

Technical data sheet

Diffuse sensor with background suppression

Part no.: 50142300

HRT 25B/L69.32-2500-S12

Contents

- Technical data
- Dimensioned drawings
- Electrical connection
- Diagrams
- Operation and display
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- Accessories



For illustration purposes only



IO-Link

Technical data

Basic data

| | |
|---------------------|--|
| Series | 25B |
| Operating principle | Diffuse reflection principle with background suppression |

Special version

| | |
|-----------------|---------------------------------|
| Special version | 2 independent switching outputs |
| | Deactivation input |
| | Teach via IO-Link |

Optical data

| | |
|--------------------------------------|---|
| Operating range | 0.05 ... 2.5 m (guaranteed operating range) |
| Operating range limit | 0.05 ... 3 m (typical operating range) |
| Beam path | Divergent |
| Light source | LED, Infrared |
| Wavelength | 850 nm |
| Transmitted-signal shape | Pulsed |
| LED group | Exempt group (in acc. with EN 62471) |
| Light spot size [at sensor distance] | 60 mm [1,000 mm] |
| Type of light spot geometry | Round |

Measurement data

| | |
|--------------------------------|--|
| Repeatability | <± 15 mm, for measurement range 50–2500 mm, depending on diffuse reflectance and object distance, at 20°C after 20 mins warmup time, average range U_B , measurement object $\geq 50 \times 50 \text{ mm}^2$ |
| Setting accuracy (via IO link) | ± 10% (300–2500 mm) |
| Temperature drift | 2 mm/K |
| Black/white behavior | 25 mm, 2–90% diffuse reflectance |

Electrical data

| | |
|----------------------|---|
| Protective circuit | Polarity reversal protection Short circuit protected Transient protection |
| Performance data | |
| Supply voltage U_B | 18 ... 30 V, DC |
| Residual ripple | 0 ... 15 %, From U_B |
| Open-circuit current | 0 ... 32 mA |

Inputs

| | |
|-------------------------------|---|
| Number of deactivation inputs | 1 Piece(s) |
| Deactivation inputs | |
| Type | Deactivation input |
| Voltage type | DC |
| Switching voltage | high: $\geq 8 \text{ V}$ low: $\leq 2 \text{ V}$ |
| Input resistance | 10,000 Ω |
| Activation/disable delay | 20 ms |

Deactivation input 1

| | |
|------------------------|-----|
| Active switching state | Low |
|------------------------|-----|

Outputs

| | |
|-------------------------------------|------------|
| Number of digital switching outputs | 2 Piece(s) |
|-------------------------------------|------------|

Switching outputs

| | |
|-------------------------|---|
| Type | Digital switching output |
| Voltage type | DC |
| Switching current, max. | 50 mA |
| Switching voltage | high: $\geq (U_B - 2 \text{ V})$ low: $\leq 2 \text{ V}$ |

Switching output 1

| | |
|---------------------|--|
| Assignment | Connection 1, pin 2 |
| Switching element | Transistor, Push-pull |
| Switching principle | IO-Link / light switching (PNP)/dark switching (NPN) |

Switching output 2

| | |
|---------------------|--|
| Assignment | Connection 1, pin 4 |
| Switching element | Transistor, Push-pull |
| Switching principle | Light switching (PNP)/dark switching (NPN) |

Time behavior

| | |
|---------------------|---|
| Switching frequency | 2 ... 30 Hz, depending on diffuse reflectance |
| Response time | 70 ms, depending on diffuse reflectance |
| Readiness delay | 300 ms |

Interface

| | |
|------------------|---------------|
| Type | IO-Link |
| IO-Link | |
| COM mode | COM2 |
| Min. cycle time | COM2 = 2.3 ms |
| Frame type | 2.1 |
| Specification | V1.1.1 |
| SIO-mode support | Yes |
| Dual Channel | Yes |

Connection

| | |
|-----------------------|---|
| Number of connections | 1 Piece(s) |
| Connection 1 | |
| Function | Signal IN Signal OUT Voltage supply |
| Type of connection | Connector |
| Thread size | M12 |
| Type | Male |
| Material | Plastic |
| No. of pins | 5 -pin |
| Encoding | A-coded |

Technical data

Mechanical data

| | |
|--|---|
| Dimension (W x H x L) | 15 mm x 38.9 mm x 28.7 mm |
| Housing material | Plastic |
| Plastic housing | PC-ABS |
| Lens cover material | Plastic / PMMA |
| Net weight | 15 g |
| Housing color | Red |
| Type of fastening | Through-hole mounting Via optional mounting device |
| Recommended tightening torque for M3 fastening | 0.9 N·m |
| Recommended tightening torque for M4 fastening | 1.4 N·m |

Operation and display

| | |
|-------------------------------------|------------------|
| Type of display | LED |
| Number of LEDs | 3 Piece(s) |
| Operational controls | Teach button |
| Function of the operational control | Range adjustment |

Environmental data

| | |
|--------------------------------|---------------|
| Ambient temperature, operation | -30 ... 50 °C |
| Ambient temperature, storage | -40 ... 60 °C |

Classification

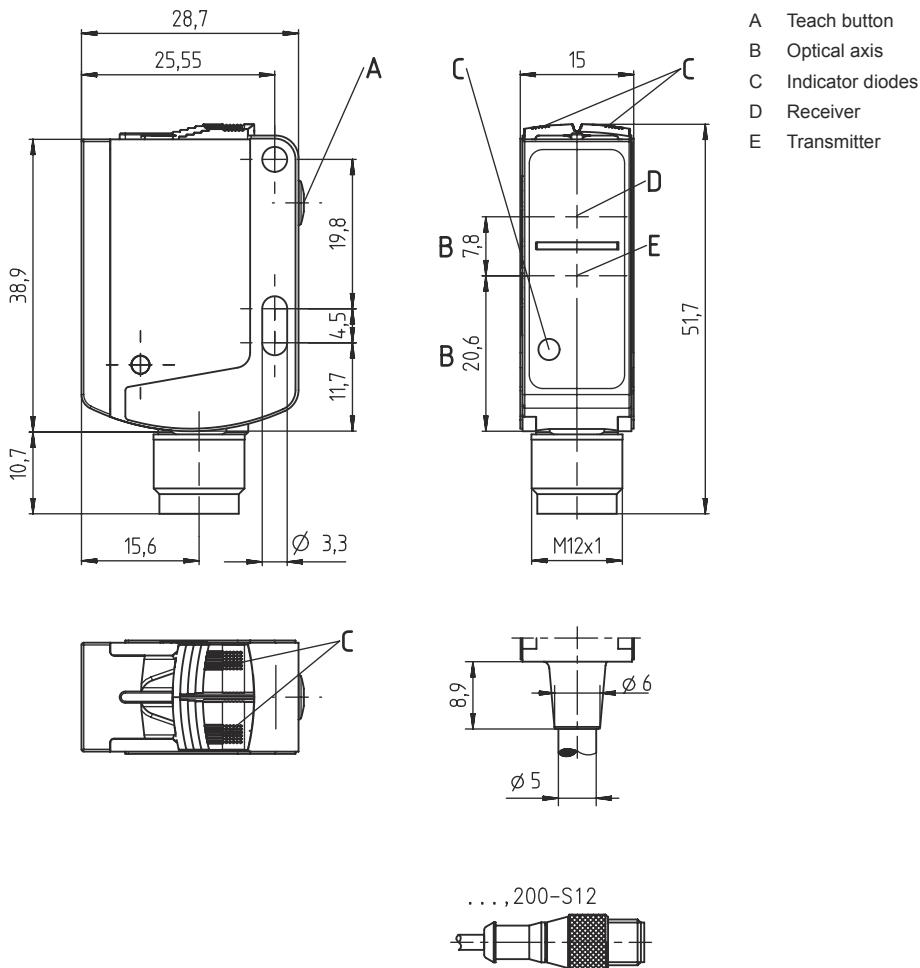
| | |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4 | 27270904 |
| ECLASS 8.0 | 27270904 |
| ECLASS 9.0 | 27270904 |
| ECLASS 10.0 | 27270904 |
| ECLASS 11.0 | 27270904 |
| ECLASS 12.0 | 27270903 |
| ECLASS 13.0 | 27270903 |
| ECLASS 14.0 | 27270903 |
| ECLASS 15.0 | 27270903 |
| ECLASS 16.0 | 27270903 |
| ETIM 5.0 | EC002719 |
| ETIM 6.0 | EC002719 |
| ETIM 7.0 | EC002719 |
| ETIM 8.0 | EC002719 |
| ETIM 9.0 | EC002719 |
| ETIM 10.0 | EC002719 |

Certifications

| | |
|----------------------|---------------|
| Degree of protection | IP 66 |
| | IP 67 |
| Protection class | III |
| Approvals | c UL US |
| Standards applied | IEC 60947-5-2 |

Dimensioned drawings

All dimensions in millimeters

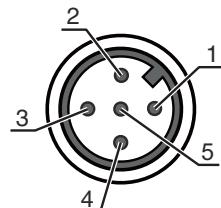


Electrical connection

Connection 1

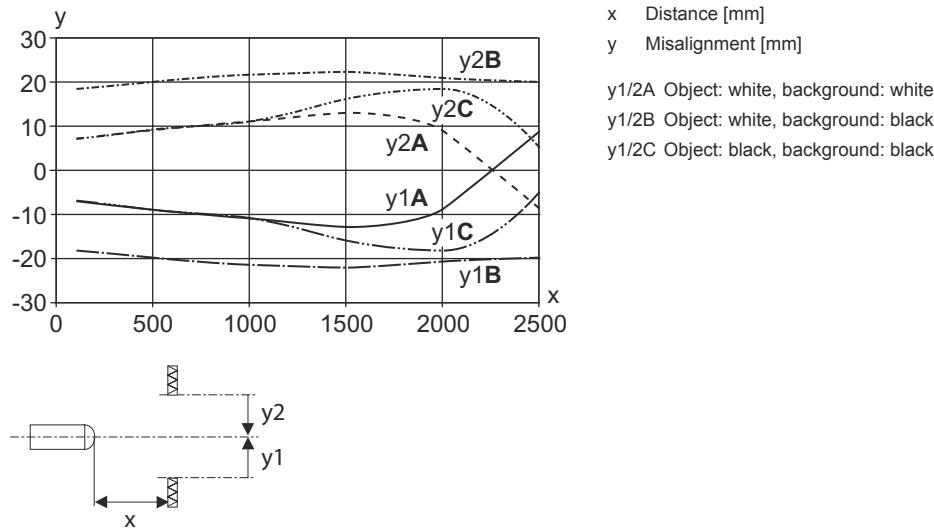
| | |
|--------------------|----------------|
| Function | Signal IN |
| Type of connection | Signal OUT |
| Thread size | Voltage supply |
| Type | Connector |
| Material | M12 |
| No. of pins | Male |
| Encoding | Plastic |

| Pin | Pin assignment |
|-----|-----------------|
| 1 | V+ |
| 2 | OUT 2 |
| 3 | GND |
| 4 | IO-Link / OUT 1 |
| 5 | IN 1 |

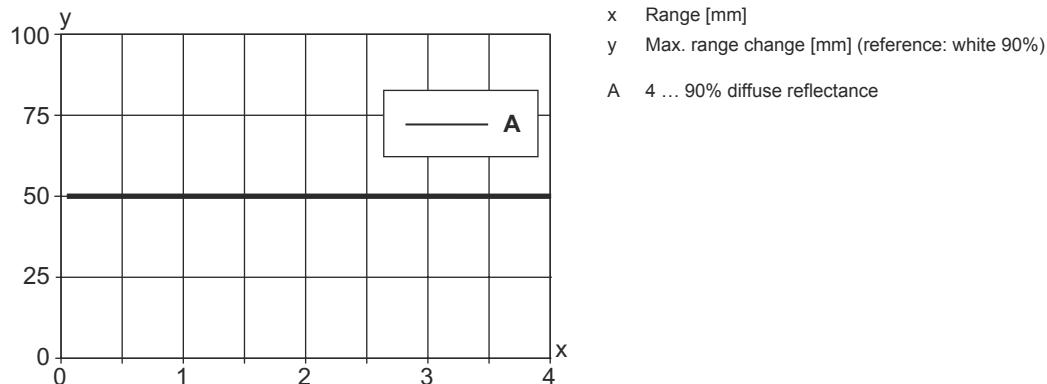


Diagrams

Typ. response behavior



Black/white behavior



Operation and display

| LED | Display | Meaning |
|-----|--------------------------|--|
| 1 | Green, continuous light | Operational readiness |
| 2 | Yellow, continuous light | Object detected (switching output Q1) |
| 3 | Yellow, continuous light | Object detected (switching output Q1) |
| | Blue, continuous light | Object detected (switching output Q2) |
| | White, continuous light | Object detected (switching output Q1 and Q2) |

Part number code

Part designation: AAA25B d EFG.HHH-i,J

| | |
|-----|---|
| AAA | Operating principle / construction HRT25B: Diffuse reflection sensor with background suppression ODT25B: Distance diffuse sensor with background suppression |
| d | Light type n/a: red light |
| E | Assignment pin 4/conductor BK L: IO-Link (with dual channel, also push/pull switching output Q1) |

Part number code

| | |
|--|---|
| F | Assignment pin 2/conductor WH 6: Push/pull (pushover) switching output Q2 |
| G | Assignment pin 5/conductor GY 6: Push/pull (pushover) switching output Q3 9: Deactivation input (factory settings) or teach input (> 8VDC, parameterizable) T: Teach input for external teach-in (> 8VDC, parameterizable) X: n.c. |
| HH | Equipment 32: Teach button for teach-in including range adjustment via IO-Link |
| i | Scanning range xxxx: Max. operating range |
| J | Electrical connection n/a: Cable, length 2,000 mm with wire-end sleeves, 5 wires -S12: M12 connector, 5-pin ,200-S12: Cable, length 200 mm with M12 connector, 5-pin |
| Note | |
|  | ↳ A list with all available device types can be found on the Leuze website at www.leuze.com . |

Notes

| | |
|--|--|
|  | Observe intended use! |
|  | <p>↳ This product is not a safety sensor and is not intended as personnel protection.</p> <p>↳ The product may only be put into operation by competent persons.</p> <p>↳ Only use the product in accordance with its intended use.</p> |

| | |
|---|--|
|  | For UL applications: |
|  | <p>↳ For UL applications, use is only permitted in Class 2 circuits in accordance with the NEC (National Electric Code).</p> |

Further information

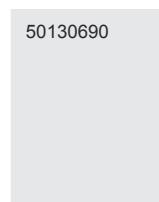
- Light source: Average life expectancy 100,000 h at an ambient temperature of 25 °C
- Values apply to measurement range 50–2,500 mm, depending on diffuse reflectance and object distance, at 20 °C after 20 mins warmup time, average range U_B , measurement object $\geq 50 \times 50 \text{ mm}^2$.

Accessories

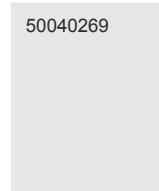
Connection technology - Connection unit

| Part no. | Designation | Article | Description |
|--|--------------------------------|----------------|---|
|  | 50144900 MD 798i-11-82/L5-2222 | IO-Link master | Current consumption, max.: 11,000 mA Interface: IO-Link, Automatic protocol detection, EtherNet IP, Modbus TCP, PROFINET Connections: 12 Piece(s) Sensor connections: 8 Piece(s) Degree of protection: IP 67, IP 65, IP 69K |

Connection technology - Connection cables

| Part no. | Designation | Article | Description |
|--|-----------------------------|------------------|---|
|  | 50130652 KD U-M12-4A-V1-050 | Connection cable | Application: Chemical resistant Connection 1: Connector, M12, Axial, Female, A-coded, 4 -pin Connector, LED: No Connection 2: Open end Shielded: No Cable length: 5,000 mm Sheathing material: PVC |
|  | 50130690 KD U-M12-4W-V1-050 | Connection cable | Application: Chemical resistant Connection 1: Connector, M12, Angled, Female, A-coded, 4 -pin Connector, LED: No Connection 2: Open end Shielded: No Cable length: 5,000 mm Sheathing material: PVC |

Mounting technology - Mounting brackets

| Part no. | Designation | Article | Description |
|---|------------------------|---------------------|---|
|  | 50124651 BT 205M-10SET | Mounting device set | Contains: 10x Design of mounting device: Angle, L-shape Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Rigid Material: Metal |
|  | 50040269 BT 25 | Mounting device | Design of mounting device: Angle, L-shape Fastening, at system: Through-hole mounting Mounting bracket, at device: Screw type Type of mounting device: Rigid Material: Metal |

Mounting technology - Rod mounts

| Part no. | Designation | Article | Description |
|--|-----------------------|-----------------|--|
|  | 50117829 BTP 200M-D12 | Mounting system | Design of mounting device: Protection hood Fastening, at system: For 12 mm rod Mounting bracket, at device: Screw type Type of mounting device: Clampable, Adjustable, Turning, 360° Material: Metal |

Accessories

| Part no. | Designation | Article | Description |
|---|-------------|--------------|--|
|  | 50117255 | BTU 200M-D12 | Mounting system Contains: 2x M3 x 16 screw, 2 M3 x 20 screws, 2x position washers Design of mounting device: Mounting system Fastening, at system: For 12 mm rod, Sheet-metal mounting Mounting bracket, at device: Screw type, Suited for M3 screws Type of mounting device: Clampable, Adjustable, Turning, 360° Material: Metal |

Note



↳ A list with all available accessories can be found on the Leuze website in the Download tab of the article detailed page.

Interface

IO-Link interface

Sensors in the HRT 25B/L... variant have a dual channel architecture. The IO-Link interface in accordance with specification 1.1.1 (October 2011) is provided on pin 4 (Q1). This allows the devices to be configured quickly and easily and, therefore, cost-effectively. Furthermore, the sensor transmits its process data and makes diagnostic information available through it.

Parallel to the IO-Link communication, the sensor can output the continuous switching signal for object detection on Q2. The IO-Link communication does not interrupt this signal.

IO-Link process data format

(IO-Link 1.1, M-sequence TYPE_2_1)

Output data device (8 bit)

| Data bit | | | | | | | | Assignment | Meaning |
|----------|---|---|---|---|---|---|---|---------------------|--|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | Switching output Q1 | 0 = inactive, 1 = active |
| | | | | | | | | Switching output Q2 | 0 = inactive, 1 = active |
| | | | | | | | | Switching output Q3 | 0 = inactive, 1 = active (if Q3 not present = 0) |
| | | | | | | | | Measurement | 0 = initialization/teach/deactivation, 1 = running measurement |
| | | | | | | | | Signal | 0 = no signal or signal too weak, 1 = signal ok |
| | | | | | | | | Warning | 0 = no warning, 1 = warning, e.g., weak signal |
| | | | | | | | | 0 | Not assigned (initial state = 0) |
| | | | | | | | | 0 | Not assigned (initial state = 0) |

Device input data

None

Device-specific IODD

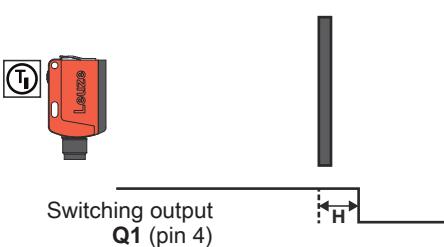
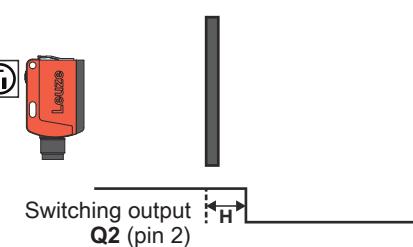
At www.leuze.com in the download area for IO-Link sensors you will find the **IODD zip file** with all data required for the installation.

IO-Link parameter documentation

A complete description of the IO-Link parameters is given in the *.html files. Please double-click one of the two language variants: ***IODD*-de.html** for **German** or ***IODD*-en.html** for **English**.

Teach settings

Sensor adjustment (teach) via teach button

| Teach | Operating level 1 | Operating level 2 |
|---|--|---|
| Teaching of two individual switching points | <p>Teach on object for Q1 (pin 4): With this teach mode, the switching distance for switching output Q1 is configured in such a way that the object which is in the beam path during the teach procedure is reliably detected.</p>  <p>Hysteresis H: To ensure continuous object detection in the switching point, the sensor has a switch hysteresis. Object is no longer detected if: distance to sensor > teach point + reserve + hysteresis.</p> | <p>Teach on object for Q2 (pin 2): With this teach mode, the switching distance for switching output Q2 is configured in such a way that the object which is in the beam path during the teach procedure is reliably detected.</p>  |

NOTE

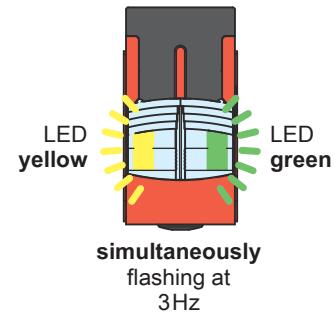
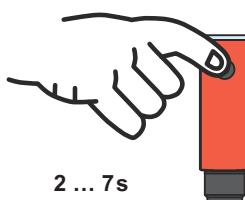


The sensors have a factory-set hysteresis **H** of 50mm.

Operation via teach button

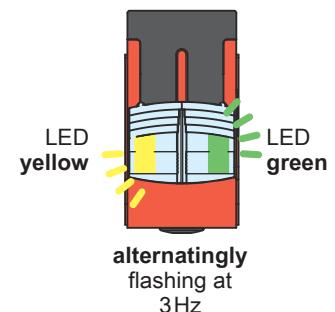
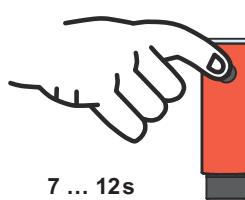
Teach-in on operating level 1 (switching distance for Q1)

- Press teach button until both LEDs flash simultaneously.
- Release teach button.
- Ready.



Teach-in on operating level 2 (switching distance for Q2)

- Press teach button until both LEDs flash alternately.
- Release teach button.
- Ready.



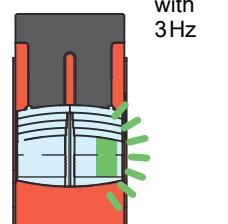
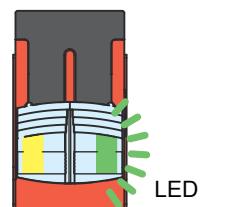
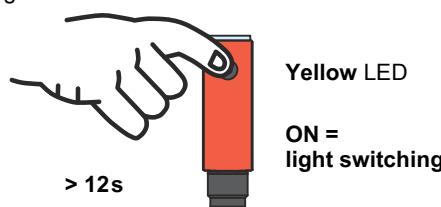
Teach settings

Adjusting the switching behavior of the switching output – light/dark switching

This function permits inversion of the sensors' switching logic.

- Press teach button until only the green LED flashes. Yellow LED:

| | |
|-----|---|
| ON | = switching outputs light switching (in the case of complementary sensors, Q1 (pin 4) light switching, Q2 (pin 2) dark switching), this means output active when object is detected. |
| OFF | = switching outputs dark switching (in the case of complementary sensors, Q1 (pin 4) dark switching, Q2 (pin 2) light switching), this means output inactive when object is detected. |
- Release teach button.
- The yellow LED then indicates the toggled switching logic.
- Ready.



OFF =
dark
switching

