

HRTL 96B

Laser light scanner with background suppression

en 03-2014/07 50116013-02



50 ... 6,500 mm



- Laser class 1
- The laser light scanner, based on the principle of light propagation time measurement, makes a large detection range and universal application possible
- Design with infrared light and visible red light
- Sensor performance allows reliable detection of both glossy and less-reflective objects at extreme angles
- Automatic reserve and hysteresis ensure reliable switching behavior
- Extremely simple operation, teachable switching points
- Pilot beam can be activated for alignment (infrared sensors)
- Time lock prevents unintentional changing of the switching points
- Optimized for positioning applications and reliable object detection (e.g. compartment occupation check, shelf positioning, feed-through monitoring)

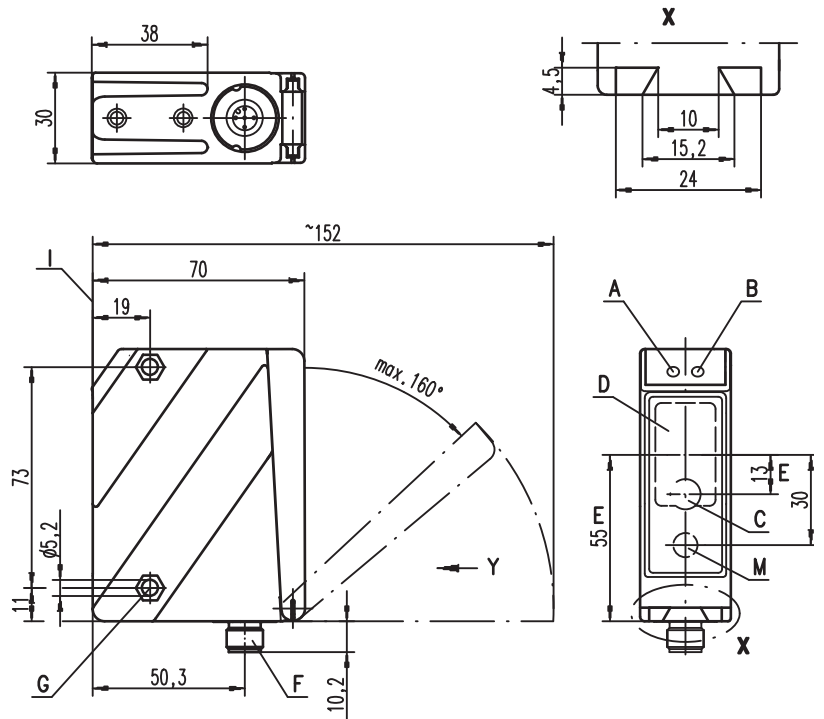


Accessories:

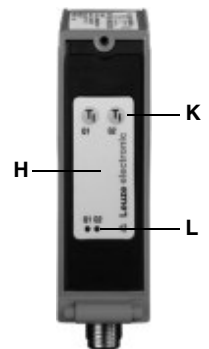
(available separately)

- Mounting systems (BT 96, BT 96.1, UMS 96, BT 450.1-96)
- M12 connectors (KD ...)
- Ready-made cables (K-D ...)

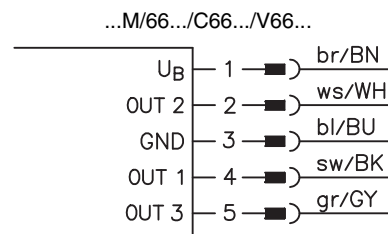
Dimensioned drawing



- 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



Electrical connection



Pin 5 = analog output
4-20mA

Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	50 ... 6500mm
Scanning range ²⁾	100 ... 6000mm
Adjustment range / teach-in range	150 ... 6000mm / 6 ... 90% diffuse reflection
Light source	laser (red light) / laser (infrared)
Wavelength	red light laser: 658nm, infrared laser: 785nm, pilot laser (red light): 658nm
Light spot diameter	1m: 6mm / 3m: 5mm / 5m: 4mm / 7m: 4mm (typ.)
Max. output power	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

Timing

Switching frequency	Infrared 100Hz	red light 50Hz
Response time	5ms	10ms
Delay before start-up	≤ 200ms	≤ 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	.../66... 2 push-pull switching outputs ⁴⁾ PNP light switching, NPN dark switching
Analog output	.../C... 4 ... 20mA
Signal voltage high/low	≥ (U_B -2V) ≤ 2V
Output current	max. 100mA

Indicators

Sensor front	ready
Green LED	reflection (Q1/Q2)
Yellow LED	see table
Sensor back	

Mechanical data

Housing	Metal housing
Optics cover	diecast zinc
Weight	glass
Connection type	380g
	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⁾
Laser class	1 in accordance with DIN EN 60825-1:2008-05
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 ⁹⁾ 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

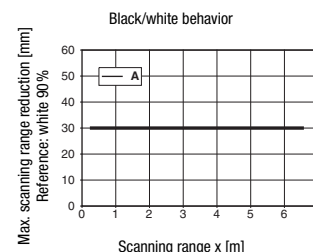
Operate in accordance with intended use.

- ⚠ 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.

Tables

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

Diagrams



A 6 ... 90% diffuse reflection

Remarks

- Setting the switching points:
Q1: Press teach button 1 for approx 2s,
Q2: Press teach button 2 for approx 2s,
release each when the LED starts flashing, teach in of switching point complete.
The object has been detected when the respective Q1/Q2 indicator lights up. 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
- With the set scanning range, a tolerance of the upper scanning range limit is possible depending on the reflection properties of the material surface.
- Scanning range/reflectivity:

Object/ diffuse reflection	
6 ... 90%	0.15 ... 6m (standard)

- **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 17 mm parallel to the infrared laser beam (see dimensioned drawing).

HRTL 96B

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Part number code

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

M Metal

Analog output

/C Current: 4 ... 20 mA

/V Voltage: 1 ... 10 V

Switching output/function (OUT 1: pin 4, OUT 2: pin 2, OUT 3: pin 5)

66 2 x push-pull transistor output, OUT 1: light switching, OUT 2: light switching

666 3 x push-pull transistor output, OUT 1: light switching, OUT 2: light switching, OUT 3: light switching

Equipment

.01 Standard

.02 Customized configuration

.03 Switching outputs OUT1/OUT2: dark switching

.21 Without additional pilot laser (for HRTL 96B... with infrared laser)

Laser class

.C1 Laser class 1 (for HRTL 96B... with red light laser)

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/66.01S-S12	50115016	2 x push-pull switching output
HRTL 96BM/66.03S-S12	50117920	2 x push-pull switching output, dark switching
HRTL 96BM/C66.01S-S12	50115015	2 x push-pull switching output, 1 x analog output ¹⁾ 4 ... 20 mA (150-15000mm)
HRTL 96BM/C66.02S-S12	50126559	2 x push-pull switching output, 1 x analog output ¹⁾ 4 ... 20 mA (150-3000mm)
HRTL 96BM/C66.01.C1S-S12	50116678	2 x push-pull switching output, 1 x analog output ¹⁾ 4 ... 20 mA (150-3000mm)

1) No object present or object is not detected
Analog output: 20 mA or 10 V

Laser safety notices - HRTL 96B M/...**ATTENTION, LASER RADIATION – LASER CLASS 1**

The device fulfills the EN 60825-1:2008-05 (IEC 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 acc. to EN 60825 (IEC 60825) in its latest version.
- ↪ 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 - HRTIL 96B/M...**ATTENTION, VISIBLE AND INVISIBLE LASER RADIATION – LASER CLASS 1**

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