

# UM18-2 Pro

Ultrasonic sensor

**SICK**  
Sensor Intelligence.



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**Described product**

UM18-2 Pro

**Manufacturer**

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**Original document**

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# 1 About this document

## 1.1 Information on the operating instructions

Read these operating instructions carefully before starting any work in order to familiarize yourself with the product and its functions.

The operating instructions are an integral part of the product and should remain accessible to the personnel at all times. When handing this product over to a third party, include these operating instructions.

These operating instructions do not provide information on the handling and safe operation of the machine or system in which the product is integrated. Information on this can be found in the operating instructions for the machine or system.

## 1.2 Symbols and document conventions

### Warnings and other notes



#### DANGER

Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented.



#### WARNING

Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented.



#### CAUTION

Indicates a situation presenting possible danger, which may lead to moderate or minor injuries if not prevented.



#### NOTICE

Indicates a situation presenting possible danger, which may lead to property damage if not prevented.



#### NOTE

Highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

### Instructions to action

- ▶ The arrow denotes instructions to action.
- 1. The sequence of instructions is numbered.
- 2. Follow the order in which the numbered instructions are given.
- ✓ The tick denotes the results of an action.

## 1.3 Further information

More information can be found on the product page.

The page can be accessed via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

The following information is available depending on the product:

- Data sheets
- This document in all available language versions
- CAD files and dimensional drawings
- Certificates (e.g., declaration of conformity)
- Other publications
- Software
- Accessories

## 2 Safety information

### 2.1 Intended use

The UM18-2 ultrasonic sensor is used for non-contact detection and distance measurement.

SICK AG assumes no liability for losses or damage arising from the use of the product, either directly or indirectly. This applies to use of the product that does not conform to its intended purpose and is neither described nor mentioned in this documentation.

### 2.2 Improper use

Any use outside of the stated areas, in particular use outside of the technical specifications and the requirements for intended use, will be deemed to be incorrect use.

- The device does not constitute a safety component in accordance with the respective applicable safety standards for machines.
- The device must not be used in explosion-hazardous areas, in corrosive environments or under extreme environmental conditions.
- Any use of accessories not specifically approved by SICK AG is at your own risk.



#### WARNING

##### Danger due to improper use!

Any improper use can result in dangerous situations.

Therefore, observe the following information:

- Product should be used only in accordance with its intended use.
- All information in the documentation must be strictly observed.
- Shut down the product immediately in case of damage.

### 2.3 Cybersecurity

#### Overview

To protect against cybersecurity threats, it is necessary to continuously monitor and maintain a comprehensive cybersecurity concept. A suitable concept consists of organizational, technical, procedural, electronic, and physical levels of defense and considers suitable measures for different types of risks. The measures implemented in this product can only support protection against cybersecurity threats if the product is used as part of such a concept.

You will find further information at [www.sick.com/psirt](http://www.sick.com/psirt), e.g.:

- General information on cybersecurity
- Contact option for reporting vulnerabilities
- Information on known vulnerabilities (security advisories)

### 2.4 Limitation of liability

Relevant standards and regulations, the latest technological developments, and our many years of knowledge and experience have all been taken into account when compiling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Non-adherence to the product documentation (e.g., operating instructions)
- Incorrect use
- Use of untrained staff
- Unauthorized conversions or repair

- Technical modifications
- Use of unauthorized spare parts, consumables, and accessories

## 2.5 Modifications and conversions



### NOTICE

Modifications and conversions to the device may result in unforeseeable dangers.

Interrupting or modifying the device or SICK software will invalidate any warranty claims against SICK AG. This applies in particular to opening the housing, even as part of mounting and electrical installation.

## 2.6 Requirements for skilled persons and operating personnel



### WARNING

**Risk of injury due to insufficient training.**

Improper handling of the device may result in considerable personal injury and material damage.

- All work must only ever be carried out by the stipulated persons.

The following qualifications are required for various activities:

*Table 1: Activities and technical requirements*

Activities	Qualification
Mounting, maintenance	<ul style="list-style-type: none"> <li>■ Basic practical technical training</li> <li>■ Knowledge of the current safety regulations in the workplace</li> </ul>
Electrical installation, device replacement	<ul style="list-style-type: none"> <li>■ Practical electrical training</li> <li>■ Knowledge of current electrical safety regulations</li> <li>■ Knowledge of the operation and control of the devices in their particular application</li> </ul>
Commissioning, configuration	<ul style="list-style-type: none"> <li>■ Basic knowledge of the computer operating system used</li> <li>■ Basic knowledge of the design and setup of the described connections and interfaces</li> <li>■ Basic knowledge of data transmission</li> </ul>
Operation of the device for the particular application	<ul style="list-style-type: none"> <li>■ Knowledge of the operation and control of the devices in their particular application</li> <li>■ Knowledge of the software and hardware environment for the particular application</li> </ul>

## 2.7 Operational safety and specific hazards

Please observe the safety notes and the warnings listed here and in other sections of this product documentation to reduce the possibility of risks to health and avoid dangerous situations.

**WARNING****Electrical voltage!**

Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
- The power supply must be disconnected when attaching and detaching electrical connections.
- The product must only be connected to a voltage supply as set out in the requirements in the operating instructions.
- National and regional regulations must be complied with.
- Safety requirements relating to work on electrical systems must be complied with.

**WARNING****Risk of injury and damage caused by potential equalization currents!**

Improper grounding can lead to dangerous equipotential bonding currents, which may in turn lead to dangerous voltages on metallic surfaces, such as the housing. Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
- Follow the notes in the operating instructions.
- Install the grounding for the product and the system in accordance with national and regional regulations.

## 2.8 UL conformity



NFPA79 applications only. Adapters including field wiring cables are available.

More information can be found on the product page:

The page can be accessed via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

## 3 Product description

### 3.1 Scope of delivery

Table 2: Scope of delivery

No. of units	Component	Note
1	Product in the type ordered	-
1	Printed safety notes, multilingual	Brief information and general safety notes

The actual scope of delivery may differ for special designs, additional orders or due to the latest technical changes.

### 3.2 Type code

#### Type code structure

UM18 – a b c d e f g h i

Position	Description	Characteristic
a	Generation	2: 2. Generation
b	Principle of operation	1: Button operation
c	Detection range, mounting distance (UD)	7: 20 mm ... 150 mm, 250 mm 1: 30 mm ... 250 mm, 350 mm 2: 65 mm ... 350 mm, 600 mm 8: 120 mm ... 1000 mm, 1300 mm
d	Connection type	1: male connector, M12, 5-pin
e	Housing version	2: Nickel-plated brass, without display 6: Plastic PBT, without display
f	Output function	6: 1 analog current interface 7: 1 analog voltage interface B: 1 push-pull: PNP/NPN with IO-Link 1.1 C: 1 push-pull: PNP/NPN with IO-Link 1.1, 1 analog current interface D: 1 push-pull: PNP/NPN with IO-Link 1.1, 1 analog voltage interface E: 2 push-pull: PNP/NPN with IO-Link 1.1
g	IO-Link, communication	1: No IO-Link 2: IO-Link
h	Performance	0: Core 1: Pro
i	Sending axis	1: Straight 2: Angled

### 3.3 Product overview

#### Product overview

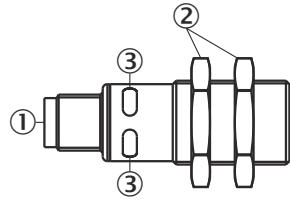


Figure 1: Product overview, example: UM18-2xxxxxx1

- ① Male connector, M12, 5-pin
- ② Fixing nuts, width 24 mm
- ③ Status LEDs

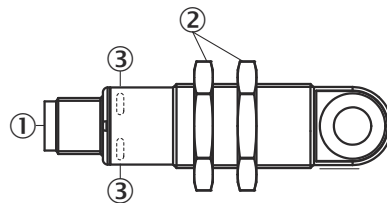


Figure 2: Product overview, example: UM18-2xxxxxx2

- ① Male connector, M12, 5-pin
- ② Fixing nuts, width 24 mm
- ③ Status LEDs

#### Further topics

- [Dimensional drawings](#)

### 4 Transport and storage

#### 4.1 Transport

**NOTICE****Damage due to improper transport!**

- The product must be packaged with protection against shock and damp.
  - Recommendation: Use the original packaging.
  - Note the symbols on the packaging.
  - Do not remove packaging until immediately before you start mounting.
- 

#### 4.2 Unpacking

- To protect the device against condensation, allow it to equilibrate with the ambient temperature before unpacking if necessary.
- Handle the device with care and protect it from mechanical damage.

#### 4.3 Transport inspection

Immediately upon receipt in Goods-in, check the delivery for completeness and for any damage that may have occurred in transit. In the case of transit damage that is visible externally, proceed as follows:

- Do not accept the delivery or only do so conditionally.
  - Note the scope of damage on the transport documents or on the transport company's delivery note.
  - File a complaint.
- 

**NOTE**

Complaints regarding defects should be filed as soon as these are detected. Damage claims are only valid before the applicable complaint deadlines.

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#### 4.4 Storage

- Do not store outdoors.
- Store in a place protected from moisture and dust.
- Recommendation: Use the original packaging.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: [see "Technical data", page 30](#).
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

## 5 Mounting

### 5.1 Mounting instructions

- Observe the technical data.
- To prevent condensation, avoid exposing the device to rapid changes in temperature.
- The mounting site has to be designed for the weight of the device.

### 5.2 Arranging multiple devices

#### 5.2.1 Mounting distances

To use multiple products, observe the following mounting distances. If you undercut the specified mounting distance, activate synchronization or multiplex operation.

Table 3: Mounting distances

Type	Parallel	Opposite
UM18-217x	> 250 mm	> 1300 mm
UM18-211x	> 350 mm	> 2500 mm
UM18-212x	> 400 mm	> 2500 mm
UM18-218x	> 700 mm	> 4000 mm

#### 5.2.2 Synchronization and multiplex operation

##### Overview

Synchronization and multiplex operation are not available in IO-Link mode.

##### Synchronization and multiplex operation

In synchronization or multiplex operation, a maximum of 20 devices can be interconnected via pin 5 (MF). Synchronization and multiplex operation prevent mutual interference of several interconnected devices. The detection area increases to the area covered by all interconnected devices.

##### Synchronization operation

In synchronization operation, all devices send and receive the ultrasonic pulses simultaneously. The device detects objects, but does not record the position of the objects. Synchronization operation starts automatically as soon as the devices are interconnected via PIN 5 (MF).

The response time of the overall system is determined by the sensor with the highest response time.

##### Multiplex operation

In multiplex operation, all devices transmit and receive the ultrasonic pulses one after the other in a defined sequence. The device detects objects and also determines the position of the objects. To switch to multiplex operation, assign different addresses to the connected devices via SOPAS ET, IO-Link or the Connect+ software.

Since measurement by the sensors is done in alternation, the response time of the total system is increased in accordance with the formula:

Total response time =  $4 \times [(1.1 \text{ ms} \times n) + 0.75 \text{ ms} \times (1 + 2 + \dots + n)]$  + sum of the response times of all connected devices

N: Number of connected devices

### Further topics

- [Switching between teach-in and synchronization/multiplex operation](#)
- [Activating and deactivating teach-in and synchronization/multiplex operation](#)

### 5.3 Alignment of the device

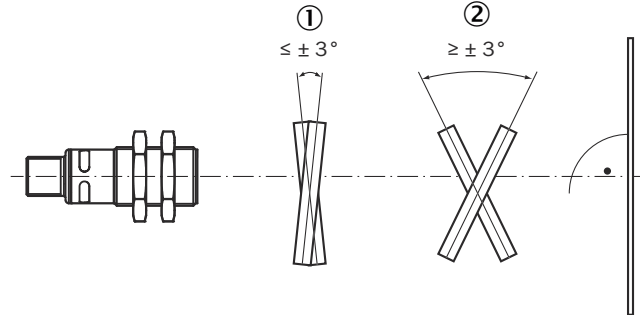


Figure 3: Aligning the product for smooth and rough surfaces

- ① Smooth surface: Angle  $\leq 90^\circ \pm 3^\circ$  between the sensor axis and object surface
- ② Rough surface: Angle  $\geq 90^\circ \pm 3^\circ$  between the sensor axis and object surface

### 5.4 Mounting the device

#### Approach

1. Select a suitable mounting location. Consider the specifications in the technical data when doing so.
2. Mount the device in a suitably prepared bracket using the fixing holes provided.
3. Tighten the fixing nuts with a torque of max. 15 Nm.

## 6 Electrical installation

### 6.1 Wiring instructions



#### NOTE

Pre-assembled cables can be found on the product page.

The page can be accessed via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

{P/N} corresponds to the part number of the product, see type label.

{S/N} corresponds to the serial number of the product, see type label (if indicated).



#### NOTICE

##### Faults during operation and defects in the device or the system

Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

The enclosure rating stated in the technical data is achieved only with a screwed plug connector or protective cap.

Connect the connecting cables in a de-energized state. Do not switch on the supply voltage until installation is complete and all connecting cables are connected to the device and control.

The supply voltage must be as specified in the technical data, [see "Technical data", page 30](#).

When commissioning, protect the device from moisture and contamination.

### 6.2 Prerequisites for safe operation of the device



#### WARNING

##### Risk of injury and damage caused by electrical current!

As a result of equipotential bonding currents between the device and other grounded devices in the system, faulty grounding of the device can give rise to the following dangers and faults:

- Dangerous voltages are applied to the metal housings.
- Devices will behave incorrectly or be destroyed.
- Cable shielding will be damaged by overheating and cause cable fires.

##### Remedial measures

- Only skilled electricians should be permitted to carry out work on the electrical system.
- If the cable insulation is damaged, disconnect the voltage supply immediately and have the damage repaired.
- Ensure that the ground potential is the same at all grounding points.
- Where local conditions do not meet the requirements for a safe earthing method, take appropriate measures. For example, ensure low-impedance and current-carrying equipotential bonding.

The device is connected to the peripheral devices (any local trigger sensor(s), system controller) via shielded cables. The cable shield – for the data cable, for example – rests against the metal housing of the device.

The device can be grounded through the cable shield or through a blind tapped hole in the housing, for example.

If the peripheral devices have metal housings and the cable shields are also in contact with their housings, it is assumed that all devices involved in the installation have the **same ground potential**.

This is achieved by complying with the following conditions:

- Mounting the devices on conductive metal surfaces
- Correctly grounding the devices and metal surfaces in the system
- If necessary: low-impedance and current-carrying equipotential bonding between areas with different ground potentials

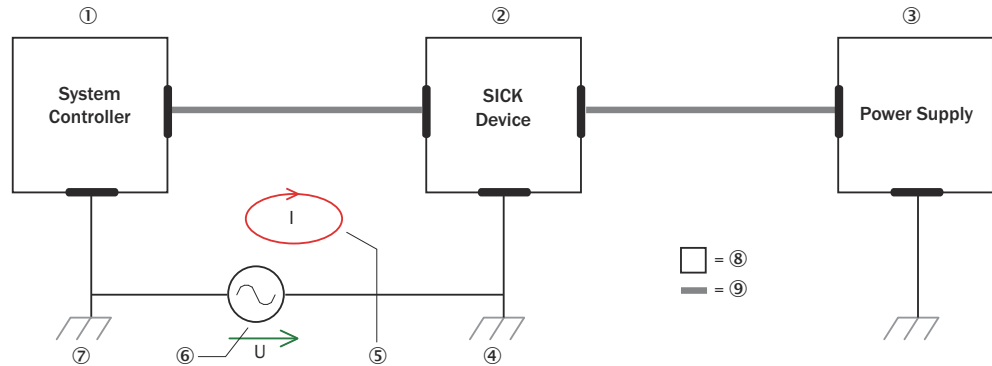


Figure 4: Example: Occurrence of equipotential bonding currents in the system configuration

- ① System controller
- ② Device
- ③ Voltage supply
- ④ Grounding point 2
- ⑤ Closed current loop with equalizing currents via cable shield
- ⑥ Ground potential difference
- ⑦ Grounding point 1
- ⑧ Metal housing
- ⑨ Shielded electrical cable

If these conditions are not fulfilled, equipotential bonding currents can flow along the cable shielding between the devices due to differing ground potentials and cause the hazards specified. This is, for example, possible in cases where there are devices within a widely distributed system covering several buildings.

**Remedial measures**

The most common solution to prevent equipotential bonding currents on cable shields is to ensure low-impedance and current-carrying equipotential bonding. If this equipotential bonding is not possible, the following solution approaches serve as a suggestion.



**NOTICE**

We expressly advise against opening up the cable shields. This would mean that the EMC limit values can no longer be complied with and that the safe operation of the device data interfaces can no longer be guaranteed.

**Measures for widely distributed system installations**

On widely distributed system installations with correspondingly large potential differences, the setting up of local islands and connecting them using commercially available **electro-optical signal isolators** is recommended. This measure achieves a high degree of resistance to electromagnetic interference.

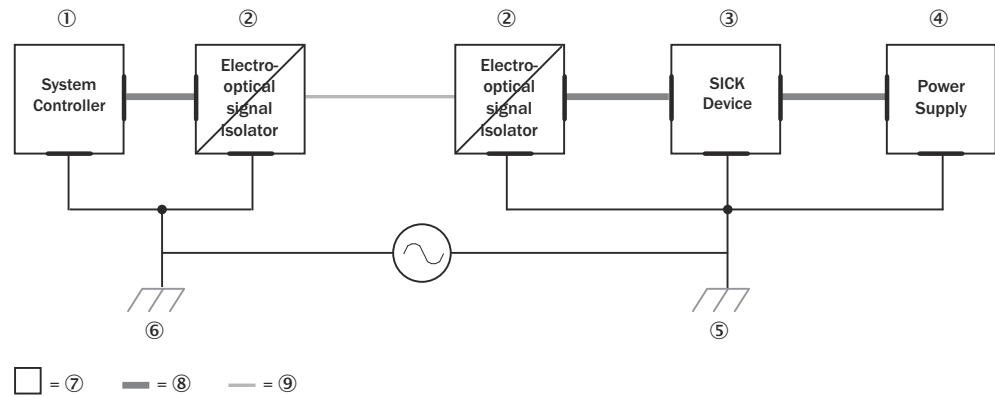


Figure 5: Example: Prevention of equipotential bonding currents in the system configuration by the use of electro-optical signal isolators

- ① System controller
- ② Electro-optical signal isolator
- ③ Device
- ④ Voltage supply
- ⑤ Grounding point 2
- ⑥ Grounding point 1
- ⑦ Metal housing
- ⑧ Shielded electrical cable
- ⑨ Optical fiber

The use of electro-optical signal isolators between the islands isolates the ground loop. Within the islands, a stable equipotential bonding prevents equalizing currents on the cable shields.

#### Measures for small system installations

For smaller installations with only slight potential differences, insulated mounting of the device and peripheral devices may be an adequate solution.

Even in the event of large differences in the ground potential, ground loops are effectively prevented. As a result, equalizing currents can no longer flow via the cable shields and metal housing.



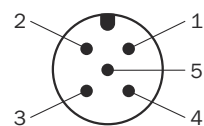
#### NOTICE

The voltage supply for the device and the connected peripheral devices must also guarantee the required level of insulation.

Under certain circumstances, a tangible potential can develop between the insulated metal housings and the local ground potential.

## 6.3 Pin assignment

### UM18-2xxxxBxxx



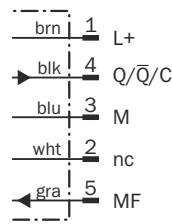


Figure 6: Male connector, M12, 5-pin

Table 4: Pin assignment UM18-2xxxxBxxx

Contact	Labels	Wire color	Signal description
1	L+	Brown	Supply voltage, see "Mechanics/Electronics", page 30
2	N/C	White	Not assigned
3	M	Blue	Supply voltage: 0 V
4	Q/Q̄/C	Black	Digital input / inverted digital output / IO-Link
5	MF	Gray	Multifunction input (MF): External teach-in, synchronization and multiplex operation, communication via Connect+ software

**UM18-2xxxxC/Dxxx**

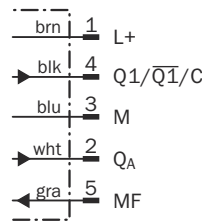
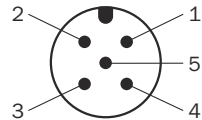
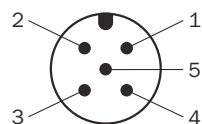


Figure 7: Male connector, M12, 5-pin

Table 5: Pin assignment UM18-2xxxxC/Dxxx

Contact	Labels	Wire color	Signal description
1	L+	Brown	Supply voltage, see "Mechanics/Electronics", page 30
2	Q <sub>A</sub>	White	Analog output
3	M	Blue	Supply voltage: 0 V
4	Q/Q̄/C	Black	Digital input / inverted digital output / IO-Link
5	MF	Gray	Multifunction input (MF): External teach-in, synchronization and multiplex operation, communication via Connect+ software

**UM18-2xxxxExxx**



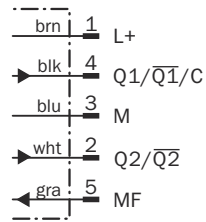


Figure 8: Male connector, M12, 5-pin

Table 6: Pin assignment UM18-2xxxExxx

Contact	Labels	Wire color	Signal description
1	L+	Brown	Supply voltage, see "Mechanics/Electronics", page 30
2	Q2/ $\overline{Q2}$	White	Digital output 2 / Inverted digital output 2
3	M	Blue	Supply voltage: 0 V
4	Q1/ $\overline{Q1}$ /C	Black	Digital input 1 / Inverted digital output 1 / IO-Link
5	MF	Gray	Multifunction input (MF): External teach-in, synchronization and multiplex operation, communication via Connect+ software

## UM18-2xxx6/7xxx

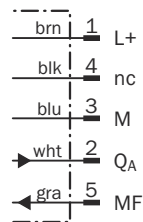
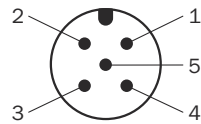


Figure 9: Male connector, M12, 5-pin

Table 7: Pin assignment UM18-2xxx6/7xxx

Contact	Labels	Wire color	Signal description
1	L+	Brown	Supply voltage, see "Mechanics/Electronics", page 30
2	Q <sub>A</sub>	White	Analog output
3	M	Blue	Supply voltage: 0 V
4	N/C	Black	Not assigned
5	MF	Gray	Multifunction input (MF): External teach-in, synchronization and multiplex operation, communication via Connect+ software

## 7 Operation

### 7.1 Display elements

#### Overview

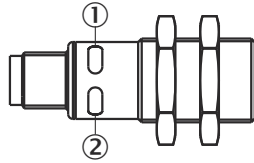


Figure 10: Status LEDs UM18-2xxxxxx1 (example)

- ① LED 1
- ② LED 2

#### Status LEDs

Status LED	Status (color)	Status
LED 1	● (Green)	Supply voltage active, product is ready for operation UM18-2xxxxC/Dxxx: When digital output 2 is deactivated.
	● (Orange)	UM18-2xxxxC/Dxxx: Digital output: Digital output is active Analog output: Object is in scaling range
LED 2	● (Orange)	Digital output: Digital output is active Analog output: Object is in scaling range
	☀ (Orange) Flashes quickly for 3 seconds.	<b>Teach-in</b> <ul style="list-style-type: none"> <li>● No object detected</li> <li>● Object outside the detection range</li> <li>● First switching point is within and second switching point is outside the detection range <sup>1)</sup></li> <li>● Scaling &lt; 1 mm is taught-in <sup>2)</sup></li> </ul> The existing switching points are retained.

● = Lights up; ☀ = Flashes; ○ = Does not light up.

- 1) Applies to the switching window and background switching functions.
- 2) Applies when teaching in the analog output.

### 7.2 Digital output 1 teach-in

#### 7.2.1 Factory settings of the digital output

- N/O contact
- UM18-2xxxxExxx: Switching point at half (Q1) and maximum (Q2) operating range

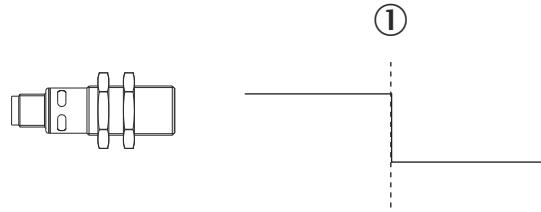
#### 7.2.2 Teaching in switching point (Single Point Mode)

##### Overview

When the object is located below the taught-in switching point, the digital output is active.

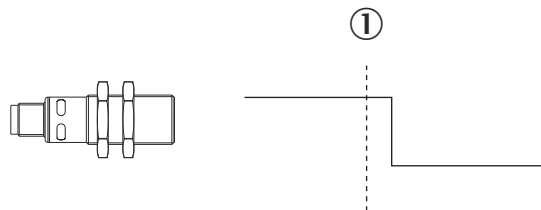
##### Approach

Teaching in the switching point (distance to object as switching point)



1. Position the object at ①.
2. Apply L+ at MF for 3 seconds until both LEDs are flashing simultaneously.
- ✓ Both LEDs flash alternately.
3. Apply L+ at MF for 1 second.
- ✓ The switching point is taught in. The product automatically switches to normal operation mode.

Teaching in switching point (distance to object + 8 % as switching point)



1. Position the object at ①.
2. Apply L+ at MF for 3 seconds until both LEDs are flashing simultaneously.
- ✓ Both LEDs flash alternately.
3. Apply L+ at MF for 3 seconds until both LEDs are again flashing alternately.
- ✓ The switching point is taught in. The product automatically switches to normal operation mode.

### 7.2.3 Teaching in switching window (Window Mode)

#### Overview

When the object is located within the taught-in switching window, the digital output is active.

#### Approach

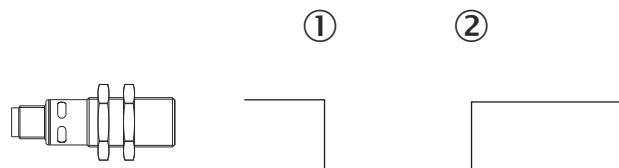


Figure 11: Window Mode

1. Position the object at ①.
2. Apply L+ at MF for 3 seconds until both LEDs are flashing simultaneously.
- ✓ Both LEDs flash alternately.
3. Position the object at ②.
- ✓ Both LEDs flash alternately.
4. Apply L+ at MF for 1 second.
- ✓ The switching points are taught in. The product automatically switches to normal operation mode.

## 7.2.4 Teaching in background (Window Mode $\pm 8\%$ )

### Overview

When the object is located either below the taught-in background - 8 % or above the taught-in background + 8 %, the digital output is active.

### Approach

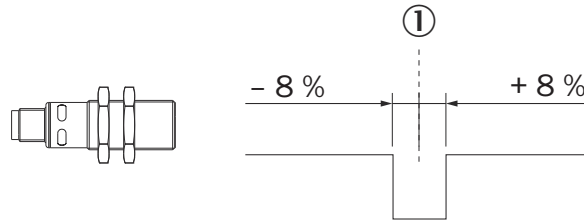


Figure 12: Window Mode  $\pm 8\%$

1. Position the background at ①.
2. Apply L+ at MF for 3 seconds until both LEDs are flashing simultaneously.
  - ✓ Both LEDs flash alternately.
3. Apply L+ at MF for 10 seconds until both LEDs stop flashing.
  - ✓ The background is taught in. The product automatically switches to normal operation mode.

## 7.2.5 Adjusting the N/C contact and N/O contact

### Approach

1. Apply L+ at MF for 13 seconds until both LEDs flash alternately.
  - ✓ Green LED flashes.
  - ✓ N/O: Orange LED lights up.
  - ✓ N/C: Orange LED does not light up.
2. To change the setting, apply L+ at MF for 1 second.
  - ✓ Orange LED changes its status.
3. Wait 10 seconds.
  - ✓ Green LED no longer flashes.
  - ✓ N/C or N/O is set. The product automatically switches to normal operation mode.

## 7.3 Digital output 2 teach-in

### 7.3.1 Factory settings of the digital output

- N/O contact
- UM18-2xxxxExxx: Switching point at half (Q1) and maximum (Q2) operating range

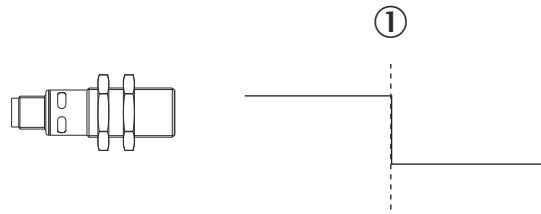
### 7.3.2 Teaching in switching point (Single Point Mode)

#### Overview

When the object is located below the taught-in switching point, the digital output is active.

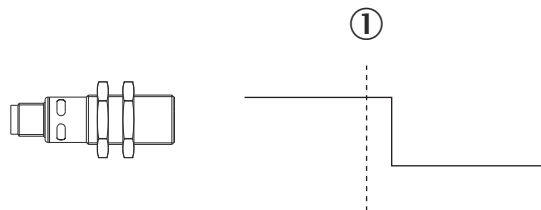
#### Approach

Teaching in the switching point (distance to object as switching point)



1. Position the object at ①.
2. Apply **M** at **MF** for 3 seconds until both LEDs are flashing simultaneously.
- ✓ Both LEDs flash alternately.
3. Apply **M** at **MF** for 1 second.
- ✓ The switching point is taught in. The product automatically switches to normal operation mode.

#### Teaching in switching point (distance to object + 8% as switching point)



1. Position the object at ①.
2. Apply **M+** at **MF** for 3 seconds until both LEDs are flashing simultaneously.
- ✓ Both LEDs flash alternately.
3. Apply **M** at **MF** for 3 seconds until both LEDs are again flashing alternately.
- ✓ The switching point is taught in. The product automatically switches to normal operation mode.

### 7.3.3 Teaching in switching window (Window Mode)

#### Overview

When the object is located within the taught-in switching window, the digital output is active.

#### Approach

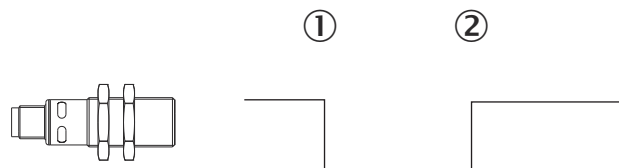


Figure 13: Window Mode

1. Position the object at ①.
2. Apply **M** at **MF** for 3 seconds until both LEDs are flashing simultaneously.
- ✓ Both LEDs flash alternately.
3. Position the object at ②.
- ✓ Both LEDs flash alternately.
4. Apply **M** at **MF** for 1 second.
- ✓ The switching points are taught in. The product automatically switches to normal operation mode.

### 7.3.4 Teaching in background (Window Mode $\pm 8\%$ )

#### Overview

When the object is located either below the taught-in background - 8% or above the taught-in background + 8%, the digital output is active.

#### Approach

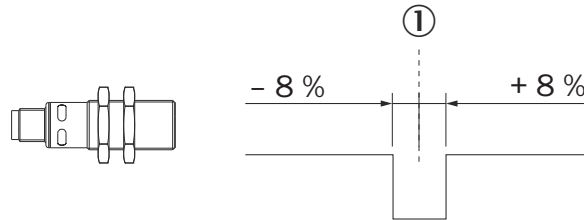


Figure 14: Window Mode  $\pm 8\%$

1. Position the background at ①.
2. Apply **M** at **MF** for 3 seconds until both LEDs are flashing simultaneously.
  - ✓ Both LEDs flash alternately.
3. Apply **M** at **MF** for 10 seconds until both LEDs stop flashing.
  - ✓ The background is taught in. The product automatically switches to normal operation mode.

### 7.3.5 Adjusting the N/C contact and N/O contact

#### Approach

1. Apply **M** at **MF** for 13 seconds until both LEDs flash alternately.
  - ✓ Green LED flashes.
  - ✓ N/O: Orange LED lights up.
  - ✓ N/C: Orange LED does not light up.
2. To change the setting, apply **M** at **MF** for 1 second.
  - ✓ Orange LED changes its status.
3. Wait 10 seconds.
  - ✓ Green LED no longer flashes.
  - ✓ N/C or N/O is set. The product automatically switches to normal operation mode.

## 7.4 Analog output teach-in

### 7.4.1 Factory settings of the analog output

- Rising output characteristic from minimum to maximum operating range

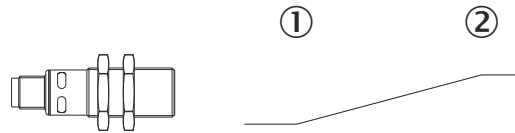
### 7.4.2 Scaling analog output

#### Overview

To scale the analog output, teach in a close sensor and distant sensor scaling limit. If the distant sensor scaling limit is taught in first and then the close sensor scaling limit, the limits are reversed internally.

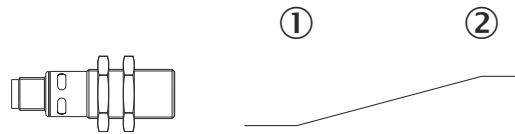
#### Approach

Teaching in the scaling limits (UM18-xxxxx6/7xxx)



1. Position the object at ①.
2. Apply **L+** at **MF** for 3 seconds until both LEDs are flashing simultaneously.
  - ✓ Both LEDs flash alternately.
3. Position the object at ②.
4. Apply **L+** at **MF** for 1 second.
  - ✓ The scaling is taught in. The product automatically switches to normal operation mode.

#### Teaching in the scaling limits (UM18-2xxxxC/Dxxx)



1. Position the object at ①.
2. Apply **M** at **MF** for 3 seconds until both LEDs are flashing simultaneously.
  - ✓ Both LEDs flash alternately.
3. Position the object at ②.
4. Apply **M** at **MF** for 1 second.
  - ✓ The scaling is taught in. The product automatically switches to normal operation mode.

### 7.4.3 Adjusting the rising or falling output characteristic

#### Approach

##### Adjusting output characteristics (UM18-xxxxx6/7xxx)

1. Apply **L+** at **MF** for 13 seconds until both LEDs flash alternately.
  - ✓ Green LED flashes.
  - ✓ Rising: Orange LED lights up.
  - ✓ Falling: Orange LED does not light up.
2. To change the setting, apply **L+** at **MF** for 1 second.
  - ✓ Orange LED changes its status.
3. Wait 10 seconds.
  - ✓ Green LED no longer flashes.
  - ✓ The rising or falling output characteristic is set. The product automatically switches to normal operation mode.

##### Adjusting the output characteristics (UM18-2xxxxC/Dxxx)

1. Apply **M** at **MF** for 13 seconds until both LEDs flash alternately.
  - ✓ Green LED flashes.
  - ✓ Rising: Orange LED lights up.
  - ✓ Falling: Orange LED does not light up.
2. To change the setting, apply **M** at **MF** for 1 second.
  - ✓ Orange LED changes its status.
3. Wait 10 seconds.
  - ✓ Green LED no longer flashes.
  - ✓ The rising or falling output characteristic is set. The product automatically switches to normal operation mode.

### 7.5 Resetting the device to factory settings

#### Approach

1. Switch off the supply voltage.
  2. Apply **M** at **MF**.
  3. Switch on the supply voltage.
  4. Wait 13 s until both LEDs stop flashing
  5. To apply the factory settings, separate **M** from **MF** before switching off the supply voltage.
- ✓ The product is reset to the factory settings. The product automatically switches to normal operation mode.

### 7.6 Switching between teach-in and synchronization/multiplex operation

#### Overview

Valid for UM18-2xxxx**B/6/7**xxx.

#### Approach

1. Switch off the supply voltage.
  2. Apply **M** at **MF**.
  3. Switch on the supply voltage.
  4. Wait 3 seconds until both LEDs are flashing simultaneously.
- ✓ Green LED flashes.
  - ✓ Teach-in: Orange LED lights up.
  - ✓ Synchronization/Multiplex operation: Orange LED does not light up.
  - 5. To change the setting, apply **M** at **MF** for 1 second.
  - ✓ Orange LED changes its status.
  - 6. Wait 10 seconds.
  - ✓ Green LED no longer flashes.
  - ✓ Teach-in or synchronization/multiplex operation is set. The product automatically switches to normal operation mode.

### 7.7 Activating and deactivating teach-in and synchronization/multiplex operation

#### Overview

Valid for UM18-2xxxx**C/D/E**xxx.

#### Approach

1. Switch off the supply voltage.
  2. Apply **M** at **MF**.
  3. Switch on the supply voltage.
  4. Wait 3 seconds until both LEDs are flashing simultaneously.
- ✓ Green LED flashes.
  - ✓ Activated: Orange LED lights up.
  - ✓ Deactivated: Orange LED does not light up.
  - 5. To change the setting, apply **M** at **MF** for 1 second.
  - ✓ Orange LED changes its status.
  - 6. Wait 10 seconds.
  - ✓ Green LED no longer flashes.
  - ✓ Teach-in or synchronization/multiplex operation is activated or deactivated. The product automatically switches to normal operation mode.

## 7.8 IO-Link

Depending on the product type, the product can exchange process data and parameters via IO-Link. To do this, connect the product to a suitable IO-Link Master. A sensor-specific device description file (IODD) is required in the IO-Link Master. The IODD and a supplementary information document are available on the product page.

The page can be accessed via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](http://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

## 7.9 Establishing a connection to SOPAS ET

### Overview

The SOPAS Engineering Tool (SOPAS ET) software is suitable for parameterization as well as for service and diagnostics purposes.

### Prerequisites

- Product type with IO-Link
- A computer with the SOPAS ET software installed on it, and a free USB 2.0 compatible port



### NOTE

The most up-to-date version of the SOPAS ET software can be downloaded from [www.sick.com/SOPAS\\_ET](http://www.sick.com/SOPAS_ET). The respective system requirements for installing SOPAS ET are also specified there.

- SICK SiLink2 Master (available as accessory)
- Connection cable with M12 male and female connectors, 4-pin (available as accessory)
- Device description file (SDD)



### NOTE

The SDD can be installed in SOPAS ET or via the SICK website. Follow the instructions in SOPAS ET.

### Approach

1. Connect the product to the SiLink2 Master via the male connector or an additional connection cable.
2. Connect the SiLink2 Master to the computer using the supplied USB cable.
3. Switch on and start the computer.
4. To ensure an adequate voltage supply to the product, also connect the enclosed wall plug to the SiLink2 Master.
- ✓ The status LEDs light up green after successful initialization. The product is ready for operation.
5. Install the device description file.
6. Select the product from the device catalog and add it to a project.
- ✓ A connection to the product is established via the communication interface. The connection must be activated for data transmission (**online**).

## 7.10 Connect+

Connect+ can be used optionally for teach-in settings and other parameter settings. To program the product with Connect+, a Connect+ adapter (CPA) and the Connect software are required. These are available as accessories.

## 8 Maintenance

### 8.1 Maintenance plan

During operation, the device works maintenance-free.

Table 8: Maintenance plan

Maintenance work	Interval	To be carried out by
Check device and connecting cables for damage at regular intervals.	Depends on ambient conditions and climate.	Specialist
Clean housing.	Depends on ambient conditions and climate.	Specialist
Check the screw connections and plug connectors.	Depends on the place of use, ambient conditions or operating requirements. Recommended: At least every 6 months.	Specialist

### 8.2 Cleaning



#### NOTICE

#### Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

- Only use recommended cleaning agents and tools.
  - Never use sharp objects for cleaning.
- 
- ▶ Carefully clean the adjoining faces with water at regular intervals.

## 9 Troubleshooting

### 9.1 General faults

Possible faults and corrective actions are described in the table below for troubleshooting. In the case of faults that cannot be rectified using the description below, please contact the SICK Service department. To find your agency, see the final page of this document.



#### NOTE

To help us to resolve the matter quickly, please note down the details on the type label.

Table 9: Troubleshooting Q&A

Question / status	Response / remedial actions
Distance measurement is not possible.	Ensure that the object is within the measuring range.

### 9.2 Repairs

Repair work on the device may only be performed by qualified and authorized personnel from SICK AG. Interruptions or modifications to the device by the customer will invalidate any warranty claims against SICK AG.

### 9.3 Returns

- ▶ Only send in devices after consulting with SICK Service.
- ▶ The device must be sent in the original packaging or an equivalent padded packaging.



#### NOTE

To enable efficient processing and allow us to determine the cause quickly, please include the following when making a return:

- Details of the contact person
- Description of the application
- Description of the fault that occurred

### 9.4 Disposal

If a device can no longer be used, dispose of it in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations. Do not dispose of the product along with household waste.



#### NOTICE

**Danger to the environment due to improper disposal of the device.**

Disposing of devices improperly may cause damage to the environment.

Therefore, observe the following information:

- Always observe the national regulations on environmental protection.
- Separate the recyclable materials by type and place them in recycling containers.

## 10 Technical data



### NOTE

The relevant online product page for your product, including technical data, dimensional drawing, and connection diagrams, can be downloaded, saved, and printed from the Internet.

The page can be accessed via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](http://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

Please note: This documentation may contain further technical data.

### 10.1 Mechanics/Electronics

<b>Supply voltage <math>V_S</math> <sup>1)</sup></b>	<b>Products with digital output</b> DC 10 V ... 30 V  <b>Products with analog output</b> <b>Voltage output:</b> <ul style="list-style-type: none"> <li>DC 15 V ... 30 V</li> </ul> <b>Current output:</b> <ul style="list-style-type: none"> <li>DC 10 V ... 30 V at <math>R_L \leq 100 \Omega</math></li> <li>DC 20 V ... 30 V at <math>R_L &gt; 100 \Omega</math></li> </ul>
<b>Power consumption</b>	$\leq 1.5 \text{ W}^{2)}$
<b>Power-up time</b>	< 300 ms
<b>Design</b>	Cylindrical
<b>Housing material</b>	Metal (nickel plated brass) Ultrasonic converter: Polyurethane foam, epoxy resin with glass content
<b>Threaded size</b>	M18 x 1
<b>Connection type</b>	Male connector, M12, 5-pin
<b>Display</b>	2 LEDs
<b>Weight</b>	Straight: 25 g Angled: 30 g
<b>Sending axis</b>	UM18 – xxxxxxxx1: Straight UM18 – xxxxxxxx2: Angled
<b>Dimensions</b>	Straight: 18 mm x 18 mm x 52.7 mm <sup>3)</sup> Angled: 18 mm x 18 mm x 68.7 mm <sup>3)</sup>
<b>Enclosure rating</b>	IP65 / IP67 (IEC 60529) <sup>4)</sup>
<b>Protection class</b>	III
<b>Max. tightening torque for fixing nuts</b>	15 Nm

<sup>1)</sup> Limit values, reverse-polarity protected. Operation in short-circuit protected network: max. 8 A, class 2.

<sup>2)</sup> Without load

<sup>3)</sup> Deviations possible, see "Dimensional drawings", page 31.

<sup>4)</sup> Prerequisites:

- The cables plugged into the electrical connections must be screwed tight. Unused electrical connections are sealed off with a protective cap.

## 10.2 Dimensional drawings

### UM18-2xxx6/7/Bxx1

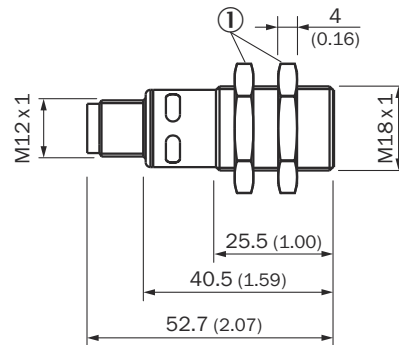


Figure 15: Structure and device dimensions, unit: mm (inch), decimal separator: period

① Fixing nuts, width 24 mm

### UM18-2xxx6/7/Bxx2

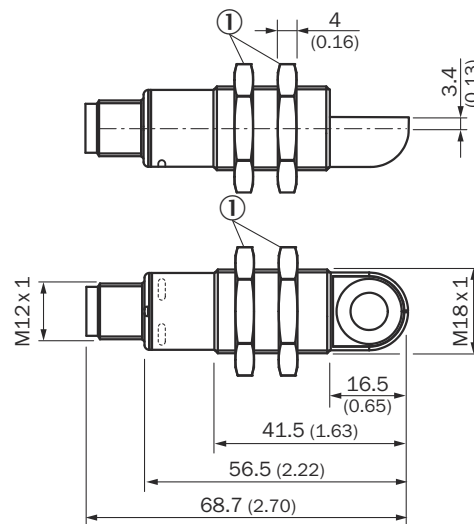


Figure 16: Structure and device dimensions, unit: mm (inch), decimal separator: period

① Fixing nuts, width 24 mm

### UM18-2xxxC/D/Exx1

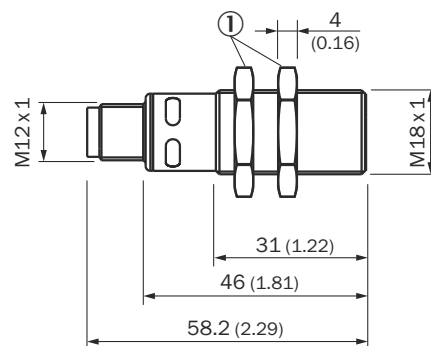


Figure 17: Structure and device dimensions, unit: mm (inch), decimal separator: period

① Fixing nuts, width 24 mm

UM18-2xxxxC/D/Exx2

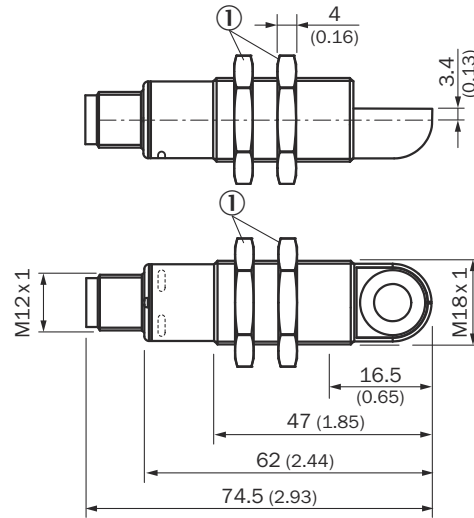


Figure 18: Structure and device dimensions, unit: mm (inch), decimal separator: period

- ① Fixing nuts, width 24 mm

10.3 Performance

<b>Operating range, limiting range <sup>1)</sup></b>	UM18-217: 20 mm ... 150 mm, 250 mm UM18-211: 30 mm ... 250 mm, 350 mm UM18-212: 65 mm ... 350 mm, 600 mm UM18-218: 120 mm ... 1000 mm, 1300 mm
<b>Measuring object</b>	Natural objects
<b>Resolution</b>	≥ 0.069 mm
<b>Repeatability</b>	± 0.15% <sup>2)</sup>
<b>Accuracy</b>	± 1% <sup>3) 4)</sup>
<b>Temperature compensation</b>	Yes
<b>Output time</b>	UM18-217: 8 ms UM18-211: 8 ms UM18-212: 16 ms UM18-218: 20 ms
<b>Response time <sup>5)</sup></b>	UM18-217: 32 ms UM18-211: 32 ms UM18-212: 64 ms UM18-218: 80 ms
<b>Switching frequency <sup>6)</sup></b>	UM18-217: 25 Hz UM18-211: 25 Hz UM18-212: 12 Hz UM18-218: 10 Hz
<b>Hysteresis <sup>6) 7)</sup></b>	UM18-217: 2 mm UM18-211: 3 mm UM18-212: 5 mm UM18-218: 20 mm
<b>Ultrasonic frequency (typical)</b>	UM18-217: 380 kHz UM18-211: 320 kHz UM18-212: 400 kHz UM18-218: 200 kHz

<b>Additional function</b>	<b>Product with digital output</b> <ul style="list-style-type: none"> <li>Adjustable switching point modes</li> <li>Teachable digital output</li> <li>Invertible digital output</li> <li>IO-Link</li> </ul>
	<b>Product with analog output</b> <ul style="list-style-type: none"> <li>Teachable analog output</li> <li>Invertible analog output</li> </ul>
	<b>All products</b> <ul style="list-style-type: none"> <li>Multifunctional input</li> <li>Synchronization and multiplex operation</li> <li>Reset to factory settings</li> </ul>

- 1) Distance measurement is not possible below the operating range of the product.
- 2) Relative to the current measured value, minimum value  $\geq$  resolution.
- 3) Relative to the current measured value.
- 4) Temperature compensation can be switched off via SOPAS ET, Connect+ or IO-Link. Not temperature compensated:  $\pm 0.17\% / K$ .
- 5) Products with analog output: Subsequent smoothing of the analog output may increase the response time by up to 200 % in some applications.
- 6) Valid for products with digital output.
- 7) Adjustable via SOPAS ET, Connect+ or IO-Link.

## 10.4 Interfaces

<b>Digital output</b>	UM18-2xxxxB/C/Dxxx: 1 push-pull: PNP/NPN digital output <sup>2)</sup> , max. output current $I_A \leq 100\text{ mA}$ UM18-2xxxxExxx: 2 push-pull: PNP/NPN digital outputs, max. output current $I_A \leq 100\text{ mA}$
<b>Analog output</b>	UM18-2xxxx6xxx: 1 analog current output, current: 4 mA ... 20 mA, $R_L \leq 500\ \Omega$ , resolution: 12 bit UM18-2xxxx7xxx: 1 analog voltage output, voltage: 0 V ... 10 V, $R_L \geq 100\text{ k}\Omega$ , resolution: 12 bit UM18-2xxxxCxxx: 1 analog current output, current: 4 mA ... 20 mA, $R_L \leq 500\ \Omega$ , resolution: 12 bit UM18-2xxxxDxxx: 1 analog voltage output, voltage: 0 V ... 10 V, $R_L \geq 100\text{ k}\Omega$ , resolution: 12 bit
<b>Multifunctional input</b>	1 multifunctional input MF

2) Push-pull: PNP/NPN: HIGH =  $U_V - (< 3\text{ V})$ /LOW =  $< 3\text{ V}$ .

## 10.5 Ambient data

<b>Ambient operating temperature</b>	-25 °C ... +70 °C <sup>1)</sup>
<b>Storage temperature</b>	-40 °C ... +85 °C

1) To prevent condensation, avoid exposing the product to rapid changes in temperature.

## 10.6 Temperature compensation

The internal temperature compensation reaches the optimum operating point after 1 minute of operation. Temperature compensation is adjusted at the factory to standard mounting conditions with an aluminum mounting bracket and mounting nuts.

Temperature compensation is automatically adjusted to the individual installation situation under the following conditions.

**Conditions of automatic adjustment of temperature compensation**

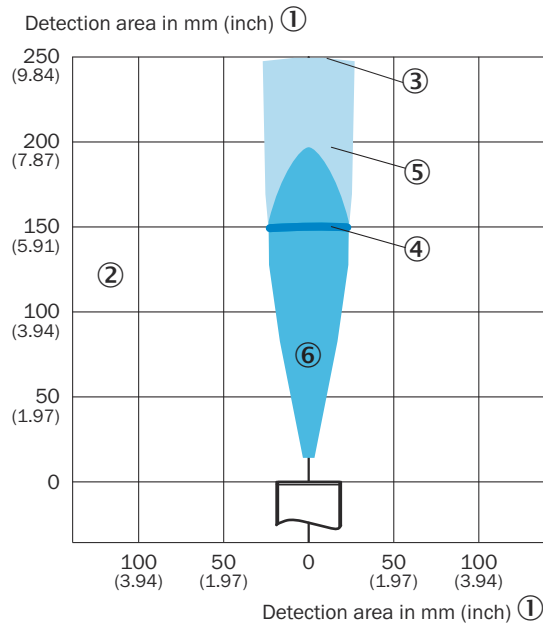
- The product is in a cold state.
- Digital output: The digital output is deactivated for approx. 30 minutes.
- Analog output: The analog output delivers a constant value of 11 mA ... 13 mA or 4.4 V ... 5.6 V for approx. 30 minutes.

If the measured value changes in the 30 minutes, the adjustment is canceled. The default parameters or the last adjusted parameters are retained. Automatic adjustment is suitable for installation situations that deviate greatly from standard installation conditions or where high measurement accuracy is required. One example is thermally insulated mounting.

Temperature compensation can be switched off via SOPAS ET, Connect+ software or IO-Link. Without temperature compensation, the accuracy deviation is  $\pm 0.17\%/K$ .

**10.7 Detection ranges**

**UM18-217xxxxxx**



- ① Detection range in mm (inch)
- ② Detection range dependent on reflection properties, size, and alignment of the object
- ③ Limiting range
- ④ Operating range
- ⑤ Example object: aligned plate 500 mm x 500 mm
- ⑥ Example object: Cylindrical bar with diameter of 10 mm

**UM18-211xxxxx**

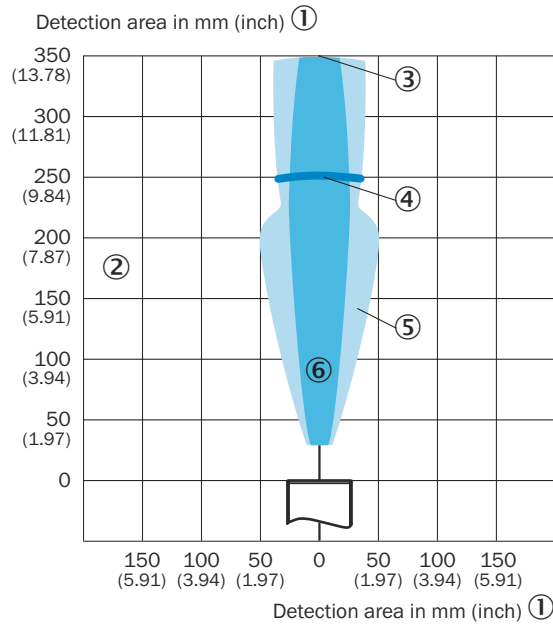


Figure 19: Um18-211xxxxx detection range

- ① Detection range in mm (inch)
- ② Detection range dependent on reflection properties, size, and alignment of the object
- ③ Limiting range
- ④ Operating range
- ⑤ Example object: Aligned plate 500 mm x 500 mm
- ⑥ Example object: Cylindrical bar with diameter of 10 mm

**UM18-212xxxxx**

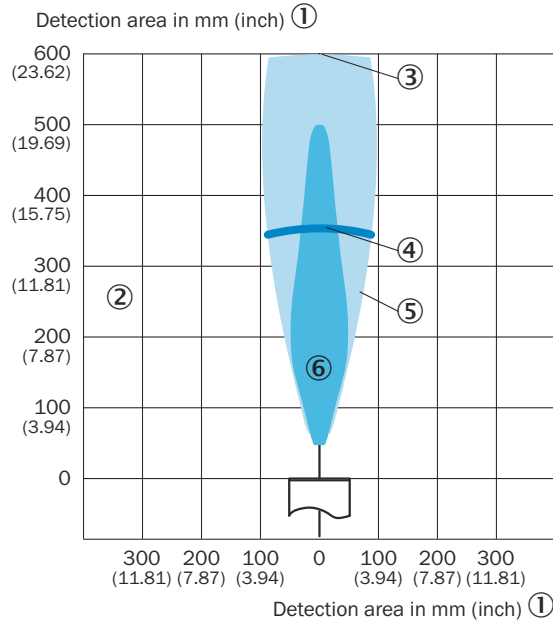


Figure 20: Um18-212xxxxx detection range

- ① Detection range in mm (inch)
- ② Detection range dependent on reflection properties, size, and alignment of the object
- ③ Limiting range
- ④ Operating range
- ⑤ Example object: Aligned plate 500 mm x 500 mm
- ⑥ Example object: Cylindrical bar with diameter of 27 mm

**UM18-218xxxxx**

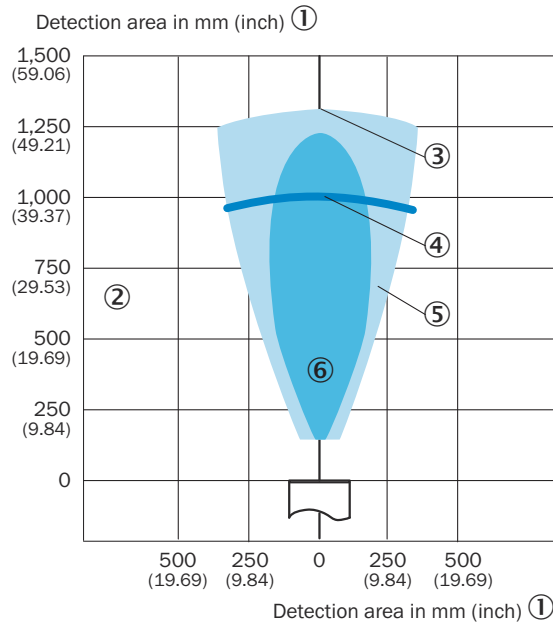


Figure 21: Um18-218xxxxx detection range

- ① Detection range in mm (inch)
- ② Detection range dependent on reflection properties, size, and alignment of the object
- ③ Limiting range
- ④ Operating range
- ⑤ Example object: Aligned plate 500 mm x 500 mm
- ⑥ Example object: Cylindrical bar with diameter of 27 mm

### 11 Accessories

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**NOTE**

On the product page you will find accessories and, if applicable, related installation information for your product.

The page can be accessed via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](https://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

**{S/N}** corresponds to the serial number of the product, see type label (if indicated).

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## 12 Annex

### 12.1 Declarations of conformity and certificates

You can download declarations of conformity and certificates via the product page.

The page can be accessed via the **SICK Product ID: [pid.sick.com/{P/N}/{S/N}](http://pid.sick.com/{P/N}/{S/N})**

**{P/N}** corresponds to the part number of the product, see type label.

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