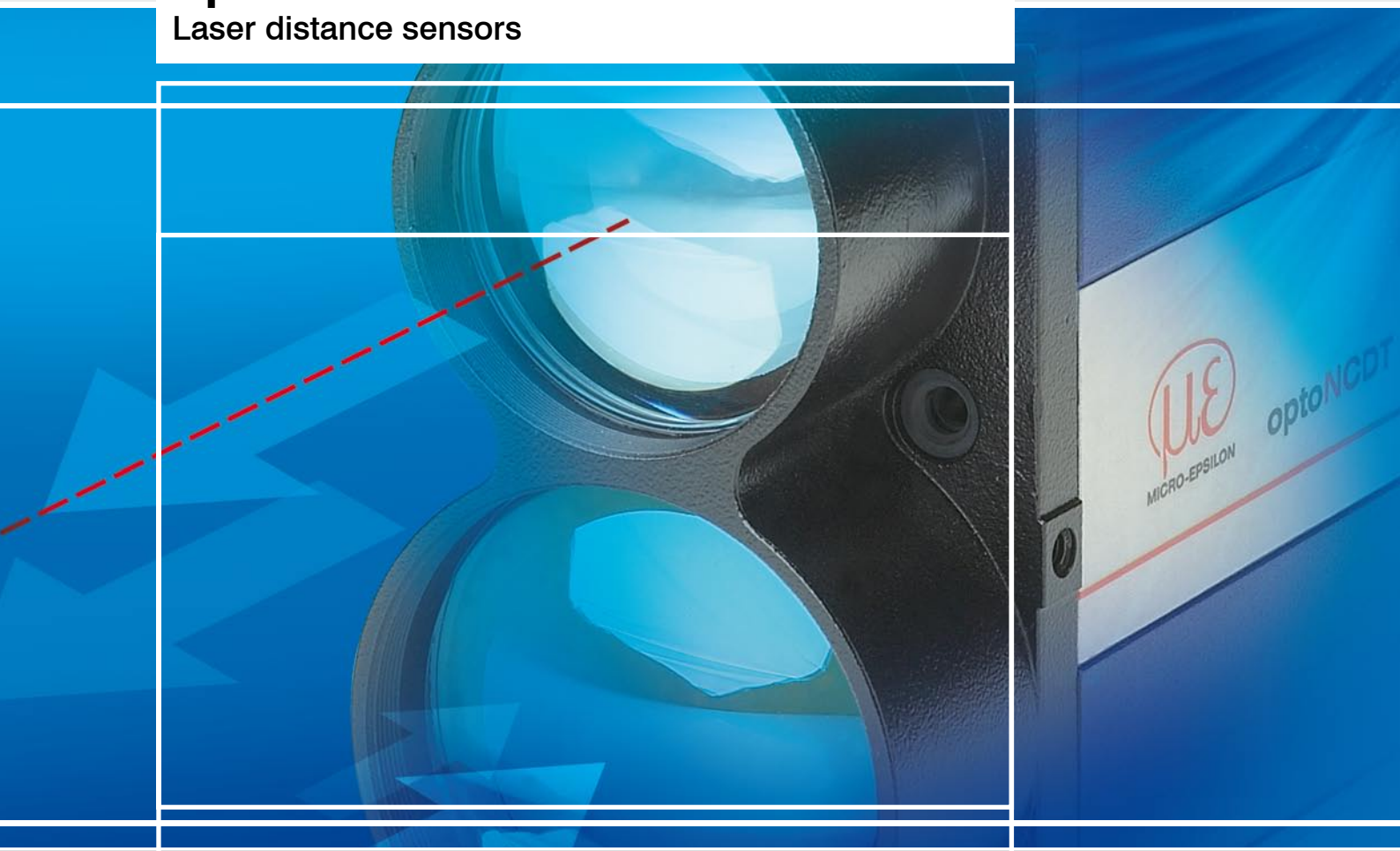
MICRO-EPSILON

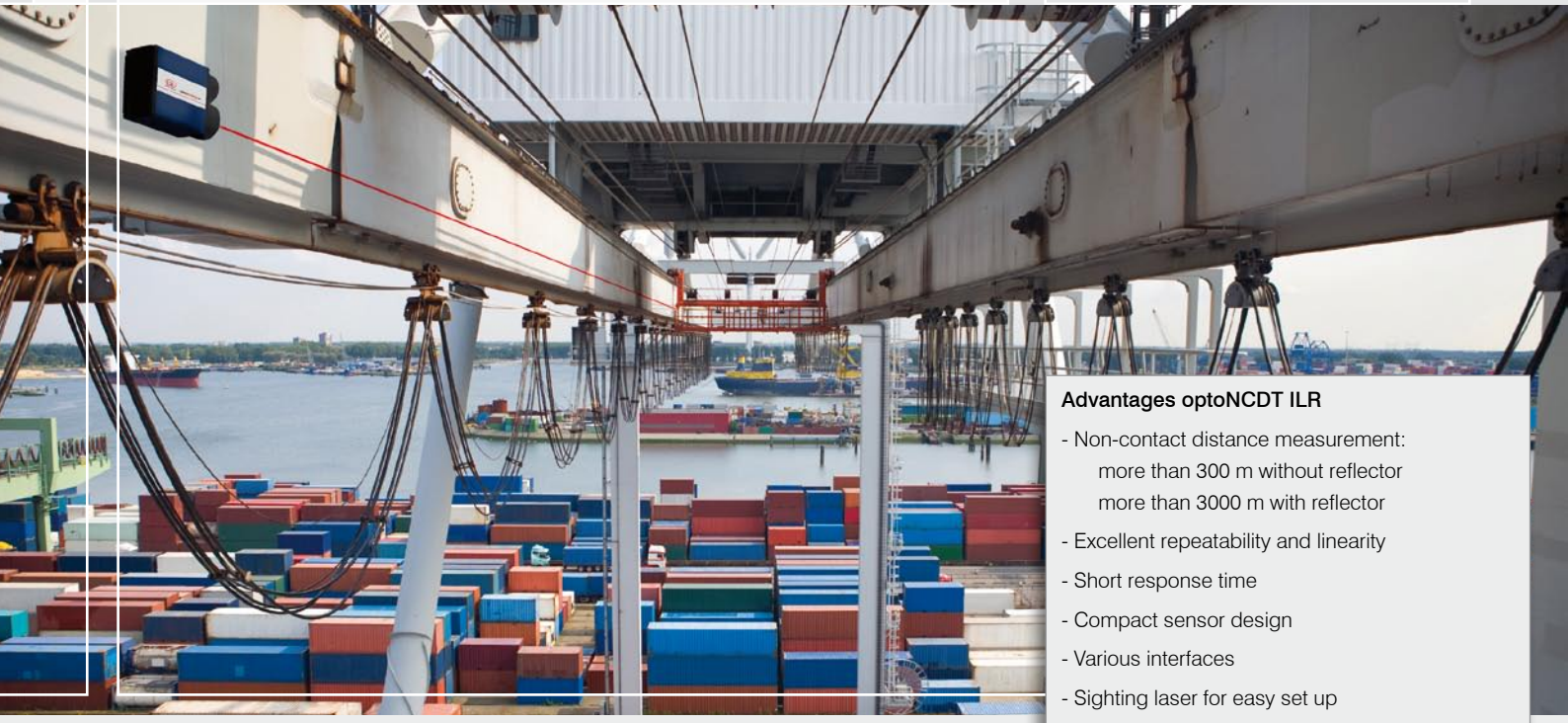
More Precision.

optoNCDT ILR

Laser distance sensors



optoNCDT ILR: Compact laser distance sensors

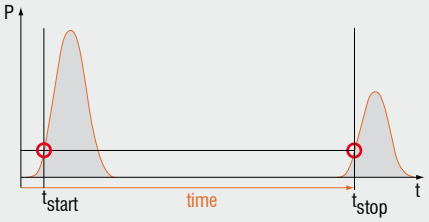


Advantages optoNCDT ILR

- Non-contact distance measurement:
  more than 300 m without reflector
  more than 3000 m with reflector
- Excellent repeatability and linearity
- Short response time
- Compact sensor design
- Various interfaces
- Sighting laser for easy set up
- Excellent price-performance ratio

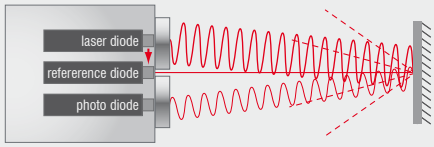
Laser distance sensors

Sensors in the optoNCDT ILR series are optoelectronic sensors for non-contact displacement, distance and also speed measurement. The large measuring range of the laser distance sensors enables measurements on critical surfaces such as, e.g. hot metal, from a safe distance or the regulation of large travel displacements with a small installation size. Measurements without wear and thus a long service life are made possible due to the non-contact measurement technique. Depending on the application, there are four series available with different focuses on accuracy and measuring speed. The sensors are designed for operation with and without reflector and are thus very flexible to use. Due to their robust construction and compact design, the ILR sensors are used indoors and outdoors for many different measurement tasks, both for static as well as moving measurement objects. The exact positioning of the sensor can be performed easily due to the switchable sighting laser.



Time of flight measurement principle

The ILR102x, 110x, 115x, and 119 x sensors operate according to the time of flight measurement principle. A laser diode in the sensor produces short laser pulses which are projected onto the target. The light reflected from the target is recorded by the sensor element. The time of flight of the light pulse to the target and back determines the measurement distance. The integrated electronics in the sensor derives the distance using the time of flight and conditions the signal for the analogue and digital output. Sensors using this principle are not sensitive to external light.



Phase comparison measuring principle

The ILR118x sensors operate according to the phase comparison principle. High frequency modulated laser light with low amplitude is transmitted to the target. Depending on the distance of the object, the distance changes the phase relationship between transmitted and received signal. Sensors using this principle operate with high accuracy for measurement distances up to 150 metres.

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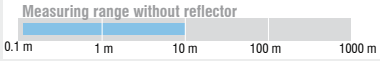
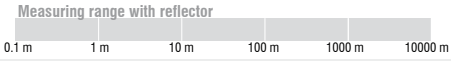
ILR 1020/1100/1150

COMPACT & FAST

Measuring ranges 0.2 ... 10 m
Linearity ±8 ... ±40mm
Repeatability ±4 ... ±10mm
Resolution from 0.1mm
Fast response time

→Interface RS422 / SSI
→Analog output 4 ... 20 mA
→Compact sensor design
→Sensor configuration via touch keys
→IP67





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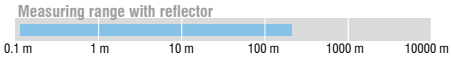
ILR 1021/1101/1151

COMPACT & FAST (REFLECTOR)

Measuring ranges 0.2 ... 250m
Linearity ±3 ... ±60mm
Repeatability ±2 ... ±10mm
Resolution from 0.1mm
Fast response time

→Interface RS422 / SSI
→Analog output 4 ... 20 mA
→Compact sensor design
→Sensor configuration via touch keys
→IP67



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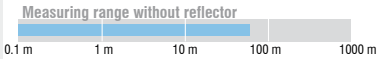
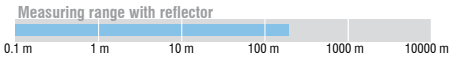
ILR 1181/1182/1183

INDUSTRIAL STANDARD WITH HIGH PRECISION

Measuring ranges 0.1 ... 150 m
Linearity ±2 ... ±5mm
Repeatability <0.5mm
Resolution 0.1mm
Measurement with and without reflector

→Interface RS232 / RS422 / SSI / Profibus
→Analog output 4 ... 20 mA
→Integrated heating (option)
→Small spot diameter
→IP65





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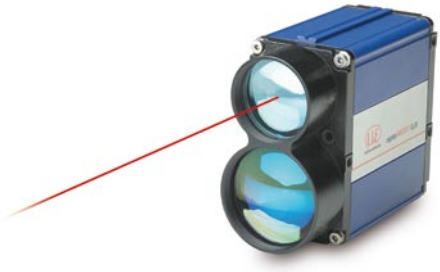
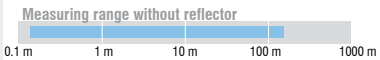
ILR 1191

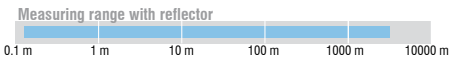
HIGH-PERFORMANCE SENSOR

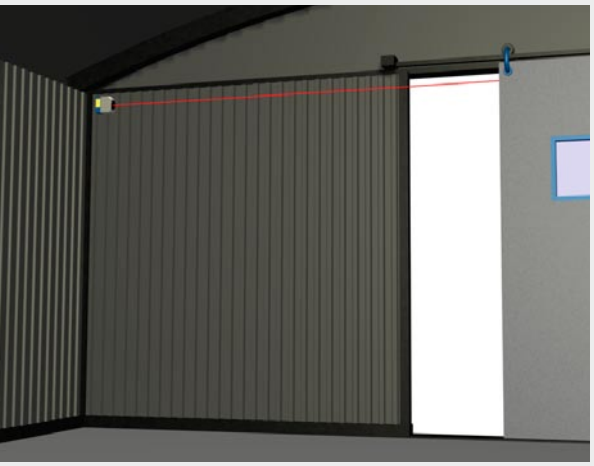
Measuring ranges 0.5 ... 3000m
Linearity ±20 ... ±60mm
Repeatability <20mm
Resolution 1mm
Measurement with and without reflector
Distance and speed measurement

→Interface RS232 / RS422 / SSI / Profibus
→Analog output 4 ... 20 mA
→High measuring rate
→With integrated heating
→IP67

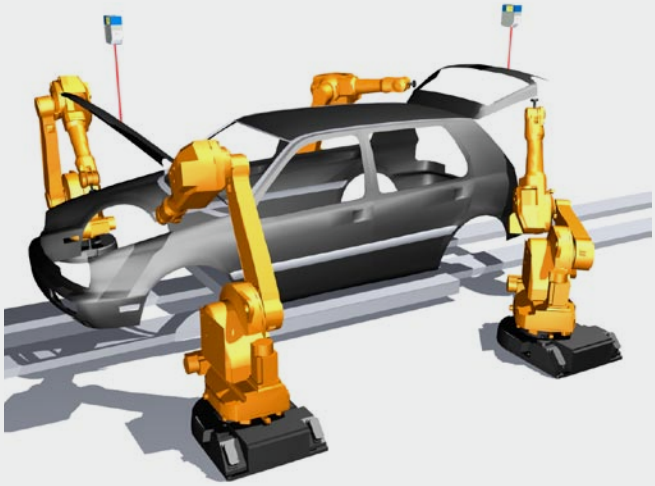




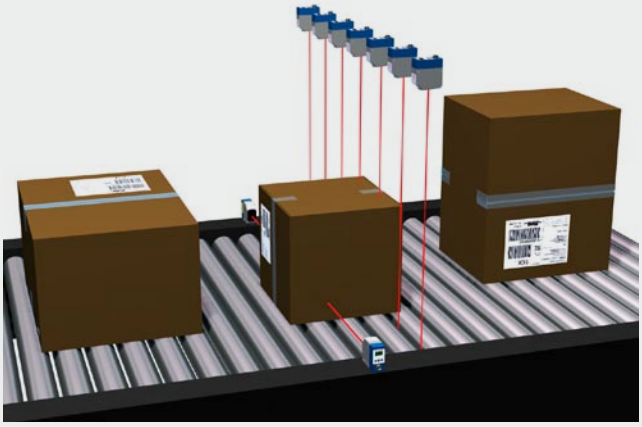




Controlled opening of gates and doors
optoNCDT ILR distance sensors monitor the opening positions of doors and gates. Apart from the linear measurement, the two switching outputs also enable a switching acquisition of certain positions (e.g. „Door open/closed“) to be employed with just one sensor.

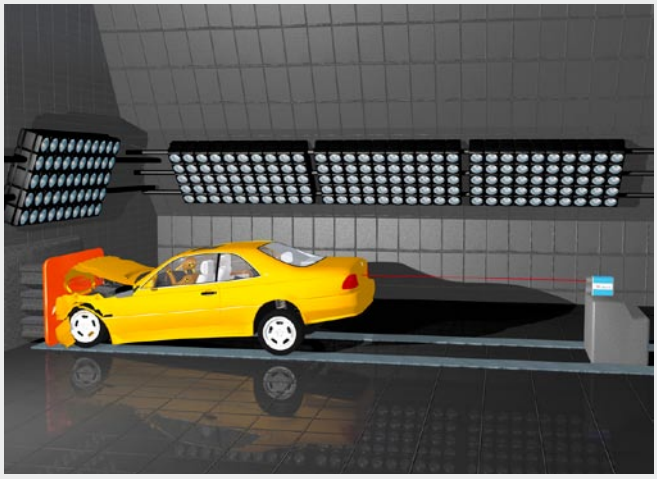


Positioning of automotive parts
In car production the positions of the trunk lid and engine hood are acquired with laser propagation time sensors. If they are completely open, the assembly robot is put into motion for further assembly steps.

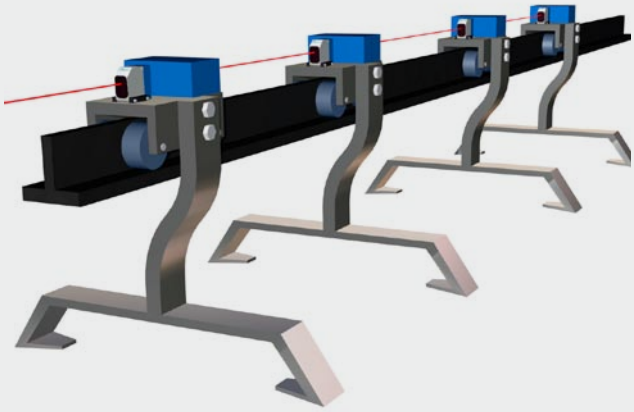


Classification and sorting on conveyors
A number of horizontally and also vertically mounted laser probes measure items in three dimensions. These are classified based on their size and then sorted.

Landscape scan with helicopters
In addition to the camera, optoNCDT ILR sensors for the height determination of the helicopter are used for the profile measurement of landscapes.

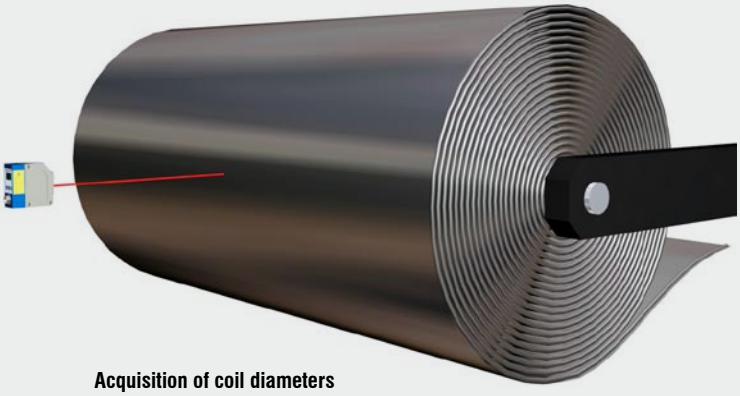


Speed measurement in the crash test
During the acceleration of vehicles in the crash test, an ILR1191 measures the impact speed and the deformation of the test vehicle.



Distance measurement on monorail conveyors
In automotive production lines car parts are transported by monorail conveyors. To control the flow of production and to prevent damage to the parts, the spacing between the conveyors is monitored.

Position measurement on gantry cranes
Numerous measurement tasks on gantry cranes must be performed: Positioning of the trolley, detection and dimensioning of containers and monitoring of the minimum clearance between the cranes. The ILR1191 with a very large measuring range and low response time is designed for these measurement tasks.



Acquisition of coil diameters
The quantities of steel, paper and fabric wound on and off are monitored via the acquisition of coil diameters using laser probes.

Level measurement in container, tanks and silos
Depending on the accuracy demanded, the filling level of silos is found at up to four points. The level is determined from these distances.

Position acquisition of gantry cranes and storage and retrieval units
Fast response time in combination with high measurement accuracy facilitate the exact positioning of storage and retrieval units.

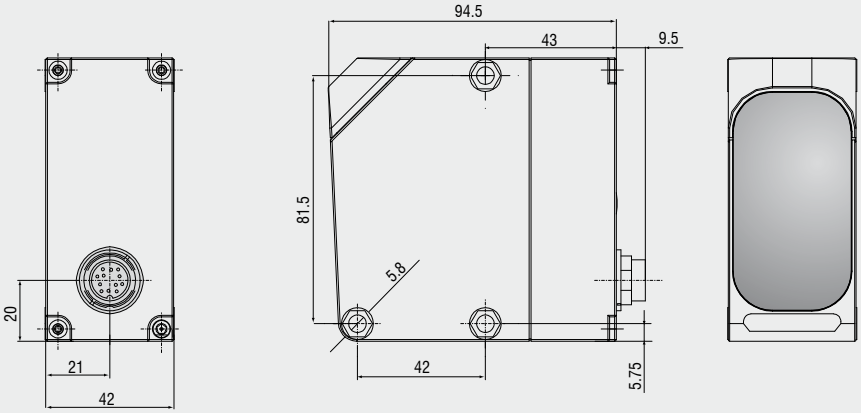
Advantages

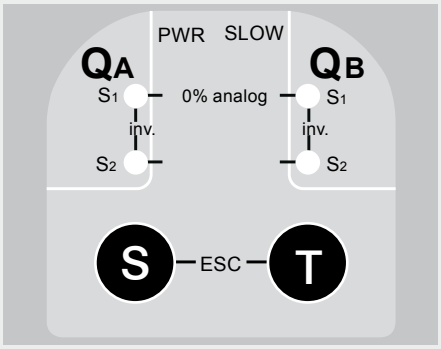
- Measuring range up to 10 m on diffuse reflecting targets
- Short response time
- Excellent price-performance ratio
- Fast sensor set configuration via touch keys

Gaging sensors of the series optoNCDT 1020/1100/1150 are designed for non-contacting measurements at distances of up to 10 m. These measurements are required for position determination, attendance checking, type classification and for machine control in numerous fields of application.

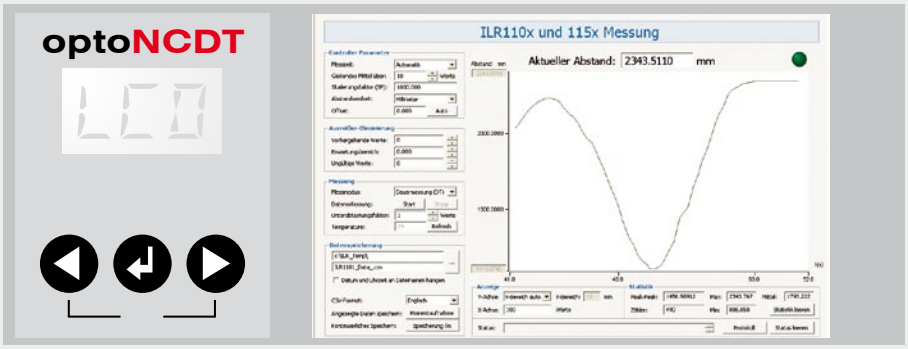
Precise sensor alignment

The aiming laser can be turned on for accurate alignment of the sensor with the measurement object. For mounting the sensor a mounting bracket and a fine adjuster are available as accessories, which simplify the precise alignment of the sensor to the measurement object.





ILR1020: Limit switch programming via touch keys



ILR1100/ILR1150: Limit switch programming via software

Model		ILR1020-6	ILR1100-6	ILR1150-10
Measuring range	black 6%	0.2 ... 2.5m	0.5 … 2m	0.5 … 3m
	grey 10%	0.2 ... 6m	0.5 m … 4m	0 5 … 7m
	white 90%	0.2 ... 6m	0.5 m … 6m	0.5 … 10m
Linearity		±40mm	±10mm	±8mm
Resolution		1 ... 5mm	0.1mm	0.1mm
Repeatability		±10 / ±15mm [1)]	±5mm	±4mm
Response time		80 / 13ms [1)]	12ms	12ms
Laser class	measuring laser	IR 905 nm, laser class 1	IR 900 nm, laser class 1	
	sighting laser	red 650 nm, laser class 2		
Operation temperature		-10° … +50° C (-20° … +50° C in continous operation)		
Storage temperature		-30° … +75° C		
Limit outputs		QA / QB (max. 100 mA)		
Switching points		free adjustable (teach in)	adjustable in 1-mm-steps	
Switching hysteresis		30mm	min. 20mm (adjustable)	min. 10mm (adjustable)
Plausibility output		-	QP (max. 50 mA)	
Service output		-	QS (max. 50 mA)	
Serial interface		-	RS422 (2 9ms at 57.6kBaud) SSI - compatible (GRAY / BINÄR adjustable) (SSI cycle 80µs)	
Bus interface		-	Profibus or DeviceNet via respective gateway (accessory)	
Analog output		4 - 20mA		
Temperature stability		<1.2mm / °C	<0.5mm / °C	<±5mm absolute
Supply		18 - 30 VDC		
Max. consumption		<3W at 24V		
Connection		5-pin connector M12	12-pin connector M16	
Protection class		IP 67		
Material (housing)		ABS shock resistant		
Vibration	EN 60947-5-2	10 - 55 Hz, amplitude 1.5mm, period 5 min. at resonant frequency or 55 Hz, stress time 30 min. per axis		
Shock	EN 60947-5-2	acceleration 30 g, pulse duration 11 ms, half sinusoid, 3 shocks/axis		
Weight		appr. 200 g	appr. 230 g	
Accessoires		page 14 - 15		

All data regarding accuracy and distance are based on the specified surface
at constant ambient conditions and with a minimum operating time of 15 minutes.
[1)] slow/fast

Operating Mode
Laser Class 1 (Infrared)

Setup Mode
Laser Class 2 (Visible - Red)
Do not stare into beam
λ: 650 nm
t_p: 0,25 µs; T: 2,5 µs
P_{max}: 3 mW

EN 60825-1. 10/2003

optoNCDT ILR 1020/1100/1150 use a semiconductor class 1 laser (operating mode) and a semiconductor class 2 laser (setup mode). With these classes no protection is needed.

Spot diameter ILR1020

Spot diameter ILR1100/1150

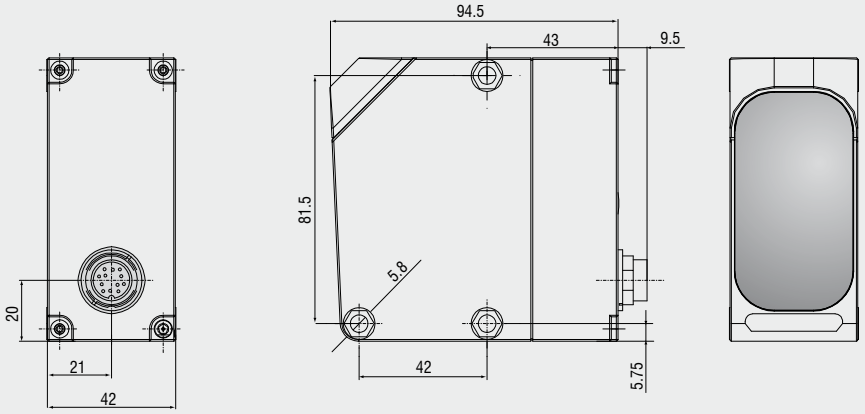
Advantages

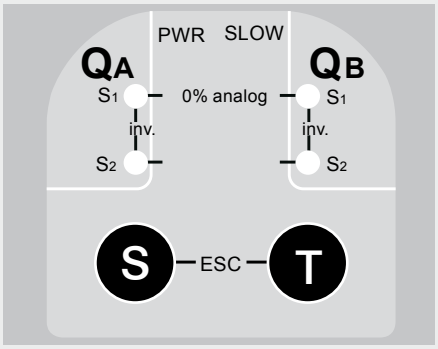
- Measuring ranges up to 250 m with reflector
- Short response time
- Excellent price-performance ratio
- Fast sensor set configuration via touch keys

Distance sensors of the series optoNCDT 1021/1101/1151 are designed for non-contact measurements against objects up to 250 m. These distance sensors need a special reflector on the measurement object with the sensor being matched to its reflective properties. The use of this reflector facilitates measurement distances of up to 250 m with excellent accuracy.

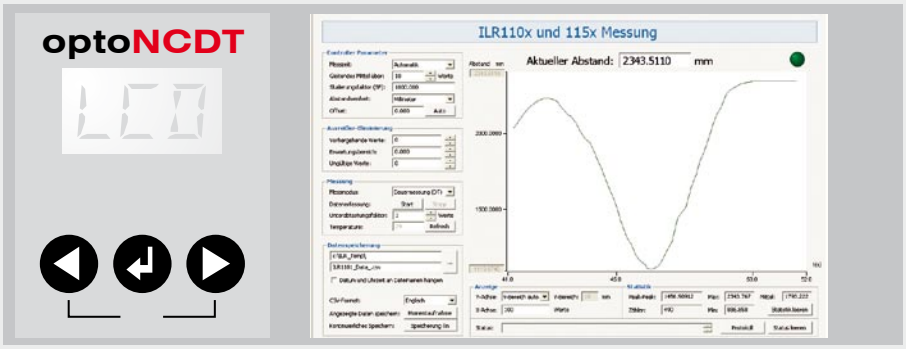
Precise sensor alignment

The aiming laser can be turned on for accurate alignment of the sensor with the measurement object. With large measurement distances this laser is adjusted using the optical alignment aid available as an accessory. For mounting the sensor a mounting bracket and a fine adjuster are available as accessories, which simplify the precise alignment of the sensor to the measurement object





ILR1021: Limit switch programming via touch keys



ILR1101/ILR1151: Limit switch programming via software

Model		ILR1021-30	ILR1101-50	ILR1151-250
Measuring range		0.2 ... 30m	0.5 … 50m	0.5 … 250m
		reflector required for operation		
Linearity		±60mm	±5mm [1]	±3mm [1]
Resolution		1 ... 5mm	0.1 or 0.125mm	
Repeatability		±5 / 10mm [2]	±4mm	±2mm
Response time		65 / 30ms [2]	12ms	
Laser class	measuring laser	IR 905 nm, laser class 1	IR 900 nm, laser class 1	
	sighting laser	red 650 nm, laser class 2		
Operation temperature		-10° … +50° C (-20° … +50° C in continous operation)		
Storage temperature		-30° … +75°C		
Limit outputs		QA / QB (max. 100 mA)		
Switching points		free adjustable (teach in)	adjustable in 1-mm-steps	
Switching hysteresis		30mm	min. 20mm (adjustable)	min. 10mm (adjustable)
Plausibility output		-	QP (max. 50mA)	
Service output		-	QS (max. 50mA)	
Serial interface		-	RS422 (2.9ms at 57.6kBaud) SSI - compatible (GRAY / BINÄR adjustable) (SSI Zyklus 80 µs)	
Bus interface		-	Profibus or DeviceNet via respective gateway (accessory)	
Analog output		4 ... 20 mA	-	-
Temperature stability		<1.2mm / °C	<0.5mm / °C	<±5mm absolut
Supply		18 - 30 VDC		
Max. consumption		<3W at 24V		
Connection		5-pin connector M12	12-pin connector M16	
Protection class		IP 67		
Material (housing)		ABS shock resistant		
Vibration	EN 60947-5-2	10 - 55 Hz, amplitude 1.5mm, period 5 min. at resonant frequency or 55 Hz, stress time 30 min. per axis		
Shock	EN 60947-5-2	acceleration 30 g, pulse duration 11 ms, half sinusoid, 3 shocks/axis		
Weight		appr. 200 g	appr. 230 g	
Accessoires		page 14 - 15		

All data regarding accuracy and distance are based on the specified surface
at constant ambient conditions and with a minimum operating time of 15 minutes.
[1] min. distance 2m
[2] slow/fast

Operating Mode
Laser Class 1 (Infrared)

Setup Mode
Laser Class 2 (Visible - Red)
Do not stare into beam
λ: 650 nm
t_p: 0,25 µs; T: 2,5 µs
P_{max}: 3 mW

EN 60825-1. 10/2003

optoNCDT ILR 1021/1101/1151 use a semiconductor class 1 laser (operating mode) and a semiconductor class 2 laser (setup mode). With these classes no protection is needed.

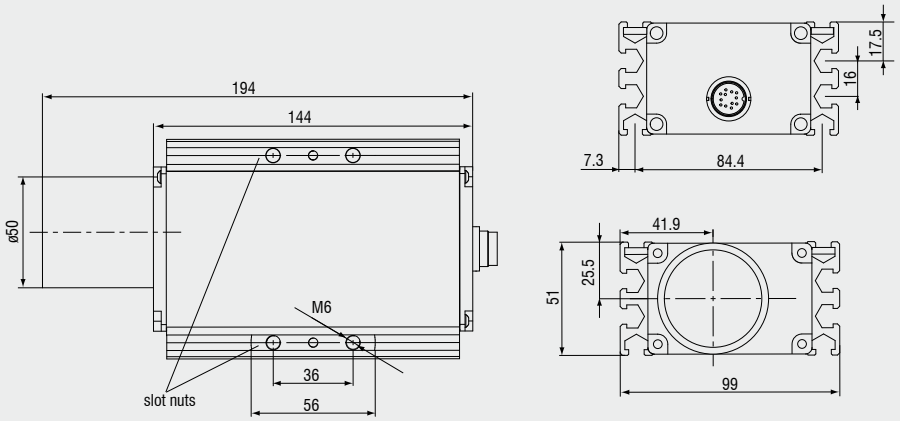
Spot diameter ILR1021

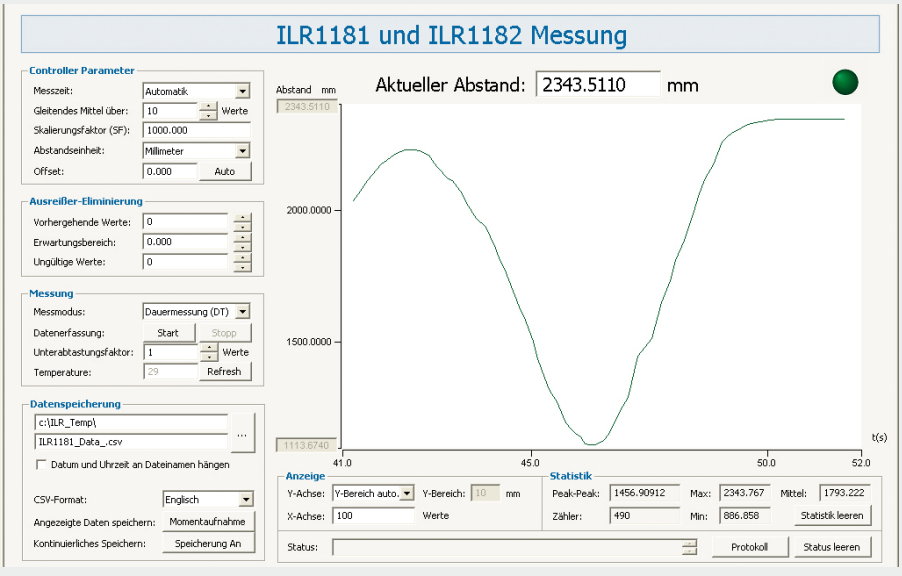
Spot diameter ILR1101/1151

Advantages

- Measuring range up to 80m on diffuse reflecting surfaces, up to 150m with reflector
- Option with integral heating
- Easy adjustment with Laser sighting
- Precise measurement on various surfaces
- Practical mounting grooves for easy installation
- Accessories for harsh environments

Sensors in the optoNCDT ILR 1181 / 1182 / 1183 series are optoelectronic sensors for non-contact distance and displacement measurement for industrial applications. Both sensors operate according to the phase comparison principle, whereby higher precision can be achieved. They can be aligned and positioned in use with a visible laser beam with little effort. The optoNCDT ILR 1182 series operates with a 50Hz measuring rate and is therefore suitable for fast processes. The mounting grooves on the housing offer flexible mounting options for many situations.





Configuration and measurement software for ILR1181 und ILR1182

Model		ILR1181-30	ILR1182-30	ILR1183-30
Measuring range [1]	black 6%	0.4 ... 17m		
	grey 10%	0.1 ... 30m		
	white 90%	0.1 ... 80m		
	reflector	0.1 ... 150m (reflector film ILR-RF118x)		
Linearity [2]		±2mm (+15°C … +30°C), ±5mm (-40°C … +50°C)		
Resolution		0.1mm		
Repeatability		≤0.5mm		
Response time [1]		100ms ... 6s	20ms ... 6s	20ms ... 6s
Laser class (IEC 825-1 / EN 60825-1)		red 650 nm, laser class 2		
Operation temperature		-10°C … + 50°C (optional -40°C … +50°C, with integrated heating)		
Storage temperature		-40°C … +70°C		
Limit outputs		QA (max. 500 mA)		QA / QB (max. 500 mA)
Switching points		free adjustable		
Switching hysteresis		free adjustable		
Trigger input (not compatible with integral heating)		trigger edge and delay selectable, trigger pulse of max 24V		
Serial interface		RS232 or RS422 [3] adjustable, max 38.4 kBaud		SSI interface (RS422), 24Bit, Gray-encoded, 50kHz … 1MHz
Profibus [3]		-		Profibus (RS485) 9.6kBaud … 12MBaud [3]
Operation mode		external triggering, single / continuous measurement, distance tracking		
Analog output		4 … 20mA (16 Bit DA)		-
Temperature stability		≤50ppm / °C		
Supply		10 … 30 VDC		
Max. consumption		<1.5W at 24 V (<24W with heating)		3,2W at 24 V (<26W with heating)
Connection		12-pin M16		1 x 12-pin M16 2 x 5-pin M12 B-encoded
Protection class		IP 65		
Material (housing)		aluminium strangeness profile, powder-coated		
Vibration/Shock		500g, 0.5ms, 1 shock/axis (DIN ISO 9022-30-08-1)		
		10g, 6ms, 1000 shocks/axis (DIN ISO 9022-3-31-01-1)		
Weight		980 g		
EMV		EN 61000-6-2, EN 55011		
Accessoires		page 14 - 15		

[1] depending on target reflectance, ambient light influences and atmospheric conditions
[2] with statistical spread of 95%
[3] sensor configuration via profibus interface

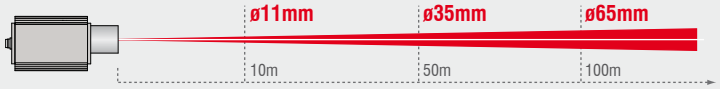
Product identification
ILR 118x - 30 (x x)

Serial interface
0 = none
1 = RS232
2 = RS422

0 = without heating
2 = integral heating

optoNCDT ILR 1181/1182/1183 operate with a wavelength of 650 nm (visible, red). The maximum optical output is ≤ 1 mW. The sensors are classified in Laser Class 2. Class 2 lasers are not notifiable and a laser protection officer is not required either.

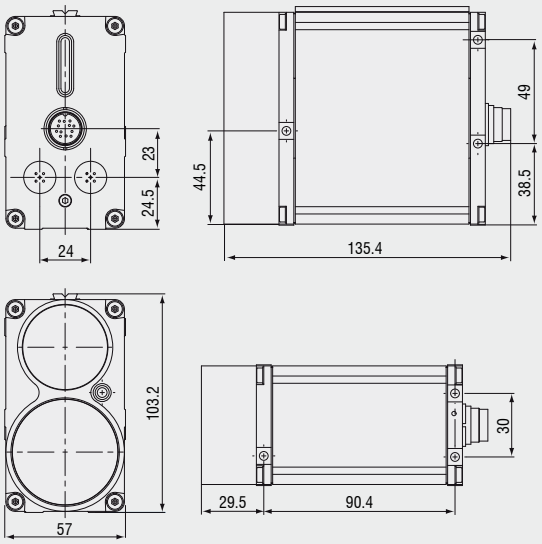
Spot diameter ILR1181/1182/1183

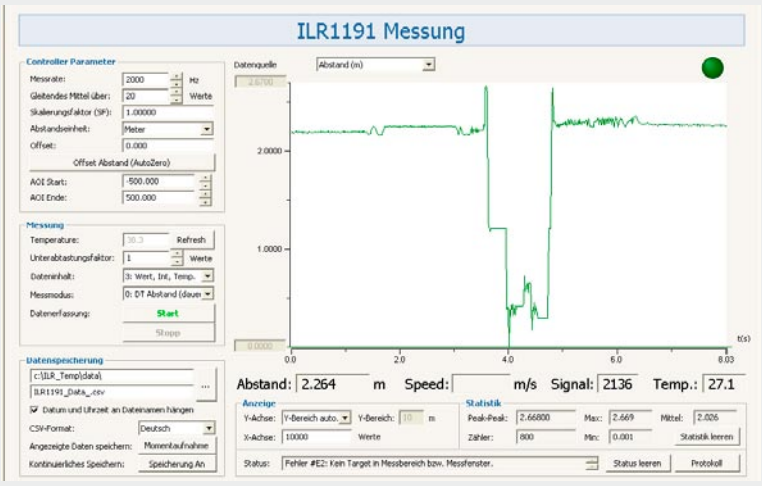


Advantages

- Measuring range 500m in diffuse reflecting surfaces, up to 3000m with reflector
- Distance and speed measurement
- Integrated heating
- For fast measuring events
- Easy installation
- Accessories for harsh environments

Sensors in the optoNCDT ILR 1191 series are optoelectronic sensors for non-contact distance and speed measurement for industrial use. The sensor is designed for very large measuring ranges, with and without reflector. Due to the very high measuring rate of the sensor, moving objects can be measured easily. The sensor operates according to the laser pulse runtime principle and is therefore particularly well suited to applications with large distances.
Commissioning of the sensor is straightforward due to a variety of interfaces and easy mounting options. The optoNCDT ILR 1191 is fitted with an integrated heater for outdoor use. A sighting device is also integrated for alignment.





Configuration and measurement software for ILR1191

Model		ILR1191-300
Measuring range [1]	black 6%	1 ... 150 m
	grey 10%	0.5 ... 300 m
	white 90%	0.5 ... 500 m
	reflector	0.5 ... 3000 m
Speed		0ms^{-1} ... 100ms^{-1}
Linearity[2]		±20mm (at measurement output 100Hz) ±60mm (at measurement output 2kHz)
Resolution		1mm
Repeatability		≤20mm
Response time	distance measurement	0.5ms
	speed measurement	12ms
Laser class	measuring laser	905 nm, laser class 1
	sighting laser	635 nm, laser class 2
Operation temperature		-40°C … +60°C
Storage temperature		-40°C … +70°C
Limit outputs		QA / QB (max. 200 mA)
Switching points		free adjustable
Switching hysteresis		free adjustable
Trigger input		trigger edge and trigger delay programmable, trigger pulse max. 30 V
Serial interface		RS232 and RS422 with 1.2kBaud … 460.8kBaud SSI interface (RS422), 24Bit, Gray-encoded 50kHz … 1MHz
Profibus		RS485, 9.6 kBaud … 12MBaud
Operation mode		single / continuous measurement, external triggering (adjustable near field elimination), speed measurement
Analog output		4 … 20mA (16 Bit DA)
Temperature stability		≤50ppm / °C
Supply		10 … 30 V DC
Max. consumption		<5W without heating, 11.5W with heating
Connection		1 x 12-pin M16, 2 x 5-pin M12 B-coded
Protection class		IP 67
Material (housing)		aluminium strangeness profile, powder-coated
Weight		800 g (depends on equipment)
Vibration/Shock		500g, 0.5ms, 1 shock / axis (DIN ISO 9022-30-08-1)
		10g, 6ms, 1000 shocks / axis (DIN ISO 9022-3-31-01-1)
EMV		EN 61000-6-2, EN 55011
Accessoires		page 14 - 15

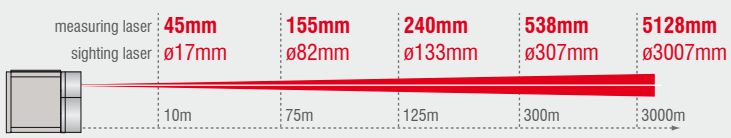
[1] depending on target reflectivity, stray light effects and atmospheric conditions
[2] with statistical spread of 95%

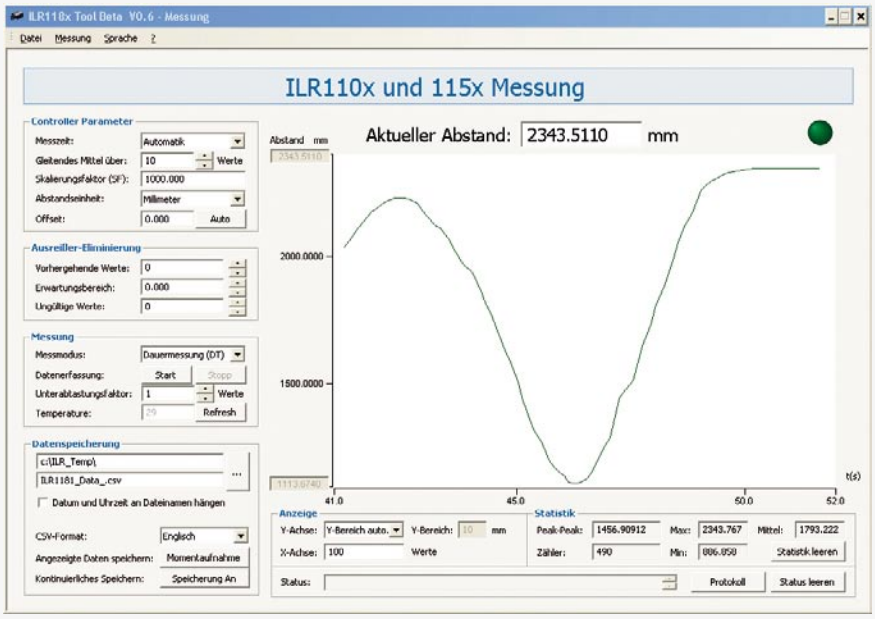
Product identification
ILR 1191 - 300 (0 x)

Serial interface
1= RS232
2= RS422
3= RS232 + SSI
4= RS232 + Profibus

optoNCDT ILR 1191 use a semiconductor class 1 laser (operating mode) and a semiconductor class 2 laser (setup mode). With these classes no protection is needed.

Spot diameter ILR1191





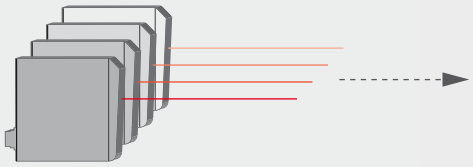
Setup and configuration software

Software for easy configuration of the sensor is included as standard. All settings can be conveniently performed with this using a Windows interface on a PC. The sensor parameters are transmitted to the sensor via the serial port and can also be saved if required. The software also contains a module which can display and store the measurement results. The connection to the PC is made using the respective sensor cable with a USB converter.

Software download free of charge from www.micro-epsilon.com/download

IF 2008 Interface card

The IF2008 interface card and IF2008E extension card are designed for installation in PCs and enables the synchronous capture of up to six digital sensor signals, two analogue sensor signals and two encoders. The card is used for the customer's own data evaluation. The interface card reads the data from all connected devices simultaneously and transmits these to an external PC for further processing.



up to 6 digital signals
2 analog signals
2 encoder

IF2008 PCI interface card for individual signal processing

CSP 2008: universal controller for multiple sensor signals

Inputs/Outputs sensors
- 2 sensor connectors (16 pin)

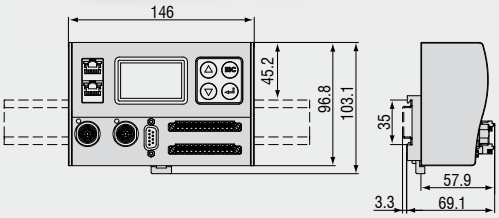
Digital
- 1x Ethernet (PC 100 MBit)
- 1x Ethercat
- 1x RS422 (SPS max. 1.5 Mbaud)
- 2 terminal strips (13 pins)

Analog
- voltage 0…5 V,
- scaleable via software
- 0…10 V, -5…5 V, -10…10 V),
- electrically isolated, 100 kHz, 16 Bit

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)



Accessories

Supply and output cable ILR10xx

PC1000-2	length 2 m
PC1000/90-2	length 2 m, 90°-connector
PC1000-5	length 5 m
PC1000/90-5	length 5 m, 90°-connector
PC1000/90-10	length 10 m, 90°-connector

Supply and output cable ILR11xx

PC1100-3	length 3 m
PC1100/90-3	length 3 m, 90°-connector
PC1100-5	length 5 m
PC1100/90-5	length 5 m, 90°-connector
PC1100/10	length 10 m
PC1100/90-10	length 10 m, 90°-connector
PC1100/20	length 20 m
PC1100/90-20	length 20 m, 90°-connector
PC1100/30	length 30 m
PC1100/90-30	length 30 m, 90°-connector
FC1100	connector
FC1100/90	connector, 90°
PC115x-3/CSP	interface cable ILR110x / 115x mit CSP
PC118x-3/CSP	interface cable ILR118x / 119x mit CSP
PC115x-3/IF2008	interface cable ILR110x / 115x mit IF2008
PC118x-3/IF2008	interface cable ILR118x / 119x mit IF2008

Configuration cable ILR118x and ILR1191:

PC1100/90-3/RSxxx	length 3 m, D-Sub for RS232 and RS422, integrated power supply

Profibus

PBC1100-I/O-5	Profibus input and output cable, 5m
PBC1100-I-5	Profibus input cable, 5m
PBC1100-I-10	Profibus input cable, 10m
PBC1100-O-5	Profibus output cable, 5m
PBC1100-O-10	Profibus output cable, 10m
PBFC1100	Profibus plug
PBMC1100	Profibus connector
PBLR1100	Profibus load resistance
ILR-M-PB/USB	Profibus/USB module and service software for ILR1183 / 1191

Accessories ILR 10xx / 110x / 115x

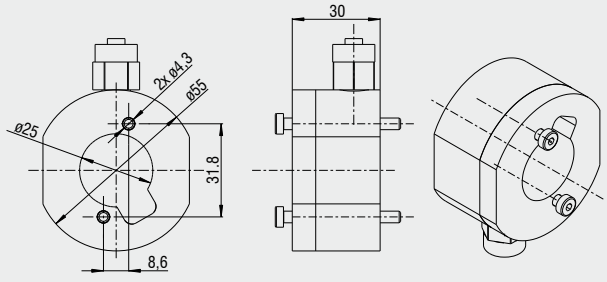
ILR-RF250	reflector film 250x250mm
ILR-R250	reflector film 250x250mm
ILR-R460	reflector film 460x460mm
ILR-R540	reflector film 540x540mm
ILR-R660	reflector film 660x660mm
ILR-R700	reflector film 700x700mm
ILR-MA90	mounting bracket
ILR-FA1	fine adjustment for mounting bracket
ILR-AA1	aligning aid
ILR-APB	connector adapter, Gateway/ProfiBus
ILR-ADN	connector adapter, Gateway/DeviceNet

Accessories ILR 118x / 1191

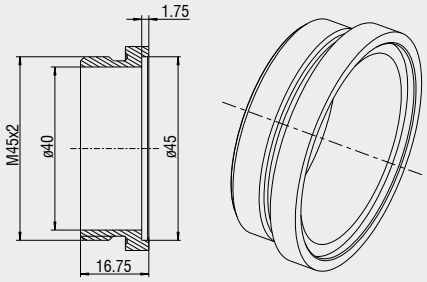
ILR-MP1191	mounting plate for ILR1191
ILR-AA1191	aligning aid for ILR1191
ILR-RPT1191	protection tube, 100mm for ILR1191
ILR-RF118x	reflector film 250x250mm for ILR1181X
ILR-MT118x	mounting clamp for ILR118x
ILR-MP118x	mounting plate for ILR118x
ILR-MTN118x	slot nuts for ILR118x
ILR-FBV118x	air purge collar for ILR118x
ILR-PG118x	protection glass for ILR118x
ILR-FV118x	filter for ILR118x

Display and signal processing units

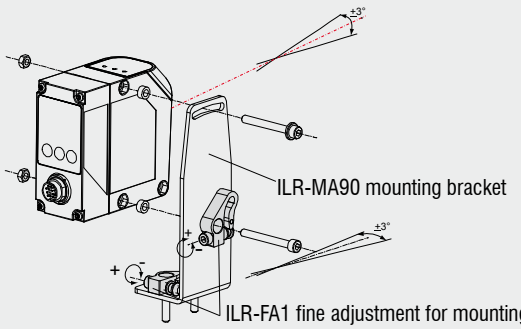
DD241PC	digital process display, 1 analog input
DD245PC	digital process display, 2 analog inputs
DD214NA	display for SSI-sensors
CSP2008	universal controller for multiple signals
IF2008	interface card RS485 for PCI interface



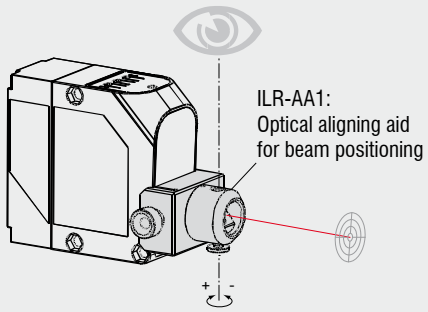
ILR-FBV118x air purge collar for ILR118x



ILR-PG118x protection glass for ILR118x



ILR-FA1 fine adjustment for mounting bracket



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