

CONTRAST SENSORS WITH FIBER-OPTIC CABLES

B



CE 

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Product description

When steam, heat or dust are present, the KTL5-2 family of contrast sensors with fiber-optic cables offers the ideal solution. Various straight or angled fiber-optics can be easily mounted on the sensor. Due to the 3-color RGB LED technology, the sensors are able to activate the best possible emitted light source for each contrast. In addition, the sensors feature application-specific teach-in processes. The sensor defines all necessary parameters automatically

– either via the teach-in button on the device or via an external control cable. The sensor then determines the ideal switching threshold from the two gray values detected. High-precision contrast detection, automatic adaptation for high-gloss objects, a 10 kHz switching frequency, analog output, and individual alignment and mounting options make the device suitable for a wide range of tasks.

At a glance

- Various heat-resistant fiber-optic cable models are available
- Various teach-in methods, including potentiometer
- Analog output
- Switching frequency of 10 kHz

Your benefits

- Reliable contrast detection
- Flexible integration into machines due to minimal space requirements and various fiber-optic cable versions
- Durable, glass fiber-optic cables
- Reliable operation in adverse environmental conditions, such as extreme temperatures and moisture
- Resistant to aggressive cleaning agents
- Compact design fits in applications with limited space

→ www.sick.com/de/en/KT5

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



Detailed technical data

Features

Dimensions (W x H x D)	30.4 mm x 53 mm x 80 mm
Sensing distance	Dependent on the fiber-optic cable
Housing design (light emission)	Rectangular
Light source ¹⁾	LED
Type of light	Green, RGB (depending on type)
Output function	Light/dark switching

¹⁾ Average service life: 100,000 h at $T_U = +25\text{ °C}$.

Mechanics/electronics

Supply voltage ¹⁾	10 V DC ... 30 V DC
Ripple ²⁾	$\leq 5 V_{pp}$
Power consumption ³⁾	< 80 mA
Switching frequency ⁴⁾	10 kHz
Response time ⁵⁾	50 μ s
Switching output	PNP: HIGH = $V_S - \leq 2\text{ V}$ / LOW approx. 0 V / NPN: HIGH = approx. V_S / LOW $\leq 2\text{ V}$,
Output type	PNP / NPN (depending on type)
Analog output Q_A	0.3 mA ... 10 mA
Output current $I_{max.}$	100 mA
Input, teach-in (ET)	PNP: Teach: $U = 10\text{ V} \dots < U_V$; Run: $U < 2\text{ V}$ NPN: Teach: $U < 2\text{ V}$; Run: $U = 10\text{ V} \dots < U_V$
Input, fine/coarse (F/C)	PNP: fine: $U = 0\text{ V}$; Coarse: $U > 10\text{ V} \dots < U_V$
Input, light/dark (L/D)	PNP / light: $U = 0\text{ V}$; dark: $U > 10\text{ V} \dots < U_V$ NPN: light: $U = U_V$; dark: $U = 0\text{ V}$ (depending on type)
Retention time (ET)	25 ms, non-volatile memory
Time delay	20 ms
Connection type	Connector M12, 4-pin / Connector M12, 5-pin (depending on type)
Protection class ⁶⁾	II
Circuit protection	V_S connections reverse-polarity protected, Output Q short-circuit protected, Interference suppression
Enclosure rating	IP 67
Weight	400 g
Housing material	Metal, zinc diecast

¹⁾ Limit values; operation in short-circuit protected network max. 8 A.

²⁾ May not exceed or fall below U_V tolerances.

³⁾ Without load.

⁴⁾ With light/dark ratio 1:1.

⁵⁾ Signal transit time with resistive load.

⁶⁾ Reference voltage DC 50 V.

Ambient data

Ambient operating temperature	-10 °C ... +55 °C
Ambient storage temperature	-25 °C ... +75 °C
Shock load	According to IEC 60068
UL File No.	NRKH.E181493 & NRKH7.E181493

KTL5-2 Fiber Optic CONTRAST SENSORS

Ordering information

Other models → www.sick.com/de/en/KT5

KTL5-2 Fiber Optic

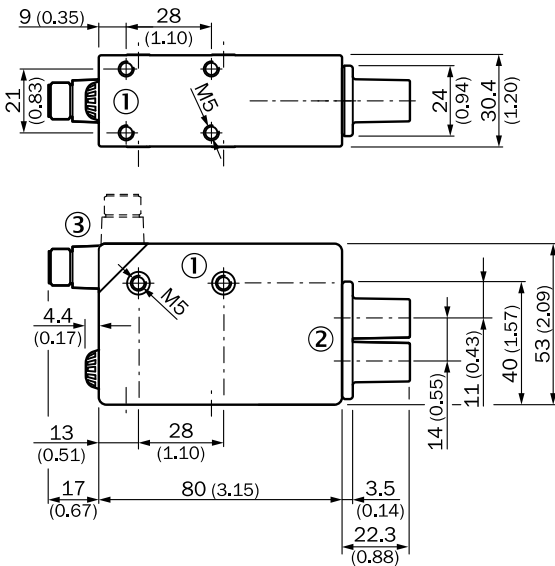
- **Sensing distance:** Dependent on the fiber-optic cable
- **Light spot size:** Dependent on the fiber-optic cable

B

Type of light	Wave length	Adjustment	Output type	Time delay	Analog output	Connection diagram	Type	Part no.
Green	520 nm	Manual adjustment, potentiometer	PNP	-	-	Cd-327	KTL5G-2P11	1016294
				0.3 mA ... 10 mA	Cd-327	KTL5G-2P51	1016950	
			NPN	-	-	Cd-327	KTL5G-2N11	1016295
				0.3 mA ... 10 mA	Cd-327	KTL5G-2N51	1016951	
		Without, automatic contrast detection	NPN	-	-	Cd-325	KTL5G-2P14	1022091
				20 ms	-	Cd-325	KTL5G-2P24	1019162
RGB	640 nm, 525 nm, 470 nm	Dynamic teach-in	PNP	-	-	Cd-324	KTL5W-2P13	1027562
				20 ms	-	Cd-324	KTL5W-2P23	1019551
			NPN	-	-	Cd-324	KTL5W-2N13	1019661
				-	-	Cd-323	KTL5W-2P16	1026006
		Static 2-point teach-in	PNP	-	-	Cd-323	KTL5W-2N16	1025995
				-	-	Cd-323	KTL5W-2N16	1025995

Dimensional drawing (Dimensions in mm (inch))

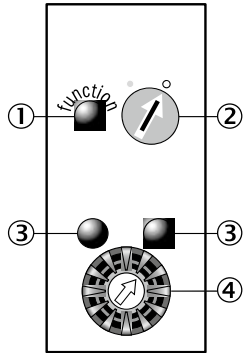
KTL5-2 Fiber Optic



- ① M5 threaded mounting hole, 5.5 mm deep
- ② Fiber-optic adapter (M12 x 1 internal thread)
- ③ Connector M12 (rotatable up to 90°)

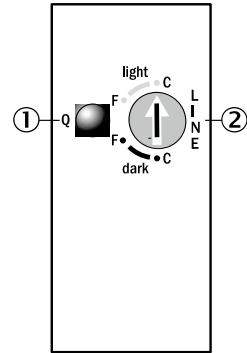
Adjustments

KTL5-2 Fiber Optic, KTL5G-xxx1



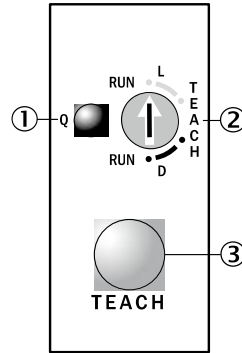
- ① Function signal indicator (yellow)
- ② Pre-selection switch (light/dark switching)
- ③ Adjustment indicators (green)
- ④ Switching threshold adjustment

KTL5-2 Fiber Optic, KTL5G-xxx4



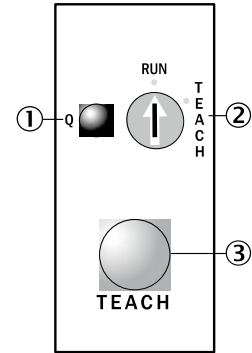
- ① Function signal indicator (yellow)
- ② Fine/coarse switch

KTL5-2 Fiber Optic, KTL5W-xxx3



- ① Function signal indicator (yellow)
- ② Pre-selection switch (light/dark switching)
- ③ Teach-in button

KTL5-2 Fiber Optic, KTL5W-xxx6

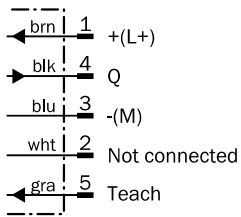


- ① Function signal indicator (yellow)
- ② Pre-selection switch
- ③ Teach-in button

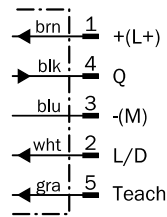
B

Connection diagram

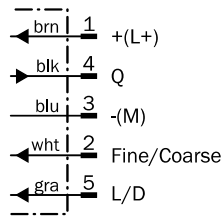
Cd-323



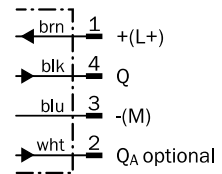
Cd-324



Cd-325

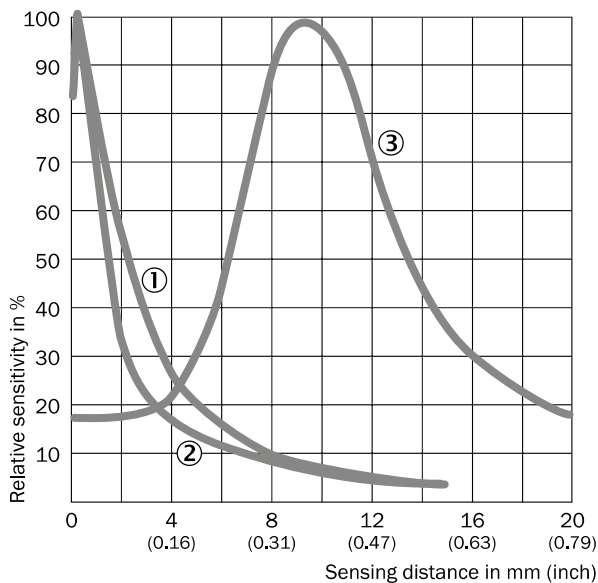


Cd-327



Sensing distance

KTL5-2 Fiber Optic



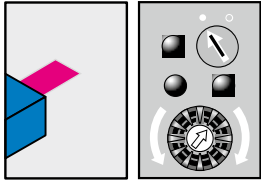
- ① Fiber-optic cable LBST 32900
- ② Fiber-optic cable LBSR 32900
- ③ Fiber-optic cable OCSL

Setting the switching threshold

Potentiometer

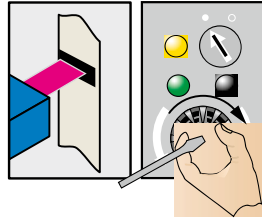
B

1. Select switching function (light/dark)



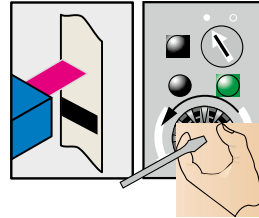
Turn the rotary switch to the desired position:
 ○ = light switching
 ● = dark switching

2. Position mark

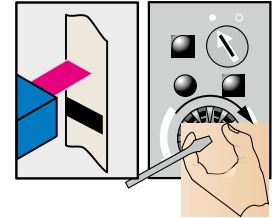


Turn potentiometer in the direction shown (green LED illuminates) until the yellow LED status changes and the green LED opposite illuminates.

3. Position background



Gradually turn back the potentiometer (count the number of turns) until the yellow LED changes status again and illuminates.



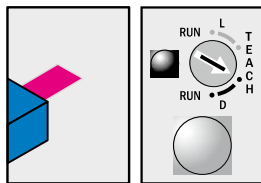
Turn the potentiometer forward again by half the number of turns to ensure that the switching threshold is optimally set.

Switching characteristics

The optimum emitted light is selected automatically.
 The switching threshold is set in the center between the background and the mark.

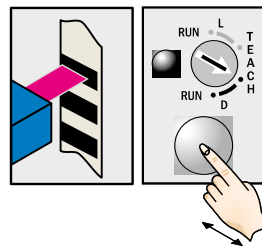
Teach-in dynamic

1. Select switching function (light/dark)



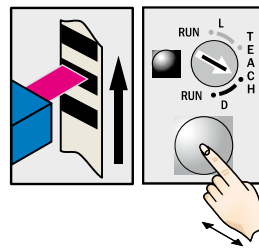
Turn the rotary switch to the desired teach position:
 D = dark switching
 L = light switching

2. Position mark or background

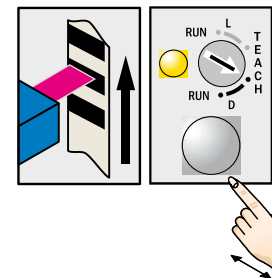


Press the teach-in button and keep it pressed.

3. Move at least one repeat length using the light spot

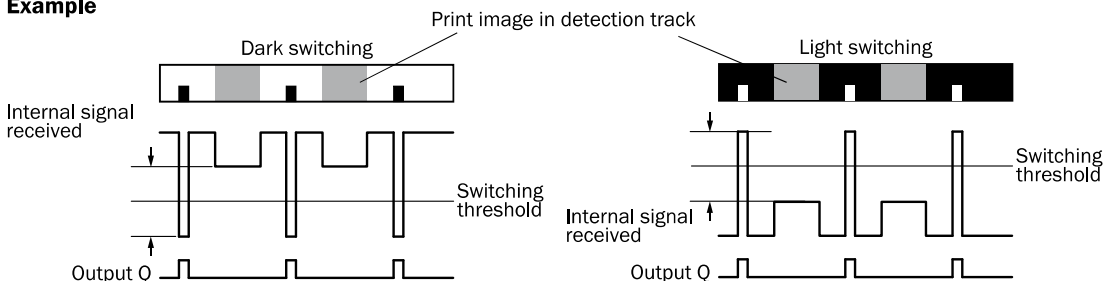


Keep the teach-in button pressed.



Release the teach-in button. Yellow LED will illuminate, when emitted light is on the mark.

Example

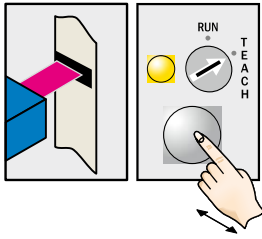


Switching characteristics

The optimum emitted light is selected automatically.
 The switching threshold is set in the center between the lowest and the second-lowest reflectivity.
 Teach-in can also be performed using an external control signal.
 Light/dark setting can also be configured using an external control signal.
 Observe the minimum speed (25 mm/s ... 300 mm/s).

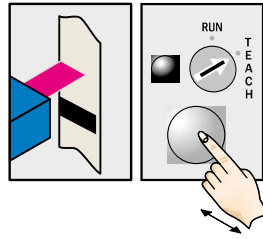
Teach-in static

1. Position mark



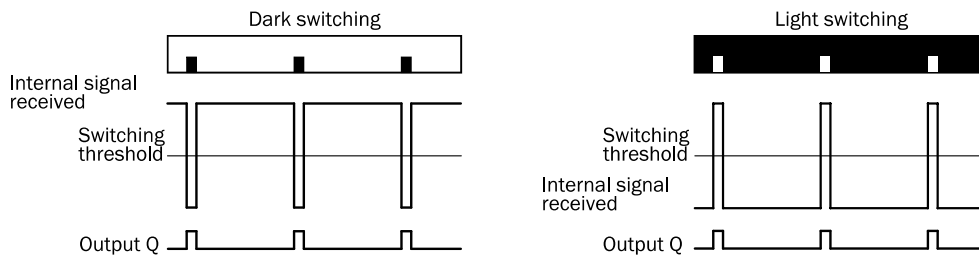
Turn rotary switch to "Teach" position. Press and hold teach-in button > 1 s. Red emitted light and yellow LED flash.

2. Position background



Press and hold teach-in button > 1 s. Yellow LED goes out.

Example (for both settings)



Switching characteristics

The optimum emitted light is selected automatically.
 Light/dark setting is defined using teach-in sequence.
 The switching threshold is set in the center between the background and the mark.
 Teach-in can also be performed using an external control signal.

B








Recommended accessories

Others

Description	Core material	Fiber length	Minimum bend radius	Detection principle	Type	Part no.
Fiber optic, bifurcated, thread/angle tip, 3.2 mm bundle, glass/stainless steel	Glass fiber	5 m	19 mm	Proximity system	LBSTA325000	7022348

B



Universal bar clamp systems

Figure	Material	Description	Type	Part no.
	Steel, zinc coated	Plate G for universal clamp bracket	BEF-KHS-G01	2022464
		Plate K for universal clamp bracket	BEF-KHS-K01	2022718
		Universal clamp bracket for rod mounting	BEF-KHS-KH1	2022726
		Mounting bar, straight, 200 mm, steel	BEF-MS12G-A	4056054
		Mounting bar, straight, 300 mm, steel	BEF-MS12G-B	4056055
		Mounting bar, L-shaped, 150 mm x 150 mm, steel	BEF-MS12L-A	4056052
		Mounting bar, L-shaped, 250 x 250 mm, steel	BEF-MS12L-B	4056053



Plug connectors and cables

Connecting cables with female connector

M12, 4-pin, PVC, chemical resistant

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.
	Female connector, M12, 4-pin, straight, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-G02M	6009382
			5 m, 4-wire	DOL-1204-G05M	6009866
	Female connector, M12, 4-pin, angled, unshielded	Cable, open conductor heads	2 m, 4-wire	DOL-1204-W02M	6009383
			5 m, 4-wire	DOL-1204-W05M	6009867

M12, 5-pin, PVC, chemical resistant

Figure	Connection type head A	Connection type head B	Connecting cable	Type	Part no.
	Female connector, M12, 5-pin, straight, unshielded	Cable, open conductor heads	2 m, 5-wire	DOL-1205-G02M	6008899
			5 m, 5-wire	DOL-1205-G05M	6009868
	Female connector, M12, 5-pin, angled, unshielded	Cable, open conductor heads	2 m, 5-wire	DOL-1205-W02M	6008900
			5 m, 5-wire	DOL-1205-W05M	6009869

→ For additional accessories, please see page K-240

