wenglor
the innovative family

OY2TA104P0150P

High-Performance Distance Sensor

Operating Instructions

EN

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1. Proper Use

This wenglor product has to be used according to the following functional principle:
High-performance distance sensors which use the principle of transit time measurement determine the distance between the sensor and the object according to the principle of transit time measurement. These sensors have a large working range and are therefore able to detect objects over large distances.
Selected sensors are distinguished by WinTec (wenglor interference free technology). This technology allows black or shiny surfaces to be reliably detected even in extremely inclined positions. It is possible to mount several sensors next to or across from each other without them influencing each other.

2. Safety Precautions

2.1. 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 personal.
- Tampering with or modifying the product is not permissible.
- Protect the product against contamination during start-up.
- These products are not suited for safety applications.

2.2. Laser/LED warning

LASER CLASS 1
EN60825-1
2007

Class Laser 1 (EN 60825-1)
Observe all applicable standards
and safety precautions.

3. EU Declaration of Conformity

The EU declaration of conformity can be found on our website at www.wenglor.com in download area.

CE   ⬦III⬦   c(UL)us LISTED IND. CONT. EQ. 72HL For use in class 2 circuits Environmental Type 1   ☑ **RoHS**

4. Technical Data

Order Number	OY2TA104P0150P
Working Range	0,1...10,1 m
Linearity Deviation	20 mm
Reproducibility	7 mm
Light Source	Laser (red)
Output Rate	330/s
Wave Length	660 nm
Service Life (Tu = 25 °C)	100000 h
Max. Ambient Light	5000 Lux
Laser Class (EN 60825-1)	1
Beam Divergence	< 2 mrad
Light Spot Diameter	see table 1
Port Type	100BASE-TX
PoE Class	1
Response Time	< 10 ms
Temperature Range	–25...50 °C
Reverse Polarity Protection	yes
Protection Class	III
Adjustment	Menu (OLED)
Housing	Plastic
Degree of Protection	IP68
Connection	M12×1, 8-pin
Webserver	yes
Control Panel No.	X2, T10
PROFINET IO, CC-B	✔

Light Spot Diameter

Working Distance	0	10 m
Light Spot Diameter	5 mm	< 20 mm

Table 1

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4.1. Connecting the Sensors

OY2TA104P0150P

001
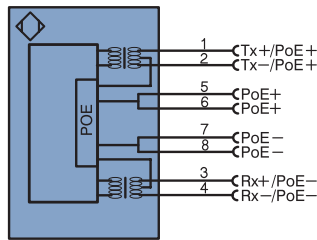
Legend

+	Supply Voltage +	
−	Supply Voltage 0 V	
~	Supply Voltage (AC Voltage)	
A	Switching Output	(NO)
Ā	Switching Output	(NC)
V	Contamination/Error Output	(NO)
V̄	Contamination/Error Output	(NC)
E	Input (analog or digital)	
T	Teach Input	
Z	Time Delay (activation)	
S	Shielding	
RxD	Interface Receive Path	
TxD	Interface Send Path	
RDY	Ready	
GND	Ground	
CL	Clock	
E/A	Output/Input programmable	
⊘	IO-Link	
PoE	Power over Ethernet	
IN	Safety Input	
OSSD	Safety Output	
Signal	Signal Output	
BI_D+/−	Ethernet Gigabit bidirect. data line (A-D)	

PT	Platinum measuring resistor
nc	not connected
U	Test Input
Ū	Test Input inverted
W	Trigger Input
O	Analog Output
O−	Ground for the Analog Output
BZ	Block Discharge
AMV	Valve Output
a	Valve Control Output +
b	Valve Control Output 0 V
SY	Synchronization
E+	Receiver-Line
S+	Emitter-Line
⏚	Grounding
SnR	Switching Distance Reduction
Rx+/−	Ethernet Receive Path
Tx+/−	Ethernet Send Path
Bus	Interfaces-Bus A(+)/B(−)
La	Emitted Light disengageable
Mag	Magnet activation
RES	Input confirmation
EDM	Contactor Monitoring
ENARS422	Encoder A/Ā (TTL)

ENA	Encoder A
ENB	Encoder B
AMIN	Digital output MIN
AMAX	Digital output MAX
AOK	Digital output OK
SY in	Synchronization In
SY OUT	Synchronization OUT
OLT	Brightness output
M	Maintenance

Wire Colors according to DIN IEC 757

BK	Black
BN	Brown
RD	Red
OG	Orange
YE	Yellow
GN	Green
BU	Blue
VT	Violet
GY	Grey
WH	White
PK	Pink

4.2. Housing Dimensions

1 = Transmitter Diode
2 = Receiver Diode

4.3. Control Panel

20 = Enter Button
22 = Up Button
23 = Down Button
60 = Display
78 = Module Status
84 = Communication Status
85 = Link/Act LED
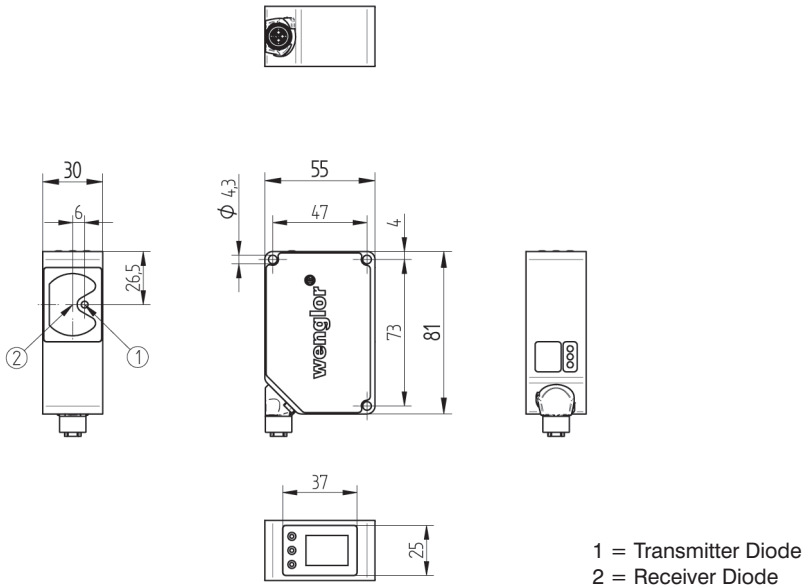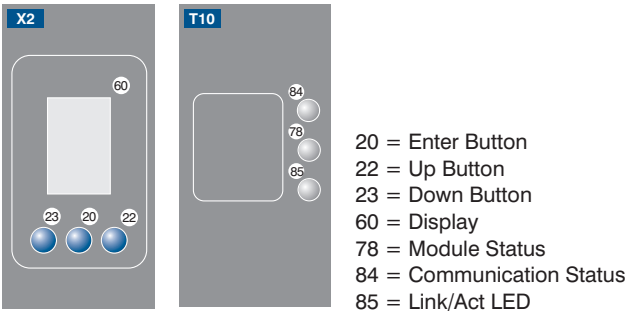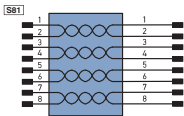
Designation	Condition	Function
CS (Communication Status)	Off	Connection (AR) with controller established
	Green	Protocol not initialized
	Red	No connection (AR) with controller established
MS (Modul Status)	Red	Error (class FATAL)
	Red flashing	Detection function, may be activated via Engineering Tool
L/A	Green	Links present
	Green flashing	Communication

4.4. Complementary Products

wenglor offers Connection Technology for field wiring.

Suiting Mounting Technology No.	340
Suiting Connection Technology No.	50

Protection Housing Set ZST-NN-02
Midspan Adapter Z0029
Switch with PoE ZAC50xN0x

5. Mounting Instructions

When using the Sensor, follow the corresponding electrical and mechanical regulations, standards and safety rules. The Sensor must be protected against mechanical influence. The Sensor has optimum extraneous light qualities when the background is within the working range.

6. Initial Operation

6.1. Initial Operation

Each Ethernet device has a unique MAC address. With wenglor you can find the MAC address on the type plate of the device.

In the default settings, the device has the following IP-Address 192.168.100.1. You can access the website of the device via the IP-Address. You can change settings on the device on the website or using the OLED display in order to test applications.

Caution: In the case of operation on a control unit, settings that were changed on the website or using the OLED display will be overwritten by the control unit.

If you want to start up the device on a control unit, please perform the following steps:

• Connect the Sensor to a switch with PoE using an appropriate cable M12×1; 8-pin. In the case of a switch without PoE, please use the Midspan Adapter (Z0029) for the appropriate voltage supply. When the voltage supply is present, the display on the Sensor starts.
• Install the associated device-specific electronic description file (e.g. for PROFINET, the GSDML file) in the hardware manager. You can find the file you require for download at **www.wenglor.com → Product World → Product search** (order number) → **Download**. Explanations regarding the electronic description file and its structure can be found in the detailed operating instructions in PDF format.
• Help on installing the file in the control and design of the network can be found in the help files of the relevant control. wenglor provides a description for the download at: **www.wenglor.com → Product World → Product search** (order number) → **Download**..

6.2. Default Settings

		OY2TA104P0150P
Display	Mode	Process
	Intensity	Screensaver
Filter		1
Laser		ON
Network	IP-Address	192.168.100.1
	Subnet Mask	255.255.255.0
	DHCP	DHCP OFF
	Std Gateway	192.168.100.254
	MAC Address	(See type plate on the product)
Language		English
Password	Activate	Off
	Change	0

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7. Functional Overview OLED-Display

Run

Display → Mode - - - - - → ○ Process / ○ Text / ○ Analyse / ○ Network

Rotate

Intensity - - - - - → ○ Min / ○ Medium / ○ Max / ○ Power save / ○ Screensaver

Filter → ○ 1 ○ 10 ○ 100 / ○ 2 ○ 20 / ○ 5 ○ 50

Laser → ○ On / ○ Off

E/A Test →
Measured Value - - → Value in *µm*

Status Bits - - - - - → No. of Status Bit

Warmup - - - - - → ○ OK / ○ Warmup

Signal - - - - - → ○ OK / ○ Too low / ○ Too high

Temperature - - - - -

Network →
IP address - - - -

Subnet Mask - - - - → Run Mode

Std Gateway - - - -

Language → ○ Deutsch / ○ English / ○ Français / ○ Español / ○ Italiano

Info → Display of Part number and Sensor version

Reset → Press <R> for Reset

Password →
Enable - - - - - → ○ ON, ○ OFF

Change - - - - - → Password: 0 – 9999

Lock - - - - - → Run Mode

Fig. 1: Set language menu

Navigation by pressing the button:
▲   : Navigation up.
▼   : Navigation down.
↵   : Enter Button.
The selection is confirmed by pressing the Enter button.

Meaning of the menu items:
◀ Back   : one level higher in the menu.
◀◀ Run   : Switch to display mode.
Change to the configuration menu by pressing any button.

Note: If no setting is made in the configuration menu for a period of 30 s, the Sensor returns automatically to the display view.
Pressing the button again returns the Sensor to the last menu view used. If a setting is made, it becomes active once you leave the configuration menu.

Important: To prevent any damage to the buttons, please do not use any pointed objects for setting.

The following explains the functions behind the individual menu items.

7.1. Run

The Sensor switches into display mode.

PROFINET device name

Bar graph display of the current measured value relative to the measuring range

Status LEDs

Current measured value in mm
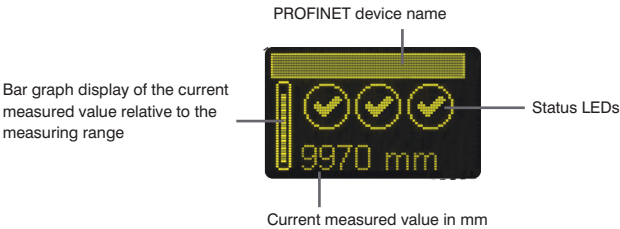
Symbol descriptions of status LEDs:

Symbol	Significance	State 1	State 2	State 3
Symbol 1	Warm-up	ok	wait	–
Symbol 2	Signal Strength	ok	too low (dirty)	too high
Symbol 3	Temperature	ok	too high	too low

7.2. Display

Display	Adjust the display device
Mode Rotate Intensity ◀ Back ◀◀ Run	**Mode:** Select display mode (see chapter 7.2.1) **Rotate:** Rotate display by 180°. By pressing the "↵" button the display is rotated by 180°. The rotation is canceled by pressing this button again. **Intensity:** Set the display intensity (see chapter 7.2.2)

7.2.1. Display Mode

The measured value in mm and the PROFINET device name always appear in the Sensor's display. [offline] will be displayed here unless the PROFINET device name has been changed. You can choose from the following additional displays in the menu item "display mode":

Mode	Adjust the display device
O Process O Text O Analysis O Network	**Process:** Display of status LEDs for warm-up, signal strength and temperature. **Text:** Display of a free text that can be sent to the Sensor via the control. **Analysis:** Display of signal strength in percent and measuring rate in 1/s. **Network:** Display of the PROFINET LEDs MS, CS and L/A. For the function of these LEDs, see "4.3. Control Panel" on page 7.

7.2.2. Display Intensity

Intensity	Set the display intensity	
O Min	**Min:**	The intensity of the display is set to a minimum value.
O Normal	**Normal:**	The intensity of the display is set to a medium value.
O Max	**Max:**	The intensity of the display is set to a maximum value.
O Power save	**Power save:**	The display switches off after one minute without a button being pressed and automatically switches back on when a button is pressed.
O Screensaver	**Screensaver:**	The colors of the display are inverted every minute.

7.3. Filter

The filter (filter size) is the number of measured values over which the Sensor takes an average. The larger the filter selected, the slower the response time of the Sensor becomes when there is a change in the measured values. A larger filter improves the reproducibility of the Sensor.

Filter	Number of values for averaging
O 1	If 1 is selected, each measured value is output directly without averaging. Whenever a value greater than 1 is selected, the Sensor takes an average over the selected number of x measured values.
O 2	
O 5	
O 10	
O 20	
O 50	
O 100	
◀ Back	
◀◀ Run	

7.4. Laser

In the menu item "Laser", the emitted light can be switched on or off.

Laser	Switch transmitted light on or off	
O On	**ON:**	Switch transmitted light on
O Off	**OFF:**	Switch transmitted light off; the Sensor no longer supplies measured values
◀ Back		
◀◀ Run		

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7.5. I/O Test

This function manually changes the output of the Sensor. As a result, it possible to test whether the further process is working as desired. The test is automatically terminated once you leave the test menu.

I/O Test	Test of the Sensor outputs
Measured value Statusbits Warm-up Signal Strength Temperature ◀ Back ◀◀ Run	**Measured value:** Default of a measured value in μm **Statusbits:** The number of the status bit to be set can be selected by pressing the "+" or "−" button. (see list of Statusbits) **Warm-up:** Default of the warm-up on "ok" or "warm-up" **Signal strength:** Default of the signal strength on "ok", "too low" or "too high" **Temperature:** Default of the temperature on "ok", "too low" or "too high"

If the Sensor returns to the display view after 30 seconds without pressing the button while the test is still active, this is indicated by a ⚠ in the display view.

List of status bits:

Number	Function	Description of when the bit is set	Measured value read-out
1	General error	One of the following bits is set.	—
2	Distance to object too small	The current measured value is below the working range.	Measuring range lower limit
3	Distance to object too large	The current measured value is above the working range.	Measuring range upper limit
4	No signal	The sensor does not detect an object within its working range.	Measuring range upper limit
5	Signal too weak	Too little light is reflected back to the sensor from the object (e.g. very dark surface). The quality of the measured value is reduced as a result.	Current measured value
6	Signal too strong	Too much light is reflected back to the sensor from the object (e.g. reflector) The quality of the measured value is reduced as a result.	Current measured value
7	Warm-up procedure	The sensor is currently in the warm-up phase and the quality of the measured value does not yet comply with the specified technical data. See page 5 below.	Current measured value
8	Temperature too high	The sensor is at the upper limit of its temperature range. If temperature continues to rise, the sensor may be destroyed.	Current measured value
9	Temperature too low	The sensor is at the lower limit of its temperature range. If temperature continues to drop, the sensor may be destroyed.	Current measured value

7.6. Network

Network	Settings of the Network Parameters	
IP-Address	**IP-Address:**	Display of the set IP-Address
Subnet Mask	**Subnet Mask:**	Display of the set Subnet Mask
DHCP	**DHCP:**	Display DHCP ON or DHCP OFF
Std Gateway	**Std Gateway:**	Display of the set standard gateway
MAC Address	**MAC Address:**	Display of the default MAC Address
Net Reset	**Net Reset:**	Reset network settings to the default settings
◀ Back		
◀◀ Run		

7.7. Language

The menu language can be changed in the menu item "Language". The user is automatically prompted for his desired language at initial operation and after each reset.

Language	Set menu language
O Deutsch	The menu appears in the selected language immediately after selection.
O English	
O Francais	
O Espanol	
O Italiano	
◀ Back	
◀◀ Run	

7.8. Info

In the menu item "Info" the following information about the Sensor is displayed:

Info	
Order number	
Software version	
Serial number	

7.9. Reset

All Sensor settings, with the exception of the network settings, can be reset to the default settings in the menu item "Reset. The settings of the default settings can be found in Chapter "6.2. Default Settings" on page 9.

Reset	Reset to the default settings
Press <R> for Reset	The Sensor settings that have been made can be reset to the default settings by pressing the "R" button.

7.10. Password

Password protection prevents against changing the set data unintentionally.

Password	Set password functionality
Activate Change Block ◀ Back ◀◀ Run	**Enable:** Turn password protection on or off. If password protection is activated, the operation of the Sensor is disabled after supply power has been interrupted and is only enabled after successfully entering password. **Change:** Change password. **Lock:** Locking Sensor causes an immediate disabling of operation if activate Password is set to "on".

If the password functionality is activated, the password must be entered before each operation of the Sensor. After correctly entering the password by means of the "+" and "−" button, the menu is activated and the Sensor is operational.
• The password functionality is deactivated in the default settings.
• The value range of the password number ranges from 0000…9999

It is necessary to note the newly defined code before changing the password. A forgotten password can only be overwritten by a general password. The general password can be requested by sending an e-mail to **support@wenglor.com**.

8. Information on PROFINET

You can find the GSDML file for download at **www.wenglor.com** → **Product World** → **Product search** (Enter the product number).

8.1. Overview of Device Access Point (DAP)

Modul-ID: 0
Submodul: 0

Parameter:

Name	Data Type	Byte Offset	Bit Offset	Bit Length	Default Value	Value Range	Change-able	Index	Length	Description
Webserver Access	BitArea	0	0	1	0: enabled	0…1	Yes	300	1 Byte	0: enabled 1: blocked
Button lock	BitArea	0	0	1	0: enabled	0…1	Yes	301	1 Byte	0: enabled 1: blocked
Rotate display	BitArea	0	0	1	0: not rotated	0…1	Yes	302	1 Byte	0: not rotated 1: rotated
Display Intensity	BitArea	0	0	3	4: Screensaver	0…4	Yes	303	1 Byte	0: Min 1: Normal 2: Max 3: Power saver mode 4: Screensaver
Display mode	BitArea	0	0	3	0: Process	0…3	Yes	304	1 Byte	0: Process 1: Analysis 2: Text 3: Network
Language	BitArea	0	0	3	1: English	0…4	Yes	305	1 Byte	0: Deutsch 1: English 2: Français 3: Español 4: Italiano

8.2. Overview of modules used in the DAP OY2TA104P0150P

Name	Cyclical Input	Parameter	Parameter Slot (pluggable)
Distance Value	Measured value, Status	Filter value, Laser ON OFF	1 (fix)
Status	Bit field	–	2 (fix)
Filter	Filter value	–	3 (pluggable)
Laser	Laser ON OFF	–	4 (pluggable)
Display text	Display text	–	5 (pluggable)
Offset	Offset Set	–	6 (pluggable)

The detailed structure of the modules is described in the following.

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Module Distance Value

Module ID: 1
Submodule: 1
Slot: 1

Format Cyclical Data:
4 Byte Statusbits (see Module status)

Input	Output	Value Range	Data Type	Unit	Description
Measured value	–	–	Integer32	mm	Distance Value
Statusbits	–	Bit	Unsigned32	–	(see Module status)

Parameter:

Name	Value Range	Data Type	Index	Presetting	Changeable
Filter	0…6	Unsigned8	257	0	yes
Laser	0…1	Bit	264	0	yes

Module Status

Module ID: 2
Submodule: 1
Slot: 2

Format Cyclical Data:

Input	Output	Value Range	Data Type	Unit	Description
Statusbits	–	Bit	Unsigned32	–	Bit0: General Bit1: Distance to Object is too small Bit2: Distance to Object is too large Bit3: No signal Bit4: Contamination Bit5: Signal too high Bit6: Warm-up procedure Bit7: Overtemperature Bit8: Undertemperature

Parameter:

Name	Value Range	Data Type	Index
–	–	–	–

Module Filter

Module ID: 3
Submodule: 1
Slot: 3

Format Cyclical Data:

Input	Output	Value Range	Data Type	Unit	Description
Filter Value	Filter Value	0…6	Unsigned8	–	0: filter size 1 1: filter size 2 2: filter size 5 3: filter size 10 4: filter size 20 5: filter size 50 6: filter size 100

Parameter:

Name	Value Range	Data Type	Index
–	–	–	–

Module Laser ON OFF

Module ID: 4
Submodule: 1
Slot: 4

Format Cyclical Data:

Input	Output	Value Range	Data Type	Unit	Description
Laser ON-OFF	Laser ON-OFF	0…1	Unsigned8	–	0: Laser ON 1: Laser OFF

Parameter:

Name	Value Range	Data Type	Index
–	–	–	–

Module Display Text

Module ID: 5
Submodule: 1
Slot: 5

Format Cyclical Data:

Input	Output	Value Range	Data Type	Unit	Description
Display Text	Display Text	Text 19 Character	Visible String	–	Displayable Display Text

Parameter:

Name	Value Range	Data Type	Index
–	–	–	–

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Module Offset

Module ID: 6
Submodule: 1
Slot: 6

Format Cyclical Data:

Output

Value Range	Data Type	Unit	Description
1…5	Unsigned8	–	0x00: Start command 0x01: Learn offset value 0x03: Reset offset value 0x04: Apply offset 0x05: Reset offset

Input

Value Range	Data Type	Unit	Description
0x00…0x10	Unsigned8	–	0x00: Ready for command 0x10: Command executed

Parameter:

Name	Wertebereich	Datentyp	Index
–	–	–	–

Examples:

Learn offset value: Input   0x00 ↘ 0x00 ↗ 0x01 ↘ 0x10
                        Output

Apply offset value: Input   0x00 ↘ 0x00 ↗ 0x04 ↘ 0x10
                        Output

9. Network Settings

To operate the device in an Ethernet LAN, the device and the remote station, for example a computer, must be located in the same network. The IP-Address of the device is set to the IP-Address 192.168.100.1 and to the subnet mask 255.255.255.0 and standard gateway 192.168.100.254. In the instructions the default values are always assumed.

WARNING: It must be ensured that supply power is not interrupted while making changes to network settings. Furthermore, supply power must maintained for at least an additional 5 minutes after the network settings have been saved to memory.

10. Web-based configuration

The device is equipped with a web-based adjustment interface that works independent of the operating system. You can configure the device conveniently using a standard web browser (e.g. Internet Explorer or Firefox).

10.1. Invoking the Management Interface

Start the web browser. Enter the IP-Address of the device in the address line of your browser, and press the Enter button. The IP-Address is preset to 192.168.100.1.

Example: http:\\192.168.100.1

The overview page "Device general" is not password protected. If other pages are accessed, a password request appears. The following user data is preset in the default settings:

User name: admin
Password: admin

The password can be changed on the "Device settings" page.

10.2. Page layout
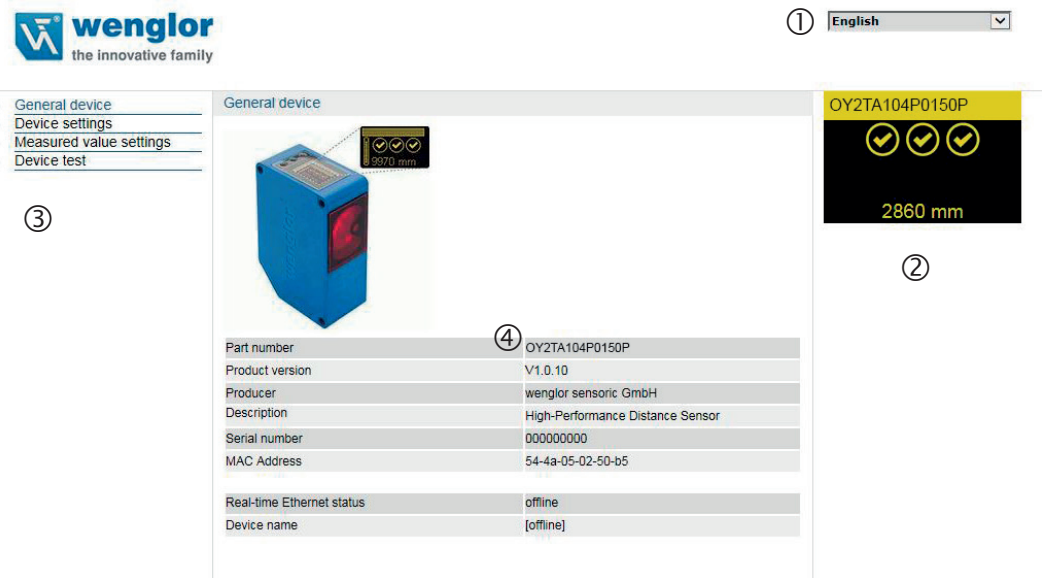
The website is divided into the following 4 areas:

1. Language selection: The website can be changed from English (default setting) to German, French, Spanish or Italian via the language selection.

2. Display: On each page, the current display is represented exactly like on the device itself.

3. Category selection: The web-based settings are divided into four categories:
- **Device general:** Overview page with general information about the device
- **Device settings:** Network and display settings of the device
- **Measured value settings:** Settings for influencing the measured value of the device
- **Device Test:** Manual change of the Sensor output in order to test the process

4. Page content: Depending on which category is selected, the relevant page content is displayed.

10.3. Device general

After establishing the connection, the overview page "Device general" is displayed.

Device Name: A unique device name can be freely assigned to each device via the PROFINET control. The device name is also displayed in the first line of the display. If no name is assigned, [offline] is displayed here.

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10.4. Device Settings

Network Settings
By clicking on "Send" the settings are saved. After interruption of the power supply, the network settings are applied.

Network Reset
In a network reset, the network settings are reset to the factory settings. See chapter "6.2. Default Settings" on page 9. The settings are applied after interruption of the power supply. The Sensor settings remain unchanged.

Display Settings
For functional description of display settings see chapter "7.2. Display" on page 12.

Password
The password for the website is changed here. An additional window opens in which the new password can be entered.

10.5. Measured Value Settings

Filter

For functional description of filter see chapter "7.3. Filter" on page 13 .

Emitted Light

For functional description of transmitted light see chapter "7.4. Laser" on page 13.

Sensor Settings Reset

In a reset, the Sensor settings are reset to the factory setting. The network settings remain unchanged.
For functional description of Sensor settings reset see chapter "7.9. Reset" on page 16.

10.6. Device Test

For functional description of device test see chapter "7.5. I/O Test" on page 14.

The test is activated as soon as at least one parameter is changed.

The length of the test is limited to 10 minutes. Afterwards, the test is terminated automatically. The remaining time of the test is displayed under the button "Switch off" and below the display window. The test can also be terminated prematurely by clicking on "Switch off".

11. Maintenance Instructions

• This wenglor Sensor is maintenance-free.
• It is recommended to clean the lens and the display regularly and to check the socket connections.
• Do not use any solvents or cleaning agents to clean the Sensor, which could damage the device.

12. Proper Disposal

wenglor sensoric gmbh does not take back unusable or irreparable products. When disposing of the products, the relevant national regulations for waste disposal apply.