

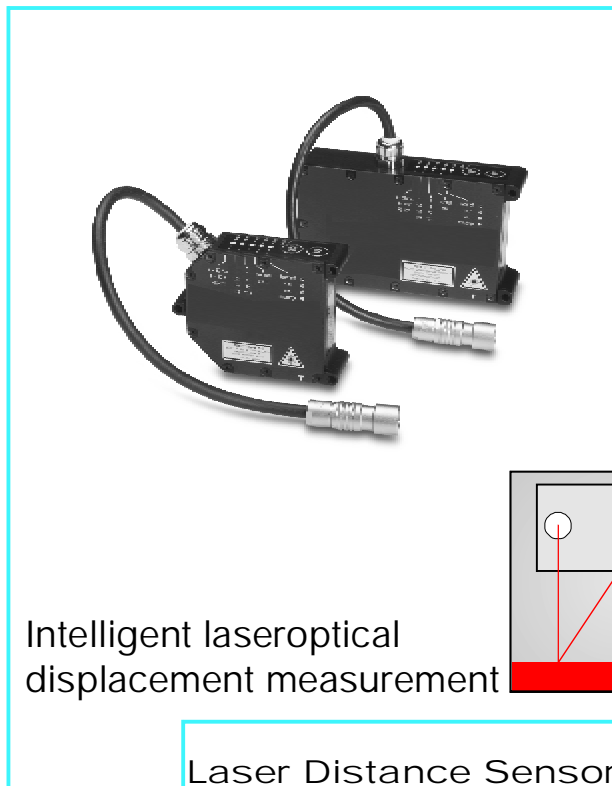
Series LDS 85/

Measurement Range [mm]:

- 2
- 10
- 20
- 50
- 100
- 200
- 250
- 500
- 750



www.eltrotec.com



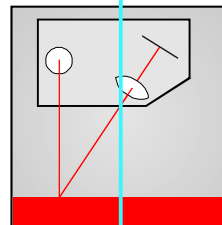
Highest resolution in class

Highest repeatability in class

Highest accuracy in class

Best performance/price ratio in class

Intelligent laser optical
displacement measurement



Laser Distance Sensor
LDS 85

Series LDS 85 is an laseroptical displacement measurement system with extensive functional features. Through the integral controller the system can be completely configured via the supplied PC software and also offers extensive functions such as limit switches, averaging, adjustable measurement rates and the synchronization of two sensors, e.g. for thickness measurement. With the unique Real-Time Surface Compensation (RTSC) the system facilitates measurements against a wide range of material surfaces (e.g. bare metals, black rubber or shiny painted surfaces). Due to the large selection of different measurement ranges from 2 to 750 mm there is a perfect sensor for each application. The compact design makes the series LDS 85 sensors particularly suitable for industrial applications in automated machinery and production equipment.

The series LDS 85 operates according to the triangulation principle. A laser diode projects a visible spot of light onto the target surface. The light reflected from this spot is directed through an optical receiving system onto a position-sensitive element (CCD array). If the target changes its distance to the sensor, this leads to a change of the imaging spot on the CCD array. The position of the spot incident on the CCD array is evaluated.

The measurements are processed digitally in the integral controller. The data are output either analog or digitally via RS422 (optionally with USB - cable EL-PC85-3/USB required).

ADVANTAGES

- RTSC fast adaptation to changing surfaces
- Compact design with integral electronics
- Configuration and control via software PC
- Synchronization of two sensors mandatory for differential and thickness measurement
- Analog and digital outputs
- Programmable limits

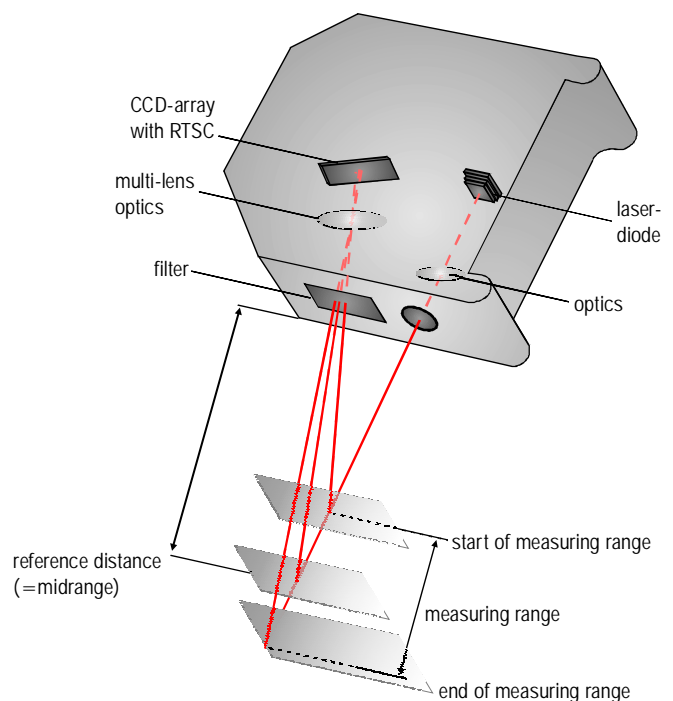
Performance proof


Every sensor is calibrated according to ISO 9000 quality standards and an individual calibration protocol is included with every sensor.



Compact design with integral controller

Despite its compact dimensions, the LDS 85 series has a completely integrated controller. There is no separate controller housing which means that installation and wiring is carried out easily and quickly. Its small size allows the sensor to be integrated into tight installation spaces.





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

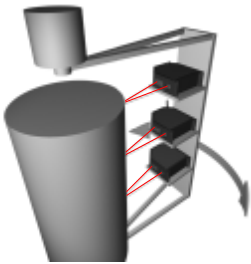
IEC - Standard

LDS 85 uses a semiconductor laser with a wavelength of 670 nm (visible/red). The maximum optical output power is 1 mW. The sensor is classified as laser class II. A warning sign is attached to the sensor housing.

Typical applications

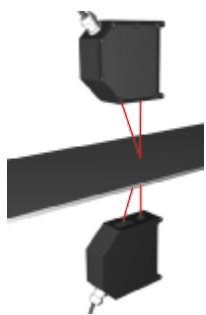
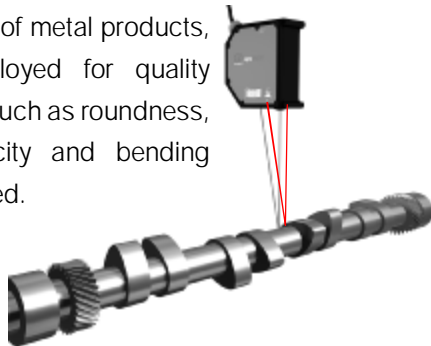
Contour measurement on catalytic converters

During the production of ceramic billets for car catalytic converters, the billets are measured for roundness and diameter on a number of radial tracks for classification. Using the IF2004 interface card (page 6), the encoder and sensor signals are synchronized to obtain precise correspondence in angle and shape.



Parts measurement

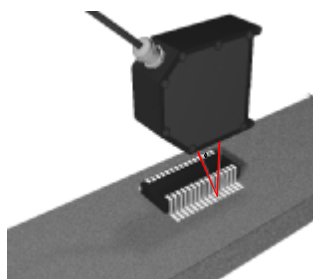
On machined surfaces of metal products, the LDS 85 is employed for quality assurance. Quantities such as roundness, concentricity, eccentricity and bending deflection are determined.



Synchronous thickness measurement
The thickness of the various web materials can be reliably acquired with LDS 85 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.

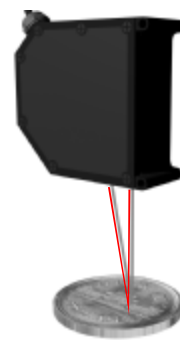
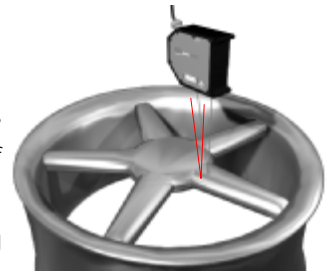
Flatness measurement of IC pins

To achieve the best quality during board assembly, all IC pins must lie 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.



Shape conformance on aluminum wheels

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



Surface profiling

Due to the small measuring spot and RTSC (Real-Time Surface Compensation), the LDS 85 is excellent for the high precision mapping of any target regardless of its reflectivity, angle, shape and color.

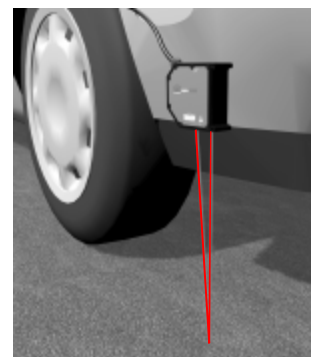
Part positioning in production lines

For automated processing stages on car bodies or vehicles an exact determination of the position relative to the processing tool is necessary (drilling, punching, fitting sub-assemblies). Due to the adjustable exposure time and the real-time surface compensation, the series LDS 85 is particularly suitable for the high precision acquisition of highly glossy surfaces.



Distance of vehicle to road surface

In road tests pitching and rolling movements, spring compression during braking and other quantities are measured with LDS 85 sensors. The series LDS 85 is particularly suitable here due to the compact construction and the possibility of supplying the sensor from the vehicle power supply (11 ... 30 VDC). For these applications there are special models LDS 85-250 VT available with increased tolerance to extra-neous light and vibration.



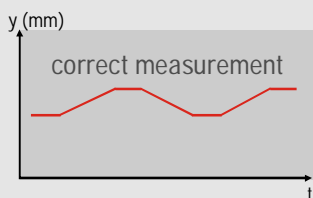
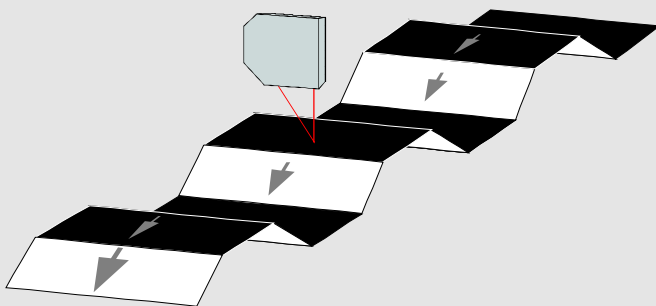
RTSC: Real-Time Surface Compensation

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

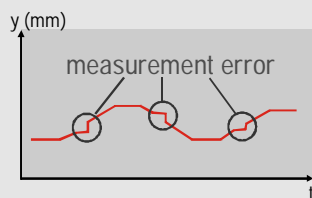
Standard commercially available laser triangulation sensors operate with a time-shift control which is additive to the measurement cycles already concluded. In this case the degree of reflection from the last measurement is used to derive the degree of reflection for the next measurement. With changing or structured surfaces the measurement results therefore deviate noticeably from the actual measurement quantity, whereas the LDS 85 is controlled in real time at the respective optimum operating point.

Principle

RTSC Real-Time Surface Compensation compared to time-shift control.



LDS 85 with RTSC real-time surface compensation



Standard laser sensors with time-shift control give distinctly incorrect signals with a change of surface

Adjustable exposure time/measurement rate

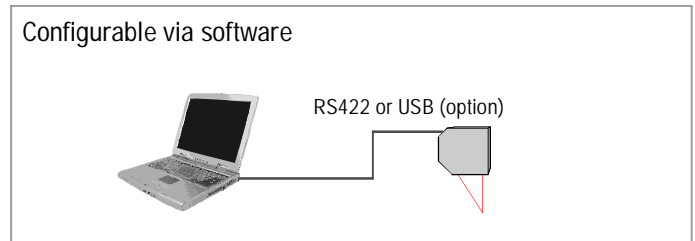
For targets with little diffuse reflectivity the exposure time can be adjusted. The programmed measurement cycle remains always constant, therefore the real-time data rate is guaranteed.

Adjustable exposure time/measurement rate

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

Configuration via software

Besides using the sensor keys, the configuration can also be carried out conveniently via the PC. The software required for this is included in the supplied items.

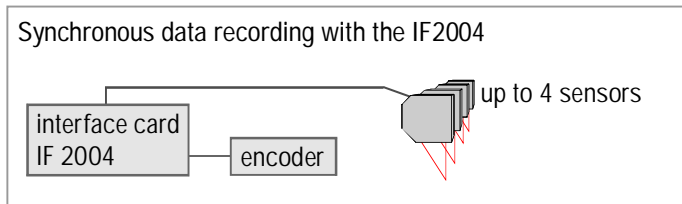


Adjustable limit switches

For a precise measurement, the LDS 85 sensors can also be programmed for tolerance or limit monitoring. Two switching points are available which can be adjusted via the software. A hysteresis for each limit can be programmed.

Synchronous data recording with the IF2004

With the IF2004 PCI interface card, which is available as an accessory, the data from up to four sensors can be synchronously read via a FIFO memory. Readings from an encoder or linear measurement system as the fourth channel can be used to map up to three LDS 85 sensors.



High flex cables rated for moving cable tracks

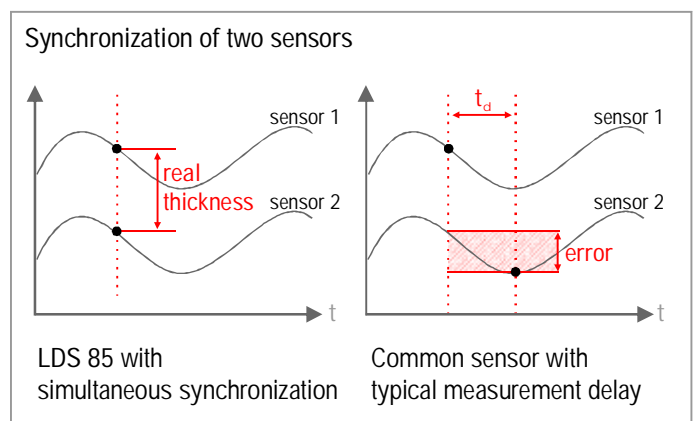
The type EL-PC 85-xx cables are rated for operation in moving cable tracks with a minimum cable bending radius of 80 mm.

Analog and digital outputs

With two analogue output signals 0 ... 10 V and 4 ... 20 mA as well as the serial RS422 interface, the LDS 85 range of sensors fulfils all interface requirements. The baud rate of the RS422 can be set in standard steps from 9,600 to 115,200 baud. This allows a direct communication to a PLC or any other host. In addition the data format of the serial interface can be changed from binary to ASCII character output.

Synchronization of two sensors

Simultaneous measurement using two sensors is necessary in order to obtain precise results, with thickness or differential measurements, when the target is moving or oscillating. The LDS 85 series supports this function, where one sensor acts as the master and provides the clock for the slave. Consequently, the measurements are always synchronous and therefore supply exact measurement results.



Wide input range (11 ... 30 VDC)

The 11 ... 30 VDC supply also enables operation in 12 V networks or direct supply from a car's on-board power supply.

Adjustable filter functions

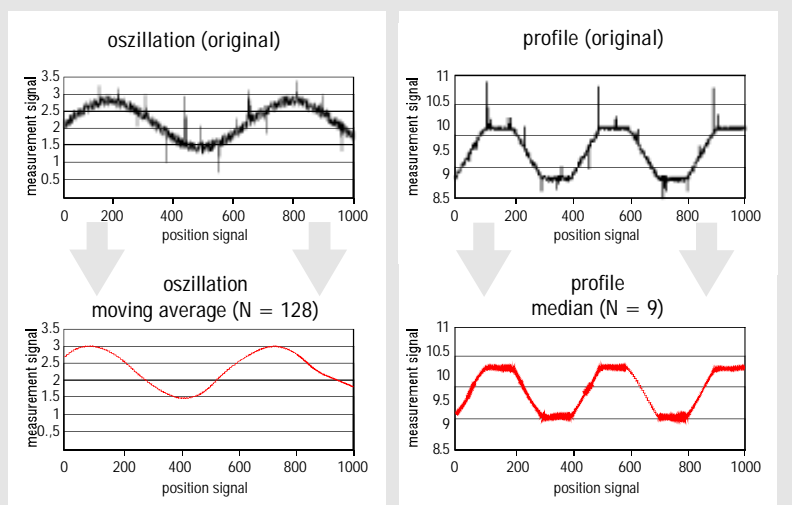
To achieve the best results for each application, three different filter functions can be applied to the measurement results.

The recursive mean works similar to an analog low-pass filter.

The moving average enables a high dynamic response even with filtering.

The median filter is especially suitable for surfaces with random false readings.

All filter settings do not reduce the output frequency (data rate) of the analog and digital outputs.



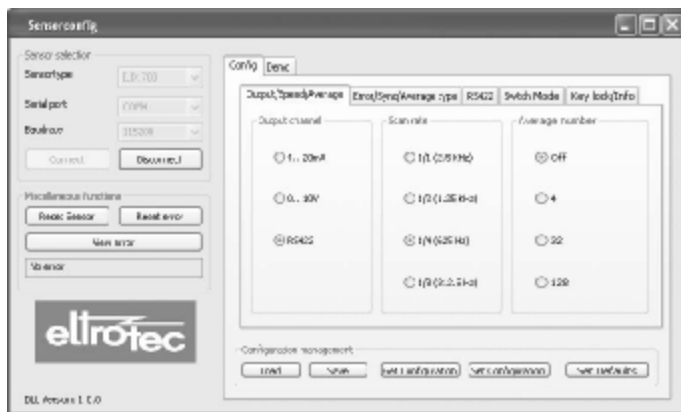
sensorCONFIG configuration/DAQ software

sensorCONFIG is the software included in the supplied items 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.

sensorCONFIG also includes a easy to use DAQ module which can display and save measurement results. The link to the PC is made via the EL-PC 85-3/USB sensor cable (optional). All the connections are then realized using time-saving plug connectors.

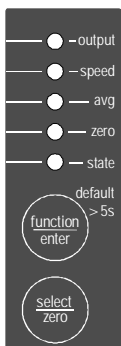
Driver support for customer software

For the LDS 85 sensors a documented driver DLL is available free of charge which enables easy integration of the sensors into existing software.



Programming of the sensor

All important functions can be set directly on the sensor using the touchkeys.



IF 2004 PCI card

The IF2004 interface card enables the synchronous acquisition of many sensor signals and an encoder. The data are saved in a FIFO memory to facilitate resource-saving block-by-block processing in the PC.



Features

- 4-channel version (four sensor inputs)
- Encoder input
- Gate input
- FIFO memory of 2 kByte for each channel, which increases when all channels are occupied
- Incremental encoder input, optically decoupled, nominally 5 V (min. 3V)

Technical data IF2004

Bus	32 bit PCI / 33 MHz / 5 VDC < 1A	
Interface	RS 422	
FIFO	4 x 2 kByte	
Input	1 - 4 sensors or 1 - 3 sensors + 1 encoder	
Input	sensors	RS422
	encoder	opto coupler / schmitt-trigger TTL (5 V)
	gate	24 V (min 10 V/10 mA, max. 30 V/30 mA)
Software	driver Win 2000/XP	
Resolution (measurement date)	16 bit	

Model	LDS 85/2	LDS 85/10	LDS 85/20	LDS 85/50	LDS 85/100	LDS 85/200	LDS 85/500	LDS 85/750	
Measuring range	2 mm	10 mm	20 mm	50 mm	100 mm	200 mm	500 mm	750 mm	
Start measuring range	24 mm	30 mm	40 mm	45 mm	70 mm	70 mm	200 mm	200 mm	
Midrange	25 mm	35 mm	50 mm	70 mm	120 mm	170 mm	450 mm	575 mm	
End measuring range	26 mm	40 mm	60 mm	95 mm	170 mm	270 mm	700 mm	950 mm	
Linearity	<0.1% FSO	<0.08% FSO				<0.1% FSO	<0.08% FSO	<0.1% FSO	
	2 µm	8 µm	16 µm	40 µm	80 µm	200 µm	400 µm	750 µm	
Resolution (at 2.5 kHz without averaging)	14 bit								
	0.1 µm	0.5 µm	1.5 µm	3 µm	6 µm	12 µm	30 µm	50 µm	
Measuring rate	2.5 kHz / 1.25 kHz / 625 Hz / 312.5 Hz (adjustable)								
Light source	semiconductor laser 1 mW, 670 nm (red)								
Permissible ambient light	10,000 lx (at 2.5 kHz measuring rate)								
Laser safety class	class 2 acc. DIN EN 60825-1 : 2001-11								
Spot diameter	SMR	80 µm	110 µm	320 µm	570 µm	740 µm	1300 µm	1500 µm	1500 µm
	MR	35 µm	50 µm	45 µm	55 µm	60 µm	1300 µm	1500 µm	1500 µm
	EMR	80 µm	110 µm	320 µm	570 µm	700 µm	1300 µm	1500 µm	1500 µm
Operating temperature	0 ... 50 °C								
Storage temperature	-20 °C ... 70 °C								
Output	measurements	selectable: 4 ... 20 mA / 0 ... 10 V / RS 422							
	switching outputs	1 x error or 2x limit (each programmable)							
Switch Input	laser ON-OFF / zero								
Operation	via touch screen on sensor or via PC with sensorCONFIG								
Power supply	24 VDC (11 ... 30 VDC), max. 150 mA								
Electromagnetic compatibility	EN 61000-6-3 EN 61000-6-2								
Sensor cable length	0.25 m (integrated cable with connector) option: 3 m or 10 m								
Synchronization	possible for simultaneous or alternating measurements								
Protection class	IP 65								
Vibration	2 g / 20 ... 500 Hz								
Shock	15 g / 6 ms								
Weight (with 0.25 cm cable)	appr. 550 g					appr. 600 g			

All specifications apply for a diffusely reflecting white ceramic target

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

Accessories (all cables suited for cable tracks)

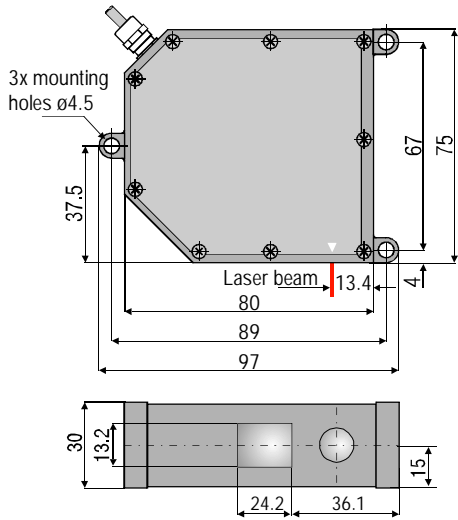
EL-PC 85-3 / EL-PC 85-10 Supply and output cable (3 m / 10 m) with free leads for connection

EL-PC 85-3/USB Sensor cable (3 m) with USB-RS422-converter and supply 90 ... 230 VAC

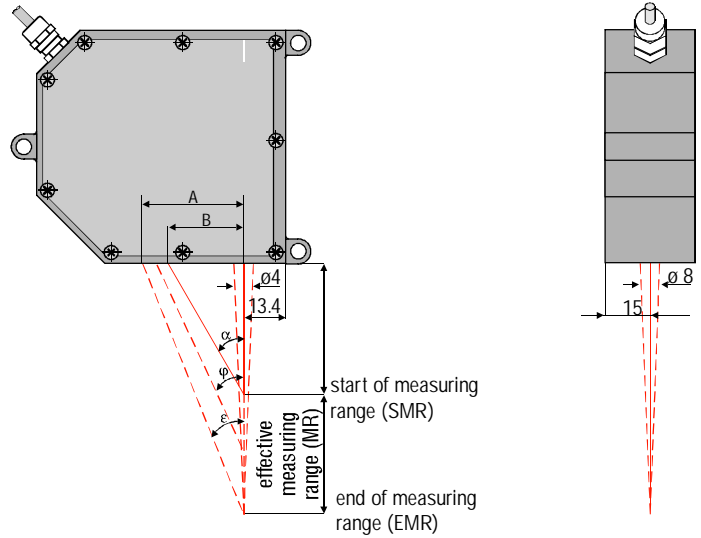
IF2004 RS422 PCI-interface-card for 4 sensors LDS 85 or 3 sensors LDS 85 + 1 encoder (11243310)

Dimensions / Course of beam dimensions in mm, not to scale

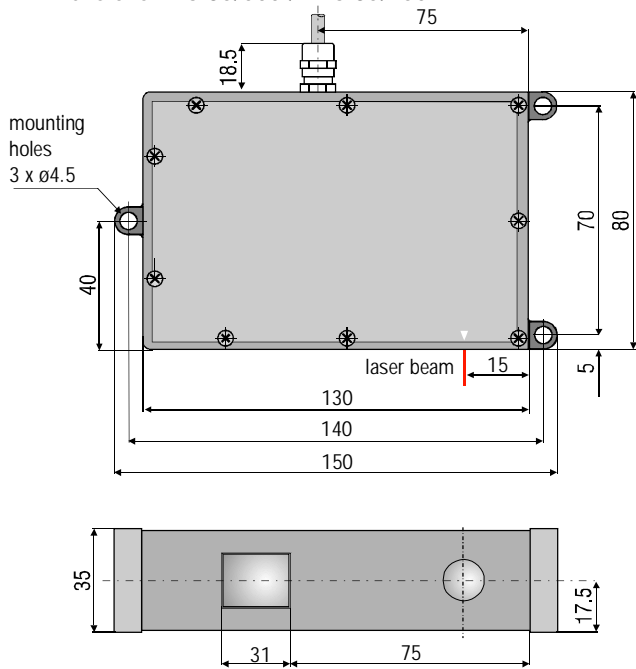
Dimensions LDS 85/2 - LDS 85/200



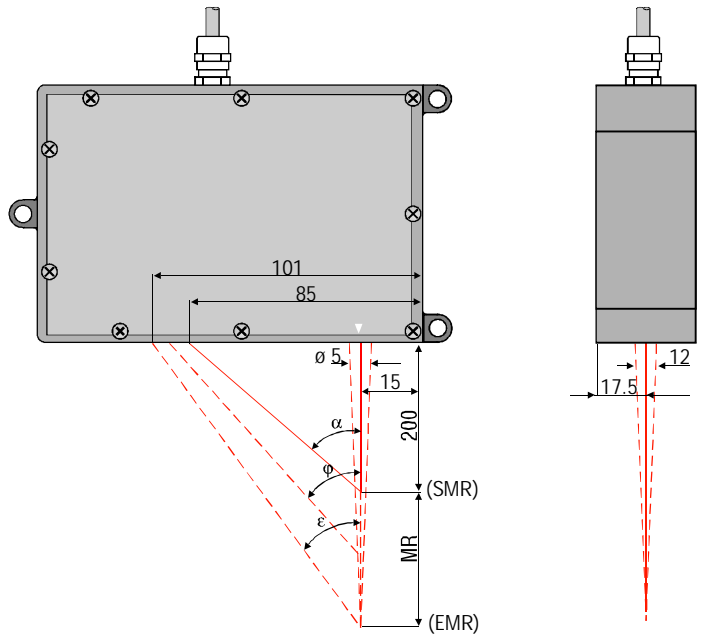
Course of beam LDS 85/2 - LDS 85/200



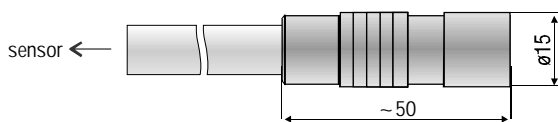
Dimensions LDS 85/500 / LDS 85/750 mm



Course of beam LDS 85/500 / LDS 85/750 mm



Cable connector



MR	SMR	a	j	e	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
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
500	200	19.3°	9.8°	7.0°	-	-
750	200	19.3°	7.7°	5.0°	-	-