

## Technical data sheet

### Multiple light beam safety device receiver

Part no.: 66576300

MLD535-R4L



For illustration purposes only

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- Technical data
- Dimensioned drawings
- Electrical connection
- Operation and display
- Suitable transmitters
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## Technical data

### Basic data

|             |          |
|-------------|----------|
| Series      | MLD 500  |
| Device type | Receiver |

### Special version

|                 |                                            |
|-----------------|--------------------------------------------|
| Special version | Reflective element for laser alignment aid |
|-----------------|--------------------------------------------|

### Functions

|                                            |                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Functions                                  | Alternative connection for second muting signal<br>Configuration by means of wiring<br>Contactor monitoring (EDM), selectable<br>Muting enable function<br>Muting-timeout extension<br>Partial muting<br>Sequence controlled 2-sensor muting<br>Start/restart interlock (RES)<br>Timing controlled 4-sensor muting |
| Reflective element for laser alignment aid | Yes                                                                                                                                                                                                                                                                                                                |
| Integrated muting indicator                | No                                                                                                                                                                                                                                                                                                                 |
| Integrated status indicator                | No                                                                                                                                                                                                                                                                                                                 |

### Characteristic parameters

|                             |                           |
|-----------------------------|---------------------------|
| Type                        | 4, IEC/EN 61496           |
| SIL                         | 3, IEC 61508              |
| SILCL                       | 3, IEC/EN 62061           |
| Performance Level (PL)      | e, EN ISO 13849-1         |
| MTTF <sub>d</sub>           | 204 years, EN ISO 13849-1 |
| PFH <sub>d</sub>            | 6.6E-09 per hour          |
| Mission time T <sub>M</sub> | 20 years, EN ISO 13849-1  |
| Category                    | 4, EN ISO 13849           |

### Optical data

|                 |            |
|-----------------|------------|
| Number of beams | 4 Piece(s) |
| Beam spacing    | 300 mm     |

### Electrical data

|                             |                                                                                                                                                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Selection of operating mode | Connection 1, pin 2: +24 V for operating mode 1, 2, 4<br>Connection 1, pin 2: 0 V for operating mode 3, 5, 6<br>Connection 1, pin 7: +24 V for operating mode 3, 5, 6<br>Connection 1, pin 7: 0 V for operating mode 1, 2, 4 |
| Protective circuit          | Overvoltage protection<br>Short circuit protected                                                                                                                                                                            |

### Performance data

|                               |                               |
|-------------------------------|-------------------------------|
| Supply voltage U <sub>B</sub> | 24 V, DC, -20 ... 20 %        |
| Current consumption, max.     | 150 mA, Without external load |
| Fuse                          | External with max. 3 A        |

### Inputs

|                                    |            |
|------------------------------------|------------|
| Number of digital switching inputs | 4 Piece(s) |
|------------------------------------|------------|

### Switching inputs

|                              |                         |
|------------------------------|-------------------------|
| Type                         | Digital switching input |
| Switching voltage high, min. | 18.2 V                  |
| Switching voltage low, max.  | 2.5 V                   |
| Switching voltage, type.     | 23 V                    |
| Voltage type                 | DC                      |
| Switching current, max.      | 5 mA                    |

#### Digital switching input 1

|            |                                                 |
|------------|-------------------------------------------------|
| Assignment | Connection 1, pin 1                             |
| Function   | Control input for start/restart interlock (RES) |

#### Digital switching input 2

|            |                                              |
|------------|----------------------------------------------|
| Assignment | Connection 1, pin 3                          |
| Function   | Control input for contactor monitoring (EDM) |

#### Digital switching input 3

|            |                                     |
|------------|-------------------------------------|
| Assignment | Connection 1, pin 4                 |
| Function   | Control input, second muting signal |

#### Digital switching input 4

|            |                                       |
|------------|---------------------------------------|
| Assignment | Connection 1, pin 8                   |
| Function   | Control input, muting enable/ timeout |

### Outputs

|                                                    |            |
|----------------------------------------------------|------------|
| Number of safety-related switching outputs (OSSDs) | 2 Piece(s) |
|----------------------------------------------------|------------|

|                                     |            |
|-------------------------------------|------------|
| Number of digital switching outputs | 1 Piece(s) |
|-------------------------------------|------------|

### Safety-related switching outputs

|                              |                                      |
|------------------------------|--------------------------------------|
| Type                         | Safety-related switching output OSSD |
| Switching voltage high, min. | 18.2 V                               |
| Switching voltage low, max.  | 2.5 V                                |
| Switching voltage, type.     | 23 V                                 |
| Voltage type                 | DC                                   |
| Current load, max.           | 380 mA                               |
| Load inductivity             | 2,200,000 µH                         |
| Load capacity                | 0.3 µF                               |
| Residual current, max.       | 0.2 mA                               |
| Residual current, type.      | 0.002 mA                             |
| Voltage drop                 | 1 V                                  |

#### Safety-related switching output 1

|                   |                     |
|-------------------|---------------------|
| Assignment        | Connection 1, pin 6 |
| Switching element | Transistor, PNP     |

#### Safety-related switching output 2

|                   |                     |
|-------------------|---------------------|
| Assignment        | Connection 1, pin 5 |
| Switching element | Transistor, PNP     |

### Switching outputs

|                              |                          |
|------------------------------|--------------------------|
| Type                         | Digital switching output |
| Switching voltage high, min. | 18.2 V                   |
| Switching voltage low, max.  | 2.5 V                    |
| Switching voltage, type.     | 23 V                     |
| Voltage type                 | DC                       |

#### Switching output 1

|                   |                                |
|-------------------|--------------------------------|
| Assignment        | Connection 1, pin 1            |
| Switching element | Transistor, PNP                |
| Function          | "State of OSSDs" signal output |

Technical data

Time behavior

|                    |        |
|--------------------|--------|
| Response time      | 50 ms  |
| Restart delay time | 100 ms |

Connection

|                                            |                   |
|--------------------------------------------|-------------------|
| Number of connections                      | 2 Piece(s)        |
| Connection 1                               |                   |
| Function                                   | Machine interface |
| Type of connection                         | Connector         |
| Thread size                                | M12               |
| Material                                   | Metal             |
| No. of pins                                | 8 -pin            |
| Connection 2                               |                   |
| Function                                   | Local interface   |
| Type of connection                         | Connector         |
| Thread size                                | M12               |
| Material                                   | Metal             |
| No. of pins                                | 8 -pin            |
| Cable properties                           |                   |
| Permissible conductor cross section, type. | 0.25 mm²          |
| Length of connection cable, max.           | 100 m             |
| Permissible cable resistance to load, max. | 200 Ω             |

Mechanical data

|                       |                                 |
|-----------------------|---------------------------------|
| Dimension (W x H x L) | 52 mm x 1,000 mm x 64.7 mm      |
| Housing material      | Metal                           |
| Metal housing         | Aluminum                        |
| Lens cover material   | Plastic / PMMA                  |
| Material of end caps  | Diecast zinc                    |
| Net weight            | 2,200 g                         |
| Housing color         | Yellow, RAL 1021                |
| Type of fastening     | Groove mounting<br>Swivel mount |

Operation and display

|                 |                          |
|-----------------|--------------------------|
| Type of display | 7-segment display<br>LED |
| Number of LEDs  | 2 Piece(s)               |

Environmental data

|                                    |               |
|------------------------------------|---------------|
| Ambient temperature, operation     | -30 ... 55 °C |
| Ambient temperature, storage       | -40 ... 75 °C |
| Relative humidity (non-condensing) | 0 ... 95 %    |

Certifications

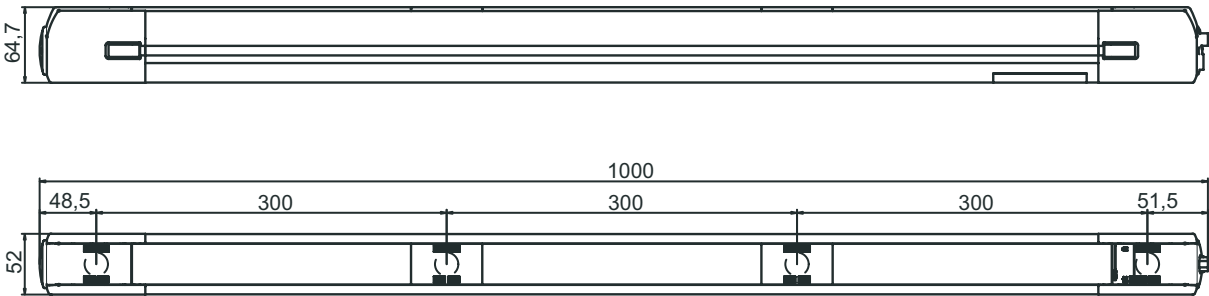
|                      |                                      |
|----------------------|--------------------------------------|
| Degree of protection | IP 67                                |
| Protection class     | III                                  |
| Approvals            | c CSA US<br>c TÜV NRTL US<br>TÜV Süd |
| US patents           | US 6,418,546 B<br>US 7,741,595 B     |

Classification

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| ECLASS 5.1.4          | 27272703 |
| ECLASS 8.0            | 27272703 |
| ECLASS 9.0            | 27272703 |
| ECLASS 10.0           | 27272703 |
| ECLASS 12.0           | 27272703 |
| ECLASS 13.0           | 27272703 |
| ECLASS 14.0           | 27272703 |
| ECLASS 15.0           | 27272703 |
| ETIM 5.0              | EC001832 |
| ETIM 6.0              | EC001832 |
| ETIM 7.0              | EC001832 |
| ETIM 8.0              | EC001832 |
| ETIM 9.0              | EC001832 |
| ETIM 10.0             | EC001832 |

Dimensioned drawings

All dimensions in millimeters

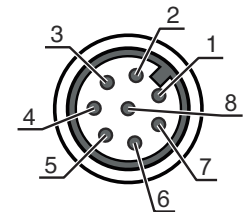


## Electrical connection

### Connection 1

|                    |                   |
|--------------------|-------------------|
| Function           | Machine interface |
| Type of connection | Connector         |
| Thread size        | M12               |
| Type               | Male              |
| Material           | Metal             |
| No. of pins        | 8 -pin            |
| Encoding           | A-coded           |

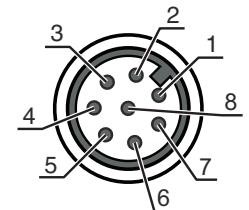
| Pin | Pin assignment         | Conductor color |
|-----|------------------------|-----------------|
| 1   | RES/OSSD status signal | White           |
| 2   | VIN                    | Brown           |
| 3   | EDM                    | Green           |
| 4   | MS2                    | Yellow          |
| 5   | OSSD2                  | Gray            |
| 6   | OSSD1                  | Pink            |
| 7   | VIN                    | Blue            |
| 8   | M-EN/TO                | Red             |



### Connection 2

|                    |                 |
|--------------------|-----------------|
| Function           | Local interface |
| Type of connection | Connector       |
| Thread size        | M12             |
| Type               | Female          |
| Material           | Metal           |
| No. of pins        | 8 -pin          |
| Encoding           | A-coded         |

| Pin | Pin assignment | Conductor color |
|-----|----------------|-----------------|
| 1   | MS4            | White           |
| 2   | +24 V          | Brown           |
| 3   | MS2            | Green           |
| 4   | MS1            | Yellow          |
| 5   | RES/LMP        | Gray            |
| 6   | MS3            | Pink            |
| 7   | 0 V            | Blue            |
| 8   | n.c.           | Red             |



## Operation and display

| LED | Display                  | Meaning                                              |
|-----|--------------------------|------------------------------------------------------|
| 1   | Red, continuous light    | OSSD off.                                            |
|     | Green, continuous light  | OSSD on                                              |
|     | Red, flashing, 1 Hz      | External error                                       |
|     | Red, flashing, 10 Hz     | Internal error                                       |
|     | Green, flashing, 1 Hz    | Weak signal, device not optimally aligned or soiled. |
| 2   | Yellow, continuous light | Start/restart interlock locked.                      |

## Suitable transmitters

|                                                                                   | Part no. | Designation | Article                                       | Description                                                                                                                                                                          |
|-----------------------------------------------------------------------------------|----------|-------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 66502300 | MLD500-T4L  | Multiple light beam safety device transmitter | Special version: Integrated laser alignment aid<br>Operating range: 0.5 ... 50 m<br>Number of beams: 4 Piece(s)<br>Beam spacing: 300 mm<br>Connection: Connector, M12, Metal, 5 -pin |

## Part number code

Part designation: **MLDxyy-zab/t****MLD** Multiple light beam safety device

|           |                                                                                                                                                                                                                                                                                                       |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>x</b>  | <b>Series</b><br>3: MLD 300<br>5: MLD 500                                                                                                                                                                                                                                                             |
| <b>yy</b> | <b>Function classes</b><br>00: transmitter<br>10: automatic restart<br>12: external testing<br>20: EDM/RES<br>30: muting<br>35: timing controlled 4-sensor muting                                                                                                                                     |
| <b>z</b>  | <b>Device type</b><br>T: transmitter<br>R: receiver<br>RT: transceiver<br>xT: transmitter with high range<br>xR: receiver for high range                                                                                                                                                              |
| <b>a</b>  | Number of beams                                                                                                                                                                                                                                                                                       |
| <b>b</b>  | <b>Option</b><br>L: integrated laser alignment aid (for transmitter/receiver)<br>M: integrated status indicator (MLD 320, MLD 520) or integrated status and muting indicator (MLD 330, MLD 335, MLD 510/A, MLD 530, MLD 535)<br>E: Connection socket for external muting indicator (AS-i models only) |
| <b>/t</b> | <b>Safety-related switching outputs (OSSDs), connection technology</b><br>-: transistor output, M12 plug<br>A: Integrated AS-i interface, M12 plug, (safety bus system)                                                                                                                               |

### Note

A list with all available device types can be found on the Leuze website at [www.leuze.com](http://www.leuze.com).

## Accessories

### Connection technology - Connection cables

|                                                                                     | Part no. | Designation        | Article          | Description                                                                                                                                                                        |
|-------------------------------------------------------------------------------------|----------|--------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50135128 | KD S-M12-8A-P1-050 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 8 -pin<br>Connector, LED: No<br>Connection 2: Open end<br>Shielded: Yes<br>Cable length: 5.000 mm<br>Sheathing material: PUR |

## Accessories

### Mounting technology - Swivel mounts

|                                                                                  | Part no. | Designation    | Article              | Description                                                                                                                                                                       |
|----------------------------------------------------------------------------------|----------|----------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 560340   | BT-SET-240BC   | Mounting bracket set | Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable<br>Type of mounting device: Turning, 240°<br>Material: Metal<br>Shock absorber: No          |
|  | 540350   | BT-SET-240BC-E | Mounting bracket set | Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable<br>Type of mounting device: Turning, 240°<br>Material: Metal, Plastic<br>Shock absorber: No |

### Services

|                                                                                   | Part no. | Designation | Article           | Description                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------|----------|-------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | S981050  | CS40-I-140  | Safety inspection | Details: Checking of a safety light barrier application in accordance with current standards and guidelines. Inclusion of the device and machine data in a database, production of a test log per application.<br>Conditions: It must be possible to stop the machine, support provided by customer's employees and access to the machine for Leuze employees must be ensured. |
|  | S981046  | CS40-S-140  | Start-up support  | Details: For safety devices including stopping time measurement and initial inspection.<br>Conditions: Devices and connection cables are already mounted, price not including travel costs and, if applicable, accommodation expenses.                                                                                                                                         |

#### Note



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