



AOD1

QUICKSTART

en

1 Intended use

AOD1 is an evaluation unit that can be used with up to two displacement measurement sensors of the type OD Mini Pro (RS485), OD5000, and OL1. The settings of the displacement measurement sensor are adjusted via the evaluation unit. The evaluation unit is used in combination with two sensor heads in order to carry out measurements of height differences or thickness.

By mounting an additional AOD1 (slave), up to four sensor heads can be offset against each other

2 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. The operating instructions must have been read and understood prior to the commencement of any work.

2.1 Supplementary and other relevant documents

- OD Mini Pro operating instructions (German/English: no. 8017923)
- OD5000 operating instructions (German no. 8021390, English no. 8021391)
- OL1 operating instructions (German no. 8022329, English no. 022330)
- WI180C-PB PROFIBUS coupler quickstart (German/English: no. 8017973)
- WI180C-PB PROFIBUS coupler operating instructions (German no. 8017974, English no. 8018416)

You can download the documents in the Internet at www.sick.com. To do this, enter the part number of the publication.

Additional information (e.g. application examples, other documents, associated software) can be found at www.sick.com/OD_Mini in the accessories section.

3 Commissioning

Ensure that installation is done by a qualified person.

3.1 Scope of delivery

- AOD1 in the version ordered.
- Protective cap included or possibly attached to the device. Without connecting cables and brackets.
- Printed Quickstart (this document): English (no. 8019684), German (no. 8019683), French (no. 8019685)

3.2 Mounting

1. Ensure that the device is not connected to a voltage supply.
2. Clamp the device onto a mounting rail.

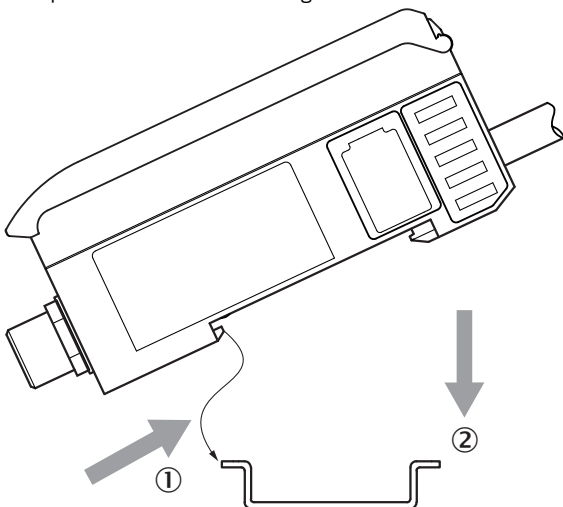


Figure 1: Mounting rail mounting

3. Check whether the mounting hook is correctly clicked into place and the device is securely mounted.

3.3 Master/slave connection (optional)

1. Clamp the downstream devices (e.g. another AOD1 or a WI180C-PB) onto the mounting rail as shown in their mounting instructions.
2. Push the downstream devices onto the 5-pin connection (1) of the AOD1. While doing so, ensure the order is correct (refer to the operating instructions for the respective device).

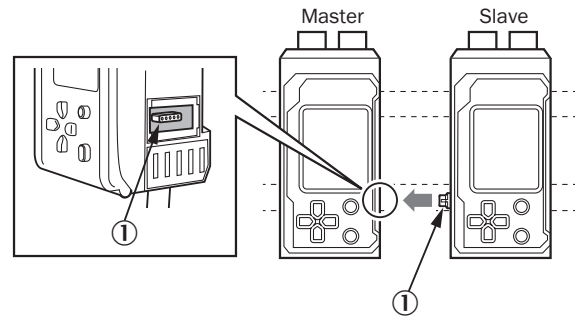


Figure 2: Master/slave connection

3. Check whether the devices are correctly contacted.
4. Fix the connected devices on the mounting rail without any spaces.

4 Electrical installation

1. Contact the cable ends as shown in the following graphic.

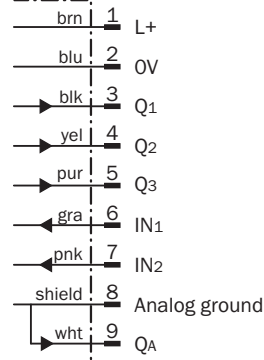


Figure 3: AOD1-xxx7Dx: connection diagram

- ① 12-24 V DC supply voltage (brown)
- ② Supply voltage 0 V (blue)
- ③ Output Q₁ (black)
- ④ Output Q₂ (yellow)
- ⑤ Output Q₃ (violet)
- ⑥ Input IN₁ (gray)
- ⑦ Input IN₂ (pink)
- ⑧ Analog ground (shield)
- ⑨ Analog output Q_A (white)

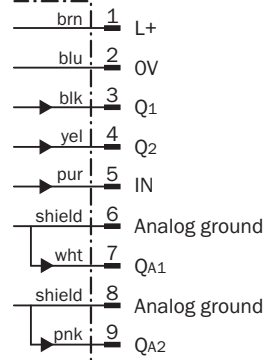


Figure 4: AOD1-xxx7Dx: connection diagram

- ① 12-24 V DC supply cable (brown)
- ② Supply voltage 0 V (blue)
- ③ Output Q₁ (black)
- ④ Output Q₂ (yellow)
- ⑤ Input IN (violet)
- ⑥ Analog ground Q_{A1}
- ⑦ Analog output Q_{A1} (white)
- ⑧ Analog ground Q_{A2}
- ⑨ Analog output Q_{A2} (pink)

2. Connect the device to the voltage supply.
 - ✓ The display lights up.
 - ✓ When switching on for the first time, the function for setting the dialog language is opened.
3. To select the language, press the pushbuttons \odot or \ominus and confirm your selection by pressing the A pushbutton.
 - ✓ The device display changes to the main view.

The dialog language can also be changed at a later date via the configuration menu.

5 Device description

Overview

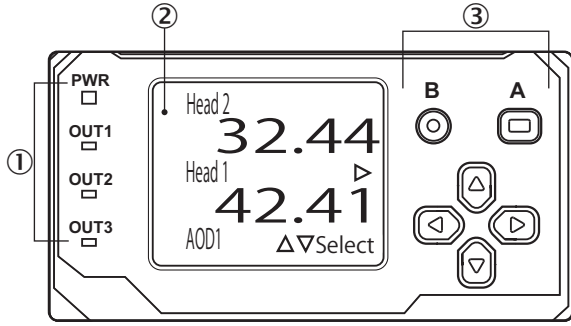


Figure 5: Display and operating elements

- ① Status LEDs
- ② Device display
- ③ Operating elements

Status LEDs

Status indicators

LED	Display	Status
PWR	● (green)	Normal operation
	● (green)	Energy-saving mode
	● (red)	Error
OUT1, OUT2, OUT3	● (orange)	Interface switched on

● = illuminated; ● = flashing

Operating help

Operating help symbols are displayed on the device display.

Operating help

Symbol	Meaning
△, ▽, ◀, ▶	Displays the actions that can be executed by pressing the pushbuttons \ominus , \oplus , \triangleleft , \triangleright .
□	Displays the actions that can be executed by pressing the pushbutton A .
■	Displays the actions that can be executed by pressing and holding the pushbutton A .
○	Displays the actions that can be executed by pressing the pushbutton B .
[]	Displays that the selected entry has not been confirmed.
[]	Displays that the selected entry has been confirmed.
▶	Displays which function/setting is selected.
□	Displays that the value can be changed.

Operating elements

Operating elements

Pushbutton	Function
A	Confirm settings.
B	Return to previous view.
\ominus , \oplus , \triangleleft , \triangleright	Select settings, change view, increase/lower values.

Fault indication (summary)

Detecting errors

Display	Cause
9999 (instead of measured value)	Compatible sensor connected, but measurement not possible. Possible cause: The measuring value is outside of the measuring range.
99999 (instead of calculated value)	Calculation not possible because at least one sensor is not returning a measured value.
---- (instead of measured value/calculated value)	No compatible sensor connected.

Dimensions

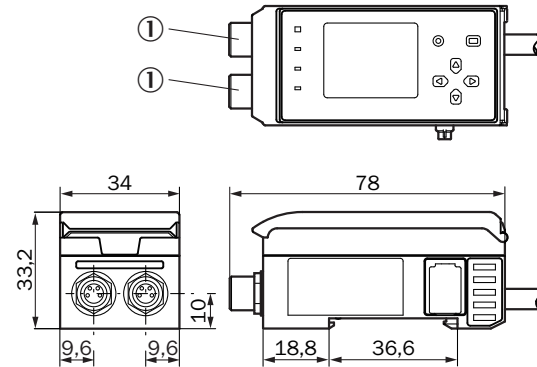


Figure 6: Dimensional drawing (dimensions in mm)

- ① Interface (sensor side), 2x M8 female connectors, 4-pin

6 Operation

Switching display on/off

After 10 minutes of no pushbutton being pressed, the display is switched off, the PWR LED flashes green.

- Press any pushbutton to switch the display on again.

Locking pushbutton

- Press and hold the pushbutton B for at least 2 seconds to lock the pushbuttons.

✓ --- Key Locked --- is shown on the bottom edge of the display.

- Press and hold the pushbutton B for at least 2 seconds again to unlock the pushbuttons.

Changing the display view

- To switch between the main view and the calculation view, press the pushbutton \ominus or \oplus .

Opening the configuration menu

- In the main view, press the pushbuttons \ominus or \oplus .
- ✓ \blacktriangleright lights up at the left edge of the display and shows the currently selected device (Head1, Head2 or AOD1).
- To select the device, press the pushbuttons \ominus or \oplus and confirm your selection by pressing the A pushbutton.
- ✓ The top menu view of the selected device opens.

7 Configuring evaluation unit

Changing the language

- Open the top menu view of the AOD1, see [Opening the configuration menu, page 2](#).
- To open the ExpertSettings menu, press the pushbutton \ominus .
- To show the Language (言語選択) function, press the pushbuttons \ominus or \oplus .
The following languages can be selected:
 - English (英語表示)
 - Japanese (日本語表示)
- To select the language, press the pushbuttons \ominus or \oplus and confirm your selection by pressing the A pushbutton.

Performing a reset

- Open the top menu view of the AOD1, see [Opening the configuration menu, page 2](#).
- To open the ExpertSettings menu, press the pushbutton \ominus .
- To show the Reset Settings function, press the pushbuttons \ominus or \oplus .
- To select **Execute by** \square (perform a reset) press the pushbuttons \ominus or \oplus and confirm the selection by pressing the pushbutton A :
✓ Finished (reset performed) is displayed instead of **Execute by** \square .

Selecting the application

The application functions selectable in AOD1 can only be used in connection with OD1 or OD500.

- Open the top menu view of the AOD1, see [Opening the configuration menu, page 2](#).
- To open the Application Settings menu, press the pushbutton \ominus .
The following applications can be selected:
 - **Not use:** No preconfigured application, processing operations must be set manually.
 - **Independent:** The two sensors measure independently of one another, no calculation of the measured values takes place.
 - **Thickness:** Thickness measurement of the measured values from the two sensors, see [Application descriptions, page 4](#).

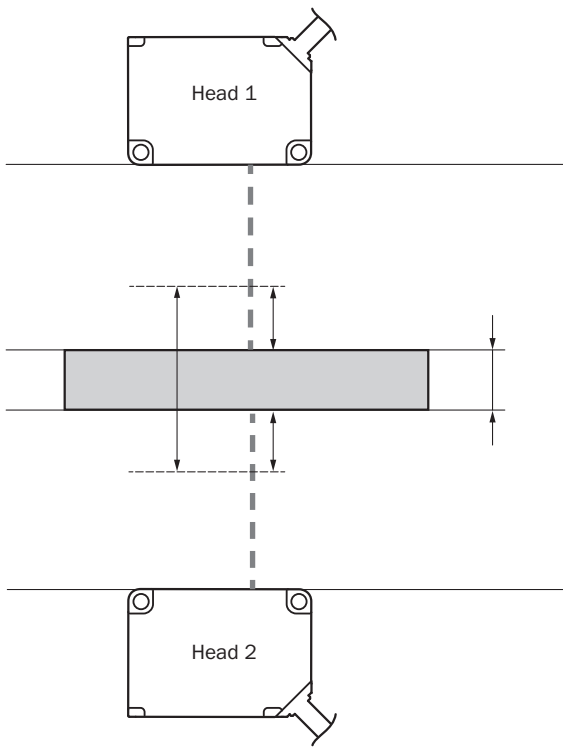


Figure 7: Application thickness

- **Difference:** Difference measurement of the measured values from the two sensors, see [Application descriptions, page 4](#).

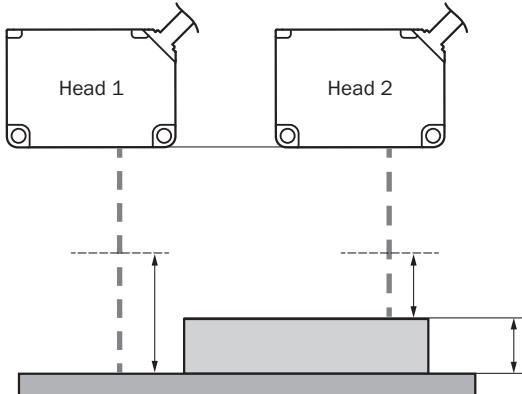


Figure 8: Application difference

- To select the pushbuttons, press \odot or \odot and confirm your selection by pressing the A pushbutton.
- To show the parameter selection, press the pushbutton \odot .

The following parameters can be selected for the individual applications:

- **Not use:** (no adjustable parameters)
- **Independent:**

No calculation

Parameter	Description
Analog Source	The assignment of the analog output must be set in the menu I/O Settings . Setting the output value: <ul style="list-style-type: none"> • Not Use: No output • Head1: Output of the measured value from sensor 1 • Head2: Output of the measured value from sensor 2

Thickness:

Thickness calculation

Parameter	Description
Thickness Value	Enter the target thickness value of the measuring object (min. 0, max. 100.00).
Upper Limit	Enter the upper limit of the permissible deviation from the thickness target value (min. -327.68, max. [327.67 - Thickness Value]).
Lower Limit	Enter the lower limit of the permissible deviation from the thickness target value (min. -327.68, max. 327.67 - Thickness Value).
Teaching Distance	Use the assistant for determining the distance between the measuring devices.
Head Distance	Manually enter the distance between the measuring devices.

Parameter	Description
Analog Source	The assignment of the analog output must be set in the menu I/O Settings . Setting the output value: <ul style="list-style-type: none"> • Not Use: No output • Active: Output of the measuring object thickness

Difference:

Differential value calculation

Parameter	Description
Difference Teach	Use assistant to determine the difference target value between the two measured values.
Difference Value	Enter difference target value (min. -100.0, max. 100.00).
Upper Limit	Enter the upper limit of the permissible deviation from the difference target value (min. -327.68, max. 327.67 - Difference Value).
Lower Limit	Enter the lower limit of the permissible deviation from the difference target value (min. -327.68, max. 327.67 - Thickness Value).
Analog Source	The assignment of the analog output must be set in the menu I/O Settings . Setting the output value: <ul style="list-style-type: none"> • Not Use: No output • Active: Output of the measuring object thickness

- To select the parameters, press the pushbuttons \odot or \odot and confirm your selection by pressing the A pushbutton.
- Make the parameter settings and confirm the entry by pressing the pushbutton A .

NOTE

The assignment of the digital outputs is automatically changed to:

- **OUT1 :** Go Head1 Result
- **OUT2 :** Go Head2 Result

This assignment can be changed in the **I/O Settings** menu.

8 Technical data (excerpt)



Technical data

Characteristic	Values
Mounting method	DIN mounting rail
Measuring device interfaces	2x M8, 4-pin
Display	128x 96 pixels
Status LEDs	Voltage supply: red/green Analog outputs: orange
Analog outputs	AOD1-xxx7Cx: 1x4-20 mA AOD1-xxx7Dx: 2x4-20 mA / 0-10 V switchable
Digital inputs	1
Digital outputs	2; NPN/PNP open collector 24 V DC, ≤ 100 mA (residual voltage ≤ 1.8 V)
Voltage supply	Master: 12-24 V DC including 10% residual ripple Slave: supply via Master
Power consumption	≤ 100 mA (at 12 V)
Circuit protection	Reverse polarity protection
Enclosure rating	IEC Standard, IP50
Ambient temperature	Operation: -20 ... +50 °C (no ice formation) Storage: -20 ... +60 °C (no ice formation)
Ambient humidity	Operation: 35 ... 85% RH (no condensation) Operation: 35 ... 85% RH (no condensation)
Vibration resistance	10 ... 55 Hz, amplitude 1.5 mm, 2 h across all axes (x, y, z)
Shock resistance	500 m/s, 3x across all axes (x, y, z)
Housing	Polycarbonate

9 Application descriptions

Thickness calculation (OD1, OD5000)

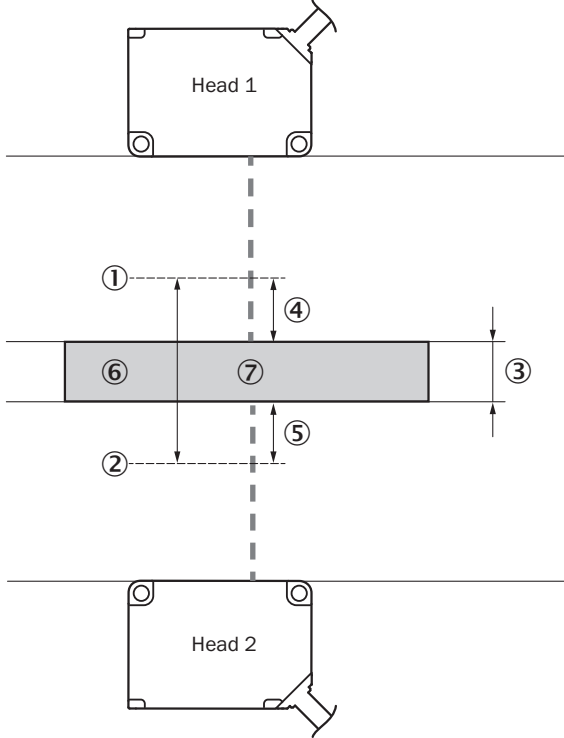


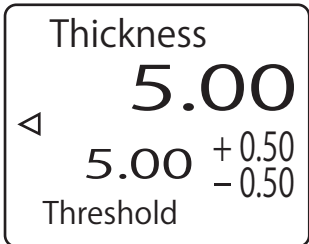
Figure 9: Application difference

- ① Center of measuring range Head1
- ② Center of measuring range Head2
- ③ Thickness of reference object
- ④ Measured value Head1
- ⑤ Measured value Head2
- ⑥ Distance of heads
- ⑦ Reference object

A description of how easily the device can be configured for measuring thicknesses appears below. This description is based on example values.

Parameter	Value
Sensor heads used (example)	2x OD1-x35x15
Center of measuring range Head1 ① and Head2 ②	35 mm
Thickness of reference object ⑦	5 mm
Upper and lower limit of differential measurement	+0.5 mm / -0.5 mm
Assumed distance of heads ⑥	23.18 mm

1. Select **Thickness** in the **AOD1 APP Settings** menu.
 2. Enter the thickness of the reference object ⑦ (5 mm).
 3. Enter the upper and lower limits of the differential measurement (+0.5 mm and -0.5 mm).
 4. Position the reference object in the measuring range of the two sensor heads.
 5. Run **Teaching - Distance** (⑥ = ③ + ④ + ⑤) by pressing **A** (a measured value of 23.18 mm is assumed here).
 6. Adjust the **Head Distance** manually if necessary.
 7. Go back to the main screen.
 8. Press the pushbutton **D** to check the calculation.
- ✓ The calculated thickness value is displayed:



Differential calculation (OD1, OD5000)

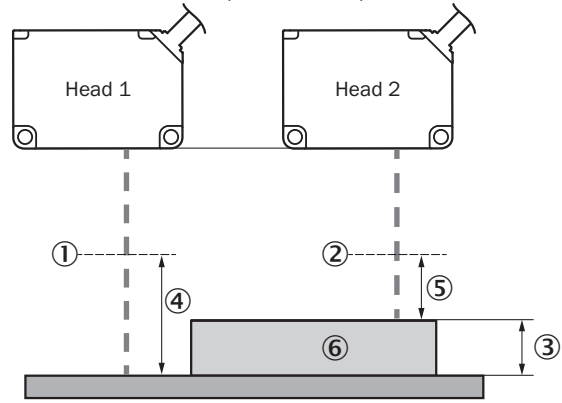


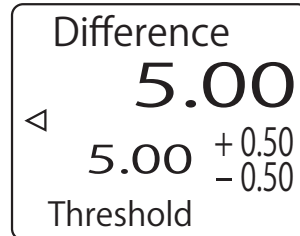
Figure 10: Application description for differential calculation

- ① Center of measuring range Head1
- ② Center of measuring range Head2
- ③ Thickness of reference object (differential value)
- ④ Measured value 1
- ⑤ Measured value 2
- ⑥ Reference object

A description of how easily the device can be configured for measuring differences appears below. This description is based on example values.

Parameter	Value
Sensor heads used (example)	2x OD1-x35x15
Center of measuring range Head1 ① and Head2 ②	35 mm
Thickness of reference object ⑥	5 mm
Upper and lower limit of differential measurement	+0.5 mm / -0.5 mm

1. Select **Difference** in the **AOD1 APP Settings** menu.
 2. Position the reference object ⑥ in the measuring range of sensor head Head2.
 3. Run **Difference - Teach** (③ = ④ - ⑤) by pressing **A** (a measured value of 5.00 mm is assumed here).
 4. Adjust the **Difference value** manually if necessary.
 5. Enter the upper and lower limits of the thickness measurement (+0.5 mm and -0.5 mm). Go back to the main screen.
 6. Press the pushbutton **D** to check the calculation.
- ✓ The calculated distance value is displayed:



Edge and width detection (OL1)

Application examples for edge and width detection can be found in the OL1 operating instructions publication (German: no. 8022329, English: no. 022330)