

# OY1P303P0102

# OY1P303P0189

High-Performance Distance Sensors



Operating Instructions

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## 1. Proper Use

This wenglor product has to be used according to the following functional principle:

### High-Performance Distance Sensors

This group brings together the most powerful sensors for distance measurement, which work in reflex mode according to different principles. High performance distance sensors are particularly fast and precise, and demonstrate their high efficiency over large working ranges. They are ideally suited for demanding applications. Even black and shiny objects are reliably detected. Ethernet technology is integrated into selected sensors.

## 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.
- Not a safety component in accordance with the EU Machinery Directive.

### 2.2. Laser/LED warning



**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](http://www.wenglor.com) in download area.



**RoHS**

## 4. Device Features

Order Number	OY1P303P01	
	89	02
Working Range	50...3050 mm	
Measuring Range	3000 mm	
Reproducibility	1 mm	
Linearity Deviation (200...3050 mm)	7 mm	
Linearity Deviation (50...200 mm)	15 mm	
Switching hysteresis	3 – 20 mm	
Light Source	Laser light (red)	
Laser Class	1	
Supply Voltage	18...30 V DC	
Current Consumption (U <sub>b</sub> = 24 V)	< 70 mA	
Switching Frequency	250 Hz	
Response Time	2 ms	
Temperature Drift (-10° < Tu < 50°)	< 0,2 mm/K	
Temperature Drift (Tu < -10°)	< 0,4 mm/K	
Temperature Range	-40 °C...50 °C	
Voltage Drop	< 2,5 V	
Switching Output/Switching Current	100 mA	
Short Circuit Protection	yes	
Reverse Polarity and Overload Protection	yes	
Protection Class	III	
Protection	IP68	
Connection	M12 × 1; 8-pin	M12 × 1; 4-pin
Suiting Connection Technology No.	89	2
Connection Diagram No.	531	782
Interface	RS-232	IO-Link
IO-Link version	—	1.1

### Measuring Range:

The Sensors' measuring range is determined by object remission.

Maximum range of            up to 3 m on white (90 % remission)  
                                       up to 3 m on grey (18 % remission)  
                                       up to 2 m on black (6 % remission)

### Light Spot Diameter

Working Distance	0	3 m
Light Spot Diameter	5 mm	9 mm

## Dependence of Hysteresis and reproducibility on the Measuring rate on white (90 % Remission)

OY1P303P01xx		
Set Filter	Default setting for min. hysteresis in mm	Reproducibility in mm
1	20	15
2	16	10
Default Settings	5	8
	10	6
	20	5
	50	4
	100	3
	200	2
	500	1

### Power-on Drift

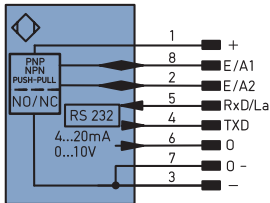
The following table provides information on the power-on drift during the warm-up phase.

Time in min	0	1	2	5	10
Power-on drift in mm	±7	±5	±4	±2	±0

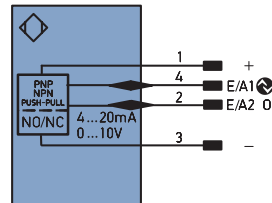
## 4.1. Connecting the Sensors

### OY1P303P0189 OY1P303P0102

531



782



#### Legend

+	Supply Voltage +
-	Supply Voltage 0 V
~	Supply Voltage (AC Voltage)
A	Switching Output (NO)
Ā	Switching Output (NC)
V	Contamination/Error Output (NO)
Ṽ	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

#### Legend

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
Awv	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
Ba	Interfaces-Bus A(+)/B(-)
La	Emitted Light disengageable

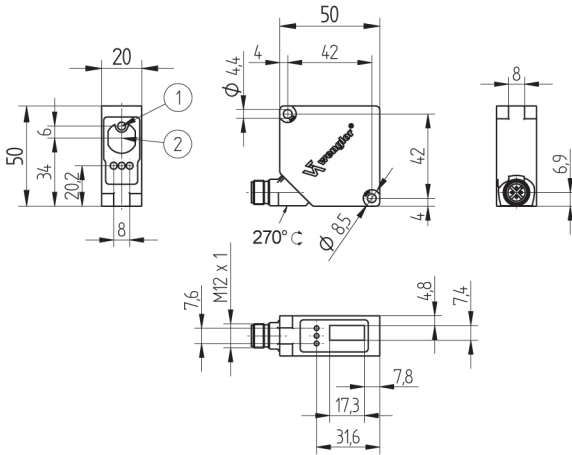
#### Legend

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
rsv	reserved

#### Wire Colors according to DIN IEC 757

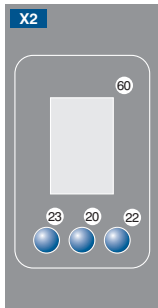
BK	Black
BN	Brown
RD	Red
OG	Orange
YE	Yellow
GN	Green
BU	Blue

## 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



01 = Switching Status Indicator  
02 = Contamination Warning  
68 = Supply Voltage Indicator

## 4.4. Complementary Products

wenglor offers Connection Technology for field wiring.

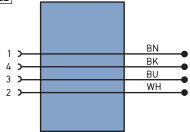
Suitable Mounting Technology No. **380**

Suitable Connection Technology No.

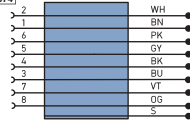
**2**

**89**

[S02]



[S74]



IO-Link Master

Protection Housing Set ZSP-NN-02

Protection Housing Set ZSV-0x-01

## 5. Mounting instructions

During operation of the Sensors, the corresponding electrical and mechanical regulations, as well as safety regulations must be observed. The Sensor must be protected from mechanical impact. The Sensor has optimal ambient light characteristics if the background changes within the Working Range.

## 6. Initial Operation

Before the configuration, connect the Sensor to 18...30 V DC.

The desired menu language must be selected after initial start-up, and after each reset (see fig. 1).



Fig. 1: Set menu language

The functions of the keys appear in the display as follows:

- ▲ : Navigate up.
- ▼ : Navigate down.
- ↵ : Selection is acknowledged with the enter key.

The keys within a menu item can also be assigned to letters or other symbols such as “+” and “-”. You can keep the “+” or “-” key pressed for a longer time in order to make larger numerical jumps.



**Meaning of the menu items:**

◀ Back: one level higher in the menu.

◀◀ Run: switch to delay mode.

Switch to the configuration menu by pressing any key.

**Note:**

If no settings are adjusted in the configuration menu for a period of 30 s, the Sensor is automatically returned to the read-out view. The Sensor accesses the last used menu view when a key is once again activated.

If a setting is adjusted, it becomes active when the configuration menu is exited.

If the “Locked by IO-Link” message appears, local operation via the display is disabled by IO-Link.

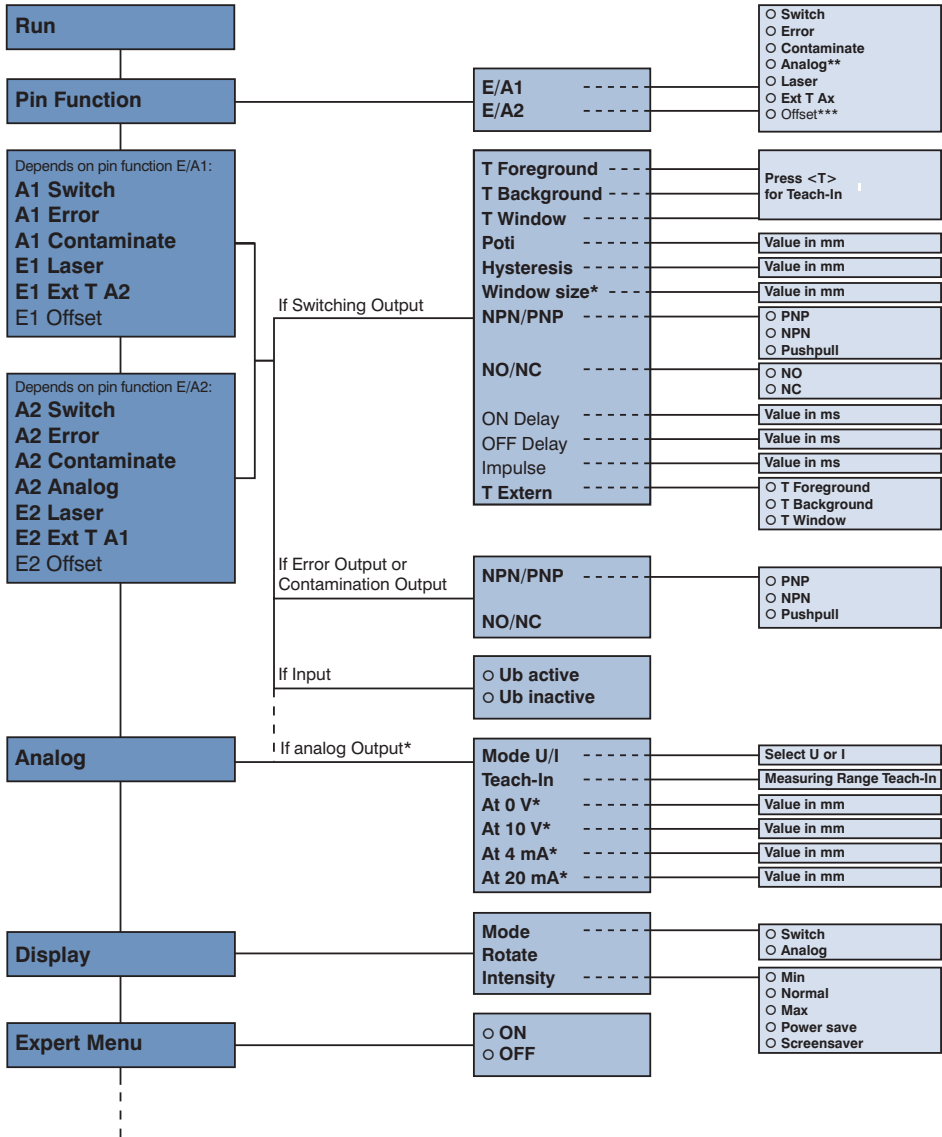
**Important:**

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

**6.1. Default Settings**

		OY1P303P0102	OY1P303P0189
<b>Pin Function</b>	E/A 1	Switching output	Switching output
	E/A 2	Analog output	Switching output
<b>Outputs</b>	Teach Mode	T Foreground	T Foreground
	Switching threshold	1000 mm	1000 mm
	Switching Hysteresis	12 mm	12 mm
	Window Size	50 mm	50 mm
	PNP/NPN	PNP	PNP
	NO/NC	NO	NO
	On-Delay	0 ms	0 ms
	Off-Delay	0 ms	0 ms
	Impulse	0 ms	0 ms
<b>Analog</b>	U/I	I	I
	4 mA	50 mm	50 mm
	20 mA	3050 mm	3050 mm
<b>Display</b>	Mode	Switch	Switch
	Intensity	Screensaver	Screensaver
<b>Expert menu</b>		Off	Off
<b>Offset</b>	Specification Offset	0 mm	0 mm
<b>Filter</b>		5	5
<b>Laser</b>		On	On
<b>Interface</b>	Mode		Comm
	Baud Rate		38400
	ASCII		Binär
	Interval		10 ms
	Mask		1
<b>Language</b>		English	English
<b>Password</b>	Enable	Off	Off
	Enter	O	O

## 7. Functional Overview

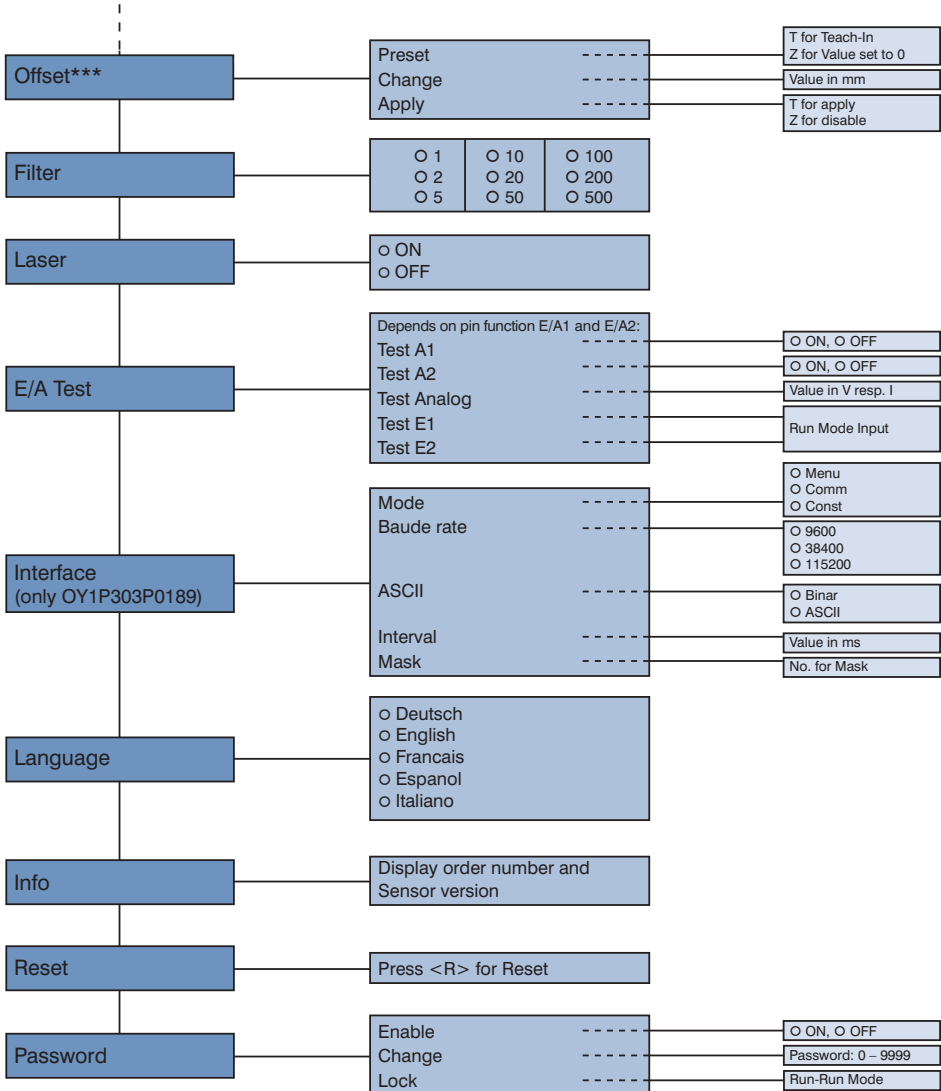


Menu items that are presented in **bold** are always displayed in the menu. The other menu items appear only when the Expert Menu is activated.

\* Visibility depends on the selected settings (see details in the respective section)

\*\* can only be selected for E/A2 in OY1P303P0102

\*\*\* only for OY1P303P0189



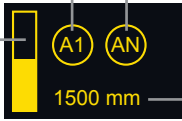
\*\*\* only for OY1P303P0189

The following explains the functions behind the individual menu items.

## 7.1. Run

The Sensor switches into display mode.

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



Selected pin function E/A1 (E/A2) with respective status

Current measured value in mm

The set function of the pins is symbolically shown as follows:

- (AN) Analog output
- (A1) (A2) Switching output A1 or A2
- (F) Error output
- (V) Contamination output
- (La) Laser shut-off
- (E) Offset input
- (T1) (T2) Teach input for A1 or A2

## 7.2. Pin Function

The Pin Function serves to determine the function of the pins E/A1 or E/A2. The pins can each take on different functions.

E/A1	Configuration of pin E/A1	
○ Switch	<b>Switch:</b>	Switching output
○ Error	<b>Error:</b>	Error output
○ Contaminate	<b>Contaminate:</b>	Contamination output
○ Laser	<b>Laser:</b>	Input for switching the transmission light on and off
○ Ext T A2	<b>Ext T A2:</b>	Teach input for A2
○ Offset	<b>Offset:</b>	Offset input (visible only at OY1P303P0189 if Expert menu is “On”)
◀ Back		
◀◀ Run		
E/A2	Configuration of pin E/A2	
○ Switch	<b>Switch:</b>	Switching output
○ Error	<b>Error:</b>	Error output
○ Contaminate	<b>Contaminate:</b>	Contamination output
○ Analog	<b>Analog:</b>	Analog output (for OY1P303P0102)
○ Laser	<b>Laser:</b>	Input for switching the transmission light on and off
○ Ext T A1	<b>Ext T A1:</b>	Teach input for A1
○ Offset	<b>Offset:</b>	Offset input (visible only at OY1P303P0189 if Expert menu is “On”)
◀ Back		
◀◀ Run		

The pin E/A2 can only be set as an analog output for Sensor OY1P303P0102. Sensor OY1P303P0189 already has a permanently set analog output (see connection diagram).

### 7.3. Function of E/A1 and E/A2

Depending on the pin function that has been set, the selected name is displayed for the menu item, e.g., A1 Switch or E1 Laser. The menu items each contain the following sub-items:

#### For switching output

If the pin is set as a switching output, the following functions can be set:

A1 Switch/A2 Switch	Sensor settings for switching outputs
T Foreground	<b>T Foreground:</b> Teach-In from object
T Backgrnd	<b>T Backgrnd:</b> Teach-In from background
T Window	<b>T Window:</b> Teach-In from window in which the Sensor switches
T Extern	<b>T Extern:</b> Define Teach mode for external Teach-In
Poti	<b>Poti:</b> Recalibrate the switching point
Hysteresis	<b>Hysteresis:</b> Change the difference between the switch-on and the switch-off points
Window size	<b>Window size:</b> Change the distance between the two switch-off points
NPN/PNP	<b>NPN/PNP:</b> Configuration of the output
NO/NC	<b>NO/NC:</b> Configuration of the output
ON Delay	<b>ON Delay:</b> Response time delay (only visible if Expert menu "On")
OFF Delay	<b>OFF Delay:</b> Fall time delay (only visible if Expert menu "On")
Impulse	<b>Impulse:</b> Pulse length (only visible if Expert menu is "On")
◀ Back	
◀◀ Run	

These menu items will be described in more detail in chapters 7.3.1 to 7.3.12.

#### For error or contamination output

If the pin is set as an error or contamination output, the following functions can be set.

A1 Error (Example)	A1 or A2 as an error or contamination output
NPN/PNP	<b>NPN/PNP:</b> Configuration of the output
NO/NC	<b>NO/NC:</b> Configuration of the output
◀ Back	
◀◀ Run	

You can find explanations of "NPN/PNP" in chapter 7.10.2. You can find explanations of "NO/NC" in chapter 7.3.8.

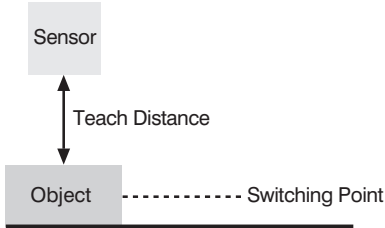
#### For Laser Switch-off, Extern Teach and Offset input

If the pin is used as an input, e.g., for switching off the laser. It is possible to set whether the input is active at Ub or at 0 V.

E1 Laser (Example)	Setting E1 or E2
○ Ub active	<b>Ub active:</b> The input is activated if the supply voltage (Ub) is present
○ Ub inactive	<b>Ub inactive:</b> The input is activated if no voltage is present
◀ Back	
◀◀ Run	

## 7.3.1. Switching Output Foreground Teach-In

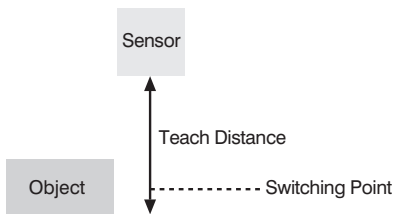
Teach-In is performed while the sensor spot is aligned to the object. The switching distance is then automatically set to a distance which is slightly greater than the clearance between the sensor and the object. The sensor is thus activated for all objects whose distance to the sensor is equal to or less than the distance to the object used for the Teach-In procedure.



T Foreground	Foreground Teach-In
Press <T> for Teach-In	Teach-In Foreground process 1) Align light spot to object. 2) Press "T" key. The switching point is learned.
	<b>Note:</b> <ul style="list-style-type: none"> <li>• The switching point can be recalibrated in the menu item Poti (see chapter 7.3.4 if needed).</li> <li>• The switching hysteresis can be modified in the menu item Hysteresis (see chapter 7.3.5) if needed.</li> </ul>

## 7.3.2. Switching Output Background Teach-In

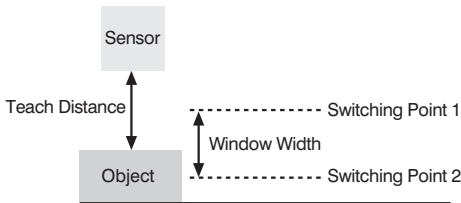
Teach-In is performed while the sensor spot is aligned to the background. The switching distance is then automatically set to a distance which is slightly less than the clearance between the sensor and the background. The sensor is thus activated whenever an object is located between the background and the sensor.



T Backgrnd	Background Teach-In
Press <T> for Teach-In	Teach-In Background process 1) Align light spot to background (e.g., on conveyor belt). 2) Press “T” key. -> The switching point is learned.  <b>Note:</b> <ul style="list-style-type: none"> <li>• The switching point can be recalibrated in the menu item Poti (see chapter 7.3.4) if needed.</li> <li>• The switching hysteresis can be modified in the menu item Hysteresis (see chapter 7.3.5) if needed.</li> </ul>

### 7.3.3. Switching Output Window Teach-In

In case of the Window Teach-In there are two switching points. The difference between the two switching points is referred to as a window. The size of the window is referred to as window width. The sensor is activated when an object is positioned within the window.



T Window	Window Teach-In
Press <T> for Teach-In	Teach-In Window process 1) Align light spot to foreground (if present) or to object. 2) Press “T” key. -> The switching points are learned.  <b>Note:</b> <ul style="list-style-type: none"> <li>• The Window Size variable can be increased or decreased in the menu item Window (see chapter 7.3.6). 50 mm is the preset.</li> <li>• The center of the window can be readjusted in the menu item Poti (see chapter 7.3.4) if needed. The two switching points are alternately displayed in this process.</li> <li>• The switching hysteresis can be modified in the menu item Hysteresis (see chapter 7.3.5) if needed.</li> </ul>

#### Examples of applications:

Ex. 1: Recognition of objects that are very difficult to recognize visually, e.g., shiny black metal plates in an extremely slanted position in front of a background.

-> Use Teach-In Background for this application.

Ex. 2: Distinction of objects, e.g., small and large packages on a conveyor belt.

-> In this application, use Teach In to the object to be recognized, at which the Sensor is to switch.

## 7.3.4. Switching Output Poti

Potentiometer	Vary switching point
Switching point in mm	The switching point can be manually varied by pressing the “+” or “-” keys. You can keep a key pressed for a longer time in order to make larger numerical jumps.

## 7.3.5. Switching Output Hysteresis

The switching hysteresis is the difference between the switch-on and the switch-off points.

Hysteresis	Vary hysteresis
Hysteresis in mm	The hysteresis can be increased by pressing the “+” key. The hysteresis can be reduced by pressing the “-” key. The minimum hysteresis depends on the filter that has been set (see chapter 4). You can keep a key pressed for a longer time in order to make larger numerical jumps.

## 7.3.6. Switching Output Window Size

**Note:** The menu item is only visible if a Window Teach has been conducted.


Window size	Vary window size
Window size in mm	The window size can be increased by pressing the “+” key. The window size can be reduced by pressing the “-” key. The minimum value that can be set is 10 mm. You can keep a key pressed for a longer time in order to make larger numerical jumps.

## 7.3.7. Switching Output NPN/PNP

NPN/PNP	Configuration of the outputs
<ul style="list-style-type: none"> <li>○ PNP</li> <li>○ NPN</li> <li>○ Pushpull</li> <li>◀ Back</li> <li>◀◀ Run</li> </ul>	<p><b>PNP:</b> The load or the evaluation device is connected between the negative pole (reference) and the output. When switched, the output is connected via an electronic switch to the positive pole.</p> <p><b>NPN:</b> The load or the evaluation device is connected between the positive pole (reference) and the output. When the Sensor switches, the output is connected via an electronic switch to the negative pole.</p> <p><b>Pushpull:</b> Push-pull output. Functions like an electronic switch that selectively couples the output to the positive pole or the negative pole</p>

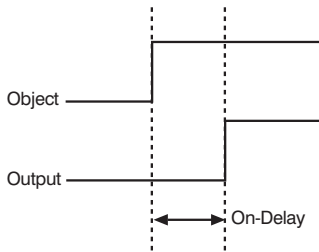


### 7.3.8. Switching Output NO/NC

	<p><b>Configuration of the outputs</b></p> <p>The output is set as a normally open contact by pressing the “NO” key. The output closes immediately when an object reaches the switching point.</p> <p>The output is set as a normally closed contact by pressing the “NC” key. The output opens immediately when an object reaches the switching point.</p>
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### 7.3.9. Switching Output Response Time Delay

The response time delay is an adjustable lengthening of the response time.

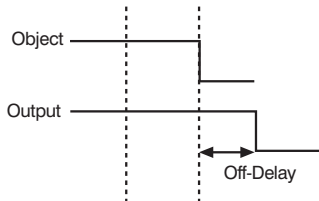


**Note:** The menu item is only visible if Expert Menu “On” has been set (see chapter 7.6).

<p><b>ON Delay</b></p> <p>ON Delay in ms</p>	<p><b>Adjust response delay time</b></p> <p>An output time delay of 0 to 10,000 ms can be set by pressing the “+” or “-” key. You can keep a key pressed for a longer time in order to make larger numerical jumps.</p>
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### 7.3.10. Switching Output Fall Time Delay

The fall time delay is an adjustable lengthening of the fall time.



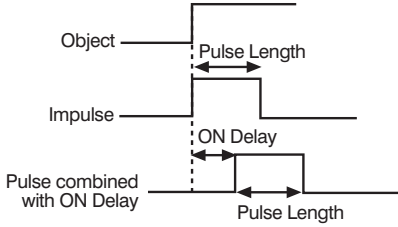
**Note:** The menu item is only visible if Expert Menu “On” has been set.

<p><b>OFF Delay</b></p> <p>OFF Delay in ms</p>	<p><b>Adjust fall time delay</b></p> <p>A fall time delay can be set by pressing the “+” or “-” key. You can keep a key pressed for a longer time in order to make larger numerical jumps.</p>
--	--

**Note:** If a pulse length has been set, a fall time delay cannot be set. In this case the note “Pulse” appears in the control panel!

## 7.3.11. Switching Output Pulse Length

The pulse length defines how long the switching state is held. The function can be combined with a response time delay.



**Note:** The menu item is only visible if Expert Menu "On" has been set.

Pulse	Set pulse length
Pulse length in ms	A pulse length of 0 to 10000 ms can be set by pressing the "+" key or the "-" key. You can keep a key pressed for a longer time in order to make larger numerical jumps.

## 7.3.12. Switching Output Teach-In External

The teaching mode that the switching output is to have can be defined in this menu. Following a signal on a pin that has been set as the external teaching input for this switching output, a Teach-In is conducted in the set teaching mode.

T Extern	Teaching Mode for External Teach-In
○ T Foreground	<b>T Foreground:</b> Foreground Teach-In
○ T Backgrnd	<b>T Backgrnd:</b> Background Teach-In
○ T Window	<b>T Window:</b> Window Teach-In
◀ Back	
◀◀ Run	

## 7.4. Analog

The “Analog” menu item is always present with Sensor OY1P3030189. The menu item “A2 Analog” is present for the Sensor OY1P303P0102 if pin 2 is set as an analog output.

Analog	Settings of the analog output
Mode U/I Teach-In At 0 V At 10 V At 4 mA At 20 mA ◀ Back ⬅ Run	<p><b>Mode U/I:</b> Set analog output to a voltage or current output.. The analog output can be set as a voltage output by pressing the “U” key. and as a current output by pressing the “I” key.</p> <p><b>Teach-In:</b> Teach-In of the start and end of the measurement range, depending on the U/I mode set. By pressing the “T” key, the current distance is assigned the value 4 mA or 0 V. The value 20 mA or 10 V can be assigned to a distance by navigating downwards. The smallest measurement range that can be set is 50 mm.</p> <p><b>At 0 V:</b> Distance at 0 V (visible in U mode) The distance assigned to the value 0 V can be recalibrated by pressing the “+” key or the “-” key.</p> <p><b>At 10 V:</b> Distance at 10 V (visible in U mode) The distance assigned to the value 10 V can be recalibrated by pressing the “+” key or the “-” key.</p> <p><b>At 4 mA:</b> Distance at 4 mA (visible in I mode) The distance assigned to the value 4 mA can be recalibrated by pressing the “+” key or the “-” key.</p> <p><b>At 20 mA:</b> Distance at 20 mA (visible in I mode) The distance assigned to the value 20 mA can be recalibrated by pressing the “+” key or the “-” key.</p>

## 7.5. Display

Display	Adjusting the display device
Mode Rotate Intensity ◀ Back ⬅ Run	<p><b>Mode:</b> Select display mode (see chapter 7.5.1)</p> <p><b>Rotate:</b> Rotate display by 180°. The display is rotated by 180° by pressing the ↵ key. The rotation is canceled by pressing this key again.</p> <p><b>Intensity:</b> Set the display intensity (see chapter 7.5.2)</p>

### 7.5.1. Display Mode

Mode	Select display mode
○ Switch ○ Analog ◀ Back ⬅ Run	<p><b>Switch:</b> The statuses of the individual inputs and outputs, and the measurement value in mm are shown in the display.</p> <p><b>Analog:</b> The analog output value and the measurement value in mm are shown in the display.</p>

## 7.5.2. Display Intensity

Intensity	Set the display intensity
<ul style="list-style-type: none"> <li>○ Min</li> <li>○ Normal</li> <li>○ Max</li> <li>○ Power save</li> <li>○ Screensaver</li> <li>◀ Back</li> <li>◀◀ Run</li> </ul>	<p><b>Min:</b> The intensity of the display is set to a minimum value.</p> <p><b>Normal:</b> The intensity of the display is set to a medium value.</p> <p><b>Max:</b> The intensity of the display is set to a maximum value.</p> <p><b>Power save:</b> The display switches off after one minute without a button being pressed and automatically switches back on when a button is pressed.</p> <p><b>Screensaver:</b> The colors of the display are inverted every minute.</p>

## 7.6. Expert Menu

Different menu items and sub-items appear in the menu, depending on whether the Expert Menu is “On” or “Off”. The Expert Menu is off in the delivery state. The menu is thereby shorter and easier to use. If the existing menu items are not sufficient for the application solution, the Expert Menu can be switched on in order to use the full scope of Sensor functions.

Expert Menu	Switch Expert Menu on or off
<ul style="list-style-type: none"> <li>○ OFF</li> <li>○ ON</li> <li>◀ Back</li> <li>◀◀ Run</li> </ul>	<p><b>OFF:</b> The Expert Menu is switched off and only a few menu items are visible.</p> <p><b>ON:</b> The Expert Menu is switched on and all menu items are visible.</p>

## 7.7. Offset

The Offset function is used to change the current measurement value to a defined value. The switching thresholds and the analog measurement range are also changed.

**Note:** The menu item is only visible if Expert Menu “On” has been set. The menu item can only be selected in OY1P303P0189.

Offset	Change the measurement value
<ul style="list-style-type: none"> <li>Preset</li> <li>Change</li> <li>Apply</li> <li>◀ Back</li> <li>◀◀ Run</li> </ul>	<p><b>Preset:</b> Learn offset value. The current measurement value is adopted as the offset value specification by pressing the “T”. The offset value is set to 0 by pressing the “Z” key.</p> <p><b>Change:</b> Change the value of the offset. By pressing the “+” key or the “-” key, the value set in the “Specification” menu item can be changed.</p> <p><b>Apply:</b> Accept the offset value set in the menu item “Specification” as the measurement value. By pressing the “T” key, the offset value set in the menu item “Specification” is adopted as the displayed measurement value. The Offset function is reset by pressing the “Z” key, and the actual distance is displayed.</p>

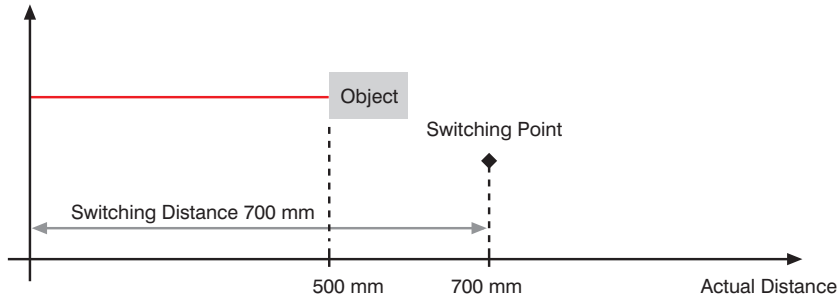
The currently set offset value is displayed in mm.

The offset can also be applied (Offset → Apply → T) via the pin E1 or E2, if it is set as the offset input (see chapter 7.2). In order to use the offset it is necessary to apply a voltage > 7 V to the input pin.

**Example of the measurement value and switching point for the Offset function:**

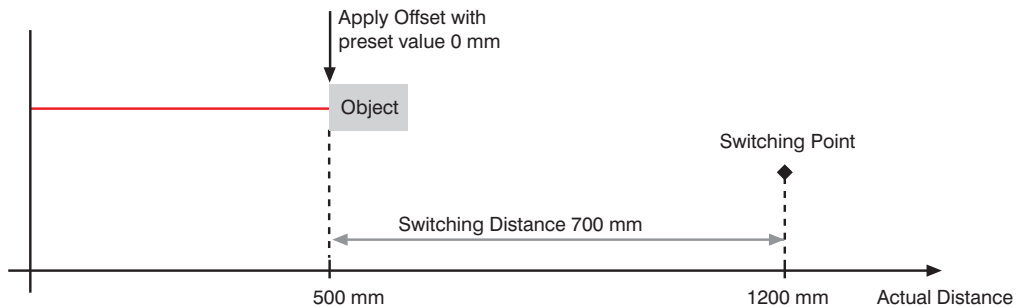
**a) Without Offset:**

In the diagram, the Sensor measures a distance of 500 mm. The switching point is located 200 mm distant, at 700 mm.



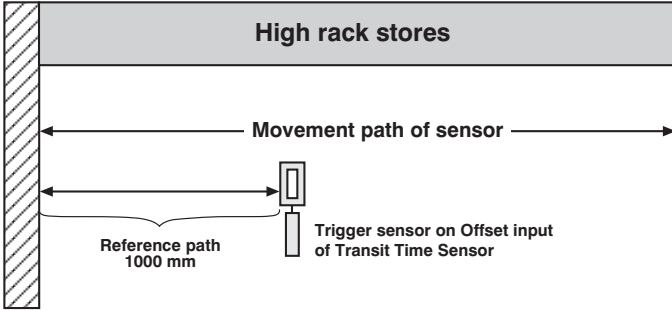
**b) With Offset:**

In the diagram, the Sensor measures a distance of 500 mm. After application of the offset with offset value of 0 mm, the measurement value at 500 mm becomes the measurement value 0 mm. Thereby the actual distance of the switching point is shifted.



## Example of eliminating the temperature drift with the offset function:

A OY1P303P0102 is used in a high rack warehouse with varying ambient temperatures. To eliminate the temperature drift, a reference path of 1000 mm is specified to the Sensor as the specification offset. Through an external trigger Sensor, the specification offset is applied and given to the Sensor as the current distance. This ensures that the distance tallies with the value of the reference route with every trigger signal and thus, the varying ambient temperature has no influence on the measurement values of the Sensor.



## 7.8. Filter

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

**Note:** The menu item is only visible if Expert Menu "On" has been set.

Filter	Number of values for averaging
<input type="radio"/> 1	If 1 is selected, each measurement value is output directly without averaging.
<input type="radio"/> 2	Whenever a value greater than 1 is selected, the Sensor takes an average over
<input type="radio"/> 5	the selected number of x measurement values, which is output every 2 ms at the
<input type="radio"/> 10	output.
<input type="radio"/> 20	
<input type="radio"/> 50	
<input type="radio"/> 100	
<input type="radio"/> 200	
<input type="radio"/> 500	
<input type="radio"/> ◀ Back	
<input type="radio"/> ◀◀ Run	

## 7.9. Laser

Transmitted light can be either deactivated or activated with the help of the **Laser** menu.

**Note:** The menu item is only visible if Expert Menu “On” has been set.

Laser	Switch transmitted light on or off
○ ON	ON: Switch transmitted light on
○ OFF	OFF: Switch transmitted light off; the Sensor no longer supplies measurement values.
◀ Back	
◀◀ Run	

## 7.10. E/A Test

This function manually changes the outputs, independently of the actual measurement value of the Sensor. In that way it is possible to check, for example, whether the outputs are properly connected to a controller or whether there is a fault on the cable that modifies the output value. It can likewise be tested whether a voltage is arriving at an input pin.

The test is automatically terminated when you leave the test menu.

**Note:** The menu item is only visible if Expert Menu “On” has been set. Only the functions for which the pin is set are displayed in each case.

E/A Test	E/A: Test of the inputs and outputs
Test A1	Test A1: Test output 1 (see chapter 7.10.1)
Test A2	Test A2: Test output 2 (see chapter 7.10.1)
Test Analog	Test Analog: Test analog output (see chapter 7.10.2) voltage or current, depending on analog mode U/I (see chapter 7.4)
Test E1	Test E1: Display whether 0 V or 24 V is present at input 1
Test E2	Test E2: Display whether 0 V or 24 V is present at input 2
◀ Back	
◀◀ Run	

### 7.10.1. E/A Test – Test A1 or A2

Test A1/Test A2	Switch outputs on or off
○ ON	ON: Switch output on (24 V)
○ OFF	OFF: Switch output off (0 V)
◀ Back	
◀◀ Run	

### 7.10.2. E/A Test – Test Ana U or I

Test Ana U/Test Ana I	Output test values at the analog output
Voltage value in V or current value in mA	An analog value can be set by pressing the “+” or “-” key.

## 7.11. Interface

The “Interface” menu item is only present for OY1P303P0189, which has an RS-232 interface.

**Note:** The menu item is only present for the OY1P303P0189 Sensor if Expert Menu “On” is set.

Interface	Basic settings for the RS-232 interface
Mode	<b>Mode:</b> Basic settings (see chapter 7.11.1)
Baude rate	<b>Baude rate:</b> Setting for the baud rate (see chapter 7.11.2)
ASCII	<b>ASCII:</b> Output format for continuous transmission (see chapter 7.11.3)
Interval	<b>Interval:</b> Transmission interval for continuous transmission (see chapter 7.11.4)
Mask	<b>Mask:</b> Desired output values for continuous transmission (see chapter 7.11.5)
◀ Back	
◀◀ Run	

### 7.11.1. Mode Interface

Mode	Response via interface
○ Menue	<b>Menu:</b> The Sensor can be addressed via a terminal program. A menu is automatically set up in the terminal program (see chapter 8.1).
○ Comm	<b>Comm:</b> The Sensor can be addressed via interface commands (see chapter 8.2).
○ Const	<b>Const:</b> The Sensor outputs values via the interface in a defined interval, depending on the mask that has been set (see table page 26).
◀ Back	As soon as the Sensor changes into the display mode, the “RS-232 active” message will be displayed instead of the measured value.
◀◀ Run	

### 7.11.2. Baud Rate Interface

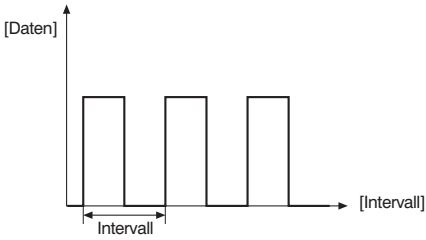
Baude rate	Set the baud rate
○ 9600	<b>9600:</b> 9600 baud
○ 38400	<b>38400:</b> 38400 baud (default setting)
○ 115200	<b>115200:</b> 115200 baud
◀ Back	
◀◀ Run	

### 7.11.3. ASCII Interface

ASCII	Output format for continuous transmission
○ Binar	Binary or ASCII format can be selected.
○ ASCII	
◀ Back	
◀◀ Run	



### 7.11.4. Interval Interface

Interval	Set transmission interval for continuous transmission
Interval in ms	<p>The length of the interval defines the intervals with which data is transmitted via the interface. The transmission interval is set from 10 ms to 10000 ms by pressing the “+” and “-” keys.</p> 

### 7.11.5. Mask Interface

Mask	ASCII: Output format for continuous transmission
Mask number 1 to 31	<p>One of the masks 1 to 31 is selected by pressing the “+” and “-” keys. The selected mask defines the information that will be output at the interface during continuous transmission (see table below).</p>

The individual output values are explained on the following pages. The individual values are read out consecutively to a single line. Only the values for the selected columns are read out.

1	2	3	4	5	6	7
Mask	Current Measured Value	Statuses of the digital outputs	Difference between current distance and the selected switching point (for each output)	Digital read-out of the current or the voltage value (depending on the setting in the "Analog" menu)	Time stamp in ms	Transmission time in ms per packet at baud rate
	+#####mm	####	+#####mm+#####mm	#####µA	#####	9600 38400 115200
String						9600 38400 115200
1	x					11.28 2.82 0.94
2		x				4.92 1.23 0.41
3	x	x				16.2 4.05 1.35
4			x			33.84 8.46 2.82
5	x		x			45.12 11.28 3.76
6		x	x			38.76 9.69 3.23
7	x	x	x			50.04 12.51 4.17
8				x		11.28 2.82 0.94
9	x			x		22.56 5.64 1.88
10		x		x		16.2 4.05 1.35
11	x	x		x		27.48 6.87 2.29
12			x	x		45.12 11.28 3.76
13	x		x	x		56.4 14.1 4.7
14		x	x	x		50.04 12.51 4.17
15	x	x	x	x		61.32 15.33 5.11
16					x	10.2 2.55 0.85
17	x				x	21.48 5.37 1.79
18		x			x	15.12 3.78 1.26
19	x	x			x	26.4 6.6 2.2
20			x		x	44.04 11.01 3.67
21	x		x		x	55.32 13.83 4.61
22		x	x		x	48.96 12.24 4.08
23	x	x	x		x	60.24 15.06 5.02
24				x	x	21.48 5.37 1.79
25	x			x	x	32.76 8.19 2.73
26		x		x	x	26.4 6.6 2.2
27	x	x		x	x	37.68 9.42 3.14
28			x	x	x	55.32 13.83 4.61
29	x		x	x	x	66.6 16.65 5.55
30		x	x	x	x	60.24 15.06 5.02
31	x	x	x	x	x	71.52 17.88 5.96

**Explanation of the individual output values:**

Column 2: Current Measured Value in mm

Column 3: Statuses of the digital outputs:

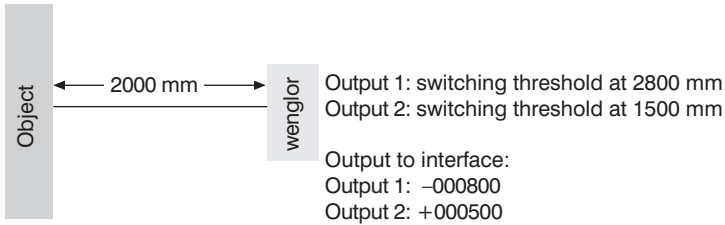
#	#	#	#
F	V	A2	A1

0: not switched  
1: switched

Ex.: 1001 -> Error output and output 1 connected, contamination output and output 2 not connected.

Column 4: Difference between current distance and the selected switching point (for each output)

Example:



Column 5: Digital read-out of the current or the voltage value in  $\mu A$  or mV (depending on the setting in the “Analog” menu)

Column 6: Time stamp

Example:

Time Stamp	Measuring Distance
00001024	1805 mm
00001066	1810 mm
99999999	2068 mm
00000000	2068 mm

By outputting the time-stamp, the individual measurement distances can be assigned to a relative time without taking into consideration the processing speed of the computer.

Time stamp:  $\Delta 1 \approx 500 \mu s$

## 7.12. 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.

**Note:** The menu item is only visible if Expert Menu “On” has been set.

Language	Set menu language
<ul style="list-style-type: none"><li>○ Deutsch</li><li>○ English</li><li>○ Francais</li><li>○ Espanol</li><li>○ Italiano</li><li>◀ Back</li><li>◀◀ Run</li></ul>	The menu appears in the selected language immediately after selection.

## 7.13. Info

**Note:** The menu item is only visible if Expert Menu “On” has been set.

The following information about the Sensor is displayed in the menu item “Info”.

Info	
<ul style="list-style-type: none"><li>Order number</li><li>Software version</li><li>Serial number</li><li>Production week</li><li>◀ Back</li><li>◀◀ Run</li></ul>	

## 7.14. Reset

The Sensor setting can be reset to the delivery state in the menu item “Reset”. The settings in the delivery state can be found in chapter 6.1.

**Note:** The menu item is only visible if Expert Menu “On” has been set.

Reset	Set back to the delivery state
Press <R> for Reset	The Sensor settings that have been made can be reset to the delivery state by pressing the “R” key.

## 7.15. Password

Password protection prevents against unintended changing of the set data.

**Note:** The menu item is only visible if Expert Menu “On” has been set.

Password	Set password functionality
Enable Change Lock ◀ Back ◀◀ Run	<p><b>Enable:</b> 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 successful password input.</p> <p><b>Change:</b> Change password.</p> <p><b>Lock:</b> Locking Sensor causes an immediate disabling of operation if Activate Password is set to “On”.</p>

If the password function has been activated, the password must be entered each time supply power to the Sensor is interrupted. After entering the correct password with the + or – key, the entire menu is enabled and the Sensor is ready for use.

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

Be sure to make a note of the new password before exiting the “change password” function! 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](mailto:support@wenglor.com).

## 8. More Settings via the RS-232 Interface

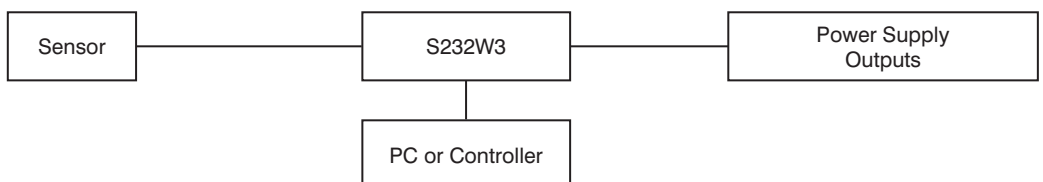
The interface makes use of the software handshake procedure. All settings can be configured at a PC and uploaded to the device. RS-232 interface connections RxD (5) and TxD (4) are linked to minus (pin 3), and can be connected to the corresponding terminals at the communication partner.

### Interface configuration:

Adjustable baud rate, 8 data bits, no parity, 1 stop bit

Connect the Sensor via wenglor interface cable S232W3 to the PC or controller as follows

- Disconnect 8-pole interface cable ZAS89xxx from the Sensor
- Plug interface cable S232W3 directly into the Sensor
- Plug 8-pole connection cable ZAS89xxx directly into the interface cable
- Connect 9-pole SUB-D plug of the S232W3 into the serial port of the PC or controller
- Switch on power supply



## 8.1. Control via a terminal program

1. Connect the Sensor as described in chapter 8 above.
2. Set the Sensor to the Interface menu mode.
  - In the menu: "Interface", "Mode" select the menu item "Menu".

Alternatively: Select <Comm> and with F1, select remote control via Terminal-Program.  
The remote control via Terminal-Program can be ended with F4.

3. Start the terminal program at the PC, for example start the Windows® HyperTerminal® by clicking  
→ Start → Programs → Accessories → Communication → HyperTerminal.
    - Settings: 38400 baud, 8, N, 1
    - Select the utilized port (e.g. COM 1).
    - Establish a connection.
- The menu appears in the terminal program.

```

wenglor sensoric gmbh 0Y1F303P0189

Main-Menü   Sub-Menü   Inhalt           actual Data
Run         Mode       Mode            A1 schalt
Pin Funktion Baudrate   Menü            00030mm 00001mm 0
A1 schalt  ASCII     00285mm        00255mm
A2 Fehler  Intervall NO/N  NPN/  Anz.  Abf.  Impu
Analog     Maske     NO    PNP    0ms   0ms   0ms
Display    Zurück
Expertenmenü Run
Offset
Filter
Laser      NO/N  NPN/  Anz.  Abf.  Impu
E/A-Test   NO    PNP    0ms   0ms   0ms
Schnittstelle
Sprache

<F1>: UP
<F2>: IH
<F3>: DOWN
Digital 1576 mm   Analog 5.086V
  
```

**Note:** Hyperterminal is no longer included by default in Windows 7.

## 8.2. Remote Control with Interface Commands

Connect the Sensor as described in chapter 8 above.

2. Set the Sensor to the interface operating mode.

- Select <Interface> from the menu.
- Select <Mode>.
- Select <Comm>.

The Sensor is now ready for interface communication.

The interface protocol for the OY1P can be downloaded as a PDF document from our website at [www.wenglor.com](http://www.wenglor.com) under the “download” heading.

## 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 device.

## 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.