

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

Timing

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

Electrical data

Operating voltage U _B	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U _B
Open-circuit current	≤ 120mA
Switching output	.../6... 1 push-pull switching output ³⁾
	PNP light switching, NPN dark switching
Signal voltage high/low	≥ (U _B -2V)/≤ 2V
Output current	max. 100mA

Indicators

Sensor front	
Green LED	ready
Yellow LED	reflection (Q1 = OUT1)
Sensor back	see table

Mechanical data

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

Environmental data

Ambient temperature (operation ⁴⁾ /storage)	-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⁾
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. 3min. 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 250VAC
- 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

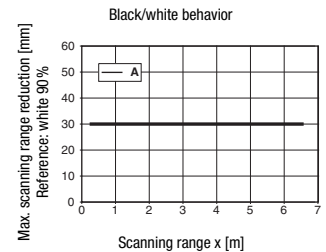
Approved purpose:

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	-	-

Diagrams



A 6 ... 90% diffuse reflection

Remarks

- Setting the switching points: Point the sensor towards the object.
Q1: Hold teach button 1 down for approx. 2s, release when the LED starts flashing, teach in of switching point complete.
The object has been detected when Q1 indicator lights up.
- Reserve: For the reliable detection of objects with low reflectance, a reserve is automatically added during the teach-in event. This is constant over the entire teach-in range.
Object is detected: distance to sensor ≤ teach-in 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 settings:
Compartment occupation check
Reserve: approx. 50 mm
hysteresis: approx. 50 mm
Push-through monitoring
Reserve: approx. 25 mm
hysteresis: approx. 15 mm
- Object detection: resolution < 5 mm, standard deviation ±10 mm at ±3 Sigma
- Edge detection/horizontal positioning: repeatability < 1 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.
- Window function: Object is detected at distance switching point ± window width
- Scanning range/reflectivity:

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

HRTL 96B

Laser light scanner with background suppression

Part number code

H R T L 9 6 B / 6 . 4 9 . 0 2 S - S 1 2

Operating principle

HRT Diffuse reflection light scanners with background suppression

Operating principle

L Laser (red light)

Construction/version

96B 96B Series

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

/6 1 x push-pull transistor output, OUT 1: light switching

Switching input

.4 Teach input (Pin 2)

.9 Deactivation input (Pin 5)

Equipment

.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 96B/6.4.02S-S12

50111815

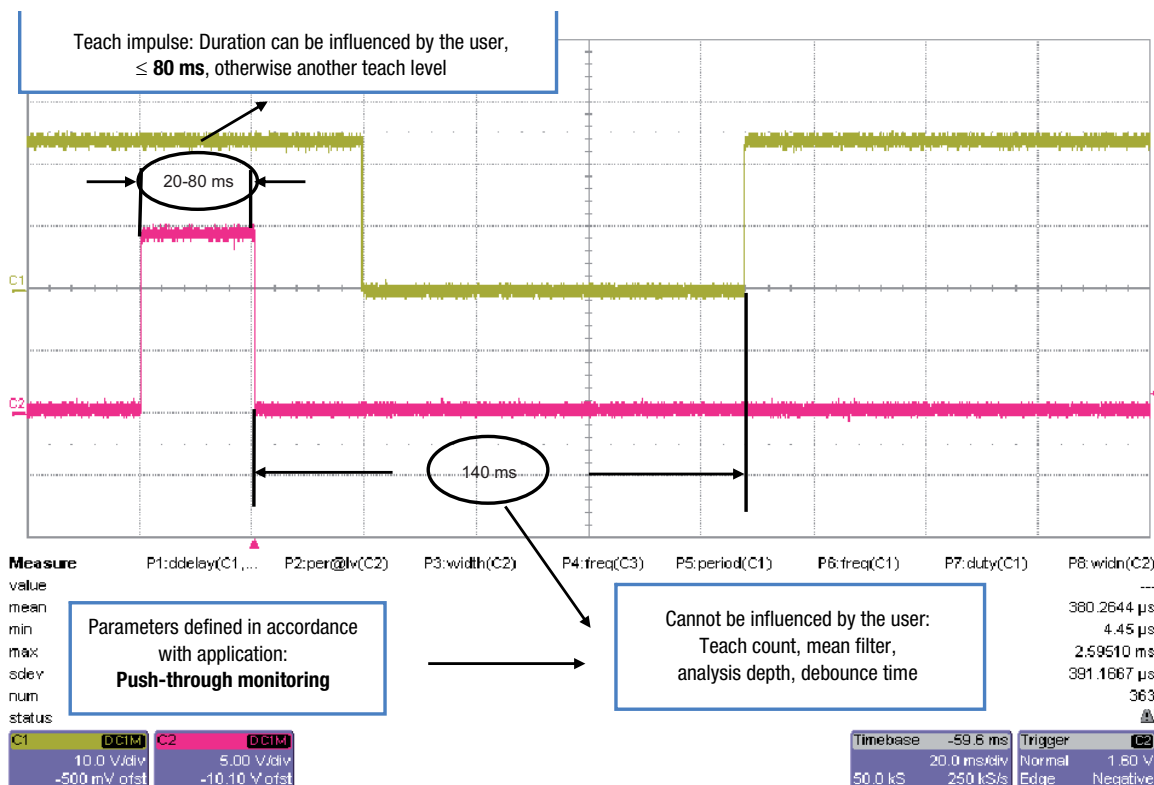
1 x push-pull switching output, 1 x teach input

HRTL 96B/6.49.02S-S12

50112803

1 x push-pull switching output, 1 x teach input, 1 x deactivation input

HRTL 96B/6.4.02S-S12 window teach-in - stop palette movement of high-bay storage device



Application examples

Combined compartment occupation check and push-through monitoring with HRTL 96B M/6.49.02S-S12 (50112803)

Process:

- High-bay storage device has reached its target position (X/Y).
- The HRTL 96 is in compartment occupancy mode (scanning range can be defined using the teach button, e.g. standard distance to palette in depth 2).
- No detection of palette signifies fork not extended.
Possible cause:
 - No palette present
 - Palette outside of tolerance range (e.g. not set down properly during the bring procedure)
 - > **OUT1 switching output (Pin 4) = inactive**
- Palette detected:
 - Switch sensor over from **compartment occupancy mode to push-through mode**
 - > **External teach-in via teach input (Pin 2)**
 - The actual distance to the palette is measured and stored (set > 20ms input).
 - Window teach-in, thus a window of approx. $\pm 30\text{mm}$ is set automatically around the teach point.
 - > **Teach-in okay: OUT1 output (Pin 4) = active**
- Start fork cycle:
 - In the event of a crash between fork and palette, the distance to the sensor changes:
Distance of sensor to palette > (teach distance + window)
 - > **OUT1 switching output (Pin 4) inactive**
 - > **Stop fork, prevent the palette from falling**
 - Distance from sensor to palette does not change
 - > **Fork cycle is concluded and palette is set down on high-bay storage device.**
- Resetting of sensor:
 - > **Set deactivation input (Pin 5 = active)**
- Approach next target...



Push-through monitoring with HRTL 96B M/6.4.02S-S12 (50111815) via external teach-in

Process:

- High-bay storage device has reached its position
- Set teach input for > 20ms
- > **External teach-in via teach input (Pin 2)**
- The actual distance to the palette is measured and stored.
- Window teach-in, thus a window of approx. $\pm 30\text{mm}$ is set automatically around the teach point.
- > **Teach-in okay: OUT1 output (Pin 4) = active**
- Start fork cycle:
 - In the event of a crash between fork and palette, the distance to the sensor changes:
Distance of sensor to palette > (teach distance + window)
 - > **OUT1 switching output (Pin 4) inactive**
 - > **Stop fork, prevent the palette from falling**
 - Distance from sensor to palette does not change
 - > **Fork cycle is concluded and palette is set down on high-bay storage device.**

