

HRTL 53 "XL" Laser diffuse reflection light scanner with background suppression

en 03-2017/11 50133836-02



20 ... 450mm
250mm with
black-white error < 10%



- Laser diffuse reflection light scanner with visible red light and adjustable background suppression
- 316L stainless steel housing in Hygiene-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and CleanProof+ tested
- Paperless device identification
- Plastic front cover
- Exact scanning range adjustment through 8-turn potentiometer
- Line-shaped laser light spot permits precise object detection along the line
- Laser class 2

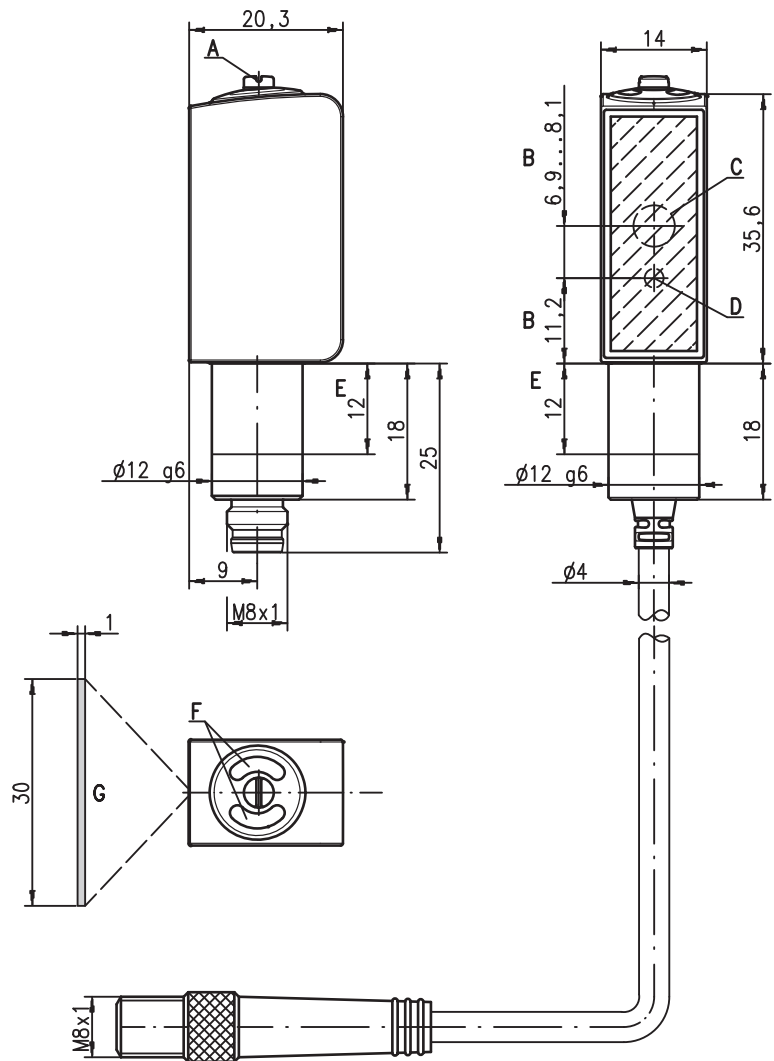
We reserve the right to make changes • PAL_HRTL53XL_en_50133836_02.fm

Accessories:

(available separately)

- Mounting systems (BT 3...)
- Cables with M8 or M12 connector (KD ...)
- Mounting devices

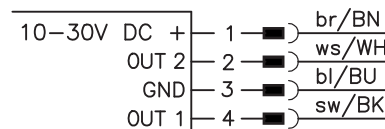
Dimensioned drawing



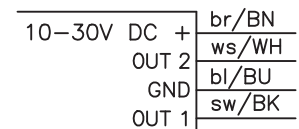
- A** 8-turn potentiometer for scanning range adjustment
- B** Optical axis
- C** Receiver
- D** Transmitter
- E** Permissible clamping range
- F** Indicator diodes
- G** Light spot 1x30mm at scanning range 50mm

Electrical connection

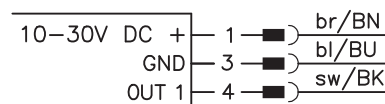
Plug connection, 4-pin



Cable, 4 wires



Plug connection, 3-pin



Specifications

Optical data

Typ. scanning range limit ¹⁾
 Scanning range ²⁾
 Adjustment range of the switching point
 Black/white error < 10% up to
 Light spot
 Light source ³⁾
 Laser class
 Wavelength
 Max. output power
 Pulse duration

Laser class 2

20 ... 450mm
 see tables
 20 ... 450mm
 250mm
 approx. 1 x 30mm² at 50mm
 laser, pulsed
 2 according to IEC 60825-1:2007
 650nm (visible red light)
 < 3,3mW
 7,6µs

Timing

Switching frequency 2,000Hz
 Response time 0,25ms
 Response jitter typ. 65µs
 Decay time 0,25ms
 Delay before start-up ≤ 300ms

Electrical data

Operating voltage U_B ⁴⁾ 10 ... 30VDC (incl. residual ripple)
 Residual ripple ≤ 10% of U_B
 Open-circuit current ≤ 20mA
 Switching output .../66 ⁵⁾ 2 push-pull switching outputs
 pin 2: PNP dark switching, NPN light switching
 pin 4: PNP light switching, NPN dark switching
 .../6 ⁵⁾ 1 push-pull switching output
 pin 4: PNP light switching, NPN dark switching
 Signal voltage high/low ≥ ($U_B - 2V$) / ≤ 2V
 Output current max. 100mA
 Scanning range adjustable via 8-turn spindle

Indicators

Green LED ready
 Yellow LED object detected - reflection

Mechanical data

Housing AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
 Housing design HYGIENE-Design
 Housing roughness ⁶⁾ $R_a \leq 2.5$
 Connector AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
 Optics cover plastic (PMMA)
 Operation plastic (TPV - PE), non-diffusive
 Weight with M8 connector: 50g
 with 200mm cable and M8 connector: 60g
 with 5000mm cable: 110g
 Connection type M8 connector, 4-pin or 3-pin,
 0,2m cable with M8 connector, 4-pin,
 5m cable, 4 x 0,20mm²
 via fit (see "Remarks")
 Fastening 3 Nm (permissible range, see dimensioned drawing)
 Max. tightening torque

Environmental data

Ambient temp. (operation/storage) ⁷⁾ -30°C ... +70°C / -30°C ... +70°C
 Protective circuit ⁸⁾ 2, 3
 VDE safety class III
 Protection class IP 67, IP 69K⁹⁾
 Environmentally tested acc. to ECOLAB, CleanProof+
 Standards applied IEC 60947-5-2
 Certifications UL 508, C22.2 No.14-13 ⁴⁾ ⁷⁾ ¹⁰⁾
 Chemical resistance tested in accordance with ECOLAB and CleanProof+ (see Remarks)

- 1) Typ. scan. range limit/adjustment range: max. achievable scanning range/adjustment range for light objects (white 90%)
- 2) Scanning range: recommended scanning range for objects with different diffuse reflection
- 3) Average life expectancy 50,000h at an ambient temperature of 25°C
- 4) For UL applications: for use in class 2 circuits according to NEC only
- 5) The push-pull switching outputs must not be connected in parallel
- 6) Typical value for the stainless steel housing
- 7) UL certified in the temperature range -30°C to 55°C, operating temperatures of +70°C permissible only briefly (≤ 15min)
- 8) 2=polarity reversal protection, 3=short-circuit protection for all transistor outputs
- 9) Only with internal tube mounting of the M8 connector
- 10) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.24A min, in the field installation

UL REQUIREMENTS

Enclosure Type Rating: Type 1

For Use in NFPA 79 Applications only.

Adapters providing field wiring means are available from the manufacturer. Refer to manufacturers information.

CAUTION – the use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

ATTENTION ! Si d'autres dispositifs d'alignement que ceux préconisés ici sont utilisés ou s'il est procédé autrement qu'indiqué, cela peut entraîner une exposition à des rayonnements et un danger pour les personnes.

Tables

Models of laser class 2:

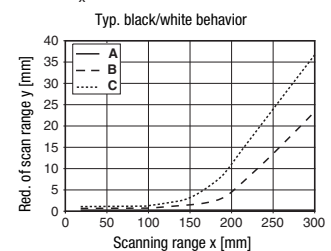
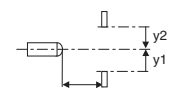
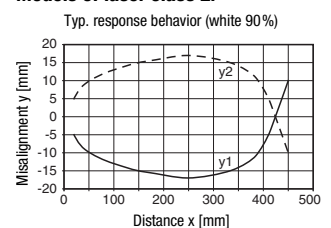
1	20	450
2	20	350
3	20	250

1	white 90%
2	gray 18%
3	black 6%

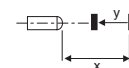
□ Scanning range [mm]

Diagrams

Models of laser class 2:



- A white 90%
- B gray 18%
- C black 6%



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.

- A list of tested chemicals can be found in the first part of the product description.
- Only secure in designated area using set screw. Max. tightening torque 3Nm.

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Laser safety notices

 **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.

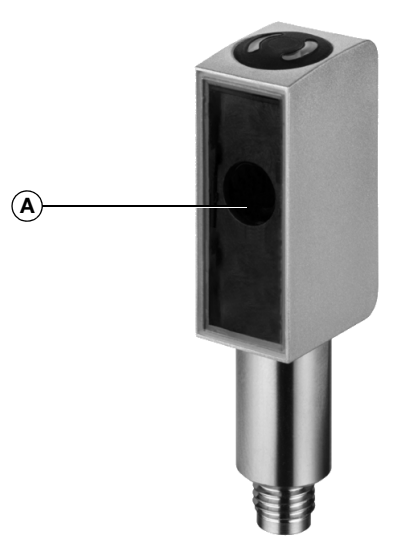

- ↳ Never look directly into the laser beam or in the direction of reflecting laser beams!
If you look into the beam path over a longer time period, there is a risk of injury to the retina.
- ↳ Do not point the laser beam of the device at persons!
- ↳ Intercept the laser beam with an opaque, non-reflective 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 not 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.

<p>①</p>  <p>A Laser exit opening</p>	<p>②</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;">50115039-02</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border: 1px solid black; padding: 5px; font-size: 8px;"> <p style="text-align: center;">LASERSTRAHLUNG NICHT IN DEN STRAHL BLICKEN</p> <p>Max. Leistung (peak): 3.3 mW Impulsdauer: 7.6 µs Wellenlänge: 650 nm</p> <p style="text-align: center;">LASER KLASSE 2 DIN EN 60825-1:2008-05</p> </td> <td style="width: 50%; border: 1px solid black; padding: 5px; font-size: 8px;"> <p style="text-align: center;">RADIAZIONE LASER NON FISSARE IL FASCIO</p> <p>Potenza max. 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Part number code

H	R	T	L	5	3	/	6	6	.	C	2	-	X	L	-	S	8
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Operating principle

HRT Diffuse reflection light scanners with background suppression

Operating principle

L Laser (red light)

Construction/version

53 53 Series

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

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

/6 1 x push-pull transistor output, OUT 1: light switching, OUT 2: not connected (n. c.)

Equipment

N/A Laser class 1 in accordance with IEC 60825-1

.C2 Laser class 2 in accordance with IEC 60825-1

Light spot

-XL Wide line-shaped laser light spot

Electrical connection

N/A Cable, PVC, standard length 2000 mm, 4-wire

-S8.3 M8 connector, 3 pin (plug)

-S8 M8 connector, 4 pin (plug)

,200-S12 Cable, PVC, length 200 mm with M 12 connector, 4 pin, axial (plug)

,5000 Cable, PVC, standard length 5000 mm, 4-wire

Order guide

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

Order code

HRTL 53/66.C2-XL-S8

Part no.

50134589

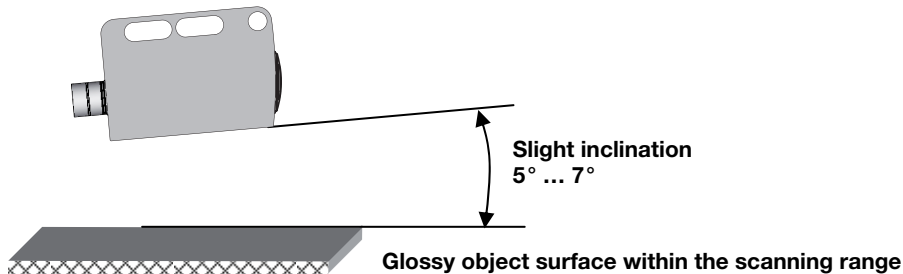
HRTL 53 "XL" Laser diffuse reflection light scanner with background suppression

Application notes



- **Detection of glossy surfaces within the scanning range:**

When detecting glossy surfaces (e.g. metals), the light beam should not hit the object surface at a right angle. A slight inclination suffices to prevent undesirable direct reflections. The following rule of thumb applies: the smaller the scanning range, the larger the angle of the inclination (approx. 5° ... 7°).

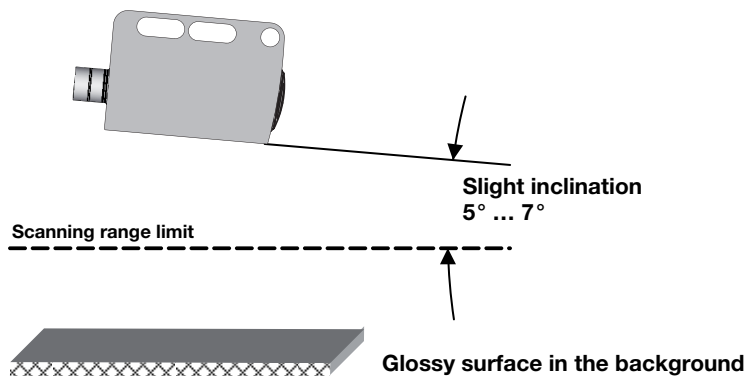


- **Avoiding interference from glossy surfaces in the background:**

If a glossy surface is in the background (distance larger than scanning range limit), reflections may cause interfering signals. These may be avoided by mounting the device at a slight angle (see figure below).

Attention!

It is imperative to note the task and the associated inclination of the scanner of approx. 5° ... 7°.



- Outside of the scanning range, the sensor operates as an energetic diffuse reflection light scanner. Light objects can still be reliably detected up to the scanning range limit.
- The sensors are equipped with effective measures for the maximum avoidance of mutual interference should they be mounted opposite one another. Opposite mounting of multiple sensors of the same type should, however, absolutely be avoided.

