HRTL 96B

Laser light scanner with background suppression

50 … 6,500 mm

18 - 30 V DC

- 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)

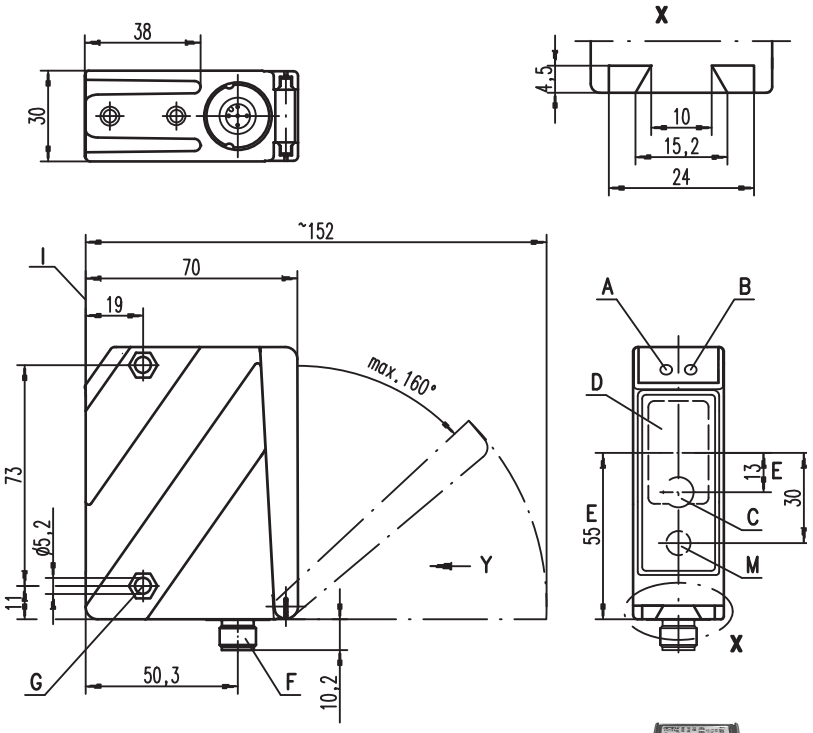
IEC 60947... IEC 60947... IP 69K IP 67

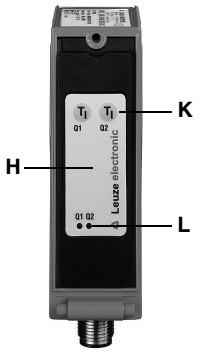
Accessories:

(available separately)

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

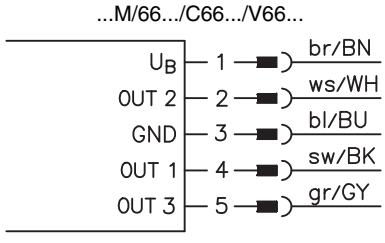
Dimensioned drawing





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 4-20 mA

en 03-2014/07 50116013-02

Specifications

Optical data

Typ. scanning range limit (white 90 %) [1]		50 … 6500 mm
Scanning range [2]		100 … 6000 mm
Adjustment range / teach-in range		150 … 6000 mm / 6 … 90 % diffuse reflection
Light source		laser (red light) / laser (infrared)
Wavelength		red light laser: 658 nm, infrared laser: 785 nm, pilot laser (red light): 658 nm
Light spot diameter		1 m: 6 mm / 3 m: 5 mm / 5 m: 4 mm / 7 m: 4 mm (typ.)
Max. output power		red light laser: 248 mW, infrared laser: 268 mW, pilot laser: 190 mW
Pulse duration		red light laser: 6.5 ns, infrared laser: 6.5 ns, pilot laser: 6.5 ns

Timing

	Infrared	red light
Switching frequency	100 Hz	50 Hz
Response time	5 ms	10 ms
Delay before start-up	≤ 200 ms	≤ 200 ms

Electrical data

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

Indicators

Sensor front

Green LED	ready
Yellow LED	reflection (Q1/Q2)

Sensor back

see table

Mechanical data

	Metal housing
Housing	diecast zinc
Optics cover	glass
Weight	380 g
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]
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 [3] [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. 3 min. 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 250 VAC
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 30 V, 0.5 A 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

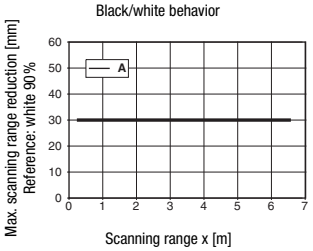
Operate in accordance with intended use.

- 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 2 s,
  Q2: Press teach button 2 for approx 2 s,
  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. 50 mm
  hysteresis: approx. 50 mm
- 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 … 6 m (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

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

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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