

P2KTxxx

Energetic Reflex Sensor



Operating Instructions

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1. General

1.1 Information Concerning these Instructions

- These instructions apply to the product with ID code P2KTxxx.
- 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

This sensor is used for object detection in accordance with the reflex sensor principle. In the case of reflex sensors, the emitter and the receiver are located in the same housing. The object to be detected reflects the light beam coming from the emitter. The receiver absorbs the reflected light and the analysis electronics process it as a switching signal. Due to the fact that bright objects are more reflective than dark objects, they can be detected from greater 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
- 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



3. Technical Data

Technical Data		Order Number	P2KT	
			001	003
Optical Data				
Detection range			700 mm	
Switching hysteresis			< 10 %	
Light source			Red light	
Service life (ambient temp. = +25 °C)			100,000 hours	
Max. permissible ambient light			10,000 lux	
Aperture angle			< 6°	
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			500 Hz	
Switching frequency (speed mode)			1000 Hz	
Response time			1 ms	
Response time (speed mode)			0.5 ms	
Temperature drift			< 10 %	
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			Stainless steel V4A	
Degree of protection			IP68/IP69K	
Connection			M8×1, 4-pin	
Lens cover			PMMA	
ECOLAB			Yes	
Technical Safety Data				
MTTFd (EN ISO 13849-1)			2584,53 a	

Spot Diameter

Detection range	100 mm	300 mm	700 mm
Spot diameter	20 mm	40 mm	80 mm

Table 1

Detection Range

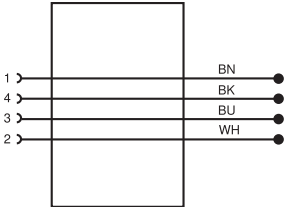
Reference Material	Detection Range
White (90 %)	700 mm
Gray (18 %)	400 mm
Black (6 %)	200 mm

Table 2

3.1 Accessory Products

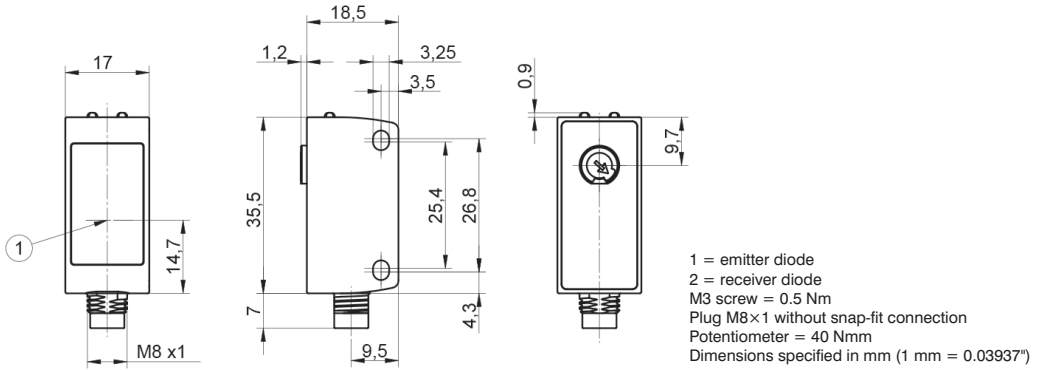
wenglor can provide you with suitable connection technology for your product.

Suitable mounting technology no.	400
Suitable connection technology no.	7
	S02



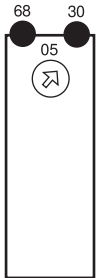
IO-Link master EFBL001, EFBL003, EP0L001
wTeach2 software DNNF005
Software IO-Link Device Tool DNNF019
Hygienically designed screws BEF-SET-48

3.2 Layout



3.3 Control Panel

1K1



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

3.4 Scope of Delivery

- Sensor
- Safety precautions
- Mounting-Set 46

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!



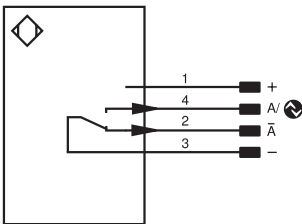
Risk of personal injury or property damage during installation!

Personal injury and damage to the product may occur.

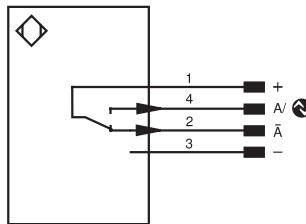
- A safe installation environment must be assured.

5.2 Electrical Connection

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Legend

+	Supply Voltage +	PT	Platinum measuring resistor	EN _{A/B}	Encoder A/Ä (TTL)
-	Supply Voltage 0 V	nc	not connected	EN _{TEST}	Encoder B/B (TTL)
U	Test Input	U	Test Input	ENA	Encoder A
~	Supply Voltage (AC Voltage)	Ü	Test Input inverted	ENb	Encoder B
A	Switching Output (NO)	W	Trigger Input	ÄMIN	Digital output MIN
Ä	Switching Output (NC)	W-	Ground for the Trigger Input	ÄMAX	Digital output MAX
V	Contamination/Error Output (NO)	O	Analog Output	ÄOK	Digital output OK
Ä	Contamination/Error Output (NC)	O-	Ground for the Analog Output	SY in	Synchronization in
E	Input (analog or digital)	BZ	Block Discharge	SY OUT	Synchronization OUT
T	Teach Input	ÄMV	Valve Output	Dat	Brightness output
Z	Time Delay (activation)	a	Valve Control Output +	M	Maintenance
S	Shielding	b	Valve Control Output 0 V	rsv	reserved
RxD	Interface Receive Path	SY	Synchronization	Wire Colors according to IEC 60757	
TxD	Interface Send Path	SY-	Ground for the Synchronization	BK	Black
RDY	Ready	E+	Receiver-Line	BN	Brown
GND	Ground	S+	Emitter-Line	RD	Red
CL	Clock	±	Grounding	OG	Orange
E/A	Output/Input programmable	SrR	Switching Distance Reduction	YE	Yellow
IO-Link	IO-Link	Rx+/-	Ethernet Receive Path	GN	Green
PoE	Power over Ethernet	Tx+/-	Ethernet Send Path	BU	Blue
IN	Safety Input	Bu	Interfaces-Bus A(+)/B(-)	VT	Violet
SSD	Safety Output	La	Emitted Light disengageable	GY	Grey
Signal	Signal Output	Mag	Magnet activation	WH	White
Bi-Di	Ethernet Gigabit bidirect. data line (A-D)	RES	Input confirmation	PK	Pink
EN _{0-pulse}	Encoder 0-pulse 0-0 (TTL)	EDM	Contactors Monitoring	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

Reflex Mode





no contamination

			
	Object → not detected	Object → detected	Object → not detected
Object	not detected	detected	not detected
Switching Status Indicator	off ○	on ●	off ○

beginning contamination

			
	Object → not detected	Object → detected	Object → not detected
Object	not detected	detected	not detected
Switching Status Indicator	off ○	blinking ●	off ○

advanced contamination

			
	Object → not detected	Object → not detected	Object → not detected
Object	not detected	not detected	not detected
Switching Status Indicator	off ○	off ○	off ○

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. IO-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	04.08.21	Initial version of the operating instructions

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.

