

DMT/DML: Non-contact measurement of large distances



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.

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

	Distance sensors Proximity mode
	Distance sensors Reflector mode





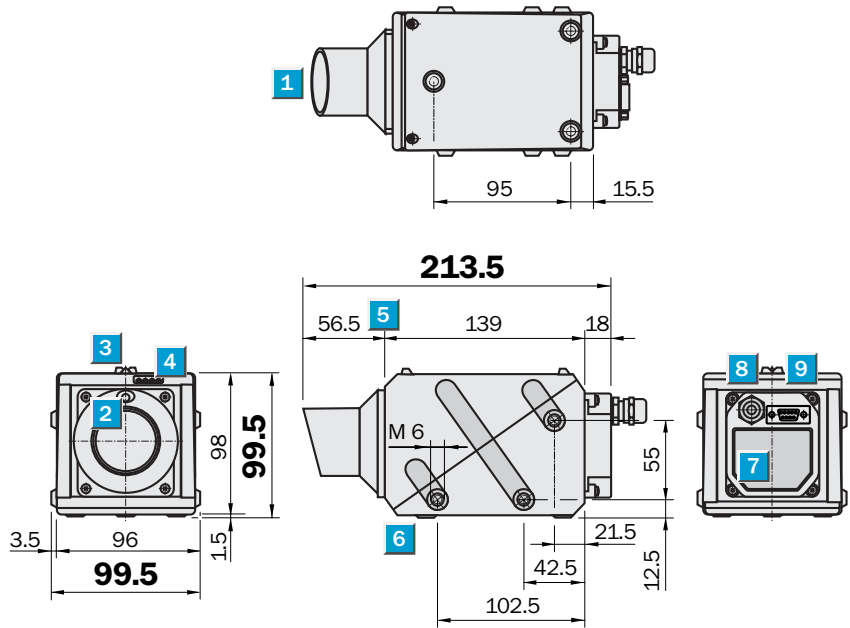
Measurement range up to 155 m

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

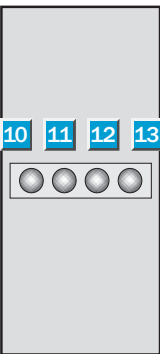


Dimensional drawing



Adjustments possible

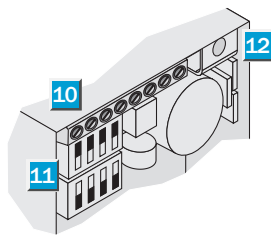
- DMT 5-1111
- DMT 10-1111



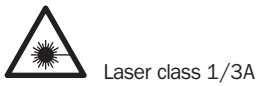
- 1** Dust protection tube
- 2** Laserpointer pilot light
- 3** Alignment sight
- 4** Function indicator
- 5** Zero level
- 6** Mounting hole M 6 threaded – 6 mm deep
- 7** Plug cover
- 8** PG 9
- 9** 9-pin plug Sub D 9
- 10** Q₁ function indicator
- 11** Q₂ function indicator
- 12** Operating active, LED green
- 13** Plausibility (measurement error) LED red

Connection type

all Types

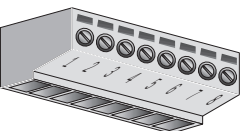


- 10** Terminals
- 11** DIP switch
RS 232/RS 422 switch
- 12** Shield



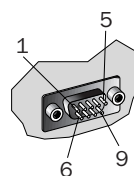
Accessories
Connectors
Mounting systems

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 Rx D	6 Tx +
3 Tx D	7 Tx -
4 NC	8 Rx +
	9 Rx -

Technical Data		DMT		5	10								
				-1111	-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 source⁴⁾, 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 Q₁ and Q₂													
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 class⁵⁾	III												
Circuit protection⁶⁾	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	

Reproducibility⁷⁾

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	-	-	-	-

⁹⁾ On request

Order information

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

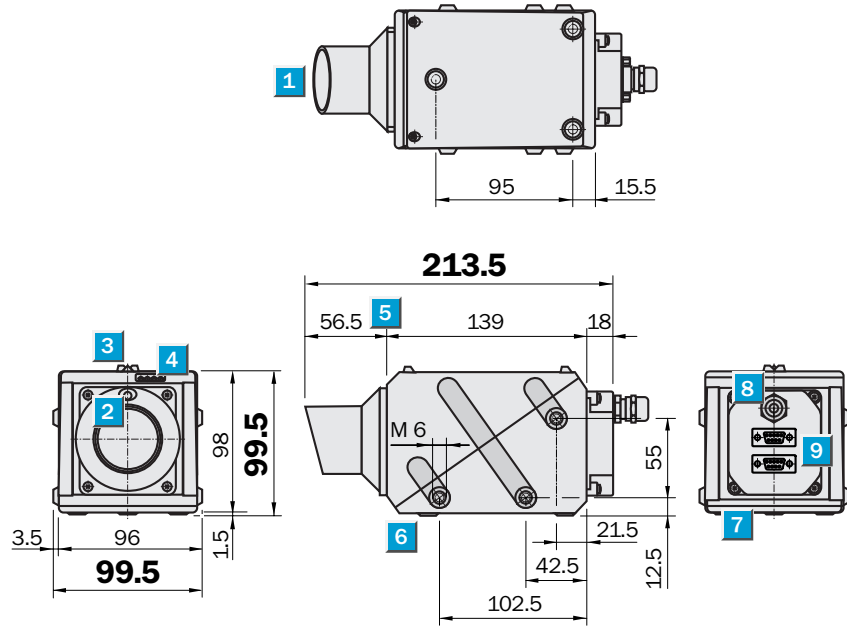


Measurement range up to 155 m

Distance measuring devices

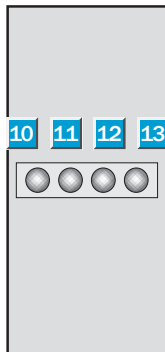
- Excellent measurement accuracy thanks to time-of-flight measurement
- Simple adjustment using pilot light
- Freely programmable parameters
- Profibus/RS 232 interface

Dimensional drawing



Adjustments possible

- DMT 5-1211
- DMT 10-1211

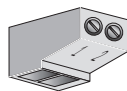


- 1 Dust protection tube
- 2 Laserpointer pilot light
- 3 Alignment sight
- 4 Function indicator
- 5 Zero level
- 6 Mounting hole M 6 threaded – 6 mm deep
- 7 Plug cover
- 8 PG 9
- 9 9-pin plug Sub D 9
- 10 Not in use
- 11 Data exchange
- 12 Operating active, LED green
- 13 Plausibility (measurement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

Connection scheme und data interface

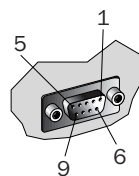
all Types

Terminal



- 1 L+
- 2 M

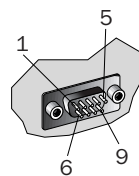
9-pin plug (bush) Sub D



- 1 NC
- 2 NC
- 3 B
- 4 RTS

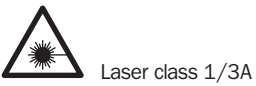
- 5 M
- 6 L+
- 7 NC
- 8 A
- 9 NC

9-pin plug Sub D



- 1 nReset
- 2 RxD
- 3 TxD
- 4 NC

- 5 M
- 6 NC
- 7 NC
- 8 NC
- 9 NC



Accessories

- Connectors
- Mounting systems

Technical Data		DMT	5	10								
			-1211	-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 source⁴⁾, 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 class⁵⁾	III											
Circuit protection⁶⁾	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	
Reproducibility⁷⁾										
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	-	-	-	-

⁷⁾ On request

Order information

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



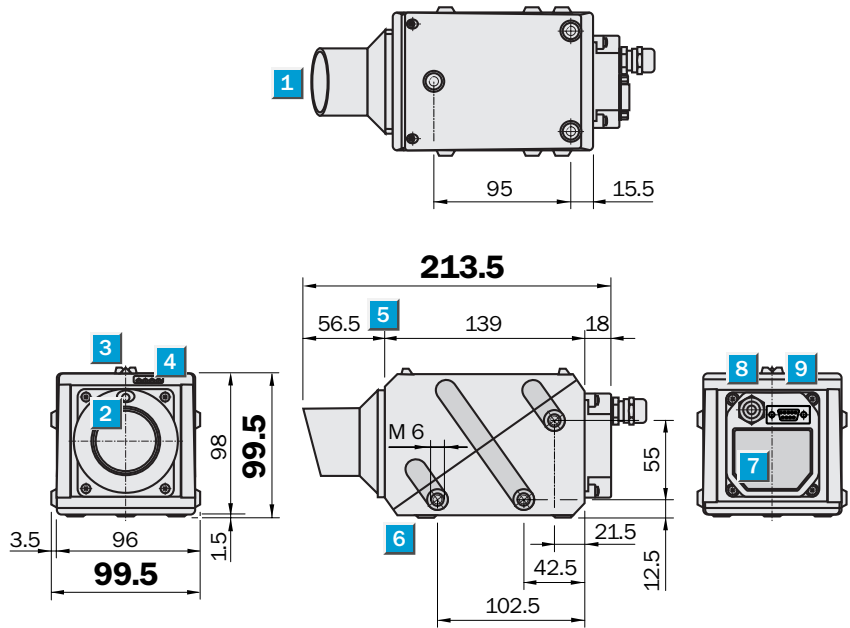
Measurement range up to 300 m

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

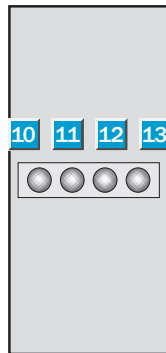


Dimensional drawing



Adjustments possible

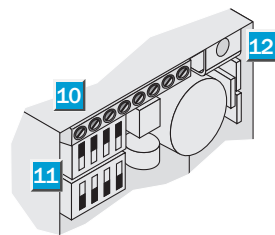
DML 40-1111



- 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 Q₁ function indicator
- 11 Q₂ function indicator
- 12 Operating active, LED green
- 13 Plausibility (measurement error) LED red

Connection type

DML 40-1111



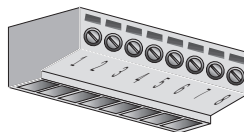
- 10 Terminals
- 11 DIP switch RS 232/RS 422 switch
- 12 Shield



Accessories

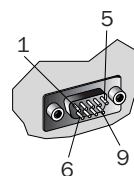
- Connectors
- Mounting systems
- Reflectors

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		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										
Reproducibility¹⁾		6 mm										
Accuracy²⁾³⁾		± 10 mm										
Light spot diameter/distance		25 mm/1 m, 70 mm/10 m, 520 mm/100 m										
Resolution		1 mm										
Light source⁴⁾, 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 Q₁ and Q₂												
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 class⁸⁾		III										
Circuit protection⁹⁾		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

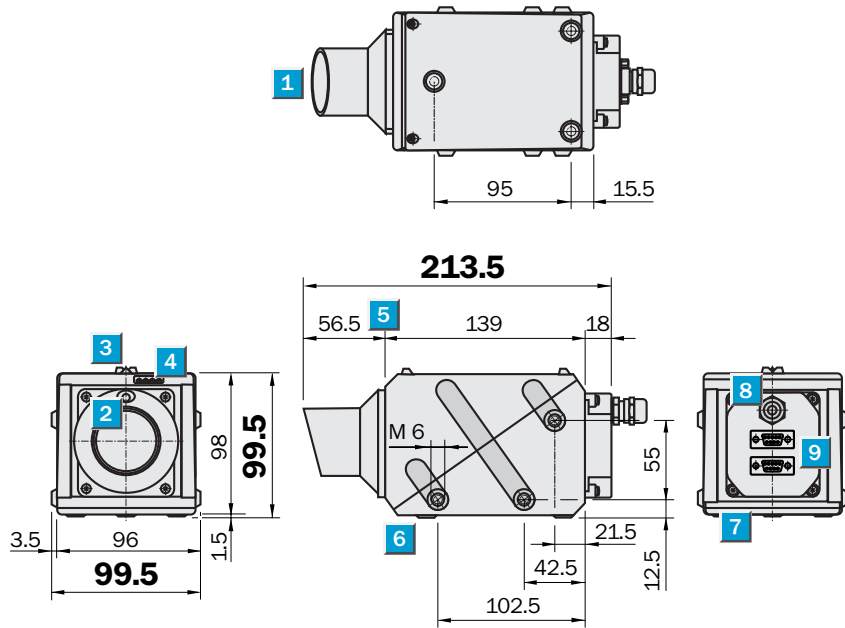
Measurement range up to 300 m

Distance measuring devices

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

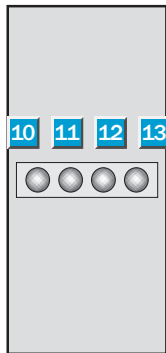


Dimensional drawing



Adjustments possible

DML 40-1211

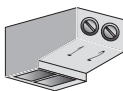


- 1** Dust protection tube
- 2** Laserpointer pilot light
- 3** Alignment sight
- 4** Function indicator
- 5** Zero level
- 6** Mounting hole M 6 threaded – 6 mm deep
- 7** Plug cover
- 8** PG 9
- 9** 9-pin plug Sub D 9
- 10** Plausibility (measurement error) LED red
- 11** Operating active, LED green
- 12** Q₁ function indicator
- 13** Q₂ function indicator

Connection scheme and data interface

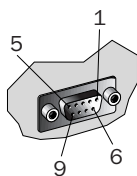
DML 40-1211

Terminal



- 1** L+
- 2** M

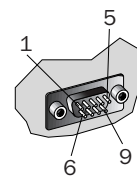
9-pin plug (bush) Sub D



- 1** NC
- 2** NC
- 3** B
- 4** RTS

- 5** M
- 6** L+
- 7** NC
- 8** A
- 9** NC

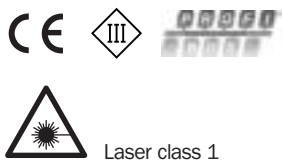
9-pin plug Sub D



- 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

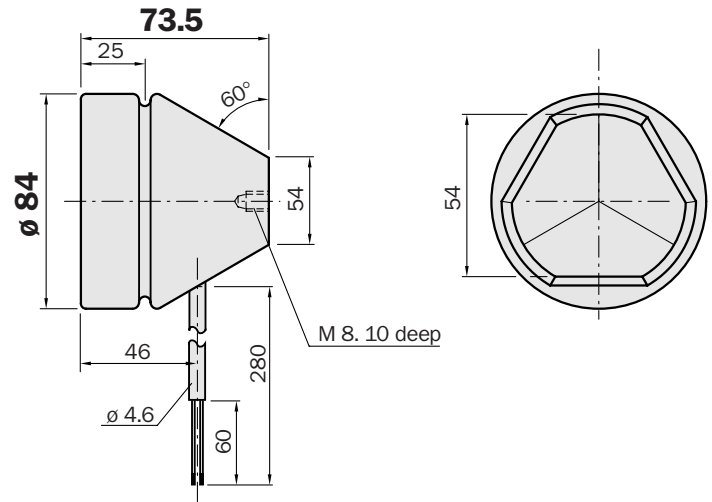
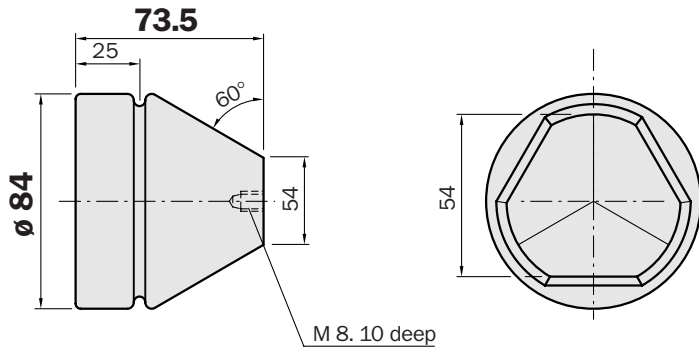
Special reflectors

Triple reflector, glass for DML

Type	Part no.
OP 55	5 309 131

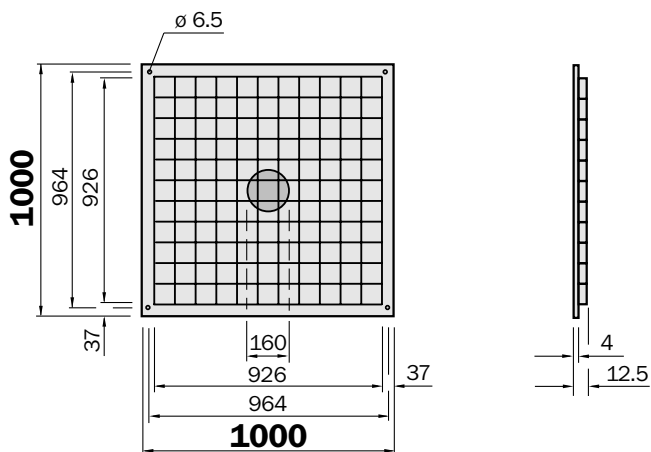
Triple reflector, glass, with heating for DML

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

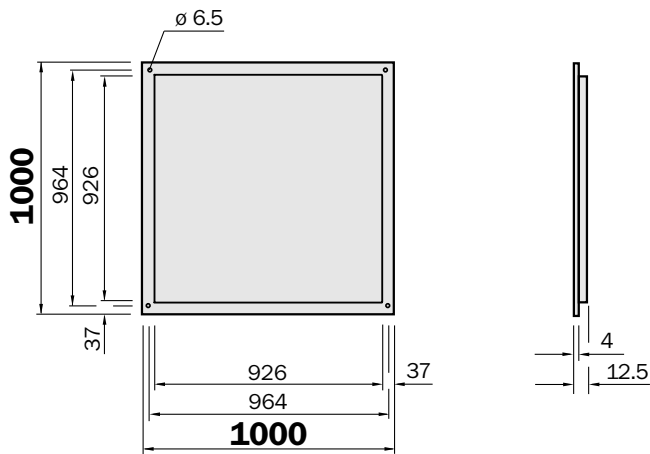


Dimension drawings and order information

Special reflectors

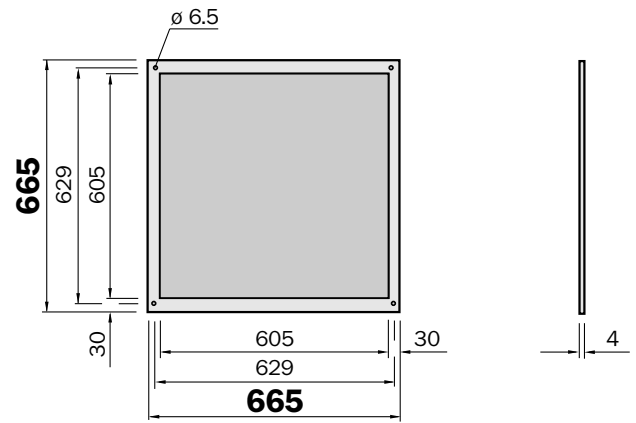
Reflector, 914 x 914 mm, Diamond Grade

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

