

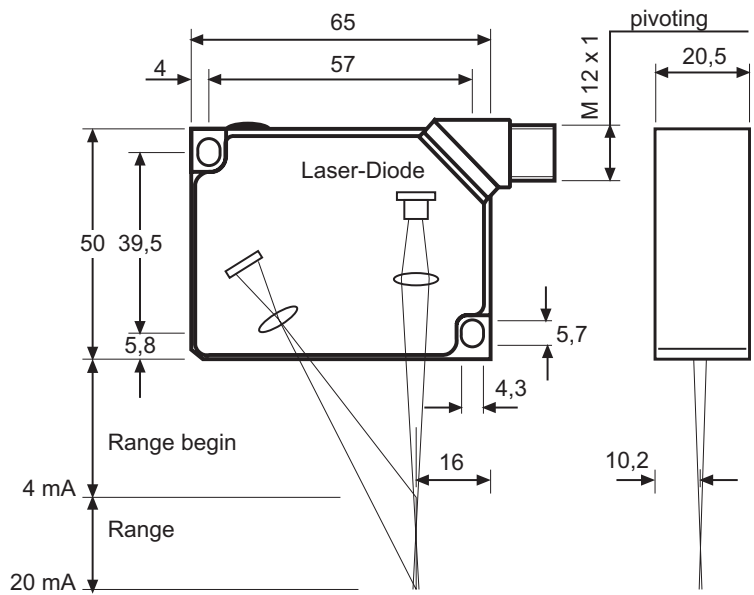
Distance Sensor M1

- Measuring
- Controlling
- Monitoring

Low cost
 Distance measuring with Laser
 100 values / s
 Triangulation analog



Sensor head M1 /20 /100 /200 /400
 Weight 100 g



- independent from object surface
- no additional electronic module

Laser Sensor M1

Sensor	M1L/ 20	M1L/ 100	M1L/ 200	M1L/ 400
Range [mm]	20	100	200	400
Range begin [mm]	30	30	50	100
Linearity* ± [mm]	0,1	0,2	0,9	1,5
Resolution* [mm]	0,1	0,3	0,4	0,6
Light spot diameter [mm]	1	2	2	3

Light source	Laser, 670 nm, red visible
Laser protection class	2
Distance output	4 ... 20 mA / 0 ... 10 V, optional RS 485
Reaction time	10 ms
Bandwith	100 Hz
Temperature drift	0,04% of range / K
Not enough light	PNP 100 mA
Ambient light	10.000 Lux
Operation time	50.000 h for Laser diode
Operation temperature	0° ... +50°C
Storage temperature	-20° ... +70°C
Humidity	< 90% RH
Protection class	IP 67
Supply	12 ... 28 VDC < 150 mA

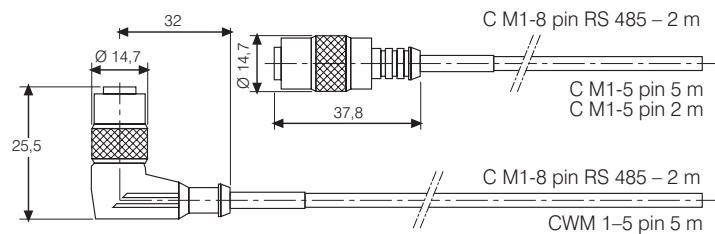
* Measurement on object color white

Delivery:

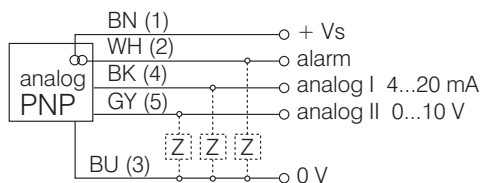
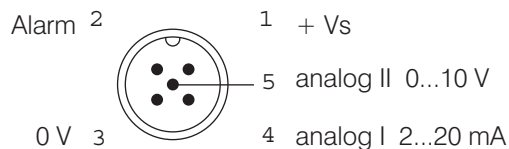
Sensor without connection cable and without connector

Please order cable and connector as accessories

connection cable



pin assignment



Distance Sensor M3

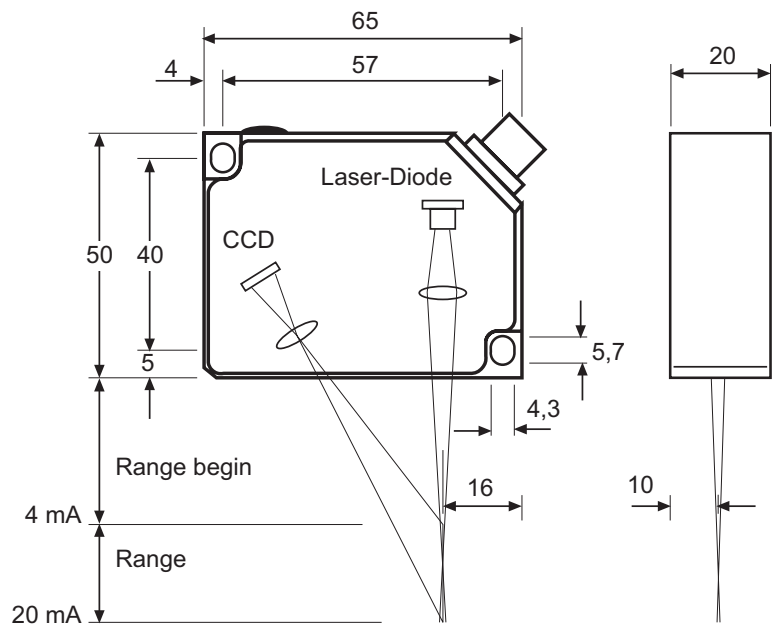
- Measuring
- Controlling
- Monitoring

Clever, with laser switch off
1000 values / s

Triangulation digital



Sensor head M3 /5 /10 /20 /50 /100 /200
Weight 90 g



- no additional electronic module
- measurement on many different surfaces up to 1 kHz: black rubber, polished metal
- automatic adjusting of measuring frequency depending on measuring object

Laser Sensor M3

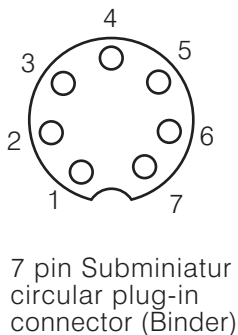
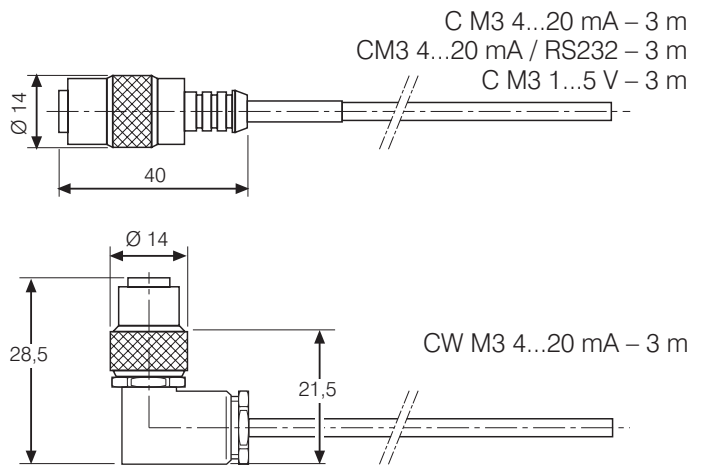
Sensor	M3L/ 5	M3L/ 10	M3L/ 20	M3L/ 50	M3L/ 100	M3L/ 200	M3L/ 250
Range [mm]	5	10	20	50	100	200	250
Range begin [mm]	20	20	30	45	50	60	100
Linearity* ± [mm]	0,01	0,02	0,04	0,1	0,2	0,8	1,2
Resolution* [mm]	0,005	0,01	0,02	0,05	0,2	0,3	0,3
Light spot diameter [mm]	1	1	1	1	1	2	4

Light source	Laser 670 nm, red visible	
Laser protection class	2	
Distance output	4 ... 20 mA / RS 232 / optional 1 ...5 V with connection cable CM3	
Reaction time	4 ms	
Bandwith	max. 1 kHz (-3 dB)	
Temperature drift	0,03% of range / K	0,08% of range / K
not enough light	PNP 100 mA	
Ambient light	5.000 Lux	7.000 Lux
max. Vibration	15 g ... 1 kHz	20 g
Operation time	50.000 h for Laser diode	
Operation temperature	0° ... +50°C	
Storage temperature	-20° ... +70°C	
Humidity	<90% RH	
Protection class	IP 67	
Supply	12 ... 28 VDC / <150 mA	

* Measurement on object color white

Delivery:

- Sensor without connection cable
- connector for soldered joint
- Manual
- Calibration report



Pin	Meaning	Attributes	Color
1	Error output	Open collector, Type: NPN, switching to GND, U _{Cmax} 30 VDC, I _{Cmax} 100 mA, short circuit proof	green
2	Laser ON/OFF	turn off laser	yellow
3	RX	RS 232	blue
4	TX	RS 232	pink
5	Current output	4 ... 20 mA, short circuit proof	grey
6	GND	Reference potential of outputs, turn off laser and supply	
7	Supply	11... 30 VDC, reverse battery protection	white

Distance Sensor M5

- Measuring
- Controlling
- Monitoring

LED, 500 values / s

Operation temperature up to 70°C

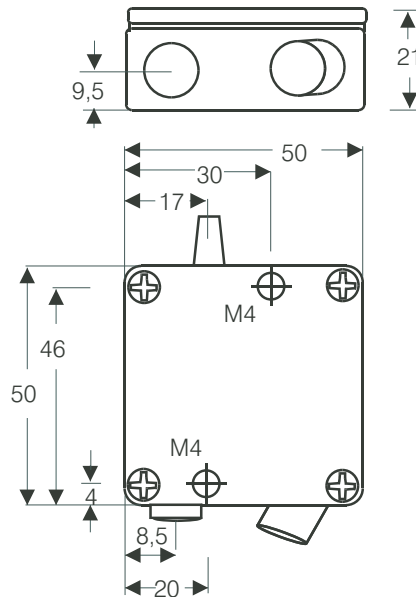
Triangulation analog



- LED Sensor with big, invisible light spot
- constant measuring values
- qualified for textiles, felt, etc. with constant colors

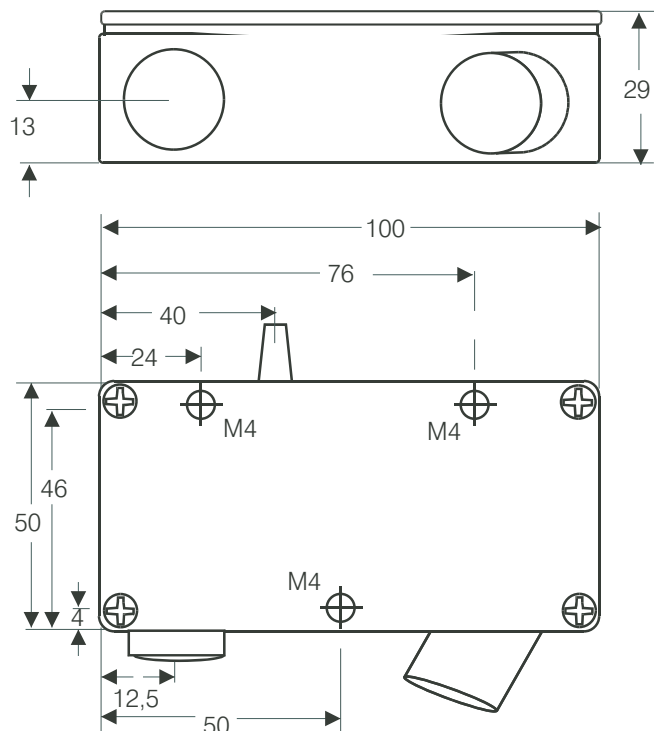
Type 2

Weight 240 g , cable length 2 m



Type 3

Weight 400 g , cable length 2 m



LED Sensor M5

Big invisible light spot für constant measurement results

Sensor	M5/2	M5/4	M5/10	M5/20	M5/100	M5/200
Casing type	2	2	2	2	3	3
Range [mm]	2	4	10	20	100	200
Range begin [mm]	23	22	40	55	170	240
Linearity* ± [mm]	0,004	0,008	0,02	0,04	0,2	0,4
Resolution* [mm]	0,0005	0,001	0,003	0,006	0,03	0,06
Light spot diameter [mm]	0,8	0,8	2	3	8	10

Light source	LED, infrared 890 nm - invisible
Sampling frequency	2,5 kHz
Distance output	±10 V; optional: ±5 V / 0 ... 10 V / 4 ... 20 mA / RS 232 / RS 485
Impedance	approx. 0 Ohm (10 mA max.)
Angle error	with 30° of inclination (A-axis): approx. 0,5% on white surface
Reaction time	1 ms, 2 ms or 20 ms adjustable
Bandwidth	500 Hz, 200 Hz or 20 Hz (-3 dB)
Temperature drift	0,02% of range / K
Intensity	0 ... 10 V
MIN	+24 V / 10 mA when lower than MIN, LED yellow
OK	+24 V / 10 mA when higher than MIN and lower than MAX, LED green
MAX	+24 V / 10 mA when higher than MAX, LED orange
Option	Relay output 0,5 A / 100 V for "MIN", "OK" and "MAX"
Switching hysteresis	approx. 0,5% of range
not enough light	+24 V / 10 mA when not enough light, LED yellow
too much light	+24 V / 10 mA when too much light, mirroring surface, LED red
Ambient light	20.000 Lux
Operation time	50.000 h for LED
Isolation voltage	200 VDC, 0V against case
max. Vibration	5 g up to 1 kHz (sensor head, 20 g optional)
Operation temperature	0° ... +70°C
Storage temperature	-20° ... +70°C
Humidity	bis 90% RH
Protection class	Sensor: IP 64, Electronic system: IP 40
Supply	+24 VDC / 200 mA (10 ... 30 V)

* Measurement on object color white - Bandwidth 500 Hz

Delivery:

- Sensor with connection cable 2m
- Electronic unit
- 25 pin D-connector for soldered joint
- Calibration report

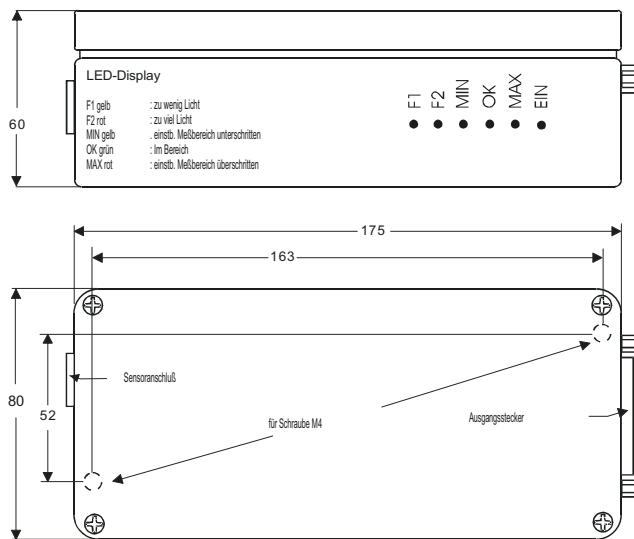
Options:

- Special cable length
- Cable output on the right side
- Sensor head with integrated protection window
- Sensor head vibration resistant
- Synchronisation of 2 sensors

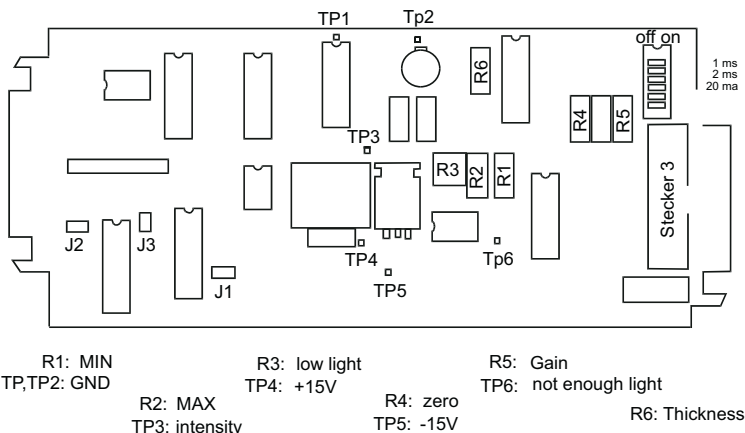
Accessories:

- Protection casing
- RS 232-Interface
- RS 485-Interface
- Extension cable 2m/3m
- Power supply
- Plug-on power supply
- Digital display (display in mm)
- More accessories on request

Electronic-unit M5



Adjustments for M5



Adjustable thresholds

The electronic system has 2 adjustable thresholds for Minimum- and Maximum-Limits. the Thresholds can be varied over the whole range, independent from the analog output.

A small hysteresis avoids flickering when the signal is close to the threshold.

When the signal is lower than MIN, the MIN output is active, when the signal is higher than MAX, the MAX output is active. Between these thresholds, the output is OK, when the object is in the sensor's range.

Thresholds are set by default to begin range and end range:

MAX: R1 = +10 V
MIN: R2 = -10 V

Dip switch settings:

Integration time	1 ms		2 ms		20 ms	
	OFF	ON	OFF	ON	OFF	ON
Frequency	500 Hz		200 Hz		20 Hz	
Switch settings						
1	X		X			X
2	X		X			X
3	X			X	X	
4	X			X	X	

default setting 500 Hz

Pin assignment:

Pin	
1	Distance output ±10 V
2	not enough light, +24 V
5	Range OK, +24 V
8	OV supply
9	Slave Takt ON
10	Master Synchron OFF
14	Analog GND
15	too much light, +24 V
16	MAX, +24 V
19	MIN, +24 V
20	Intensity 0 ... 10 V
21	+24 V supply
22	Master Takt OFF
23	Slave ON

- Measuring
- Controlling
- Monitoring

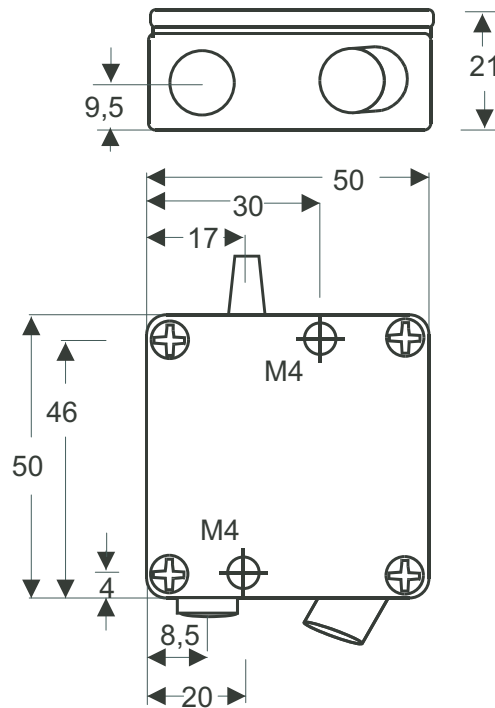
Distance Sensor M500

Laser Sensor up to 500 kHz
Measuring range 2 and 8 mm



Type 2

Weight 240 g, cable length 1 m



■ for extreme fast measuring

■ small sensor head due to separated electronic module

Laser Sensor M500

For very fast measuring

Sensor	M500L/ 2	M500L/ 8
Casing type	2	2
Range [mm]	2	8
Range begin [mm]	23	47,5
Linearity* ± [mm]	0,004	0,016
Resolution* [mm]	0,04	0,1
Light spot diameter [mm]	0,06	0,3

Light source	Laser, 670 nm, red visible
Sampling frequency	DC
<u>Laser protection class</u>	3R
Distance output	±10 V
Angle error	with 15° of inclination (A-axis): approx. 0,5% on white surface
Analog outputs	Reaction time 1,2 µs
	Bandwith 500 kHz (-3 dB)
	Temperature drift 0,07% of range / K
<u>Intensity output</u>	0 ... 10 V
	MIN +24 V / 10 mA when lower than MIN, LED yellow
Switching outputs	OK +24 V / 10 mA when higher than MIN and lower than MAX, LED green
	MAX +24 V / 10 mA when higher than MAX, LED orange
	Error output +24 V / 10 mA, LED red
	Switching hysteresis 0,2% of range
	Ambient light 500 Lux - only continuous light, no artificial light (50 Hz)
	Operation time 50.000 h for Laser diode
	Isolation voltage 200 VDC
	max. Vibration 5 g up to 1 kHz
	Operation temperature +10° ... +50°C
	Storage temperature -20° ... +70°C
	Humidity up to 90% RH
	Protection class Sensor: IP 64, Electronic system: IP 40
	Supply +24 VDC / 350 mA (18 ... 28 V)

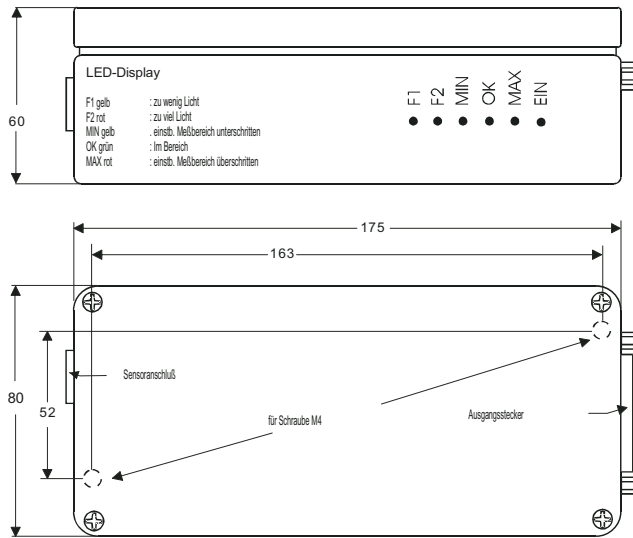
* Measurement on object color white – Bandwith 500 kHz

Delivery:

- Sensor with connection cable 1 m
- electronic unit
- 25 pin Sub-D connector for output, soldering version
- Calibration report

special types on request

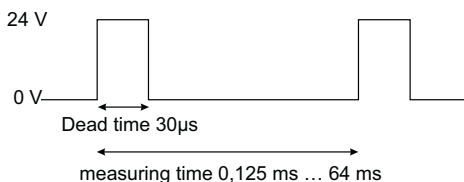
Electronic unit M500



The M500 is working at DC-operation. For the adaption to fluctuations of the ambient light, the sensor is effecting a correction of this light every 0,125 to 64 ms.

To reach full speed, the sensor should operate in a casing protected against changing light (light bulb or neon lamp).

M500 Zero-point cycle
Output on pin 4 25 pin connector

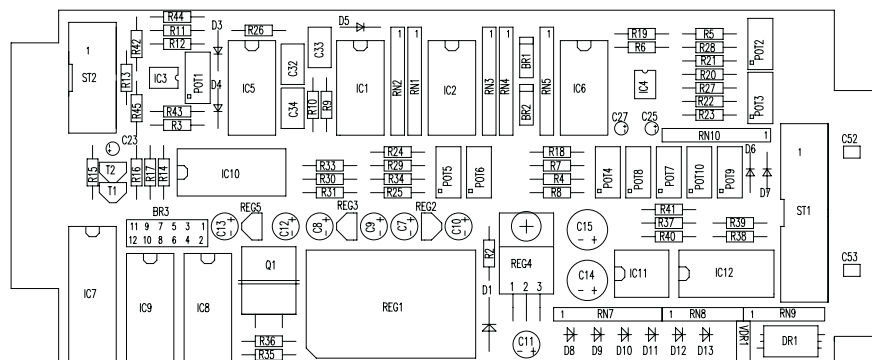


Pin assignment
25 pin SUB-D connector:

Pin	
1	Distance output ± 10 V
2	not enough light, +24 V
4	Impulse for alignment
5	Range OK, +24 V
7	external alignment
8	0V supply
14	analog GND
15	too much light, +24 V
16	MAX, +24 V
18	Intensity 0 ... 10 V
19	MIN, +24 V
21	18 ... 28 V, approx. 350 mA

This zero-point cycle will start automatically all 0,125 to 64 ms. The measuring time can be set by dip switches. If the sensor is going into the zero-point cycle, the zero set output will be high. During this time all other outputs will be undetermined.

BR 3	Intervall
1-2	64 ms
3-4	32 ms
5-6	1 ms
7-8	0,5 ms
9-10	0,25 ms
11-12	0,125 ms



Distance Sensor M7

- Measuring
- Controlling
- Monitoring

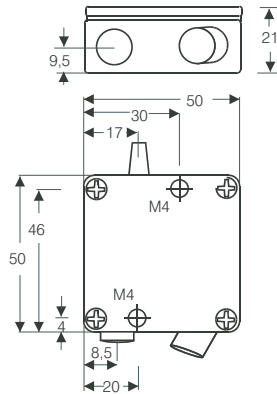
Laser Sensor up to 10 kHz
measuring range 0,5 ... 400mm

Triangulation analog

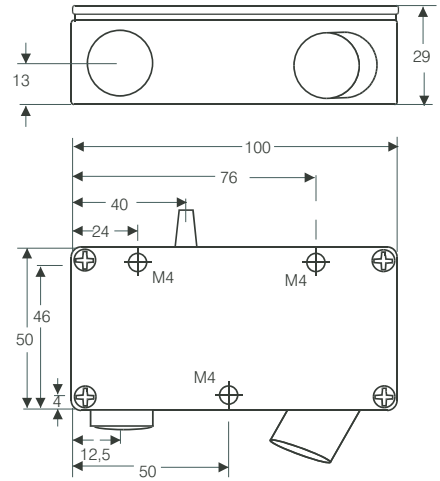


- small sensor head due to separated electronic module
- independent from object surface: bright, dark
- very precise and fast measurement due to special analog module
- easy adjusting of measuring frequency and reaction time

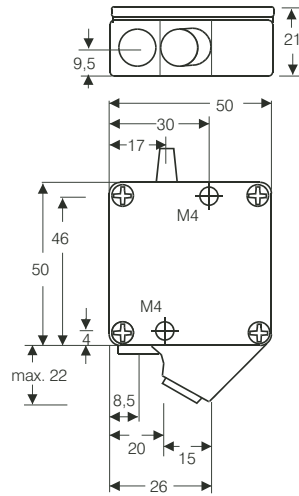
Type 2
Weight 240 g, cable length 2 m



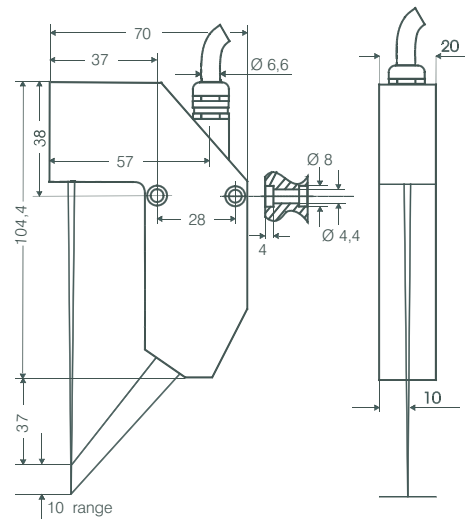
Type 3
Weight 400 g, cable length 2 m



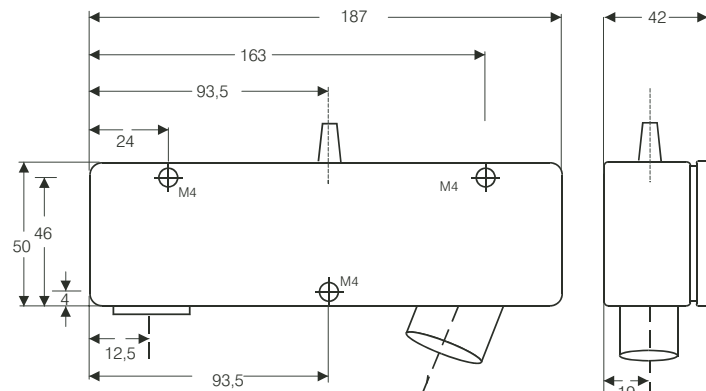
Type 1
Weight 250 g, cable length 2 m



Type 5
Weight 200 g, cable length 2 m



Type 4
Weight 850 g, cable length 2 m



Laser Sensor M7

For all surfaces, matt black to high splendid, adjustable up to 10 kHz

Sensor	M7L/ 0,5	M7L/ 2	M7L/ 4	M7L/ 10	M7L/ 20	M7L/ 50	M7L/ 100	M7L/ 200	M7L/ 400	M7L/ 42/10
Casing type	1	2	2	2	2	3	3	3	4	5
Range [mm]	0,5	2	4	10	20	50	100	200	400	10
Range begin [mm]	23,75	23	22	40	55	95	170	240	480	37
Linearity* ± [µm]	1,0	4,0	8,0	20	40	100	200	400	700	20
Resolution* [µm]	0,2	0,4	1,0	5,0	9,0	30	60	200	600	3,0
Light spot diameter [mm]	0,1	0,2	0,3	0,6	0,9	1,5	1,5	2	4	0,2
Laser protection class	2	2	2	2	2	2	2	2	3R	2

Light source	Laser, 670 nm, red visible
Sampling frequency	54 kHz
Distance output	±10 V (optional 0 ... 10 V / 0 ... 5 V / ±5 V) RS 232 / 4 ... 20 mA (optional 0 ... 20 mA)
Impedance	approx. 0 Ohm (10 mA max.)
Analog outputs	Angle error with 30° of inclination (A-axis): approx. 0,5% on white surface
Reaction time	0,1 ... 67 ms
Bandwith	0,015 ... 10 kHz (-3 dB)
Temperature drift	0,02% of range / K
Intensity output	0 ... 10 V
Switching outputs	MIN +24 V / 10 mA when lower than MIN, LED yellow OK +24 V / 10 mA when higher than MIN and lower than MAX, LED green MAX +24 V / 10 mA when higher than MAX, LED orange
Error output	+24 V / 10 mA, LED red
Switching hysteresis	approx. 0,5% of range
Ambient light	20.000 Lux
Operation time	50.000 h for Laser diode
Isolation voltage	200 VDC, 0V against case
max. Vibration	5 g up to 1 kHz (sensor head, 20 g optional)
Operation temperature	0° ... +50°C
Storage temperature	-20° ... +70°C
Humidity	up to 90% RH
Protection class	Sensor: IP 64, Electronic system: IP 40
Supply	+24 VDC / 200 mA (10 ... 30 V)

* Measurement on object color white – bandwith 15 Hz

Delivery:

- Sensor with connection cable 2m
- Electronic unit
- 25 pin D-connector, soldering version
- Calibration report

Options:

- Special cable length
- Sensor head with integrated protection window
- Sensor head vibration resistant

Accessories:

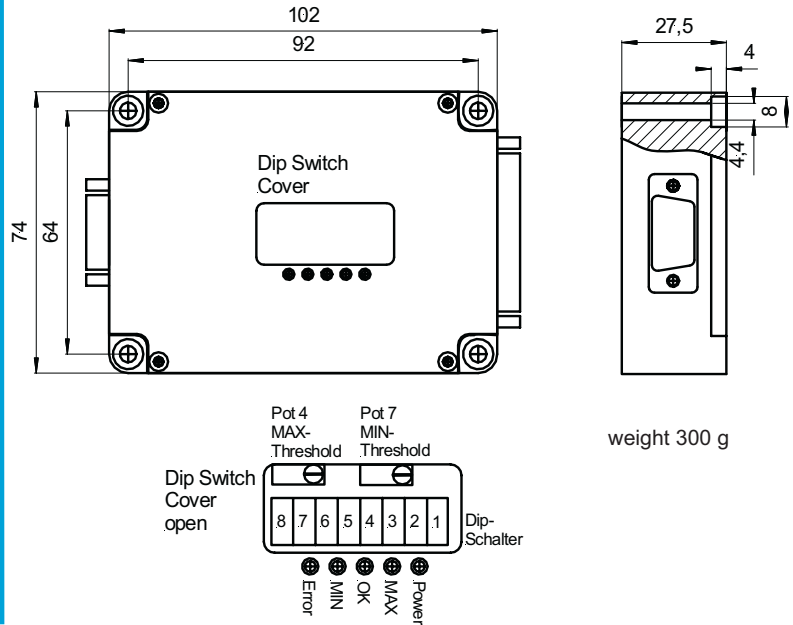
- Thickness measuring system
- Increased laser capacity
- Protection casing
- Interference filter
- RS 232-Interface
- Extension cable 2m
- Power supply
- Plug-on power supply
- Digital display (display in mm)
- More accessories on request

Special types on request

Electronic unit M7-series



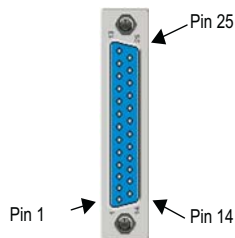
Standard delivery of M7, M72 and M74



weight 300 g

Pin assignment 25 pin SUB-D connector:

Pin	
1	Distance output ± 10 V
2	Error +24 V / 10 mA
3	Laser OFF, 0V
4	TXD
5	Range OK, +24 V / 10 mA
6	4 ... 20 mA
7	RXD
8	0V supply
14	Analog GND
16	MAX, +24 V / 10 mA
17	Input Sensor 2
18	RTS
19	MIN, +24 V / 10 mA
20	Intensity 0 ... 10 V
21	+24 V supply



Dip switch settings:

SW1	Function
on	RS 232 Software Trigger with RXD
off	Stop with RTS

SW2	Function
on	RS 232 Baud rate = 38,4 kBaud
off	RS 232 Baud rate = 115,2 kBaud

SW3 unconnected

SW4	SW5	SW6	F/kHz	T/ms
on	on	on	10	0,1
off	on	on	7	0,14
on	off	on	4	0,25
off	off	on	1	1
on	on	off	0,25	4
off	on	off	0,1	10
on	off	off	0,025	40
off	off	off	0,015	67

SW7	SW8	Function
on	on	Normal-Laser off when I/O = GND
off	on	Trigger with I/O = GND
on	off	Sensor = Master
off	off	Sensor = Slave

Default setting 4 kHz

Distance Sensor M72

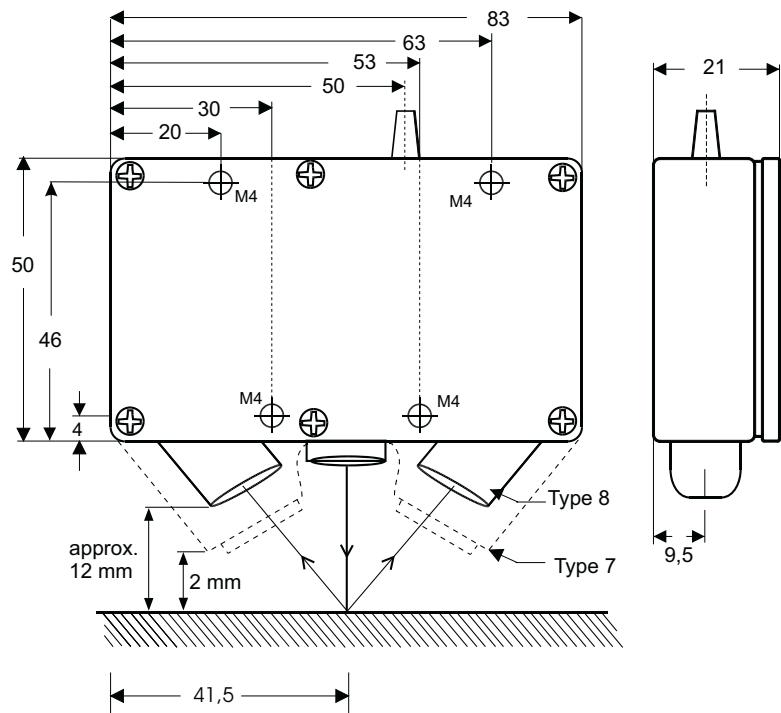
- Measuring
- Controlling
- Monitoring

Laser Sensor up to 10 kHz
measuring range 0,5 ... 4 mm

Triangulation analog



Type 7 / Type 8
weight 300 g, cable length 2 m



- for mirroring surfaces
- double sensor with two receivers for high accuracy
- independent from object surface: bright, dark
- easy adjusting of measuring frequency and reaction time

Double sensor M72L, for high accuracy

For changing surfaces with bright/dark contrasts, scratches or crystalline surfaces a double sensor may be used to achieve higher accuracy than a single sensor.

Two receivers take care that irregularities are reduced, higher accuracies of better than 0,1 μm are possible on surfaces like tinned steel.

Laser Sensor M72

For special surfaces like solder

Sensor	M72L/ 0,5	M72L/ 2	M72L/ 4
Casing type	7	8	8
Range [mm]	0,5	2	4
Range begin [mm]	23,75	23	22
Linearity* ± [mm]	0,001	0,004	0,008
Resolution* [mm]	0,0001	0,0005	0,001
Light spot diameter [mm]	0,1	0,2	0,3

	Light source	Laser, 670 nm, red visible
	Sampling frequency	54 kHz
	Distance output	±10 V (optional 0 ... 10 V / 0 ... 5 V / ±5 V) RS 232 / 4 ... 20 mA (optional 0 ... 20 mA)
	Impedance	approx. 0 Ohm (10 mA max.)
Analog outputs	Angle error	with 30° of inclination (A-axis): approx. 0,5% on white surface
	Reaction time	0,1 ... 67 ms
	Bandwith	0,015 ... 10 kHz (-3 dB)
	Temperature drift	0,02% of range / K
	Intensity output	0 ... 10 V
	MIN	+24 V / 10 mA when lower than MIN, LED yellow
Switching outputs	OK	+24 V / 10 mA when higher than MIN and lower than MAX, LED green
	MAX	+24 V / 10 mA when higher than MAX, LED orange
	Error output	+24 V / 10 mA, LED red
	Switching hysteresis	approx. 0,5% of range
	Ambient light	20.000 Lux
	Operation time	50.000 h for Laser diode
	Isolation voltage	200 VDC, 0V against case
	max. Vibration	5 g up to 1 kHz (sensor head, 20 g optional)
	Operation temperature	0° ... +50°C
	Storage temperature	-20° ... +70°C
	Humidity	up to 90% RH
	Protection class	Sensor: IP 64, Electronic system: IP 40
	Supply	+24 VDC / 200 mA (10 ... 30 V)

* Measurement on object color white – bandwith 15 Hz

Delivery:

- Sensor with connection cable 2m
- Electronic unit
- 25 pin D-connector, soldering version
- Calibration report

Options:

- Special cable length
- Sensor head with integrated protection window
- Sensor head vibration resistant

Accessories:

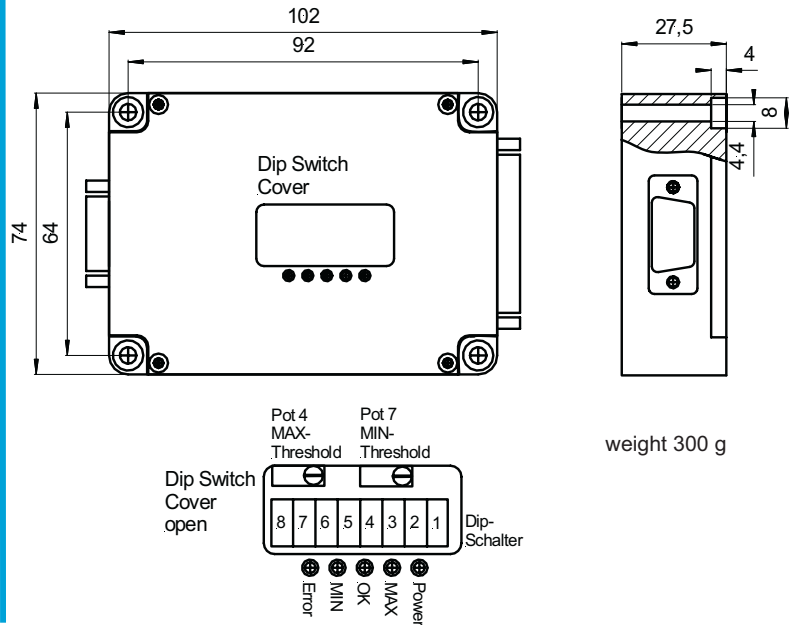
- Thickness-measuring system
- Increases laser capacity
- Protection casing
- Interference filter
- RS 232- Interface
- Extension cable 2m
- Power supply
- Plug-on power supply
- Digital display (display in mm)
- More accessories on request

Special types on request

Electronic unit M7-series

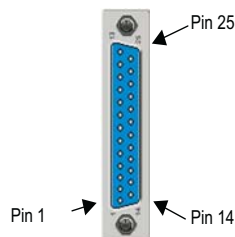


Standard delivery of M7, M72 and M74



Pin assignment 25 pin SUB-D connector:

Pin	
1	Distance output ± 10 V
2	Error +24 V / 10 mA
3	Laser OFF, 0V
4	TXD
5	Range OK, +24 V / 10 mA
6	4 ... 20 mA
7	RXD
8	0V supply
14	Analog GND
16	MAX, +24 V / 10 mA
17	Input Sensor 2
18	RTS
19	MIN, +24 V / 10 mA
20	Intensity 0 ... 10 V
21	+24 V supply



Dip switch settings:

SW1	Function
on	RS 232 Software Trigger with RXD
off	Stop with RTS

SW2	Function
on	RS 232 Baud rate = 38,4 kBaud
off	RS 232 Baud rate = 115,2 kBaud

SW3 unconnected

SW4	SW5	SW6	F/kHz	T/ms
on	on	on	10	0,1
off	on	on	7	0,14
on	off	on	4	0,25
off	off	on	1	1
on	on	off	0,25	4
off	on	off	0,1	10
on	off	off	0,025	40
off	off	off	0,015	67

SW7	SW8	Function
on	on	Normal-Laser off when I/O = GND
off	on	Trigger with I/O = GND
on	off	Sensor = Master
off	off	Sensor = Slave

Default setting 4 kHz

Distance Sensor M74

- Measuring
- Controlling
- Monitoring

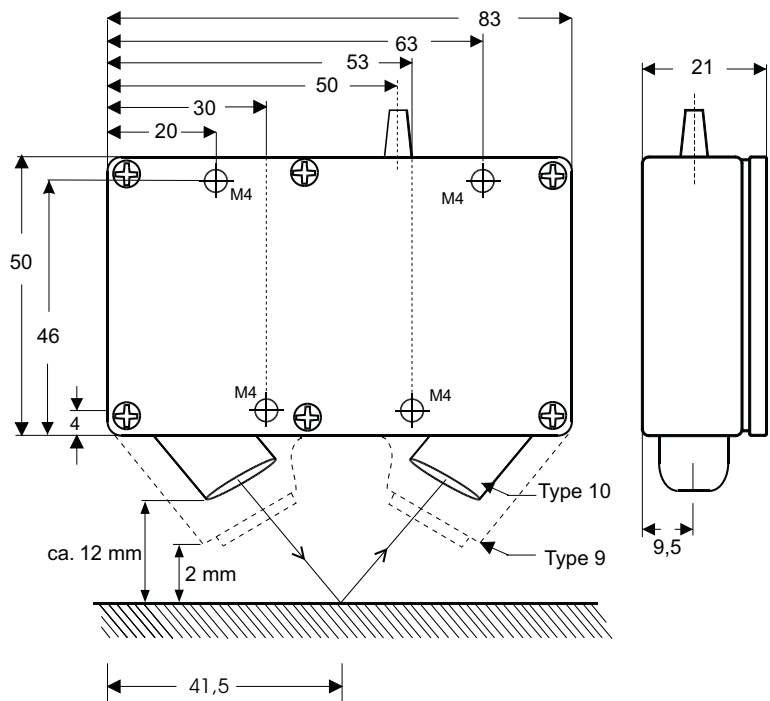
Laser Sensor up to 10 kHz
Measuring range 0,5 and 2 mm

Triangulation analog



Type 9 / Type 10

Weight 300 g, cable length 2 m



- for high mirroring and transparent surfaces
- small sensor head due to separated electronic module
- easy adjusting of measuring frequency and reaction time

M74 Sensor for high mirroring surfaces

The laser beam is inclined under an angle of 45°, this guarantees precise distance measuring on mirrors, glasses, wafers or other high mirroring surfaces.

Laser Sensor M74

For high mirroring and transparent surfaces like mirror, sheet glass or clingwrap

Sensor	M74L/ 0,5	M74L/ 2
Casing type	9	10
Range [mm]	0,5	2
Range begin [mm]	23,75	23
Linearity* ± [mm]	0,001	0,004
Resolution* [mm]	0,0003	0,001
Light spot diameter [mm]	0,1	0,1

Light source	Laser, 670 nm, red visible
Sampling frequency	54 kHz
Distance output	±10 V (optional 0 ... 10 V / 0 ... 5 V / ±5 V) RS 232 / 4 ... 20 mA (optional 0 ... 20 mA)
Impedance	approx. 0 Ohm (10 mA max.)
Angle error	with 30° of inclination (A-axis): approx. 0,5% on white surface
Reaction time	0,1 ... 67 ms
Bandwidth	0,015 ... 10 kHz (-3 dB)
Temperature drift	0,02% / K of range
Intensity output	0 ... 10 V
MIN	+24 V / 10 mA when lower than MIN, LED yellow
OK	+24 V / 10 mA when higher than MIN and lower than MAX, LED green
MAX	+24 V / 10 mA when higher than MAX, LED orange
Error output	+24 V / 10 mA, LED red
Switching hysteresis	approx. 0,5% of range
Ambient light	20.000 Lux
Operation time	50.000 h for Laser diode
Isolation voltage	200 VDC, 0V against case
max. Vibration	5 g up to 1 kHz (sensor head, 20 g optional)
Operation temperature	0° ... +50°C
Storage temperature	-20° ... +70°C
Humidity	up to 90% RH
Protection class	Sensor: IP 64, Electronic system: IP 40
Supply	+24 VDC / 200 mA (10 ... 30 V)

* Measurement on glass – bandwidth 15 Hz

Delivery:

- Sensor with connection cable 2m
- Electronic unit
- 25pin D-connector, soldering version
- Calibration report

Options:

- Special cable length
- Sensor head with integrated protection window

Accessories:

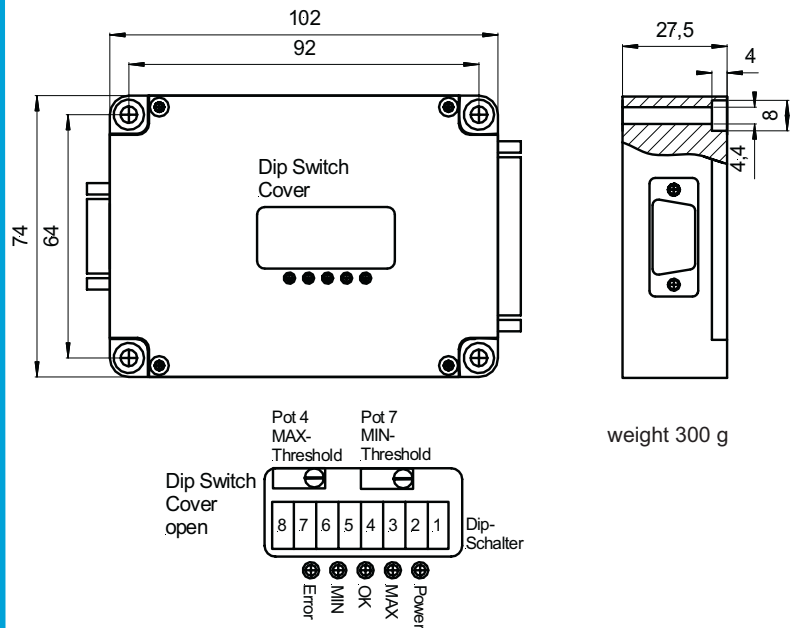
- Thickness-measuring system
- Increases laser capacity
- Protection casing
- Interference filter
- RS 232- Interface
- Extension cable 2m
- Power supply
- Plug-on power supply
- Digital display (display in mm)
- More accessories on request

Special types on request

Electronic unit M7-series

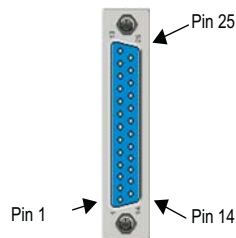


Standard delivery of M7, M72 and M74



Pin assignment 25 pin SUB-D connector:

Pin	
1	Distance output ± 10 V
2	Error +24 V / 10 mA
3	Laser OFF, 0V
4	TXD
5	Range OK, +24 V / 10 mA
6	4 ... 20 mA
7	RXD
8	0V supply
14	Analog GND
16	MAX, +24 V / 10 mA
17	Input Sensor 2
18	RTS
19	MIN, +24 V / 10 mA
20	Intensity 0 ... 10 V
21	+24 V supply



Dip switch settings:

SW1	Function
on	RS 232 Software Trigger with RXD
off	Stop with RTS

SW2	Function
on	RS 232 Baud rate = 38,4 kBaud
off	RS 232 Baud rate = 115,2 kBaud

SW3 unconnected

SW4	SW5	SW6	F/kHz	T/ms
on	on	on	10	0,1
off	on	on	7	0,14
on	off	on	4	0,25
off	off	on	1	1
on	on	off	0,25	4
off	on	off	0,1	10
on	off	off	0,025	40
off	off	off	0,015	67

SW7	SW8	Function
on	on	Normal-Laser off when I/O = GND
off	on	Trigger with I/O = GND
on	off	Sensor = Master
off	off	Sensor = Slave

Default setting 4 kHz

Distance Sensor M27

Laser Sensor bandwidth 37 kHz
Measurement range
0,5 ... 200 mm

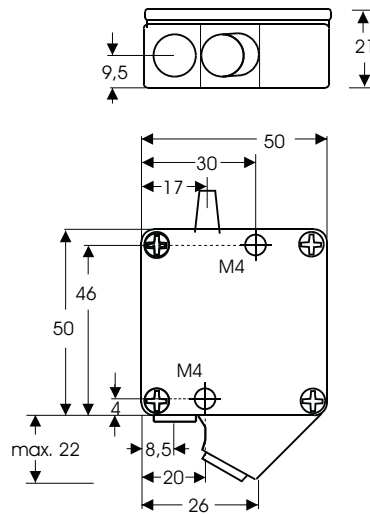
Triangulation analog



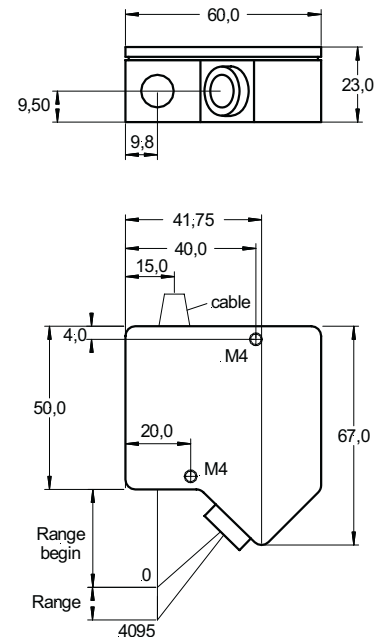
- compact sensor head
separate electronic system
- measurement independent
from object: shiny, dark
- for fast measurements as for
example:
Vibration measurement
- easy set up of measurement
frequency and reaction time

• Measuring
• Controlling
• Monitoring

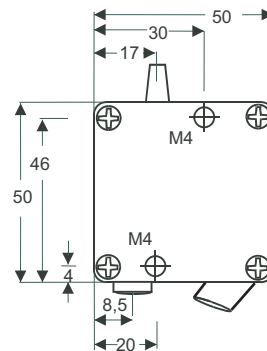
Type 1
weight 250 g, cable length 2 m



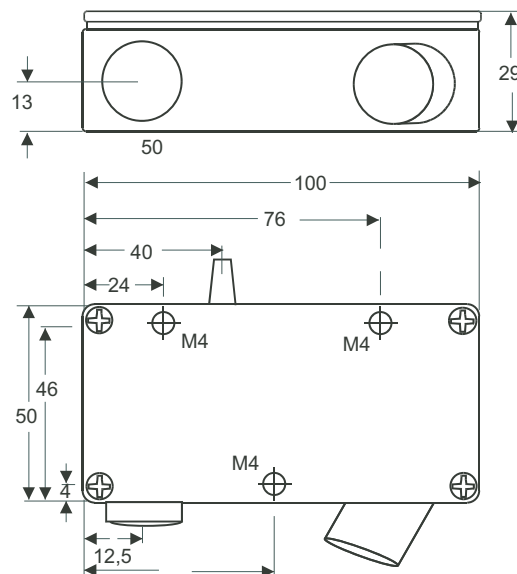
Type 6
weight 290 g, cable length 2 m



Type 2
weight 240 g, cable length 2 m



Type 3
weight 400 g, cable length 2 m



Laser Sensor M27

Fast capturing for example: vibration measurement

Sensor	M27L/ 0,5	M27L/ 1,5	M27L/ 2	M27L/ 4	M27L/ 10	M27L/ 20	M27L/ 50	M27L/ 100	M27L/ 200
Casing type	1	6	2	2	2	2	3	3	3
Range [mm]	0,5	1,5	2	4	10	20	50	100	200
Range begin [mm]	23,75	32,75	23	22	40	55	95	170	240
Linearity* [mm]	0,001	0,004	0,004	0,008	0,02	0,04	0,1	0,2	0,4
Resolution* [mm]	0,0015	0,0045	0,006	0,012	0,03	0,06	0,2	0,5	1,0
Resolution** [mm]	0,0075	0,0225	0,03	0,06	0,15	0,3	0,8	2,0	4,0
Light spot diameter [mm]	0,1	0,1	0,2	0,3	0,6	0,9	1,5	1,5	2,0
Laser protection class	2	2	2	2	2	2	2	3R	3R

Light source	Laser, 670 nm, red visible
Sampling frequency	136 kHz
Distance output	±10 V (optional 0 ... 10 V / 0 ... 5 V / ±5 V) RS 232 / 4 ... 20 mA (optional 0 ... 20 mA)
Impedance	approx. 0 Ohm (10 mA max.)
Angle error	with 30° of inclination (A-axis): approx. 0,5% on white surface
Reaction time	27 ... 400 µs
Bandwith	2,5 ... 37 kHz (-3 dB)
Temperature drift	0,02% / K of range
Intensity output	0 ... 10 V
MIN	+24 V / 10 mA when lower than MIN, LED yellow
OK	+24 V / 10 mA when higher than MIN and lower than MAX, LED green
MAX	+24 V / 10 mA when higher than MAX, LED orange
Error output	+24 V / 10 mA, LED red
Switching hysteresis	approx. 0,5% of range
Ambient light	20.000 Lux
Operation time	50.000 h for Laser diode
Isolation voltage	200 VDC, 0V against case
max. Vibration	5 g up to 1 kHz (sensor head, 20 g optional)
Operation temperature	0° ... +50°C
Storage temperature	-20° ... +70°C
Humidity	up to 90% RH
Protection class	Sensor: IP 64, Electronic system: IP 40
Supply	+24 VDC / 200 mA (10 ... 30 V)

* Measurement on object color white - frequency range 2,5 kHz

**Measurement on object color white - frequency range 37 kHz

Delivery:

- Sensor with connection cable 2 m
- Electronic unit
- 25 pin D-Sub-connector for output, soldering version

Options:

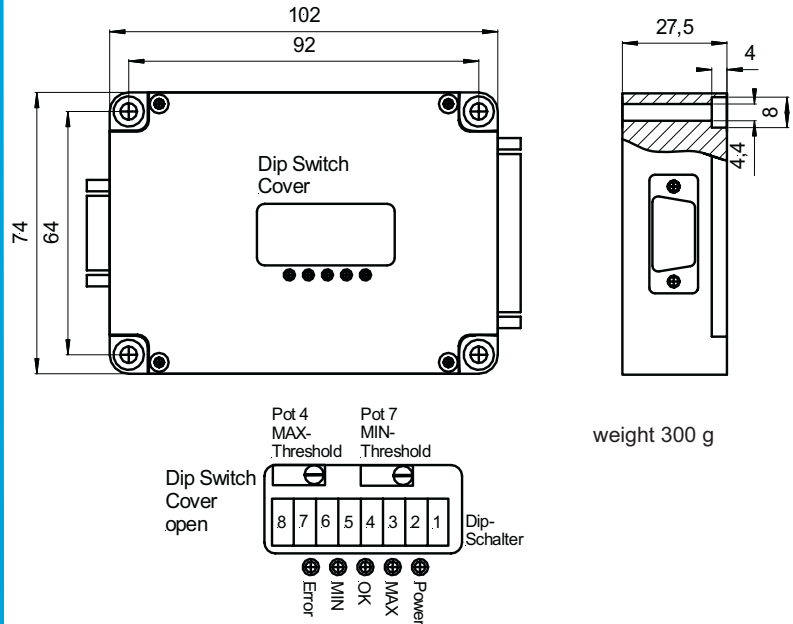
- Special cable length
- Sensor head with integrated protection glass
- Sensor head vibration resistant

Accessories:

- Thickness measurement system
- High laser power
- Protection casing
- Interference filter
- Connection cable for RS 232
- Extension cable sensor head 2 m
- Power supply for integration
- Power supply, EU
- Digital display (display in mm)
- More accessories on request

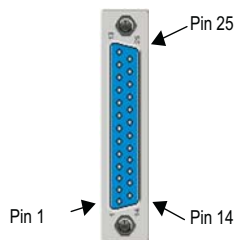
Special types on request

Electronic unit M27



Pin assignment 25 pin SUB-D connector:

Pin	Function
1	Distance output ± 10 V
2	Error +24 V / 10 mA
3	Laser OFF, 0V
4	TXD
5	Range OK, +24 V / 10 mA
6	4 ... 20 mA
7	RXD
8	0V supply
14	Analog GND
16	MAX, +24 V / 10 mA
17	Input Sensor 2
18	RTS
19	MIN, +24 V / 10 mA
20	Intensity 0 ... 10 V
21	+24 V supply



Dip switch settings:

SW1	Function
on	RS 232 Software Trigger with RXD
off	Stop with RTS

SW2	Function
on	RS 232 Baud rate = 38,4 kBaud
off	RS 232 Baud rate = 115,2 kBaud

SW3 unconnected

SW4	SW5	SW6	F/kHz	T/ μ s
on	on	on	37	27
off	on	on	30	33
on	off	on	25	40
off	off	on	20	50
on	on	off	15	67
off	on	off	10	100
on	off	off	5	200
off	off	off	2,5	400

SW7	SW8	Function
on	on	Normal-Laser off when I/O = GND
off	on	Trigger with I/O = GND
on	off	Sensor = Master
off	off	Sensor = Slave

Default setting 37 kHz

Distance Sensor M9

- Measuring
- Controlling
- Monitoring

Innovative

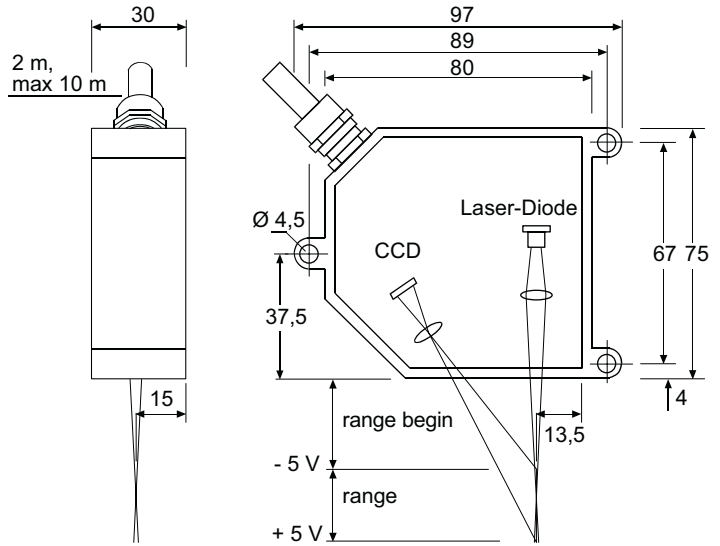
Laser Sensor up to 5 kHz

Triangulation digital



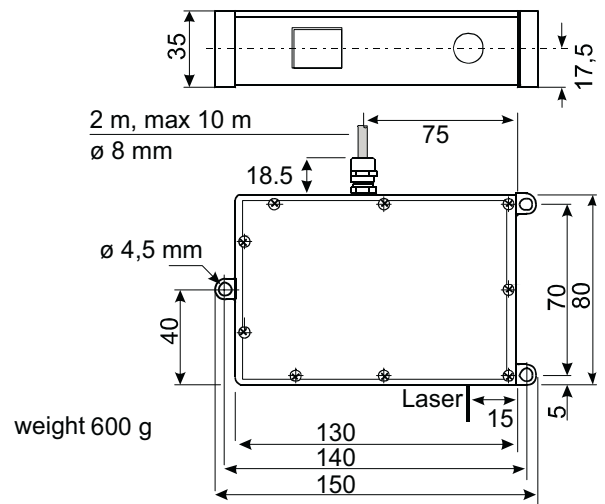
Sensor head Type /2 /10 /20 /50 /100 /200

Weight 500 g, cable length 2 m



Sensor head M9L/ 500

Weight 600 g, cable length 2 m



■ measurements on many different surfaces possible

Laser Sensor M9

For high accuracy

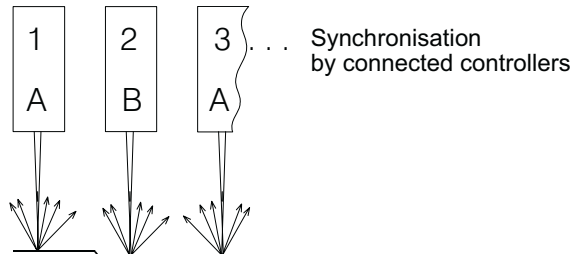
Sensor		M9L/2	M9L/10	M9L/20	M9L/50	M9L/100	M9L/200	M9L/500
Range [mm]		2	10	20	50	100	200	500
Range begin [mm]		24	30	40	45	70	70	200
Linearity* [mm]		0,002	0,008	0,015	0,04	0,08	0,2	0,4
Resolution* [mm]		0,0002	0,002	0,004	0,01	0,02	0,04	0,05
Light spot diameter [mm]		0,2	0,4	0,3	0,5	0,6	1,2	1,5
Light source		Laser, 670 nm, red visible						
Laser protection class		2						
Distance output		±5 V / optional RS 232						
Angle error		with 30° of inclination (A-axis): approx. 0,5% on white surface						
Reaction time		1,5 ms						
Bandwidth		5 kHz (-3 dB)						
Temperature drift		0,01% of range / K						
Switching output		not enough light 30 V / 100 mA optical coupler						
Ambient light		10.000 Lux						
Operation time		50.000 h for Laser diode						
Isolation voltage		200 VDC, 0V against case						
max. Vibration		5 g up to 1 kHz						
Operation temperature		0° ... +50°C						
Storage temperature		-20° ... +70°C						
Humidity		5 - 95% RH						
Protection class		Sensor IP 65, Controller IP 50						
Supply		21 ... 27 VDC < 500 mA						

3 ms
2,5 kHz

* Measurement on object color white

Delivery:

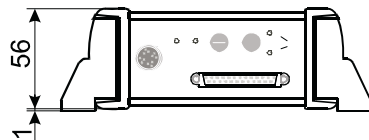
- Sensor with connection cable 2 m
- Controller
- 25pin D-connector, soldering version
- Calibration report



Accessories:

- Cable extension
- Protection casing

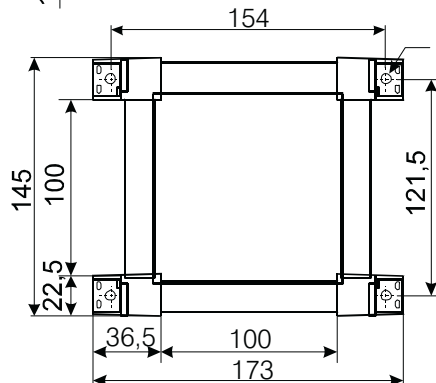
Controller for all types of sensors
Weight 1000 g



If the sensors are mounted too close, the ambient light of a close-by sensor can influence the measurement result

Options:

- RS 232-Interface



Synchronisation is standard.

The controllers have to be wired together.

Distance Sensor M10

- Measuring
- Controlling
- Monitoring

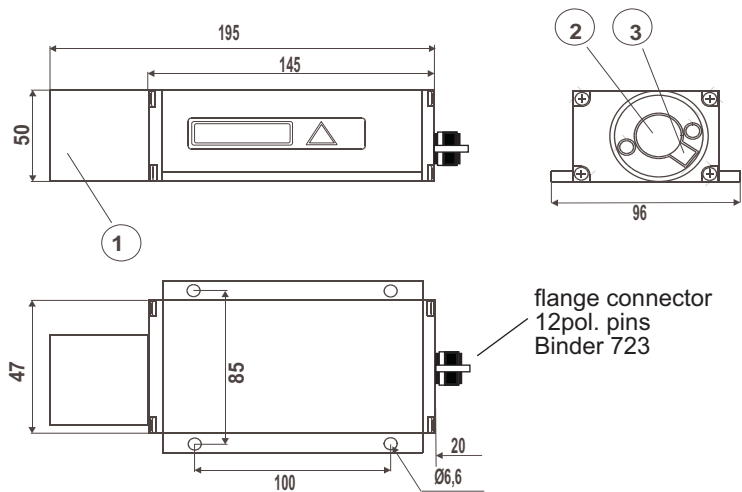
Measurement up to 30 m,
with reflector up to 100m

Comparative phase measurement



Distance sensor for distance from 0.2 to more than 100 Meter. The sensor measures on all natural surfaces, except glass and water. Measurement of distance below 30 Meter needs no reflector. Laser beam divergence and Laser spot is small. This allows measurement in small tubes.

For protection of the optical system, touch, mechanical hazards, a protective cover is mounted at the front of the unit.



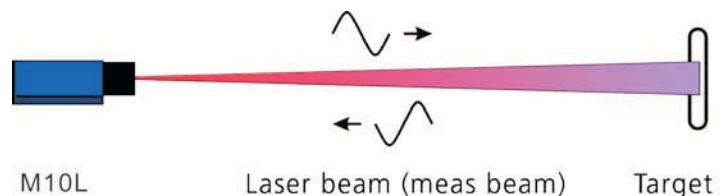
weight 850 g

- 1 protective cover
- 2 receiver optic
- 3 sender optic

- surveillance of cranes and elevators
- measurement of loose parts
- security applications
- object recognition detection of presence control from a big distance

Measurement Principle

The M10 uses phase comparison method. The M10 sends out modulated visible laser light in different frequencies. The diffuse reflected light from the target is compared to the internal reference signal. A microprocessor calculates the distance from the phase shift to the reference. Accuracy is ± 2 mm and resolution 0.1 mm within a range of 1 m.



Laser Sensor M10

ranges programmable, e. g. range 0,5m, range begin 9,5 m

Sensor	M10L/100 - 10 Hz	M10L/100 - 50 Hz
Range	100 m, reflection foil is necessary for range > 30 m	
Range begin	0,2 m	
Linearity*	± 2 mm for range < 30 m, ± 3 mm for range > 30 m	
Resolution**	1 mm	
Light spot diameter	< 6 mm with 10 m, < 30 mm with 50 m, < 60 mm with 100 m	
Measuring frequency	1 ... 10 Hz	50 Hz

Light source	Laser, 650 nm, red visible
Laser protection class	2
Distance output	4 ... 20 mA, RS 232, optional: RS 422; 2 ... 10 V
Analog outputs	programmable thresholds
Load resistor	500 Ohm
Temperature drift	0,005% of range / K
Switching output	MAX 0,5 A programmable
Trigger input	3 ... 24 V, delay time 5 ms, adjustable up to 10s
Operation temperature	-10° ... +50°C
Storage temperature	-20° ... +70°C
Humidity	bis 90% RH
Protection class	IP 65
Supply	10 ... 30 V / 150 mA

* typical measuring accuracy under average conditions within specified measuring range

**within the treshold of 1 m = 0,1 mm, outputs only with 4...20 mA oder 2...10V

Delivery:

- Sensor without connection cable
- Demo-Software
- Manual

Options:

- Interface 422
- Distance output 2...10 V

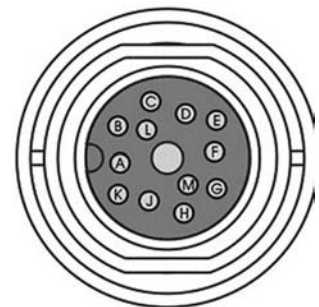
Accessories:

- connection cable 2m, 5 m or 10 m
- connection box

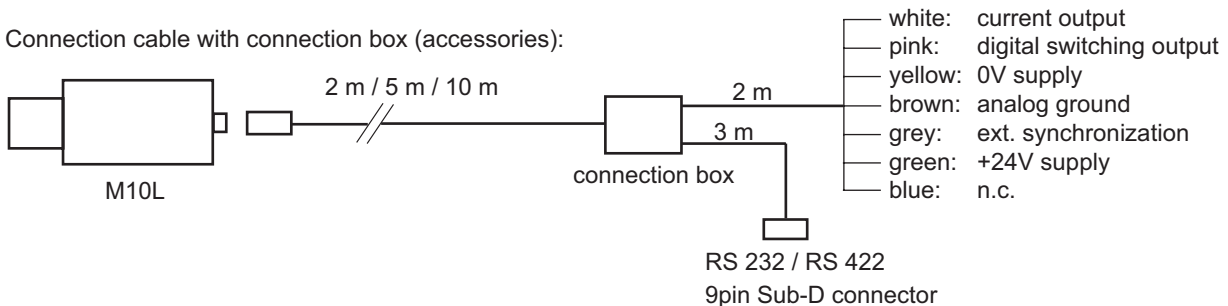
Connection cable (accessories):

Pin	color	RS 232	RS 422
A	green	TxD	RX+
B	yellow	RxD	RX-
C	brown	TRIG	TRIG
D	red	lout	lout
E	black	n.c.	TX-
F	violet	n.c.	TX+
G	orange	U _V	U _V
H	white	ALARM	ALARM
J	grey	GND	GND
L	blue	GND	GND

12-pole round-type (flange-mount)-Binder series 723:



Connection cable with connection box (accessories):



error and technical modification reserved

DB-M10_1-02-E

Distance Sensor M11

- Measuring
- Controlling
- Monitoring

Laser Sensor up to 10 kHz
Range 10 ... 150 mm

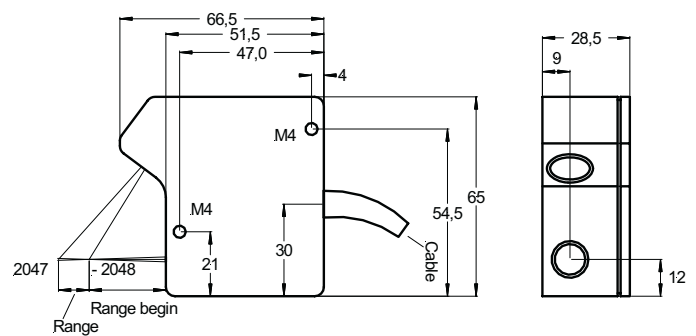
Triangulation digital



M11L/20

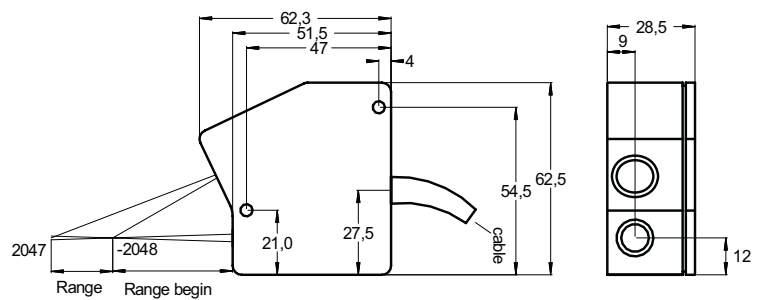
Sensor head M11L/10

Weight 280 g, cable length 2 m



Sensor head M11L/20

Weight 250 g, cable length 2 m

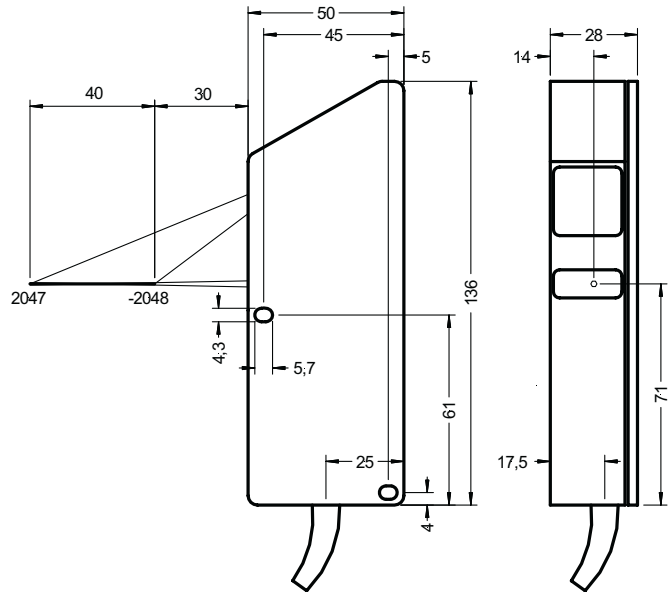


- digital distance sensor with high accuracy and resolution
- measurements on many different surfaces possible

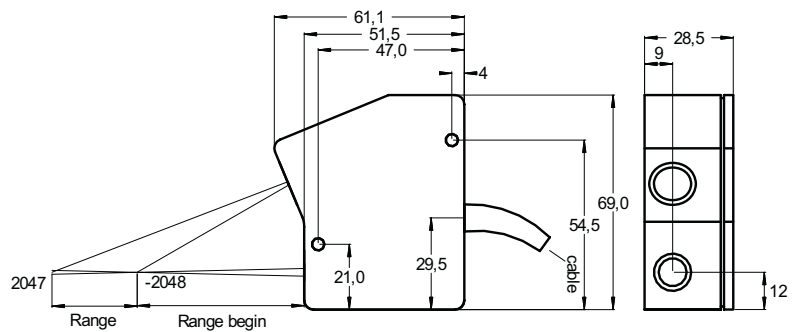


M11L/40

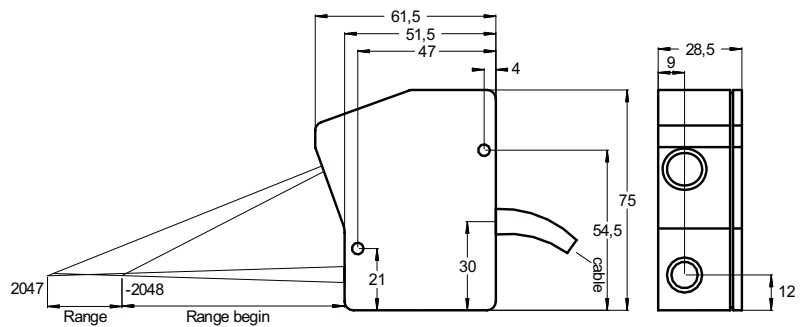
Sensor head M11L/40
Weight 410 g, cable length 2 m



Sensor head M11L/50
Weight 260 g, cable length 2 m



Sensor head M11L/100
Weight 270 g, cable length 2 m



Laser Sensor M11

For highest accuracy

Sensor		M11L/ 10	M11L/ 20	M11L/ 40	M11L/ 50	M11L/ 100	M11L/ 150***
Range [mm]		10	20	40	50	100	150
Range begin [mm]		25	40	30	55	75	1350
Linearity* ± [mm]		0,005	0,01	0,02	0,025	0,05	0,15
Resolution* [mm]		0,0025	0,005	0,01	0,0125	0,025	0,04
Light spot diameter [mm]		0,8	0,9	0,4	1	1,1	2
Laser protection class		2	2	2	2	2	3R
Light source	Laser, 670 nm, red visible						
Sampling frequency**	500 Hz up to 10 kHz						1 kHz
Distance output	±10 V (optional 0 ... 10 V / 0 ... 5 V) RS 232 / 4 ... 20 mA (optional 0 ... 20 mA)						
Impedance	approx. 0 Ohm (10 mA max.)						
Angle error	with 30° of inclination (A-axis): approx. 0,5% on white surface						
Reaction time	200 µs						
Bandwith	0,5 x sampling frequency						
Temperature drift	0,01% of range / K						
Intensity output	0 ... 10 V						
Switching outputs	MIN	+24 V, RB ¹⁾ < object < RB + 10% R ²⁾ , LED yellow					
	OK	+24 V, RB + 10% R < object < RE ³⁾ - 10% R, LED green					
	MAX	+24 V, RE - 10% R < object < RE, LED orange					
Error output	+24 V / 10 mA, LED red						
Ambient light	20.000 Lux on measured object						
Operation time	50.000 h for Laser diode						
Isolation voltage	200 VDC, 0 V against case						
max. Vibration	5 g up to 1 kHz						
Operation temperature	0° ... +40°C						
Storage temperature	-20° ... +70°C						
Humidity	up to 90% RH						
Protection class	IP 64						
Supply	+24 VDC / 280 mA (10 ... 28 V)						

* Measurement on object color white

** Automatic adjustment of sampling frequency depending on object's light intensity

*** Technical drawing on request

1) RB: Range begin 2) R: Range 3) RE: Range end

Delivery:

- Sensor with connection cable 2m
- Electronic unit
- 25 pin Sub-D connector for output soldering version
- Calibration report

Options:

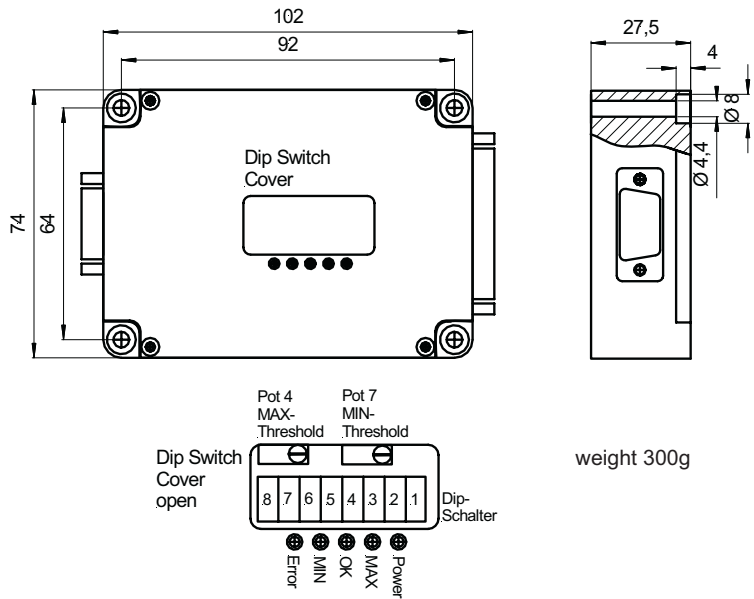
- Special cable length
- Interference filter
- Sensor head with integrated protection window
- Sensor head vibration resistant

Accessories:

- Thickness measuring system
- Increased laser capacity
- Supply output cable for RS 232
- Extension cable 2m
- Industrial power supply
- Power supply for wall socket
- Digital display (display in mm)
- More accessories on request

- Special type M11LS for high mirroring surfaces on request

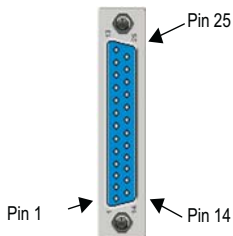
Electronic unit M11



weight 300g

Pin assignment 25 pin SUB-D connector:

Pin	
1	Distance output ± 10 V
2	Error +24 V / 10 mA
3	Laser OFF, 0V
4	TXD
5	Range OK, +24 V / 10 mA
6	4 ... 20 mA
7	RXD
8	0V supply
14	Analog GND
16	MAX, +24 V / 10 mA
17	Input Sensor 2
18	RTS
19	MIN, +24 V / 10 mA
20	Intensity 0 ... 10 V
21	+24 V supply



Dip switch settings:

SW1	SW2	SW3	adjustment intensity in % of saturation (sampling frequency)
off	off	off	Laser off / adjustment off
off	off	on	adjustment off (sampling frequency 1 kHz)
off	on	off	adjustment off (sampling frequency 5 kHz)
off	on	on	adjustment off (sampling frequency 10 kHz)
on	off	off	20%
on	off	on	30%
on	on	off	40%
on	on	on	60%
SW4	SW5	Filter	
off	off	Integration off	
off	on	Integration of 2 measurements	
on	off	Integration of 4 measurements	
on	on	Integration of 8 measurements	
SW6	SW7	plausibility test (deviation of last measured value)	
off	off	plausibility test off	
off	on	plausibility test 1 ($\pm 1\%$ of range)	
on	off	plausibility test 2 ($\pm 5\%$ of range)	
on	on	plausibility test 3 ($\pm 10\%$ of range)	
SW8			
off	control by dip switches *)		
on	control by PC (RS 232)		

*) default setting (do not change!)

RS 232-protocol (115,2 kBaud):

Data bits	7	6	5	4	3	2	1	0
Lowbyte	off	DB6	DB5	DB4	DB3	DB2	DB1	DB0
Highbyte	on	DB11	DB10	DB9	DB8	DB7	F2	F1

DB 0 - 11 = signed data bits; DB0 = LSB; DB11 = MSB

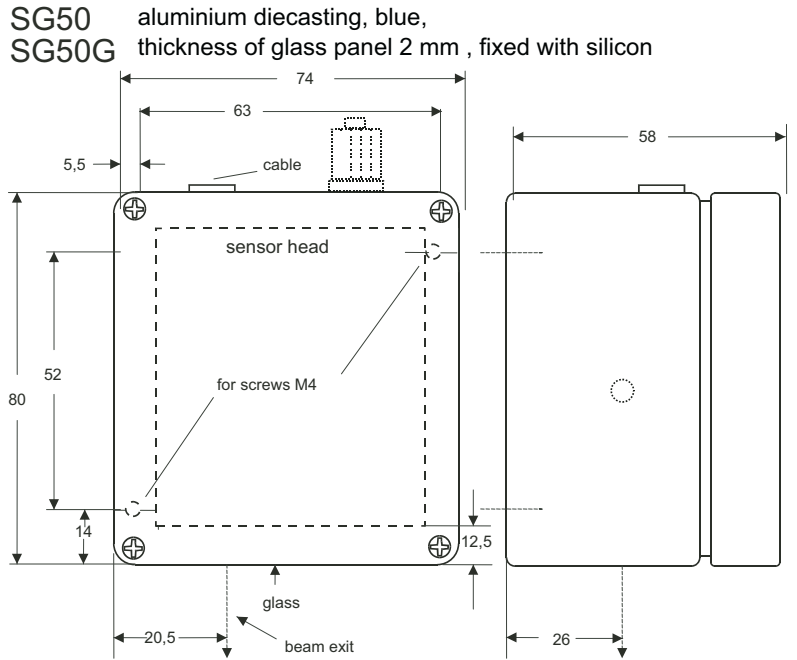
F2	F1	Status
off	off	OK
off	on	MIN
on	off	MAX
on	on	Fehler

Accessory Protection case for M5 / M7 Sensors

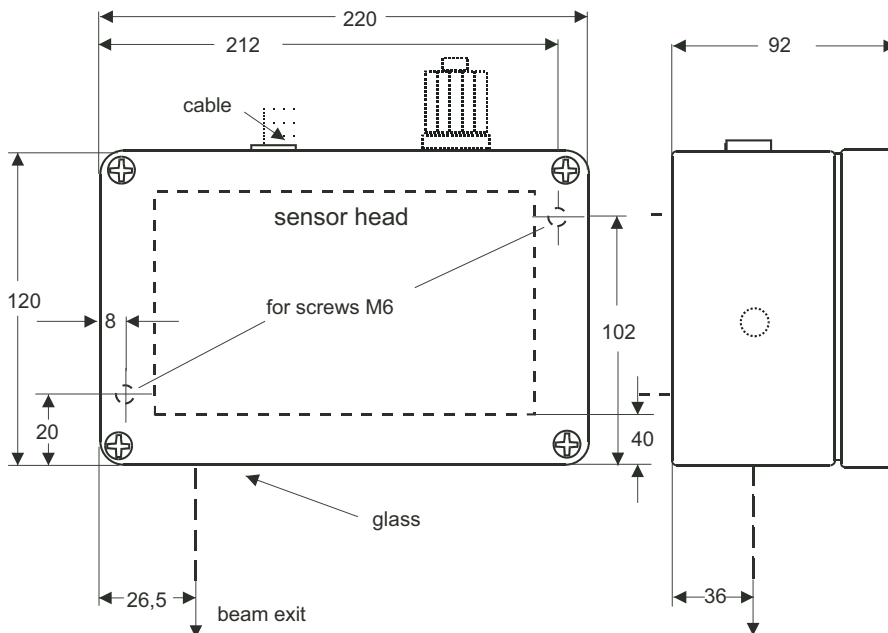
- Measuring
- Controlling
- Monitoring

For applications at high pollution level or temperature over 50°C, protection casing should be used.

There are cases with integrated window for shelter, easy to clean and cases with air cooling, avoiding penetration of dust through the shelter opening.

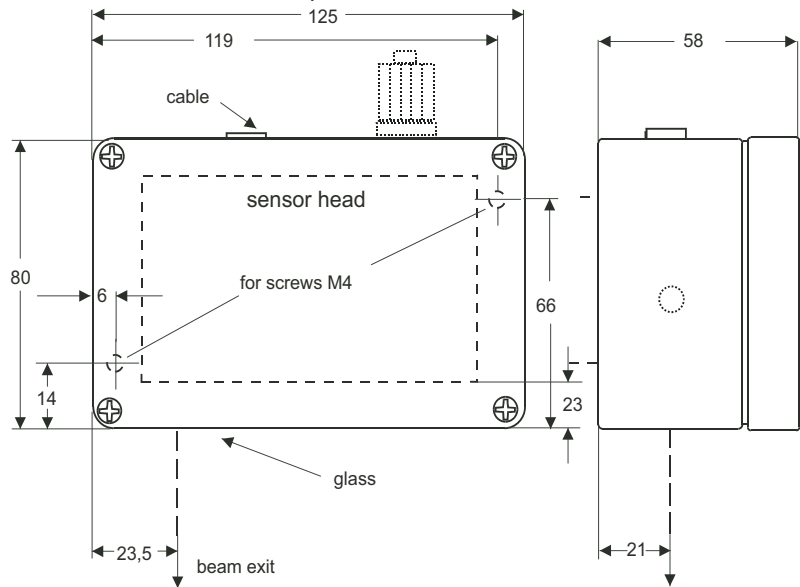


SG400G for range 400 mm, aluminium diecasting, blue,
SG400GL thickness of glass panel 2 mm, fixed with silicon
connection for compressed air tube d 4 mm / D 6 mm



Accessory Protection case for M5 / M7 Sensors

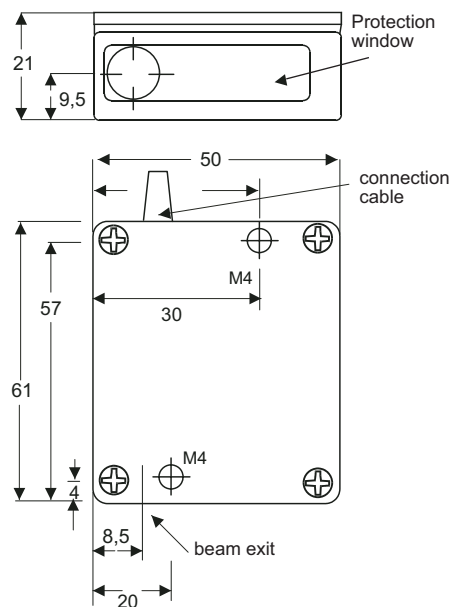
SG100G for ranges 50, 100 and 200 mm,
SG100GL thickness of glass panel 2 mm, fixed with silicon
connection for compressed air tube d 4 mm / D 6 mm



Sensor head M5 / M7 with Protection window

This sensor head is available with an additional protection window alternatively of plastics or glass. An additional protection case is not necessary.

Sensor head
M5 / M7



available for ranges 2, 4, 10 and 20mm

Accessory Digital display Modig



Representation of:

- display of maximum value
- display of minimum value
- amount

- Measuring
- Controlling
- Monitoring

The digital display allows a demonstration of the active measuring value in mm. For a measuring range of 2 mm a ± 10 V distance output can be displayed as numerical numbers 0.0001 [mm] up to 1.9999 [mm].

Accuracy 18° ...28°C, Range +/- 20V = 0,02% of displax + 3 mV
Weight < 500 g
supply 110 ... 250 VAC 50/60 HZ

Digital display Modig with alarm card
There is only one card to attach:

- relay output card 2 changer, contact load 5A, 120/240 VAC or 28 VDC
- relay output card 4 shutter, contact load 3A, 120/240 VAC or 28 VDC
- transistor output card 4 NPN-Open collector max. 100 mA / 30VDC
- transistor output card 4 PNP-Open collector max. 100 mA / 30VDC

Digital display Modig-RS485

RS485, transfer rate max. 19,2 kBaud, cable length up to 100 m

Digital display Modig -PROFIBUS-DP

Dimensions/ hole of control panel:
92 x 45 mm, min. thickness 3 mm