EN

wenglor
the innovative family

ODX402P0088
ODX402P0099

Fiber Optic Cable Sensor



Operating Instructions

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1. Proper Use

This wenglor product is used in accordance with the following mode of operation:
Both plastic fiber optic cables and glass fiber optic cables can be connected to fiber optic cable sensors. Universal reflex sensors can be used both with and without fiber optic cables. Fiber optic cable sensors analyze the light reflected by the object. The output switches when an object reaches the selected range (detection) or when the active light beam is interrupted (operating limits). Bright objects reflect more light than dark objects, and can thus be recognized from greater distances. In barrier operation, the color of the object has no effect on the range.

2. Safety Precautions

- This operating instruction is part of the product and must be kept during its entire service life.
- Read this operating instruction carefully before using the product.
- Installation, start-up and maintenance of this product has only to be carried out by trained personnel.
- Tampering with or modifying the product is not permissible.
- Protect the product against contamination during start-up.
- Not a safety component in accordance with the EU Machinery Directive.

3. General Information Regarding the Product

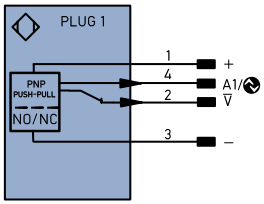
Three wenglor fiber optic cables can be adapted to these Sensors. Up to 12 add-on modules can be connected to this basic module, making 15 fiber optic cables available. The modern OLED display assures easy, menu-driven Sensor setup. Signal strengths and the switching threshold can be read from the display as numeric values or as a bar graph. Convenient programming and quick diagnosis is possible via the IO-Link interface.

4. Product Features

4.1. Connection Diagrams

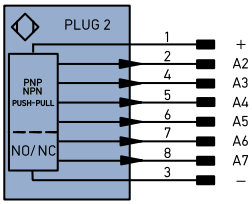
Plug number 1

773



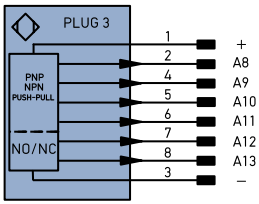
Plug number 2

775



Plug number 3

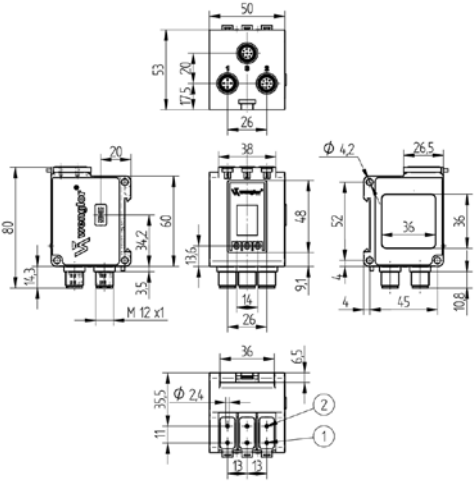
776



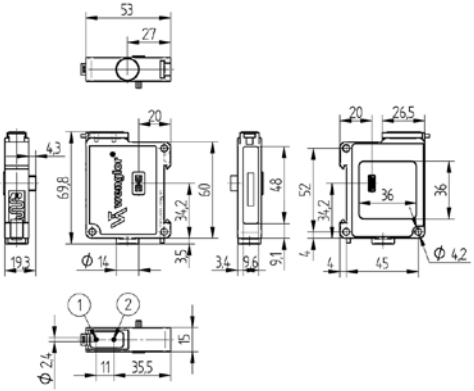
+	Supply Voltage “+”
A/	Switching Output (1, 2, 3…)/IO-Link
A	Switching Output (1, 2, 3…)
V̄	Contamination Output/Error Output (NC)
–	Supply Voltage “0 V”

4.2. Housing Dimensions

ODX402P0088



ODX402P0099



1 =Transmitter Diode

2 =Receiver Diode

4.3. EC Declaration of Conformity

The products are developed, constructed and manufactured according to the directive 2004/108/EC.
The following international standards and specifications apply:

EN 60947-5-2:2007+A1:2012 Low-voltage switchgear and controlgear
Part 5-2: Control circuit devices and switching elements – Proximity switches

Any additional standards which are applicable for the given application must be observed.



4.4.Technical Data

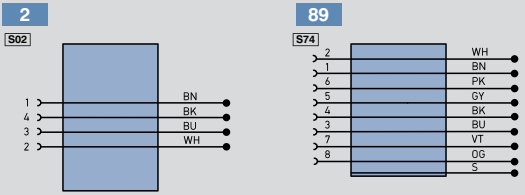
Switching Hysteresis	< 15 %
Light Source	Red Light
Wave Length	660 nm
Service Life (Tu = 25 °C)	100000 h
max. Ambient Light	10000 Lux
Supply Voltage	18…30 V
Current Consumption (Ub = 24 V)	< 70 mA (+10 mA per ODX402P0099)
Switching Frequency	2 kHz
Response Time	250 µs (+70 µs per ODX402P0099)
ON-/OFF-Delay	0…10000 ms
Temperature Drift	< 10 %
Temperature Range	–25…60 °C
Switching Output Voltage Drop	< 2,5 V
Switching Output/Switching Current	100 mA
Short Circuit Protection	yes
Reverse Polarity Protection	yes
Overload Protection	yes
Teach Mode	NT, MT, ZT, DT, TP, HT, FT
Adjustment	Teach-In
Housing	Plastic
Degree of Protection	IP50
Connection	M12 × 1; 4+8-pin
Protection Class	III
DIN-Rail mounting	35 mm

4.5. Contamination Output

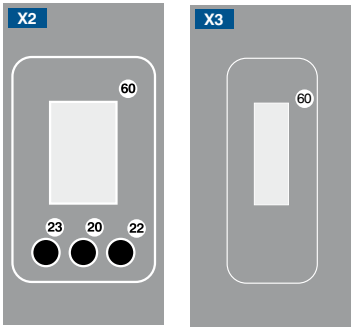
The contamination output functions as a normally closed contact (NC) and is switched off as soon as at least one of the connected sensors is being operated within the unreliable range.
Unreliable range: ontamination, misalignment

4.6. Complementary Products (see catalog)

wenglor offers Connection Technology for field wiring.

Suiting Connection Technology No.	
Glass Fiber Optic Cable	
IO-Link Master	
Plastic Fiber Optic Cable	
Add-on Module ODX402P0099	

4.7. Control Panel



20 = Enter Button
22 = Up Button
23 = Down Button
60 = Display

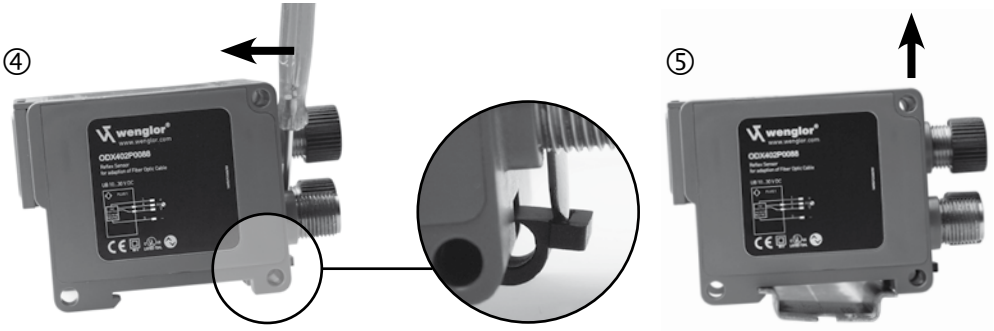
4.8. Installation Instructions

All applicable electrical and mechanical regulations, standards and safety precautions must be adhered to when installing and operating the Sensor. The Sensor must be protected against mechanical influences. Install the device such that its installation position cannot be inadvertently changed.

4.8.1 Mounting to a DIN rail



Fig.1 Mounting of the Sensor to a DIN rail



4.8.2 Side mounting

Side mounting a unit: Secure the Sensor with screws (M4) through the mounting holes.



Fig. 2 Side mounting of the Sensor

4.8.3 Connecting the plastic fibre-optic cable

- Please cut the plastic fibre-optic cable once before using with the Z0015 cutting tool.
- Open the mounting slide with a screwdriver (see fig. 3-1)
- Insert the light cable into the opening provided to this end (see fig. 3-2)
- Close the mounting slide (see fig. 3-3)



Fig. 3 Connecting the plastic fibre-optic cable

5. Initial Start-Up

Before the configuration, connect plug no. 1 and/or 2 and/or 3, depending on which outputs you need (view chapter “Connection Diagrams” on page 4).

Note: If more than one plug is used, only one Supply Voltage can be used. The desired menu language must be selected after initial start-up, and after each reset (see chapter “Display” on page 18 in this regard).

Switch to the configuration menu by pressing any key.
Note: If no settings are adjusted in the configuration menu for a period of 30 seconds, the Sensor is automatically returned to the display mode.
The Sensor accesses the last used menu view when a key is once again activated. If a setting is configured, it becomes active when the configuration menu is exited.

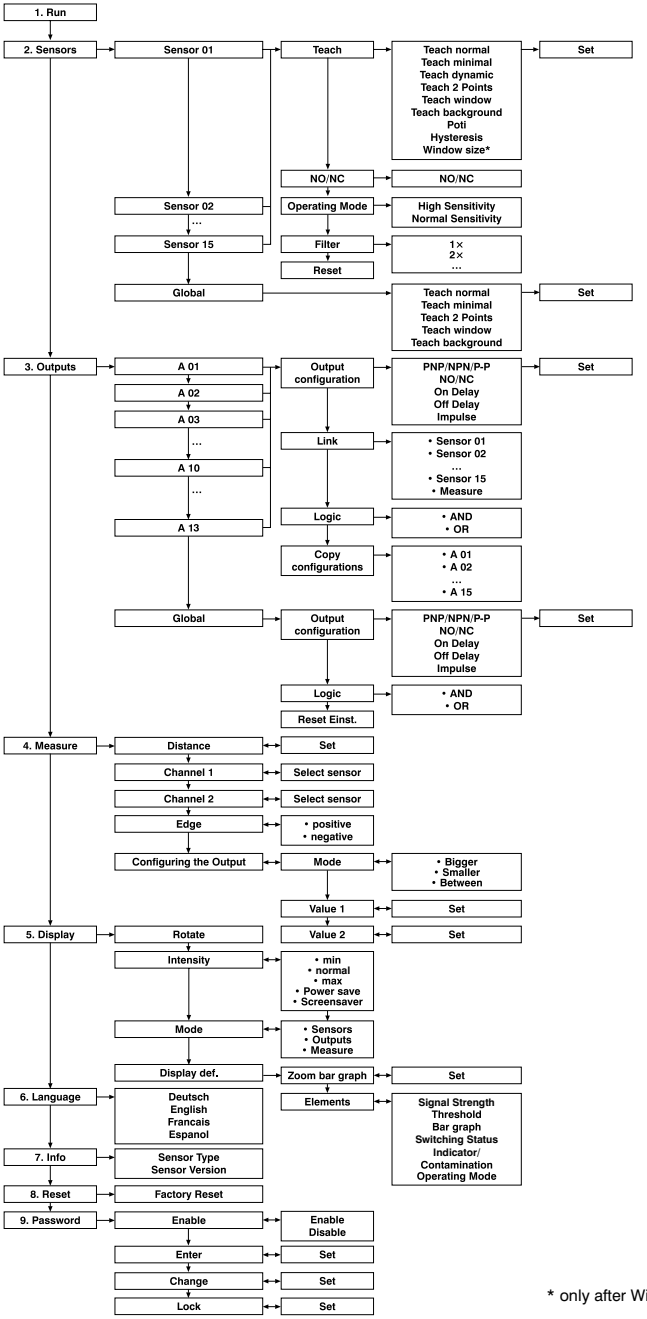
The keys are used for navigation, and for configuring settings. The functions of the navigation keys vary from menu to menu. The functions of the keys appear in the display as follows:
▲: Navigate up.
▼: Navigate down.
◀ Back: Move up one level within the menu.
◀◀ Run: Switch to the display mode.
Selection is acknowledged with the enter key.

Important: Do not use any sharp objects to press the keys when configuring settings, because they might otherwise be damaged.

5.1. Overview of functions

Description	Function	Page
Run	Switch to display mode	11
Sensors	Configuring of the Sensors	11
Outputs	Select output function	14
Measure	Configuration of the Speed Measurement Function	16
Display	Select display characteristics	18
Language	Select the desired menu language	19
Info	Read out information regarding the Sensor	19
Reset	Return to default settings	19
Password	Protection against unauthorized changes to settings	20

5.2. Menu Structure

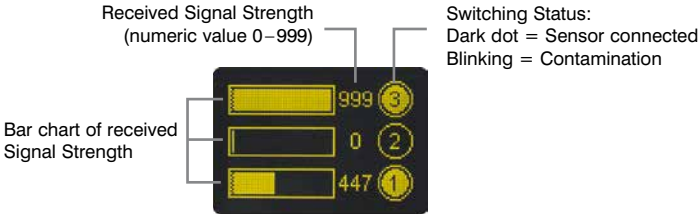


* only after Window Teach

6. Settings

6.1. Run

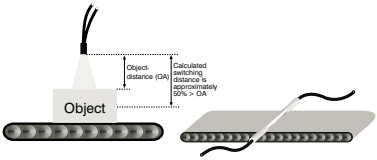
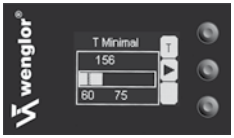
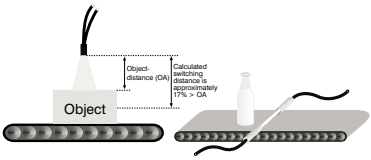
The Sensor is switched to the display mode when the enter key is pressed.



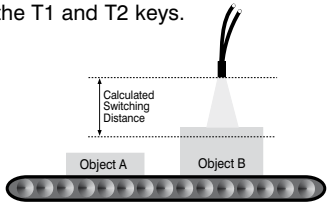
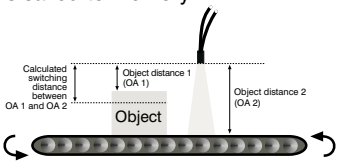
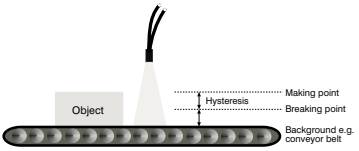
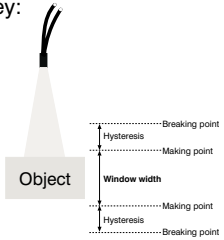
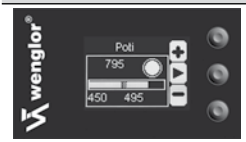
6.2. Sensors

In the menu Sensors the connected Sensors are configured. Therefor select one of the connected Sensors, or all Sensors (Global) with the navigation keys and the enter key. The Sensor(s) then can be configured.

6.2.1 Teach-In

Function	Description
T Normal	Normal Teach-In
	The object is taught in by pressing the T key: • Align the spot to the object. • Briefly press the T key. ➔ The switching distance to the object is set. • If necessary, readjust the switching distance with the help of the “Potentiometer” menu item. 
T Minimal	Minimal Teach-In/Glass recognition
	The object is taught in by pressing the T key: • Align the spot to the object. • Briefly press the T key. ➔ The switching distance to the object is set. • If necessary, readjust the switching distance with the help of the “Potentiometer” menu item. 

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T 2-Point	Two-Point Teachen
	To two objects are taught in by pressing the T1 and T2 keys. • Align the spot to object A. • Briefly press the T1 key. • Align the spot to object B. • Briefly press the T2 key. ➔ The switching point is automatically set between the signal strength from objects A and B. 
T Dynamic	**Dynamic Teach-In**
	The Sensor enters a recording phase when the T1 key is pressed, and the minimum and maximum signal strength is saved to memory. • Align the spot to the background (e. g. conveyor belt). • Briefly press the T1 key. • Move objects through the light beam. • Briefly press the T2 key. ➔ The switching point is set automatically between the minimum and maximum signal strength saved to memory during the recording phase. 
T Background	**Background Teach-In**
	The background is taught in by pressing the T key, like this a quasi background suppression is possible: • Align the spot to the background (e. g. conveyor belt). • Briefly press the T key. ➔ The Switching Point is set slightly in front of the background. 
T Window	**Window Teach-In**
	A window tolerance is taught in by pressing the T key: • Align the spot to the object. • Briefly press the T key. ➔ Tolerance window is set up around the switching point. The window width value and hysteresis are both adjustable (see below). If the object is located within the window width, the Sensor is switched. The lower and the upper switching thresholds are displayed alternately while the window is being taught in. 
Potentiometer	**Readjusting Switching Distance**
	Switching distance can be readjusted by pressing the + or – key.*

Hysteresis	Adjusting Switching Hysteresis
	The hysteresis value is adjusted by pressing the + or – key.* **Normal Sensitivity:** Minimum value: 20, maximum value: 200 **High Sensitivity:** Minimum value: 45, maximum value: 200
Window Width	Setting Window Width
	(only adjustable after window teach-in) Window width is selected by pressing the + or – key. *Minimum value: 50, maximum value: 500

* Press and hold the + or – key in order to scroll quickly through the numbers.

6.2.2 Configuring the Operating Mode

Function	Description
Operating Mode	Configuration of the Sensitivity
	By pressing the key ▲ and ▼ the desired operating mode is selected and confirmed by pressing the Enter key. High Sensitivity: Highest sensitivity for large ranges. Normal Sensitivity: Normal sensitivity for standard applications and applications with the lenses LA27 and 28.

6.2.3 Set filter

Function	Description
Filter	Set filter
	By pressing the key + or – a filter is set respectively the filter function is deactivated. If the filter function is set, several additional light impulses are used in order to make the signal more resistant against influences of ambient light. **Note:** An alteration of the filter changes the max. Switching Frequency proportionally.

Filter	1	2*	3	4	5	6	7	8
Switching Frequency	2 kHz	1 kHz	660 Hz	500 Hz	400 Hz	330 Hz	285 Hz	250 Hz

* Default Setting

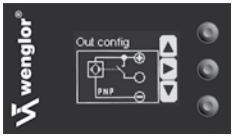
6.2.4 Reset

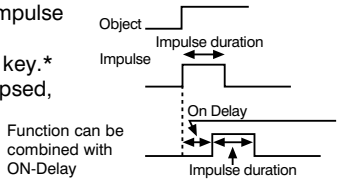
Function	Description
Reset	Default setting
	All of the selected Sensor settings are returned to their default values by pressing the R key.

6.3. Output

In the menu Outputs the 13 outputs of the Sensor are configured and linked.
Therefor select one of the 13 outputs, or all outputs (Global) with the navigation keys and the enter key.
The output(s) then can be configured and linked.

6.3.1 Configuring the Output

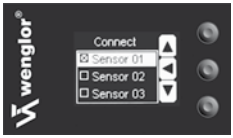
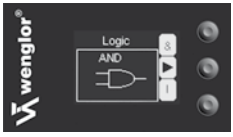
Function	Description
PNP/NPN	Selecting the Output Type
	The output is preset to PNP. Pressing the ▼ key sets the output to push-pull. Pressing the ▼ key again sets the output to NPN. The respective circuit diagram indicates how the output is set: PNP Push-Pull NPN  **Note:** NPN possible only for outputs 2 – 13.
NO/NC	Selecting the Output Function
	The normally open or normally closed output function is selected by pressing the NO or the NC key. The respective circuit diagram is displayed.
On-Delay	Adjusting On-Delay
	On-delay can be adjusted within a range of 0 to 10000 ms by pressing the + or – key.* See figure 4 on page 16.

Off-Delay	Adjusting Off-Delay
	Off-delay can be adjusted within a range of 0 to 10000 ms by pressing the + or – key.* Off-delay is disabled if a impulse duration has already been selected. See figure 4 on page 16.
Impulse	Adjusting Impulse Duration
	Pulse duration defines how long the output signal remains in the activated state. A impulse length can be selected within a range of 0 to 10000 ms by pressing the + or – key.* After the selected pulse duration has elapsed, the output signal is returned to the deactivated state. (Description applies to NO contacts in scanning mode or NC contacts in barrier mode.) 

* Press and hold the + or – key in order to scroll quickly through the numbers.

6.3.2 Link the outputs

The outputs can be linked to one or more Sensors, or to the speed measurement function.

Function	Description
Sensors	Select the Sensors to be linked
	The Sensors to be linked are selected in the select list den with the navigation keys and the enter key. One or maximal all connected Sensors can be selected. Also “Measure” can be selected to link the speed measurement function to an output. See section “Measure” on page 16.
Logic	Selecting the Linkage Logic
	By pressing the & key and the I key the logic by which the selected Sensors are linked is selected. The respective symbol is displayed.
Copy Configurations	Copy Configurations to other Outputs
	The configurations of one output are copied to one or several other outputs. Therefor the output/s where the configuration should be copied are selected with the keys ▲ and ▼ and the enter key. Select <Copy with key ▲ and ▼ and confirm by pressing the enter key.

6.3.3 ON-/OFF-Delay

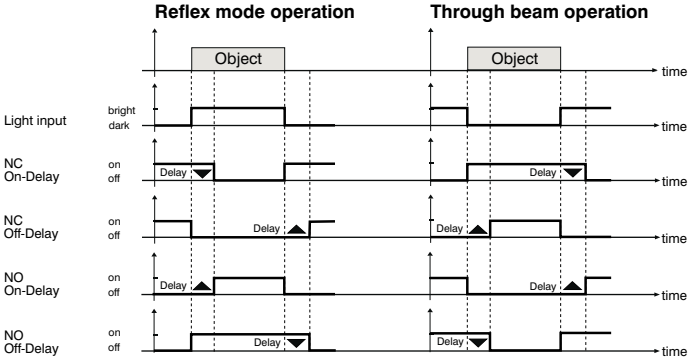
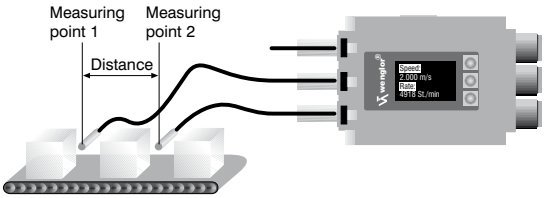


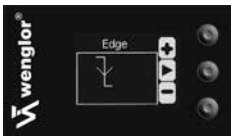
Fig. 4 ON-/OFF-Delay

6.4. Measure



In the menu Measure the speed measurement function is set.

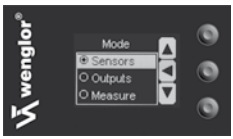
This function measures the time between the interruption of measurement point one and measurement point two and calculates the speed. The speed is displayed in the display mode “Measurement” and can be read out via IO-Link. In addition this function can be linked to an output. The output switches as soon as the entered speed is reached.

Function	Description
Distance	Enter the Measurement Distance
	By pressing the key + resp. – the distance between the two Measurement points is set *. Minimal value: 10 mm; Maximal value: 10000 mm
Channel 1	Set Measurement Point 1
	By pressing the key + and – the first measurement point for the speed measurement is selected under the connected Sensors.
Channel 2	Set Measurement Point 2
	By pressing the key + and – the second measurement point for the speed measurement is selected under the connected Sensors.
Edge	Set Edge
	For the determination of the speed the rising (positive) or the falling (negative) edge of des switching signal can be used. By pressing the key + and – the rising or the falling edge is selected.
Out. config	Output configuration
	• Mode: ➔ Bigger: The output switches as soon as the measurement speed is higher than value 1. ➔ Smaller: The output switches as soon as the measurement speed is lower than value 2. ➔ Between: The output switches as soon as the measurement speed is between value 1 and value 2. • Value 1: Entry of lower speed • Value 2: Entry of upper speed**

* Press and hold the + or – key in order to scroll quickly through the numbers.
** Only if mode “Between” is activated.

6.5. Display

The display is set up with the help of the display menu.

Function	Description
Rotate	Rotating the Display
	The display is rotated 180° by pressing the enter key. The display can be returned to its original position by pressing the same key once again.
Intensity	Adjusting Display Brightness
	After pressing the ▸ and ◂ keys, the menu appears immediately with the selected brightness setting (min., normal or max). In setting power save the display turns off after 60 seconds. In setting screensaver, the display inverts every 60 seconds. The brightness is set to normal during these settings. Selection is acknowledged by pressing the enter key.
Mode	Select the Display Mode
	By pressing the key ▲ and ▼ the display mode is selected and confirmed by pressing the enter key. The selectable modes are: • Sensors: Status of the Sensors (view “elements”) is displayed • Outputs: Status of all 15 outputs is displayed • Measurement: The current speed of the measurement function is displayed.
Display Definition	Defining the Display
	Zooming the bar graph: The bar graph is zoomed by pressing the ▲ and ▼ keys. Display elements: The elements which will appear at the display can be selected with the ▲ and ▼ keys and acknowledged by pressing the enter key. Displayable elements include: • Signal Strength(numeric value 0–999) • Threshold (numeric value 0–999) • Bar graph • Switching Status Indicator/contamination warning (output) • Operating Mode The elements can be displayed all together, individually or in any desired combination.

6.6. Language

The desired menu language can be selected in the “Language” menu.

Function	Description
Language	Selecting the Display Language
	The desired display language is selected by pressing the ▲ and ▼ keys, and is acknowledged by pressing the enter key. The desired language appears in the menus as soon as it has been selected. Selectable languages: • German • English • French • Spanish The display language must be selected after initial start-up, and after each reset.

6.7. Information

The following information regarding the Sensor is displayed in the “Info” menu:

- Sensor type
- Sensor version



6.8. Reset

Sensor settings can be returned to their default values with the help of the “Reset” menu.

Function	Description
Reset	Default setting
	All of the selected Sensor settings are returned to their default values by pressing the R key.

6.9. Password

The Sensor can be locked by entering a password in the “Password” menu, so that setting can not be readjusted.

Function	Description
Enable	Switching the Password Function On or Off
	“Enable” or “Disable” can be selected with the ▲ and ▼ keys. The password function is thus switched on or off. If the password function is activated, Sensor operation is disabled after supply power has been interrupted. Immediate disabling is also possible with the help of the “Disable” submenu.
Enter	Password Entry for Enabling the Sensor
	The password for enabling the Sensor is selected with the + or – key.* Selection is acknowledged by pressing the enter key. The password is set to “0” upon shipment from the factory.
Change	Changing the Password
	The desired new password is selected with the + or – key.* Selection is acknowledged and the password is changed by pressing the enter key.
Disabling	Disabling the Sensor
	The Sensor is disabled without interrupting supply power. The Sensor is disabled by pressing the enter key, and the password entry window is displayed immediately. The Sensor is switched to the display mode after approximately 30 seconds. A password must be entered in order to continue using the Sensor.

Notes regarding password functions:

If the password function has been activated, the password must be entered each time supply power to the Sensor is interrupted. After pressing a key, the menu is automatically switched to the password entry mode.

After the password has been correctly entered, the entire menu is enabled and the Sensor can be operated.

- The password function is deactivated upon shipment from the factory.
- The password is set to “0” upon shipment from the factory.
- Passwords can be selected within a range of 0000 to 9999.

It must be assured that the newly selected password is noted before the password is changed. If the password is forgotten, it must be overwritten with a master password. The master password can be requested by e-mail from **support@wenglor.com**.

7. IO-Link

Parameter data can be found in the interface protocol under:
www.wenglor.com ➔ Product World ➔ Search (Enter the product number) ➔ Download ➔ Interface protocol

8. Add-on Modules

8.1. Connect the Add-on Modules

Up to 12 Add-on Modules (ODX402P0099) can be connected to the Sensor. At each Add-on Module another Plastic Fiber Optic Cable can be connected, The Add-on Modules are configured like the Sensors of the Basic Module via the menu. The Add-on Module can be connected to the Basic Module before operation or during operation through the plug connection. We suggest to use end brackets for the DIN-Rail.
The Basic Module signalizes in the display that an Add-on Module has been connected. In order to configure this Module a Sensor number between 4 and 15 has to be attributed. Select the number with key ▲ and ▼ and confirm with the enter key.
The Sensor confirms the distribution of the Sensor number in its display.



The Add-on Module is generally attributed to the closest output that is still free. In the menu “Outputs” this attribution can be changed.
In the menu Sensors the Add-on Module can be configured. Therefor the Sensor has to be selected with the keys ▲ and ▼ and has to be confirmed with the enter key (view chapter “Sensors” on page 11).

8.2. Disconnect the Add-on Modules

There are two possibilities to disconnect one or several Add-on Modules:
1. without previous reset
2. with previous reset

In case of disconnection without previous reset the Add-on Module is disconnected during operation or in OFF status from the Basic Module.
Here the configurations of the Module and the Sensor number are kept.
If this Add-on Module is connected with another system afterwards, where the Sensor number is already taken, a double attribution and thus an error will occur.
Thus we suggest to reset the Sensor before disconnecting it from the Basic Module.
In case of disconnection with previous reset the Sensor is reseted (like in chapter “Reset” on page 19) and then disconnected from the Basic Module. If this Add-on Module is connected with another system afterwards, a new Sensor number has to be attributed first.

9. Maintenance Instructions

- This wenglor Sensor is maintenance-free.
- It is advisable to clean the lens and the display, and to check the plug connections at regular intervals.
- Do not clean with solvents or cleansers which could damage the product.

10. Proper Disposal

wenglor sensoric gmbh does not accept the return of unusable or irreparable products. Respectively valid national waste disposal regulations apply to product disposal.