



Figure can vary

**Part no.: 68003916**  
**MLC530R90-1650**  
**Safety light curtain receiver**



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## Technical data

| <b>Basic data</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Series                           | MLC 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Device type                      | Receiver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Contains                         | 2x BT-NC sliding block                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Application                      | Access guarding<br>Danger zone guarding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Functions</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Function package                 | Extended                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Functions                        | Combination of floating/fixed blanking, can be changed to "fixed blanking" during operation<br>Contactor monitoring (EDM)<br>Fixed blanking with 1-beam tolerance<br>Fixed blanking without tolerance<br>Fixed blanking without tolerance, can be activated/deactivated during operation<br>Floating blanking, can be changed to "fixed blanking" during operation<br>Integration of "contact-based safety circuit"<br>Integration of "electronic safety-related switching outputs"<br>MaxiScan<br>Partial muting<br>Reduced resolution, can be changed to "fixed blanking" during operation<br>Start/restart interlock (RES)<br>Timing controlled 2-sensor muting<br>Transmission channel changeover |
| <b>Characteristic parameters</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Type                             | 4 , IEC/EN 61496                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| SIL                              | 3 , IEC 61508                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SILCL                            | 3 , IEC/EN 62061                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Performance Level (PL)           | e , EN ISO 13849-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| PFH <sub>D</sub>                 | 7.73E-09 per hour                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Mission time T <sub>M</sub>      | 20 years , EN ISO 13849-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Category                         | 4 , EN ISO 13849                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Protective field data</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Resolution                       | 90 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Protective field height          | 1,650 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Optical data</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Synchronization                  | Optical between transmitter and receiver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Electrical data</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Protective circuit               | Overvoltage protection<br>Short circuit protected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Performance data</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Supply voltage U <sub>B</sub>    | 24 V , DC , -20 ... 20 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Current consumption, max.        | 150 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Fuse                             | 2 A semi time-lag                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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## Inputs

Number of digital switching inputs 3 Piece(s)

### Switching inputs

|                              |                         |
|------------------------------|-------------------------|
| Type                         | Digital switching input |
| Switching voltage high, min. | 18 V                    |
| Switching voltage low, max.  | 2.5 V                   |
| Switching voltage, typ.      | 22.5 V                  |
| Voltage type                 | DC                      |

## Outputs

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

### Safety-related switching outputs

|                              |                                      |
|------------------------------|--------------------------------------|
| Type                         | Safety-related switching output OSSD |
| Switching voltage high, min. | 18 V                                 |
| Switching voltage low, max.  | 2.5 V                                |
| Switching voltage, typ.      | 22.5 V                               |
| Voltage type                 | DC                                   |
| Current load, max.           | 380 mA                               |
| Load inductivity             | 2,000 µH                             |
| Load capacity                | 0.3 µF                               |
| Residual current, max.       | 0.2 mA                               |
| Residual current, typ.       | 0.002 mA                             |
| Voltage drop                 | 1.5 V                                |

### Safety-related switching output 1

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

### Safety-related switching output 2

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

## Timing

|                    |        |
|--------------------|--------|
| Response time      | 6 ms   |
| Restart delay time | 100 ms |

## Connection

Number of connections 1 Piece(s)

### Connection 1

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

### Cable properties

|                                            |          |
|--------------------------------------------|----------|
| Permissible conductor cross section, typ.  | 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) | 29 mm x 1,716 mm x 35.4 mm |
| Housing material      | Metal , Aluminum           |

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|                      |                                                                                  |
|----------------------|----------------------------------------------------------------------------------|
| Lens cover material  | Plastic / PMMA                                                                   |
| Material of end caps | Diecast zinc                                                                     |
| Net weight           | 1,800 g                                                                          |
| Housing color        | Yellow, RAL 1021                                                                 |
| Type of fastening    | Groove mounting<br>Mounting bracket<br>Mounting on Device Column<br>Swivel mount |

### Operation and display

|                 |                          |
|-----------------|--------------------------|
| Type of display | 7-segment display<br>LED |
| Number of LEDs  | 3 Piece(s)               |

### Environmental data

|                                    |               |
|------------------------------------|---------------|
| Ambient temperature, operation     | -30 ... 55 °C |
| Ambient temperature, storage       | -30 ... 70 °C |
| Relative humidity (non-condensing) | 0 ... 95 %    |

### Certifications

|                      |                                                |
|----------------------|------------------------------------------------|
| Degree of protection | IP 65                                          |
| Protection class     | III                                            |
| Certifications       | c CSA US<br>c TÜV NRTL US<br>S Mark<br>TÜV Süd |
| Vibration resistance | 50 m/s <sup>2</sup>                            |
| Shock resistance     | 100 m/s <sup>2</sup>                           |
| US patents           | US 6,418,546 B                                 |

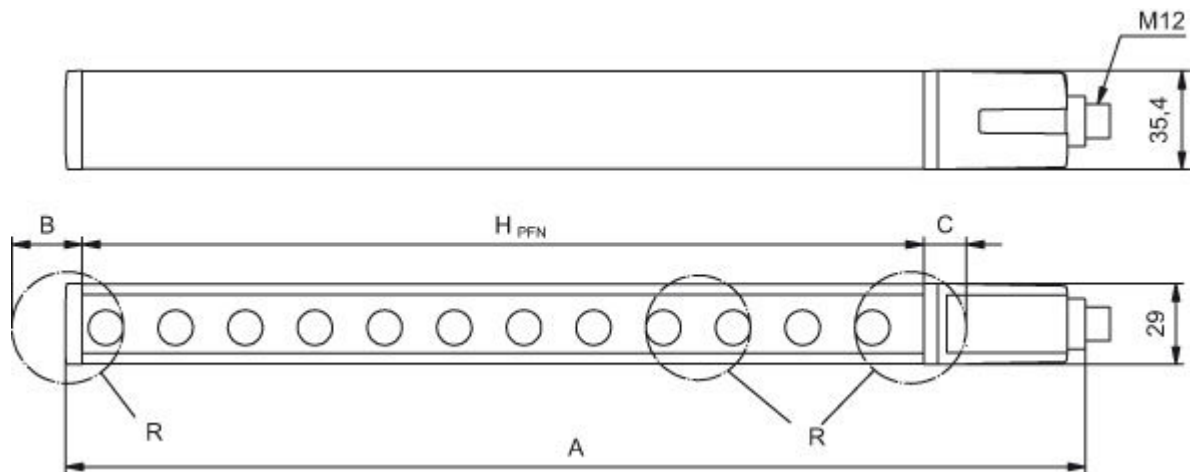
### Classification

|                       |          |
|-----------------------|----------|
| Customs tariff number | 85365019 |
| eCl@ss 8.0            | 27272704 |
| eCl@ss 9.0            | 27272704 |
| ETIM 5.0              | EC002549 |
| ETIM 6.0              | EC002549 |

## Dimensioned drawings

All dimensions in millimeters

Calculation of the effective protective field height  $HPFE = HPFN + B + C$



$HPFE$  Effective protective field height = 1740 mm

$HPFN$  Nominal protective field height = 1650 mm

A Total height = 1716 mm

B 50 mm

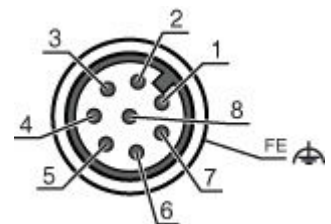
C 40 mm

R Effective protective field height  $HPFE$  goes beyond the dimensions of the optics area to the outer borders of the circles labeled with R.

## Electrical connection

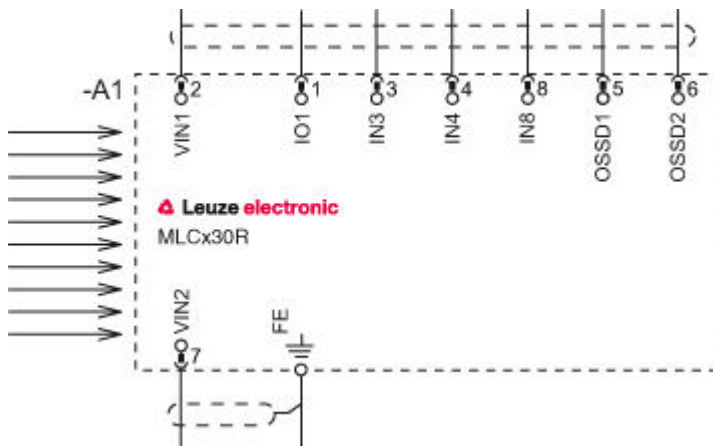
| Connection 1       |                   |
|--------------------|-------------------|
| Type of connection | Connector         |
| Function           | Machine interface |
| Thread size        | M12               |
| Type               | Male              |
| Material           | Metal             |
| No. of pins        | 8 -pin            |
| Encoding           | A-coded           |
| Connector housing  | FE/SHIELD         |

| Pin | Pin assignment | Conductor color |
|-----|----------------|-----------------|
| 1   | IO1            | White           |
| 2   | VIN1           | Brown           |
| 3   | IN3            | Green           |
| 4   | IN4            | Yellow          |
| 5   | OSSD1          | Gray            |
| 6   | OSSD2          | Pink            |
| 7   | VIN2           | Blue            |
| 8   | IN8            | Red             |



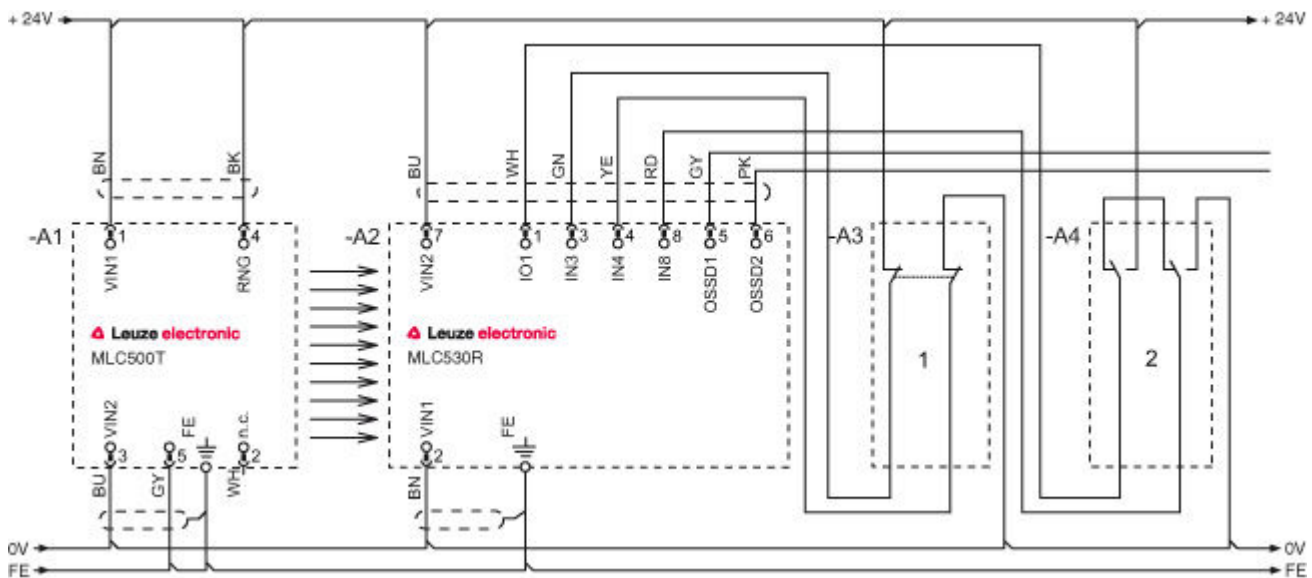
## Circuit diagrams

### Connection diagram receiver



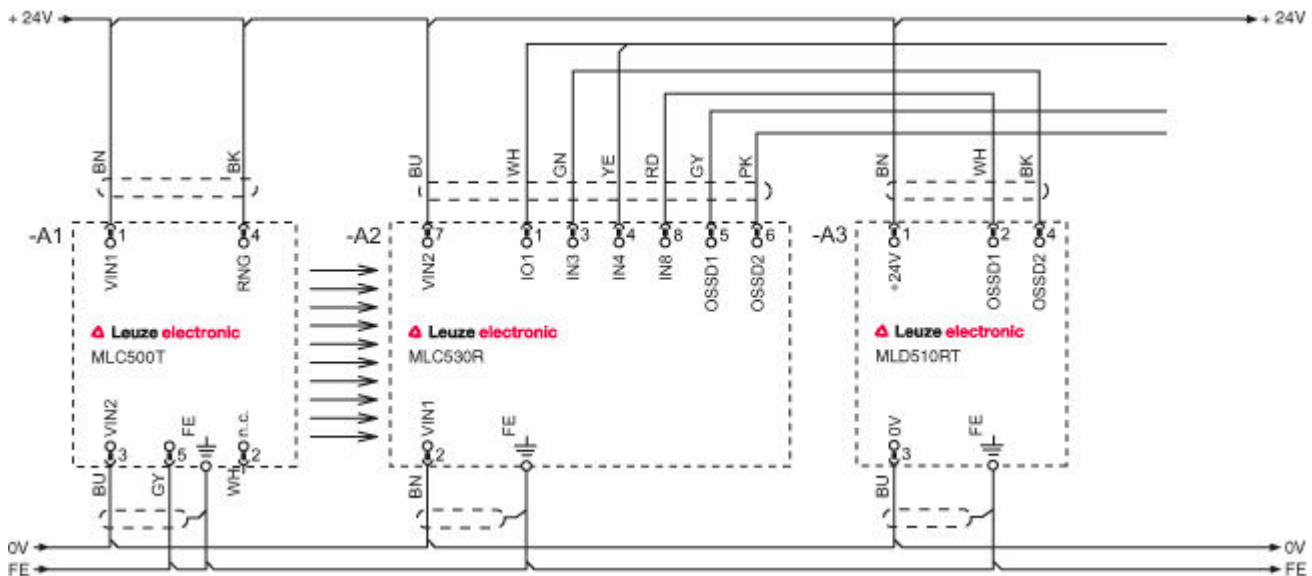
- VIN1 = +24 V, VIN2 = 0 V: transmission channel C1
- VIN1 = 0 V, VIN2 = +24 V: transmission channel C2

Operating mode 1: circuit diagram example of linkage with position switch for monitoring for the presence of machine parts with fixed blanking

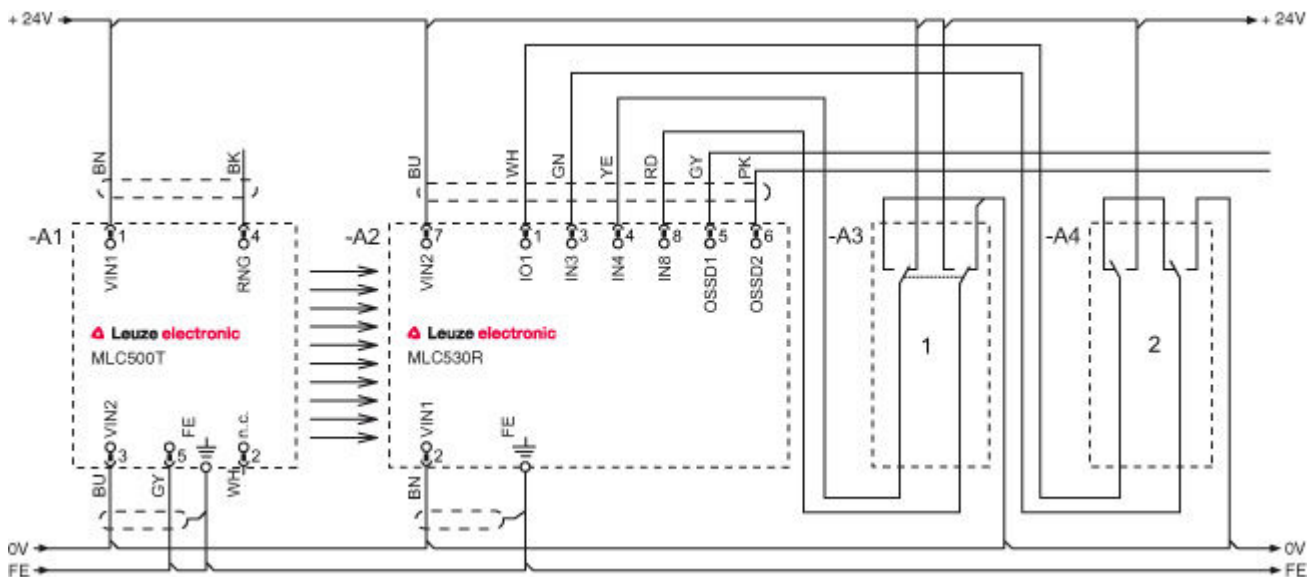


- 1 Linked safety sensor, e.g. safety door switch
- 2 Key switch for teaching ("teach key switch")

Operating mode 2: circuit diagram example of linkage of electronic safety-related switching outputs for the combined monitoring of access points and areas

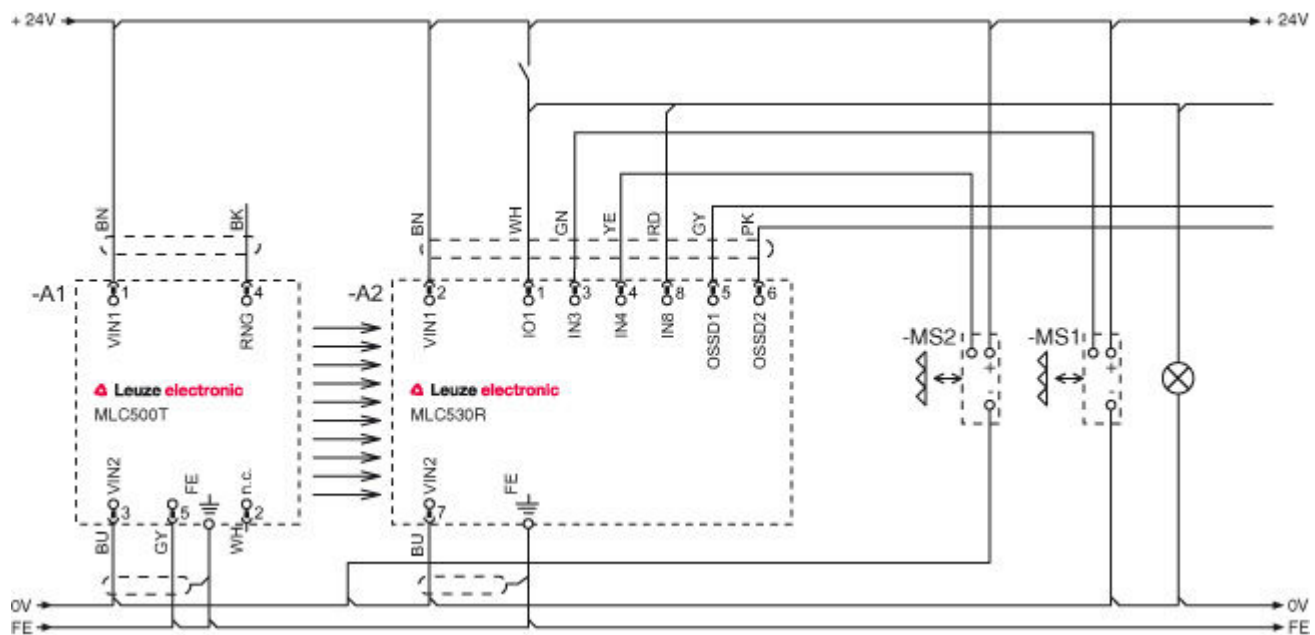


Operating mode 3: circuit diagram example of a linked, contact-based position switch for monitoring of the blanked object and a changeover switch for switching between function groups FG1 and FG2



- 1 Changeover key switch for switching between function groups FG1 and FG2
- 2 Key switch for teaching blanking areas

## Operating mode 4: circuit diagram example for timing controlled 2-sensor muting



## Operation and display

### LEDs

| LED | Display                     | Meaning                                                                                                               |
|-----|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1   | Off                         | Device switched off                                                                                                   |
|     | Red, continuous light       | OSSD off                                                                                                              |
|     | Red, flashing, 1 Hz         | External error                                                                                                        |
|     | Red, flashing, 10 Hz        | Internal error                                                                                                        |
|     | Green, flashing, 1 Hz       | OSSD on, weak signal                                                                                                  |
|     | Green, continuous light     | OSSD on                                                                                                               |
| 2   | Off                         | RES deactivated or RES activated and enabled or RES blocked and protective field interrupted                          |
|     | Yellow, continuous light    | RES activated and blocked but ready to be unlocked - protective field free and linked sensor is enabled if applicable |
|     | Yellow, flashing            | Upstream safety circuit opened                                                                                        |
|     | Yellow, flashing (1x or 2x) | Changeover of the upstream safety circuit                                                                             |
| 3   | Off                         | No special function (blanking, muting, etc.) active                                                                   |
|     | Blue, continuous light      | Protective field parameter (blanking) correctly taught                                                                |
|     | Blue, flashing, 1 Hz        | Muting active                                                                                                         |
|     | Blue, short flashing        | Teaching of protective field parameters or muting restart required or muting override active                          |
|     | Blue, flashing, 10 Hz       | Error during teaching of protective field parameters                                                                  |

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## Suitable transmitters

|                                                                                   | Part no. | Designation    | Article                          | Description                                                                                                                        |
|-----------------------------------------------------------------------------------|----------|----------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|  | 68000916 | MLC500T90-1650 | Safety light curtain transmitter | Resolution: 90 mm<br>Protective field height: 1,650 mm<br>Operating range: 0 ... 20 m<br>Connection: Connector, M12, Metal, 5 -pin |

## Part number code

Part designation: **MLCxyy-za-hhhhei-ooo**

| MLC | Safety light curtain                                                                                                                                                                                                                                                                         |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| x   | <b>Series:</b><br>3: MLC 300<br>5: MLC 500                                                                                                                                                                                                                                                   |
| yy  | <b>Function classes:</b><br>00: Transmitter<br>01: transmitter (AIDA)<br>02: Transmitter with test input<br>10: Basic receiver - automatic restart<br>11: basic receiver - automatic restart (AIDA)<br>20: Standard receiver - EDM/RES selectable<br>30: Extended receiver - blanking/muting |
| z   | <b>Device type:</b><br>T: transmitter<br>R: receiver                                                                                                                                                                                                                                         |
| a   | <b>Resolution:</b><br>14: 14 mm<br>20: 20 mm<br>30: 30 mm<br>40: 40 mm<br>90: 90 mm                                                                                                                                                                                                          |
| hhh | <b>Protective field height:</b><br>150 ... 3000: from 150 mm to 3000 mm                                                                                                                                                                                                                      |
| e   | <b>Host/Guest (optional):</b><br>H: Host<br>MG: Middle Guest<br>G: Guest                                                                                                                                                                                                                     |
| i   | <b>Interface (optional):</b><br>/A: AS-i                                                                                                                                                                                                                                                     |
| ooo | <b>Option:</b><br>/V: high Vibration-proof<br>EX2: explosion protection (zones 2 + 22)<br>SPG: Smart Process Gating                                                                                                                                                                          |

### Note

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

## Notes

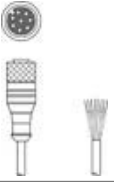
### Observe intended use!

- The product may only be put into operation by competent persons.
- Only use the product in accordance with its intended use.

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## 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>Connection 2: Open end<br>Shielded: Yes<br>Cable length: 5,000 mm<br>Sheathing material: PUR |

### Mounting technology - Swivel mounts

|                                                                                   | Part no. | Designation | Article              | Description                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------|----------|-------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 429393   | BT-2HF      | Mounting bracket set | Contains: 2x BT-HF swivel mount, 1 cylinder for mounting on the light curtain<br>Fastening, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable<br>Type of mounting device: Turning, 360°<br>Material: Metal, Plastic |

## Services

|                                                                                     | Part no. | Designation | Article                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|----------|-------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | S981050  | CS40-I-140  | Safety inspection "Safety light barriers" | 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.<br>Restrictions: Travel costs and accommodation expenses charged separately and according to expenditure. |
|  | 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.<br>Restrictions: Max. 2 h., no mechanical (mounting) and electrical (wiring) work performed, no changes (attachments, wiring, programming) to third-party components in the nearby environment.                                                   |