

KRTM 55

en 06-2017/11 50112063-03



13mm

ECOLAB®
CleanProof+

IO-Link

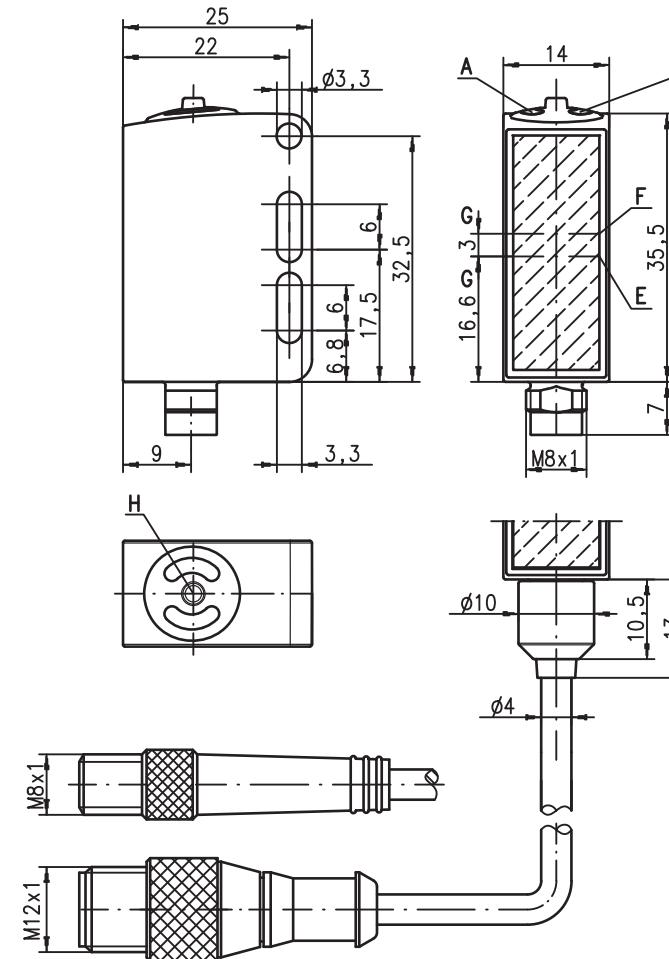
- RGB transmitter
- Various teach variants
- Short response time
- Switching threshold adjustment via EasyTune
- Level adaptation for glossy objects
- 316L stainless steel housing in WASH-DOWN-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and CleanProof+ tested
- Paperless device 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 ...)

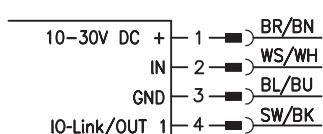
Dimensioned drawing



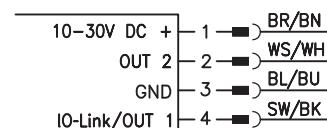
A Green indicator diode
B Yellow indicator diode
C Light spot orientation horizontal
D Light spot orientation vertical
E Transmitter
F Receiver
G Optical axis
H Teach button

Electrical connection

Connector, 4-pin



KRTM 55/L6.1121,200-S12



Specifications

Optical data

Scanning range ¹⁾	13mm \pm 2mm
Light spot dimensions in RUN-Mode	1.5mm x 4mm (at a distance of 13mm)
Light spot dimensions in Teach-Mode	1.5mm x 6.5mm (at a distance of 13mm)
Light spot orientation	vertical or horizontal (see dimensioned drawing)
Light source ²⁾	LEDs (red, green, blue)
Wavelength	640nm, 525nm, 470nm

Sensor operating modes

IO-Link	COM2 (38.4kBaud)
SIO	standard push-pull

Timing of the sensor

Internal switching frequency	10kHz
Internal response time	50 μ s
Response jitter, internal	20 μ s
Repeatability ³⁾	0.02mm
Delay before start-up	\leq 300ms
Conveyor speed during teach	\leq 0.1m/s for a mark width of 1mm
Teach process	static 1-point, static 2-point or dynamic 2-point
Teach delay	\leq 10ms

Timing of the outputs

Response time	SIO operation (without IO-Link): 50 μ s
	COM2 (with IO-Link): typ. 2.5ms

Electrical data

Operating voltage U_B ⁴⁾	with SIO with COM2	10 ... 30VDC (incl. residual ripple) 18 ... 30VDC (incl. residual ripple)
Residual ripple		\leq 15% of U_B
Output/function	.../2... .../4... .../6.1121... .../L6.1121...	pin 4: NPN transistor, GND if mark detected pin 4: PNP transistor, U_B if mark detected pin 4: IO-Link 1.0 pin 4: IO-Link 1.1
Signal voltage high/low		$\geq (U_B - 2V) / \leq 2V$
Output current		max. 100mA
Open-circuit current		\leq 25mA

Indicators

Green LED in continuous light	ready
Green and yellow LED flashing at 3Hz	teach event active
Green and yellow LED flashing at 8Hz	teaching error
Green LED off and yellow LED flashing at 8Hz	sensor error
Yellow LED in continuous light	mark detected (dependent on the teach sequence)
Transmitter LEDs flashing at 8Hz	teaching error

Mechanical data

Housing	AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Housing design	WASH-DOWN-Design
Housing roughness ⁵⁾	$R_a \leq 2.5$
Connector	AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Optics cover	coated plastic (PMMA), scratch resistant and non-diffusive plastic (TPV-PE), non-diffusive
Operation	with M8 connector: 40g
Weight	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 0.20mm ²
Connection type	

Environmental data

Ambient temp. (operation/storage) ⁶⁾	-30°C ... +70°C/-30°C ... +70°C
Protective circuit ⁷⁾	2, 3
VDE safety class ⁸⁾	III
Protection class ⁹⁾	IP 67, IP 69K
Environmentally tested acc. to	ECOLAB, CleanProof+
Light source	exempt group (in acc. with EN 62471)
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 ⁴⁾ ⁶⁾ ¹⁰⁾
Chemical resistance	tested in accordance with ECOLAB and CleanProof+ (see Remarks)

Options

Input pin 2 (not for KRTM 55/L6...)	keyboard lockout / line teach / pulse stretching $\geq 8V / \leq 2V$ or not connected
Function characteristics	
Input active/not active	
Output pin 4	
Line teach active	2Hz at the switching output see configuration file IODD
for SIO	
for COM2	
Error after line teach	2Hz at the switching output see configuration file IODD
for SIO	
for COM2	

- 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 (\leq 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.

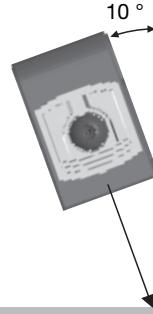
CAUTION – the use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

ATTENTION ! Si d'autres dispositifs d'alignement que ceux précisés 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

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	

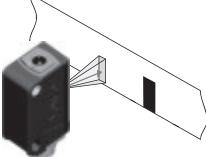
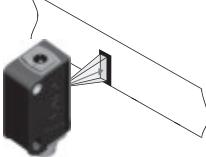


Further information and details on the IO-Link interface can be found in the separate IO-Link data sheet.

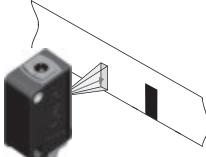
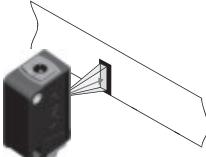
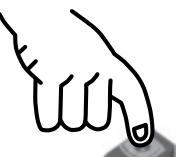
Static 2-point teach

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.	Sensor in RUN mode. Yellow LED illuminates.
	 2 ... 7s Value for background is accepted.	 Simultaneous flashing		 Value for mark is accepted.	 Switching threshold set in the center.

Switching threshold near the mark:

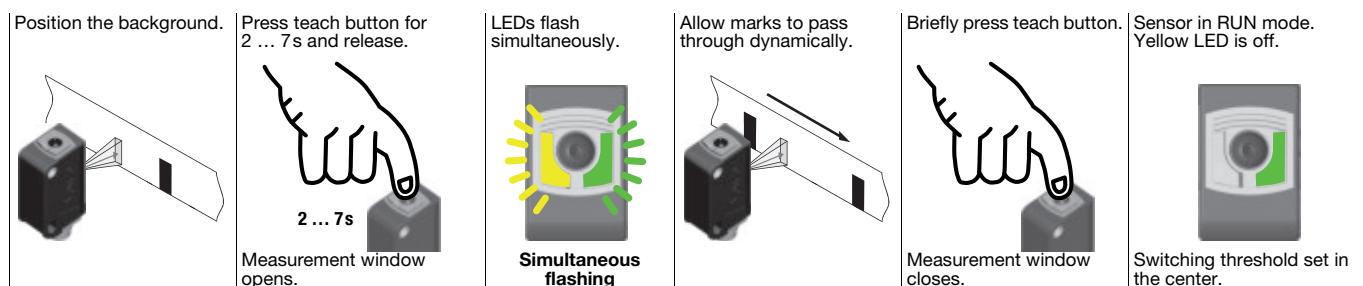
Position the background.	Press teach button for 7 ... 12s and release.	LEDs flash alternately.	Position the mark.	Briefly press teach button.	Sensor in RUN mode. Yellow LED illuminates.
	 7 ... 12s Value for background is accepted.	 Alternating flashing		 Value for mark is accepted.	 Switching threshold is set near the mark.

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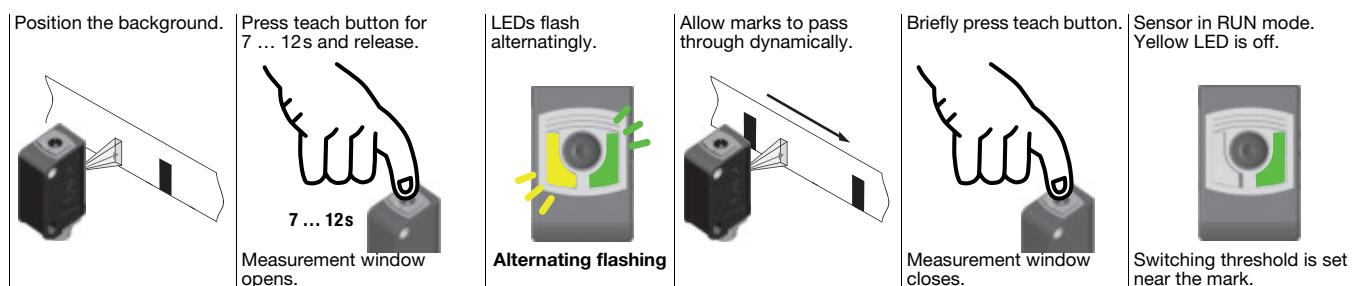
Dynamic 2-point teach

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

Switching threshold in center



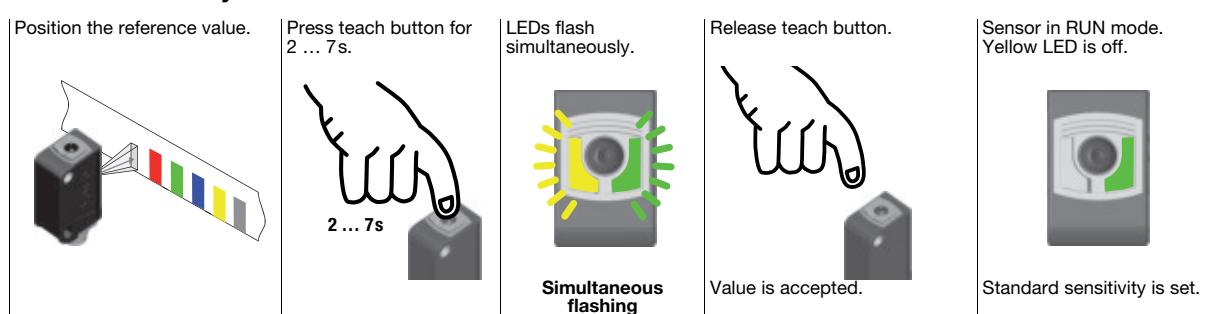
Switching threshold near the mark



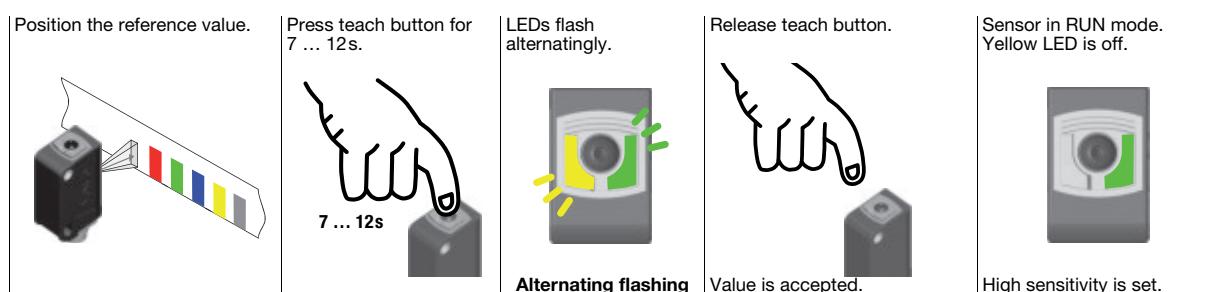
Static 1-point teach

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

Standard sensitivity

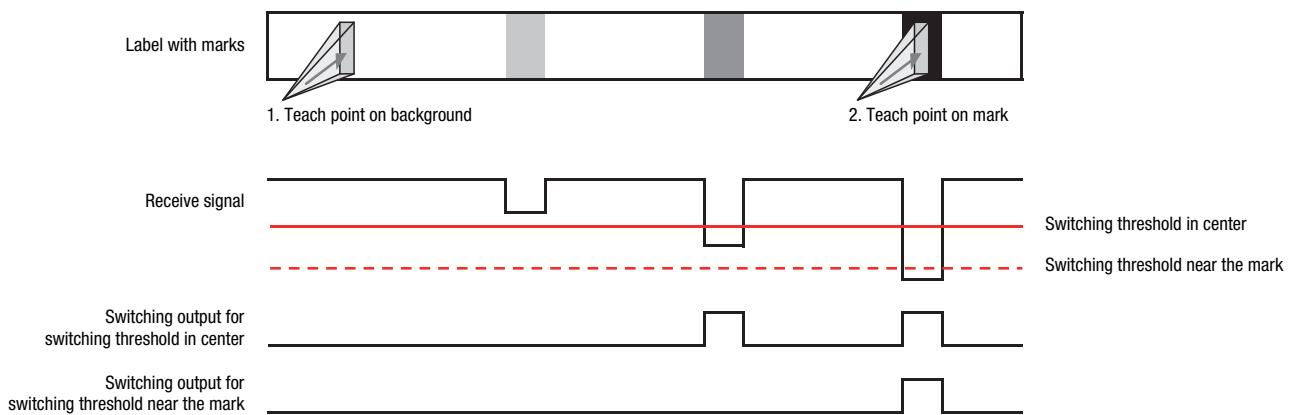


High sensitivity

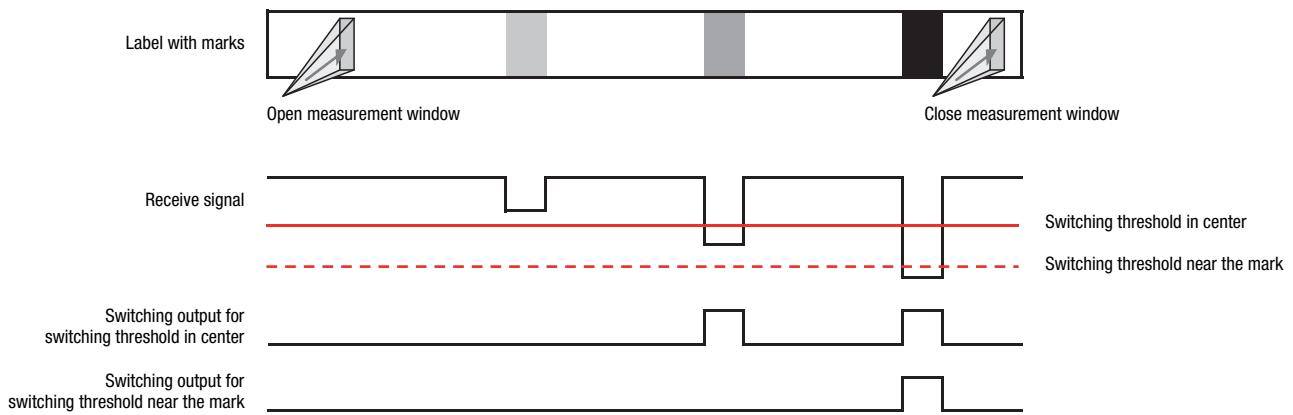


Switching threshold diagrams

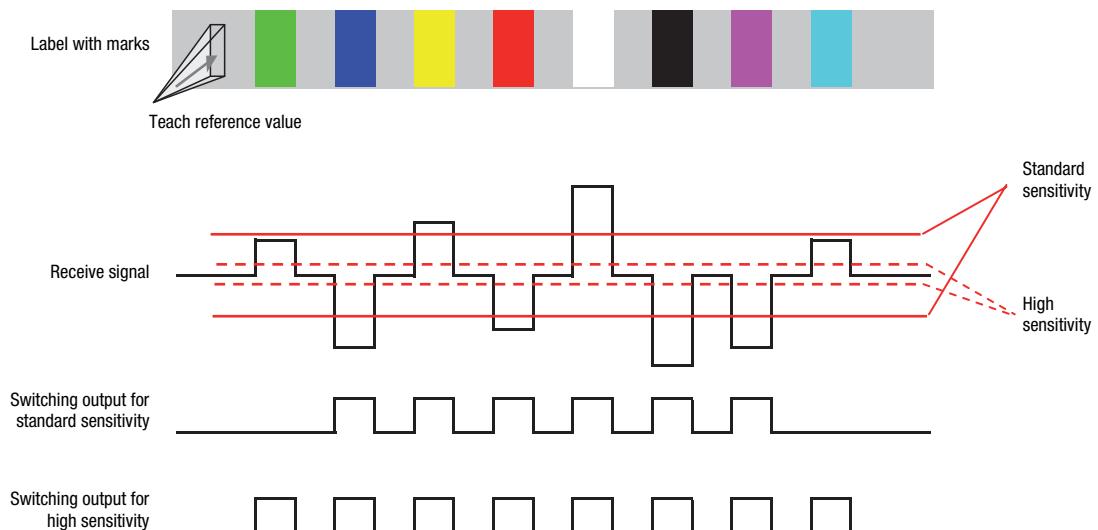
Static 2-point teach



Dynamic 2-point teach



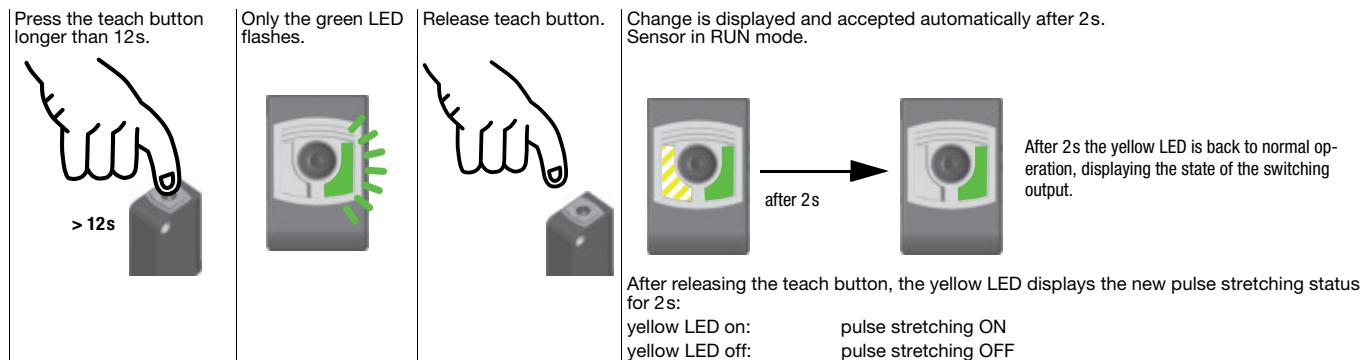
Static 1-point teach



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Pulse stretching option

Switching pulse stretching on or off:



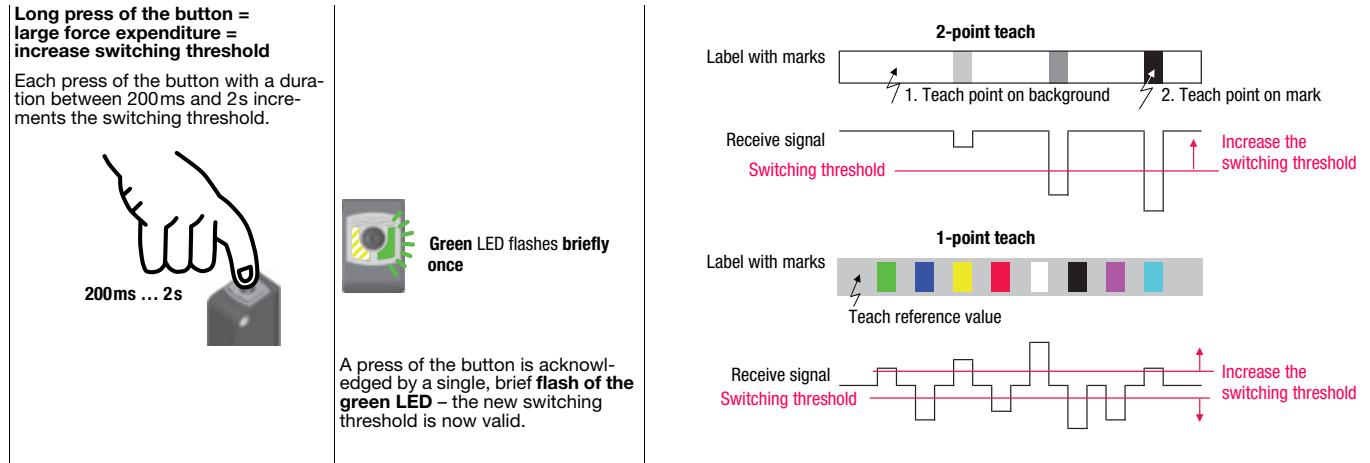
"EasyTune" option - fine tuning of the switching threshold

Following power-on and completed teach event:

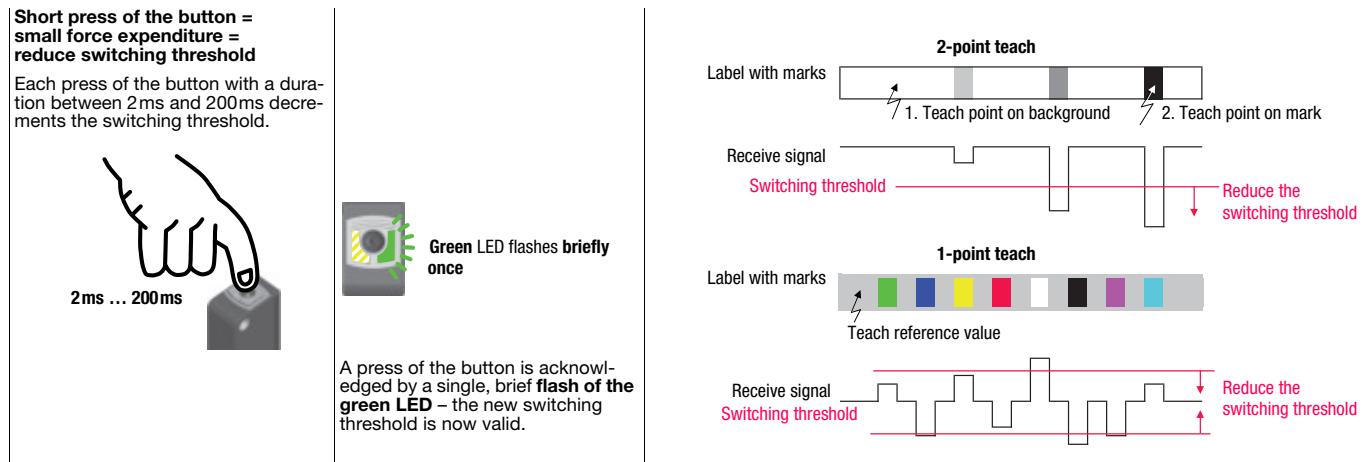
Green LED illuminates continuously (ready)

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

Increasing the switching threshold:



Reducing the switching threshold:



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, not for KRTM 55/L6...)



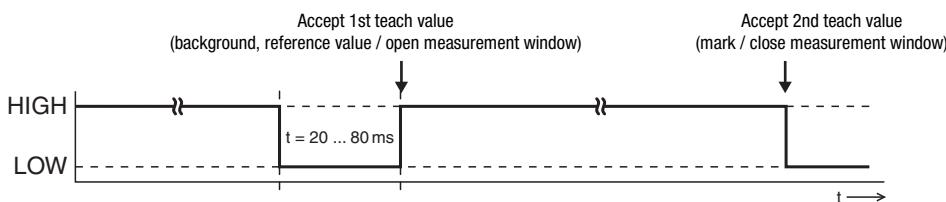
The following description applies to PNP switching logic!

Signal level LOW $\leq 2V$

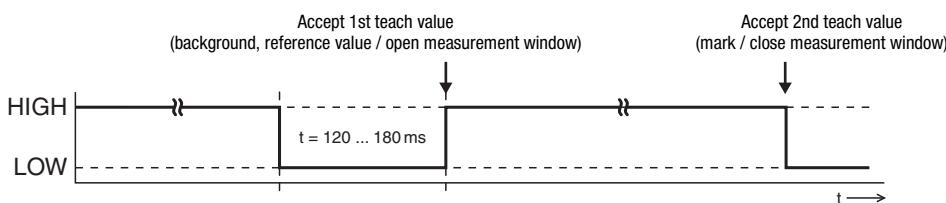
Signal level HIGH $\geq (U_B - 2V)$

With the NPN models, the signal levels are inverted!

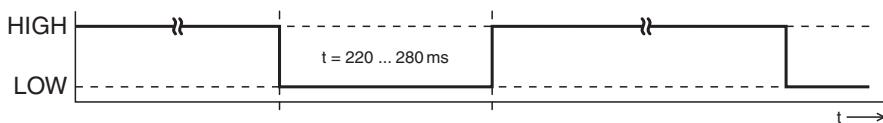
Switching threshold in center / standard sensitivity



Switching threshold near the mark / high sensitivity



Pulse stretching ON



Pulse stretching OFF



Locking the teach button via the input IN (Pin 2, not for KRTM 55/L6...)



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.

