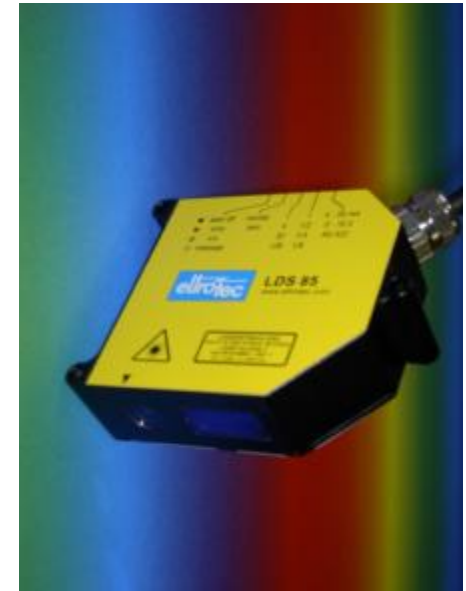


Recognition of:
shape - color – surfaces – distance & profile



- Laser distance sensors
- Laser beam sensors
- Laser micrometers

for



Distance-, Edge-, Diameter-, Profile, Surface- Measurement
Training Documents

07/2007/CPH

Laser Distance Sensors

- distance -, thickness -, profile- measurement



Product Overview

Series: LT, LDS 60, LDS 70, LDS 85, LDS 100, LDS 400, LDS 500, LBS-M-34, LZS, LBM, EPC

Range: - (25, 70, 225) mm
- (30 – 2000) mm
- (5 – 250) mm / (2-750) mm
- (300 – 4000) mm (20 m, 100 m, 500 m)

Accuracy: $\geq 0,1 \mu\text{m}$ beginning

Frequency: 0,3; 1; 2; 5; 10 kHz

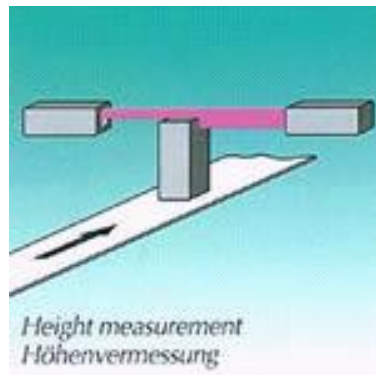
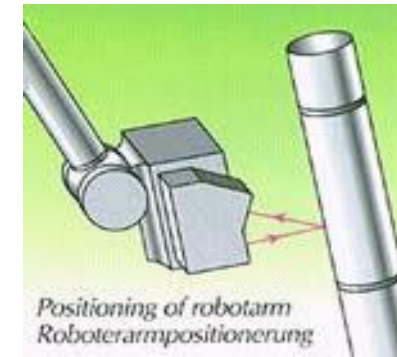
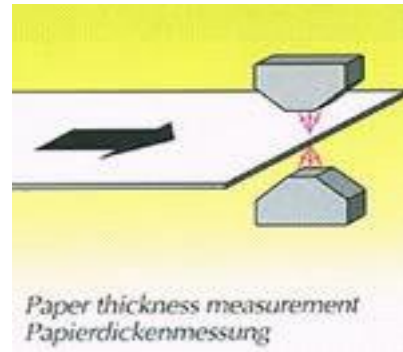
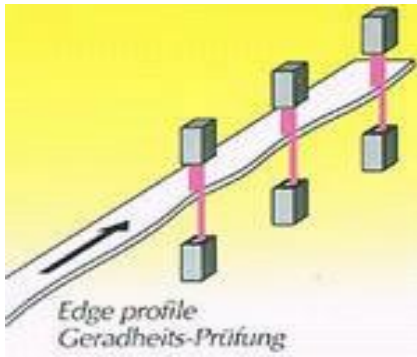
Interface: 1-9 VDC, 1-5 VDC, 4-20 mA, 0-10 VDC
RS 232 / 485, 3 PNP / NPN outputs / USB

Solutions: Process Controller EPC 90 for monitoring distance, thickness, range, ...

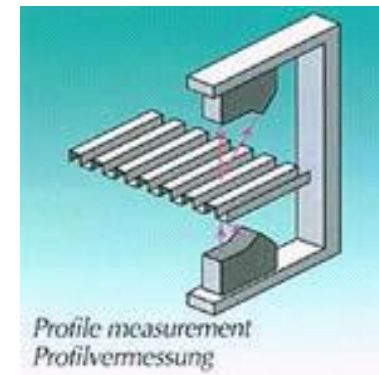
Recognition of:
shape - color – surfaces – distance & profile



Your task ?



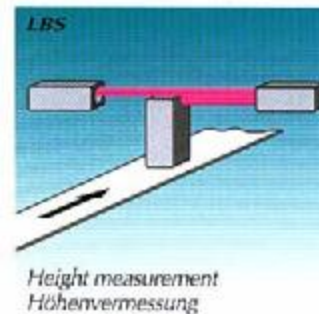
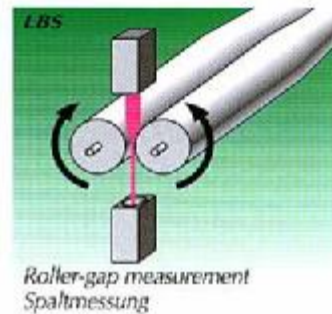
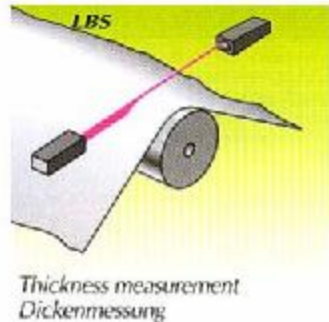
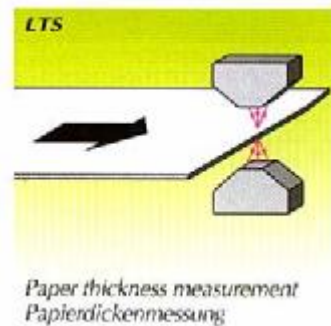
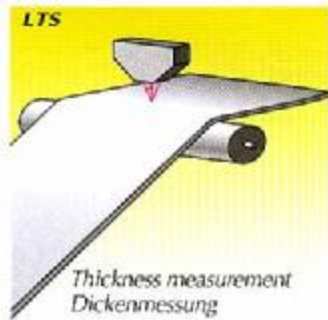
Our
solution !



Recognition of:
shape - color – surfaces – distance & profile



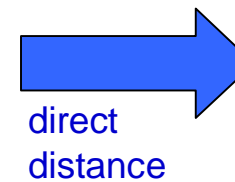
Specials: Laser-Beam-Sensors versus direct distance measurement



Big distance
High resolution

High Temperature
Indirect measurement

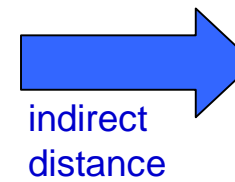
High Temperature
& Applications



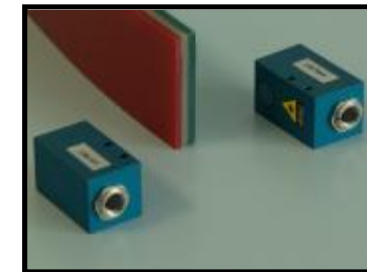
direct
distance



Laser distance sensors
LDS / LT sensors



indirect
distance

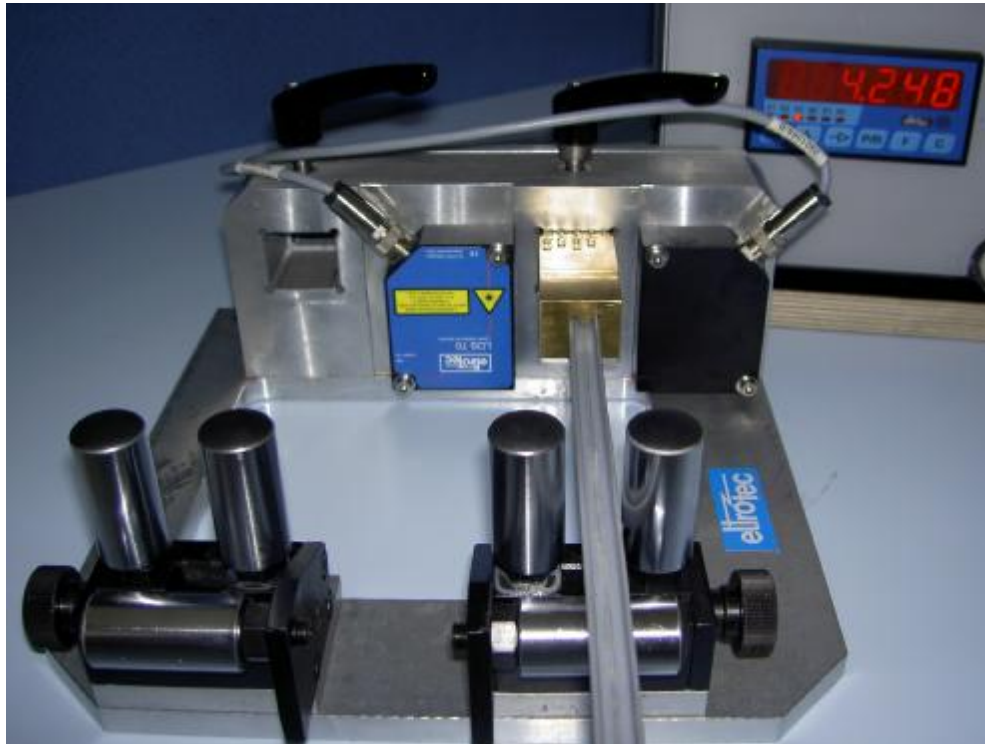


Laser line sensors (LZS)
Laser beam sensors (LBS)
Laser micrometer (LBM)

Recognition of:
shape - color – surfaces – distance & profile



Application note: LDS 70 (Laser-Distance-Sensor)



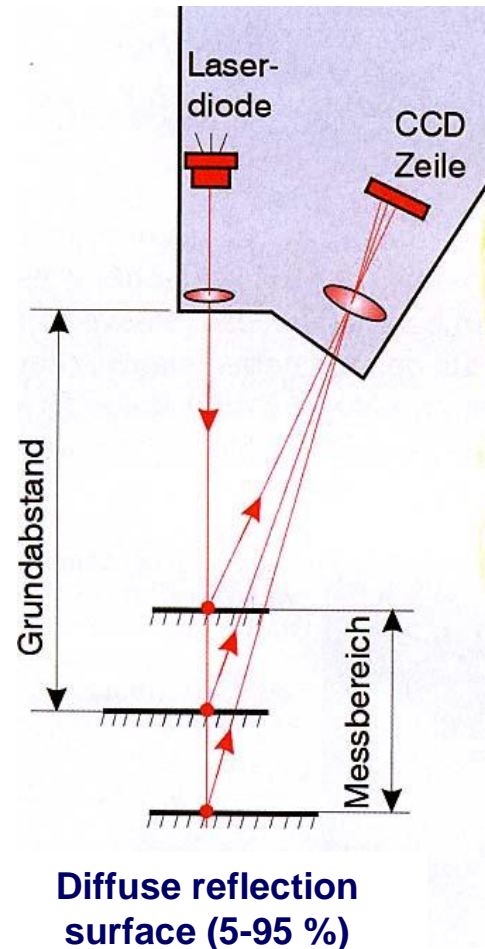
Thickness Measurement on extruded plastic-material with two LDS 70/5 and process controller EPC 90.

2 inputs, thickness, 3 outputs

- Range: e.g. 2 x 5mm up to 2 x 250mm
- measuring accuracy: < 5/100 mm
- for 24-hours online applications
- frequency: ≤ 1000 Hz
- complete solution for customer
- engineering from Eltrotec to optimize the customers workflow.
- customers: producers of endless materials, engine fitters, end users

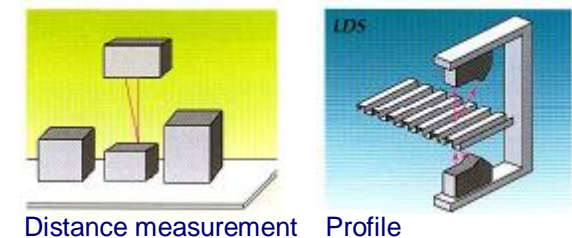
Applications:

- Distance, Profile, Thickness
- Vibration, Adjustment
- Position, Oscillation
- Flatness, Planity
- Surface defects
- Edges, roundness
- Road deformation measurement



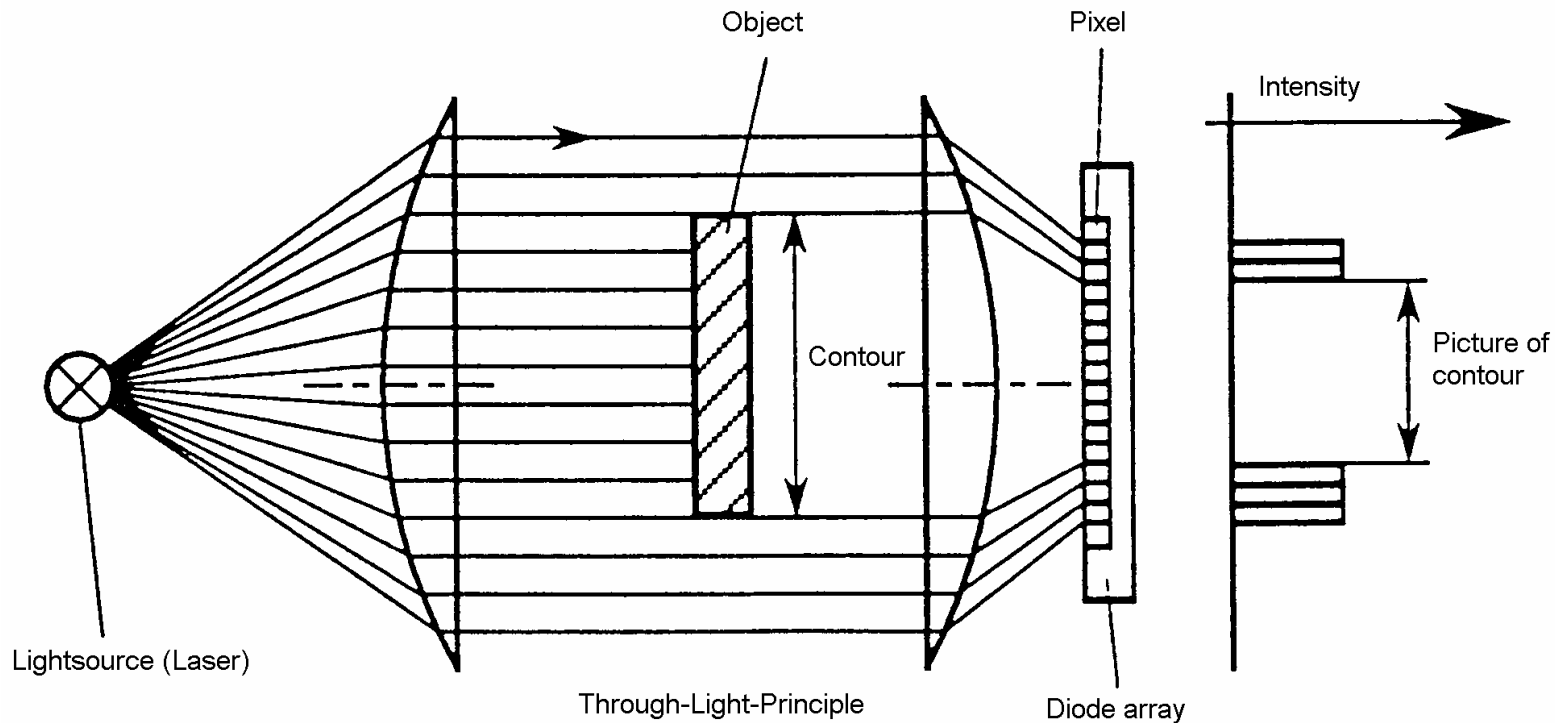
Function Principle of
LASER - DISTANCE –
SENSORS
(LDS)

Basic: triangulation



Recognition of:
shape - color – surfaces – distance & profile

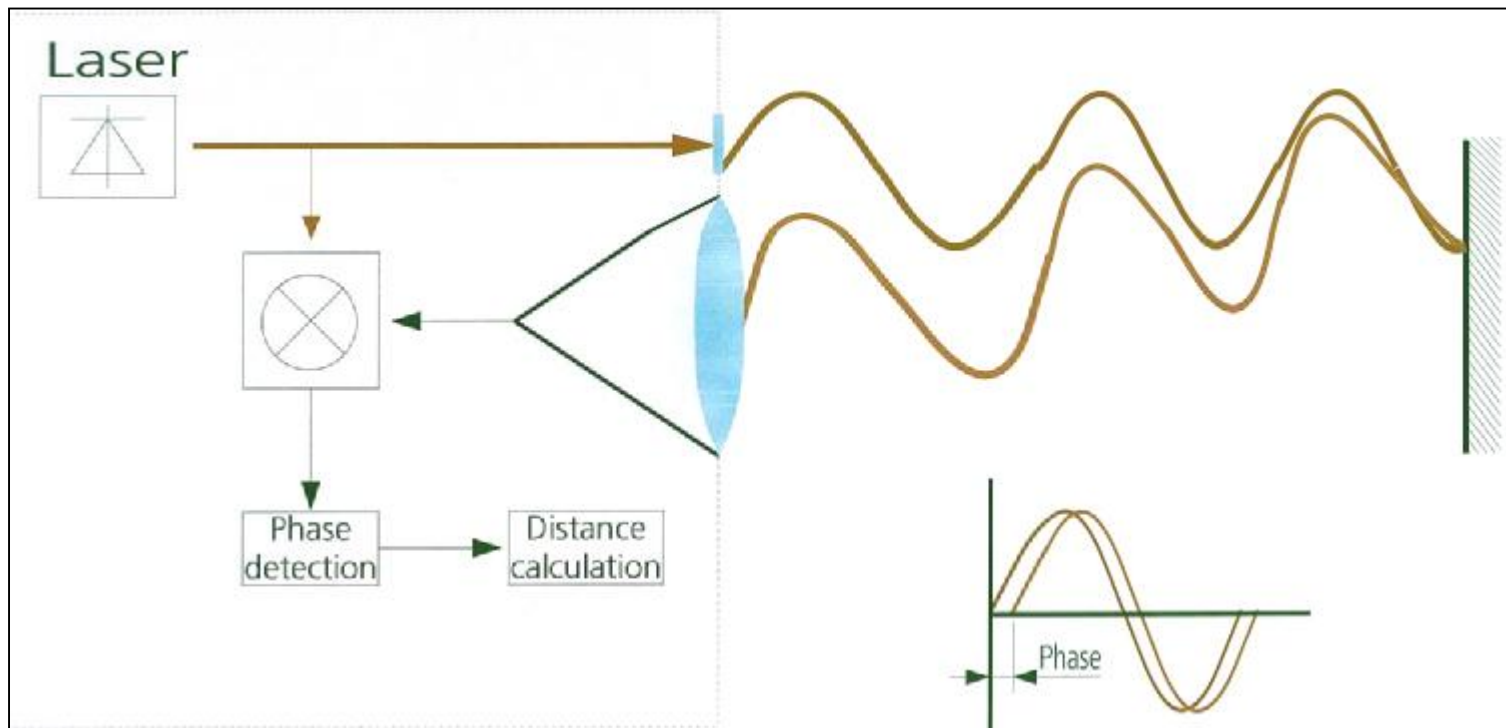
Description through-light principle



LBS = Intensity – Measurement 0-10 VDC

LZS / LBM = CCD-Pixel counting

Time of flight measurement Phase shift measurement (LDS 400 / 500)



How to find the right laser distance sensor

- Basic distance è Measuring range
- Resolution è μm , 1/100 – 1/10 mm
- Linearity è Diameter measuring / total range / at one point
- Surface è (5-95) % reflectivity, transparent, glass
- Frequency è some 100 Hz, 1; 2; 5; 10 kHz
- Interface è 0-10 / 1-5 / VDC, 4-20 mA, RS 485, USB, ...
- Spot diameter è depends on the product surface

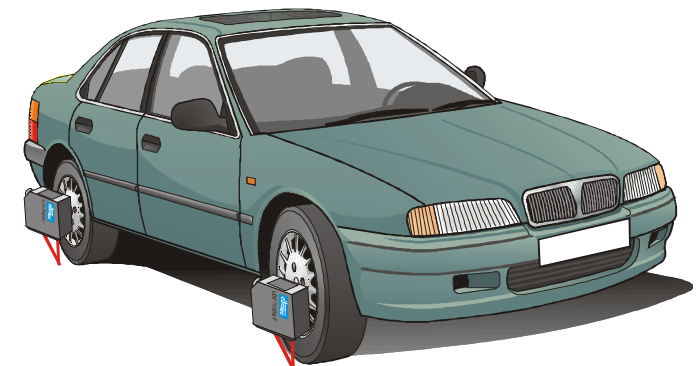
These questions have to be cleared to find the right sensor.

Recognition of:
shape - color – surfaces – distance & profile



Laser Distance Sensor LDS 70

- Measuring ranges 5 - 200 mm (250 mm)
- Resolution 0,6 μm - 40 μm
- Frequency 1 kHz
- Outputs 1-5 V; 4-20 mA; RS 232
- High linearity
- Color independent measurement
- CCD- receiver
- LDS 70/250F shock and illumination interface resistant for car, road or train to rail applications



Road profile measurement

Recognition of:
shape - color – surfaces – distance & profile



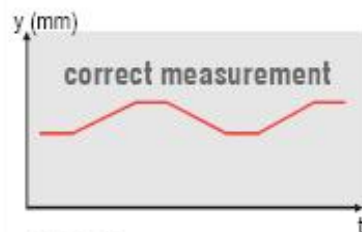
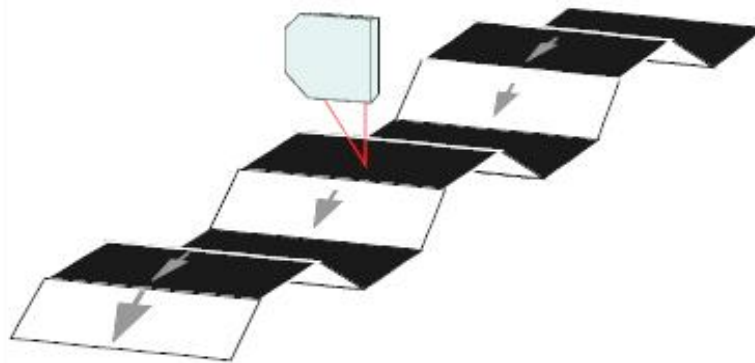
LDS 60 / Basic Sensor

- Ranges: 20 / 50 / 100 / 200 mm
- Resolution: 4 / 10 / 50 / 150 μm
- Output: 4-20 mA / 1-5 V DC
- Frequency 500 Hz
- Same dimensions than LDS 70

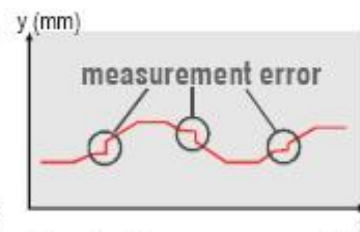


LDS 85 Intelligent laser optical displacement sensor

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



LDS 85
with RTSC real-time
surface compensation



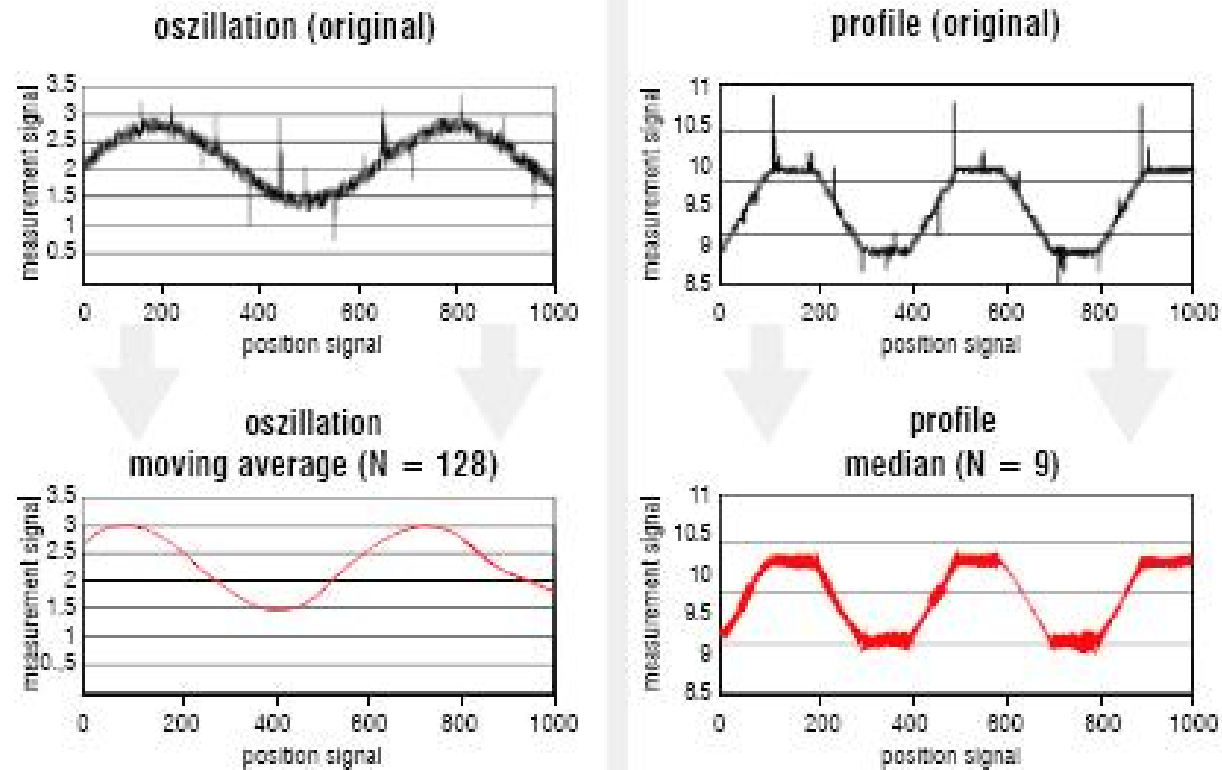
Standard laser sensors with
time-shift control give
distinctly incorrect signals
with a change of surface



- Best signal conditioning in the sensor
- Demo software included to present and store data's

LDS 85

Adjustable filter functions:



Recognition of:
shape - color – surfaces – distance & profile



LDS 85

- Highest resolution in class
- Highest repeatability in class
- Highest accuracy in class
- Best performance / price ratio in class
- 2 / 10 / 20 / 50 / 100 / 200 / 250 VT / 500 / 750 mm
- All functions in one housing

LDS 85

- Linearity: 2 / 8 / 10 / 40 / 80 / 200 / 400 / 750 μm
- Resolution: 0,1 - 50 μm
- Frequency: 2,5 kHz / 1,25 / 625 / 312,5 Hz
- Outputs: 4-20 mA / 0-10 VDC / RS 422 / USB – Adaptation
- Software: programming and showing the measurement range
- Version: 250 VT (with interference filter, shock approval for distance measuring on roads, trains, shock application)

Road profile measurement (20 sensors along the width of a street on a running measurement car) for all companies which are responsible for the „autobahn“ quality – we have the experience

Recognition of:
shape - color – surfaces – distance & profile

elrotec

Laser Distance Sensor LDS 100

- Distances up to 4000 mm
- Resolution 10-500 μm
- Frequency 1 kHz (2 kHz / 5 kHz / 10 kHz)
- Outputs: 1-9 V; 4-20 mA; RS 232 (RS 485)
- High linearity
- Colour independent measurement
- Synchronization of 2 sensors for thickness measurement
- CCD - receiver
- Measuring of surfaces up to (1300°)
- for wood, building materials, steel applications, plastic extrusions



(options with additional prices!)

Recognition of:
shape - color – surfaces – distance & profile



Laser Distance Sensor LDS 400

- „Time of flight“ principle
- Analogue and switching output
- Measuring range 300 - 4000 mm
- Digital Resolution $\geq 0,9$ mm
- Switching Frequency 100 Hz / 500 Hz
- 2 x PNP or NPN, 4-20 mA, RS 485
- 4-digit display (distance value and parameter settings)
- SET-pushbutton
- 20 meter / 100 meter (on reflector 200 x 300 mm)



Recognition of: shape - color – surfaces – distance & profile



Technical Specifications:

LDS 400 / . . . versions / time of flight measurement

	/ 4	/ 7	/ 20	/ 100
measurement range: (300 ... mm)	≤ 4000 mm reflection (18-90 %)	≤ 7000 mm reflection (18-90 %)	≤ 20 m on reflector (340 x 200)	≤ 100 m on reflector (340 x 200) mm
resolution (digital)	0,9 mm	0,6 mm	0,6 mm	6 mm
repeatability [mm]	2 / 6 mm normal / fast	± 7	± 10 mm normal ± 12 mm fast	20 mm normal 30 mm fast
linearity %	0,3	0,3	0,25	0,3
output-hysteresis	± 2,5 mm	± 2,5 mm	± 12,5 mm	± 20 mm
response time	5 ms (normal); 1 ms (fast)	5 ms (normal); 1 ms (fast)	5 ms (normal); 1 ms (fast)	5 ms (normal); 1 ms (fast)
switching frequency	100 / 500 Hz	100 / 500 Hz	100 / 500 Hz	100 / 500 Hz
interfaces	2 x PNP or 2 x NPN RS 485 4-20 mA	2 x PNP or 2 x NPN RS 485 4-20 mA	2 x PNP or 2 x NPN RS 485 4-20 mA	2 x PNP or 2 x NPN RS 485 4-20 mA
connector	M12 - 8-polig	M12 - 8-polig	M12 - 8-polig	M12 - 8-polig
operating temperature	-20° C bis +50° C	-20° C bis +50° C	-20° C bis +50° C	-20° C bis +50° C
storage temperature	-30° C bis +75° C	-30° C bis +75° C	-30° C bis +75° C	-30° C bis +75° C
temperature drift	± 0,6 mm / C°	± 0,6 mm / C°	± 1,5 mm / C°	± 2 mm / C°
order code: 1065_____	PNP NPN -2680 -2683	PNP NPN -3365 -3366	PNP NPN -3042 -3043	PNP NPN -3044 -3045

Applications:

Distance measurement on: steel, plastic, crane, timber, paper, tunneling/mining, railway, storage technology, container handling, automatic doors, warehouse technology,

02/2007

Recognition of:
shape - color – surfaces – distance & profile



LDS 400

LDS 500

LDS 60

LDS 70



Sensor solutions for automation, assembling and handling

www.contika.dk

Recognition of: shape - color – surfaces – distance & profile



Laser Distance Sensors Serie LDS 500

Measurement principle: Time of flight with temperature compensation* (absolute measurement system with measurement reference details)
Laser red light, diameter of light spot 4 - 40 mm

Advantage: High measuring accuracy $\pm 1,5$ mm at a high temperature range

Disadvantage: Low switching frequency (6,6 Hz on white surface)
response time: 0,15 sec
best price / quality relation

Types: LDS 500 / ...	/ 30	/ 15	/ 30 H	/ 15 H
Measuring range:	50 mm - 500 m	=	=	=
Accuracy* (2 σ):	± 3 mm	$\pm 1,5$ mm	± 3 mm	$\pm 1,5$ mm
Resolution:	0,1 mm	0,1 mm	0,1 mm	0,1 mm
Diameter of Reflector: (for big distances)	210 x 297 mm (white painted)	=	=	=
Temperature range:	-10°C to +50°C	-10°C to +50°C	(-40°C to +50°C)	(-10°C to +50°C)
Outputs:	RS 232, 422 0/4 - 20 mA 2 Switching outputs 4 status indications Ext. Trigger	=	=	=
Power supply:	10 V - 30 V DC IP 65	=	24 - 30 V DC	24 - 30 V DC
measurement range: 18 - 90% surfaces without reflector	approx. 50 m	approx. 50 m	approx. 50 m	approx. 50 m

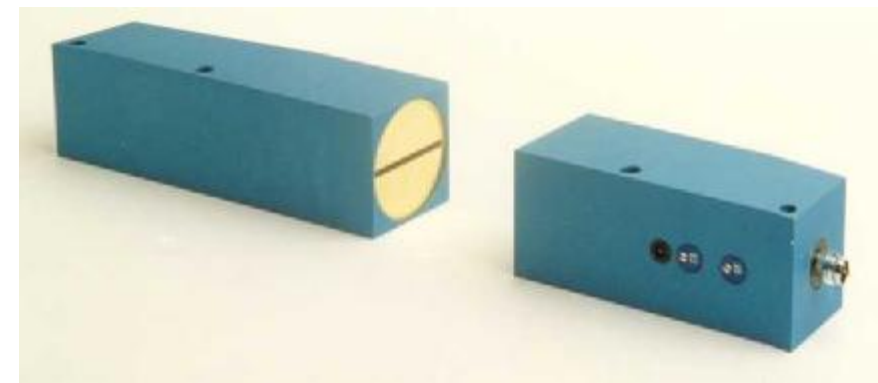
01/2007

Recognition of:
shape - color – surfaces – distance & profile




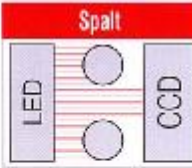
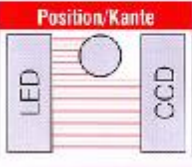
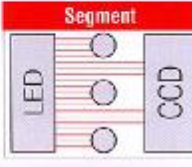
Laser – Beam – Sensor LBS-M-34

- Collimates Laser beam 670 nm
- Diaphragm 5 x 2 / 10 x 2 / 25 x 2
- Aluminum Housings anodized
- Analog output 0..10 V
- Laser Power adjustable
- Switching output, adjustable
- Laser-Class II
- Frequency 25 kHz
- Housing with IP 67
- Plug M12 / 4pol.
- Resolution: $\geq 50 \mu\text{m}$
- For positioning and edge control tasks



Laser Beam Sensors

for online measurement task (OEM – sensor production)

Durchmesser	Spalt	a) <u>Laser beam sensors</u> LBS-series	b) <u>Laser line sensors</u> LZS-series	c) <u>Laser micrometer</u> LBM-series
		<ul style="list-style-type: none">• 2-25 mm• resolution $\geq 50 \mu\text{m}$• intensity measurement• 0-10 VDC output• 25 kHz switching frequency• 100 kHz analogue band with• distance ≤ 6 meter for positioning and edge control	<ul style="list-style-type: none">• 8 / 100 mm• 1000 point CCD resolution• Software driven• \emptyset, edge, positioning• 100 Hz• output by RS 232• switching output• parameter setting by software• OEM- customised version possible	<ul style="list-style-type: none">• 34 / 40 mm• 1 and 0,25 μm resolution• Controller for \emptyset, edge, position, segment, ...• RS232• 2300 Hz• Length measurement by two LBM sensors and software by Eltrotec available
		<ul style="list-style-type: none">• <u>No diameter control</u>		

Recognition of:
 shape - color – surfaces – distance & profile



Product overview: laser distance sensors / laser beam sensors / laser micrometer

Products	Measuring range mm	Frequency kHz	Resolution µm	Interfaces
LDS 60	20 / 50 / 100 / 200	0,5	4 / 10 / 50 / 100	4-20 / 1-5 V
LDS 70	5 / 10 / 20 / 50 / 100 / 200	1	0,6 - 40	4-20 / 1-5 / RS232
LDS 70-250 F	250	1	50	4-20 / 1-5 / RS232
LT	25 / 70 / 250	0,3	10 / 50 / 300	0-10 V / 4-20 / RS232
LDS 85	2 / 10 / 20 / 50 / 100 / 200 / 500 / 750	2,5	0,1 µm -	all types
LDS 100	30 / 100 / 200 / 300 / 500 / 700 / 900 / 1400 / 2000	1, 2, 5, 10	2 µm -	all types
LDS 400	4 / 7 / 20 / 100 m	0,1 / 0,5	0,9 - 6 mm	RS485 / 2 digital / 4- 20 mA
LDS 500	50 mm - 500 m	6 Hz	0,1 mm	all types
LBS-M-34	3 Typen 0° / 90° version	25 kHz	≥ 10 µm	0-10 VDC
LBM 34	34	2, 3	1 µm	all types
LBM 40	40	2, 3	0,25 µm	all types
LZS-TB-AE1	8	100 Hz	8 µm	all types