# HRTL 96B

## Laser light scanner with background suppression

en 01-2013/05 50113822

**50 … 6,500 mm**

18 - 30 V DC

- Laser scanner with large detection range for universal application (visible red light)
- Light propagation time measurement makes use possible under extreme environmental conditions (brightness, light, interfering contours)
- Extremely simple operation, teachable switching points
- Time lock prevents unintentional changing of the switching points
- Automatic reserve and hysteresis ensure reliable switching behavior
- Switching behaviour independent of the direction of movement
- Optimized for positioning tasks and reliable object detection (e.g. compartment occupancy monitoring, horizontal positioning)
- Diagnostic function

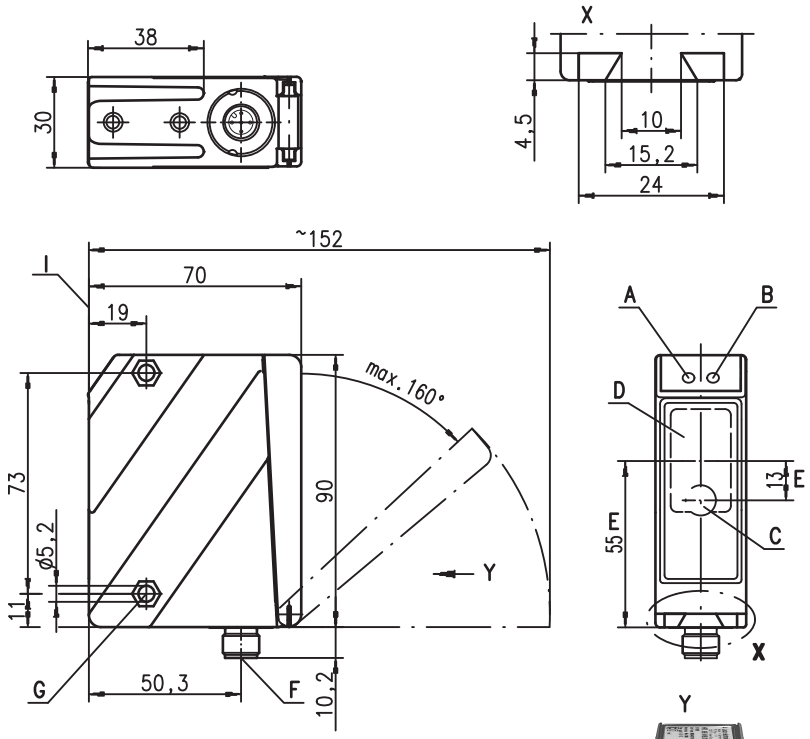
IEC 60947... IEC 60947... IP 69K IP 67

## Accessories:

**(available separately)**

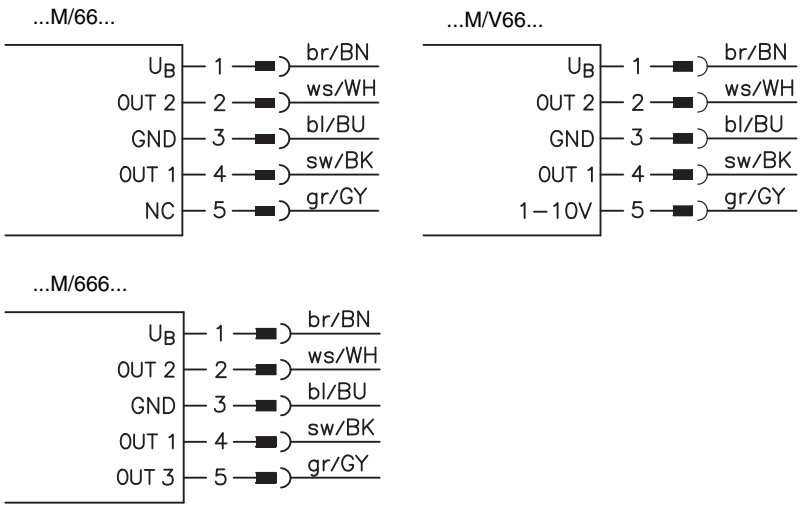
- Mounting systems (BT 96, BT 96.1, UMS 96, BT 450.1-96)
- M12 connectors (KD …)
- Ready-made cables (K-D …)

## 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/Q3
**L** Yellow indicator diodes for switching outputs Q1/Q2

## Electrical connection



# 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) |
| Light spot diameter | | 1 m:6 mm / 3 m:5 mm / 5 m:4 mm / 7 m:4 mm |
| Wavelength | | 658 nm |
| Max. output power | | < 248 mW |
| Pulse duration | | 6.5 ns |

**Timing**

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

**Electrical data**

| | | |
|---|---|---|
| Operating voltage $U_B$ | | 18 … 30 VDC (incl. residual ripple) |
| Residual ripple | | ≤ 15 % of $U_B$ |
| Open-circuit current | | ≤ 120 mA |
| Switching output | …/(V)66… | 2 push-pull switching outputs [3]<br>PNP light switching, NPN dark switching |
| | …/666 … | 3 push-pull switching outputs [3]<br>PNP light switching, NPN dark switching |
| Analogue output | configurable: | 0 … 10 V / 1 … 10 V (default) / 0 … 5 V / 1 … 5 V |
| Signal voltage high/low | | ≥ ($U_B$-2 V)/≤ 2 V |
| Output current | | max. 100 mA |

**Indicators**

| | |
|---|---|
| **Sensor front** | |
| LED green | 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 /storage)[4] | -40 °C … +50 °C / -35 °C … +70 °C |
| Protective circuit [5] | 1, 2, 3, 4 |
| VDE safety class [6] | II, all-insulated |
| Protection class | IP 67, IP 69K [7] |
| Laser class | 2 in accordance with EN 60825-1:2007 |
| Standards applied | IEC 60947-5-2 |

1) Typ. scanning range limit: max. attainable range without performance reserve
2) Scanning range: recommended range with performance reserve
3) The push-pull switching outputs must not be connected in parallel
4) 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
5) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking
6) Rating voltage 250 VAC
7) 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

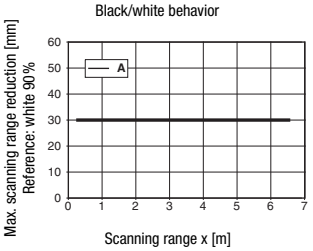
**Approved purpose**:
This product may only be used by qualified personnel and must only be used for the approved purpose. This sensor is not a safety sensor and is not to be used for the protection of persons.

# Tables

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

# Diagrams

Black/white behavior



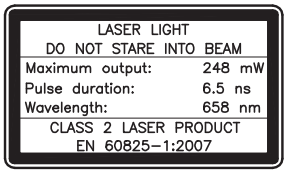

**A** 6 … 90 % diffuse reflection

# Remarks

- **Setting the switching points:**
  Point the sensor towards the object.
  Q1: Hold teach button 1 down for approx. 2 s,
  Q2: Hold teach button 2 down for approx. 2 s, release each when the LED starts flashing, teach in of switching point complete.
  Q3: Hold teach button 1 down for approx. 12 s, release when the LED starts fast flashing, teach in of switching point complete.
  The object has been detected when the respective Q1/Q2 indicator lights up. There is no LED for Q3.
- **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 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) |

- **Laser warning signs:**
  It is important to attach the stick-on labels delivered with the device! If the signs could be covered due to the installation location of the device, attach them close to the device so that it is not possible to look into the laser beam when reading the notices.



## HRTL 96B — Laser light scanner with background suppression

## Part number code

| H | R | T | L | | 9 | 6 | B | M | / | V | 6 | 6 | . | 0 | 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)**

**/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

**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/666.01S-S12 | 50112804 | 3 teachable switching points, 3 x push-pull switching output, PNP light switching |
| HRTL 96BM/66.01S-S12 | 50108889 | 2 teachable switching points, 2 x push-pull switching output, PNP light switching |
| HRTL 96BM/66.02S-S12 | 50113800 | 2 teachable switching points, 2 x push-pull switching output, PNP dark switching |
| HRTL 96BM/V66.01S-S12 | 50110952 | 2 teachable switching points, 2 x push-pull switching output, PNP light switching, 1 x analog output[1] Voltage 1 … 10 V (100 … 6000 mm) |
| HRTL 96BM/V66.02S-S12 | 50110728 | 2 teachable switching points, 2 x push-pull switching output, PNP light switching, 1 x analog output[1] Voltage 1 … 10 V (100 … 1500 mm) |

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