

P1KTxxx

Reflex Sensor with line optic



Operating Instructions

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1. General

1.1 Information Concerning these Instructions

- These instructions apply to the product with ID code P1KTxxx.
- 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:



Attention-Getting Word! 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:

Reflex Sensor

The reflex sensor makes use of a red light line in accordance with the energetic principle and is suitable for detecting objects without any background. It's suitable for reliable detection of objects with stamped or perforated surfaces such as PCBs and perforated sheet metal. Furthermore, objects can be detected on the light line regardless of position. The IO-Link interface can be used to configure the reflex sensor (PNP/NPN, NC/NO, switching distance), as well as for reading out switching statuses and distance values.

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
- 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!

Risk of personal injury or property damage in case of incorrect initial start-up and maintenance!

Personal injury and damage to equipment may occur.

- Adequate training and qualification of personnel.
-

2.4 Modification of Products



DANGER!

Risk of personal injury or property damage if the product is modified!

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



RoHS

3. Technical Data

| Technical Data | Order Number | P1KT | |
|--|-------------------|---------------|-----|
| | | 002 | 004 |
| Optical Data | | | |
| Detection range | | 100 mm | |
| Switching hysteresis | | < 10 % | |
| Light source | | Red light | |
| Service life (ambient temp. = +25° C) | | 100,000 hours | |
| Max. permissible ambient light | | 10,000 lux | |
| Spot diameter | | See table 1 | |
| Electrical Data | | | |
| Supply power | | 10...30 V DC | |
| IO-Link supply voltage | | 18...30 V DC | |
| Current consumption (operating voltage = 24 V) | | ≤ 20 mA | |
| Switching frequency | | 750 Hz | |
| Switching frequency (speed mode) | | 1000 Hz | |
| Response time | | 1 ms | |
| Response time (speed mode) | | 0.67 ms | |
| Temperature drift | | < 5 % | |
| 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 | × | |
| | NPN | | × |
| | NC, NO antivalent | × | × |
| Connection Diagram No. | | 215 | 213 |
| Mechanical Data | | | |
| Setting method | | Potentiometer | |
| Housing material | | Plastic | |
| Degree of protection | | IP/67IP68 | |
| Connection | | M8×1, 4-pin | |
| Lens cover | | PMMA | |
| Technical Safety Data | | | |
| MTTFd (EN ISO 13849-1) | | 1718, 95 a | |

Spot Diameter

| | | | |
|-----------------|----------|----------|-----------|
| Detection range | 30 mm | 65 mm | 100 mm |
| Spot diameter | 10×35 mm | 11×70 mm | 12×100 mm |

Table 1

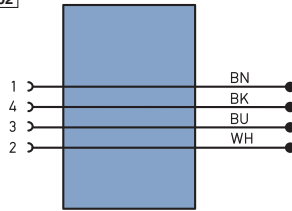
3.1 Accessory Products

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

Suitable mounting technology no. **400**

Suitable connection technology no. **7**

S02

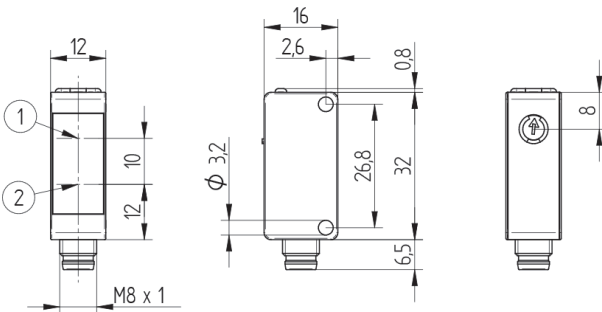


PNP-NPN converter BG7V1P-N-2M

IO-Link master

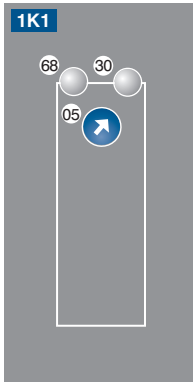
wTeach2 software DNNF005

3.2 Layout



- 1 = emitter diode
- 2 = receiver diode
- M3 screw = 0.5 Nm
- Potentiometer = 40 Nmm
- Dimensions specified in mm (1 mm = 0.03937")

3.3 Control Panel



05 = switching distance adjuster
30 = switching status indicator / contamination warning
68 = supply power indicator

3.4 Scope of Delivery

- Sensor
- Safety precautions
- Mounting-Set 01

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 “3. Technical Data” on page 7).

ATTENTION!



Risk of property damage in case of improper installation!

The product may be damaged.

- Installation instructions must be complied with.

CAUTION!

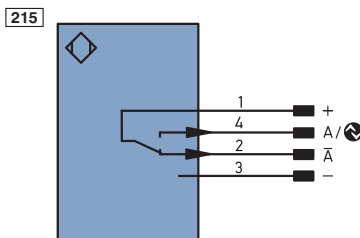
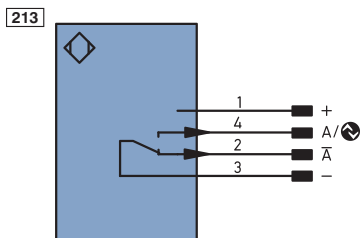


Risk of personal injury or property damage during installation!

Personal injury and damage to the product may occur.

- A safe installation environment must be assured.

5.2 Electrical Connection



Legend

| | | | | | |
|----------|--|--------|------------------------------|--------|---------------------|
| + | Supply Voltage + | PT | Platinum measuring resistor | ENa | Encoder A |
| - | Supply Voltage 0 V | nc | not connected | ENb | Encoder B |
| ~ | Supply Voltage (AC Voltage) | U | Test Input | AMin | Digital output MIN |
| A | Switching Output (NO) | Ū | Test Input inverted | Amax | Digital output MAX |
| Ā | Switching Output (NG) | W | Trigger Input | Aox | Digital output OK |
| V | Contamination/Error Output (NO) | O | Analog Output | SY In | Synchronization In |
| V̄ | Contamination/Error Output (NG) | O- | Ground for the Analog Output | SY OUT | Synchronization OUT |
| E | Input (analog or digital) | BZ | Block Discharge | Brt | Brightness output |
| T | Teach Input | Aw | Valve Output | M | Maintenance |
| Z | Time Delay (activation) | s | Valve Control Output + | | |
| S | Shielding | b | Valve Control Output 0 V | | |
| RxD | Interface Receive Path | SY | Synchronization | | |
| TxD | Interface Send Path | E+ | Receiver-Line | | |
| RDY | Ready | S+ | Emitter-Line | | |
| GND | Ground | ⊕ | Grounding | | |
| CL | Clock | SnR | Switching Distance Reduction | | |
| E/A | Output/Input programmable | Rx+/- | Ethernet Receive Path | | |
| IO-Link | IO-Link | Tx+/- | Ethernet Send Path | | |
| PoE | Power over Ethernet | Bus | Interfaces-Bus A(+)/B(-) | | |
| IN | Safety Input | La | Emitted Light disengageable | | |
| DSSD | Safety Output | Mag | Magnet activation | | |
| Signal | Signal Output | RES | Input confirmation | | |
| Bl_D+/- | Ethernet Gigabit bidirect. data line (A-D) | EDM | Contactor Monitoring | | |
| EN0Pulse | Encoder 0-pulse 0-0 (TTL) | ENaTTL | Encoder A/Ā (TTL) | | |
| | | ENbTTL | Encoder B/B̄ (TTL) | | |

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 |
| GNVE | 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.

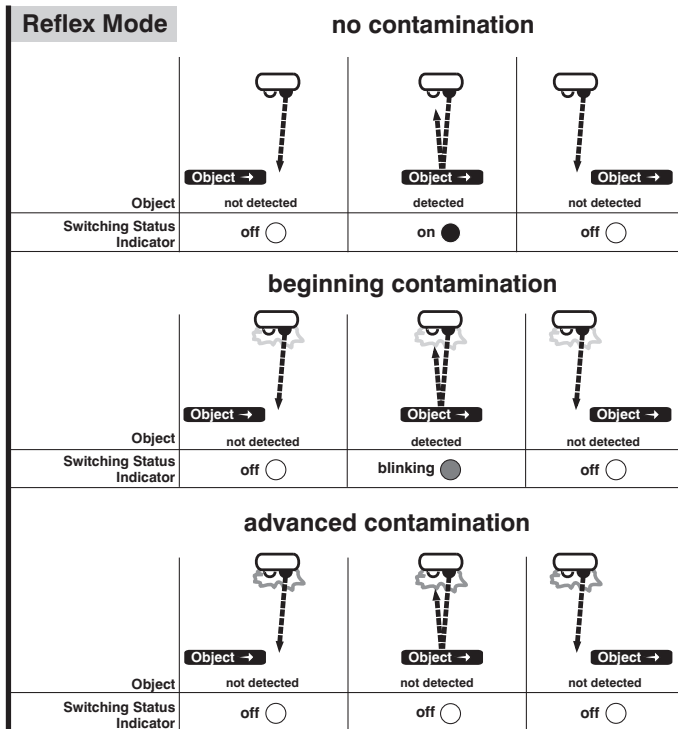
- The electric device may only be connected by appropriately qualified personnel.

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 | <ul style="list-style-type: none"> • Increase the sensor's switching distance. • Reduce distance between sensor and object. |
| 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



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

- Adjust and securely mount the sensor such that the spot strikes the object to be detected.
- Turn the potentiometer all the way to the left.
- Turn up the potentiometer until activation occurs and, if required, turn it up a bit more for increased switching reliability.

7. I/O-Link

Further settings are possible via the IO-Link interface. The IODD can be found at www.wenglor.com in the product's download area.

8. 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.

9. 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.

10. Appendix

10.1 List of Abbreviations

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

10.2 Change Index, Operating Instructions

| Version | Date | Description/Change |
|---------|----------|---|
| 1.0.0 | 16.03.17 | Initial version of the operating instructions |
| 1.1.0 | 04.12.17 | "3. Technical Data" on page 7 |

10.3 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.