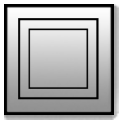
PT230020

Laser sensors
Diffuse-reflection sensor with analog and switching output

- **Plastic housing**
- **Protection class IP67**
- **Analog output 4 … 20mA**
- **M12 connection, 270° rotatable**

Laser protection class 1
Setting via teach-in

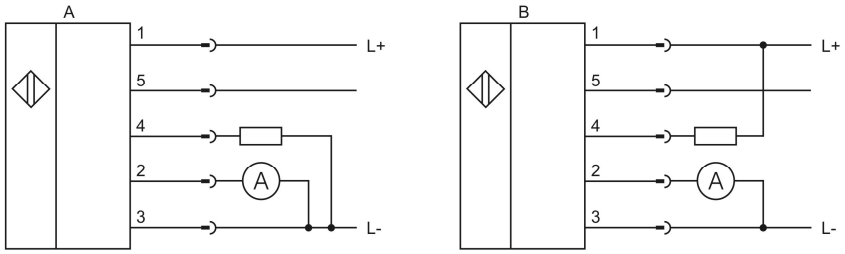
TECHNICAL DATA

Function	Time of Flight
Measuring range	0. 1 … 5m
Resolution	< 5mm (12bit)
Linearity	± 30mm
Repeatability	1.2mm
Operating voltage	18 … 30V DC
Ripple	≤ 10%
Readiness delay	≤ 5s
Power consumption (without load)	≤ 60mA
Output signal	PNP / NPN, no/nc
Output current (max. load)	100mA
Voltage drop (max. load)	2.4V
Switching frequency	≤ 250Hz
Hysteresis	20mm
Analog output	4 … 20mA
Update rate	2ms
Burden	≤ 500Ω
Temperature drift	< 2mm / K
Warm-up time	20min
Transmitting element	Laser diode, red light, pulsed
Wavelength	655nm
Laser protection class	1
Reverse polarity protection	+
Short-circuit protection	+
Display (operation)	LED green
Display (analog output)	LED yellow
Display (switching output)	LED yellow
Material (housing)	ABS
Material (front screen)	PMMA
Temperature (operation)	-20 … +60°C
Protection class (EN 60529)	IP67 & IP69k
Connection	M12-connector 5-pin, rotatable
Connection accessories	e.g. **VK205625**
Mounting accessories (universal holder)	**AY000119**

Laser protection class 1 according to IEC 60825-1

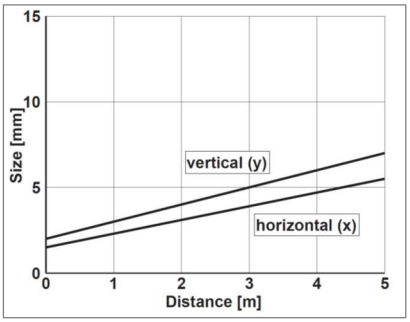
21 CFR 1040.10 and 1040.11 except for the deviations according to Laser Notice No. 56 of May 2019.

Connection

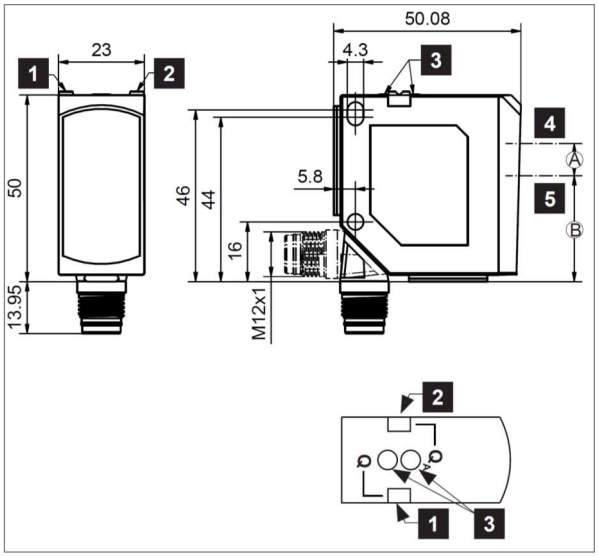


Colors: 1 = BN (brown), 2 = WH (white), 3 = BU (blue), 4 = BK (black), 5 = GY (grey)
Function: A: 1 = L+, 2 = 4 …20mA , 3 = L-, 4 = PNP NO/NC, 5 = Control
B: 1 = L+, 2 = 4 …20mA , 3 = L-, 4 = NPN NO/NC, 5 = Control

Light spot size



Dimensional drawing



Operating elements

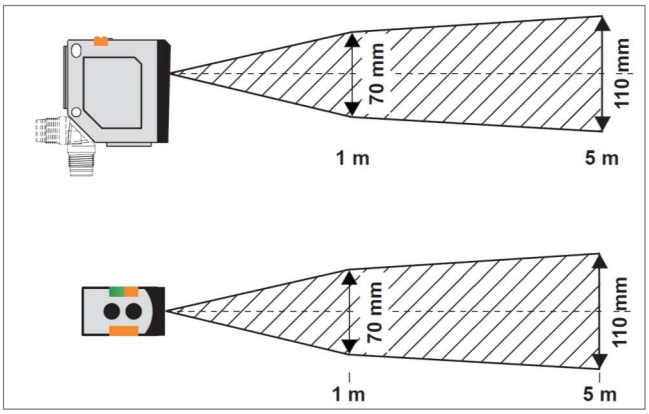
1 = LED yellow (display switching output)
2 = LED yellow (display analog output)
LED green (display operating voltage)
3 = Buttons: Q = Teach switching output
Q_A = Teach analog output
4 = Transmitter axis (A = 8.6mm)
5 = Receiver axis (B = 28.4mm)

Measuring range

Cover material	Measuring range
white (90%)	0.1 …5m
grey (18%)	0.1 …5m
black (6%)	0.1 …3m

Factory setting: measuring range 0.3 … 3m

Avoid further light spots in the hatched area!



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Safety instructions

Read the instruction manual carefully before commissioning!

Connection, assembly, adjustment, and commissioning may only be carried out by qualified personnel.

The device is not a safety component according to the EU Machinery Directive. If there is a direct impact on personal safety, the use of this product is prohibited!

Use in outdoor areas is not permitted.

Attention: Use of controls or adjustments or performance of procedures other than those specified may result in hazardous radiation exposure.

Laser protection class 1 according to IEC 60825-1

Wavelength 655nm, frequency 62.5kHz, pulse width <5ns, limit value pulse <1.25W

Conforms to 21 CFR 1040.10 and 1040.11 except for the deviations according to Laser Notice No. 56 of May 2019.

Intended use

The sensor is used for optical contactless detection of objects.

Mounting

Attach the sensor with a suitable mounting bracket.

Connection

Plug on the cable socket in a de-energised condition and screw it tight. Connect the cable according to the connection diagram on page 2.

The sensor automatically detects whether the load at the switching output is PNP or NPN. Load voltage and supply voltage must come from one voltage source, a parallel connection of two sensors is not permitted!

Setting

The laser scanner has an analog and a switching output that can be set independently of each other.

Analog output: The two teach points mark the beginning and end of the measuring range and scale the analog output.
Teach 1 = 4mA, Teach 2 = 20mA.

Switching output: Die beiden Teachpunkte kennzeichnen Anfang und Ende des Schaltfensters.

Setting modes: Teach sequence and object distance determine the characteristic curve of the analog output and the window width of the switching output.

Control input

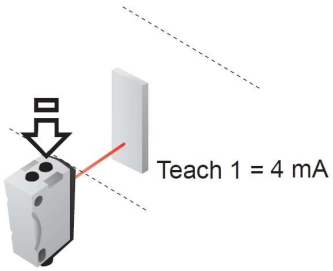
The sensor has a control input on PIN 5 (gray wire of the cable socket) with the following functions:

open:	Teach buttons active
connection to L-:	Teach-buttons locked
connection to L+:	Teach-input active

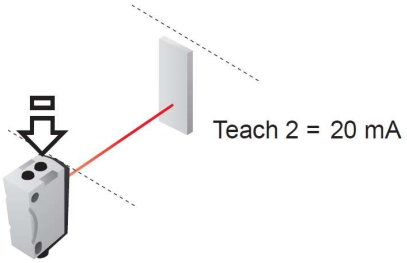
Maintenance

The laser scanner is maintenance-free. It is recommended to clean the optical surfaces and to check screw connections and plug connections at regular intervals.

Teach-in analog output

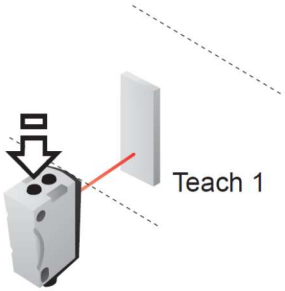


Button Q_A > press **3s**, or connect Control with L+ > 3s until the green and the yellow LED are blinking simultaneously.

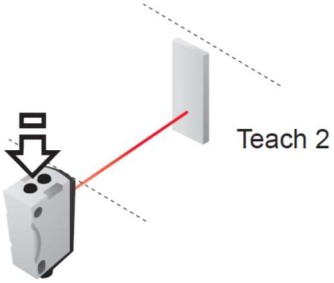


Button Q_A > press **1s**, or connect Control with L+ > 1s.

Teach-in switching output



Button Q > press **3s** or connect Control with L+ > 6s until the green and the yellow LED are blinking simultaneously.



Button Q > press **1s** or connect Control with L+ > 1s.

Switching N.O. / N.C.

Button Q > press **10s**, or connect Control with L+ > 10s until the green and the yellow LED are blinking alternately

→ **N.O.**

green LED is blinking
yellow LED is on
↓
wait 10s
↓

Press Q key quickly or connect control with L+

→ **N.C.**

green LED is blinking
yellow LED is off
↓
wait 10s
↓

→ …

Switching the analog characteristic curve

Button Q_A > press **10s**, until the green and yellow LEDs are blinking alternately

→ **Characteristic curve (as teached)**

green LED is blinking
yellow LED is on
↓
wait 10s
↓

Button Q_A press quickly

→ **Characteristic curve inverted** → **...**

green LED in blinking
yellow LED is off
↓
wait 10s
↓

Switching Auto-Detect / NPN / PNP

Button Q > press **13s**, or connect Control with L+ > 13s until the green and the yellow LED are blinking simultaneously

→ **Auto-Detect**

Green and yellow
LED are blinking
simultaneously
↓
wait 10s

→

Button Q press quickly or connect control with L+

→ **NPN**

green LED is blinking
↓
wait 10s
↓

→

Button Q press quickly or connect control with L+

→ **PNP** → **...**

yellow LED is blinking
↓
wait 10s
↓

Switching the analog output

Button Q_A > press **13s**, until the green and the yellow LED are blinking simultaneously

→ **Analog output voltage**

green LED is blinking
↓
wait 10s
↓

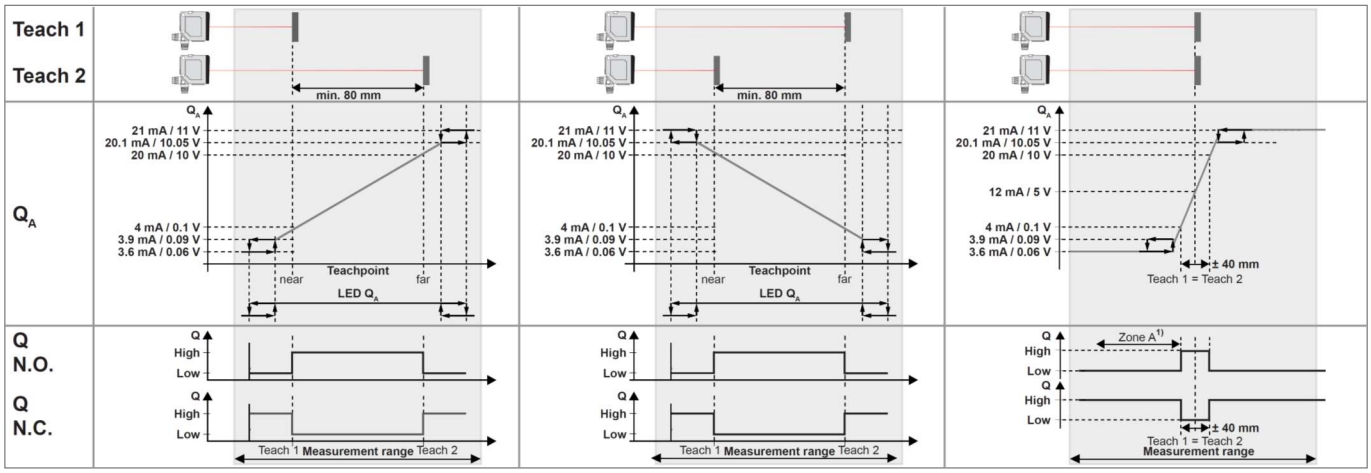
→

Button Q_A press quickly

→ **Analog output current** → **...**

yellow LED is blinking
↓
wait 10s
↓

Setting modes



1) Forced reflector operation: all non-transparent objects in zone A are reliably detected.

Reset to factory setting

1. Disconnect the device from the supply voltage.
2. Press one of the keys QA or Q.
3. Switch the supply voltage back on while keeping the keys pressed. The green LED is blinking.
4. Press and hold the buttons for more than 10s until both LEDs are blinking 3x simultaneously.
5. The factory setting is restored.