incremental signals RS422, TTL comp., 5 VDC</p> <p>8 SSI or BiSS and 2048 ppr incremental signals RS422, TTL comp., 10...30 VDC</p> <p>9 SSI or BiSS and 2048 ppr incremental signals RS422, TTL comp., 5 VDC, with sensor output for voltage monitoring at encoder</p>				<p><b>Options (service)</b></p> <p>1 no option</p> <p>2 status LED</p> <p>3 SET button and status LED</p> <p><b>I/Os</b></p> <p>2 input SET, DIR additional status output</p> <p><b>Resolution</b></p> <p>A 10 bit ST + 12 bit MT</p> <p>1 11 bit ST + 12 bit MT</p> <p>2 12 bit ST + 12 bit MT</p> <p>3 13 bit ST + 12 bit MT</p> <p>4 14 bit ST + 12 bit MT</p> <p>7 17 bit ST + 12 bit MT</p> <p><b>Code</b></p> <p>B SSI, binary</p> <p>C BiSS, binary</p> <p>G SSI, Gray</p>		



# At a glance

## Inclinometers



### Inclinometers – Solutions for many applications

No matter if applied in harvesters, agricultural and construction machinery, in vehicles and airplanes or in machines, robots and solar plants: Sensors for measuring and monitoring inclination are universally applicable and help to improve the safety and efficiency of operations.

Inclination is defined as the relative angular tilt to the horizon or perpendicular. Inclinometers use the local gravity respectively acceleration of gravity as a reference to measure angular tilt. The measuring principle is similar to that of perpendicular drop, whereby the mass is directly related to the gravitational field. Following this principle, inclinometers use mechanical pendulums, bending beams or liquids like in water-levels.

TURCK inclinometers incorporate a micro-mechanical pendulum based on MEMS technology (Mikro Elektro Mechanic Systems). The core piece is a capacitive sensor element consisting of two parallel arranged plate electrodes with a dielectric in the middle.

The dielectric of this differential capacitor is designed as a resilient pendulum. If the position of the sensor changes, the dielectric in the middle moves, causing the capacitance ratio between both electrodes to change. This change in capacitance is exactly measured and processed to detect the angular tilt.

The extremely rugged TURCK inclinometers are also suited for fast production sequences and withstand impacts. The standard product portfolio comprises rectangular shaped, biaxially operating inclinometers Q20L60, with angular ranges of  $\pm 10^\circ$ ,  $\pm 45^\circ$  and  $\pm 60^\circ$ . It also includes devices with analog voltage, current or ratiometric output as well as 20 mm uniaxial versions with freely adjustable measuring range  $0^\circ \dots 360^\circ$  and analog or digital output.

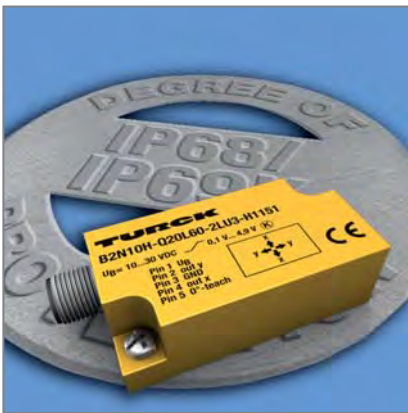
The Q42 complementing the product range, features a standard CANopen interface (CiA DS-301). These sensors provide baud rates of 10 kbps up to 1Mbps, high sampling rates and bandwidths as well as parameterizable vibrostability.

# Our strenghts - Your advantages



## High repeatability

The Q20L60 series is the right solution for high-precision applications, operating with a repeatability of 0.1% f.s. Q20L60 and Q42 inclinometers both feature a resolution of up to 0.04°.



## High protection rating

The sensors are IP68 and IP69K protected, fulfilling high requirements such as:

- 24 hrs. continuous storage at +70 °C
- 24 hrs. continuous storage at -25 °C
- 7 days submersed, depth 1m
- 10 thermal shock changes from +70 °C to -25 °C, dwell cycle per temperature 1 hour
- Suited for high pressure steam-jet cleaning acc. to DIN 40050-9, following EN 60529



## 360° freely selectable range

The uniaxial inclinometers operate over the full angular range of 360°. The required measuring range is set via teach adapter. Select the start value and press the teach adapter VB2-SP3 for 1 sec. Then select the end value and press the teach adapter for 3 seconds.



# advantages



## Compact CANopen interface

The inclinometers with CANopen interface (CIA DS-301) provide baud rates of 10 kbps up to 1Mbps, high sampling rates and bandwidths as well as parameterizable vibrostability.



## Easy setting of zero point

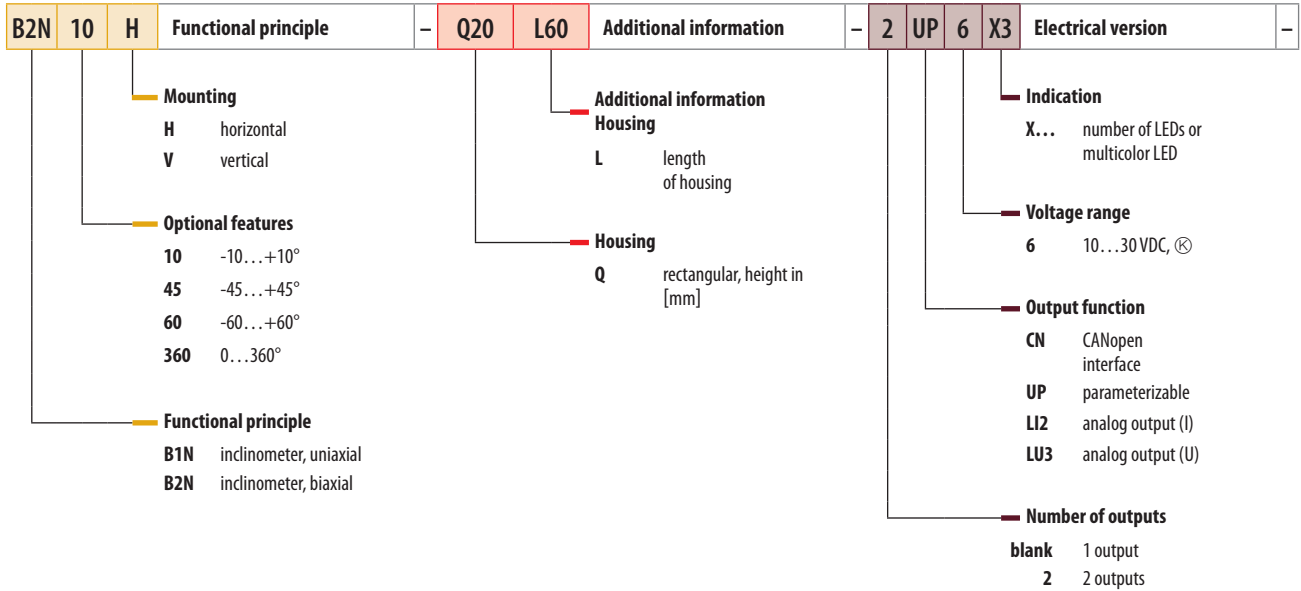
The home position (zero point) is easily set with the teach adapter VB2-SP3. Move the sensor in the wanted position, press the teach adapter for just 1 second and the sensor is calibrated!

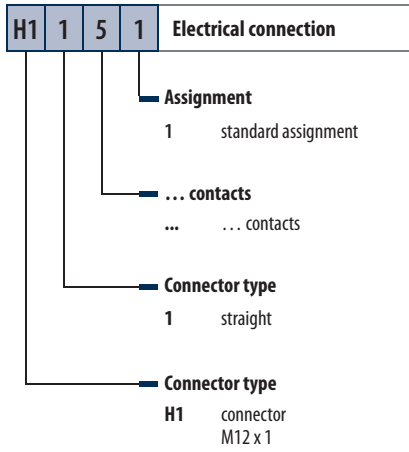


## Programmable switchpoints

The inclinometer with digital output features two programmable switchpoints that can be set with the teach adapter TX1-Q20L60. Different positions at cranes and utility vehicles are thus detected and monitored for example.

# Type code





# Inclinometers for all applications



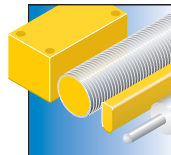
The standard product portfolio comprises rectangular shaped, biaxially operating inclinometers Q20L60, with angular ranges of  $\pm 10^\circ$ ,  $\pm 45^\circ$  and  $\pm 60^\circ$ . It also includes devices with analog voltage, current or ratiometric output as well as 20 mm uniaxial versions with freely adjustable measuring range  $0^\circ \dots 360^\circ$  and analog or digital output.

The Q42 complementing the product range, features a standard CANopen interface (CiA DS-301). These sensors provide baud rates of 10 kbps up to 1 Mbps, high sampling rates and bandwidths as well as a parameterizable vibro-stability.

## Features

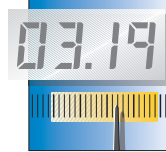
- Compact rectangular design
- High-speed measurement
- Sensitive and precise
- Long-term stable and reliable
- Zero-offset compensation
- High protection classes IP68 and IP69K
- Extremely robust
- Simple alignment
- Adjustable measuring range
- Adjustable switchpoints

## Properties



### Design

Compact housing, 20 x 42 mm



### Measuring ranges

Angular ranges  $\pm 10^\circ$ ,  $\pm 45^\circ$ ,  $\pm 60^\circ$ ,  $\pm 85^\circ$  and  $360^\circ$



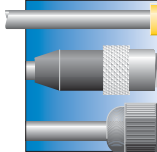
### Materials

Rugged plastic housings, fully encapsulated, chemical-resistant



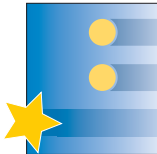
### Electrical versions

Digital as well as analog current and voltage outputs



### Electrical connections

M12 x 1 plug connection for simple installation



### Special features

Zero point setting

## Q20L60 – Voltage output 0.1...4.9 V



<b>General data</b>			
<b>Dimensions</b>	30 x 20 x 60 mm	<b>Ambient temperature</b>	-30...+70 °C
<b>Voltage output</b>	0.1...4.9 V	<b>Protection class</b>	IP68 / IP69K
<b>Operating voltage</b>	10...30 VDC	<b>Material housing</b>	PC

### Types and data – selection table

Type	Measuring range	Absolute accuracy (at 25 °C)	Temperature coef- ficient typical	Resolution	w	d
B2N10H-Q20L60-2LU3-H1151	-10...10°	0.3 °	0.01 °/K	0.04 °	w133	d562
B2N45H-Q20L60-2LU3-H1151	-45...45°	0.5 °	0.03 °/K	0.1 °	w133	d562
B2N60H-Q20L60-2LU3-H1151	-60...60°	0.5 °	0.03 °/K	0.14 °	w133	d562
B2N85H-Q20L60-2LU3-H1151	-85...85°	0.5 °	0.03 °/K	0.14 °	w133	d562

## Q20L60 – Current output 4...20 mA



<b>General data</b>			
<b>Dimensions</b>	30 x 20 x 60 mm	<b>Ambient temperature</b>	-30...+70 °C
<b>Current output</b>	4...20 mA	<b>Protection class</b>	IP68 / IP69K
<b>Operating voltage</b>	10...30 VDC	<b>Material housing</b>	PC

### Types and data – selection table

Type	Measuring range	Absolute accuracy (at 25 °C)	Temperature coef- ficient typical	Resolution	w	d
B2N10H-Q20L60-2LI2-H1151	-10...10°	0.3 °	0.01 °/K	0.04 °	w134	d562
B2N45H-Q20L60-2LI2-H1151	-45...45°	0.5 °	0.03 °/K	0.1 °	w134	d562
B2N60H-Q20L60-2LI2-H1151	-60...60°	0.5 °	0.03 °/K	0.14 °	w134	d562
B2N85H-Q20L60-2LI2-H1151	-85...85°	0.5 °	0.03 °/K	0.14 °	w134	d562

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 736 ff

## Q20L60 – Ratiometric voltage output



<b>General data</b>			
<b>Dimensions</b>	30 x 20 x 60 mm	<b>Ambient temperature</b>	-30...+70 °C
<b>Ratiometric output voltage</b>	2...98 % U <sub>b</sub>	<b>Protection class</b>	IP68 / IP69K
<b>Operating voltage</b>	4.75...5.25 VDC	<b>Material housing</b>	PC

### Types and data – selection table

Type	Measuring range	Absolute accuracy (at 25 °C)	Temperature coefficient typical	Resolution	w	d
B2N60H-Q20L60-2LU5-H1151	-60...60°	0.5 °	0.03 °/K	0.14 °	w133	d562
B2N10H-Q20L60-2LU5-H1151	-10...10°	0.3 °	0.01 °/K	0.04 °	w133	d562
B2N45H-Q20L60-2LU5-H1151	-45...45°	0.5 °	0.03 °/K	0.1 °	w133	d562
B2N85H-Q20L60-2LU5-H1151	-85...85°	0.5 °	0.03 °/K	0.14 °	w133	d562

## Q20L60 – Adjustable measuring range



<b>General data</b>			
<b>Dimensions</b>	30 x 20 x 60 mm	<b>Operating voltage</b>	10...30 VDC
<b>Measuring range</b>	0...360 °	<b>Ambient temperature</b>	-30...+70 °C
<b>Absolute accuracy (at 25 °C)</b>	0.5 °	<b>Protection class</b>	IP68 / IP69K
<b>Temperature coefficient typical</b>	0.03 °/K	<b>Material housing</b>	PC
<b>Resolution</b>	0.14 °		

### Types and data – selection table

Type	Current output	Voltage output	w	d
B1N360V-Q20L60-LI2-H1151	4...20 mA	-	w135	d563
B1N360V-Q20L60-LU3-H1151	-	0.1...4.9 V	w136	d563

## Q20L60 – Two programmable switchpoints



<b>Type</b>	B1N360V-Q20L60-2UP6X3-H1151	<b>Operating voltage</b>	10...30 VDC
<b>Dimensions</b>	30 x 20 x 60 mm	<b>Ambient temperature</b>	-30...+70 °C
<b>Measuring range</b>	0...360°	<b>Protection class</b>	IP68 / IP69K
<b>Output</b>	programmable, 2 x PNP	<b>Material housing</b>	PC
<b>Absolute accuracy (at 25°C)</b>	0.5°	<b>Wiring diagram</b>	w137
<b>Resolution</b>	0.14°	<b>Dimension drawing</b>	d564

## Q42 – CANopen interface



<b>General data</b>			
<b>Dimensions</b>	52 x 42 x 68 mm	<b>Ambient temperature</b>	-40...+80 °C
<b>Absolute accuracy (at 25°C)</b>	0.1°	<b>Protection class</b>	IP68 / IP69K
<b>Temperature coefficient typical</b>	0.008 °/K	<b>Material housing</b>	PA
<b>Operating voltage</b>	10...30 VDC		

### Types and data – selection table

Type	Resolution	Measuring range	<span style="background-color: #008000; color: white; padding: 2px;">w</span>	<span style="background-color: #ff0000; color: white; padding: 2px;">d</span>
B2N10H-Q42-CNX2-2H1150	0.05°	-10...+10°	w138	d565
B2N45H-Q42-CNX2-2H1150	0.1°	-45...+45°	w138	d565
B2N60H-Q42-CNX2-2H1150	0.1°	-60...+60°	w138	d565





# At a glance

## Ultrasonic sensors



### Ultrasonic sensing – Versatile solutions for many applications

Ultrasonic sensors detect a multitude of objects contactless and wear-free with ultrasonic waves. In contrast to other sensing technologies, it is not important whether the object is transparent or opaque, metallic or non-metallic, firm, liquid or powdery. More important is the surface of the objects. The smoother the surface, the better the reflectivity and the larger the range.

The application possibilities for ultrasonic sensors are nearly infinite. Whether level or height detection, measurement of distance or object counting, ultrasonic sensors detect objects of different material qualities and within a large range. Environmental conditions such as spray, dust or rain hardly affect their functionality.

Ultrasonic diffuse mode sensors detect all objects that echo back ultrasonic waves. For this purpose the sensor emits ultrasonic pulses in cyclic periods. The echo is reverberated and transformed into an electrical signal through the sensor's transducer. The distance between the sensor and object is determined through the echo propagation principle, whereby the period between pulse emission and reverberation is related to a given sonic speed.

Ultrasonic sensors are also available as opposed and diffuse mode devices. In opposed mode, ultrasonic waves are continuously propagating between emitter and receiver. If an object crosses the wave, re-

verberation is cut off and the sensor produces a switching signal.

TURCK's ultrasonic sensors are available in many different designs, measuring ranges, beam angles and output types. Most of them feature temperature compensation, noise suppression and a connection cable for autosynchronization (protection against crosstalk).

Sensors with two switching outputs are suited for the control of minimum and maximum levels for example. Analog sensors are available with current and voltage output. Sensors with external transducer are best suited for confined spaces.

Small objects are detected with pinpoint accuracy, using versions with a narrow beam angle of approx. 6°. Devices with wider beam angle of 12° to 15° are also available. Sensors with a beam angle of 60° are best suited for monitoring very large areas. They detect smooth and even surfaces easily and are insensitive to tilt.

# Our strengths - Your advantages



## Broad product range – Different designs and beam angles

TURCK ultrasonic sensors are available as metal threaded barrels M18/M30 or plastic rectangular Q30 devices with a narrow beam angle of 6°. They detect very small objects with pinpoint accuracy. The Q30 with a beam angle of 6° achieve ranges of up to 8 m. Q45U and T30U with beam angles of 12° to 15° achieve longer rang-

es. The beam angle of CP40 types is 60°. These sensors monitor large areas and are insensitive to tilt when detecting objects with smooth and even surfaces.

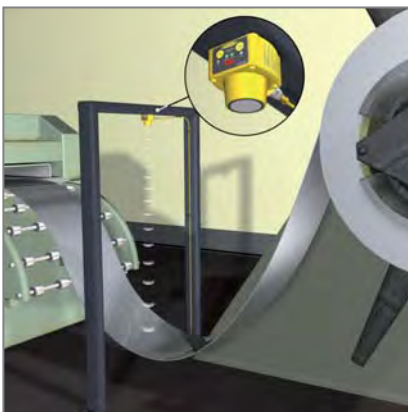
The right choice for confined spaces is the Q45U with external transducer.



## Highly efficient – Extremely accurate at any given range

The achievable range of ultrasonic sensors depends on the wavelength respectively the frequency used. The greater the wavelength/lower the frequency, the larger the range. Compact sensors achieve ranges from 300 mm up to 500 mm. With large wavelengths of 5 mm ranges of 8 m and more can be achieved.

The accuracy of ultrasonic sensing is not only limited by the wavelength but also by the fluctuation of sonic speed caused by temperature changes. Therefore most of the sensors are equipped with temperature compensation. This enables analog sensors to achieve a resolution of up to 0.6 mm over a wide temperature range.



## Protection against interferences – Noise suppression and synchronization

Signal processing is not influenced by metallic clink or compressed air hissing. Such unwanted ambient noises are filtered out through an optimally selected frequency range and a patented noise suppression circuit. Crosstalk between ultrasonic sensors is inhibited through multiplexing or synchronization.

Most sensors feature autosynchronization. For this purpose they emit ultrasonic pulses synchronously and behave like one single sensor with extended beam angle, provided they are accordingly arranged. Park distance controls in cars are based on ultrasonic sensors technology.

# advantages



### T30UX – Accurately measured values and minimal influence of temperature

Thanks to a powerful transducer and temperature compensation, the T30UX provide very accurately measured values. The diffuse mode versions achieve ranges of up to 3 m and have short blind zones of only 10 % f.s. Through the integrated temperature compensation failure rates are reduced by approx. 90 %.

Within the defined temperature window of -40...+70 °C the range limits are kept stable with a slight drift of only 2.2 %. The IP67 rated sensors are applied in different industrial sectors such as the automotive (detection of glass), paper manufacturing (sag control), pharmaceutical (level control) and many other fields of application.



### M25U – All-metal ultrasonic sensors for aseptic applications

The M25U are fully encapsulated in stainless steel and IP68/IP69K rated. They meet all requirements on hygienic design of the food and beverage as well as the pharmaceutical industry. The stainless steel housing not only resists chemicals and aggressive cleaning agents, it is also thermal-shock proof. The sensors resist hot cleaning at +60 °C immediately followed by cold rinsing at +10 °C easily.

The ultrasonic opposed mode sensor can be adjusted to two sensitivities: Normal sensitivity, max. range 1 m, for objects sizing Ø 30 mm and larger; high sensitivity, max. range 40 cm, for objects sizing Ø 15 mm and larger.



### QS18U – Also available with focussing adapter

The beam of some ultrasonic sensors such as the QS18U can be focussed with the UWG18 adapter. This allows small ob-

jects to be detected free from interfering ambient conditions. Measurements in tubes and barrels are also possible.

# Designs and variants

Page 723



**QS18U**

Page 727



**S18U**

Page 708



**M18K**

Page 704



**M18**

**Design**

rectangular, 15 x 35 x 33.5 mm

cylindrical/threaded,  
 Ø18 x 80.8 mm,  
 Ø18 x 85.1 mm,  
 Ø18 x 90.9 mm,  
 Ø18 x 95.1 mm

cylindrical/threaded,  
 Ø18 x 63 mm,  
 Ø18 x 81 mm

cylindrical/threaded,  
 Ø18 x 101 mm,  
 Ø18 x 104 mm

**Output function**

PNP

pnp/npn  
 Analog output

frequency  
 PNP

PNP  
 Analog output

**Protection class**

IP67  
 IP68

IP67

IP67

IP67

**Ambient temperature**

-20...+60 °C

-20...+60 °C

-25...+70 °C

-25...+70 °C

**Max. range**

50 cm

30 cm

70 cm

100 cm

# Standard variants

Page 714



**M30**

Page 729



**T30U**

Page 725



**QT50**

Page 720



**Q30**

**Design**

cylindrical/threaded,  
 Ø30 x 141.5 mm,  
 Ø65 x 163.5 mm,  
 Ø30 x 160.5 mm,  
 Ø30 x 131 mm,  
 Ø47.5 x 150 mm

cylindrical/threaded,  
 Ø40 x 45 mm

rectangular,  
 74 x 84.2 x 67.4 mm,  
 74 x 100.2 x 67.4 mm

rectangular,  
 65 x 30 x 88 mm

**Output function**

PNP  
 PNP/analog output

PNP  
 PNP/analog output  
 Analog output

PNP  
 Analog output

PNP  
 Analog output

**Protection class**

IP65

IP67

IP67

IP65

**Ambient temperature**

-25...+70 °C

-20...+70 °C  
 -40...+70 °C

-20...+70 °C

0...+55 °C

**Max. range**

600 cm

300 cm

800 cm

100 cm

# Designs and variants

Page 700



Page 711



## CP40

<b>Design</b>	rectangular, 40 x 40 x 160 mm, 40 x 40 x 177.5 mm
<b>Output function</b>	PNP Analog output
<b>Protection class</b>	IP40
<b>Ambient temperature</b>	0...+70 °C
<b>Max. range</b>	180 cm

## M25

<b>Design</b>	smooth barrel, Ø25 x 106 mm
<b>Output function</b>	pnp/npn
<b>Protection class</b>	IP67 / IP69K
<b>Ambient temperature</b>	-20...+70 °C
<b>Max. range</b>	50 cm

# s and variants

## Rectangular CP40

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The CP40 detect glass or metal objects with a smooth surface, even with oblique incidence of the sensing beam. They cover a wide sensing range of 5 cm to 180 cm with a beam angle of 60°.

They are available with PNP transistor or Analog output 0...10 VDC / 0...20 mA

### Features

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- Compact rectangular design, 160 x 40 x 40 mm
- plastic housing
- Protection class IP40
- Ambient temperature 0° C...+70 °C
- Diffuse mode
- Max. range 180 cm
- Beam angle 60°
- Change of beam direction through movable sensor head
- Analog or switching output
- LEDs indicate switching status /object detected
- Operating range adjusted via potentiometer



## Type code CP40, M18, M18K, M30, Q12, Q30

RUR	70	M18KS	AP8X	H1141	3GD
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RUR	Series	70	Sensing range	M18KS	Design
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**Series**

<b>RU</b>	ultrasonic sensor, diffuse mode
<b>RUC</b>	ultrasonic sensor, programmable synchronizable, multiplex function diffuse mode
<b>RUN</b>	ultrasonic sensor, diffuse mode
<b>RUR</b>	ultrasonic sensor, retroreflective mode

**Sensing range**

**70** max. sensing range in cm

**Design**

<b>CP40</b>	rectangular, plastic 40 x 40 x 160 mm or 40 x 40 x 177.5 mm
<b>EM18</b>	cylinder/thread M18, stainless steel, Ø 18 mm
<b>EM30</b>	cylinder/thread M30 stainless steel, Ø 30 mm
<b>EMT18</b>	cylinder/thread, M18, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>EMT30</b>	cylinder/thread M30, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone), Ø 30 mm
<b>M18</b>	cylinder/thread, M18, metal, CuZn nickel-plated, Ø 18 mm
<b>M18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated Ø 18 mm
<b>M18KS</b>	compact design, side emission, cylinder/thread M18, metal, CuZn, nickel-plated, Ø 18 mm
<b>M30</b>	cylinder/thread M30, metal CuZn, nickel-plated, Ø 30 mm
<b>M3047</b>	cylinder/thread M30, metal CuZn, nickel-plated sonic transducer Ø 47 mm
<b>M3065</b>	cylinder/thread M30, metal CuZn nickel-plated sonic transducer Ø 65 mm, Ø 18 mm
<b>MT18</b>	cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), Ø 18 mm
<b>MT18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>MT3047</b>	cylinder/thread M30, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), ultrasonic transducer Ø 47 mm
<b>Q12</b>	compact, rectangular plastic 31 x 12 x 20 mm
<b>Q30</b>	compact, rectangular plastic, 65 x 30 x 88 mm

AP8X	Electrical version	H1141	Electrical connection
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**Electrical version**

<b>A</b>	NO
<b>2A</b>	2 x NO
<b>F</b>	frequency output
<b>I</b>	analog output 0 ... 20 mA or 4 ... 20 mA
<b>L</b>	analog
<b>N</b>	NPN
<b>P</b>	PNP
<b>U</b>	analog output 0 ... 10V
<b>X</b>	LED display
<b>X2</b>	2 x LEDs
<b>6</b>	10 ... 30 VDC input current
<b>8</b>	18 ... 35 VDC input current

**Electrical connection**

<b>H1141</b>	connector, M12 x 1, 4-pole
<b>H1151</b>	connector, M12 x 1, 5-pole
<b>V1141</b>	connector, M8 x 1, 4-pole
<b>blank</b>	cable connection, 2 m, with CP40 = terminal chamber

3GD	Approval
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**Approval**

<b>3GD</b>	ATEX declaration of conformity 3163M, EX II 3 G EEx nA II T6 X / II 3 D IP65 T 60 °C X (only valid for RUC ... M30 family)
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## CP40 – Switching output



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature</b>	0...+70 °C
<b>Display, Object detected</b>	LED	<b>Range</b>	5...180 cm
<b>Type</b>		<b>Approach speed</b>	1 m/s
<b>Output</b>	—, PNP	<b>Converter ring material</b>	plastic
<b>Switching frequency</b>	≤ 3 Hz	<b>Converter ring quality</b>	PBT
<b>Protection class</b>	IP40	<b>Ultrasound frequency</b>	40 kHz
<b>Housing material</b>	plastic, PBT-GF30-V0		

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d
RU100-CP40-AP6X2	40 x 40 x 160 mm	terminal chamber	w011	d566
RU100-CP40-AP6X2-H1141	40 x 40 x 177.5 mm	connector, M12 x 1	w001	d567

## CP40 – Analog output



<b>Type</b>	RU100-CP40-LIUX	<b>Analog output</b>	0...20 mA, 0...10 V
<b>Operating voltage</b>	15...30 VDC	<b>Load</b>	≥ 4700... ≤ 500 Ω
<b>Power-on, indicator</b>	LED	<b>Response time</b>	150 ms
<b>Display, Object detected</b>	LED	<b>Approach speed</b>	1 m/s
<b>Type</b>		<b>Converter ring material</b>	plastic
<b>Dimensions</b>	40 x 40 x 160 mm	<b>Converter ring quality</b>	PBT
<b>Protection class</b>	IP40	<b>Ultrasound frequency</b>	40 kHz
<b>Housing material</b>	plastic, PBT-GF30-V0	<b>Wiring diagram</b>	w054
<b>Electrical connection</b>	terminal chamber	<b>Dimension drawing</b>	d568
<b>Ambient temperature</b>	0...+70 °C		
<b>Range</b>	5...180 cm		

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 806 ff

## Cylindrical design M18 – Threaded barrel



The M18 detect small objects with pin-point accuracy. They are IP67 rated and thus also applicable in rough environments.

The electronics is incorporated in a small 18 mm threaded barrel made of nickel-plated brass. Different types are available with operating ranges of 30 cm or 100 cm and with switching or Analog output. In order to avoid crosstalk, up to six devices can be synchronized simply by connecting the power supply. Alternate operation of several sensors is also possible through external control.

### Features

- M18, threaded barrel
- Nickel-plated brass
- Protection class IP67
- Ambient temperature -25...+70 °C
- Diffuse mode
- Max. range 100 cm
- Beam angle 6°
- Switching or Analog output
- LED indicates the switching status
- Operating range adjusted via potentiometer and programming device
- Synchronizing/enable input

## Type code CP40, M18, M18K, M30, Q12, Q30

RUR	70	M18KS	AP8X	H1141	3GD
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RUR	Series	70	Sensing range	M18KS	Design
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**Series**

<b>RU</b>	ultrasonic sensor, diffuse mode
<b>RUC</b>	ultrasonic sensor, programmable synchronizable, multiplex function diffuse mode
<b>RUN</b>	ultrasonic sensor, diffuse mode
<b>RUR</b>	ultrasonic sensor, retroreflective mode

**Sensing range**

**70** max. sensing range in cm

**Design**

<b>CP40</b>	rectangular, plastic 40 x 40 x 160 mm or 40 x 40 x 177.5 mm
<b>EM18</b>	cylinder/thread M18, stainless steel, Ø 18 mm
<b>EM30</b>	cylinder/thread M30 stainless steel, Ø 30 mm
<b>EMT18</b>	cylinder/thread, M18, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>EMT30</b>	cylinder/thread M30, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone), Ø 30 mm
<b>M18</b>	cylinder/thread, M18, metal, CuZn nickel-plated, Ø 18 mm
<b>M18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated Ø 18 mm
<b>M18KS</b>	compact design, side emission, cylinder/thread M18, metal, CuZn, nickel-plated, Ø 18 mm
<b>M30</b>	cylinder/thread M30, metal CuZn, nickel-plated, Ø 30 mm
<b>M3047</b>	cylinder/thread M30, metal CuZn, nickel-plated sonic transducer Ø 47 mm
<b>M3065</b>	cylinder/thread M30, metal CuZn nickel-plated sonic transducer Ø 65 mm, Ø 18 mm
<b>MT18</b>	cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), Ø 18 mm
<b>MT18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>MT3047</b>	cylinder/thread M30, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), ultrasonic transducer Ø 47 mm
<b>Q12</b>	compact, rectangular plastic 31 x 12 x 20 mm
<b>Q30</b>	compact, rectangular plastic, 65 x 30 x 88 mm

AP8X	Electrical version	H1141	Electrical connection
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**Electrical version**

<b>A</b>	NO
<b>2A</b>	2 x NO
<b>F</b>	frequency output
<b>I</b>	analog output 0...20 mA or 4...20 mA
<b>L</b>	analog
<b>N</b>	NPN
<b>P</b>	PNP
<b>U</b>	analog output 0...10V
<b>X</b>	LED display
<b>X2</b>	2 x LEDs
<b>6</b>	10...30 VDC input current
<b>8</b>	18...35 VDC input current

**Electrical connection**

<b>H1141</b>	connector, M12 x 1, 4-pole
<b>H1151</b>	connector, M12 x 1, 5-pole
<b>V1141</b>	connector, M8 x 1, 4-pole
<b>blank</b>	cable connection, 2 m, with CP40 = terminal chamber

3GD	Approval
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**Approval**

<b>3GD</b>	ATEX declaration of conformity 3163M, EX II 3 G EEx nA II T6 X / II 3 D IP65 T 60 °C X (only valid for RUC...M30 family)
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## M18 – Switching output



### General data

**Operating voltage** 20...30 VDC  
**Output** —, PNP  
**Protection class** IP67  
**Electrical connection** connector, M12 x 1

**Ambient temperature** -25...+70 °C  
**Converter ring material** plastic  
**Converter ring quality** PBT

### Types and data – selection table

Type	Switching frequency	Dimensions	Housing material	Range	Ap- proach speed	Ultra- sound frequency	w	d
RU30-M18-AP8X-H1141	≤ 5 Hz	Ø18 x 101 mm	metal, CuZn, nickel-plated	5...30 cm	4 m/s	400 kHz	w081	d569
RU100-M18-AP8X-H1141	≤ 4 Hz	Ø18 x 104 mm	metal, CuZn, nickel-plated	15...100 cm	8 m/s	230 kHz	w081	d570
RU100-MT18-AP8X-H1141	≤ 4 Hz	Ø18 x 104 mm	metal, CuZn, nickel-plated	15...100 cm	8 m/s	230 kHz	w081	d570
RU30-EM18-AP8X-H1141	≤ 5 Hz	Ø18 x 101 mm	stainless steel, V2A (1.4305), nickel-plated	5...30 cm	4 m/s	400 kHz	w081	d569
RU100-EM18-AP8X-H1141	≤ 4 Hz	Ø18 x 104 mm	stainless steel, V2A (1.4305), nickel-plated	15...100 cm	8 m/s	230 kHz	w081	d570

## M18 – Analog output



### General data

**Operating voltage** 20...30 VDC  
**Protection class** IP67  
**Electrical connection** connector, M12 x 1  
**Ambient temperature** -25...+70 °C

**Analog output** 4...20 mA  
**Converter ring material** plastic  
**Converter ring quality** PBT

Types and data – selection table

Type	Dimensions	Housing material	Range	Response time	Approach speed	Ultrasound frequency	w	d
RU100-M18-LIX-H1141	Ø18 x 104 mm	metal, CuZn, nickel-plated	15...100 cm	120 ms	8 m/s	230 kHz	w139	d571
RU30-M18-LIX-H1141	Ø18 x 101 mm	metal, CuZn, nickel-plated	5...30 cm	100 ms	4 m/s	400 kHz	w139	d572
RU100-MT18-LIX-H1141	Ø18 x 104 mm	metal, CuZn, nickel-plated	15...100 cm	120 ms	8 m/s	230 kHz	w139	d571
RU30-EMT18-LIX-H1141	Ø18 x 101 mm	stainless steel, V2A (1.4305), nickel-plated	5...30 cm	100 ms	4 m/s	400 kHz	w139	d572

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 806 ff

## M18K – Threaded barrel

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The M18K detect small objects with pinpoint accuracy. They are IP67 rated and thus also applicable in rough environments.

The sensors come in a small 18 mm threaded barrel made of nickel-plated brass. Available are diffuse mode devices with a max. range of 20 cm and retroreflective mode devices with a max. range of 70 cm. Both versions are either equipped with a PNP transistor or analog frequency output.

### Features

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- M18K, threaded barrel
- Nickel-plated brass
- Protection class IP67
- Diffuse mode (RU/RUN) and retroreflective mode (RUR) devices
- Max. range 70 cm
- Beam angle 6°
- Version with lateral emission (M18KS)
- Switching or analog frequency output
- LED indicates the switching status and teach mode
- Adjustments via teach input



## Type code CP40, M18, M18K, M30, Q12, Q30

RUR	70	M18KS	AP8X	H1141	3GD
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RUR	Series	70	Sensing range	M18KS	Design
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### Series

<b>RU</b>	ultrasonic sensor, diffuse mode
<b>RUC</b>	ultrasonic sensor, programmable synchronizable, multiplex function diffuse mode
<b>RUN</b>	ultrasonic sensor, diffuse mode
<b>RUR</b>	ultrasonic sensor, retroreflective mode

### Sensing range

**70** max. sensing range in cm

### Design

<b>CP40</b>	rectangular, plastic 40 x 40 x 160 mm or 40 x 40 x 177.5 mm
<b>EM18</b>	cylinder/thread M18, stainless steel, Ø 18 mm
<b>EM30</b>	cylinder/thread M30 stainless steel, Ø 30 mm
<b>EMT18</b>	cylinder/thread, M18, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>EMT30</b>	cylinder/thread M30, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone), Ø 30 mm
<b>M18</b>	cylinder/thread, M18, metal, CuZn nickel-plated, Ø 18 mm
<b>M18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated Ø 18 mm
<b>M18KS</b>	compact design, side emission, cylinder/thread M18, metal, CuZn, nickel-plated, Ø 18 mm
<b>M30</b>	cylinder/thread M30, metal CuZn, nickel-plated, Ø 30 mm
<b>M3047</b>	cylinder/thread M30, metal CuZn, nickel-plated sonic transducer Ø 47 mm
<b>M3065</b>	cylinder/thread M30, metal CuZn nickel-plated sonic transducer Ø 65 mm, Ø 18 mm
<b>MT18</b>	cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), Ø 18 mm
<b>MT18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>MT3047</b>	cylinder/thread M30, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), ultrasonic transducer Ø 47 mm
<b>Q12</b>	compact, rectangular plastic 31 x 12 x 20 mm
<b>Q30</b>	compact, rectangular plastic, 65 x 30 x 88 mm

AP8X	Electrical version	H1141	Electrical connection
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### Electrical version

<b>A</b>	NO
<b>2A</b>	2 x NO
<b>F</b>	frequency output
<b>I</b>	analog output 0...20 mA or 4...20 mA
<b>L</b>	analog
<b>N</b>	NPN
<b>P</b>	PNP
<b>U</b>	analog output 0...10V
<b>X</b>	LED display
<b>X2</b>	2 x LEDs
<b>6</b>	10...30 VDC input current
<b>8</b>	18...35 VDC input current

### Electrical connection

<b>H1141</b>	connector, M12 x 1, 4-pole
<b>H1151</b>	connector, M12 x 1, 5-pole
<b>V1141</b>	connector, M8 x 1, 4-pole
<b>blank</b>	cable connection, 2 m, with CP40 = terminal chamber

3GD	Approval
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### Approval

<b>3GD</b>	ATEX declaration of conformity 3163M, EX II 3 G EEx nA II T6 X / II 3 D IP65 T 60 °C X (only valid for RUC...M30 family)
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## M18K – Analog frequency output



### General data

<b>Operating voltage</b>	20...30 VDC	<b>Ambient temperature</b>	-25...+70 °C
<b>Protection class</b>	IP67	<b>Converter ring material</b>	plastic
<b>Housing material</b>	metal, CuZn, nickel-plated	<b>Converter ring quality</b>	PBT
<b>Electrical connection</b>	connector, M12 x 1		

Versions with lateral emission (M18KS)

### Types and data – selection table

Type	Dimensions	Range	Ultrasound frequency	w	d
RU20-M18K-LFX-H1141	Ø18 x 63 mm	3...20 cm	400 kHz	w140	d573
RU70-M18K-LFX-H1141	Ø18 x 63 mm	10...70 cm	200 kHz	w140	d573
RU20-M18KS-LFX-H1141	Ø18 x 81 mm	3...20 cm	400 kHz	w140	d574
RU70-M18KS-LFX-H1141	Ø18 x 81 mm	10...70 cm	200 kHz	w140	d574

## M18K – Switching output (Diffuse mode sensor)



### General data

<b>Operating voltage</b>	20...30 VDC	<b>Electrical connection</b>	connector, M12 x 1
<b>Output</b>	—, PNP	<b>Ambient temperature</b>	-25...+70 °C
<b>Protection class</b>	IP67	<b>Converter ring material</b>	plastic
<b>Housing material</b>	metal, CuZn, nickel-plated	<b>Converter ring quality</b>	PBT

Versions with lateral emission (M18KS)

### Types and data – selection table

Type	Switching frequency	Dimensions	Range	Ultrasound frequency	w	d
RUN20-M18K-AP8X-H1141	≤ 10 Hz	Ø18 x 63 mm	3...20 cm	400 kHz	w141	d573
RUN70-M18K-AP8X-H1141	≤ 5 Hz	Ø18 x 63 mm	10...70 cm	200 kHz	w141	d573
RUN20-M18KS-AP8X-H1141	≤ 10 Hz	Ø18 x 81 mm	3...20 cm	400 kHz	w141	d574
RUN70-M18KS-AP8X-H1141	≤ 5 Hz	Ø18 x 81 mm	10...70 cm	200 kHz	w141	d574

## M18K – Switching output (retroreflective sensor)



### General data

<b>Operating voltage</b>	20...30 VDC	<b>Electrical connection</b>	connector, M12 x 1
<b>Output</b>	—, PNP	<b>Ambient temperature</b>	-25...+70 °C
<b>Protection class</b>	IP67	<b>Converter ring material</b>	plastic
<b>Housing material</b>	metal, CuZn, nickel-plated	<b>Converter ring quality</b>	PBT

Versions with lateral emission (M18KS)

### Types and data – selection table

Type	Switching frequency	Dimensions	Range	Ultrasound frequency	w	d
RUR20-M18K-AP8X-H1141	≤ 10 Hz	Ø18 x 63 mm	0...20 cm	400 kHz	w141	d573
RUR70-M18K-AP8X-H1141	≤ 5 Hz	Ø18 x 63 mm	0...70 cm	200 kHz	w141	d573
RUR20-M18KS-AP8X-H1141	≤ 10 Hz	Ø18 x 81 mm	0...20 cm	400 kHz	w141	d574
RUR70-M18KS-AP8X-H1141	≤ 5 Hz	Ø18 x 81 mm	0...70 cm	200 kHz	w141	d574

## M25U - Smooth barrel

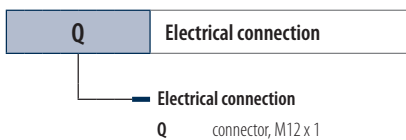
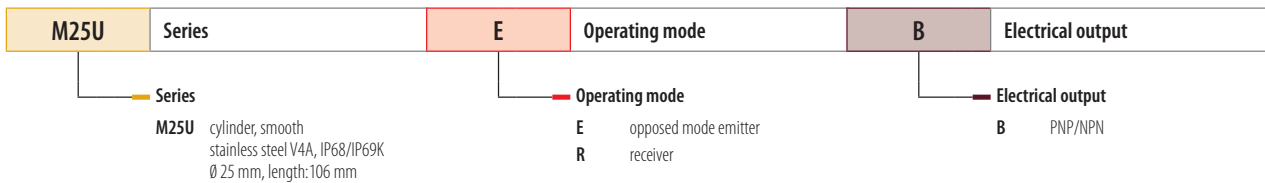


The M25U are fully encapsulated in stainless steel and are IP68/IP69K rated. This makes them ideally suited for tasks in aseptic applications of the food and beverage as well as the pharmaceutical industry. The ultrasonic opposed mode version incorporates emitter and receiver and achieves a max. range of 75 mm. The device is available with PNP/NPN switching output. Two sensitivities can be adjusted: Normal sensitivity, max. range 1m (for objects sizing Ø 30 mm and larger); high sensitivity, max. range 40 cm (for objects sizing Ø 15 mm and larger).

### Features

- All-metal ultrasonic sensor M25U
- Hygienic design, smooth barrel, stainless steel, Ø 25 mm
- Opposed mode, emitter/receiver
- Max. range 75 mm
- Protection rating IP67 / IP69K
- Resistant to aggressive cleaning agents and disinfectants
- Designed for 200,000 cleaning cycles, 15 min, water +80 °C, rapid cool down
- PNP/NPN switching output
- High sensitivity for small objects (minimum size Ø 15 mm)

### Type code M25U



## M25 – Opposed mode sensor – Emitter



<b>Type</b>	M25UEQ	<b>Electrical connection</b>	connector, M12 x 1
<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature</b>	-20...+70 °C
<b>Power-on, indicator</b>	LED	<b>Range</b>	0...50 cm
<b>Dimensions</b>	Ø25 x 106 mm	<b>Ultrasound frequency</b>	140 kHz
<b>Protection class</b>	IP67 / IP69K	<b>Wiring diagram</b>	w068
<b>Housing material</b>	metal, V4A 1.4401 (AISI 316)	<b>Dimension drawing</b>	d575

## M25 – Opposed mode sensor – Receiver



<b>Type</b>	M25URBQ	<b>Housing material</b>	metal, V4A 1.4401 (AISI 316)
<b>Operating voltage</b>	10...30 VDC	<b>Electrical connection</b>	connector, M12 x 1
<b>Power-on, indicator</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Output</b>	—, pnp/npn	<b>Range</b>	0...50 cm
<b>Switching frequency</b>	≤ 250 Hz	<b>Wiring diagram</b>	w142
<b>Dimensions</b>	Ø25 x 106 mm	<b>Dimension drawing</b>	d576
<b>Protection class</b>	IP67 / IP69K		

## Cylindrical design M30 – Threaded barrel



The M30 detect small objects with pin-point accuracy and are hosted in a 30 mm threaded barrel made of nickel-plated brass. Available are versions with 30, 130, 300 and 600 cm range, switching output, switching and Analog output or with two switching outputs.

In order to avoid crosstalk, up to six RUC devices can be synchronized simply by connecting the power supply. Alternate operation of several sensors is also possible via external control or synchronizing/enable input.

### Features

- M30 housing, threaded barrel
- Nickel-plated brass
- Protection class IP65
- Ambient temperature -25...+70 °C
- Diffuse mode
- Max. range 600 cm
- Beam angle 6°
- Switching or Analog output or two switching outputs
- LED indicates the switching status
- Operating range adjusted via potentiometer and programming device
- Devices with synchronizing/enable input
- 3GD version for explosion hazardous areas

## Type code CP40, M18, M18K, M30, Q12, Q30

RUR	70	M18KS	AP8X	H1141	3GD
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RUR	Series	70	Sensing range	M18KS	Design
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**Series**

<b>RU</b>	ultrasonic sensor, diffuse mode
<b>RUC</b>	ultrasonic sensor, programmable synchronizable, multiplex function diffuse mode
<b>RUN</b>	ultrasonic sensor, diffuse mode
<b>RUR</b>	ultrasonic sensor, retroreflective mode

**Sensing range**

**70** max. sensing range in cm

**Design**

<b>CP40</b>	rectangular, plastic 40 x 40 x 160 mm or 40 x 40 x 177.5 mm
<b>EM18</b>	cylinder/thread M18, stainless steel, Ø 18 mm
<b>EM30</b>	cylinder/thread M30 stainless steel, Ø 30 mm
<b>EMT18</b>	cylinder/thread, M18, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>EMT30</b>	cylinder/thread M30, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone), Ø 30 mm
<b>M18</b>	cylinder/thread, M18, metal, CuZn nickel-plated, Ø 18 mm
<b>M18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated Ø 18 mm
<b>M18KS</b>	compact design, side emission, cylinder/thread M18, metal, CuZn, nickel-plated, Ø 18 mm
<b>M30</b>	cylinder/thread M30, metal CuZn, nickel-plated, Ø 30 mm
<b>M3047</b>	cylinder/thread M30, metal CuZn, nickel-plated sonic transducer Ø 47 mm
<b>M3065</b>	cylinder/thread M30, metal CuZn nickel-plated sonic transducer Ø 65 mm, Ø 18 mm
<b>MT18</b>	cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), Ø 18 mm
<b>MT18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>MT3047</b>	cylinder/thread M30, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), ultrasonic transducer Ø 47 mm
<b>Q12</b>	compact, rectangular plastic 31 x 12 x 20 mm
<b>Q30</b>	compact, rectangular plastic, 65 x 30 x 88 mm

AP8X	Electrical version	H1141	Electrical connection
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**Electrical version**

<b>A</b>	NO
<b>2A</b>	2 x NO
<b>F</b>	frequency output
<b>I</b>	analog output 0...20 mA or 4...20 mA
<b>L</b>	analog
<b>N</b>	NPN
<b>P</b>	PNP
<b>U</b>	analog output 0...10V
<b>X</b>	LED display
<b>X2</b>	2 x LEDs
<b>6</b>	10...30 VDC input current
<b>8</b>	18...35 VDC input current

**Electrical connection**

<b>H1141</b>	connector, M12 x 1, 4-pole
<b>H1151</b>	connector, M12 x 1, 5-pole
<b>V1141</b>	connector, M8 x 1, 4-pole
<b>blank</b>	cable connection, 2 m, with CP40 = terminal chamber

3GD	Approval
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**Approval**

<b>3GD</b>	ATEX declaration of conformity 3163M, EX II 3 G EEx nA II T6 X / II 3 D IP65 T 60 °C X (only valid for RUC...M30 family)
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## M30 – Switching output



### General data

<b>Operating voltage</b>	20...30 VDC
<b>Output</b>	—, PNP
<b>Protection class</b>	IP65
<b>Electrical connection</b>	connector, M12 x 1

<b>Ambient temperature</b>	-25...+70 °C
<b>Converter ring material</b>	plastic
<b>Converter ring quality</b>	PBT

### Types and data – selection table

Type	Switching frequency	Dimensions	Housing material	Range	Approach speed	Ultrasound frequency	w	d
RU30-M30-AP8X-H1141	≤ 8 Hz	Ø30 x 141.5 mm	metal, CuZn, nickel-plated	6...30 cm	4 m/s	400 kHz	w001	d577
RU30-EM30-AP8X-H1141	≤ 8 Hz	Ø30 x 141.5 mm	stainless steel, V2A (1.4305)	6...30 cm	4 m/s	400 kHz	w143	d577
RU30-EMT30-AP8X-H1141	≤ 8 Hz	Ø30 x 141.5 mm	stainless steel, V2A (1.4305)	6...30 cm	4 m/s	400 kHz	w143	d577
RU100-M30-AP8X-H1141	≤ 4 Hz	Ø30 x 141.5 mm	metal, CuZn, nickel-plated	20...130 cm	10 m/s	200 kHz	w001	d577
RU100-EM30-AP8X-H1141	≤ 4 Hz	Ø30 x 141.5 mm	stainless steel, V2A (1.4305)	20...130 cm	10 m/s	200 kHz	w143	d577
RUC30-M30-AP8X-H1141	≤ 8 Hz	Ø30 x 141.5 mm	metal, CuZn, nickel-plated	6...30 cm	4 m/s	400 kHz	w081	d577
RUC130-M30-AP8X-H1141	≤ 4 Hz	Ø30 x 141.5 mm	metal, CuZn, nickel-plated	20...130 cm	10 m/s	200 kHz	w081	d577
RUC300-M3047-AP8X-H1141	≤ 2 Hz	Ø30 x 160.5 mm	metal, CuZn, nickel-plated	40...300 cm	16 m/s	120 kHz	w081	d578
RUC600-M3065-AP8X-H1141	≤ 1 Hz	Ø65 x 163.5 mm	metal, CuZn, nickel-plated	60...600 cm	18 m/s	80 kHz	w081	d579

## M30 – Two switching outputs



### General data

<b>Operating voltage</b>	20...30 VDC
<b>Output</b>	2x —, PNP
<b>Protection class</b>	IP65
<b>Housing material</b>	metal, CuZn, nickel-plated

<b>Electrical connection</b>	connector, M12 x 1
<b>Ambient temperature</b>	-25...+70 °C
<b>Converter ring material</b>	plastic
<b>Converter ring quality</b>	PBT



Types and data – selection table

Type	Switching frequency	Dimensions	Range	Approach speed	Ultrasound frequency	w	d
RUC30-M30-2AP8X-H1151	≤ 8 Hz	Ø30 x 141.5 mm	6...30 cm	4 m/s	400 kHz	w144	d577
RUC130-M30-2AP8X-H1151	≤ 4 Hz	Ø30 x 141.5 mm	20...130 cm	10 m/s	200 kHz	w144	d577
RUC300-M3047-2AP8X-H1151	≤ 2 Hz	Ø30 x 160.5 mm	40...300 cm	16 m/s	120 kHz	w144	d578
RUC600-M3065-2AP8X-H1151	≤ 1 Hz	Ø65 x 163.5 mm	60...600 cm	18 m/s	80 kHz	w144	d579

## M30 – Switching and Analog output



**General data**

<b>Operating voltage</b>	20...30 VDC	<b>Ambient temperature</b>	-25...+70 °C
<b>Output</b>	—, PNP/analog output	<b>Analog output</b>	4...20 mA
<b>Protection class</b>	IP65	<b>Converter ring material</b>	plastic
<b>Housing material</b>	metal, CuZn, nickel-plated	<b>Converter ring quality</b>	PBT
<b>Electrical connection</b>	connector, M12 x 1		

Types and data – selection table

Type	Switching frequency	Dimensions	Range	Approach speed	Ultrasound frequency	w	d
RUC30-M30-LIAP8X-H1151	≤ 8 Hz	Ø30 x 131 mm	6...30 cm	4 m/s	400 kHz	w145	d577
RUC130-M30-LIAP8X-H1151	≤ 4 Hz	Ø30 x 131 mm	20...130 cm	10 m/s	200 kHz	w145	d577
RUC300-M3047-LIAP8X-H1151	≤ 2 Hz	Ø47.5 x 150 mm	40...300 cm	16 m/s	120 kHz	w145	d578
RUC600-M3065-LIAP8X-H1151	≤ 1 Hz	Ø65 x 163.5 mm	60...600 cm	18 m/s	80 kHz	w145	d579

## M30 – Switching and Analog output – Ex-area



### General data

<b>Operating voltage</b>	20...30 VDC	<b>Ambient temperature</b>	-25...+70 °C
<b>Output</b>	—, PNP/analog output	<b>Analog output</b>	4...20 mA
<b>Protection class</b>	IP65	<b>Converter ring material</b>	plastic
<b>Housing material</b>	metal, CuZn, nickel-plated	<b>Converter ring quality</b>	PBT
<b>Electrical connection</b>	connector, M12 x 1		

ATEX category II 3 G, Ex zone 2 – ATEX category II 3 D, Ex zone 22

### Types and data – selection table

Type	Switching frequency	Dimensions	Range	Approach speed	Ultrasound frequency	w	d
RUC130-M30-LIAP8X-H1151/3GD	≤ 4 Hz	Ø30 x 131 mm	20...130 cm	10 m/s	200 kHz	w145	d577
RUC300-M3047-LIAP8X-H1151/3GD	≤ 2 Hz	Ø47.5 x 150 mm	40...300 cm	16 m/s	120 kHz	w145	d578

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 806 ff

## Compact rectangular design Q30

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The Q30 detect small objects with pin-point accuracy. They are available as diffuse mode sensors with sensing ranges of 30 cm respectively 100 cm, optionally with switching or Analog output.

In order to avoid crosstalk, up to six devices can be synchronized simply by connecting the power supply. Alternate operation of several sensors is also possible via external control or synchronizing/enable input.

### Features

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- Compact rectangular design  
88 x 65 x 30 mm
- plastic housing
- Protection class IP65
- Ambient temperature 0...+55 °C
- Diffuse mode
- Max. range 100 cm
- Beam angle 6°
- Analog or switching output
- LEDs indicate switching status/object detected
- Easy adjustment of operating range via potentiometer
- Synchronizing/enable input

## Type code CP40, M18, M18K, M30, Q12, Q30

RUR	70	M18KS	AP8X	H1141	3GD
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RUR	Series	70	Sensing range	M18KS	Design
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**Series**

<b>RU</b>	ultrasonic sensor, diffuse mode
<b>RUC</b>	ultrasonic sensor, programmable synchronizable, multiplex function diffuse mode
<b>RUN</b>	ultrasonic sensor, diffuse mode
<b>RUR</b>	ultrasonic sensor, retroreflective mode

**Sensing range**

**70** max. sensing range in cm

**Design**

<b>CP40</b>	rectangular, plastic 40 x 40 x 160 mm or 40 x 40 x 177.5 mm
<b>EM18</b>	cylinder/thread M18, stainless steel, Ø 18 mm
<b>EM30</b>	cylinder/thread M30 stainless steel, Ø 30 mm
<b>EMT18</b>	cylinder/thread, M18, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>EMT30</b>	cylinder/thread M30, stainless steel, teflon-coated ultrasonic transducer surface (containing silicone), Ø 30 mm
<b>M18</b>	cylinder/thread, M18, metal, CuZn nickel-plated, Ø 18 mm
<b>M18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated Ø 18 mm
<b>M18KS</b>	compact design, side emission, cylinder/thread M18, metal, CuZn, nickel-plated, Ø 18 mm
<b>M30</b>	cylinder/thread M30, metal CuZn, nickel-plated, Ø 30 mm
<b>M3047</b>	cylinder/thread M30, metal CuZn, nickel-plated sonic transducer Ø 47 mm
<b>M3065</b>	cylinder/thread M30, metal CuZn nickel-plated sonic transducer Ø 65 mm, Ø 18 mm
<b>MT18</b>	cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), Ø 18 mm
<b>MT18K</b>	compact design, cylinder/thread M18, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone) Ø 18 mm
<b>MT3047</b>	cylinder/thread M30, metal, CuZn, nickel-plated, teflon-coated ultrasonic transducer surface (containing silicone), ultrasonic transducer Ø 47 mm
<b>Q12</b>	compact, rectangular plastic 31 x 12 x 20 mm
<b>Q30</b>	compact, rectangular plastic, 65 x 30 x 88 mm

AP8X	Electrical version	H1141	Electrical connection
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**Electrical version**

<b>A</b>	NO
<b>2A</b>	2 x NO
<b>F</b>	frequency output
<b>I</b>	analog output 0...20 mA or 4...20 mA
<b>L</b>	analog
<b>N</b>	NPN
<b>P</b>	PNP
<b>U</b>	analog output 0...10V
<b>X</b>	LED display
<b>X2</b>	2 x LEDs
<b>6</b>	10...30 VDC input current
<b>8</b>	18...35 VDC input current

**Electrical connection**

<b>H1141</b>	connector, M12 x 1, 4-pole
<b>H1151</b>	connector, M12 x 1, 5-pole
<b>V1141</b>	connector, M8 x 1, 4-pole
<b>blank</b>	cable connection, 2 m, with CP40 = terminal chamber

3GD	Approval
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**Approval**

<b>3GD</b>	ATEX declaration of conformity 3163M, EX II 3 G EEx nA II T6 X / II 3 D IP65 T 60 °C X (only valid for RUC...M30 family)
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## Q30 – Switching output



### General data

<b>Operating voltage</b>	18...35 VDC
<b>Output</b>	—, PNP
<b>Dimensions</b>	65 x 30 x 88 mm
<b>Protection class</b>	IP65
<b>Housing material</b>	plastic, PBT-GF30-V0

<b>Electrical connection</b>	connector, M12 x 1
<b>Ambient temperature</b>	0...+55 °C
<b>Converter ring material</b>	plastic
<b>Converter ring quality</b>	PBT

### Types and data – selection table

Type	Switching frequency	Switching frequency	Range	Approach speed	Ultrasound frequency	w	d
RU30-Q30-AP8X-H1141	≤ 8 Hz	-	6...30 cm	4 m/s	400 kHz	w081	d580
RU100-Q30-AP8X-H1141	≤ 5 Hz	≤ 0.005 kHz	20...100 cm	8 m/s	230 kHz	w081	d580

## Q30 – Analog output



### General data

<b>Operating voltage</b>	18...35 VDC
<b>Display, Object detected Type</b>	LED
<b>Dimensions</b>	65 x 30 x 88 mm
<b>Protection class</b>	IP65
<b>Housing material</b>	plastic, PBT-GF30-V0
<b>Electrical connection</b>	connector, M12 x 1

<b>Ambient temperature</b>	0...+55 °C
<b>Analog output</b>	0...10 V
<b>Load</b>	≥ 1000 Ω
<b>Converter ring material</b>	plastic
<b>Converter ring quality</b>	PBT

### Types and data – selection table

Type	Range	Response time	Approach speed	Ultrasound frequency	w	d
RU30-Q30-LUX-H1141	6...30 cm	70 ms	4 m/s	400 kHz	w146	d580
RU100-Q30-LUX-H1141	20...100 cm	90 ms	8 m/s	230 kHz	w146	d580

**w** Wiring diagrams on page 832 ff

**d** Dimension drawings on page 842 ff

**a** Accessories on page 806 ff

## Compact rectangular design QS18U



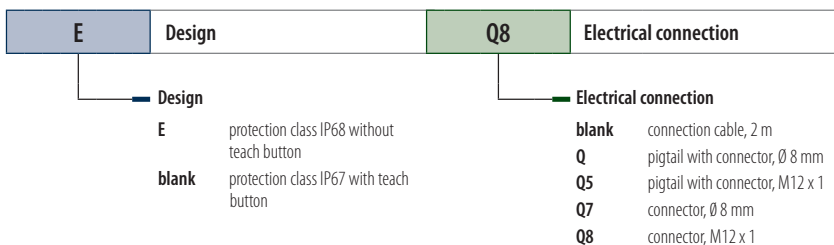
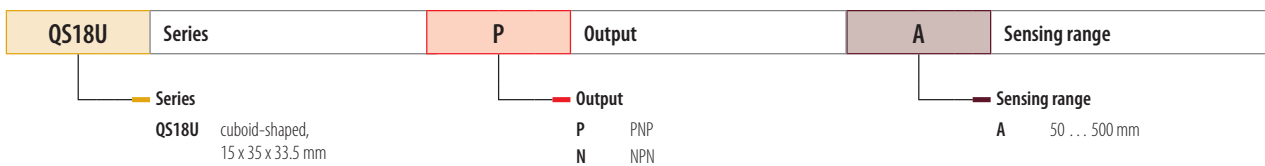
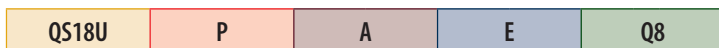
The QS18U are suited for confined spaces. They withstand rough environments thanks to protection rating IP67/IP68.

The sensors fit in almost any space. They are optionally available with M18 thread and can thus replace M18 threaded barrel sensors. Diffuse and retroreflective mode devices offer sensing ranges of 5 cm respectively 50 cm. They are available with PNP or NPN switching output.

### Features

- Very compact rectangular design, 33.5 x 15 x 35 mm
- plastic housing
- Protection classes IP67/IP68
- Ambient temperature -20...+60 °C
- Diffuse mode
- Retroreflective mode (with adjustable switching output)
- Max. sensing range 500 mm
- Switching output
- LEDs indicate power ON and switching status
- Easy teaching, remote or via pushbutton

### Type code QS18U





## QS18U – Switching output




### General data

<b>Operating voltage</b>	12...30 VDC	<b>Ambient temperature</b>	-20...+60 °C
<b>Output</b>	—, PNP	<b>Range</b>	5...50 cm
<b>Switching frequency</b>	≤ 33 Hz	<b>Converter ring material</b>	plastic
<b>Dimensions</b>	33.5 x 15 x 35 mm	<b>Converter ring quality</b>	PBT
<b>Housing material</b>	plastic, ABS	<b>Ultrasound frequency</b>	300 kHz

QS18U...E, IP68 rated, without pushbutton

### Types and data – selection table

Type	Protection class	Electrical connection		
QS18UPA	IP67	cable	w147	d581
QS18UPAQ8	IP67	connector, M12 x 1	w147	d582
QS18UPAE	IP68	cable	w147	d583
QS18UPAEQ8	IP68	connector, M12 x 1	w147	d584

## QT50U



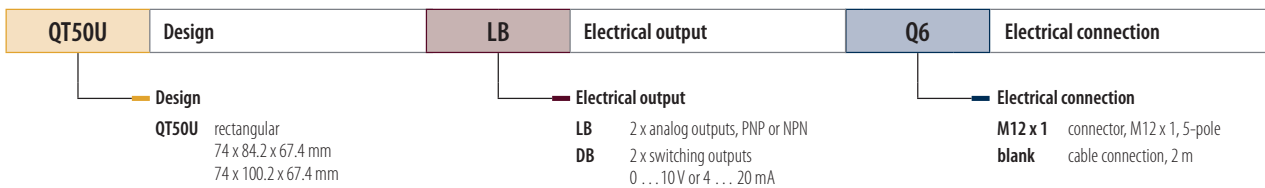
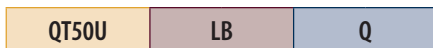
The QT50U are available as diffuse mode sensors with sensing ranges of 20 cm or 800 cm and with switching or Analog output.

Many configurations can be set via DIP switch, allowing the sensors to be mounted in nearly any application. The fully encapsulated device is ideally suited for monitoring filling levels of liquids and solids. Versions with Analog output are best suited for continuous monitoring. Versions with two digital outputs allow limit values for close and distant range to be adjusted separately for each output.

### Features


- Compact rectangular design, 67.4 x 74 x 84.2 mm
- plastic housing
- Protection class IP67
- Ambient temperature -20...+70 °C
- Diffuse mode
- Max. range 800 cm
- Beam angle 12°
- Analog and switching output
- LEDs indicate the signal strength
- Configuration via DIP/rotary switch
- Easy teaching via pushbutton or external cable

### Type code QT50U





## QT50 – Two switching outputs



<b>General data</b>		
<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature Range</b>
<b>Display, Object detected Type</b>	LED	-20...+70 °C
<b>Output</b>	2x  , PNP	<b>Converter ring material</b>
<b>Switching frequency</b>	≤ 5 Hz	plastic
<b>Protection class</b>	IP67	<b>Converter ring quality</b>
<b>Housing material</b>	plastic, ABS	PBT
		<b>Ultrasound frequency</b>
		75 kHz

### Types and data – selection table


Type	Dimensions	Electrical connection		
QT50UDB	74 x 84.2 x 67.4 mm	cable	w148	d585
QT50UDBQ6	74 x 100.2 x 67.4 mm	connector, M12 x 1	w148	d586

## QT50 – Analog output



<b>General data</b>		
<b>Operating voltage</b>	10...30 VDC	<b>Analog output Load</b>
<b>Display, Object detected Type</b>	LED	4...20 mA, 0...10 V
<b>Protection class</b>	IP67	≥ 1000...≤ 500 Ω
<b>Housing material</b>	plastic, ABS	<b>Converter ring material</b>
<b>Ambient temperature Range</b>	-20...+70 °C	plastic
	20...800 cm	<b>Converter ring quality</b>
		PBT
		<b>Ultrasound frequency</b>
		75 kHz

### Types and data – selection table

Type	Dimensions	Electrical connection		
QT50ULB	74 x 84.2 x 67.4 mm	cable	w149	d585
QT50ULBQ6	74 x 100.2 x 67.4 mm	connector, M12 x 1	w149	d586

## Cylindrical design S18U – Threaded barrel



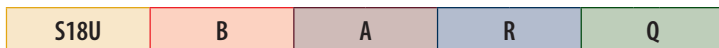
The S18U detect small objects with pin-point accuracy. They withstand rough environments thanks to protection rating IP67.

The sensors come in an 18 mm threaded barrel made of plastic. They are available as diffuse or retroreflective mode devices with sensing ranges between 3 cm to 30 cm and with switching or Analog output.

### Features

- M18, threaded barrel
- plastic housing, straight/angled
- Protection class IP67
- Ambient temperature -20...+60 °C
- Diffuse mode
- Retroreflective sensing mode adjustable (with switching output)
- Max. range 30 cm
- Beam angle 6°
- Analog or switching output
- Easy teaching via pushbutton or external cable

### Type code S18U



Series

S18U cylinder, plastic, thread Ø 18 mm

Output

**B** PNP/NPN transistor output adjustable to retroreflective mode switching range adjustable via teach-in  
**U** 0...10V, measuring range adjustable via teach-in  
**I** 4...20 mA, measuring range adjustable via teach-in

Range

**A** 3...30 cm



Design

**R** housing, angled  
**blank** housing, straight

Electrical connection

**Q** connector, M12 x 1  
**blank** connection cable, 2 m

## S18U – Switching output



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Ambient temperature Range</b>	-20...+60 °C
<b>Display, Object detected Type</b>	LED	<b>Response time</b>	5 ms
<b>Output</b>	—, pnp/npn	<b>Converter ring material</b>	plastic
<b>Switching frequency</b>	≤ 8 Hz	<b>Converter ring quality</b>	PBT
<b>Protection class</b>	IP67	<b>Ultrasound frequency</b>	300 kHz
<b>Housing material</b>	plastic, PBT		

### Types and data – selection table

Type	Dimensions	Electrical connection	w	d
S18UBA	Ø18 x 80.8 mm	cable	w107	d587
S18UBAR	Ø18 x 85.1 mm	cable	w107	d588
S18UBAQ	Ø18 x 90.9 mm	connector, M12 x 1	w107	d589
S18UBARQ	Ø18 x 95.1 mm	connector, M12 x 1	w107	d590

## S18U – Analog output



### General data

<b>Operating voltage</b>	10...30 VDC	<b>Range</b>	3...30 cm
<b>Display, Object detected Type</b>	LED	<b>Response time</b>	3 ms
<b>Protection class</b>	IP67	<b>Converter ring material</b>	plastic
<b>Housing material</b>	plastic, PBT	<b>Converter ring quality</b>	PBT
<b>Ambient temperature</b>	-20...+60 °C	<b>Ultrasound frequency</b>	300 kHz

### Types and data – selection table

Type	Dimensions	Electrical connection	Analog output	Load	w	d
S18UUA	Ø18 x 80.8 mm	cable	0...10 V	≥ 2500 Ω	w077	d587
S18UIA	Ø18 x 80.8 mm	cable	4...20 mA	-	w077	d587
S18UIAR	Ø18 x 85.1 mm	cable	4...20 mA	-	w077	d588
S18UUAR	Ø18 x 85.1 mm	cable	0...10 V	≥ 2500 Ω	w077	d588
S18UIAQ	Ø18 x 90.9 mm	connector, M12 x 1	4...20 mA	-	w077	d589
S18UUAQ	Ø18 x 90.9 mm	connector, M12 x 1	0...10 V	≥ 2500 Ω	w077	d589
S18UIARQ	Ø18 x 95.1 mm	connector, M12 x 1	4...20 mA	-	w077	d590
S18UUARQ	Ø18 x 95.1 mm	connector, M12 x 1	0...10 V	≥ 2500 Ω	w077	d590

w Wiring diagrams on page 832 ff

d Dimension drawings on page 842 ff

a Accessories on page 806 ff

## Cylindrical design T30U – Threaded barrel



The T30U offer many output configurations in a universal housing. They are applied to monitor filling levels in tanks or detect transparent materials.

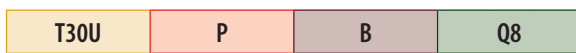
Available are versions with two switching outputs as well as one switching and one Analog output for current or voltage. Thus measurements and switching operations can be implemented simultaneously. Switching and measuring outputs can be programmed the same or different operating ranges.

The sensors are available as diffuse mode devices with max. sensing ranges of 100, 200 or 300 cm.

### Features

- T30U, plastic housing with M30 thread
- Protection class IP67
- Ambient temperature -20...+70 °C
- Diffuse mode
- Max. ranges 100, 200, 300 cm
- Analog and switching output or two switching outputs
- The outputs can either be programmed together or separately with rising or falling Analog output curve.
- LEDs indicate power ON, signal strength and output status
- Easy teaching via pushbuttons or external cable
- Chemical-resistant and teflon-coated versions

### Type code T30U



#### Series

- T30U** cylinder, thread Ø 40 mm  
length 45 mm,  
without temperature compensation
- T30UX** cylinder, thread Ø 40 mm  
length 45 mm,  
with temperature compensation

#### Output

- DP** PNP (2 x)
- UP** PNP, analog output 0...10 V
- IP** PNP, analog output 4...20 mA

#### Range

- A** 15 ... 100 cm
- B** 30 ... 200 cm
- C** 40 ... 300 cm

#### Q8

#### Electrical connection


#### Electrical connection

- Q8** connector, M12 x 1
- blank** connection cable, 2 m

## T30U – Two switching outputs





### General data

<b>Operating voltage</b>	12...24 VDC
<b>Output</b>	2x  , PNP
<b>Dimensions</b>	Ø40 x 45 mm
<b>Protection class</b>	IP67

<b>Housing material</b>	plastic, Polyester
<b>Ambient temperature</b>	-20...+70 °C
<b>Converter ring material</b>	plastic
<b>Converter ring quality</b>	Epoxy-resin


### Types and data – selection table

Type	Switching frequency	Electrical connection	Range	Ultrasound frequency		
T30UDPA	≤ 20 Hz	cable	15...100 cm	230 kHz	w148	d591
T30UDPB	≤ 10 Hz	cable	30...200 cm	120 kHz	w148	d591
T30UDPAQ	≤ 20 Hz	connector, M12 x 1	15...100 cm	230 kHz	w148	d592
T30UDPBQ	≤ 10 Hz	connector, M12 x 1	30...200 cm	120 kHz	w148	d592

## T30UX – Switching output – Temperature compensation





### General data

<b>Operating voltage</b>	10...30 VDC
<b>Display, Object detected'</b>	LED
<b>Type</b>	
<b>Output</b>	 , PNP
<b>Dimensions</b>	Ø40 x 45 mm
<b>Protection class</b>	IP67

<b>Housing material</b>	plastic, Polyester
<b>Ambient temperature</b>	-40...+70 °C
<b>Converter ring material</b>	plastic
<b>Converter ring quality</b>	PBT

### Types and data – selection table

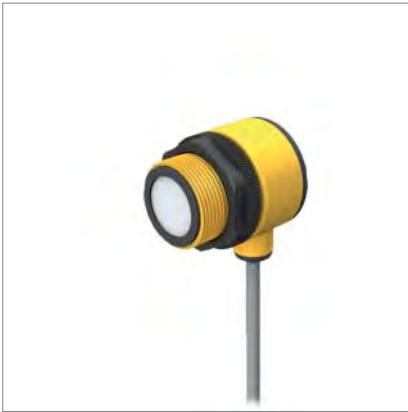
Type	Switching frequency	Electrical connection	Range	Response time	Ultrasound frequency		
T30UXDA	≤ 10 Hz	cable	10...100 cm	45 ms	224 kHz	w081	d591
T30UXDB	≤ 5 Hz	cable	20...200 cm	92 ms	174 kHz	w081	d591
T30UXDC	≤ 3 Hz	cable	30...300 cm	135 ms	114 kHz	w081	d591
T30UXDAQ8	≤ 10 Hz	connector, M12 x 1	10...100 cm	45 ms	224 kHz	w081	d592
T30UXDBQ8	≤ 5 Hz	connector, M12 x 1	20...200 cm	92 ms	174 kHz	w081	d592
T30UXDCQ8	≤ 3 Hz	connector, M12 x 1	30...300 cm	135 ms	114 kHz	w081	d592

 Wiring diagrams on page 832 ff

 Dimension drawings on page 842 ff

 Accessories on page 806 ff

## T30U – Switching and Analog output



<b>General data</b>			
<b>Operating voltage</b>	15...24 VDC	<b>Housing material</b>	plastic, Polyester
<b>Display, Object detected'</b>	LED	<b>Ambient temperature</b>	-20...+70 °C
<b>Type</b>			
<b>Output</b>	—, PNP/analog output	<b>Converter ring material</b>	plastic
<b>Dimensions</b>	Ø40 x 45 mm	<b>Converter ring quality</b>	Epoxy-resin
<b>Protection class</b>	IP67		

### Types and data – selection table

Type	Switching frequency	Electrical connection	Range	Analog output	Load	Ultrasound frequency	w	d
T30UIPA	≤ 20 Hz	cable	15...100 cm	4...20 mA	-	230 kHz	w150	d591
T30UIPB	≤ 10 Hz	cable	30...200 cm	4...20 mA	-	120 kHz	w150	d591
T30UUPA	≤ 20 Hz	cable	15...100 cm	0...10 V	≥ 1000 Ω	230 kHz	w150	d591
T30UUPB	≤ 10 Hz	cable	30...200 cm	0...10 V	≥ 1000 Ω	120 kHz	w150	d591
T30UIPAQ	≤ 20 Hz	connector, M12 x 1	15...100 cm	4...20 mA	-	230 kHz	w150	d592
T30UIPBQ	≤ 10 Hz	connector, M12 x 1	30...200 cm	4...20 mA	-	120 kHz	w150	d592
T30UUPBQ	≤ 10 Hz	connector, M12 x 1	30...200 cm	0...10 V	≥ 1000 Ω	120 kHz	w150	d592
T30UUPAQ	≤ 20 Hz	connector, M12 x 1	15...100 cm	0...10 V	≥ 1000 Ω	230 kHz	w150	d592

## T30UX – Analog output – Temperature compensation



<b>General data</b>			
<b>Operating voltage</b>	10...30 VDC	<b>Housing material</b>	plastic, Polyester
<b>Display, Object detected'</b>	LED	<b>Ambient temperature</b>	-40...+70 °C
<b>Type</b>			
<b>Dimensions</b>	Ø40 x 45 mm	<b>Converter ring material</b>	plastic
<b>Protection class</b>	IP67	<b>Converter ring quality</b>	PBT

### Types and data – selection table

Type	Electrical connection	Range	Analog output	Load	Response time	Ultrasound frequency	w	d
T30UXUC	cable	30...300 cm	0...10 V	≥ 2500 Ω	135 ms	114 kHz	w146	d591
T30UXUB	cable	20...200 cm	0...10 V	≥ 2500 Ω	92 ms	174 kHz	w146	d591
T30UXIC	cable	30...300 cm	4...20 mA	-	135 ms	114 kHz	w139	d591



Type	Electrical connection	Range	Analog output	Load	Response time	Ultrasound frequency	w	d
T30UXUA	cable	10...100 cm	0...10 V	≥ 2500 Ω	45 ms	224 kHz	w146	d591
T30UXIB	cable	20...200 cm	4...20 mA	-	92 ms	174 kHz	w139	d591
T30UXIA	cable	10...100 cm	4...20 mA	-	45 ms	224 kHz	w139	d591
T30UXUAQ8	connector, M12 x 1	10...100 cm	0...10 V	≥ 2500 Ω	45 ms	224 kHz	w146	d592
T30UXUCQ8	connector, M12 x 1	30...300 cm	0...10 V	≥ 2500 Ω	135 ms	114 kHz	w146	d592
T30UXICQ8	connector, M12 x 1	30...300 cm	4...20 mA	-	135 ms	114 kHz	w139	d592
T30UXIAQ8	connector, M12 x 1	10...100 cm	4...20 mA	-	45 ms	224 kHz	w139	d592
T30UXUBQ8	connector, M12 x 1	20...200 cm	0...10 V	≥ 2500 Ω	92 ms	174 kHz	w146	d592
T30UXIBQ8	connector, M12 x 1	20...200 cm	4...20 mA	-	92 ms	174 kHz	w139	d592



# At a glance

## Connecting and Mounting accessories



### Connection technology

TURCK connectors fulfill many different requirements of the automation industry. The standard and universally applicable product series help to minimize installation efforts and storage space.

M8/M12 x 1 female or male outputs are available, straight and angled, 3 and 4-pole. The M12 is also available as 5-pole version. The entire product family is IP67 rated.



### Mounting accessories

TURCK offers the appropriate accessories for quick mounting, optimal operation and protection of the sensors. Accessories for:

- Proximity sensors
- Dual sensors for rotary actuators
- Magnetic field sensors

- Pressure sensors
- Temperature sensors
- Flow sensors
- Ultrasonic sensors

More accessories for photoelectric and inspection sensors are listed at the end.

## Plug connections

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The product range features flit plugs with injection-moulded cables, connection cables and field attachable plugs. You find a short overview of the standard flit plugs with stripped cable end further below in this chapter.

Please visit our website for more details on our entire product range.

### Automation-Line plug connections

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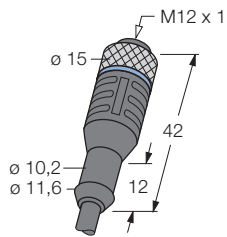
- Trailing capability
- Free from halogen, silicone and PVC
- UL approved
- Resistant to weld splatter, chemicals and oils
- Resistant to microbes and hydrolysis
- Flame-retardant

### FB+ plug connections

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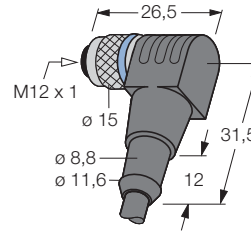
- IP68/IP69K rated
- Resistant to cleaning agents
- Stainless steel coupling nut

## Plug connections



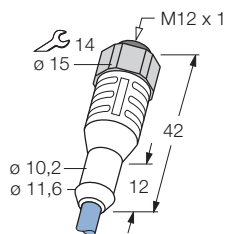
**Female**  
**M12 x 1 straight**  
**Cable length 2 m**

3-pole AL-WAK3-2/S370  
4-pole AL-WAK4-2/S370  
5-pole AL-WAK4.5-2/S370



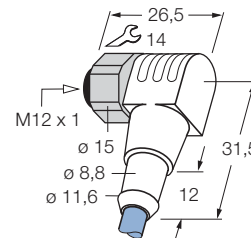
**Female**  
**M12 x 1 angled**  
**Cable length 2 m,**  
**Food industry**

3-pole AL-WWAK3-2/S370  
4-pole AL-WWAK4-2/S370  
5-pole AL-WWAK4.5-2/S370



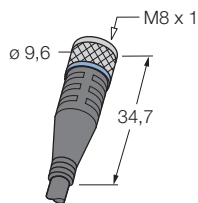
**Female**  
**M12 x 1 straight**  
**Cable length 2 m**  
**Food industry**

4-pole FB-WAK4-2/S2300



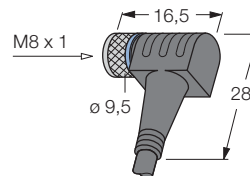
**Female**  
**M12 x 1 angled**  
**Cable length 2 m,**  
**Food industry**

4-pole FB-WWAK4-2/S2300



**Female**  
**M8 x 1 straight**  
**Cable length 2 m**

3-pole AL-SKP3-2/S370  
4-pole AL-SKP4-2/S370



**Female**  
**M8 x 1 angled**  
**Cable length 2 m**

3-pole AL-SWKP3-2/S370  
4-pole AL-SWKP4-2/S370

For other cable lengths see [www.turck.com](http://www.turck.com)

## Accessories for proximity sensors



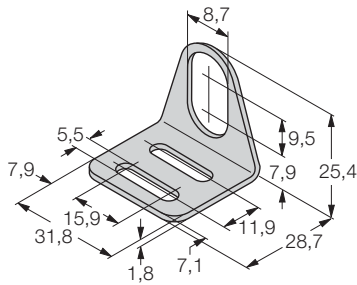
Our scope of delivery comprises accessories for operating, mounting and protection of proximity sensors. We offer function supporting accessories and actuating elements, accessories for easy and safe mounting as well as protective aids to hold up mechanical damage.

### Features

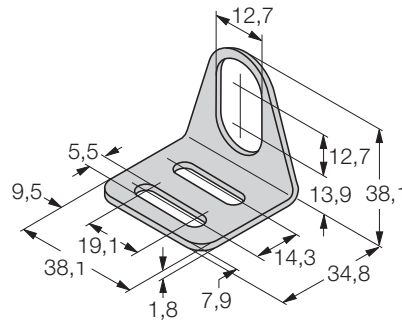
- Protective housing and mounting rails for CP40 sensors
- Fixing clamps for smooth and threaded barrel sensors
- Teflon caps for M12, M18 and M30 threads protect against weld splatter
- Test box to check the functionality of sensors
- Universal signal transducer for sensors with M12 connector
- Brackets provide highest mounting flexibility

## Mounting brackets

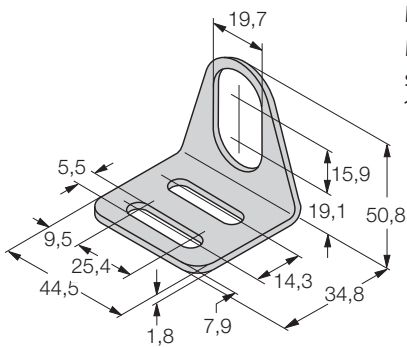
**MW-08**  
Mounting bracket;  
stainless steel A2  
1.4301 (AISI 304)



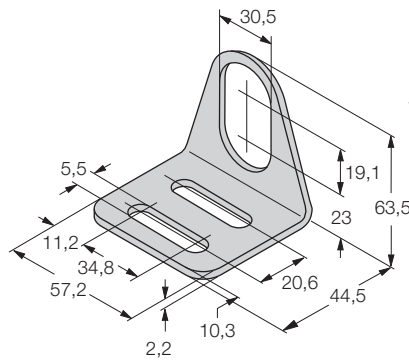
**MW-12**  
Mounting bracket;  
stainless steel A2  
1.4301 (AISI 304)



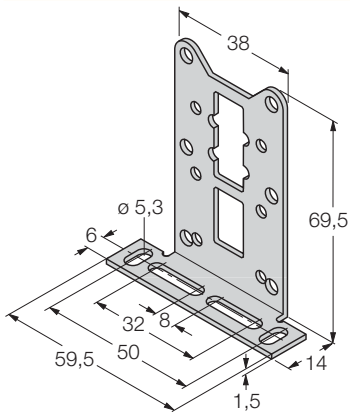
**MW-18**  
Mounting bracket;  
stainless steel A2  
1.4301 (AISI 304)



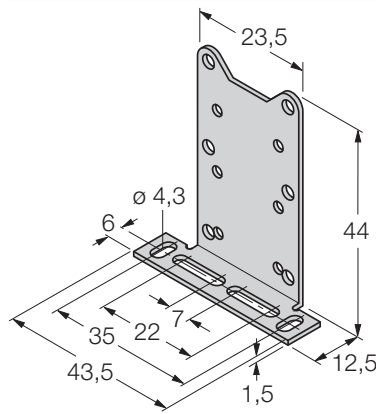
**MW-30**  
Mounting bracket;  
stainless steel A2  
1.4301 (AISI 304)



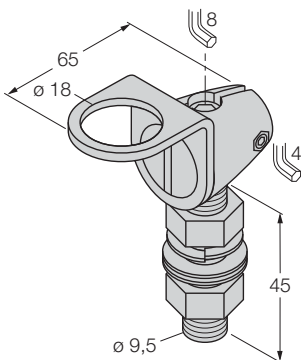
**MW-Q14/Q20**  
Mounting bracket;  
VA 1.4301



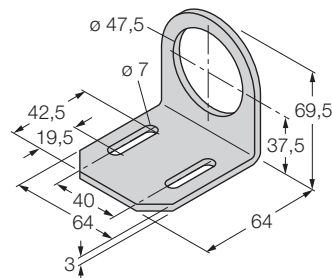
**MW-Q08/Q10**  
Mounting bracket;  
VA 1.4301



**SMB18FA**  
Mounting bracket;  
VA 1.4401

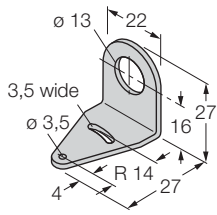


**MW 47**  
Mounting bracket;  
steel plate, zinc-plated



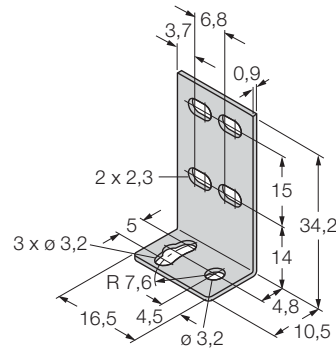
**SMBQS12PD**

Mounting bracket;  
VA 1.4401, for Q12  
series



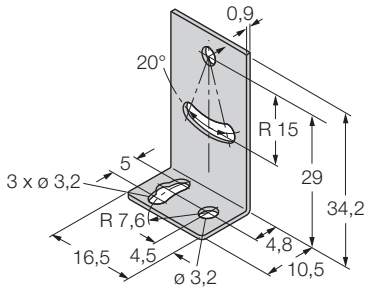
**SMBQ12T**

Mounting bracket;  
VA 1.4401, for photo-  
electric sensor, Q12  
series



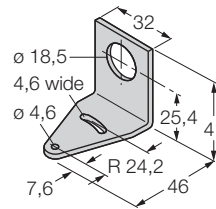
**SMBQ12A**

Mounting bracket;  
VA 1.4401, for photo-  
electric sensor, Q12  
series



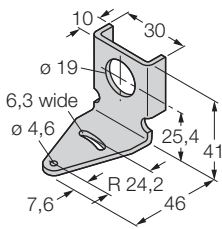
**SMB18A**

Mounting bracket for  
threaded barrels,  
stainless steel



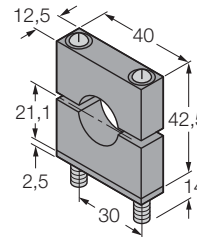
**SMB18Q**

Mounting bracket for  
threaded barrels,  
stainless steel



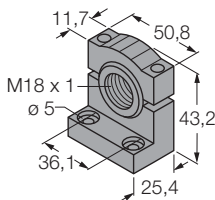
**SMB18C**

Mounting bracket,  
PBT black; 2 screws  
M5 x 0.8



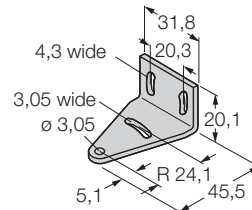
**SMB18SF**

Mounting bracket,  
PBT black



**SMB312S**

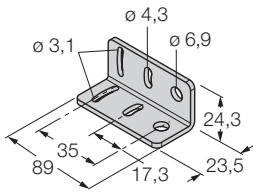
Mounting bracket for  
threaded barrels,  
stainless steel





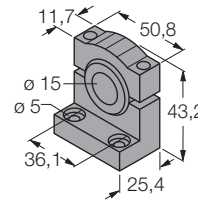
**SMB312B**

Mounting bracket for threaded barrels, stainless steel



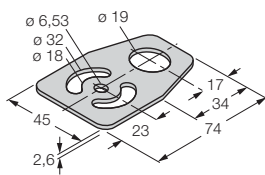
**SMB1815SF**

Mounting bracket, PBT black



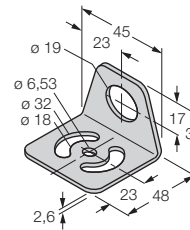
**SMBAMS18P**

Backplane, stainless steel



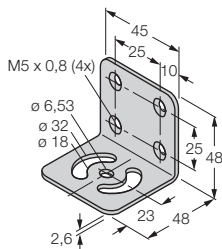
**SMBAMS18RA**

Mounting bracket, stainless steel



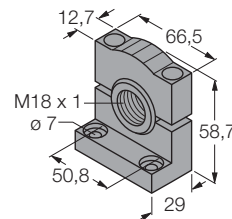
**SMBAMSBRA**

Mounting bracket, stainless steel



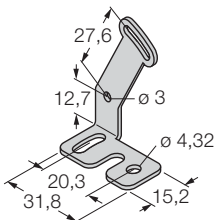
**SMB3018SC**

Mounting bracket, PBT black



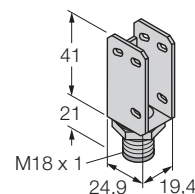
**SMBQS18AF**

Mounting bracket, stainless steel, for QS18AF series



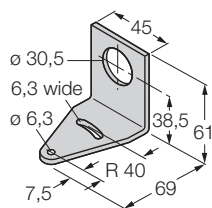
**SMBQS18A**

Mounting bracket, stainless steel, for QS18 series



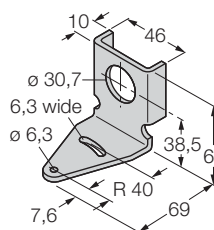
**SMB30A**

Mounting bracket for threaded barrels, stainless steel



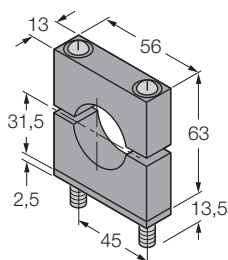
**SMB30Q**

Mounting bracket for threaded barrels, stainless steel



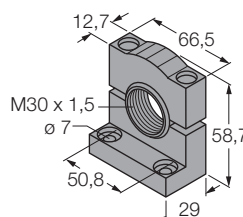
**SMB30C**

Mounting bracket, PBT black; 2 screws M5 x 0.8



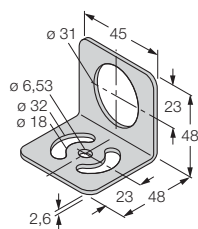
**SMB30SC**

Mounting bracket, PBT black; 4 screws M5 x 0.8



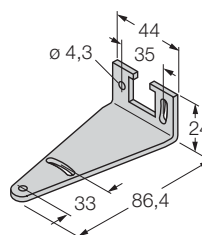
**SMBAMS30RA**

Mounting bracket, stainless steel



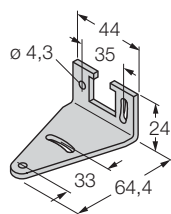
**SMBQS30LT**

Mounting bracket, stainless steel, for QS30 series



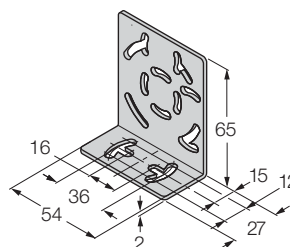
**SMBQS30L**

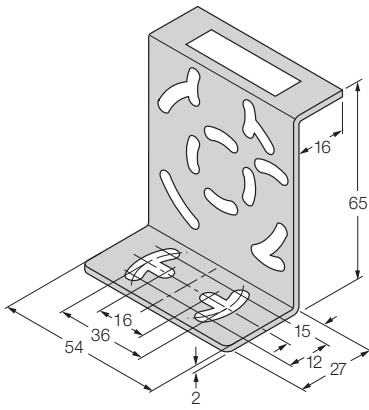
Mounting bracket, stainless steel, for QS30 series



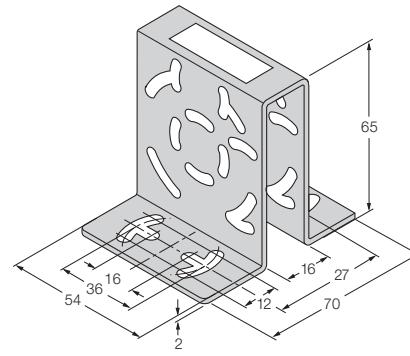
**SMB46L**

Mounting bracket for threaded barrels, stainless steel

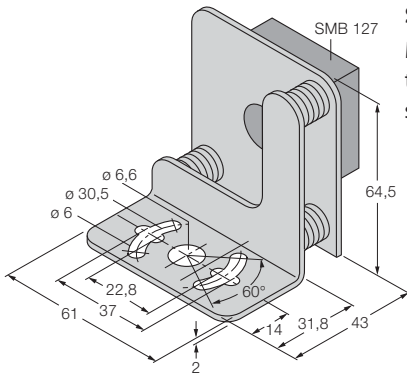




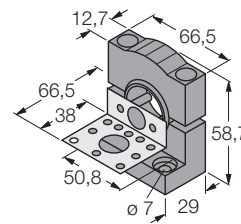
**SMB46S**  
Mounting bracket for  
threaded barrels,  
stainless steel



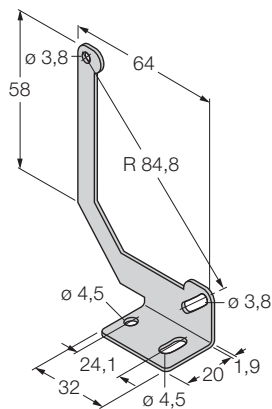
**SMB46U**  
Mounting bracket for  
threaded barrels,  
stainless steel



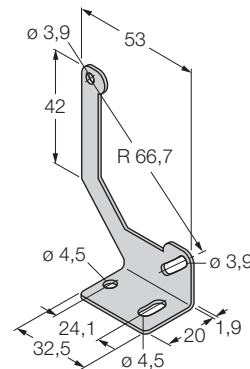
**SMB46A**  
Mounting bracket for  
threaded barrels,  
stainless steel



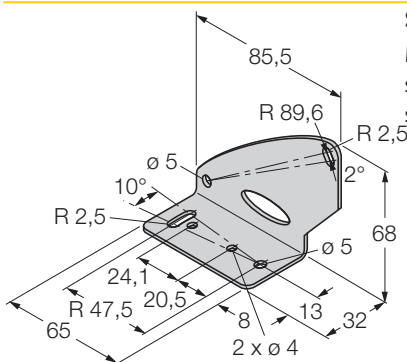
**SMB30SK**  
Mounting bracket,  
PBT black



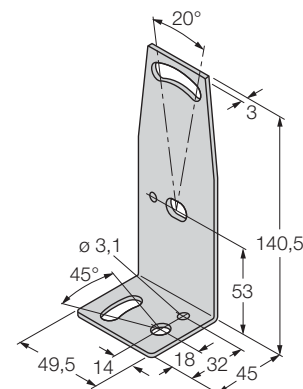
**SMBQ50**  
Mounting bracket,  
stainless steel, for Q50  
series



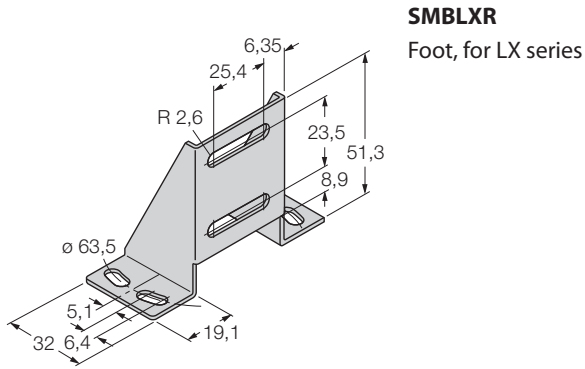
**SMBQ60**  
Mounting bracket,  
stainless steel, for Q60  
series



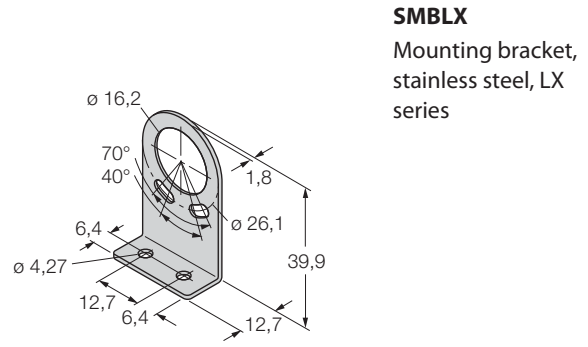
**SMBLT31**  
Mounting bracket,  
stainless steel, for LT3  
series



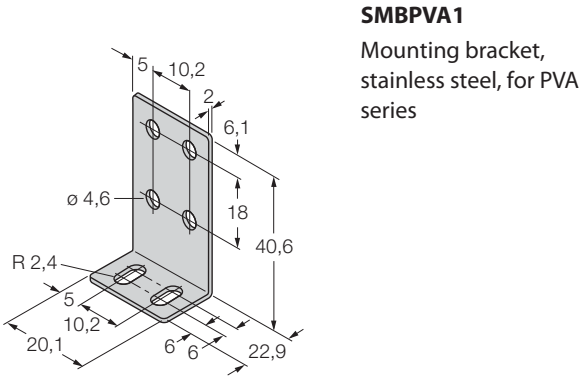
Mounting bracket,  
stainless steel, for LT3  
series



**SMLXR**  
Foot, for LX series

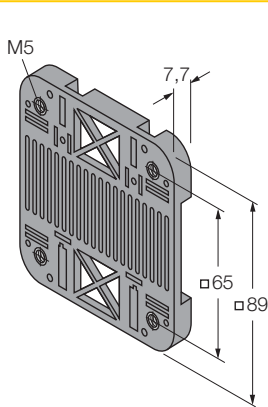


**SMLX**  
Mounting bracket,  
stainless steel, LX  
series

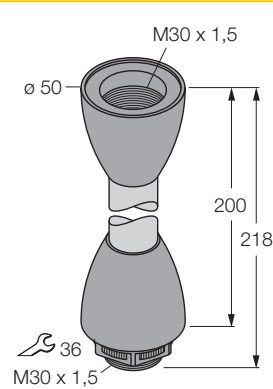


**SMBPVA1**  
Mounting bracket,  
stainless steel, for PVA  
series

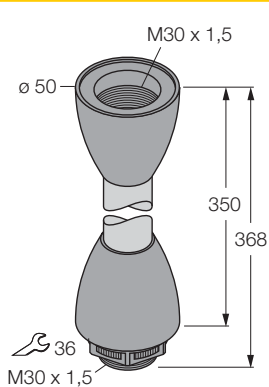
## Mounting aids



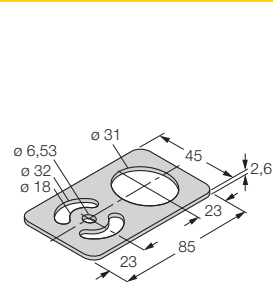
**SMBDX80DIN**  
Backplane for DIN rail,  
suited for CP80, DX80,  
K80, Q80



**SOK-K50L-150SS**  
Foot for signal light  
K50L, stainless-steel  
round bar, adapter  
made of Acetal



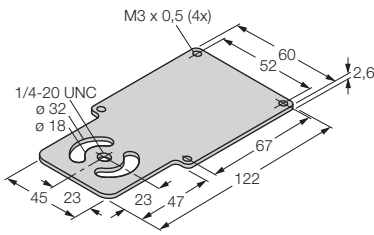
**SOK-K50L-300SS**  
Foot for signal light  
K50L, stainless-steel  
round bar, adapter  
made of Acetal



**SMBAMS30P**  
Backplane, stainless  
steel

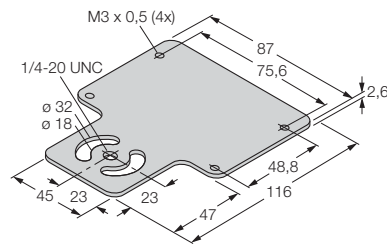
**SMBAMSQ60P**

Backplane, stainless steel, for Q60 series



**SMBAMSLT3P**

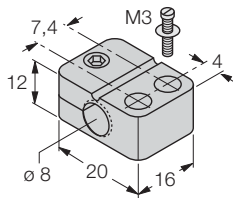
Backplane, stainless steel, for LT3 series



**Fixing clamps**

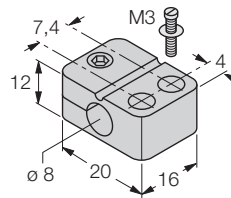
**BST-08B**

Fixing clamp with dead-stop; PA6



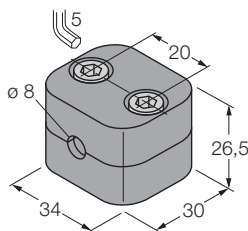
**BST-08N**

Quick-mount fixing clamp without dead-stop; PA6



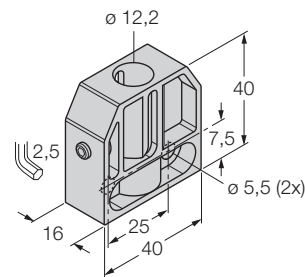
**BSS-08**

Fixing clamp; polypropylene



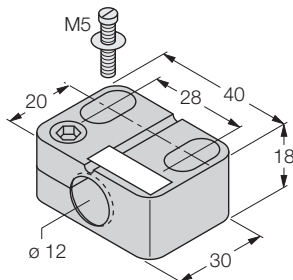
**BS 12**

Fixing clamp; PBT-GF20



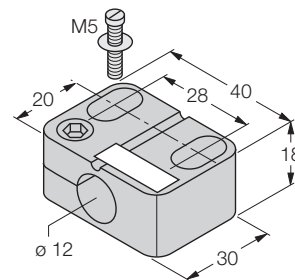
**BST-12B**

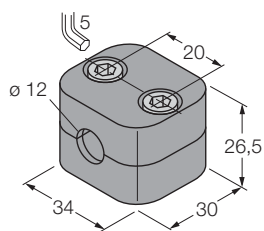
Fixing clamp with dead-stop; PA6



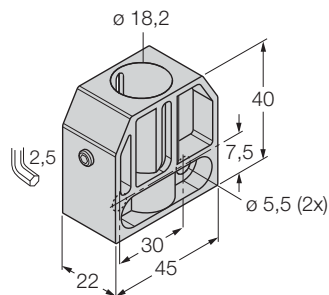
**BST-12N**

Quick-mount fixing clamp without dead-stop; PA6

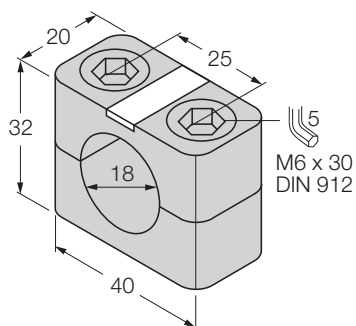




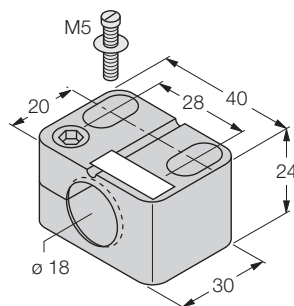
**BSS-12**  
Fixing clamp;  
polypropylene



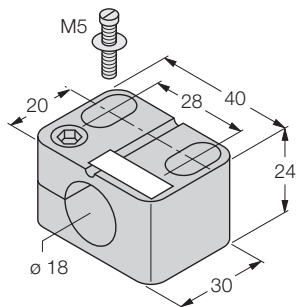
**BS 18**  
Fixing clamp; PA66-GF



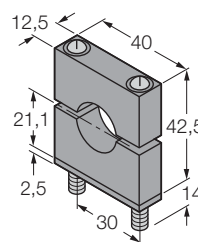
**BSN 18**  
Fixing clamp; PA66-GF



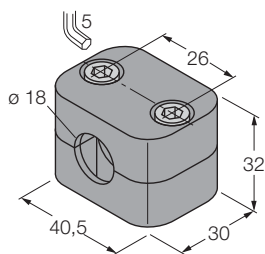
**BST-18B**  
Fixing clamp with  
dead-stop; PA6



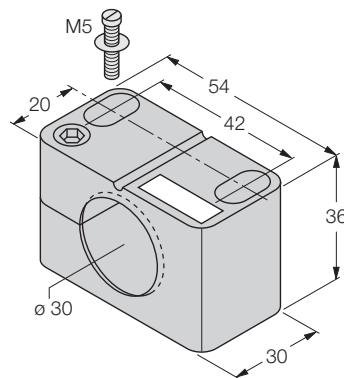
**BST-18N**  
Quick-mount fixing  
clamp without dead-  
stop; PA6



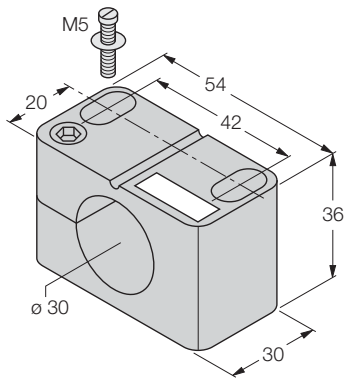
**SMB18C**  
Mounting bracket,  
PBT black; 2 screws  
M5 x 0.8



**BSS-18**  
Fixing clamp;  
polypropylene

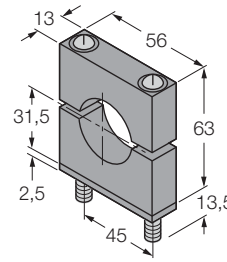


**BST-30B**  
Fixing clamp with  
dead-stop; PA6



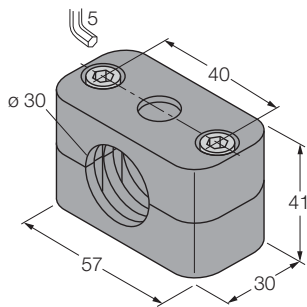
**BST-30N**

Quick-mount fixing clamp without dead-stop; PA6



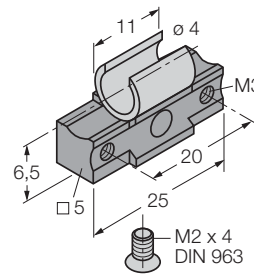
**SMB30C**

Mounting bracket, PBT black; 2 screws M5 x 0.8



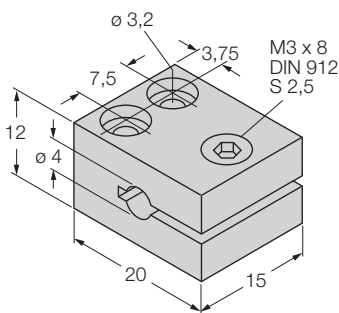
**BSS-30**

Fixing clamp; polypropylene



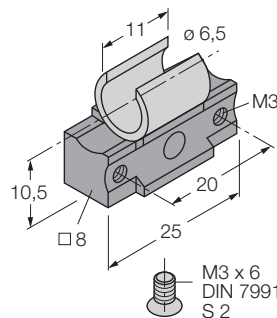
**BS 540**

Fixing clamp; mounting block made (anodized aluminium); clamp sleeve (steel)



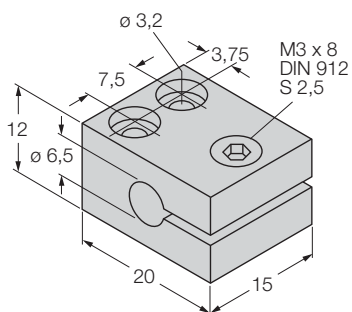
**MBS40**

Fixing clamp; mounting block (anodized aluminium)



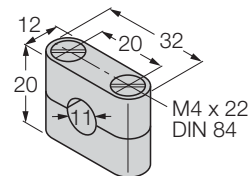
**BS 865**

Fixing clamp; mounting block (anodized aluminium); clamp sleeve (steel)



**MBS65**

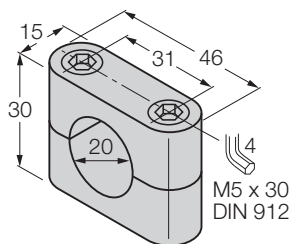
Fixing clamp; mounting block (anodized aluminium)



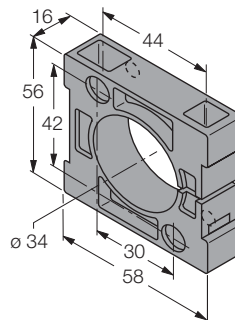
**BS 11**

Fixing clamp; mounting block: PBT

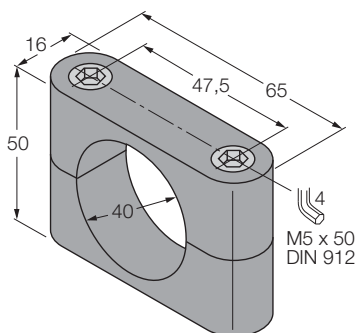
**BS 20**  
Fixing clamp;  
mounting block PBT



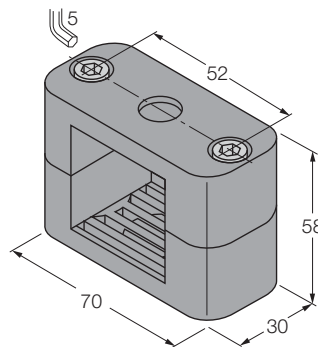
**BS34.1**  
Fixing clamp; mount-  
ing block (PBT-GF20-  
V0); dimensions  
(58 mm x 56 mm x  
16 mm), included in  
delivery (2 M5 screws  
for base mounting)



**BS 40**  
Fixing clamp;  
mounting block PBT

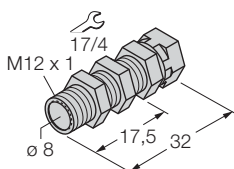


**BSS-CP40**  
Fixing clamp,  
polypropylene

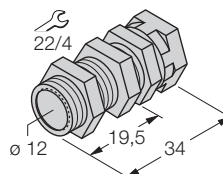


## Quick-mount brackets

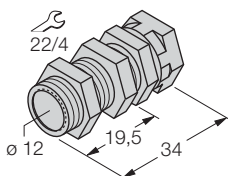
**QM-08**  
Quick-mount bracket  
with dead-stop;  
chrome-plated brass  
male thread M12 x 1.  
Note: The switching  
distance of proxim-  
ity switches may be  
reduced by the use of  
quick-mount brackets.



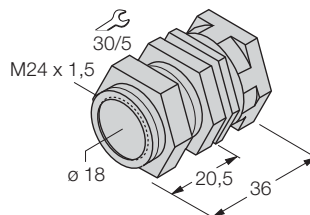
**QM-12**  
Quick-mount bracket  
with dead-stop;  
chrome-plated brass  
male thread M16 x 1.  
Note: The switching  
distance of proxim-  
ity switches may be  
reduced by the use of  
quick-mount brackets.



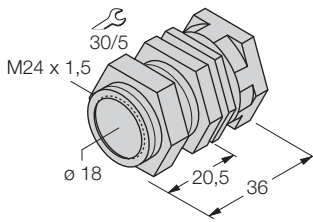
**QMT-12**  
Quick-mount bracket  
with dead-stop;  
teflon-coated brass  
male thread M16 x 1.  
Note: The switching  
distance of proxim-  
ity switches may be  
reduced by the use of  
quick-mount brackets.



**QM-18**  
Quick-mount bracket  
with dead-stop;  
chrome-plated brass  
male thread M24 x 1.5.  
Note: The switching  
distance of proxim-  
ity switches may be  
reduced by the use of  
quick-mount brackets.

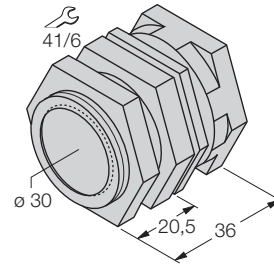






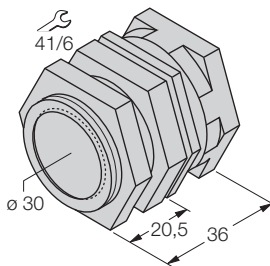
#### QMT-18

Quick-mount bracket with dead-stop; teflon-coated brass male thread M24 x 1.5. Note: The switching distance of proximity switches may be reduced by the use of quick-mount brackets.



#### QM-30

Quick-mount bracket with dead-stop; chrome-plated brass male thread M36 x 1.5. Note: The switching distance of proximity switches may be reduced by the use of quick-mount brackets.



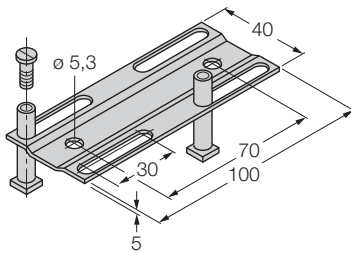
#### QMT-30

Quick-mount bracket with dead-stop; teflon-coated brass male thread M36 x 1.5. Note: The switching distance of proximity switches may be reduced by the use of quick-mount brackets.

## Mounting rail

#### JS 025/037

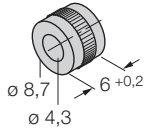
Mounting rail;  
VA 1.4301



## Spacer rollers

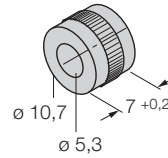
### MH-Q14

Mounted with active face downwards, for Q14



### MH-Q20

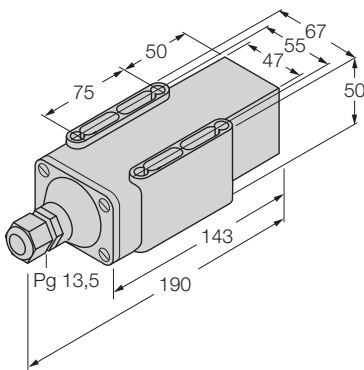
Mounted with active face downwards, for Q20



## Protective housings

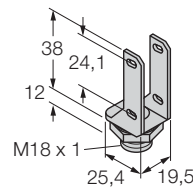
### SG40/2 (ULTEM)

Protective housing; housing/cover material: ULTEM; temperature resistant up to +170 °C, especially UV and ozone resistant; protection class IP 68, 5 m wh.



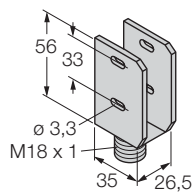
### SMBQS18Y

Protective housing, stainless steel, for QS18 series



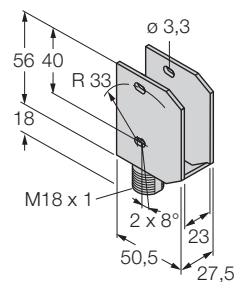
### SMBQS30Y

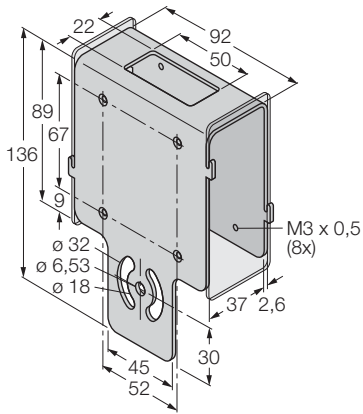
Protective housing, stainless steel, for QS30 series



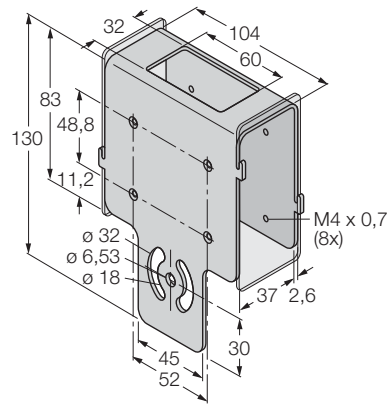
### SMBQS30YL

Protective housing with safety glass panel, stainless steel, for QS30 series

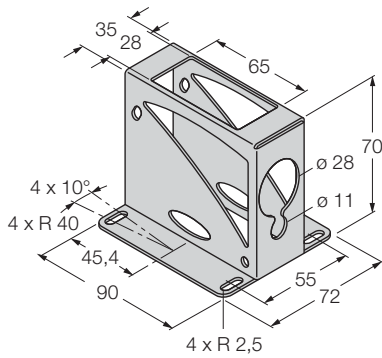




**SMBAMSQ60IP**  
Protective housing  
with safety glass  
panel, stainless steel,  
for Q60

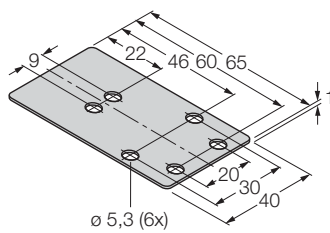


**SMBAMSLT3IP**  
Protective housing  
with safety glass  
panel, for LT3 series

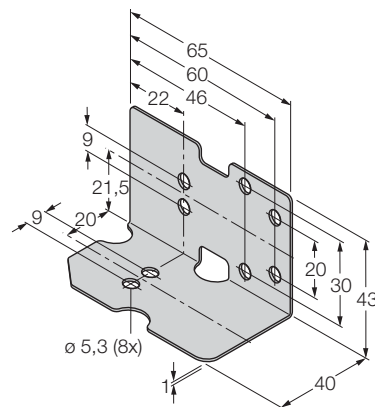


**SMBLT32**  
Protective housing,  
stainless steel, for  
LT3 series

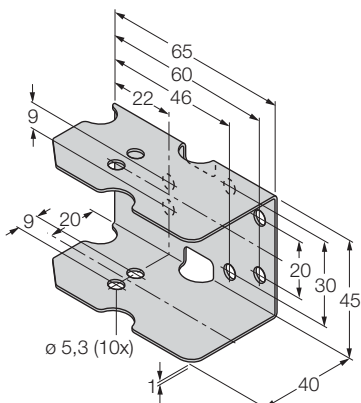
## Protective frames



**MF-CK40-1S**  
Protective frame  
(I-profile)

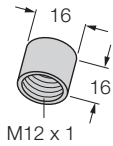


**MF-CK40-2S**  
Protective frame  
(L-profile)

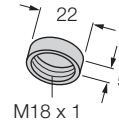


**MF-CK40-3S**  
Protective frame  
(U-profile)

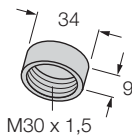
## Protective caps



**SKN/M12**  
Protective teflon cap;  
PTFE; for use in  
welding systems and  
grinding machinery  
exposed to strong  
sparking

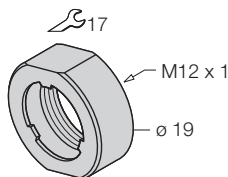


**SKN/M18**  
Protective teflon cap;  
PTFE; for use in  
welding systems and  
grinding machinery  
exposed to strong  
sparking

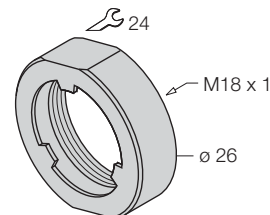


**SKN/M30**  
Protective teflon cap;  
material PTFE; for use  
in welding systems  
and grinding machin-  
ery exposed to strong  
sparking

## Screw caps



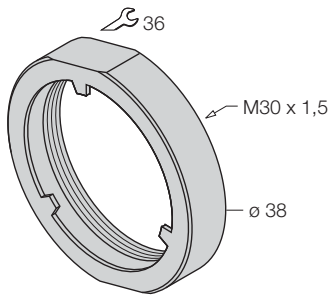
**PN-M12**  
Screw cap;  
stainless steel A2  
1.4305 (AISI 303)



**PN-M18**  
Screw cap; stainless  
steel A2 1.4305 (AISI  
303)

**PN-M30**

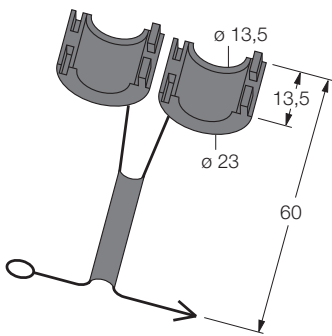
Screw cap; stainless steel A2 1.4305 (AISI 303)



**Safety clips**

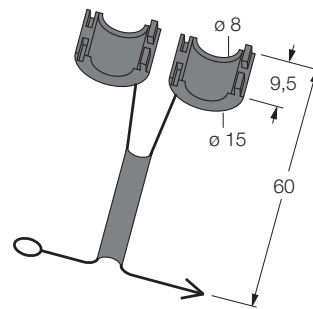
**SC-M12/3GD**

Safety clip for sensors with M12 x 1 plug connection and approval according to ATEX II 3 G or II 3 D



**SC-M8/3GD**

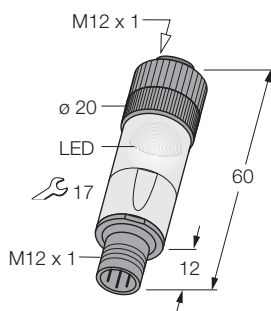
Safety clip for sensors with M8 x 1 plug connection and approval according to ATEX II 3 G or II 3 D



**Adapters**

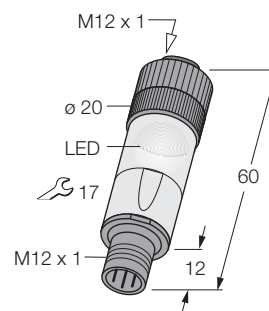
**SPF1-AP6X**

Adapter for rotation speed monitor

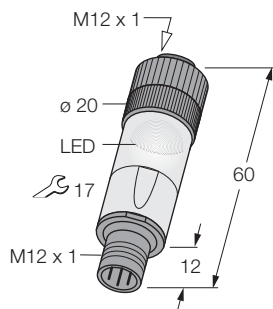


**SPN1-AP6-ARN6X**

Adapter for PNP/NPN switching function

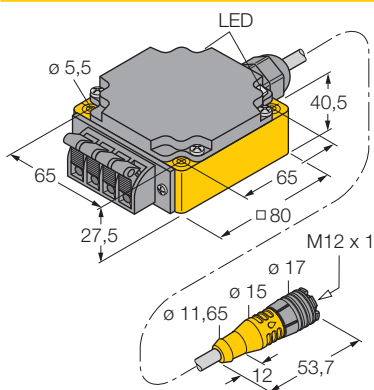


**SPT1-AP6X**  
Adapter with switch-  
ON/OFF delay

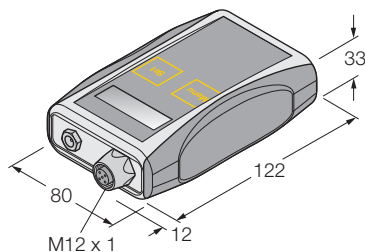


## Test boxes

**TB3-CP80**  
Universal test box for  
PNP, NPN and NAMUR  
sensors



**TB4**  
Universal test and  
configuration box  
for analog and binary  
sensors.





## Accessories for dual sensors

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TURCK offers a comprehensive range of sensors and matching accessories for position feedback. This allows cost-effective planning, commissioning and operation of systems. Different actuating elements can be applied for clockwise and counterclockwise rotating actuators and changing switchpoints.

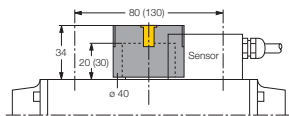
### Features

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- Broad range of actuating elements and accessories
- Highly resistant to chemicals and cleaning agents
- For all standard actuators
- Rugged design

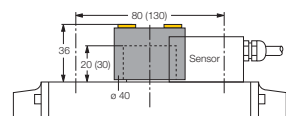


## Dual sensors DSU35



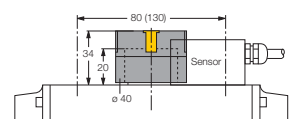
### BTS-DSU35-EB1

Actuation kit (puck); end position damped; hole pattern on flange surface 80 x 30 mm and 130 x 30 mm; interconnecting shaft (shaft extension) height 20 (30) mm / Ø max. 30 mm



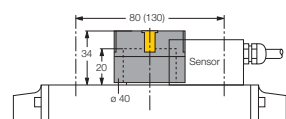
### BTS-DSU35-EU2

Actuation kit (puck); end position damped for clockwise or counter-clockwise drives; hole pattern on flange surface 80 x 30 mm and 130 x 30 mm; interconnecting shaft (shaft extension) height 20 (30) mm / Ø max. 30 mm



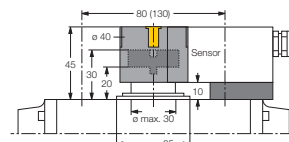
### BTS-DSU35-EBE1

Actuation kit (puck), end position damped and switchpoint adjustable; hole pattern on flange surface 80 x 30 mm (130 x 30 mm); interconnecting shaft (shaft extension) height 20 / Ø max. 30 mm



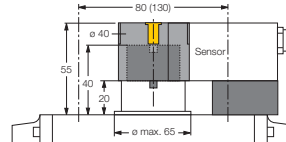
### BTS-DSU35-EBE3

Actuation kit (puck), end position damped; „open“ and „closed“ switch-point infinitely adjustable; hole pattern on flange surface 80 x 30 mm and 130 x 30 mm; interconnecting shaft (shaft extension) height 20 / Ø max. 30 mm



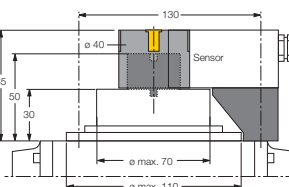
### BTS-DSU35-Z01

Mounting kit for larger rotary actuators: Ø disc and snap ring max. 65 mm; hole pattern on flange surface 30 x 80 mm (30 x 130 mm); interconnecting shaft (shaft extension) height 30 mm / Ø max. 30 mm



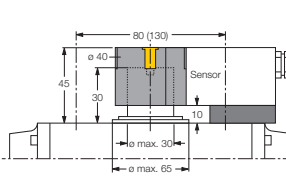
### BTS-DSU35-Z02

Mounting kit for larger rotary actuators: Ø disc and snap ring max. 65 mm; hole pattern on flange surface 30 x 80 mm (30 x 130 mm); interconnecting shaft (shaft extension) height 20 (30) mm / Ø max. 40 mm



### BTS-DSU35-Z03

Mounting kit for larger rotary actuators: Ø disc and snap ring max. 110 mm; hole pattern on flange surface 30 x 130 mm; interconnecting shaft (shaft extension) height 30 mm / Ø max. 70 mm

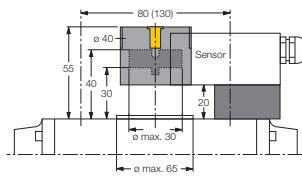


### BTS-DSU35-Z04

Mounting kit for larger rotary actuators: Ø disc and snap ring max. 65 mm; hole pattern on flange surface 30 x 80 mm (30 x 130 mm); interconnecting shaft (shaft extension) height 30 mm / Ø max. 30 mm

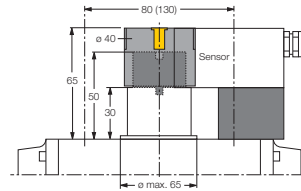
## Accessories

### Dual sensors for rotary actuators



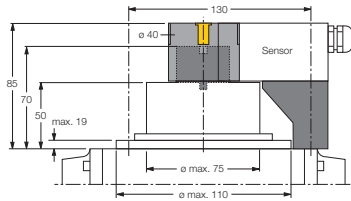
#### BTS-DSU35-Z05

Mounting kit for larger rotary actuators:  $\varnothing$  disc and snap ring max. 65 mm; hole pattern on flange surface 30 x 80 mm (30 x 130 mm); interconnecting shaft (shaft extension) height 30 mm /  $\varnothing$  max. 30 mm



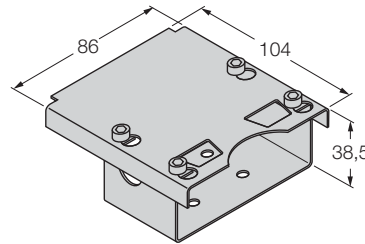
#### BTS-DSU35-Z06

Mounting kit for larger rotary actuators:  $\varnothing$  disc and snap ring max. 65 mm; hole pattern on flange surface 30 x 80 mm (30 x 130 mm); interconnecting shaft (shaft extension) height 30 mm /  $\varnothing$  max. 40 mm



#### BTS-DSU35-Z07

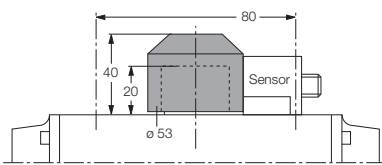
Mounting kit for larger rotary actuators:  $\varnothing$  disc and snap ring max. 110 mm; hole pattern on flange surface 30 x 130 mm; interconnecting shaft (shaft extension) height 30 mm /  $\varnothing$  max. 75 mm



#### SG-DSU35TC

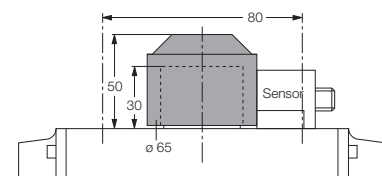
Protective housing for dual sensors, series DSU35, for mechanically protected installation in the explosion hazardous area

## Dual sensors DSC26



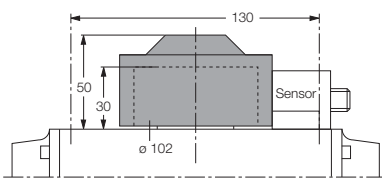
#### BTS-DSC26-EB1

Actuation kit (puck); end position damped; hole pattern on flange surface 80 x 30 mm and 130 x 30 mm; interconnecting shaft (shaft extension) height 20 mm /  $\varnothing$  max. 35 mm



#### BTS-DSC26-EB2

Actuation kit (puck); end position damped; hole pattern on flange surface 80 x 30 mm and 130 x 30 mm; interconnecting shaft (shaft extension) height 30 mm /  $\varnothing$  max. 50 mm



#### BTS-DSC26-EB3

Actuation kit (puck); end position damped; hole pattern on flange surface 30 x 130 mm; interconnecting shaft (shaft extension) height 30 mm /  $\varnothing$  max. 85 mm



## Accessories for magnetic field sensors

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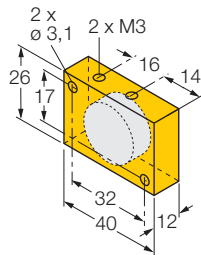
The permanent magnets are used as actuating elements for magnetic inductive proximity sensors or as positioning elements for magnetic inductive linear-position sensors. Despite the small size, they achieve larger switching distances compared to inductive sensors. They fit in narrow spaces and are ideal for difficult sensing conditions, such as hangar doors with poor guiding control.

### Features

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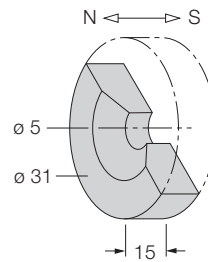
- Strontium ferrite magnets, rugged and resistant to chemicals
- Block-shaped polyamide magnet
- Switching distance up to 90 mm on BIM-(E)M12 sensors
- Switching distance up to 78 mm on BIM-EG08 sensors
- Recommended distance between magnet and WIM-Q25L positioning sensor: 3 to 5 mm

## Actuating magnets



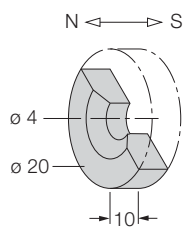
### DM-Q12

Actuating magnet; block-shaped, plastic; sensing range 58 mm on BIM-(E)M12 sensors resp. 49 mm on BIM-EG08 sensors; in combination with Q25: Recommended distance between sensor and magnet: 3 ... 5 mm



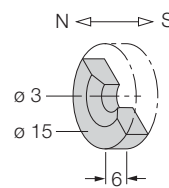
### DMR31-15-5

Actuating magnet, Ø 31 mm (Ø 5 mm), h: 15 mm; sensing range 90 mm on BIM-(E)M12 sensors resp. 78 mm on BIM-EG08 sensors; in combination with Q25L: Recommended distance between sensor and magnet: 3 ... 5 mm



### DMR20-10-4

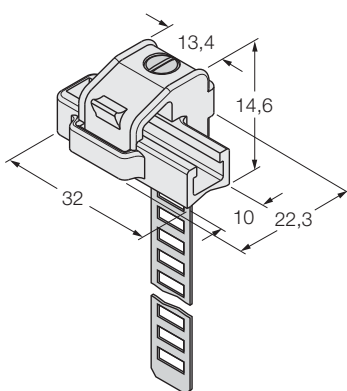
Actuating magnet; Ø 20 mm (Ø 4 mm), height 10 mm; sensing range 59 mm on BIM-(E)M12 sensors resp. 50 mm on BIM-EG08 sensors; in combination with Q25L: Recommended distance between sensor and magnet: 3 ... 4 mm



### DMR15-6-3

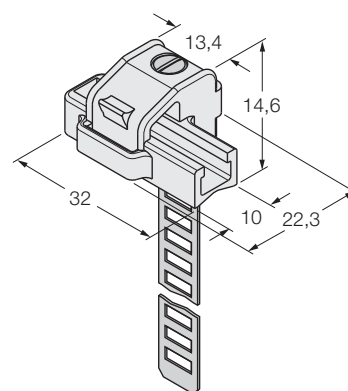
Actuating magnet, Ø 15 mm (Ø 3 mm), height 6 mm; sensing range 36 mm on BIM-(E)M12 sensors resp. 32 mm on BIM-EG08 sensors; in combination with Q25L: Recommended distance between sensor and magnet: 3 ... 4 mm

## Accessories for UNT



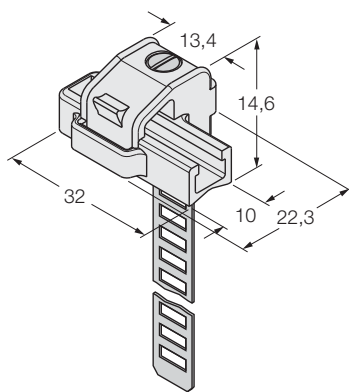
### KLRC-UNT1

Mounting aid for Ø cylinders; Ø 8...25 mm; PA 6I/6T / nickel silver; fire-hazard classification acc. to UL94 - V2



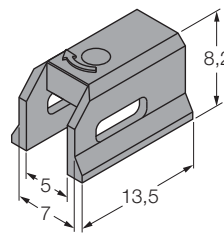
### KLRC-UNT2

Mounting aid for Ø cylinders; Ø 25...63 mm; PA 6I/6T / nickel silver; fire-hazard classification acc. to UL94 - V2



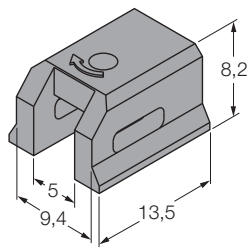
**KLRC-UNT3**

Mounting aid for  
 ○ cylinders;  
 Ø 63...130 mm;  
 PA 6I/6T / nickel silver;  
 fire-hazard classifica-  
 tion acc. to UL94 - V2



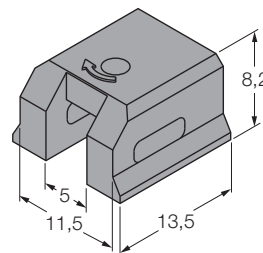
**KLDT-UNT2**

Mounting aid for  
 □ dovetail groove  
 cylinders; groove  
 width 7 mm; PPS



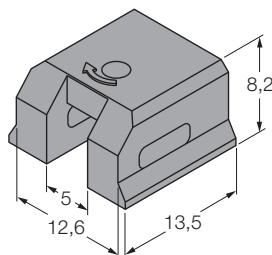
**KLDT-UNT3**

Mounting aid for  
 □ dovetail groove  
 cylinders; groove  
 width 9.4 mm; PPS



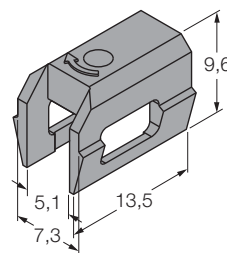
**KLDT-UNT4**

Mounting aid for  
 □ dovetail groove  
 cylinders; groove  
 width 11.5 mm; PPS



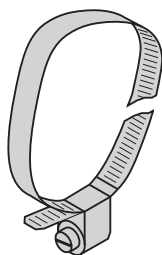
**KLDT-UNT5**

Mounting aid for  
 □ dovetail groove  
 cylinders; groove  
 width 12.6 mm; PPS



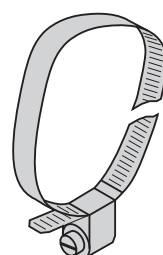
**KLDT-UNT6**

Mounting aid for  
 □ dovetail groove  
 cylinders; groove  
 width 7.35 mm; PPS



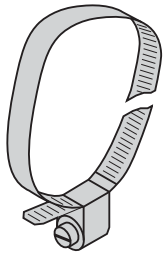
**ASB-1**

Clip collar to mount  
 BIM-UNT in combina-  
 tion with KLDT-UNT2  
 on round cylinders Ø  
 7...11 mm.



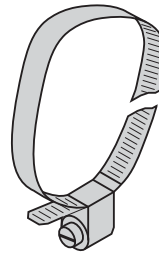
**ASB-2**

Clip collar to mount  
 BIM-UNT in combina-  
 tion with KLDT-UNT2  
 on round cylinders Ø  
 11...19 mm.



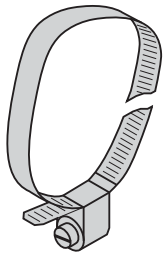
**ASB-3**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders  $\varnothing$  18...29 mm.



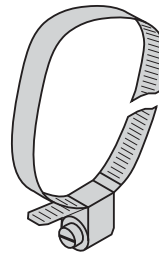
**ASB-4**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders  $\varnothing$  28...39 mm.



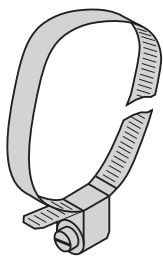
**ASB-5**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders  $\varnothing$  38...49 mm.



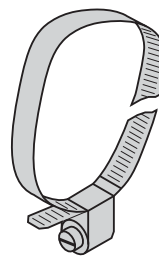
**ASB-6**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders  $\varnothing$  48...59 mm.



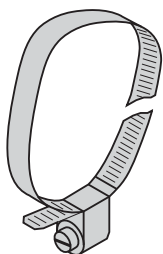
**ASB-7**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders  $\varnothing$  58...69 mm.



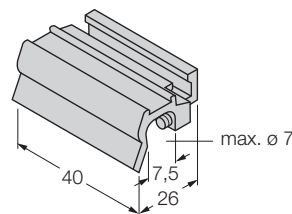
**ASB-8**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders  $\varnothing$  68...79 mm.



**ASB-9**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders  $\varnothing$  78...89 mm.




**KLZ1-INT**

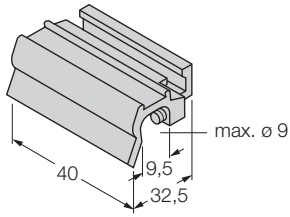
Mounting aid for  $\bigcirc$  tie-rod cylinder  $\varnothing$  32...40 mm; aluminium; further mounting accessories for other cylinder diameters on request

## Accessories


### Magnetic field sensors

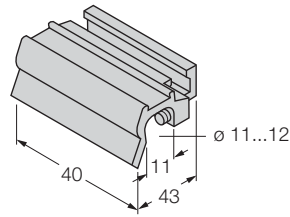
#### KLZ2-INT

Mounting aid for  
 tie-rod cylinder  
 Ø 50...63 mm;  
 aluminium; further  
 mounting accessories  
 for other cylinder  
 diameters on request




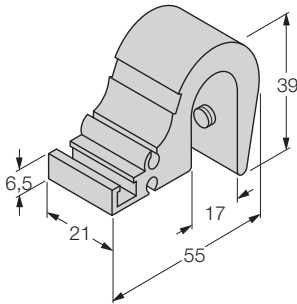
#### KLZ3-INT

Mounting aid for  
 tie-rod cylinder;  
 Ø 80...100 mm;  
 aluminium; further  
 mounting accessories  
 for other cylinder  
 diameters on request




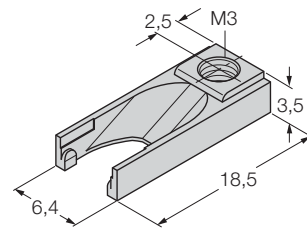
#### KLZ5-INT

Mounting aid for  
 tie-rod cylinder;  
 Ø 160...200 mm;  
 aluminium; further  
 mounting accessories  
 for other cylinder  
 diameters on request




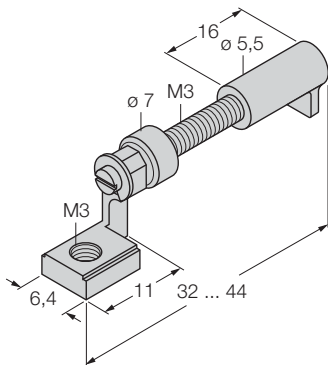
#### UNT-Stopper

Mounting aid for  
 fine-tuning of switch-  
 point on  T-groove  
 cylinders; snap-lock  
 mounting in the  
 sensor fixture; suited  
 for multiple use;  
 plastic




#### UNT-Justage

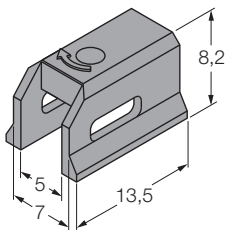
Mounting aid for  
 fine-tuning of switch-  
 point on  T-groove  
 cylinders; snap-lock  
 mounting in the sen-  
 sor fixture; suited for  
 multiple use;  
 metal/plastic




## Accessories for WIM

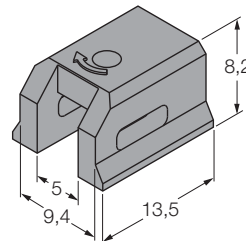
#### KLDT-UNT2

Mounting aid for  
 dovetail groove  
 cylinders; groove  
 width: 7 mm; PPS




#### KLDT-UNT3

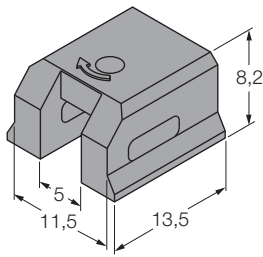
Mounting aid for  
 dovetail groove  
 cylinders; groove  
 width: 9.4 mm; PPS






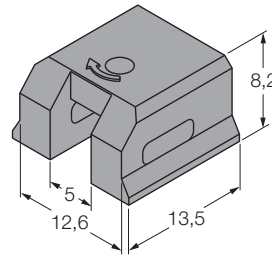
**KLDT-UNT4**

Mounting aid for  
 dovetail groove  
 cylinders; groove  
 width: 11.5 mm; PPS




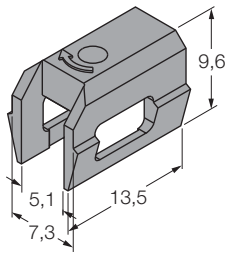
**KLDT-UNT5**

Mounting aid for  
 dovetail groove  
 cylinders; groove  
 width: 12.6 mm; PPS



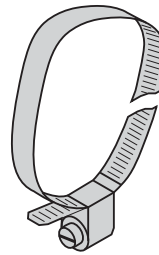
**KLDT-UNT6**

Mounting aid for  
 dovetail groove  
 cylinders; groove  
 width: 7.35 mm; PPS



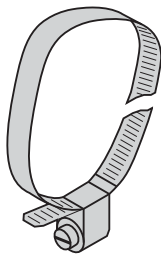
**ASB-1**

Clip collar to mount  
 BIM-UNT in combina-  
 tion with KLDT-UNT2  
 on round cylinders  
 Ø 7...11 mm.



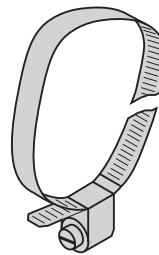
**ASB-2**

Clip collar to mount  
 BIM-UNT in combina-  
 tion with KLDT-UNT2  
 on round cylinders  
 Ø 11...19 mm.



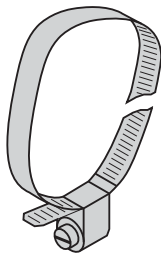
**ASB-3**

Clip collar to mount  
 BIM-UNT in combina-  
 tion with KLDT-UNT2  
 on round cylinders  
 Ø 18...29 mm.



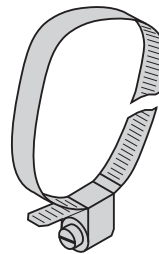
**ASB-4**

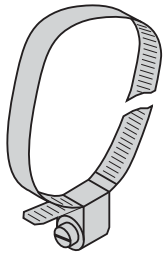
Clip collar to mount  
 BIM-UNT in combina-  
 tion with KLDT-UNT2  
 on round cylinders  
 with diameters of  
 28...39 mm.



**ASB-5**

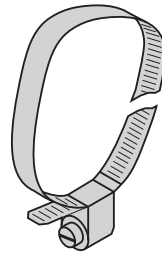
Clip collar to mount  
 BIM-UNT in combina-  
 tion with KLDT-UNT2  
 on round cylinders  
 with diameters of  
 38...49 mm.





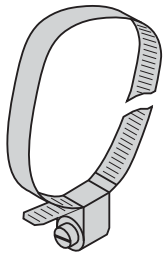
**ASB-6**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders Ø 48...59 mm.



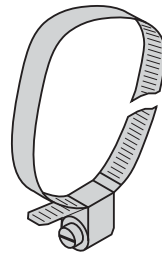
**ASB-7**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders Ø 58...69 mm.



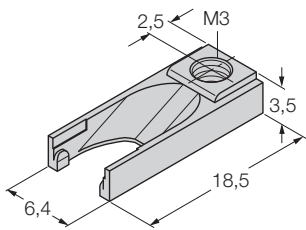
**ASB-8**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders Ø 68...79 mm.



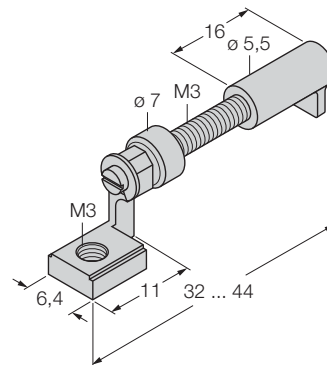
**ASB-9**

Clip collar to mount BIM-UNT in combination with KLDT-UNT2 on round cylinders Ø 78...89 mm.



**UNT-stopper**

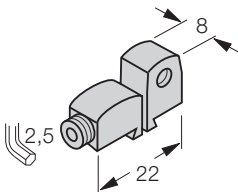
Mounting aid for fine-tuning of switch-point on T-groove cylinders; snap-lock mounting in the sensor fixture; suited for multiple use; plastic



**UNT-fine adjustment**

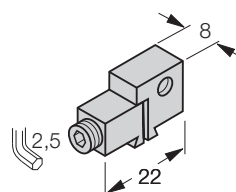
Mounting aid for fine-tuning of switch-point on T-groove cylinders; snap-lock mounting in the sensor fixture; suited for multiple use; metal/plastic

**Accessories for NST**



**KLN 1**


Clamping piece for dovetail groove cylinders or T-groove cylinders; clamping width 5.2...13.5 mm; anodized aluminium

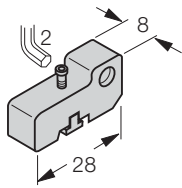


**KLN 3**


Clamping piece for dovetail groove cylinders or T-groove cylinders; clamping width 5.2...13.5 mm; anodized aluminium

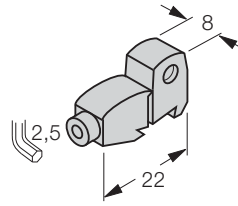
**KLN-SMC**

Clamping piece for  
 SMC cylinders;  
 clamping width 4 mm;  
 anodized aluminium




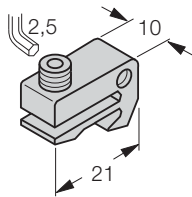
**KLF 1**

Clamping piece for  
 external dove-  
 tail grooves; for all  
 cylinder diameters,  
 material: Anodized  
 aluminium




**KLF 2**

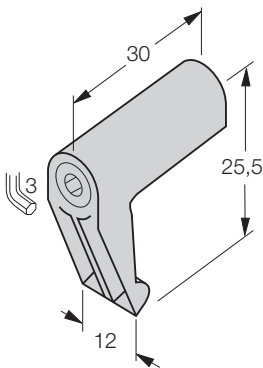
Clamping piece for  
 external dovetail  
 grooves (IMI Norgrem)  
 or all cylinder  
 diameters, anodized  
 aluminium




**Accessories for IKT**

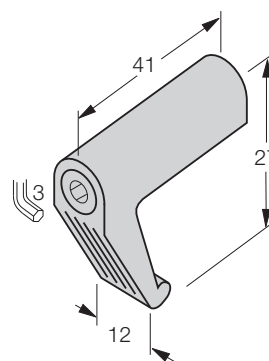
**KLI 1**

Clamping piece for  
 tie-rod cylinders;  
 Ø 32...100 mm;  
 die-cast zinc




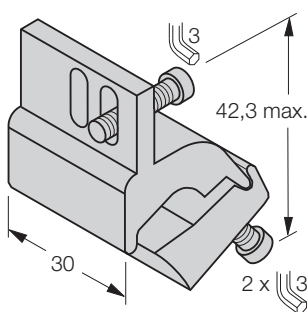
**KLI 3**

Clamping piece for  
 tie-rod cylinders;  
 Ø 63...160 mm;  
 die-cast zinc




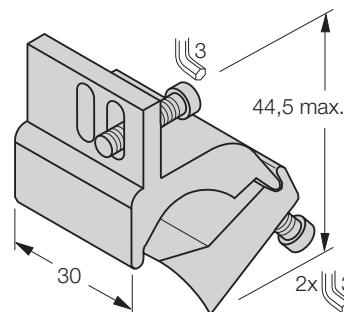
**KLI 5Z**

Clamping piece for  
 tie-rod cylinders;  
 Ø 32...63 mm;  
 aluminum



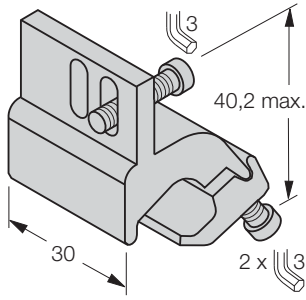
**KLI 6Z**

Clamping piece for  
 tie-rod cylinders;  
 Ø 50...125 mm;  
 aluminum



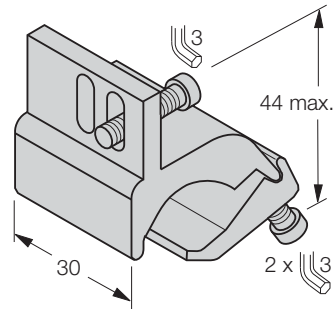
## Accessories

### Magnetic field sensors



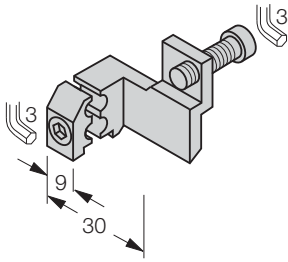
#### KLI 5

Clamping piece for  
□ profile cylinder;  
Ø 32...50 mm;  
aluminium



#### KLI 6

Clamping piece for  
□ profile cylinder;  
Ø 50...100 mm;  
aluminium



#### KLI 7

Clamping piece for  
□ profile cylinder  
with external dovetail  
grooves; Ø 32...200  
mm; aluminium



## Accessories for linear position sensors

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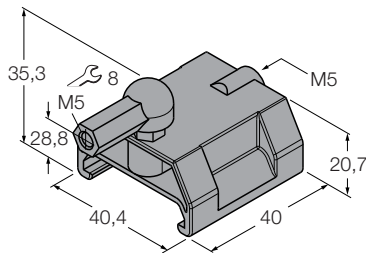
The range of accessories includes guided and floating positioning elements as well as different mounting aids for linear position sensors. The measuring range is set via pushbutton at the teach adapter. The sensors are thus easily adjusted to the correspondent application. The programmed measuring range is tested with the analog test box.

**Features**

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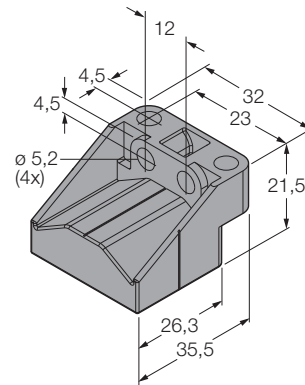
- Broad range of positioning elements and mounting accessories
- Highest mounting flexibility
- Guided and floating positioning elements

## Li-Q25L



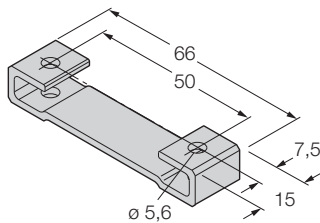
### P1-Li-Q25L

Guided positioning element. The positioning magnet is inserted in the sensor guide.



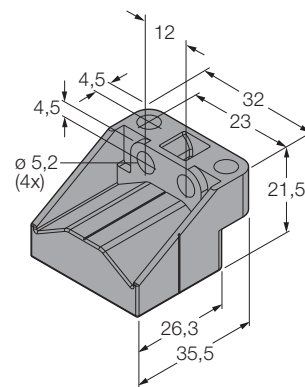
### P2-Li-Q25L

Floating positioning element



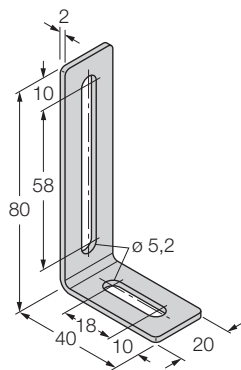
### M1-Q25L

Mounting foot for linear position sensor Q25L; aluminium; 2 pcs. per bag



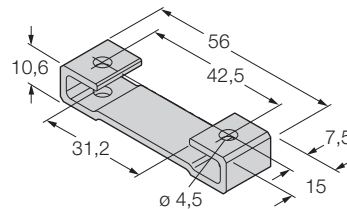
### P3-Li-Q25L

Floating positioning element, right-angle mounting



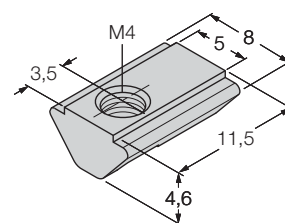
### M4-Q25L

Mounting bracket for linear position sensor Q25L; material Stainless steel; 2 pcs. per bag



### M2-Q25L

Mounting foot for linear position sensor Q25L; aluminium; 2 pcs. per bag

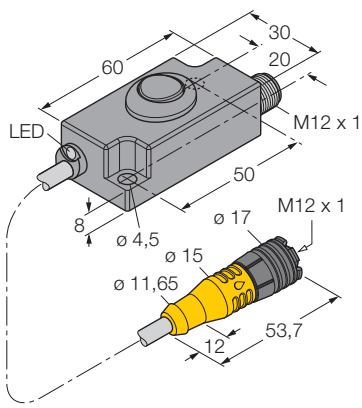


### MN-M4-Q25

Sliding block with M4 thread for the backside profile of the Q25L; material Brass; 10 pcs. per bag

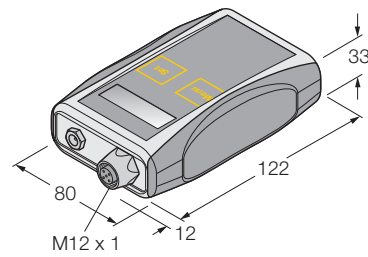
## Accessories

### Linear position sensors



#### TX1-Q20L60

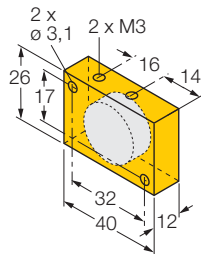
Teach adapter:



#### TB4

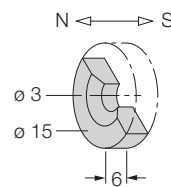
Universal test and configuration box for analog and binary sensors.

## WIM-Q25L



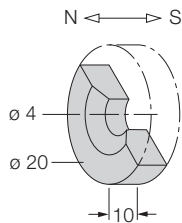
#### DM-Q12

Actuation magnet; block-shaped, plastic; sensing range 58 mm on BIM-(E)M12 sensors resp. 49 mm on BIM-EG08 sensors; recommended distance between sensor and magnet 3...5 mm when used with Q25L



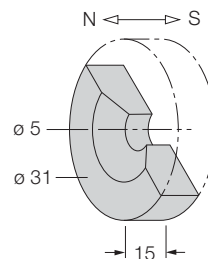
#### DMR15-6-3

Actuation magnet, Ø 15 mm (Ø 3 mm), height 6 mm; sensing range 36 mm on BIM-(E)M12 sensors resp. 32 mm on BIM-EG08 sensors; recommended distance between sensor and magnet 3...4 mm when used with Q25L



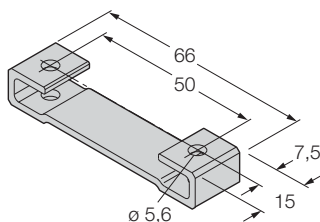
#### DMR20-10-4

Actuation magnet; Ø 20 mm (Ø 4 mm), height 10 mm; sensing range 59 mm on BIM-(E)M12 sensors resp. 50 mm on BIM-EG08 sensors; recommended distance between sensor and magnet 3...4 mm when used with Q25L



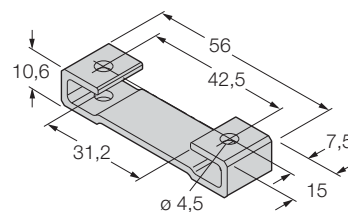
#### DMR31-15-5

Actuation magnet, Ø 31 mm (Ø 5 mm), height 15 mm; sensing range 90 mm on BIM-(E)M12 sensors resp. 78 mm on BIM-EG08 sensors; recommended distance between sensor and magnet 3...5 mm when used with Q25L



#### M1-Q25L

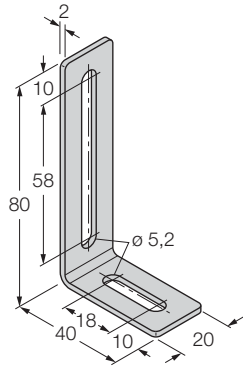
Mounting foot for linear position sensor Q25L; aluminium; 2 pcs. per bag



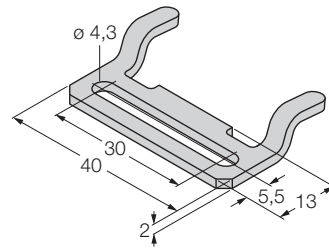
#### M2-Q25L

Mounting foot for linear position sensor Q25L; aluminium; 2 pcs. per bag

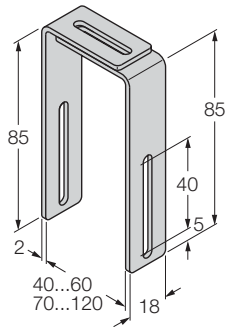




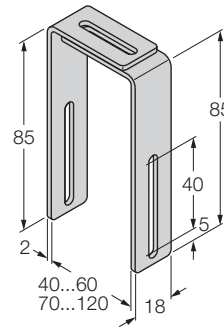
**M4-Q25L**  
Mounting bracket for  
linear position sensor  
Q25L; stainless steel;  
2 pcs. per bag



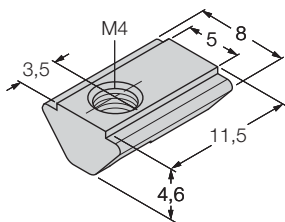
**MB1-Q25**  
Mounting clip for  
linear position sensor  
Q25L; stainless steel;  
2 pcs. per bag



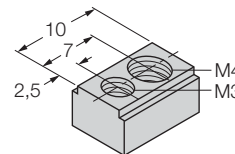
**MB2.1-Q25**  
Mounting bracket for  
linear position sensors  
Q25L; mounting on  
pneumatic cylinders  
(40...60mm); stainless  
steel; 4 pcs. per bag



**MB2.2-Q25**  
Mounting bracket for  
linear position sensors  
Q25L; mounting on  
pneumatic cylinders  
(70...120mm); stain-  
less steel; 4 pcs. per  
bag



**MN-M4-Q25**  
Sliding block with M4  
thread for backside  
profile of the Q25L;  
brass; 10 pcs. per bag



**MN-C1**  
Sliding block for T-  
groove cylinder, 2 pcs.  
per bag

## Accessories for pressure sensors

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The range of accessories comprises aids for mounting, operating and protecting pressure sensors of the PK and PS series. It also includes a heat sink to reduce high ambient temperatures.

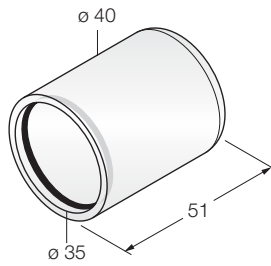
### Features

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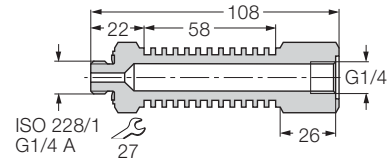
- Protective cap for the PS series
- Reduction of temperature for the PS and PT series
- Mounting accessories for the PK series

## PS series

**PTS-Cover**  
Protective cap

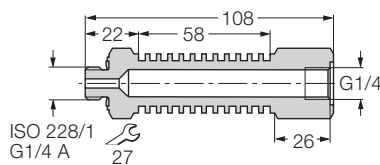


**PCS-G1/4A4**  
Heat sink



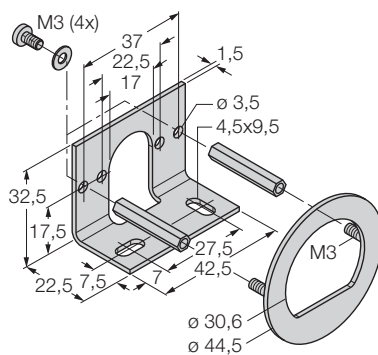
## PT series

**PCS-G1/4A4**  
Heat sink

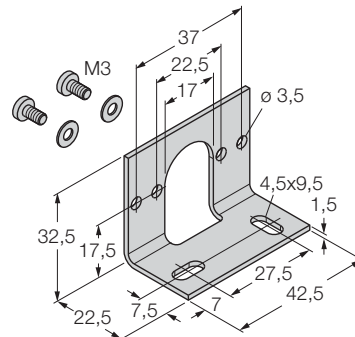


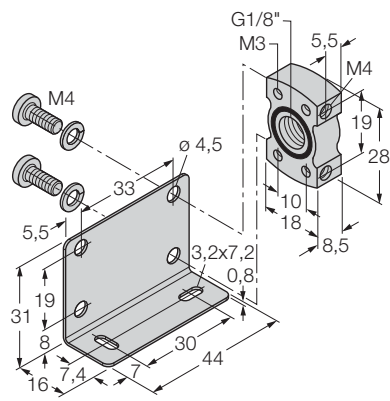
## PK series

**PK-N-MZ-001**  
Mounting kit PK-N

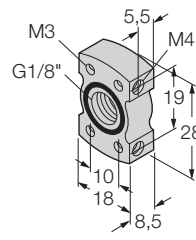


**PK-N-MZ-002**  
Mounting kit PK-N





**PK-P-MZ-001**  
Mounting kit PK-P



**PK-P-MZ-002**  
Flange connection  
PK-P



## Accessories for temperature sensors

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We offer a large range of function supporting accessories such as compression and cutting ring fittings for easy and safe mounting, as well as protective aids such as thermowells and caps. They are tailored to the correspondent sensor types and protect them against mechanical stresses.

**Features**

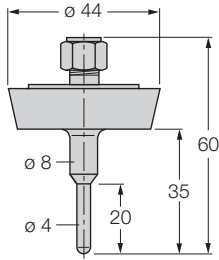
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- Compression fittings for temperature probes with different process connections
- Thermowells

## THW-3 – Thermowells for 3 mm probes

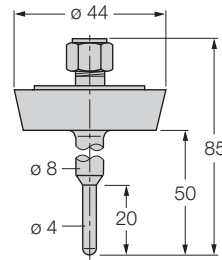
**THW-3-DN25K-L035**

Thermowell for temperature probes



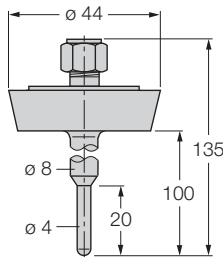
**THW-3-DN25K-A4-L050**

Thermowell for temperature probes



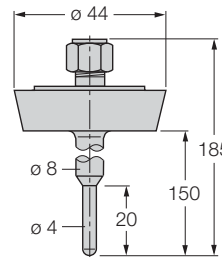
**THW-3-DN25K-A4-L100**

Thermowell for temperature probes



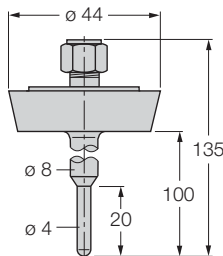
**THW-3-DN25K-A4-L150**

Thermowell for temperature probes



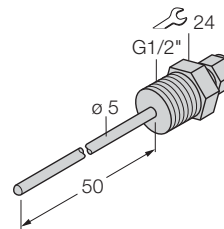
**THW-3-DN25K-A4-L250**

Thermowell for temperature probes



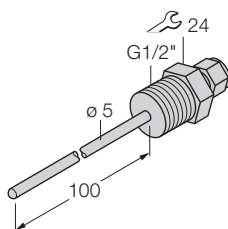
**THW-3-G1/2-A4-L050**

Thermowell for temperature probes



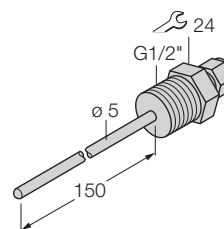
**THW-3-G1/2-A4-L100**

Thermowell for temperature probes



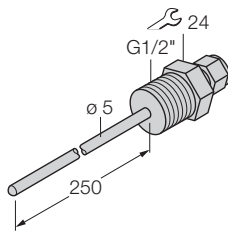
**THW-3-G1/2-A4-L150**

Thermowell for temperature probes



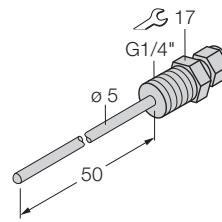
**THW-3-G1/2-A4-L250**

Thermowell for temperature probes



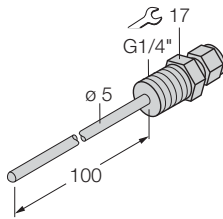
**THW-3-G1/4-A4-L050**

Thermowell for temperature probes



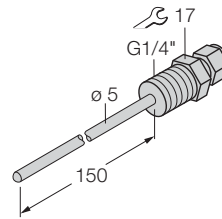
**THW-3-G1/4-A4-L100**

Thermowell for temperature probes



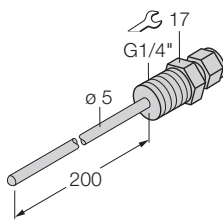
**THW-3-G1/4-A4-L150**

Thermowell for temperature probes



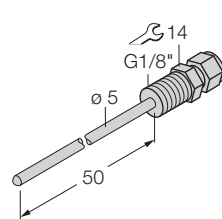
**THW-3-G1/4-A4-L200**

Thermowell for temperature probes



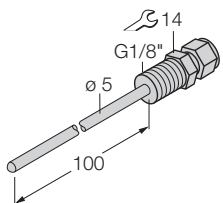
**THW-3-G1/8-A4-L050**

Thermowell for temperature probes



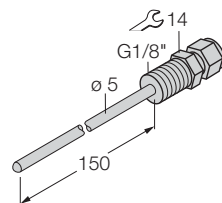
**THW-3-G1/8-A4-L100**

Thermowell for temperature probes



**THW-3-G1/8-A4-L150**

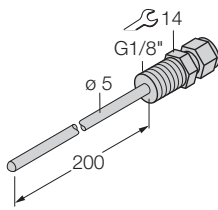
Thermowell for temperature probes





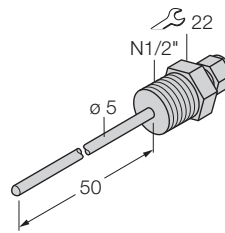
**THW-3-G1/8-A4-L200**

Thermowell for temperature probes



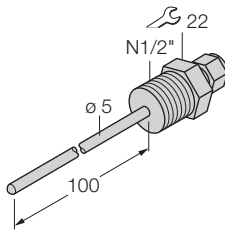
**THW-3-N1/2-A4-L050**

Thermowell for temperature probes



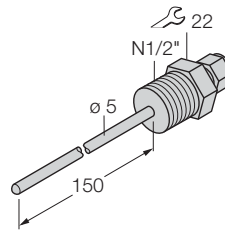
**THW-3-N1/2-A4-L100**

Thermowell for temperature probes



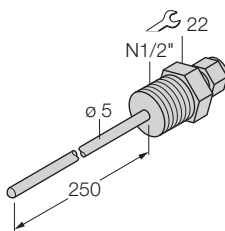
**THW-3-N1/2-A4-L150**

Thermowell for temperature probes



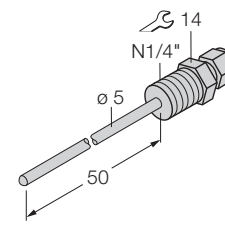
**THW-3-N1/2-A4-L250**

Thermowell for temperature probes



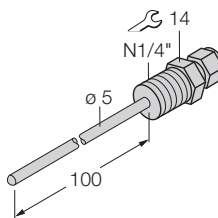
**THW-3-N1/4-A4-L050**

Thermowell for temperature probes



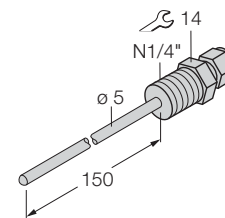
**THW-3-N1/4-A4-L100**

Thermowell for temperature probes

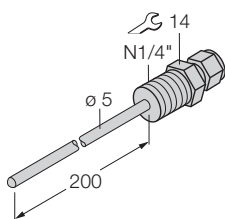


**THW-3-N1/4-A4-L150**

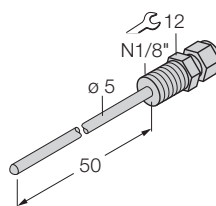
Thermowell for temperature probes



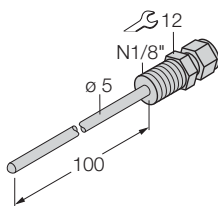
**THW-3-N1/4-A4-L200**  
Thermowell for temperature probes



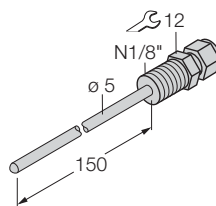
**THW-3-N1/8-A4-L050**  
Thermowell for temperature probes



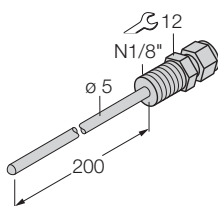
**THW-3-N1/8-A4-L100**  
Thermowell for temperature probes



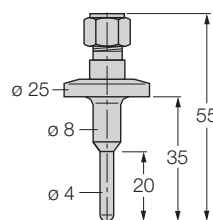
**THW-3-N1/8-A4-L150**  
Thermowell for temperature probes



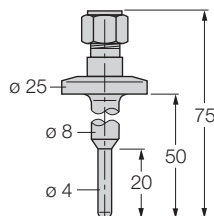
**THW-3-N1/8-A4-L200**  
Thermowell for temperature probes



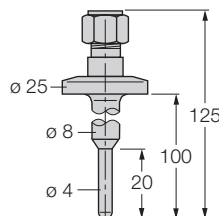
**THW-3-TRI3/4-A4-L035**  
Thermowell for temperature probes

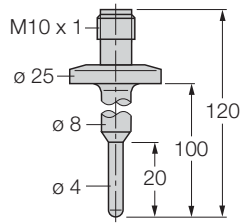


**THW-3-TRI3/4-A4-L050**  
Thermowell for temperature probes

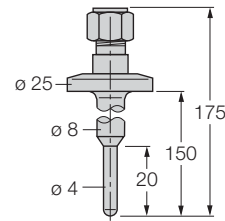


**THW-3-TRI3/4-A4-L100**  
Thermowell for temperature probes

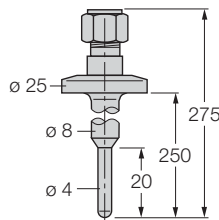




**THW-3-TRI3/4-A4-L100**  
Thermowell for temperature probes

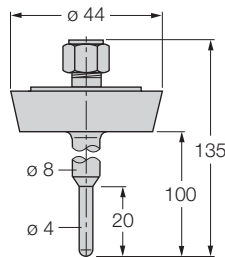


**THW-3-TRI3/4-A4-L150**  
Thermowell for temperature probes

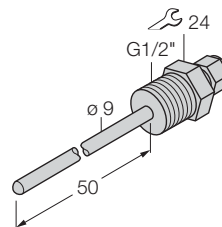


**THW-3-TRI3/4-A4-L250**  
Thermowell for temperature probes

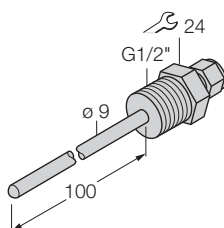
## THW-6 – Thermowells for 6 mm probes



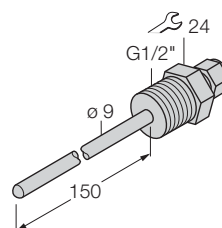
**THW-6-DN25K-A4-L100**  
Thermowell for temperature probes



**THW-6-G1/2-A4-L050**  
Thermowell for temperature probes



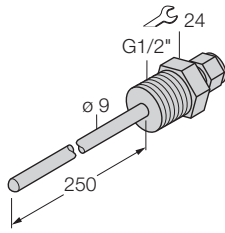
**THW-6-G1/2-A4-L100**  
Thermowell for temperature probes



**THW-6-G1/2-A4-L150**  
Thermowell for temperature probes

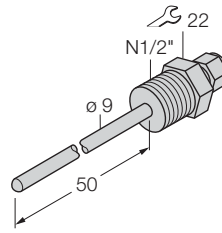
**THW-6-G1/2-A4-L250**

Thermowell for temperature probes



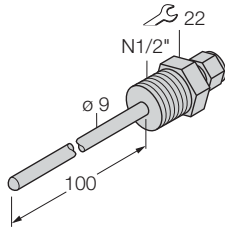
**THW-6-N1/2-A4-L050**

Thermowell for temperature probes



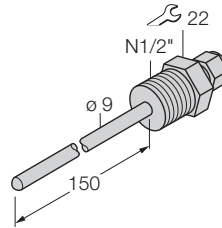
**THW-6-N1/2-A4-L100**

Thermowell for temperature probes



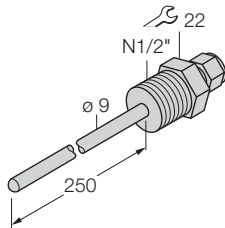
**THW-6-N1/2-A4-L150**

Thermowell for temperature probes



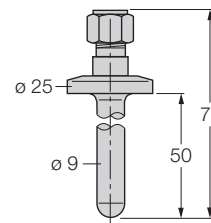
**THW-6-N1/2-A4-L250**

Thermowell for temperature probes



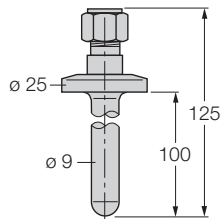
**THW-6-TRI3/4-A4-L050**

Thermowell for temperature probes



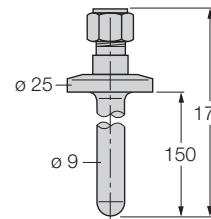
**THW-6-TRI3/4-A4-L100**

Thermowell for temperature probes



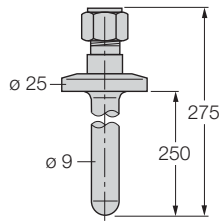
**THW-6-TRI3/4-A4-L150**

Thermowell for temperature probes



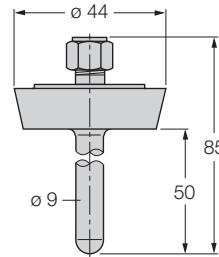
**THW-6-TRI3/4-A4-L250**

Thermowell for temperature probes



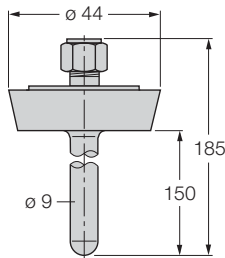
**THW-6-DN25K-A4-L050**

Thermowell for temperature probes



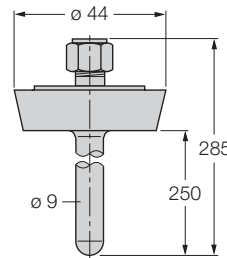
**THW-6-DN25K-A4-L150**

Thermowell for temperature probes



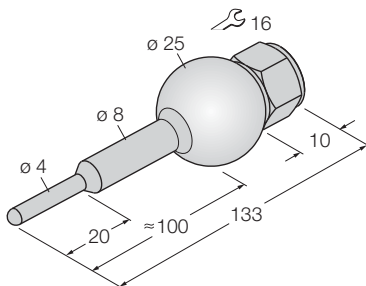
**THW-6-DN25K-A4-L250**

Thermowell for temperature probes



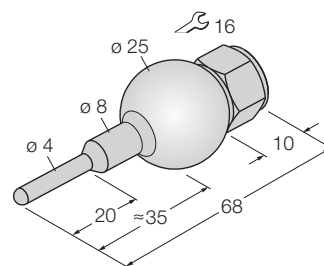
**THW-3-UNI25-A4-L100**

Thermowell for temperature probes



**THW-3-UNI25-A4-L035**

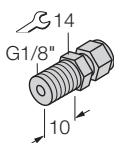
Thermowell for temperature probes



**CF-3 – Compression fittings for 3 mm probes**

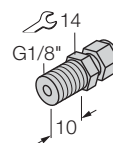
**CF-M-3-G1/8-A4**

Compression fitting for temperature probes



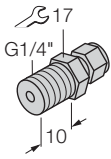
**CF-M-3-N1/8-A4**

Compression fitting for temperature probes



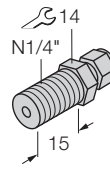
**CF-M-3-G1/4-A4**

Compression fitting for direct mounting of temperature probes



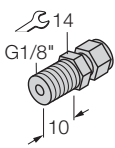
**CF-M-3-N1/4-A4**

Compression fitting for direct mounting of temperature probes



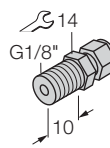
**CF-P-3-G1/8-A4**

Compression fitting for direct mounting of temperature probes



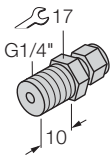
**CF-P-3-N1/8-A4**

Compression fitting for direct mounting of temperature probes



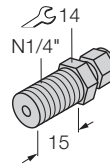
**CF-P-3-G1/4-A4**

Compression fitting for direct mounting of temperature probes



**CF-P-3-N1/4-A4**

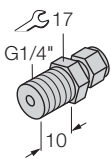
Compression fitting for direct mounting of temperature probes



**CF-6 – Compression fittings for 6 mm probes**

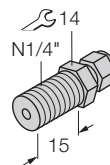
**CF-M-6-G1/4-A4**

Compression fitting for direct mounting of temperature probes



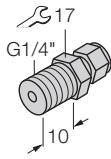
**CF-M-6-N1/4-A4**

Compression fitting for direct mounting of temperature probes



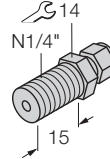
**CF-P-6-G1/4-A4**

Compression fitting  
for direct mounting of  
temperature probes



**CF-P-6-N1/4-A4**

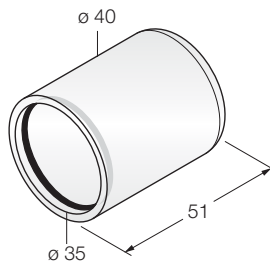
Compression fitting  
for direct mounting of  
temperature probes



**Accessories**

**PTS-Cover**

Protective cap



## Accessories for flow sensors / flow meters

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We offer a large range of function supporting accessories for easy and safe mounting, different adapters and mounting kits as well as protective aids to hold up mechanical stress.

### Features

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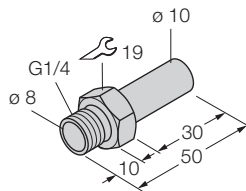
- Adapters for flow meters, D18, D15, D10 on G1/2
- Other connection types on request
- Mounting aids for FTCL, FCVI and FCMI flow meters



## Adapters and mounting kits

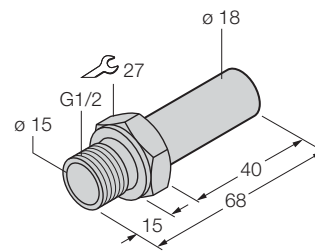
### FTCI-G1/4A4-D10/ L050

Adapter for G1/4  
thread; stainless steel  
A4 (1.4571/AISI 316Ti)



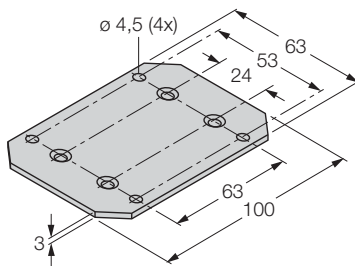
### FTCI-G1/2A4-D18/ L068

Adapter for G1/2  
thread, stainless steel  
A4 (1.4571/AISI 316Ti)



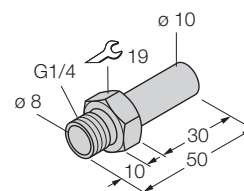
### FTCI-MP01AL

Aluminium mounting  
panel for front mount-  
ing



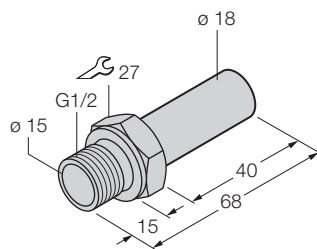
### FTCI-G1/4A4-D10/ L050

Adapter for G1/4  
thread, stainless steel  
A4 (1.4571/AISI 316Ti)



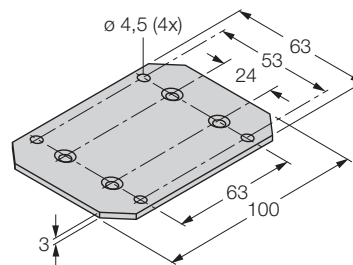
### FTCI-G1/2A4-D18/ L068

Adapter for G1/2  
thread, stainless steel  
A4 (1.4571/AISI 316Ti)



### FTCI-MP01AL

Aluminium mounting  
panel for  
front mounting



## Reflectors

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The use of reflectors and reflective foils requires sufficient excess gain (excess radiated power). „Excess gain 1“ means, the sensor operates without excess of radiancy. If dust, fume or mist is expected to contaminate the lens or the beam path, excess gain of the system has to be enlarged ( $> 1.5$ ) compared to a clean environments (1.5).

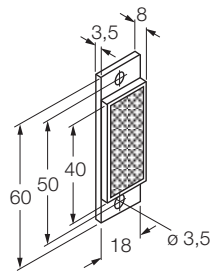
Unless otherwise indicated, the ranges of the retroreflective sensors stated are based on the use of a BRT-3 reflector with a diameter of 75 mm.

### Features

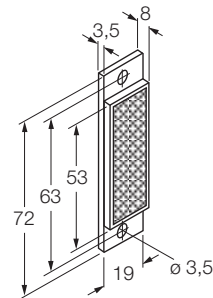
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- Reflectors and reflective foils are available in different sizes and with different mounting arrangements.
- Reflectors for rough environments and high temperatures

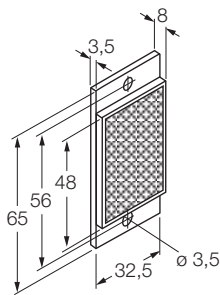
## Rectangular reflectors



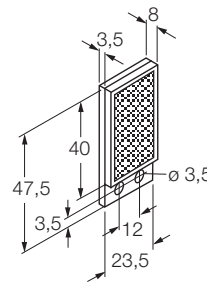
**BRT-40X18A**  
Rectangular reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
-20 ... +60 °C



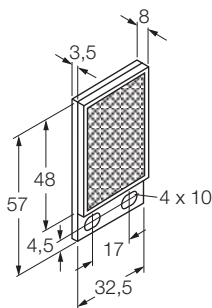
**BRT-53X19A**  
Rectangular reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures max.  
+50 °C



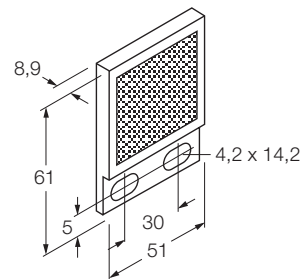
**BRT-48X32A**  
Rectangular reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
max. +50 °C



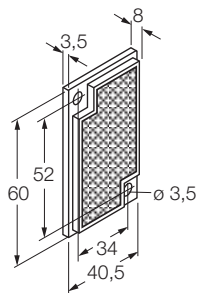
**BRT-40X23B**  
Rectangular reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures  
max. +50 °C



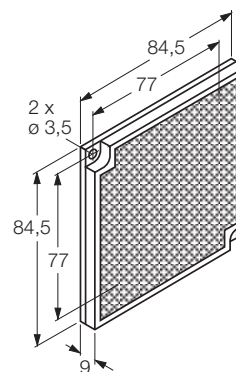
**BRT-48X32B**  
Rectangular reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
-20 °C ... +60 °C



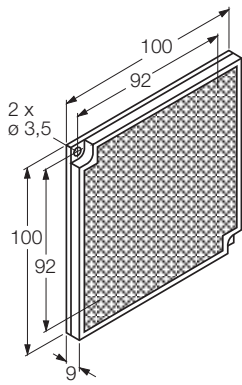
**BRT-46**  
Rectangular reflector,  
reflection coefficient  
1.8, acrylic, ambient  
temperatures  
max. +50 °C



**BRT-60X40C**  
Rectangular reflector,  
reflection coefficient  
1.48, acrylic, ambient  
temperatures  
max. +50 °C

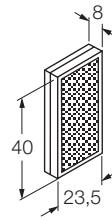


**BRT-77X77C**  
Rectangular reflector,  
reflection coefficient  
2.0, acrylic, ambient  
temperatures  
-20 °C ... +60 °C



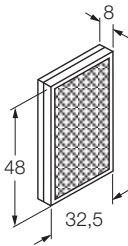
**BRT-92 x92C**

Rectangular reflector,  
reflection coefficient  
3.0, acrylic, ambient  
temperatures  
-20 °C... +60 °C



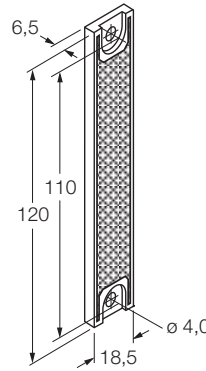
**BRT-40X23**

Rectangular reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures  
-20 °C... +60 °C



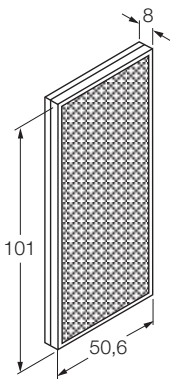
**BRT-48X32**

Rectangular reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
-20 °C... +60 °C



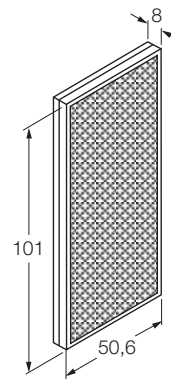
**BRT-100X18A**

Rectangular reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures  
-20 °C... +60 °C



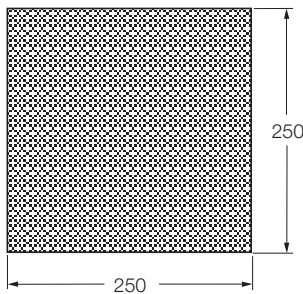
**BRT-100X50**

Rectangular reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures  
-20 °C... +60 °C



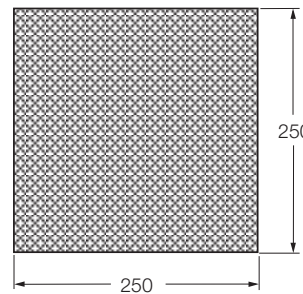
**BRT-100X55A**

Rectangular reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures  
-20 °C... +60 °C



**BRT-250**

Special rectangular  
reflector for LT7PLVQ  
sensor, aluminium,  
ambient temperatures  
-20 °C... +50 °C

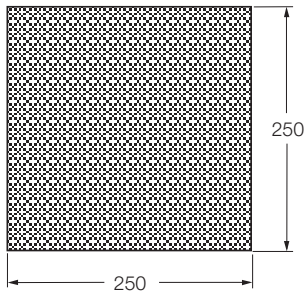


**BRT-4HT**

Rectangular reflector,  
reflection coefficient  
0.15, aluminium,  
ambient temperatures  
max. +480 °C

**BRT-50X60H**

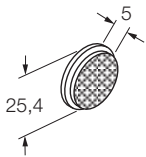
Rectangular reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures  
max. +110 °C



**Round reflectors**

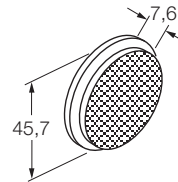
**BRT-25**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
max. +65 °C



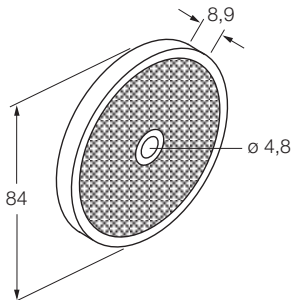
**BRT-40**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
max. +65 °C



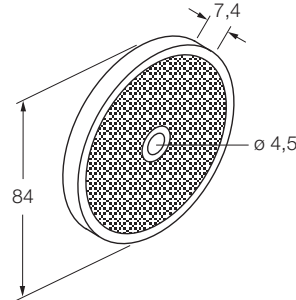
**BRT-75**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
max. +65 °C



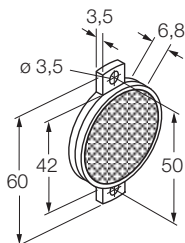
**BRT-84**

Round reflector,  
reflection coefficient  
1.4, acrylic, ambient  
temperatures  
-20 °C... +60 °C



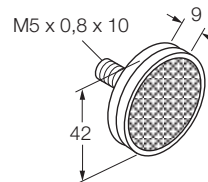
**BRT-42A**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
-20 °C... +60 °C



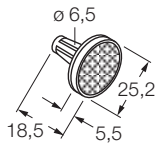
**BRT-42D**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
-20 °C... +60 °C



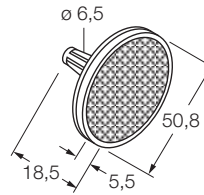
**BRT-25R**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
-20 °C... +60 °C



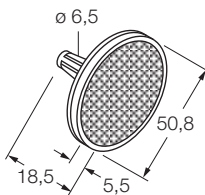
**BRT-50R**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
max. +50 °C



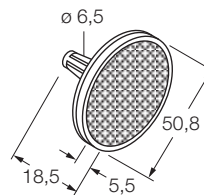
**BRT-2A**

Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
max. +65 °C



**BRT-41AHT**

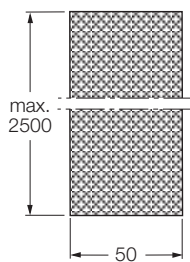
Round reflector,  
reflection coefficient  
1.0, acrylic, ambient  
temperatures  
-20 °C... +200 °C



**Reflective foils**

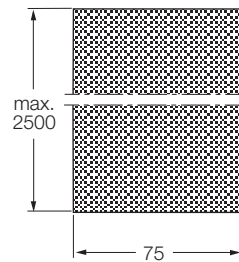
**BRF50H (1M)**

Self-adhesive  
reflective foil made  
of epoxy resin;  
length 1 m, reflection  
coefficient 0.7,  
ambient temperature  
max. +60 °C



**BRF75H (1M)**

Self-adhesive  
reflective foil made  
of epoxy resin;  
length 1 m, reflection  
coefficient 0.7,  
ambient temperature  
max. +60 °C





## Glass fibers

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In many applications objects can only be detected through the use of fiber optics. If light beams have to be piped through very hot, humid or chemically aggressive ambients, glass or plastic fibers are the ideal solution.

Glass fibers are available in different sizes, lengths and qualities, as monofilaments for opposed mode sensors and as bifurcated or double bifurcated fibers for diffuse mode sensors.

Unlike plastic fibers, glass fibers have a bigger inner bending radius and are not suited for frequent bending.

### Features

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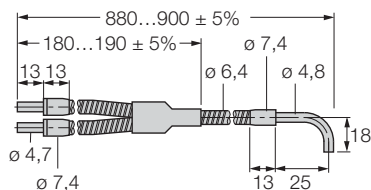
- Standard and special types for demanding application conditions
- High chemical resistance
- Broad temperature range: -140 °C...+480 °C
- Immune to moisture
- Resistant to impacts and vibration
- High interference immunity
- Robust design, for application in vacuum chambers
- Mounted with brackets



## Glass fibers – diffuse mode

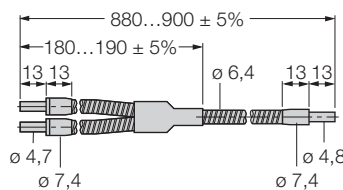
### BA23S

Glass fiber, diffuse mode, angled head (90°), flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



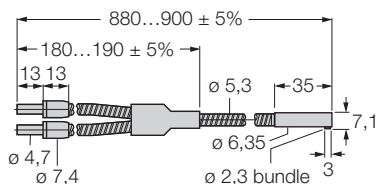
### BF23S

Glass fiber, diffuse mode, flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



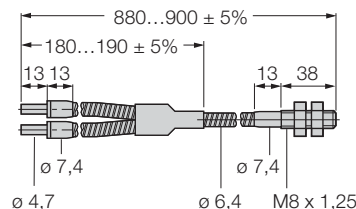
### BA1.53SMTA

Glass fiber, diffuse mode, head 1.5 mm angled (90°), flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



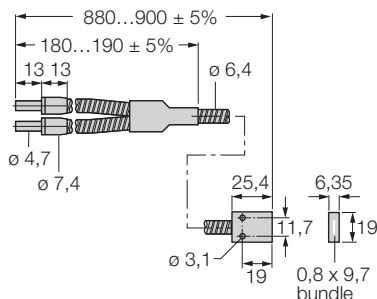
### BT23SM8

Glass fiber, diffuse mode, threaded brass bushing M8 x 1.25, bundle diameter 3.2 mm, flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



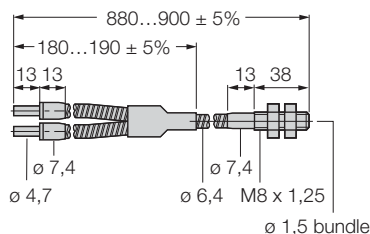
### BR23S

Glass fiber, diffuse mode, rectangular beam, flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



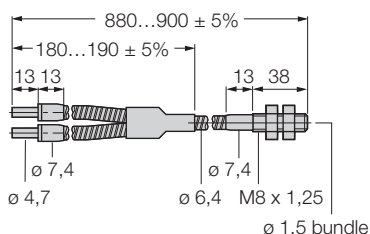
### BT13SM8

Glass fiber, diffuse mode, threaded brass bushing M8 x 1.25, bundle diameter 1.6 mm, flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



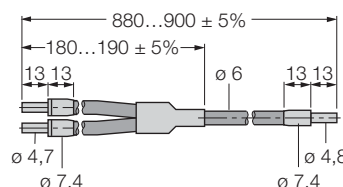
### BP13P

Glass fiber, diffuse mode, bendable tip, galvanized PVC jacket, ambient temperatures -140 °C ... +250 °C



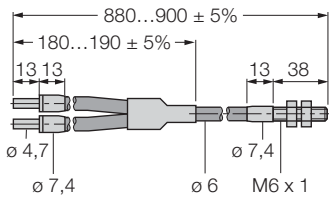
### BF23P

Glass fiber, sensing mode: Diffuse mode sensor, galvanized PVC jacket; ambient temperatures -40 °C ... +105 °C



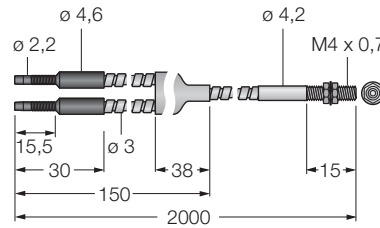
**BT23PM6**

Glass fiber, diffuse mode, PVC cable; ambient temperatures -40 °C...+105 °C



**BMT16.6S-HT**

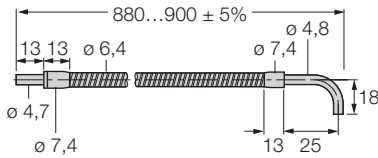
Glass fiber, diffuse mode, compact head, high temperature proof up to +315 °C, threaded brass bushing M4 x 0.7, flexible stainless steel sheath



**Glass fibers – opposed mode**

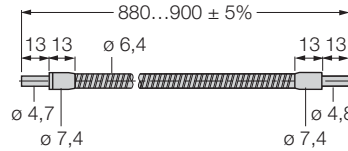
**IA23S**

Glass fiber, opposed mode, angled head 90°, flexible stainless steel sheath, ambient temperatures -140 °C ...+250 °C



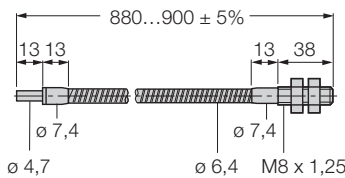
**IF23S**

Glass fiber, opposed mode, flexible stainless steel sheath, ambient temperatures -140 °C...+250 °C



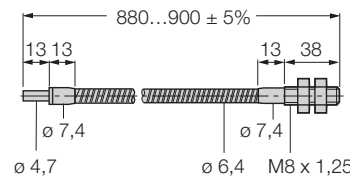
**IT23SM8**

Glass fiber, opposed mode, threaded brass bushing M8 x 1.25, bundle diameter 3.2 mm, flexible stainless steel sheath, ambient temperatures -140 °C ...+250 °C



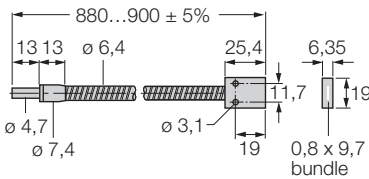
**IR2.53S**

Glass fiber, opposed mode, rectangular beam, bundle diameter 4 mm, flexible stainless steel sheath, ambient temperatures -140 °C...+250 °C



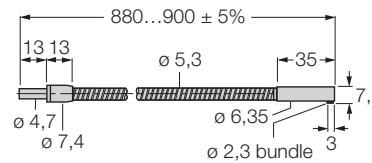
**IR23S**

Glass fiber, opposed mode, rectangular beam, bundle diameter 3.2 mm, flexible stainless steel sheath, ambient temperatures -140 °C ...+250 °C



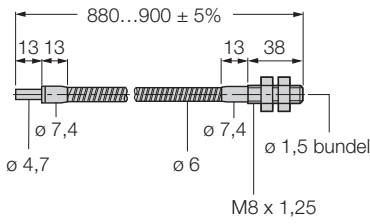
**IA1.53SMTA**

Glass fiber, opposed mode, compact head 1.5 mm, angled 90°, flexible stainless steel sheath, ambient temperatures -140 °C ...+250 °C



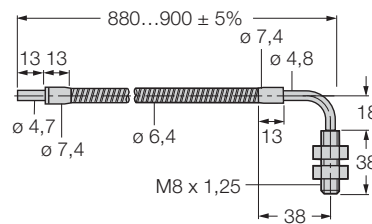
**IT13SM8**

Glass fiber, opposed mode, threaded brass bushing M8 x 1.25, bundle diameter 1.6 mm, flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



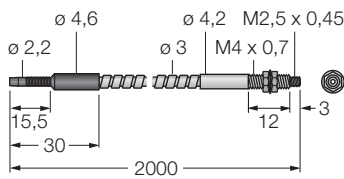
**IAT23SM8**

Glass fiber, opposed mode, angled head 90°, threaded brass bushing M8 x 1.25, flexible stainless steel sheath, ambient temperatures -140 °C ... +250 °C



**IMT.756.6S-HT**

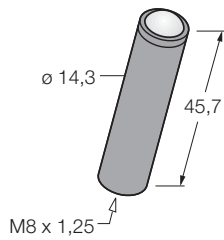
Glass fiber, opposed mode, compact head, temperature proof up to +315 °C, threaded brass bushing M4 x 0.7, flexible stainless steel sheath



**Glass fibers – lenses**

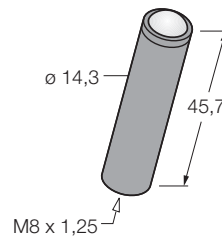
**L9M8**

Glass lens in a blue galvanized aluminium sheath, for glass fibers, range extension of opposed mode sensing, ambient temperatures up to +315 °C



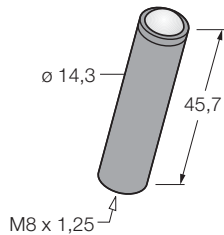
**L10M8**

Convergent glass lens in a red galvanized aluminium sheath to focus the light of bifurcated fiber optic sensors, e.g. for print/color mark detection, focal distance 5 mm ± 1 mm, ambient temperatures up to +315 °C



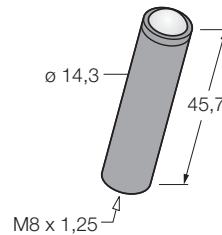
**L16FM8**

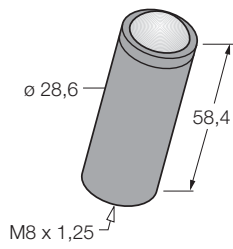
Glass lens in plastic jacket for glass fibers; range extension of opposed mode sensing, ambient temperatures up to +105 °C



**L16FALM8**

Glass lens in a galvanized aluminium sheath; for glass fibers, range extension of opposed and retro-reflective sensing mode, long range, ambient temperatures up to +315 °C

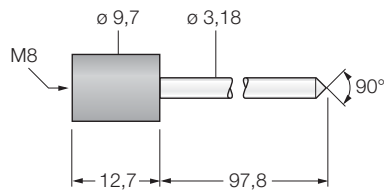




**L16FSSM8**

Glass lens in a stainless steel sheath; for glass fiber optics, range extension of opposed and retro-reflective mode sensing, long range, ambient temperatures up to +480 °C

**Glass fibers – monitoring of filling levels**



**TGRM8 mm**

Monitoring of filling levels with bifurcated glass fibers, M8 thread (types „B...M8“), end tip screwed on the fiber, chemical-resistant glass tip, ambient temperatures -140 °C...+250 °C



## Plastic fibers

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The very flexible plastic fibers are a well-priced solution for applications with poorly accessible spaces.

Plastic fibers can be cut to the required length. They are freely bendable and fit in the respective space. For applications in which the fibers need to be bended in all directions, TURCK offers extremely flexible coiled version with the following diameters: 0.25, 0.5, 0.75, 1 and 1.5 mm. They are sold in pairs.

### Features

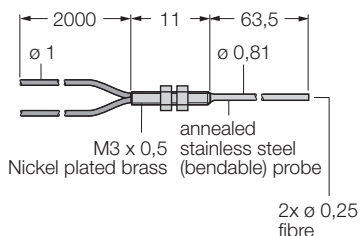
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- Well-priced solution for confined spaces
- Easy fitting
- Coiled plastic fibers, freely bendable
- Highly flexible
- Cut to fit
- Extremely small bending radii, more than 1,000,000 bending cycles
- Ambient temperatures: -30...+70 °C
- Mounting brackets are available

## Plastic fibers – diffuse mode

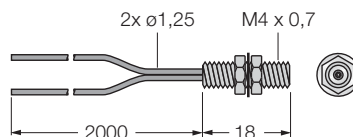
### PBP16U

Plastic fiber, diffuse mode, bendable tip, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



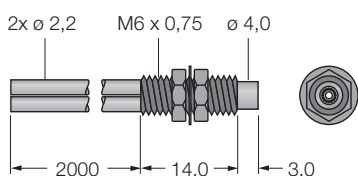
### PBCT26U

Plastic fiber, diffuse mode, coaxial, threaded bushing M4 x 0.7 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



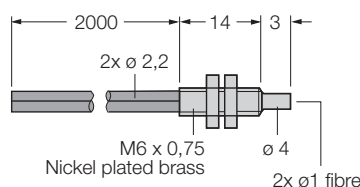
### PBCT46U

Plastic fiber, diffuse mode, coaxial, threaded bushing M6 x 0.75 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



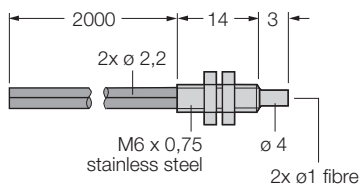
### PBT46UHF

Plastic fiber, diffuse mode, threaded bushing M6 x 0.75 mm, highly bendable DURA-BEND™ multicore fiber, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



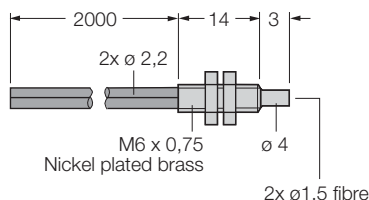
### PBT46UHT1

Plastic fiber, diffuse mode, threaded bushing M6 x 0.75 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures up to +125 °C



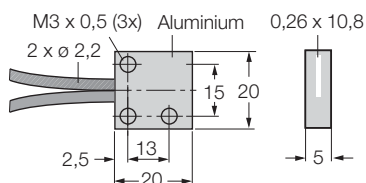
### PBT66U

Plastic fiber, diffuse mode, threaded bushing M6 x 0.75 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



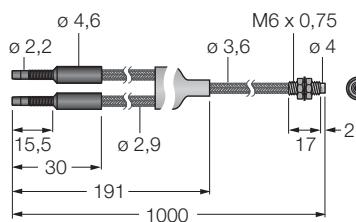
### PBR1X326U

Plastic fiber, diffuse mode, rectangular beam, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



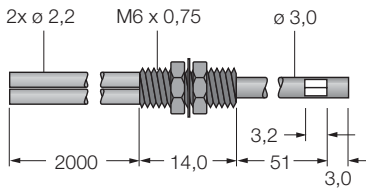
### PBT43TMB5

Plastic fiber, diffuse mode, threaded bushing M6 x 0.75 mm, plug-gable end tip (for D12 sensor), polyethylene jacket, ambient temperatures -30 °C...+70 °C



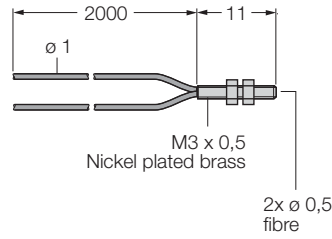
**PBPS46UMT**

Plastic fiber, diffuse mode, lateral beam, head with bendable tip, threaded bushing M6 x 0.75 mm, pre-assembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



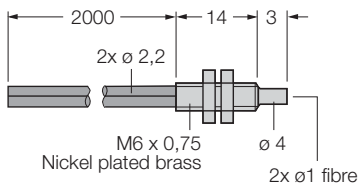
**PBT26U**

Plastic fiber, diffuse mode, threaded bushing M3 x 0.75 mm, pre-assembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



**PBT46U**

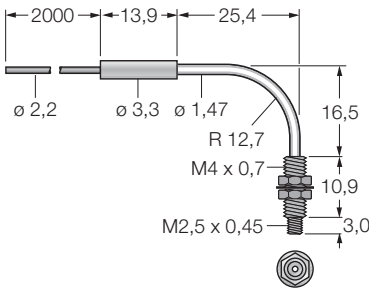
Plastic fiber, diffuse mode, polyethylene cable; ambient temperatures -30 °C...+70 °C



**Plastic fibers – opposed mode**

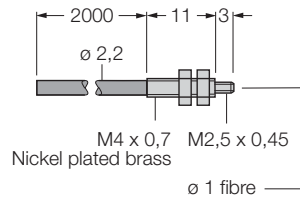
**PIAT46U**

Plastic fiber, opposed mode, angled head 90°, threaded bushing M2.5 x 0.45 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



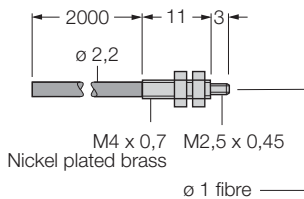
**PIT46UHF**

Plastic fiber, opposed mode, threaded bushing M2.5 x 0.45 mm, highly bendable DURA-BEND™ multicore fiber, pre-assembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



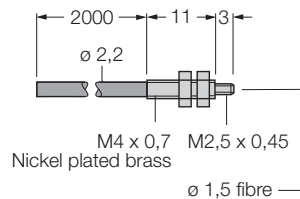
**PIT46UHT1**

Plastic fiber, opposed mode, threaded bushing M2.5 x 0.45 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures up to +125 °C



**PIT66U**

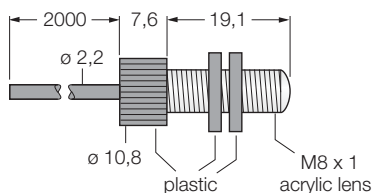
Plastic fiber, opposed mode, bundle diameter Ø 1.5 mm, threaded bushing M2.5 x 0.45 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C





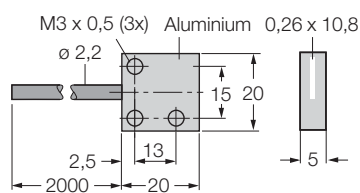
**PIL46U**

Plastic fiber, opposed mode, with acrylic lens, threaded bushing M8 x 1, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



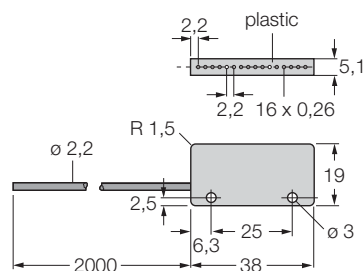
**PIR1X166U**

Plastic fiber, opposed mode, compact head, rectangular/straight beam, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



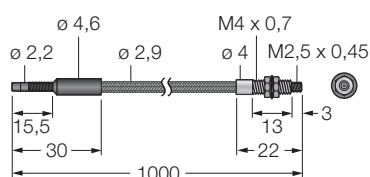
**PIRS1X166UMPMAL**

Plastic fiber, opposed mode, rectangular beam, side emission, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



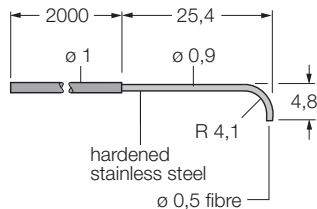
**PIT43TMB5**

Plastic fiber, opposed mode, threaded bushing M2.5 x 0.45 mm, pluggable end tip (for D12 sensor), polyethylene jacket, ambient temperatures -30 °C...+70 °C



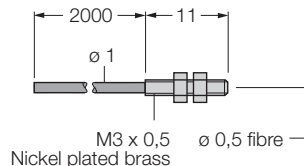
**PIA26U**

Plastic fiber, opposed mode, angled head 90°, polyethylene jacket, ambient temperatures -30 °C...+70 °C



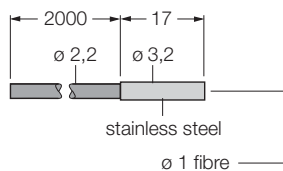
**PIT26U**

Plastic fiber, opposed mode, threaded bushing M3 x 0.5 mm, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C



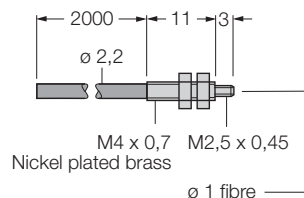
**PIF46U**

Plastic fiber, opposed mode, smooth bushing ø 3.2, preassembled wire without end tip, polyethylene jacket, ambient temperatures -30 °C...+70 °C

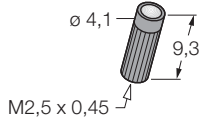


**PIT46U**

Plastic fiber, opposed mode, polyethylene cable; ambient temperatures -30 °C...+70 °C

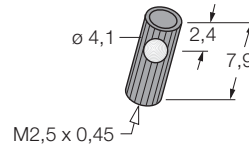


## Plastic fibers – Lenses



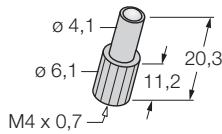
### L2

Glass lens in nickel-plated brass jacket, for range extension, ambient temperatures -60 ...+350 °C



### L2RA

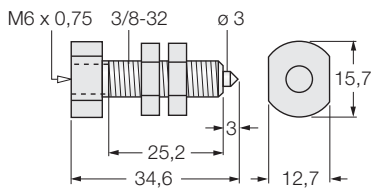
Glass lens (prism) in nickel-plated brass jacket, lateral beam emission, for range extension, ambient temperatures -60 ...+300 °C



### L4C6

Accessory lens in anodized aluminium jacket to focus the light, range 6 mm  $\pm$  1 mm, spot size  $\varnothing$  2.5 mm, ambient temperatures -40 ...+70 °C

## Plastic fibers – Monitoring of filling levels



### TGR3/8MPFMQ

Monitoring of filling levels with bifurcated plastic fiber PBT46U and PBT26UM6M.1, polypropylene jacket, quartz glass tip, ambient temperatures -30 °C...+70 °C.



## Accessories for ultrasonic sensors

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TURCK offers a large selection of accessories for operating, mounting and protection of ultrasonic sensors. .

### Features

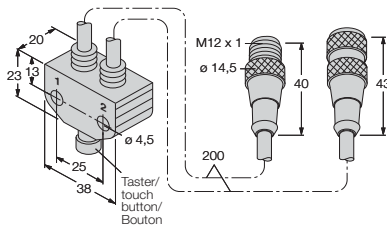
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- Teach adapter
- Programming device
- Ultrasonic adapter

## Ultrasonic sensors

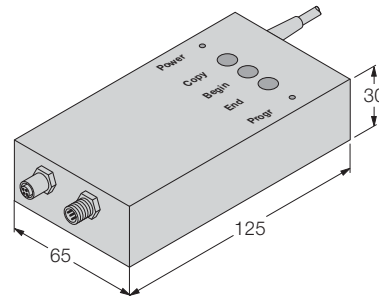
### VB2-SP2

Teach adapter for ultrasonic sensors, types RUN and RUR



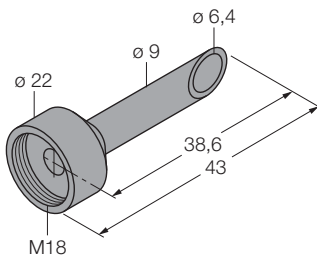
### RU-PDI

Programming device for configuration of ultrasonic sensors types RU...-M18 and RUC...-M30



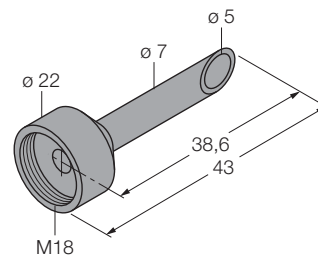
### UWG18-6.4

Ultrasonic focussing-adapter for QS18U and S18U, internal diameter 6.4 mm



### UWG18-5.0

Ultrasonic focussing-adapter for QS18U and S18U, internal diameter 5.0 mm

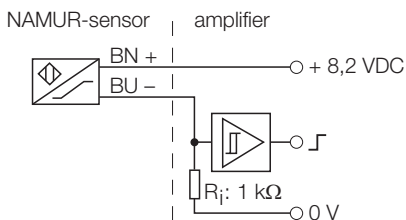


# General information

## Electrical versions

### NAMUR

NAMUR sensors according to EN 60947-5-6 are polarized 2-wire sensors which change their internal resistance depending on the damping (constant distance/current characteristic). They are designed for connection to external switching amplifiers which convert the current change into a binary output signal.



#### Advantages of NAMUR sensors

Applicable in explosion hazardous areas in conjunction with an approved switching amplifier.

Permanent wire-break and short-circuit protection via switching amplifier.

Sensors with NAMUR output are suited for detection of fast movements and high rotation speed. NAMUR sensors have the same housing style but feature a higher switching frequency.

#### Nominal operating values

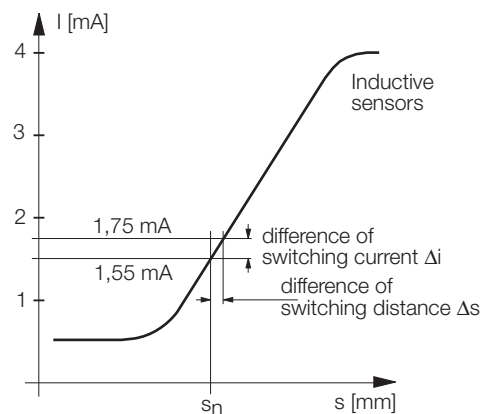
The nominal values according to EN 60947-5-6:

- $U_0 = 8,2 \text{ VDC}$
- $R_i = 1000 \ \Omega$
- $I_{\text{activated}} \leq 1.2 \text{ mA}$
- $I_{\text{non-activated}} \geq 2.1 \text{ mA}$
- Please note that capacitive magnetic field sensors feature an inverted characteristic due to their functional principle.

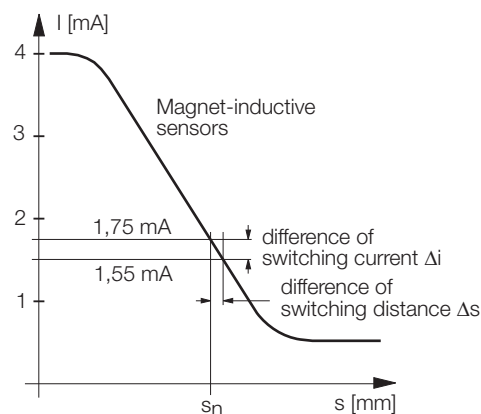
TURCK-NAMUR sensors are adjusted at 1.55 mA for  $s_n$  and 1.75 mA for  $s_n + \Delta s$ , precisely in the middle of the "NAMUR-window" (see characteristics).

- Reverse polarity protected
- Hysteresis H: 1... 10 %
- Temperature drift  $< \pm 10 \%$  (nominal temperature range  $-20...+70 \text{ }^\circ\text{C}$ )  $< \pm 20 \%$  (extended temperature range  $-40/-25...+100/120 \text{ }^\circ\text{C}$ )
- Repeatability R:  $< 2 \%$

#### NAMUR characteristic, inductive sensors



#### NAMUR characteristic, capacitive and magnetic field sensors



#### Status display (LED)

Based on the special functional principle, inductive sensors with NAMUR output feature an inverted LED function: The LED lights up in undamped and not in damped state. This is so, because in damped state only a weak current flow is produced (see NAMUR-characteristics). This is not enough to drive an LED. In undamped state instead enough current is provided for an LED signal.

# Information

## Ambient conditions

Protection rating (IEC 60529/EN 60529) IP67  
Pollution degree 3  
Shock resistance 30 x g (11 ms)  
Vibration resistance 55 Hz (1 mm)

## Use in explosion hazardous areas

If applied in explosion hazardous areas, NAMUR sensors must be connected to approved switching amplifiers with intrinsically safe control circuits. TURCK offers a wide range of approved switching amplifiers.

- Supply and output via approved external switching amplifiers Coding: ...-Y1.
- Class Ex ia IIC T4...T6 (approved for use in explosion hazardous areas; EC type examination certificate according to EN 60079-0 and EN 61214-0; approval according to directive 94/9/EG, KEMA 02 ATEX 1090 X).
- Avoid static charging when using sensor types CA40, CK40, CP40, CP80, DSU26, DSU35, K40, K90, MP, Q80.
- Mounting conditions according to certificate and instruction manual.

## Use in safety-related applications IEC 61508

Nearly all NAMUR sensors of the TURCK product portfolio are suited for the application in safety systems (inclusive of SIL2 according to IEC 61508). This has been certified by an independent test body (TÜV). The certificate is valid for all TURCK sensors with standard NAMUR output. These sensors are 100 % compatible with all standard NAMUR signal processors i.e. SPS systems with NAMUR inputs.

Failure probability ( $PFD_{avg}$ )

- $7.00 \times 10^{-6}$  test interval 1 year
- $3.50 \times 10^{-6}$  test interval 5 years
- Safe failure fraction (SFF): 0.9

## Series or parallel connection of NAMUR sensors

Not permitted with TURCK switching amplifiers.

#### Maximum cable length

In order to determine the maximum cable length, two conditions have to be considered:

Condition 1:

A maximum cable resistance of 50  $\Omega$  is predefined by the EN 60947-5-6

standard. The maximum cable length can be calculated taking this value in relation to the core diameter:

$$l = R \times Q / \delta$$

$l$  = max. core length, m

$R$  = max. resistance,  $\Omega$

$Q$  = core diameter,  $\text{mm}^2$

$\delta$  = specific resistance of the core materials (0.0175 for copper),  $\Omega \times \text{mm}^2 \times \text{m}$

Example for copper core with a core diameter of  $Q = 0.34 \text{ mm}^2$ :

$$l = 50 \times 0.34 / 0.0175 = 971 \text{ m}$$

As NAMUR sensors are operated with two cores, the determined value has to be divided by two. Concerning our example, the calculated maximum cable length would be:

$$971 / 2 = 485.5 \text{ m}$$

Note: Additional resistances, like corrosion or transfer resistance of connection terminals are not included in this calculation!

Condition 2:

If the sensor is operated in explosion hazardous areas, the maximum inductivity and capacity has to be considered. The correspondent values are listed on the data sheets of NAMUR sensors and isolating switching amplifiers.

Example:

– Isolating switching amplifier IM1-22Ex-R:

$C_{\text{max}}$  830 nF ;  $L_{\text{max}}$  5 mH (for EEx ia IIC)

– Sensor Bi5-EG18SK-Y1X:

$C_i$  = 150 nF;  $L_i$  = 150  $\mu$ H

If the values of isolating switching amplifiers and sensors are subtracted, the following values result:

$C$  = 680 nF ;  $L$  = 4.85 mH.

Values for inductivity and capacity per meter are usually indicated by the cable vendor. 110 nF/km and 1 mH/km are index values for inductivity and capacity of the cables. The following maximum cable lengths can be calculated on the basis of these standard values:

max. cable length based on 110 nF/km:

$$680 \text{ nF} / 110 \text{ nF} = 6.18 \text{ km}$$

max. cable length based on 1 mH/km:

$$4.85 \text{ mH} / 1 \text{ mH} = 4.85 \text{ km}$$

The maximally allowed cable length is the smallest value which was calculated on the basis of the two conditions.

This example lead to the following results:

– Condition 1: Cable resistance: 485.5 m

– Condition 2:

a) Cable inductivity: 6.18 km

b) Cable capacity: 4.85 km

Considering both conditions, the maximum cable length in this example is 485.5 m.



## Sensors with transistor output 3/4-wire DC

### Advantages

- Very low leakage current
- Easy connection to relays or PLCs
- Series or parallel connection possible

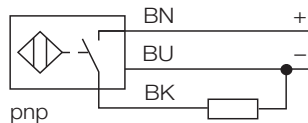
### Power supply

- Operating voltage:  $U_B$ : 10...30 VDC, 10...55 VDC or 10...65 VDC
- Ripple  $W_{ss}$ : 10 %

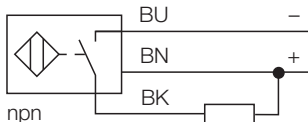
### Switching output

- Normally open (NO) or normally closed (NC) with 3-wire sensors
- Exclusive OR (XOR) with 4-wire sensors
- Cyclic short circuit protection
- Wire-break protection
- Reverse polarity protection
- Usage category 13
- Rated insulation voltage  $U_i = 0.5$  kV
- Rated conditional short-circuit current 100 A

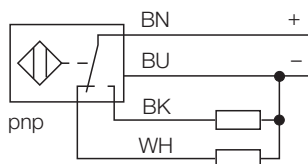
### 3-wire DC (PNP)



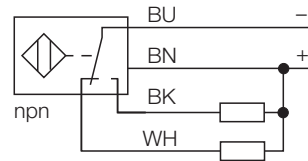
### 3-wire DC (NPN)



### 4-wire DC (PNP)



### 4-wire DC (NPN)



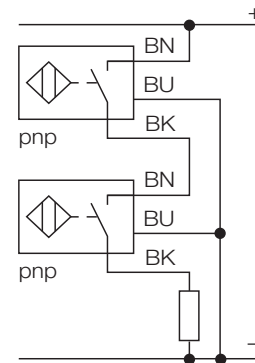
### Ambient conditions

- Protection rating (IEC 60529/EN 60529) IP67/IP68/IP69K (depending on sensor type)
- Pollution degree 3
- Shock resistance 30 x g (11 ms)
- Vibration resistance 55 Hz (1 mm)

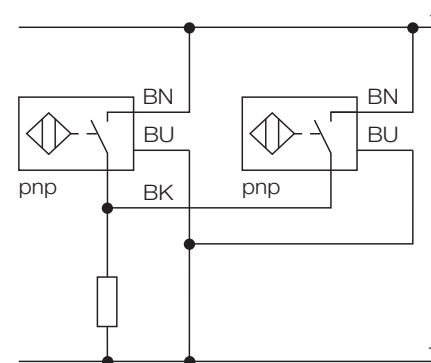
### Series or parallel connection

When sensors are series connected, voltage drops and readiness delays of the individual sensors add up.

### 3-wire DC series connection



### 3-wire DC parallel connection



## Sensors with transistor output 2-wire DC

### Advantages

- Only two wires
- Short-circuit proof

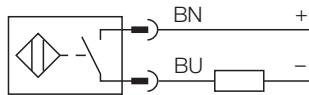
### Power supply

- Operating voltage  $U_B$ : 10...30 VDC or 10...65 VDC (see type code)
- Ripple  $W_{ss}$ : 10 %

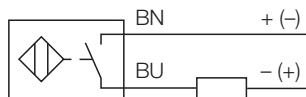
### Switching behaviour

- Normally open (NO)
- Cyclic short-circuit protection (overload trip point  $> I_e + 20 \text{ mA}$ )
- Reverse polarity protection
- Off-state current  $I_r$ :  $\leq 0.6 \text{ mA}$
- Voltage drop  $U_d$ : non-polarized version (AD)  $< 5 \text{ V}$ , polarized version (AG)  $< 4.2 \text{ V}$
- Usage category 13

### 2-wire DC (polarized)



### 2-wire DC (non-polarized)



### Ambient conditions

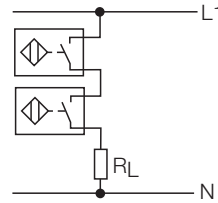
- Protection rating, minimum IP65
- Pollution degree 3
- Shock resistance: 30 x g (11 ms)
- Vibration resistance: 55 Hz (1 mm)

### Series connection of 2-wire sensors

- Normally open (NO): AND logic
- Normally closed (NC): NOR logic

When sensors are series connected, voltage drops of the individual sensors add up. This reduces the usable voltage at the load. Care must be taken not to underrange the minimum admissible supply voltage.

### Series connection of 2-wire sensors



## 2-wire AC/DC sensors

### Advantages

- Only two wires
- AC/DC connection
- Short-circuit proof (types: ADZ, RDZ, FDZ)

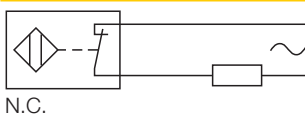
### Power supply

- Operating voltage of inductive and capacitive sensors  $U_B$ : 20...250 VAC oder 10...300 VDC
- Except for sensors with selective functions (NF) and sensors with extended temperature range up to +120 °C

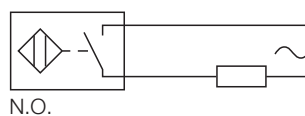
### Switching behaviour

- Normally open (NO), coding: ...ADZ/AZ
- Normally closed (NC), coding: ...RDZ/RZ
- Normally open (NO) and normally closed (NC) programmable connection, coding: ...FDZ/FZ
- Off-state current:  $I_s \leq 1.7$  mA (AC),  $I_s \leq 1.5$  mA (DC)
- Latching short-circuit protection, types ADZ, RDZ, FDZ; surge current  $\leq 8$  A ( $\leq 5$  ms, max. 5 Hz); overload trip point  $> 500$  mA
- Voltage drop  $U_d < 6 V_{eff}$
- Hysteresis H: 3...15 %
- Temperature drift  $< \pm 10$  % ( default temperature range -25...+70 °C),  $< \pm 20$  % (extended temperature range -40/-25...+100/120 °C)
- Repeatability R:  $< 2$  %
- Usage category: AC 140/DC 13
- Rated insulation voltage  $U_i = 1.5$  kV
- Rated conditional short-circuit 100 A
- Should the ambient temperature exceed + 40 °C the rated operating current is limited.

### 2-wire AC/DC, NC



### 2-wire AC/DC, NO



### Ambient conditions

- Protection rating (IEC 60529/EN 60529): IP67
- Pollution degree: 3
- Shock resistance: 30 x g (11 ms)
- Vibration resistance: 55 Hz (1 mm)

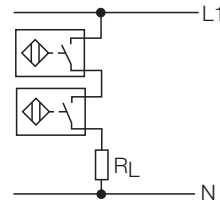
### Series connection of 2-wire AC/DC sensors

- Normally closed (NO): AND logic
- Normally open (NC): NOR logic

When sensors are series connected, voltage drops of the individual sensors add up. This reduces the usable voltage at the

load. Care must be taken not to underrange the minimum admissible supply voltage.

### Series connection of 2-wire AC/DC sensors



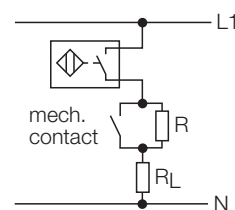
### Mechanical switches and AC/DC sensors connected in series

The open contact interrupts the supply voltage of the sensor. If the sensor is damped while the mechanical contact closes, a short time delay will occur. The readiness delay before availability ( $t \leq 80$  ms) prevents immediate switching  
Solution: A resistor connected in series with the contact ensures the minimum voltage supply to the sensor. Thus, the time delay before availability after opening of the mechanical contact is avoided

Formular to calculate the resistance value:

$$R = 10V / I_{Load} P = I_{Load}^2 \times R$$

### Series connection with mechanical switches

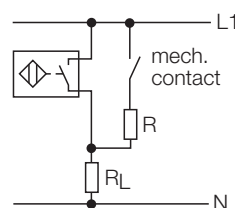


### Mechanical switches and AC/DC sensors connected in parallel

The closed contact interrupts the supply voltage of the sensor. The sensor is ready for operation after opening the contact and following time delay ( $t = 80$  ms)

Solution: A resistor connected in parallel to the mechanical contact supplies the sensor in open contact state, so that the time delay before availability effect is avoided. For 230 VAC the resistance value is approx. 91 k $\Omega$ /1 W.  
Approximate resistance value 400  $\Omega$ /V

### Parallel connection with mechanical switches



## Sensors with analog output

### Advantages

- Linear characteristic (except SiU)
- Miniature design with extended sensing range and non-linearized output (SiU)
- Variable outputs: Current, voltage, frequency, adjustable switching output.

### Power supply

- Operating voltage  $U_B$ : 15...30 VDC
- Ripple  $W_{ss}$ : 10 %

### Ambient conditions

- Protection rating, minimum IP65
- Pollution degree 3
- Shock resistance: 30 x g (11 ms)
- Vibration resistance: 55 Hz (1 mm)

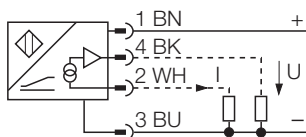
### Standard data

- Repeatability R: < 1 %; R < 0.5 % after warm-up time 30 min.
- Temperature drift:  $\leq 0.06\% / ^\circ\text{C}$
- Usage category: 13
- Rated insulation voltage:  $U_i = 0.5\text{ kV}$

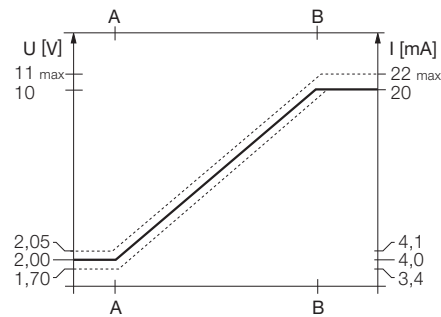
### Load resistance

- Current output: < 0.4 k $\Omega$
- Voltage output:  $\geq 4.7\text{ k}\Omega$
- Frequency output: < 1 k $\Omega$

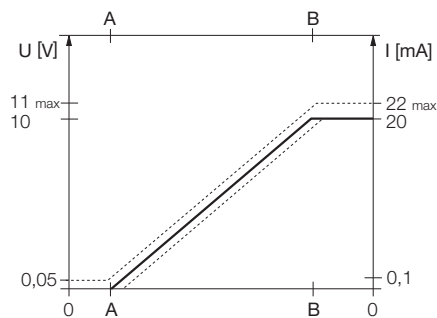
### Wiring diagram of sensors with voltage and current output (example)



### Output characteristic of sensors with 2...10 V/4...20 mA output (example)



### Output characteristic of sensors with 0...10 V/0...20 mA output (example)





# General information

## Standards and directives (if applicable)

### Standards

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#### EN 60947-5-2

Low voltage switchgear and control-gear, part 5: Control units and switching elements, main section 2: Proximity switches

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#### EN 60079-0

Electrical apparatus for use in explosion hazardous locations, General requirements

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#### EN 60079-11

Electrical apparatus for use in explosion hazardous locations Intrinsic safety „i“

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#### EN 60079-15

Electrical apparatus for use in explosion hazardous locations type of protection „n“

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#### EN 61241-0

General requirements for electrical equipment applied in areas exposed to flammable dust

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#### EN 61241-1

Electrical equipment for application in dust exposed areas, protected by housing

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#### EN 61000-6-4

Electromagnetic compatibility (EMC), generic emission standard

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#### EN 61000-6-2

Electromagnetic compatibility (EMC), generic immunity standard

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#### EN 60529/IEC 60529/DIN VDE 0470-1

Protection ratings (IP code) of the housings indicating the degree of protection against the ingress of dust and humidity.

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#### EN 60947-5-6 (NAMUR)

Control units and switching elements/proximity switches, DC interface for proximity sensors and switching amplifiers (NAMUR)

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#### IEC 61508 (SIL)

Functional safety of safety related, electronic and programmable electronic systems

# Information

## Directives

### 2006/95/EG

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Low voltage directive

### 2004/108/EG

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Electromagnetic compatibility;  
CE marking

### 94/9/EG

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Explosion protection (ATEX)

### CE

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The CE-symbol is neither a seal of quality nor a test mark but serves for free trade within the European Community. Manufacturers assure that the protective aims of the applicable directives are fulfilled by CE-labeled products.

# General information

## Housing materials

### Housing materials – abbreviations and explanations

#### ABS

Acrylnitril-Butadien-Styrol  
impact resistant, rigid

#### AL

Aluminium  
low specific weight, good oxidation resistance

#### CuZn-Cr

Chrome-plated brass  
standard housing material

#### CuZn-OP

Optaloy-coated brass  
standard housing material

#### CuZn-T

Teflon-coated brass  
protection against weld splatter

#### DURO

Duroplast  
excellent mechanical strength and temperature resistance

#### EPTR

Thermoplastic rubber  
good mechanical strength, temperature and chemical-resistant

#### FEP

Fluoropolymer  
high temperature resistance, high abrasion resistance, resistant to acids, alcalis, solvents, lacquer, benzine and oils

#### GD-Al

Die-cast aluminium  
low specific weight, excellent tightness and durability

#### GD-Zn

Die-cast, zinc  
excellent tightness and durability

#### LCP

Liquid crystal copolyester  
excellent stability, low thermal expansion, excellent chemical resistance and flame retardant properties (UL94-V0)

#### PA

Polyamide  
good mechanical strength, temperature resistance, PA6/12 approved for the food industry

#### PA-T

Teflon-coated polyamide  
protection against weld splatter

#### PA-X

Irradiated polyamide  
excellent mechanical strength, high temperature resistance, PA6/12 approved for the food industry

#### PBT

Polybutylenterephthalate  
excellent mechanical strength and temperature resistance, good resistance against chemicals, flame retardant and self-extinguishing (UL94-V0), transparent and UV-resistant

#### PC

Polycarbonate  
highly impact-resistant

#### PEEK

Polyethertetherketone  
good mechanical properties at high temperatures, high dimensional stability and chemical resistance





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**POM**

Polyoxymethylene  
high impact resistance, good mechanical and chemical resistance

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**PP**

Polypropylene  
excellent chemical resistance, even against acids, alkalis and solvents. High temperature and mechanical resistance.

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**PTFE**

Teflon  
excellent resistance to high temperatures and chemicals

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**PUR**

Polyurethane  
elastic, abrasion-proof, impact resistant; oil, grease and solvent resistant

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**PVC**

Polyvinylchlorid  
good mechanical strength, impact and chemical resistance

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**PVDF**

Polyvinylidenfluorid  
high temperature resistance, good chemical resistance (similar to PTFE), high mechanical strength

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**SrFe**

Strontium-Ferrite  
properties are similar to ceramic material with respect to rigidity and brittleness, good resistance to corrosion and chemicals

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**Trogamid**

Polyamide  
transparent, hard, rigid, good chemical resistance

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**ULTEM (PEI)**

Polyetherimide  
excellent mechanical strength and temperature resistance, good chemical resistance, (PEI) flame retardant and self-extinguishing (UL94-V0), transparent and UV-resistant

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**V4A**

Top-quality stainless steel  
Excellent corrosion resistance, specified for high requirements, especially for the food industry

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**VA**

Stainless steel  
excellent corrosion resistance, specified for high requirements of the food industry

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**VA-T**

Teflon-coated stainless steel  
protection against weld splatter

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**VES**

Vestamid (PA)  
good mechanical strength and excellent temperature resistance

## Sensor cables

### PVC cable jacket with PVC wire insulation

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Standard quality, fine-wire litz construction, highly flexible (Li-fYY)

### PUR cable jacket with PVC wire insulation

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Resistant to all industrial oils and lubricants. Fine-wire litz construction. Resistant to vibration and bending stress; small bending radius  
Identification: .../S90

### Silicone cable jacket with silicone Adernisolation

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For use at high or low ambient temperatures (-50...+180 °C) moderate mechanical strength, average resistance to alkalis, acids, oils and solvents  
Identification:  
.../S140 or .../S120 (+120 °C)  
SiHSi, 2 x 0.5 mm<sup>2</sup>, 16 x 0.2  
SiHSi, 3 x 0.5 mm<sup>2</sup>, 16 x 0.2  
SiHSi, 3 x 0.25 mm<sup>2</sup>, 14 x 0.15

### PTFE cable jacket with PTFE wire insulation

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Optimum resistance to high temperatures and chemicals  
Identification:  
.../S120 (+120 °C)  
.../S907 (+160 °C)  
.../S200 (+200 °C)

### FEP cable jacket FEP wire insulation

---

Suited for low temperature applications  
Temperature range -100...+180 °C  
Identification: .../S939 (-60 °C)

### Ölflex PUR cable jacket with PVC wire insulation

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Good resistance to oils, extremely abrasion and friction-resistant, firm, antiseptic and hydrolysis resistant, temperature range -5...+70 °C  
Identification: .../S396 (underwater)

### TPE cable jacket with TPE wire insulation

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Good temperature and chemical resistance (-40...+130 °C)  
Identification: ...EG08.../S100



# Glossary

## Terms and definitions

### Active face

The point where the high-frequency magnetic field leaves the sensor. Regarding threaded barrel sensors, the active face is at the front. Concerning rectangular plastic sensors, the zone of the active face is marked with a target.

### AID alignment indicating device (photoelectric sensors)

The AID emits pulses at a rate proportional to the quantity of received light. The higher the pulse frequency, the higher the amount of light. A pulse rate of 1 Hz indicates that the sensor receives just the right amount of light it needs to switch. Slight contamination may cause malfunctioning. A pulse rate of 3 Hz or more ensures reliable operation of the sensor.

### Air pressure (ultrasonic sensors)

Normal atmospheric changes of  $\pm 5\%$  (for a local reference point) can lead to a deviation of the sensing range of about  $\pm 0.6\%$ .

### Air streams (ultrasonic sensors)

Air streams influence the echo time, however, air flow speeds of up to 10 m/s are insignificant. In conditions where turbulences prevail, e.g. above glowing metal, the use of ultrasonic sensors is not recommended, because the echo of distorted sound waves is difficult to evaluate.

### Air temperature and humidity (ultrasonic sensors)

Both air temperature and air humidity influence the sonic pulse duration. An increase of temperature by 20 °C causes a change of the sensing distance of max. 8%. An increase of humidity results in an increase of sound speed of max. 2%. The distance to the object seemingly decreases with a higher sound speed.

### Alarm output

The alarm output indicates low excess gain or overload. Many sensors mentioned in this catalog feature an alarm output.

### Ambient conditions (photoelectric sensors)

The ambient conditions determine the sensor's reliability. Working at its maximum range in demanding ambients, the sensor will soon perform less efficiently and finally be inoperable due to dirt covering the lens. If the same sensor works at half its distance in the same environment, the good performance may be kept stable for a longer time. The optimal range for each sensor and the individual ambient conditions is determined with the excess gain curve.

### Analog output signal

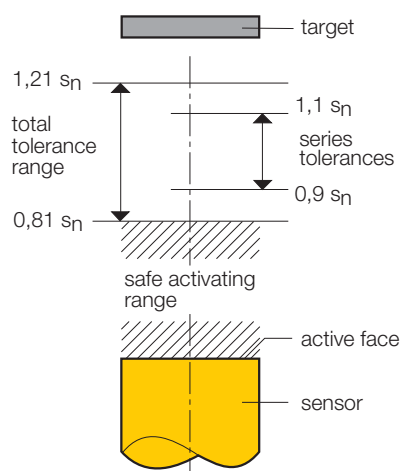
The analog output signal is provided at the output either at 4...20 mA, 0...10 V or a similar power rate.

### Assured switching distance ( $s_a$ ) inductive sensors

"Distance at which the sensor securely switches". Correlation to rated switching distance  $s_n$ :  $s_a < 0.81 \times s_n$

### Assured switching distance ( $s_a$ ) capacitive sensors

- Distance at which the sensor securely switches
- Correlation to rated switching distance  $s_n$ :  $s_a < 0.72 \times s_n$



#### Background suppression (photoelectric sensors)

Normal diffuse mode sensors switch on when the level of light reflected back to the receiver exceeds the sensor's threshold. A dark object that is close and a bright object that is further away reflect the same quantity of light. It is recommended that, in order to have an acceptable contrast, any object that has to be ignored, should be at least four times further away than the actual target to be detected. Background suppression sensors not only detect the amount of energy returned to the sensor but also determine the distance to the object reflecting the light. A background suppression sensor detects objects reliably up to a set distance (the cutoff point) while ignoring other objects that are slightly further away regardless of their surface reflectivity.

#### Blind zone (ultrasonic and linear position sensors)

Diffuse mode ultrasonic sensors are not capable of detecting targets located directly in front of the sonic transducer. The area between the sonic transducer surface and the beginning of the detection range is called blind zone and must always be kept free. With regard to linear position sensors, the blind zone marks the area in which the positioning element can not be detected

#### Burst pressure (pressure sensors)

The minimum pressure a sensor must withstand without damage. If the minimum pressure is exceeded, the sensor may leak or be destroyed..

#### Close-up range suppression (capacitive sensors)

Dirt deposits and humidity are blanked out through integrated self-compensation.

#### Color effects (photoelectric sensors)

Colored objects may affect the measurement accuracy of photoelectric sensors. White, red, yellow and orange objects reflect more light than green, blue or black ones. All values indicated in this catalog are related to the official white Kodak test card.

#### Contrast (photoelectric sensors)

The most important factor for reliable operation of photoelectric sensors is the contrast. Contrast is the degree of difference between two sensing conditions, light and dark. For example, a thick cardboard box breaks a retroreflective beam. The contrast is determined through adjusting first the light condition. For this purpose the sensitivity is reduced to the minimum level (counter clockwise rotation of button). Subsequently the level of sensitivity is increased until the status LED lights up. Next the dark condition is established when the sensor switches off. Subsequently the sensitivity is increased until the status LED lights up again. The best contrast is achieved if the difference between both switching states covers more than a third of the adjustable range. Sensors without sensitivity adjustment are not suited for low contrast applications.

#### Convergent mode sensors (photoelectric sensors)

Convergent mode sensors use a lens system that focuses the emitted light to an exact point in front of the sensor and focuses the receiver element at the same point. They operate like diffuse mode sensors, detecting an object through its reflectivity. Small objects, edges and transparent materials are reliably detected. It is important though that the objects are within the near-field depth. The near-field depth is defined as the area in front and behind the focal point in which objects are detected. The higher the reflectivity of an object the deeper the field. Through bundling light in the focal point, convergent mode sensors are capable of detecting objects with low reflectivity. They detect transparent materials easily, such as glass bottles on conveyor belts. Convergent mode sensors working with visible light are suited for the detection of color marks.

#### Correction factors

see Reduction factors

#### Crosstalk (ultrasonic sensors)

Crosstalk occurs when ultrasonic sensors are mounted side by side. It can either be avoided through minimum distances kept between the sensors, alternate operation or synchronization (see multiplexing).

#### Degree of pollution

§ 6.1.3.2 of IEC 60947-1 defines 4 pollution degrees: TURCK proximity sensors belong to category 3 as per IEC 60947-1 conductive or dry, non-conductive dirt that becomes conductive due to condensation.

#### Designs and beam angle (ultrasonic sensors)

TURCK ultrasonic sensors are available as threaded barrels M18/ M30 or rectangular Q30 devices with a narrow beam angle of 6°. They detect very small objects with pinpoint accuracy up to a distance of 8 m. Q45U and T30U types feature beam angles of 12° to 15° and achieve longer ranges. CP40 types with a beam angle of 60° monitor large areas and are immune to tilt when detecting objects with smooth and even surfaces.

#### Diffuse mode sensors (photoelectric sensors)

Like retroreflective sensors, diffuse mode sensors host emitter and receiver circuitry in the same housing. In this sensing mode, an object is not detected through the interruption of a light beam but through the reflectivity of an object. An object is detected when sufficient light is reflected back to the emitter. The switching distance of diffuse mode sensors depends largely on the reflectivity of the object.

#### Diffuse mode sensors with background suppression (photoelectric sensors)

Diffuse mode sensors with background suppression operate with an emitter and several receivers. They not only detect the amount of light returned but also the distance to the object and figure out if the object is within or outside the sensing range. They are available either with fixed or adjustable field

#### Digital output

Digital output signals are ON/OFF signals which are produced when continuous measurement reaches a given value. They are usually produced with PNP/NPN transistors or an electromagnetic relay.

#### Distance measuring gauge (inductive sensors)

Square metal plate to determine the measuring range  $s_n$ :

- Material: St37
- Thickness: 1 mm
- Edge length  $3 \times s_n$ , if  $3 \times s_n$  is greater than the diameter of the active face, otherwise just the diameter of the active face.

#### Dynamic output

Sensors with dynamic output respond highly sensitive and create a short pulse upon damping.

#### EMC (electromagnetic capability)

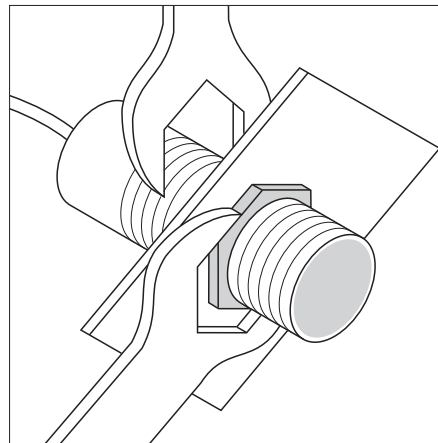
The ability of an electrical device to operate failure-free and without negative influence on the operating environment.

#### Excess gain (photoelectric sensors)

Excess gain indicates how much light a sensor receives under certain conditions. This value is compared to the amount of light the sensor needs to switch. Excess gain 1 indicates that the sensor receives a minimum quantity of light, just enough to work. Excess gain 50 indicates that the sensor receives fifty times more light than needed for proper operation. In a clean environment, excess gain 1.5 is sufficient to ensure proper operation of the sensor in case of offset or gradual consumption of the LED. If dust, fume or mist is expected to contaminate the lens, excess gain should be higher than 1.5. All values for the sensing ranges stated in this catalog refer to excess gain 1.

#### Fixing torque

Concerning threaded barrel sensors, the maximum moment of force to be observed in order to avoid torsional stress. You find the corresponding values on the data sheets. If exposed to strong vibrations, use liquid threaded fastener on anaerobic base (e.g. Loctite 242).



#### Flush and non-flush mounting (inductive and capacitive sensors)

Flush mountable sensors can be mounted in metal up to the active face. Non-flush mountable sensors have to protrude the metal, they have larger sensing ranges.

Non-flush mountable *uprox*<sup>®</sup>+ sensors with integrated self-compensation can be embedded partially (see technical data). Flush mountable *uprox*<sup>®</sup>+ with integrated self-compensation can be recessed (see technical data).

#### Hysteresis function (pressure sensors)

This function is used to establish a stable switching state, independent of system-related pressure fluctuations near the adjusted set point. The switching range is limited by a switchpoint (SP) and a release point (RP) adjusted by the user.

#### Linearity deviation

Indicated by sensors with analog output. Admissible deviation of the output signal from an ideal linear curve, indicated in % f.s. of the output signal.

### **Magnetic field immune**

Magnetic-field immune sensors with ferrite core are insensitive to magnetic fields occurring in welding systems for example. All *uprox*<sup>®</sup>+ and *uprox*<sup>®</sup> sensors are immune to magnetic DC or AC fields.

### **Measurement accuracy**

The closeness of the measured value to the nominal value. See also Measurement deviation

### **Measurement deviation**

Deviation of a measured value from a nominal value according to DIN 1319-1:1995.

### **Measurement error**

see Measurement deviation

### **Measuring range**

Indicated by sensors with analog output.  
The range within which the output signal is changed.

### **Media temperature (flow sensors)**

The temperature range in which the sensor operates according to its measurement properties.

### **Minimum operating current (I<sub>m</sub>)**

Minimum current in ON state to maintain the functionality. Indicated for 2-wire sensors only.

### **Multiplexing (ultrasonic sensors)**

Mutual influence is impossible with alternately operating ultrasonic sensors. The more sensors are operated alternately, the lower the switching frequency. The X1-line of the sensor series RUC-M30, RU-Q30 and RU-M18 can also be used as an enable input for multiplexing. If the X1-line is connected to +24 V, the sensor is enabled; if the X1-line is connected to 0 V, the sensor is disabled. Multiplexing via the X1-line has the advantage that for each enable-operation only the response time and not the time-delay before availability has to be considered. Once connected to the X1 line, most sensors can be programmed with the RU-PDI to multiplex automatically.

### **Noise suppression (ultrasonic sensors)**

Noise such as metal clink or roaring pressure have no influence on the evaluation of signals thanks to the optimally adjustable frequency range and the patented noise suppression circuitry.

### **No-load current (I<sub>o</sub>)**

Current flow between supply voltage and 0 V. Indicated for 3 and 4-wire sensors only.

### **Object color (photoelectric sensors)**

The color as well as the transparency of objects has no influence on the sensing range. Glass or perspex are reliably detected.

### **Object surface (photoelectric sensors)**

Sometimes the surface quality of an object helps to choose the right sensor. Photoelectric sensors are usually not the right choice for mirror-like surfaces. Measuring errors are likely to occur even with semi-transparent and porous surfaces such as plastic or foam.

### **Operating range (flow sensors)**

The operating ranges vary from one type of fluid to the other. They are proportional to the speed of the fluid that the sensor can detect. At the same flow rate compared to water, air can only conduct away a fraction of the heat from the heating element. Therefore different operating ranges apply for water, oil or air.

### **Operating range (pressure sensors)**

Is the tolerance, in which deviation of pressure is permitted.

### **Operating range (temperature sensors)**

Is the tolerance in which deviation of temperature is permitted.

### **Operating modes (ultrasonic and photoelectric sensors)**

Ultrasonic sensors are mainly used in the diffuse mode. An object in front of the sensor is detected by the partly reflected sound wave. They are also used in opposed and retroreflective mode. An ultrasonic opposed mode sensor consists of an emitter and a receiver which listen to each other permanently. The ultrasonic sound is interrupted by an object between emitter and receiver, causing the sensor to switch. Photoelectric sensors operate according to the same principles using light instead of sound

### **Opposed mode sensors (photoelectric sensors)**

Opposed mode sensors consist of emitter and receiver mounted in separate housings. They are installed directly opposite each other in such a way that the light from the emitter is aimed directly at the receiver. When an object interrupts or weakens the light beam, the sensor switches. Opposed mode sensors are the most reliable photoelectric sensors for detection of opaque targets.

#### Optical fibers

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Optical fibers are suited for many applications:

- Detection of small objects
- Fit in confined spaces
- High-temperature resistant
- Immune to strong magnetic fields
- Vibration proof
- Resistant to aggressive gases
- Suited for explosion hazardous areas

Optical fibers made of glass or plastic are used to pipe light from the sensor to the object and back. They are passive components of a photoelectric system. Because of their passiveness and the absence of moving parts, light can be piped in hazardous areas. They are also immune to electromagnetic interference. The strands are incased in a cladding that reflects light to the core. The cladding has a lower refractive index than the core. The law of total internal reflection defines, when a light beam hits the medium boundary between two media with different refractive index, it is totally reflected, provided the angle of incidence does not exceed a determined critical angle.

#### Output function

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NAMUR: Standard output signal according to EN 60947-5-6

Normally open (NO): The output is open when the sensor is non-activated and closed when the sensor is activated.  
Normally closed (NC): The output is closed when the sensor is non-activated and open when the sensor is activated.

Antivalent: One of the two outputs is closed when the sensor is non-activated and the other one when the sensor is activated.

Analog output: The signal provided at the output is either 4...20 mA or 0...10 V.

SSI output: Digital output transmitting measured values directly to the control unit or via remote I/O fieldbus station.

#### Overpressure (pressure sensors)

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The maximum pressure load exerted on the sensor occasionally without impeding its functionality, yet allowing the tolerances to be exceeded.

#### Precipitation and humidity (ultrasonic sensors)

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Normal concentrations of rain or snow do not affect the sensor's operability. The CP40 transducers are not protected against humidity (protection class IP40). All other types are not damaged by water but correct functionality may be impaired. Ultrasonic transducers should generally be protected against direct wetting.

#### Predamping protection

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Self-compensation inhibits predamping of non-flush mountable sensors and enables partial embedding of the same with reduced switching distances.

#### Pressure range (pressure sensors)

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The operating range in which deviation of pressure is permitted.

#### Principle of photoelectric sensing

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Photoelectric sensors operate on the principle of emitting and receiving light. All sensors in this catalog are compact devices having optics, amplifier and switching output in the same housing. A diode emits a light beam which is either cut off (opposed mode) or reflected by an object (retroreflective/diffuse mode). The sensor detects a change in light intensity causing the output to switch. Photoelectric sensors operate with modulated light in order to blank out unwanted influence of ambient light.

#### Polarizing filter (photoelectric sensors)

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If strong reflecting objects have to be detected with retroreflective sensors a polarizing filter is required. A tripel reflector redirects the light beam by 90°, maintaining the polarization of the light reflected by the object's surface. The polarizing filter enables the sensor to distinguish between light thrown back from the object or from the reflector.

#### Power consumption

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The power needed to operate a sensor. For sensors with switching output the power consumption is indicated without load

#### Protection rating

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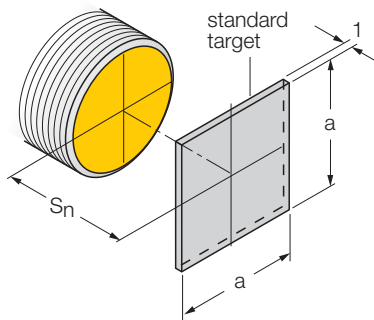
Protection against contact with and ingress of foreign bodies and water:

- IP65: Full protection against dust and hose water
- IP67: Full protection against dust and water. Watertight at a depth of 1 m, for a period of 30 min. and constant ambient temperature.
- IP68: Sensors for higher demands; 24 hrs. continuous storage at +70 °C; 24 hrs. continuous storage at -25 °C; 7 days submerged at a depth of 1 m; 10 temperature cycles + 70 °C...-25 °C, dwell cycle per temperature 1hrs.
- IP69K: Suited for high pressure cleaning acc. to DIN 40050-9 following EN 60529



### Rated operating distance (sn)

The rated operating distance is measured through the axial approach of a standard target. Manufacturing tolerances and external influences such as temperature and voltage are not considered. The tables only indicate the rated operating distances.



### Readiness delay

Sensors feature a readiness delay of < 80 ms to suppress failure pulses occurring in the period between power-on and operational readiness.

### Real switching distance (Sr)

Real switching distance ( $s_r$ )

- Switching distance under fixed temperature and supply conditions
- Factory set tolerances are taken into account
- Correlation to rated operating distance  $0.9 s_n < s_r < 1.1 s_n$ .

### Reduction factor

The switching distance of inductive ferrite core sensors depends on the material of the actuating element. The maximum switching distance is attained with mild steel St37, whereas with other metals only smaller switching distances are achieved.

The reduction factor indicates to which fraction the switching distance is reduced by using other metals than St37.

Typical reduction factor values : Mild steel (St37): 1; brass: 0.35 - 0.5; copper: 0.25 - 0.45; aluminium: 0.35 - 0.50; stainless steel: 0.6 - 1

*uprox*<sup>®</sup> and *uprox*<sup>+</sup> sensors have the same switching distance for all metals. The reduction factor is always 1.

### Reflectivity of surfaces (photoelectric sensors)

An object has to reflect sufficient light in order to be detected by a diffuse or a convergent mode sensor. The amount of light received, depends on the emitting power of the sensor and the reflectivity of the object. A dark object reflects less light than a bright one (see Excess gain). A smooth, mirror-like surface has to be aligned perpendicular to the sensor's axis. Otherwise, the light is not reflected back.

### Reflectors and filters (photoelectric sensors)

All sensing ranges of photoelectric sensors and excess gain curves of retroreflective sensors mentioned in this catalog were determined with the BRT75 reflector. Retroreflectors are designed in such a way that light is reflected back in the same direction. The amount of light reflected back to the sensor depends on two factors:

1. The size of the reflecting surface
2. The reflector's reflectivity.

Short distances require a reflector with Ø 25 mm which is capable of reflecting the light as good as a Ø 75 mm reflector. A Ø 75 mm reflector reflects up to nine times more light than a Ø 25 mm and is suited for longer distances..

### Refreshing rate

The period a value takes to be formed in an application in device A, to be sent on line to a device B and made available to the application there. The refreshing rate should not be confused with the response time, which is slower in most cases. A floating average value can be formed for a data volume of 10 ms and given out every 1 ms. In this case the refreshing rate is 1/1 ms resp. 1 kHz, while the response time is 6 ms.

### Release point (pressure sensors)

In hysteresis mode, the output switches at the release point (rP) when system pressure decreases. In window mode, the output switches at the rP independent of whether system pressure increases or decreases.

### Repeatability

Repeatability is defined as the deviation of the switchpoint after often repeated switching, under identical conditions and with the same digital sensor.

For example, a laser sensor is programmed to switch at 100 mm. The actual distance is measured twenty times with a micro-meter. The standard deviation measured is 0.01 mm.; the two sigma repeatability is 0.02 mm.

### Repeatability

Sensors with switching output (digital):

Deviation of the switchpoint after often repeated switching, under identical conditions and with the same sensor. Sensors with analog output: Change of the output value under the same conditions and with the same sensor. Value of the measured range indicated in percentage.

### Residual current (Ir)

2-wire sensors: The current which flows in non-active condition.

3 and 4-wire sensors: The current which flows in non-active condition between the output and 0 V (PNP output), resp. between output and supply voltage (NPN output).

## Glossary

### Terms and definitions

#### Resolution

Analog signals converted to digital signals by a DA converter. Each digital signal is individually resolved. The resolution indicates the increment of the signal, meaning the smallest possible change of the analog output signal.

#### Response time (flow sensors)

Is the time a sensor takes to react to a given change of an input signal.

Example: A temperature sensor working at 0 °C is instantly immersed in 100 °C hot water. After 4 seconds, the sensor indicates 63 °C. The response time is thus 4 seconds.

#### Retroreflective sensors (photoelectric sensors)

Retroreflective sensors host both emitter and receiver circuitry in the same housing. A light beam is established between the emitter, reflector and receiver. An object is sensed when it interrupts the beam. Retroreflective sensors share some advantages with opposed mode sensors such as good contrast and high excess gain. Moreover, only one device has to be installed and wired. A retroreflective target is an optical device that reflects the light back in the direction of the light source. Retroreflective sensing mode allows reliable detection over a relatively long distance without the need to wire up two electrical devices.

#### Reverse polarity protection

Protection against false connection.

#### Ripple

Residual AC voltage superimposed on the DC supply voltage. Usually 10 % ripple (peak to peak) of the applied supply voltage is tolerable.

#### Sensing conditions (ultrasonic sensors)

The ultrasonic transducers are especially optimized for the medium „air“. They can also be used for other gaseous media. In this case the sensitivity and the range need to be adjusted.

#### Standby time (flow sensors)

The time a flow sensor needs to achieve a stable state after it has been turned on.

#### Static output (ring sensors)

Sensors with a static output produce a constant pulse as long as they are damped. In principle, all proximity sensors feature a static output. The term is used in connection with ring sensors (see also dynamic output).

#### Storage temperature

The storage temperature may range from -30...+85 °C.

#### Surface roughness (ultrasonic sensors)

Ultrasonic sensors detect objects with a surface roughness exceeding 0.15 mm. On the one hand, the surface need not be aligned exactly towards the sensor but on the other hand the sensing range has to be reduced.

#### Surge current

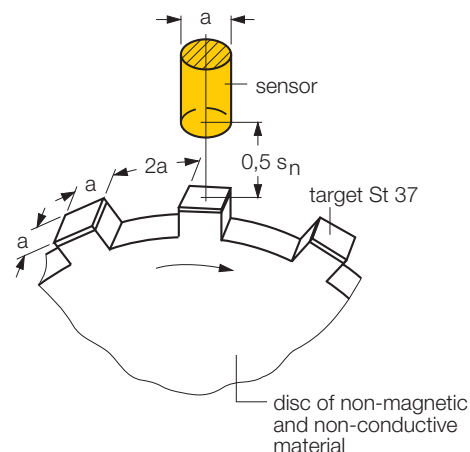
Inrush current transiently flowing through the output.

#### Switching distance (s)

Distance at which a change of signal is produced with axial approach of the object.

#### Switching frequency

The switching frequency indicates the number of status changes per second. The higher the switching frequency the more often switching can be repeated per second resp. the faster the switching operation. Concerning proximity switches, the switching frequency indicates the maximum number of changes between damped and undamped state per second (Hz). Maximum switching frequency at an operating distance  $s = S_N/2$ , measured with a gauge wheel.



#### Short-circuit protection

Protection against overload.

#### Switching frequency (max.)

The maximum switching frequency indicates how many status changes per second are possible.

#### Switch element function

see Output function

### Switch-off time (flow sensors)

Time the flow sensor needs to measure and display the drop in flow speed.

### Switchpoint (pressure and temperature sensors)

In hysteresis mode, the output switches at the switchpoint (sP) when system pressure or temperature increases. In window mode, the output switches at the sP independent of whether system pressure or temperature increases or decreases.

### Switchpoint accuracy (pressure and temperature sensors)

The switchpoint accuracy defines the maximum admissible deviation of an adjusted value from the actual switchpoint value.

### Switching delay

Is the period between attaining a switchpoint and resulting change of status at the output.

### Switch-on time (flow sensors)

Time the flow sensor needs to measure and display the increase in flow speed.

### Synchronization (ultrasonic sensors)

Crosstalk can be avoided through synchronization. Most sensors of the RUC-M30, RU-M18 and RU-Q30 series synchronize themselves by simply connecting the synchronization line. They emit sonic pulses simultaneously, performing like a single sensor with extended angle of detection.

### System pressure (pressure sensors)

The media pressure exerted on the pressure sensor.

### Temperature drift

Temperature-dependent change of switchpoint or output value.

### Temperature gradient (flow sensors)

The temperature gradient defines the max. temperature rise that a flow sensor can adapt to without damage. The sensors have the ability to compensate temperature jumps within specified tolerances. Excess of these tolerances may lead to malfunction. In this case, the sensor has to be adjusted to the new temperature range to ensure correct detection of flow.  
Unit of measure: °C/min. or K/min.

### Transparent objects (photoelectric sensors)

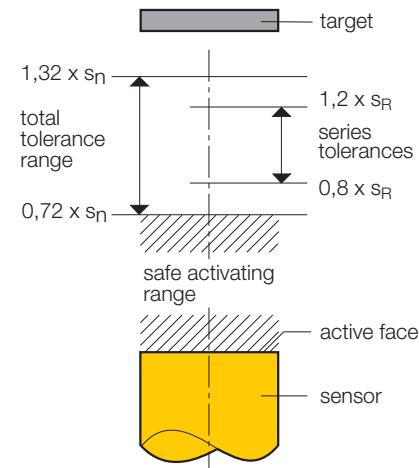
Transparent objects are hardly detected by opposed mode sensors as they reflect the light beam only partially. Retroreflective sensors are better suited for this task because the light beam passes the object twice. This improves the contrast considerably. Anyhow, the switchpoint has to be adjusted precisely which is only possible with sensors featuring sensitivity adjustment. Diffuse mode or convergent mode sensors are best suited for this job.

### Usable operating distance (Su) (capacitive sensors)

Operating distance which is guaranteed within the permitted temperature and voltage range.

Correlation to rated operating distance:

- $0.8 \times s_r < s_u < 1.2 \times s_r$
- $0.72 \times s_n < s_u < 1.32 \times s_n$

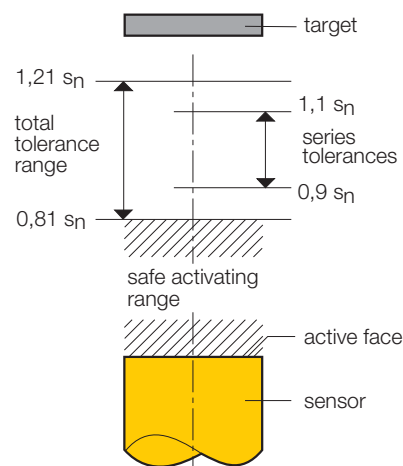


### Usable operating distance (Su) (inductive sensors)

Operating distance which is guaranteed within the permitted temperature and voltage range

Correlation to rated operating distance

- $0.9 \times s_r < s_u < 1.1 \times s_r$
- $0.81 \times s_n < s_u < 1.21 \times s_n$



## Glossary

### Terms and definitions

#### Utilization categorie

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The utilization category indicates the area in which sensors can be operated. Category IEC 60947-5-2 is defined in relation to the correspondent rated current, rated voltage and the load current.

Inductive sensors by TURCK fulfill the following categories:

DC-13: Control of electromagnets

AC-140: Control of smaller electromagnetic loads with holding current  $> 0.2$  A

#### Voltage drop (Ud)

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Voltage drop is the reduction in voltage of a connected output.

#### Weld-proof

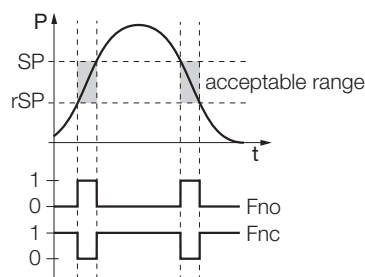
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Weld-resistant sensors can be applied in welding systems. They incorporate a special ferrite core which makes them immune to magnetic AC and DC fields (see Magnetic field immune).

#### Window function

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An adjustable range, in which the sensor operates in a defined switching state. The window (switching range) is limited by an upper and lower value set by the operator.



#### Wire-break protection

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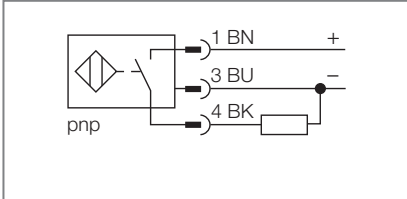
If the supply cable is cut, the output stays off (no failure).



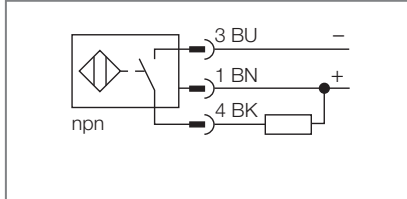
# Wiring diagrams

## Wiring diagrams

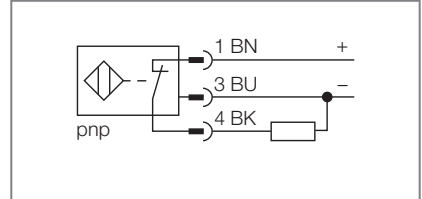
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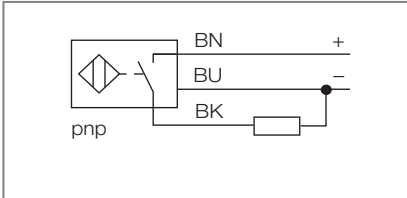
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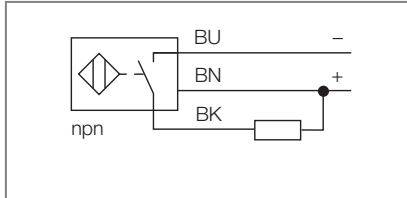
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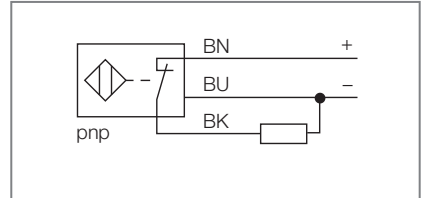
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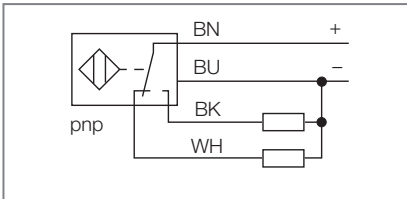
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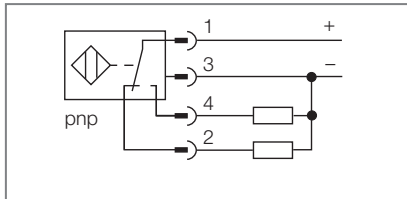
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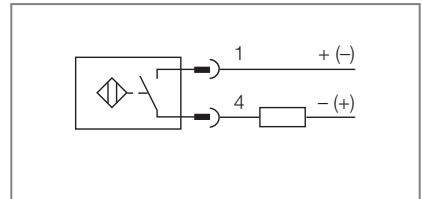
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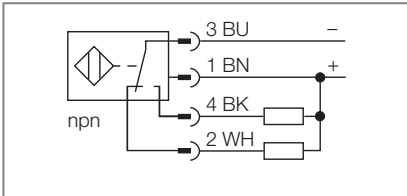
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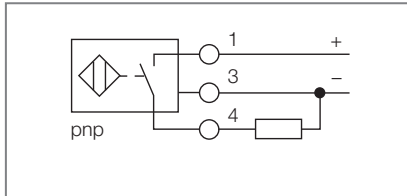
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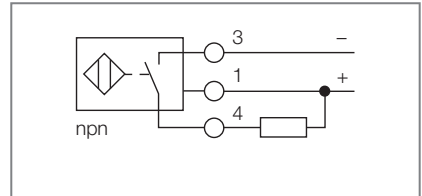
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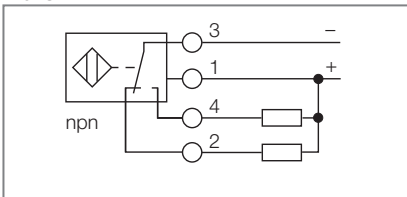
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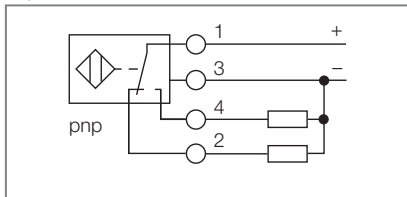
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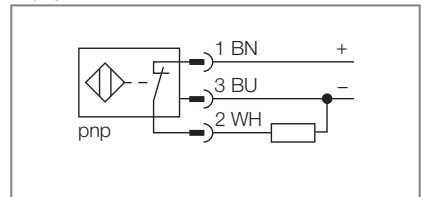
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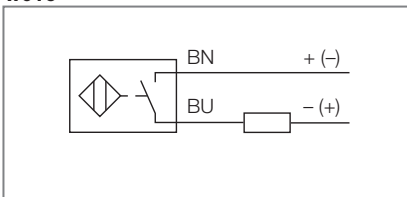
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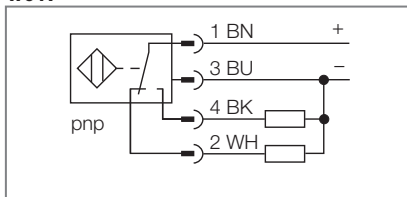
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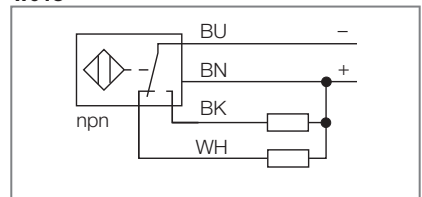
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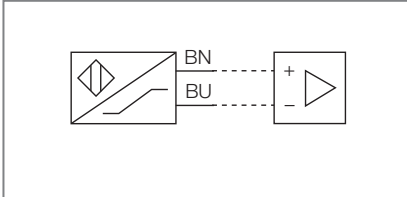
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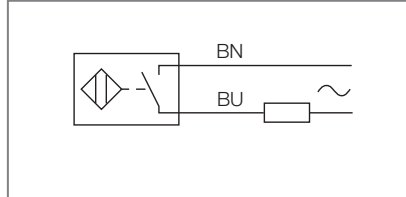
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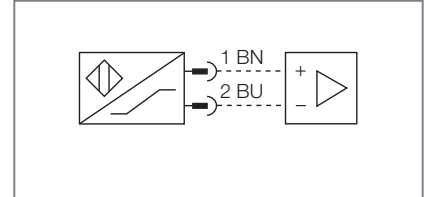
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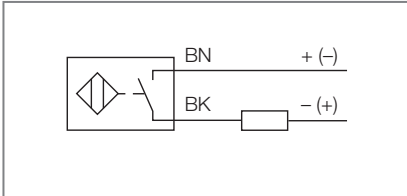
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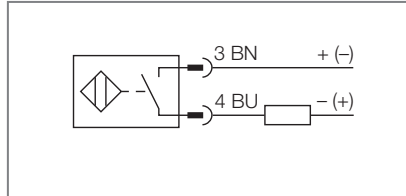
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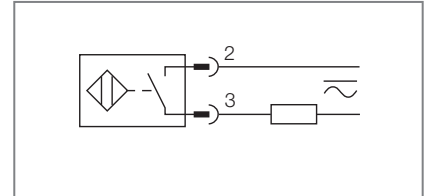
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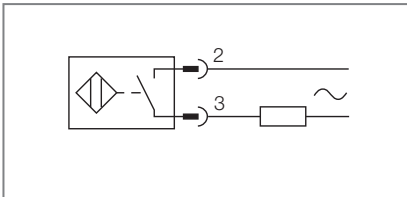
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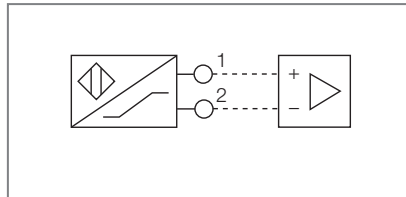
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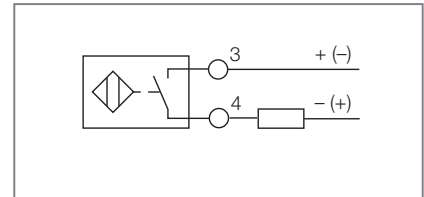
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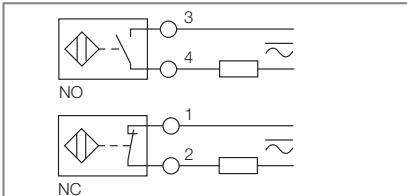
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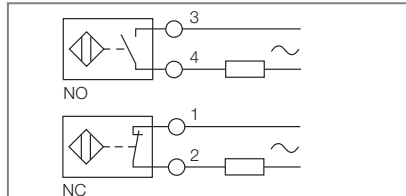
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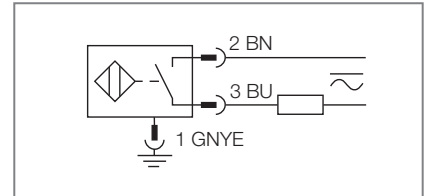
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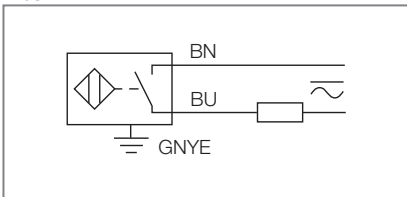
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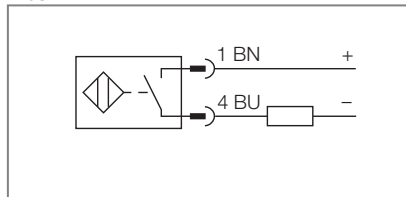
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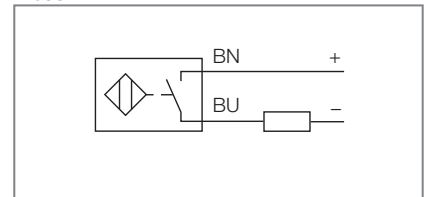
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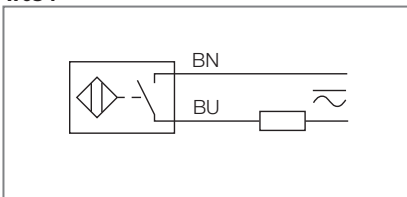
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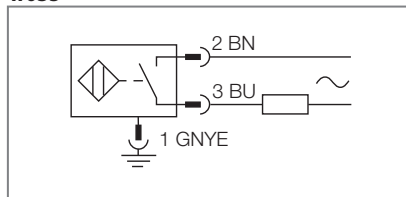
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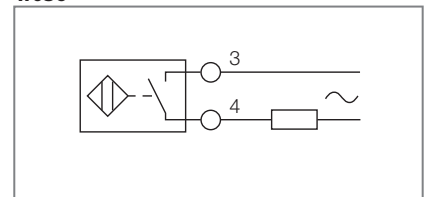
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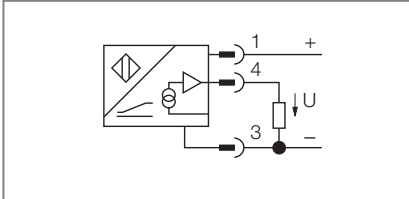


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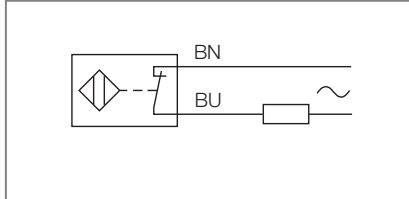


# Wiring diagrams

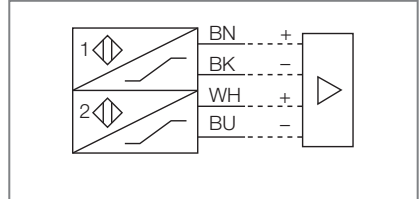
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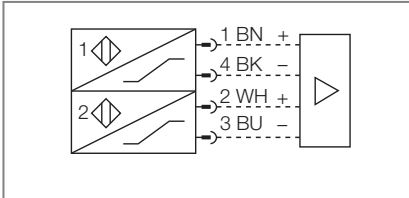
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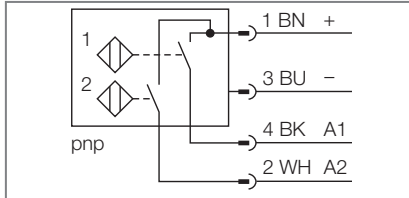
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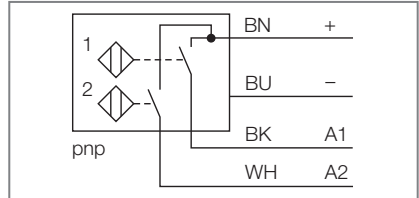
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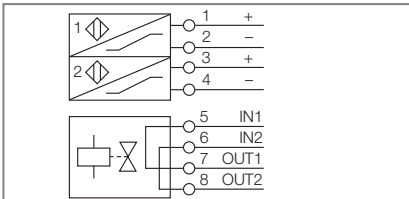
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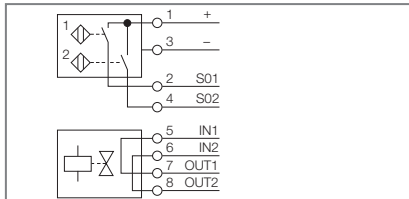
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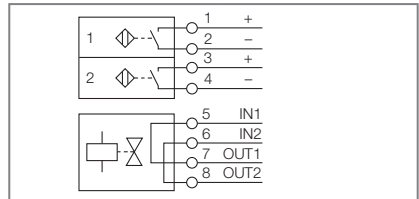
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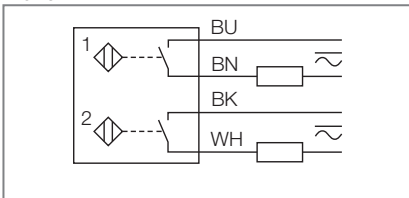
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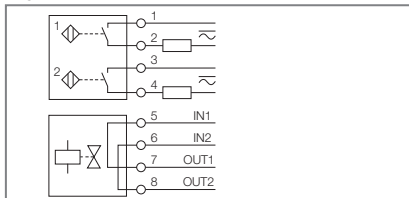
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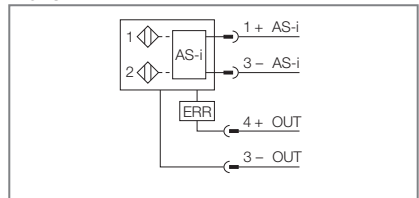
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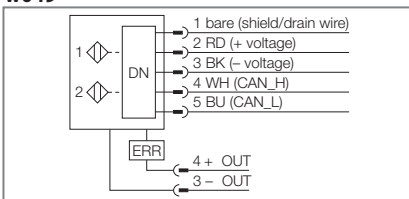
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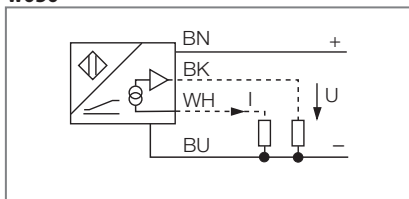
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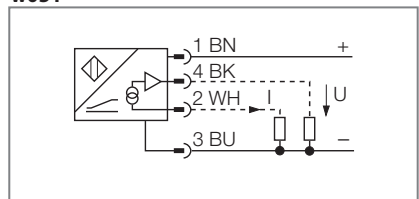
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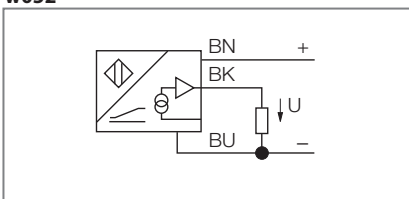
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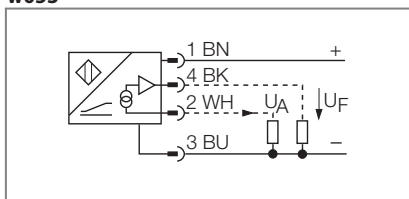
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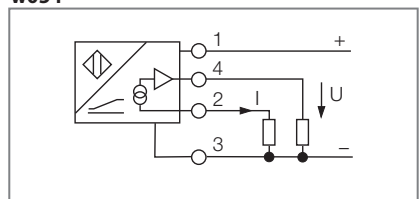
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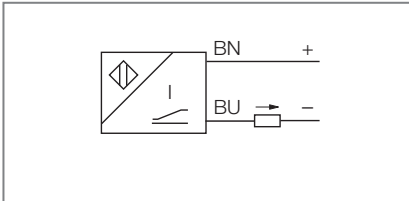


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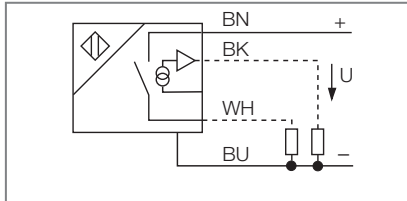




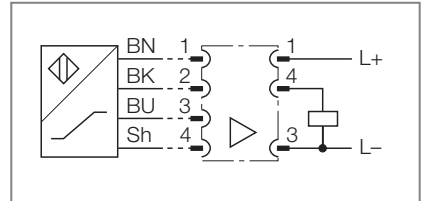
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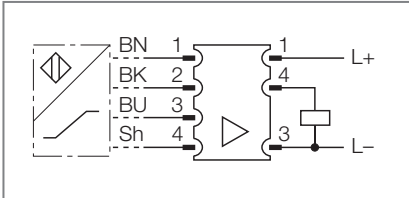
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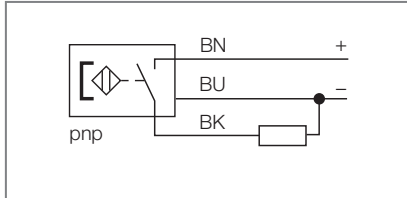
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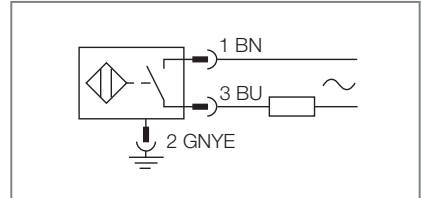
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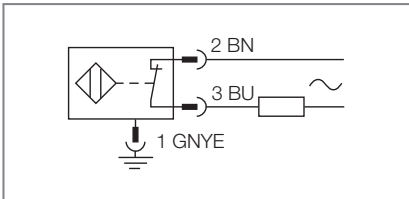
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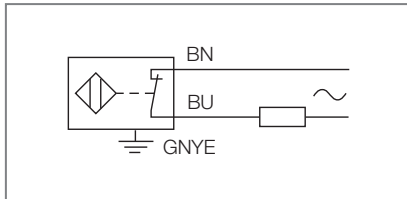
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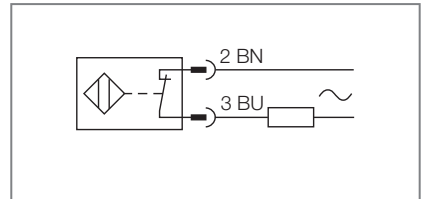
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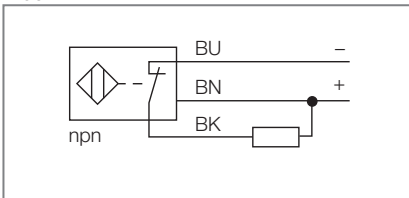
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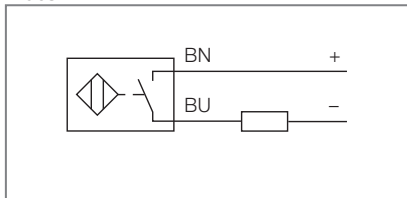
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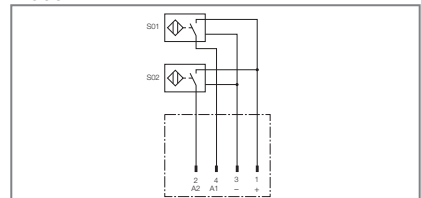
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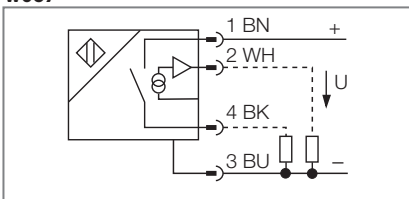
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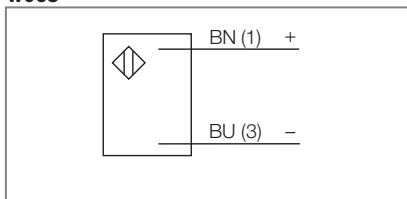
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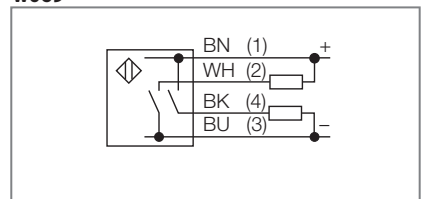
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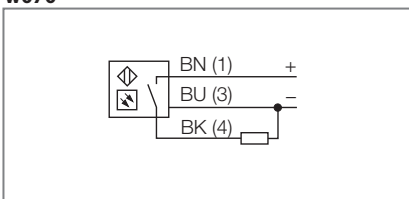
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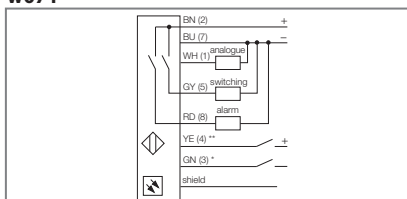
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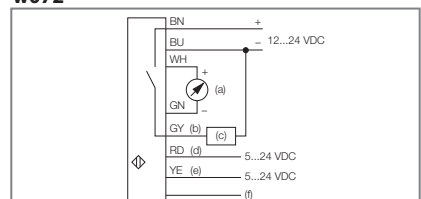
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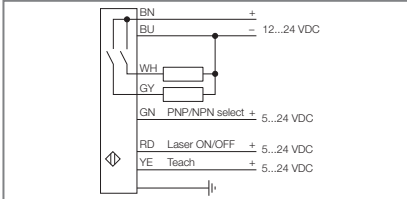
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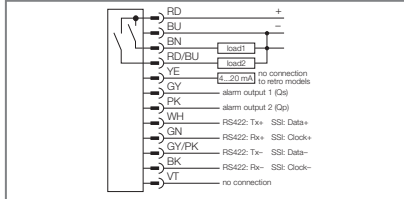
# Wiring diagrams

## Wiring diagrams

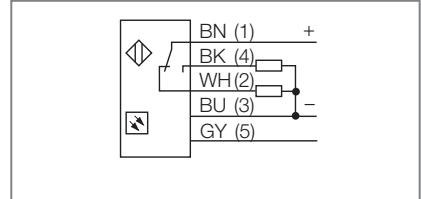
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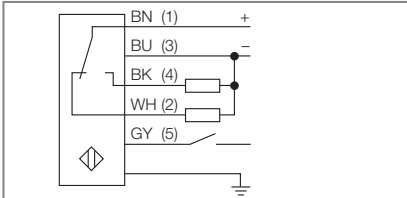
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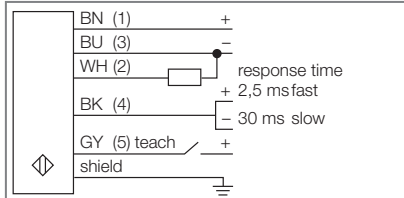
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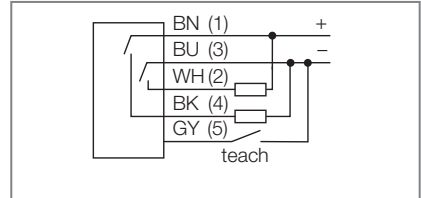
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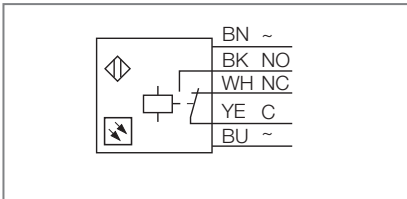
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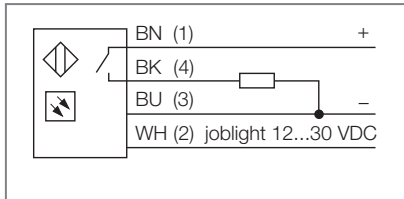
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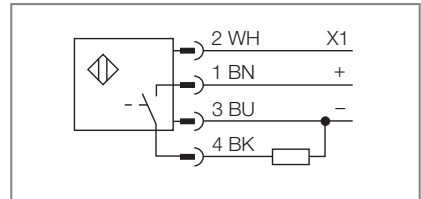
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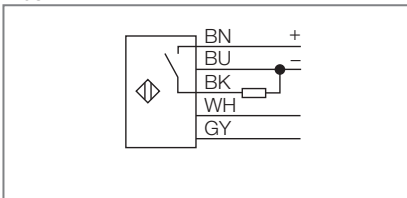
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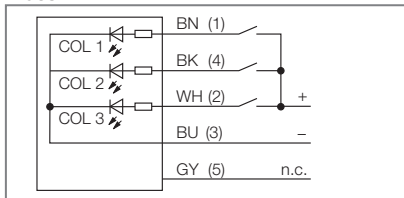
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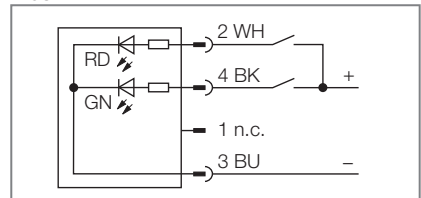
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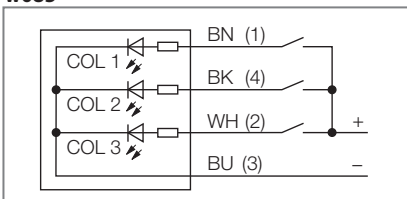
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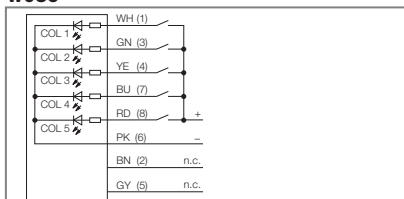
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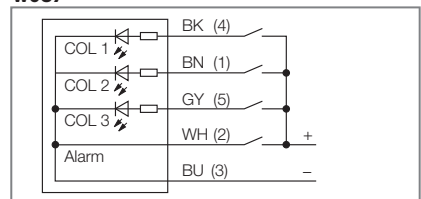
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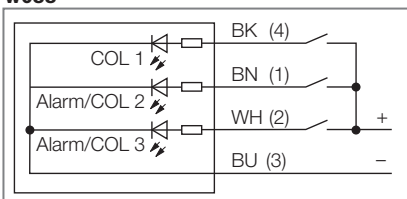
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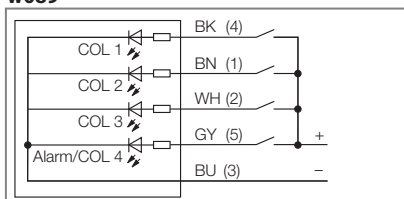
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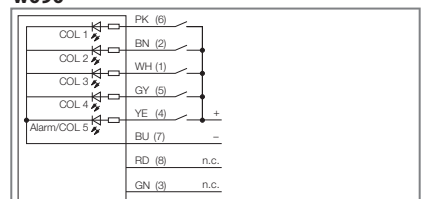
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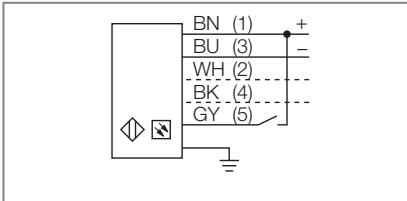
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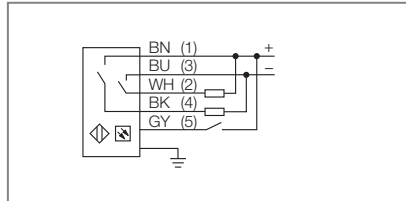
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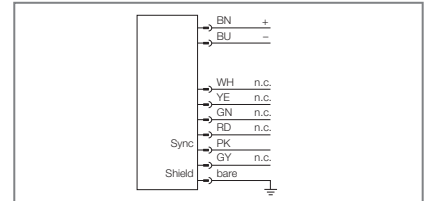
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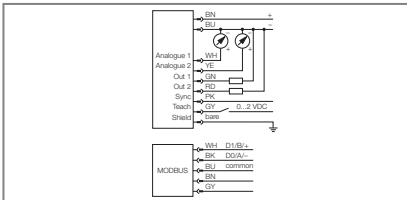
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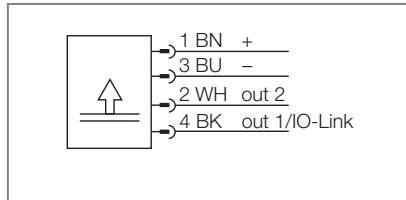
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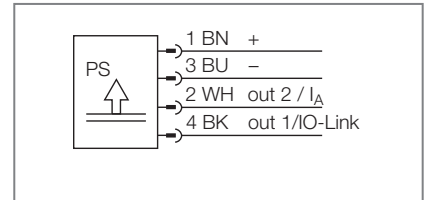
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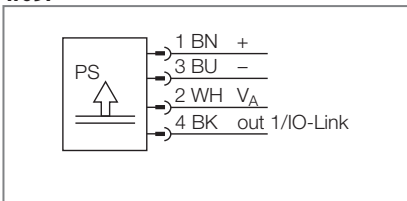
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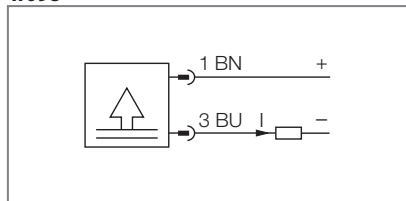
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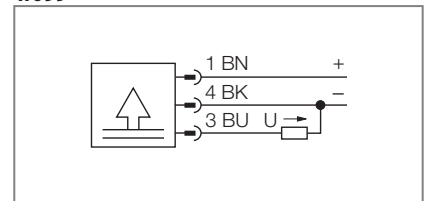
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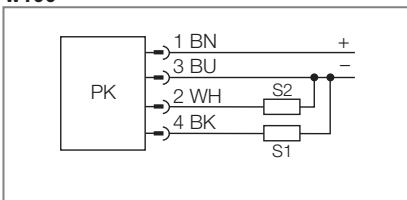
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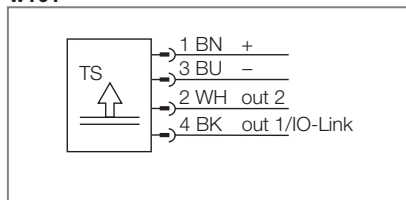
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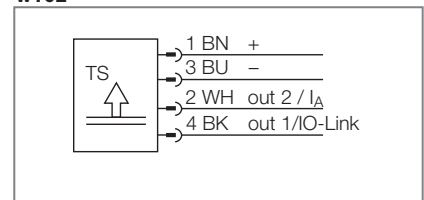
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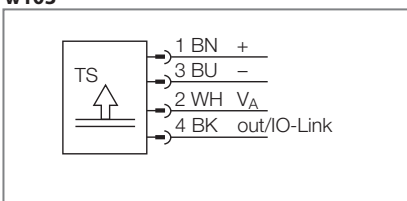
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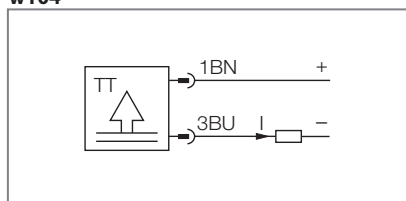
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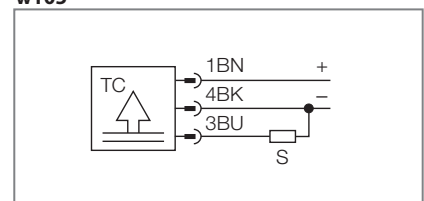
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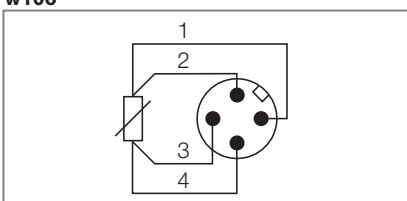
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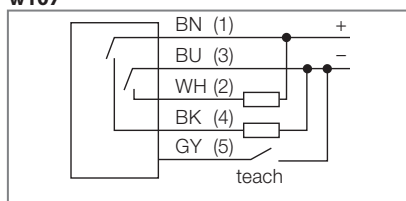
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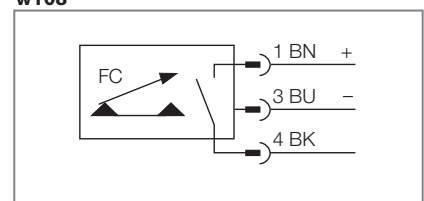
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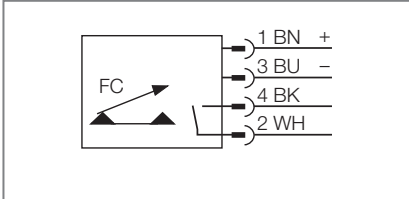
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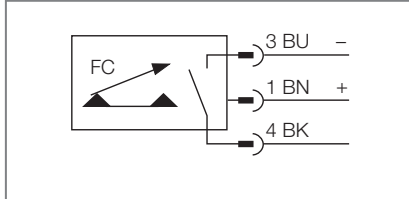
# Wiring diagrams

## Wiring diagrams

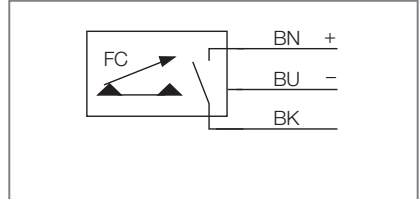
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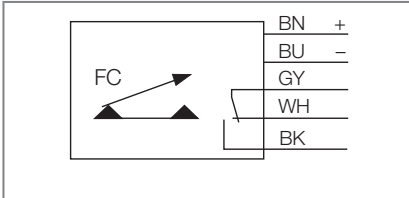
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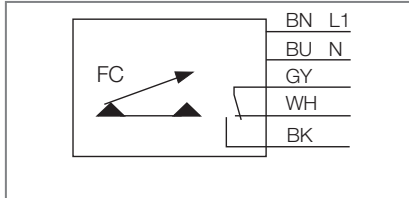
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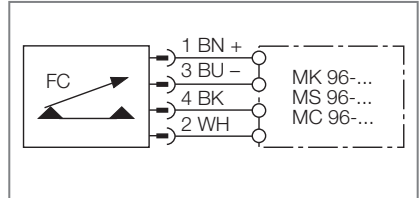
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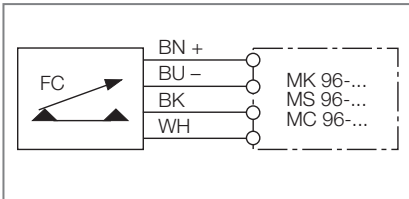
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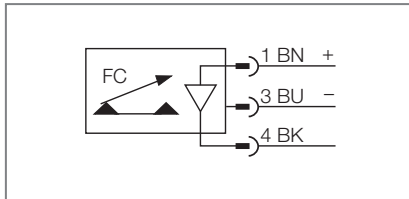
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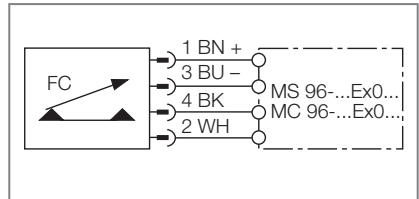
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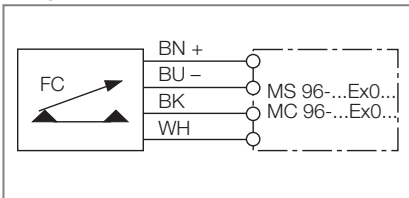
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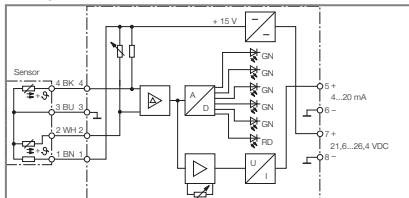
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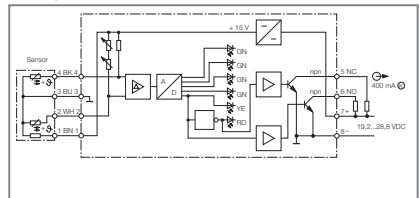
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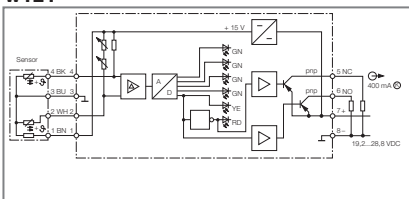
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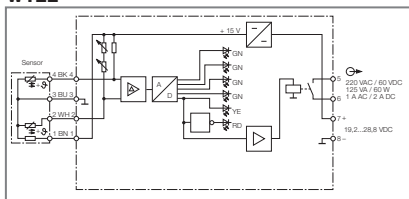
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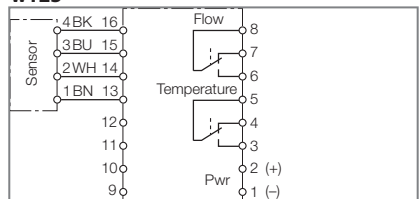
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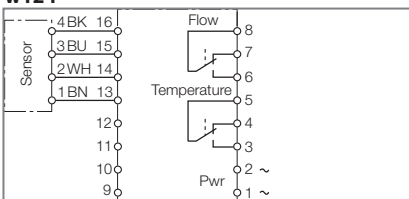
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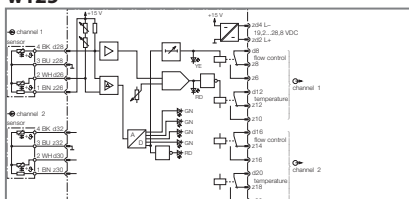
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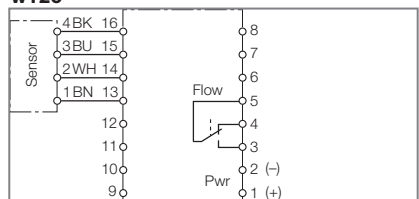
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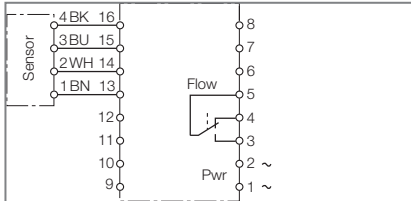
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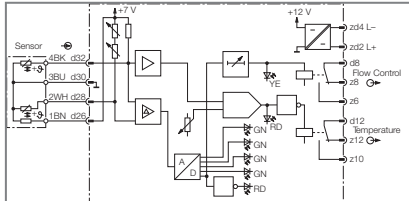
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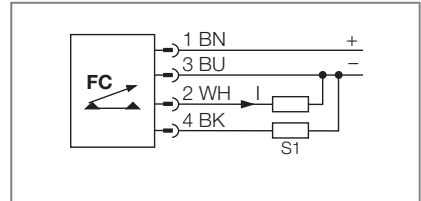
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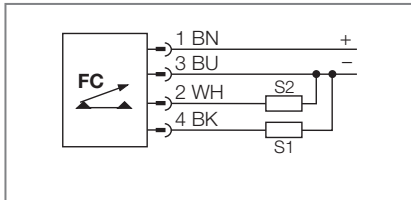
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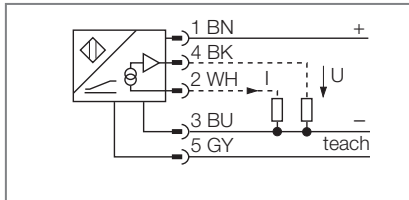
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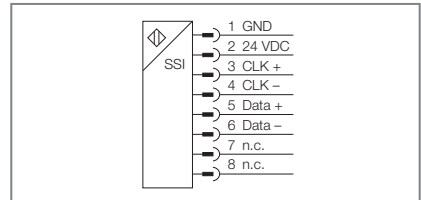
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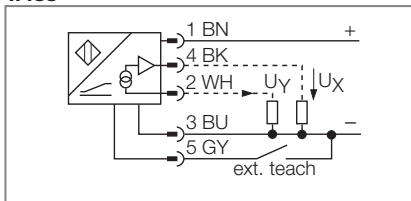
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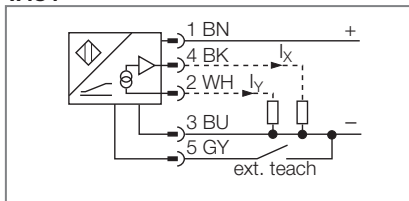
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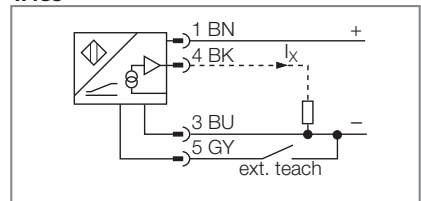
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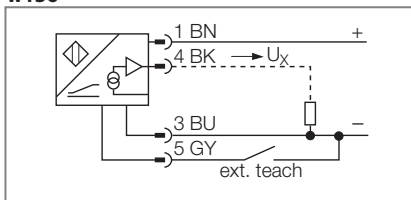
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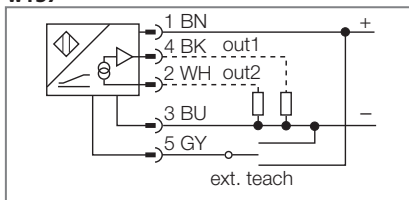
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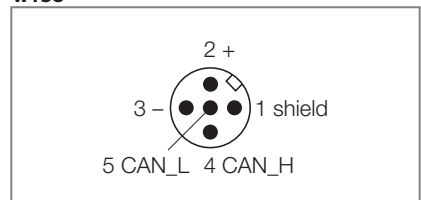
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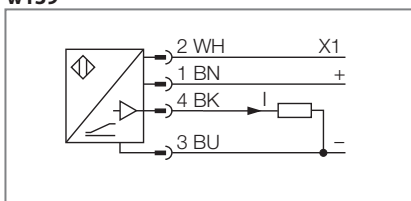
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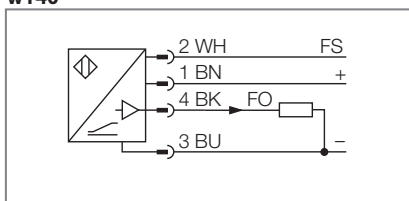
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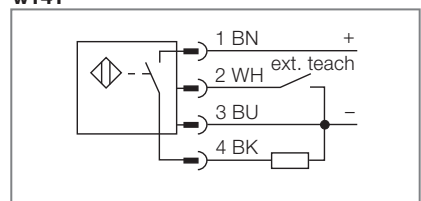
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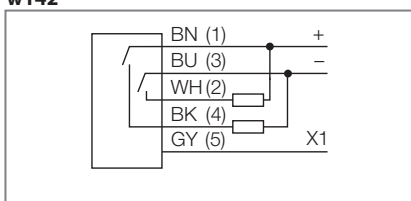
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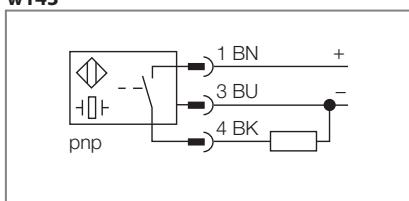
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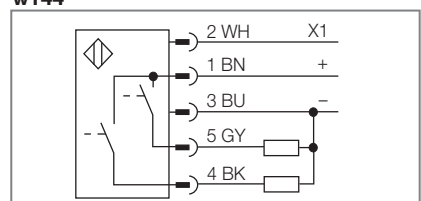
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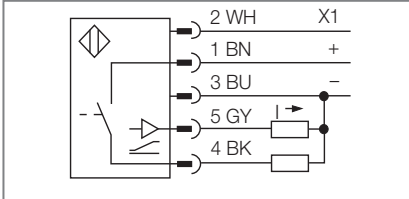


Wiring diagrams

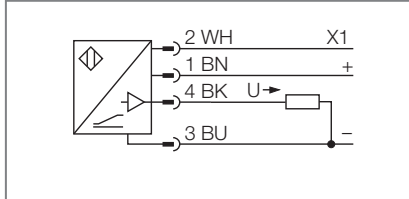
# Wiring diagrams

## Wiring diagrams

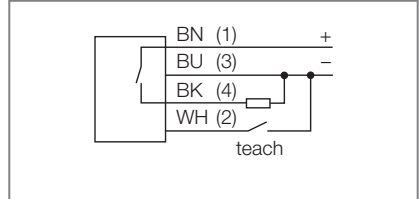
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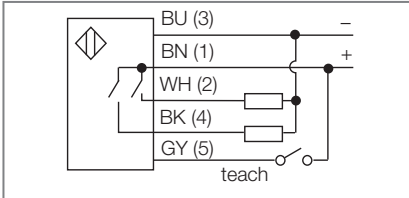
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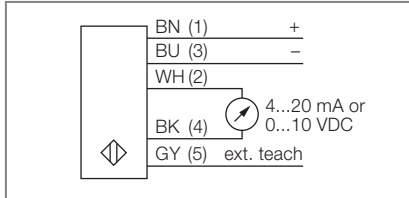
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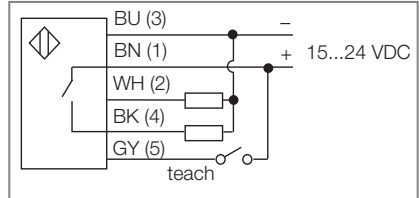
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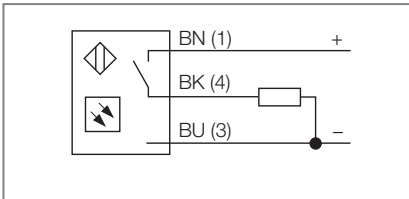
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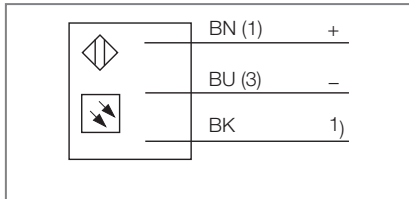
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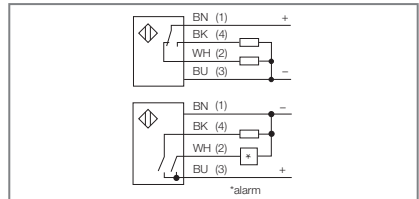
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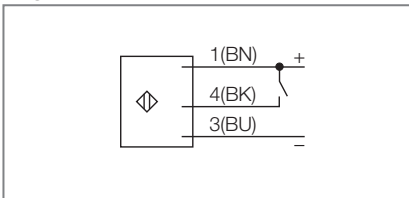
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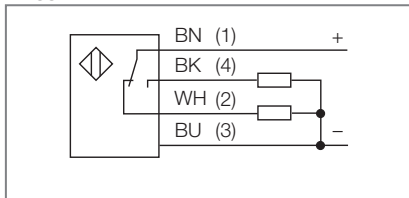
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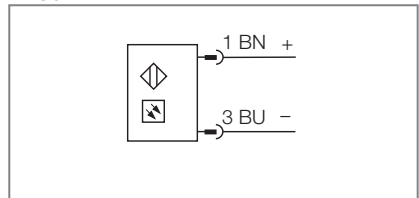
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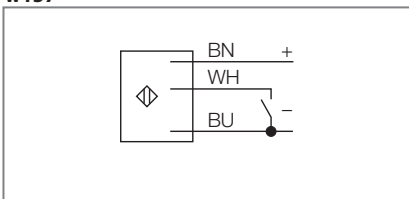
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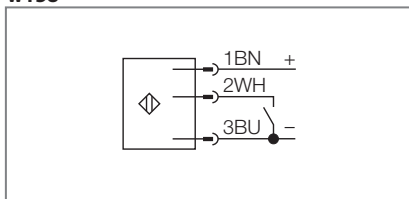
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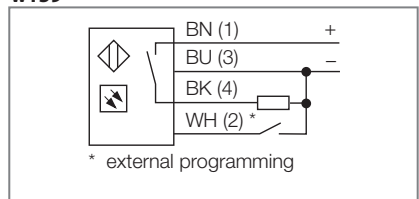
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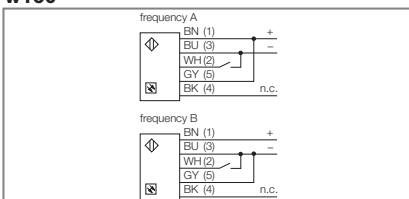
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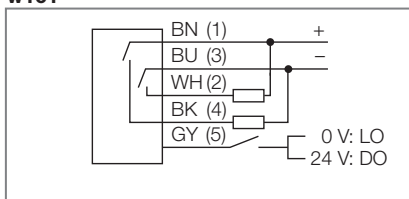
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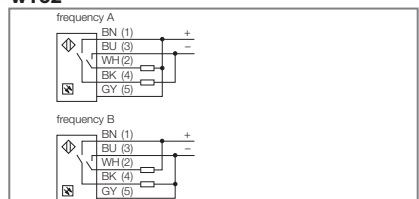
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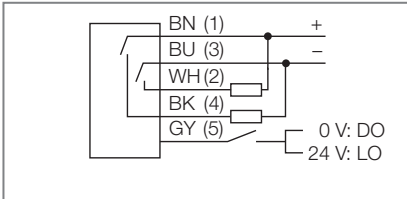
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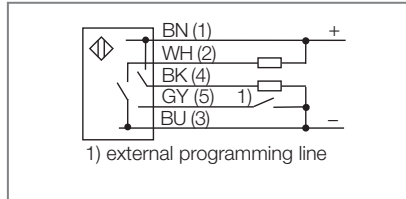
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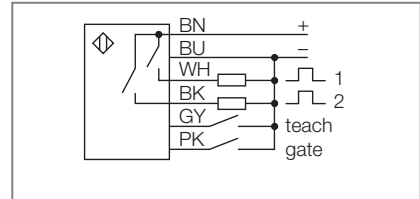
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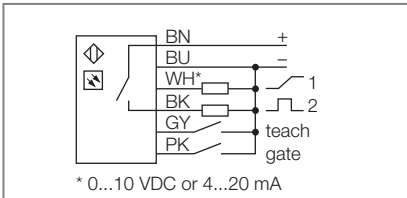
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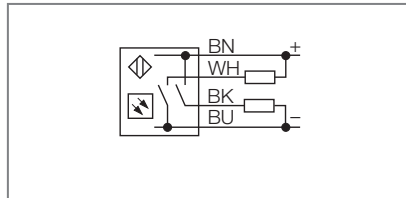
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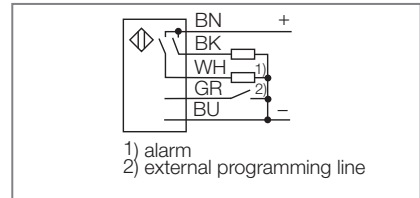
w166



w167

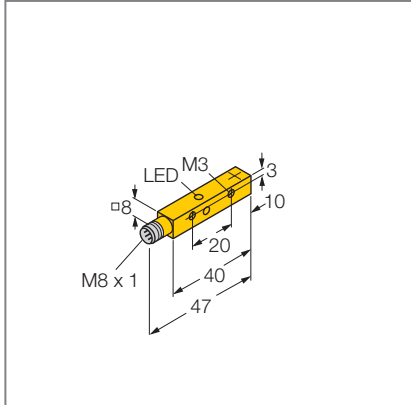


w168

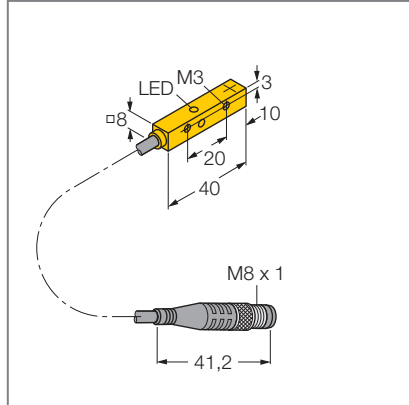


# Dimension drawings

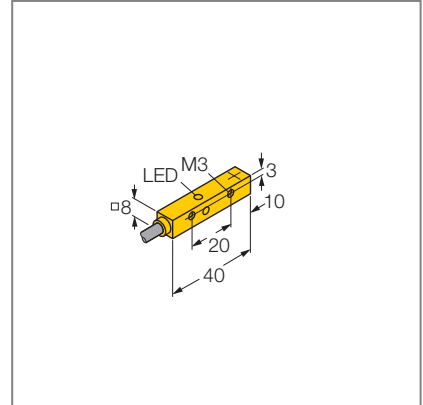
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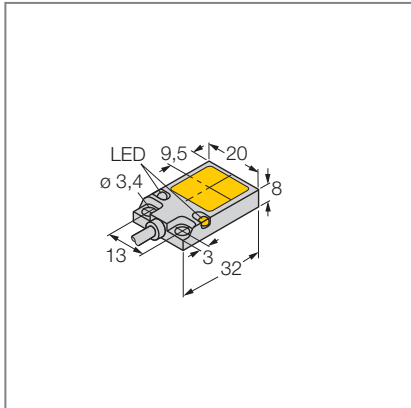
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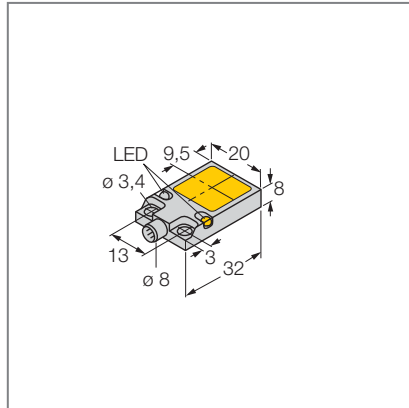
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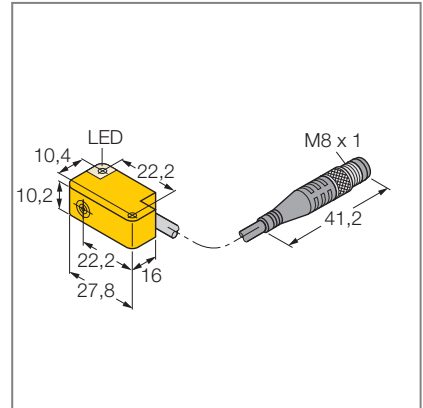
d004



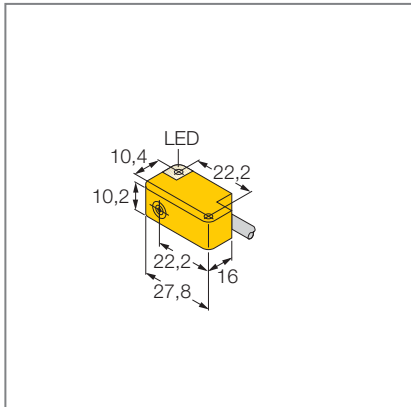
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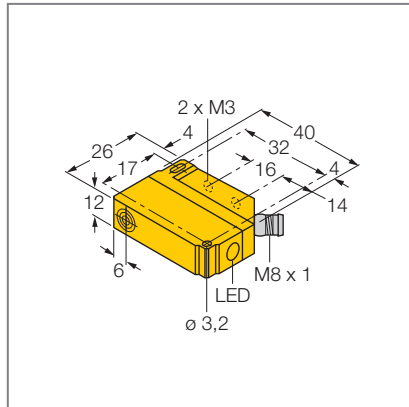
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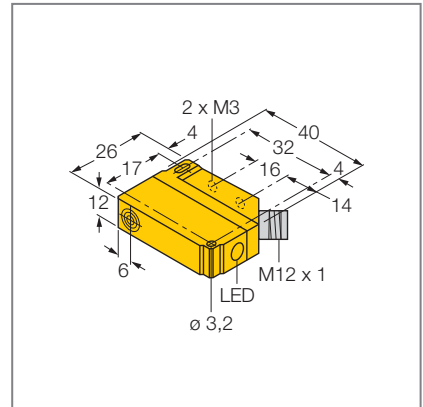
d007



d008

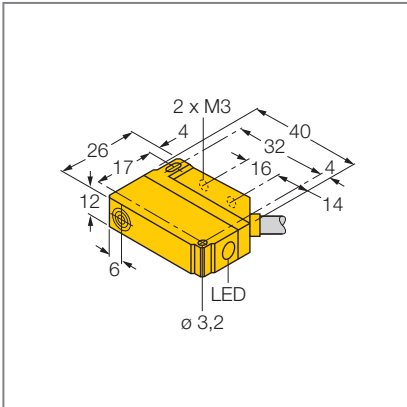


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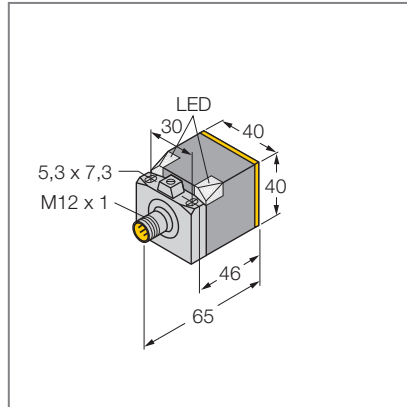




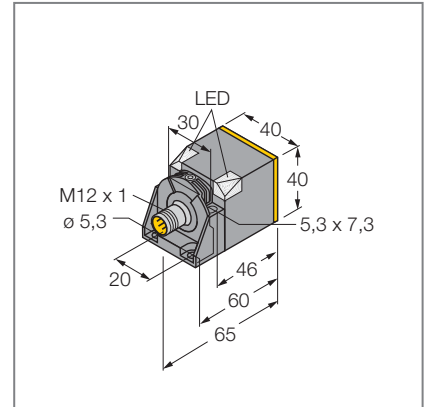
d010



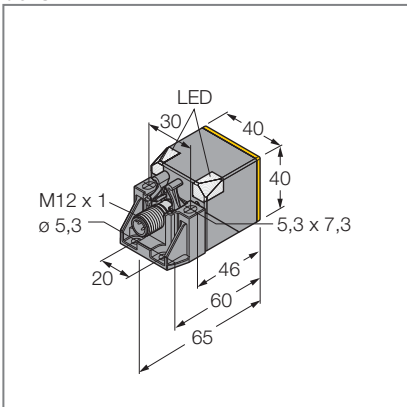
d011



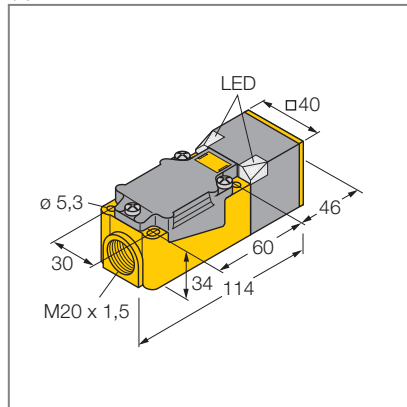
d012



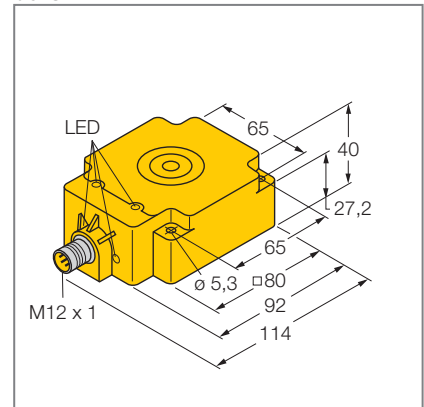
d013



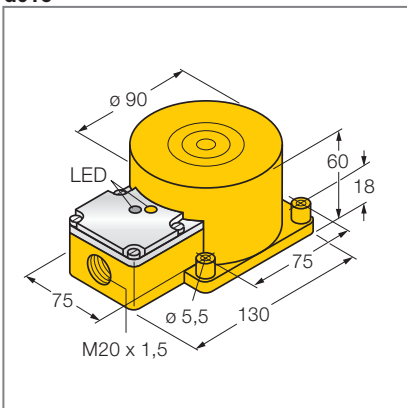
d014



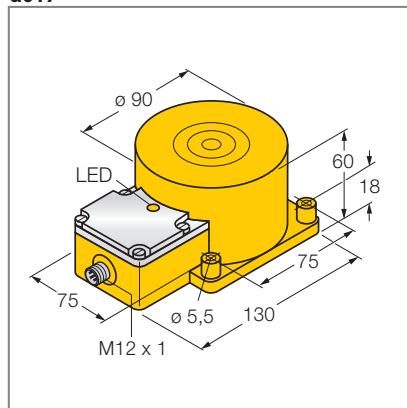
d015



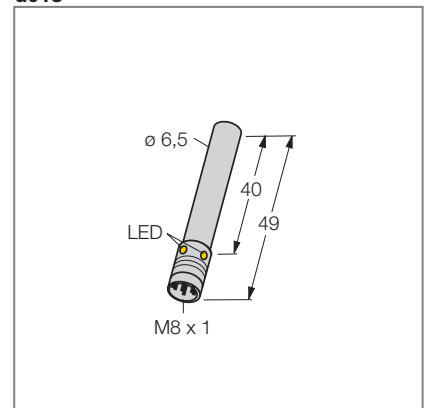
d016



d017

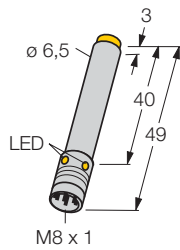


d018

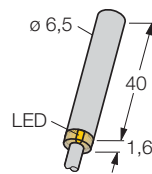


# Dimension drawings

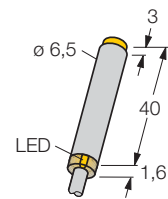
d019



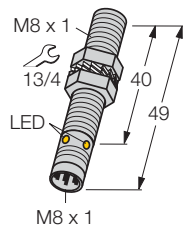
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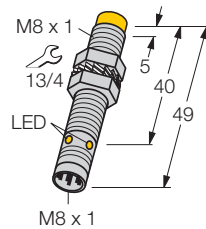
d021



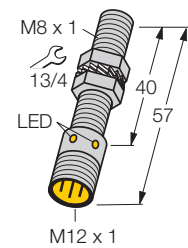
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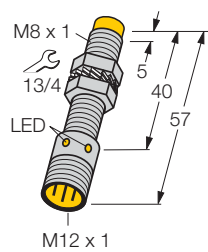
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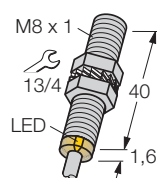
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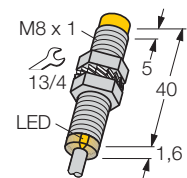
d025



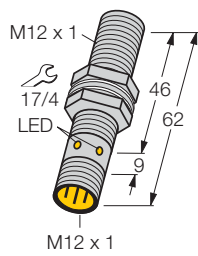
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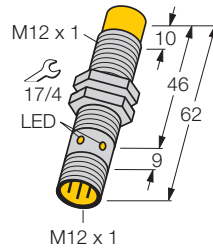
d027



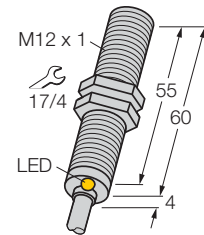
d028



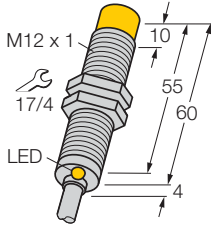
d029



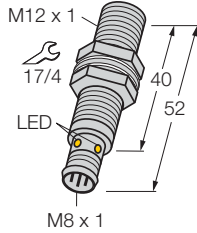
d030



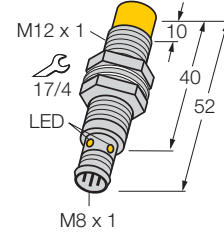
d031



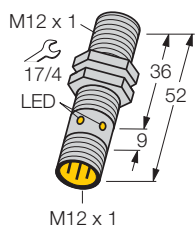
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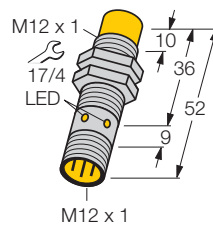
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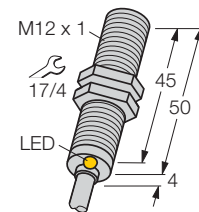
d034



d035

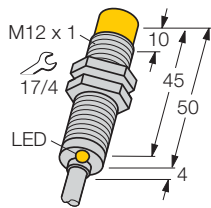


d036

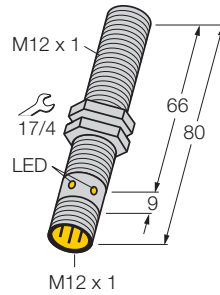


# Dimension drawings

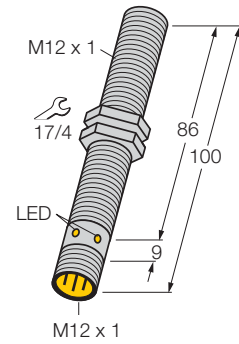
d037



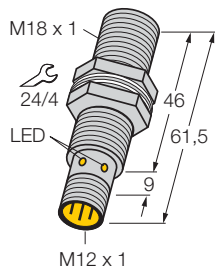
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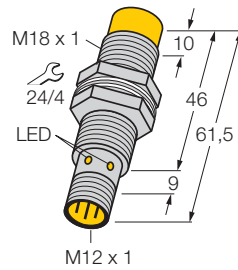
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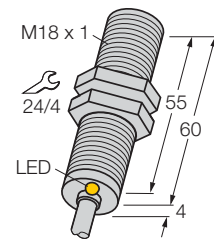
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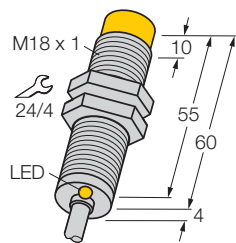
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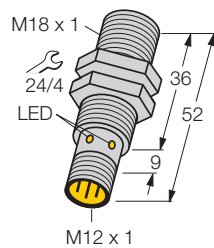
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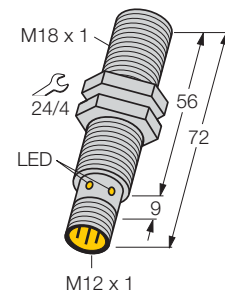
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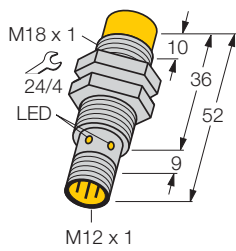
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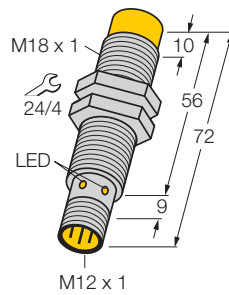
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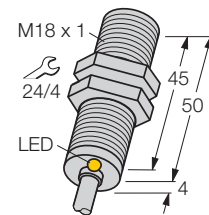
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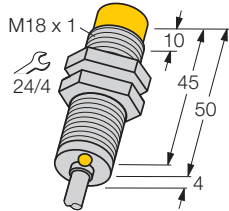
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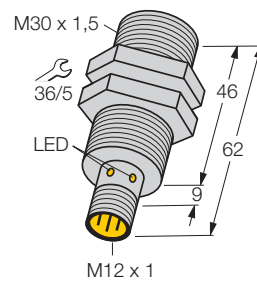
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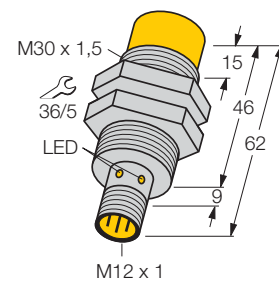
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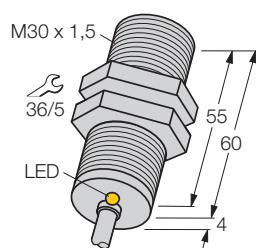
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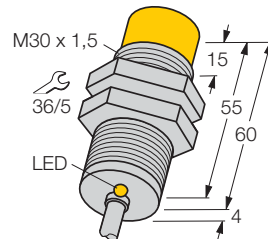
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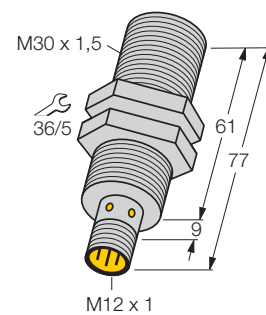
d052



d053

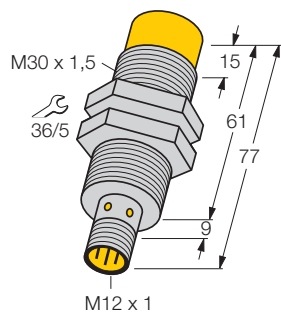


d054

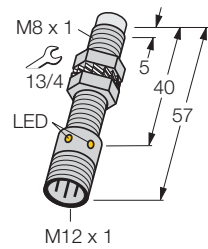


# Dimension drawings

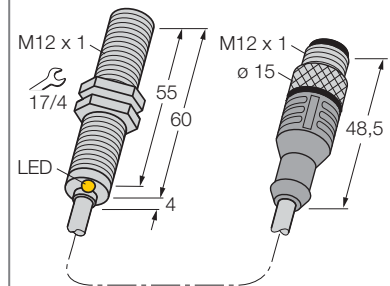
d055



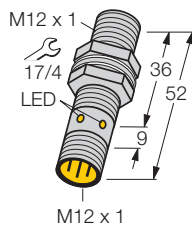
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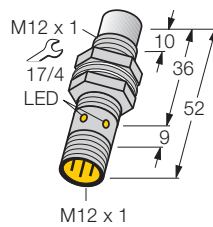
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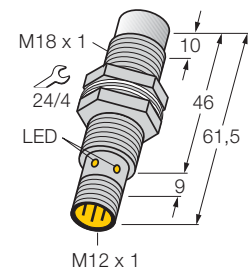
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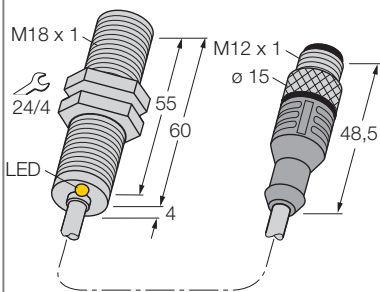
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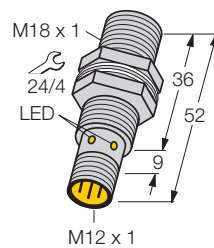
d060



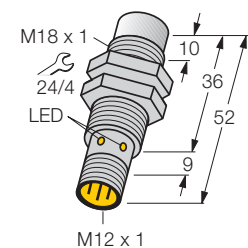
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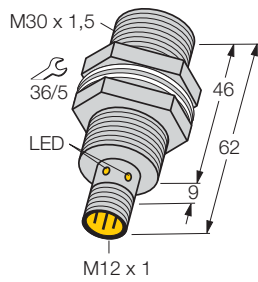
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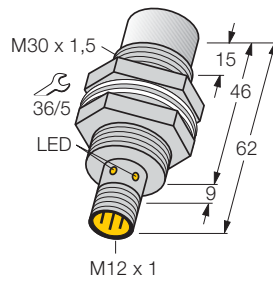
d063



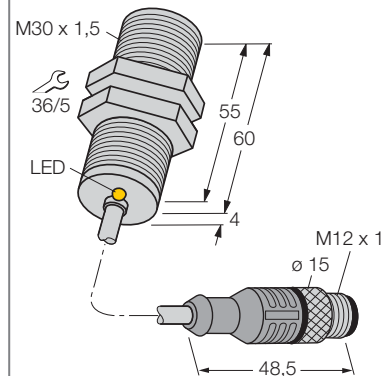
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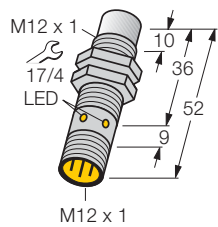
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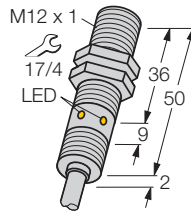
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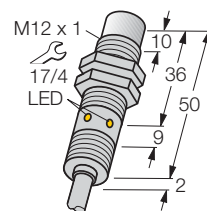
d067



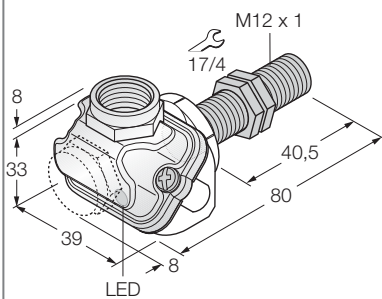
d068



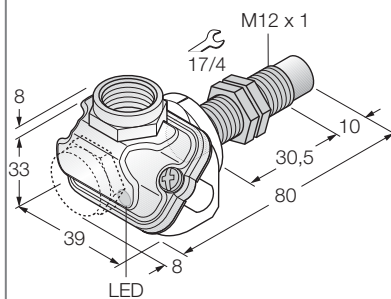
d069



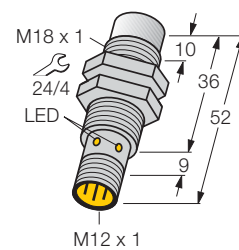
d070



d071

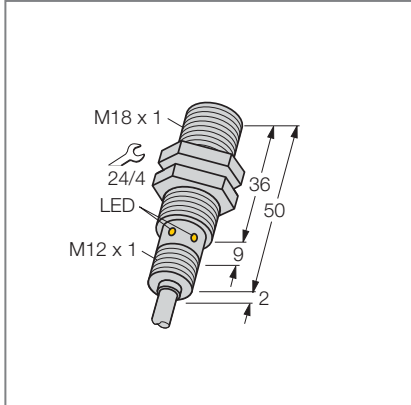


d072

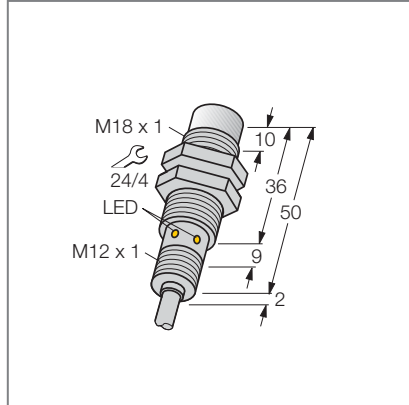


# Dimension drawings

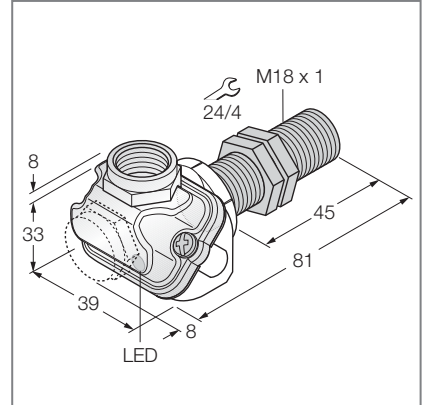
**d073**



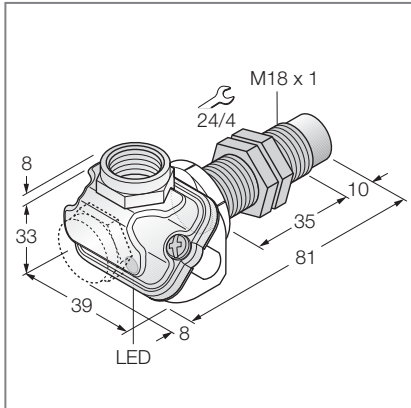
**d074**



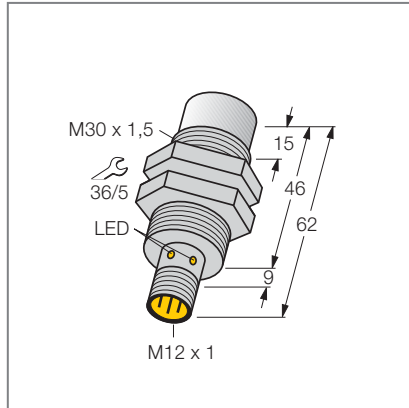
**d075**



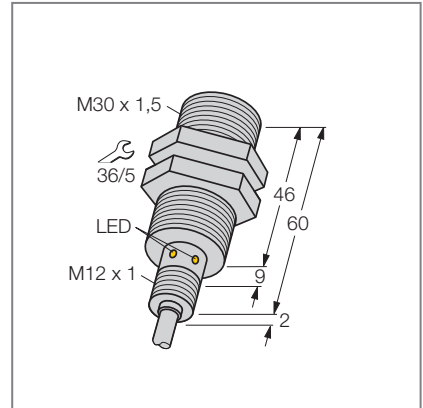
**d076**



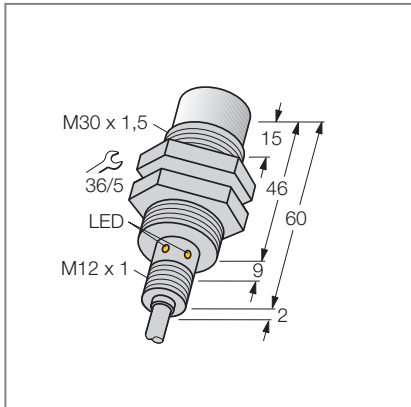
**d077**



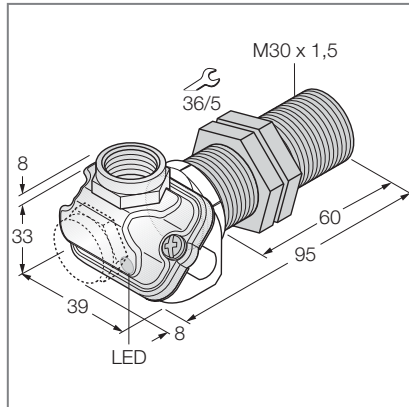
**d078**



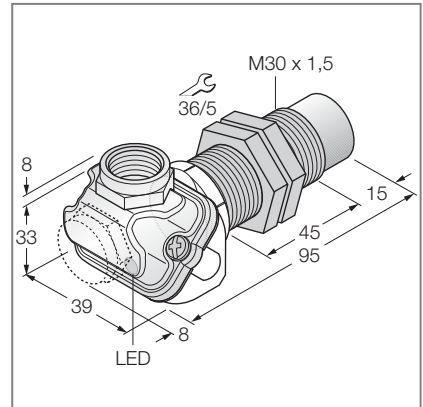
**d079**



**d080**

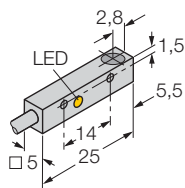


**d081**

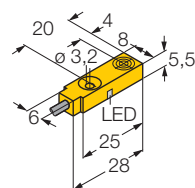




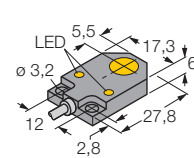
d082



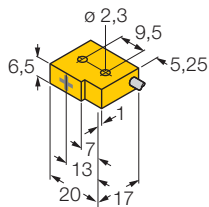
d083



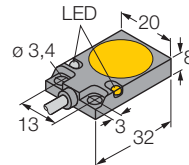
d084



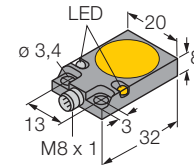
d085



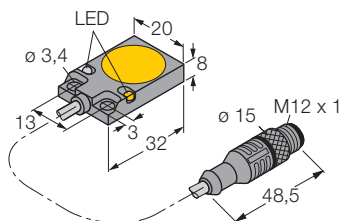
d086



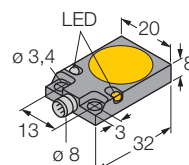
d087



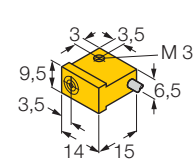
d088



d089

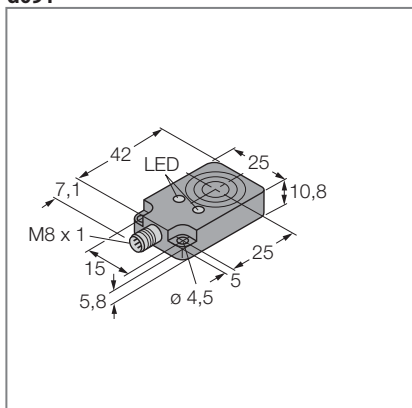


d090

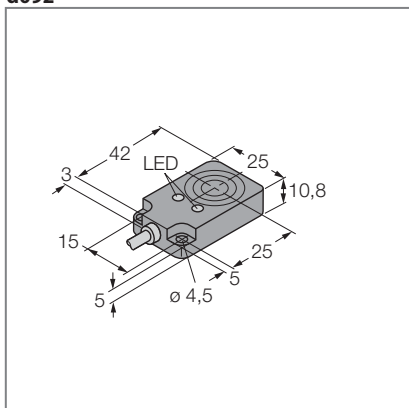


# Dimension drawings

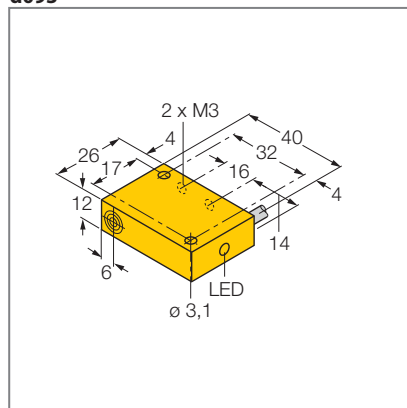
d091



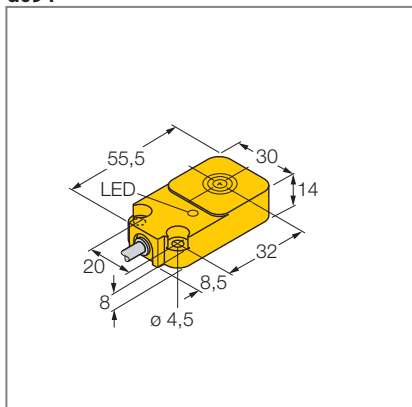
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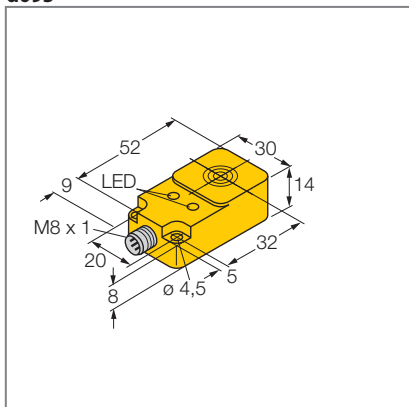
d093



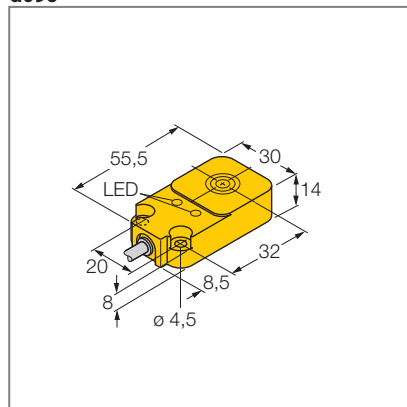
d094



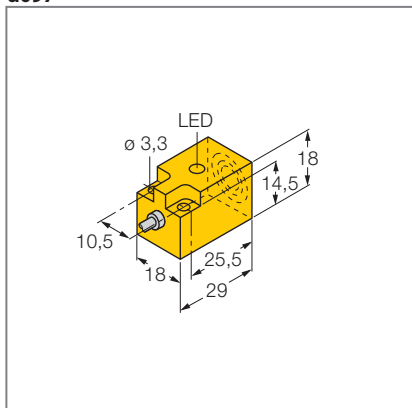
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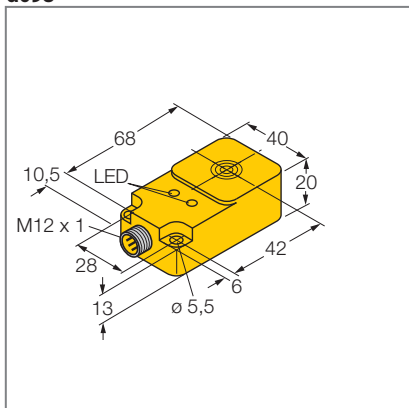
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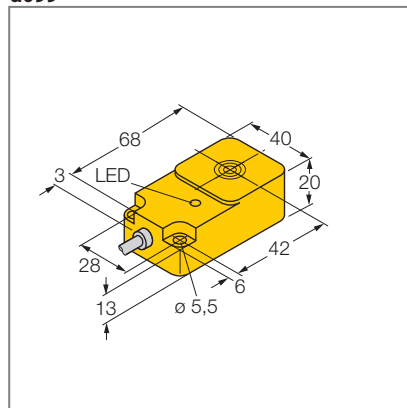
d097



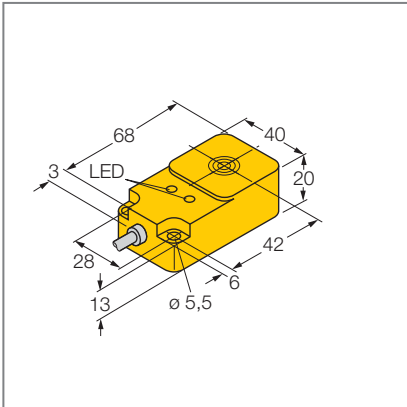
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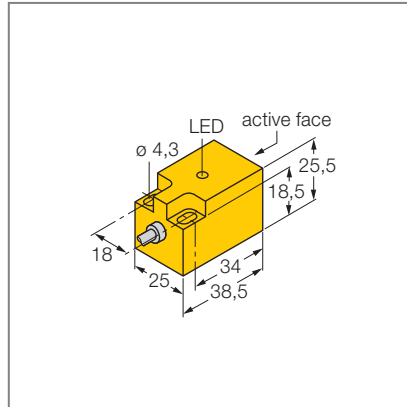
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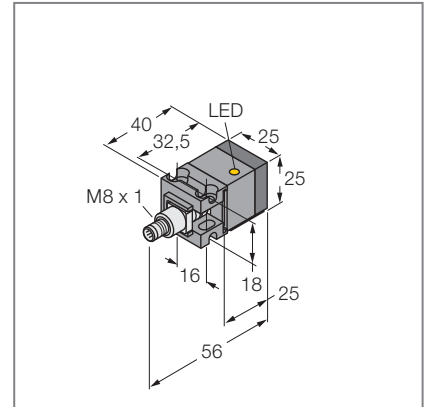
d100



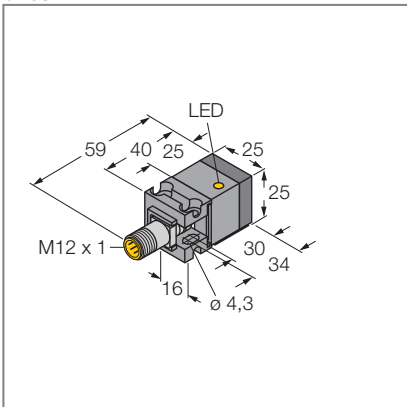
d101



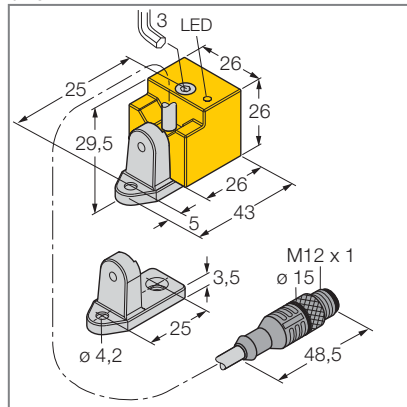
d102



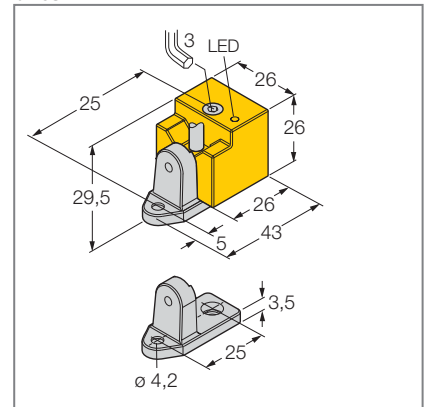
d103



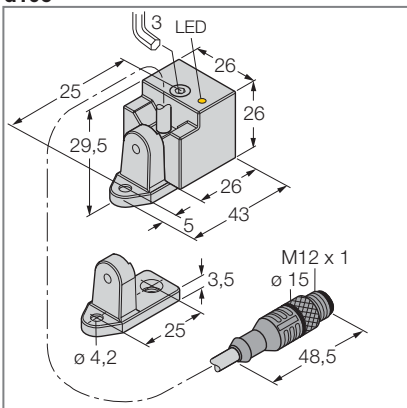
d104



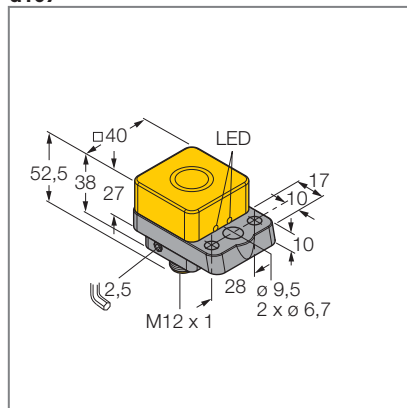
d105



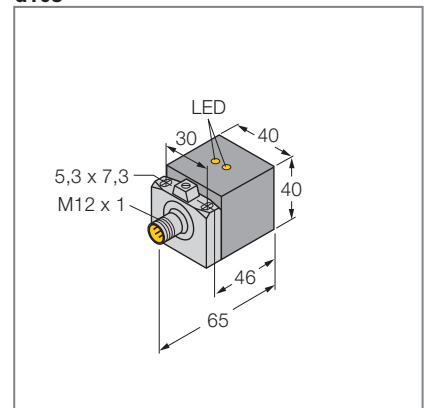
d106



d107

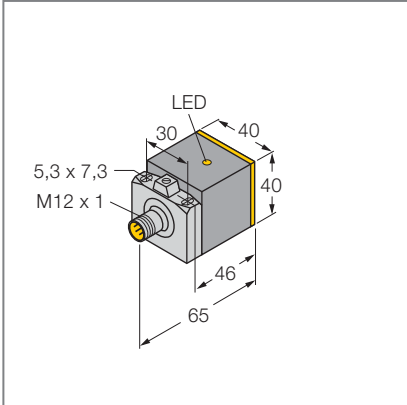


d108

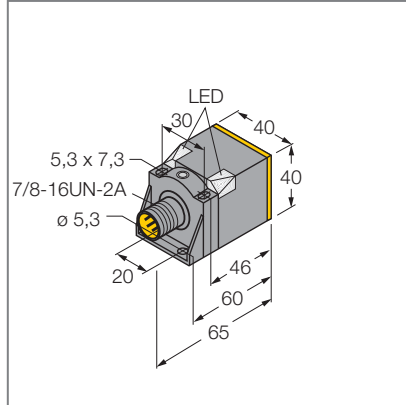


# Dimension drawings

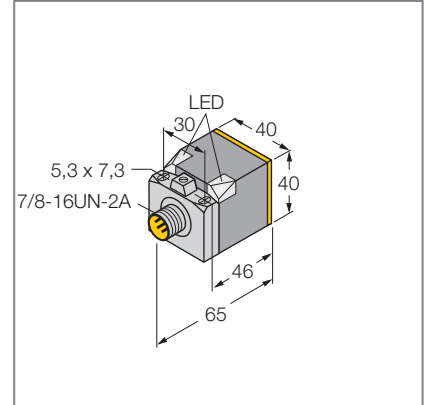
d109



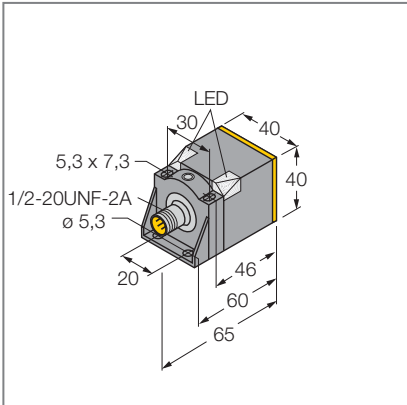
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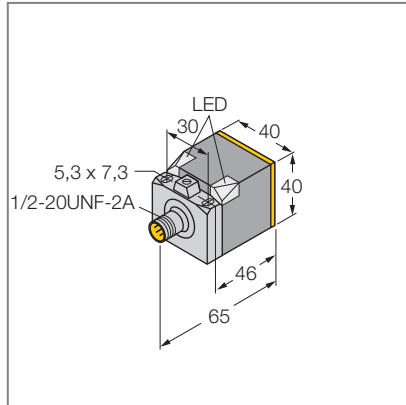
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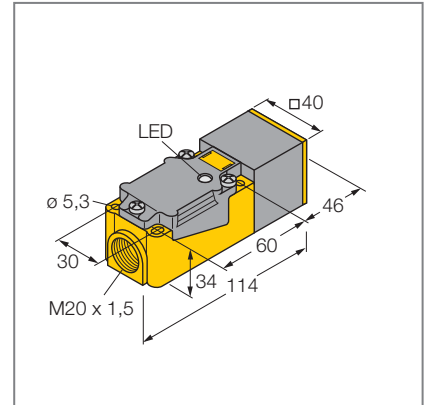
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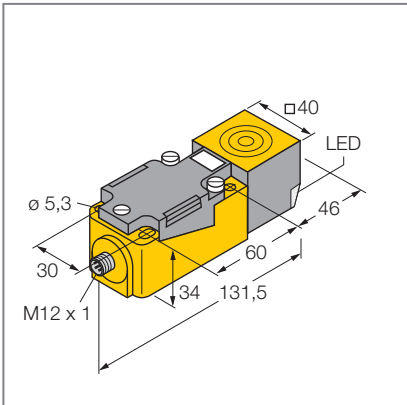
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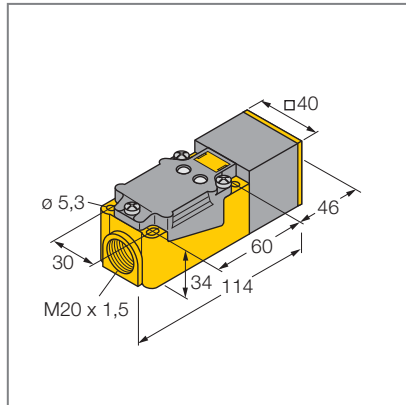
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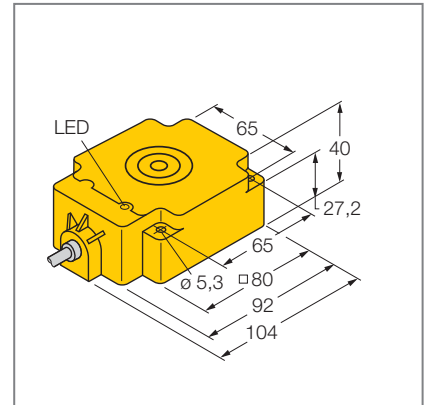
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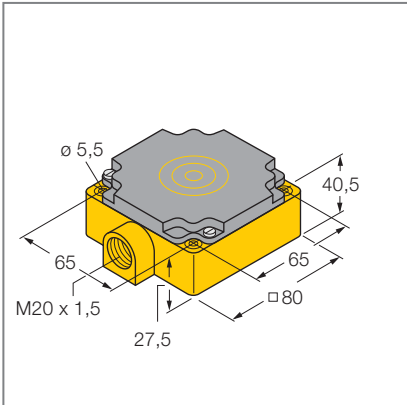
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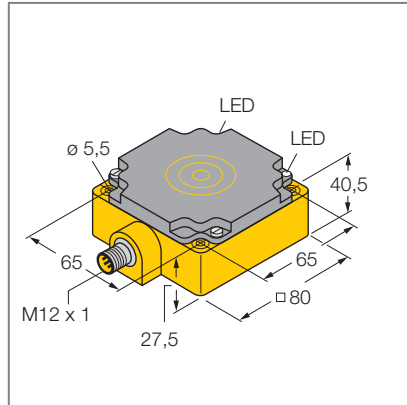
d117



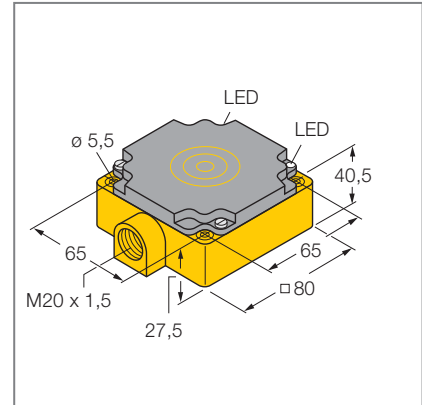
d118



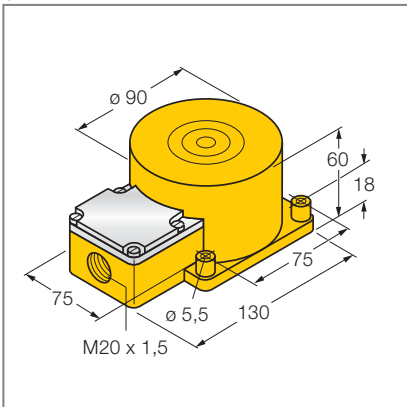
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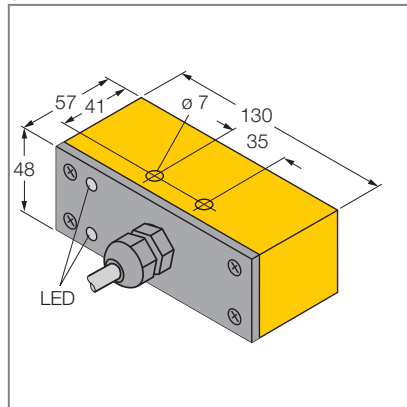
d120



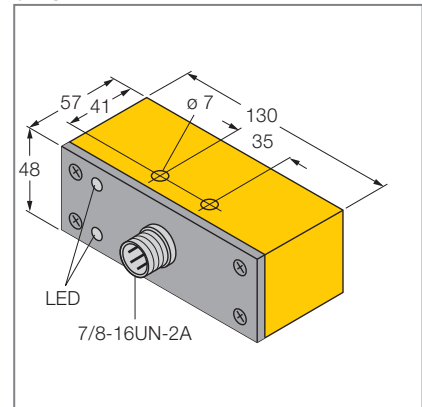
d121



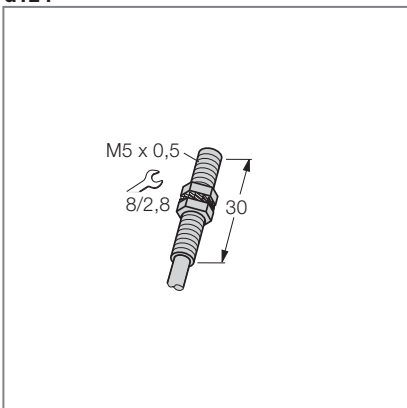
d122



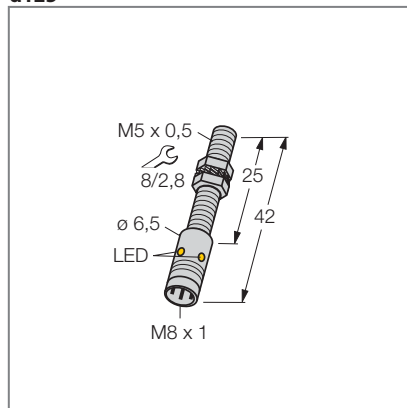
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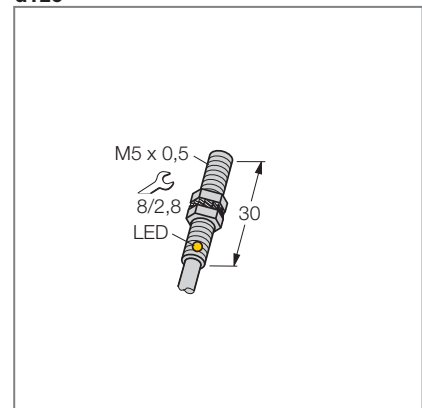
d124



d125

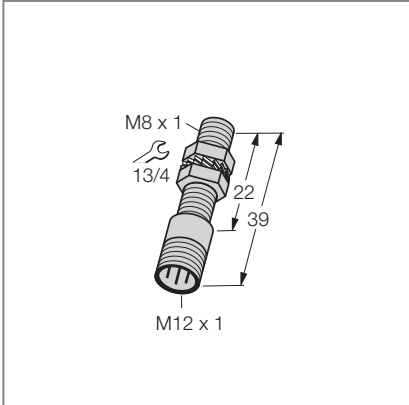


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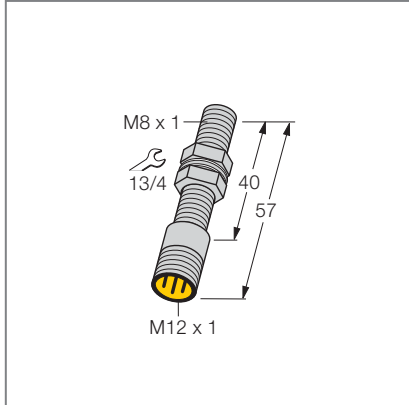


# Dimension drawings

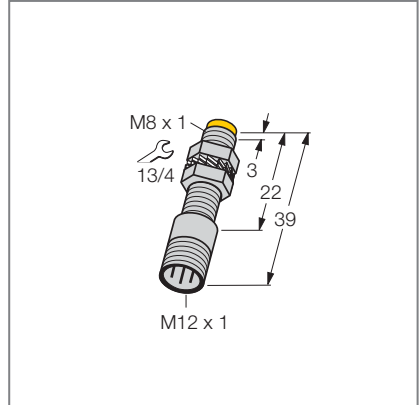
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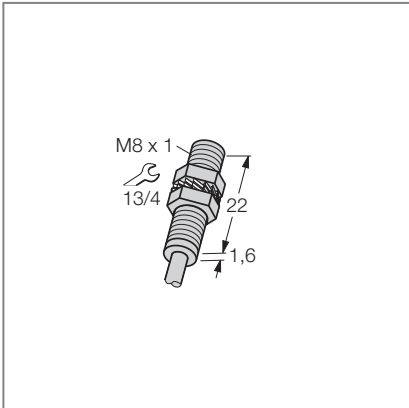
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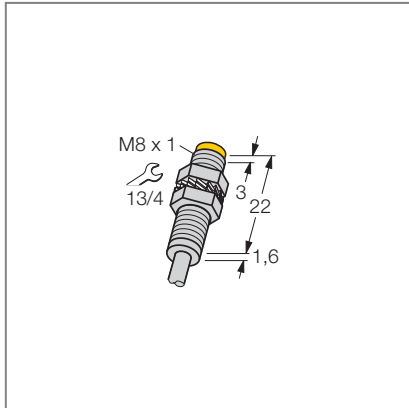
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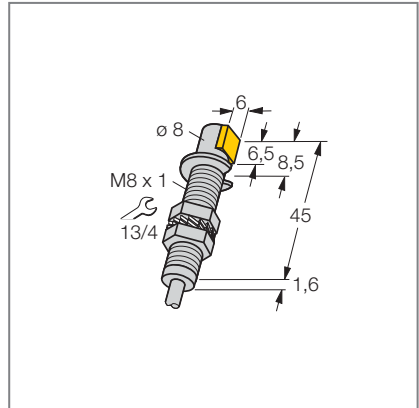
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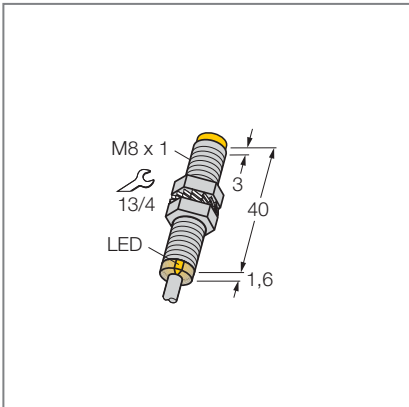
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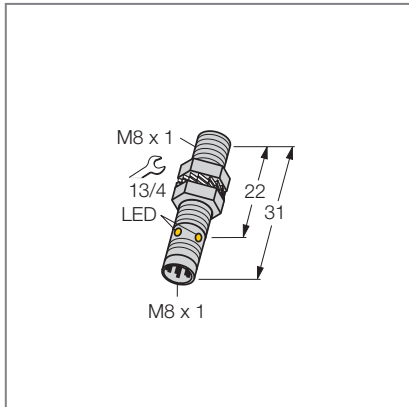
d132



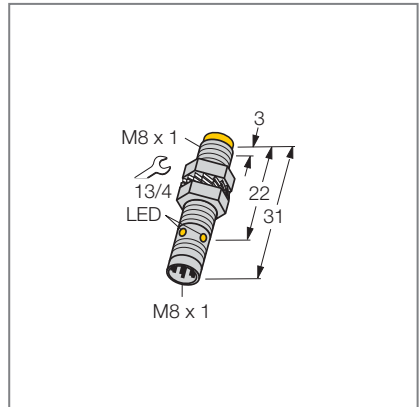
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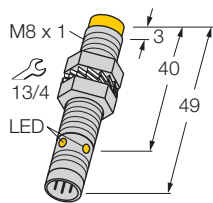
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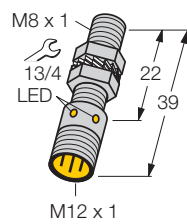
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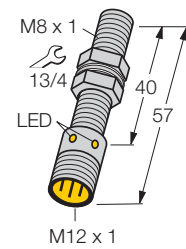
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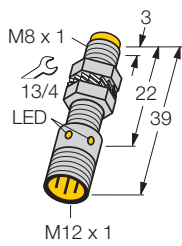
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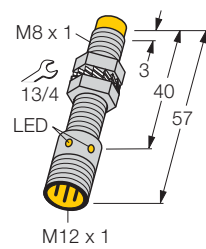
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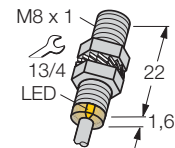
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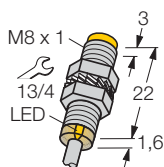
d140



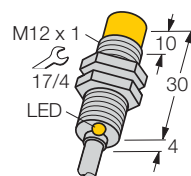
d141



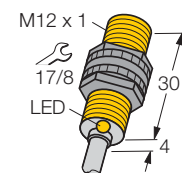
d142



d143

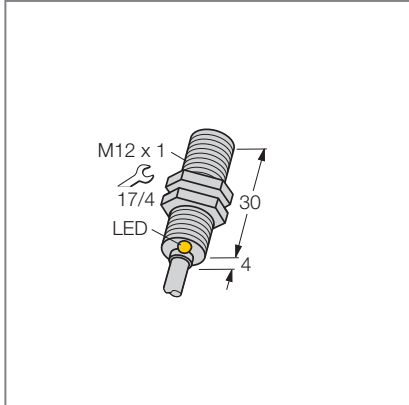


d144

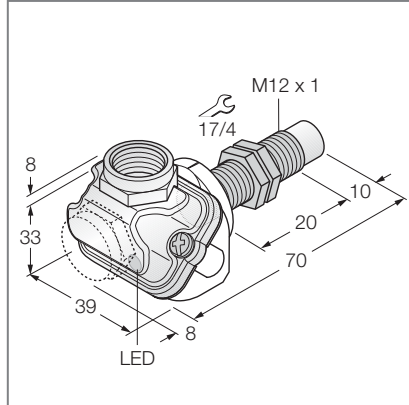


# Dimension drawings

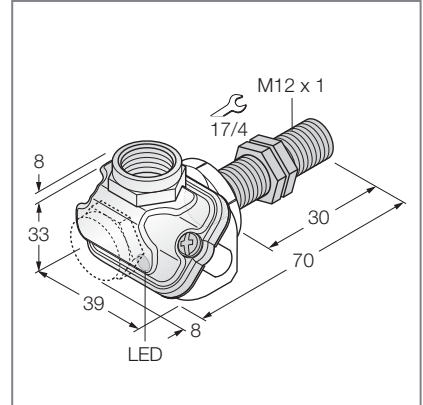
d145



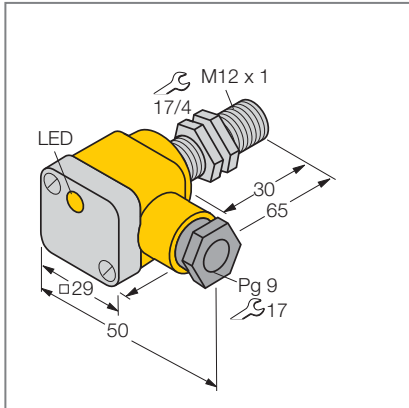
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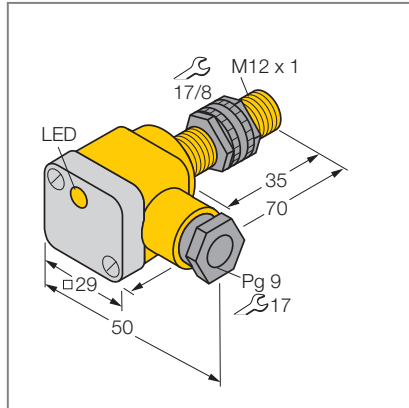
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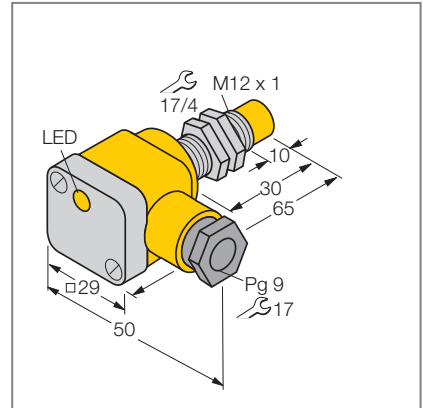
d148



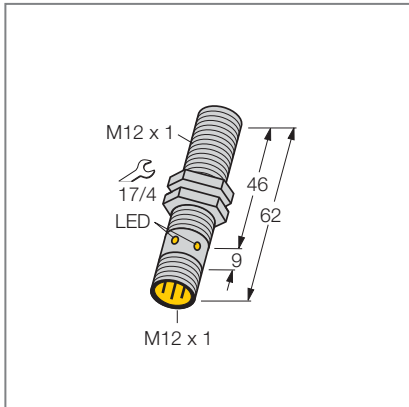
d149



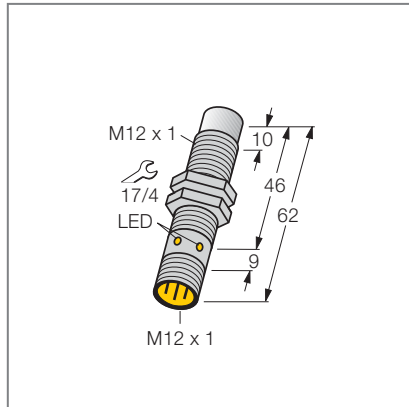
d150



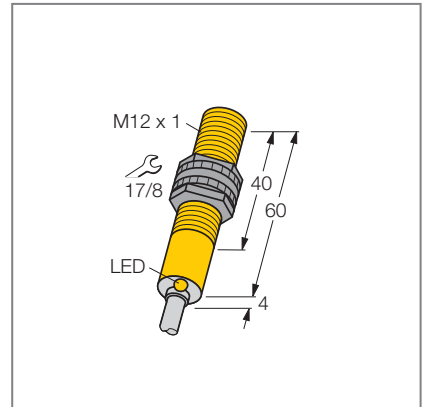
d151



d152

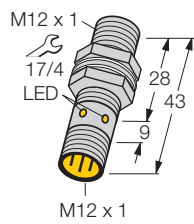


d153

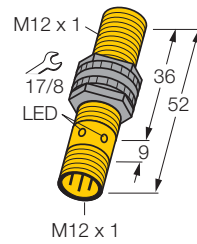




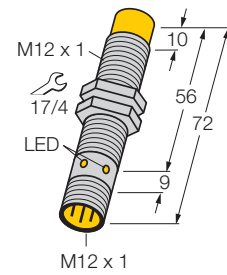
d154



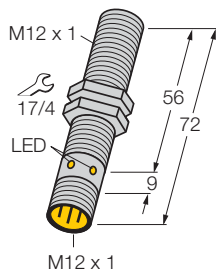
d155



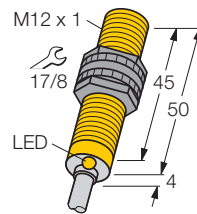
d156



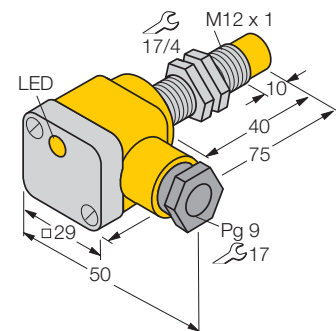
d157



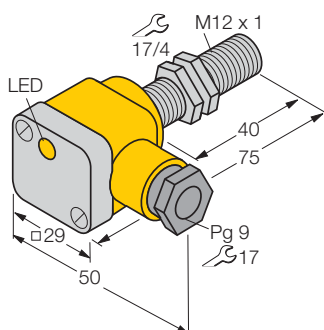
d158



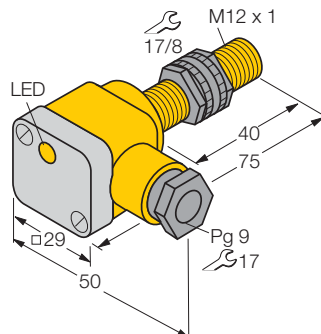
d159



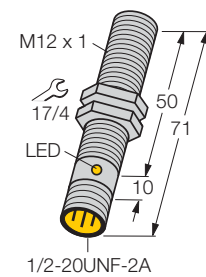
d160



d161

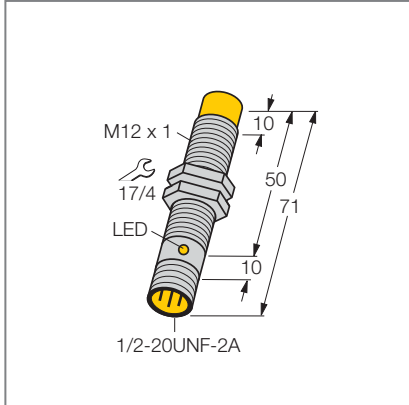


d162

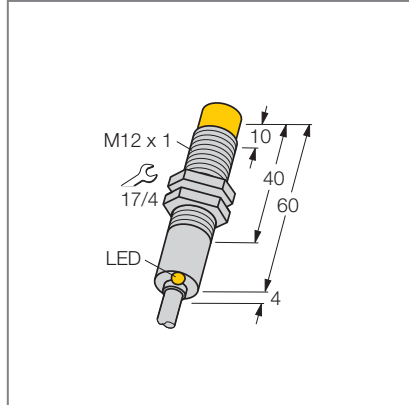


# Dimension drawings

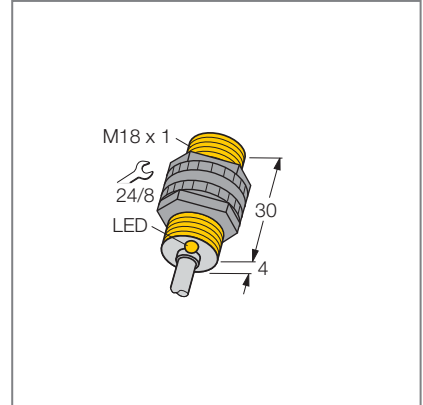
d163



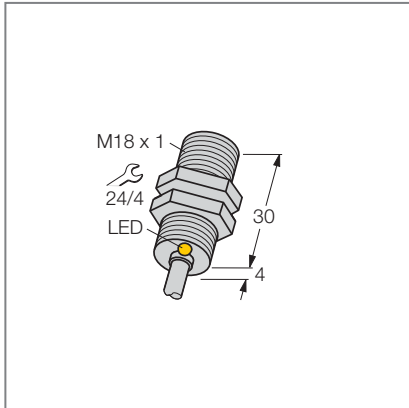
d164



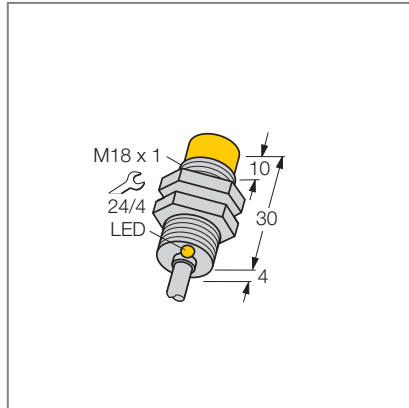
d165



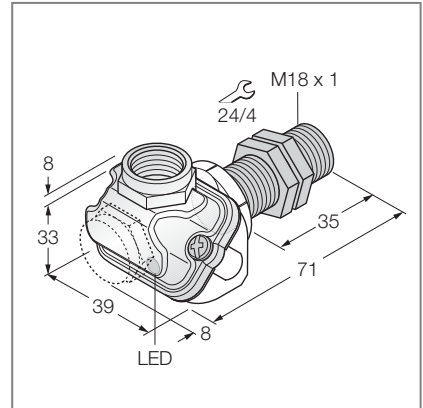
d166



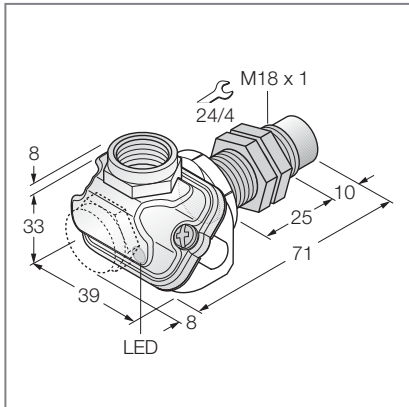
d167



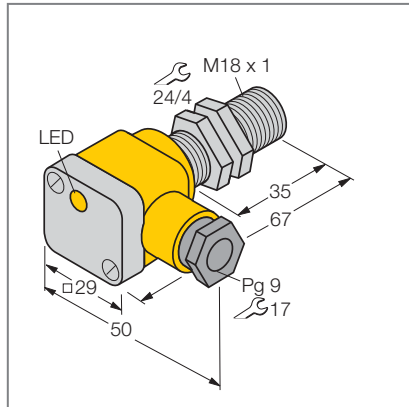
d168



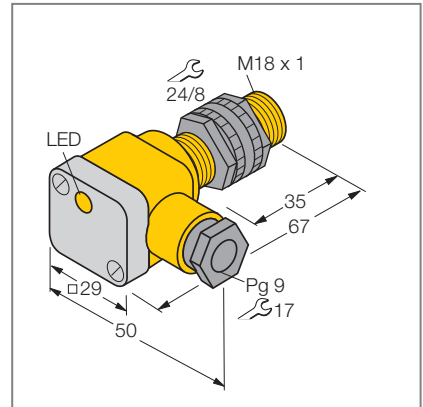
d169



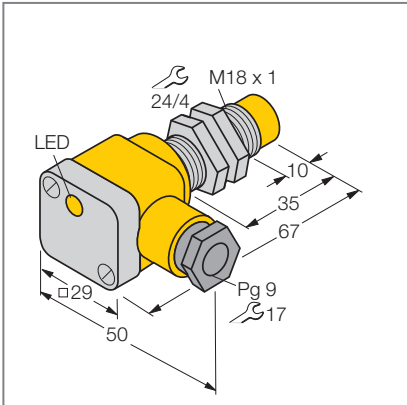
d170



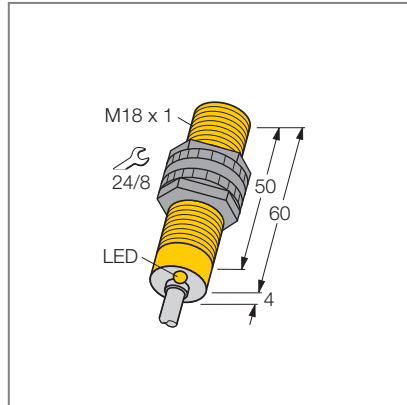
d171



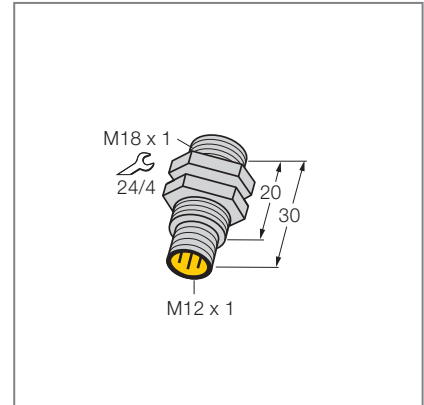
d172



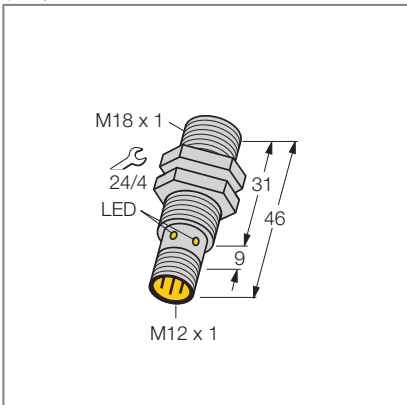
d173



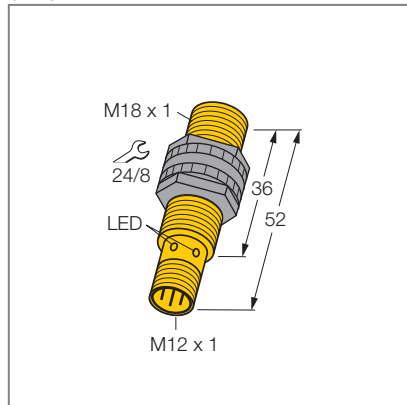
d174



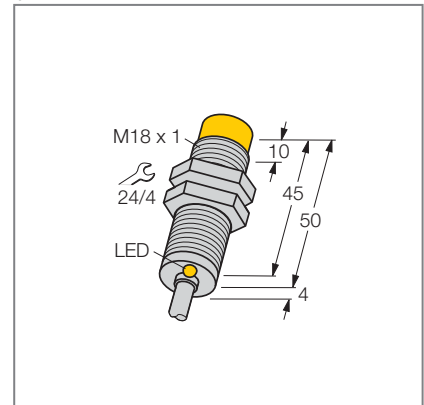
d175



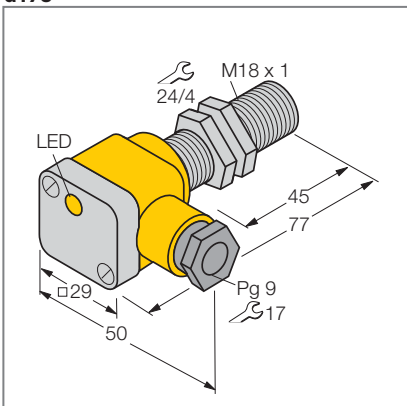
d176



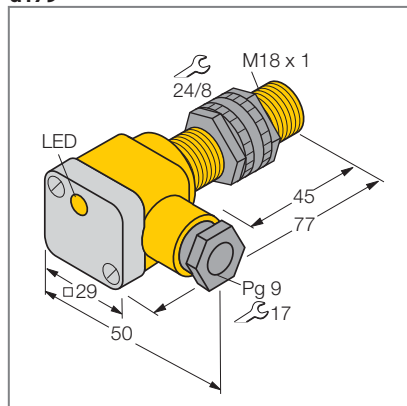
d177



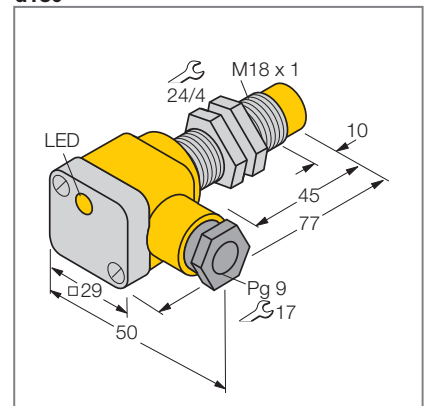
d178



d179

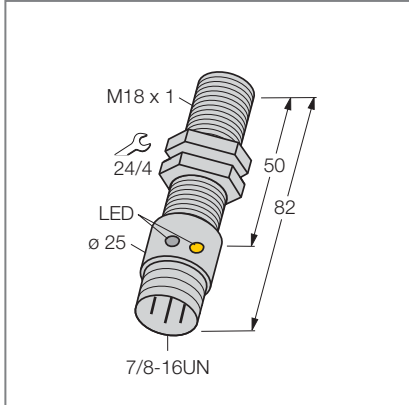


d180

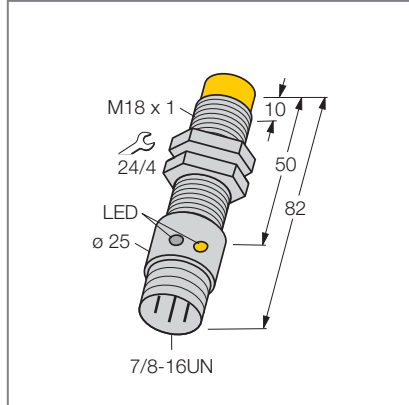


# Dimension drawings

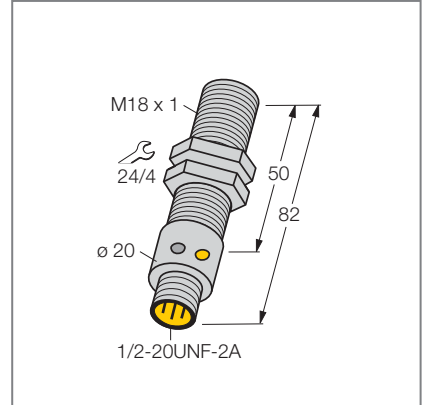
**d181**



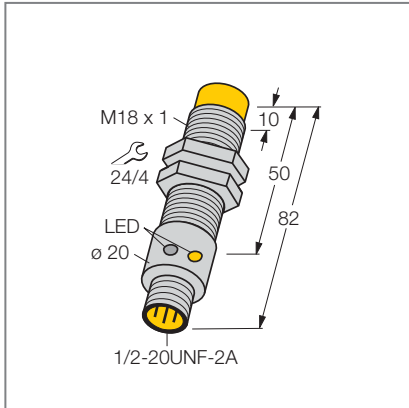
**d182**



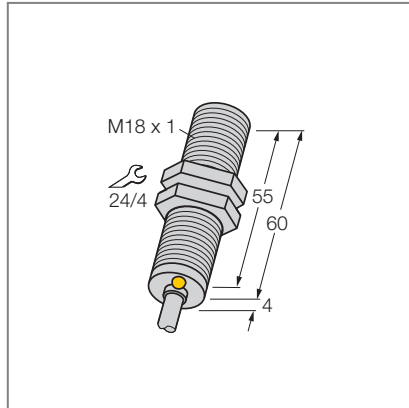
**d183**



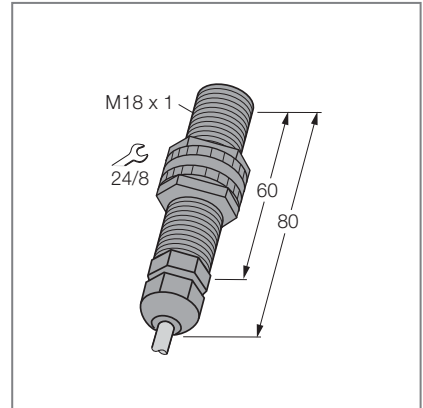
**d184**



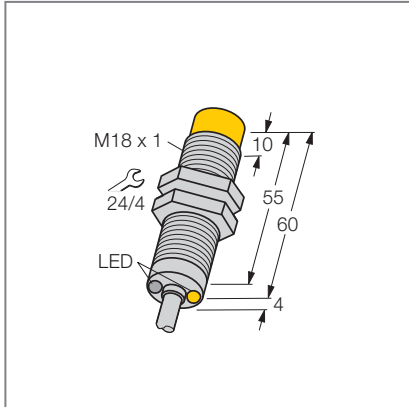
**d185**



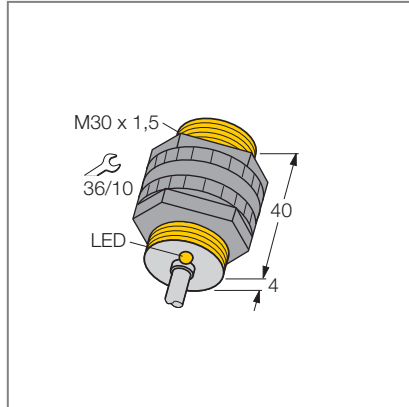
**d186**



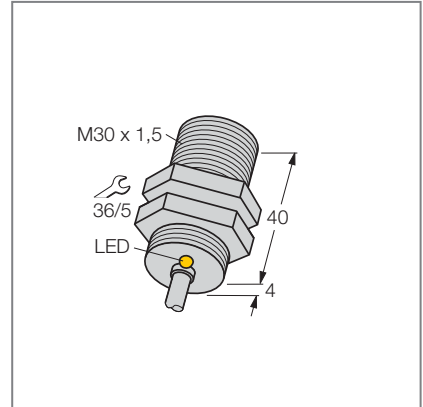
**d187**



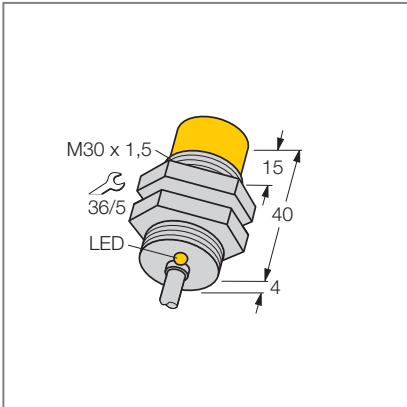
**d188**



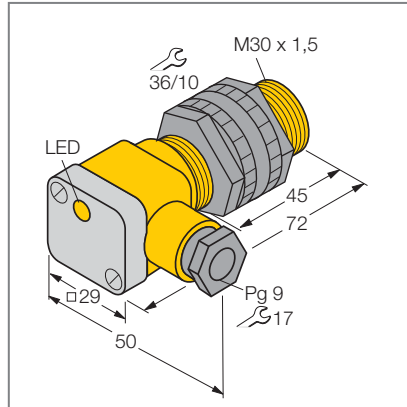
**d189**



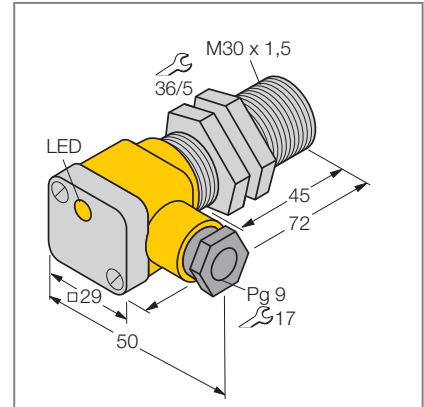
d190



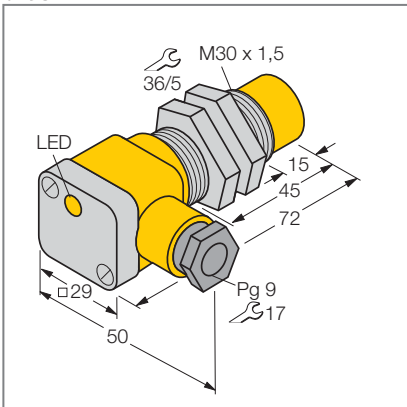
d191



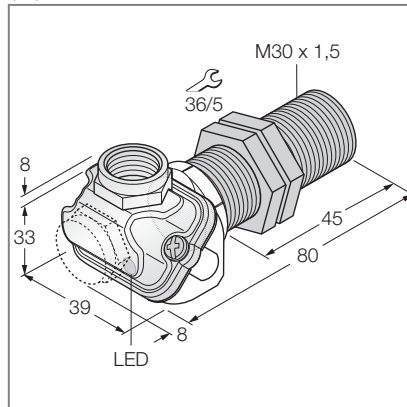
d192



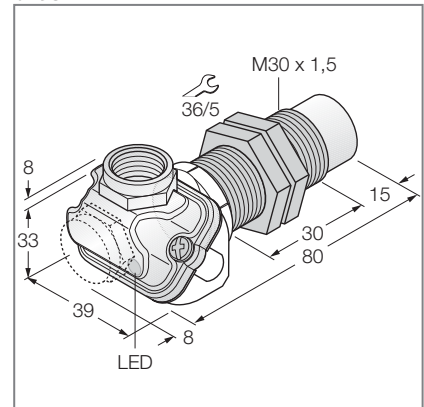
d193



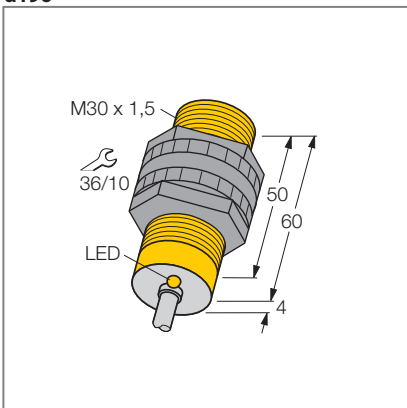
d194



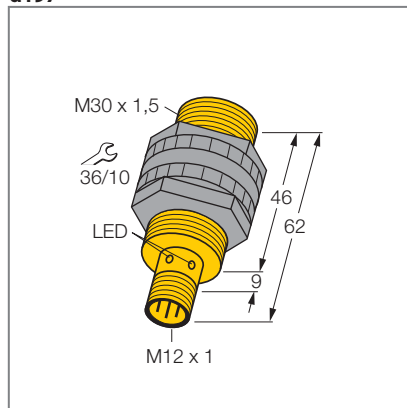
d195



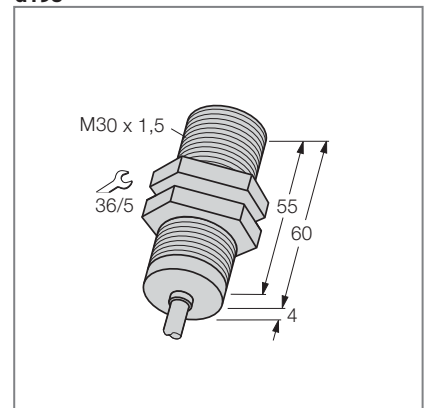
d196



d197

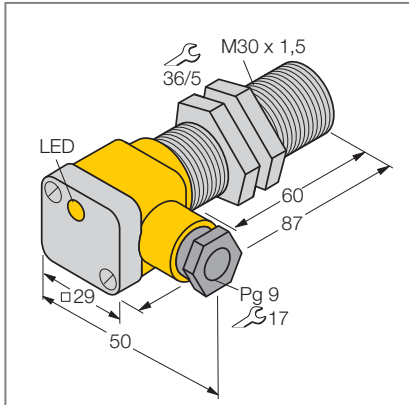


d198

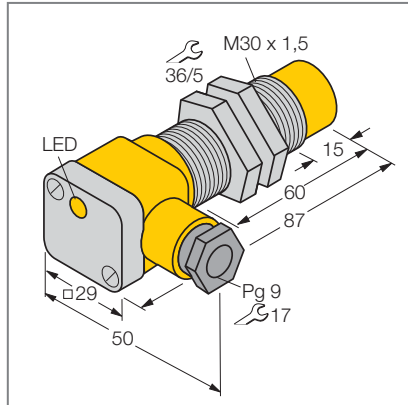


# Dimension drawings

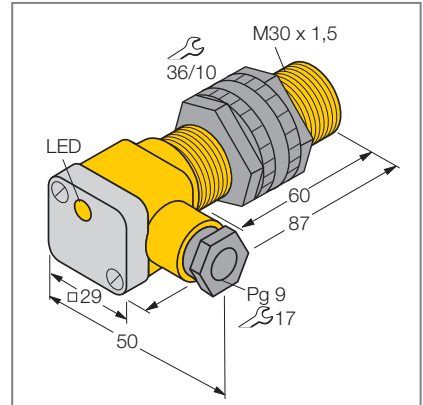
d199



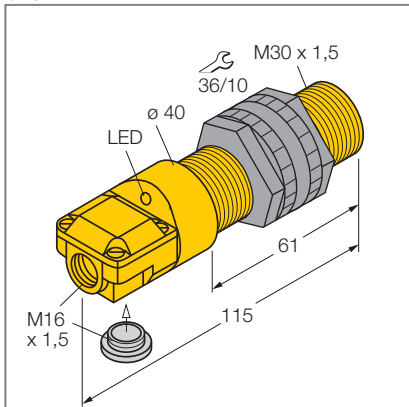
d200



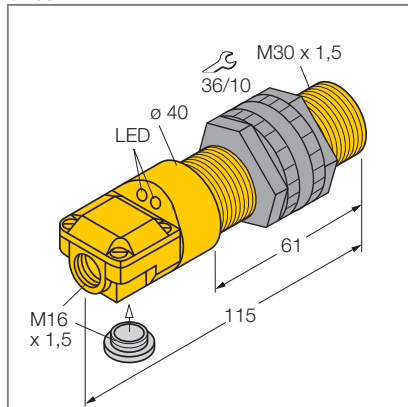
d201



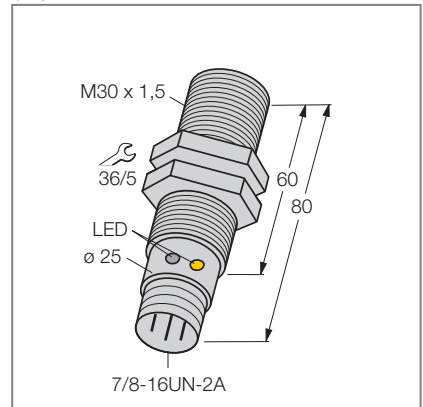
d202



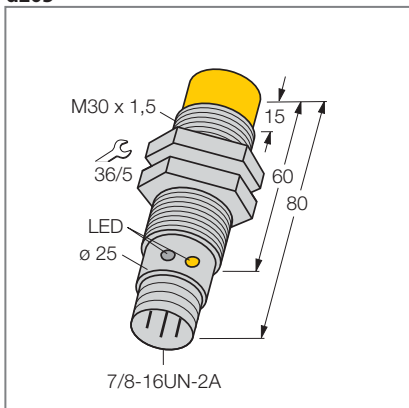
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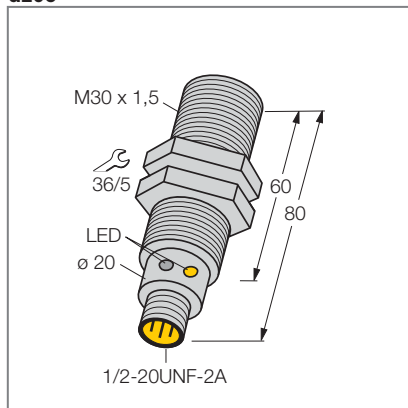
d204



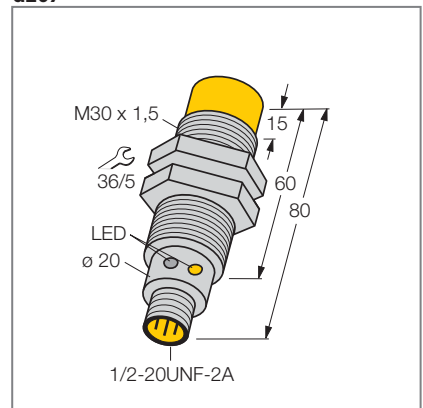
d205



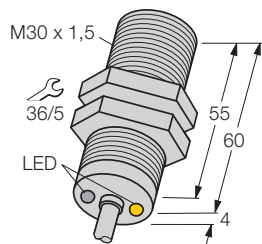
d206



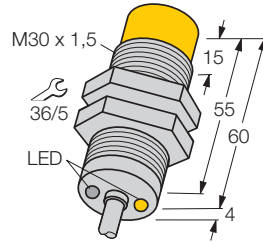
d207



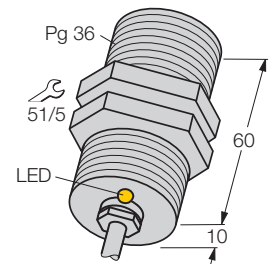
d208



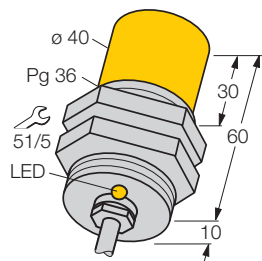
d209



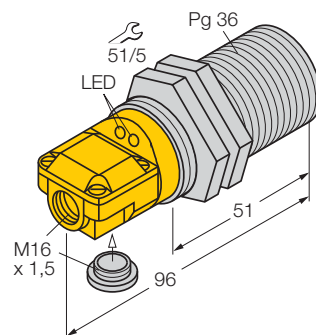
d210



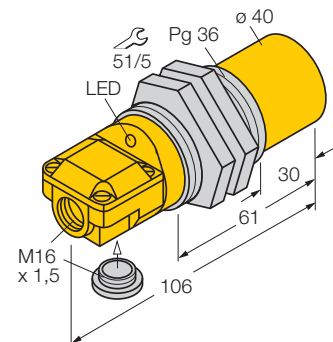
d211



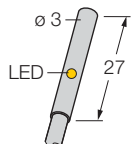
d212



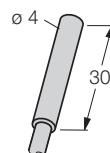
d213



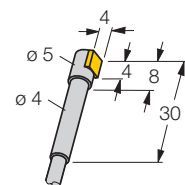
d214



d215

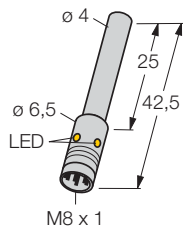


d216

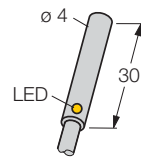


# Dimension drawings

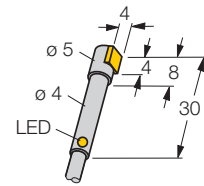
d217



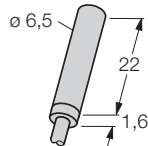
d218



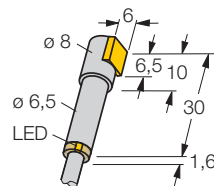
d219



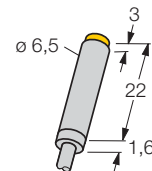
d220



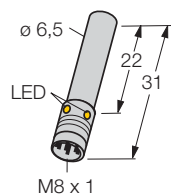
d221



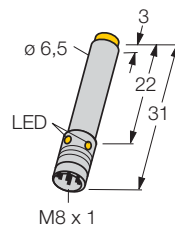
d222



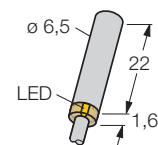
d223



d224

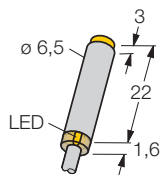


d225

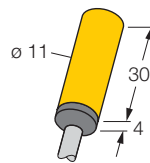




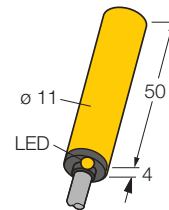
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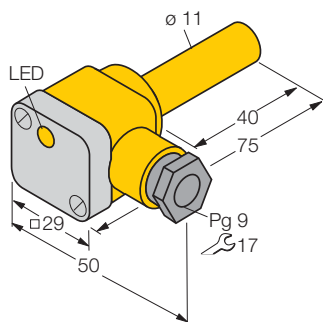
d227



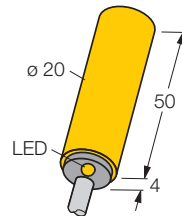
d228



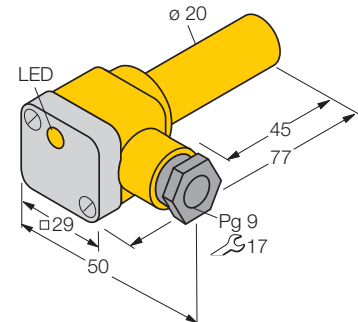
d229



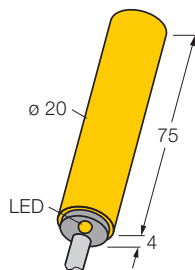
d230



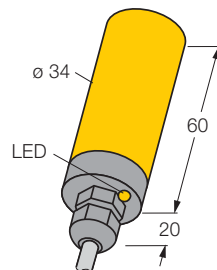
d231



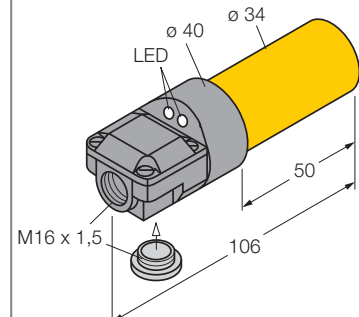
d232



d233

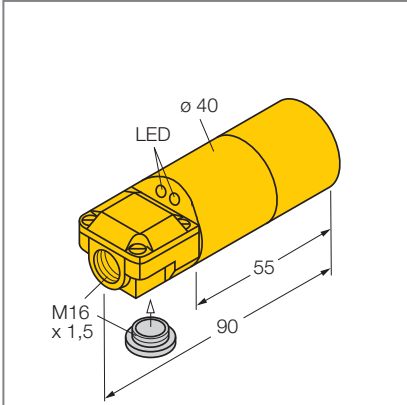


d234

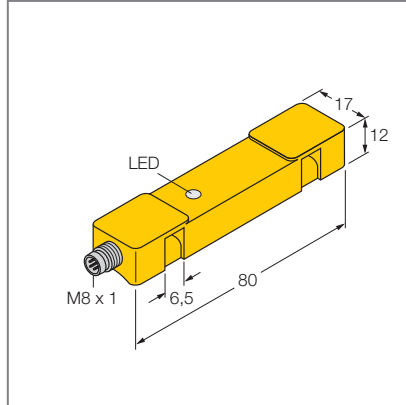


# Dimension drawings

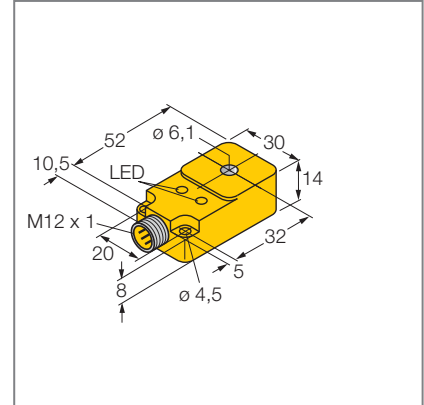
d235



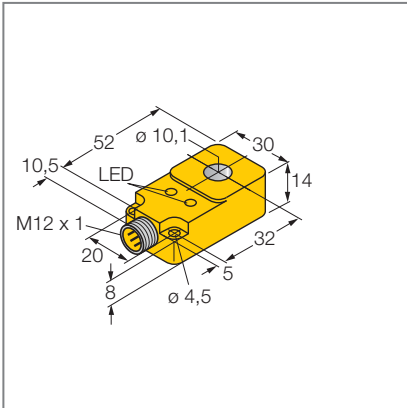
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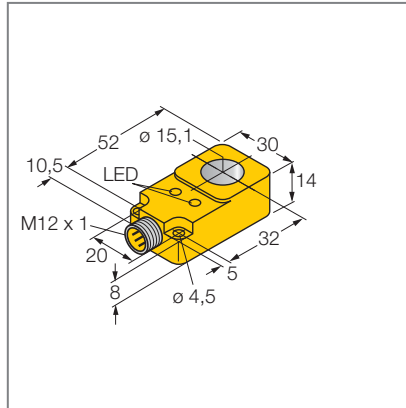
d237



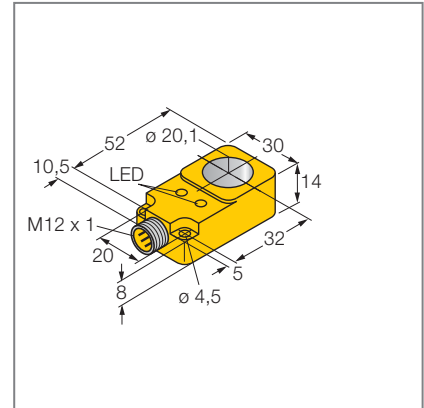
d238



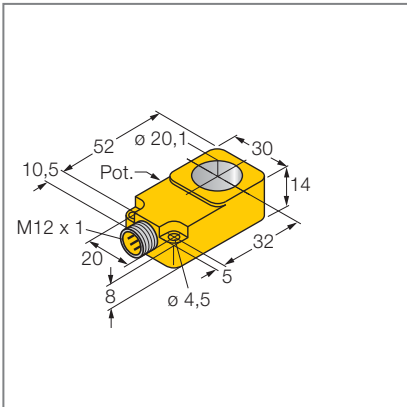
d239



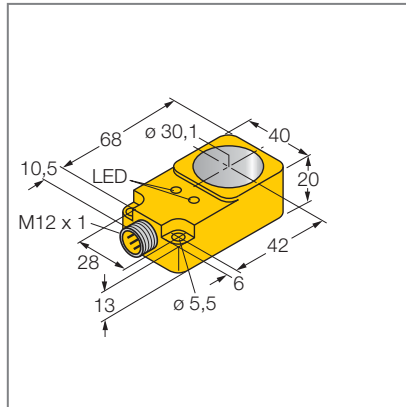
d240



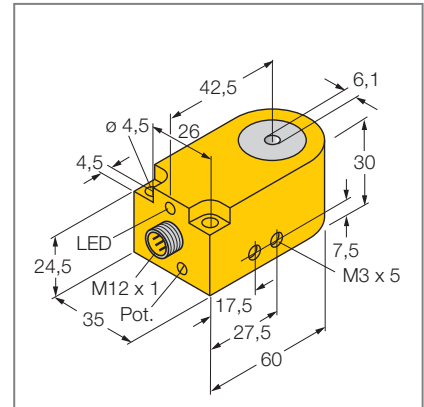
d241



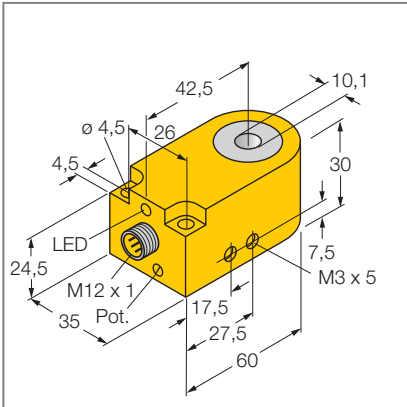
d242



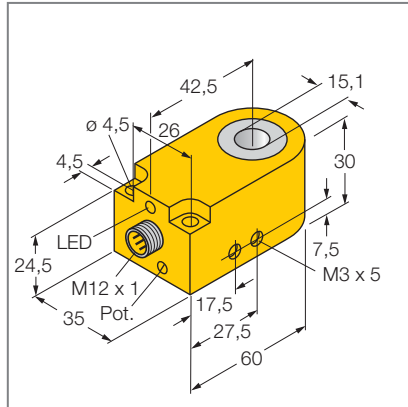
d243



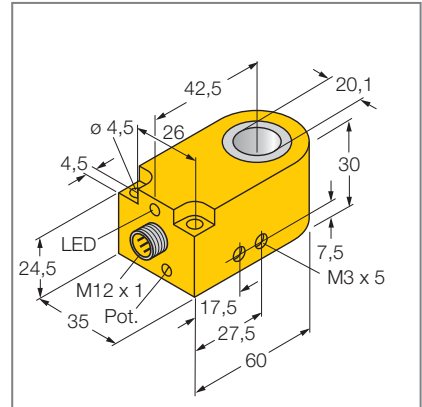
d244



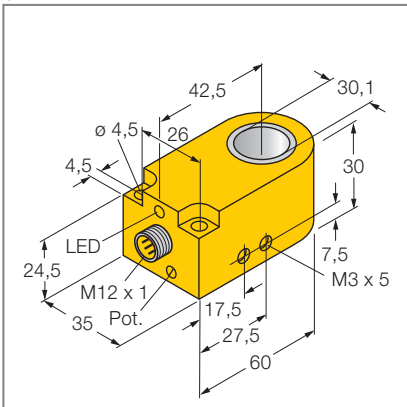
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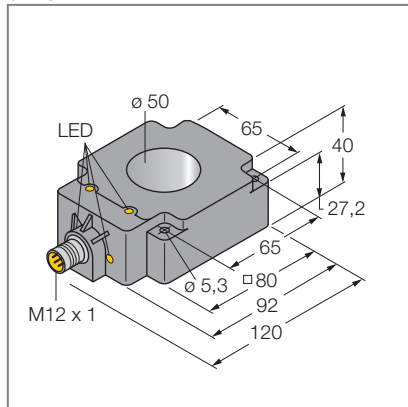
d246



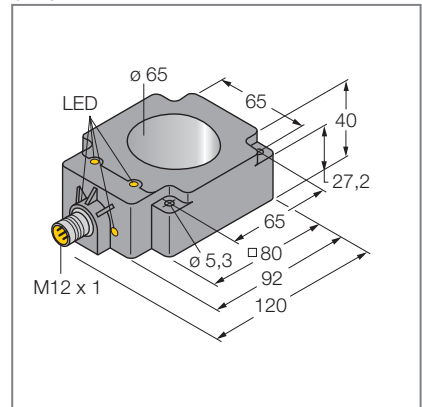
d247



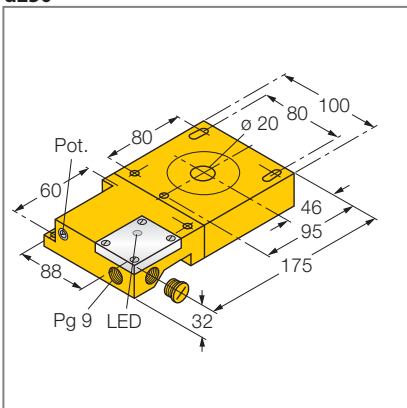
d248



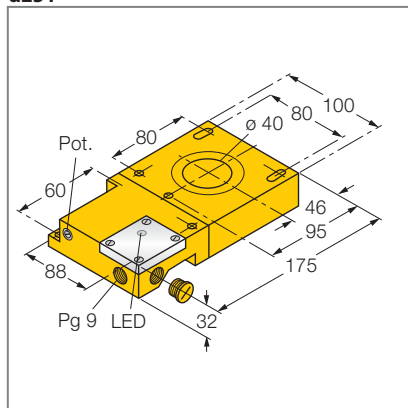
d249



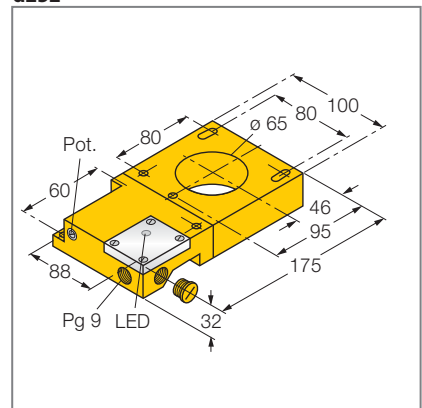
d250



d251

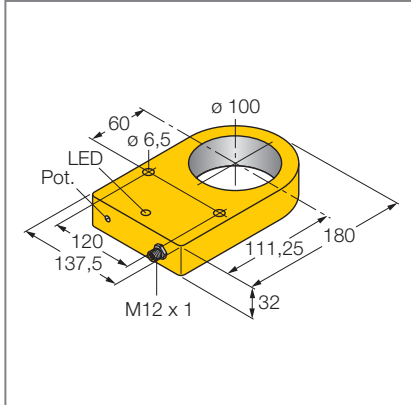


d252

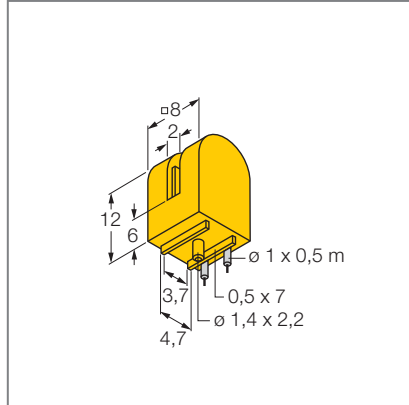


# Dimension drawings

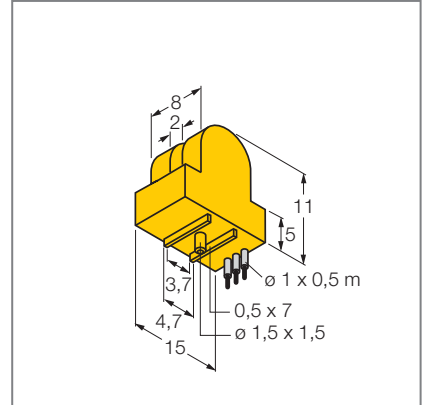
d253



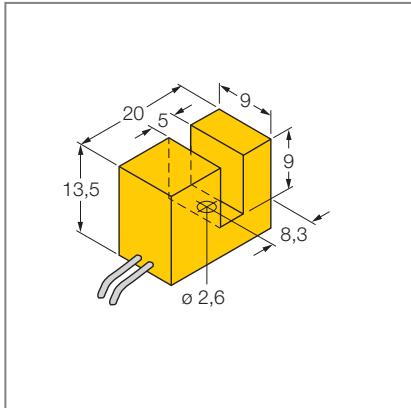
d254



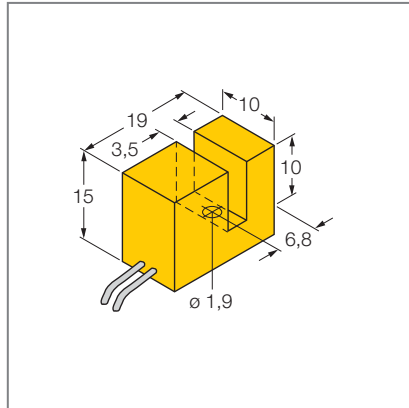
d255



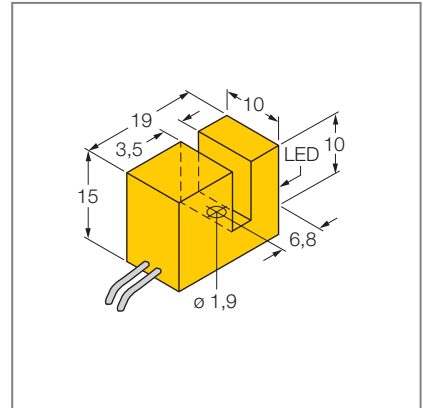
d256



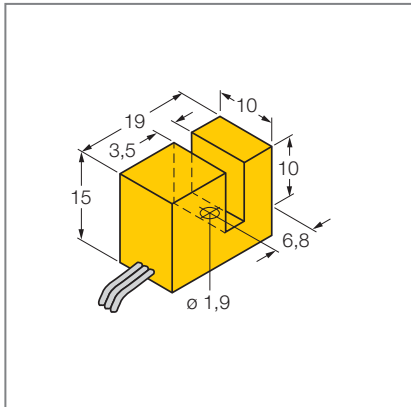
d257



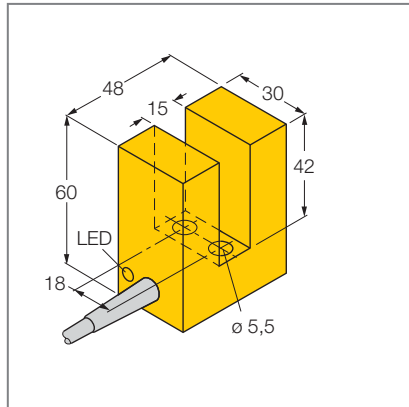
d258



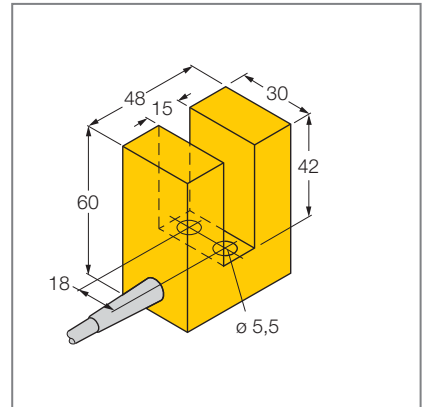
d259



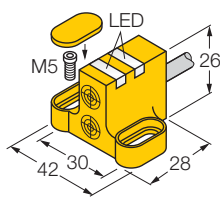
d260



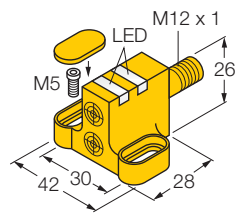
d261



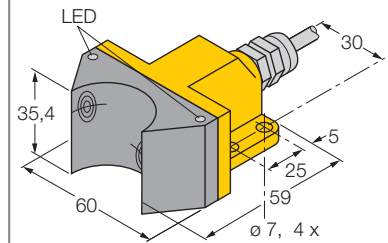
d262



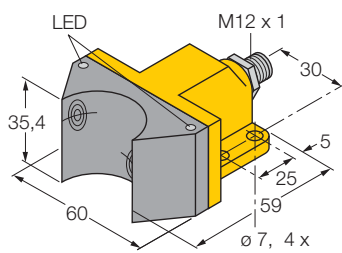
d263



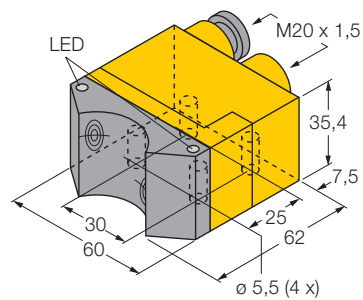
d264



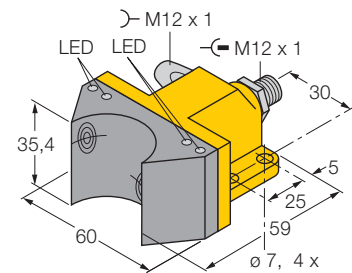
d265



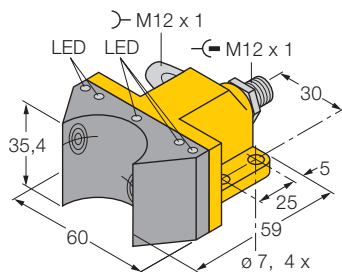
d266



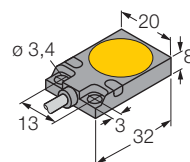
d267



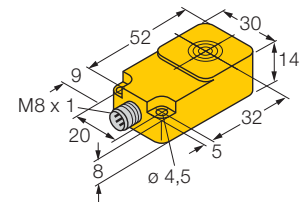
d268



d269

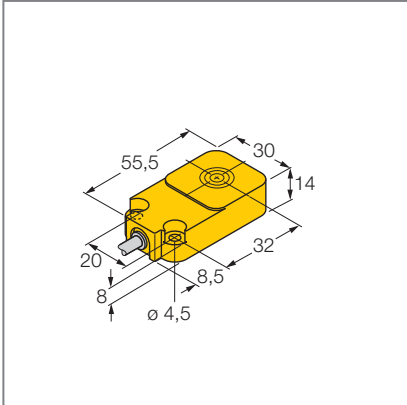


d270

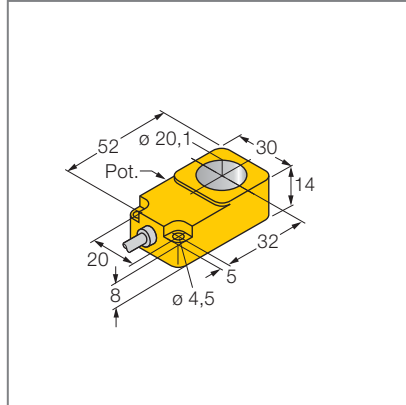


# Dimension drawings

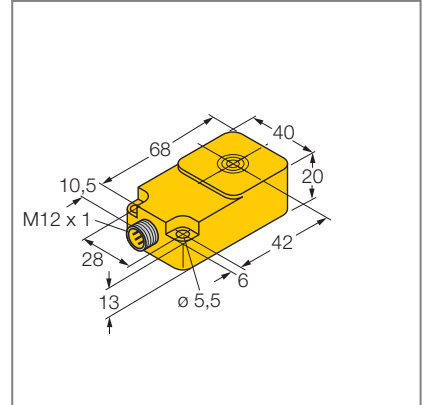
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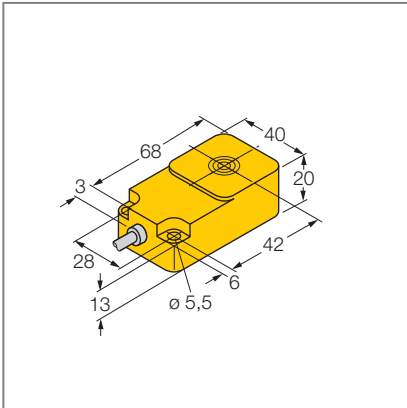
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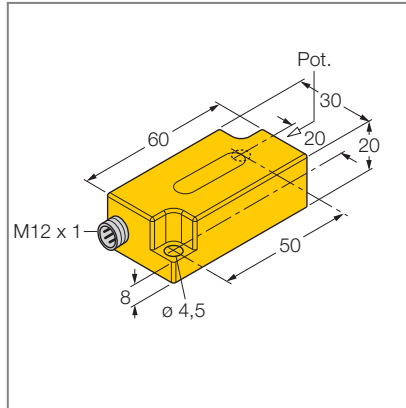
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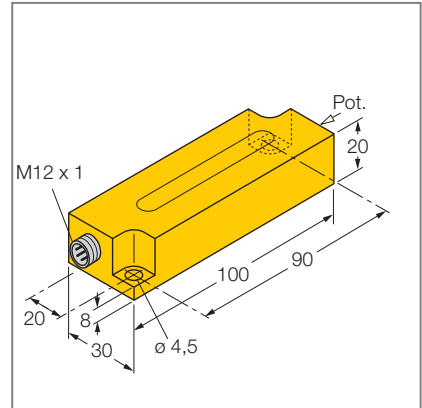
d274



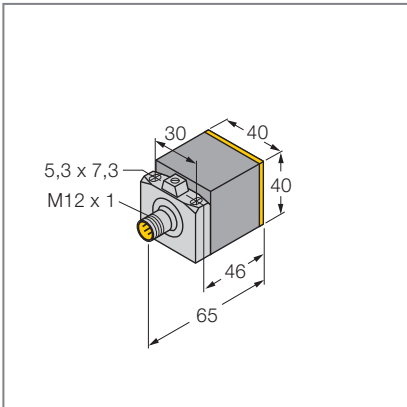
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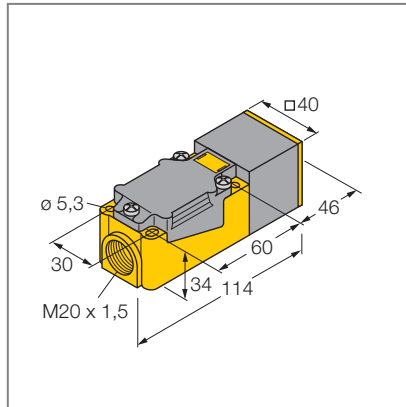
d276



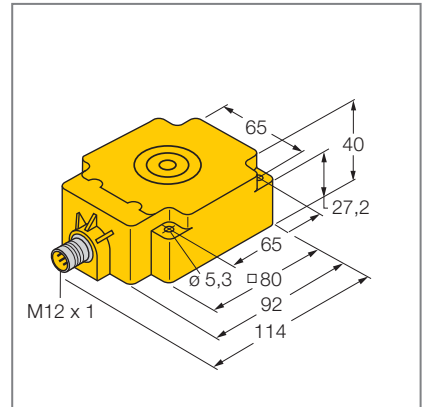
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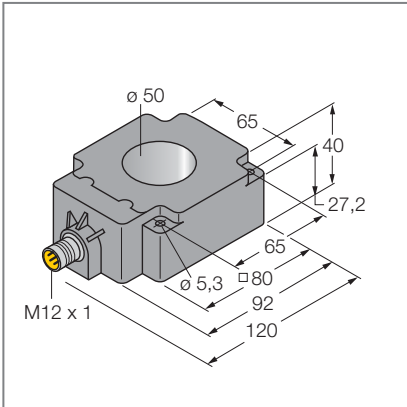
d278



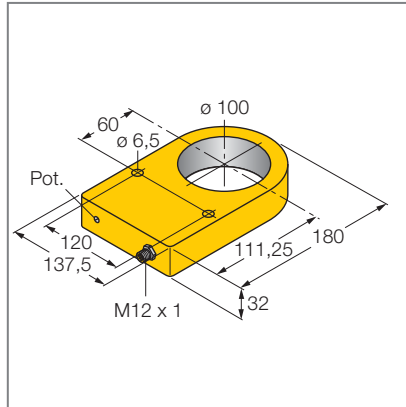
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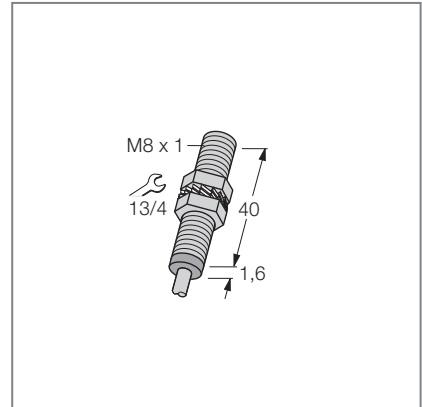
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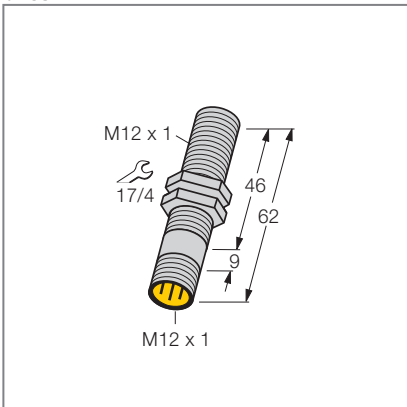
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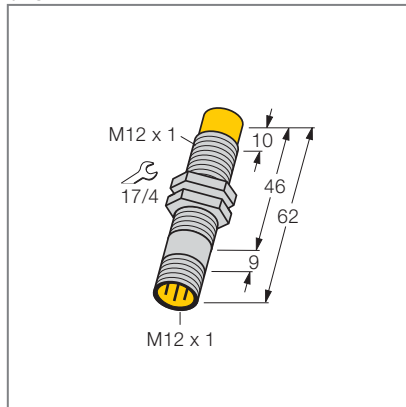
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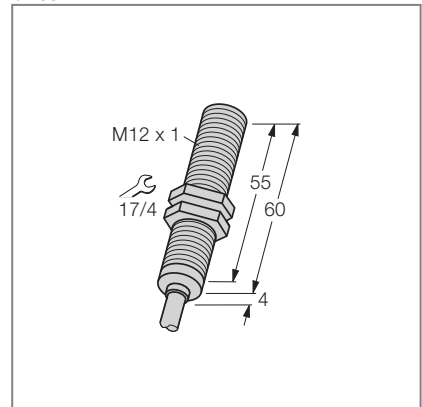
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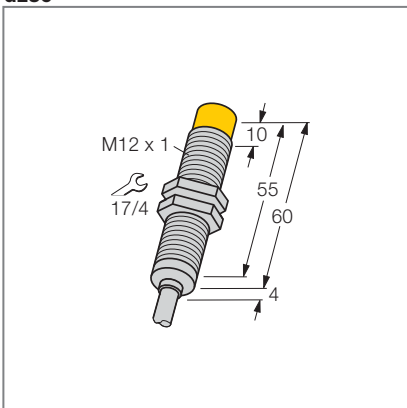
d284



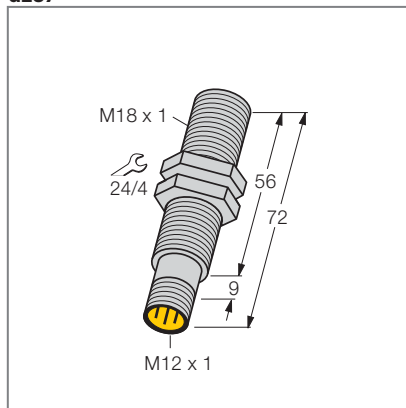
d285



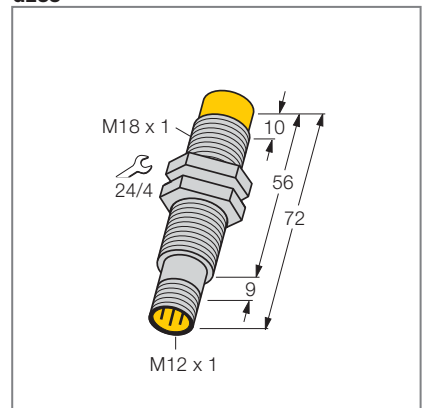
d286



d287

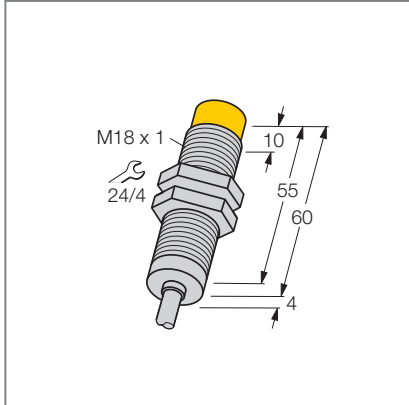


d288

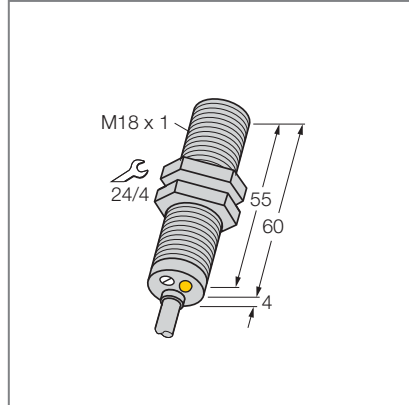


# Dimension drawings

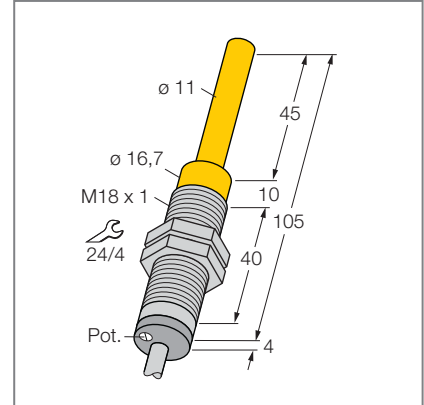
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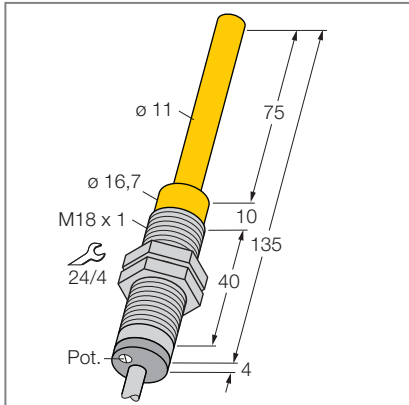
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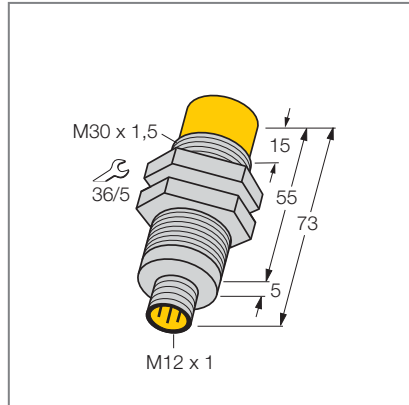
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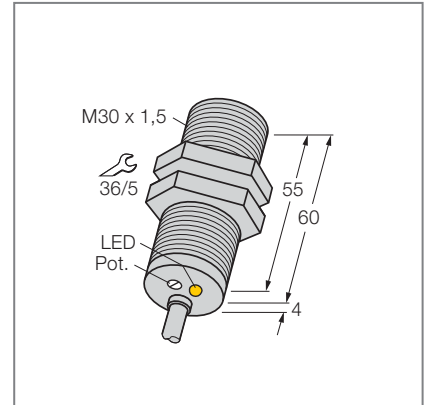
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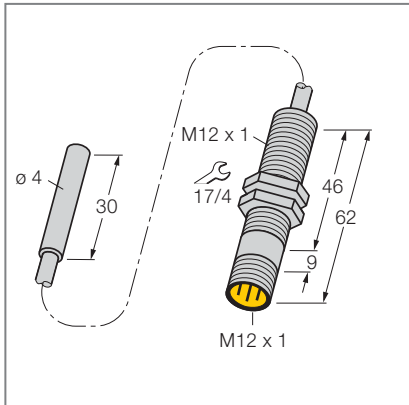
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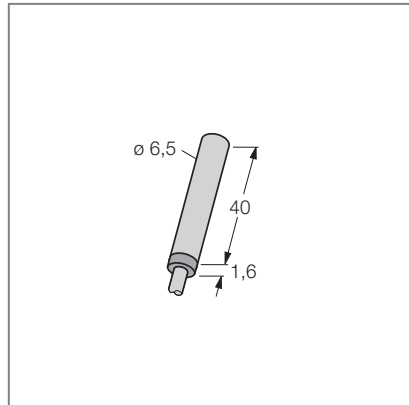
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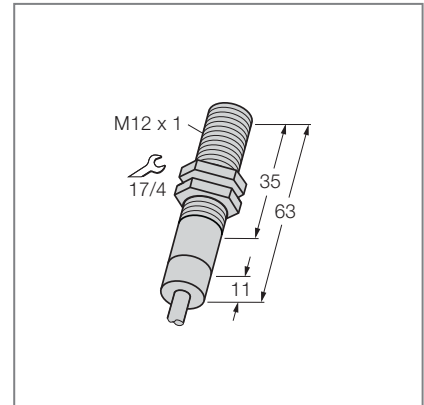
d295



d296

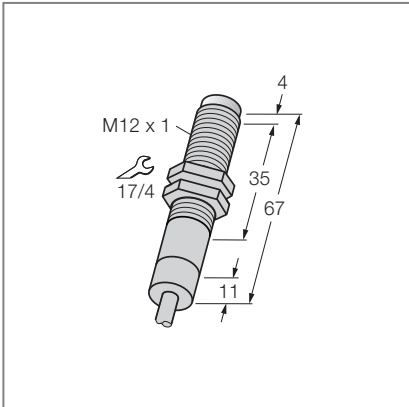


d297

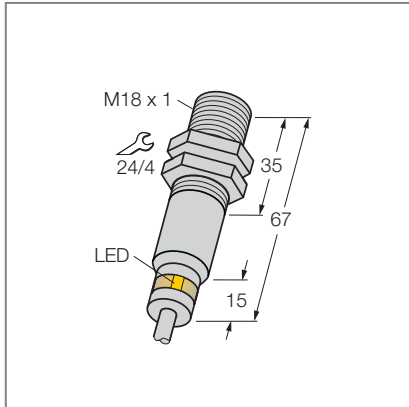




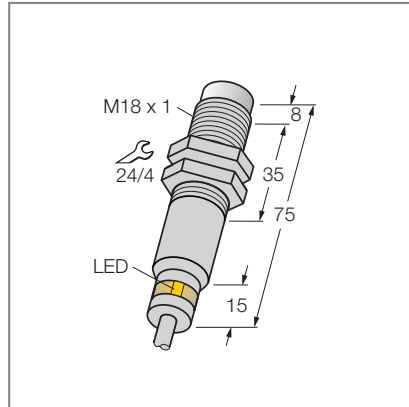
d298



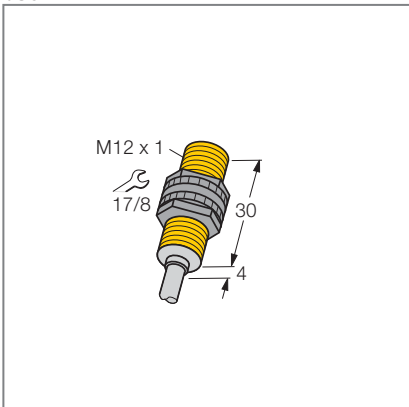
d299



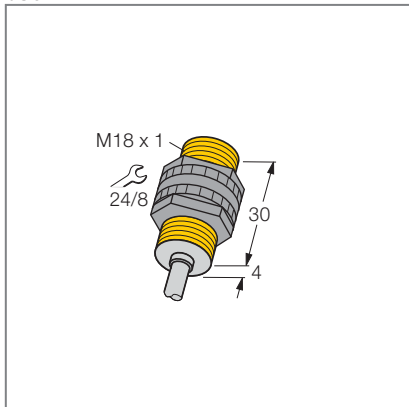
d300



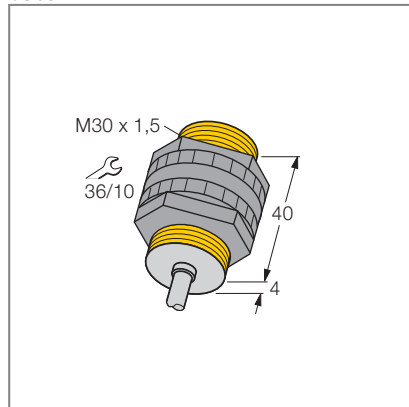
d301



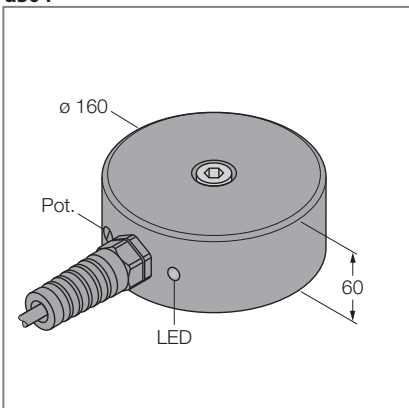
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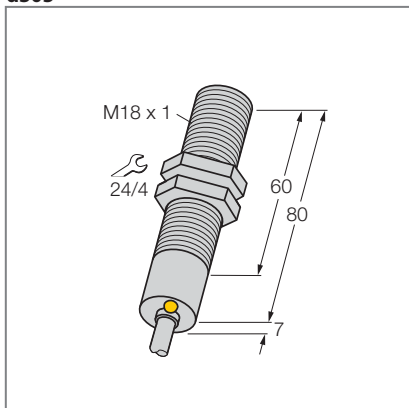
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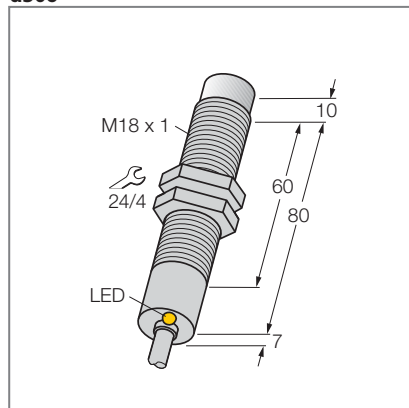
d304



d305



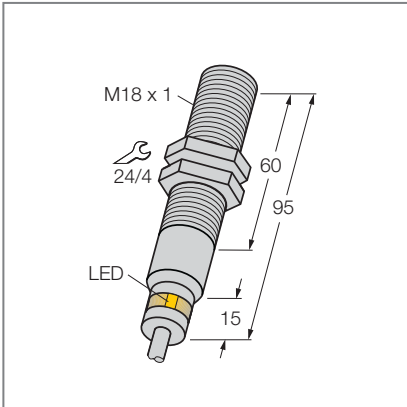
d306



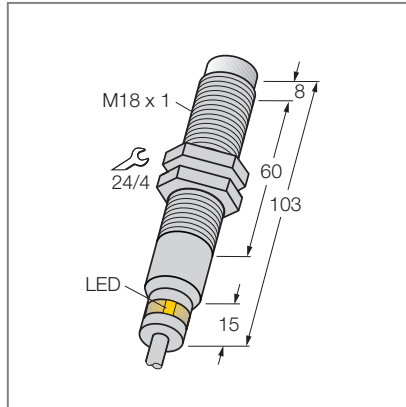
Dimension drawings

# Dimension drawings

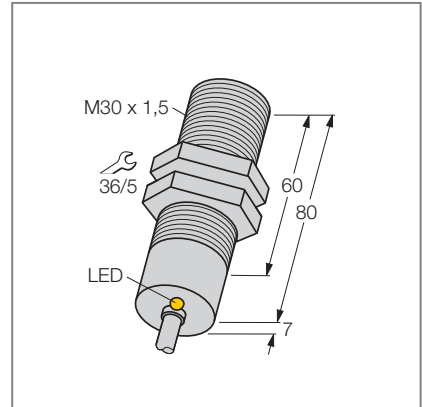
d307



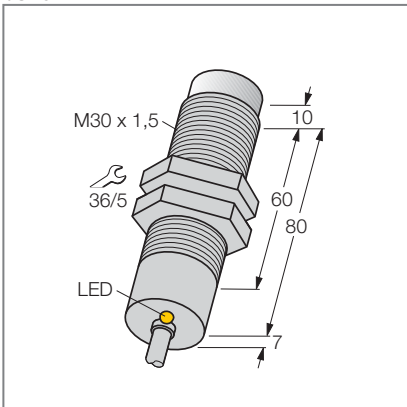
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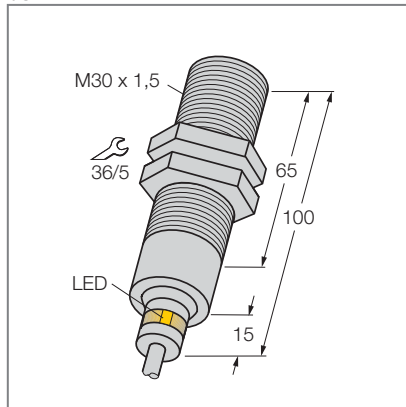
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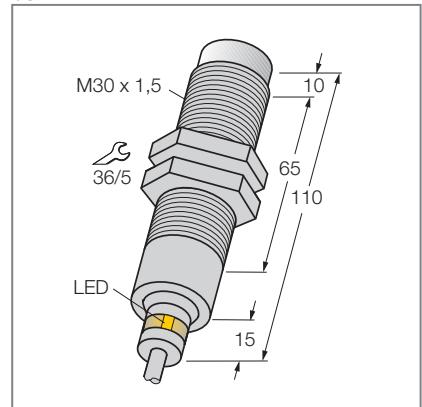
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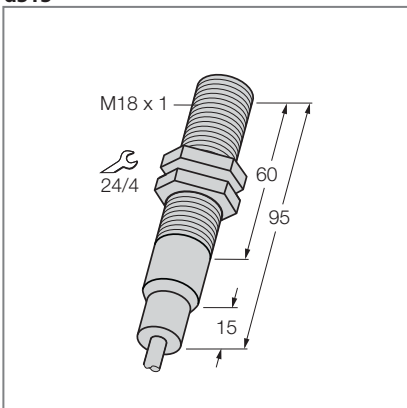
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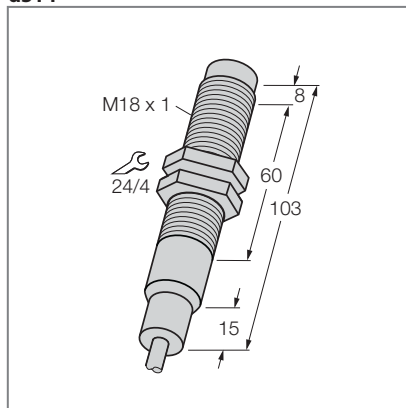
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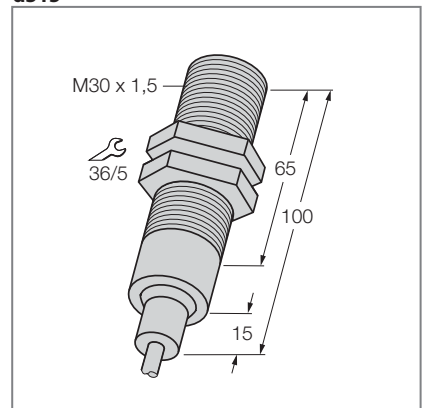
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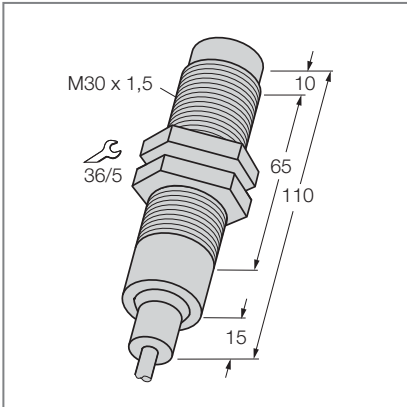
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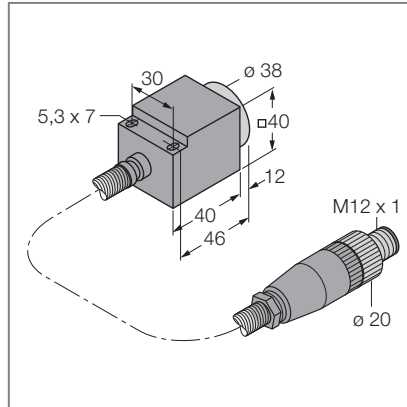
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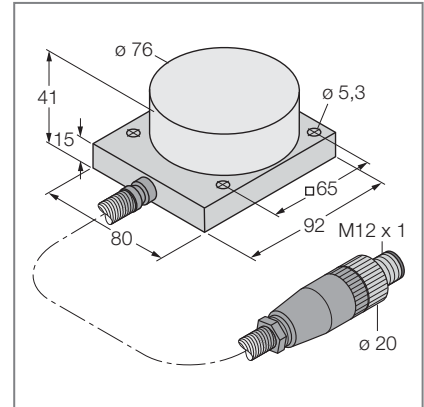
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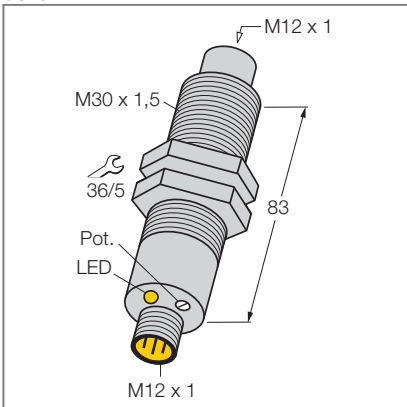
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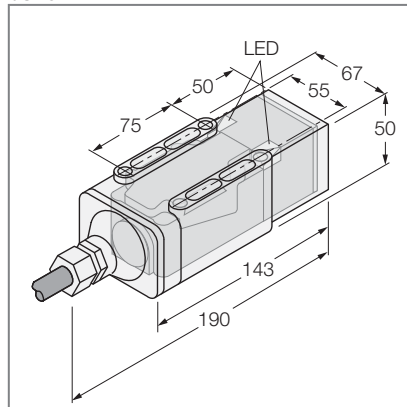
d318



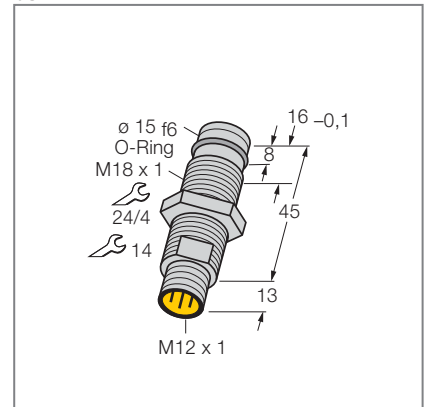
d319



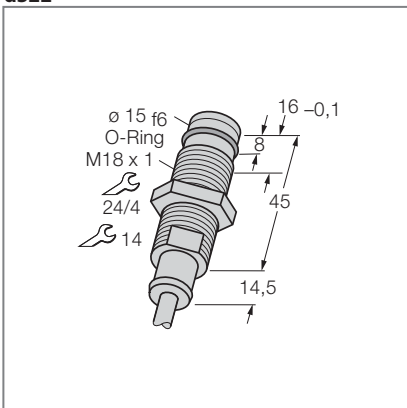
d320



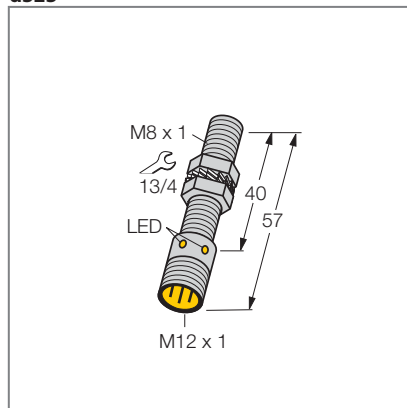
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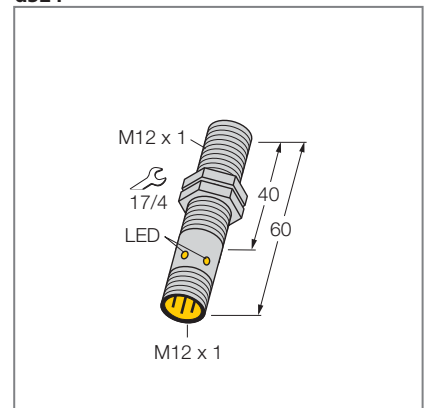
d322



d323

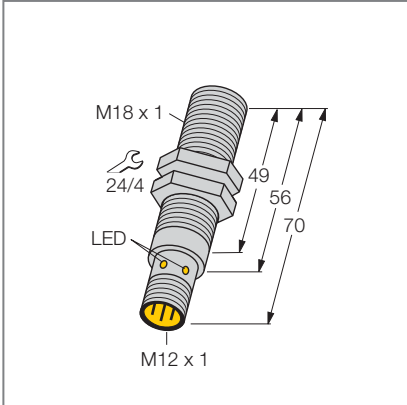


d324

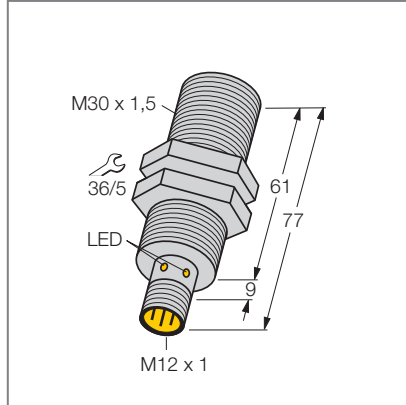


# Dimension drawings

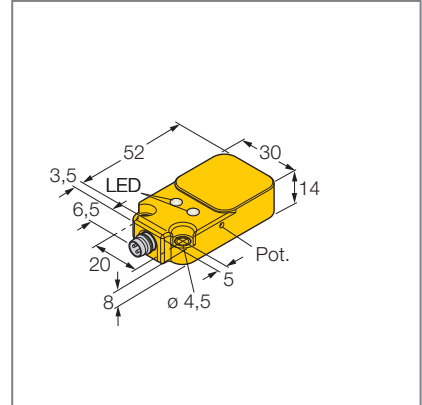
**d325**



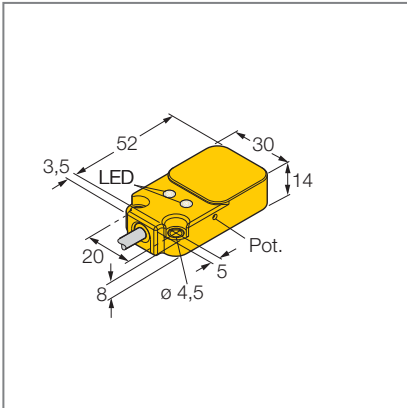
**d326**



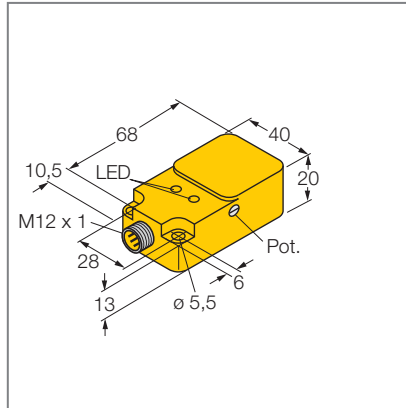
**d327**



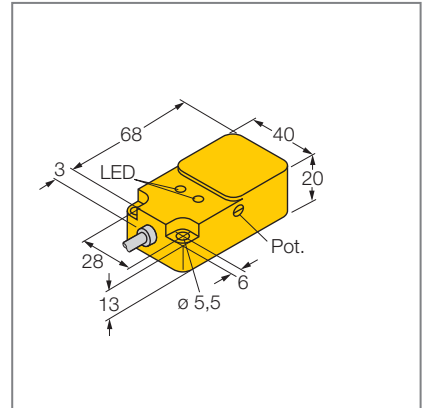
**d328**



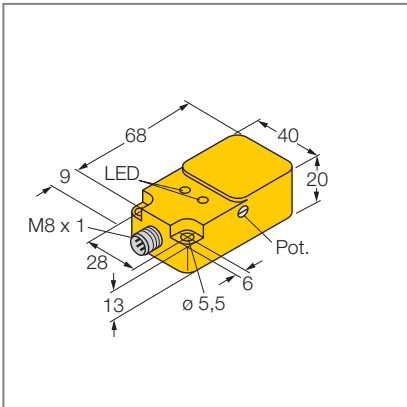
**d329**



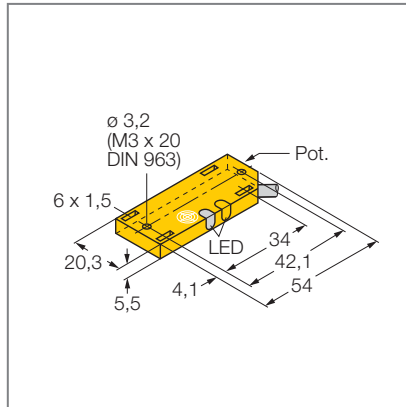
**d330**



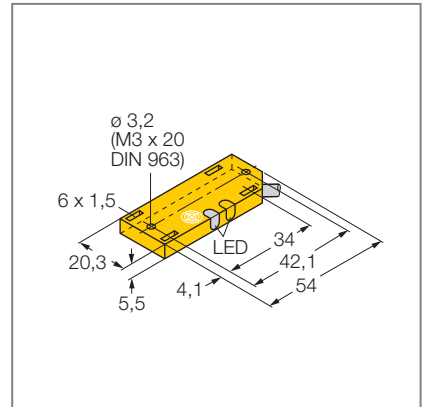
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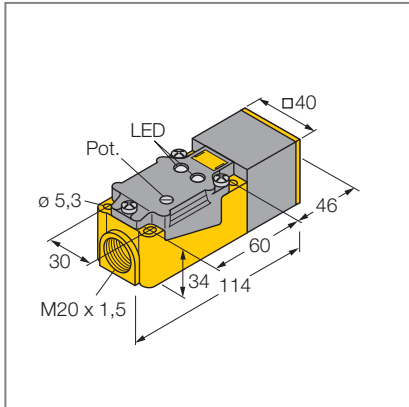
**d332**



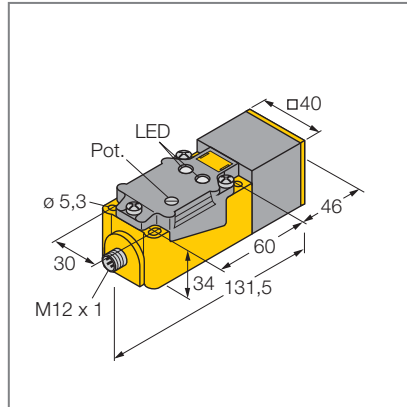
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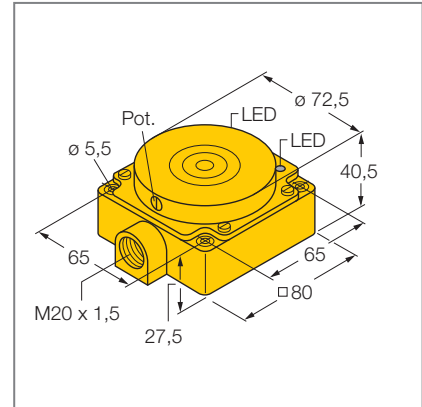
d334



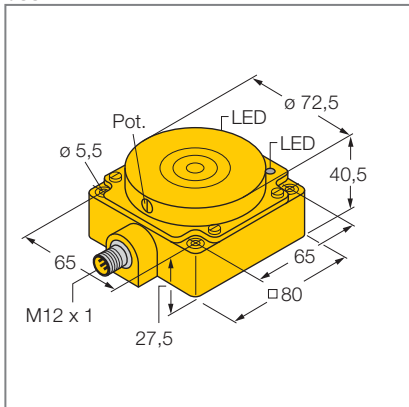
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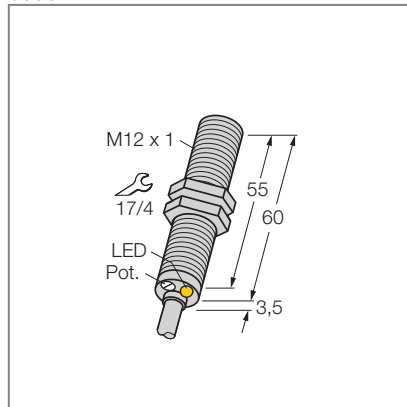
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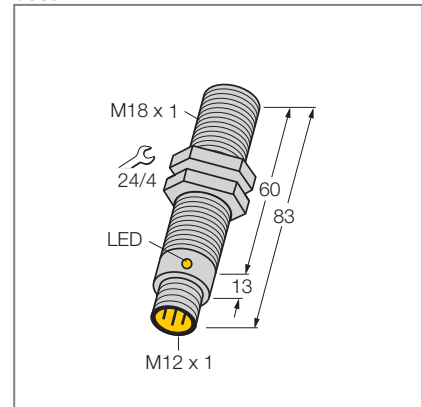
d337



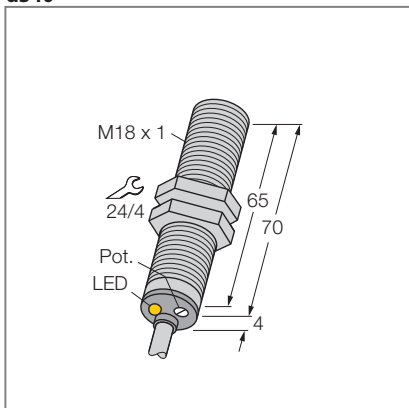
d338



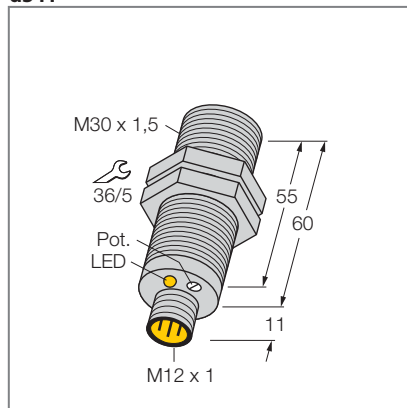
d339



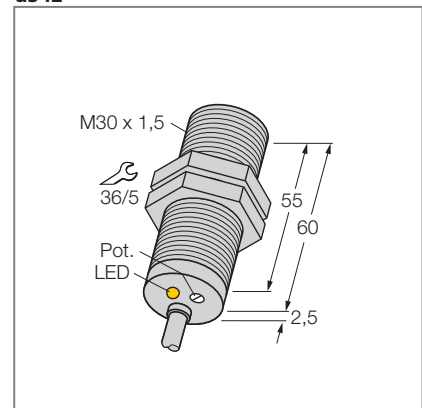
d340



d341

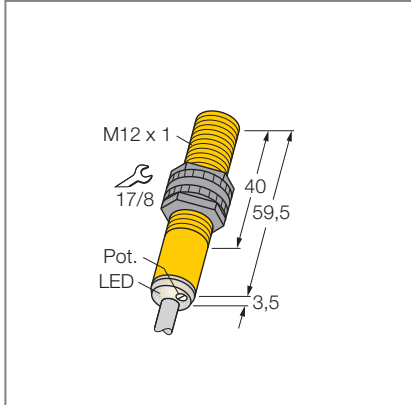


d342

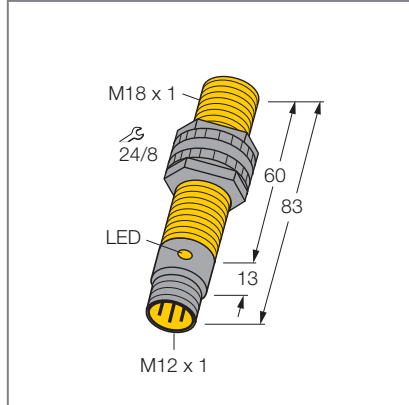


# Dimension drawings

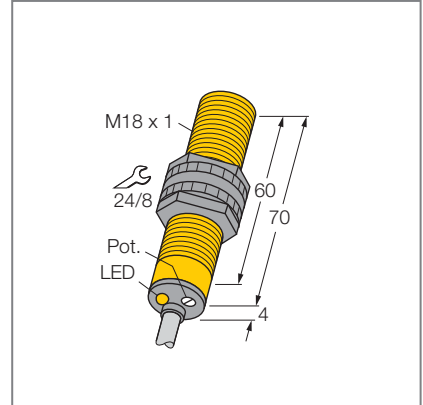
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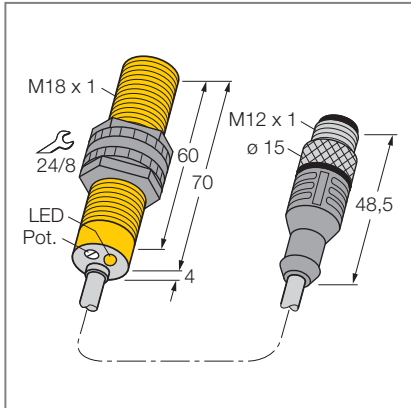
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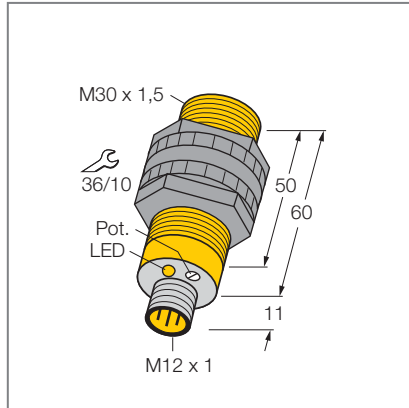
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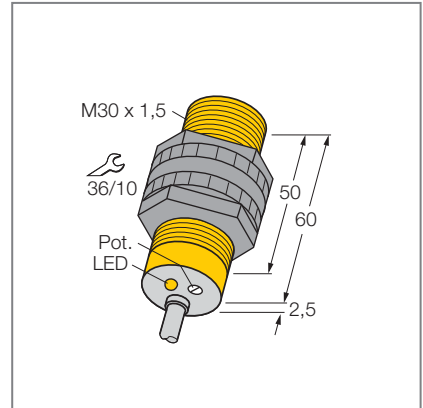
d346



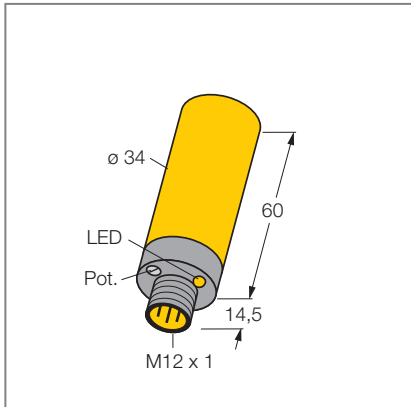
d347



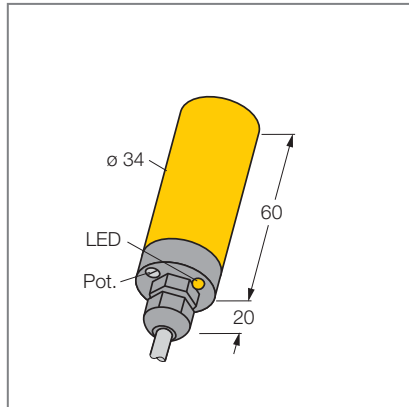
d348



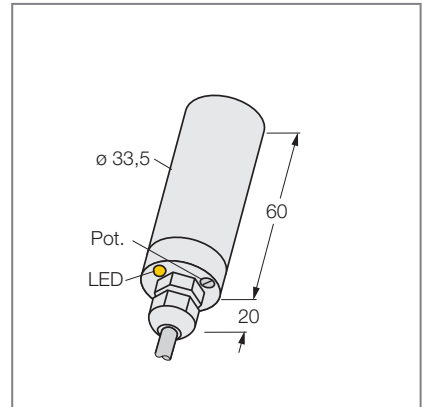
d349



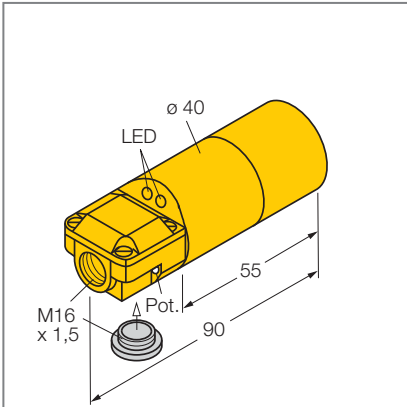
d350



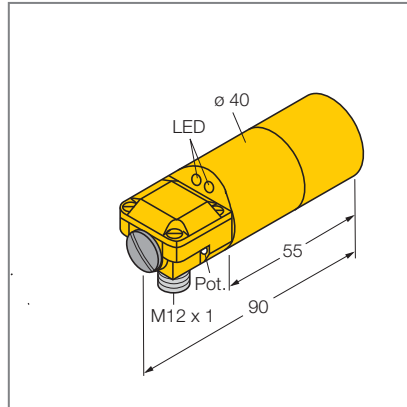
d351



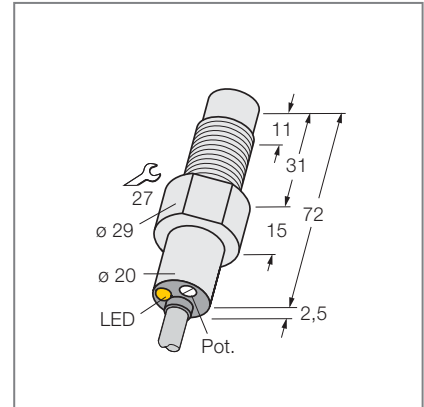
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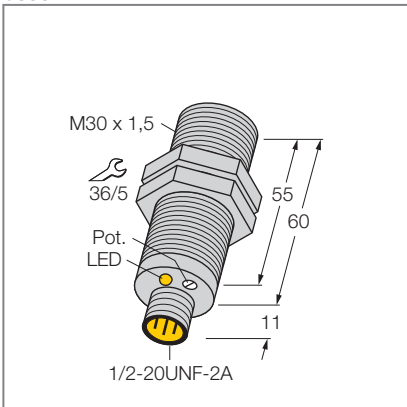
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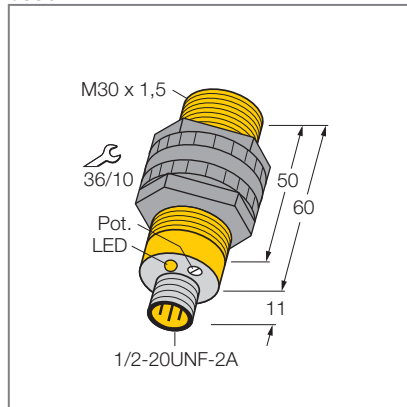
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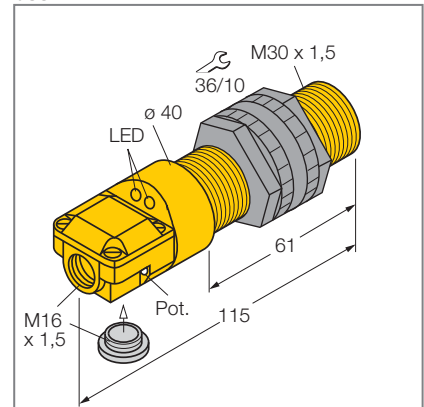
d355



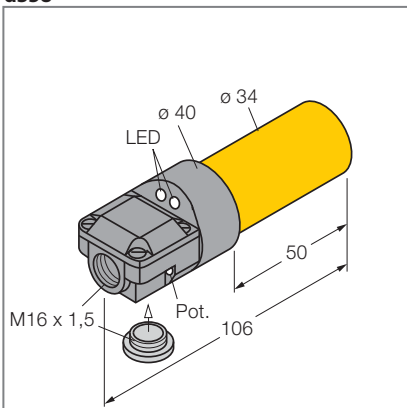
d356



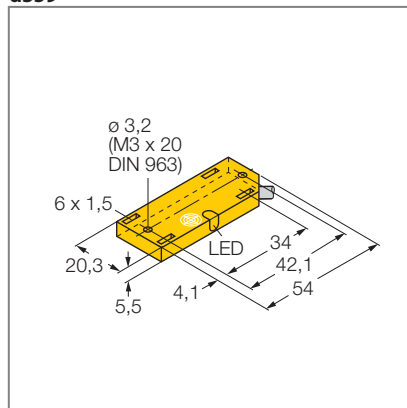
d357



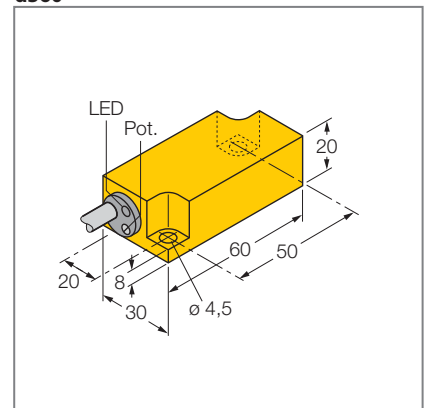
d358



d359

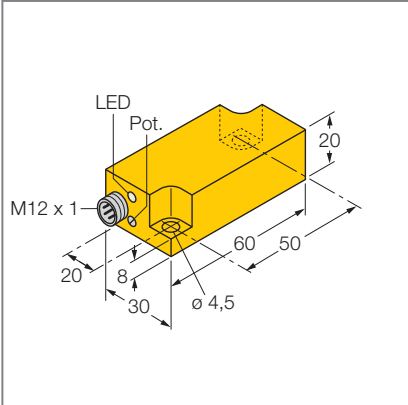


d360

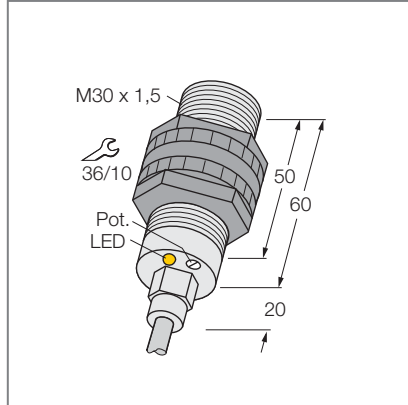


# Dimension drawings

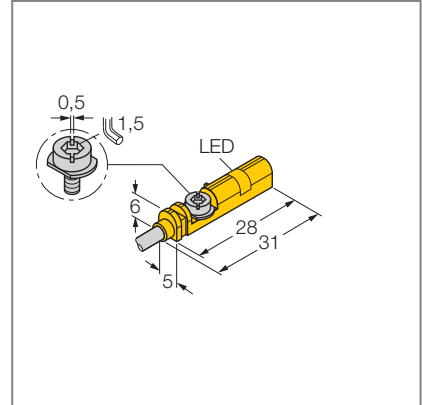
**d361**



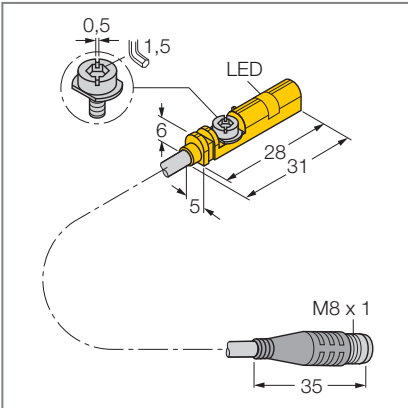
**d362**



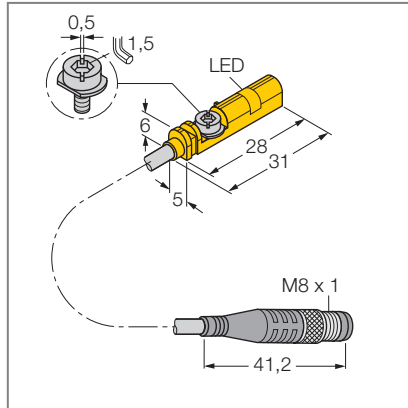
**d363**



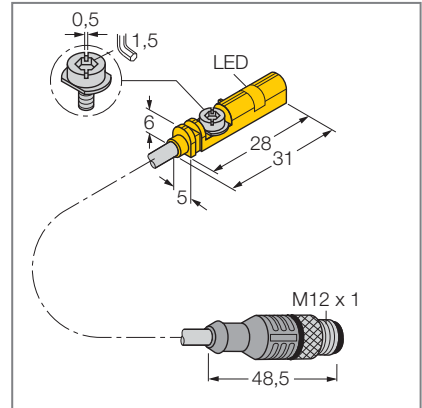
**d364**



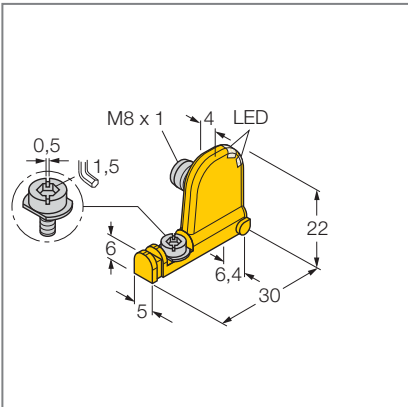
**d365**



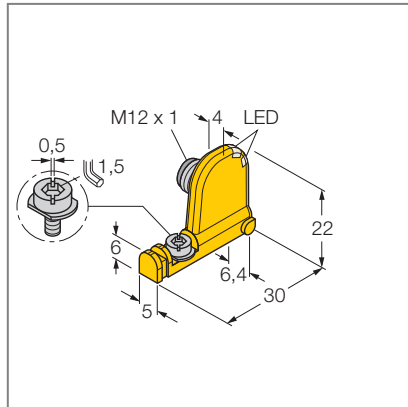
**d366**



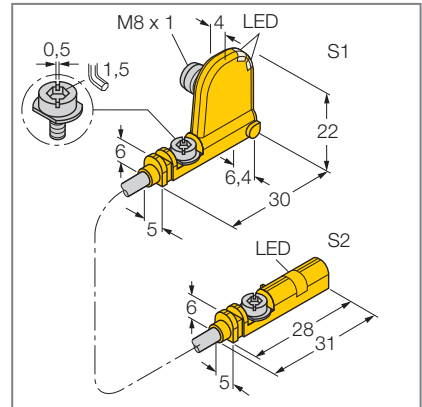
**d367**



**d368**

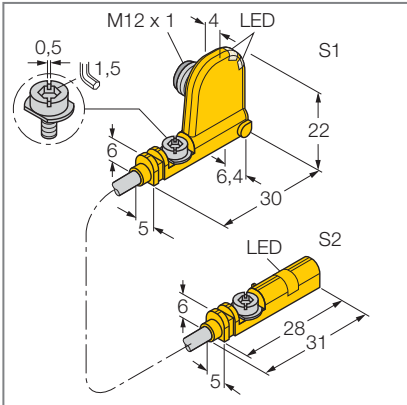


**d369**

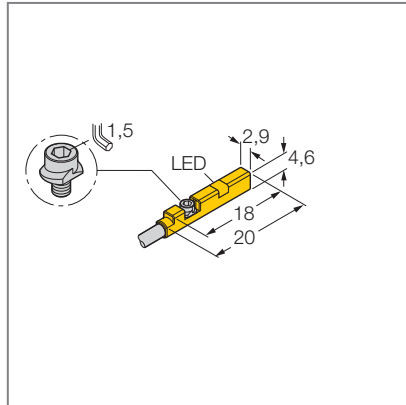




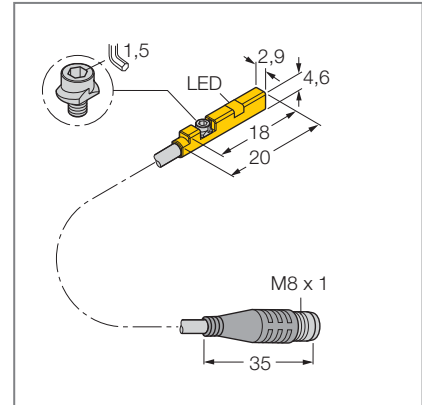
d370



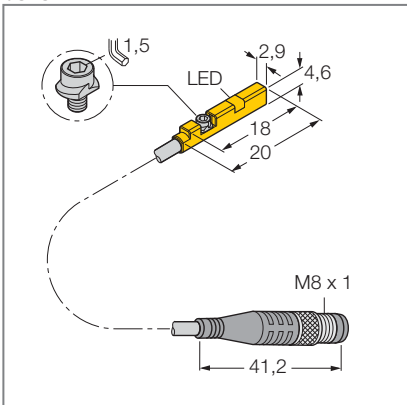
d371



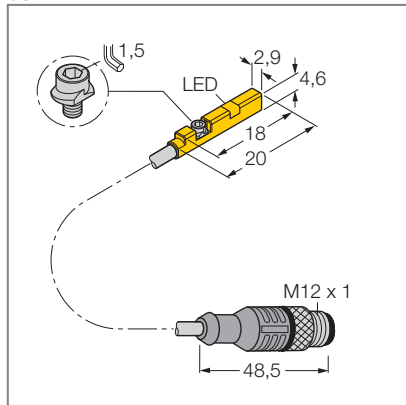
d372



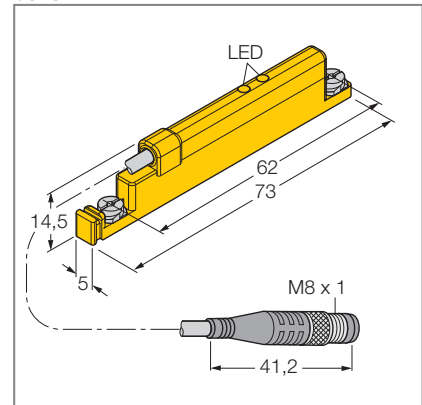
d373



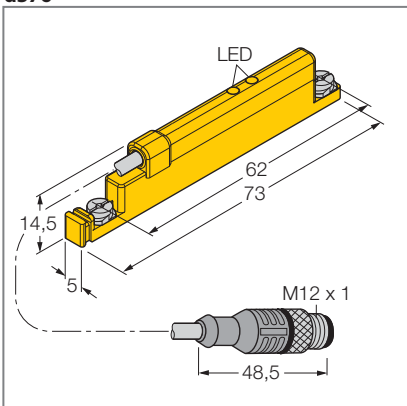
d374



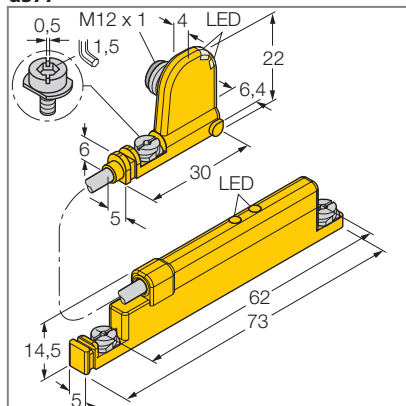
d375



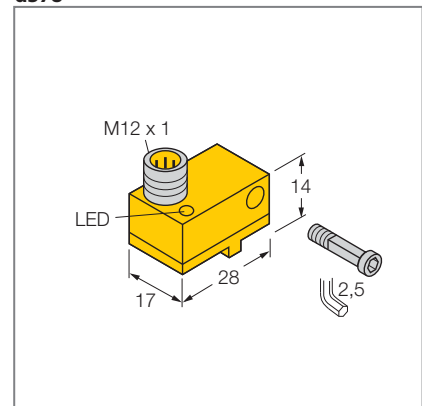
d376



d377

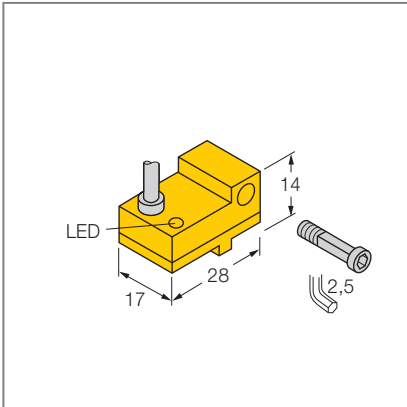


d378

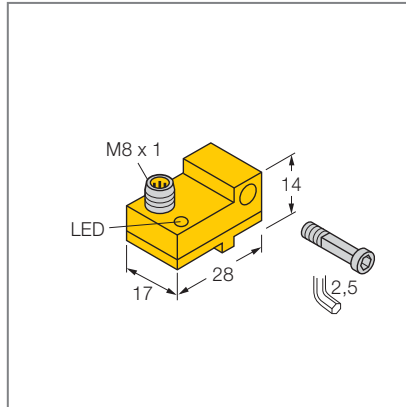


# Dimension drawings

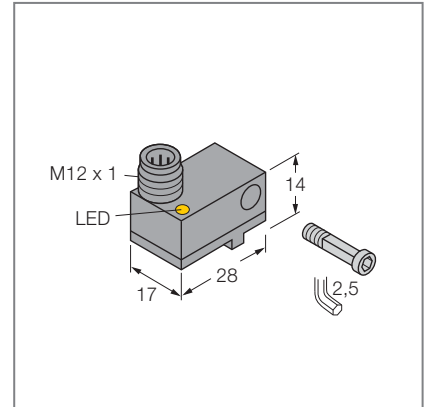
d379



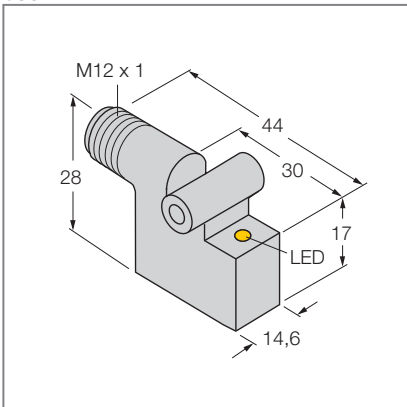
d380



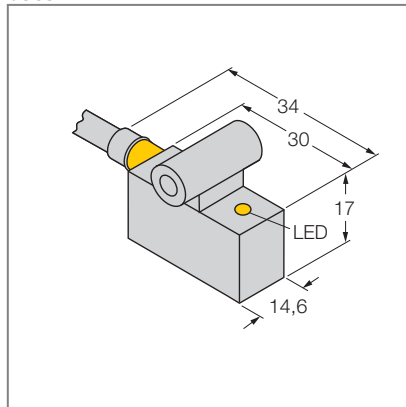
d381



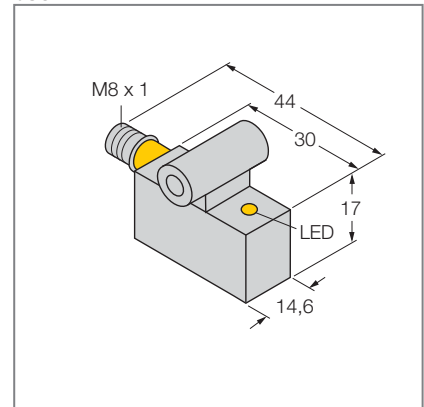
d382



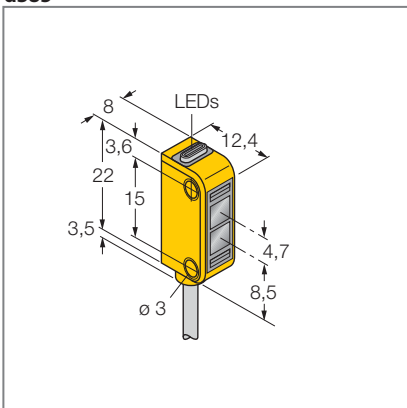
d383



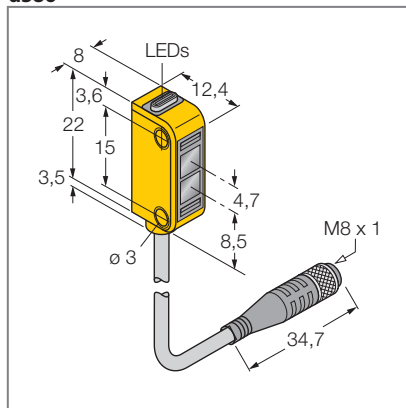
d384



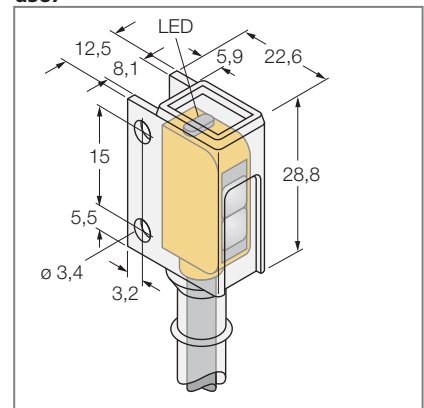
d385



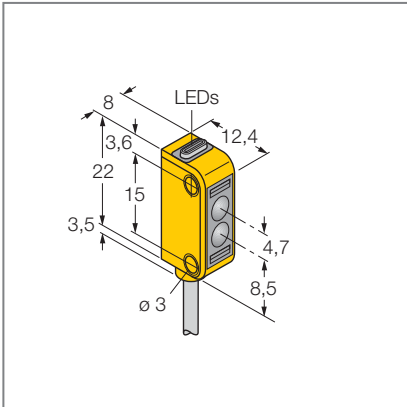
d386



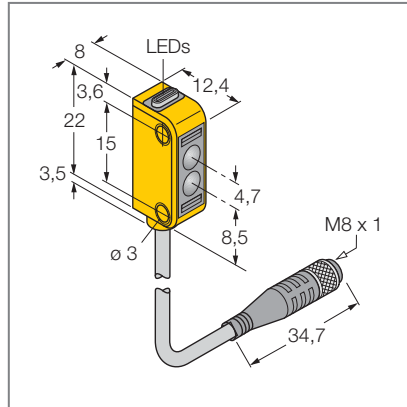
d387



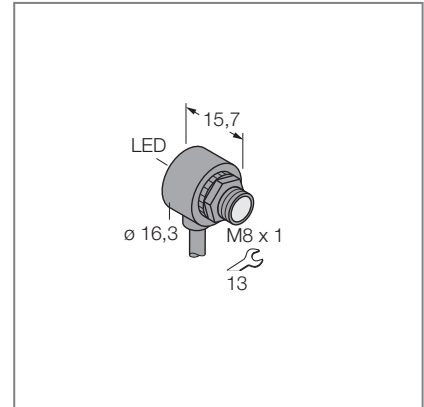
d388



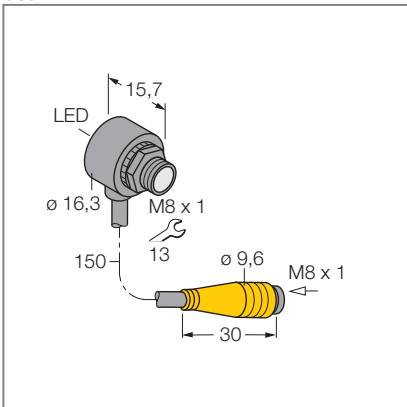
d389



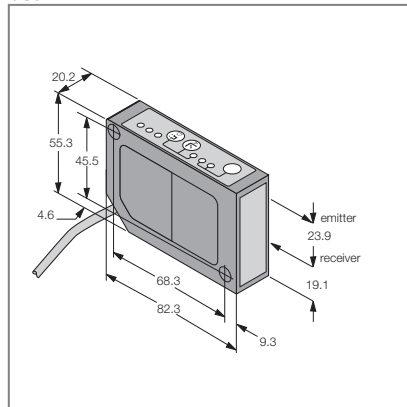
d390



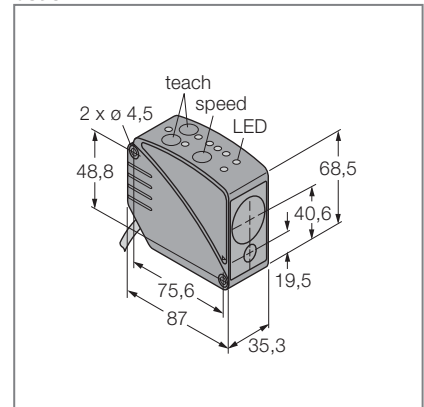
d391



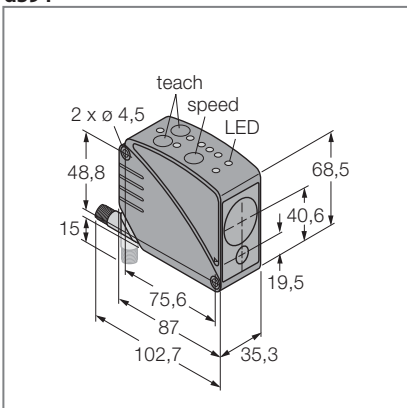
d392



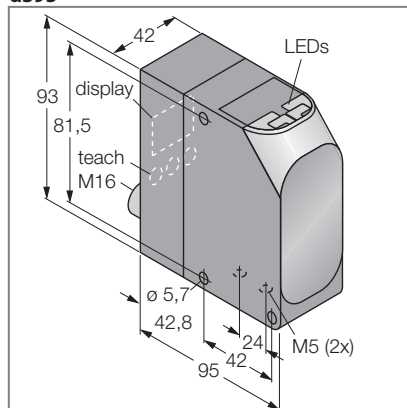
d393



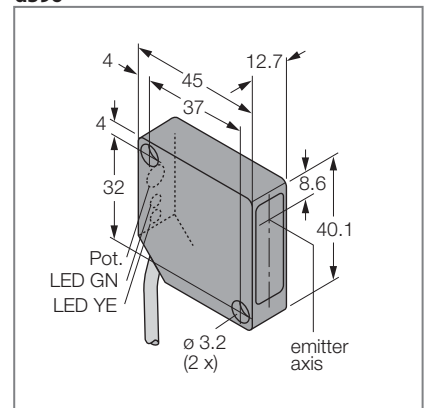
d394



d395

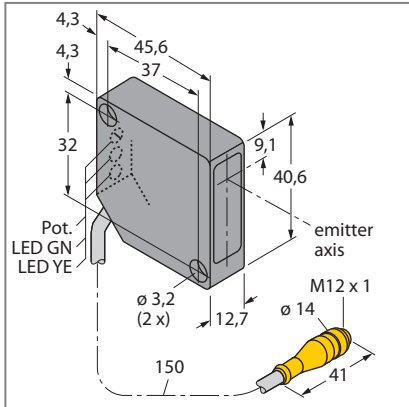


d396

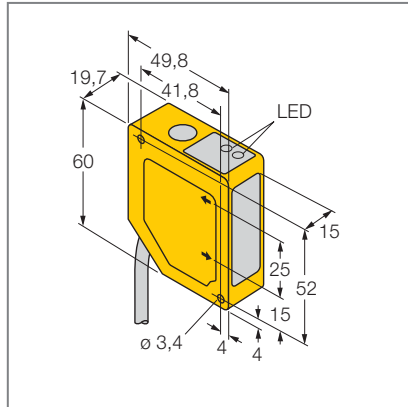


# Dimension drawings

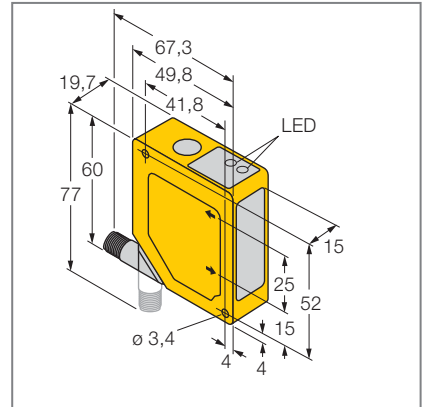
d397



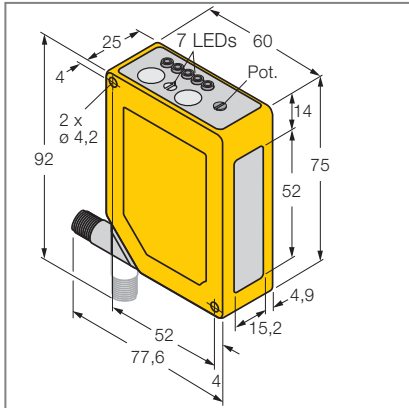
d398



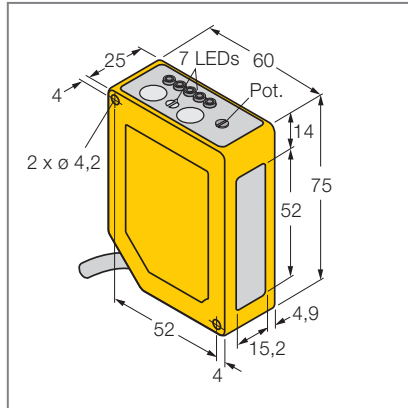
d399



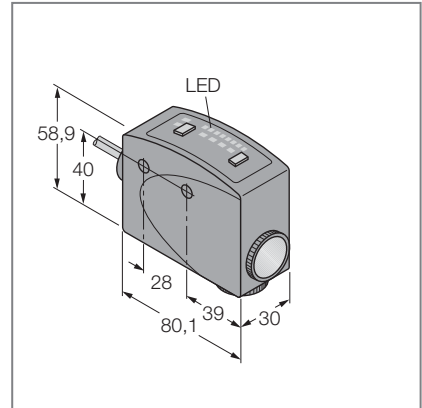
d400



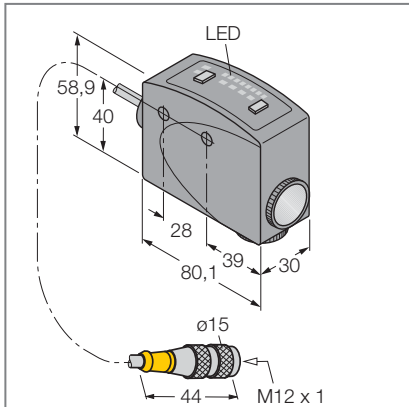
d401



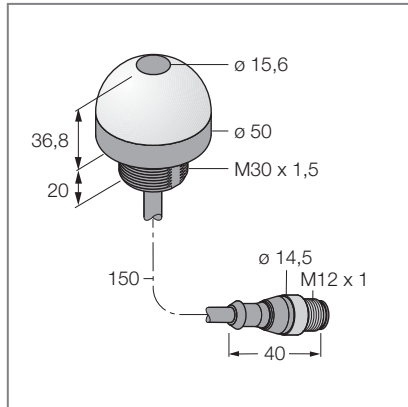
d402



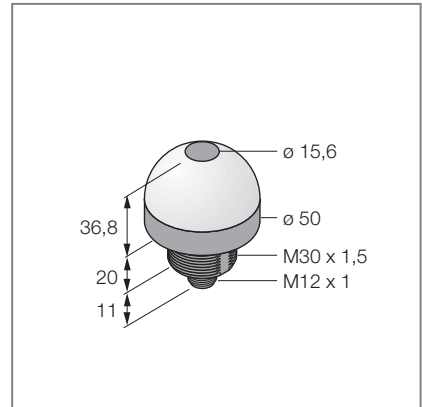
d403



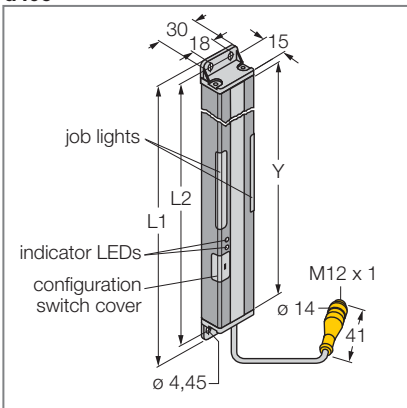
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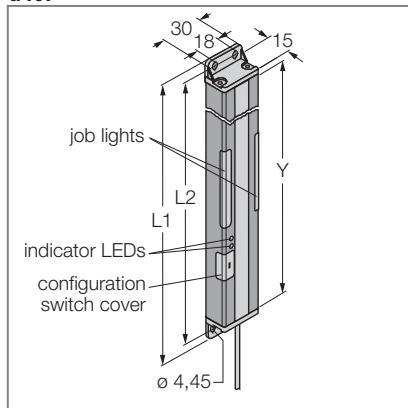
d405



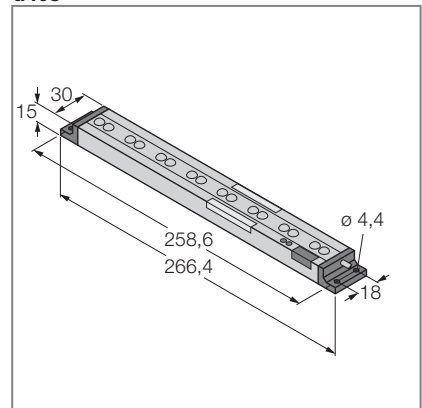
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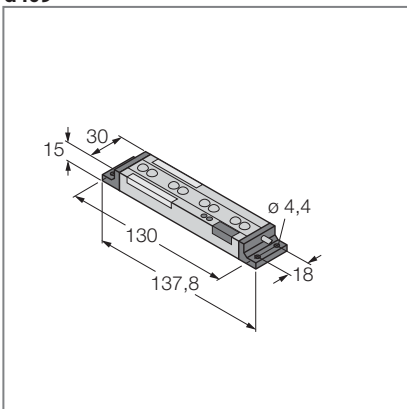
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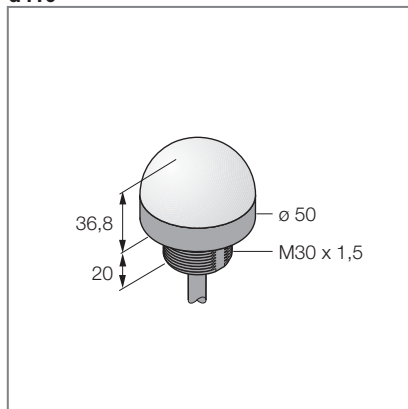
d408



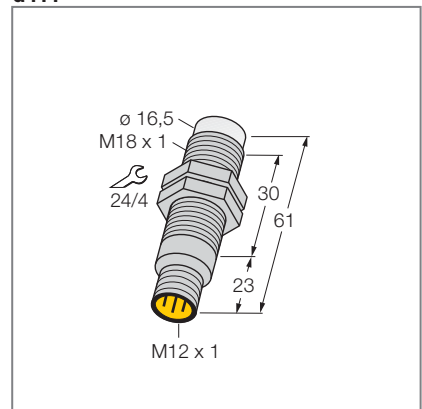
d409



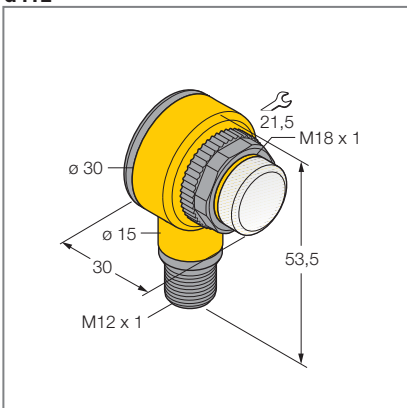
d410



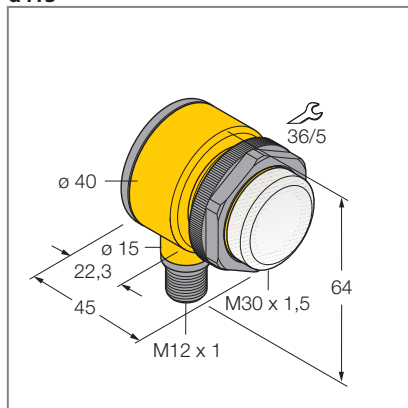
d411



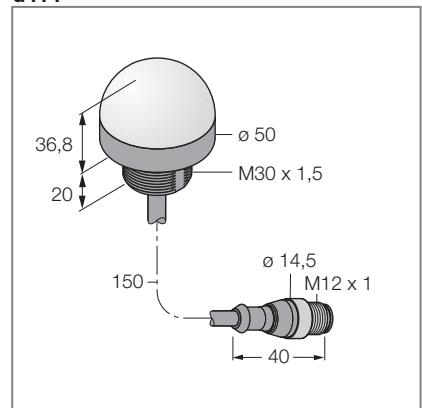
d412



d413

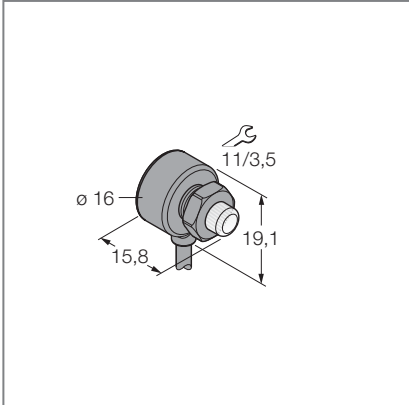


d414

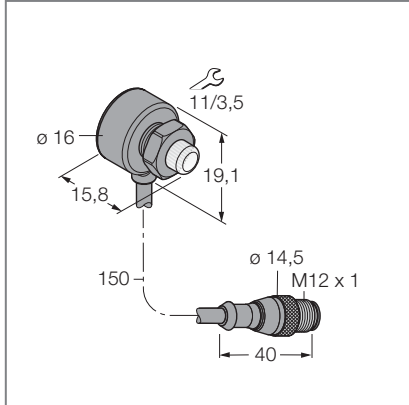


# Dimension drawings

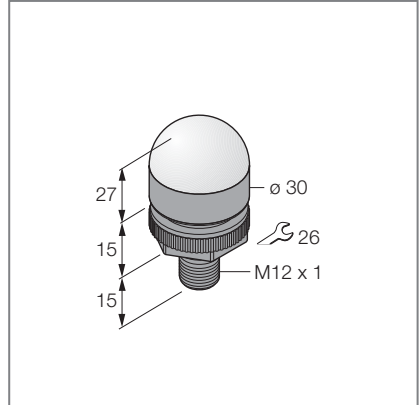
**d415**



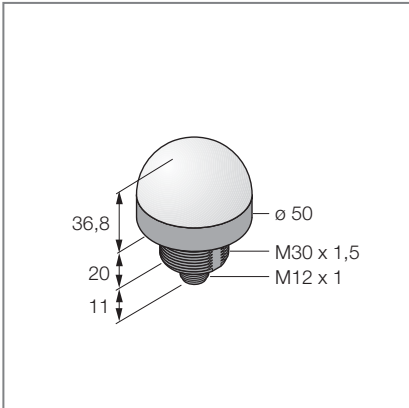
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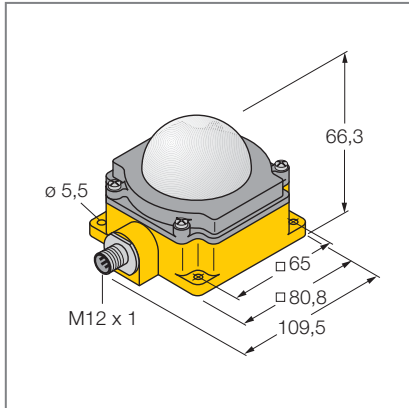
**d417**



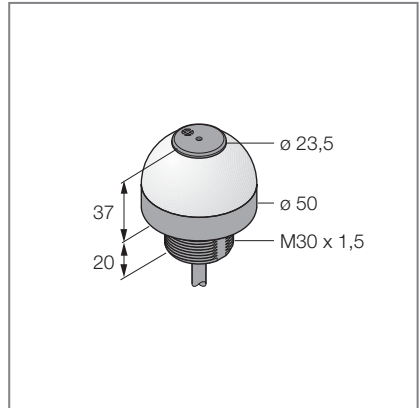
**d418**



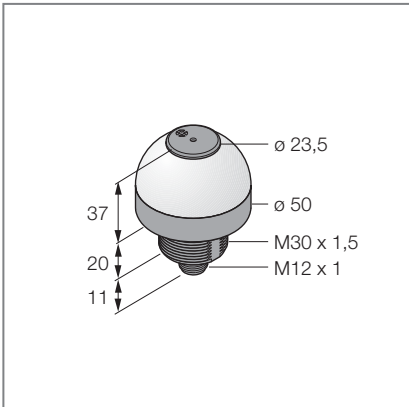
**d419**



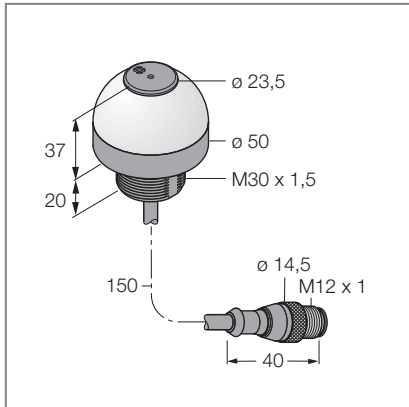
**d420**



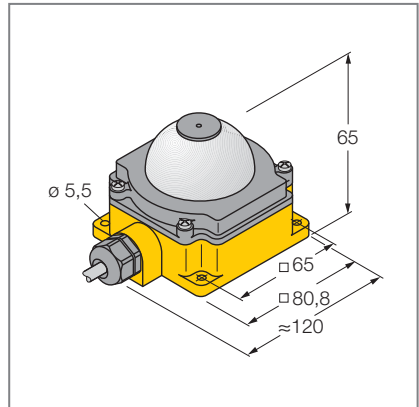
**d421**



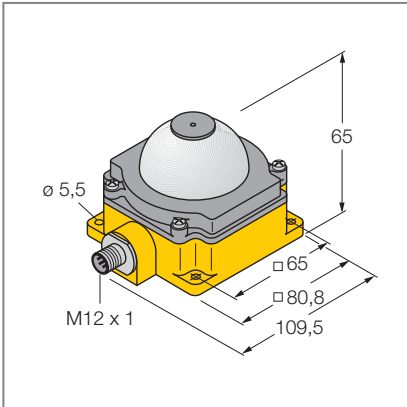
**d422**



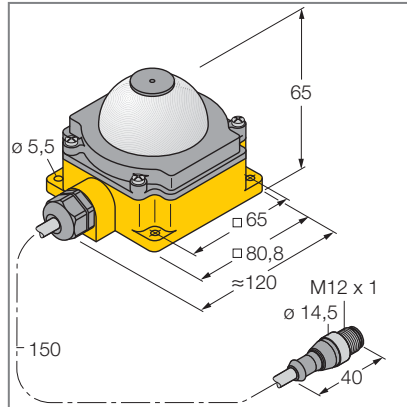
**d423**



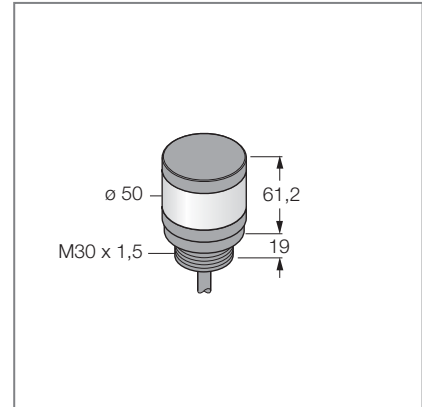
d424



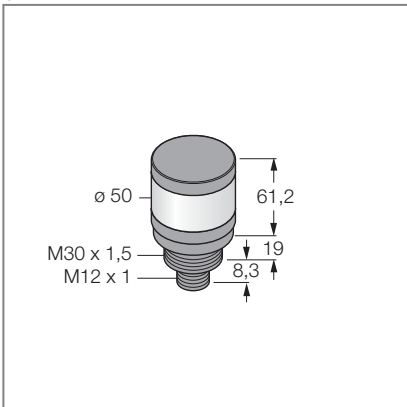
d425



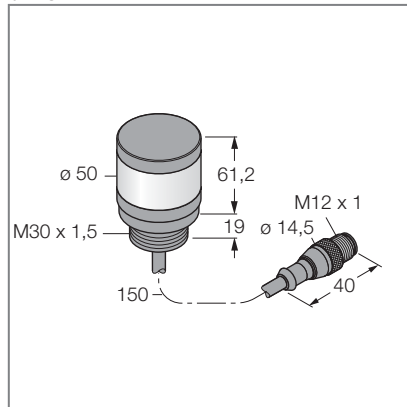
d426



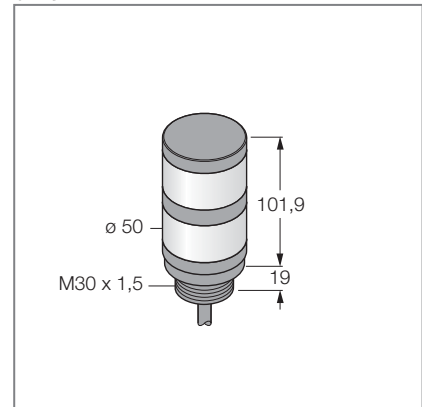
d427



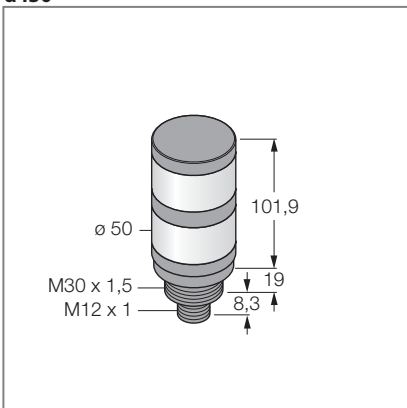
d428



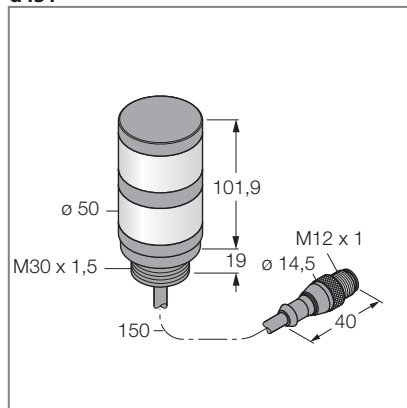
d429



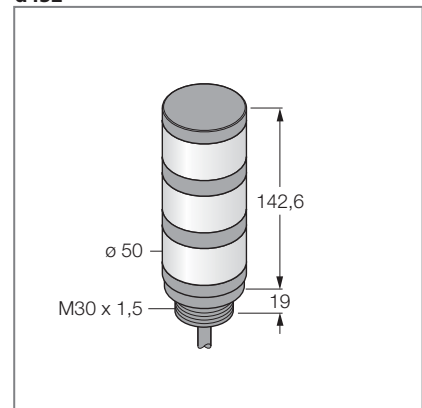
d430



d431

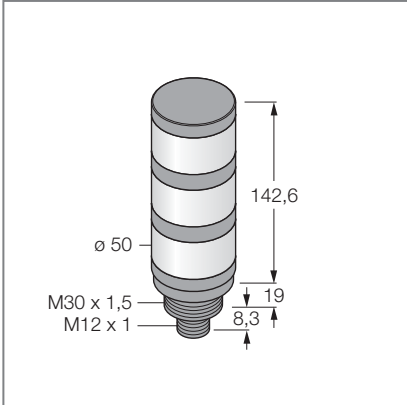


d432

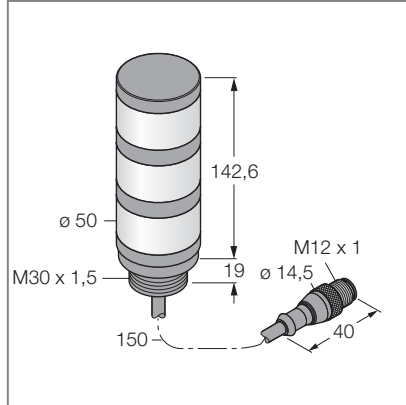


# Dimension drawings

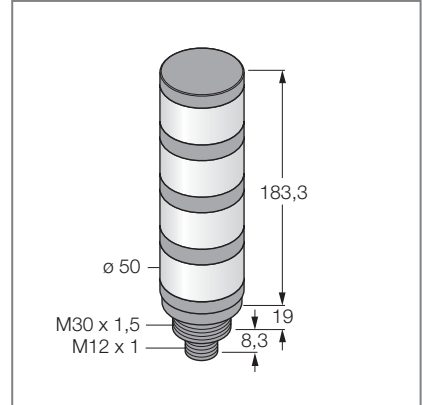
d433



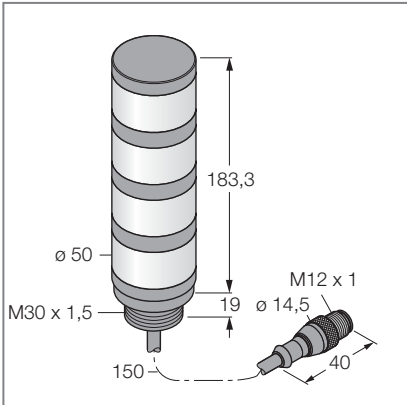
d434



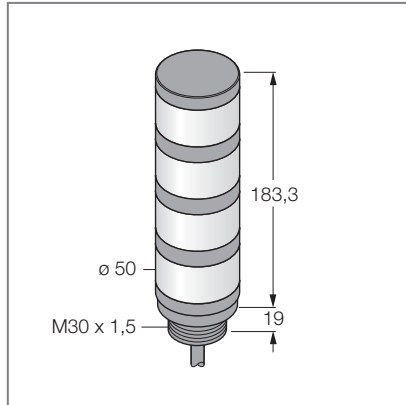
d435



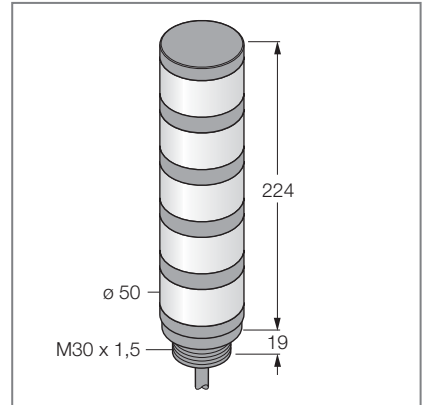
d436



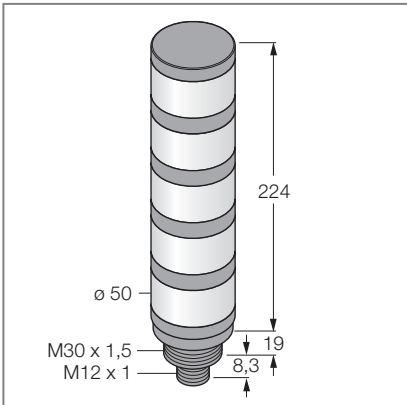
d437



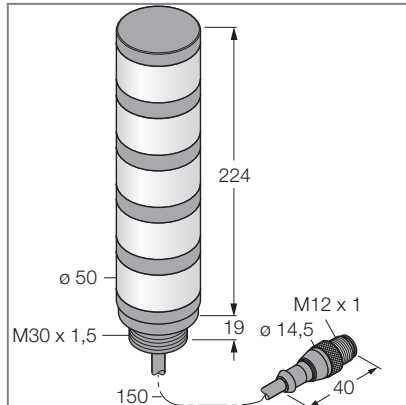
d438



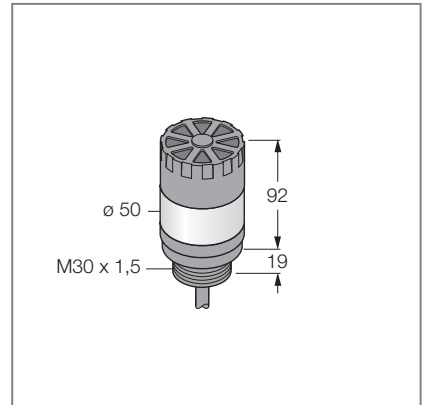
d439



d440

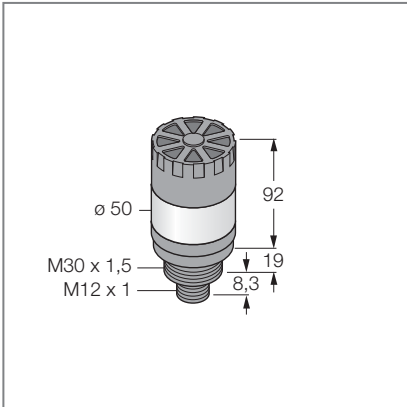


d441

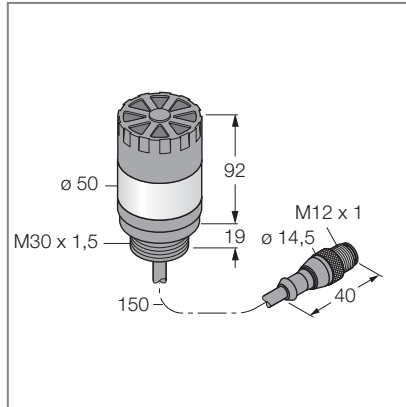




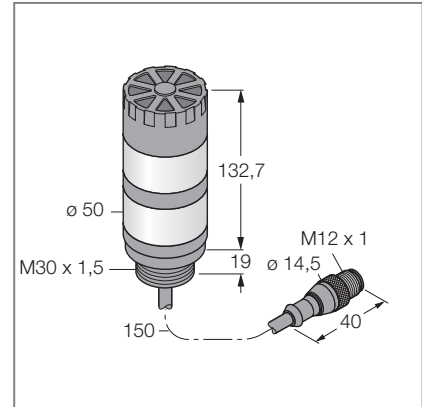
d442



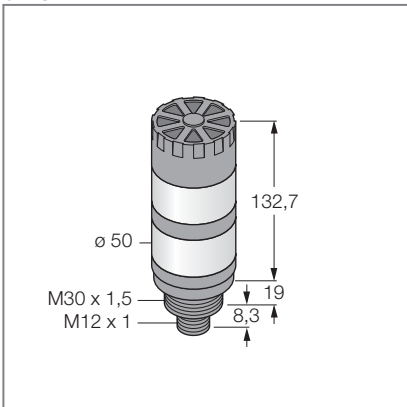
d443



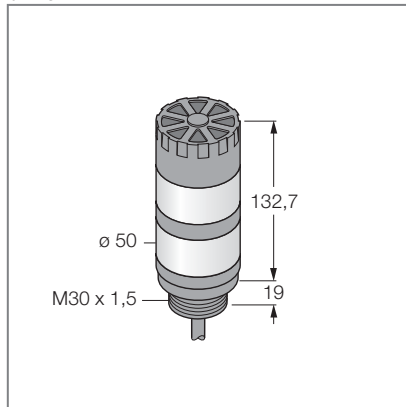
d444



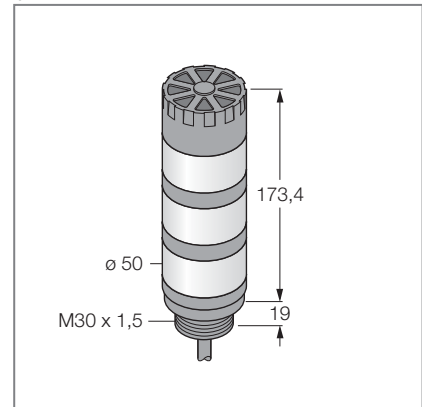
d445



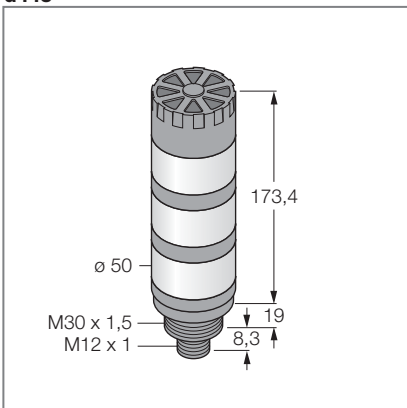
d446



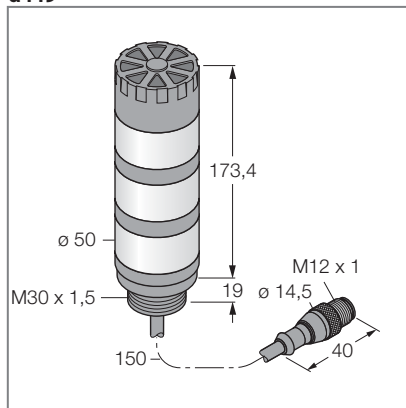
d447



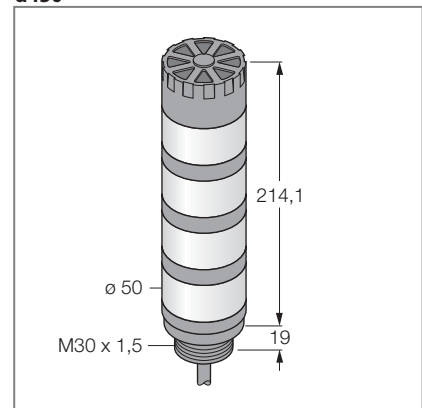
d448



d449

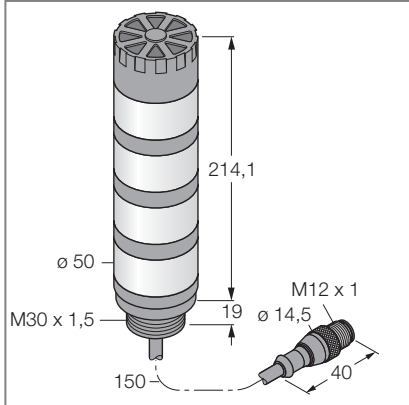


d450

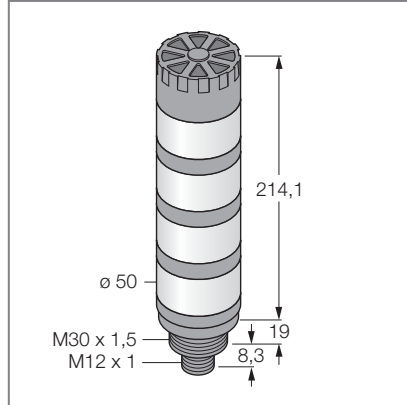


# Dimension drawings

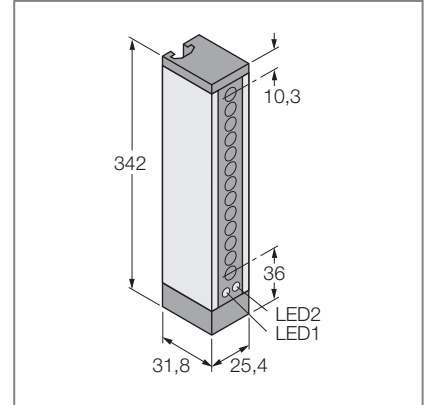
**d451**



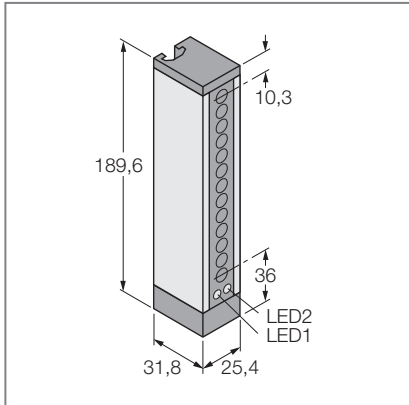
**d452**



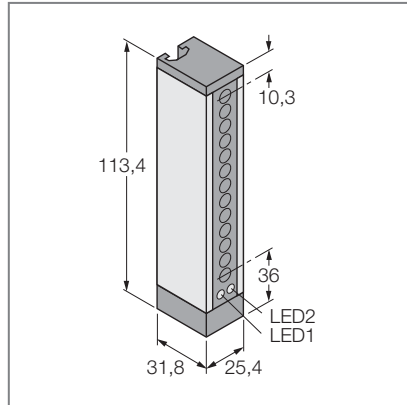
**d453**



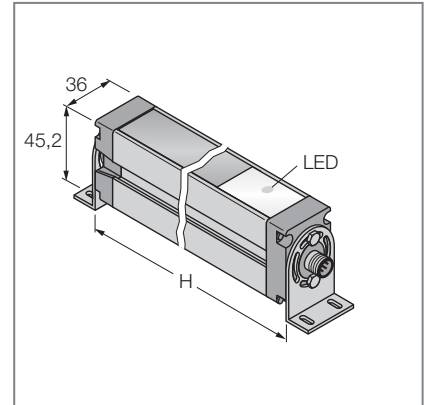
**d454**



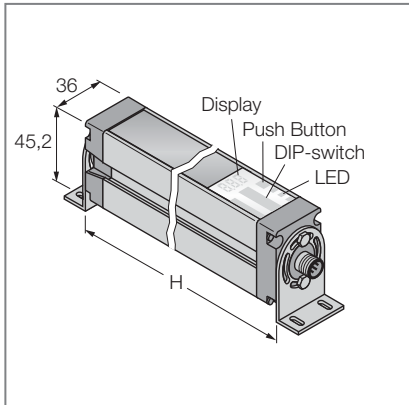
**d455**



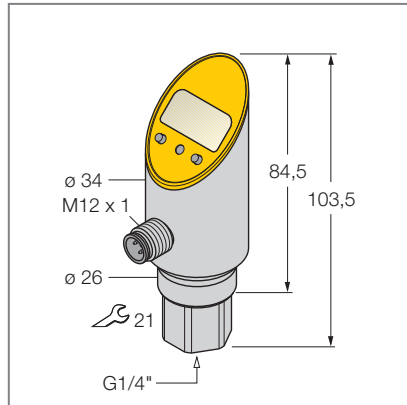
**d456**



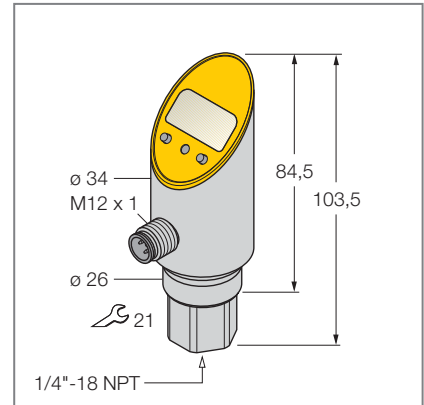
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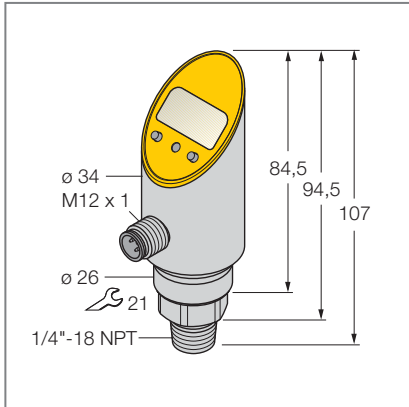
**d458**



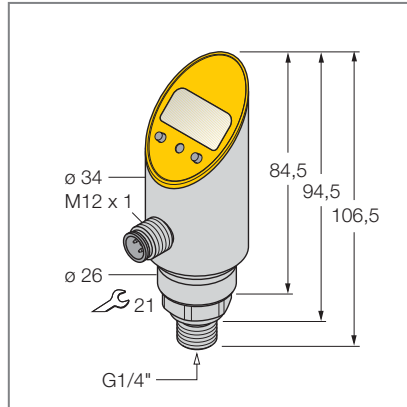
**d459**



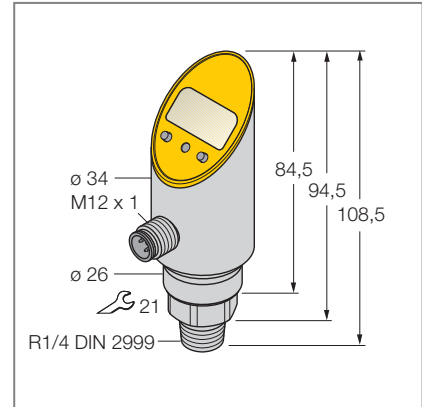
d460



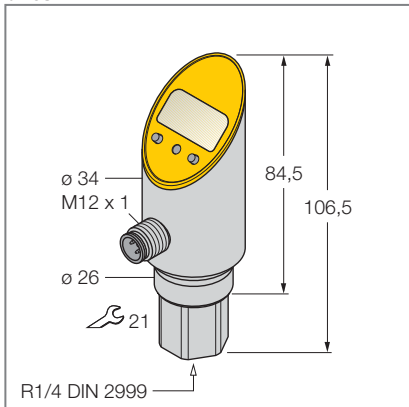
d461



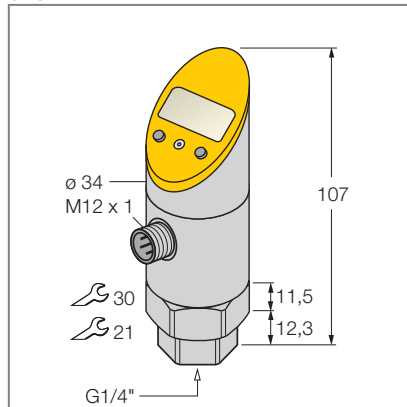
d462



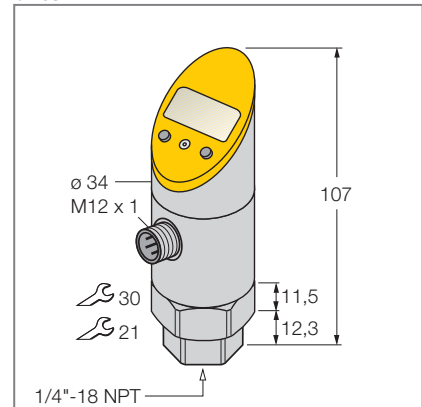
d463



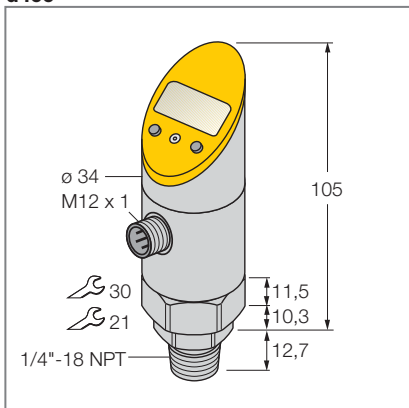
d464



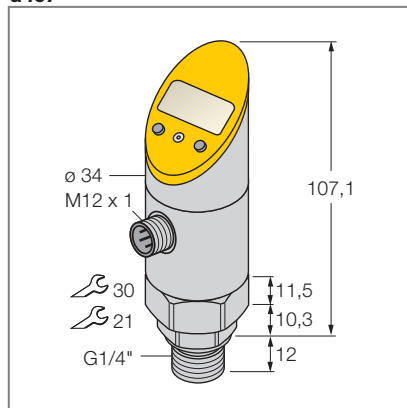
d465



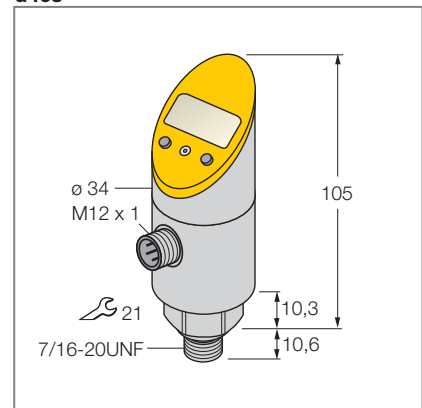
d466



d467

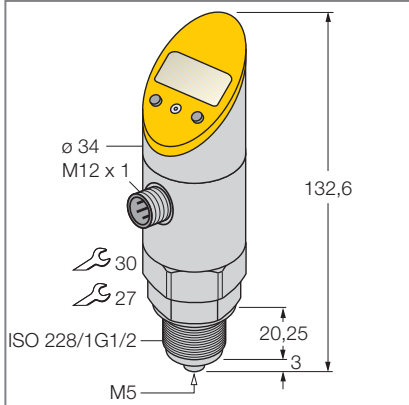


d468

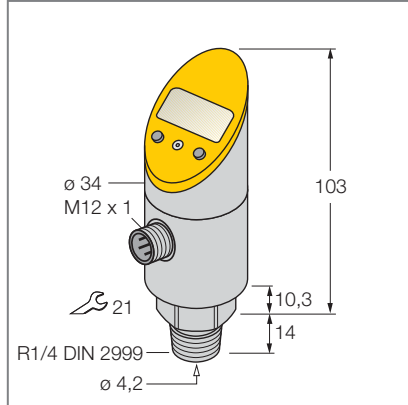


# Dimension drawings

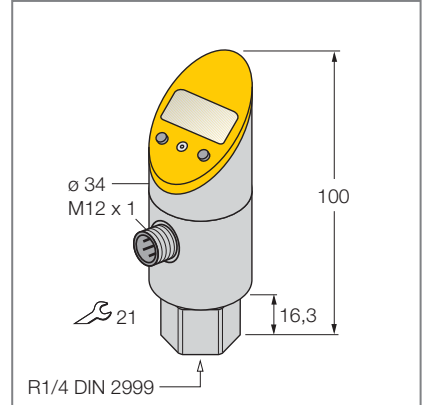
**d469**



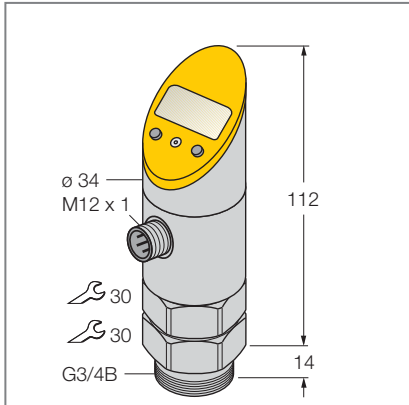
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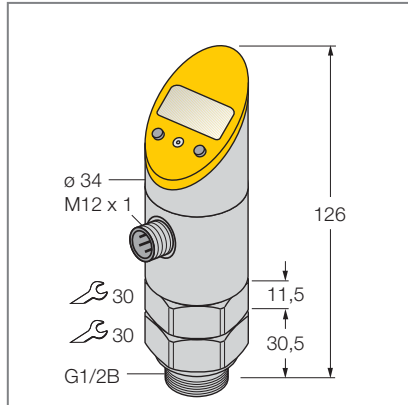
**d471**



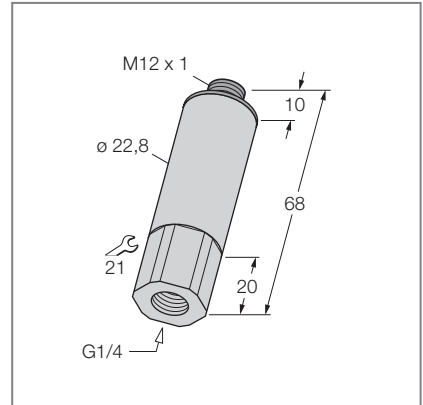
**d472**



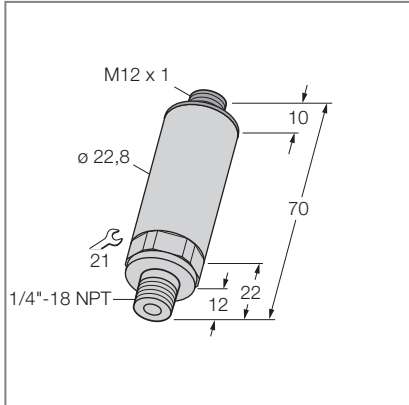
**d473**



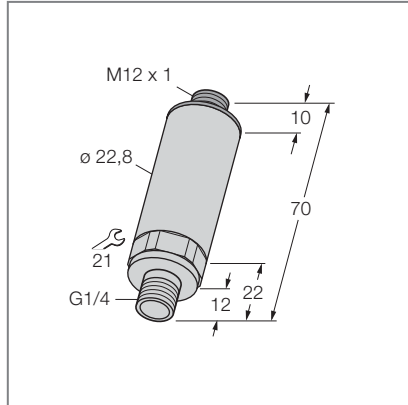
**d474**



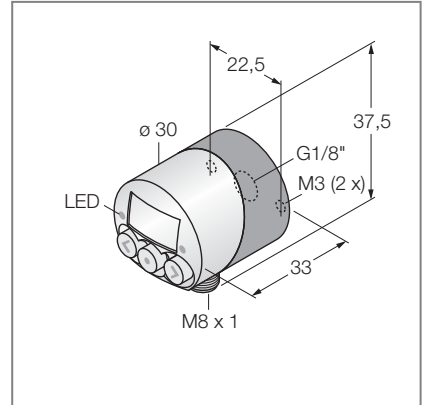
**d475**



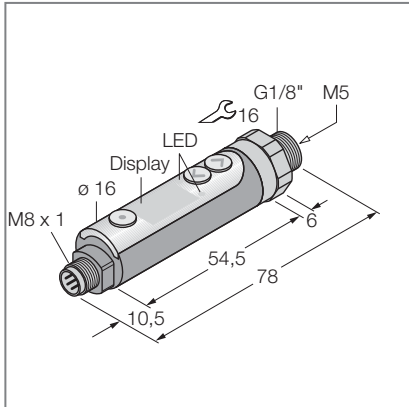
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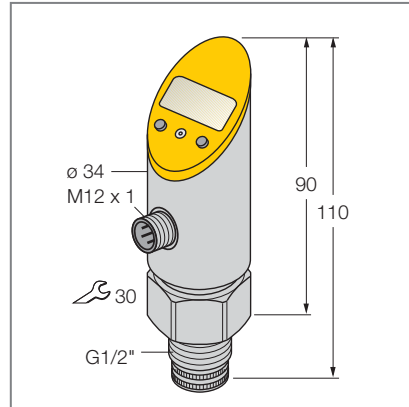
**d477**



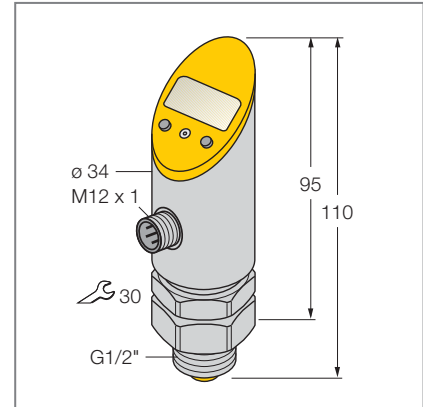
d478



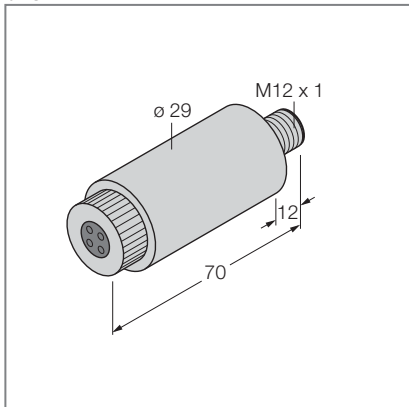
d479



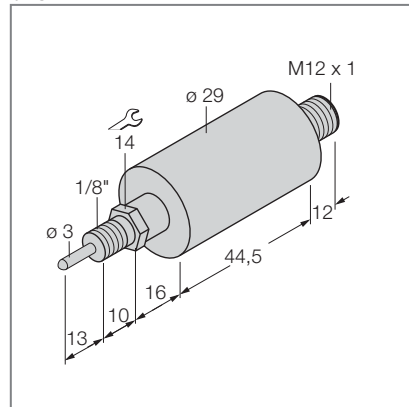
d480



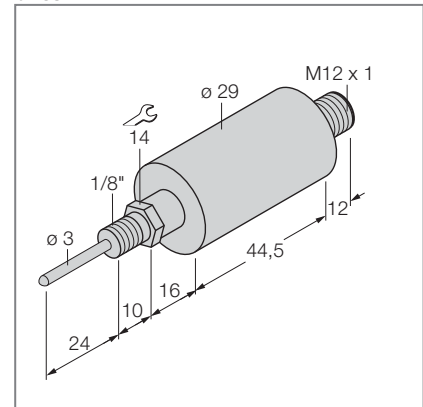
d481



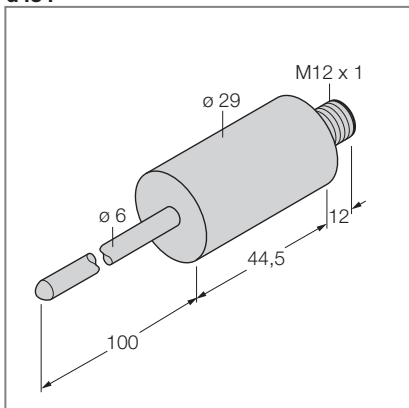
d482



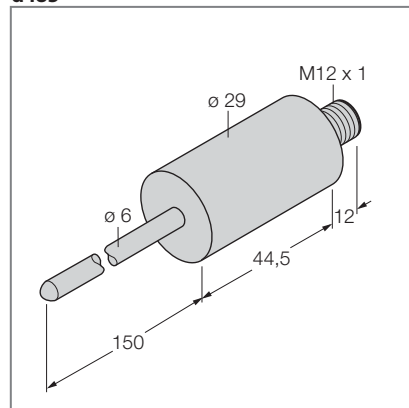
d483



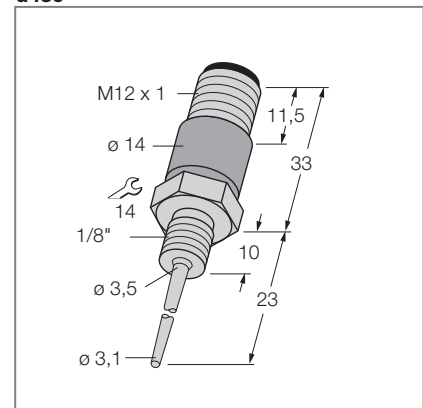
d484



d485

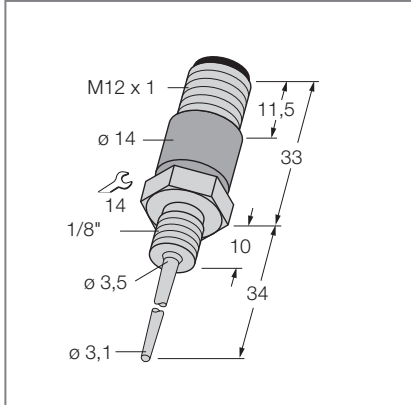


d486

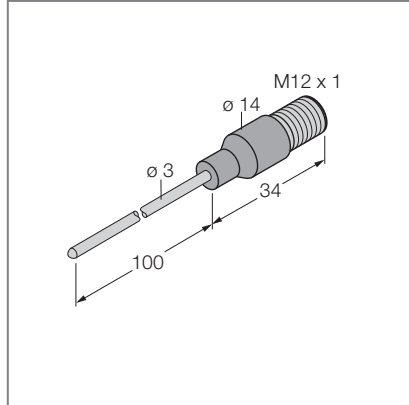


# Dimension drawings

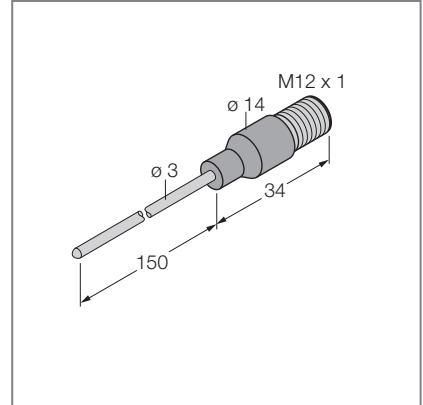
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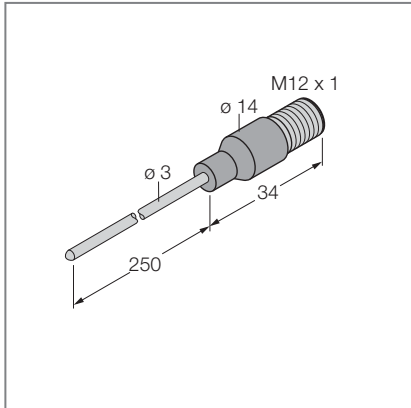
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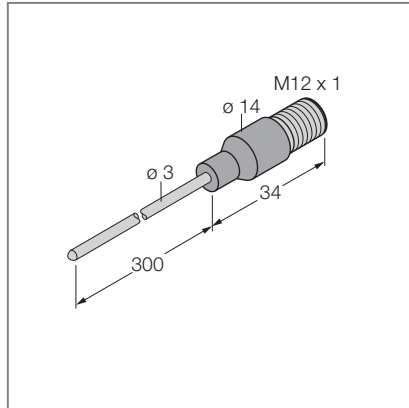
d489



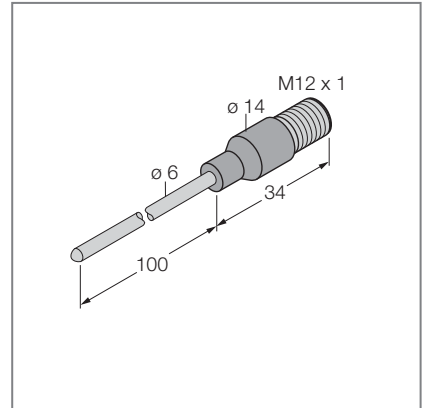
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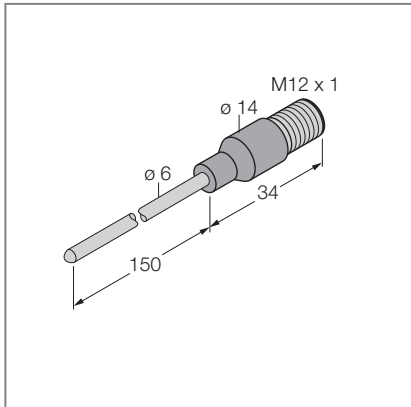
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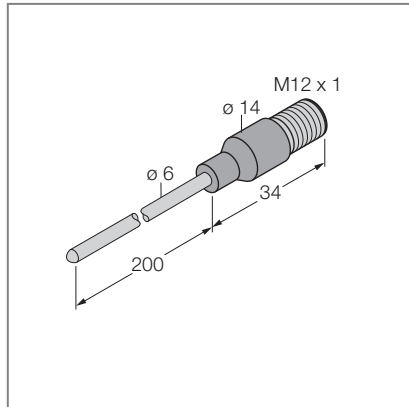
d492



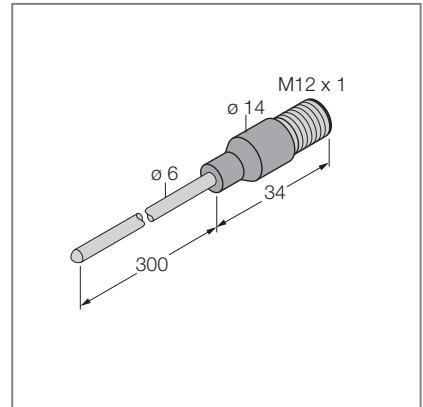
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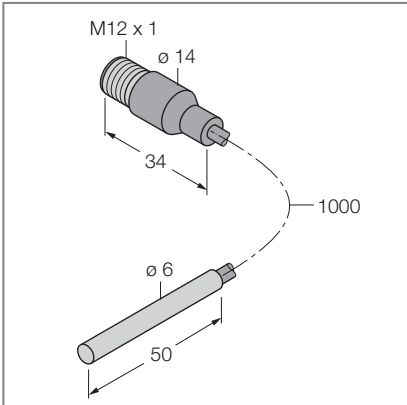
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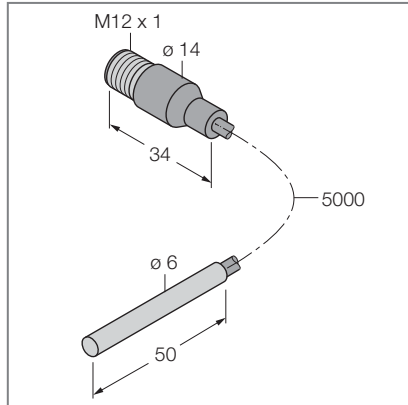
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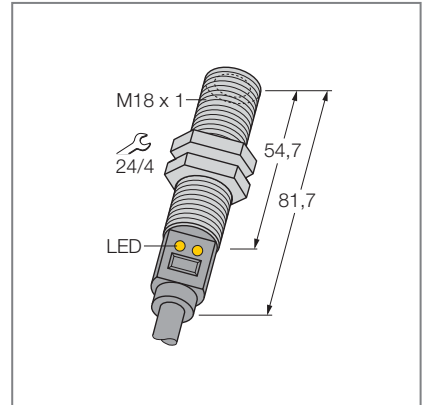
d496



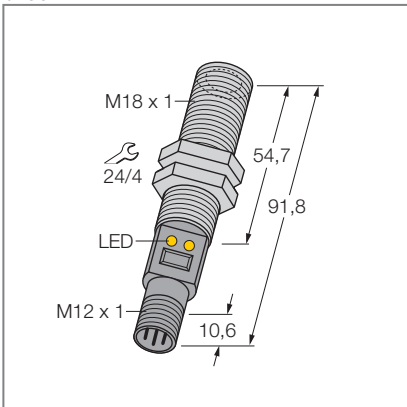
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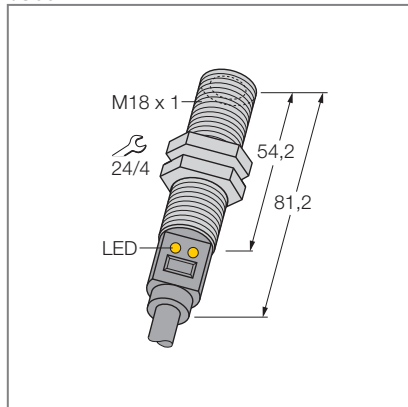
d498



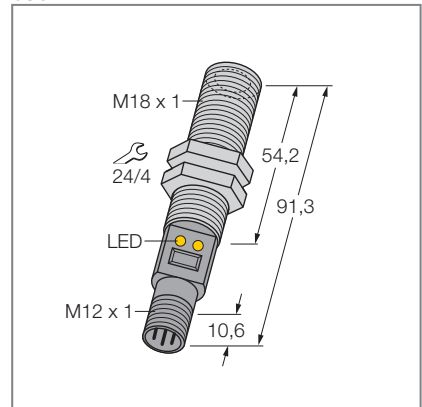
d499



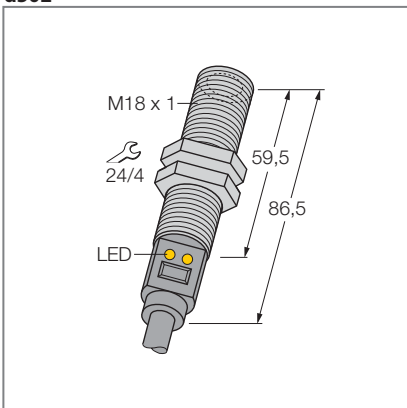
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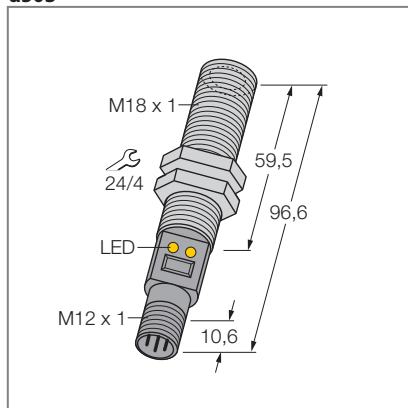
d501



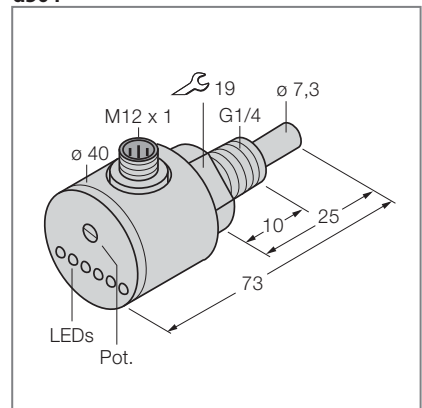
d502



d503

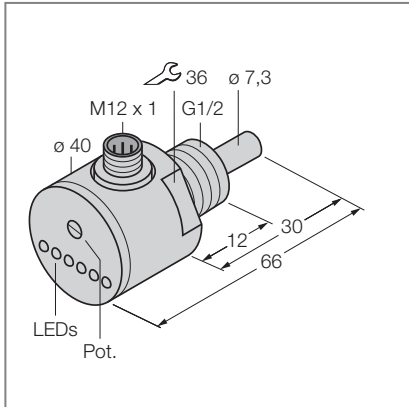


d504

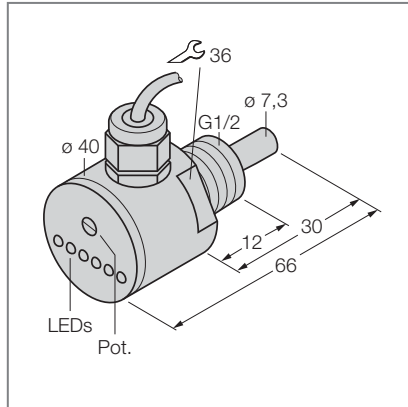


# Dimension drawings

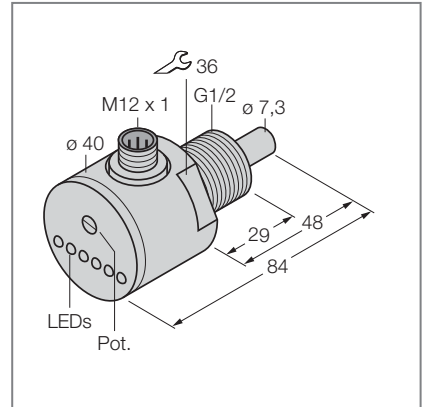
d505



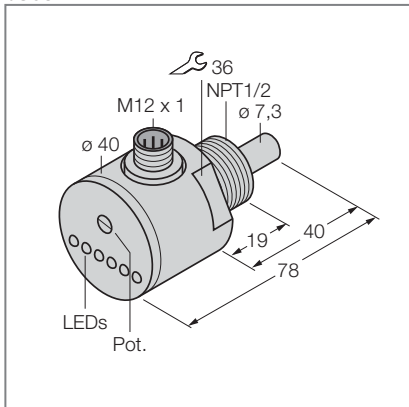
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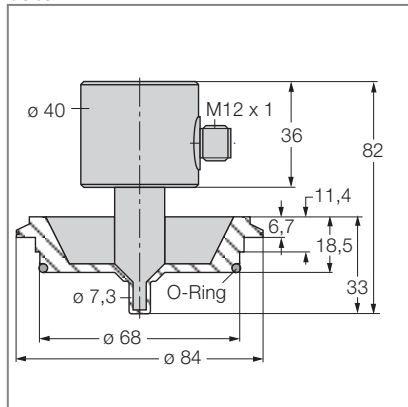
d507



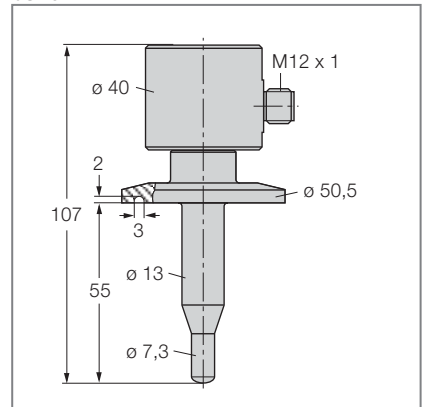
d508



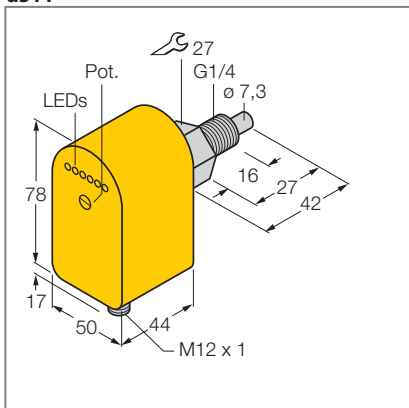
d509



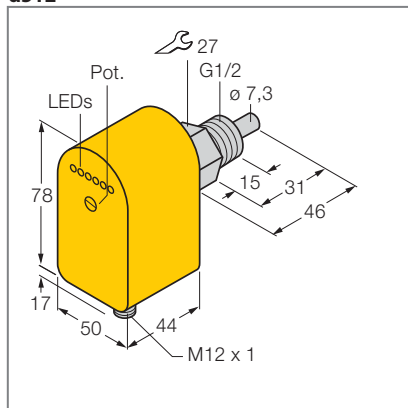
d510



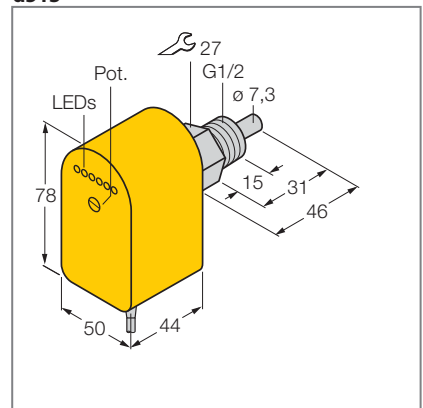
d511



d512

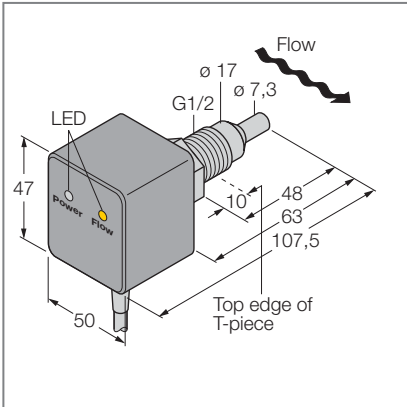


d513

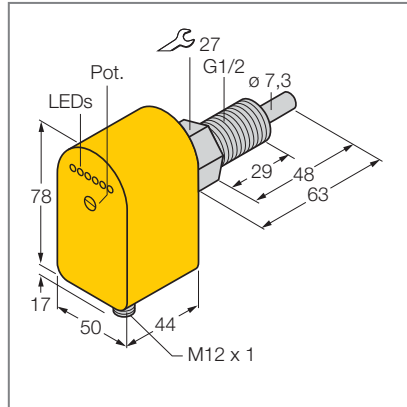




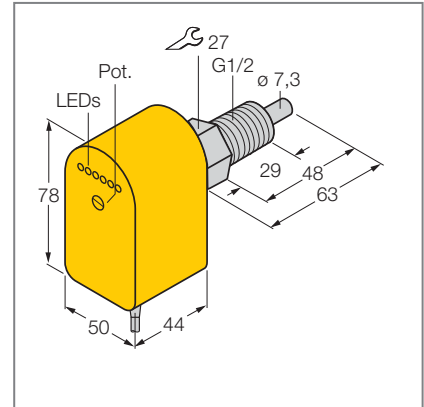
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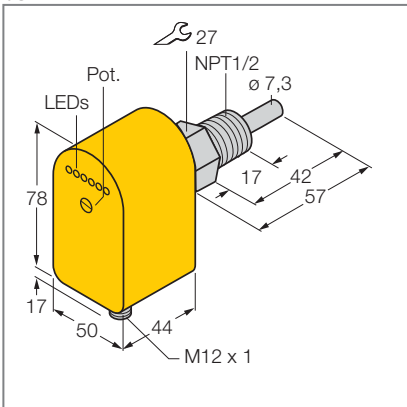
d515



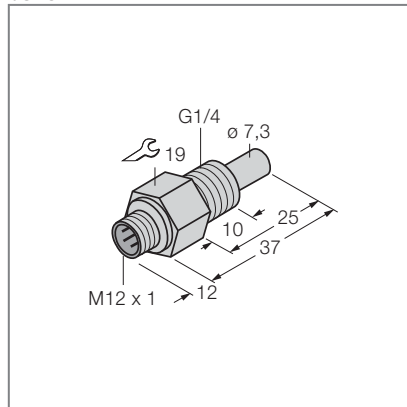
d516



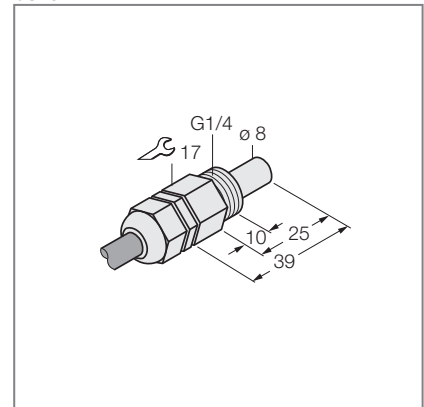
d517



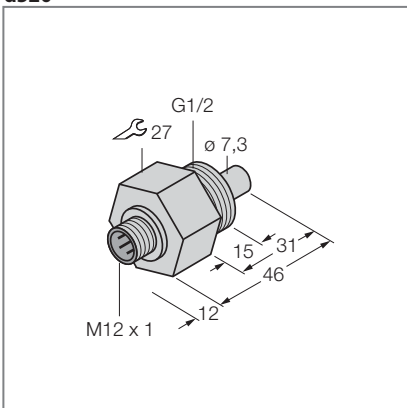
d518



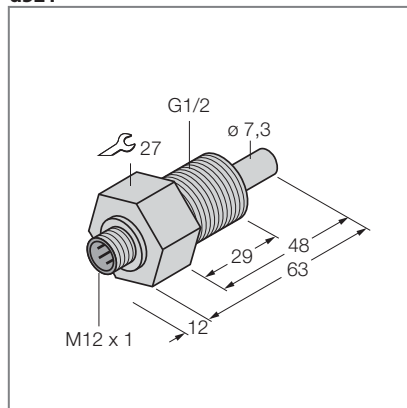
d519



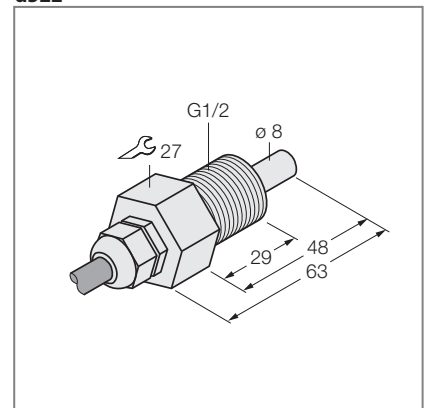
d520



d521

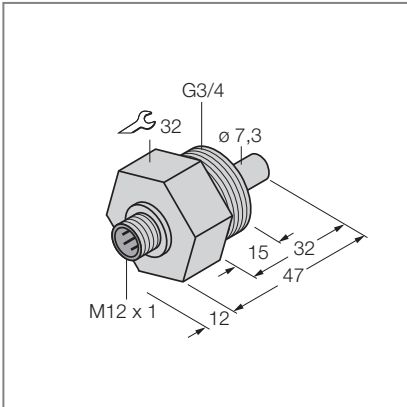


d522

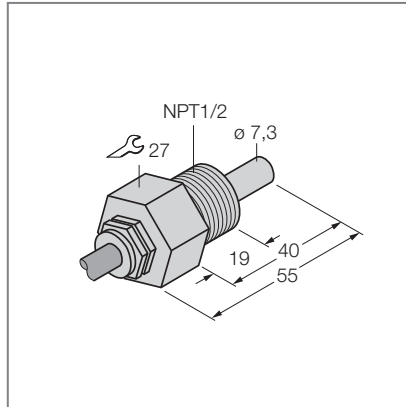


# Dimension drawings

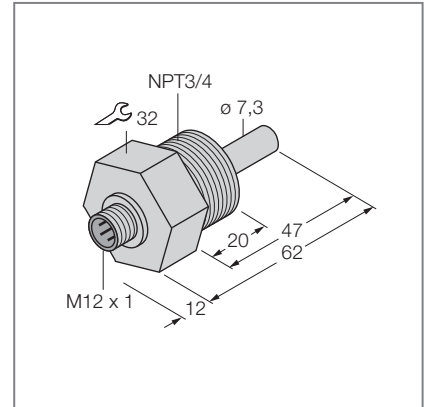
d523



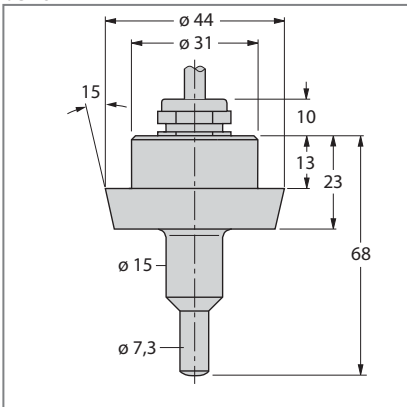
d524



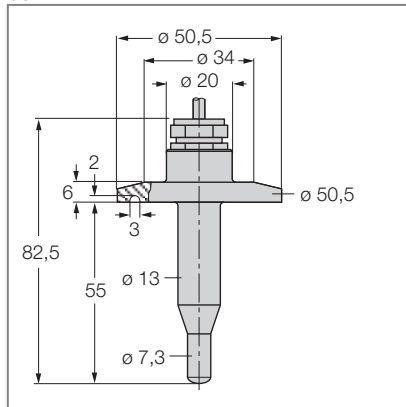
d525



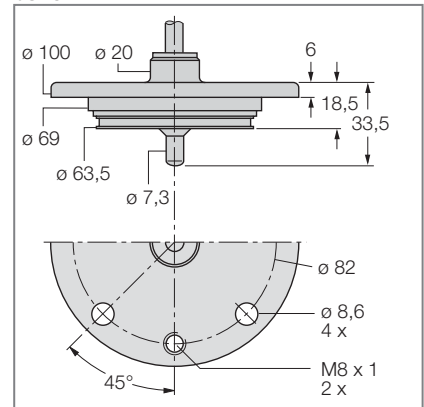
d526



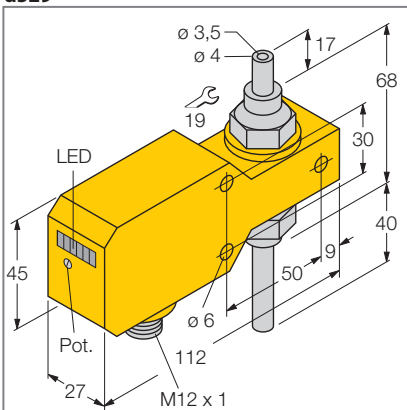
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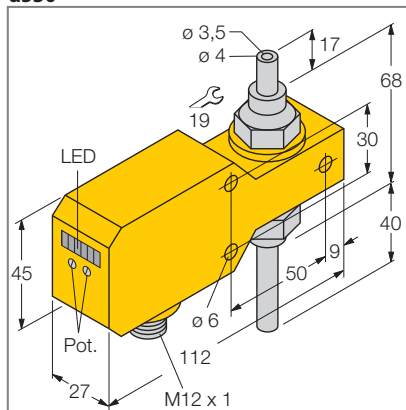
d528



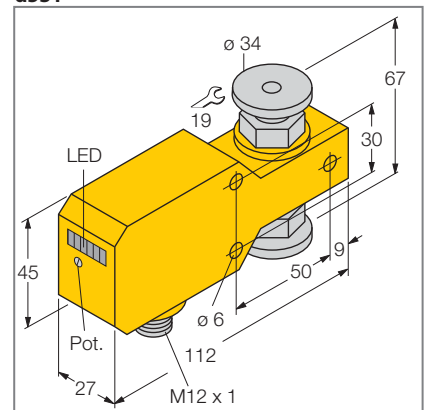
d529



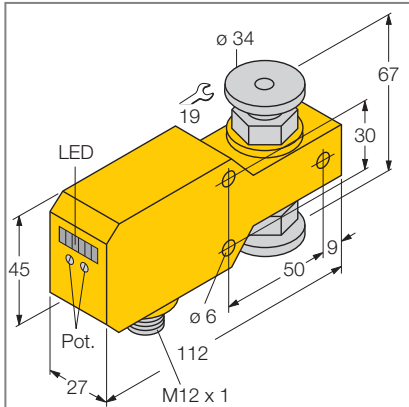
d530



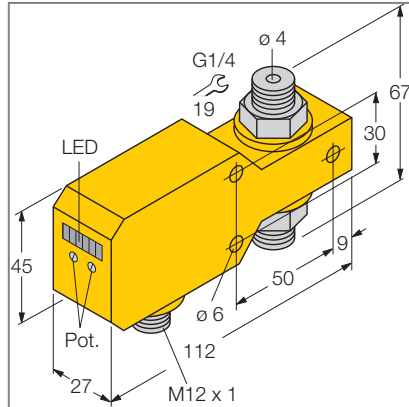
d531



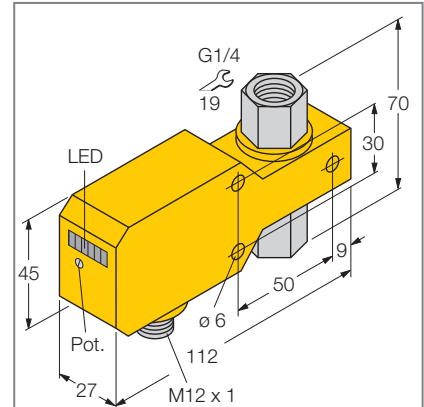
d532



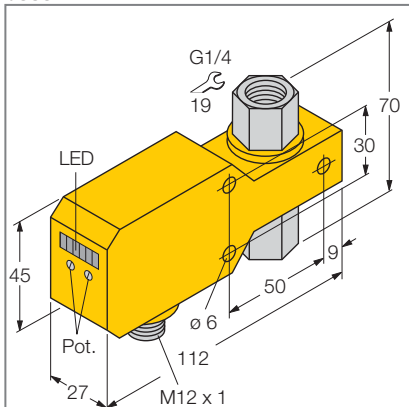
d533



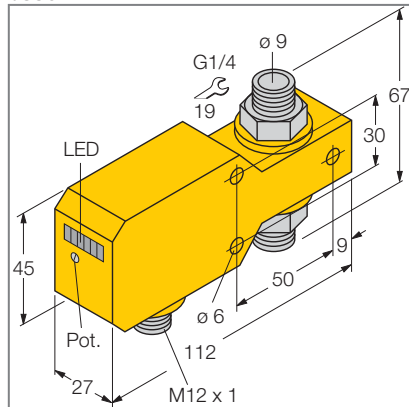
d534



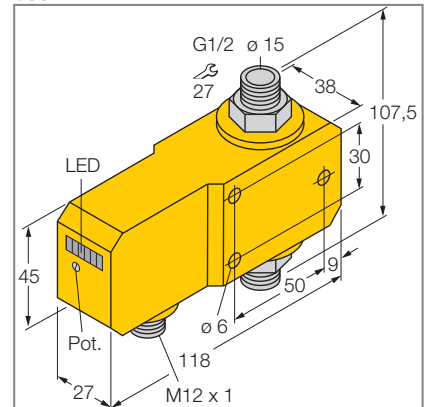
d535



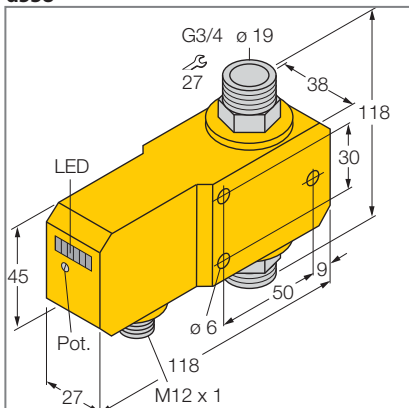
d536



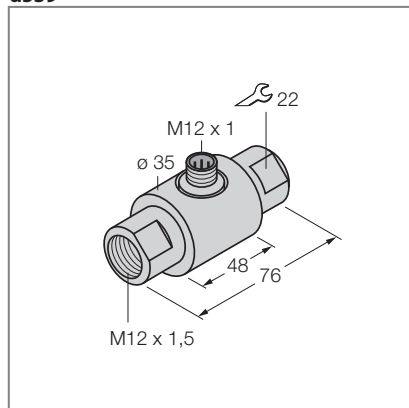
d537



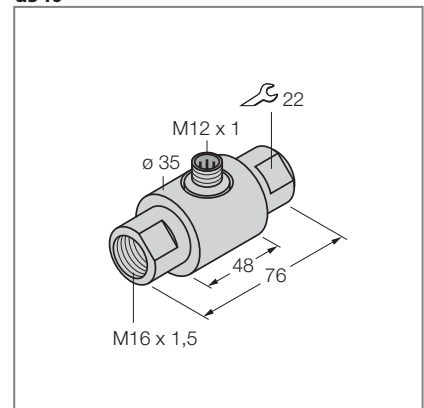
d538



d539

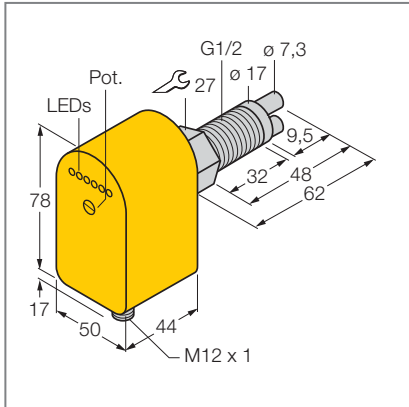


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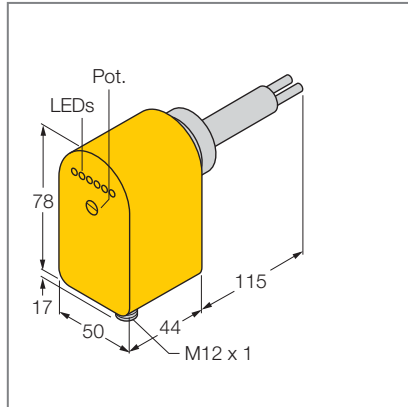


# Dimension drawings

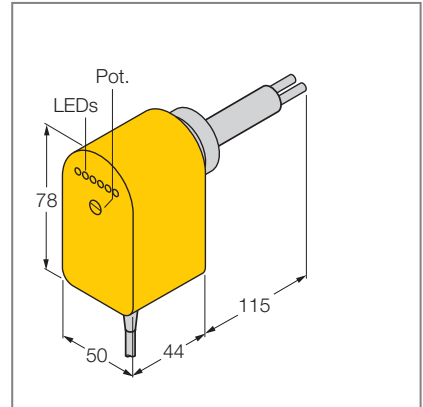
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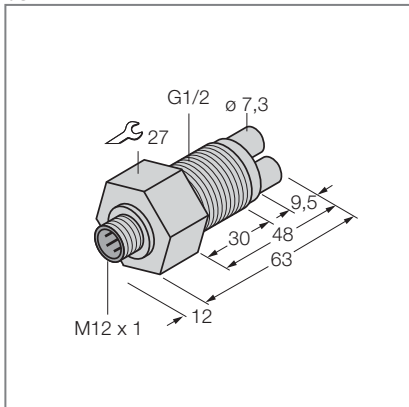
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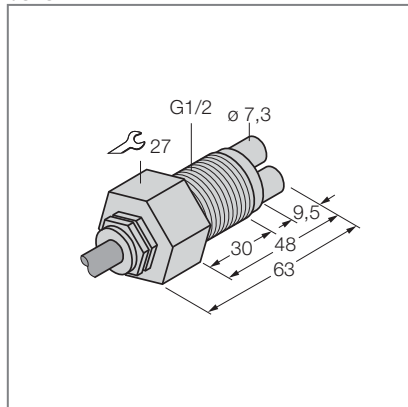
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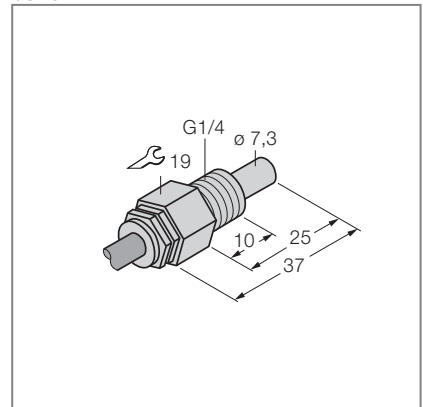
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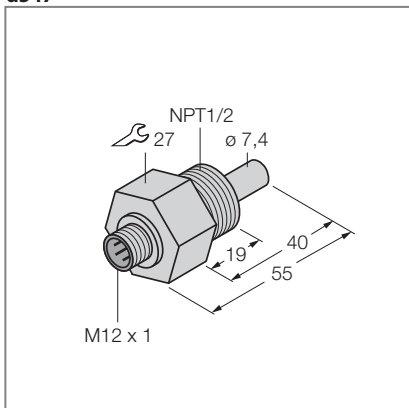
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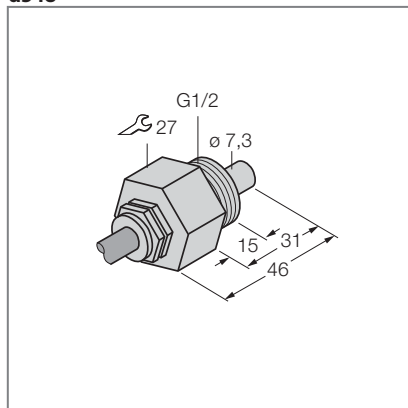
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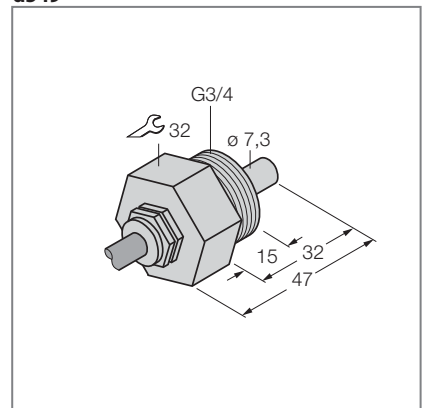
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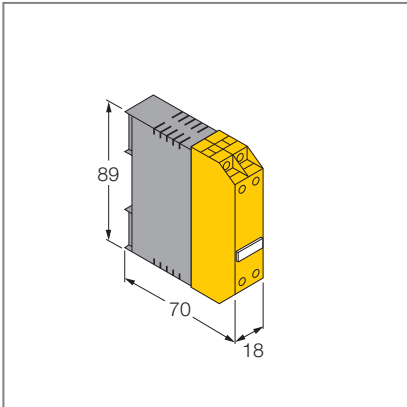
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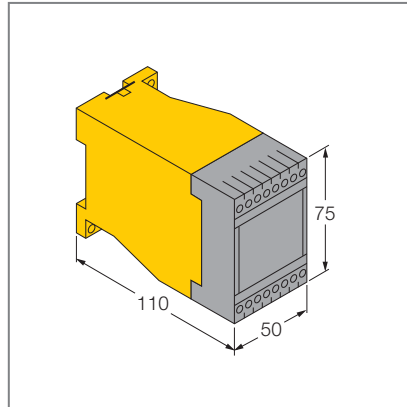
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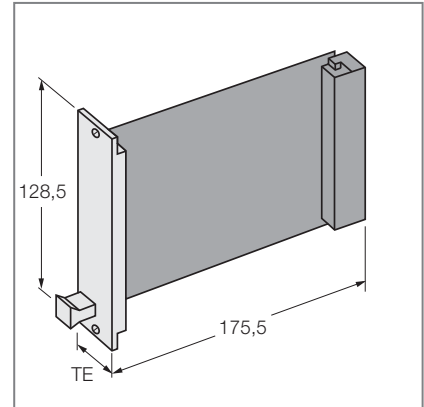
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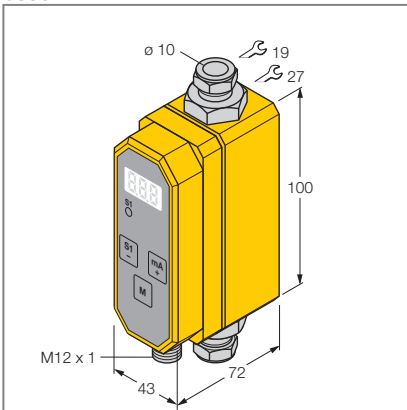
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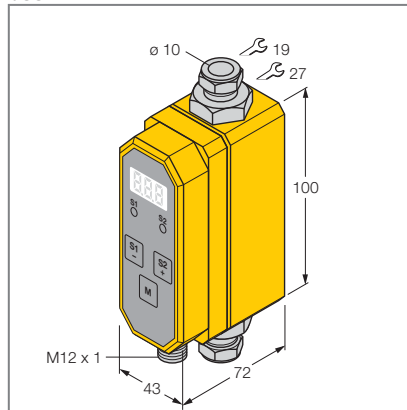
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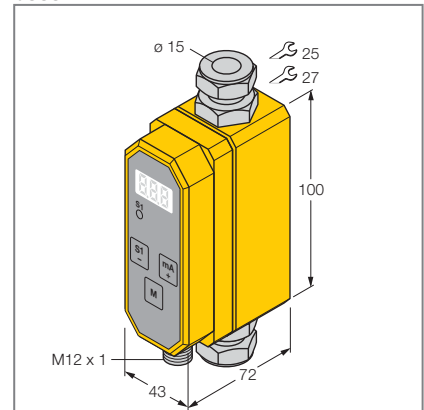
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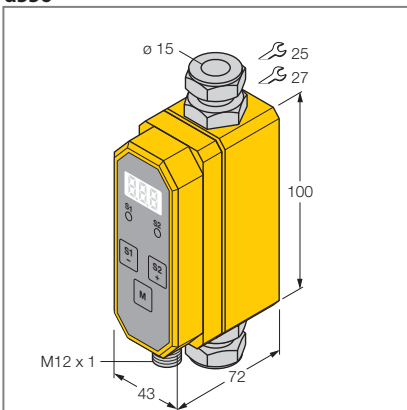
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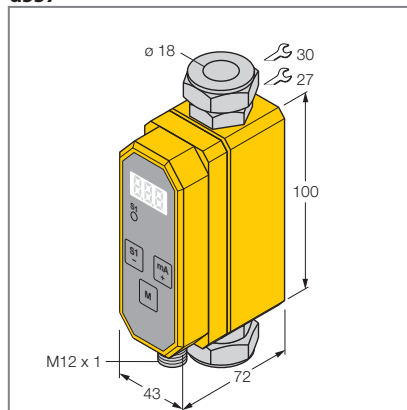
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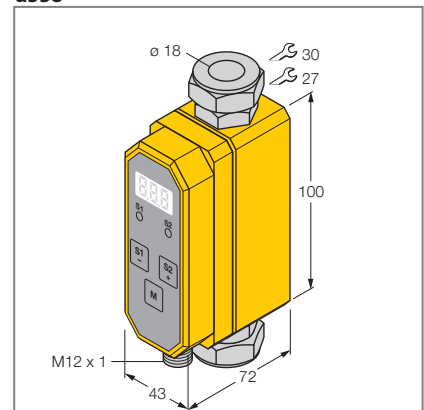
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d557

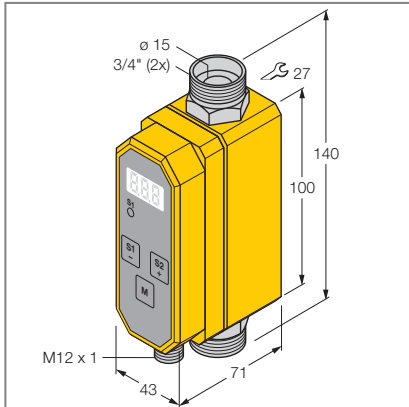


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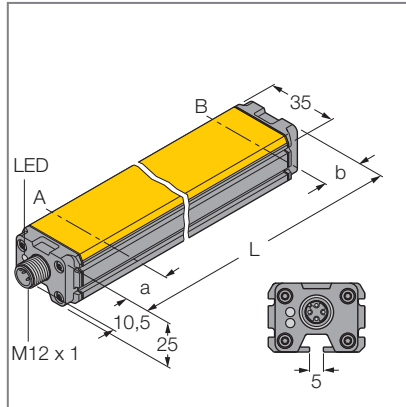


# Dimension drawings

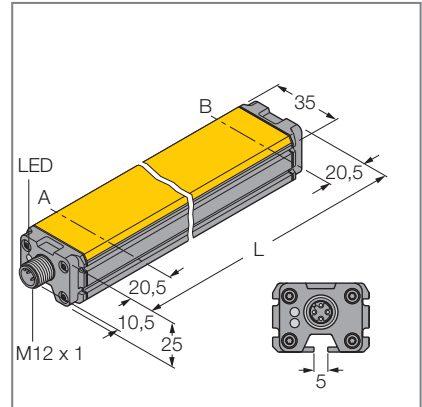
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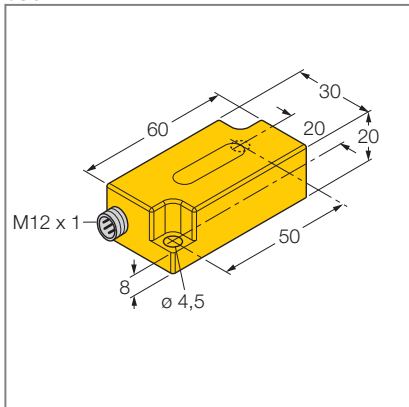
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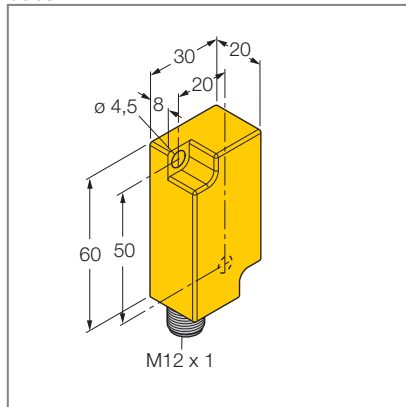
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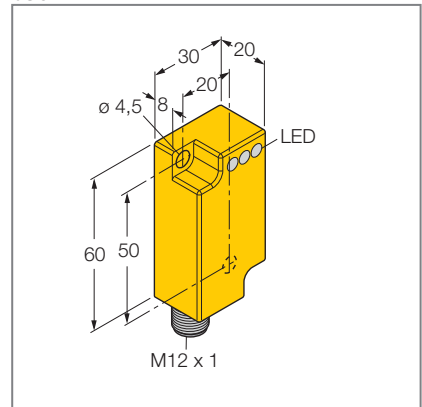
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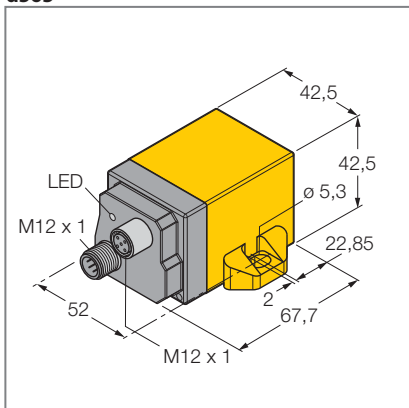
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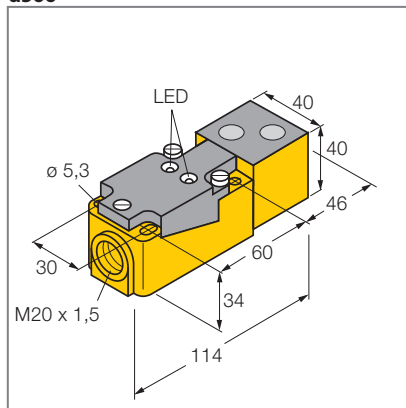
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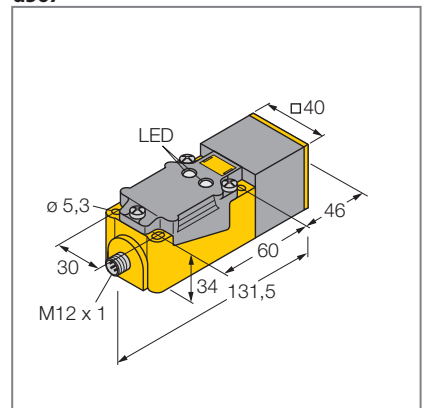
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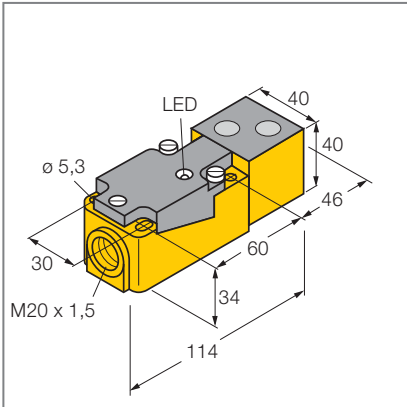
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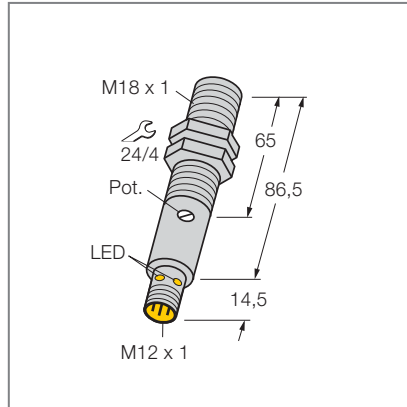
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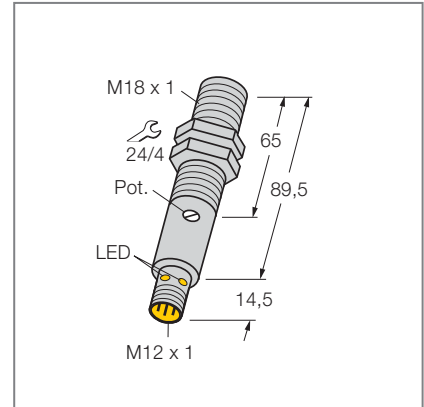
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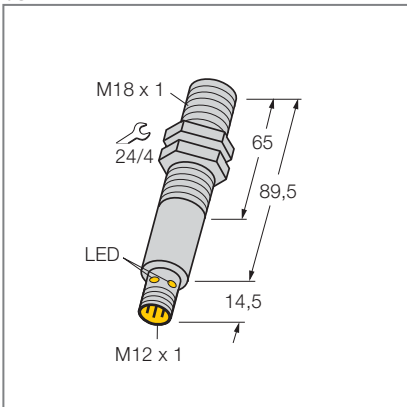
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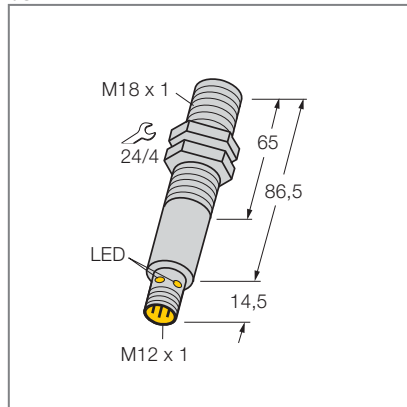
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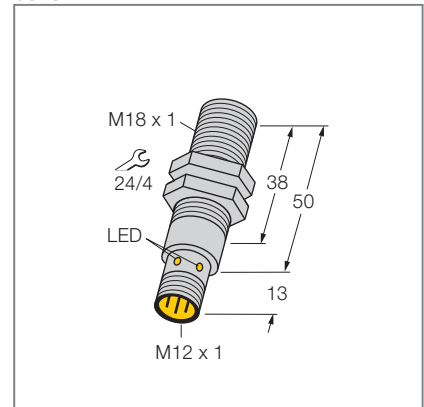
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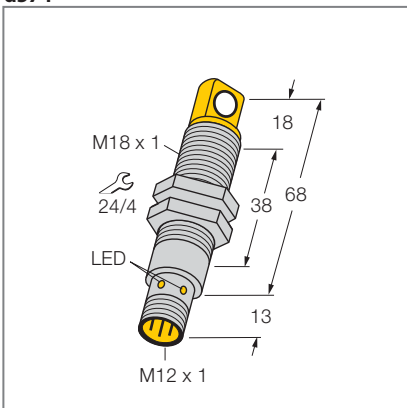
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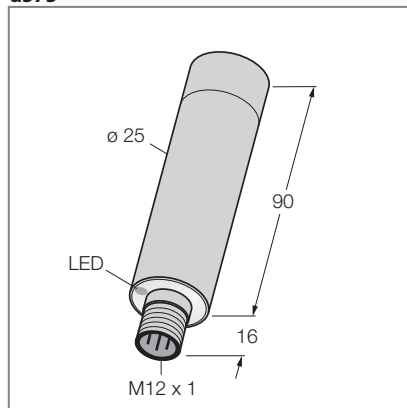
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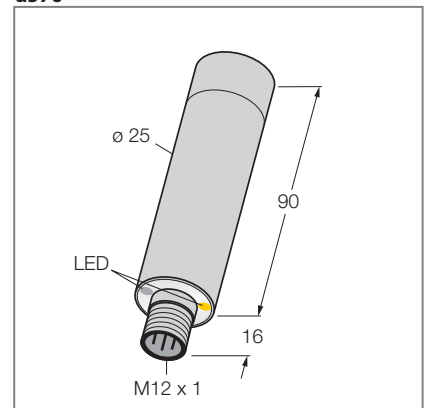
d574



d575

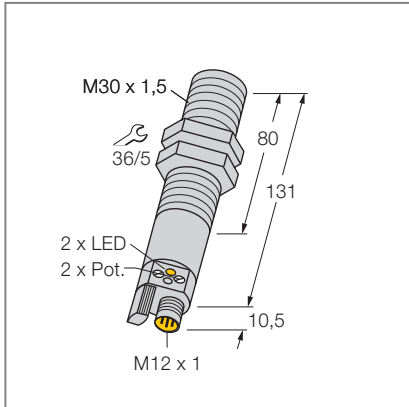


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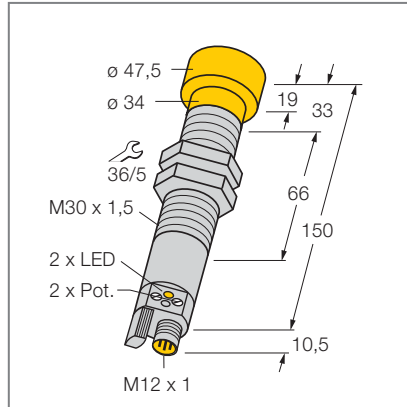


# Dimension drawings

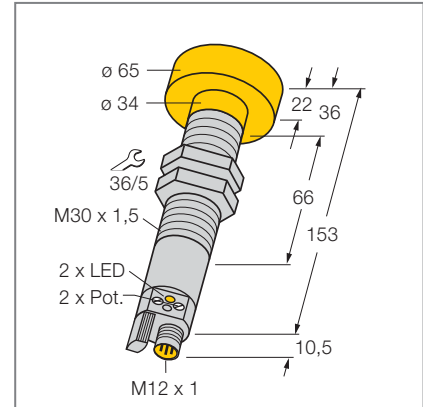
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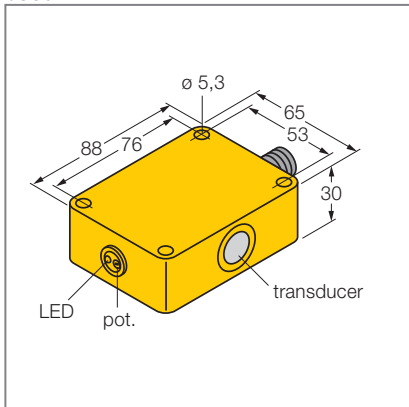
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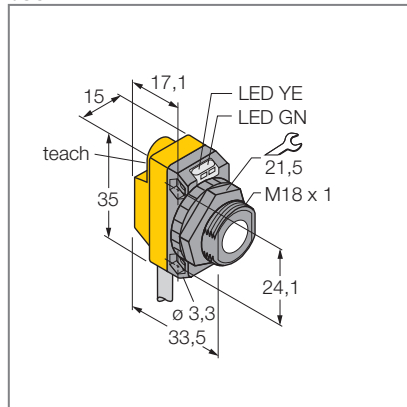
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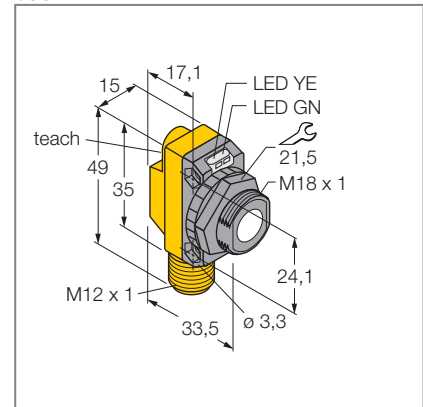
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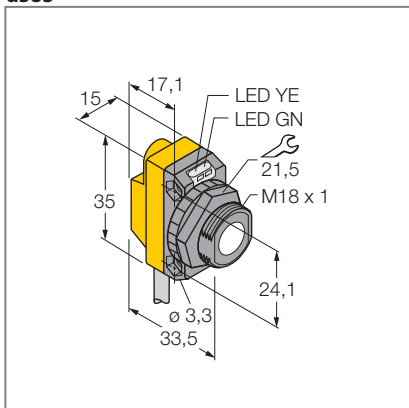
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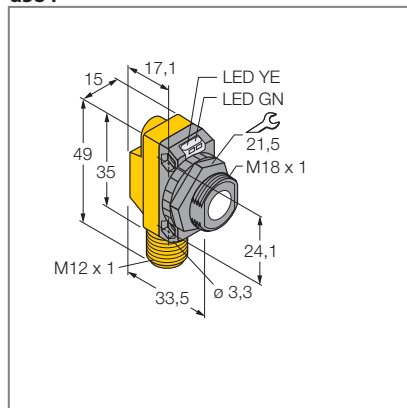
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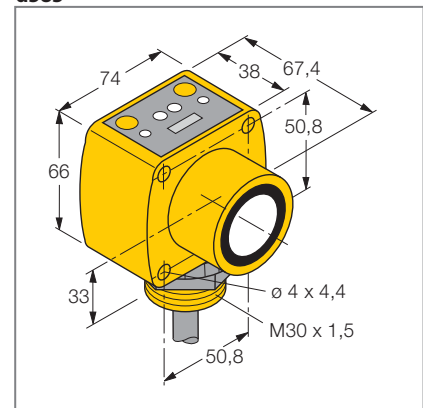
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d584

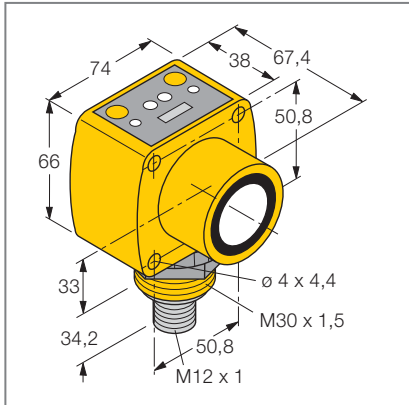


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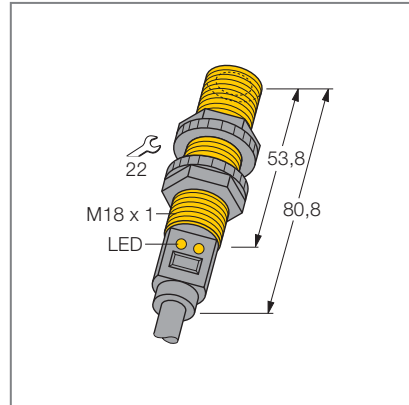




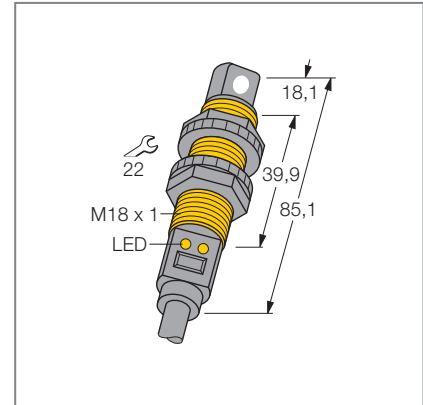
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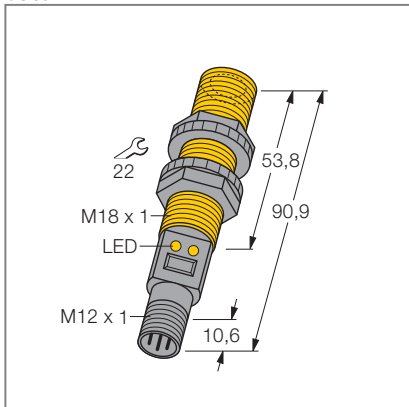
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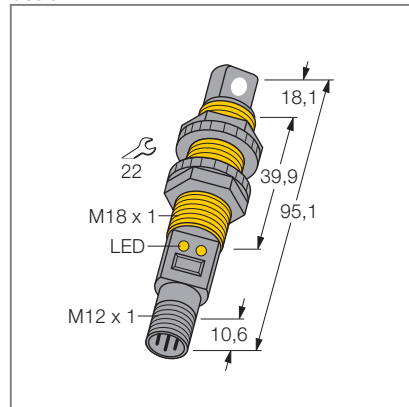
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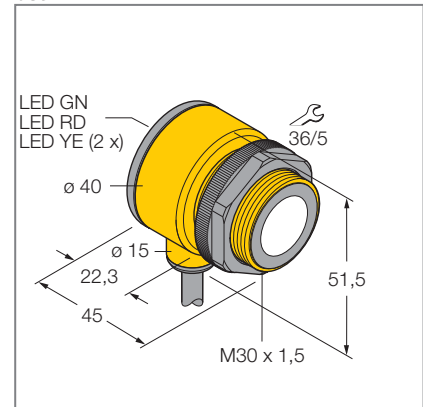
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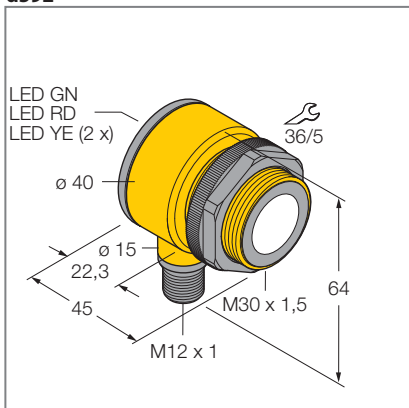
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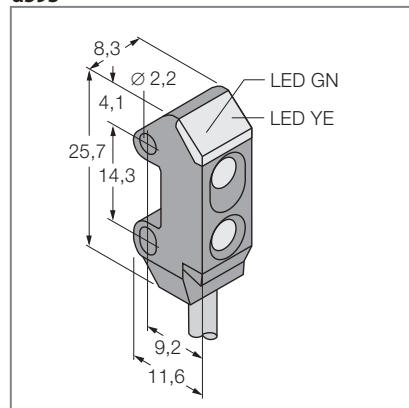
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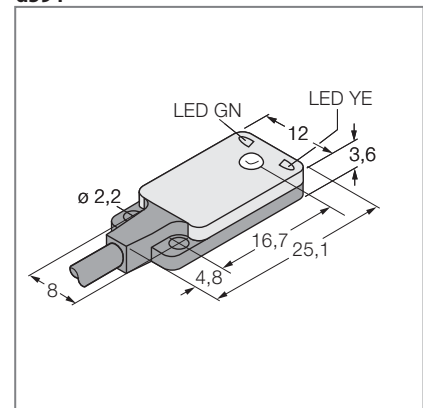
d592



d593

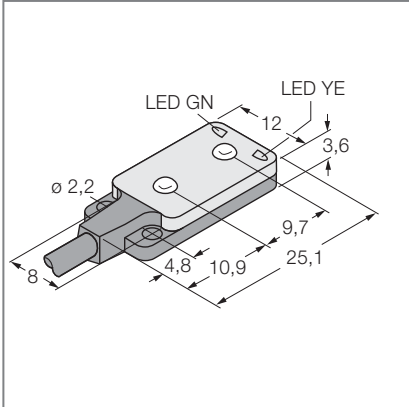


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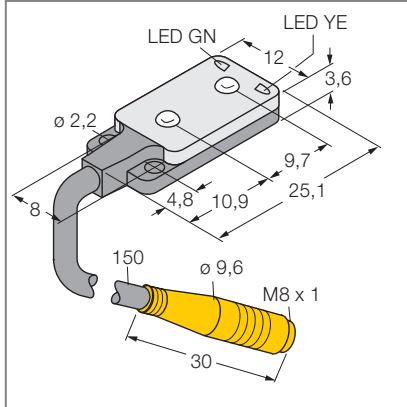


# Dimension drawings

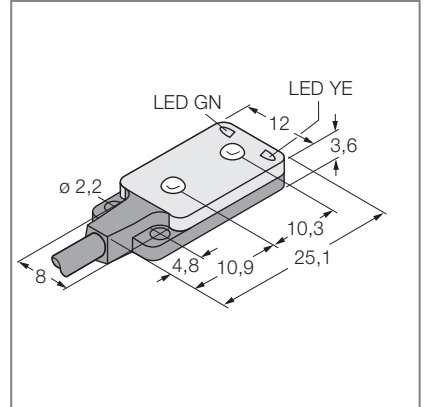
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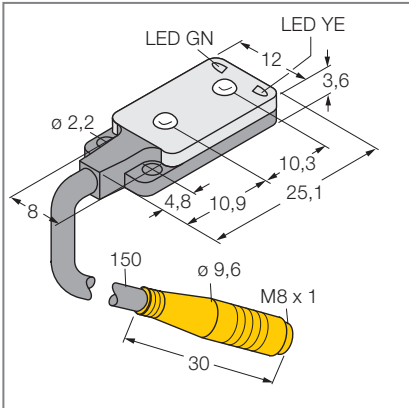
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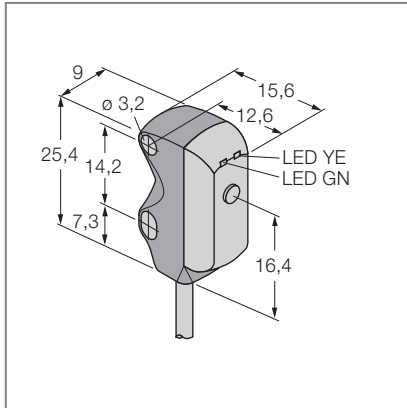
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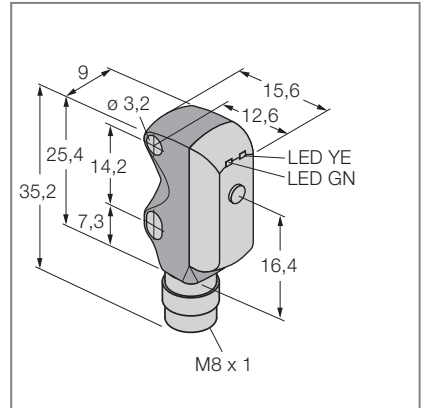
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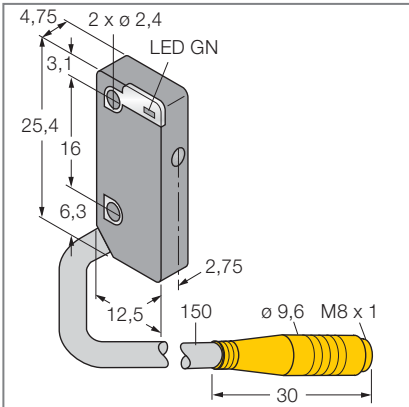
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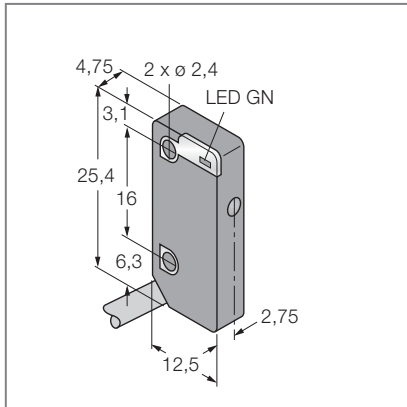
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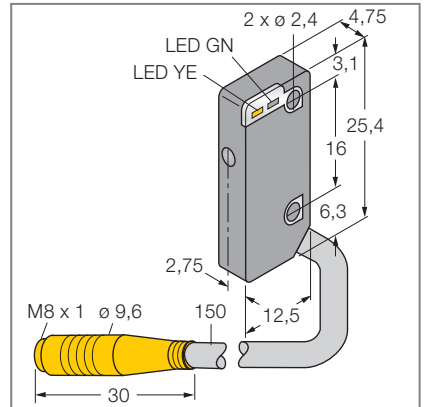
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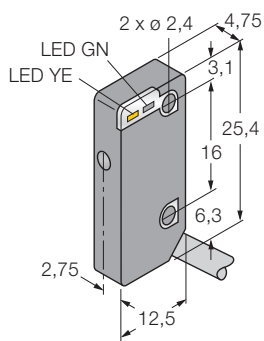
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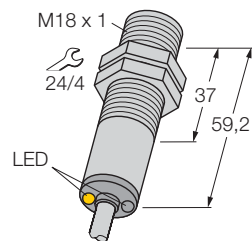
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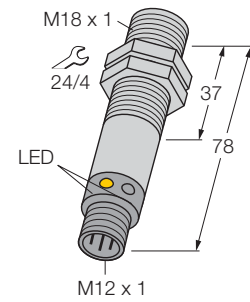
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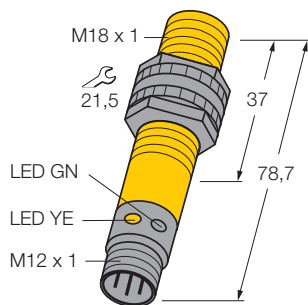
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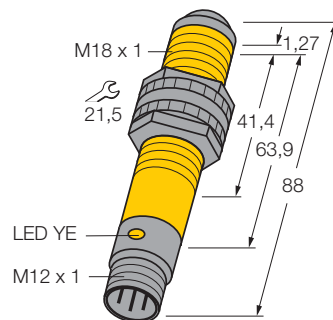
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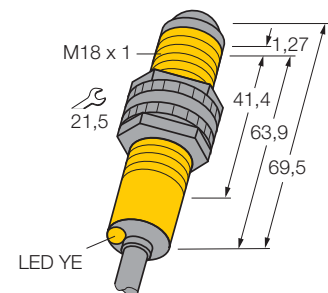
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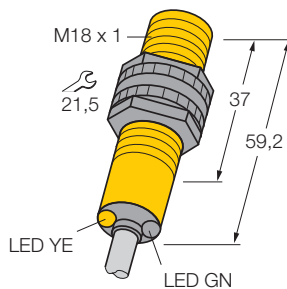
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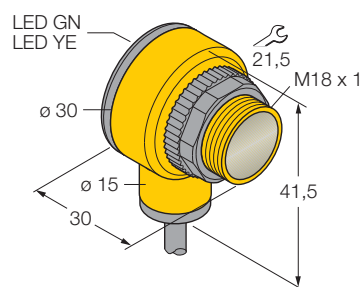
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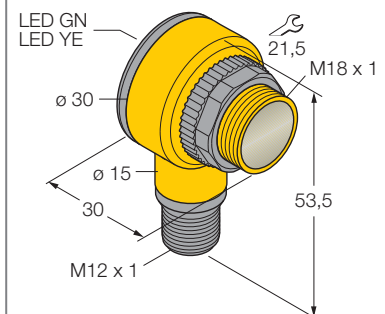
d610



d611

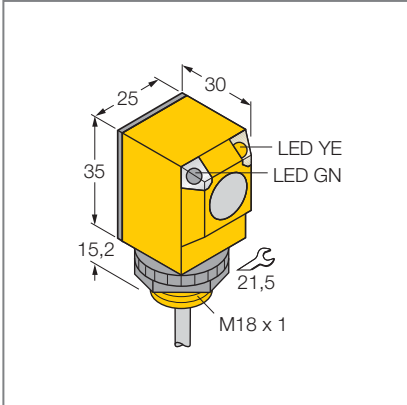


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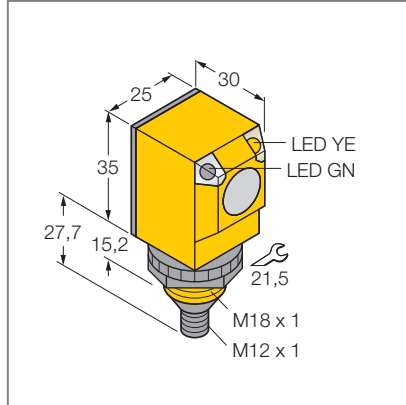


# Dimension drawings

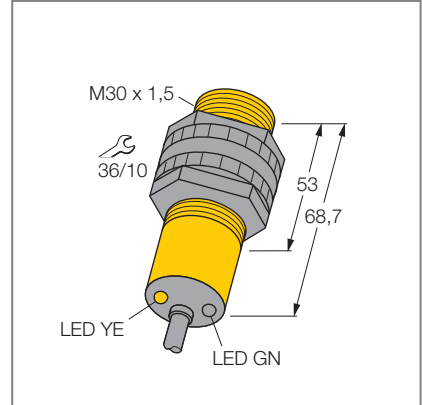
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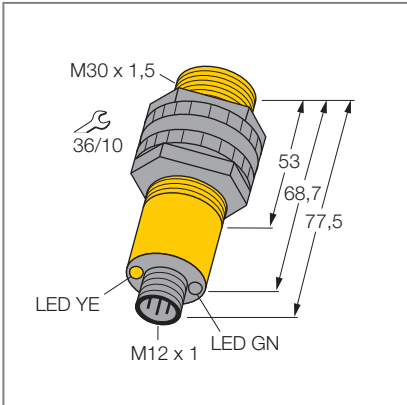
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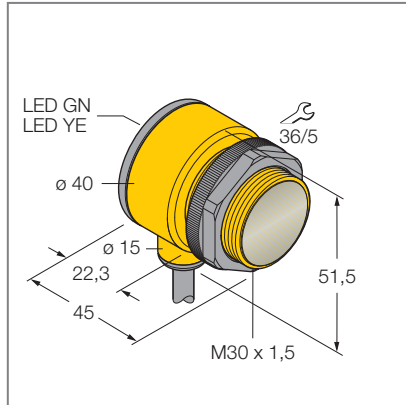
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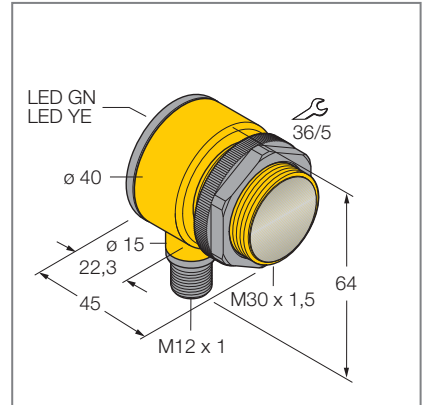
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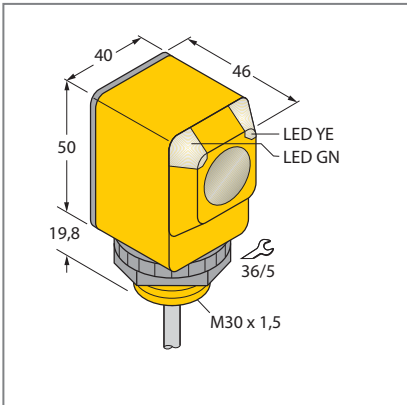
d617



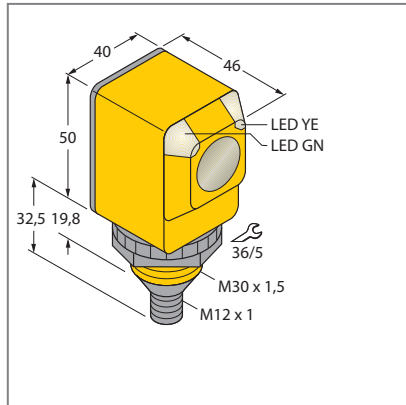
d618



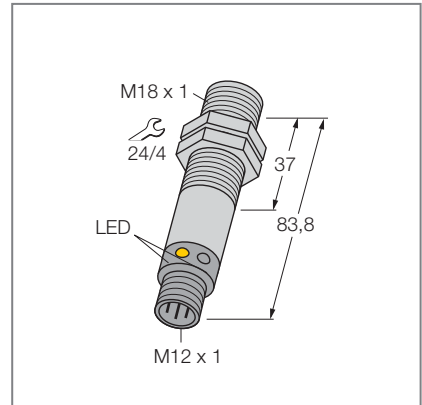
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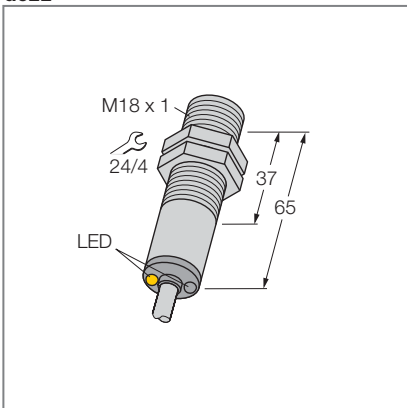
d620



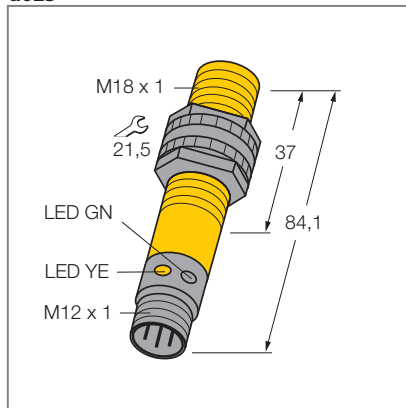
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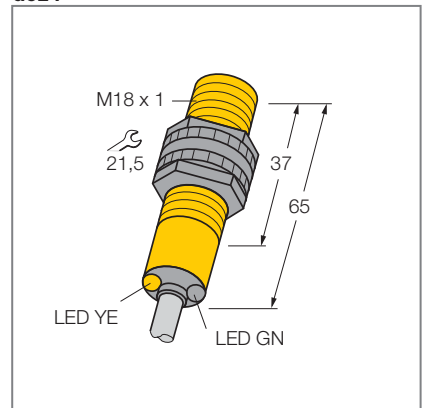
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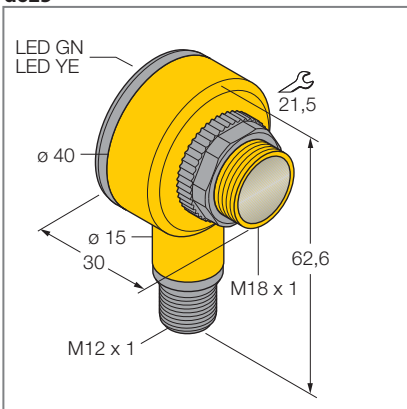
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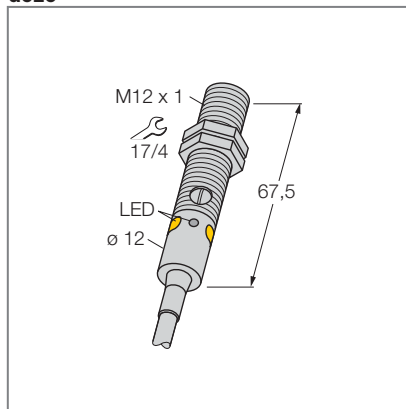
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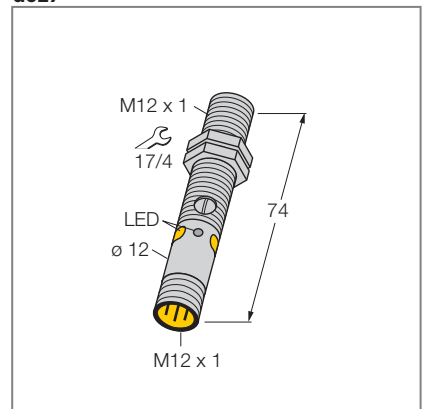
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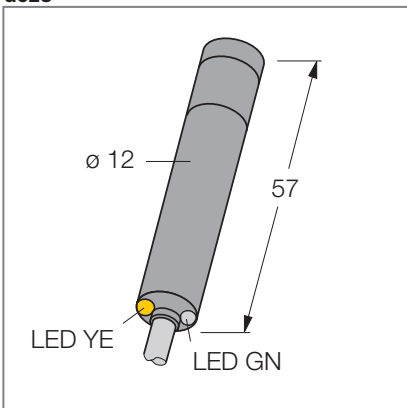
d626



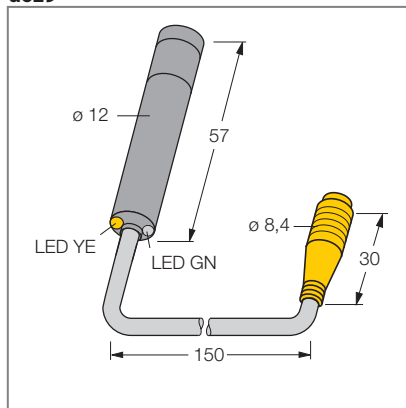
d627



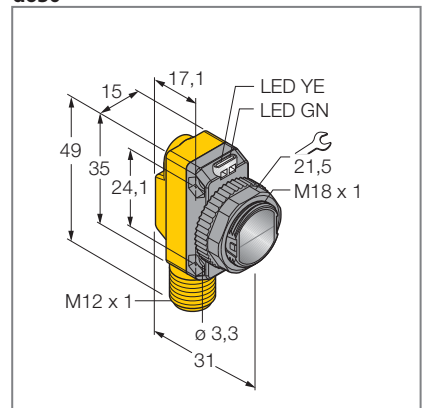
d628



d629

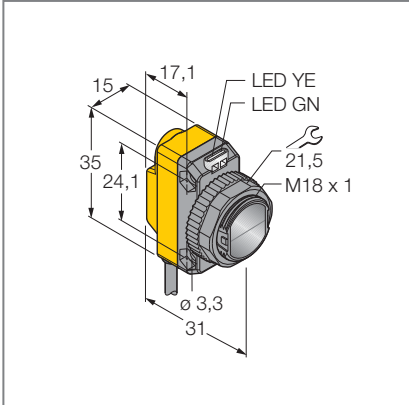


d630

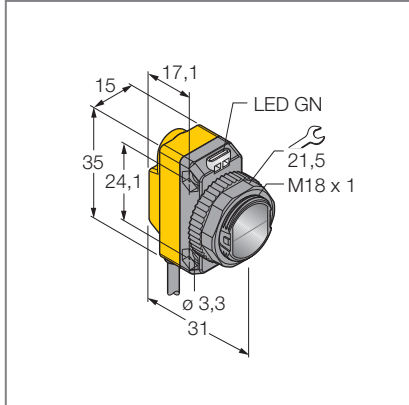


# Dimension drawings

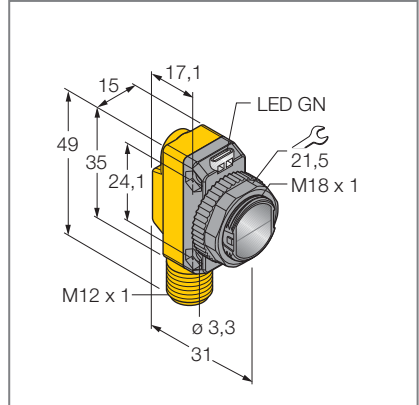
**d631**



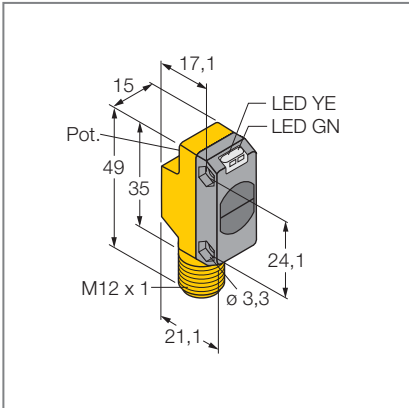
**d632**



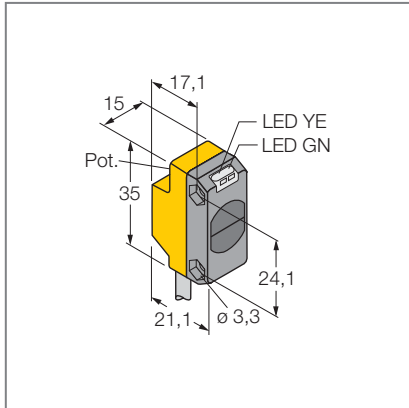
**d633**



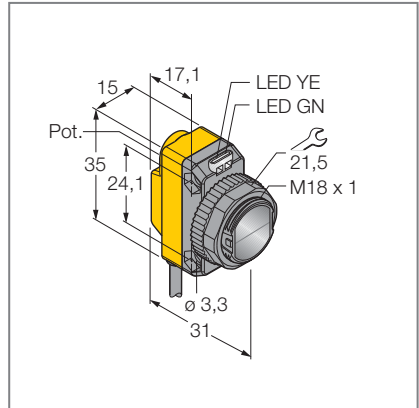
**d634**



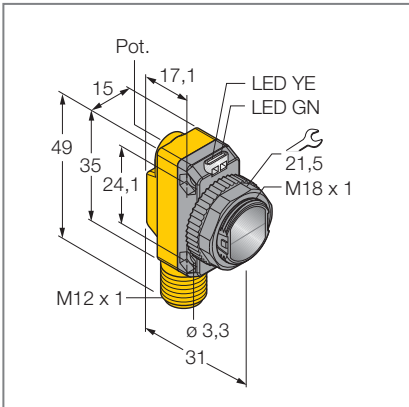
**d635**



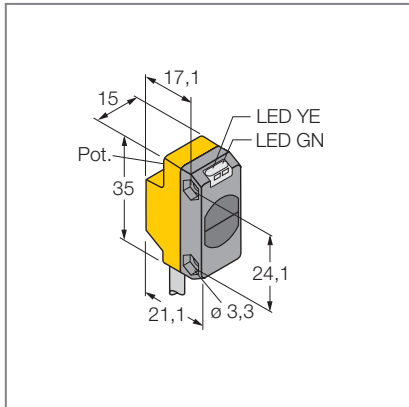
**d636**



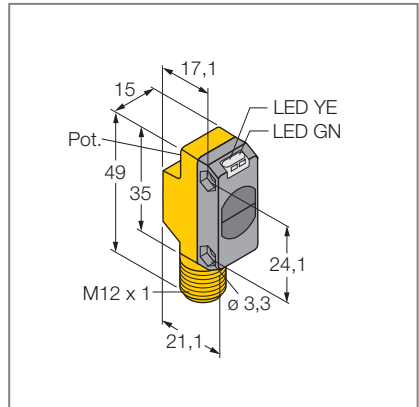
**d637**



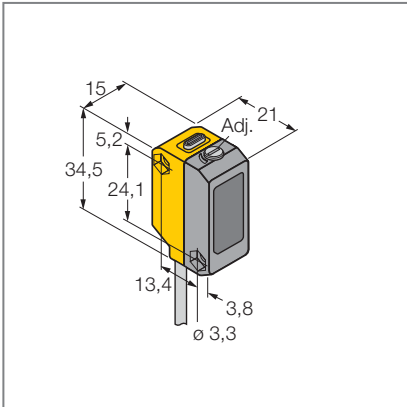
**d638**



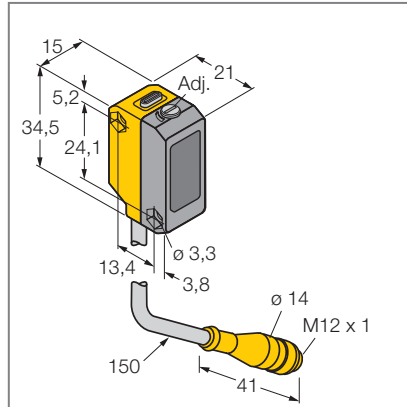
**d639**



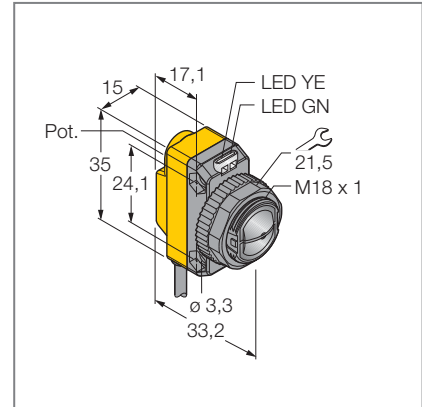
d640



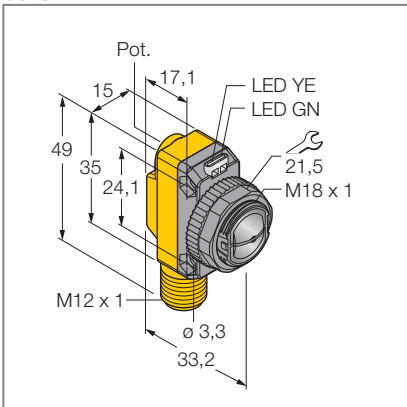
d641



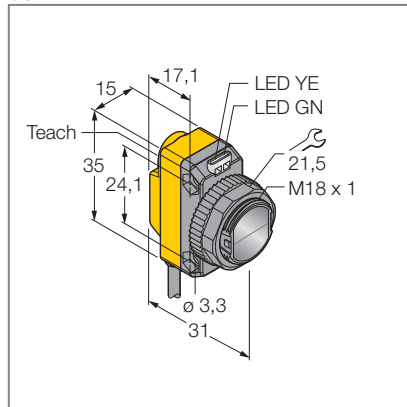
d642



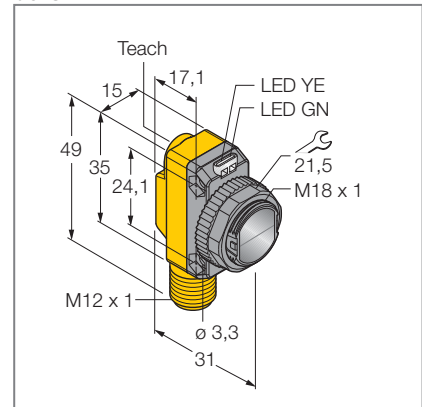
d643



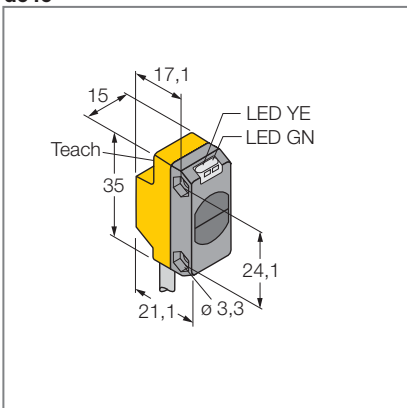
d644



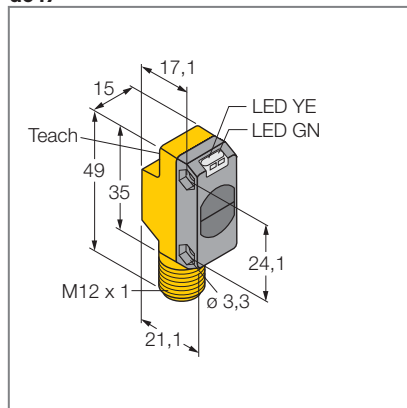
d645



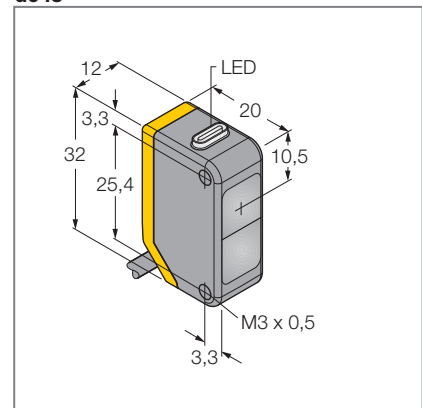
d646



d647

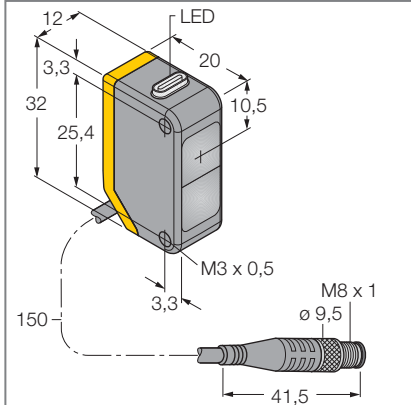


d648

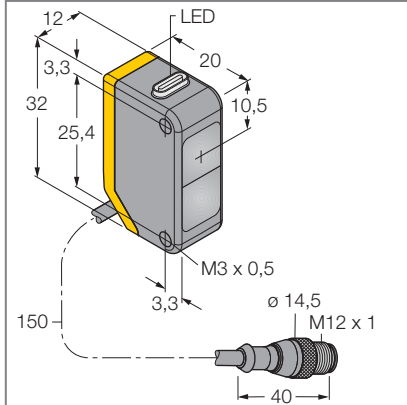


# Dimension drawings

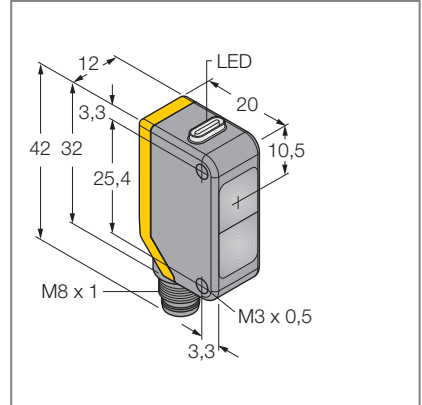
**d649**



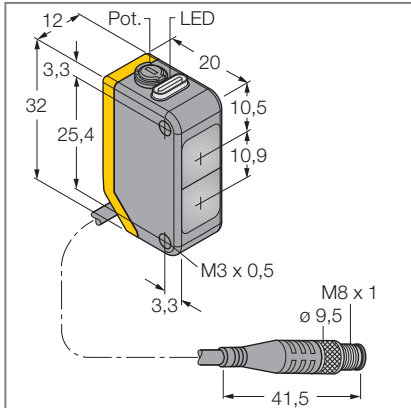
**d650**



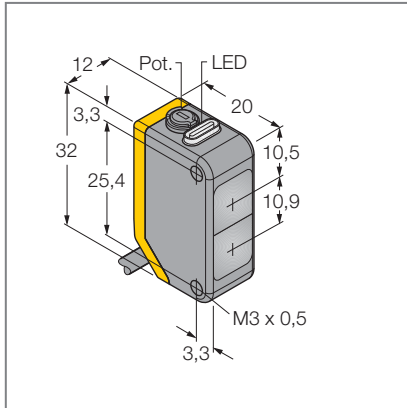
**d651**



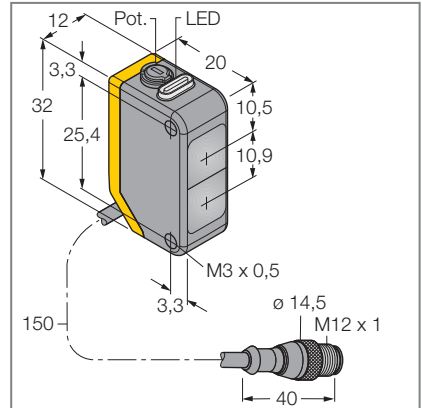
**d652**



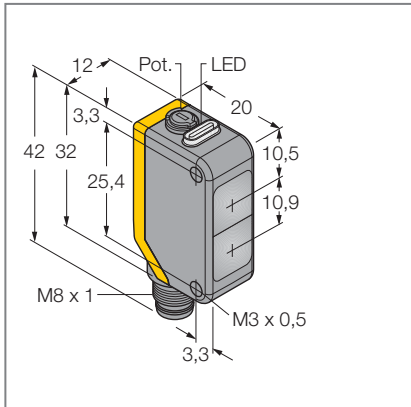
**d653**



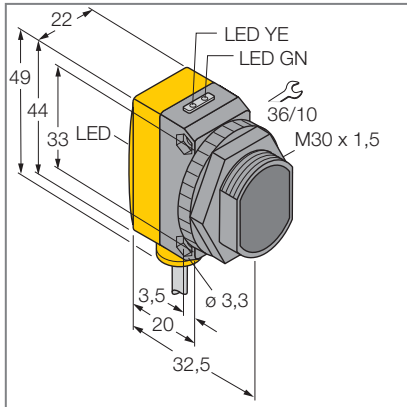
**d654**



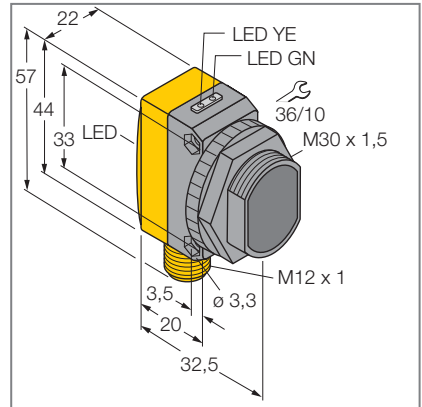
**d655**



**d656**

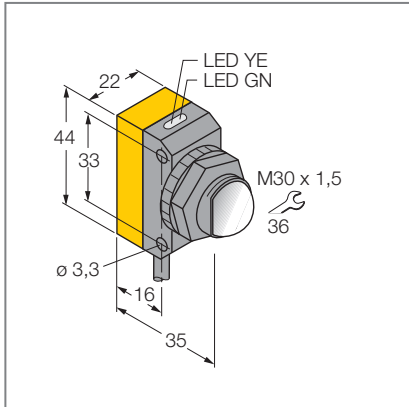


**d657**

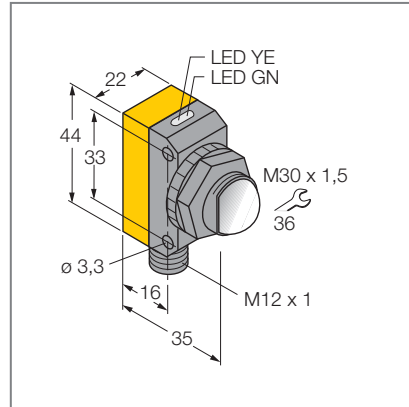




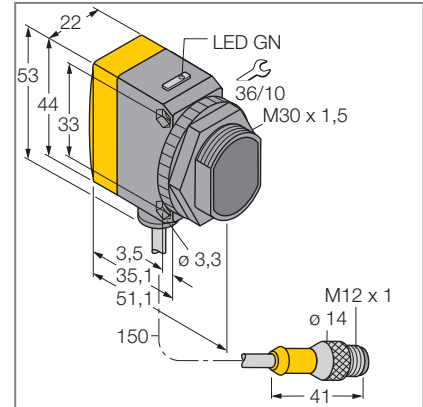
d658



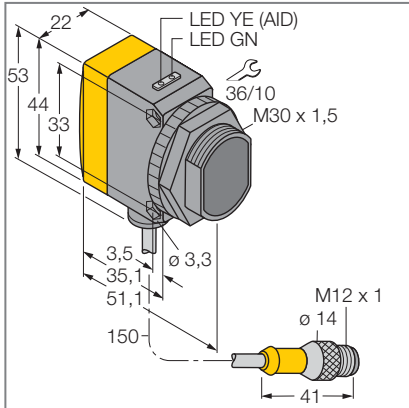
d659



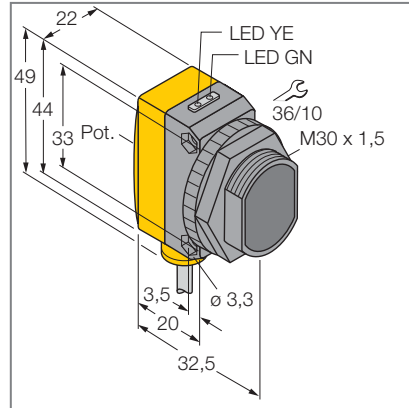
d660



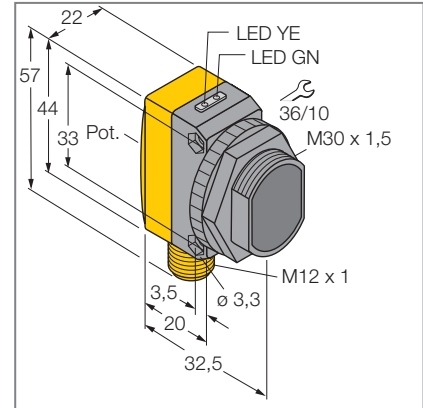
d661



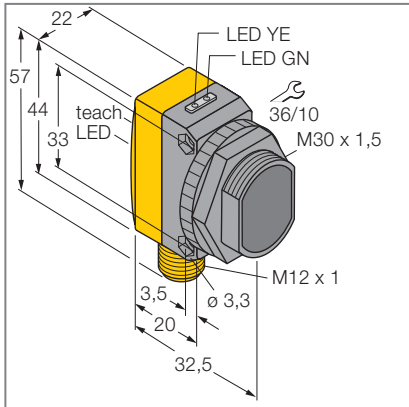
d662



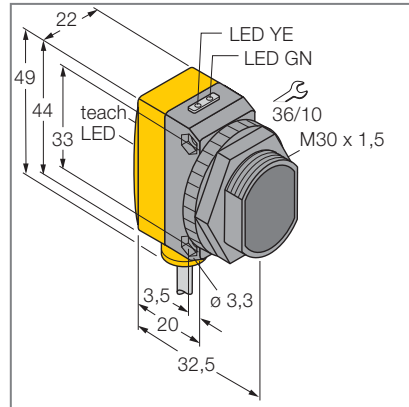
d663



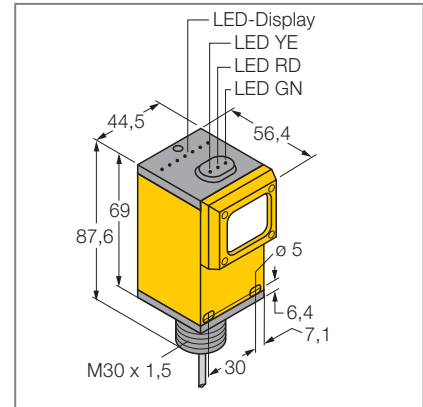
d664



d665

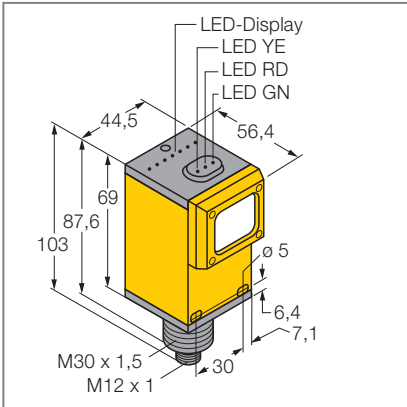


d666

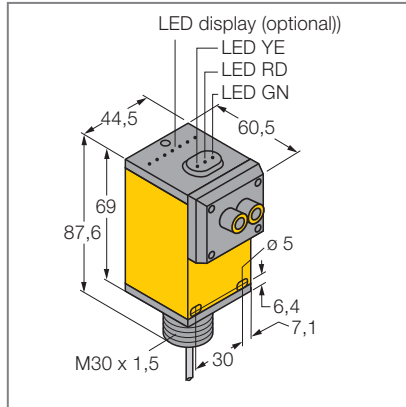


# Dimension drawings

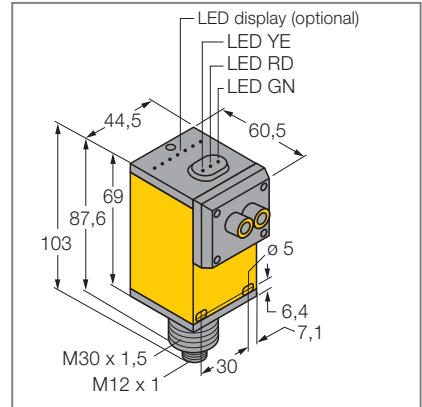
**d667**



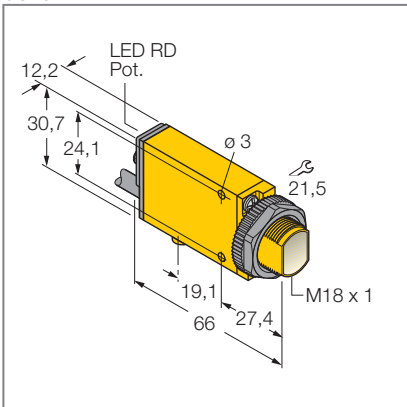
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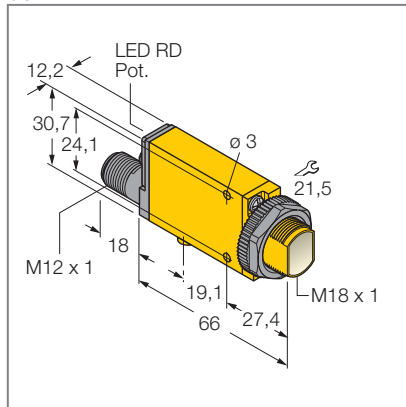
**d669**



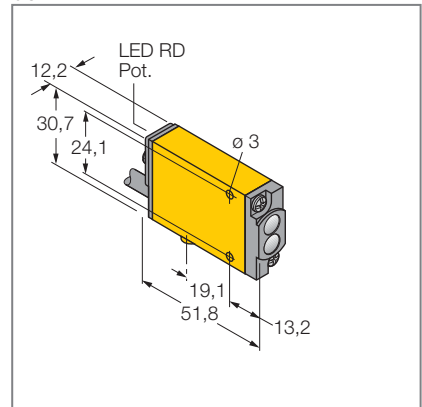
**d670**



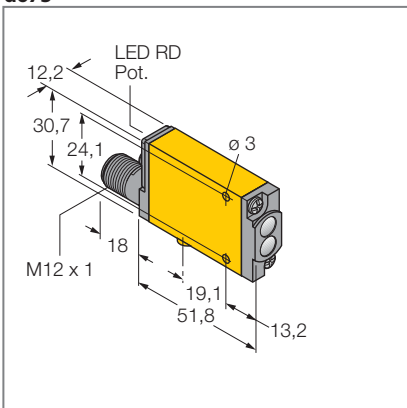
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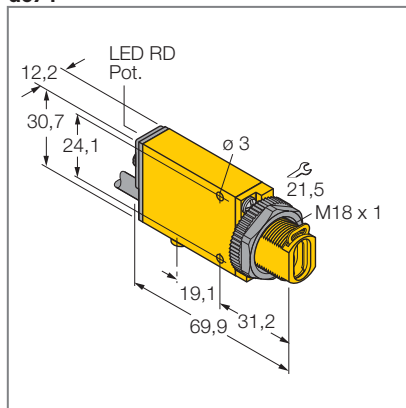
**d672**



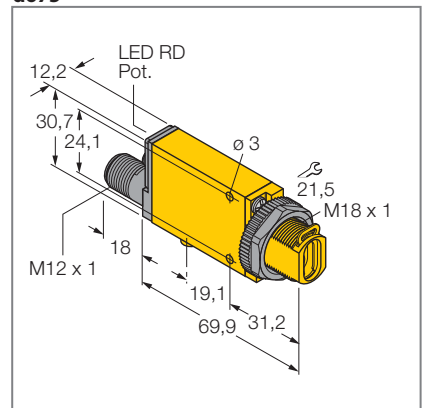
**d673**



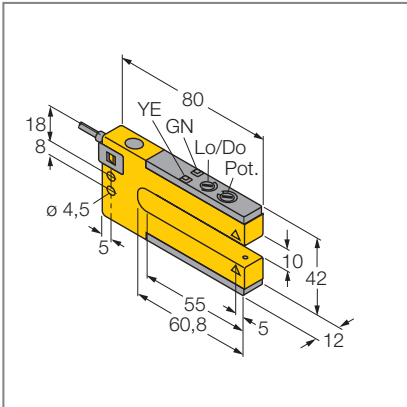
**d674**



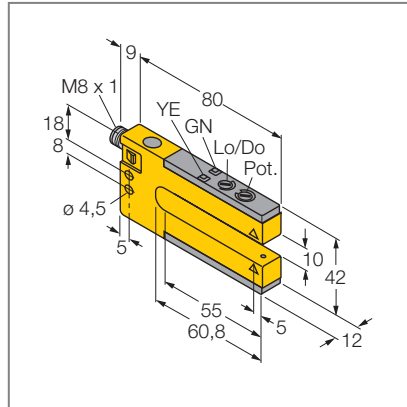
**d675**



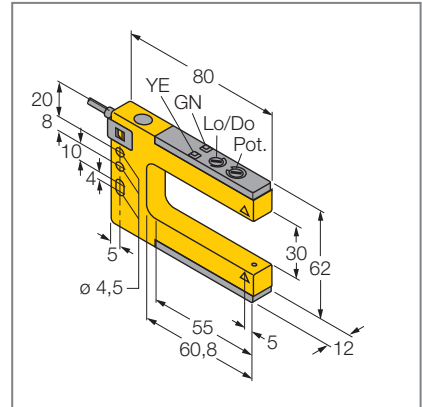
**d676**



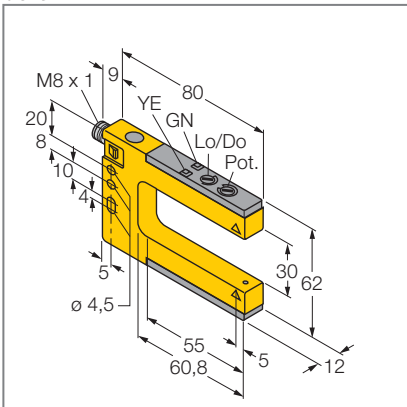
**d677**



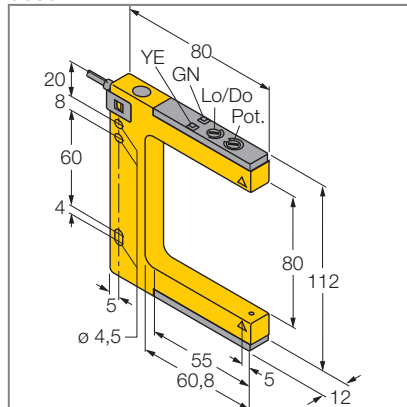
**d678**



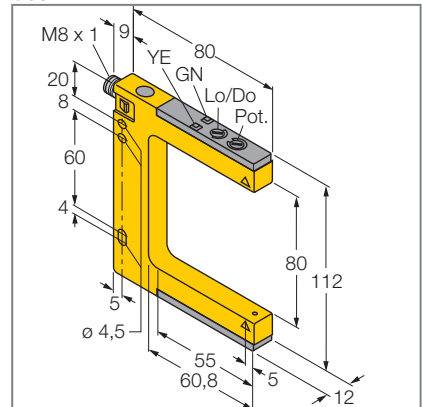
**d679**



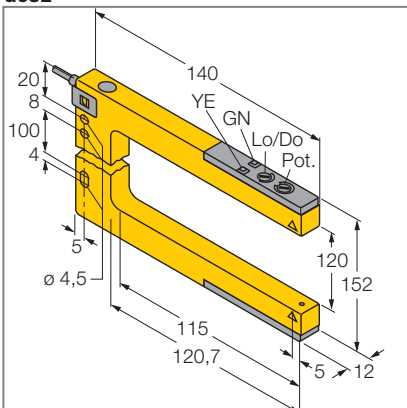
**d680**



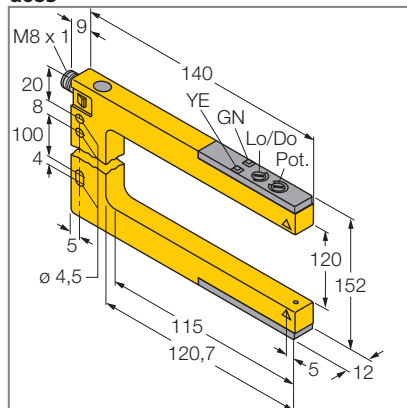
**d681**



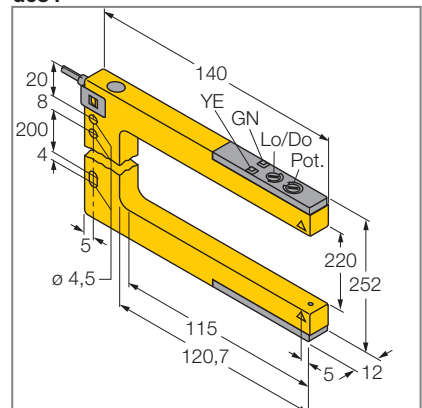
**d682**



**d683**



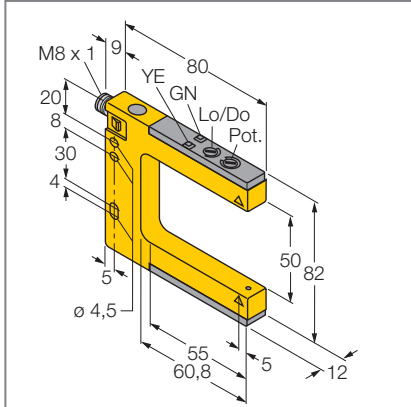
**d684**



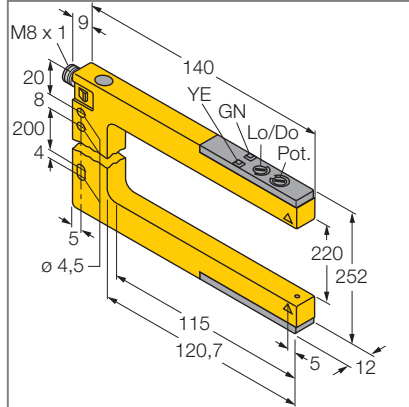
Dimension drawings

# Dimension drawings

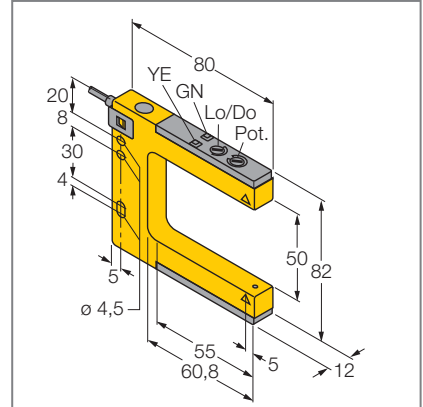
**d685**



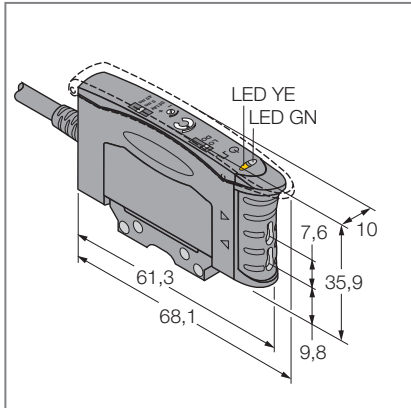
**d686**



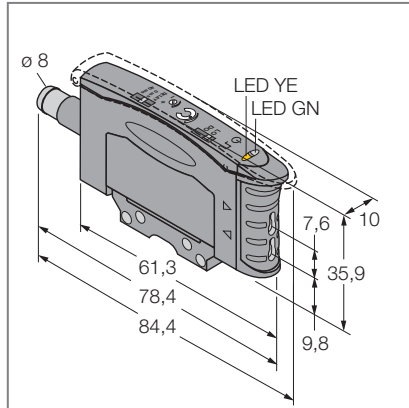
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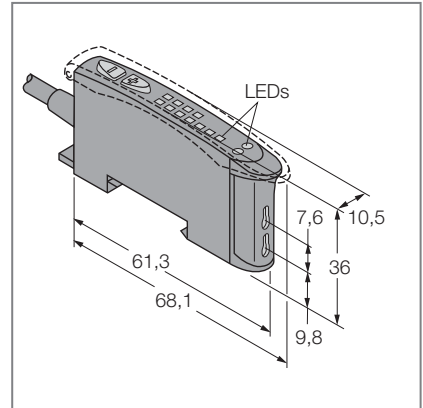
**d688**



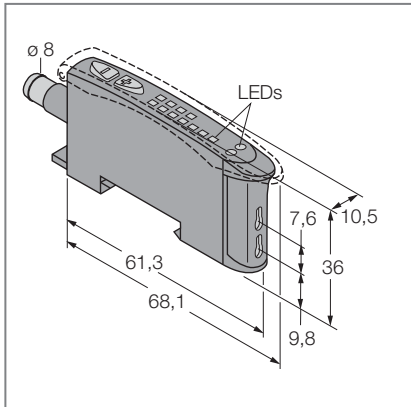
**d689**



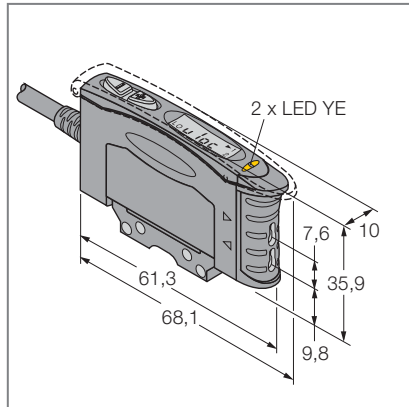
**d690**



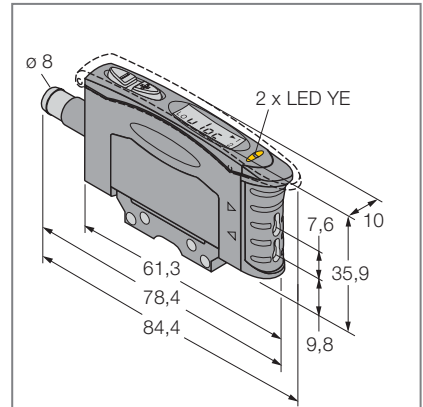
**d691**



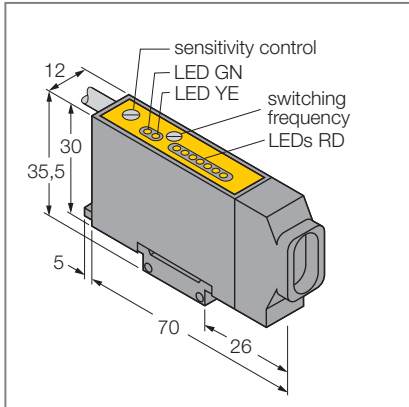
**d692**



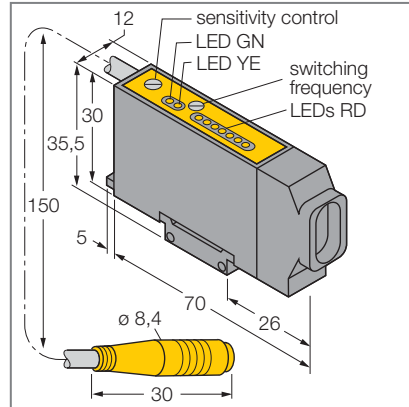
**d693**



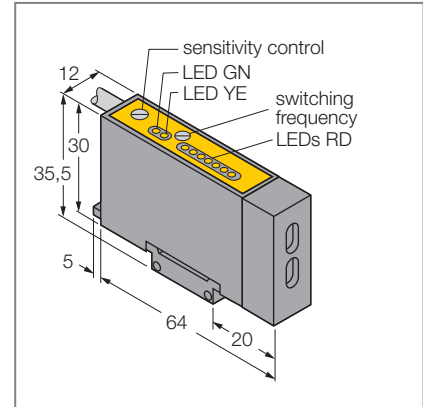
d694



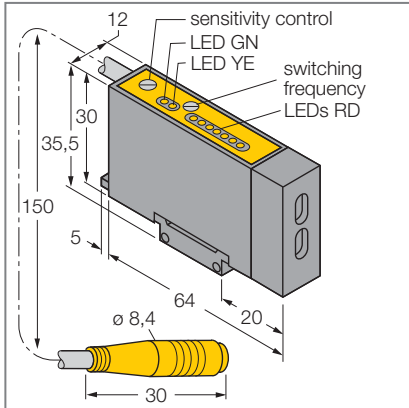
d695



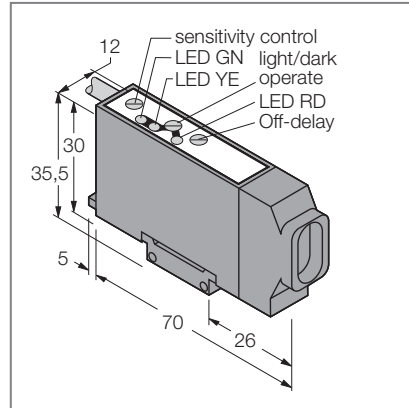
d696



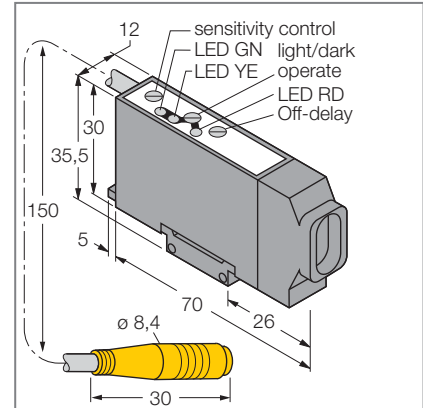
d697



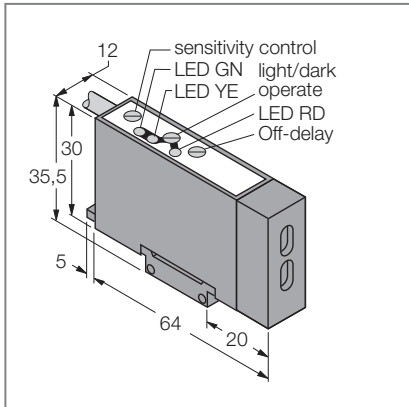
d698



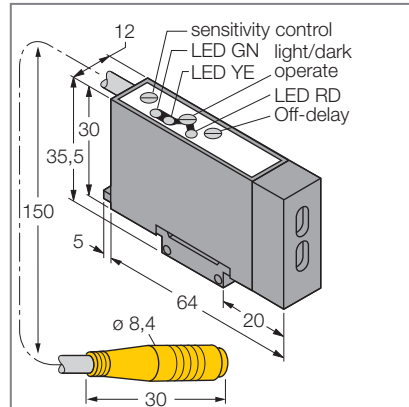
d699



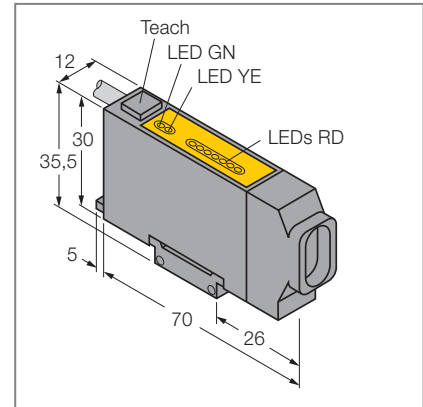
d700



d701

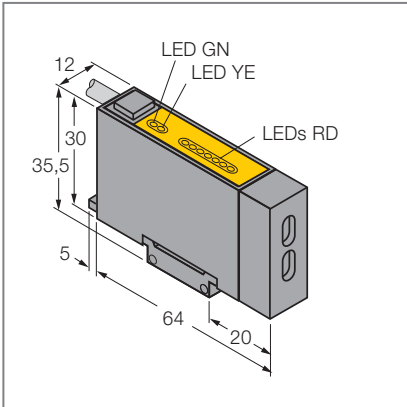


d702

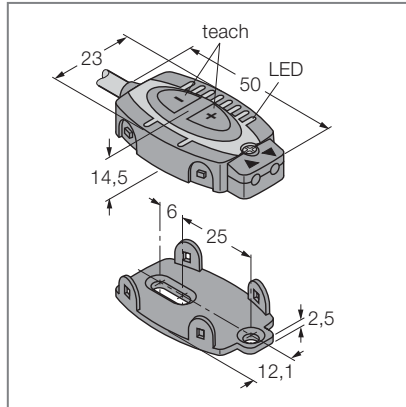


# Dimension drawings

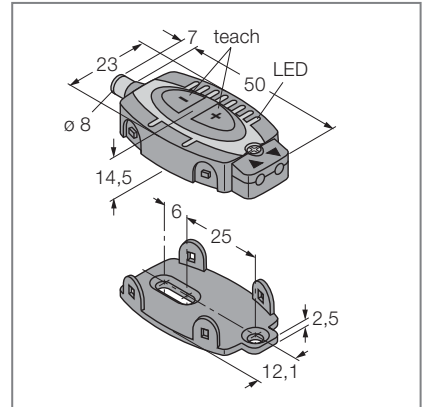
d703



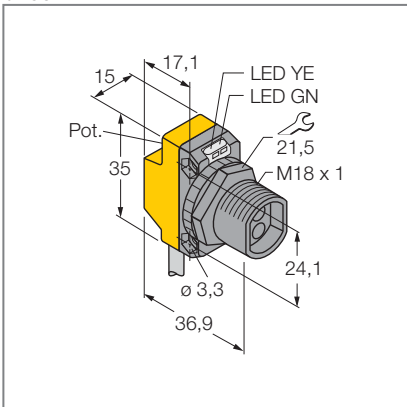
d704



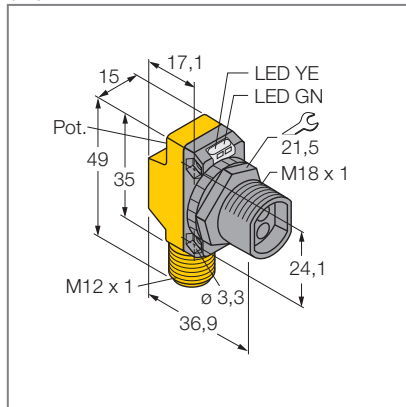
d705



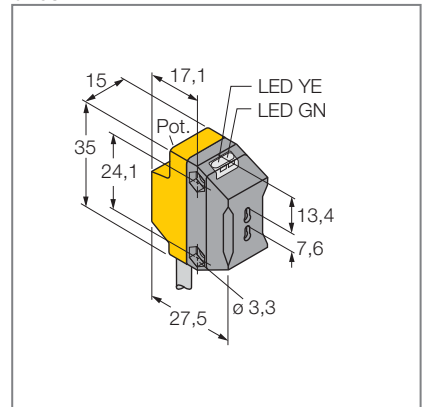
d706



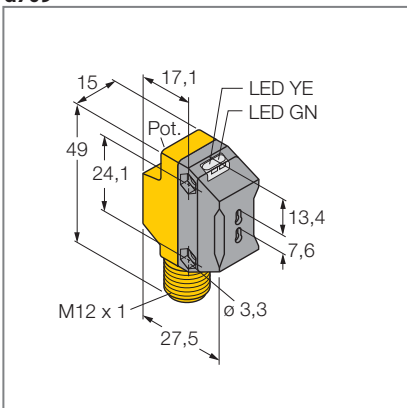
d707



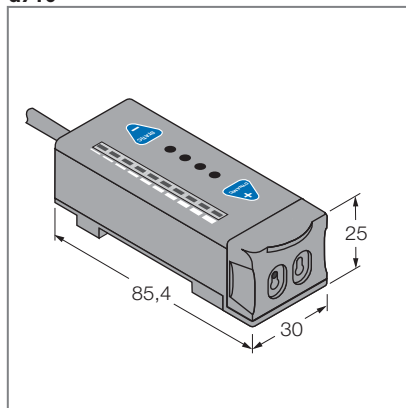
d708



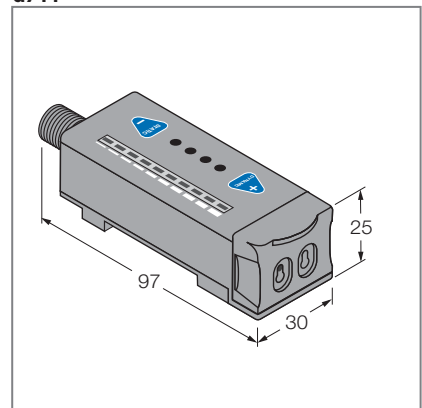
d709



d710



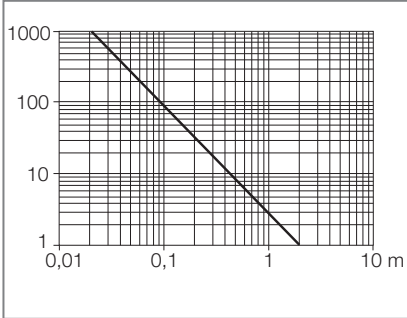
d711



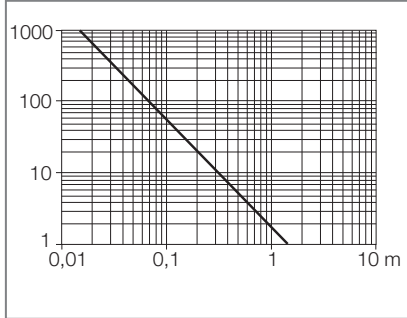
# Dimension drawings

# Excess gain curves

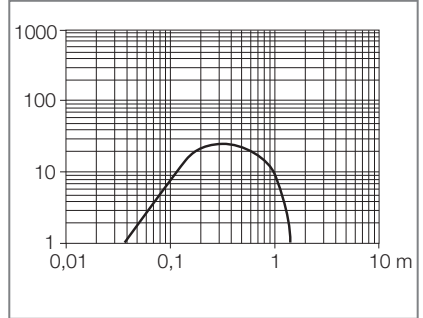
**e001**



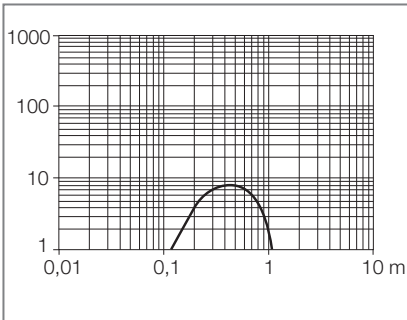
**e002**



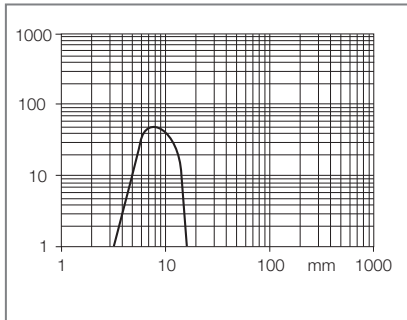
**e003**



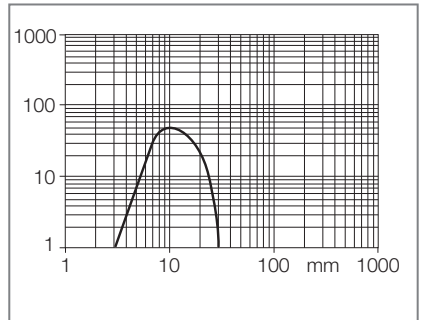
**e004**



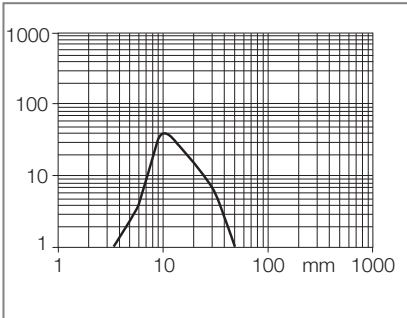
**e005**



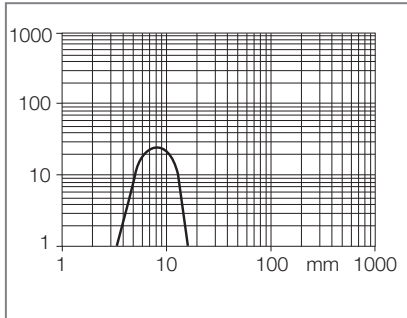
**e006**



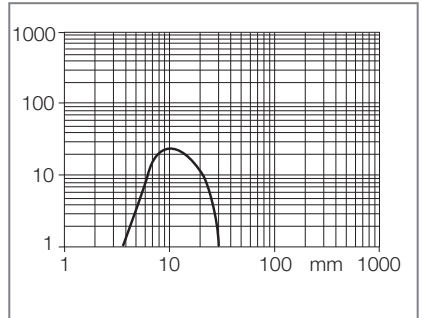
**e007**



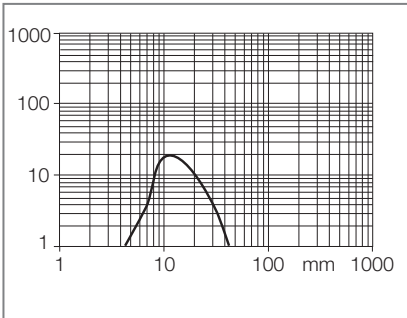
**e008**



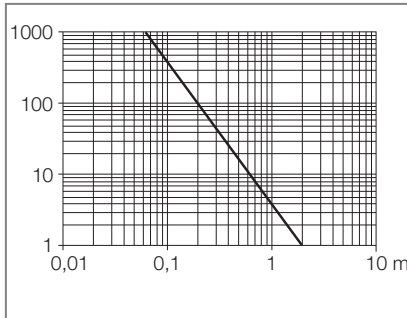
**e009**



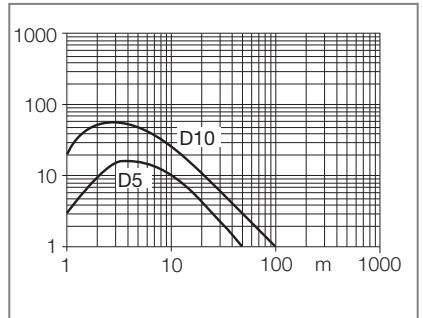
**e010**



**e011**

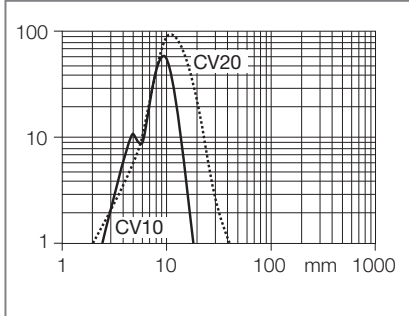


**e012**

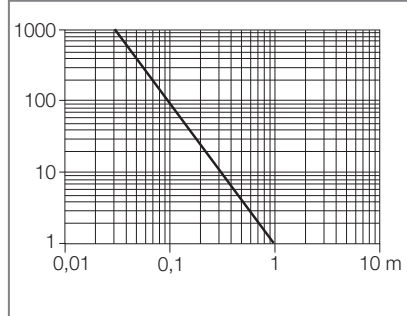




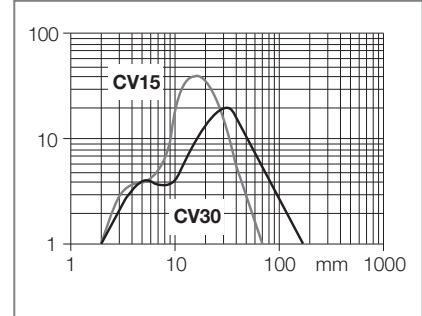
e013



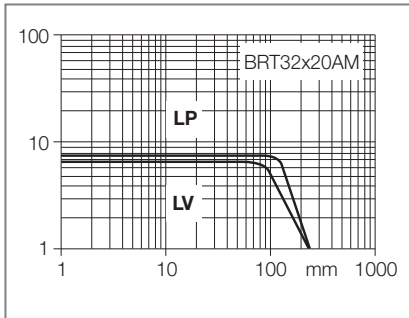
e014



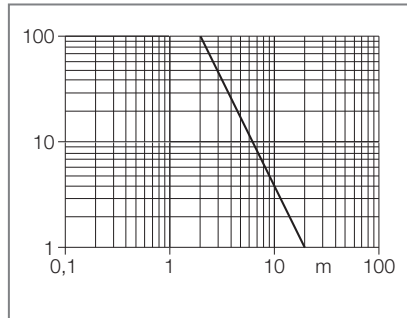
e015



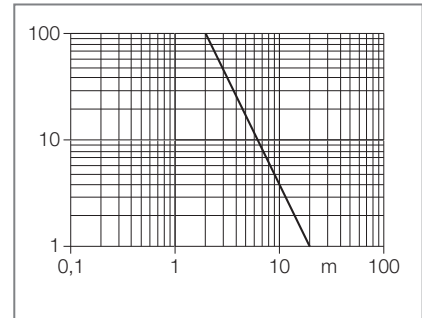
e016



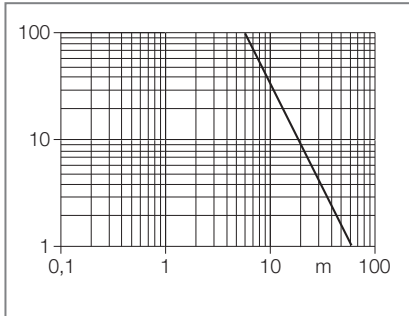
e017



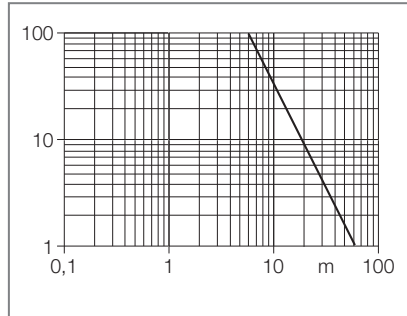
e018



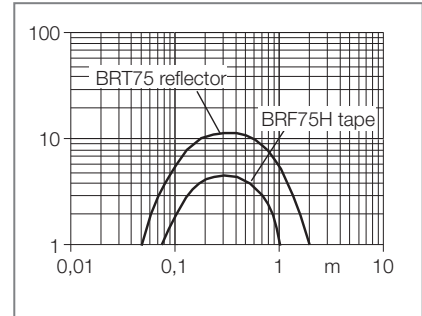
e019



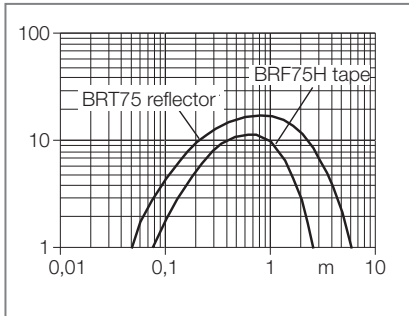
e020



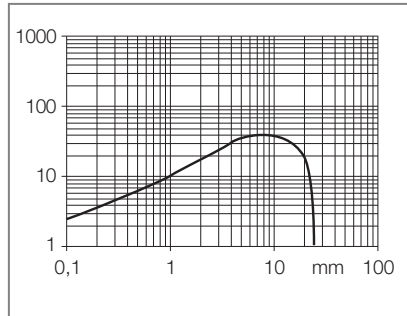
e021



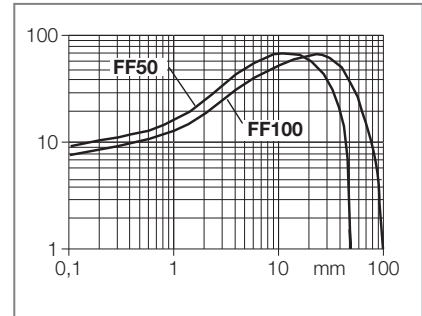
e022



e023

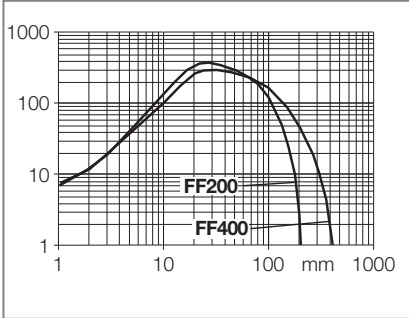


e024

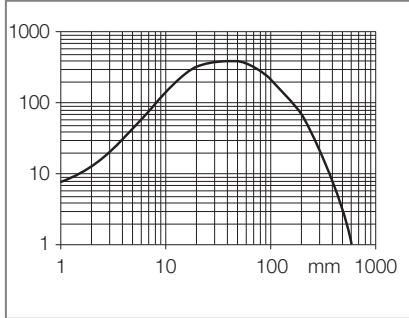


# Excess gain curves

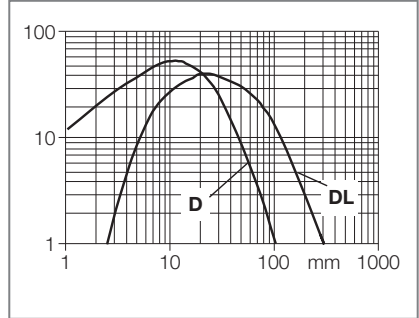
e025



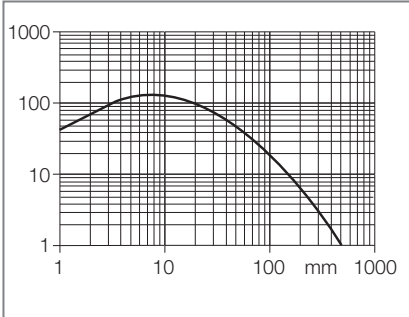
e026



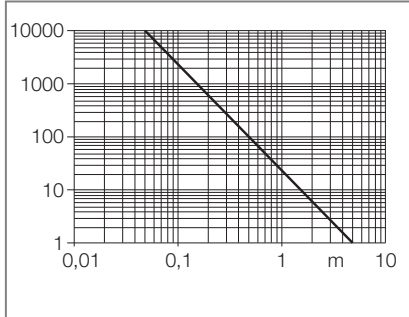
e027



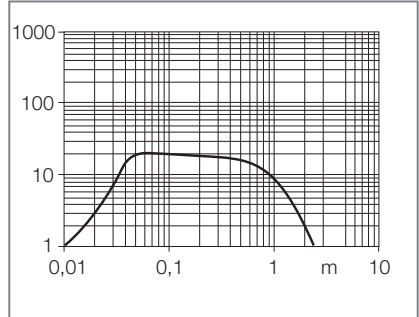
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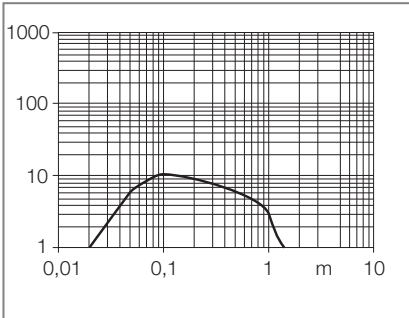
e029



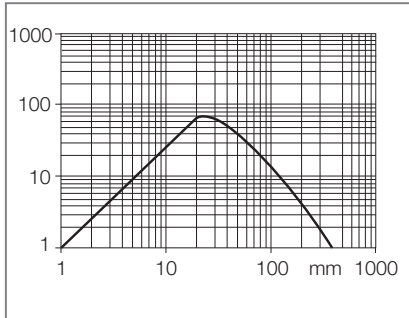
e030



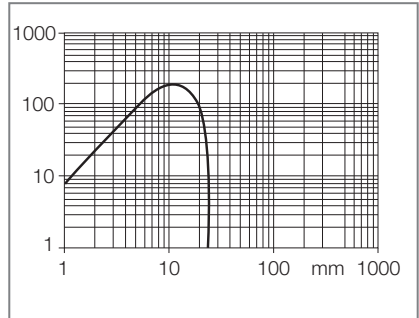
e031



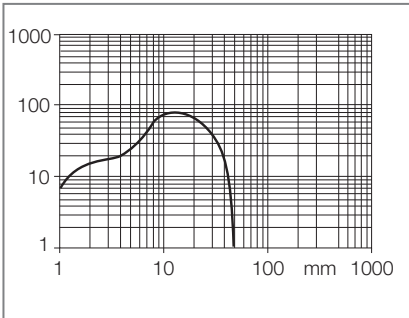
e032



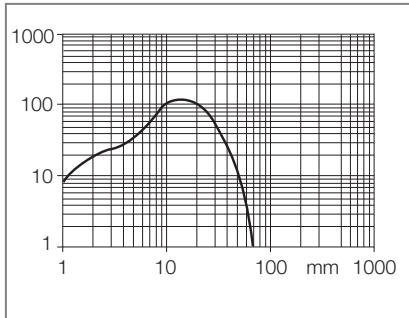
e033



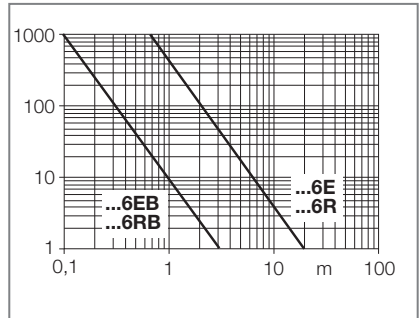
e034



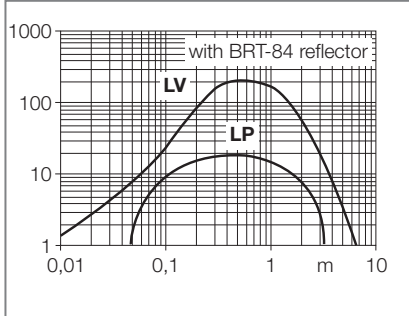
e035



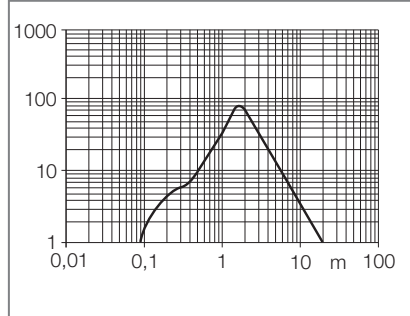
e036



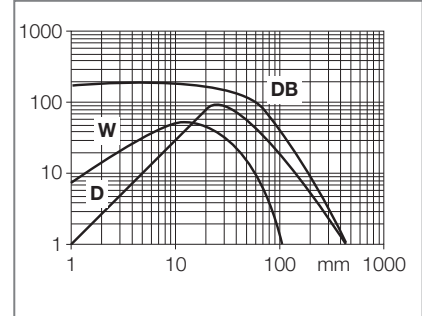
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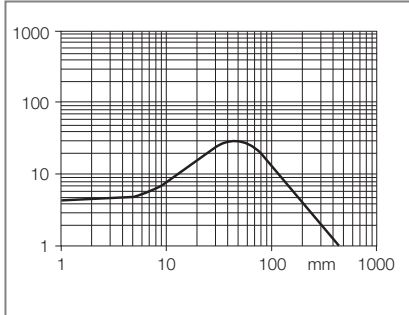
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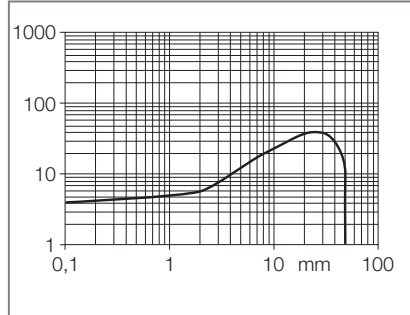
e039



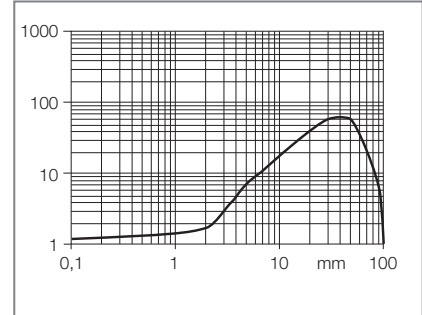
e040



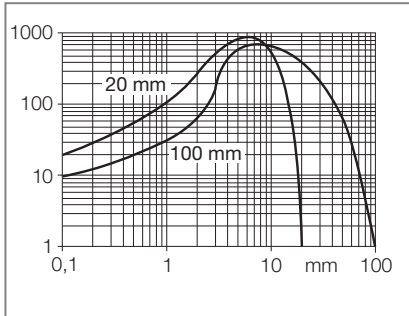
e041



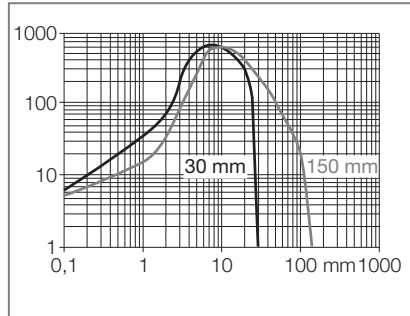
e042



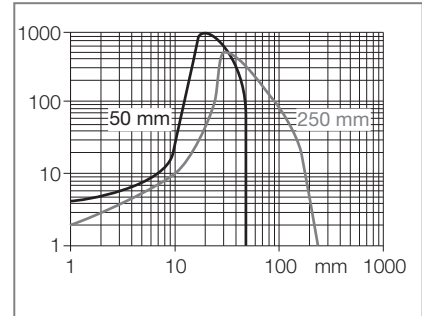
e043



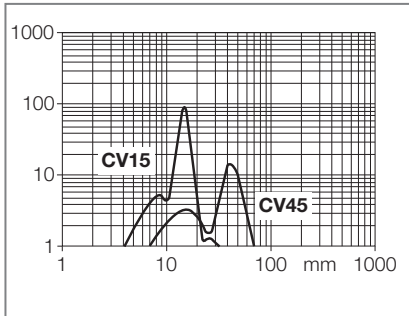
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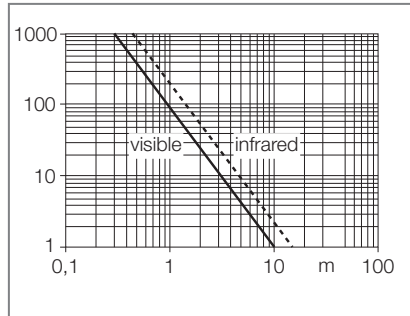
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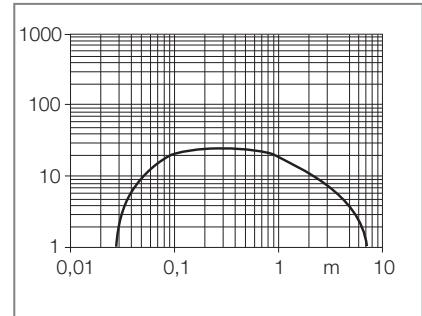
e046



e047

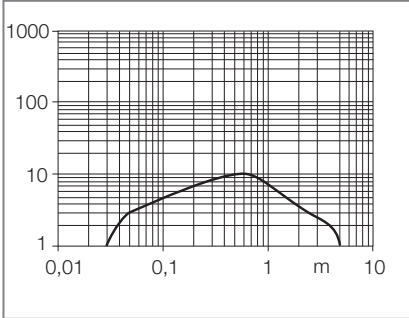


e048

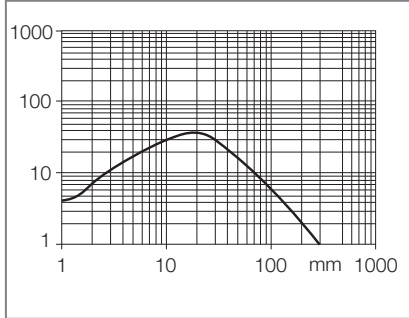


# Excess gain curves

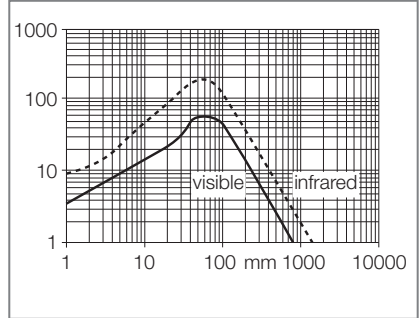
**e049**



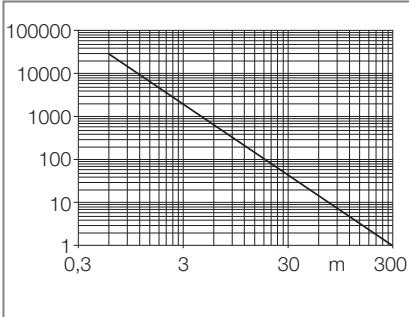
**e050**



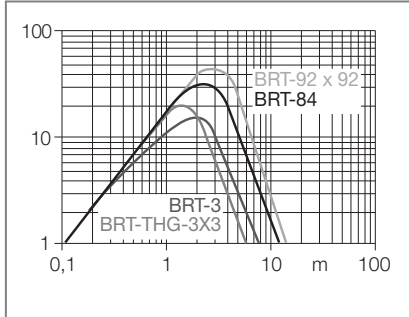
**e051**



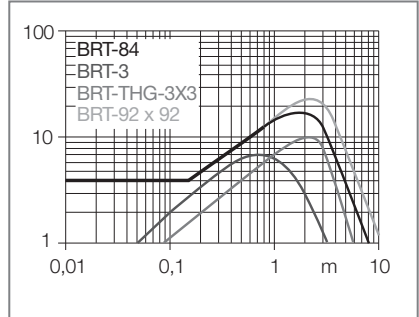
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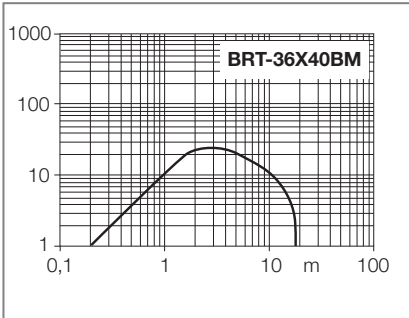
**e053**



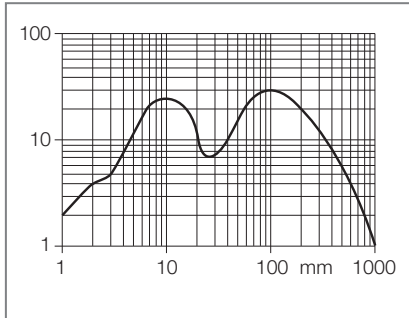
**e054**



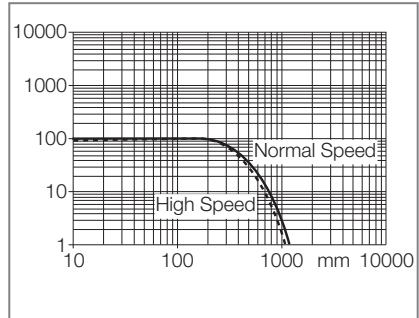
**e055**



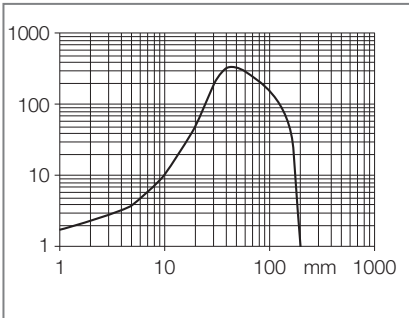
**e056**



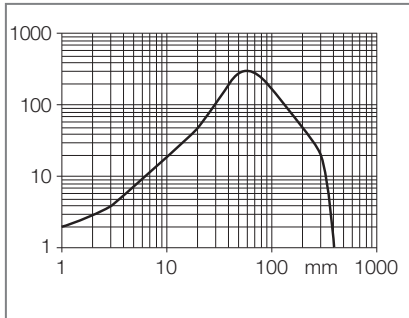
**e057**



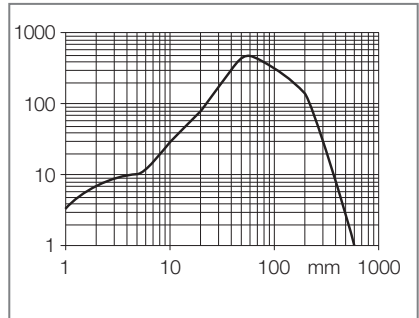
**e058**



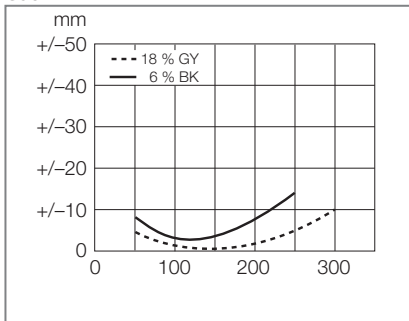
**e059**



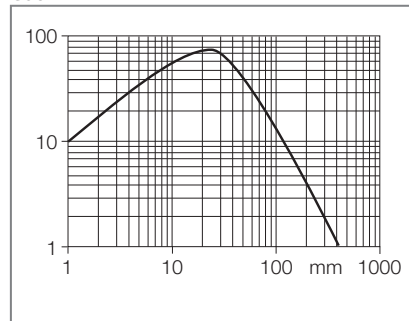
**e060**



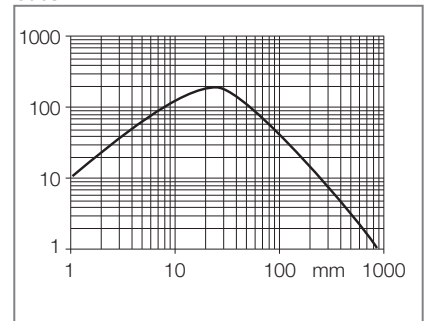
e061



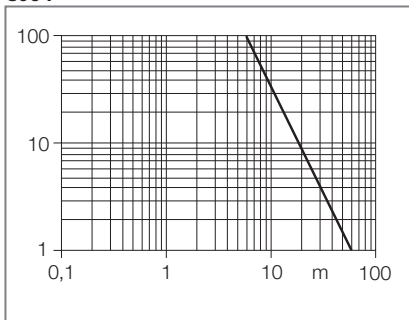
e062



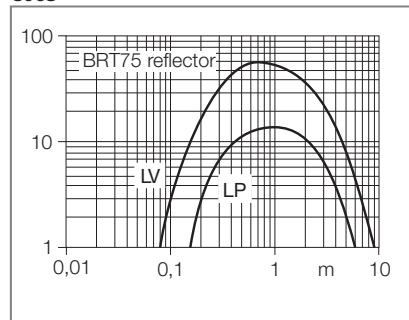
e063



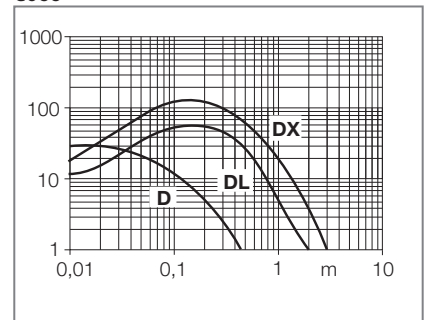
e064



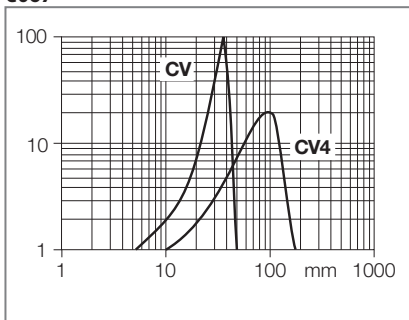
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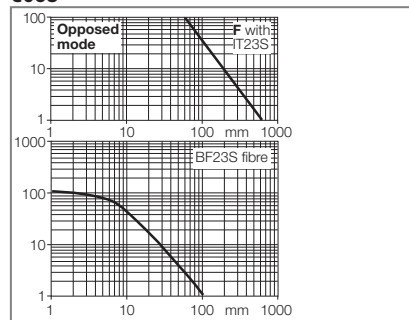
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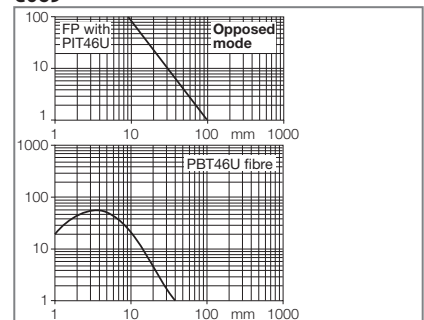
e067



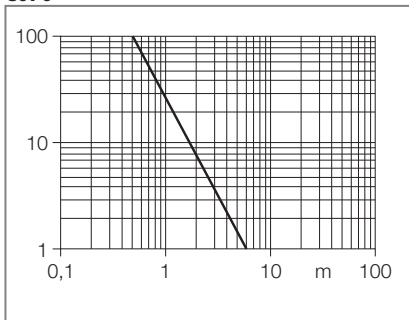
e068



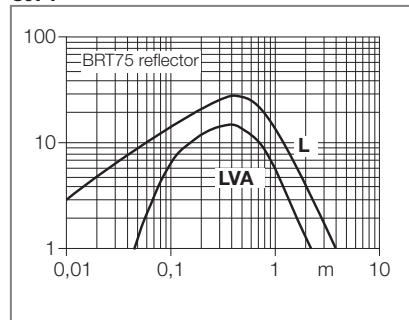
e069



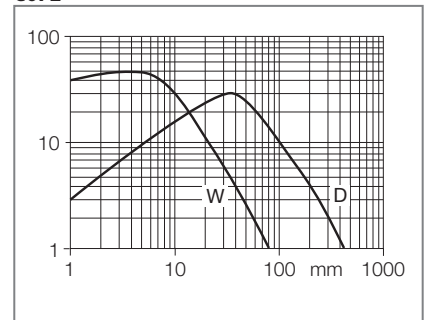
e070



e071



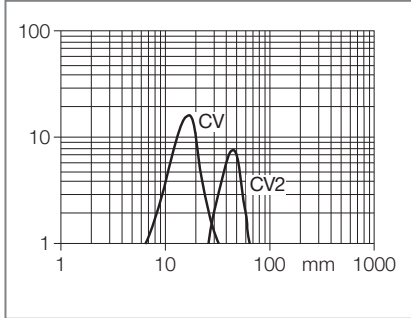
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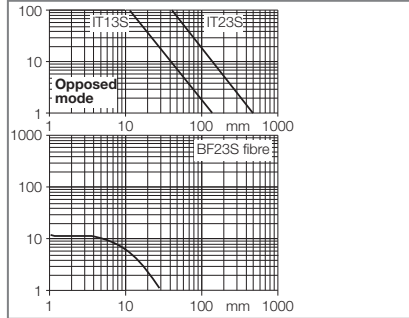
Excess gain curves

# Excess gain curves

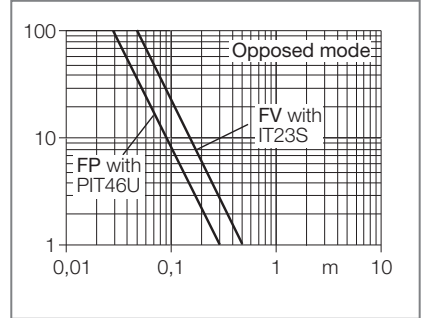
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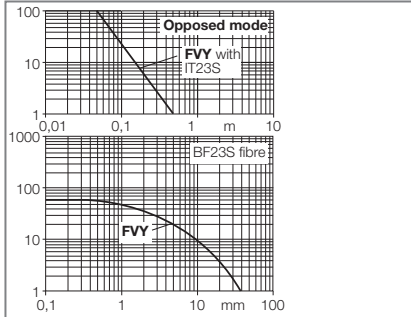
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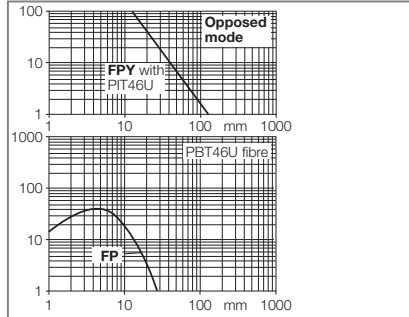
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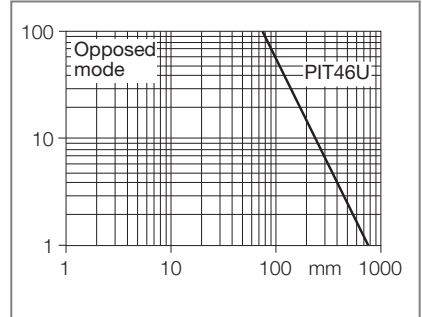
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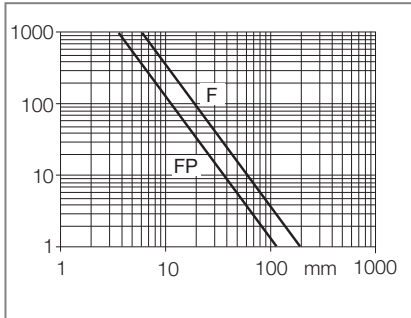
e077



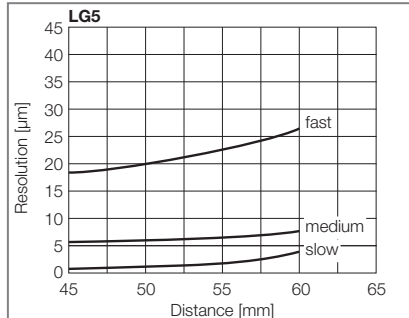
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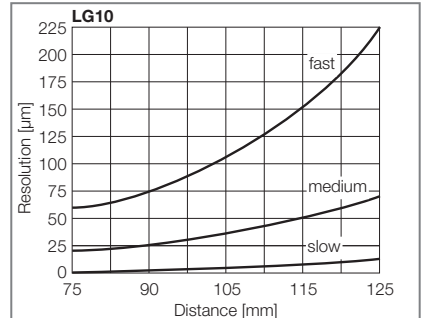
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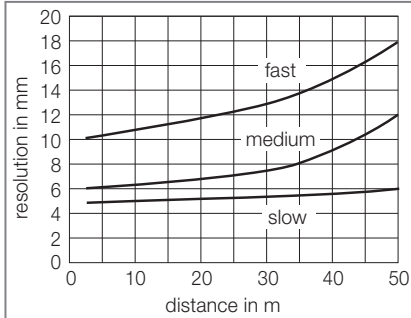
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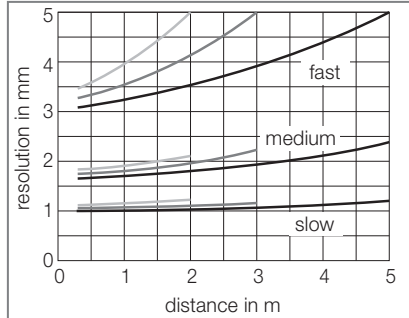
e081



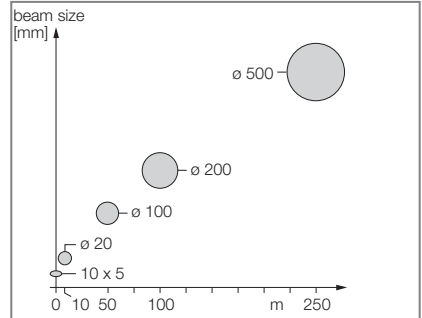
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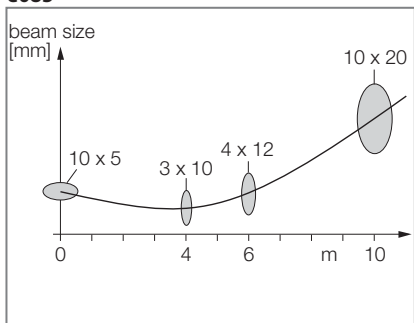
e083



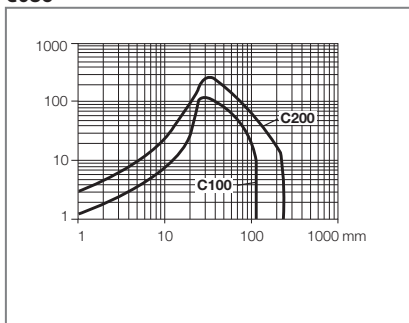
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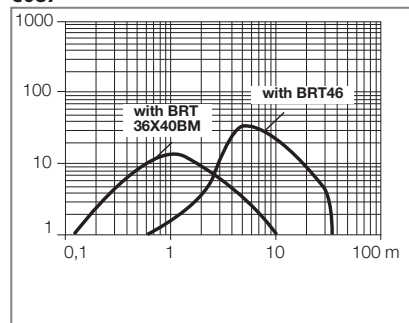
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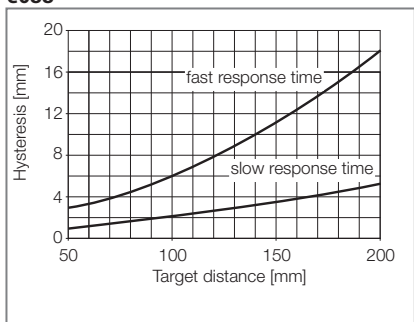
e086



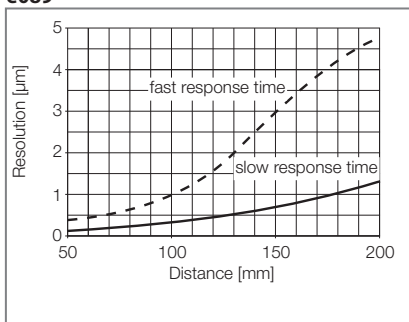
e087



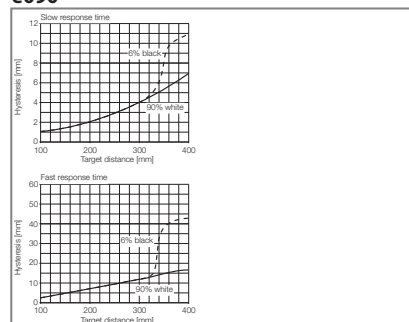
e088



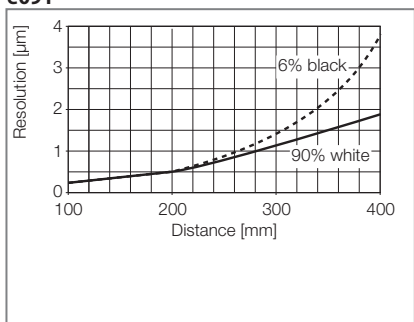
e089



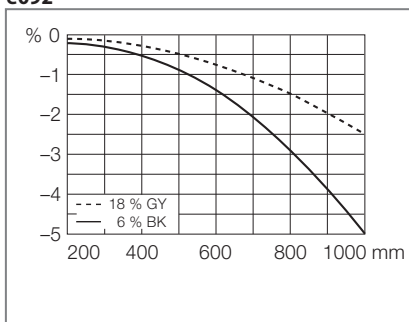
e090



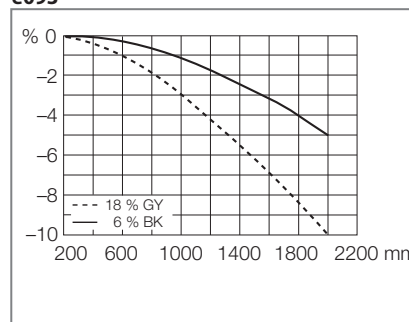
e091



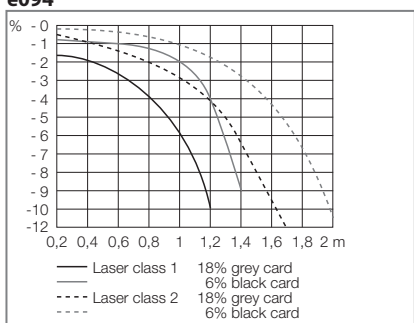
e092



e093



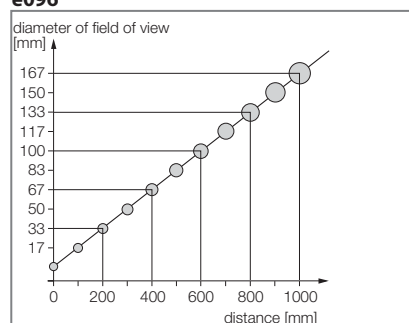
e094



e095

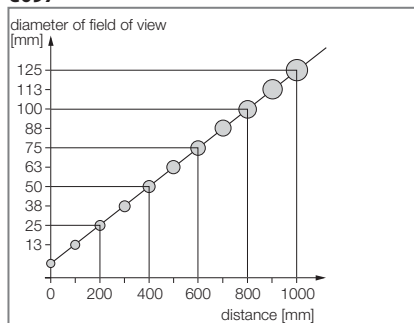
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RD	- - -	+	+	-
YE	—		+	-
YE	- - -	+	+	-
GN	—		+	-
GN	- - -		+	-
RD-GN-YE	+	+	+	-

e096

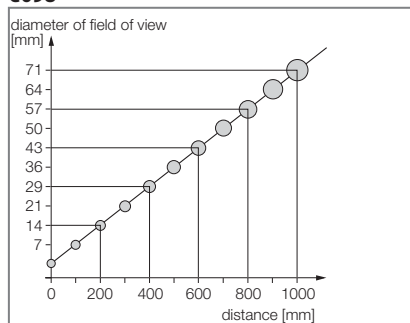


# Excess gain curves

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# Excess gain curves

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