

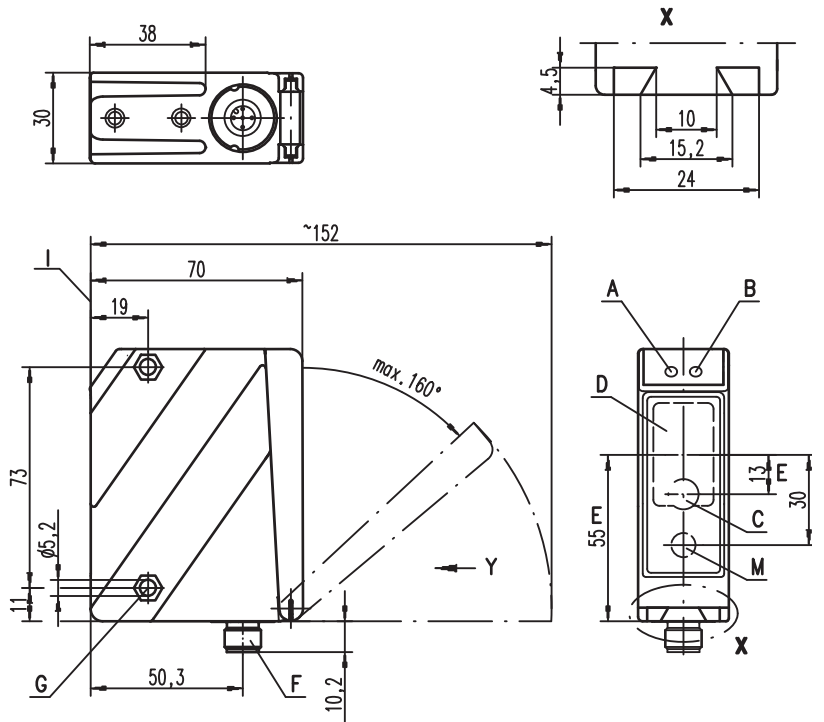
**HRTL 96B**

**Laser light scanner with background suppression**

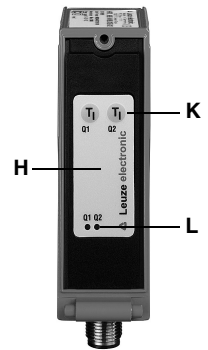
en 03-2014/07 50116013-02



**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

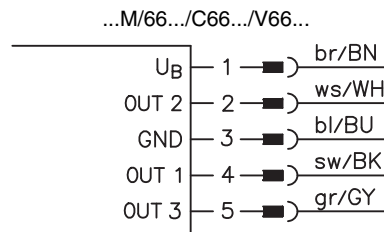


**50 ... 6,500 mm**



- 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)

**Electrical connection**



Pin 5 = analog output  
4-20mA



**Accessories:**

(available separately)

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

We reserve the right to make changes • DS\_HRTL96BMC66\_en\_50116013\_02.fm

## Specifications

### Optical data

Typ. scanning range limit (white 90%) <sup>1)</sup>	50 ... 6500mm
Scanning range <sup>2)</sup>	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	<b>Infrared</b>	<b>red light</b>
Response time	100Hz	50Hz
Delay before start-up	5ms	10ms
	≤ 200ms	≤ 200ms

### Electrical data

Operating voltage $U_B$ <sup>3)</sup>	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Open-circuit current	≤ 120mA
Switching output	.../66... 2 push-pull switching outputs <sup>4)</sup> PNP light switching, NPN dark switching
Analog output	.../C... 4 ... 20mA
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 100mA

### Indicators

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

### Mechanical data

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

### Environmental data

Ambient temperature (operation <sup>5)</sup> /storage)	-40°C ... +50°C / -35°C ... +70°C
Protective circuit <sup>6)</sup>	1, 2, 3, 4
VDE safety class <sup>7)</sup>	II, all-insulated
Degree of protection	IP 67, IP 69K <sup>8)</sup>
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 <sup>9)</sup> <sup>10)</sup>

- 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

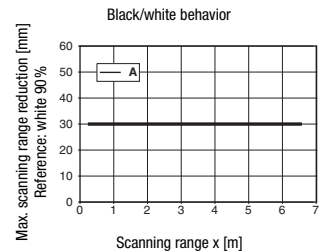
### Operate in accordance with intended use.

- ⚠ 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: Align sensor with object.  
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.<sup>11)</sup>
- 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

## Laser light scanner with background suppression

### 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 ... 20mA

**/V** Voltage: 1 ... 10V

#### 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](http://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 <sup>1)</sup> 4 ... 20mA (150-15000mm)
HRTL 96BM/C66.02S-S12	50126559	2 x push-pull switching output, 1 x analog output <sup>1)</sup> 4 ... 20mA (150-3000mm)
HRTL 96BM/C66.01.C1S-S12	50116678	2 x push-pull switching output, 1 x analog output <sup>1)</sup> 4 ... 20mA (150-3000mm)

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

**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**

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.