



Laser Triangulation Displacement Sensors





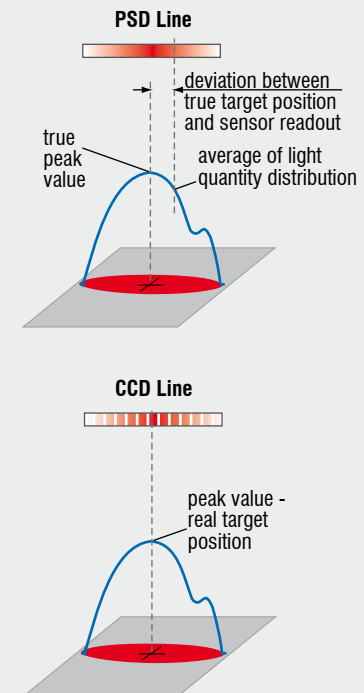
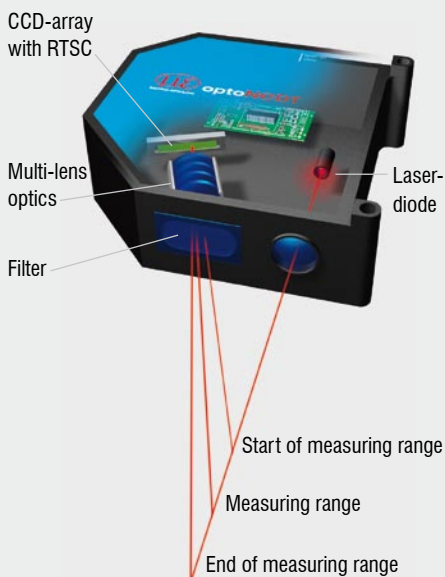
- Non-contact
- Wear free
- Large stand off
- Tiny measuring spot for small targets
- High speed
- Precision measurement
- Any target

A laser diode forms a spot on the surface of the target. The diffusely reflected light is projected back onto an imaging array via a precision receiving optical system. If the distance between the target and the laser sensor changes, the angle at which the light spot is observed also changes, resulting in a different position on the receiving imaging device. The position sensitive measuring element used for the series optoNCDT 16x7 is a PSD element, for all the other sensor models of the optoNCDT series a digital imaging device is utilized.

The series optoNCDT are world wide recognized as precision laser optical displacement and position sensors.

Laser optical displacement sensors measure from various distances to the target with a tiny beam spot, which enables measurements against the smallest parts. Due to the large stand off, measurements against critical surfaces such as hot surfaces are possible.

The non-contact principle allows complete wear free precision measurement. Since there is no physical contact with the target, neither the measurement nor the specimen are effected by the reading. The laser triangulation principle is ideal for any high speed measurement task which requires extremely high accuracy and resolution.



LASER RADIATION
Do not stare into the beam
CLASS 2 LASER PRODUCT
IEC 60825-1: 2001-11
P<1mW; λ=670nm

IEC - Standard

optoNCDT sensors uses a semiconductor laser with a wavelength of 670nm (visible/red). The maximum optical output power is 1mW. The sensor is classified as laser class II. A warning sign is attached to the sensor housing.

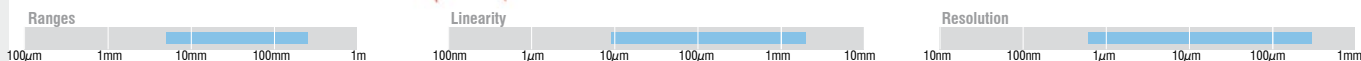
page 10-15

COMPACT & LOW COST Series 1302 / 1402 / 1402SC

Ranges 5 - 600mm
Resolution from 1 μ m
For tiny installation rooms



- CMOS sensor element
- Output analog / digital
- Integral controller
- Auto Target Compensation (ATC)
- Trigger input and teach in
- DAQ and configuration software (series 1402)
- Performance certificate (series 1402)
- High flex cables rated for moving cable tracks
- Robot rated cable
- Adjustable measuring rate (series 1402)
- Version 1402SC with stainless steel housing



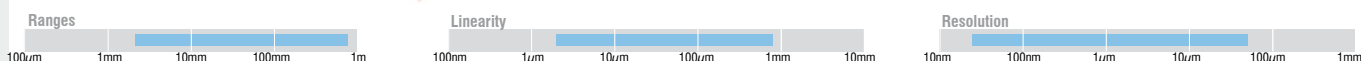
page 16-21

INDUSTRY STANDARD Series 1700 / 1700LL / 1700DR

Ranges 2 - 750mm
Resolution from 0.025 μ m
No external controller
Anti speckle and specular model



- CCD sensor element
- Output analog / digital
- Integral controller
- Auto Target Compensation (ATC)
- Real-Time-Surface-Compensation (RTSC)
- Adjustable filter functions
- DAQ and configuration software
- Performance certificate
- Option for direct reflection or metal target
- High flex cables rated for moving cable tracks
- Robot rated cable



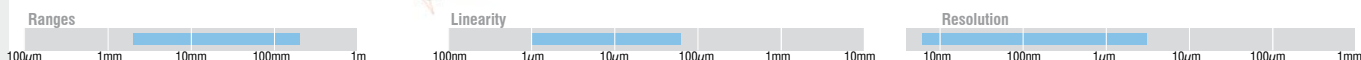
page 22-25

MOST PRECISE SENSOR Series 2200 / 2200LL

Ranges 2 - 200mm
Resolution from 0.0075 μ m
Unmatched accuracy
Anti speckle sensor



- CCD sensor element
- Output analog / digital
- Auto Target Compensation (ATC)
- Real-Time-Surface-Compensation (RTSC)
- Adjustable filter functions
- DAQ and configuration software
- Performance certificate
- Option for direct reflection or metal target
- High flex cables rated for moving cable tracks



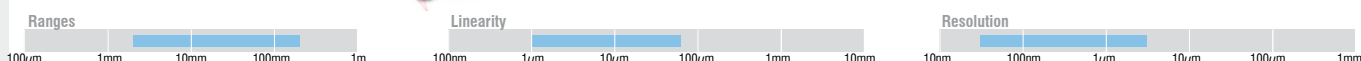
page 26-29

MOST PRECISE AT MAXIMUM SPEED Series 2220 / 2220LL

Ranges 2 - 200mm
Resolution from 0.03 μ m
Maximum speed
Anti speckle sensor



- CCD sensor element
- Output analog / digital
- Auto Target Compensation (ATC)
- Real-Time-Surface-Compensation (RTSC)
- Adjustable filter functions
- DAQ and configuration software
- Performance certificate
- Option for direct reflection or metal target
- High flex cables rated for moving cable tracks



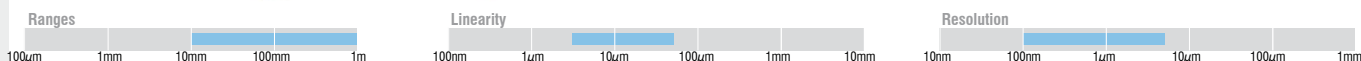
page 30-33

LARGE STAND OFF Series 1810-50 / 2210 / 1710-1000

Ranges 10 - 50mm
Resolution from 0.125 μ m
Large stand off



- CCD sensor element
- Output analog / digital
- Auto Target Compensation (ATC)
- Real-Time-Surface-Compensation (RTSC)
- Adjustable filter functions
- DAQ and configuration software
- Performance certificate
- High flex cables rated for moving cable tracks
- 1710-1000 with measuring range up to 1000mm



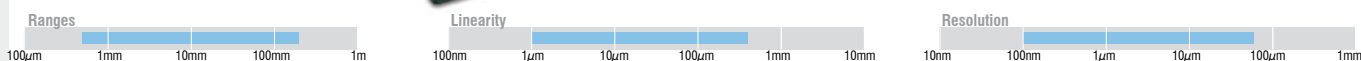
page 34-35

THE HIGH SPEED PSD SENSOR Series 1607

Ranges 0.5 - 200mm
Resolution from 0.1 μ m
Up to 37,000Hz true analog frequency response



- PSD sensor element
- Output analog / digital
- Auto Target Compensation (ATC)
- Performance certificate
- High flex cables rated for moving cable tracks



Well designed for industrial applications

The sensors of the product group optoNCDT are especially well designed for industrial applications. Due to their robust design and technical features precise measurement results are guaranteed, even under the most difficult conditions.

Analog and digital outputs

The sensors optoNCDT offers various analog output signals as well as digital interfaces for the best and cleanest signal transfer. These intelligent sensors use high speed digital serial interfaces to communicate with a PC or a PLC for configuration and measurement. Multiple digital I/Os supply additional control features.

Compact design with integral controller

All ranges of the optoNCDT 1302, 1402, 1700, 1700LL and 1700DR series have a completely integrated controller. There is no separate controller box, offering easy installation and wiring with no risk of mismatching of the sensor heads. Its small and compact size allows the sensor to be integrated into tight installation spaces.

High flex cable rating

All available cables for the optoNCDT sensors are high flex rated for moving cable tracks. For the use of the sensors on robotic arms, cables of the series 1302, 1402, 1700, 1700LL and 1700DR are offered with a specific torsional robotic rating.

Leading in laser displacement measurement

Laser triangulation sensors from Micro-Epsilon have a successful history. As the pioneer in the area of CCD-sensors, Micro-Epsilon has set the benchmark with their laser triangulation sensors in the sophisticated field of measurement. The series optoNCDT offers multiple range models in five different performance classes, each representing the industry standard.

Certified quality: Calibration certificate

To document the performance of optoNCDT sensors, each sensor is calibrated before delivery and supplied with its own calibration protocol. These documents are included with the delivery and are proof of the excellent performance of each individual unit, traceable by its serial number.



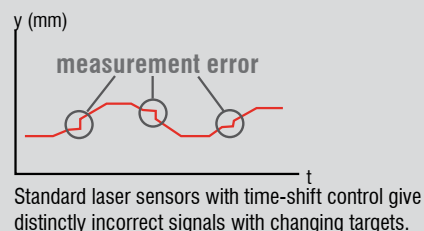
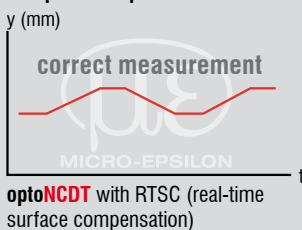
World-wide unique: Real-Time Surface Compensation (RTSC)

With RTSC, a world-wide unique innovation, the degree of reflection from the target is compensated during the on-going exposure in real-time. The exposure time or the amount of light produced by the laser is optimally matched to the currently running exposure cycle. Only sensors from Micro-Epsilon are equipped with this innovative real-time control and consequently they always achieve optimum results even with changing surfaces.

Standard commercially available laser triangulation sensors operate with a time-shift control which is additive to the measurement cycles already concluded. In this case the degree of reflection from the last measurement is used to derive the degree of reflection for the next measurement. With changing or structured surfaces the measurement results therefore deviate noticeably from the actual measurement quantity, whereas the optoNCDT is controlled in real time at the respective optimum operating point. A true measurement reading is consistently output without any loss or delay, regardless of the surface quality at the true sensor data rate.

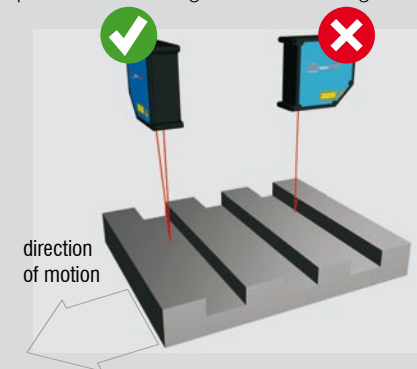
[available for series 1810-50 and 2210, all 1700 series, all 2200 series, all 2220 series]

Comparison: optoNCDT with RTSC and conventional sensor



Laser head orientation

When mounting the laser head, consider possible shadowing of the reflected light.



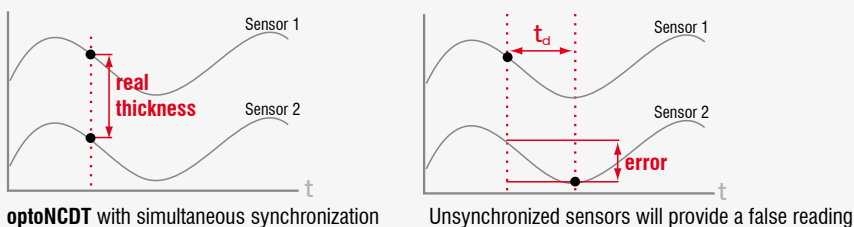
Measuring with multiple sensors

For many applications it is necessary to measure with several sensors either absolutely synchronous or alternating for interference issues. The optoNCDT series supports both features, a true synchronous measurement and an alternating operation as well.

Synchronization of two sensors

In order to obtain accurate results for a thickness or differential measurement while the target is moving or oscillating the absolute simultaneous measurement of the two sensors is necessary. The optoNCDT series supports this feature where one sensor is programmed to be the master, providing the trigger for the other slave unit. Consequently, the actual measurements are always time synchronous and therefore supply an exact measurement. [available for series 1810-50 and 2210, all 1700 series, all 2200 series, all 2220 series]

Synchronization for a thickness measurement with two opposing sensors



IF2008 Interface Card for synchronous data acquisition

The IF2008 Interface Card is designed for the data acquisition of up to eight sensors (6x digital, 2x analog) and two encoder. This enables the simultaneous evaluation of multiple signals. Here, the sensors can be located opposite one another, e.g. for thickness measurement, or mounted in one plane, e.g. for differential height measurement. The interface card reads out the data from all the connected devices simultaneously and passes them to an external PC for further processing.

Whereas the simultaneous measurement method is intended for opaque targets, alternating synchronisation, which prevents possible interference, can be set up for transparent objects.

[technical data on page 30]

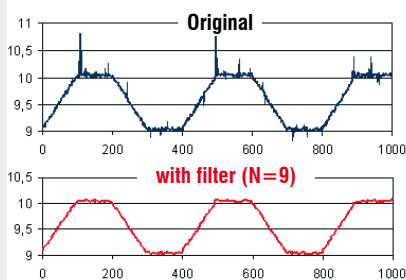
CSP 2008: Controller for up to six sensors

The CSP2008 controller can be used to process between two and six digital or analog input signals (2 x internal plus 4 x external via Ethercat modules from Beckhoff (available september 2010)) of almost all Micro-Epsilon displacement sensors. Ethercat can also be used as an external interface for connecting further sensors and I/O modules. The controller has a high luminance display so that measured values can be easily read, even from a long distance. [technical data on page 31]

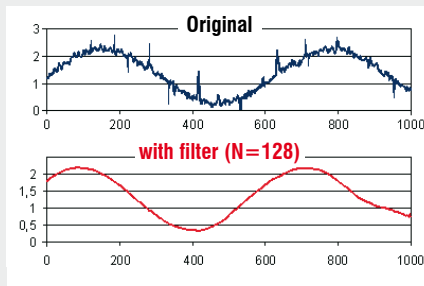
Adjustable filter functions

To achieve the best measurement results in every application, three different filter functions can be activated inside the optoNCDT processor. The recursive mean works similar to an analog low-pass filter. The moving average enables a high dynamic response and general noise reduction. The median filter is especially suitable for surfaces with random erratic false readings. All filter settings do not effect the true output frequency (data rate) of the analog and digital outputs.

[available for series 1402, 1810-50 and 2210, all 1700 series, all 2200 series, all 2220 series]



Profile measurement with median filter



Vibration measurement with moving average

Customized sensor

Micro-Epsilon always considers customized modifications of existing models to adapt to special applications.

Even entire custom design changes are possible to fully satisfy the customer's special OEM requirements e.g:

- special cable/connector configurations
- customized stand off or ranges
- improved specifications (vibration, shock...)
- custom firmware

High speed measurement

For fast measurements the optoNCDT sensors offer a high speed real time data rate up to 20 kHz. For the fastest applications, e.g vibration analysis, the special analog series optoNCDT 16x7 is available with a 37 kHz analog frequency response (equivalent to 300 kHz digital data rate).

DAQ and setup software

The optoNCDT series can be completely configured with ease via the setup software. The basic configuration is also possible via the touch keys. The entire SDK and software required for the optoNCDT series can be downloaded for free!

www.me-us.com/downloads.htm

[available for series 1402, 1810-50 and 2210, all 1700 series, all 2200 series, all 2220 series]

optoNCDT 1700: The industry standard among the laser triangulation sensors

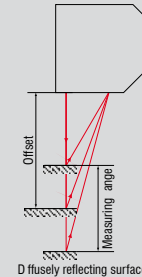
The series optoNCDT 1700 is the leading sensor in its class, in respect to price, performance and functionality. For optimum performance against true direct reflecting surfaces (glass and mirror) is a special series optoNCDT 1700DR available. Key features of the optoNCDT 1700:

Specular Model - For direct reflecting targets (glass and mirror)

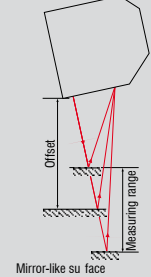
optoNCDT 1700DR are special sensors for optical distance measurement of direct reflecting materials. Three sensors are designed specifically for use with direct reflecting targets like glass or mirror. The high measuring rate of 2.5kHz and the maximum resolution of 0.1 μ m make precise measurement of the desired targets possible. The reflected laser beam is guided into the receiving array by tilting the sensor and is then directly converted into an electrical signal by the integrated controller. The design is identical to the successful optoNCDT 1700 standard series.

As well as the integrated controller, the series also incorporates a foil keypad directly on the sensor, whereby adjustments without configuration software are possible. A different tilt angle is necessary for each sensor depending on the measuring range. Therefore, mounting stencils for easy alignment of the sensors to the target are included as standard.

Mounting diffuse reflection
(tilt tolerance >80°)



Mounting direct reflection
(tilt tolerance <0.1°)



Programmable limits

The optoNCDT 1700 sensors can be programmed with an upper and lower limit. This allows an independent monitoring of a precise tolerance for a part. The two limits are programmable via software and include an adjustable hysteresis for each limit.

Switch Output Properties (in mm)

Monitoring:	Trigger switch mode
Limit Assignment:	Use F1 For Upper Limit
Upper Limit:	23.00
Upper Hysteresis:	22.00
Master Value:	0.00
Lower Hysteresis:	-25.00
Lower Limit:	-25.50

Programmable exposure time/measurement rate

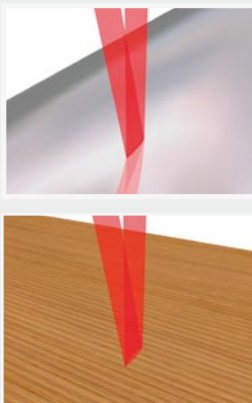
For targets with little diffuse reflectivity (transparent or very shiny) the exposure time can be adjusted. The programmed measurement cycle remains constant, providing still the real time capability.

Adjustable exposure time/ measurement rate series 1700

Measuring range	2.5kHz	1.25kHz	625Hz	312.5Hz
Max. exposure time	0.4ms	0.8ms	1.6ms	3.2ms

Event capturing

Time critical events are captured with the external trigger input. A trigger box is available for wide trigger input levels. The measurement and data stream is completely controlled via an external signal. [Specifications on page 35]



optoNCDT LL series - Anti speckle sensor

Interferences in the laser spotlight are caused by the surface roughness of an object. These interferences in the sub-micron range occur especially in case of objects with a metallic lustre. This physical effect makes it often difficult to carry out measurements on metallic surfaces.

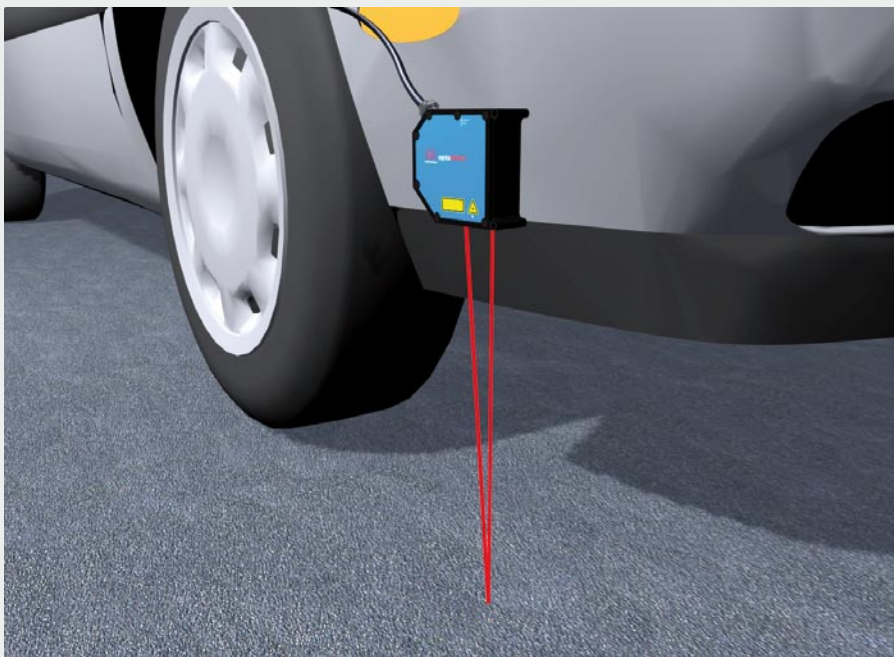
The new LaserLine series avoids this effect. Special lenses expand the laser point to a short oval line. By using a special algorithm, the measurement is averaged across the length of this line. The LL series averages the surface property for a precise and stable distance signal on structured and rough target.

The interferences occurring on metallic surfaces are effectively filtered. That way the distance to the metal can be exactly determined.

The new function is made possible with three sensor arrays. The optoNCDT 1700LL operates with an integrated controller and is also highly practical for use

on the robot. The high-performance model optoNCDT 2200LL is used when extremely precise measurements are required. The top-model optoNCDT 2220LL is used for very fast measurements. The measurement rate of 20 kHz in combination with the LaserLine optical system allows absolute high-performance measurements on metals. No special alignment for the LL sensor head is required.



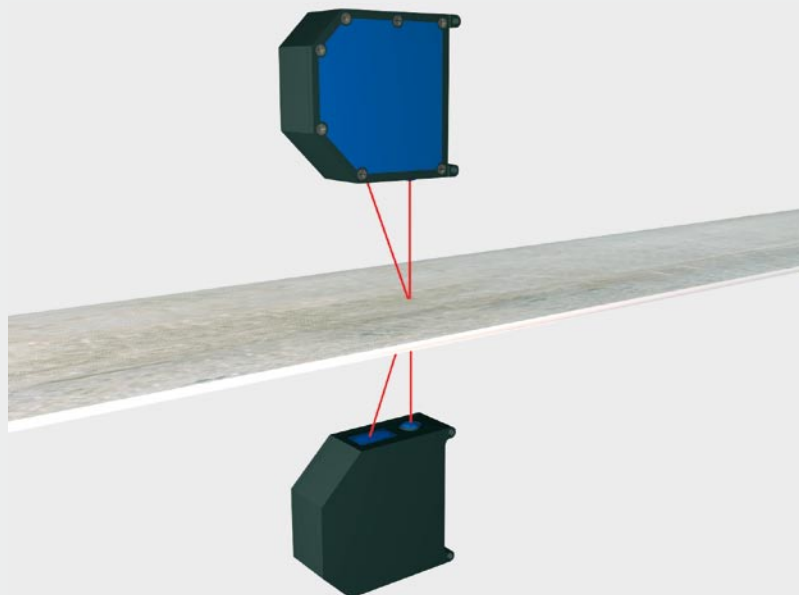


Ride height measurement

In road tests pitching and rolling movements, spring compression during braking and other dimensions are measured with the optoNCDT sensor. These sensors are particularly suitable due to the compact and robust design and the possibility of supplying the sensor from the vehicle onboard power supply. For these type of applications special models are available with improved shock, vibration and ambient light specifications.

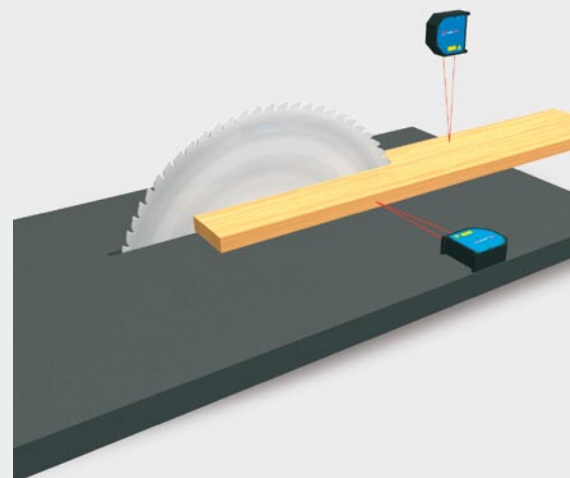
Synchronous thickness measurement

The thickness of the various web materials can be reliably acquired with the optoNCDT sensors. With their high measuring rate and the possibility of synchronizing two or more sensors (simultaneous measurement), the sensors are ideal for moving and oscillating targets.



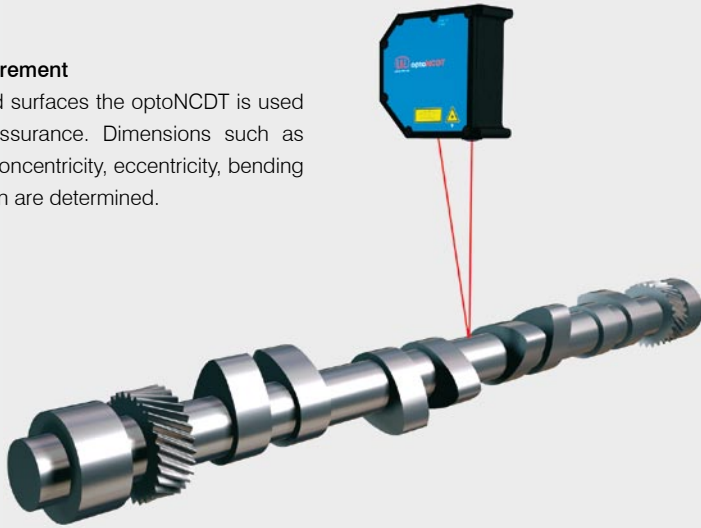
Dimensional measurement

In wood processing machines optoNCDT sensors are used for validating the proper dimensions of the products.

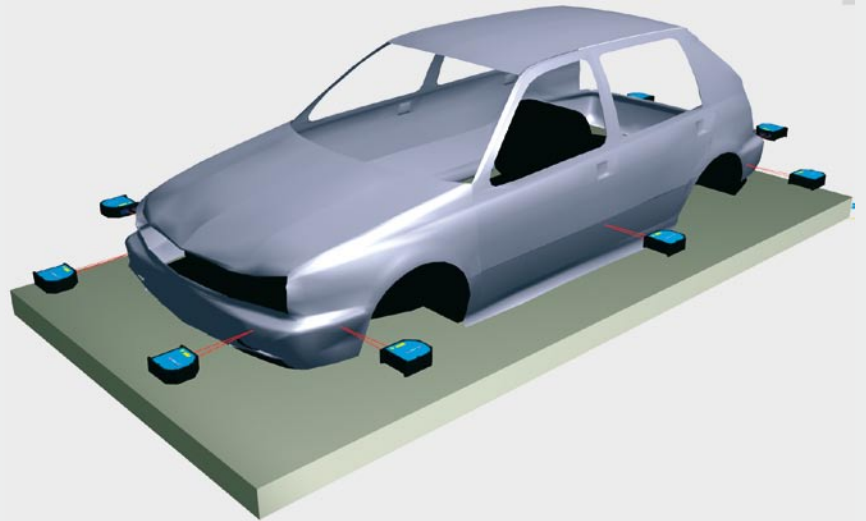


Parts measurement

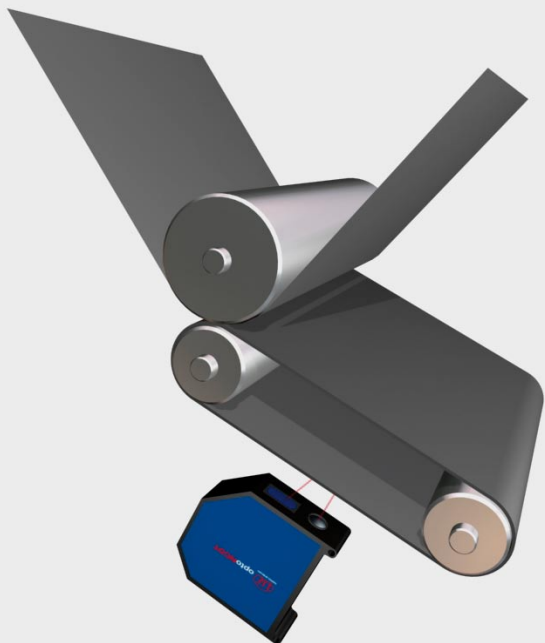
On machined surfaces the optoNCDT is used for quality assurance. Dimensions such as roundness, concentricity, eccentricity, bending and deflection are determined.

**Part positioning in production lines**

In automated processing stages for vehicles or other goods, a precise measurement of the position relative to the processing tool is necessary (drilling, punching, fitting sub-assemblies). Sensors with real-time surface compensation are particularly suitable for the high precision acquisition of highly shiny and varying surfaces.

**Deflection**

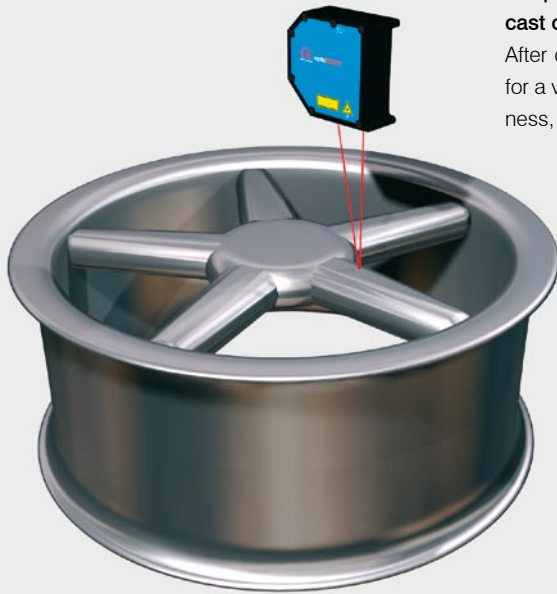
Black rubber, an extremely difficult material to read off, is already measured directly after the calender with optoNCDT sensors. The sensors guarantee a flawless production of the rubber web.





Surface profiling

Due to the small measuring spot and the RTSC (Real-Time Surface Compensation), the optoNCDT sensors are excellent for the high precision mapping of any target.

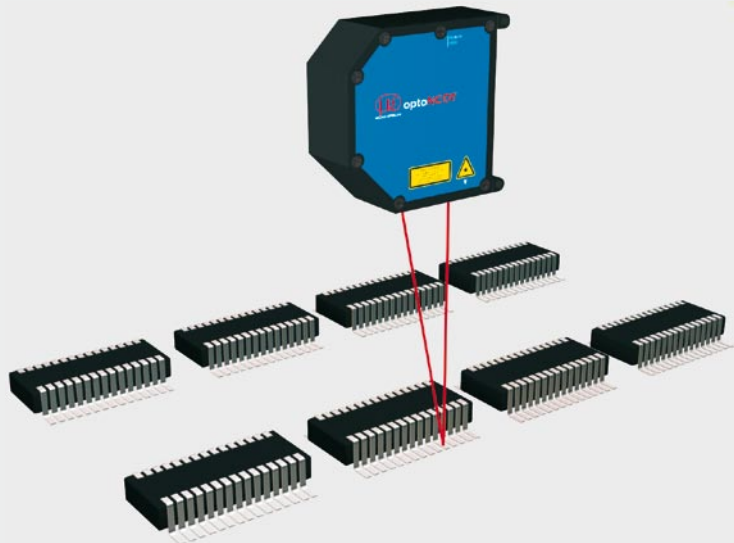


Shape conformance on cast or formed parts









After casting, aluminum wheels are measured for a variety of features, e.g. hub depth, roundness, bulging, etc., before further processing.

Flatness measurement (Coplanarity)

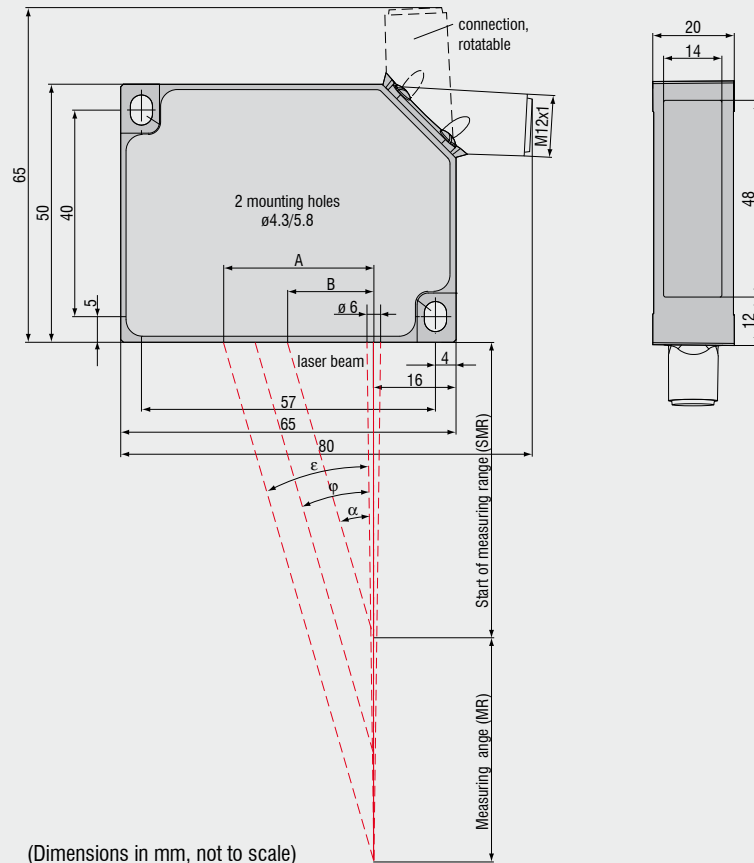
To achieve the best quality during board assembly, all IC pins must be aligned in one plane. In modern automatic placement systems the ICs are therefore measured directly before placement. The tiny light spot diameters enable the measurement of the finest pin geometries.





-  **Four models with measuring ranges from 20mm to 200mm**
-  **Ideal for OEM applications**
-  **Compact design with integrated controller**
-  **Measuring rate up to 750Hz**
-  **Analog (U/I) and digital output**
-  **Trigger input and teach-in**
-  **High flex cables for dragchain and robot use**
-  **Configuration via software www.micro-epsilon.com/download**

optoNCDT 1302

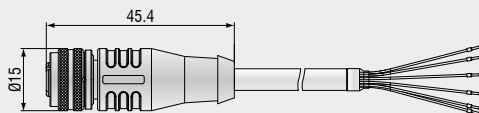


(Dimensions in mm, not to scale)

Model		ILD 1302-20	ILD 1302-50	ILD 1302-100	ILD 1302-200
Measuring range		20mm	50mm	100mm	200mm
Start of measuring range	SMR	30mm	45mm	50mm	60mm
Midrange	MR	40mm	70mm	100mm	160mm
End of measuring range	EMR	50mm	95mm	150mm	260mm
Linearity		40 μ m	100 μ m	200 μ m	400 μ m
		± 0.2 % FSO			
Resolution	averaged with factor 64	4 μ m	10 μ m	20 μ m	40 μ m
		0.02 % FSO			
	dynamic 750Hz	10 μ m	25 μ m	50 μ m	100 μ m
	digital	0.05 % FSO			
Measuring rate		12bit			
Light source		750Hz			
Laser protection class		semiconductor laser <1mW, 670nm (red)			
Spot diameter		class 2 IEC 60825-1 : 2001-11			
Spot diameter	SMR	210 μ m	1100 μ m	1400 μ m	2300 μ m
	MR	530 μ m	110 μ m	130 μ m	2200 μ m
	EMR	830 μ m	1100 μ m	1400 μ m	2100 μ m
Protection class		IP 67			
Vibration		15g / 10Hz...1kHz			
Shock		15g / 6ms (IEC 68-2-29)			
Weight (without cable)		approx. 83g			
Operating temperature		0...+50°C			
Storage temperature		-20...+70°C			
Output	analog	4...20mA (1...5V with cable PC 1402-3/U)			
	digital	RS422 (12bit)			
Control I/O		1x open collector output (switching output, switch, error); 1x input (teach in, trigger); 1x laser on/off			
Power supply		11...30VDC, 24VDC / 50mA			
Controller		integrated signal processor			
Electromagnetic compatibility (EMC)		EN 61326-1:2006 / EN 55011 Class B (Interface emission) EN 61326-1:2006 / EN 61000-4-2:1995 + A1:1998 + A2:2001 (Interference resistance)			

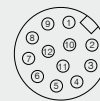
FSO = Full scale output All specifications apply for a diffusely reflecting matt white ceramic target
SMR = Start of measuring range; MR = Midrange; EMR = End of measuring range

Connector axial



12-pin-connector










(view on solder termination side of male inserts)



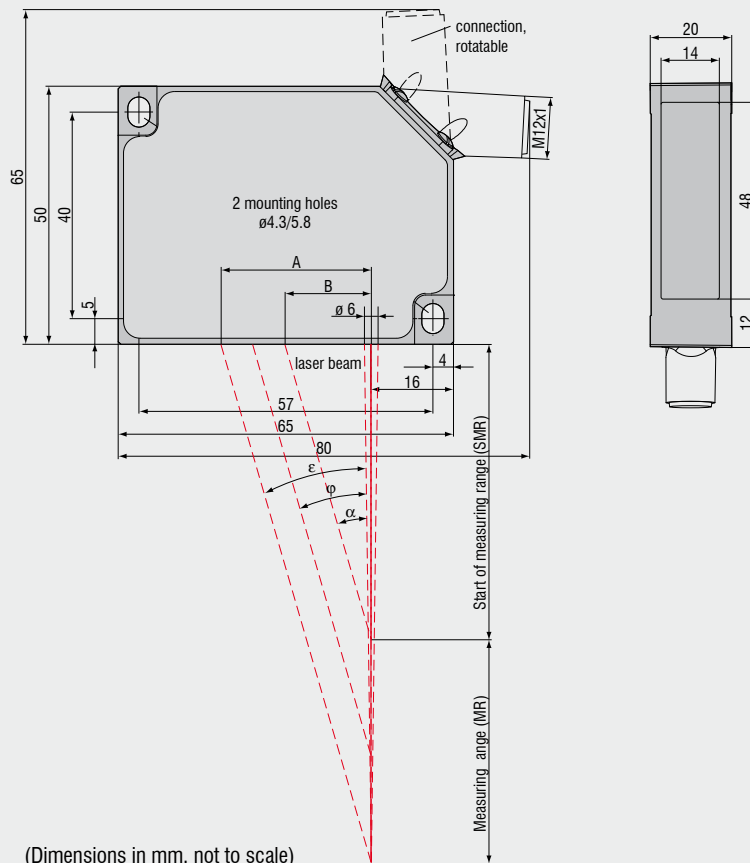
Pin	Description		color PC1402-x/l
3	RS422 Rx+	serial input	green
4	RS422 Rx-		yellow
5	RS422 Tx+	serial output	grey
6	RS422 Tx-		pink
7	+U _B	11-30VDC type 24V	red
8	Laser on/off	switch input	black
9	Teach in		violet
10	Error	switch output	brown
11	I _{OUT}	4 ... 20mA	white
12	GND	supply and signal ground	blue

The cable screen is connected with the sensor housing. The interface and power supply cable are robot rated and UL certified. At one end there is a 12pin M12 connector, the other end is open.



-  **Seven models with measuring ranges from 5mm to 600mm**
-  **Compact design with integrated controller**
-  **Adjustable measuring rate up to 1.5kHz**
312Hz
375Hz
1000Hz
-  **Analog (U/I) and digital output**
-  **Trigger input and teach-in**
-  **Adjustable filter functions**
Peak selection (firmware)
-  **High flex cables for dragchain and robot use**
-  **Calibration certificate included**
-  **Configuration via software**
www.micro-epsilon.com/download

optoNCDT 1402



MR	SMR	α	ϕ	ϵ	A	B
5	20.0	33.5	35.5	37.1	18.9	13.2
10	20.0	33.5	32.9	32.4	19.1	13.2
20	30.0	31.2	27.9	25.8	24.2	18.2
50	45.0	25.1	19.6	16.9	28.9	21.1
100	50.0	23.1	14.4	11.3	30.1	21.3
200	60.0	20.1	9.4	6.8	30.8	22.0
250VT	100.0	14.7	7.6	5.5	33.9	26.2
600	200.0	9.7	4.3	3	41.6	33.7

(Dimensions in mm, not to scale)

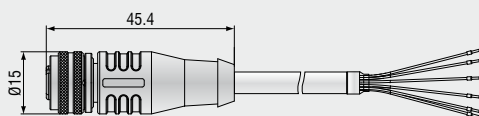
Model		ILD 1402-5	ILD 1402-10	ILD 1402-20	ILD 1402-50	ILD 1402-100	ILD 1402-200	ILD 1402-250VT	ILD 1402-600	
Measuring range		5mm	10mm	20mm	50mm	100mm	200mm	250mm	600mm	
Start of measuring range		20mm	20mm	30mm	45mm	50mm	60mm	100mm	200mm	
Midrange		22.5mm	25mm	40mm	70mm	100mm	160mm	225mm	500mm	
End of measuring range		25mm	30mm	50mm	95mm	150mm	260mm	350mm	800mm	
Linearity		5...9 μ m	5...18 μ m	7...36 μ m	12...90 μ m	20...180 μ m	40...360 μ m	50...1200 μ m	120...3000 μ m	
		$\leq 0.18\%$ FSO						$\leq 0.5\%$ FSO		
Resolution ¹⁾	with averaging factor 64	0.6 μ m	1 μ m	2 μ m	5 μ m	10 μ m	13 μ m	32 μ m	80 μ m	
	dynamic 1.5 kHz	$\leq 0.02\%$ FSO						$\leq 0.02.. 0.12\%$ FSO		
	digital	14bit								
Measuring rate, programmable		1.5kHz; 1kHz; 750Hz; 375Hz; 50Hz								
Exposure rate, programmable ²⁾		0.6ms; 1ms; 1.3ms; 2.6ms; 20ms								
Light source		semiconductor laser <1mW, 670nm (red)								
Laser safety class		class 2 IEC 60825-1 : 2001-11								
Spot diameter	SMR	110 μ m	110 μ m	210 μ m	1100 μ m	1400 μ m	2300 μ m	5000 μ m	2.6 x 5mm	
	MMR	380 μ m	650 μ m	530 μ m	110 μ m	130 μ m	2200 μ m	5000 μ m	2.6 x 5mm	
	EMR	650 μ m	1200 μ m	830 μ m	1100 μ m	1400 μ m	2100 μ m	5000 μ m	2.6 x 5mm	
Protection class		IP 67								
Vibration		15g / 10Hz ... 1kHz						20g / 10Hz...1kHz		
Shock		15g / 6ms (IEC 68-2-29)								
Weight (without cable)		appr. 83g						appr. 130g		
Operation temperature		0 ... +50°C								
Storage temperature		-20 ... +70°C								
Measurement output	analog	4 ... 20mA (1 ... 5V with cable PC 1402-x/U); free scalable within the nominal range								
	digital	RS422 / 14bit								
Control I/O		1x open collector output (switching output, switch, error); 1x input (teach in, trigger); 1x laser on/off								
Supply		11 ... 30VDC, 24VDC / 50mA								
Controller		integrated signal processor								
Software		free setup and aquisition tool + SDK (software development kit)								
Electromagnetic compatibility (EMC)		EN 61326-1:2006 / EN 55011 Class B (Interface emission)								
		EN 61326-1:2006 / EN 61000-4-2:1995 + A1:1998 + A2:2001 (Interference resistance)								

FSO = Full scale output All specifications apply for a diffusely reflecting matt white ceramic target

¹⁾ resolution digital output 14bit ²⁾ time to measurement rate

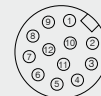
SMR = Start of measuring range MMR = Midrange EMR = End of measuring range

Connector axial



12-pin-connector










(view on solder termination side of male inserts)



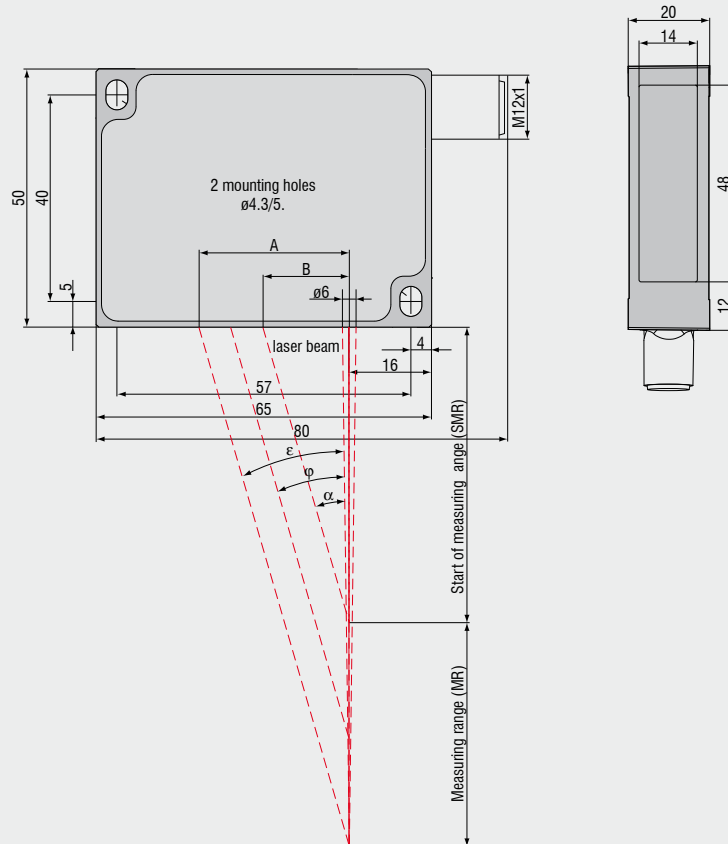
Pin	Description	color PC1402-x/I
3	RS422 Rx+	green
4	RS422 Rx-	yellow
5	RS422 Tx+	grey
6	RS422 Tx-	pink
7	+U _B	11-30DV 24V MP
8	Laser off	black
9	Teach in	violet
10	Error	brown
11	I _{OUT}	4 ... 20mA
12	GND	supply and signal ground
1/2	n.c.	blue

The cable screen is connected with the sensor housing. The interface and power supply cable are robot rated and UL certified. At one end there is a 12pin M12 connector, the other end is open.



-  **Seven models with measuring ranges from 5mm to 600mm**
-  **Food-grade stainless steel housing
No dirt deposits possible**
-  **Adjustable measuring rate up to 1.5kHz**
312Hz
375Hz
1000Hz
-  **Analog (U/I) and digital output**
-  **Trigger input and teach-in**
-  **Adjustable filter functions
Peak selection (firmware)**
-  **High flex cables for dragchain and robot use**
-  **Calibration certificate included**
-  **Configuration via software**
www.micro-epsilon.com/download

optoNCDT 1402SC



(Dimensions in mm, not to scale)

MR	SMR	α	φ	ϵ	A	B
5	20.0	33.5	35.5	37.1	18.9	13.2
10	20.0	33.5	32.9	32.4	19.1	13.2
20	30.0	31.2	27.9	25.8	24.2	18.2
50	45.0	25.1	19.6	16.9	28.9	21.1
100	50.0	23.1	14.4	11.3	30.1	21.3
200	60.0	20.1	9.4	6.8	30.8	22.0
250VT	100.0	14.7	7.6	5.5	33.9	26.2
600	200.0	9.7	4.3	3	41.6	33.7

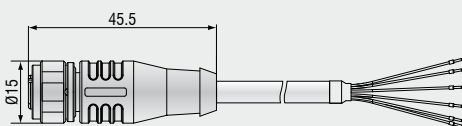
Model		ILD 1402-5SC	ILD 1402-10SC	ILD 1402-20SC	ILD 1402-50SC	ILD 1402-100SC	ILD 1402-200SC	ILD 1402-250SC	ILD 1402-600SC	
Measuring range		5mm	10mm	20mm	50mm	100mm	200mm	250mm	600mm	
Start of measuring range		20mm	20mm	30mm	45mm	50mm	60mm	100mm	200mm	
Midrange		22.5mm	25mm	40mm	70mm	100mm	160mm	225mm	500mm	
End of measuring range		25mm	30mm	50mm	95mm	150mm	260mm	350mm	800mm	
Linearity		5...9 μ m	5...18 μ m	7...36 μ m	12...90 μ m	20...180 μ m	40...360 μ m	50...1200 μ m	120...3000 μ m	
		$\leq 0.18\%$ FSO						$\leq 0.5\%$ FSO		
Resolution ¹⁾	with averaging factor 64	0.6 μ m	1 μ m	2 μ m	5 μ m	10 μ m	13 μ m	32 μ m	80 μ m	
	dynamic 1.5 kHz	$\leq 0.01\%$ FSO						$\leq 0.02\%$ FSO		
	digital	$\leq 0.02\%$ FSO						$\leq 0.02...0.12\%$ FSO		
Measuring rate, programmable		14bit								
Exposure rate, programmable ²⁾		1.5kHz; 1kHz; 750Hz; 375Hz; 50Hz								
Light source		0.6ms; 1ms; 1.3ms; 2.6ms; 20ms								
Laser safety class		semiconductor laser < 1mW, 670nm (red)								
Spot diameter		class 2 IEC 60825-1 : 2001-11								
Spot diameter	SMR	110 μ m	110 μ m	210 μ m	1100 μ m	1400 μ m	2300 μ m	5000 μ m	2.6 x 5mm	
	MMR	380 μ m	650 μ m	530 μ m	110 μ m	130 μ m	2200 μ m	5000 μ m	2.6 x 5mm	
	EMR	650 μ m	1200 μ m	830 μ m	1100 μ m	1400 μ m	2100 μ m	5000 μ m	2.6 x 5mm	
Protection class		IP 69K								
Vibration		15g / 10Hz ... 1kHz						20g / 10Hz...1kHz		
Shock		15g / 6ms (IEC 68-2-29)								
Weight (without cable)		appr. 83g						appr. 130g		
Operation temperature		0 ... +50°C								
Storage temperature		-20 ... +70°C								
Measurement output	analog	4 ... 20mA (1 ... 5V with cable PC 1402-x/U); free scalable within the nominal range								
	digital	RS422 / 14bit								
Control I/O		1x open collector output (switching output, switch, error); 1x input (teach in, trigger); 1x laser on/off								
Supply		11 ... 30VDC, 24VDC / 50mA								
Controller		integrated signal processor								
Software		free setup and aquisition tool + SDK (software development kit)								
Electromagnetic compatibility (EMC)		EN 61326-1:2006 / EN 55011 Class B (Interface emission)								
		EN 61326-1:2006 / EN 61000-4-2:1995 + A1:1998 + A2:2001 (Interference resistance)								

FSO = Full scale output All specifications apply for a diffusely reflecting matt white ceramic target

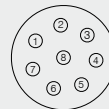
¹⁾ resolution digital output 14bit ²⁾ tide to measurement rate

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range

Connector axial












8-pin-connector

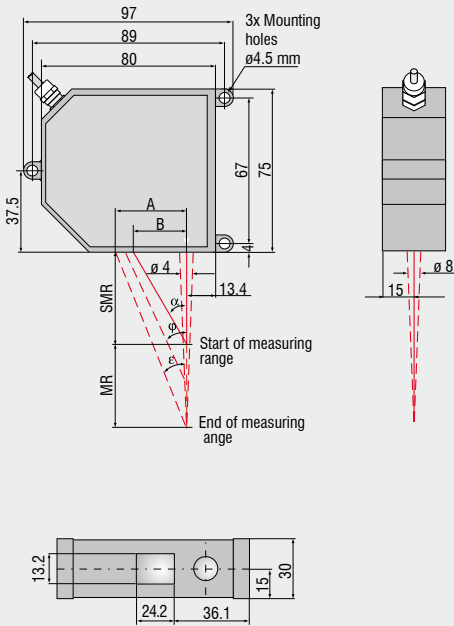


Pin	Description	color
1	I _{OUT}	white
2	Error	brown
3	RS422 Rx+	green
4	RS422 Rx-	yellow
5	RS422 Tx+	grey
6	RS422 Tx-	pink
7	GND	blue
	+U _B	red
	Laser off	
	Teach in	

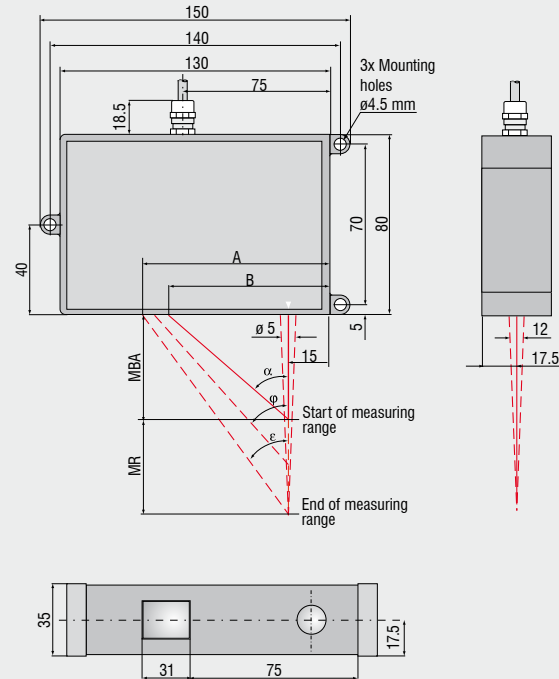


-  **Ten models with measuring ranges from 2mm to 750mm**
-  **Compact design with integrated controller**
-  **Real Time Surface Compensation**
-  **Adjustable measuring rate up to 2.5kHz**
-  **Analog (U/I) and digital output**
-  **Adjustable filter functions (firmware)**
-  **High flex cables for dragchain and robot use**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**

optoNCDT 1700 (2/10/20/50/100/200/250VT mm)
(Dimensions in mm, not to scale. All CAD files are available online.)

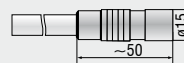


optoNCDT 1700 (40/500/750 mm)

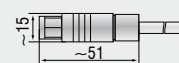


MR	SMR	α	ϕ	ϵ	A	B
2	24	35°	40°	44.8°	25.8	16.8
10	30	34.3°	35.2°	35.6°	28.7	20.5
20	40	28.8°	27.5°	26.7°	30.1	22.0
50	45	26.5°	23.0°	18.3°	31.5	22.5
100	70	19.0°	15.4°	10.9°	32.6	24.1
200	70	19.0°	9.78°	6.97°	33.1	24.1
250VT	70	19.0°	8.4°	6.0°	33.5	24.1
40	175	22.1°	21.9°	21.8°	101	86
500	200	19.3°	9.8°	7.0°	101	85
750	200	19.3°	7.7°	5.0°	101	85

Connector (sensor side)
Article Number: 0323243



Connector (sensor cable)
Article Number: 0323272

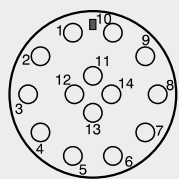


Model		ILD 1700-2	ILD 1700-10	ILD 1700-20	ILD 1700-40	ILD 1700-50	ILD 1700-100	ILD 1700-200	ILD 1700-250VT	ILD 1700-500	ILD 1700-750
Measuring range		2mm	10mm	20mm	40mm	50mm	100mm	200mm	250mm	500mm	750mm
Start of measuring range	SMR	24mm	30mm	40mm	175mm	45mm	70mm	70mm	70mm	200mm	200mm
Midrange	MMR	25mm	35mm	50mm	195mm	70mm	120mm	170mm	195mm	450mm	575mm
End of measuring range	EMR	26mm	40mm	60mm	215mm	95mm	170mm	270mm	320mm	700mm	950mm
Linearity		2µm	8µm	16µm	32µm	40µm	80µm	200µm	630µm	400µm	750µm
	FSO	≤0.1%	≤0.08%					≤0.1%	≤0.25%	≤0.08%	≤0.1%
Resolution	dynamic ¹⁾	0.1µm	0.5µm	1.5µm	4µm	3µm	6µm	12µm	50µm	30µm	50µm
	static ²⁾	0.025µm	0.125µm	0.375µm	1µm	0.75µm	1.5µm	3µm	12.5µm	7.5µm	12.5µm
Measuring rate		2.5kHz / 1.25kHz / 625Hz / 312.5Hz (adjustable)									
Light source		semiconductor laser <1mW, 670nm (red)									
Permissible ambient light	at 2.5kHz	10,000lx							15,000lx	10,000lx	
Laser safety class		class 2 acc. DIN EN 60825-1 : 2001-11									
Spot diameter	SMR	80µm	110µm	320µm	230µm	570µm	740µm	1300µm	1500µm	1500µm	1500µm
	MMR	35µm	50µm	45µm	210µm	55µm	60µm	1300µm	1500µm	1500µm	1500µm
	EMR	80µm	110µm	320µm	230µm	570µm	700µm	1300µm	1500µm	1500µm	1500µm
Operation temperature		0 ... +50°C							0 ... +55°C	0 ... +50°C	
Storage temperature		-20 ... +70°C									
Output	measurements	selectable: 4 ... 20mA / 0 ... 10V / RS 422 / USB (optional with cable PC1700-3/USB)									
	switching outputs	1 x error or 2 x limit (each programmable)									
Switch Input		laser ON-OFF / zero									
Operation		via touch screen on sensor or via PC with ILD 1700 tool									
Power supply		24VDC (11 ... 30VDC), max. 150mA									
Electromagnetic compatibility (EMC)		EN 61000-6-3 EN 61000-6-2									
Sensor cable length (with connector)		0.25m (integrated cable with connector) option: 3m or 10m									
Synchronization		possible for simultaneous or alternating measurements									
Protection class		IP 65									
Vibration		2g / 20 ... 500Hz									
Shock		15g / 6ms									
Weight (with 0.25m cable)		~ 550g			~ 600g		~ 550g			~ 600g	

FSO = Full Scale Output All specifications apply for a diffusely reflecting white ceramic target

¹⁾at 2.5kHz without averaging ²⁾with averaging factor 128











SMR = Start of measuring range MMR = Midrange EMR = End of measuring range



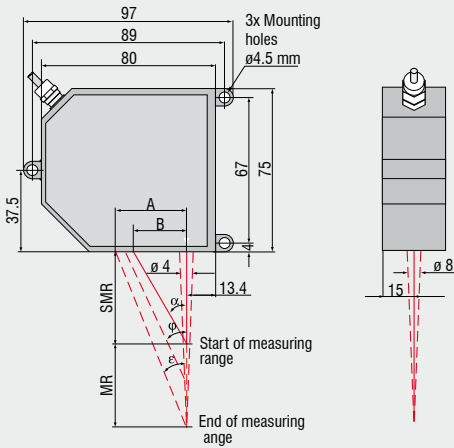
14-pin-connector
(Pin side female cable connector or solder-pin side male cable connector)

Pin assignment							
Pin-Nr.	Function	Cable colors		Pin-Nr.	Function	Cable colors	
		PC1700-x	PC1700-10/3/IF2004			PC1700-x	PC1700-10/3/IF2004
1	RS422 output (symmetric)	green	NC	8	Error or limit output	grey and pink	NC
2		brown		9	Laser on/off	red and blue	yellow
3	Symmetrical synchron output (Master) or input (Slave)	blue	green	10	Zero	white and green	NC
4		pink	grey	11	RS422 input (symmetric)	yellow	NC
5	Power supply (11 ... 30 VDC)	red	white	12		grey	
6	GND	black	brown	13	Analog output	Coaxial inner conductor, white	NC
7	Limit output	violet	NC	14	AGND	Coaxial screening	NC

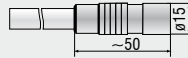


-  **Laser Line averages across shiny metallic or structured surfaces**
-  **Four models with measuring ranges from 2mm to 50mm**
-  **Compact design with integrated controller**
-  **Real Time Surface Compensation**
-  **Adjustable measuring rate up to 2.5kHz**
312Hz
375Hz
1000Hz
-  **Analog (U/I) and digital output**
-  **Adjustable filter functions (firmware)**
-  **High flex cables for dragchain and robot use**
-  **Calibration certificate included**
-  **Configuration via software**
www.micro-epsilon.com/download

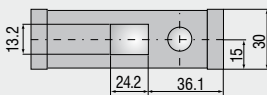
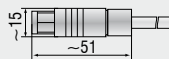
optoNCDT 1700LL (2/10/20/50 mm)
(Dimensions in mm, not to scale. All CAD files are available online.)



Connector (sensor side)
Article Number: 0323243



Connector (sensor cable)
Article Number: 0323272



MR	SMR	α	ϕ	ϵ	A	B
2	24	35°	40°	44 8°	25.8	16.8
10	30	34.3°	35 2°	35 6°	28.7	20.5
20	40	28.8°	27 5°	26.7°	30.1	22.0
50	45	26.5°	23 0°	18 3°	31.5	22.5

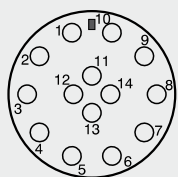
Model		ILD1700-2LL	ILD 1700-10LL	ILD 1700-20LL	ILD 1700-50LL
Measuring range		2mm	10mm	20mm	50mm
Start of measuring range	SMR	24mm	30mm	40mm	45mm
Midrange	MMR	25mm	35mm	50mm	70mm
End of measuring range	EMR	26mm	40mm	60mm	95mm
Linearity		2 μ m	8 μ m	16 μ m	40 μ m
	FSO	$\leq 0.1\%$		$\leq 0.08\%$	
Resolution ¹⁾	dynamic ²⁾	0.1 μ m	0.5 μ m	1.5 μ m	3 μ m
	static ³⁾	0.025 μ m	0.125 μ m	0.375 μ m	0.75 μ m
Measuring rate		2.5kHz / 1.25kHz / 625Hz / 312.5Hz (adjustable)			
Light source		semiconductor laser <1mW, 670nm (red)			
Permissible ambient light	at 2.5kHz	10,000lx			
Laser safety class		class 2 acc. DIN EN 60825-1 : 2001-11			
Spot diameter	SMR	85 x 240 μ m	120 x 405 μ m	185 x 485 μ m	350 x 320 μ m
	MMR	24 x 280 μ m	35 x 585 μ m	55 x 700 μ m	70 x 960 μ m
	EMR	64 x 400 μ m	125 x 835 μ m	195 x 1200 μ m	300 x 1940 μ m
Operation temperature		0 ... +50°C			
Storage temperature		-20 ... +70°C			
Output	measurements	selectable: 4 ... 20mA / 0 ... 10V / RS 422 / USB (optional with cable PC1700-3/USB)			
	switching outputs	1 x error or 2 x limit (each programmable)			
Switch Input		laser ON-OFF / zero			
Operation		via touch screen on sensor or via PC with ILD 1700 tool			
Power supply		24VDC (11 ... 30VDC), max. 150mA			
Electromagnetic compatibility (EMC)		EN 61000-6-3 EN 61000-6-2			
Sensor cable length (with connector)		0.25m (integrated cable with connector) option: 3m or 10m			
Synchronization		possible for simultaneous or alternating measurements			
Protection class		IP 65			
Vibration		2g / 20 ... 500Hz			
Shock		15g / 6ms			
Weight (with 0.25m cable)		~ 550g			

FSO = Full Scale Output All specifications apply for a diffusely reflecting white ceramic target

¹⁾ for measurements against high glossy surfaces (targets), resolution depends on the material

²⁾ at 2.5kHz without averaging ³⁾ with averaging factor 128

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range













14-pin-connector
(Pin side female cable connector or solder-pin side male cable connector)

Pin assignment							
Pin-Nr.	Function	Cable colors		Pin-Nr.	Function	Cable colors	
		PC1700-x	PC1700-10/3/IF2004			PC1700-x	PC1700-10/3/IF2004
1	RS422 output (symmetric)	green	NC	8	Error or limit output	grey and pink	NC
2		brown		9	Laser on/off	red and blue	yellow
3	Symmetrical synchron output (Master) or input (Slave)	blue	green	10	Zero	white and green	NC
4		pink	grey	11	RS422 input (symmetric)	yellow	NC
5	Power supply (11 ... 30 VDC)	red	white	12		grey	
6	GND	black	brown	13	Analog output	Coaxial inner conductor, white	NC
7	Limit output	violet	NC	14	AGND	Coaxial screening	NC

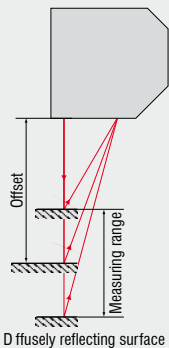
Specular model
For direct reflecting targets (glass and mirror)

optoNCDT 1700DR

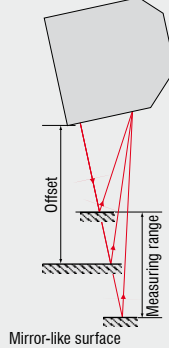


-  **Precise measurement of direct reflecting surfaces (glass and mirror)**
-  **Three models with measuring ranges from 2mm to 20mm**
-  **Compact design with integrated controller**
-  **RTSC Real Time Surface Compensation**
-  **Adjustable measuring rate up to 2.5kHz**
-  **Analog (U/I) and digital output**
-  **Adjustable filter functions (firmware)**
-  **High flex cables for dragchain and robot use**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**

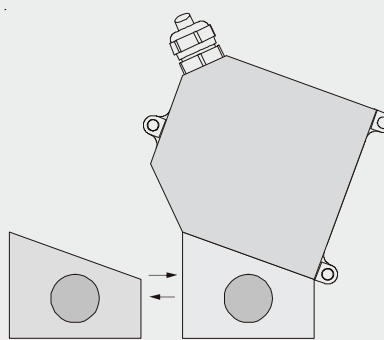
Mounting diffuse reflection
(tilt tolerance > 80°)



Mounting direct reflection
(tilt tolerance < 0.1°)

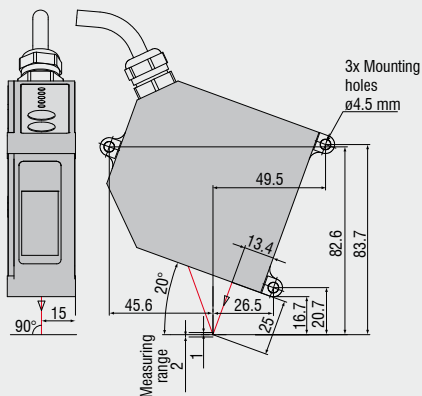


Precision alignment accessory

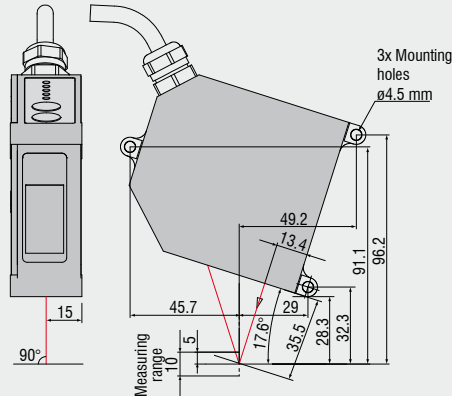


Mounting device included with delivery.

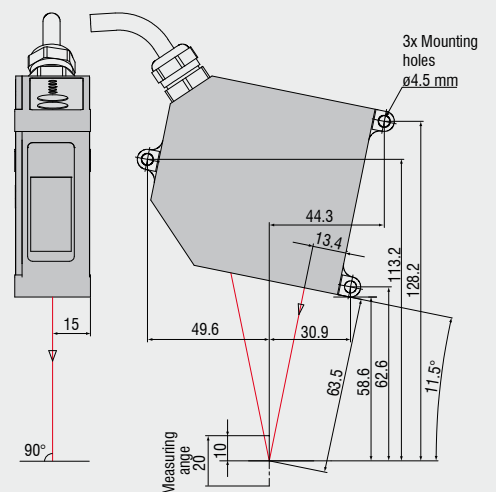
optoNCDT 1700-2DR



optoNCDT 1700-10DR



optoNCDT 1700-20DR



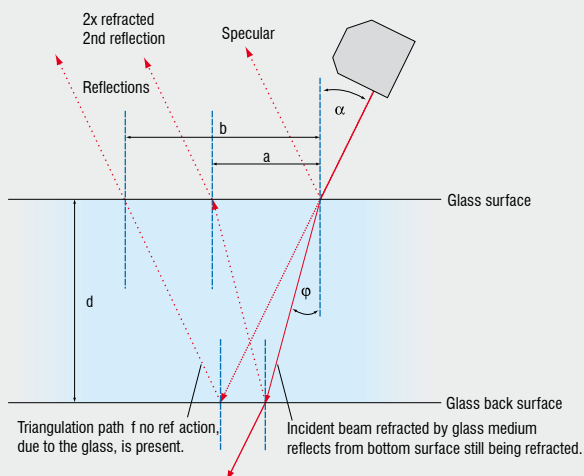
(Dimensions in mm, not to scale. All CAD files are available online.)

Model	ILD1700-2DR	ILD1700-10DR	ILD1700-20DR
Measuring range	2mm	10mm	20mm
Start, mid, end of measuring range	see engineering drawing		
Linearity	2 μ m	10 μ m	40 μ m
	$\leq 0.1\%$ FSO		$\leq 0.2\%$ FSO
Resolution	dynamic ¹⁾	0.1 μ m	3 μ m
	static ²⁾	0.025 μ m	0.75 μ m
Measuring rate	2.5kHz / 1.25kHz / 625Hz / 312.5Hz (adjustable)		
Light source	semiconductor laser <1mW, 670nm (red)		
Permissible ambient light	10,000lx (at 2.5kHz)		
Laser safety class	class 2 acc. DIN EN 60825-1 : 2001-11		
Spot diameter	SMR	80 μ m	110 μ m
	MMR	35 μ m	50 μ m
	EMR	80 μ m	110 μ m
Operation temperature	0 ... +50°C		
Storage temperature	-20 ... +70°C		
Output	measurements	selectable: 4 ... 20mA / 0 ... 10V / RS 422 / USB (option with cable PC1700-3/USB)	
	switching outputs	1 x error or 2 x limit (each programmable)	
Switch input	laser ON-OFF / zero		
Operation	via touch screen on sensor or via PC with ILD 1700 tool		
Power supply	24VDC (11 ... 30VDC), max. 150mA		
Electromagnetic compatibility (EMC)	EN 61000-6-3; EN 61000-6-2		
Sensor cable length (with connector)	0.25m (integrated cable with connector) option: 3m or 10m		
Synchronization	possible for simultaneous or alternating measurements		
Protection class	IP 65		
Vibration	2g / 20 ... 500Hz		
Shock	15g / 6ms		
Weight (with 0.25m cable)	~ 550g		

FSO = Full Scale Output All specifications are valid for polished and planar surfaces.

¹⁾ at 2.5kHz without averaging ²⁾ with averaging factor 128

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range

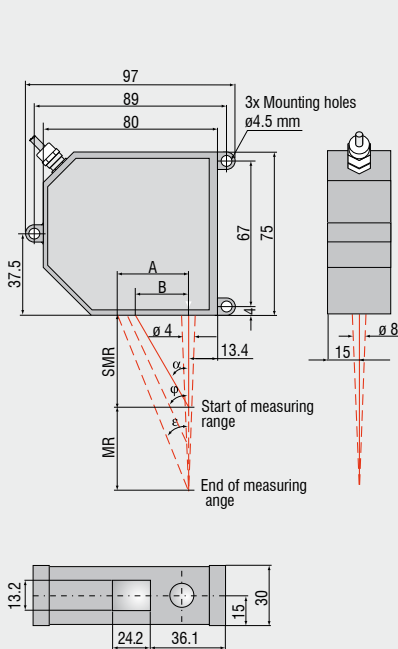


1700DR: Firmware option „first surface reflection only“ provides stable reading from the top surface of transparent targets like glass

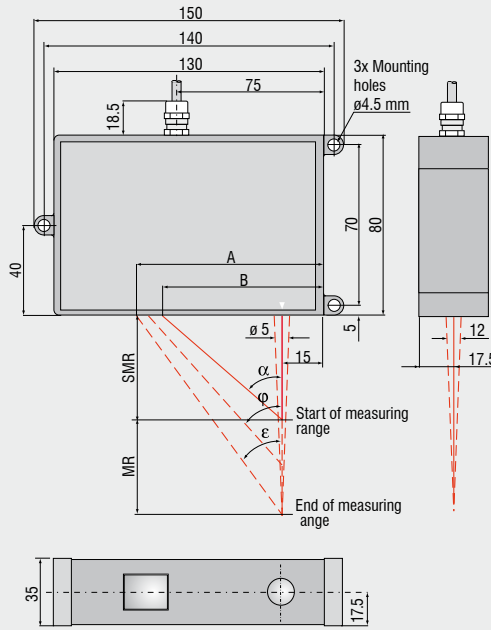


-  **Seven models with measuring ranges from 2mm to 200mm**
-  **Sensor head and separate controller**
-  **Measurement rate up to 10kHz**
-  **Real Time Surface Compensation**
-  **Analog and digital output**
-  **Adjustable filter functions (firmware)**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**

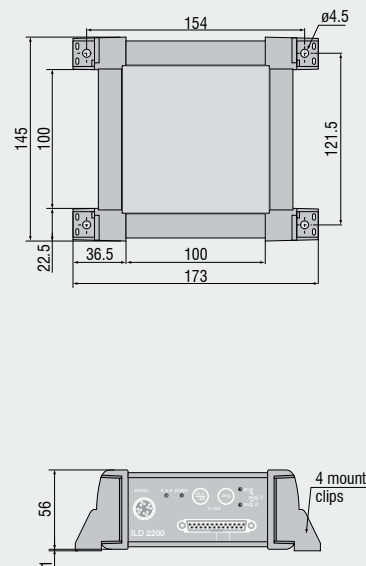
optoNCDT 2200 (2/10/20/50/100 mm)



optoNCDT 2200 (40/200 mm)



Controller



(Dimensions in mm, not to scale. All CAD files are available online.)

MR	SMR	α	ϕ	ϵ	A	B
2	24	35.0°	40.0°	44.8°	25.8	16.8
10	30	34.3°	35.2°	35.6°	28.7	20.5
20	40	28.8°	27.5°	26.7°	30.1	22
50	45	26.5°	23.0°	18.3°	31.5	22.5
100	70	19.0°	15.4°	10.9°	32.6	24.1
40	175	22.1°	21.9°	21.8°	101	86
200	130	25.1°	16.7°	13.1°	91.6	7

Model		ILD 2200-2	ILD 2200-10	ILD 2200-20	ILD 2200-40	ILD 2200-50	ILD 2200-100	ILD 2200-200
Measuring range		2mm	10mm	20mm	40mm	50mm	100mm	200mm
Start of measuring range	SMR	24mm	30mm	40mm	175mm	45mm	70mm	130mm
Midrange	MMR	25mm	35mm	50mm	195mm	70mm	120mm	230mm
End of measuring range	EMR	26mm	40mm	60mm	215mm	95mm	170mm	330mm
Linearity		1 μ m	3 μ m	6 μ m	12 μ m	15 μ m	30 μ m	60 μ m
		$\leq 0.05\%$ FSO		$\leq 0.03\%$ FSO				
Resolution	dynamic ¹⁾	0.03 μ m	0.15 μ m	0.3 μ m	0.6 μ m	0.8 μ m	1.5 μ m	3 μ m
	static ²⁾	0.0015% FSO						
Measuring rate		10kHz						
Permissible ambient light		30,000lx						
Spot diameter	SMR	80 μ m	110 μ m	160 μ m	230 μ m	215 μ m	350 μ m	1300 μ m
	MMR	35 μ m	50 μ m	60 μ m	210 μ m	80 μ m	130 μ m	1300 μ m
	EMR	80 μ m	110 μ m	160 μ m	230 μ m	215 μ m	350 μ m	1300 μ m
Light source		semiconductor laser <1mW, 670nm (red)						
Laser safety class		class 2 acc. DIN EN 60825-1/A1 12.99 / IEC 825-1/A1 12.99 / FDA						
Protection class		sensor: IP 65 / controller: IP 50						
Operation temperature		0 ... +50°C						
Storage temperature		-20 ... +70°C						
Output		analog: $\pm 5V$ digital: RS 422 / 691.2kbaud						
Power supply		24VDC ($\pm 15\%$), max. 500mA						
Sensor cable length		standard: 2m - integrated option: 5m/10m						
Controller		functions: auto zero / signal averaging dimensions: 143mm x 145mm x 52mm - without mounting clips						
Electromagnetic compatibility (EMC)		EN 55011/12.1998 and EN 50082-2/ 02.1996						
Vibration		2g / 20 ... 500Hz						
Shock		15g / 6ms / 3 axis						
Weight	sensor	~550g			~600g	~550g		~600g
	controller	~1000g						

FSO = Full Scale Output All specifications apply for a diffusely reflecting matt white ceramic target

¹⁾ at 10 kHz without averaging ²⁾ with PC averaging factor 128

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range

Pin assignment					
Pin	Function	Cable Colors ¹⁾	Pin	Function	Cable Colors ¹⁾
1	+24 VDC	red ³⁾	15	GND	-
2	GND	-	16	Signal ground	inner screen
3	Analog signal	green	17	Laser Off (-)	black
4	Laser Off (+)	violet	18	Zero (-)	grey
5	Zero (+)	pink	19	Sync Out	-
6	GND	-	20	Sync In (+)	-
7	Sync In (-)	-	21	Error 1 (+)	white
8	Error 1 (-)	brown	22	Error 2 (+)	grey/pink
9	Error 2 (-)	blue/red	23	RS422 S	²⁾
10	RS422 S	²⁾	24	RS422 R	²⁾
11	RS422 R	²⁾	25	GND	-
14	Supply ground	blue ³⁾			

1) Color apply to the cables
PC1800-3,
PC1800-3/10/RS485










2) Pin assignment,
15-pol. Sub D in the
PC1800-3/10/RS485

3) Color also apply to the
cables PC2200-3/3/RS422

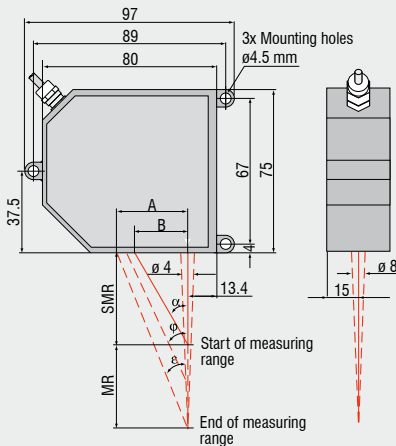
Most precise with anti speckle feature
For metallic or rough surfaces

optoNCDT 2200LL

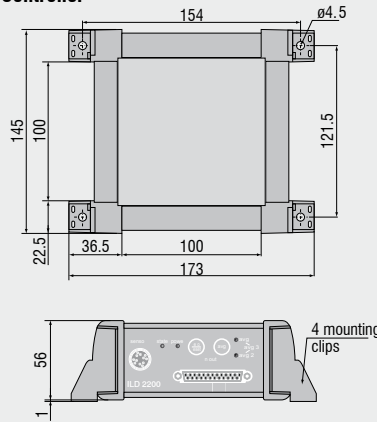


-  **Laser line averages across shiny metallic or structured surfaces**
-  **Four models with measuring ranges from 2mm to 50mm**
-  **Sensor head and separate controller**
-  **Measurement rate up to 10kHz**
-  **Real Time Surface Compensation**
-  **Analog and digital output**
-  **Adjustable filter functions (firmware)**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**

optoNCDT 2200LL (2/10/20/50 mm)



Controller



(Dimensions in mm, not to scale.
CAD files are available online)



MR	SMR	α	φ	ϵ	A	B
2	24	35.0°	40.0°	44.8°	25.8	16.8
10	30	34.3°	35.2°	35.6°	28.7	20.5
20	40	28.8°	27.5°	26.7°	30.1	22
50	45	26.5°	23.0°	18.3°	31.5	22.5

Model		ILD 2200-2LL	ILD 2200-10LL	ILD 2200-20LL	ILD 2200-50LL
Measuring range		2mm	10mm	20mm	50mm
Start of measuring range	SMR	24mm	30mm	40mm	45mm
Midrange	MMR	25mm	35mm	50mm	70mm
End of measuring range	EMR	26mm	40mm	60mm	95mm
Linearity		1 μ m	3 μ m	6 μ m	15 μ m
		$\leq 0.05\%$ FSO		$\leq 0.03\%$ FSO	
Resolution ¹⁾	dynamic ²⁾	0.03 μ m	0.15 μ m	0.3 μ m	0.8 μ m
	static ³⁾	0.0015% FSO			
Measuring rate		10kHz			
Permissible ambient light		30 000lx			
Spot diameter	SMR	85 x 240 μ m	120 x 405 μ m	185 x 485 μ m	350 x 320 μ m
	MMR	24 x 280 μ m	35 x 585 μ m	55 x 700 μ m	70 x 960 μ m
	EMR	64 x 400 μ m	125 x 835 μ m	195 x 1200 μ m	300 x 1940 μ m
Light source		semiconductor laser <1mW, 670nm (red)			
Laser safety class		class 2 acc. DIN EN 60825-1/A1 12.99 / IEC 825-1/A1 12.99 / FDA			
Protection class		sensor: IP 65 / controller: IP 50			
Operation temperature		0 ... +50°C			
Storage temperature		-20 ... +70°C			
Output		analog: ± 5 V digital: RS 422 / 691.2kBaund			
Power supply		24VDC ($\pm 15\%$), max. 500mA			
Sensor cable length		standard: 2m - integrated option: 5m/10m			
Controller		functions: auto zero / signal averaging dimensions: 143mm x 145mm x 52mm - without mounting clips			
Electromagnetic compatibility (EMC)		EN 55011/12.1998 and EN 50082-2/02.1996			
Vibration		2g / 20 ... 500Hz			
Shock		15g / 6ms / 3 axis			
Weight		sensor: ~550g controller: ~1000g			

FSO = Full Scale Output SMR = Start of measuring range MMR = Midrange EMR = End of measuring range

All specifications apply for a diffusely reflecting white ceramic target

¹⁾ for measurements against high glossy surfaces (targets), resolution depends on the material

²⁾ at 10kHz without averaging

³⁾ with PC averaging factor 128

Pin assignment					
Pin	Function	Cable Colors ¹⁾	Pin	Function	Cable Colors ¹⁾
1	+24 VDC	red ³⁾	15	GND	-
2	GND	-	16	Signal ground	inner screen
3	Analog signal	green	17	Laser Off (-)	black
4	Laser Off (+)	violet	18	Zero (-)	grey
5	Zero (+)	pink	19	Sync Out	-
6	GND	-	20	Sync In (+)	-
7	Sync In (-)	-	21	Error 1 (+)	white
8	Error 1 (-)	brown	22	Error 2 (+)	grey/pink
9	Error 2 (-)	blue/red	23	RS422 S	²⁾
10	RS422 S	²⁾	24	RS422 R	²⁾
11	RS422 R	²⁾	25	GND	-
14	Supply ground	blue ³⁾			

1) Color apply to the cables
PC1800-3,
PC1800-3/10/RS485

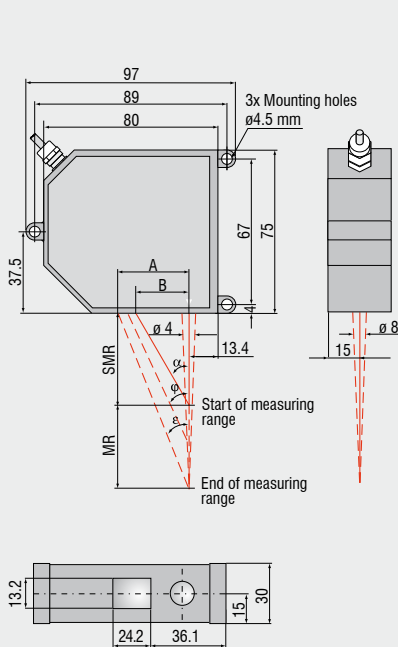
2) Pin assignment,
15-pol. Sub D in the
PC1800-3/10/RS485

3) Color also apply to the
cables PC2200-3/3/RS422

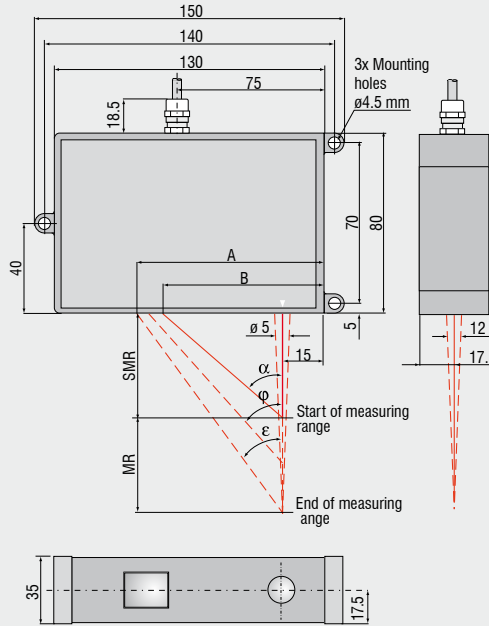


-  **Six models with measuring ranges from 2mm to 200mm**
-  **Sensor head and separate controller**
-  **20kHz measurement rate over the full working range**
-  **Real Time Surface Compensation**
-  **Analog and digital output**
-  **Adjustable filter functions (firmware)**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**

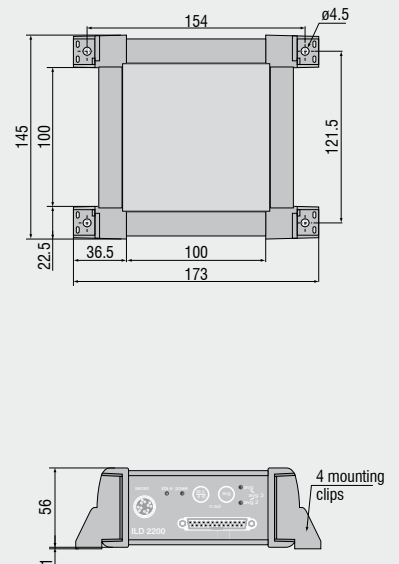
optoNCDT 2220 (2/10/20/50/100 mm)



optoNCDT 2220 (200 mm)



Controller



(Dimensions in mm, not to scale. All CAD files are available online.)

MR	SMR	α	ϕ	ϵ	A	B
2	24	35.0°	40.0°	44.8°	25.8	16.8
10	30	34.3°	35.2°	35.6°	28.7	20.5
20	40	28.8°	27.5°	26.7°	30.1	22
50	45	26.5°	23.0°	18.3°	31.5	22.5
100	70	19.0°	15.4°	10.9°	32.6	24.1
200	130	25.1°	16.7°	13.1°	91.6	7

Model		ILD 2220-2	ILD 2220-10	ILD 2220-20	ILD 2220-50	ILD 2220-100	ILD 2220-200
Measuring range		2mm	10mm	20mm	50mm	100mm	200mm
Start of measuring range	SMR	24mm	30mm	40mm	45mm	70mm	130mm
Midrange	MMR	25mm	35mm	50mm	70mm	120mm	230mm
End of measuring range	EMR	26mm	40mm	60mm	95mm	170mm	330mm
Linearity		1 μ m	3 μ m	6 μ m	15 μ m	30 μ m	60 μ m
		$\leq 0.05\%$ FSO		$\leq 0.03\%$ FSO			
Resolution (at 20 kHz without averaging)		0.03 μ m	0.15 μ m	0.3 μ m	0.8 μ m	1.5 μ m	3 μ m
		0.0015% FSO					
Measuring rate		20kHz					
Permissible ambient light		30.000lx					
Spot diameter	SMR	80 μ m	110 μ m	160 μ m	215 μ m	350 μ m	1300 μ m
	MMR	35 μ m	50 μ m	60 μ m	80 μ m	130 μ m	1300 μ m
	EMR	80 μ m	110 μ m	160 μ m	215 μ m	350 μ m	1300 μ m
Light source		semiconductor laser <1mW, 670nm (red)					
Laser safety class		class 2 acc. DIN EN 60825-1/A1 12.99 / IEC 825-1/A1 12.99 / FDA					
Protection class		sensor: IP 65 / controller: IP 50					
Operation temperature		0 ... +50°C					
Storage temperature		-20 ... +70°C					
Output		analog: $\pm 5V$ digital: RS 422 / 691.2kBaund					
Power supply		24VDC ($\pm 15\%$), max. 500mA					
Sensor cable length		standard: 2m - integrated option: 5m/10m					
Controller		functions: auto zero / signal averaging dimensions: 143mm x 145mm x 52mm - without mounting clips					
Electromagnetic compatibility (EMC)		EN 55011/12.1998 and EN 50082-2/ 02.1996					
Vibration		2g / 20 ... 500Hz					
Shock		15g / 6ms / 3 axis					
Weight	sensor	~550g					~600g
	controller	~1000g					

FSO = Full Scale Output

All specifications apply for a diffusely reflecting matt white ceramic target

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range










Pin assignment					
Pin	Function	Cable Colors ¹	Pin	Function	Cable Colors ¹
1	+24 VDC	red ³	15	GND	-
2	GND	-	16	Signal ground	inner screen
3	Analog signal	green	17	Laser Off (-)	black
4	Laser Off (+)	violet	18	Zero (-)	grey
5	Zero (+)	pink	19	Sync Out	-
6	GND	-	20	Sync In (+)	-
7	Sync In (-)	-	21	Error 1 (+)	white
8	Error 1 (-)	brown	22	Error 2 (+)	grey/pink
9	Error 2 (-)	blue/red	23	RS422 S	²
10	RS422 S	²	24	RS422 R	²
11	RS422 R	²	25	GND	-
14	Supply ground	blue ³			

1) Color apply to the cables
PC1800-3,
PC1800-3/10/RS485

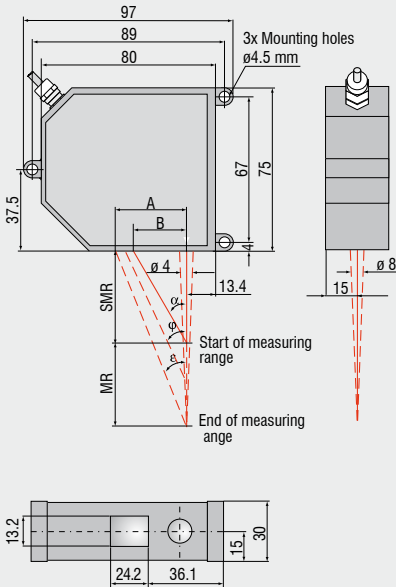
2) Pin assignment,
15-pol. Sub D in the
PC1800-3/10/RS485

3) Color also apply to the
cables PC2200-3/3/RS422

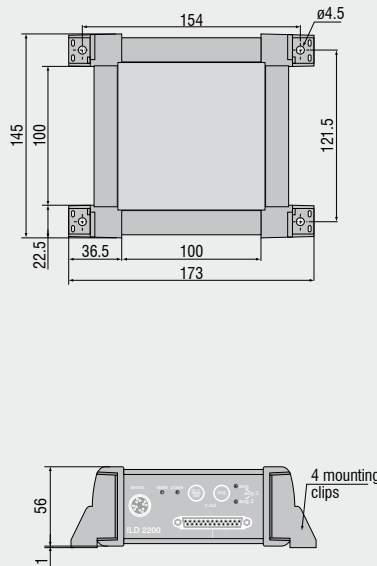


-  **Laser line averages across shiny metallic or structured surfaces**
-  **Four models with measuring ranges from 2mm to 50mm**
-  **Sensor head and separate controller**
-  **20kHz measurement rate over the full working range**
-  **RTSC Real Time Surface Compensation**
-  **Analog and digital output**
-  **Adjustable filter functions (firmware)**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**

optoNCDT 2220LL (2/10/20/50 mm)



Controller



(Dimensions in mm, not to scale. All CAD files are available online.)

MR	SMR	α	ϕ	ϵ	A	B
2	24	35.0°	40.0°	44.8°	25.8	16.8
10	30	34.3°	35.2°	35.6°	28.7	20.5
20	40	28.8°	27.5°	26.7°	30.1	22
50	45	26.5°	23.0°	18.3°	31.5	22.5

Model		ILD 2220-2LL	ILD 2220-10LL	ILD 2220-20LL	ILD 2220-50LL
Measuring range		2mm	10mm	20mm	50mm
Start of measuring range	SMR	24mm	30mm	40mm	45mm
Midrange	MMR	25mm	35mm	50mm	70mm
End of measuring range	EMR	26mm	40mm	60mm	95mm
Linearity		1 μ m	3 μ m	6 μ m	15 μ m
		$\leq 0.05\%$ FSO		$\leq 0.03\%$ FSO	
Resolution ¹⁾ (at 20 kHz without averaging)		0.03 μ m	0.15 μ m	0.3 μ m	0.8 μ m
		0.0015% FSO			
Measuring rate		20kHz			
Permissible ambient light		30 000lx			
Spot diameter	SMR	85 x 240 μ m	120 x 405 μ m	185 x 485 μ m	350 x 320 μ m
	MMR	24 x 280 μ m	35 x 585 μ m	55 x 700 μ m	70 x 960 μ m
	EMR	64 x 400 μ m	125 x 835 μ m	195 x 1200 μ m	300 x 1940 μ m
Light source		semiconductor laser <1mW, 670nm (red)			
Laser safety class		class 2 acc. DIN EN 60825-1/A1 12.99 / IEC 825-1/A1 12.99 / FDA			
Protection class		sensor: IP 65 / controller: IP 50			
Operation temperature		0 ... +50°C			
Storage temperature		-20 ... +70°C			
Output		analog: $\pm 5V$ digital: RS 422 / 691.2kBaud			
Power supply		24VDC ($\pm 15\%$), max. 500mA			
Sensor cable length		standard: 2m - integrated option: 5m/10m			
Controller		functions: auto zero / signal averaging dimensions: 143mm x 145mm x 52mm - without mounting clips			
Electromagnetic compatibility (EMC)		EN 55011/12.1998 and EN 50082-2/ 02.1996			
Vibration		2g / 20 ... 500Hz			
Shock		15g / 6ms / 3 axis			
Weight		sensor: $\sim 550g$ controller: $\sim 1000g$			

FSO = Full Scale Output

All specifications apply for a diffusely reflecting matt white ceramic target

¹⁾ for measurements against high glossy surfaces (targets), resolution depends on the material

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range










Pin assignment					
Pin	Function	Cable Colors ¹⁾	Pin	Function	Cable Colors ¹⁾
1	+24 VDC	red ³⁾	15	GND	-
2	GND	-	16	Signal ground	inner screen
3	Analog signal	green	17	Laser Off (-)	black
4	Laser Off (+)	violet	18	Zero (-)	grey
5	Zero (+)	pink	19	Sync Out	-
6	GND	-	20	Sync In (+)	-
7	Sync In (-)	-	21	Error 1 (+)	white
8	Error 1 (-)	brown	22	Error 2 (+)	grey/pink
9	Error 2 (-)	blue/red	23	RS422 S	²⁾
10	RS422 S	²⁾	24	RS422 R	²⁾
11	RS422 R	²⁾	25	GND	-
14	Supply ground	blue ³⁾			

1) Color apply to the cables
PC1800-3,
PC1800-3/10/RS485

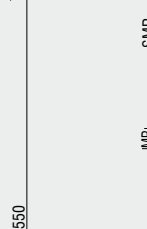
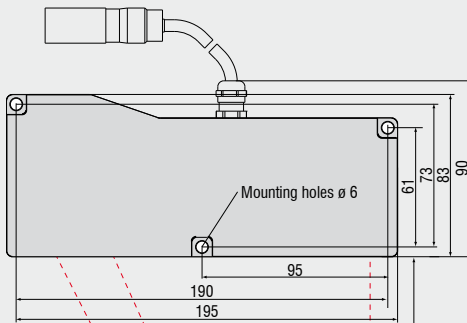
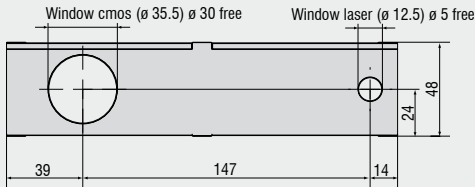
2) Pin assignment,
15-pol. Sub D in the
PC1800-3/10/RS485

3) Color also apply to the
cables PC2200-3/3/RS422

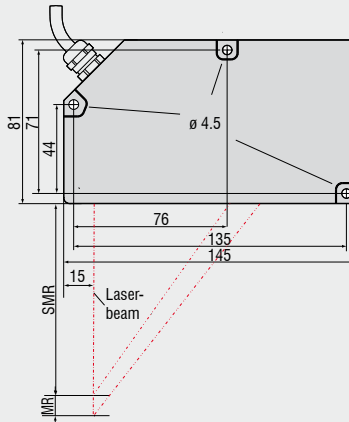
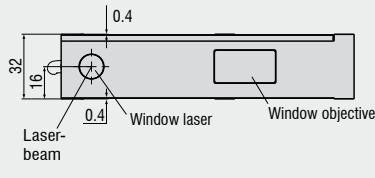


-  **High accuracy and long standoff distances**
-  **Three models with measuring ranges from 10mm to 50mm**
-  **Sensor head and separate controller**
-  **Measurement rate up to 10kHz**
-  **Real Time Surface Compensation**
-  **Analog and digital output**
-  **Adjustable filter functions (firmware)**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**

optoNCDT 1810-50

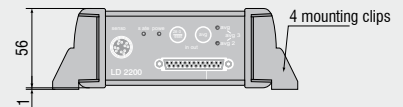
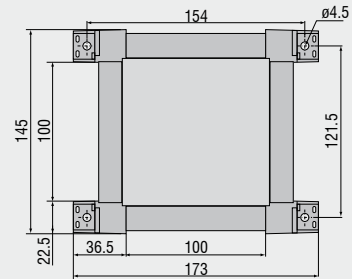


optoNCDT 2210



Dimensions in mm, not to scale.

Controller



Model		ILD 1810-50	ILD 2210-10	ILD 2210-20
Measuring range		50mm	10mm	20mm
Start of measuring range	SMR	550mm	95mm	90mm
Midrange	MMR	575mm	100mm	
End of measuring range	EMR	600mm	105mm	110mm
Linearity		50 μ m	3 μ m	6 μ m
		$\leq 0.1\%$ FSO	$\leq 0.03\%$ FSO	
Resolution	dynamic ¹⁾	5 μ m	0.5 μ m	1 μ m
	static ²⁾	0.01% FSO	0.005% FSO	
Measuring rate		2.5kHz	10kHz	
Permissible ambient light		10.000lx	30.000lx	
Spot diameter	SMR	400 x 500 μ m	130 μ m	200 μ m
	MMR	400 x 500 μ m	60 μ m	60 μ m
	EMR	400 x 500 μ m	130 μ m	200 μ m
Light source		semiconductor laser <1mW, 670nm (red)		
Laser safety class		class 2 acc. DIN EN 60825-1 : 2001-11 / Class 2 (IEC 60825-1) Class II (FDA)		
Protection class		sensor: IP 65 controller: IP 50		
Operation temperature		0 ... 50°C		
Storage temperature		-20 ... 70°C		
Output	analog	$\pm 5V$ (-10V ... +10V)		
	digital	option: RS232 or RS422	RS422 / 687.5kbaud	
Power supply		24VDC ($\pm 15\%$), max. 500mA		
Sensor cable length		standard: 2m - integrated option: 5m/10m on request		
Controller		functions: auto zero / signal averaging dimensions: 143mm x 145mm x 52mm - without mounting clips		
Electromagnetic compatibility (EMC)		EN 50081-1 and EN 50082-2		
Vibration		2g / 20 ... 500Hz		
Shock		15g / 6ms / 3 axis		
Weight	sensor	~800g	~500g	
	controller		~1000g	










FSO = Full Scale Output

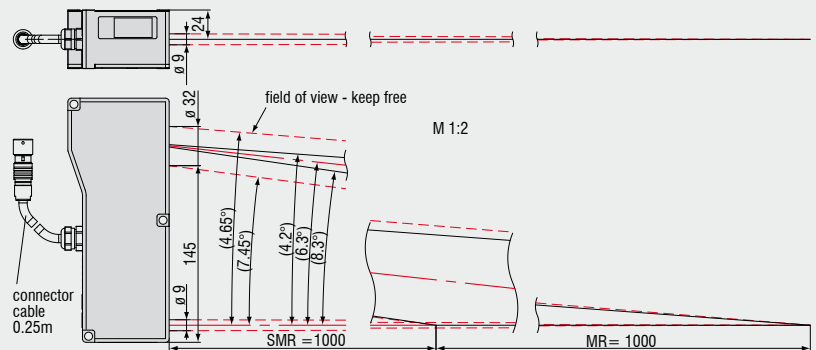
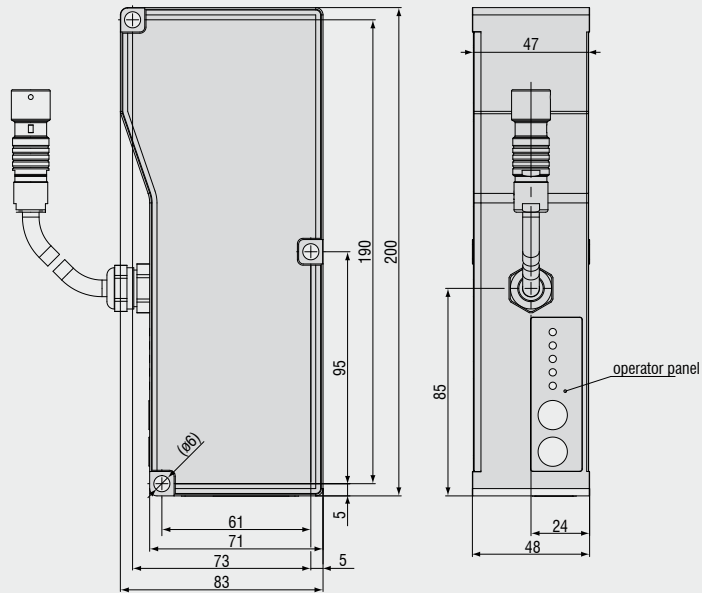
All specifications apply for a diffusely reflecting matt white ceramic target

¹⁾ series 1810: at 2.5 kHz without averaging, series 2210: at 10 kHz without averaging ²⁾ with PC averaging factor 128

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range









-  **High accuracy and long standoff distances**
-  **Model with measuring range up to 1000mm**
-  **Compact design with integrated controller**
-  **Adjustable measuring rate up to 2.5kHz**
-  **Real Time Surface Compensation**
-  **Analog (U/I) and digital output**
-  **Adjustable filter functions (firmware)**
-  **Calibration certificate included**
-  **Configuration via software www.micro-epsilon.com/download**



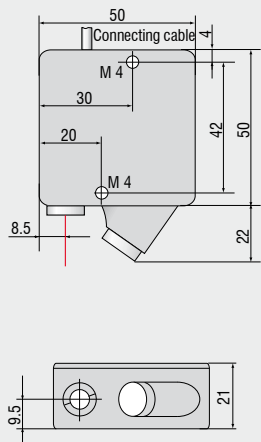
Model	ILD1710-1000	
Measuring range	1000mm	
Start of measuring range	1000mm	
Midrange	1500mm	
End of measuring range	2000mm	
Linearity	$\leq \pm 0.1\%$ FSO	± 1 mm
Resolution (at 2.5kHz, without averaging)	100 μ m	
Measuring rate	2.5 kHz / 1.25 kHz / 625 Hz / 312.5 Hz (adjustable)	
Lichtquelle	semiconductor laser <1mW, 670nm (red)	
Permissible ambient light	at 2.5kHz	10.000lx
Laser safety class	class 2 acc. DIN EN 60825-1 : 2001-11 / Class 2 (IEC 60825-1) Class II (FDA)	
Spot diameter	SMR	2.5...5mm
	MMR	2.5...5mm
	EMR	2.5...5mm
Temperature stability	0.01 % FSO/ $^{\circ}$ C	
Operation temperature	0 ... 50 $^{\circ}$ C	
Storage temperature	-20 ... +70 $^{\circ}$ C	
Output	measurements	switchable: 4 ... 20 mA / 0 ... 10 V / RS 422 / USB (optional via cable PC1700-3/USB)
	switching outputs	1 x error or 2x limit values (configurable)
Switching input	Laser ON-OFF / Zero	
Operation	via keypad directly on the sensor and/or via PC with ILD1700 Tool	
Power supply	24VDC (11 ... 30 VDC), max. 150mA	
Electromagnetic compatibility (EMC)	EN 61000-6-3 and EN 61000-6-2	
Sensor cable	standard 0.25m integrated	
Synchronisation	possible for simultaneous or alternating measurements	
Protection class	IP 65	
Vibration	2g / 20 ... 500Hz	
Shock	15g / 6ms	
Weight	~ 0.8kg	

FSO = Full Scale Output All specifications apply for a diffusely reflecting matt white ceramic target
SMR = Start of measuring range; MMR = Midrange; EMR = End of measuring range;

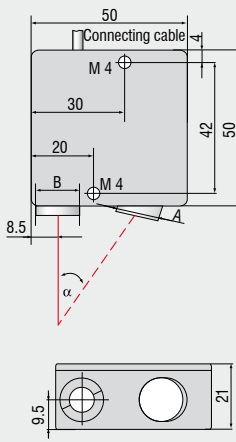


-  **Eight models with measuring ranges from 0.5mm to 200mm**
-  **Sensor head and separate controller**
-  **Up to 37kHz true analogue frequency response**
-  **Analog (U/I) and digital outputs**
-  **Adjustable filter functions (firmware)**
-  **Calibration certificate included**

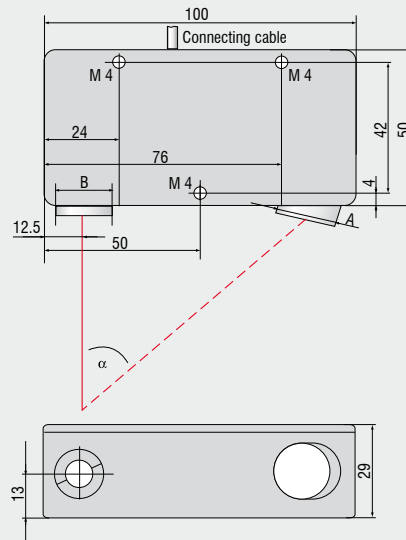
optoNCDT 1607 - 0.5



optoNCDT 1607 - 2/4/10/20



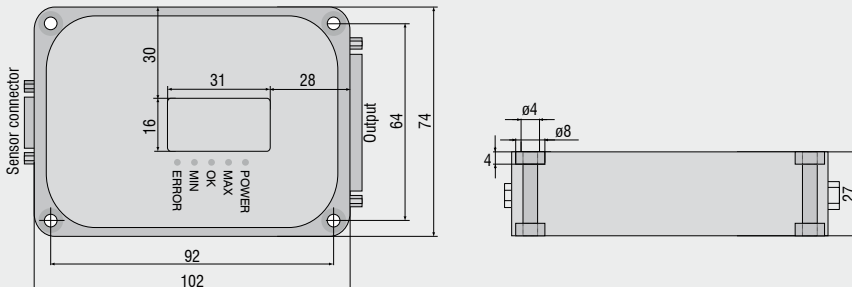
optoNCDT 1607 - 50/100/200



MR	Angle	A	B
0.5	SMR 1.75 mm, measures are not relevant		
2	45°	13	5
4	45°	13	5
10	29°	12	5
20	23°	12	5
50	28°	22	8
100	18°	22	8
200	12°	22	8

(Dimensions in mm, not to scale.)

Controller



Model		LD 1607-0.5	LD 1607-2	LD 1607-4	LD 1607-10	LD 1607-20	LD 1607-50	LD 1607-100	LD 1607-200	
Measuring range		0.5mm	2mm	4mm	10mm	20mm	50mm	100mm	200mm	
Start of measuring range	SMR	23 75mm	23mm	22mm	40mm	55mm	95mm	170mm	240mm	
Midrange	MMR	24mm	24mm	24mm	45mm	65mm	120mm	220mm	340mm	
End of measuring range	EMR	24 25mm	25mm	26mm	50mm	75mm	145mm	270mm	440mm	
Linearity		1μm	4μm	8μm	20μm	40μm	100μm	200μm	400μm	
		≤0 2% FSO								
Resolution (Noise)*	static	0.1μm	0.5μm	1μm	3μm	6μm	20μm	30μm	60μm	
Frequency response		10kHz, 7kHz, 4kHz, 1kHz, 250Hz, 100Hz, 25Hz or 15Hz (-3dB), selectable with DIP switches optional: Model LD1627: 37kHz (-3dB)								
Light source		laser < 1mW, wavelength: 670nm (red)								
Life cycle	typ.	100,000h (laserdiode)								
Laser safety class		class 2 (DIN EN 60825-1:2001-11)								
Spot diameter	MMR	0.1mm	0.3mm	0.3mm	0.6mm	0.9mm	1.5mm	1.5mm	4mm	
Permissible ambient light		20,000lx								
Output		displacement: ±10V / 4 - 20mA / RS232 intensity: 0 ... 10V								
Vibration		2g (IEC 68-2-6)								
Shock		15g (IEC 68-2-6)								
Operation temperature		0 ... +50°C								
Storage temperature / humidity		-20 ... +70°C / up to 90% RH								
Protection class		sensor: IP 64 / electronics: IP 40								
Supply		+ 24VDC / 200mA (10 ... 30VDC)								
Connector		25-pin Sub-D connector								
Weight	Sensor	250g	240g					400g		
	Controller	275g								
Sensor cable length		2m								

FSO = Full Scale Output All specifications apply for a diffusely reflecting matt white ceramic target

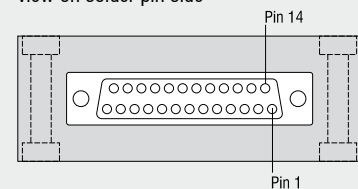
* Frequency response 15 Hz

SMR = Start of measuring range MMR = Midrange EMR = End of measuring range

switching outputs (connector) 24 V logic		
MIN		+24V / 10mA
OK		+24V / 10mA
MAX		+24V / 10mA
Hysteresis		appr. 0.4% FSO
Output of errors (connector)		
Too little light		+24V / 10mA
Too much light		+24V / 10mA
LED - indicators		
POWER	GREEN	power on
MAX	RED	adjustable MAX value is exceeded
OK	GREEN	LED level indicator OK shows the position of the target within the set limits
MIN	YELLOW	adjustable value drops below the set MIN
ERROR	RED	too little light is reflected

Pin assignment controller		
Pin-Nr.	Function	Cable Colors
1	Displacement output, ±10V	green
2	Too little light, +24V	-
3	Laser OFF Input +15 - 30V	white
4	TXD (RS232)	-
5	OK in range, +24V	-
6	4 ... 20mA	-
7	RXD (RS232)	-
8	0 V supply	brown
9-13	n.c.	-
14	Analog ground	blue screen
15	Too much light +24V	-
16	MAX, +24V	-
17	n.c.	-
18	RTS (RS232)	-
19	MIN, +24V	-
20	Light intensity 0 - 10V	red
21	+24V supply (10 - 36V)	green
22-25	n.c.	-

25-pin power and output connector view on solder pin side



Accessories for all optoNCDT SeriesPower supply

PS 2010 (for top-hat rail mounting;
L/W/H 120x120x40mm; Input 115 / 230VAC
selectable; output 24VDC / 2.5A)

Controller

CSP 2008 (controller for processing of
multiple sensor signals; analog and digital
interfaces)

Interface card

IF2008 (Interface card for individual signal
processing; analog and digital interfaces)

Accessories optoNCDT 1302Supply and output cable, rated for moving
cable tracks (available in 90° version / robot
rated)

PC 1402-3/I (3m, output 4 ... 20mA)
PC 1402-6/I (6m, output 4 ... 20mA)
PC 1402-3/U (3m, with integral resistance,
output 1 ... 5VDC)
PC 1402-6/U (6m, with integral resistance,
output 1 ... 5VDC)
PC1402-3/IF2008 (3m, supply and output
cable)
PC 1402-3/USB (3m, supply and output
cable)
PC1401/1402-0.2 (0.2m, adapter cable 12-
pin to 7-pin)

Protective housing

SGH 1800
SGHF 1800

Accessories optoNCDT 1402Supply and output cable(drag chain rated / robot rated)

PC 1402-3/I (3m, output 4 ... 20mA)
PC 1402-6/I (6m, output 4 ... 20mA)
PC 1402-3/U (3m, with integral resistance,
output 1 ... 5VDC)
PC 1402-6/U (6m, with integral resistance,
output 1 ... 5VDC)
PC1402-3/IF2008 (3m, supply and output
cable)
PC 1402-3/USB (3m, supply and output
cable)
PC1401/1402-0.2 (0.2m, adapter cable 12-
pin to 7-pin)
PC 1402-3/CSP (3m, for CSP 2008)

Protective housing

SGH 1800
SGHF 1800

Accessories optoNCDT 1607 / 1627Supply and output cable

PC 1605-3 (3m)
PC 1605-6 (6m)
PC 1607-3/RS232 (3m, with 9-pin
Sub-D connector for RS232)

Protective housing

SGF 1605-20 (for LD1607-2/4/10/20)
SGF 1605-200 (for LD1607-50/100/200)
SQL with connection for compressed air

Accessories**optoNCDT 1700/1700LL/1700DR**Supply and output cable(drag chain rated / robot rated)

PC 1700-3 (3m)
PC 1700-10 (10m)
PC 1700-10/3/IF2008 (10m, for use with
interface card IF2008)
PC 1700-3/T (3m, for use with trigger box)
PC 1700-10/T
(10m, for use with trigger box)
PC 1700-3/USB (3m, with USB-RS422-
converter, power supply 90 ... 230 VAC)

Protective housing

SGH 1800
(for ILD 1700-2/10/20/50/100/200/250VT
and ILD 1700-2LL/10LL/20LL/50LL)
SGH 2200-200 (for ILD 1700-40/500/750)
SGxF 1800
(option with compressed air clean setup)
SGxF 2200-200
(option with compressed air clean setup)

External trigger

Triggerbox 1700 (Electronics for triggering
optoNCDT 1700 sensors. Acceptable
trigger levels from +2.4VDC to +24VDC,
L/W/H 98x64x34mm)

Accessories**optoNCDT 2200(LL) / 2220(LL) /
1810-50 / 2210**Supply and output cable (drag chain rated)

PC 1800-3 (3m)
PC 1800-8 (8m)
PC2200-3/10/RS485 (3m, RS 485 for use
with interface card IF2008)
PC 2200-3/3/RS422 (3m, for IF2008/RS422/
USB-converter)

Sensor cable extension (drag chain rated)

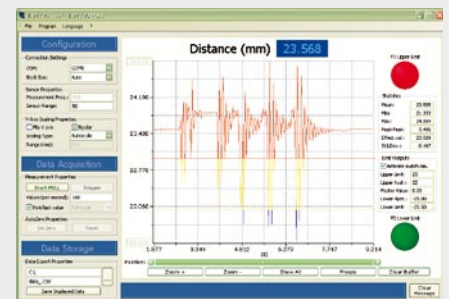
CE 1800-3 (3m)
CE 1800-8 (8m)

Protective housing(only for series 2200, 2200LL, 2220, 2220LL)

SGx 1800 (for ILD 2200-2/10/20/50/100,
ILD 2200-2LL/10LL/20LL/50LL,
ILD 2220-2/10/20/50/100,
ILD 2220-2LL/10LL/20LL/50LL)

SGH 2200-200

(for ILD 2200-40/200, ILD 2220-200)
SGxF 1800 (option with compressed air
clean setup)
SGxF 2200-200 (option with compressed
air clean setup)

**Setup and configuration software**

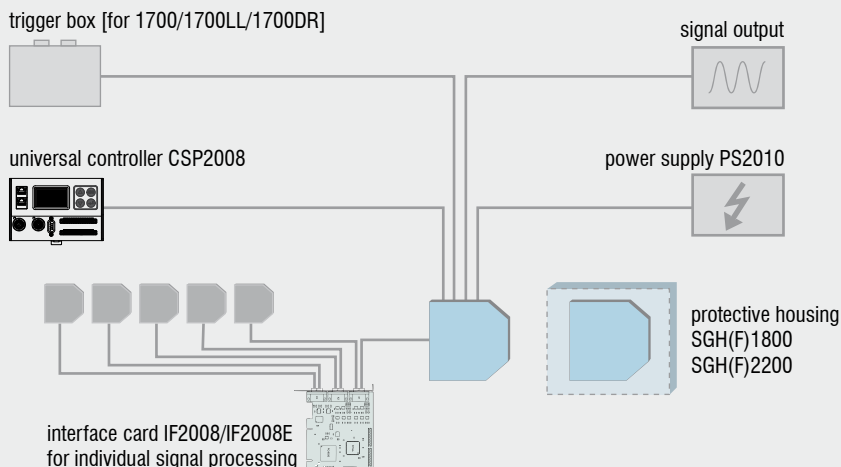
ILD Tools is the software included for easy
sensor configuration. All the settings can be
implemented conveniently via a Windows user
interface on the PC. The sensor parameters
are sent to the sensor via the serial port and
can also be saved if required. ILD Tools also
includes a module which can display and save
measurement results. The link to the PC is
made via the sensor cable with a USB conver-
ter. [available for all series except 1302 and 1607]

Driver support for customer software

For the optoNCDT sensors documented DLL
drivers are available free of charge, which ena-
bles easy integration of the sensors into exist-
ing software.

**Software download free of charge from
www.micro-epsilon.com/download****IF 2008 Interface card**

The Interface card IF 2008 enables a synchro-
nous data acquisition of up to four digital sig-
nals and two encoder. The data is stored in
a FIFO memory to generate a resource-con-
serving processing in blocks. The IF2008E
board offers two sensor inputs, two AD-Con-
verter inputs, four opto-coupler inputs and
four opto-coupler outputs. The boards IF2008
and IF2008E can operate independently of
each other or coupled. In sum, eight sensors
and two encoders can be connected with the
boards.



CSP 2008: Universal controller for multiple sensor signals

Inputs/Outputs sensors

2 sensor connectors (16 pin)

Digital

1x ethernet (PC 100 MBit)
1x ethercat
1x RS422 (PLC max. 1,5 Mbaud)
2 terminal strips (13 pins)

Analog input

voltage 0...5 V, scaleable via software
0...10 V, -5...5 V, -10...10 V,
electrically isolated, 100 kHz, 16 Bit
(available september 2010)

Analog output

voltage 0...5 V,
0...10 V, -5...5 V, -10...10 V

Functions

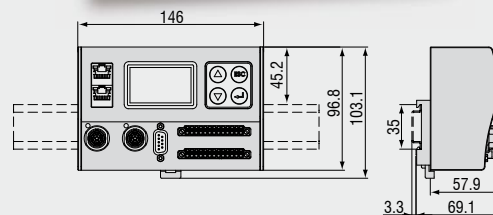
filter: moving average 1...1024 /
recursive 1...32768 / median 3/5/7/9
zero, master
trigger (measuring value, edge, gate,
software)
automatic sensor detection
(digital interface)
scaleable measuring ranges
synchronisation

Limits

OG, UG, OW, UW, OK

Calculation

A,B; A+B; A-B; -A-B; K-A-B; K+A+B;
K+A-B; K+A; K+B; K(A+B); K(A+k*B)



Universal controller with DIN rail TS 35
(dimensions not to scale)

Protective housing for harsh environment

To protect the laser sensors in extreme environments individual protective housings are available for all sensor models. Three options for the protective housing are offered.



Option SGH:

Completely enclosed housing with an integrated front window, where the sensor measures through the window. The water resistant housing (IP68) provides protection against aggressive solvents and detergents.

Option SGHF:

The SGHF version offers optimum protection for the sensor with integrated compressed air cooling and provides protection against fluids.

Option SGL:

Protective housing with open slot for air purging of the measurement gap and cooling purpose.

Dimensions

SGx 16x7/20: 74x80x58mm for
ILD 16x7-2/4/10/20

SGx 16x7/200: 125x80x58mm for
ILD16x7-50/100/200

SGx 1800: 140x140x71 mm for
ILD 1302 and ILD 1402
ILD 1700-2/10/20/50/100/200/250VT,
ILD 1700-2LL/10LL/20LL/50LL,
ILD 2200-2/10/20/50/100,
ILD 2200-2LL/10LL/20LL/50LL,
ILD 2220-2/10/20/50/100,
ILD 2220-2LL/10LL/20LL/50LL

SGx 2200: 140x180x71 mm for
ILD 1700-40/500/750,
ILD 2200-40/200,
ILD 2220-200

High performance sensors made by Micro-Epsilon



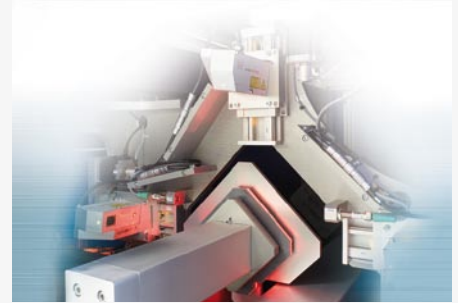
Sensors and systems for displacement, position and dimension

- Eddy current sensors
- Optical and laser sensors
- Capacitive sensors
- Inductive sensors
- Draw-wire sensors
- Optical micrometers
- 2D/3D profile sensors
- Image processing



Sensors and measurement devices for non-contact temperature sensors

- Online instruments
- Handheld devices



Measuring systems for quality control

- for plastic and film
- for tire and rubber
- for web material
- for automotive components
- for glass