



Figure can vary

**Part no.: 66577200**

**MLD535-RT3**

**Multiple light beam safety device  
transmitter/receiver**



## Contents

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## Technical data

<b>Basic data</b>	
Series	MLD 500
Device type	Transceiver
<b>Functions</b>	
Functions	Start/restart interlock (RES) Sequence controlled 2-sensor muting Contactor monitoring (EDM), selectable Timing controlled 2-sensor muting Partial muting Muting-timeout extension Timing controlled 4-sensor muting Muting enable function Alternative connection for second muting signal
<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
MTTF <sub>d</sub>	204 years, EN ISO 13849-1
PFH <sub>D</sub>	6.6E-09 per hour
Mission time T <sub>M</sub>	20 years, EN ISO 13849-1
Category	4, EN ISO 13849
<b>Protective field data</b>	
Operating range	0.5 ... 6 m
Operating range in connection with MLD-XM03	0.5 ... 8 m
<b>Optical data</b>	
Number of beams	3 Piece(s)
Beam spacing	400 mm
Light source	LED, Infrared
LED light wavelength	850 nm
Mean power of transmitter diode	1.369 µW
Transmitted-signal shape	Pulsed
LED group	Exempt group in acc. with EN 62471:2008
<b>Electrical data</b>	
Selection of operating mode	Connection 1, pin 2: +24 V for operating mode 1, 2, 4 Connection 1, pin 7: 0 V for operating mode 1, 2, 4 Connection 1, pin 7: +24 V for operating mode 3, 5, 6 Connection 1, pin 2: 0 V for operating mode 3, 5, 6
Protective circuit	Overvoltage protection Short circuit protected
<b>Performance data</b>	
Supply voltage U <sub>B</sub>	24 V, DC, -20 ... 20 %
Current consumption, max.	150 mA, Without external load
Fuse	External with max. 3 A

<b>Inputs</b>	
Number of digital switching inputs	4 Piece(s)
<b>Switching inputs</b>	
Type	Digital switching input
Switching voltage high, min.	18.2 V
Switching voltage low, max.	2.5 V
Switching voltage, typ.	23 V
Voltage type	DC
Switching current, max.	5 mA
<b>Digital switching input 1</b>	
Assignment	Connection 1, pin 1
Function	Control input for start/restart interlock (RES)
<b>Digital switching input 2</b>	
Assignment	Connection 1, pin 3
Function	Control input for contactor monitoring (EDM)
<b>Digital switching input 3</b>	
Assignment	Connection 1, pin 4
Function	Control input, second muting signal
<b>Digital switching input 4</b>	
Assignment	Connection 1, pin 8
Function	Control input, muting enable/ timeout

**Outputs**

Number of safety-related switching outputs (OSSDs)	2 Piece(s)
Number of digital switching outputs	1 Piece(s)

**Safety-related switching outputs**

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

**Safety-related switching output 1**

Assignment	Connection 1, pin 6
Switching element	Transistor, PNP

**Safety-related switching output 2**

Assignment	Connection 1, pin 5
Switching element	Transistor, PNP

**Switching outputs**

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

**Switching output 1**

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

**Timing**

Response time	50 ms
Restart delay time	100 ms

**Connection**

Number of connections	2 Piece(s)
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**Connection 1**

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

**Connection 2**

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

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**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)	52 mm x 900 mm x 64.7 mm
Housing material	Metal, Aluminum
Lens cover material	Plastic / PMMA
Material of end caps	Diecast zinc
Net weight	2,000 g
Housing color	Yellow, RAL 1021
Type of fastening	Groove mounting Swivel mount

**Operation and display**

Type of display	LED
Number of LEDs	2 Piece(s)

**Environmental data**

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


**Certifications**

Degree of protection	IP 67
Protection class	III
Certifications	TÜV Süd c CSA US c TÜV NRTL US
US patents	US 6,418,546 B US 7,741,595 B


**Classification**

eCl@ss 8.0	27272703
eCl@ss 9.0	27272703
ETIM 5.0	EC001832

**Suitable deflecting mirrors**

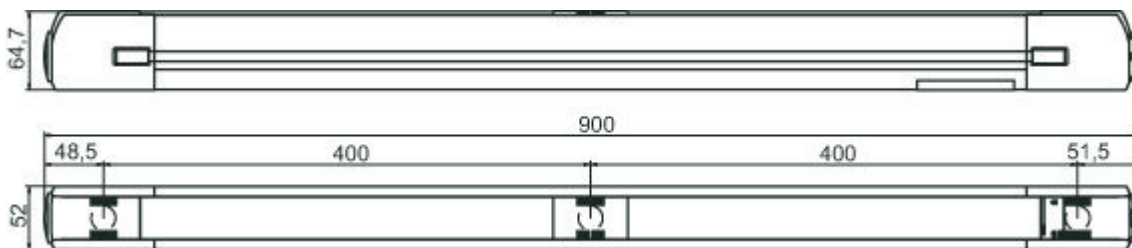
	Part no.	Designation	Article	Description
	66500200	MLD-M003	Deflecting mirror	Number of beams: 3 Piece(s) Beam spacing: 400 mm Type of fastening: Groove mounting, Swivel mount, Mounting on Device Column

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	Part no.	Designation	Article	Description
	66500201	MLD-XM03	Deflecting mirror	Number of beams: 3 Piece(s) Beam spacing: 400 mm Type of fastening: Groove mounting, Swivel mount, Mounting on Device Column

## Dimensioned drawings

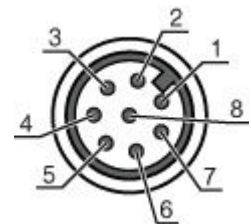
All dimensions in millimeters



## 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

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

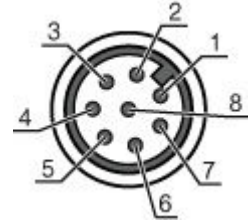


Connection 2	
Type of connection	Connector
Function	Local interface
Thread size	M12
Type	Female
Material	Metal

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Connection 2	
No. of pins	8 -pin
Encoding	A-coded

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



## Operation and display

### LEDs

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

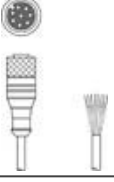



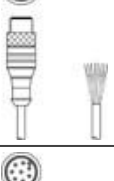

## Part number code

Part designation: **MLDxyy-zab/t**

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





## 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 Connection 2: Open end Shielded: Yes Cable length: 5,000 mm Sheathing material: PUR
	50135129	KD S-M12-8A-P1-100	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 8 -pin Connection 2: Open end Shielded: Yes Cable length: 10,000 mm Sheathing material: PUR
	50135130	KD S-M12-8A-P1-150	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 8 -pin Connection 2: Open end Shielded: Yes Cable length: 15,000 mm Sheathing material: PUR
	50135131	KD S-M12-8A-P1-250	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 8 -pin Connection 2: Open end Shielded: Yes Cable length: 25,000 mm Sheathing material: PUR
	50135132	KD S-M12-8A-P1-500	Connection cable	Connection 1: Connector, M12, Axial, Female, A-coded, 8 -pin Connection 2: Open end Shielded: Yes Cable length: 50,000 mm Sheathing material: PUR
	50135139	KS S-M12-8A-P1-050	Connection cable	Connection 1: Connector, M12, Axial, Male, A-coded, 8 -pin Connection 2: Open end Shielded: Yes Cable length: 5,000 mm Sheathing material: PUR
	50135140	KS S-M12-8A-P1-100	Connection cable	Connection 1: Connector, M12, Axial, Male, A-coded, 8 -pin Connection 2: Open end Shielded: Yes Cable length: 10,000 mm Sheathing material: PUR
	50135141	KS S-M12-8A-P1-150	Connection cable	Connection 1: Connector, M12, Axial, Male, A-coded, 8 -pin Connection 2: Open end Shielded: Yes Cable length: 15,000 mm Sheathing material: PUR

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## Mounting technology - Swivel mounts

	Part no.	Designation	Article	Description
	560340	BT-SET-240BC	Mounting bracket set	Fastening, at system: Through-hole mounting Mounting bracket, at device: Clampable Type of mounting device: Turning, 240° Material: Metal
	540350	BT-SET-240BC-E	Mounting bracket set	Fastening, at system: Through-hole mounting Mounting bracket, at device: Clampable Type of mounting device: Turning, 240° Material: Metal, Plastic
	560342	BT-SET-240BCS	Mounting bracket set	Fastening, at system: Through-hole mounting Mounting bracket, at device: Clampable Type of mounting device: Turning, 240°, Shock absorber Material: Metal Shock absorber: Yes
	540352	BT-SET-240BCS-E	Mounting bracket set	Fastening, at system: Through-hole mounting Mounting bracket, at device: Clampable Type of mounting device: Shock absorber, Turning, 240° Material: Metal, Plastic Shock absorber: Yes

## Mounting technology - Other

	Part no.	Designation	Article	Description
	424417	BT-2P40	Mounting bracket set	Contains: 2x BT-P40 clamp bracket Design of mounting device: Mounting clamp Fastening, at system: Groove mounting Mounting bracket, at device: Groove mounting Type of mounting device: Clampable Material: Metal

## Muting - Mounting systems

	Part no.	Designation	Article	Description
	426492	Set-AC-MT-4S	Muting sensor set	Operating range: 0 ... 4 m Cable length of muting sensors: 300 mm Type of muting sensors: Retro-reflective photoelectric sensors PRK 3B Number of muting sensors: 4 Piece(s) Number of reflectors: 4 Piece(s)
	426522	Set-AC-MTX-4S	Muting sensor set	Operating range: 0 ... 8 m Cable length of muting sensors: 300 mm Type of muting sensors: PRK 25B retro-reflective photoelectric sensors Number of muting sensors: 4 Piece(s) Number of reflectors: 4 Piece(s)
	426528	Set-AC-MTX.2-4S	Muting sensor set	Operating range: 0 ... 8 m Cable length of muting sensors: 2,000 mm Type of muting sensors: PRK 25B retro-reflective photoelectric sensors Number of muting sensors: 4 Piece(s) Number of reflectors: 4 Piece(s)

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## Muting - Connection technology

	Part no.	Designation	Article	Description
	520140	AC-SCM6U	Sensor connection module	Suitable for: MLD 335, MLD 535 multiple light beam safety devices Supply voltage: 24 V, DC, -20 ... 20 % Number of connections: 7 Piece(s) Connection: Cable with connector, M12, 500 mm Type of fastening: Through-hole mounting, Groove mounting
	520141	AC-SCM6U-BT	Sensor connection module	Suitable for: MLD 335, MLD 535 multiple light beam safety devices Supply voltage: 24 V, DC, -20 ... 20 % Number of connections: 7 Piece(s) Connection: Cable with connector, M12, 500 mm Type of fastening: Mounting plate
	520142	AC-SCM6U-BT-L	Sensor connection module	Suitable for: MLD 335, MLD 535 multiple light beam safety devices Supply voltage: 24 V, DC, -20 ... 20 % Number of connections: 7 Piece(s) Connection: Cable with connector, M12, 500 mm Type of fastening: Mounting plate with L-angle


## Display/operating elements

	Part no.	Designation	Article	Description
	426296	AC-ABF70	Acknowledgment unit	Switching current via button: 1 ... 1,000 mA Housing material: Glass fiber reinforced (PPS), self-extinguishing Clamping plate material: Stainless steel Degree of protection: IP 67, IP 69K Functions: Reset of the start/restart interlock, Overriding with AOPDs with muting function, Illuminated reset buttons Reset buttons: Yes LED indicators: Yes

## Alignment aids

	Part no.	Designation	Article	Description
	520023	LA-78M	Alignment aid	Light source: laser, Red Housing material: Metal
	520024	LA-78M-UDC	Alignment aid	Light source: laser, Red Housing material: Metal

## Device columns

	Part no.	Designation	Article	Description
	549879	UDC-1140-S2	Device column	Dimensions: 160 mm x 1,200 mm x 149 mm Column height without foot: 1,140 mm Functions: Adjustable, 3 directions, Mounting and protection of light curtains and multiple light beam devices

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	Part no.	Designation	Article	Description
	549852	UDC-1300-S2	Device column	Dimensions: 160 mm x 1,360 mm x 149 mm Column height without foot: 1,300 mm Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions
	549853	UDC-1600-S2	Device column	Dimensions: 160 mm x 1,660 mm x 149 mm Column height without foot: 1,600 mm 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 Column height without foot: 1,900 mm 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 Column height without foot: 2,100 mm 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 Column height without foot: 2,500 mm 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 Column height without foot: 3,100 mm Functions: Mounting and protection of light curtains and multiple light beam devices, Adjustable, 3 directions