EN

P1NKxxx

Retro-Reflex Sensors for Clear Glass Recognition
High-End with Teach-in



Operating Instructions

Translation of the Original Operating Instruction
Subject to change without notice
Available as PDF version only
Version: 1.1.0
Status: 11.07.2019
www.wenglor.com

Table of Contents

1. General 3
1.1 Information Concerning these Instructions 3
1.2 Explanations of Symbols 3
1.3 Limitation of Liability 4
1.4 Copyrights 4
2. For Your Safety 5
2.1 Use for Intended Purpose 5
2.2 Use for Other than the Intended Purpose 5
2.3 Personnel Qualifications 6
2.4 Modification of Products 6
2.5 General Safety Precautions 6
2.6 Approvals and protection class 6
3. Technical Data 7
3.1 Technical Data 7
3.1.1 Spot diameter 8
3.1.2 Smallest detectable part 8
3.1.3 Switching distance 8
3.2 Complementary Products 9
3.3 Layout 9
3.4 Control Panel 10
3.5 Scope of Delivery 10
4. Transport and Storage 10
4.1 Transport 10
4.2 Storage 10
5. Installation and Electrical Connection 11
5.1 Installation 11
5.2 Electrical Connection 11
5.3 Diagnostics 12
6. Settings 14
6.1 Alignment 14
6.2 Teach-In 15
7. Functions Overview 16
7.1 Teach-In Mode 16
7.1.1 Minimal Teach-In (default setting) 16
7.1.2 Normal Teach-In 16
7.2 Dynamic readjustment 16
7.3 Pin Function, E/AO2 17
7.3.1 Input External Teach-In 17
7.3.2 Error Output 17
7.4 Additional functions and settings via IO-Link: 18
8. IO-Link 18
9. NFC 18
10. Maintenance Instructions 19
11. Proper Disposal 19
12. Appendix 20
12.1 List of Abbreviations 20
12.2 Change Index, Operating Instructions 20
12.3 EU Declaration of Conformity 20

1. General

1.1 Information Concerning these Instructions

- These instructions apply to the product with ID code P1NKxxx.
- They make it possible to use the product safely and efficiently.
- These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life.
- Local accident prevention regulations and national work safety regulations must be complied with as well.
- The product is subject to further technical development, and thus the information contained in these operating instructions may also be subject to change. The current version can be found at www.wenglor.com in the product's separate download area.



NOTE!
The operating instructions must be read carefully before using the product and must be kept on hand for later reference.

1.2 Explanations of Symbols

- Safety precautions and warnings are emphasized by means of symbols and attention-getting words
- Safe use of the product is only possible if these safety precautions and warnings are adhered to

The safety precautions and warnings are laid out in accordance with the following principle:



Type and Source of Danger!

Possible consequences in the event that the hazard is disregarded.
- Measures for averting the hazard.

The meanings of the attention-getting words, as well as the scope of the associated hazards, are listed below.



DANGER!
This word indicates a hazard with a high degree of risk which, if not avoided, results in death or severe injury.



WARNING!
This word indicates a hazard with a medium degree of risk which, if not avoided, may result in death or severe injury.



CAUTION!
This word indicates a hazard with a low degree of risk which, if not avoided, may result in minor or moderate injury.



ATTENTION!
This word draws attention to a potentially hazardous situation which, if not avoided, may result in property damage.



NOTE!
A note draws attention to useful tips and suggestions, as well as information regarding efficient, error-free use.

1.3 Limitation of Liability

- The product has been developed in consideration of the current state-of-the-art and applicable standards and guidelines. Subject to change without notice.
- A valid declaration of conformity can be accessed at www.wenglor.com in the product's separate download area.
- wenglor sensoric elektronische Geräte GmbH (hereinafter referred to as "wenglor") excludes all liability in the event of:
    - Non-compliance with the instructions
    - Use of the product for purposes other than those intended
    - Use by untrained personnel
    - Use of unapproved replacement parts
    - Unapproved modification of products
- These operating instructions do not include any guarantees from wenglor with regard to the described procedures or specific product characteristics.
- wenglor assumes no liability for printing errors or other inaccuracies contained in these operating instructions, unless wenglor was verifiably aware of such errors at the point in time at which the operating instructions were prepared.

1.4 Copyrights

- The contents of these instructions are protected by copyright law.
- All rights are reserved by wenglor.
- Commercial reproduction or any other commercial use of the provided content and information, in particular graphics and images, is not permitted without previous written consent from wenglor.

2. For Your Safety

2.1 Use for Intended Purpose

The product is based on the following functional principle:

Retro-Reflex Sensors for Clear Glass Recognition

Reflex sensors for clear glass recognition can be adjusted so precisely that they can reliably recognize highly transparent objects such as glass, glass bottles or sheet products. Even shiny, chromed or reflective surfaces can be reliably detected thanks to the integrated polarization filter.
The transmitter and receiver are located in a single housing and require a reflector to work. The output switches if the light beam between the sensor and reflector is interrupted. The visible light spot of retro-reflex sensors facilitates adjustment and commissioning. Depending on the sensor type, even small objects up to 0.1mm can be reliably detected over long distances.

This product can be used in the following industry sectors:

- Special machinery manufacturing
- Heavy machinery manufacturing
- Logistics
- Automotive industry
- Food industry
- Packaging industry
- Pharmaceuticals industry
- Plastics industry
- Woodworking industry
- Beverages industry
- Consumer goods industry
- Paper industry
- Electronics industry
- Glass industry
- Steel industry
- Aviation industry
- Chemicals industry
- Alternative energy
- Raw materials extraction

2.2 Use for Other than the Intended Purpose

- Not a safety component in accordance with 2006/42/EC (Machinery Directive).
- The product is not suitable for use in potentially explosive atmospheres.
- The product may only be used with accessories supplied or approved by wenglor, or combined with approved products. A list of approved accessories and combination products can be accessed at www.wenglor.com on the product detail page.



DANGER!

Risk of personal injury or property damage in case of use for other than the intended purpose!
Use for other than the intended purpose may lead to hazardous situations.
- Observe instructions regarding use for intended purpose.

2.3 Personnel Qualifications

- Suitable technical training is a prerequisite.
- In-house electronics training is required.
- Trained personnel must have uninterrupted access to the operating instructions.



DANGER!
Personal injury and damage to equipment may occur.
- Adequate training and qualification of personnel.

2.4 Modification of Products



DANGER!
Personal injury and damage to equipment may occur. Non-observance may result in loss of the CE marking and the guarantee may be rendered null and void.
- Modification of the product is impermissible.

2.5 General Safety Precautions



NOTE!
- These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life.
- In the event of possible changes, the respectively current version of the operating instructions can be accessed at www.wenglor.com in the product's download area.
- Read the operating instructions carefully before using the product.
- Protect the sensor against contamination and mechanical influences.

2.6 Approvals and protection class



3. Technical Data

3.1 Technical Data

Order Number / Technical Data		P1NK	
		205	208
Optical Data			
Range		3,500 mm	
Reference reflector		RQ100BA	
Clear glass recognition		yes	
Switching hysteresis		< 5 %	
Light source		Red light	
Polarization filter		yes	
Service life (ambient temp. = +25° C)		100,000 h	
Max. permissible ambient light		10,000 Lux	
Aperture angle		3°	
Single-lens optics		yes	
Spot diameter		See table 1	
Electrical Data			
Supply power		15…30 V DC	
IO-Link supply voltage		18…30 V DC	
Current consumption (operating voltage = 24 V)		< 20 mA	
Switching frequency		1000 Hz	
Switching frequency (speed mode)		2000 Hz	
Response time		0,5 ms	
Response time (speed mode)		0,25 ms	
Temperature drift		< 3 %	
Temperature range		−40…60 °C	
Switching output voltage drop		< 2 V	
Switching output switching current		100 mA	
Switching output residual current		< 50 µA	
Short-circuit protection		yes	
Reverse polarity protected		yes	
Overload-proof		yes	
Lockable		yes	
Interface		IO-Link	
IO-Link version		1.1	
Protection class		III	
Output function	PNP, Programmable	×	
	NPN, Programmable		×
Mechanical Data			
Setting method		Teach-in / NFC	
Housing material		Plastic	
Degree of protection		IP67/IP68	
Connection		Plug M12; 4-pin	
Connection diagram no.		221	
Lens cover		PMMA	
Technical Safety Data			
MTTFd (EN ISO 13849-1)		2476, 21a	

3.1.1 Spot diameter

Range	0,3 m	1,7 m	3,5 m
Spot diameter	20 mm	55 mm	110 mm

Table 1

3.1.2 Smallest detectable part

Range	0,3 m	1,7 m	3,5 m
Smallest detectable part	1 mm	5 mm	10 mm

Table 2

3.1.3 Switching distance

Achievable switching distance depends on the utilized reflector. Nominal switching distance is achieved with reflector types RQ100BA. Achievable ranges for other reflectors are listed in the following tables:

Reflector	Range
RQ100BA	0...3,5 m
RE18040BA	0...2,5 m
RQ84BA	0...3 m
RR84BA	0...3,5 m
RE9538BA	0...1,4 m
RE6151BM	0...2,8 m
RR50_A	0...2,5 m
RE6040BA	0...2,8 m
RE8222BA	0...1,6 m
RR34_M	0...1,8 m
RE3220BM	0...1,1 m
RE6210BM	0...0,8 m
RR25_M	0...1 m
RR25KP	0...0,5 m
RR21_M	0...0,7 m
Z90R005	0…1,8 m
ZRAE02B01	0...1,5 m
ZRME01B01	0...0,35 m
ZRME03B01	0...1,5 m
ZRMR02K01	0...1,5 m
ZRMS02_01	0...0,7 m
RF508	0...0,7 m
RF258	0...0,7 m
ZRDF__K01	0...2,2 m
Z91R001	0...1,5 m
ZRDF10K01	0...2,4 m

NOTE!

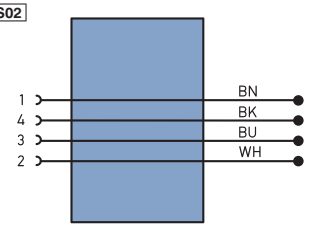
- In order to increase the stability in the detection of highly transparent objects, it is reccomended to use reflectors with microstructure.

3.2 Complementary Products

wenglor can provide you with suitable connection technology for your product.

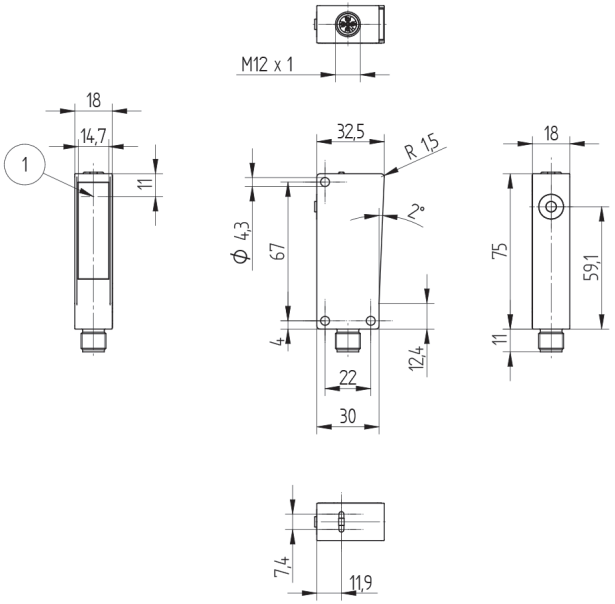
Suitable mounting technology no.	350
Suitable connection technology no.	2

S02



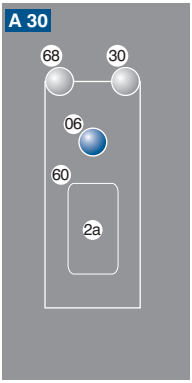
IO-Link master
wTeach2 software DNNF005

3.3 Layout



1= Optical axis
M3 screw = 0.5 Nm
Dimensions specified in mm (1 mm = 0.03937")

3.4 Control Panel



2a = NFC interface
06 = teach-in key
30 = switching status indicator / contamination warning
60 = Display
68 = supply power indicator

3.5 Scope of Delivery

- Sensor
- Safety precautions
- Mounting-Set 02

4. Transport and Storage

4.1 Transport

Upon receipt of shipment, the goods must be inspected for damage in transit. In the case of damage, conditionally accept the package and notify the manufacturer of the damage. Then return the device, making reference to damage in transit.

4.2 Storage

The following points must be taken into condition with regard to storage:

- Do not store the product outdoors.
- Store the product in a dry, dust-free place.
- Protect the product against mechanical impacts.
- Protect the product against exposure to direct sunlight.

ATTENTION!

Risk of property damage in case of improper storage!

The product may be damaged.

- Storage instructions must be complied with.

5. Installation and Electrical Connection

5.1 Installation

- Protect the product from contamination during installation.
- Observe all applicable electrical and mechanical regulations, standards, and safety rules.
- Protect the product against mechanical influences.
- Make sure that the sensor is mounted in a mechanically secure fashion.
- Specified torque values must be complied with (see section “3. Technical Data”, page 7).

ATTENTION!

Risk of property damage in case of improper installation!

The product may be damaged.

- Installation instructions must be complied with.

CAUTION!

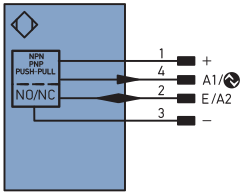
Risk of personal injury or property damage during installation!

Personal injury and damage to the product may occur.

- A safe installation environment must be assured.

5.2 Electrical Connection

221



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)
EN RS422	Encoder 0-pulse 0-0̄ (TTL)

PT	Platinum measuring resistor
nc	not connected
U	Test Input
Ū	Test Input inverted
W	Trigger Input
W–	Ground for the 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
SY–	Ground for the 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

EN A RS422	Encoder A/Ā (TTL)
EN B RS422	Encoder B/B̄ (TTL)
EN A	Encoder A
EN B	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 IEC 60757

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



DANGER!

Risk of personal injury or property damage due to electric current!

Voltage conducting parts may cause personal injury or damage to equipment.

- The electric device may only be connected by appropriately qualified personnel.

5.3 Diagnostics

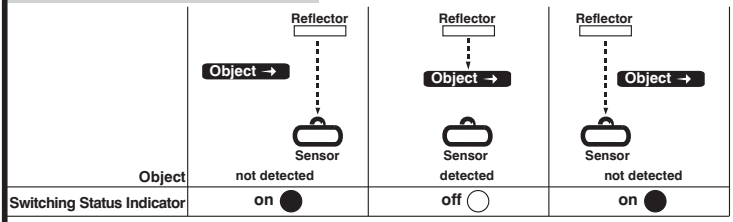
Causes for Triggering the Contamination Warning (blinking LED):

Display LED	Diagnosis/Cause	Elimination
Continuous blinking at approx. 2.5 Hz	Contamination	Carefully clean the optic cover with a cloth.
	Aged emitter diode	Replace the sensor.
	Unreliable working range	• Increase the sensor's switching distance. • Reduce distance between sensor and reflector.
Continuous blinking at approx. 5 Hz	Short-circuit	Check electrical wiring and eliminate the short-circuit.
	Over-temperature	Disconnect the sensor from supply power and allow it to cool down.
	Hardware error	Replace the sensor.

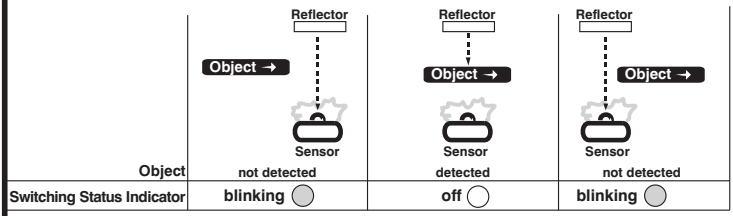
Contamination Warning Flowcharts

Retro Reflective Barrier

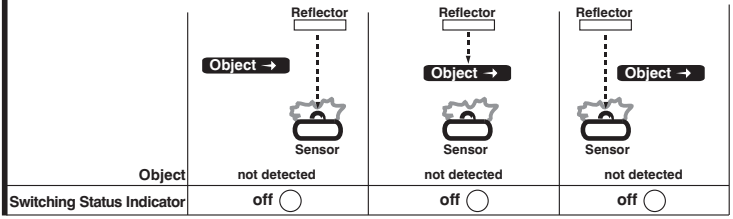
no contamination



beginning contamination



advanced contamination



Required action in case of fault:

NOTE!

- Shut down the machine.
- Analyze and eliminate the cause of error with the help of the diagnostics information.
- If the error cannot be eliminated, please contact wenglor's support department.
- Do not operate in case of indeterminate malfunctioning.
- The machine must be shut down if the error cannot be unequivocally clarified or reliably eliminated.

DANGER!

Risk of personal injury or property damage in case of non-compliance!

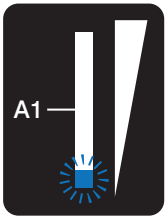
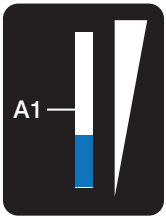
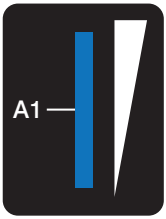
The system's safety function is disabled. Personal injury and damage to equipment.

- Required action as specified in case of fault.

6. Settings

6.1 Alignment

- Briefly press the teach-in key (< 1 second).
- The display is switched to the alignment mode.
- Align the sensor to the reflector. The light path must not be obstructed by any objects.

No Signal or Weak Signal from the Reflector	Adequate Signal from the Reflector	Strong Signal from the Reflector
The lowermost LED blinks.	One or several LEDs are continuously lit.	Many LEDs are continuously lit.
		
Sensor not ready for operation	Sensor ready for operation	Sensor ready for operation
• Align the sensor and the reflector so that at least one LED is continuously lit. • Reduce distance between the sensor and the reflector. • Use a different reflector.	• Align the sensor and the reflector so that the largest possible number of LEDs lights up.	—

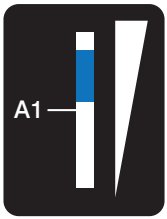
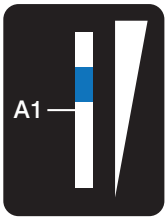
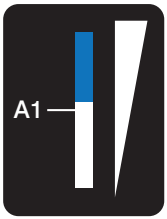
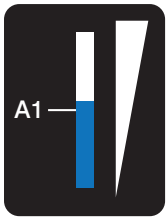
NOTE!

- The more LEDs light up the stronger the signal from the reflector.
- Not all of the LEDs have to light up in order to assure optimum functioning, and this isn't always possible due to the reflector's range and reflectivity. The display should be used to achieve the strongest possible signal with the respective setup.

- Briefly press the teach-in key once again (< 1 second).
- The display is switched to the run mode.

6.2 Teach-In

- Press and hold the teach-in key until the switching status indicator LED starts blinking.
- Release the teach-in key after 2 seconds.
- Teach-in is conducted and the switching status indicator LED lights up in acknowledgment. 3 LEDs above A1 light up at the LED display.
- Move the object into the light barrier and check for correct functioning.

Sensor Taught In	Inadequate Signal Reduction Due to Object	Signal Boosting Due to Object	Signal Reduction Due to Object with Functional Reserve
3 LEDs above A1 on	Up to 3 LEDs above A1 on	4 LEDs above A1 on	LEDs below A1 on
			
No object	Object not detected	Object not detected	Object detected with reserve
—	• Object not suitable for detection	• Object not suitable for detection	—

NOTE!

- Teach-in can be conducted in the alignment mode as well as in the run mode. After teach-in has been completed, the sensor switches automatically to the run mode.
- Marking A1 indicates the selected switching point.
- The more LEDs light up below A1 for a given object the greater the functional reserve.

7. Functions Overview

Further settings can be entered to the sensor via IO-Link or NFC.

7.1 Teach-In Mode

7.1.1 Minimal Teach-In (default setting)

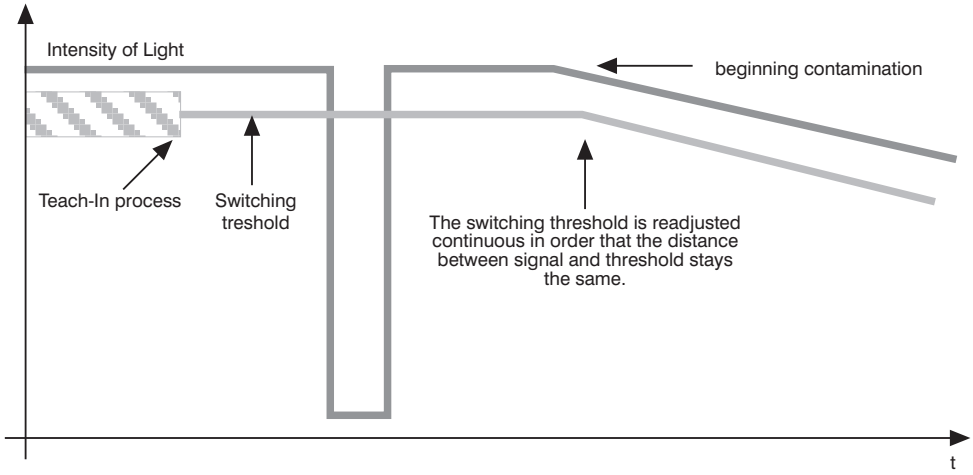
With this teach-in mode, the switching point is to a value just below momentary signal strength in consideration of signal quality. This makes it readily possible to detect transparent objects such as glass, PET and sheet materials.

7.1.2 Normal Teach-In

With this teach-in mode, the switching point is set to a value which corresponds to half of the signal strength. As a result, this mode has more switching reserve for the detection of opaque objects.

7.2 Dynamic readjustment

Continuous readjustment of the Sensor switching threshold. The time interval for the readjustment can be adjusted via interface. In delivery status the function is activated.



7.3 Pin Function, E/AO2

The function of E/A2 can be configured either as an output or an input.

7.3.1 Input External Teach-In

Teach in output A1 via the teach-in input.

1. Set the E/A2 pin function to external teach-in.

With Ub setting active (default):
2. Apply 18…30 V to pin E/A2 for at least 1 second, but for no more than 4 seconds.
3. As soon as voltage drops at the input, A1 is taught in.

With Ub setting inactive:
2. Disconnect pin I/O2 or connect it to 0 V for at least 1 second, but for no more than 4 seconds.
3. As soon as voltage is applied to the input, O1 is taught in.

Locking

If the teach-in input is continuously activated, the teach-in key is locked and protected against inadvertent changes.

1. Change the E/A2 pin function to external teach-in input.

With Ub setting active (default):
2. Permanently connect pin E/A2 to voltage within a range of 18 to 30 V DC.
3. The sensor is protected against inadvertent changes caused by the teach-in key.

With Ub setting inactive:
2. Permanently disconnect pin I/O2 or connect it to 0 V.
3. The sensor is protected against inadvertent changes caused by the teach-in key.

7.3.2 Error Output

The error output is switched in the following cases:

- Contamination
- Aged emitter diode
- Unreliable working range
- Short-circuit
- Over-temperature
- Hardware error

7.4 Additional functions and settings via IO-Link:

- PNP/NPN/push-pull
- NC/NO
- Switching hysteresis
- On/off-delay
- Operating mode
- Switch emitted light off
- Test mode
- Data storage

8. IO-Link

Process and parameters data, as well as the IODD, can be found at www.wenglor.com in the product's separate download area.

9. NFC

The devices can be set up and their parameters can be configured via the NFC interface with the help of an Android smartphone and wenglor's "Sensor Configurator" app. Process data cannot be read out via NFC but they're available via IO-Link.

The wenglor app can be downloaded free of charge from the Google Play Store. Download the app and follow the installation instructions.

Scan the code below to access the wenglor app directly.





The settings are selected via the app and are then transmitted to the sensor.

With the "Read" or "Write" mode activated, hold the smartphone's antenna just above the sensor's active NFC sensing face.

NOTE!

- NFC antenna position varies from one smartphone to the next.
- Refer to the smartphone's operating instructions in order to determine the antenna's exact position.

If a connection isn't established immediately, move the smartphone across the sensing face until connection is successful.

The sensor doesn't necessarily have to be connected to supply voltage for data transmission, i.e. transmission is also possible in the de-energized state.

10. Maintenance Instructions

NOTE!

- This wenglor sensor is maintenance-free.
- Cleaning and inspection of the plug connections at regular intervals are advisable.
- Do not clean the sensor with solvents or cleansers which could damage the product.
- The product must be protected against contamination during initial start-up.

11. 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.

12. Appendix

12.1 List of Abbreviations

Abbreviation	Meaning
Tu	Ambient temperature
Ub	Supply voltage
IODD	IO Device Description
MTTFd	Mean Time to Dangerous Failure

12.2 Change Index, Operating Instructions

Version	Date	Description/Change
1.0.0	19.03.19	Initial version of the operating instructions
1.1.0	11.07.19	“7.3 Pin Function, E/AO2” on page 17

12.3 EU Declaration of Conformity

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