

KRTW 55

en 05-2017/11 50112062-02



13mm

ECOLAB®
CleanProof+

IO-Link

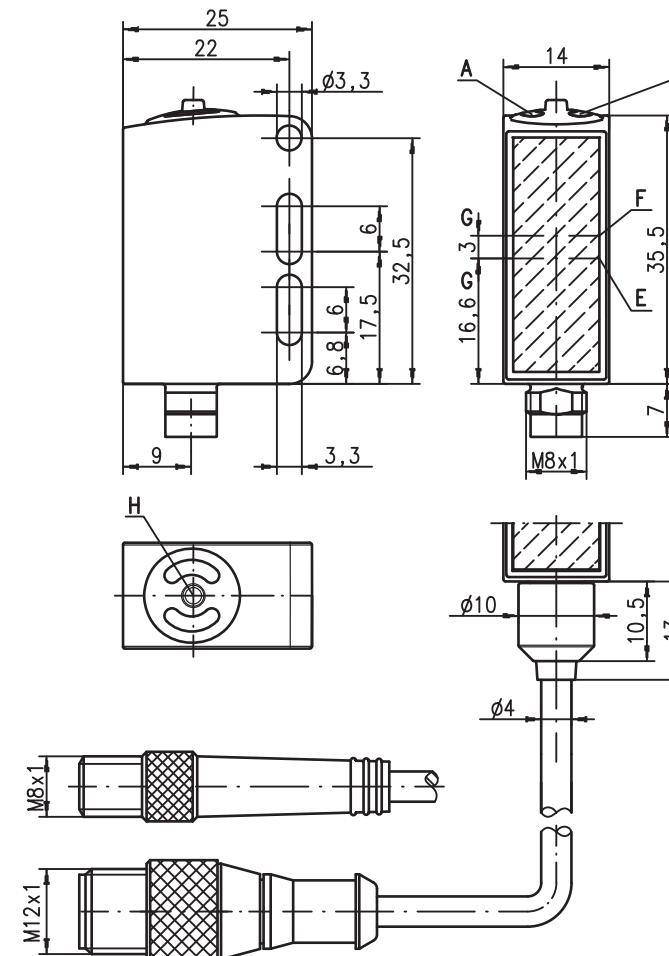
- White light transmitter
- Various teach variants
- Short response time
- Switching threshold adjustment via EasyTune
- Level adaptation for glossy objects
- 316L stainless steel housing in WASH-DOWN-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and CleanProof+ tested
- Paperless device identification
- Scratch resistant and non-diffusive plastic front cover
- Keyboard lockout
- Remote teach via cable
- Pulse stretching 20ms

Accessories:

(available separately)

- Mounting systems (BT 3...)
- Cables with M8 or M12 connector (KD ...)

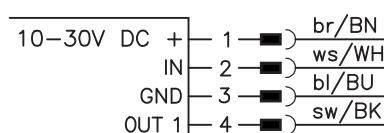
Dimensioned drawing



A Green indicator diode
B Yellow indicator diode
C Light spot orientation horizontal
D Light spot orientation vertical
E Transmitter
F Receiver
G Optical axis
H Teach button

Electrical connection

Connector, 4-pin



Specifications

Optical data

Scanning range ¹⁾
Light spot dimensions
Light spot orientation
Light source ²⁾
Wavelength

Sensor operating modes

IO-Link
SIO
Dual Core

Timing of the sensor

Internal switching frequency
Internal response time
Response jitter, internal
Repeatability ³⁾
Delay before start-up
Conveyor speed during teach
Teach process
Teach delay

Timing of the outputs

Response time

13mm ± 2mm
1.5mm x 4mm (at a distance of 13mm)
vertical or horizontal (see dimensioned drawing)
white LED (optimized through YellowBoost)
430 ... 700nm

COM2 (38.4kBaud)
standard push-pull
no

10kHz
50µs
20µs
0.02mm
≤ 300ms
≤ 0.1m/s for a mark width of 1mm
static 1-point, static 2-point or dynamic 2-point
≤ 10ms

Electrical data

Operating voltage U_B ⁴⁾

with SIO
with COM2

10 ... 30VDC (incl. residual ripple)
18 ... 30VDC (incl. residual ripple)
≤ 15% of U_B
pin 4: GND if mark detected
pin 4: U_B if mark detected
pin 4: IO-Link SIO mode, U_B if mark detected
pin 4: IO-Link COM2 mode, see configuration file IODD
≥ $(U_B - 2V)/2V$
max. 100mA
≤ 20mA

Residual ripple
Output/function

.../2...
.../4...
.../6...
.../6...

Signal voltage high/low
Output current
Open-circuit current

.../2V
≥ (2V - 2V)/2V
max. 100mA
≤ 20mA

Indicators

Green LED in continuous light
Green and yellow LED flashing at 3Hz
Green and yellow LED flashing at 8Hz
Green LED off and yellow LED flashing at 8Hz
Yellow LED in continuous light
Transmitter LED, white flashing at 8Hz

ready
teach event active
teaching error
sensor error
mark detected (dependent on the teach sequence)
teaching error

Mechanical data

Housing
Housing design
Housing roughness ⁵⁾
Connector
Optics cover
Operation
Weight

AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
WASH-DOWN-Design
 $Ra \leq 2.5$
AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
coated plastic (PMMA), scratch resistant and non-diffusive
plastic (TPV-PE), non-diffusive
with M8 connector: 40g
with 200mm cable and M12 connector: 60g
with 5000mm cable: 110g
M8 connector, 4-pin,
0.2m cable with M12 connector, 4-pin
5m cable, 4 x 0.20mm²

Connection type

Environmental data

Ambient temp. (operation/storage) ⁶⁾
Protective circuit ⁷⁾
VDE safety class ⁸⁾
Protection class ⁹⁾
Environmentally tested acc. to
Light source
Standards applied
Certifications
Chemical resistance

-30°C ... +70°C/-30°C ... +70°C
2, 3
III
IP 67, IP 69K
ECOLAB, CleanProof+
exempt group (in acc. with EN 62471)
IEC 60947-5-2
UL 508, C22.2 No.14-13 ^{4) 6) 10)}
tested in accordance with ECOLAB and CleanProof+ (see Remarks)

Options

Input pin 2

Function characteristics
Input active/not active

Keyboard lockout / line teach / pulse stretching
≥ 8V/≤ 2V or not connected

Output pin 4

Line teach active
Error after line teach

for SIO
for COM2
for SIO
for COM2

2Hz at the switching output
see configuration file IODD
2Hz at the switching output
see configuration file IODD

1) Scanning range: recommended range with performance reserve

2) Average life expectancy 100,000h at an ambient temperature of 25°C

3) At conveyor speed 1m/s

4) For UL applications: for use in class 2 circuits according to NEC only

5) Typical value for the stainless steel housing

6) UL certified in the temperature range -30°C to 55°C,

operating temperatures of +70°C permissible only briefly (≤ 15min)

7) 2-polarity reversal protection, 3=short circuit protection for all transistor outputs

8) Rating voltage 50V

9) IP 69K only in combination with M12 connector

10) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.24A min, in the field installation

Remarks

UL REQUIREMENTS

Enclosure Type Rating: Type 1
For Use in NFPA 79 Applications
only.

Adapters providing field wiring
means are available from the manufacturer. Refer to manufacturers information.

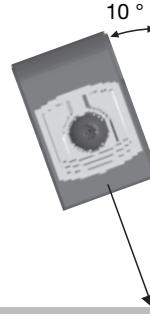
CAUTION – the use of controls or
adjustments or performance of
procedures other than those specified
herein may result in hazardous radiation exposure.

ATTENTION ! Si d'autres dispositifs d'alignement que ceux précités ici sont utilisés ou s'il est procédé autrement qu'indiqué, cela peut entraîner une exposition à des rayonnements et un danger pour les personnes.

Operate in accordance with intended use!

- ☒ This product is not a safety sensor and is not intended as personnel protection.
- ☒ The product may only be put into operation by competent persons.
- ☒ Only use the product in accordance with the intended use.

- With glossy objects, the sensor is to be fastened at an inclination of approx. 10° relative to the object surface.



- For applications in wet environment, the customer must protect the M8-connection against humidity.

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Order guide

Selection table

		Order code →					
Equipment ↓							
Transmitter color	white light	●	●	●	●	●	●
	RGB (red, green, blue)						
	laser-generated red light						
Light spot orientation	vertical	●	●	●	●	●	●
	horizontal						
	round						
Output (OUT 1)	PNP transistor output		●	●			●
	NPN transistor output				●	●	
	push-pull switching output	●					
	IO-Link COM2	●					
Input (IN)	teach input	●	●	●	●	●	●
Connection	M8 connector, metal	●	●		●		
	200 mm cable with M12 connector	4-pin				●	
	cable 5000 mm, 4-wire						●
Teach process	static 1-point						
	static 2-point	●	●	●	●	●	●
	dynamic 2-point						
Response time / Switching frequency	50 µs / 10 kHz	●	●	●	●	●	●
	83 µs / 6 kHz						
	125 µs / 4 kHz						
Configuration	switching threshold adjustment with EasyTune via teach button	●	●	●	●	●	●
	remote teach, keyboard lockout and pulse stretching via pin 2	●	●	●	●	●	●
	teach level 1, teach-level 2 and pulse stretching via teach button	●	●	●	●	●	●

IO-Link process data

The sensor transmits 2 bytes to the master.

Data bit	Assignment	Default settings
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0		
	Switching output	0 = no mark, 1 = mark detected
	Not assigned	Free
	Sensor operation	0 = off, 1 = on
	Switching threshold LSB	
	Switching threshold	Value range 0 ... 31 (0 ... 100% in approx. 3% steps)
	Switching threshold	0% = min. switching threshold 100% = max. switching threshold
	Switching threshold	
	Switching threshold MSB	
	Active transmitter LSB	00 = red, 01 = green or white, 10 = blue, 11 = all colors on (teach-in active)
	Active transmitter MSB	
	Not assigned	Free
	Measurement value LSB	
	Measurement value	Value range 0 ... 31 (0 ... 100% in approx. 3% steps)
	Measurement value	0% = min. signal level 100% = max. signal level
	Measurement value	
	Measurement value MSB	

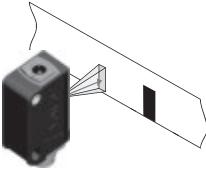
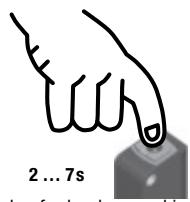
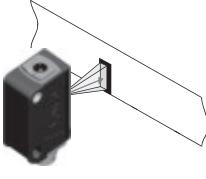
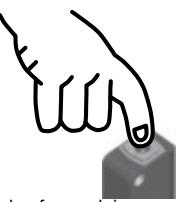


Additional information on the IO-Link service data is available on request.

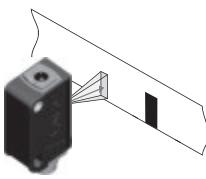
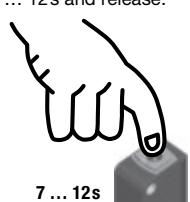
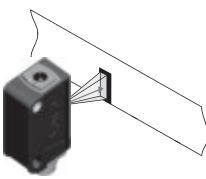
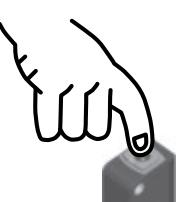
Static 2-point teach

Suitable for manual positioning of the marks (availability dependent on sensor type).

Switching threshold in center:

Position the background.	Press teach button for 2 ... 7s and release.	LEDs flash simultaneously.	Position the mark.	Briefly press teach button.
	 2 ... 7s Value for background is accepted.	 Simultaneous flashing		 Value for mark is accepted.

Switching threshold near the mark:

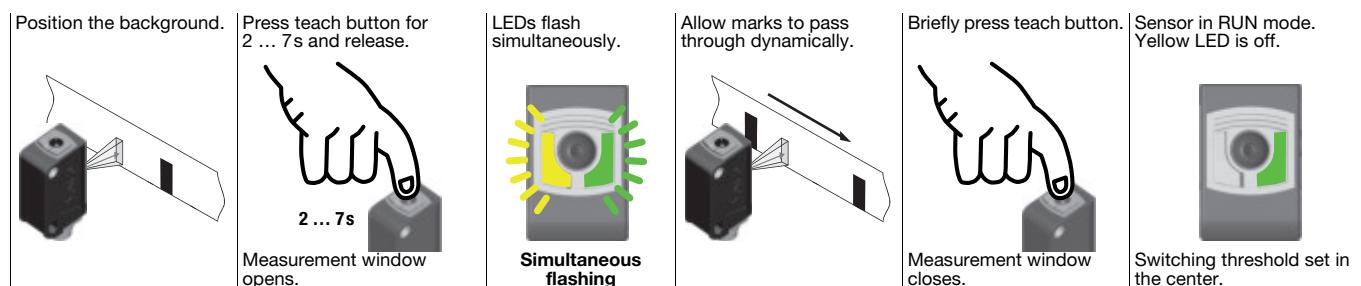
Position the background.	Press teach button for 7 ... 12s and release.	LEDs flash alternately.	Position the mark.	Briefly press teach button.
	 7 ... 12s Value for background is accepted.	 Alternating flashing		 Value for mark is accepted.

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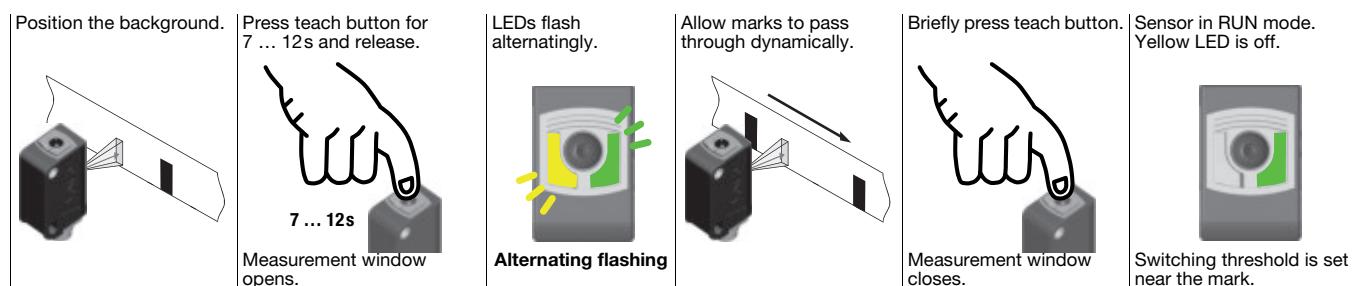
Dynamic 2-point teach

Suitable for marks moved during automated machine processes (availability dependent on sensor type).

Switching threshold in center



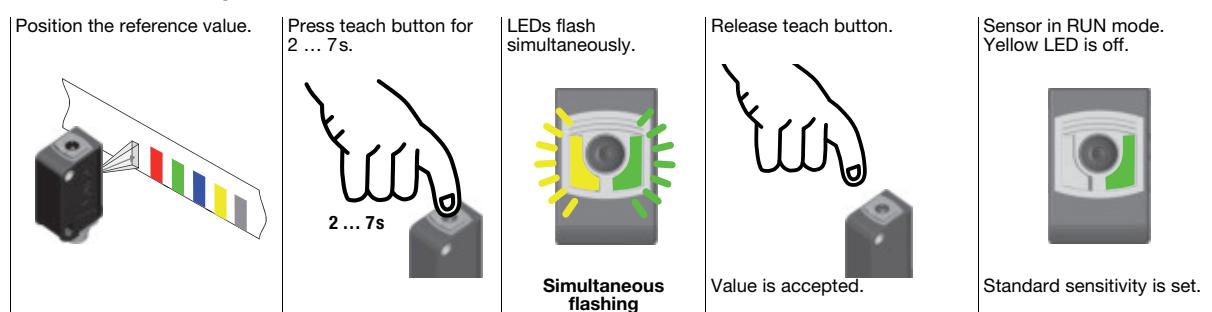
Switching threshold near the mark



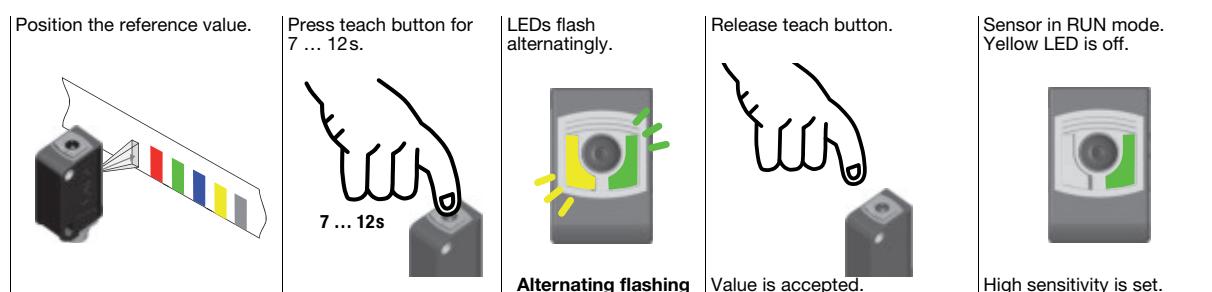
Static 1-point teach

Suitable for detecting all marks outside of the reference value (availability dependent on sensor type).

Standard sensitivity

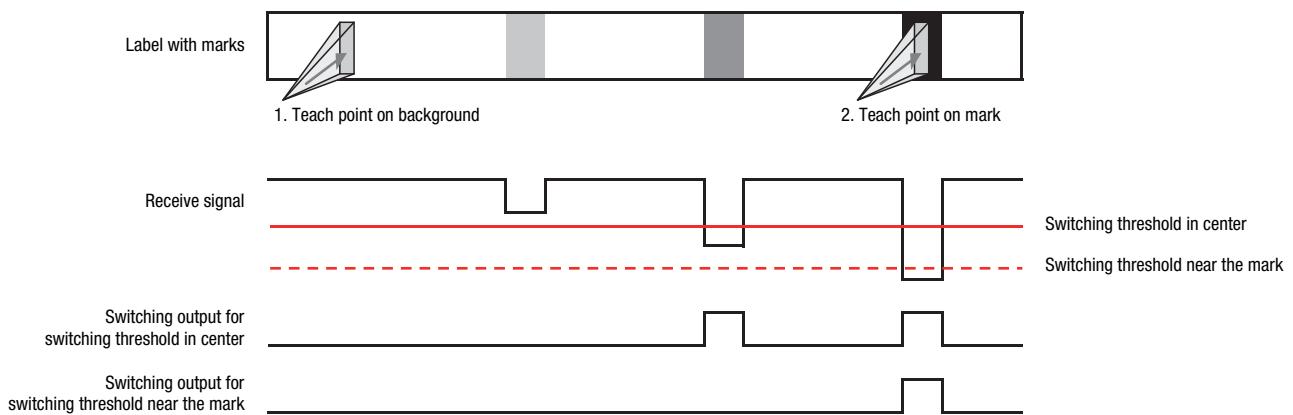


High sensitivity

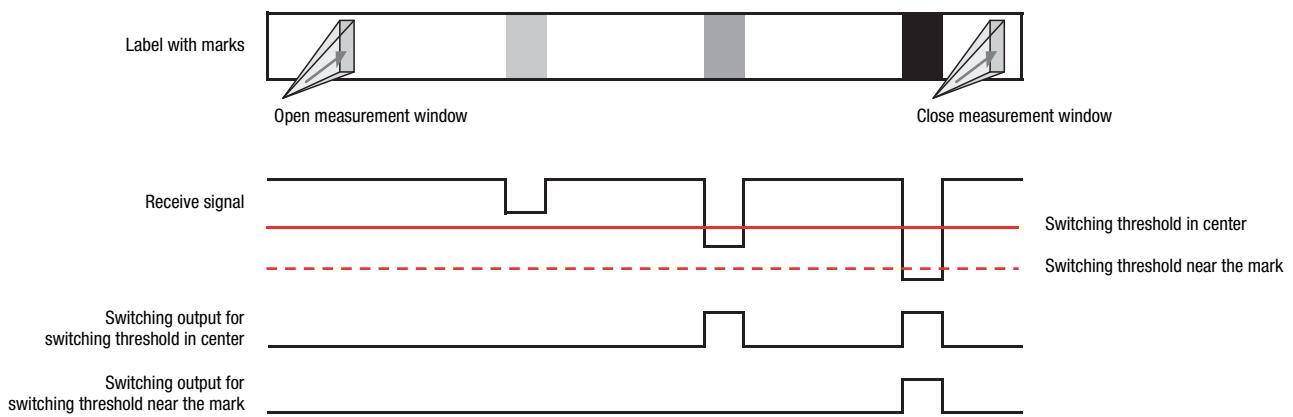


Switching threshold diagrams

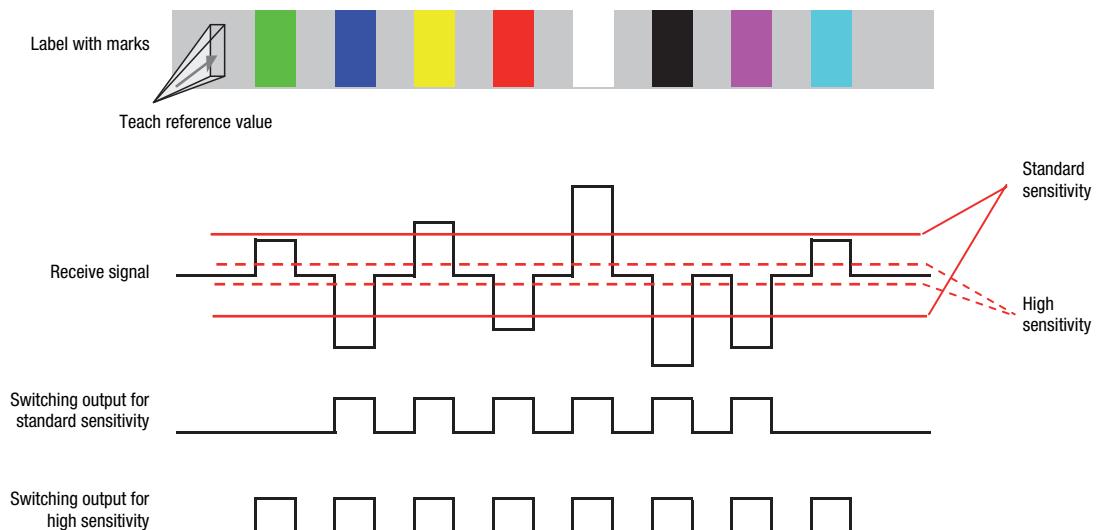
Static 2-point teach



Dynamic 2-point teach



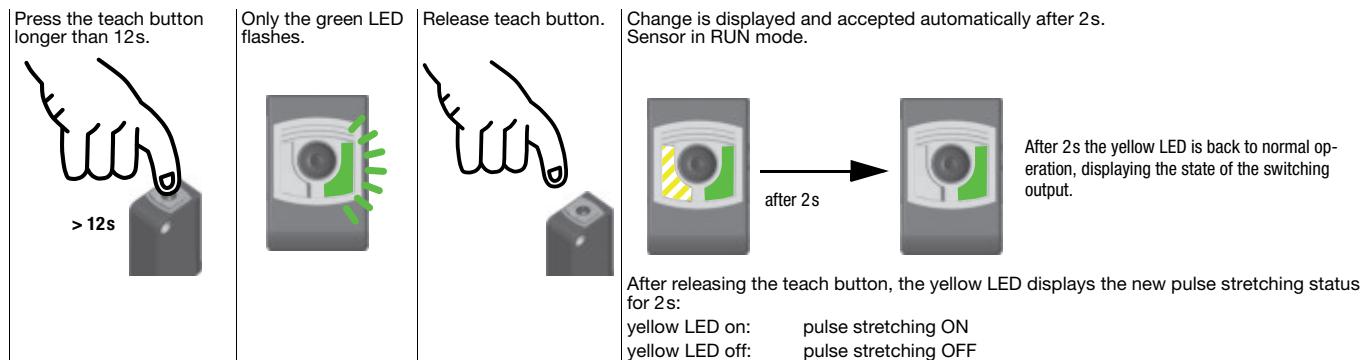
Static 1-point teach



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Pulse stretching option

Switching pulse stretching on or off:



"EasyTune" option - fine tuning of the switching threshold

Following power-on and completed teach event:

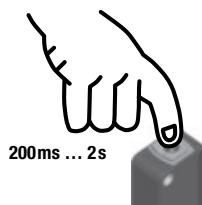
Green LED illuminates continuously (ready)

Yellow LED on/off continuously (mark detected/not detected)

Increasing the switching threshold:

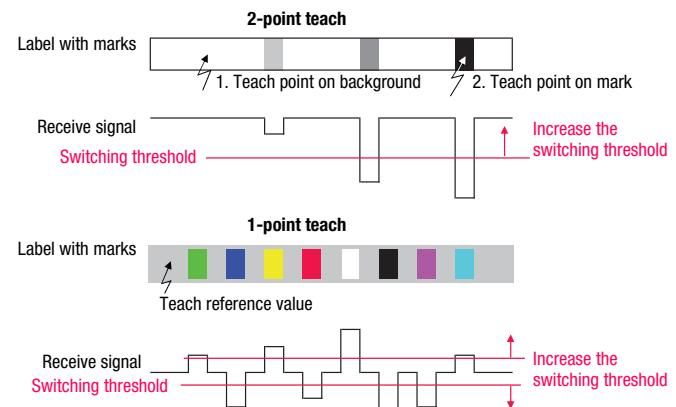
Long press of the button =
large force expenditure =
increase switching threshold

Each press of the button with a duration between 200ms and 2s increments the switching threshold.



Green LED flashes briefly once

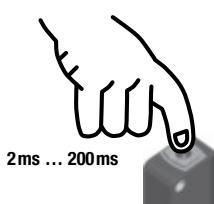
A press of the button is acknowledged by a single, brief **flash of the green LED** – the new switching threshold is now valid.



Reducing the switching threshold:

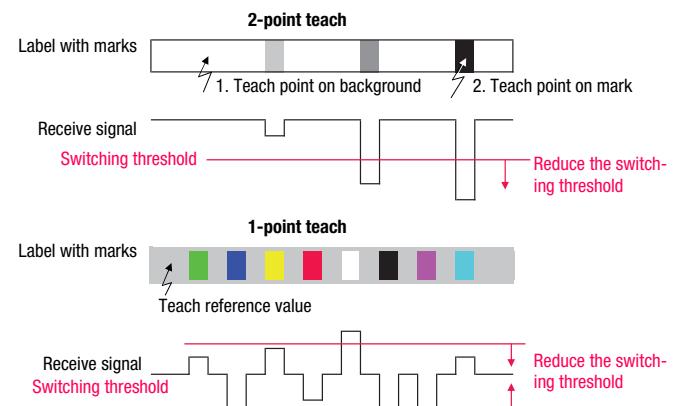
Short press of the button =
small force expenditure =
reduce switching threshold

Each press of the button with a duration between 2ms and 200ms decrements the switching threshold.



Green LED flashes briefly once

A press of the button is acknowledged by a single, brief **flash of the green LED** – the new switching threshold is now valid.



If the upper or lower end of the adjustment range is reached, the green and yellow LEDs flash at a considerably higher frequency of 8Hz for the duration of one second.

Sensor adjustments via the input IN (Pin 2)



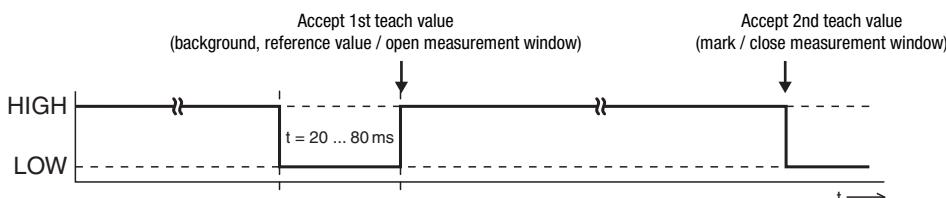
The following description applies to PNP switching logic!

Signal level LOW $\leq 2V$

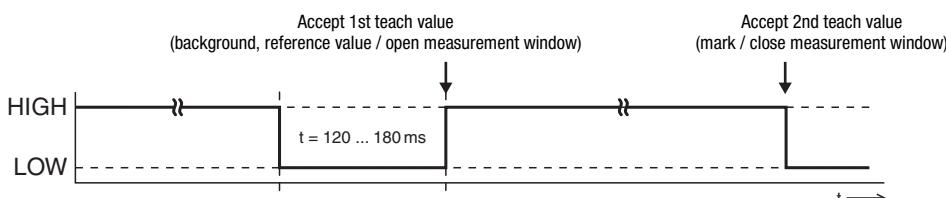
Signal level HIGH $\geq (U_B - 2V)$

With the NPN models, the signal levels are inverted!

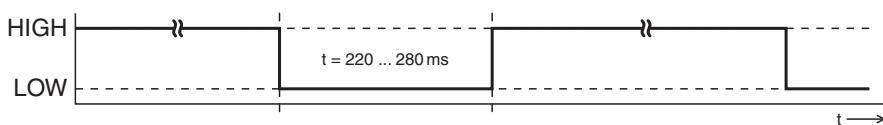
Switching threshold in center / standard sensitivity



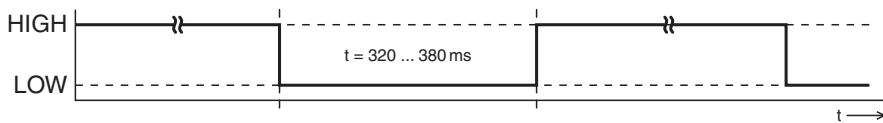
Switching threshold near the mark / high sensitivity



Pulse stretching ON



Pulse stretching OFF



Locking the teach button via the input IN (Pin 2)



A **static HIGH signal** ($\geq 20\text{ms}$) at the teach input locks the teach button on the sensor if required, such that no manual operation is possible (e.g., protection from erroneous operation or manipulation).

If the teach input is not connected or if there is a static low signal, the button is unlocked and can be operated freely.

