

OD1000  
Displacement measurement sensor



Intended use

The displacement measurement sensor is an opto-electronic measuring device and is used for optical, non-contact distance measurement between the displacement measurement sensor and an object.

The required optical properties of the object that will be detected are specified in the technical data section of this document.

About this document

The purpose of the Quickstart is to allow you to commission the product quickly and easily and to achieve initial measurement results.

Scope of delivery

- Distance sensor in the version ordered.
- Printed Quickstart (this document): English (no. 8019639), German (no. 8019638), French (no. 8019640)
- Distance sensor SafetyNotes (multiple languages: no. 8019331)

Supplementary and other relevant documents

- OD1000 operating instructions (German no. 8019641, English no. 8019642)
- You can download the documents in the Internet at [www.sick.com/OD1000](http://www.sick.com/OD1000).

Safety information

- Please observe the safety notes and the warnings listed in the publication Safety Notes (no. 8019331) to reduce the possibility of risks to health and avoid dangerous situations.
- Read these instructions before commissioning the product in order to familiarize yourself with the device and its functions.
- The distance sensor corresponds to laser class 1.
- Mounting and electrical installation are to be performed only by qualified technicians.
- Use the device only under permitted ambient conditions (e.g., temperature) (see "Technical specifications").
- Opening the screws of the distance sensor housing will invalidate any warranty claims against SICK AG.
- The distance sensor does not constitute personal protection equipment in accordance with the respective applicable safety standards for machines.
- All electrical circuits must be connected to the device with safety extra-low voltage (SELV or PELV).
- Observe the information on the connection diagram and inputs/outputs on the side plate of the device.

Commissioning

Mounting and alignment

- Mount the displacement measurement sensor using the designated fixing holes, see *Appendix, Device structure and dimensions*.
- Make the electrical connection. Attach and tighten a voltage-free cable, see "Electrical installation".
- Switch on the supply voltage.  
☒ The green operating LED lights up. The device needs around 10 seconds of initialization time before it is ready for operation.
- Align the light spot so that the desired object is measured.

Electrical installation

- Ensure that the voltage supply is not connected.
- Connect the device according to the connection diagram.

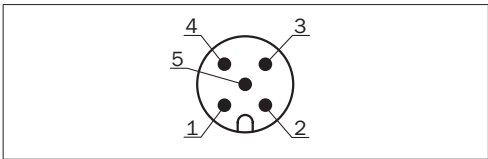


Fig. 1: Connection type: Male connector M12, 5-pin

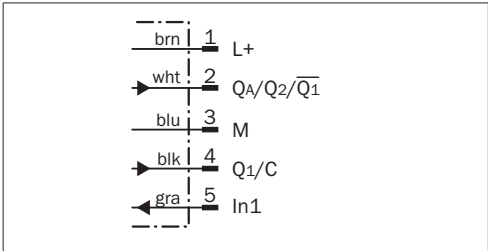


Fig. 2: Connection scheme

Device description

Device structure and dimensions

See *Appendix, Device structure and dimensions*.

Status displays and operating elements

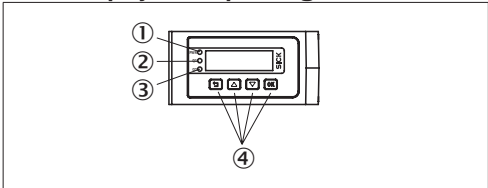


Fig. 3: Status displays, operating elements

- ① PWR status LED (green)
- ② Q1 status LED (orange)
- ③ Q2 status LED (orange)
- ④ Operating buttons

Indicator	Status	Meaning
PWR status indicator	●	Voltage supply available, device ready for use
	○	Voltage supply not available
	●●	Voltage supply available, device ready for use, connection to an IO-Link master available
Q <sub>2</sub> output display	●	Switching output active
	○	Switching output not active

Indicator	Status	Meaning
Q <sub>2</sub> output display	●	Switching output active or measured value within the scaling range for the analog output
	○	Switching output not active or measured value outside the scaling range for the analog output
Q <sub>1</sub> and Q <sub>2</sub> output displays	●●	Teach-in operation is carried out
	●●●	Teach-in operation has failed
	●●●	There is a fault

○ = does not light up ● = lights up; ●● = flashing

Tab. 1: Status displays

Pushbutton	Function	Description
OK	Open menu/confirm	Opens the menu, confirms entries, or switches to the next menu level of a selected element. Moves the cursor to the right when entering numbers.
↩	Cancel	Switches to the previous menu level. Moves the cursor to the left when entering numbers.
▲	Navigate	Switches between multiple screens on one menu level. Increases the value when entering numbers.
▼	Navigate	Switches between multiple screens on one menu level. Reduces the value when entering numbers.

Tab. 2: Operating elements

Operation

Factory settings

The following is a selection of important device functions and parameters and their factory settings. A complete overview of factory settings can be found in the operating instructions.

Function	Parameter/value
User level	Easy
Q1 output	<ul style="list-style-type: none"><li>Distance to object, one switching point</li><li>Switching point: +400 mm</li><li>Active status: High</li><li>Hysteresis: +1.0 mm</li><li>Delay mode: Off</li></ul>
Q2/Qa output	<ul style="list-style-type: none"><li>4...20 mA analog output</li><li>Distance 4 mA: -400 mm<sup>1)</sup></li><li>Distance 20 mA: +400 mm<sup>2)</sup></li><li>Hysteresis: +1.0 mm</li><li>Delay mode: Off</li></ul>
IO-Link	COM3
Measurement value filter	Off

1) Corresponds to lower measuring range limit 200 mm  
2) Corresponds to upper measuring range limit 1,000 mm

## Operation via display

The following is a selection of frequently used functions for device configuration. A complete description of the functions can be found in the operating instructions.

### Q1 output

The Q1 output is purely a switching output. In addition, the output serves as a communication line for bidirectional data transmission when using the IO-Link interface.

The Q1 output provides the following switching modes:

- DtO, distance to object (1-point), one switching point
- Window, two switching points
- ObSB, object between sensor (device) and background, one switching point

1. **[OK]** > I/O INTERFACE > **[OK]** > Q1 OUTPUT > **[OK]**
2. Selecting switching mode: DISTANCE TO OBJECT, WINDOW or ObSB > **[OK]**
3. Teaching-in or entering value:
  - Placing the switching point at the current distance at the time of pushing the pushbutton: TEACH Q1 > **[OK]** > Q1 (signal output at the time of undercutting switching point, normally open) or Q1<sub>NOT</sub> (signal output at the time of exceeding switching point, normally closed) > **[OK]**
  - Manually setting the distance of the switching point:  
MANUAL TEACH Q1 > **[OK]** > Enter value > **[OK]**

The following parameters can also be set in all switching modes: Q1 ACTIVE STATE, Q1 HYSTERESIS, DELAY MODE and TIME FOR DELAY MODE. More information can be found in the operating instructions.

### Q2/Qa output

The Q2/Qa output can be configured either as an analog output or as a switching output.

#### 4-20 mA analog output

If the 4-20 mA setting is selected, output 2 functions as an analog current output. The measured value of the device is output as a proportional-linear current value that corresponds to the other device settings. The slope of the analog characteristic lines can be changed by teaching-in a distance to the lower (4 mA) and upper (20 mA) limit.

1. **[OK]** > I/O INTERFACE > **[OK]** > Q2/QA OUTPUT > **[OK]** > ANALOG OUTPUT 4-20mA > **[OK]**
2. Selecting parameters and teaching-in or entering value:
  - TEACH QA > **[OK]** > DISTANCE (4 mA) or DISTANCE (20 mA).
  - TEACH QA > **[OK]** > DISTANCE (4 mA) or DISTANCE (20 mA).

#### 0 - 10 V analog output

If the 0 - 10 V setting is selected, output 2 functions as an analog voltage output. The measured value of the device is output as a proportional-linear voltage value that corresponds to the other device settings. The slope of the analog characteristic lines can be changed by teaching-in a distance to the lower (0 V) and upper (10 V) limit.

1. **[OK]** > I/O INTERFACE > **[OK]** > Q2/QA OUTPUT > **[OK]** > ANALOG OUTPUT 0-10V > **[OK]**
2. Selecting parameters and teaching-in or entering value:
  - TEACH QA > **[OK]** > DISTANCE (0 V) or DISTANCE (10 V).
  - MANUAL TEACH QA > **[OK]** > DISTANCE (0 V) or DISTANCE (10 V).

#### Digital output

In the case of the digital output function, output 2 functions as a switching output. Since output 1 is used exclusively for switching, this setting corresponds to the behavior of output 1. A switching signal that corresponds to the other device settings is output based on the current measured value.

The Q1 digital output provides the following switching modes, among others:

- DtO, distance to object (1-point), one switching point
- Window, two switching points
- ObSB, object between sensor (device) and background, one switching point
- Q2=Q1 not (output of the opposite switching signal from output 1)

The switching modes are configured corresponding to the Q1 analog output, see description above.

## Measurement value filter

The measurement value filters are used to optimize the signal diagram in order to simplify the evaluation by the control system, e.g., for regulation tasks.

- Average filter The average filter carries out a moving averaging of the measured values. This filter is suitable for smoothing an irregular signal diagram, for example to hide the roughness of a surface. The temporal reproducibility can also be improved.

Example MEASUREMENT VALUE FILTER 4:

Measurement	Measured value	Average value 1	Average value 2	...
1	25	25	-	-
2	21	21	21	-
3	19	19	19	...
4	23	23	23	...
5	21	-	84 :4 = 21	...
6	...	-	-	...

- Median filter: The moving median filter sorts the measured values according to their size and selects the middle value from a sequence. This filter is suitable for excluding individual outliers from the calculation of an average value. Both types of filter affect the response time of the distance sensor.

Example MEDIAN FILTER 7:

Measurement	Measured value	Median 1	Median 2	...
1	23	21	-	-
2	85	22	4	-
3	21	22	21	...
4	22	23	22	...
5	23	24	23	...
6	24	85	24	...
7	22	-	85	...
8	4	-	-	...
9	...	-	-	...

1. **[OK]** > MEASUREMENT > **[OK]** > BASIC SETTINGS > **[OK]** > MEASUREMENT VALUE FILTER > **[OK]**
2. Selecting parameters and activating or entering value:
  - Do NOT USE A FILTER > **[OK]**
  - AVERAGE FILTER > **[OK]**
  - MEDIAN FILTER > **[OK]**

## Operation via SOPAS ET and IO-Link

In addition to the previously described configuration option, the device can also be configured via IO-Link or SOPAS ET PC software. More information can be found in the operating instructions.

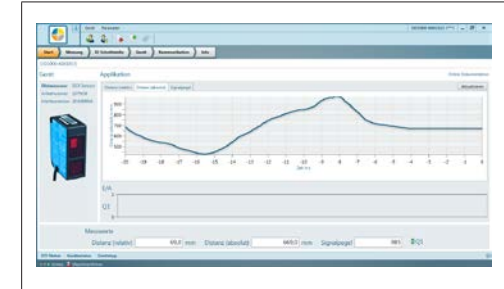


Fig. 4: SOPAS ET device window



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