

TURCK

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BI/NI-IOLU69X2-H1141 Inductive IO-Link Sensors with an Analog Output

Instructions for Use

Contents

1	About these instructions	4
1.1	Target groups	4
1.2	Explanation of symbols	4
1.3	Other documents	4
1.4	Feedback about these instructions	4
2	Information about the product	5
2.1	Product identification	5
2.2	Scope of delivery.....	5
2.3	Turck service	5
3	For Your Safety	6
3.1	Intended use	6
3.2	Obvious misuse	6
3.3	General safety instructions	6
4	Product description	7
4.1	Device overview	7
4.1.1	Display elements	8
4.2	Properties and features	8
4.3	Operating principle	8
4.4	Functions and operating modes	8
4.4.1	Sensor functions	9
4.4.2	Adjustable properties: Output configuration — Switching output	10
4.4.3	Adjustable properties: Output configuration — Analog output.....	11
4.4.4	SIO mode (standard I/O mode)	11
4.5	Technical accessories	12
5	Mounting	16
5.1	Mounting cylindrical devices.....	16
5.2	Mounting rectangular devices	18
5.2.1	Positioning the active face.....	19
6	Connection	20
6.1	Wiring diagram.....	20
7	Commissioning.....	21
7.1	Initiating IO-Link mode.....	21
7.2	Initiating SIO mode.....	21
8	Operation.....	22
8.1	LED display.....	22
8.2	Operating devices in IO-Link mode.....	22
8.3	Operating devices in SIO mode.....	22
8.4	Target outside of range	22
9	Setting	23
9.1	Setting via IO-Link	23
9.1.1	IO-Link parameters	23
9.1.2	Parameter transfer using an IO-Link Call module.....	23
9.1.3	Process data	23

9.2	Setting in SIO mode.....	23
9.2.1	Configuring the device prior to initial commissioning.....	23
9.2.2	Configuring the device following initial commissioning.....	24
10	Troubleshooting.....	25
11	Maintenance	26
12	Repair	26
12.1	Returning devices	26
13	Decommissioning	26
14	Disposal.....	26
15	Technical data.....	27
15.1	Technical data — BI...-M.....	27
15.2	Technical data — NI...-M...	29
15.3	Technical data — BI/NI...-CK40...	31
16	Turck branches — contact data	33

1 About these instructions

These instructions describe the setup, functions and use of the product and help you to operate the product according to its intended purpose. Read these instructions carefully before using the product. This will prevent the risk of personal injury and damage to property. Keep these instructions safe during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

1.2 Explanation of symbols

The following symbols are used in these instructions:



DANGER

DANGER indicates a hazardous situation with a high level of risk, which, if not avoided, will result in death or serious injury.



WARNING

WARNING indicates a hazardous situation with a medium level of risk, which, if not avoided, will result in death or serious injury.



CAUTION

CAUTION indicates a hazardous situation with a medium level of risk, which, if not avoided, will result in moderate or minor injury.



NOTICE

CAUTION indicates a situation which, if not avoided, may cause damage to property.



NOTE

NOTE indicates tips, recommendations and important information about special action steps and issues. The notes simplify your work and help you to avoid additional work.



MANDATORY ACTION

This symbol denotes actions that the user must carry out.



RESULT OF ACTION

This symbol denotes the relevant results of an action.

1.3 Other documents

Besides this document, the following material can be found on the Internet at www.turck.com:

- Data sheet
- IO-Link parameters manual
- IODD file

All of the necessary Turck software components and the IODD can be downloaded via the Turck software manager. The Turck software manager is available at www.turck.com and can be downloaded free of charge.

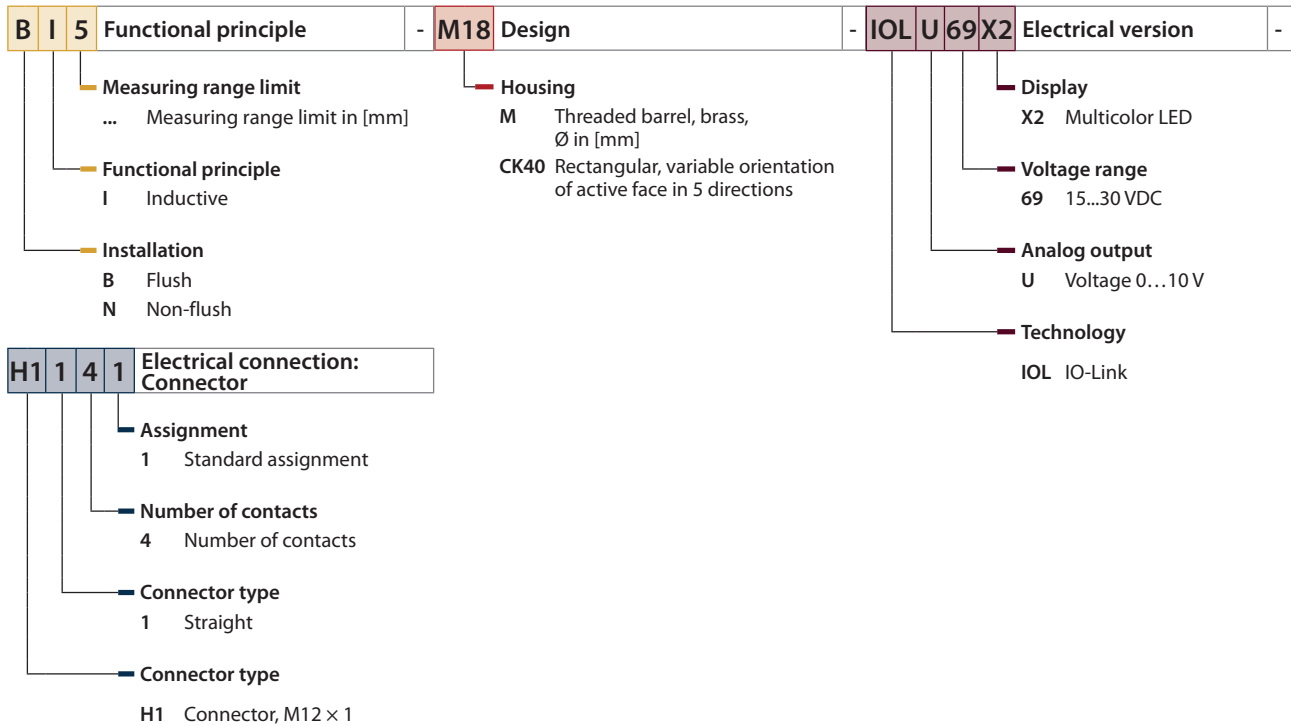
1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

2 Information about the product

2.1 Product identification

B I 5 - M18 - IOL U 69 X2 - H 1 4 1



2.2 Scope of delivery

The delivery consists of the following:

- Sensor
- 2 mounting nuts (for threaded-barrel devices)
- 2 lock washers (for M12 designs)
- BS4-CK40 mounting clip (for CK40... designs)
- Quick Start Guide

2.3 Turck service

Turck supports you in your projects – from the initial analysis right through to the commissioning of your application. The Turck product database at www.turck.com offers you several software tools for programming, configuring or commissioning, as well as data sheets and CAD files in many export formats.

The contact data for Turck branches is provided at [▶ 33].

3 For Your Safety

The product is designed according to state of the art technology. Residual hazards, however, still exist. Observe the following safety instructions and warnings in order to prevent danger to persons and property. Turck accepts no liability for damage caused by failure to observe these safety instructions.

3.1 Intended use

Inductive sensors can be used to detect metallic objects contactless and wear-free. The devices are equipped with an analog output and emit a voltage signal that is proportional to the distance.

The devices can be operated and configured with IO-Link masters conforming to specification 1.1 via an IO-Link interface. During operation, process and diagnostic data can be exchanged between the sensors and the higher-level control system via IO-Link.

The device must only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

3.2 Obvious misuse

- The devices are not safety components and must not be used for personal or property protection.
- The listed measuring ranges relate to a standard target in accordance with EN 60947-5-2:2012. Using other targets (in particular small targets) can result in different switching behavior.

3.3 General safety instructions

- The device must only be fitted, installed, operated, parameterized and maintained by trained and qualified personnel.
- Only use the device in compliance with the applicable national and international regulations, standards and laws.
- The device meets the EMC requirements for the industrial areas. When used in residential areas, take measures to prevent radio frequency interference.

4 Product description

The sensors are available in cylindrical and rectangular designs.

The cylindrical devices come in a metal housing with M12, M18 or M30 male thread and a plastic front cap. The active face can be mounted either flush or non-flush with the mounting surface, depending on the variant.

The rectangular devices are installed in a plastic housing. The active face has five possible positions. The active face can be mounted either flush or non-flush with the mounting surface, depending on the variant.

The devices have two outputs that can be adjusted independently of one another. Output 1 can be operated either as a switching output or in IO-Link mode, whereas output 2 is designed as an analog output.

4.1 Device overview

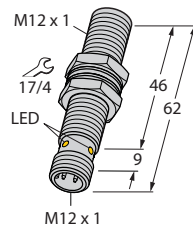


Fig. 1: Dimensions —
BI-M12...

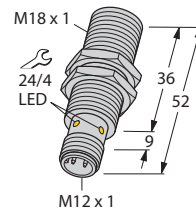


Fig. 2: Dimensions —
BI-M18...

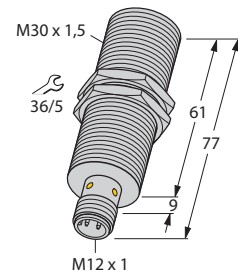


Fig. 3: Dimensions —
BI-M30...

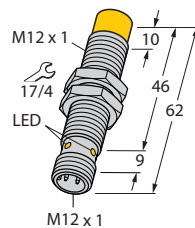


Fig. 4: Dimensions —
NI-M12...

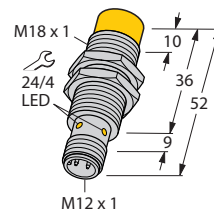


Fig. 5: Dimensions —
NI-M18...

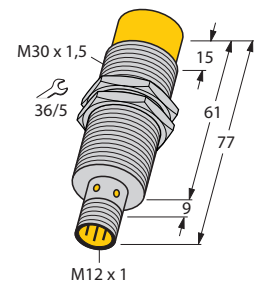


Fig. 6: Dimensions —
NI-M30...

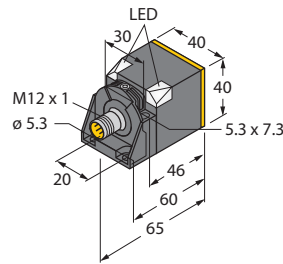


Fig. 7: Dimensions —
CK40 design

4.1.1 Display elements

The cylindrical devices have one green and one yellow status LED. The rectangular devices each have two green and two yellow status corner LEDs.

4.2 Properties and features

- Cylindrical and rectangular designs
- Protection class IP67
- DC 4-wire, 15...30 VDC
- Analog output, 0...10 V (2...10 V parameterizable)
- Connector, M12 × 1
- Communication via IO-Link V1.1 or standard I/O
- Adjustable distance value in 12-bit IO-Link process data
- Switching point configurable via two teach points
- Switching distance and hysteresis parameterizable
- Identification via 32-byte memory
- Temperature monitoring with adjustable limits

4.3 Operating principle

Inductive sensors detect metal objects contactless and wear-free by creating an electromagnetic field that interacts with the detected object.

The measuring sensors with IO-Link are able to transfer the measured values via an analog voltage output or via the IO-Link process data. The sensors can also be parameterized via the IO-Link interface.

4.4 Functions and operating modes

The devices can be operated in IO-Link mode, in SIO mode or in analog mode. The devices must be connected to an IO-Link master for operation in IO-Link mode.

IO-Link mode provides bidirectional IO-Link communication between an IO-Link master and the sensors. For this the devices are integrated in the controller level via an IO-Link master. Measured values, switching information and diagnostics data are made available with the process data via the IO-Link interface. Identification messages and extended diagnostics information can be queried acyclically via IO-Link. Different sensor functions can be configured via the IO-Link interface.

4.4.1 Sensor functions



NOTE

The 12-bit coding of the analog signal means that the value range when parameterizing the sensor functions is 0...4095.

In order to achieve optimum accuracy, it is recommended to set the switching points within a range of 10...90 % of the measuring range.

Digital output — Single point mode

In **single point** operating mode, a switching point, either with values in the range 0...4095 or with an existing target, can be set for the digital output. The hysteresis can be adjusted.

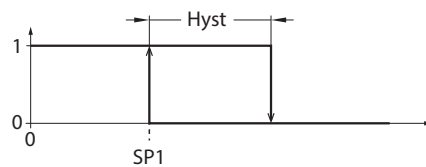


Fig. 8: Single point mode

Digital output — Window mode

In **window** operating mode, the start and end points of the switching window with values in the range 0...4095 can be set for the digital output. The switching window must be within the sensing range. The hysteresis can be adjusted.

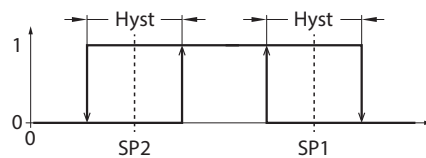


Fig. 9: Window mode

Digital output — Two points mode

In **two points** operating mode, a switching point and a tripping point with values in the range 0...4095 can be set for the digital output. This mode can also be used as a freely adjustable hysteresis.

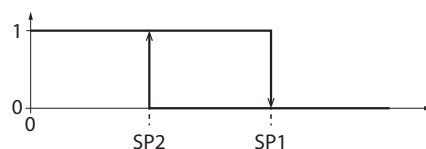


Fig. 10: Two points mode

Digital output — Temperature alert

In temperature alert operating mode, the limits for undertemperature and overtemperature can be set.

4.4.2 Adjustable properties: Output configuration — Switching output

The following output configurations can be set for the switching output:

- PNP, NO
- PNP, NC
- NPN, NO
- NPN, NC

Switching hysteresis



NOTE

This property is only available for the **single point** and **window mode** functions.

The switching distance hysteresis can be set to one of two levels **standard** and **short**.



NOTICE

Short hysteresis selected

Uncontrolled switching between the switching states

- ▶ Select a switching distance and a target in the application that allow the hysteresis to be set to **short**.
-

Temperature indicator



NOTE

The temperature indicator shows neither a precise measured value nor the exact ambient temperature.

The device is equipped with an integrated temperature indicator. The current internal sensor temperature can be read out using the acyclic IO-Link parameter data. The application-specific limit values **undertemperature alert** and **overtemperature alert** can be set within the permissible temperature range. Instances of overshoot and undershoot of the limit values are transferred to the control system via bit 1 and bit 2 of the process data. The set limits can be read out using the acyclic parameter data.

The temperature unit can be set to °C, °F or K. In addition to the alerts in the process data, the **temperature alert** operating mode can issue an alert via the switching output of the sensor. The device switches in the event of undershoot or overshoot of the set limits.

Application-specific tag

The application-specific tag can be used to assign a name to the device in the application. In order to facilitate this application-specific assignment, the device has a 32-byte memory. The entire memory can be read out using the acyclic parameter data.

Damping

When damping is enabled, an average of the values measured over a set period is displayed. The period of time can be set within the range 0...4095 ms.

One point teach

Using the **one point teach** function, a value can be set within 20...80 % of the maximum sensing range. Using the set value, the ascent of the characteristic curve is scaled to no more than 10 % of the maximum sensing range. The analog output and the process value have a fixed characteristic curve ascent.

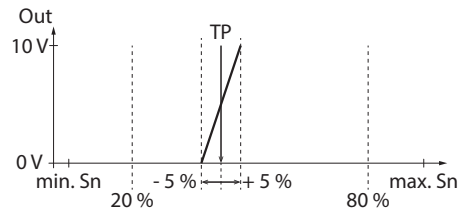


Fig. 11: One point teach

4.4.3 Adjustable properties: Output configuration — Analog output

The following output configurations can be set for the analog output:

- 0...10 V
- 2...10 V

The measuring range can be set in the value range of 0...4095. The output curve can be inverted if the higher value is taught first.

4.4.4 SIO mode (standard I/O mode)

In standard I/O mode, devices can be operated via a fieldbus device or a controller with digital PNP or NPN inputs. An IO-Link master is not required.

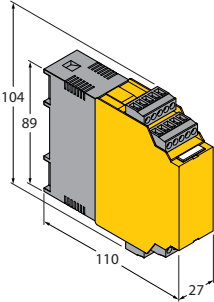
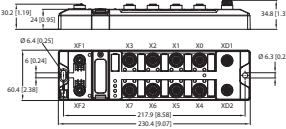
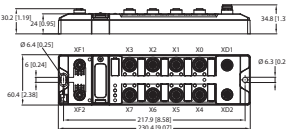
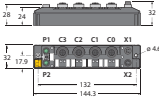

In SIO mode the device has one switching output (pin 4) and one analog output (pin 2). The following IO-Link communication cannot be used:

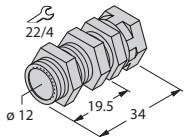
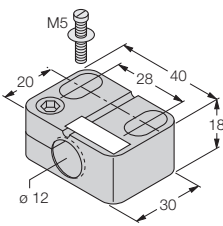
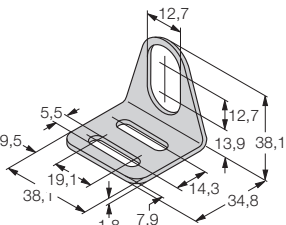
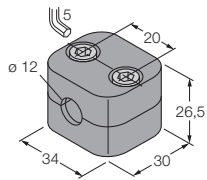
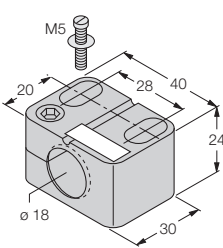
- Binary coded analog values
- Application specific marking
- Reading of IO-Link parameter data

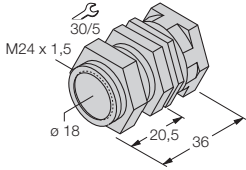
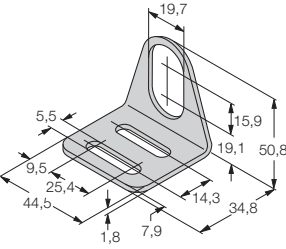
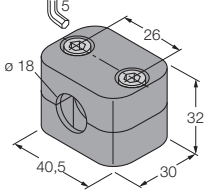
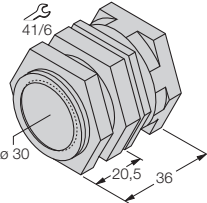
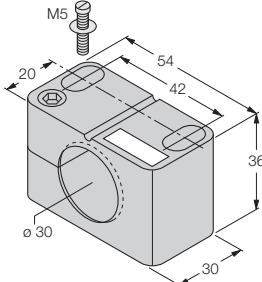
All other sensor functions and settable features can be used in SIO mode. The set functions can be evaluated via the switch signals of the particular output.

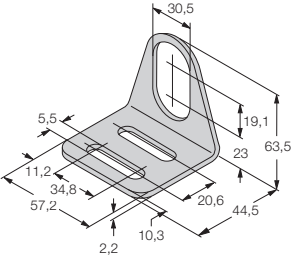
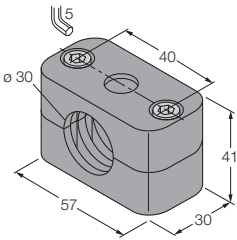
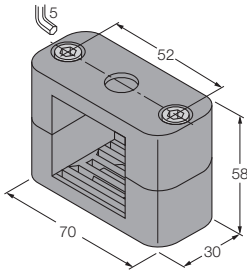
Parameter changes made via IO-Link are also retained in the device after saving and after the power supply is interrupted. Devices can be set via IO-Link and then operated at the digital inputs with the appropriate settings in SIO mode.

4.5 Technical accessories

Dimension drawing	Type	ID	Description
	IM43-13-SR	7540041	Trip amplifier; 1-channel; input 0/4...20 mA or 0/2...10 V; supply of a 2-wire or 3-wire transmitter/sensor; limit value adjustment via teach button; three relay outputs with one NO contact each; removable terminal blocks; 27 mm wide; universal operating voltage 20...250 VUC; more trip amplifiers are listed in our "Interface Technology" catalog
	TBEN-LL-8IOL	100003910	Compact multiprotocol I/O module for Ethernet; 8 IO-Link master channels; 4 universal digital PNP channels 2 A, channel diagnostics; PROFINET device, EtherNet/IP device or Modbus TCP server; integrated Ethernet switch; supports 10 Mbps/100 Mbps; 2 x M12, 4-pin, D-coded, Ethernet fieldbus connection; PROFINET S2 system redundancy; glass fiber-reinforced housing; shock and vibration tested; fully encapsulated module electronics; protection class IP65/IP67/IP69K; M12, 5-pin, L-coded connector for power supply; galvanically isolated voltage groups support passive safety; ATEX Zone 2/22; M12, 5-pin slots for IO-Link Master; IO-Link master Port Class A and Port Class B; IO-Link protocol 1.1; ARGEE programmable
	TBEN-LL-8IOLA	100029880	Compact multiprotocol I/O module for Ethernet; 8 IO-Link master channels; 16 universal digital PNP channels, channel diagnostics; PROFINET device, EtherNet/IP device or Modbus TCP server; integrated Ethernet switch; supports 10 Mbps/100 Mbps; 2 x M12, 4-pin, D-coded, Ethernet fieldbus connection; PROFINET S2 system redundancy; glass fiber-reinforced housing; shock and vibration tested; fully encapsulated module electronics; protection class IP65/IP67/IP69K; M12, 5-pin, L-coded connector for power supply; galvanically isolated voltage groups support passive safety; M12, 5-pin slots for IO-Link master; IO-Link master Port Class A; IO-Link protocol 1.1
	TBEN-S2-4IOL	6814024	Compact multiprotocol I/O module for Ethernet; 4 IO-Link master channels; 4 universal digital PNP channels, 0.5 A; channel diagnostics; PROFINET device, EtherNet/IP device or Modbus TCP server; integrated Ethernet switch; supports 10 Mbps/100 Mbps; 2 x M8, 4-pin, Ethernet fieldbus connection; glass fiber-reinforced housing; shock and vibration tested; fully encapsulated module electronics; protection class IP65/IP67/IP69K; 4-pin M8 connector for power supply; galvanically isolated voltage groups; ATEX Zone 2/22; M12, 5-pin slots for IO-Link master; IO-Link protocol 1.1; ARGEE programmable
	RKC4.4T-2/ TXL1001	6628825	Connection cable, M12 female connector, straight, 4-pin, cable length: 2 m, protective jacket material: Aramid fibers, yellow; temperature peak: 200 °C; other cable lengths and versions available, see www.turck.com

Dimension drawing	Type	ID	Description
	QM-12	6945101	Quick-mount bracket with dead-stop; material: chrome-plated brass. Male thread M16 × 1. Note: The switching distance of the proximity switches may change when using quick-mount brackets.
	BST-12B	6947212	Mounting clip for threaded barrel devices, with dead-stop; material: PA6
	MW12	6945003	Mounting bracket for threaded barrel devices; material: stainless steel A2 1.4301 (AISI 304)
	BSS-12	6901321	Mounting clip for smooth and threaded barrel devices; material: polypropylene
	BST-18B	6947214	Mounting clip for threaded barrel devices, with dead-stop; material: PA6

Dimension drawing	Type	ID	Description
	QM-18	6945102	Quick-mount bracket with dead-stop; material: chrome-plated brass. Male thread M24 × 1.5. Note: The switching distance of the proximity switches may change when using quick-mount brackets.
	MW18	6945004	Mounting bracket for threaded barrel devices; material: stainless steel A2 1.4301 (AISI 304)
	BSS-18	6901320	Mounting clip for smooth and threaded barrel devices; material: polypropylene
	QM-30	6945103	Quick-mount bracket with dead-stop; material: chrome-plated brass. Male thread M36 × 1.5. Note: The switching distance of the proximity switches may change when using quick-mount brackets.
	BST-30B	6947216	Mounting clip for threaded barrel devices, with dead-stop; material: PA6

Dimension drawing	Type	ID	Description
 <p>Technical drawing of a mounting bracket (MW30) with dimensions: 30,5 (width), 19,1 (height), 63,5 (total height), 23 (height to top edge), 5,5 (flange thickness), 11,2 (flange width), 34,8 (flange length), 57,2 (total length), 2,2 (flange thickness), 10,3 (hole offset), 20,6 (hole diameter), and 44,5 (total width).</p>	MW30	6945005	Mounting bracket for threaded barrel devices; material: stainless steel A2 1.4301 (AISI 304)
 <p>Technical drawing of a mounting clip (BSS-30) with dimensions: 40 (width), 41 (height), 57 (length), 30 (depth), and a hole diameter of 30. A small detail shows a 5mm hole.</p>	BSS-30	6901319	Mounting clip for smooth and threaded barrel devices; material: polypropylene
 <p>Technical drawing of a mounting clip (BSS-CP40) with dimensions: 52 (width), 58 (height), 70 (length), and 30 (depth). A small detail shows a 5mm hole.</p>	BSS-CP40	6901318	Mounting clip for rectangular devices; material: polypropylene

5 Mounting

5.1 Mounting cylindrical devices

The sensors may be mounted in any position.

The maximum tightening torque when mounting the sensors can be found in the following table:

Design	Maximum tightening torque
M12	10 Nm
M18	25 Nm
M30	75 Nm

- ▶ Clean the mounting surface and mounting environment.
- ▶ If required, the sensor may be mounted in a mounting aid (mounting bracket or mounting clip).
- ▶ Mount the sensor or mounting aid at the intended location for use. Observe the minimum mounting distances.

Mounting distances — Flush-mountable devices

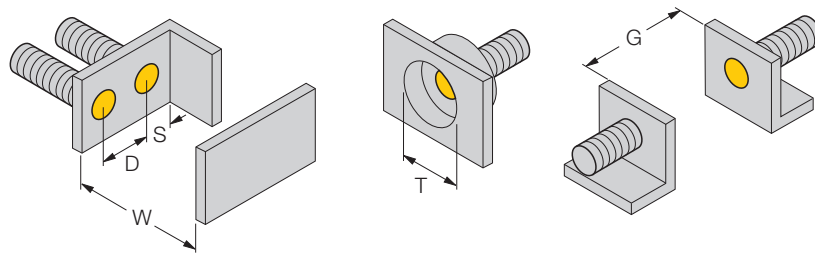


Fig. 12: Minimum mounting distances — Cylindrical design, flush-mountable

Distance	
D	2 × diameter of active face
W	3 × end of measuring range
T	3 × diameter of active face
S	1.5 × diameter of active face
G	6 × end of measuring range

Mounting distances — Non-flush-mountable devices

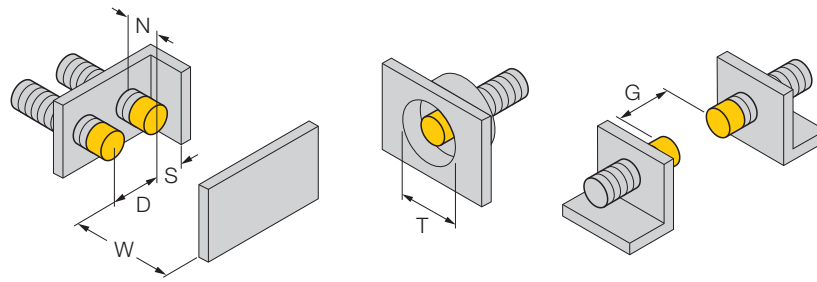


Fig. 13: Minimum installation distances — Cylindrical design, non-flush-mountable

Distance	
D	3 × diameter of active face
W	3 × end of measuring range
T	3 × diameter of active face
S	1.5 × diameter of active face
G	6 × end of measuring range
N	2 × end of measuring range

5.2 Mounting rectangular devices

The sensors may be mounted in any position.

- ▶ Clean the mounting surface and mounting environment.
- ▶ If required, the sensor may be mounted in a mounting aid (mounting bracket or mounting clip).
- ▶ Mount the sensor or mounting aid at the intended location for use. Observe the minimum mounting distances and installation conditions.

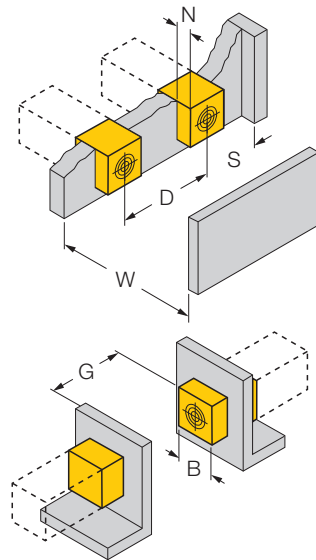


Fig. 14: Minimum mounting distances — rectangular designs

Distance	Design	
	NI...CK40	BI...-CK40
D	$3 \times B$	$2 \times B$
W	$3 \times \text{end of measuring range}$	$3 \times \text{end of measuring range}$
S	$1.5 \times B$	$1 \times B$
G	$6 \times \text{end of measuring range}$	$6 \times \text{end of measuring range}$
N	$0.5 \times B$	

5.2.1 Positioning the active face

The active face can be set in five different directions:

- Active face front (as supplied)
 - Active face left
 - Active face right
 - Active face up
 - Active face down
- ▶ Undo the locking screw.
 - ▶ Pull the sensor from the mounting bracket.
 - ▶ Undo the screws on the sensor.
 - ▶ Remove the adapter bracket and rotate 180°.
 - ▶ Re-tighten the screws on the sensor and align the male connector if necessary.
 - ▶ Fit the sensor and the mounting bracket and tighten the locking screw.

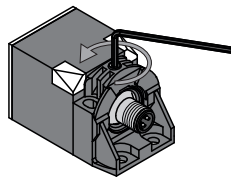


Fig. 15: Undo the locking screw

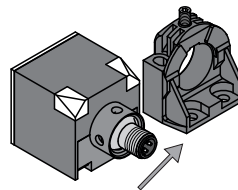


Fig. 16: Pull the sensor out of the mounting bracket

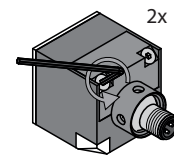


Fig. 17: Undo the screws on the sensor

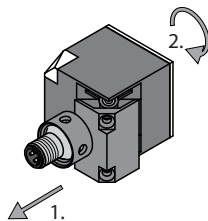


Fig. 18: Remove the adapter bracket and rotate 180°

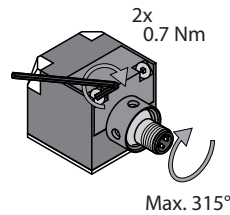


Fig. 19: Tighten the screws on the sensor and align the male connector

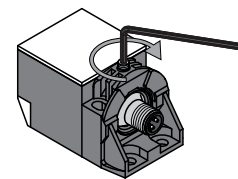


Fig. 20: Fit the sensor and the mounting bracket and tighten the locking screw

6 Connection

- ▶ Connect the connecting cable coupling to the connector at the rear of the sensor in accordance with the wiring diagram.
- ⇒ The device is ready for operation.

6.1 Wiring diagram

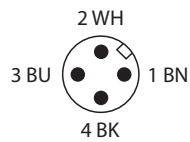


Fig. 21: Pin assignment

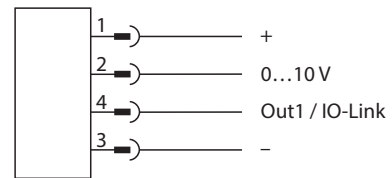


Fig. 22: Wiring diagram

7 Commissioning

Once the cables and the supply voltage are connected, the device is automatically operational after 80 ms. When the device is connected to an IO-Link master, IO-Link communication will start automatically. To do this, the IO-Link master sends a wake-up request to the device.

7.1 Initiating IO-Link mode

- ▶ Set a cycle time of at least 2.3 ms on the IO-Link master.
- ⇒ The device is ready for operation.

7.2 Initiating SIO mode

- ▶ Connect the device to a standard I/O port or an analog port.
- ⇒ The device is operational after a delay of 500 ms.

The delay is necessary in SIO mode for the operation of preactuated sensors so that the sensor can exclude being connected to an IO-Link master. The operation delay has no effect on any potential IO-Link communication.

8 Operation

The devices can be operated in either SIO mode (pin 2: analog output, pin 4: switching output) or in IO-Link mode.

8.1 LED display

The cylindrical devices have one green and one yellow status LED. The rectangular devices each have two green and two yellow status corner LEDs.



NOTE

The switching status of the device is only displayed via the LEDs in SIO mode. In IO-Link mode, the green LED flashes (1 s on, 0.1 s off).

LED display	Meaning
Flashes green (1 s on, 0.1 s off)	IO-Link communication
Green	Device is operational
Yellow	Switching output is actuated

8.2 Operating devices in IO-Link mode

A range of sensor functions and adjustable properties are available in IO-Link mode. All parameters can be changed by the control system via bidirectional IO-Link communication, both during commissioning and during operation.



NOTE

Any changes to the output configuration are only updated after a power reset or after a switch to SIO mode.

8.3 Operating devices in SIO mode

In SIO mode, the device operates in accordance with the most recent setting configured in IO-Link mode. It is not possible to use the full extent of the sensor functions and adjustable properties in SIO mode. The following functions are set by default:

- Sensor function: **single point**
- Analog output: 0...10 V, switching output: PNP (NO)
- Switching distance: 100 %

8.4 Target outside of range

The sensor indicates whether the target is out of range via the following means:

- Output via the process data
- Analog output emits 10.2 V

9 Setting

The device has two outputs which can be set independently of each other. Output 1 can be operated either as a switching output or as an interface for IO-Link communication, output 2 is designed as an analog output.

9.1 Setting via IO-Link

The devices can be parameterized via the IO-Link communication interface within the limits of their technical specifications (see data sheet). For further information on IO-Link see the IO-Link commissioning manual (D900633).

9.1.1 IO-Link parameters

A range of application-specific parameters can be configured via the IO-Link interface. For more information about the functions and the IO-Link parameters, please refer to [▶ 9] and the IO-Link parameters manual for the device.

9.1.2 Parameter transfer using an IO-Link Call module

Since such a wide range of functions are performed by the devices, the parameter subindices described in the IO-Link parameters manual cannot be addressed when transferring parameters using an IO-Link Call module that corresponds to the IO-Link specification. In order to transfer values, the complete data string of the parameter index must be transferred from the control system to the device in binary. The subindex that refers to the entire string must be set to "0" in the IO-Link Call module. It is not possible to separate the subindices.

9.1.3 Process data

Bit	Function	Meaning/bit information
0	Switching output	0: Switching output not actuated 1: Switching output actuated
1	Undertemperature	1: Temperature indicator detects an undershoot of the set temperature limits
2	Overtemperature	1: Temperature indicator detects an overshoot of the set temperature limits
3	Target outside of range	1: Target outside of range
4...15	Analog value	12-bit coding for the analog value

9.2 Setting in SIO mode

A variety of sensor functions and adjustable properties (see [▶ 8]) are available in SIO mode. The set functions can be analyzed using the switching signals or analog values for the respective output.

9.2.1 Configuring the device prior to initial commissioning

- ▶ Configure the sensor functions and properties via an IO-Link master or an IO-Link USB adaptor using a configuration tool.
- ⇒ The selected settings are saved and will be operational following the installation of the device in the plant.

9.2.2 Configuring the device following initial commissioning

- ▶ Disconnect the device from the control system.
- ▶ Configure the sensor functions and properties via an IO-Link master or an IO-Link USB adaptor using a configuration tool.
- ⇒ The selected settings are saved and will be operational following reinstallation in the plant.

10 Troubleshooting

- ▶ If possible, deploy the device in another location in the application.

If the malfunction persists, this indicates that there is a sensor error.

- ▶ Take the device out of operation and replace the malfunctioning device with another device of the same type.

If the device functions correctly elsewhere in the application, this indicates that there is an application-related error.

- ▶ Check the area around the device for metallic foreign bodies in the metal-free zones.
- ▶ Check the area around the device for sources of EMC interference.

11 Maintenance

Ensure regularly that the plug connections and cables are in good condition.

The devices are maintenance-free, clean dry if required.

12 Repair

The device is not intended for repair by the user. The device must be decommissioned if it is faulty. Observe our return acceptance conditions when returning the device to Turck.

12.1 Returning devices

If a device has to be returned, bear in mind that only devices with a decontamination declaration will be accepted. This is available for download at <https://www.turck.de/en/return-service-6079.php> and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

13 Decommissioning

- ▶ Disconnect the connection cable from the power supply and/or processing units.
- ▶ Disconnect the connection cable from the device.
- ▶ Undo the connections of the device or if necessary the mounting aid for the mounting area.
- ▶ If present: undo the connection between the device and the mounting aid.

14 Disposal



The devices must be disposed of properly and do not belong in the domestic waste.

15 Technical data

15.1 Technical data — Bl...-M...

Type	BI3-M12-IOLU69X2-H1141	BI5-M18-IOLU69X2-H1141	BI10-M30-IOLU69X2-H1141
Ident-No.	100001075	100001077	100001079
Measuring range	0.2...3 mm	1...5 mm	2...10 mm
Mounting condition	Flush		
Correction factors	St37 = 1; Al = 0.3; stainless steel = 0.7; Ms = 0.4		
Repeatability	≤ 1 % of the measuring range A – B ≤ 0.25 % of full scale, after 0.5 h warm-up		
Linearity deviation	≤ 1 %		
Temperature drift	≤ ± 3 % ≤ ± 0.06 %/K ≤ ± 5 %, ≤ 0 °C, ≥ +50 °C		
Ambient temperature	-25...+70 °C		
Operating voltage	15...30 VDC		
Residual ripple	≤ 10 % U _{ss}		
No-load current	≤ 20 mA		
Isolation test voltage	≤ 0.5 kV		
Short-circuit protection	Yes		
Wire-break protection / Reverse polarity protection	No/complete (analog output restricted)		
Communication protocol	IO-Link		
Output function	4-wire, PNP/NPN, analog output		
Voltage output	0...10 V		
Load resistance voltage out- put	≥ 4.7 kΩ		
Response time	0.0015 s at the output		
IO-Link			
IO-Link specification	V1.1		
IO-Link port type	Class A		
Communication mode	COM 2 (38.4 kBaud)		
Process data width	16 bit		
Switchpoint information	1 bit		
Status bit information	2 bit		
Frame type	2.2		
Minimum cycle time	2.3 ms		
Function of pin 4	IO-Link		
Function of pin 2	Analog		
Maximum cable length	20 m		
Design	M12 × 1 threaded barrel	M18 × 1 threaded barrel	M30 × 1.5 threaded barrel
Dimensions	62 mm	52 mm	77 mm
Housing material	Metal, CuZn, chrome-plated		
Active face material	Plastic, PA12-GF30		

Type	BI3-M12-IOLU69X2-H1141	BI5-M18-IOLU69X2-H1141	BI10-M30-IOLU69X2-H1141
Max. tightening torque of housing nut	10 Nm	25 Nm	75 Nm
Electrical connection	M12 × 1 male connector		
Vibration resistance	55 Hz (1 mm)		
Shock resistance	30 g (11 ms)		
Protection class	IP67		
MTTF	751 years acc. to SN 29500 (ed. 99) 40 °C		
Operating voltage display	LED, green		
Display switching status	LED, yellow		

15.2 Technical data — NI...-M...

Type	NI4-M12-IOLU69X2-H1141	NI7-M18-IOLU69X2-H1141	NI12-M30-IOLU69X2-H1141
Ident-No.	100001076	100001078	100001080
Measuring range	0.5...4 mm	1...7 mm	2...12 mm
Mounting condition	Non-flush		
Correction factors	St37 = 1; Al = 0.3; stainless steel = 0.7; Ms = 0.4		
Repeatability	≤ 1 % of the measuring range A – B ≤ 0.25 % of full scale, after 0.5 h warm-up		
Linearity deviation	≤ 1 %		
Temperature drift	≤ ± 3 % ≤ ± 0.06 %/K ≤ ± 5 %, ≤ 0 °C, ≥ +50 °C		
Ambient temperature	-25...+70 °C		
Operating voltage	15...30 VDC		
Residual ripple	≤ 10 % U _{ss}		
No-load current	≤ 20 mA		
Isolation test voltage	≤ 0.5 kV		
Short-circuit protection	Yes		
Wire-break protection / Reverse polarity protection	No/complete (analog output restricted)		
Communication protocol	IO-Link		
Output function	4-wire, PNP/NPN, analog output		
Voltage output	0...10 V		
Load resistance voltage out- put	≥ 4.7 kΩ		
Response time	0.0015 s at the output		
IO-Link			
IO-Link specification	V1.1		
IO-Link port type	Class A		
Communication mode	COM 2 (38.4 kBaud)		
Process data width	16 bit		
Switchpoint information	1 bit		
Status bit information	2 bit		
Frame type	2.2		
Minimum cycle time	2.3 ms		
Function of pin 4	IO-Link		
Function of pin 2	Analog		
Maximum cable length	20 m		
Design	M12 × 1 threaded barrel	M18 × 1 threaded barrel	M30 × 1.5 threaded barrel
Dimensions	62 mm	52 mm	77 mm
Housing material	Metal, CuZn, chrome-plated		
Active face material	Plastic, PA12-GF30		
Max. tightening torque of housing nut	10 Nm	25 Nm	75 Nm

Type	NI4-M12-IOLU69X2-H1141	NI7-M18-IOLU69X2-H1141	NI12-M30-IOLU69X2-H1141
Electrical connection	M12 × 1 male connector		
Vibration resistance	55 Hz (1 mm)		
Shock resistance	30 g (11 ms)		
Protection class	IP67		
MTTF	751 years acc. to SN 29500 (ed. 99) 40 °C		
Operating voltage display	LED, green		
Display switching status	LED, yellow		

15.3 Technical data — BI/NI...-CK40...

Type	BI11-CK40-IOLU69X2-H1141	NI25-CK40-IOLU69X2-H1141
Ident-No.	100001081	100001082
Measuring range	3...11 mm	5...25 mm
Mounting condition	Flush	Non-flush
Correction factors	St37 = 1; Al = 0.3; stainless steel = 0.7; Ms = 0.4	
Repeatability	≤ 1 % of the measuring range A – B ≤ 0.25 % of full scale, after 0.5 h warm-up	
Linearity deviation	≤ 1 %	
Temperature drift	≤ ± 3 % ≤ ± 0.06 %/K ≤ ± 5 %, ≤ 0 °C, ≥ +50 °C	
Ambient temperature	-25...+70 °C	
Operating voltage	15...30 VDC	
Residual ripple	≤ 10 % U _{ss}	
No-load current	≤ 20 mA	
Isolation test voltage	≤ 0.5 kV	
Short-circuit protection	Yes	
Wire-break protection / Reverse polarity protection	No/complete (analog output restricted)	
Communication protocol	IO-Link	
Output function	4-wire, PNP/NPN, analog output	
Voltage output	0...10 V	
Load resistance voltage out- put	≥ 4.7 kΩ	
Response time	0.0015 s at the output	
IO-Link		
IO-Link specification	V1.1	
IO-Link port type	Class A	
Communication mode	COM 2 (38.4 kBaud)	
Process data width	16 bit	
Switchpoint information	1 bit	
Status bit information	2 bit	
Frame type	2.2	
Minimum cycle time	2.3 ms	
Function of pin 4	IO-Link	
Function of pin 2	Analog	
Maximum cable length	20 m	
Design	Rectangular, CK40 Variable orientation of active face in five directions	
Dimensions	65 × 40 × 40 mm	
Housing material	Plastic, PBT-GF20-V0, black	
Active face material	Plastic, PA12-GF30, yellow	
Electrical connection	M12 × 1 male connector	

Type	BI11-CK40-IOLU69X2-H1141 NI25-CK40-IOLU69X2-H1141
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Protection class	IP67
MTTF	751 years acc. to SN 29500 (ed. 99) 40 °C
Operating voltage display	2 × LEDs, green
Display switching status	2 × LEDs, yellow
Included in delivery	Mounting clip BS4-CK40

16 Turck branches — contact data

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