DMT/DML: Non-contact measurement of large distances

Distance sensors
Proximity mode

Distance sensors
Reflector mode

The devices in the DMT series use the time-of-flight method to measure the distance to naturally reflecting objects in a distance of up to 150 m. The DML variant even functions at distances of up to 300 m with Diamond Grade reflective tape.

The DMT/DML operates by emitting extremely short pulses of light and by measuring the travel time of these pulses to the object and back. It then uses the pulse travel time to calculate the distance to the object.

Once identified, the distance is indicated via a serial RS 232 or RS 422 interface. If required, the distance can also be transmitted via an analogue 4 ... 20 mA interface.

Two additional switching outputs with programmable parameters are also available: the operator can, for example, define certain work points as fixed distances which signal whenever the set value is exceeded or not met. The devices are also available with an Profibus interface. The system parameters are programmed via the RS 232 interface, using a laptop.

The programmable averaging function allows for extremely accurate detection of targets with slow procedures as well as rapid determination of distance values with dynamic procedures.

The large measuring range make these devices ideal for use in a wide range of branches for many different applications:

- level measurement in silos,
- goods profile measurement in connection with crane controls,
- determining the diameter of paper rolls in the printing and paper industry,
- measuring the level of water or paper stock,
- measuring and regulating sag,
- measuring the dimensions of slabs,
- outdoor crane positioning.

SICK

Measurement range up to 155 m

Distance measuring devices

- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters – 2 switching outputs
- RS 422 or RS 232 serial interface
- Analogue output

CE

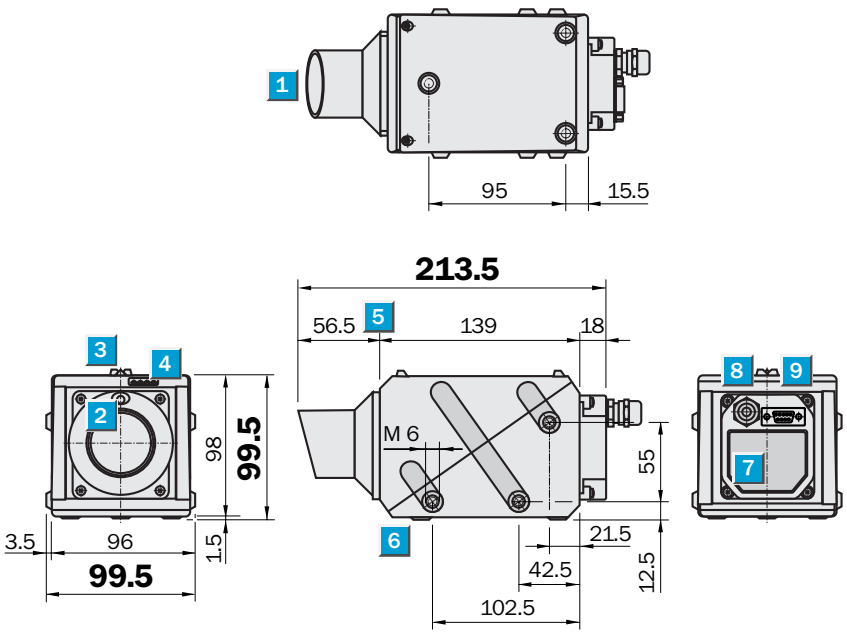
Laser class 1/3A

Accessories

Connectors

Mounting systems

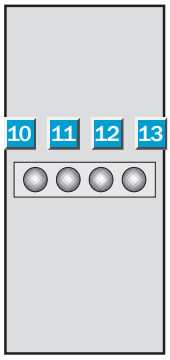
Dimensional drawing



Adjustments possible

DMT 5-1111

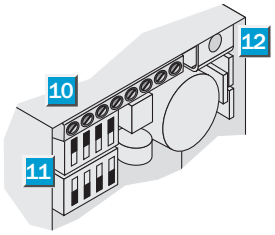
DMT 10-1111



1 Dust protection tube
2 Laserpointer pilot light
3 Alignment sight
4 Function indicator
5 Zero level
6 Mounting hole M 6 threaded – 6 mm deep
7 Plug cover
8 PG 9
9 9-pin plug Sub D 9
10 Q_1 function indicator
11 Q_2 function indicator
12 Operating active, LED green
13 Plausibility (measurement error) LED red

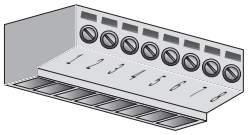
Connection type

all Types



10 Terminals
11 DIP switch
RS 232/RS 422 switch
12 Shield

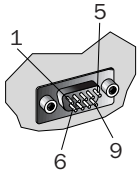
PG 9, terminal assignment



1	L+
2	M
3	Q_1
4	Q_2

5	L+/Q
6	M/Q_A
7	Q_A
8	NC

9-pin plug Sub D



1	NC
2	RxD
3	TxD
4	NC

5	GND
6	Tx +
7	Tx –
8	Rx +
9	Rx –

Technical Data	DMT	5 -1111	10 -1111
Measurement range	0.5 ... 155 m		■
	0.5 ... 55 m	■	
Light spot diameter/distance	25 mm/1 m, 70 mm/10 m, 520 mm/100 m		■
	30 mm/1 m, 80 mm/10 m, 500 mm/65 m	■	
Resolution	1 mm	■	■
Light source[1], light type	Laser diode, infrared light	■	■
Laser category	1 (IEC 825-1/EN 60825-1)	■	
	3A (IEC 825-1/EN 60825-1)		■
Supply voltage V_S	18 ... 30 V DC[2]	■	■
Ripple	< 5 V_{PP}[3]	■	■
Power consumption	≤ 6 W[4]	■	■
Switching outputs Q_1 and Q_2		■	■
Input L+/Q	+5 ... +30 V DC, supply Q_1/Q_2	■	■
Output current I_A max.	100 mA	■	■
Analogue output	4 ... 20 mA, programmable	■	■
Serial interface	RS 422/RS 232 switchable	■	■
Measured value output			
Mean value creation	16/64/256/1024 values	■	■
Output rate	16 ms, 64 ms, 256 ms, 1024 ms	■	■
Temperature drift	typ. 0.3 mm/K	■	■
Initialisation period	6 s	■	■
Connection type	Sub D 9/PG 9	■	■
VDE protection class[5]	III	■	■
Circuit protection[6]	A, B	■	■
Enclosure rating	IP 65	■	■
Ambient temperature T_A	Operation 0 °C ... + 40 °C	■	■
	Storage – 25 °C ... + 70 °C	■	■
Weight	Approx. 1200 g	■	■

1) Average service life 50,000 h at T_A = +25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Reference voltage 50 V DC
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Environmental conditions constant, minimal switching period 30 min
8) 23 °C air temperature, 977 hPa, minimal switching period 30 min
9) Re-calibration recommended after 25,000 h

Reproducibility and accuracy as a function of measurement distance[7] [8] [9]

	DMT-									
	5	**10**	**5**	**10**	**5**	**10**	**5**	**10**	**5**	**10**
Measurement distance	1 m		15 m		25 m	40 m	55 m	65 m	155 m	
Reproducibility[7]										
White, 90 % remission	7 mm	7 mm	7 mm	7 mm	7 mm	7 mm	10 mm	7 mm	–	10 mm
Grey, 18 % remission	7 mm	7 mm	7 mm	7 mm	10 mm	7 mm	–	10 mm	–	–
Black, 6 % remission	7 mm	7 mm	10 mm	7 mm	–	10 mm	–	–	–	–
Accuracy[8] [9]										
White, 90 % remission	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	–	±10 mm
Grey, 18 % remission	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	–	±10 mm	–	–
Black, 6 % remission	±10 mm	±10 mm	±10 mm	±10 mm	–	±10 mm	–	–	–	–

*) On request

Order information

Type	Part no.
DMT 5-1111	6 022 339
DMT 10-1111	6 022 351

Measurement range up to 155 m

Distance measuring devices

- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters
- Profibus/RS 232 interface

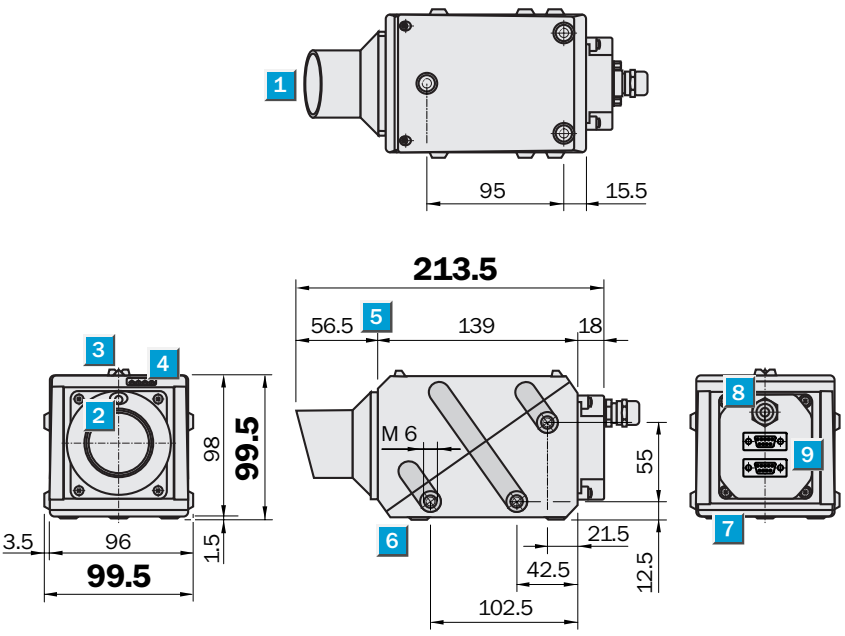
Laser class 1/3A

Accessories

Connectors

Mounting systems

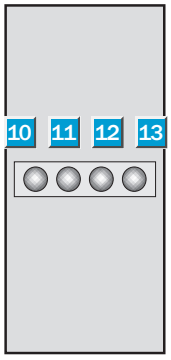
Dimensional drawing



Adjustments possible

DMT 5-1211

DMT 10-1211

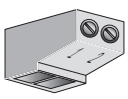


1	Dust protection tube
2	Laserpointer pilot light
3	Alignment sight
4	Function indicator
5	Zero level
6	Mounting hole M 6 threaded – 6 mm deep
7	Plug cover
8	PG 9
9	9-pin plug Sub D 9
10	Not in use
11	Data exchange
12	Operating active, LED green
13	Plausibility (measurement error) LED red

Connection scheme und data interface

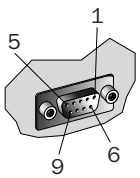
all Types

Terminal



1	L+
2	M

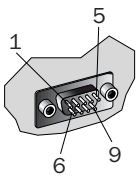
9-pin plug (bush) Sub D



1	NC
2	NC
3	B
4	RTS

5	M
6	L+
7	NC
8	A
9	NC

9-pin plug Sub D



1	nReset
2	RxD
3	TxD
4	NC

5	M
6	NC
7	NC
8	NC
9	NC

Technical Data	DMT	5 -1211	10 -1211
Measurement range	0.5 ... 155 m		■
	On request	■	
Light spot diameter/distance	25 mm/1 m, 70 mm/10 m, 520 mm/100 m		■
	30 mm/1 m, 80 mm/10 m, 500 mm/65 m	■	
Resolution	1 mm	■	■
Light source[1], light type	Laser diode, infrared light	■	■
Laser category	1 (IEC 825-1/EN 60825-1)	■	
	3A (IEC 825-1/EN 60825-1)		■
Supply voltage V_S	18 ... 30 V DC[2]	■	■
Ripple	< 5 V_{PP}[3]	■	■
Power consumption	≤ 6 W[4]	■	■
Interface	Profibus	■	■
Programmable interface	RS 232	■	■
Measured value output			
Mean value creation	16/64/256/1024 values	■	■
Output rate	16 ms, 64 ms, 256 ms, 1024 ms	■	■
Temperature drift	typ. 0.3 mm/K	■	■
Initialisation period	6 s	■	■
Connection type	Sub D 9/PG 9	■	■
VDE protection class[5]	III	■	■
Circuit protection[6]	A, B	■	■
Enclosure rating	IP 65	■	■
Ambient temperature T_A	Operation 0 °C ... + 40 °C	■	■
	Storage – 25 °C ... + 70 °C	■	■
Weight	Approx. 1200 g	■	■

1) Average service life 50,000 h at T_A = +25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Reference voltage 50 V DC
6) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected
7) Environmental conditions constant, minimal switching period 30 min
8) 23 °C air temperature, 977 hPa, minimal switching period 30 min
9) Re-calibration recommended after 25,000 h

Reproducibility and accuracy as a function of measurement distance[7] [8] [9]

	DMT-									
	5	**10**	**5**	**10**	**5**	**10**	**5**	**10**	**5**	**10**
Measurement distance	1 m		15 m		25 m	40 m	55 m	65 m	155 m	
Reproducibility[7]										
White, 90 % remission	7 mm	7 mm	7 mm	7 mm	7 mm	7 mm	10 mm	7 mm	–	10 mm
Grey, 18 % remission	7 mm	7 mm	7 mm	7 mm	10 mm	7 mm	–	10 mm	–	–
Black, 6 % remission	7 mm	7 mm	10 mm	7 mm	–	10 mm	–	–	–	–
Accuracy[8] [9]										
White, 90 % remission	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	–	±10 mm
Grey, 18 % remission	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	±10 mm	–	±10 mm	–	–
Black, 6 % remission	±10 mm	±10 mm	±10 mm	±10 mm	–	±10 mm	–	–	–	–

*) On request

Order information

Type	Part no.
DMT 5-1211	6 022 350
DMT 10-1211	6 022 352

Measurement range up to 300 m

Distance measuring devices

- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters – 2 switching outputs
- RS 422 or RS 232 serial interface
- Analogue output

CE

Laser class 1

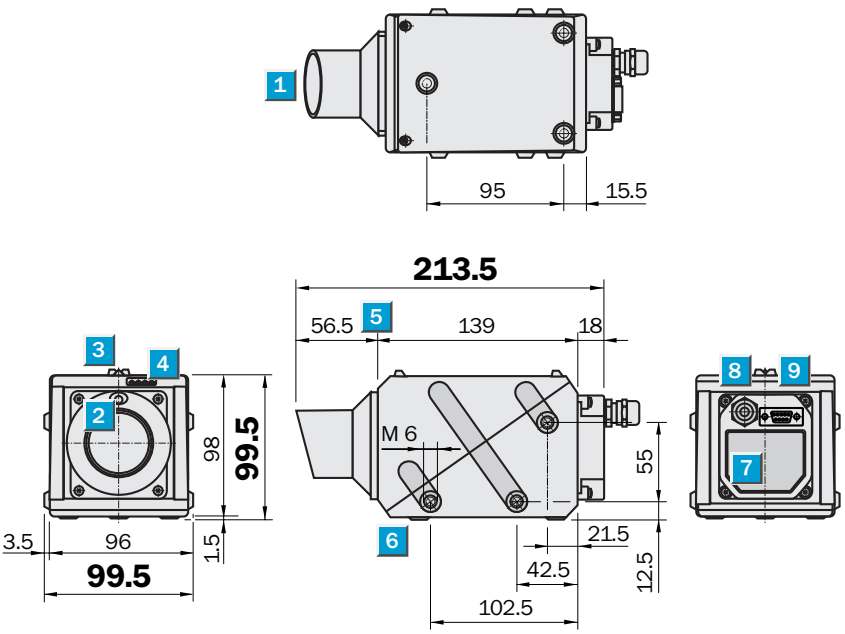
Accessories

Connectors

Mounting systems

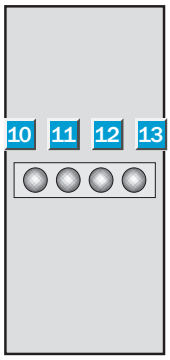
Reflectors

Dimensional drawing



Adjustments possible

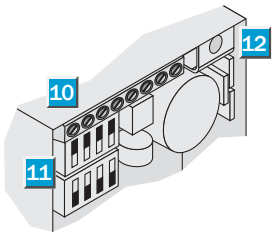
DML 40-1111



1	Dust protection tube
2	Laserpointer pilot light
3	Alignment sight
4	Function indicator
5	Zero level
6	Mounting hole M 6 threaded – 6 mm deep
7	Plug cover
8	PG 9
9	9-pin plug Sub D 9
10	Q_1 function indicator
11	Q_2 function indicator
12	Operating active, LED green
13	Plausibility (measurement error) LED red

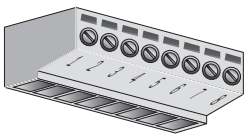
Connection type

DML 40-1111



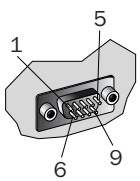
10	Terminals
11	DIP switch RS 232/RS 422 switch
12	Shield

PG 9, terminal assignment



1	L+	5	L+/Q
2	M	6	M/Q_A
3	Q_1	7	Q_A
4	Q_2	8	NC

9-pin plug Sub D



1	NC	5	GND
2	RxD	6	Tx +
3	TxD	7	Tx –
4	NC	8	Rx +
		9	Rx –

Technical Data	DML 40-	1111									
Measurement range, on Diamond Grade	0.5 ... 300 m										
PL 880 F	0.5 ... 600 m										
OP 55	0.5 ... 1100 m										
Reproducibility[1]	6 mm										
Accuracy[2] [3]	± 10 mm										
Light spot diameter/distance	25 mm/1 m, 70 mm/10 m, 520 mm/100 m										
Resolution	1 mm										
Light source[4], **light type**	Laser diode, infrared light										
Laser category	1 (IEC 825-1/EN 60825-1)										
Supply voltage V_S	18 ... 30 V DC[5]										
Ripple	< 5 V_{PP}[6]										
Power consumption	≤ 6 W[7]										
Switching outputs Q_1 and Q_2											
Input L+/Q	+5 ... +30 V DC, supply Q_1/Q_2										
Output current I_A max.	100 mA										
Analogue output	4 ... 20 mA, programmable										
Serial interface	RS 422/RS 232 switchable										
Measured value output											
Mean value creation	16/64/256/1024 values										
Output rate	3.2 ms, 12.8 ms, 50 ms, 200 ms										
Temperature drift	typ. 0.3 mm/K										
Initialisation period	6 s										
Connection type	Sub D 9/PG 9										
VDE protection class[8]	III										
Circuit protection[9]	A, B										
Enclosure rating	IP 65										
Ambient temperature T_A	Operation 0 °C ... + 40 °C										
	Storage – 25 °C ... + 70 °C										
Weight	Approx. 1200 g										

1) Environmental conditions constant, minimal switching period 30 min
2) 23 °C air temperature, 977 hPa, minimal switching period 30 min
3) Re-calibration recommended after 25,000 h
4) Average service life 50,000 h at T_A = +25 °C
5) Limit values
6) May not exceed or fall short of V_S tolerances
7) Without load
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected

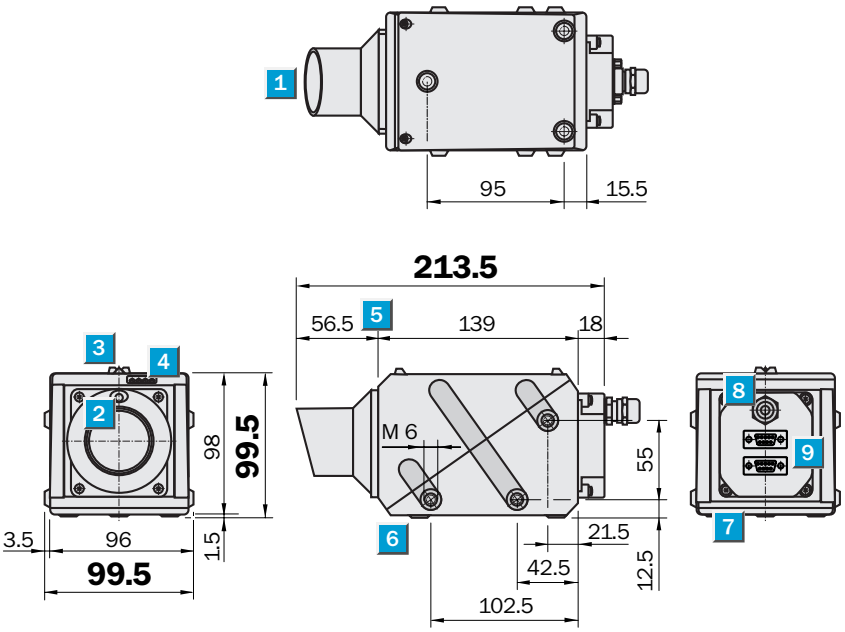
Order information	
Type	**Part no.**
DML 40-1111	6 022 353

Measurement range up to 300 m

Distance measuring devices

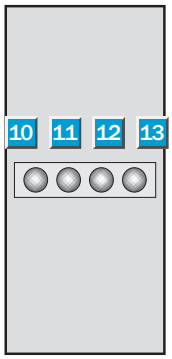
- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters
- Profibus RS 232 interface

Dimensional drawing



Adjustments possible

DML 40-1211



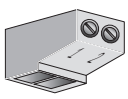
1	Dust protection tube
2	Laserpointer pilot light
3	Alignment sight
4	Function indicator
5	Zero level
6	Mounting hole M 6 threaded – 6 mm deep
7	Plug cover
8	PG 9
9	9-pin plug Sub D 9
10	Plausibility (measurement error) LED red
11	Operating active, LED green
12	Q_1 function indicator
13	Q_2 function indicator

Laser class 1

Connection scheme and data interface

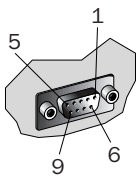
DML 40-1211

Terminal



1	L+
2	M

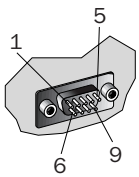
9-pin plug (bush) Sub D



1	NC
2	NC
3	B
4	RTS

5	M
6	L+
7	NC
8	A
9	NC

9-pin plug Sub D



1	nReset
2	RxD
3	TxD
4	NC

5	M
6	NC
7	NC
8	NC
9	NC

Accessories

- Connectors
- Mounting systems
- Reflectors

Technical Data	DML 40-	1211									

Measurement range, on Diamond Grade	0.5 ... 300 m	
PL 880 F	0.5 ... 600 m	
OP 55	0.5 ... 1100 m	
Reproducibility[1]	6 mm	
Accuracy[2] [3]	± 10 mm	
Light spot diameter/distance	25 mm/1 m, 70 mm/10 m, 520 mm/100 m	
Resolution	1 mm	
Light source[4], **light type**	Laser diode, infrared light	
Laser category	1 (IEC 825-1/EN 60825-1)	
Supply voltage V_S	18 ... 30 V DC[5]	
Ripple	< 5 V_{PP}[6]	
Power consumption	≤ 6 W[7]	
Interface	Profibus	
Programmable interface	RS 232	
Measured value output		
Mean value creation	16/64/256/1024 values	
Output rate	3.2 ms, 12.8 ms, 50 ms, 200 ms	
Temperature drift	typ. 0.3 mm/K	
Initialisation period	6 s	
Connection type	Sub D 9/PG 9	
VDE protection class[8]	III	
Circuit protection[9]	A, B	
Enclosure rating	IP 65	
Ambient temperature T_A	Operation 0 °C ... + 40 °C	
	Storage – 25 °C ... + 70 °C	
Weight	Approx. 1200 g	

1) Environmental conditions constant, minimal switching period 30 min
2) 23 °C air temperature, 977 hPa, minimal switching period 30 min
3) Re-calibration recommended after 25,000 h
4) Average service life 50,000 h at T_A = +25 °C
5) Limit values
6) May not exceed or fall short of V_S tolerances
7) Without load
8) Reference voltage 50 V DC
9) A = V_S connections reverse-polarity protected
B = Output Q short-circuit protected

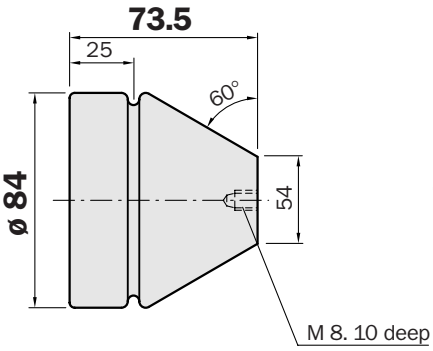
Order information	
Type	**Part no.**
DML 40-1211	6 022 354

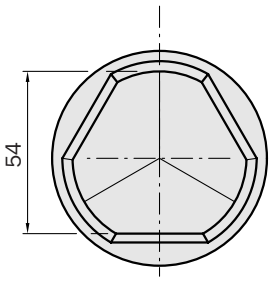
Dimension drawings and order information

Special reflectors

Triple reflector, glass for DML

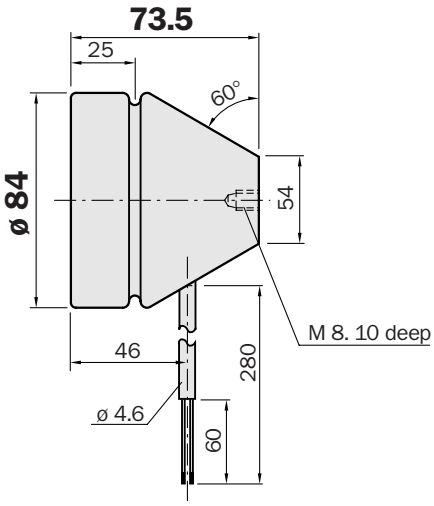
Type	Part no.
OP 55	5 309 131

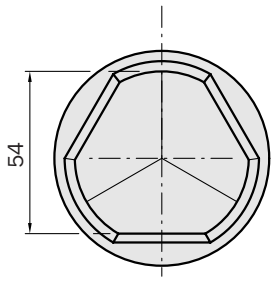




Triple reflector, glass, with heating for DML

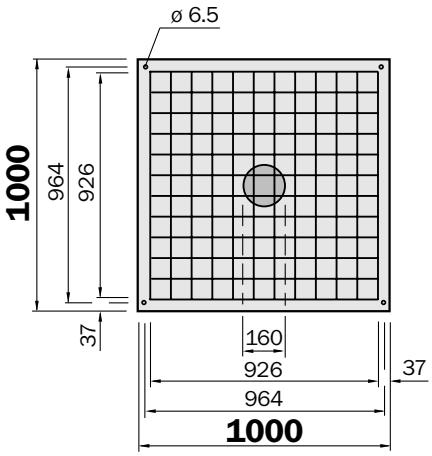
Type	Part no.
OP 55 H	5 309 132

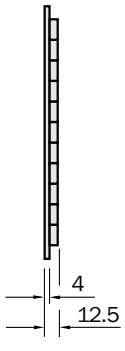




Combi-reflector, 11 x 11 PL 80 A, centre reflectivity reduced

Type	Part no.
PL 880 F	1 013 786



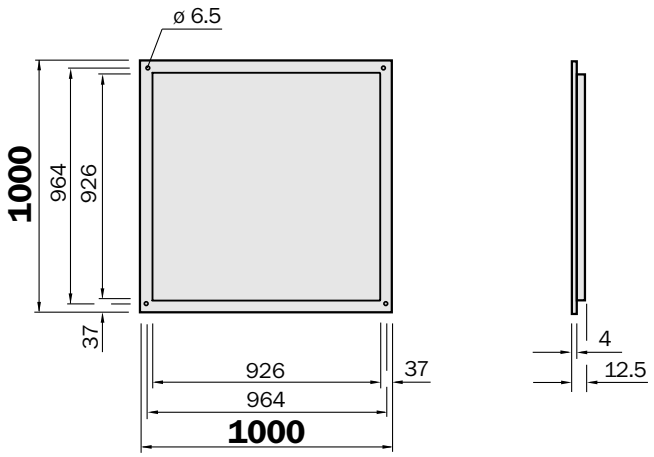


Dimension drawings and order information

Special reflectors

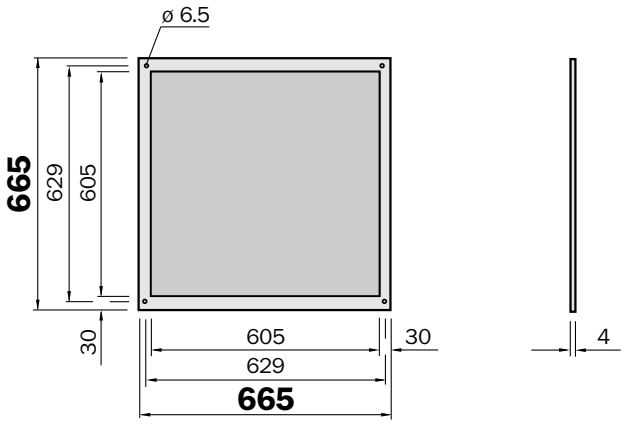
Reflector, 914 x 914 mm, Diamond Grade

Type	Part no.
PL 880 DG	1 018 975



Reflector, 605 x 605 mm, Diamond Grade

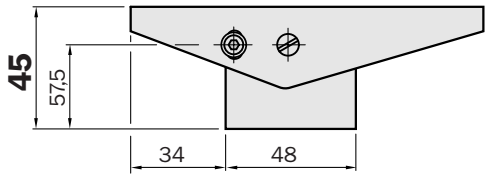
Type	Part no.
PL 560 DG	1 016 806

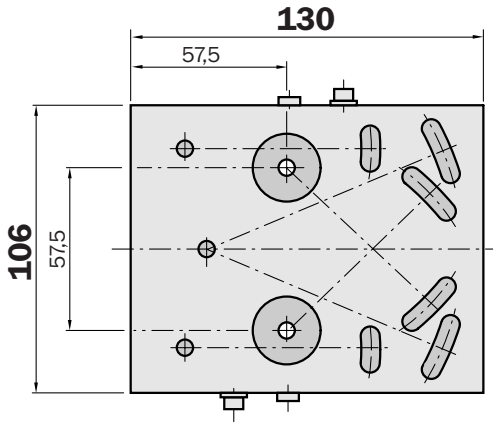


Mounting bracket

Articulated mounting for DMT/DML

Type	Part no.
BEF-GH-DMT	5 309 130





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