



## MLDSET-M21, -M31, -M32, -M33

Protective sensor sets



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Leuze electronic GmbH + Co. KG

In der Braike 1

D-73277 Owen / Germany

Phone: +49 7021 573-0

Fax: +49 7021 573-199

<http://www.leuze.com>

[info@leuze.de](mailto:info@leuze.de)

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# 1 About this document

## 1.1 Other applicable documents

The information on the MLDSET protective sensor sets is divided into two documents.

- ↪ For the safe implementation, testing and operation, you must open document “MLD 500, MLD 300, Safe implementation and operation” on the included CD-ROM or download it from <http://www.leuze.com/mld/> or request it from [service.protect@leuze.de](mailto:service.protect@leuze.de) or call +49 7021 573-123.

Table 1.1: Other applicable documents

Purpose and target group	Title	Source
Detailed information for all users on the MLD safety sensor	MLD 500, MLD 300, Safe implementation and operation	Included CD-ROM or download from Internet: <a href="http://www.leuze.com/mld/">http://www.leuze.com/mld/</a>
Basic information for technicians	MLDSET-M21, -M31, -M32, -M33, mounting instructions (this document)	Included CD-ROM or download from Internet: <a href="http://www.leuze.com/mld/">http://www.leuze.com/mld/</a>

## 1.2 Used symbols and signal words

Table 1.2: Warning symbols and signal words




	Symbol indicating dangers to persons
<b>NOTE</b>	Signal word for property damage Indicates dangers that may result in property damage if the measures for danger avoidance are not followed.
<b>CAUTION</b>	Signal word for minor injuries Indicates dangers that may result in minor injury if the measures for danger avoidance are not followed.
<b>WARNING</b>	Signal word for serious injury Indicates dangers that may result in severe or fatal injury if the measures for danger avoidance are not followed.
<b>DANGER</b>	Signal word for life-threatening danger Indicates dangers with which serious or fatal injury is imminent if the measures for danger avoidance are not followed.

Table 1.3: Other symbols

	Symbol for tips Text passages with this symbol provide you with further information.
	Symbol for action steps Text passages with this symbol instruct you to perform actions.

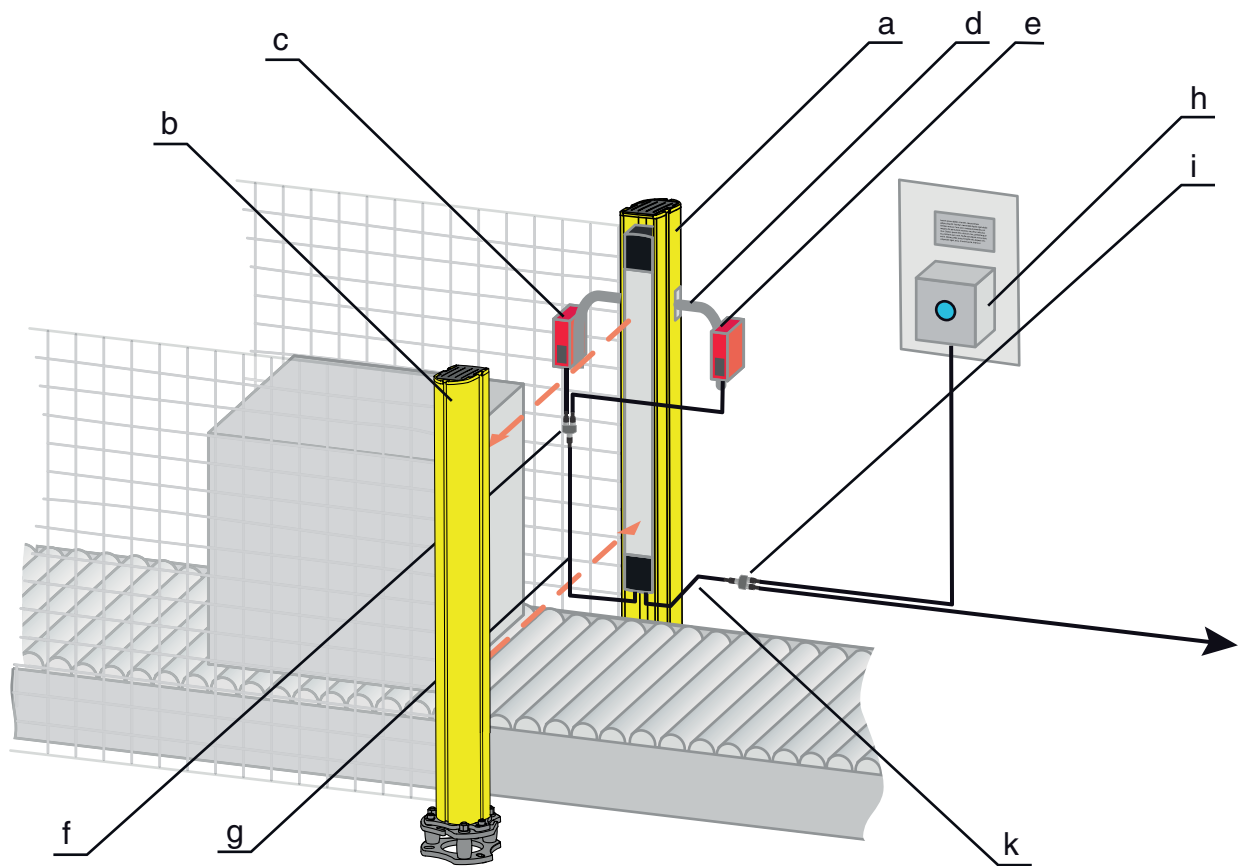
## **2 Safety**

Please observe the translation of the original operating instructions “MLD 300, MLD 500 multiple light beam safety devices, safe implementation and operation”, see chapter 1.1 “Other applicable documents”.

### 3 Device description

#### 3.1 MLDSET-M21 (2-beam)

With muting function and 2 diffuse reflection sensors as muting sensors for use in system separation

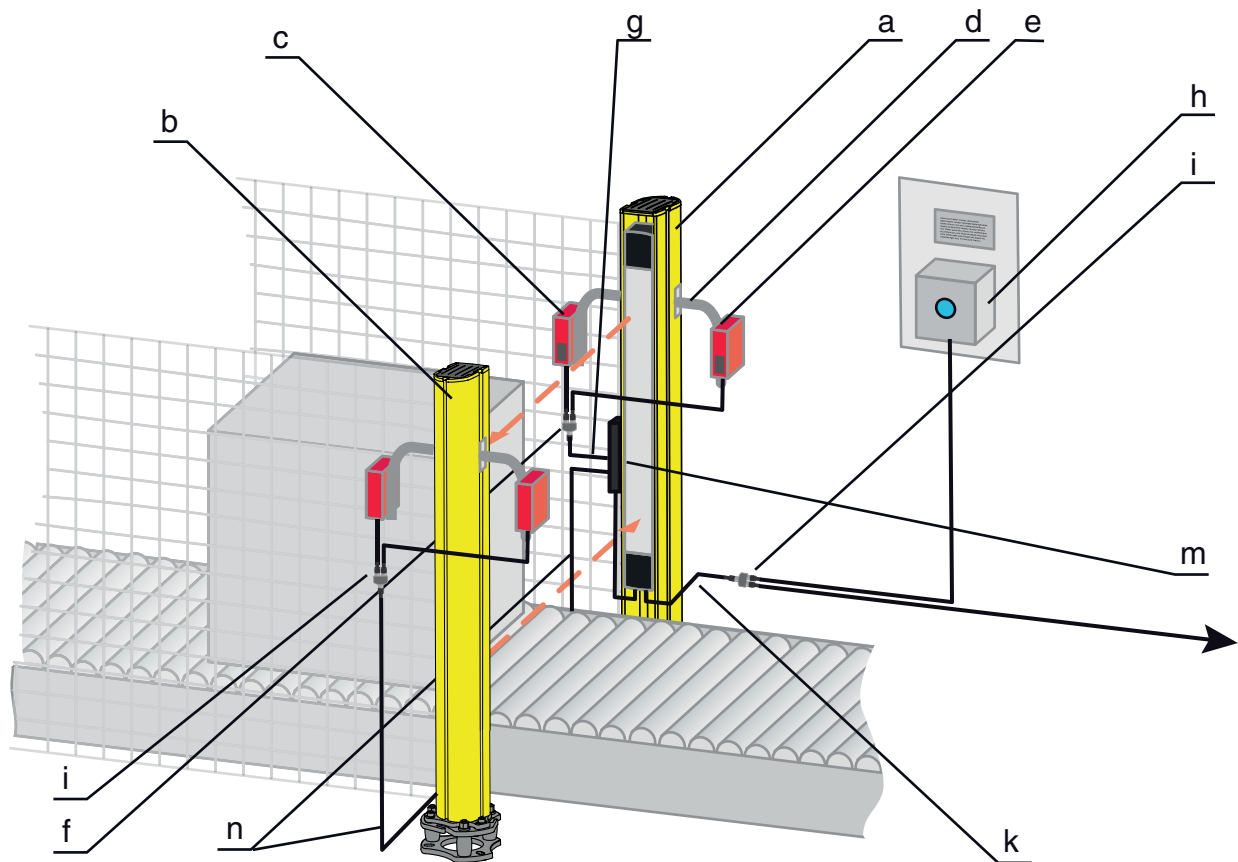


- a MLD 530-RT2M-UDC-1300-S2
- b MLD-M002-UDC-1300-S2
- c IHRT 46B/4,200-S12
- d MMS-A-2N55
- e BTU 300M.5-D12
- f CB-M12-ACY3/1
- g CB-M12-2000-5GF/GM
- h AC-ABF 70.BB
- i CB-M12-ACY8/1
- k K-DS M12A-M12A-8P-0.3m-S-PUR

Figure 3.1: MLDSET-M21

3.2 MLDSET-M21.4 (2-beam), MLDSET-M21 (2-beam) with the MLDSET-ACC21-31.2 extension set

With muting function and 4 diffuse reflection sensors as muting sensors for use in system separation.

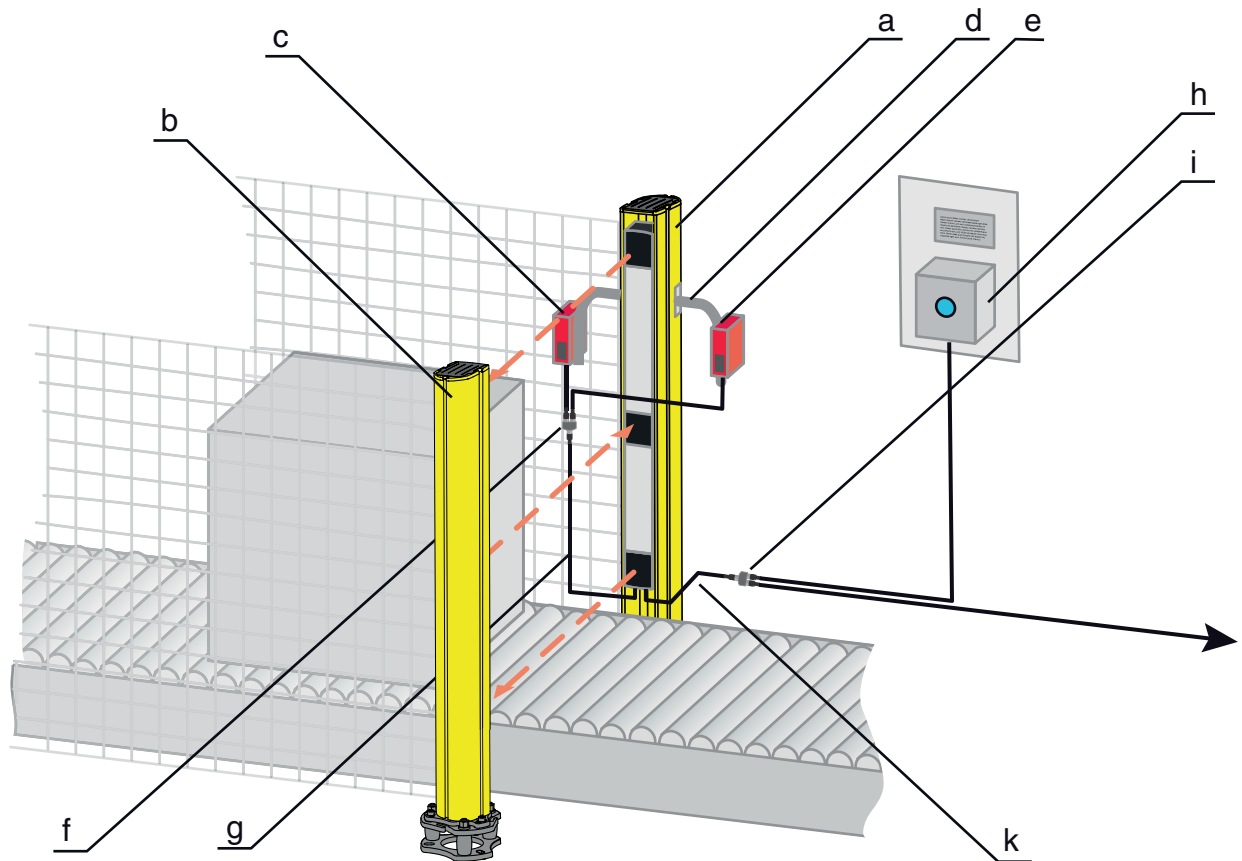


- a MLD 530-RT2M-UDC-1300-S2
- b MLD-M002-UDC-1300-S2
- c IHRT 46B/4,200-S12
- d MMS-A-2N55
- e BTU 300M.5-D12
- f CB-M12-ACY3/1
- g CB-M12-2000-5GF/GM
- h AC-ABF 70.BB
- i CB-M12-ACY8/1
- k K-DS M12A-M12A-8P-0.3m-S-PUR
- m AC-SCM5U-BT
- n CB-M12-1500-3GF/GM

Figure 3.2: MLDSET M21.4, MLDSET-M21 with MLDSET-ACC21-31.2

### 3.3 MLDSET-M31 (3-beam)

With muting function and 2 diffuse reflection sensors as muting sensors for use in system separation.



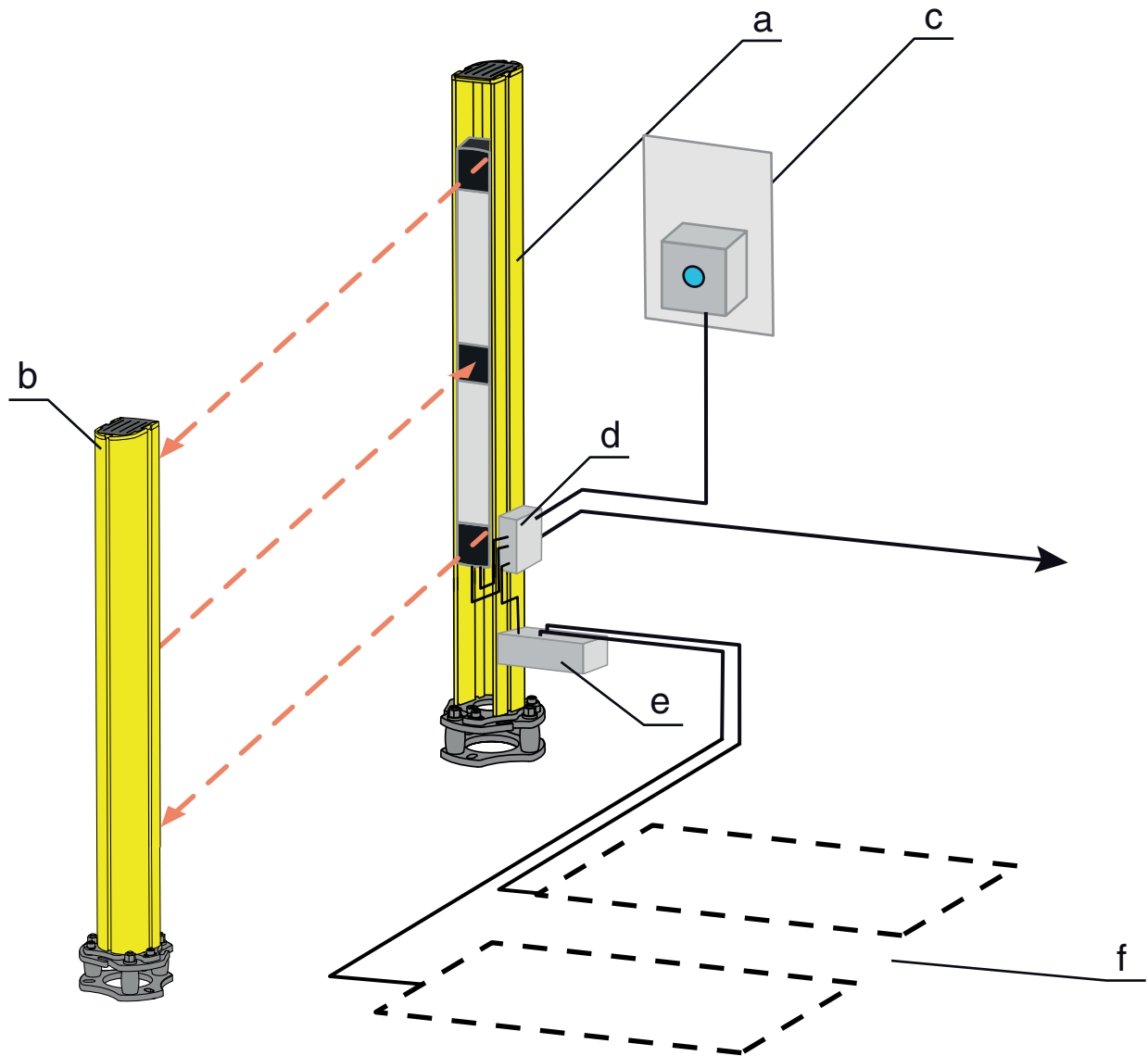
- a MLD 530-RT3M-UDC-1300-S2
- b MLD-M003-UDC-1300-S2
- c IHRT 46B/4,200-S12
- d MMS-A-2N55
- e BTU 300M.5-D12
- f CB-M12-ACY3/1
- g CB-M12-2000-5GF/GM
- h AC-ABF 70.BB
- i CB-M12-ACY8/1
- k K-DS M12A-M12A-8P-0.3m-S-PUR

Figure 3.3: MLDSET-M31



### 3.4 MLDSET-M32 (3-beam)

With muting function and 2 induction loops as muting sensors for use at transfer stations.

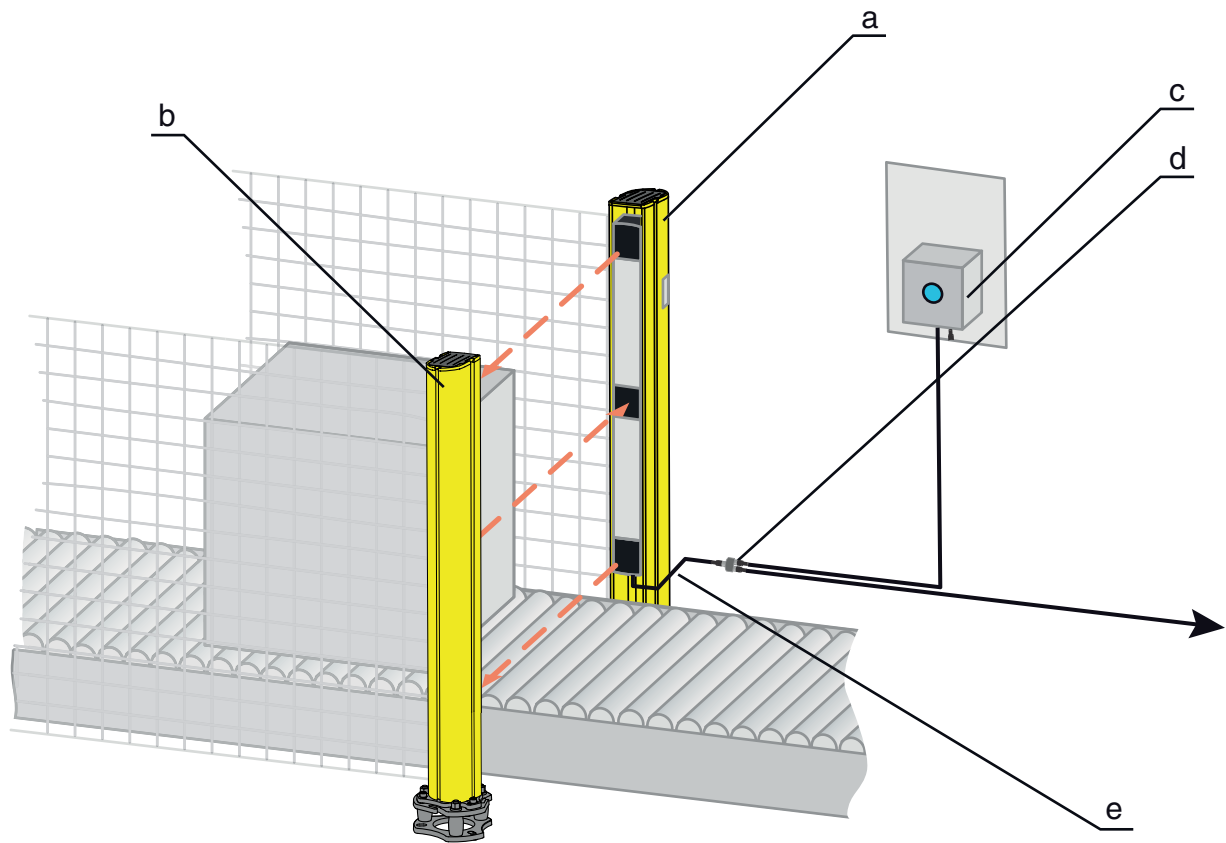


- a MLD 530-RT3M-UDC-1300-S2
- b MLD-M003-UDC-1300-S2
- c AC-ABF 70.BB
- d ACC-DP-BB.A1
- e ACC-BB-IND-A1
- f KAS\_1
- g CB-M12-ACP-4GM

Figure 3.4: MLDSET-M32

### 3.5 MLDSET-M33 (3-beam)

Without muting function, for use as access safeguarding.



- a MLD 530-RT3M-UDC-1300-S2
- b MLD-M003-UDC-1300-S2
- c AC-ABF 70.A.1
- d CB-M12-ACY8/1
- e K-DS M12A-M12A-8P-0.3m-S-PUR

Figure 3.5: MLDSET-M33

## 4 Mounting

### Necessary tools:

- Allen key set
- Hexagon wrench set
- Level
- Hammer drill with 10 mm concrete bit
- Hammer
- Cross-head screwdriver

### 1. Fasten the columns to the floor

- ↻ Use the base plate to determine the mounting midpoint of the column and make a mark on the floor.
- ↻ Set the drilling template on the center point, align it and mark the bore holes.
- ↻ Drill the fastening holes according to instructions and insert the floor anchors.
- ↻ Set the columns up and screw them on firmly.

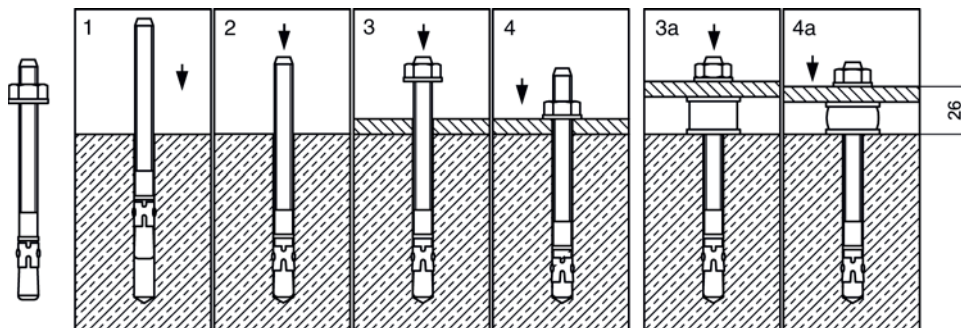
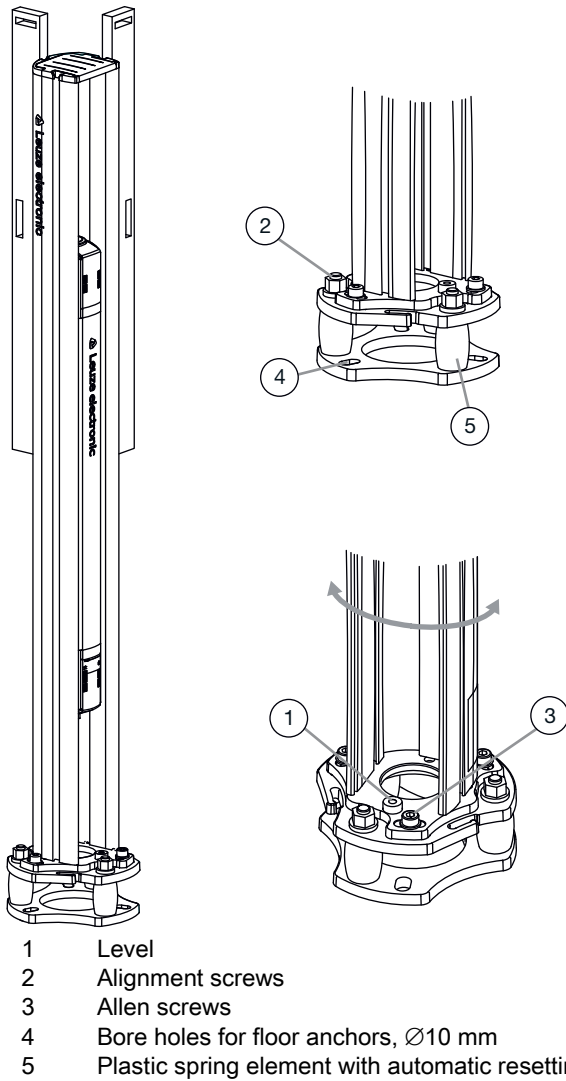


Figure 4.1: Mounting step: fasten columns to the floor

### 2. Align columns

- ↻ Roughly align the column using the level (1).
- ↻ Align the column to the alignment screws (2) in a vertical position using the level.
- ↻ Loosen the Allen screws (3) and align the column axially.



- 1 Level
- 2 Alignment screws
- 3 Allen screws
- 4 Bore holes for floor anchors,  $\varnothing 10$  mm
- 5 Plastic spring element with automatic resetting

Figure 4.2: Mounting step: align columns

### 3. Fasten and align muting sensors (MLDSET-M21 and MLDSET-M31 only)

- ↻ Guide two sliding blocks into each of the slots.
- ↻ Loosely screw the mounting devices into the sliding block at the intended height.
- ↻ Align the sensors in the desired position and secure them.

### 4. Establish the electrical connection

- ↻ Establish the electrical connections (see chapter 3 "Device description" and see chapter 5 "Electrical connection").

### 5. Align and start-up safety sensor

- ↻ Switch on the safety sensor.
- ↻ Adjust the height of the safety sensor and the Deflecting Mirror. After the Allen screws are loosened (1), the devices can be slid easily into the slot.
- ↻ Adjust the axial alignment of the safety sensor and the Deflecting Mirror. After the Allen screws (2) have been loosened, the entire column with the built-in device can be rotated slightly.

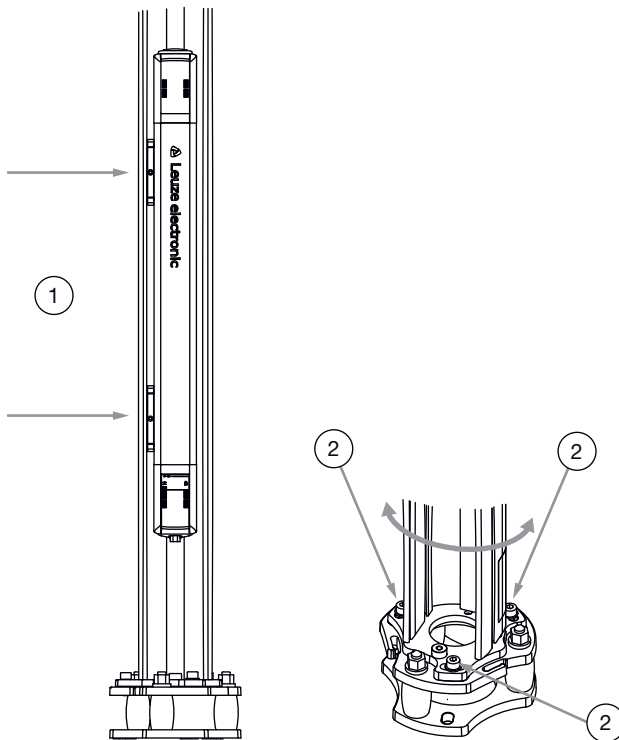


Figure 4.3: Mounting step: align safety sensor

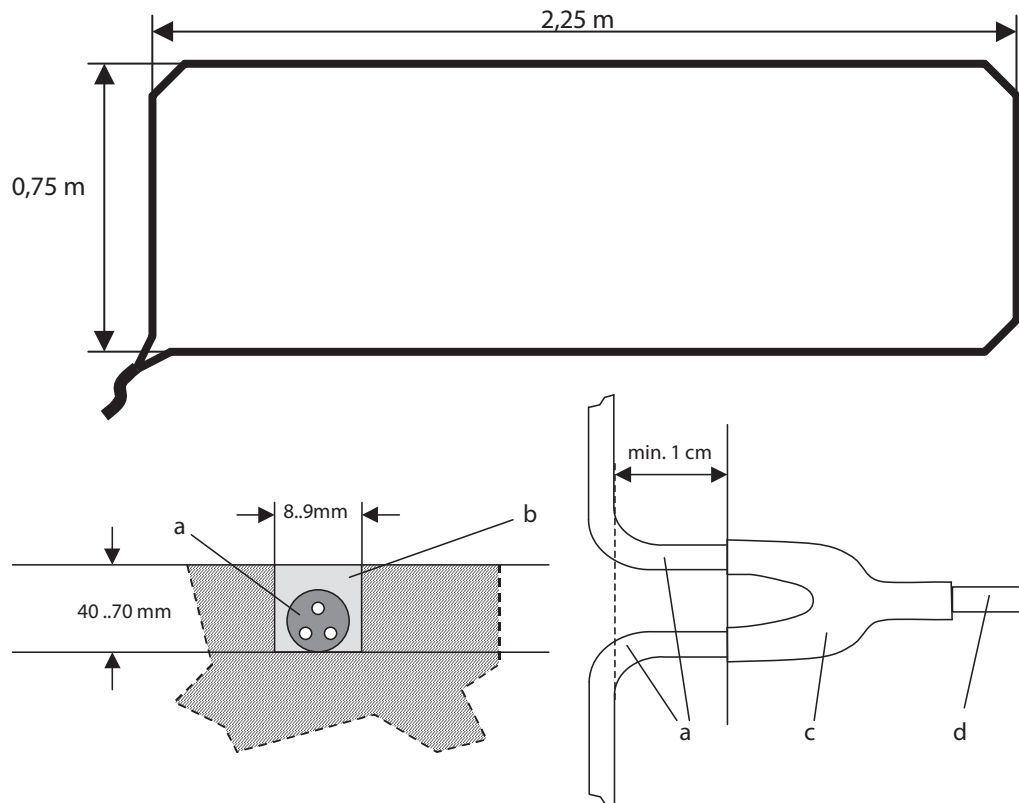
### 7. Checklist – complete prior to the initial start-up

- ↳ Start up the machine or system according to the original operating instructions of the safety sensor (see chapter 1.1 "Other applicable documents").

### 4.1 Laying induction loops with the MLDSET-M32

Cable the induction loops and observe the following hint:

The induction loops are usually laid in rectangular form with an aspect ratio of 1:3. The loop length of the KAS\_1 used is 6 m. This results in a rectangle with dimensions 0.75 m x 2.25 m and with corners cut off by 45° for laying the induction loop. In asphalt or concrete, this is performed in a cut slot with the following geometric dimensions: depth approx. 40 - 70 mm, width approx. 8 - 9 mm. The induction loops must be laid at a distance of >1 m from one another. Their supply lines must be laid in different slots with at least 10 cm distance so that they do not influence one another




- a Loop wire
- b Sealing material
- c Union
- d Loop feed

Figure 4.4: Induction loops laying

Seal the slot and observe the following:


- ☞ The loop cut must be dry and free of dust.
- ☞ The loop wire must lie entirely in the loop slot; it may need to be fixed with wooden wedges or silicone.
- ☞ Seal the loop slot cleanly.
- ☞ Only use enough sealing material to fill the loop slot.
- ☞ Allow the sealing material to harden well.

 <b>WARNING</b>
<p><b>Metal armor in the floor reduces the sensitivity of the induction loop. The smaller the distance of the loop to the metal armor, the lower the sensitivity will be. Rails, supports, floor grids or steel constructions are to be considered as metal armors. If possible in the planning phase, omit the metal armor or lay it deeper in the loops area.</b></p>

Shorten the loop feed to the required length and connect the induction loops to the supplied convertible HARAX plug. The connection of the loop feed occurs at pins 1 and 3, see figure 5.4.

Shorten the loop feed to the required length and connect the induction loops to the supplied convertible HARAX plug. The connection of the loop feed occurs at pins 1 and 3, see figure 0.4.

## 4.2 Mounting the acknowledgment unit

 <b>WARNING</b>
<p><b>The acknowledgment unit must be arranged so that the entire danger zone can be seen from the installation site.</b></p>

- ↳ Mount the control unit with the mounting plate on the hard guard.
- ↳ Use the mounting rails supplied for fixing.
- ↳ Set up the electrical connection, see chapter 5 "Electrical connection".

## 5 Electrical connection

Please observe the translation of the original operating instructions “MLD 300, MLD 500 multiple light beam safety devices, safe implementation and operation”, see chapter 1.1 "Other applicable documents".

**⚠ WARNING**

**Faulty electrical connection or improper function selection may result in serious injury!**

- Only allow competent persons to perform the electrical connection.
- For access guarding, activate the start/restart interlock and make certain that it cannot be unlocked from within the danger zone.
- Select the functions so that the safety sensor can be used as intended.
- Select the safety-relevant functions for the safety sensor.
- Always loop both safety-related switching outputs OSSD1 and OSSD2 into the work circuit of the machine.
- Signal outputs must not be used for switching safety-relevant signals.

### 5.1 Circuit diagram examples

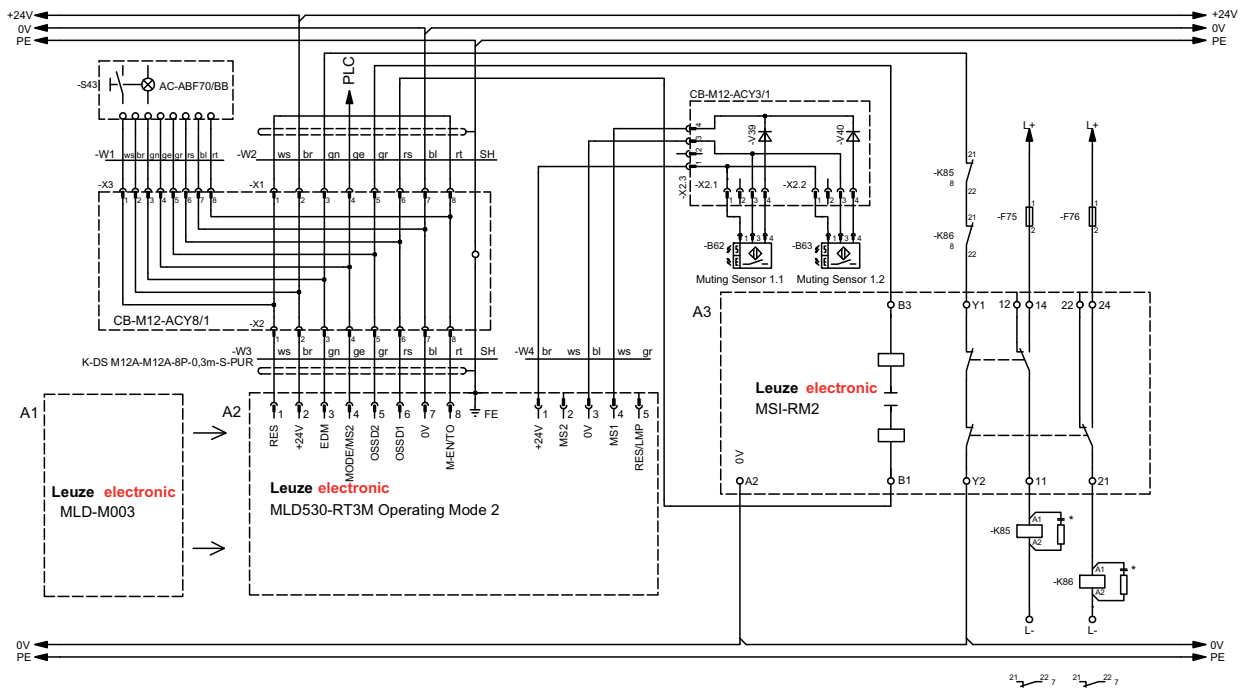


Figure 5.1: Circuit diagram example MLDSET-M21 or MLDSET-M31



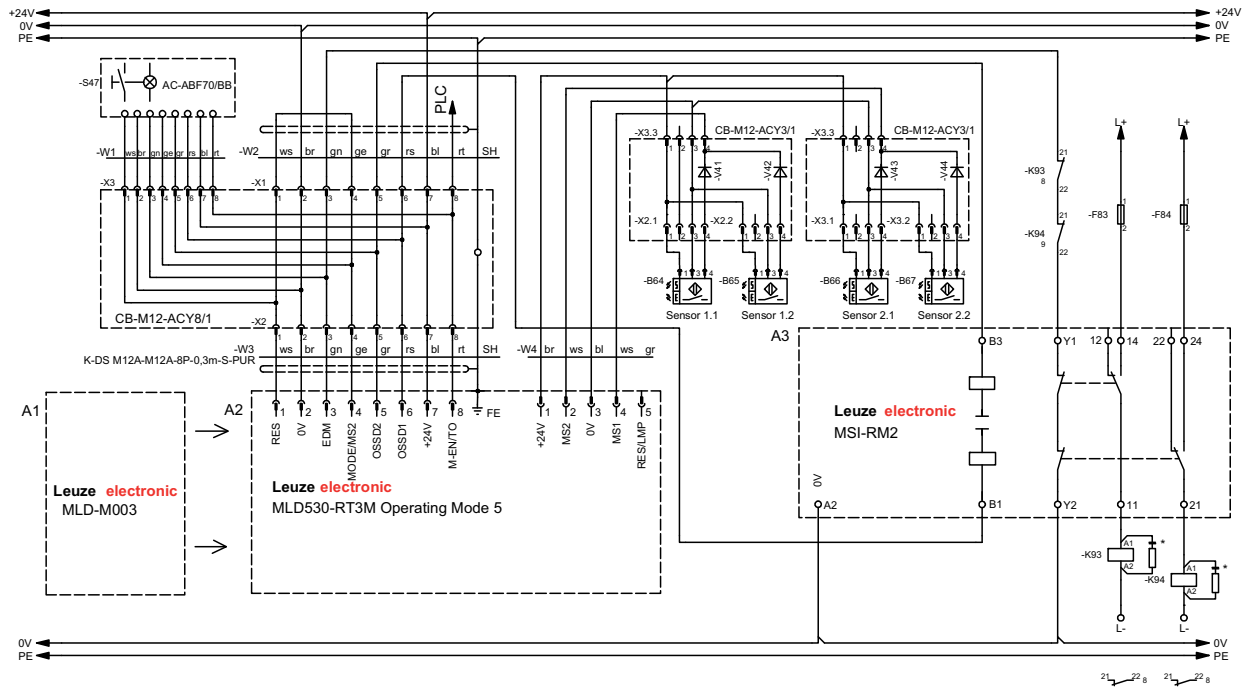
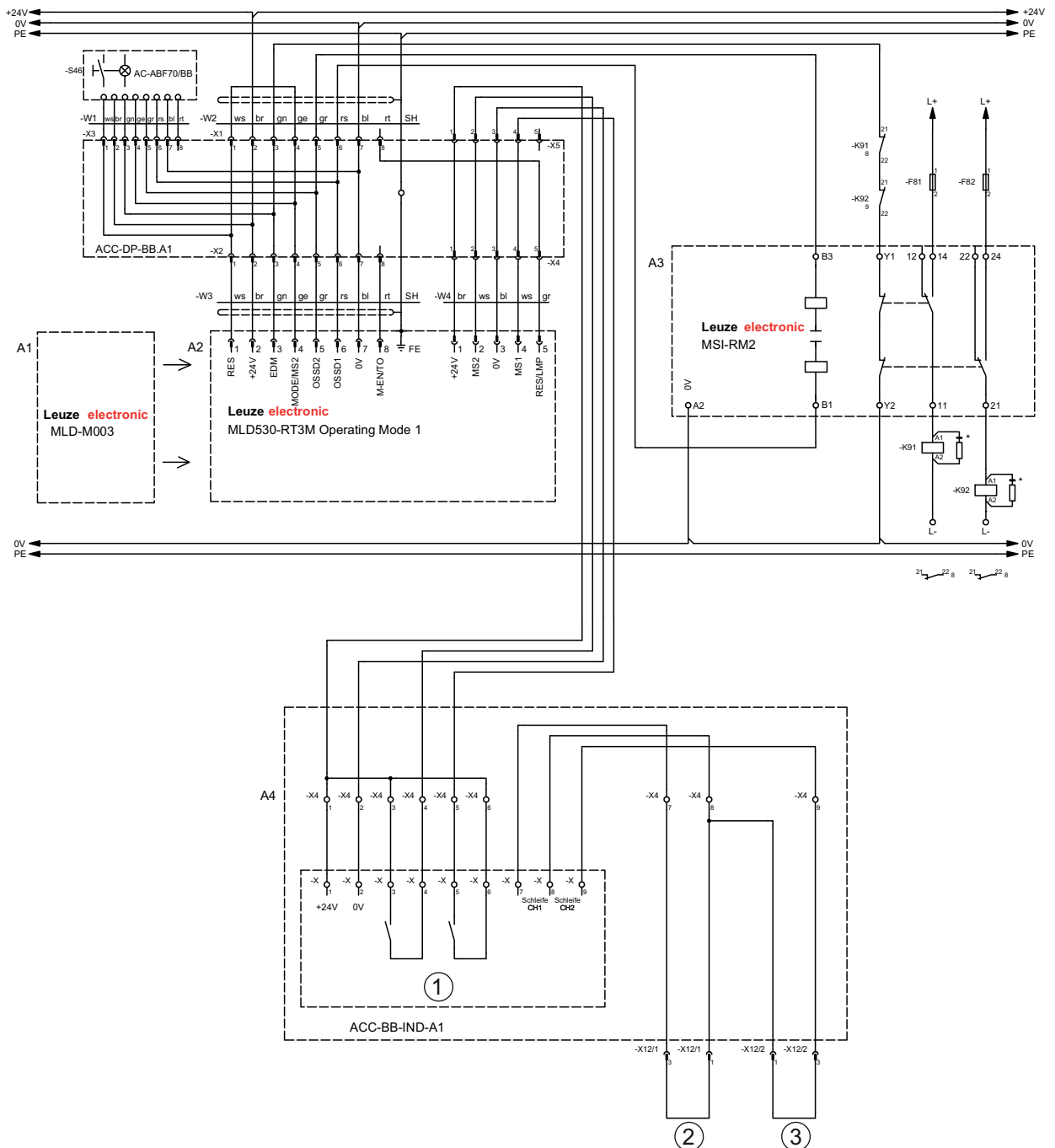


Figure 5.2: Circuit diagram example MLDSET-M21.4 or MLDSET-M21 or MLDSET-M31 with accessory set MLDSET-ACC21-31.2



- 1 Induction impulse transmitter IG325/2 WT
- 2 Induction loop 1
- 3 Induction loop 2

Figure 5.3: Circuit diagram example MLDSET-M32

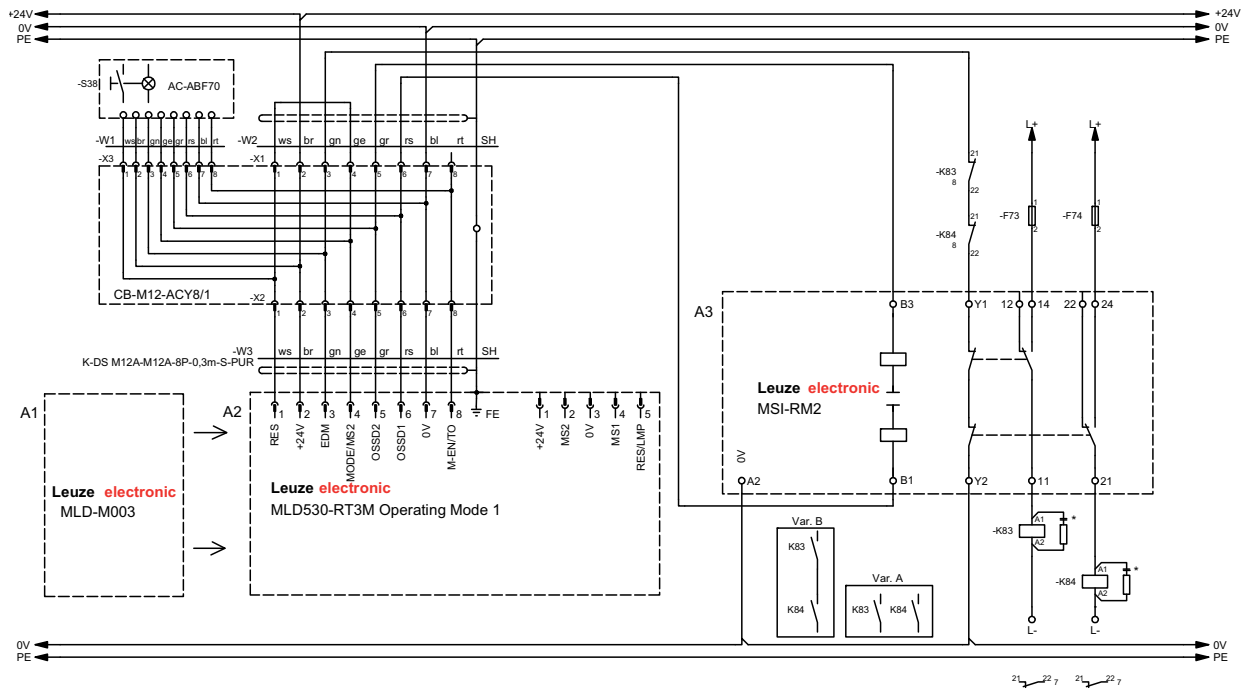


Figure 5.4: Circuit diagram example MLDSET-M33

## **6 Service and support**

24-hour on-call service at:  
+49 7021 573-0

Service hotline:  
+49 7021 573-123

E-mail:  
**service.protect@leuze.de**

Return address for repairs:  
Service center  
Leuze electronic GmbH + Co. KG  
In der Braike 1  
D-73277 Owen / Germany

## 7 Ordering information, scope of delivery and accessories

### 7.1 Order guide

Table 7.1: Part numbers MLDSET

Part no.	Article	Description
66900032	MLDSET-M21	Protective Sensor Set
66900036	MLDSET-M21.4	Protective Sensor Set
66900033	MLDSET-M31	Protective Sensor Set
66900034	MLDSET-M32	Protective Sensor Set
66900035	MLDSET-M33	Protective Sensor Set

### 7.2 Scope of delivery

Table 7.2: Scope of delivery MLDSET-M21

Qty.	Part no.	Article	Description
1	426548	MLD 530-RT2M-UDC-1300-S2	MLD transceiver, pre-mounted in UDC device column
Consisting of:			
1	66568100	MLD530-RT2M	MLD transceiver, 2-beam, Range 0.5 ... 8 m, Integrated status/muting indicator
1	549852	UDC-1300-S2	Device column, set for floor mounting included
Consisting of:			
1	905065	MLD-M002-UDC-1300-S2	MLD deflecting mirror, pre-mounted in UDC device column
Consisting of:			
1	66500100	MLD-M002	Deflecting mirror, 2-beam
1	549852	UDC-1300-S2	Device column, set for floor mounting included
Consisting of:			
1	426592	MLDSET-ACC21-31	Accessory set for MLDSET-M21 and MLDSET-M31
Consisting of:			
2	50106553	IHRT 46B/4,200-S12	Diffuse sensors with background suppression, 0.2 m cable with M12 plug
1	430305	MMS-A-2N55	Mounting bracket set for lateral mounting on UDC device column (for two diffuse sensors)
2	50120425	BTU 300M.5-D12	Stainless steel mounting device for sensors of the 46B series
1	548040	CB-M12-ACY3/1	Y-distribution box for two diffuse sensors

Qty.	Part no.	Article	Description
1	548362	CB-M12-2000-5GF/GM	Interconnection cable from Y-distribution box for diffuse sensors to MLD interface socket, length 2 m
1	426240	AC-ABF 70.BB	Acknowledgment unit with illuminated start button, on mounting plate with notice sign in 5 languages, cable length 5 m
1	50123947	CB-M12-ACY8/1	Y-distribution box for interconnection cable from MLD machine interface to acknowledgment unit
1	50124228	K-DS M12A-M12A-8P-0.3m-S-PUR	Interconnection cable from MLD interface socket to Y-distribution box, length 0.3 m

Table 7.3: Scope of delivery MLDSET-M21.4

Qty.	Part no.	Article	Description
1	426548	MLD 530-RT2M-UDC-1300-S2	MLD transceiver, pre-mounted in UDC device column
Consisting of:			
1	66568100	MLD530-RT2M	MLD transceiver, 2-beam, Range 0.5 ... 8 m, Integrated status/muting indicator
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	905065	MLD-M002-UDC-1300-S2	MLD deflecting mirror, pre-mounted in UDC device column
Consisting of:			
1	65500100	MLD-M002	Deflecting mirror, 2-beam
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	426547	MLDSET-ACC21-31.4	Accessory set for MLDSET-M21 and MLDSET-M31, 4x diffuse sensors
Consisting of:			
4	50106553	IHRT 46B/4,200-S12	Diffuse sensors with background suppression, 0.2 m cable with M12 plug
2	430305	MMS-A-2N55	Mounting bracket set for lateral mounting on UDC device column (for two diffuse sensors)
4	50120425	BTU 300M.5-D12	Stainless steel mounting device for sensors of the 46B series
2	548040	CB-M12-ACY3/1	Y-distribution box for two diffuse sensors
1	548362	CB-M12-2000-5GF/GM	Interconnection cable from Y-distribution box for diffuse sensors to sensor connection box AC-SCM5-BT, length 2 m

Qty.	Part no.	Article	Description
1	150682	CB-M12-5000-3GF/GM	Interconnection cable from Y-distribution box for diffuse sensors to sensor connection box AC-SCM5-BT, length 5 m
1	520151	AC-SCM5U-BT	Sensor connection box with connection cable on MLD interface socket, length 0.5 m
1	426299	AC-ABF70.INV.BB	Acknowledgment unit with illuminated start button, on mounting plate with notice sign in 5 languages, cable length 5 m
1	50123947	CB-M12-ACY8/1	Y-distribution box for interconnection cable from MLD machine interface to acknowledgment unit
1	50124228	K-DS M12A-M12A-8P-0.3m-S-PUR	Interconnection cable from MLD interface socket to Y-distribution box, length 0.3 m

Table 7.4: Scope of delivery MLDSET-M31

Qty.	Part no.	Article	Description
1	426549	MLD 530-RT3M-UDC-1300-S2	MLD transceiver, pre-mounted in UDC device column
Consisting of:			
1	66568200	MLD 530-RT3M	MLD transceiver, 3-beam, Range 0.5 ... 6 m, Integrated status/muting indicator
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	905067	MLD-M003-UDC-1300-S2	MLD deflecting mirror, pre-mounted in UDC device column
Consisting of:			
1	66500200	MLD-M003	Deflecting mirror, 3-beam
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	426592	MLDSET-ACC21-31	Accessory set for MLDSET-M21 and MLDSET-M31
Consisting of:			
2	50106553	IHRT 46B/4,200-S12	Diffuse sensors with background suppression, 0.2 m cable with M12 plug
1	430305	MMS-A-2N55	Mounting bracket set for lateral mounting on UDC device column (for two diffuse sensors)
2	50120425	BTU 300M.5-D12	Stainless steel mounting device for sensors of the 46B series
1	548040	CB-M12-ACY3/1	Y-distribution box for two diffuse sensors

Qty.	Part no.	Article	Description
1	548362	CB-M12-2000-5GF/GM	Interconnection cable from Y-distribution box for diffuse sensors to MLD interface socket, length 1.5 m
1	426240	AC-ABF 70.BB	Acknowledgment unit with illuminated start button, on mounting plate with notice sign in 5 languages, cable length 5 m
1	50123947	CB-M12-ACY8/1	Y-distribution box for interconnection cable from MLD machine interface to acknowledgment unit
1	50124228	K-DS M12A-M12A-8P-0.3m-S-PUR	Interconnection cable from MLD interface socket to Y-distribution box, length 0.3 m

Table 7.5: Scope of delivery MLDSET-M32

Qty.	Part no.	Article	Description
1	426548	MLD 530-RT3M-UDC-1300-S2	MLD transceiver, pre-mounted in UDC device column
Consisting of:			
1	66568200	MLD 530-RT3M	MLD transceiver, 3-beam, range 0.5 ... 6 m, integrated status/muting indicator
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	905067	MLD-M003-UDC-1300-S2	MLD deflecting mirror, pre-mounted in UDC device column
Consisting of:			
1	66500200	MLD-M003	Deflecting mirror, 3-beam
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	426593	MLDSET-ACC32	Accessory set for MLDSET-M32
Consisting of:			
1	426240	AC-ABF 70.BB	Acknowledgment unit with illuminated start button, on mounting plate
1	426241	ACC-DP-BB.A1	Distributor box, 1.5 m connection cables
1	426242	ACC-BB-IND-A1	Induction-loop control device Beumer IGS326,4SB in housing, on mounting plate, 2 m connection cable
2	426359	KAS_1	Induction loop
2	151701	CB-M12-ACP-4GM	Harax M12 plug, 3-pin



Table 7.6: Scope of delivery MLDSET-M33

Qty.	Part no.	Article	Description
1	426549	MLD 530-RT3M-UDC-1300-S2	MLD transceiver, pre-mounted in UDC device column
Consisting of:			
1	66568200	MLD 530-RT3M	MLD transceiver, 3-beam, Range 0.5 ... 6 m, Integrated status/muting indicator
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	905067	MLD-M003-UDC-1300-S2	MLD deflecting mirror, pre-mounted in UDC device column
Consisting of:			
1	66500200	MLD-M003	Deflecting mirror, 3-beam
1	549852	UDC-1300-S2	Device column, set for floor mounting included
1	426594	MLDSET-ACC33	Accessory set for MLDSET-M33
Consisting of:			
1	426243	AC-ABF 70.A.1	Acknowledgment unit with illuminated start button, on mounting plate, cable length 5 m
1	50123947	CB-M12-ACY8/1	Y-distribution box for interconnection cable from MLD machine interface to acknowledgment unit
1	50124228	K-DS M12A-M12A-8P-0.3m-S-PUR	Interconnection cable from MLD interface socket to Y-distribution box, length 0.3 m

Table 7.7: Scope of delivery of accessory set MLDSET-ACC21-31.2

Qty.	Part no.	Article	Description
2	50106553	IHRT 46B/4,200-S12	Diffuse sensors with background suppression, 0.2 m cable with M12 plug
1	430305	MMS-A-2N55	Mounting bracket set for lateral mounting on UDC device column (for two diffuse sensors)
2	50120425	BTU 300M.5-D12	Stainless steel mounting device for sensors of the 46B series
1	548040	CB-M12-ACY3/1	Y-distribution box for two diffuse sensors
1	548362	CB-M12-2000-5GF/GM	Interconnection cable from Y-distribution box for diffuse sensors to MLD interface socket, length 2 m
1	520151	AC-SCM5U-BT	Sensor connection box with connection cable on MLD interface socket, length 0.5 m

### 7.3 Accessories

Table 7.8: Accessories

Part no.	Article	Description
426592	MLDSET-ACC21-31	Accessory set for MLDSET-M21 <sup>a)</sup>
426595	MLDSET-ACC21-31.2	Accessory set for MLDSET-M21 and MLDSET-M31 (for 4 sensors)
426593	MLDSET-ACC32	Accessory set for MLDSET-M32 <sup>b)</sup>
426594	MLDSET-ACC33	Accessory set for MLDSET-M33 <sup>c)</sup>

a) included in the scope of delivery of MLDSET-M21 and MLDSET-M31

b) included in the scope of delivery of MLDSET-M32

c) included in the scope of delivery of MLDSET-M33

### 7.4 Accessory components



Figure 7.1: 426240 AC-ABF 70.BB; acknowledgment unit with illuminated start button, on mounting plate with notice sign in 5 languages, 5 m connection cable

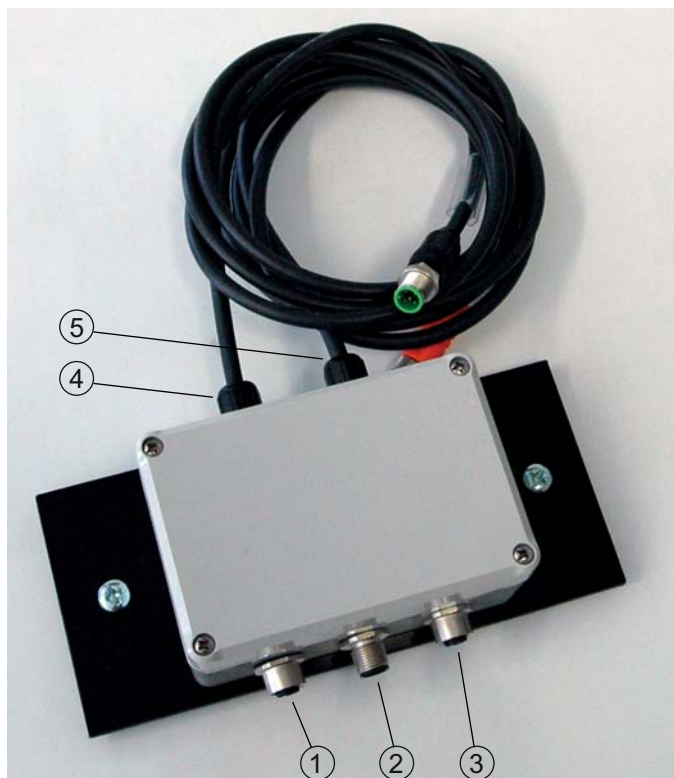


Figure 7.2: 426243 AC-ABF 70.A.1; acknowledgment unit with illuminated start button, on mounting plate, 5 m connection cable (MLDSET-M33 only)



- 1 M12 connections for induction loops
- 2 Connection with M12 plug to ACC-DP-BB.A1

Figure 7.3: 426242 ACC-BB-IND-A1; Beumer IGS326,4SB induction-loop control device in housing, on mounting plate, 2 m connection cable



- 1 M12 socket, 4-pin → ACC-BB-IND-A1
- 2 M12 plug, 8-pin → connection to switch cabinet
- 3 M12 plug, 8-pin → connection for acknowledgment unit AC-ABF 70.A.1
- 4 M12 cable connection, 5-pin → MLD interface socket, 5-pin
- 5 M12 cable connection, 8-pin → MLD machine interface, 8-pin

Figure 7.4: 426241 ACC-DP-BB.A1; distributor box, 1.5 m connection cables