





MINI, EASY, SPEEDY

B


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Product description

Top performance for universal, space-saving use in the packaging industry: The new KTM core contrast sensor from SICK features a high grayscale resolution and is integrated into a small, tried-and-tested housing. The optimized OES4 ASIC technology and a response time of 50 µs ensure reliable and ac-

curate detection of contrast marks, even on glossy materials. The easy adjustment method ensures greater flexibility during commissioning. The KTM reliably detects marks even in conditions with weak contrast ratios and is therefore ideal for use in a wide range of applications.

At a glance

- Small, tried-and tested housing
- High grayscale resolution
- Very large dynamic range means reliable detection of contrasts on glossy materials
- Switching frequency: 10 kHz
- White light

Your benefits

- Small housing allows installation even where space is limited
- Powerful, fast contrast sensor ensures high machine throughput
- Good contrast resolution and a very large dynamic range ensure good detection performance on glossy materials, thus increasing the range of application possibilities
- Quick and easy configuration

→ www.sick.com/de/en/KTM_Core

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) | 31.5 mm x 21 mm x 12 mm |
| Sensing distance | 12.5 mm |
| Housing design (light emission) | Rectangular |
| Sensing distance tolerance | ± 3 mm |
| Light source ¹⁾ | LED |
| Type of light | White |
| Max. web speed tech-in (dynamic) ²⁾ | 1 m/s |
| Teach-in mode | Potentiometer, manual / Potentiometer, screw driver (depending on type) |
| Output function | Light/dark switching |

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

²⁾ At a mark size of 4 mm.

Mechanics/electronics

| | |
|---|--|
| Supply voltage ¹⁾ | 12 V DC ... 24 V DC |
| Ripple ²⁾ | ≤ 5 V _{pp} |
| Power consumption ³⁾ | < 50 mA |
| Switching frequency ⁴⁾ | 10 kHz |
| Response time ⁵⁾ | 50 μs |
| Jitter | 25 μs |
| Switching output | PNP: HIGH = $V_S - \leq 2\text{ V}$ / LOW approx. 0 V, NPN: HIGH = approx. V_S / LOW ≤ 2 V |
| Output type | PNP, NPN |
| Output current I_{max} ⁶⁾ | 50 mA |
| Retention time (ET) | 28 ms, non-volatile memory |
| Connection type | Connector M8, 4-pin / Cable with connector M12, 4-pin (depending on type) |
| Protection class | III |
| Circuit protection | V_S connections reverse-polarity protected, Output Q short-circuit protected, Interference suppression |
| Enclosure rating | IP 67 |
| Weight | |
| Connector M8, 4-pin | 20 g |
| Cable with connector M12, 4-pin | 70 g |
| Housing material | Plastic, ABS |

¹⁾ Limit values: DC 12 V (−10 %) ... DC 24 V (+20 %). 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⁾ At supply voltage > 24 V, $I_{\text{max}} = 30\text{ mA}$. I_{max} is consumption count of all Q_n .

Ambient data

| | |
|--------------------------------------|---|
| Ambient operating temperature | −10 °C ... +55 °C |
| Ambient storage temperature | −20 °C ... +75 °C |
| Shock load | According to IEC 60068 |
| UL File No. | |
| Connector M8, 4-pin | NRKH.E348498 / NRKH.E348498 & NRKH7.E348498 (depending on type) |
| Cable with connector M12, 4-pin | NRKH.E348498 |

Ordering information

Other models → www.sick.com/de/en/KTM_Core

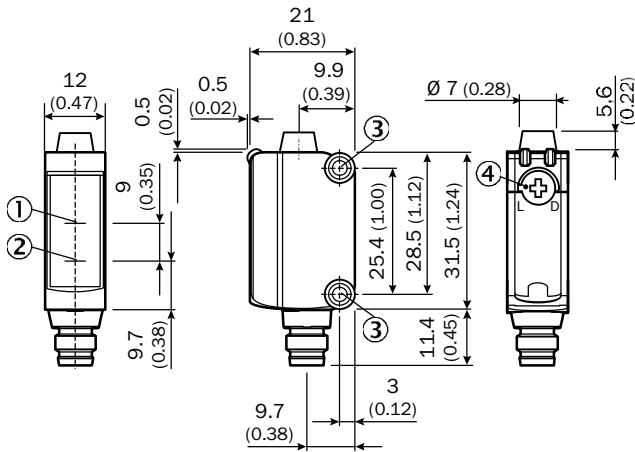
KTM Core

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| Adjustment | Light spot size (distance) | Connection type | Type | Part no. |
|-----------------------------|----------------------------|---------------------------------|--------------|----------|
| Potentiometer, manual | ∅ 1 mm (10 mm) | Connector M8, 4-pin | KTM-MB8A191P | 1066885 |
| | ∅ 2 mm (12.5 mm) | | KTM-MB31191P | 1062203 |
| Potentiometer, screw driver | ∅ 2 mm (12.5 mm) | Connector M8, 4-pin | KTM-MB31111P | 1062202 |
| | | Cable with connector M12, 4-pin | KTM-MB31112P | 1070053 |

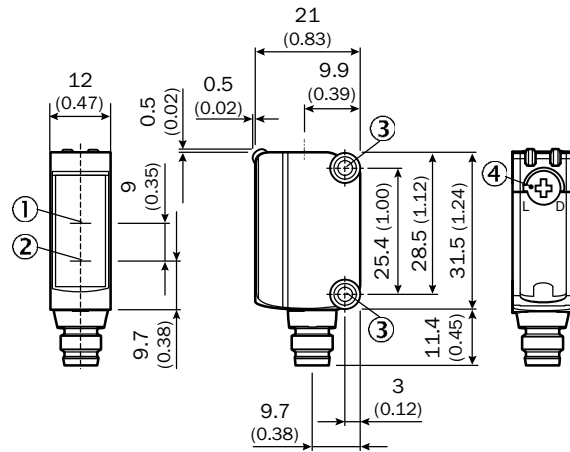
Dimensional drawings (Dimensions in mm (inch))

KTM-xBxxx91x



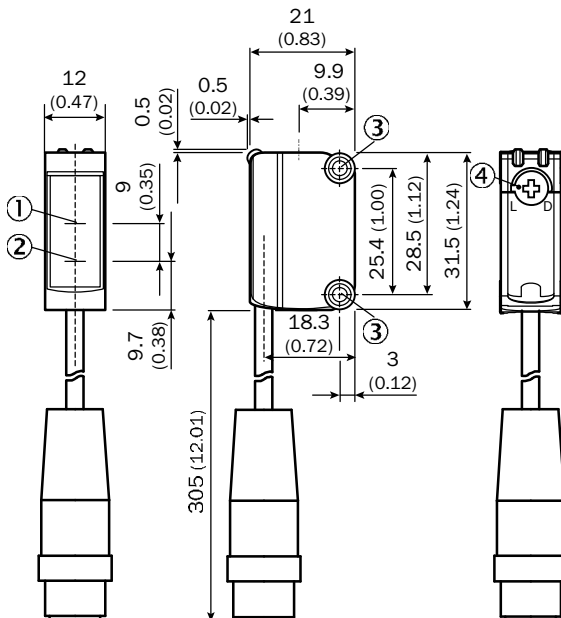
- ① Optical axis receiver
- ② Optical axis sender
- ③ Fixing hole M3
- ④ Light/ dark rotary switch: L = light switching, D = dark switching

KTM-xBxxx11x



- ① Optical axis receiver
- ② Optical axis sender
- ③ Fixing hole M3
- ④ Light/ dark rotary switch: L = light switching, D = dark switching

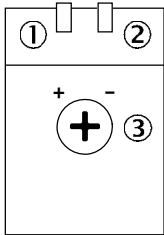
KTM-xBxxx12x



- ① Optical axis receiver
- ② Optical axis sender
- ③ Fixing hole M3
- ④ Light/ dark rotary switch: L = light switching, D = dark switching

Adjustments

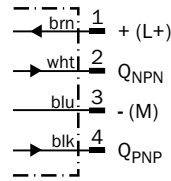
KTM Core



- ① Status indicator LED, yellow: Status switching output Q (dark switching)
- ② Status indicator LED green: supply voltage on
- ③ Switching threshold adjustment

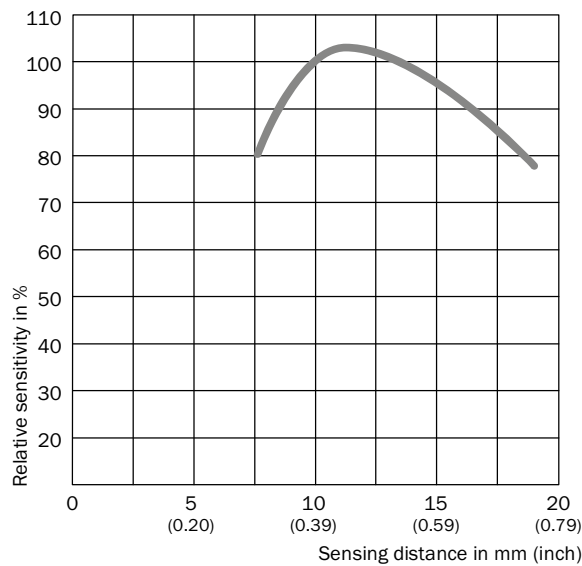
Connection diagram

Cd-086



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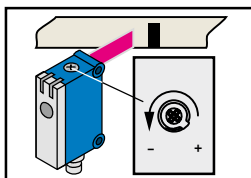
Sensing distance



Setting the switching threshold

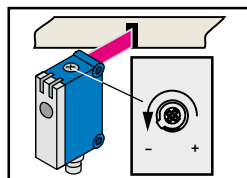
For example dark switching

1. Position background



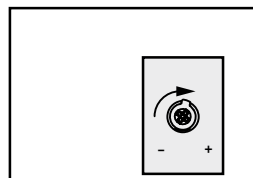
Start at "+" (right-hinged).
Turn potentiometer in direction "+" until the yellow LED goes out.

2. Position mark



Yellow LED lights up.
Continue to turn the potentiometer in direction "-" until the yellow LED goes out again.

3. Set switching threshold



Turn between positions 1 and 2, to ensure that the switching threshold is optimally set.

Switching characteristics




Light switching: yellow LED ≠ switching output Q
Dark switching: yellow LED = switching output Q

Light/dark switching selectable by means of rotary switch
KTM-xBxxx1xx: potentiometer can be adjusted with a screwdriver
KTM-xBxxx9xx: potentiometer can be adjusted with a screwdriver or by hand

Recommended accessories



Universal bar clamp systems

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| Figure | Material | Description | Type | Part no. |
|---|---|--|--------------|----------|
|  | Steel, zinc coated | Universal clamp bracket for rod mounting | BEF-KHS-KH1 | 2022726 |
|  | | Plate L for universal clamp bracket | BEF-KHS-L01 | 2023057 |
|  | Zinc plated steel (sheet), Diecast zinc (clamp) | Plate N08 for universal clamp bracket | BEF-KHS-N08 | 2051607 |
| | Stainless steel 1.4571 (sheet), Stainless steel 1.4408 (clamp) | Plate N08N for universal clamp bracket | BEF-KHS-N08N | 2051616 |
|  | Steel, zinc coated | 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 |

Mounting brackets and mounting plates

Mounting brackets

| Figure | Material | Description | Type | Part no. |
|---|--------------------|-------------------------------------|------------|----------|
|  | Stainless steel | Mounting bracket for wall mounting | BEF-W100-A | 5311520 |
|  | Steel, zinc coated | Mounting bracket for floor mounting | BEF-W100-B | 5311521 |



Mounting plates

| Figure | Material | Description | Type | Part no. |
|---|-----------------|--------------------------|---------------|----------|
|  | Stainless steel | Adapter plate KT3 to KTM | BEF-AP-KTMS01 | 2068786 |



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 |

M8, 4-pin, PVC, chemical resistant

| Figure | Connection type head A | Connection type head B | Connecting cable | Type | Part no. |
|---|---|-----------------------------|------------------|---------------|----------|
|  | Female connector, M8, 4-pin, straight, unshielded | Cable, open conductor heads | 2 m, 4-wire | DOL-0804-G02M | 6009870 |
| | | | 5 m, 4-wire | DOL-0804-G05M | 6009872 |
|  | Female connector, M8, 4-pin, angled, unshielded | Cable, open conductor heads | 2 m, 4-wire | DOL-0804-W02M | 6009871 |
| | | | 5 m, 4-wire | DOL-0804-W05M | 6009873 |

→ For additional accessories, please see page K-240

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MINI, EASY, SPEEDY, ROBUST

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Product description

Top performance for universal, space-saving use in the packaging industry even under harsh conditions: The new KTM prime contrast sensor from SICK features a high grayscale resolution and is integrated into a small, tried-and-tested housing that is also available in stainless steel. The optimized OES4 ASIC technology and a response time of 35 μ s ensure reliable and accurate detection of contrast marks, even on glossy materials. The various teach-in methods (dynamic, static, and

switching threshold near the marks) ensure greater flexibility during commissioning. The integrated IO-Link interface can be used to access the parameter settings. This speeds up and simplifies format changes. The KTM reliably detects marks even in conditions with weak contrast ratios and is therefore ideal for use in a wide range of applications; in the stainless steel version, it can even be used in harsh environments during intensive cleaning.

At a glance

- Small, tried-and-tested housing, also available in stainless steel
- High grayscale resolution
- Very large dynamic range means reliable detection of contrasts on glossy materials
- Static and dynamic teach-in in one variant
- Switching frequency: 15 kHz
- KTM Prime with IO-Link functions

Your benefits

- Small housing allows installation even where space is limited
- Powerful, fast contrast sensor ensures high machine throughput
- Three-color LED technology allows a reliable process, with contrast marks detected even in conditions with weak contrast ratios
- Good contrast resolution and a very large dynamic range ensure good detection performance on glossy materials, thus increasing the range of application possibilities
- Various teach-in methods enable more flexible commissioning
- Long service life, even in harsh environments, thanks to stainless steel housing; as a result, excellent system throughput and low spare parts costs
- Enhanced diagnostics and visualization of sensor parameters, as well as quick and easy format changes, since parameter settings can be downloaded via IO-Link

 IO-Link



Additional information

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→ www.sick.com/de/en/KTM_Prime

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

| | KTM Prime | KTM Prime Inox |
|--|---|------------------------------|
| Dimensions (W x H x D) | 31.5 mm x 21 mm x 12 mm | 48.6 mm x 22.2 mm x 15.25 mm |
| Sensing distance | 12.5 mm | 11 mm |
| Housing design (light emission) | Rectangular | |
| Sensing distance tolerance | ± 3 mm | |
| Light source ¹⁾ | LED | |
| Type of light | White/RGB | RGB |
| Wave length | 470 nm, 525 nm, 625 nm | |
| Light spot direction ²⁾ | Vertical | |
| Max. web speed tech-in (dynamic) ³⁾ | 1 m/s | |
| Teach-in mode | 2-point teach-in static/dynamic + proximity to mark | |
| Output function | Light/dark switching | |
| IO-Link functions | Standard functions | - |

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

²⁾ In relation to long side of housing.

³⁾ At a mark size of 4 mm.

Mechanics/electronics

| | KTM Prime | KTM Prime Inox |
|--|---|---------------------------------|
| Supply voltage ¹⁾ | 12 V DC ... 24 V DC | |
| Ripple ²⁾ | ≤ 5 V _{pp} | |
| Power consumption ³⁾ | < 50 mA | |
| Switching frequency ⁴⁾ | 15 kHz | |
| Response time ⁵⁾ | 35 μs | |
| Jitter | 15 μs | |
| Switching output | PNP / NPN; PNP: HIGH = $V_S - \leq 2\text{ V}$ / LOW approx. 0 V NPN: HIGH = approx. V_S / LOW ≤ 2 V, | |
| Output current I _{max.} ⁶⁾ | 50 mA | |
| Input, teach-in (ET) | PNP: Teach: $U = 10,8\text{ V} \dots < U_V$; Run: $U < 2\text{ V}$ or open NPN: Teach: $U < 2\text{ V}$; Run: $U_V - 2\text{ V}$ or open | |
| Retention time (ET) | 28 ms, non-volatile memory | |
| Connection type | Connector M8, 4-pin / Cable with connector M12, 4-pin (depending on type) | Cable with connector M12, 4-pin |
| Protection class | III | |
| Circuit protection | V_S connections reverse-polarity protected, Output Q short-circuit protected, Interference suppression | |
| Fieldbus interface | IO-Link (depending on type) | |
| Enclosure rating | IP 67 | IP 67, IP 69K |
| Weight | Connector M8, 4-pin Cable with connector M12, 4-pin | - 60 g |
| Housing material | Plastic, ABS | Stainless steel 316L |

¹⁾ Limit values: DC 12 V (-10 %) ... DC 24 V (+20 %). 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⁾ At supply voltage > 24 V, I_{max} = 30 mA. I_{max} is consumption count of all Q_n.

Ambient data

| | KTM Prime | KTM Prime Inox |
|---------------------------------|------------------------------|-------------------|
| Ambient operating temperature | -10 °C ... +55 °C | -30 °C ... +70 °C |
| Ambient storage temperature | -20 °C ... +75 °C | -30 °C ... +75 °C |
| Shock load | According to IEC 60068 | |
| UL File No. | - | |
| Connector M8, 4-pin | NRKH.E348498 & NRKH7.E348498 | - |
| Cable with connector M12, 4-pin | NRKH.E348498 | - |

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Ordering information

Other models → www.sick.com/de/en/KTM_Prime

KTM Prime

| Type of light | Light spot size | Output type | Connection type | Connection diagram | Type | Part no. |
|---------------|-----------------|---------------------|---------------------------------|--------------------|----------------------------|----------|
| White | Ø 2 mm | PNP | Connector M8, 4-pin | Cd-092 | KTM-MP31181P | 1065756 |
| | | | Cable with connector M12, 4-pin | Cd-092 | KTM-MP31182P | 1070490 |
| | | NPN, IO-Link | Connector M8, 4-pin | Cd-092 | KTM-MN31181P | 1071947 |
| | | | Connector M8, 4-pin | Cd-321 | KTM-MP317A1P | 1071482 |
| RGB | 1.5 mm x 6.5 mm | PNP | Connector M8, 4-pin | Cd-092 | KTM-MP11181P | 1072473 |
| | | | Cable with connector M12, 4-pin | Cd-092 | KTM-WP11181P | 1062199 |
| | | | Cable with connector M12, 4-pin | Cd-092 | KTM-WP11182P | 1062201 |
| | | NPN | Connector M8, 4-pin | Cd-092 | KTM-WP11282P ¹⁾ | 1072002 |
| | | | Cable with connector M12, 4-pin | Cd-092 | KTM-WN11181P | 1062200 |
| | | NPN, IO-Link | Connector M8, 4-pin | Cd-092 | KTM-WN11182P | 1062150 |
| | | | Connector M8, 4-pin | Cd-321 | KTM-WP117A1P | 1061770 |
| | | Connector M8, 4-pin | Cd-321 | KTM-WN117A1P | 1061787 | |

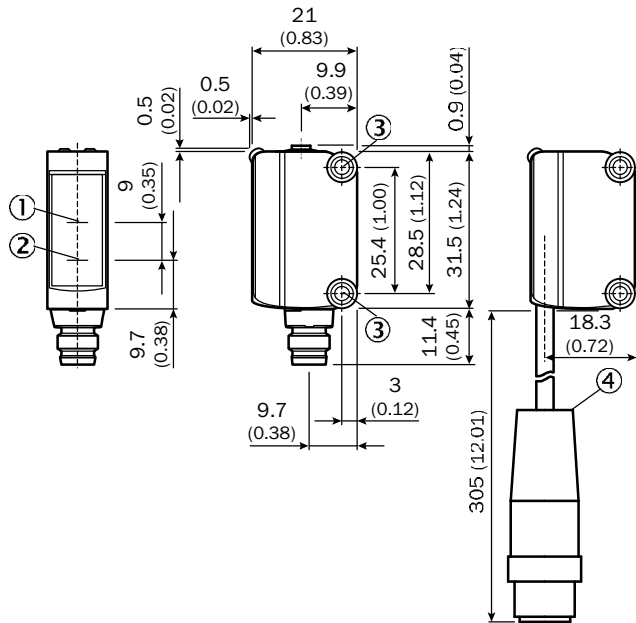
¹⁾ Time delay: 32 ms.

KTM Prime Inox

| Type of light | Light spot size | Output type | Connection type | Connection diagram | Type | Part no. |
|---------------|-----------------|--------------|---------------------------------|--------------------|--------------|----------|
| RGB | 1.5 mm x 6.5 mm | PNP | Cable with connector M12, 4-pin | Cd-092 | KTM-WP1A182V | 1052956 |
| | | NPN | Cable with connector M12, 4-pin | Cd-092 | KTM-WN1A182V | 1062148 |
| | | PNP, IO-Link | Cable with connector M12, 4-pin | Cd-321 | KTM-WP1A7A2V | 1062147 |

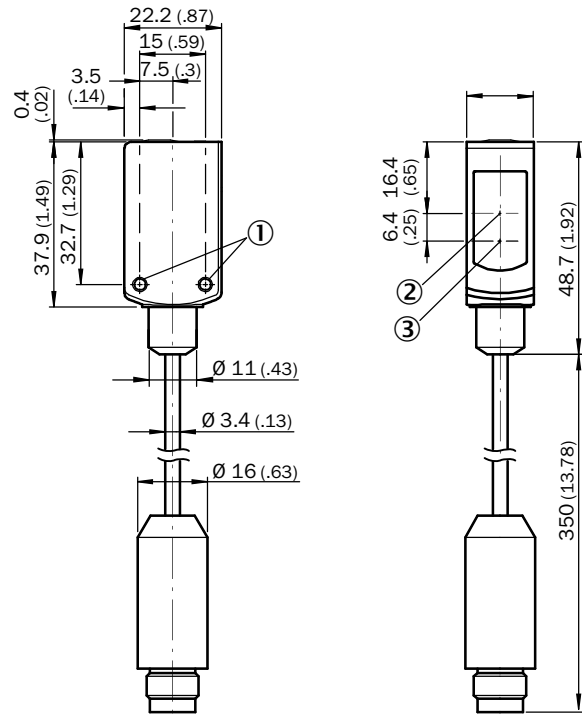
Dimensional drawings (Dimensions in mm (inch))

KTM Prime



- ① Optical axis receiver
- ② Optical axis sender
- ③ Fixing hole M3
- ④ Cable with male connector M12 (only KTM-xxxx2x)

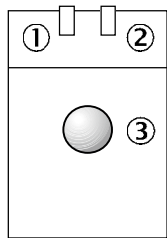
KTM Prime Inox



- ① Fixing hole M3
- ② Optical axis receiver
- ③ Optical axis sender

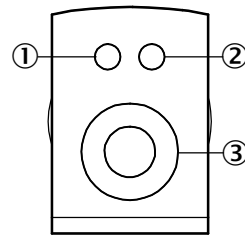
Adjustments

KTM Prime



- ① Status indicator LED, yellow: Status switching output Q (dark switching)
- ② Status indicator LED green: supply voltage on
- ③ Teach-in button

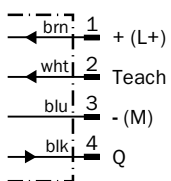
KTM Prime Inox



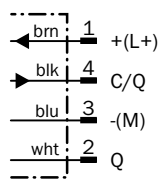
- ① Status indicator LED, yellow: Status switching output Q
- ② Status indicator LED green: supply voltage on
- ③ Teach-in button

Connection diagram

Cd-092

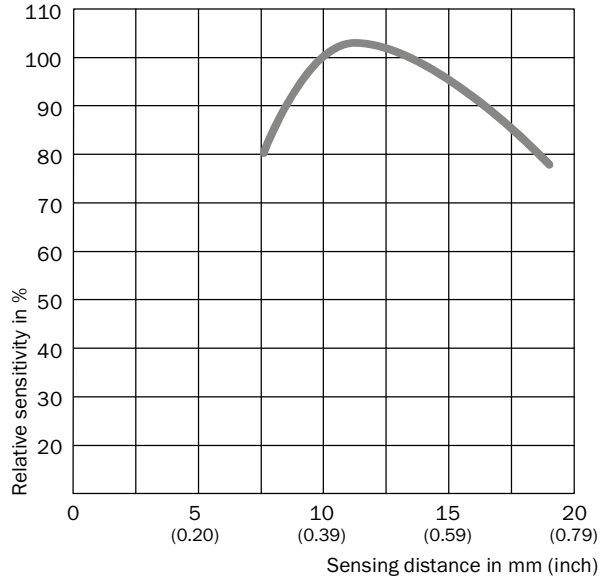


Cd-321



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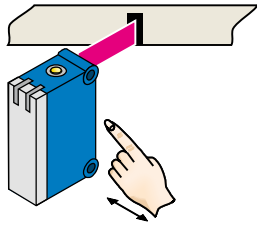
Sensing distance



Setting the switching threshold

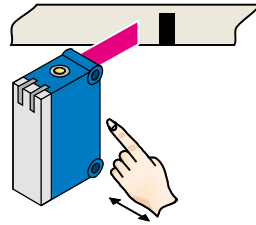
Teach-in static

1. Position mark



Press and hold teach-in button > 1 < 3 s.
Yellow LED flashes slowly.

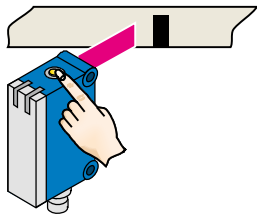
2. Position background



Press and hold teach-in button < 3 s.
Yellow LED goes out.

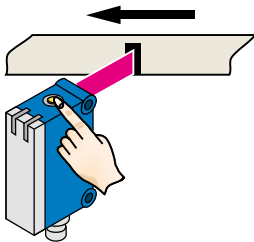
Teach-in dynamic

1. Position background

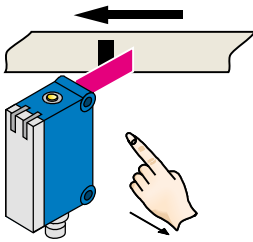


Press the teach-in button and keep it pressed. LED flashing slowly.

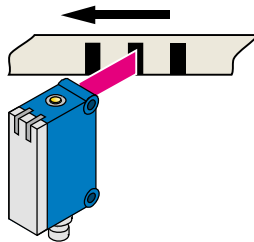
2. Move at least the mark and background using the light spot.



Keep the teach-in button > 3 < 30 s pressed.

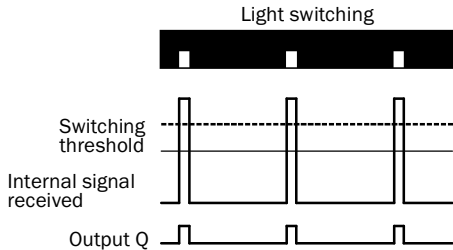
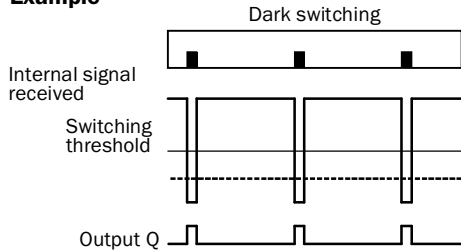


Release the teach-in button.



Yellow LED will illuminate, when emitted light is on the mark.

Example



Switching characteristics

The optimum emitted light is selected automatically (at RGB variants).
 Static teach-in: light/dark setting is defined using teach-in sequence.
 Dynamic teach-in: switching output active on mark, if background is longer in the field of view during the teach-in.
 The switching threshold is set in the center between the background and the mark.

If the button is pressed again within 10 s of the teach (> 20 ms < 10 s), the relative switching threshold is placed 75 % between mark (100 %) and background (0 %) (dotted line in Figure).
 Teach-in can also be performed using an external control signal (only dynamic teach-in).

Keylock activation and deactivation: hold down teach-in button > 30 s.



Teach-in failure: yellow LED indicator and the transmitted light of the sensor flashing quickly.
 For dynamic teach-in with ET signal (5 Hz) via switching output Q.

Recommended accessories

Modules and gateways



Connection modules

B


| Figure | Description | Type | Part no. |
|---|--|-------------------|----------|
|  | IO-Link version V1.1, Port class 2, PIN 2, 4, 5 galvanically connected, Supply voltage 18 V DC ... 32 V DC (limit values, operation in short-circuit protected network max. 8 A) | SICK Memory Stick | 1064290 |
|  | IO-Link V1.1 Class A port, USB2.0 port, optional external power supply 24V / 1A | SiLink2 Master | 1061790 |

Mounting brackets and mounting plates

Mounting brackets

| Figure | Material | Description | Type | Part no. |
|---|--------------------|-------------------------------------|------------|----------|
|  | Stainless steel | Mounting bracket for wall mounting | BEF-W100-A | 5311520 |
|  | Steel, zinc coated | Mounting bracket for floor mounting | BEF-W100-B | 5311521 |



Mounting plates

| Figure | Material | Description | Type | Part no. |
|---|-----------------|--------------------------|---------------|----------|
|  | Stainless steel | Adapter plate KT3 to KTM | BEF-AP-KTMS01 | 2068786 |



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 |

M8, 4-pin, PVC, chemical resistant


| Figure | Connection type head A | Connection type head B | Connecting cable | Type | Part no. |
|---|---|-----------------------------|------------------|---------------|----------|
|  | Female connector, M8, 4-pin, straight, unshielded | Cable, open conductor heads | 2 m, 4-wire | DOL-0804-G02M | 6009870 |
| | | | 5 m, 4-wire | DOL-0804-G05M | 6009872 |
|  | Female connector, M8, 4-pin, angled, unshielded | Cable, open conductor heads | 2 m, 4-wire | DOL-0804-W02M | 6009871 |
| | | | 5 m, 4-wire | DOL-0804-W05M | 6009873 |

→ For additional accessories, please see page K-240

B

LONG SENSING DISTANCE – PRECISE DETECTION

B



KT3L-PP24B
1.200.244
DC 18-30V
OUT 200mA
40 mm

Made in Germany

CE

UL LISTED

CDRH

Additional information

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Product description

The KT3L Laser contrast sensor is ideally suited for detecting small contrast marks (1 x 1 mm²). The small, precise laser spot can detect objects at any distance, making the KT3L suitable for a wide range of contrast detection applications that require long sensing distances. The sensor, which is ideal for distances from 20 mm to 60 mm,

functions reliably even if the distance between the sensor and the object fluctuates during operation. The compact housing allows it to be installed in the tightest spaces. Plus, simple 2-point teach-in where the operator teaches the mark and the background enables quick setup.

At a glance

- Very small housing
- Precise, small laser spot
- Sensing distance up to 60 mm
- Simple 2-point teach-in
- Switching frequency of 1,5 kHz
- Reliable operation for jittering materials

Your benefits

- Compact design fits in applications with limited space
- Small, precise light spot detects the smallest contrast marks, e.g., 1 x 1 mm², using Class II laser technology
- Long sensing distances up to 60 mm enable flexible installation
- The sensor's long depth-of-field ensures that it can be used at various sensing distances
- Automatic adaptation for high-gloss objects ensures high throughput
- Reliable operation for jittering materials

→ www.sick.com/de/en/KT3

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.

