

HRTL(I)L 96B

Laser light scanner with background suppression

en 03-2016/04 50113486-02



100 ... 30000mm



- Laser class 1 and 2
- The laser light scanner, based on the principle of light propagation time measurement, makes a large detection range and universal application possible
- Optimized for use with reflective tape
- Differentiates reflective tape from other objects (e.g. collision protection, area monitoring, synchronization)
- Automatic reserve and hysteresis ensure reliable switching behavior
- Extremely simple operation, teachable switching points
- Adaptable to applications by means of configuration
- Test input for checking the switching function and deactivating the laser
- Time lock prevents unintentional changing of the switching points

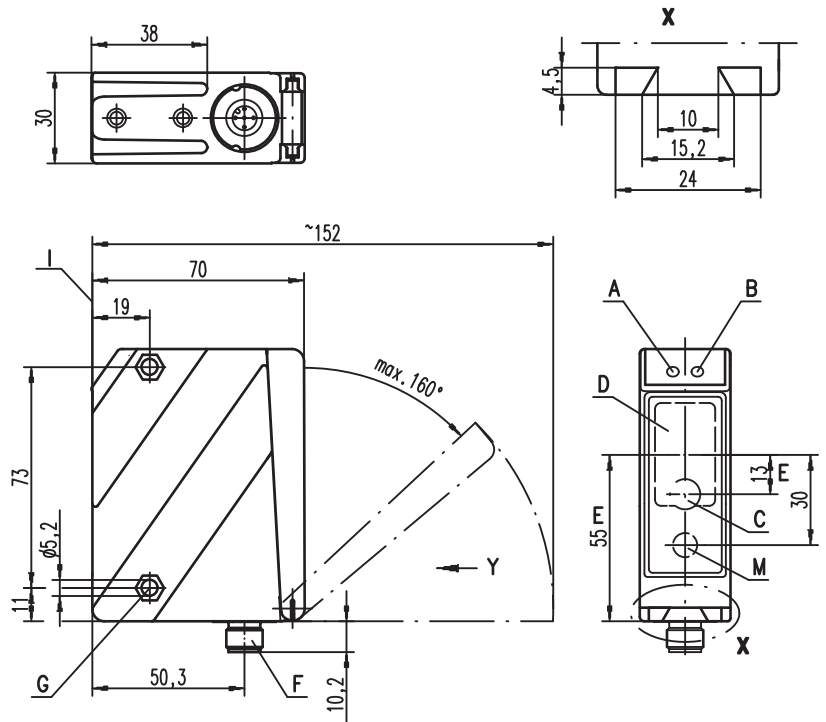


Accessories:

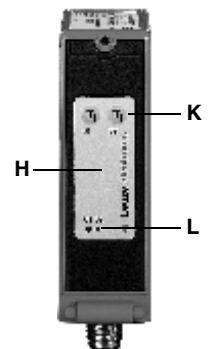
(available separately)

- Mounting systems (BT 96, BT 96.1, UMS 96, BT 450.1-96)
- M12 connectors (KD ...)
- Ready-made cables (K-D ...)
- Tape 4 100x100
- Ref 7-A-100x100

Dimensioned drawing

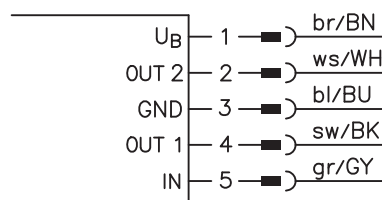


- A Green indicator diode
- B Yellow indicator diode
- C Transmitter
- D Receiver
- E Optical axis
- F Device plug M12x1
- G Countersinking for SK nut M5, 4.2 deep
- H Key pad
- I Reference edge for the measurement (cover glass)
- K Scanning range adjustment Q1/Q2
- L Yellow indicator diodes for switching outputs Q1/Q2
- M Pilot beam transmitter (HRTL 96B... only)



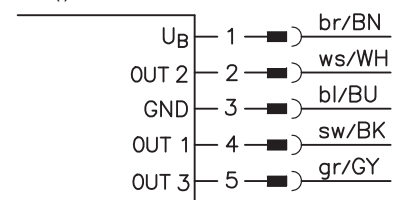
Electrical connection

HRTL 96BM/66.9...



Pin 5 = deactivation

HRTL(I)L 96BM/66.04S-S12



Pin 5 = NC

We reserve the right to make changes • DS_HRTL96BM660xS_TOF_en_50113486_02.fm

Specifications

Optical data

Typ. scanning range limit (tape 4) ¹⁾	100 ... 30000mm
Scanning range ²⁾	150 ... 25000mm
Adjustment range / teach-in range	150 ... 25000mm
Light source	laser (red light) / laser (infrared)
Laser class	red light laser: 2 acc. to IEC 60825-1:2007, infrared laser: 1 acc. to IEC 60825-1:2007, pilot laser: 1 acc. to IEC 60825-1:2007
Wavelength	red light laser: 658nm, infrared laser: 785nm,
Max. output power	pilot laser (red light): 658mW, red light laser: 248mW, infrared laser: 268mW, pilot laser: 190mW
Pulse duration	red light laser: 6.5ns, infrared laser: 6.5ns, pilot laser: 6.5ns
Light spot diameter	1m:6mm / 3m:5mm / 5m:4mm / 7m:4mm

Timing

Switching frequency	100Hz
Response time	5ms
Delay before start-up	≤ 200ms

Electrical data

Operating voltage U_B ³⁾	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 120mA
Switching output	.../6... 1 push-pull switching output ⁴⁾ PNP light switching, NPN dark switching .../66... 2 push-pull switching outputs ⁴⁾ HRTL 96BM/66.9.03S-S12: PNP light switching, NPN dark switching HRT(I)L 96BM/66.04S-S12: PNP dark switching, NPN light switching ≥ ($U_B - 2V$) / ≤ 2V max. 100mA
Signal voltage high/low	
Output current	

Indicators

Sensor front	
Green LED	ready
Yellow LED	reflection (Q1 = OUT1)
Sensor back	see table

Mechanical data

Housing	Metal housing diecast zinc
Optics cover	glass
Weight	380g
Connection type	M12 connector, 5-pin

Environmental data

Ambient temperature (operation ⁵⁾ /storage)	-40°C ... +50°C / -35°C ... +70°C
Protective circuit ⁶⁾	1, 2, 3, 4
VDE safety class ⁷⁾	II, all-insulated
Degree of protection	IP 67, IP 69K ⁸⁾
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 ³⁾ ⁹⁾ ¹⁰⁾

Options

Deactivation input

Transmitter inactive/active	≥ 8V / ≤ 2V
Activation/disable delay	≥ 20ms
Input resistance	10KΩ ± 10%

- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) Scanning range: recommended range with performance reserve
- 3) For UL applications: for use in class 2 circuits according to NEC only
- 4) The push-pull switching outputs must not be connected in parallel
- 5) Down to -30°C: Without restriction. Below -30°C: Sensor for voltage supply remains in place, the sensor becomes fully functional again approx. 3min. following reactivation of the voltage supply, if necessary, repeat the activation procedure
- 6) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking
- 7) Rating voltage 250VAC
- 8) IP 69K test in accordance with DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test
- 9) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)
- 10) CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- 11) Inverted for dark switching

Tables

Switching points	no reflection	object detected
Yellow LED Q 1	off	on
Yellow LED Q 2	off	on

Remarks

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.

- **Setting switching points Q1/Q2:** Align sensor with object, press respective teach button for at least 2s, then release the button. Object is detected if the corresponding Q1/Q2 indicator illuminates.¹¹⁾
- **Reserve:** For the reliable detection of objects with low reflectance, a reserve is automatically added during the teach event. This is constant over the entire teach range. Object is detected: distance to sensor ≤ teach point + reserve
- **Hysteresis:** To ensure continuous object detection in the switching point, the sensor has a switch-off hysteresis. Object is no longer detected if: distance to sensor > teach-in point + reserve + hysteresis.
- **Factory setting:** reserve: approx. 50mm
hysteresis: approx. 50mm
- **Object detection:** resolution < 5mm, standard deviation ±10mm at ±3 Sigma
- **With the set scanning range,** a tolerance of the upper scanning range limit is possible depending on the reflection properties of the material surface.
- **Pilot laser (alignment)**

Activation:

Hold Q1 teach button
down < 1.5 s

Deactivation:

Hold Q1 teach button
down < 1.5 s

The pilot laser (red light) of the infrared devices is used exclusively as an alignment aid. The beam radiates at a distance of 17mm parallel to the infrared laser beam (see dimensioned drawing).

HRTL(I)L 96B

Laser light scanner with background suppression

Part number code

H	R	T	L	9	6	B	/	6	6	.	9	.	0	3	S	-	S	1	2
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Operating principle

HRT Diffuse reflection light scanners with background suppression

Operating principle

L Laser (red light)

IL Laser (infrared light)

Construction/version

96B 96B Series

Switching output/function (OUT 1: pin 4, OUT 2: pin 2)

/6 1 x push-pull transistor output, OUT 1: light switching

/66 2 x push-pull transistor output,
HRTL 96BM/66.9.03S-S12: OUT 1: light switching, OUT 2: light switching
HRT(I)L 96BM/66.04S-S12: OUT 1: dark switching, OUT 2: dark switching

Switching input

.9 Deactivation input (pin 5)

Equipment

.0x Individual customer or sensor configuration

Light-spot geometry

S Small light spot

Electrical connection

-S12 M12 connector, 5-pin (plug)

Order guide

The sensors listed here are preferred types; current information at www.leuze.com

Order code	Part no.	Features
HRTL 96BM/66.04S-S12 ¹⁾	50115690	Laser class 2, 2 x push-pull switching output, OUT1/2 dark switching
HRTL 96BM/66.9.03S-S12 ²⁾	50112862	Laser class 2, 2 x push-pull switching output, OUT1/2 light switching, 1 x deactivation input
HRTL 96BM/66.04S-S12 ¹⁾	50125111	Laser class 1, 2 x push-pull switching output, OUT1/2 dark switching

1) The sensor is optimized for detecting reflective tape - other objects / surfaces are suppressed. Especially suited, e.g., for:

- Collision protection: telfer line, crane systems, ...
- Area monitoring: side-tracking skate
- Synchronization: conveyor systems, crane systems

2) The sensor is optimized for a large range on reflective tape. Objects in the short range (<6m) are detected depending on their surface.

Scanning area: larger scanning ranges on request

Laser safety notices - HRTL 96B/M...



ATTENTION, VISIBLE AND INVISIBLE LASER RADIATION – LASER CLASS 1

The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product in **laser class 1** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24th, 2007.

⚠ Adhere to the applicable legal and local regulations regarding protection from laser beams.

⚠ The device must not be tampered with and must not be changed in any way.

There are no user-serviceable parts inside the device.

Repairs must only be performed by Leuze electronic GmbH + Co. KG.

Laser safety notices - HRTL 96B M/...



ATTENTION, LASER RADIATION – LASER CLASS 2

Never look directly into the beam!

The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product in **laser class 2** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24th, 2007.

- ⚠ Never look directly into the laser beam or in the direction of reflecting laser beams!
If you look into the beam path over a longer time period, there is a risk of injury to the retina.
- ⚠ Do not point the laser beam of the device at persons!
- ⚠ Intercept the laser beam with an opaque, non-reflective object if the laser beam is accidentally directed towards a person.
- ⚠ When mounting and aligning the device, avoid reflections of the laser beam off reflective surfaces!
- ⚠ CAUTION! Use of controls or adjustments or performance of procedures other than specified herein may result in hazardous light exposure.
- ⚠ Adhere to the applicable legal and local regulations regarding protection from laser beams.
- ⚠ The device must not be tampered with and must not be changed in any way.
There are no user-serviceable parts inside the device.
Repairs must only be performed by Leuze electronic GmbH + Co. KG.

NOTICE

Affix laser information and warning signs!

Laser information and warning signs are affixed to the device(see ①). In addition, self-adhesive laser information and warning signs (stick-on labels) are supplied in several languages (see ②).

- ⚠ Affix the laser information sheet with the language appropriate for the place of use to the device.
When using the device in the US, use the stick-on label with the "Complies with 21 CFR 1040.10" notice.
- ⚠ Affix the laser information and warning signs near the device if no signs are attached to the device (e.g. because the device is too small) or if the attached laser information and warning signs are concealed due to the installation position.
Affix the laser information and warning signs so that they are legible without exposing the reader to the laser radiation of the device or other optical radiation.

①



- A Laser exit opening
- B Laser warning sign

②

50108905-04

LASERSTRAHLUNG NICHT IN DEN STRAHL BLICKEN Max. Leistung (peak): 248 mW Impulsdauer: 6.5 ns Wellenlänge: 658 nm LASER KLASSE 2 DIN EN 60825-1:2008-05	RADIAZIONE LASER NON FISSARE IL FASCIO Potenza max. (peak): 248 mW Durata dell'impulso: 6.5 ns Lunghezza d'onda: 658 nm APPARECCHIO LASER DI CLASSE 2 EN 60825-1:2007
LASER RADIATION DO NOT STARE INTO BEAM Maximum Output (peak): 248 mW Pulse duration: 6.5 ns Wavelength: 658 nm CLASS 2 LASER PRODUCT EN 60825-1:2007	RAYONNEMENT LASER NE PAS REGARDER DANS LE FAISCEAU Puissance max. (crête): 248 mW Durée d'impulsion: 6.5 ns Longueur d'onde: 658 nm APPAREIL A LASER DE CLASSE 2 EN 60825-1:2007
AVOID EXPOSURE – LASER RADIATION IS EMITTED FROM THIS APERTURE	EXPOSITION DANGEREUSE – UN RAYONNEMENT LASER EST ÉMIS PAR CETTE OUVERTURE
RADIACIÓN LASER NO MIRAR FIJAMENTE AL HAZ Potencia máx. (peak): 248 mW Duración del impulso: 6.5 ns Longitud de onda: 658 nm PRODUCTO LASER DE CLASE 2 EN 60825-1:2007	RADIAÇÃO LASER NÃO OLHAR FIXAMENTE O FEIXE Potência máx. (peak): 248 mW Período de pulso: 6.5 ns Comprimento de onda: 658 nm EQUIPAMENTO LASER CLASSE 2 EN 60825-1:2007
LASER RADIATION DO NOT STARE INTO BEAM Maximum Output (peak): 248 mW Pulse duration: 6.5 ns Wavelength: 658 nm CLASS 2 LASER PRODUCT IEC 60825-1:2007 Complies with 21 CFR 1040.10	激光辐射 勿直视光束 最大输出 (峰值): 248 mW 脉冲持续时间: 6.5 ns 波长: 658 nm 2 类激光产品 GB7247.1-2012