



Figure can vary

**Part no.: 68001904**  
**MLC510R90-450**  
**Safety light curtain receiver**



## Contents

- Technical data
- Suitable transmitters
- Dimensioned drawings
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Part no.: 68001904 – MLC510R90-450 – Safety light curtain receiver

## Technical data

### Basic data

|             |                                         |
|-------------|-----------------------------------------|
| Series      | MLC 500                                 |
| Device type | Receiver                                |
| Contains    | 2x BT-NC sliding block                  |
| Application | Danger zone guarding<br>Access guarding |

### Functions

|                  |                                                            |
|------------------|------------------------------------------------------------|
| Function package | Basic                                                      |
| Functions        | Automatic start/restart<br>Transmission channel changeover |

### Characteristic parameters

|                             |                          |
|-----------------------------|--------------------------|
| 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          |

### Protective field data

|                         |        |
|-------------------------|--------|
| Resolution              | 90 mm  |
| Protective field height | 450 mm |

### Optical data

|                 |                                          |
|-----------------|------------------------------------------|
| Synchronization | Optical between transmitter and receiver |
|-----------------|------------------------------------------|

### Electrical data

|                    |                                                   |
|--------------------|---------------------------------------------------|
| Protective circuit | Overvoltage protection<br>Short circuit protected |
|--------------------|---------------------------------------------------|

### Performance data

|                           |                        |
|---------------------------|------------------------|
| Supply voltage            | 24 V, DC, -20 ... 20 % |
| Current consumption, max. | 150 mA                 |
| Fuse                      | 2 A semi time-lag      |

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### 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 2 |
| Switching element | Transistor, PNP     |

#### Safety-related switching output 2

|                   |                     |
|-------------------|---------------------|
| Assignment        | Connection 1, pin 4 |
| Switching element | Transistor, PNP     |

### Timing

|                    |        |
|--------------------|--------|
| Response time      | 3 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        | 5 -pin            |

#### Cable properties

|                                            |                      |
|--------------------------------------------|----------------------|
| Permissible conductor cross section, typ.  | 0.25 mm <sup>2</sup> |
| 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 516 mm x 35.4 mm                                                         |
| Housing material      | Metal, Aluminum                                                                  |
| Lens cover material   | Plastic / PMMA                                                                   |
| Material of end caps  | Diecast zinc                                                                     |
| Net weight            | 600 g                                                                            |
| Housing color         | Yellow, RAL 1021                                                                 |
| Type of fastening     | Mounting bracket<br>Groove mounting<br>Mounting on Device Column<br>Swivel mount |

### Operation and display

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|                 |            |
|-----------------|------------|
| Type of display | LED        |
| Number of LEDs  | 2 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 TÜV NRTL US<br>TÜV Süd<br>S Mark<br>c CSA US |
| Vibration resistance | 50 m/s <sup>2</sup>                            |
| Shock resistance     | 100 m/s <sup>2</sup>                           |
| US patents           | US 6,418,546 B                                 |

### Classification

|            |          |
|------------|----------|
| eCl@ss 8.0 | 27272704 |
| eCl@ss 9.0 | 27272704 |
| ETIM 5.0   | EC002549 |

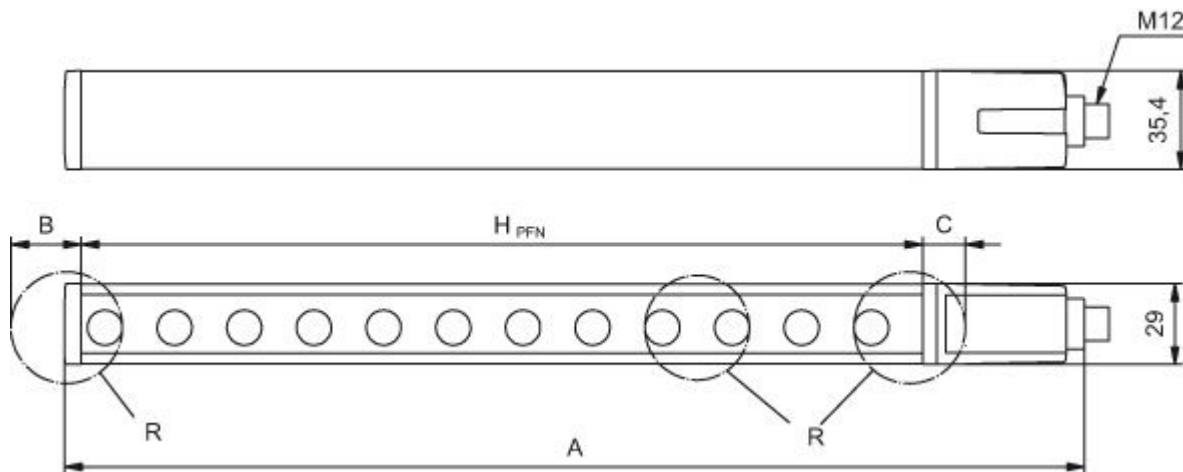
## Suitable transmitters

|                                                                                     | Part no. | Designation   | Article                          | Description                                                                                                                      |
|-------------------------------------------------------------------------------------|----------|---------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|  | 68000904 | MLC500T90-450 | Safety light curtain transmitter | Resolution: 90 mm<br>Protective field height: 450 mm<br>Operating range: 0 ... 20 m<br>Connection: Connector, M12, Metal, 5 -pin |
|  | 68008904 | MLC502T90-450 | Safety light curtain transmitter | Resolution: 90 mm<br>Protective field height: 450 mm<br>Operating range: 0 ... 20 m<br>Connection: Connector, M12, Metal, 5 -pin |

## Dimensioned drawings

All dimensions in millimeters

Calculation of the effective protective field height  $H_{PFE} = H_{PFN} + B + C$

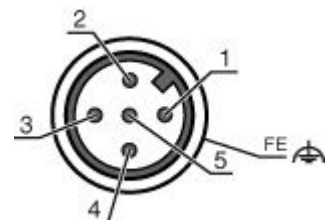


|           |                                                                                                                                               |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| $H_{PFE}$ | Effective protective field height = 540 mm                                                                                                    |
| $H_{PFN}$ | Nominal protective field height = 450 mm                                                                                                      |
| A         | Total height = 516 mm                                                                                                                         |
| B         | 50 mm                                                                                                                                         |
| C         | 40 mm                                                                                                                                         |
| R         | Effective protective field height $H_{PFE}$ goes beyond the dimensions of the optics area to the outer borders of the circles labeled with R. |

## Electrical connection

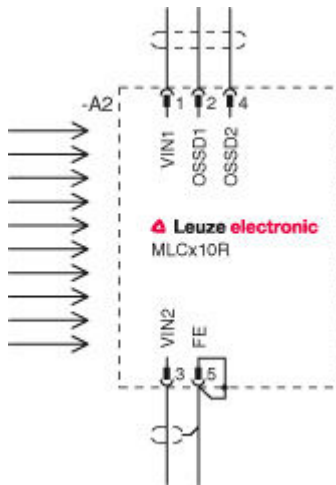
| Connection 1       |                   |
|--------------------|-------------------|
| Type of connection | Connector         |
| Function           | Machine interface |
| Thread size        | M12               |
| Type               | Male              |
| Material           | Metal             |
| No. of pins        | 5 -pin            |
| Encoding           | A-coded           |
| Connector housing  | FE/SHIELD         |

| Pin | Pin assignment | Conductor color |
|-----|----------------|-----------------|
| 1   | VIN1           | Brown           |
| 2   | OSSD1          | White           |
| 3   | VIN2           | Blue            |
| 4   | OSSD2          | Black           |
| 5   | FE/SHIELD      | Gray            |



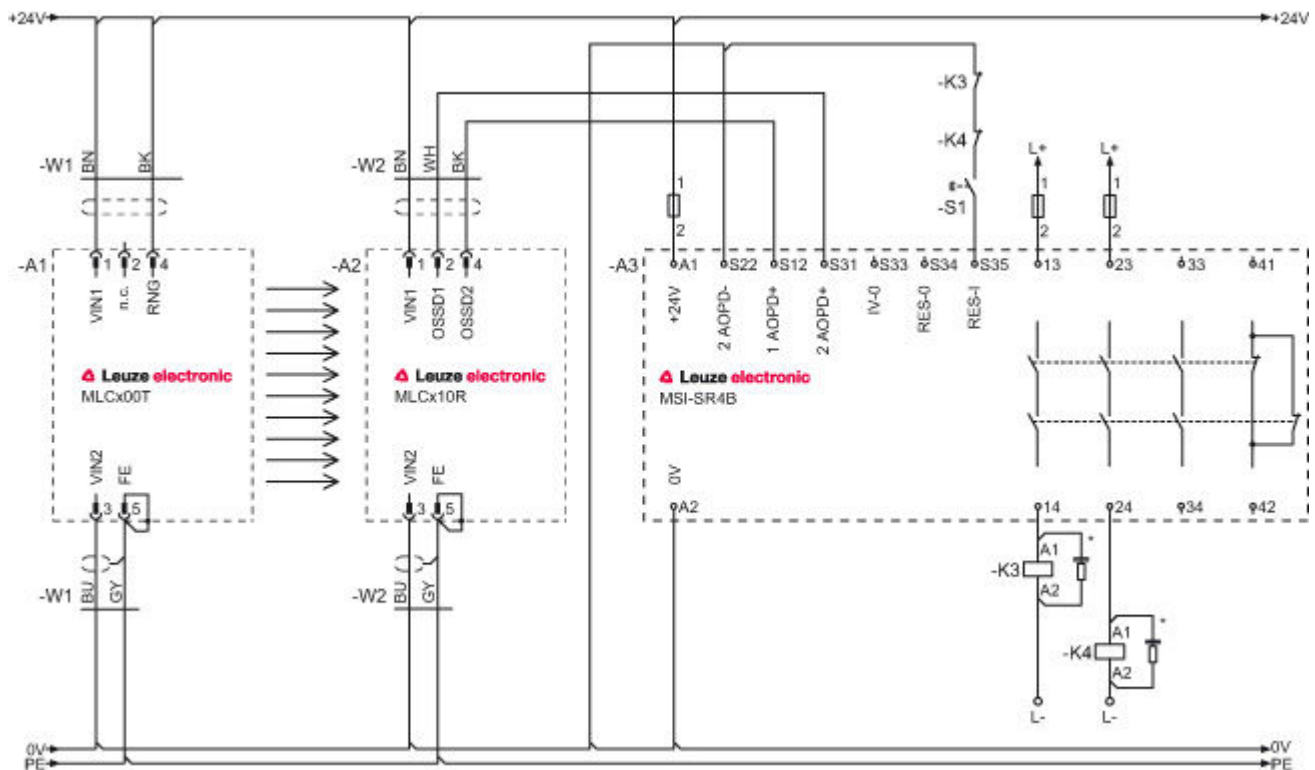
## Circuit diagrams

### Connection diagram receiver



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

### Circuit diagram example with downstream MSI-SR4B safety relay



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## 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                     | Transmission channel C1           |
|     | Red, continuous light   | OSSD off, transmission channel C2 |

## Part number code

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

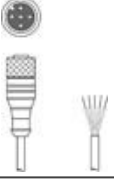
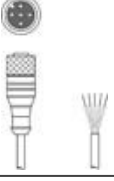
| MLC  | Safety light curtain                                                                                                                                                                                                                                                                         |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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                                                                                                                                                                                                          |
| hhhh | <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).

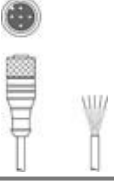
## Accessories

### Connection technology - Connection cables

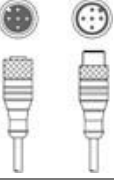
|                                                                                     | Part no. | Designation        | Article          | Description                                                                                                                                                   |
|-------------------------------------------------------------------------------------|----------|--------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | 429088   | CB-M12-15000-5GF   | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 15,000 mm<br>Sheathing material: PUR  |
|    | 678057   | CB-M12-15000E-5GF  | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: Yes<br>Cable length: 15,000 mm<br>Sheathing material: PUR |
|    | 429089   | CB-M12-25000-5GF   | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 25,000 mm<br>Sheathing material: PUR  |
|   | 678058   | CB-M12-25000E-5GF  | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: Yes<br>Cable length: 25,000 mm<br>Sheathing material: PUR |
|  | 429281   | CB-M12-50000-5GF   | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 50,000 mm<br>Sheathing material: PUR  |
|  | 50133860 | KD S-M12-5A-P1-050 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: Yes<br>Cable length: 5,000 mm<br>Sheathing material: PUR  |
|  | 50133861 | KD S-M12-5A-P1-100 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: Yes<br>Cable length: 10,000 mm<br>Sheathing material: PUR |
|  | 50137013 | KD S-M12-5A-P1-500 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: Yes<br>Cable length: 10,000 mm<br>Sheathing material: PVC |
|  | 50133841 | KD U-M12-5A-P1-050 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 5,000 mm<br>Sheathing material: PUR   |



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|                                                                                   | Part no. | Designation        | Article          | Description                                                                                                                                                  |
|-----------------------------------------------------------------------------------|----------|--------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 50132534 | KD U-M12-5A-P1-100 | Connection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Open end<br>Shielded: No<br>Cable length: 10,000 mm<br>Sheathing material: PUR |

## Connection technology - Interconnection cables

|                                                                                   | Part no. | Designation        | Article               | Description                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------|----------|--------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 548361   | CB-M12-1000-5GF/GM | Interconnection cable | Connection 1: Connector, M12, Axial, Female, A-coded, 5 -pin<br>Connection 2: Connector, M12, Axial, Male, A-coded, 5 -pin<br>Shielded: No<br>Cable length: 1,000 mm<br>Sheathing material: PUR |

## Connection technology - Connectors

|                                                                                     | Part no. | Designation | Article   | Description                                                |
|-------------------------------------------------------------------------------------|----------|-------------|-----------|------------------------------------------------------------|
|  | 429175   | CB-M12-5GF  | Connector | Connection: Connector, M12, Axial, Female, A-coded, 5 -pin |

## Mounting technology - Mounting brackets

|                                                                                     | Part no. | Designation | Article              | Description                                                                                                                                                   |
|-------------------------------------------------------------------------------------|----------|-------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 429056   | BT-2L       | Mounting bracket set | Design of mounting device: Angle, L-shape<br>Mounting bracket, at system: Through-hole mounting<br>Mounting bracket, at device: Screw type<br>Material: Metal |
|  | 429057   | BT-2Z       | Mounting bracket set | Design of mounting device: Angle, Z-shape<br>Mounting bracket, at system: Through-hole mounting<br>Mounting bracket, at device: Screw type<br>Material: Metal |

## 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>Mounting bracket, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable<br>Type of mounting device: Turning, 360°<br>Material: Metal, Plastic |

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|                                                                                   | Part no. | Designation | Article              | Description                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------|----------|-------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 429394   | BT-2HF-S    | Mounting bracket set | Contains: 2x BT-HF swivel mount, 1 cylinder for mounting on the light curtain<br>Mounting bracket, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable<br>Type of mounting device: Turning, 360°<br>Material: Metal, Plastic<br>Shock absorber: Yes |

## Mounting technology - Other

|                                                                                     | Part no. | Designation | Article              | Description                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------|----------|-------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | 425740   | BT-10NC60   | Sliding block set    | Contains: 10x BT-NC sliding block<br>Bore hole 1: Ø 4.7 mm<br>Bore hole 2: M6<br>Design of mounting device: Sliding block<br>Mounting bracket, at system: Mounting thread<br>Mounting bracket, at device: Groove mounting<br>Material: Metal                                   |
|    | 425741   | BT-10NC64   | Sliding block set    | Contains: 10x BT-NC-M4-M6 sliding block<br>Bore hole 1: M4<br>Bore hole 2: M6<br>Design of mounting device: Sliding block<br>Mounting bracket, at system: Mounting thread<br>Mounting bracket, at device: Groove mounting<br>Material: Metal                                   |
|   | 425742   | BT-10NC65   | Sliding block set    | Contains: 10x BT-NC-M5-M6 sliding block<br>Bore hole 1: M5<br>Bore hole 2: M6<br>Design of mounting device: Sliding block<br>Mounting bracket, at system: Mounting thread<br>Mounting bracket, at device: Groove mounting<br>Material: Metal                                   |
|  | 424417   | BT-2P40     | Mounting bracket set | Contains: 2x BT-P40 clamp bracket<br>Design of mounting device: Mounting clamp<br>Mounting bracket, at system: Groove mounting<br>Mounting bracket, at device: Groove mounting<br>Type of mounting device: Clampable<br>Material: Metal                                        |
|  | 424422   | BT-2SB10    | Mounting bracket set | Contains: 2x BT-SB10<br>Design of mounting device: Mounting clamp<br>Mounting bracket, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable, an der seitlichen C-Nut<br>Type of mounting device: Swiveling<br>Swivel range: -8 ... 8°<br>Material: Metal |
|  | 424423   | BT-2SB10-S  | Mounting bracket set | Contains: 2x BT-SB10-S<br>Design of mounting device: Mounting clamp<br>Mounting bracket, at system: Through-hole mounting<br>Mounting bracket, at device: Clampable, an der seitlichen C-Nut<br>Swivel range: -8 ... 8°<br>Material: Metal<br>Shock absorber: Yes              |

## Alignment aids

|                                                                                     | Part no. | Designation | Article       | Description               |
|-------------------------------------------------------------------------------------|----------|-------------|---------------|---------------------------|
|  | 427300   | AC-ALM      | Alignment aid | Housing material: Plastic |
|  | 520101   | AC-ALM-M    | Alignment aid | Housing material: Plastic |

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|                                                                                   | Part no. | Designation | Article       | Description                                         |
|-----------------------------------------------------------------------------------|----------|-------------|---------------|-----------------------------------------------------|
|  | 560020   | LA-78U      | Alignment aid | Light source: laser, Red<br>Housing material: Metal |
|  | 520004   | LA-78UDC    | Alignment aid | Light source: laser, Red<br>Housing material: Metal |

## Protective screens

|                                                                                    | Part no. | Designation | Article              | Description                                                     |
|------------------------------------------------------------------------------------|----------|-------------|----------------------|-----------------------------------------------------------------|
|   | 429038   | MLC-2PSF    | Mounting bracket set | Type of fastening: Clampable<br>Mounting device material: Metal |
|  | 347073   | MLC-PS450   | Protective screen    | Protective field height: 450 mm<br>Material: PMMA, clear        |

## Deflecting mirror

|                                                                                     | Part no. | Designation | Article           | Description                                                                                         |
|-------------------------------------------------------------------------------------|----------|-------------|-------------------|-----------------------------------------------------------------------------------------------------|
|  | 529604   | UM60-450    | Deflecting mirror | Dimensions: 25 mm x 520 mm x 68 mm<br>Protected field height up to: 450 mm<br>Mirror length: 510 mm |

## Device columns

|                                                                                     | Part no. | Designation | Article       | Description                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|----------|-------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 549856   | UDC-1000-S2 | Device column | Dimensions: 160 mm x 1,060 mm x 149 mm<br>Column height without foot: 1,000 mm<br>Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions |
|  | 549852   | UDC-1300-S2 | Device column | Dimensions: 160 mm x 1,360 mm x 149 mm<br>Column height without foot: 1,300 mm<br>Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions |

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|                                                                                     | Part no. | Designation | Article       | Description                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|----------|-------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | 549853   | UDC-1600-S2 | Device column | Dimensions: 160 mm x 1,660 mm x 149 mm<br>Column height without foot: 1,600 mm<br>Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions |
|    | 549854   | UDC-1900-S2 | Device column | Dimensions: 160 mm x 1,960 mm x 149 mm<br>Column height without foot: 1,900 mm<br>Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions |
|    | 549867   | UDC-2100-S2 | Device column | Dimensions: 160 mm x 2,160 mm x 149 mm<br>Column height without foot: 2,100 mm<br>Functions: Adjustable, 3 directions, Mounting and protection of light curtains and multiple light beam devices |
|    | 549857   | UDC-2500-S2 | Device column | Dimensions: 160 mm x 2,560 mm x 149 mm<br>Column height without foot: 2,500 mm<br>Functions: Adjustable, 3 directions, Mounting and protection of light curtains and multiple light beam devices |
|   | 549865   | UDC-3100-S2 | Device column | Dimensions: 160 mm x 3,160 mm x 149 mm<br>Column height without foot: 3,100 mm<br>Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions |
|  | 549855   | UDC-900-S2  | Device column | Dimensions: 160 mm x 960 mm x 149 mm<br>Column height without foot: 900 mm<br>Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions     |

## 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.