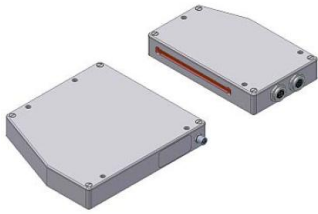


Datasheet – Technical Specification:		
Product:	OZLS – 75 – T / R – EM1 (engineering model 1)	
Description:	Laser line sensor, through-beam principle, with integrated trigger sensor. Class 2 (Popt ≤1mW, λ=670nm) laser transmitter, ccd-line receiver with 4096 pixel, 65mm working range, 16 µm resolution, rs232-output, analog (0..10V) and digital interface.	
		
Date:	05.03.2013	
Revision History / Date:	Rev 1.0 / 04.11.2010 (wk) Rev 1.1 / 21.08.2012 (wk) Rev 1.2 / 22.11.2012 (wk)	Initial release for engineering model 1 (- EM1) Diagnostics-data-transfer-option (Firmware V. 3.22) Linear-Correction ON/OFF-option (Firmware V. 3.24)

Mechanical data:	
Design	CCD line sensor, trigger sensor, trough-beam principle
Working distance	Up to 200mm
Outer dimensions	Transmitter: L x W x H approx. 127mm x 115mm x 20mm Receiver: L x W x H approx. 70mm x 115mm x 20mm
Housing material	Aluminium (not anodized)
Weight	Transmitter: approx. 320g Receiver: approx. 200g
Mounting	Transmitter: 4 through holes, each 4.5mm diameter Receiver: 3 through holes, each 4.5mm diameter
Enclosure rating	Housing: IP64, optics: IP65
Operating temperature range	0 ... 50 °C

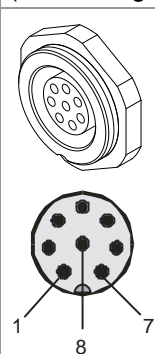
Optical Data Transmitter:	
Light source	Semiconductor laser diode, 670nm, DC-operation, 1mW max. optical power, laser class 2 acc. to DIN-EN 60825-1. The use of this laser transmitter therefore requires no additional protective measures.
Life time of laser diode	Typ. 150.000 h (1% MTTF)
Dimension of light curtain	Typ. 80mm x 10mm

Optical Data Receiver:	
Receiver	CCD line sensor (charge coupled device), 4096 subpixel, position of pixel1 = 92.55mm to reference line
Paper trigger sensor	High-speed photodiode, center position = 102mm to reference line
Measuring range	Typ. 65mm
Resolution	Typ. 16µm
Linearity	Typ. 0.08% FSR (full scale range)
Optical filter	Interference filter RG645
Mechanical aperture	80mmx1mm

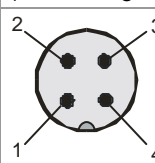
Electrical Data:	
Distribution Voltage	24 VDC ($\pm 10\%$ residual ripple), reversed polarity protected
Power consumption at unloaded outputs	Approx. 2.6W (24VDC, 110mA)
Indication LED for POWER	Two-colour LED, green/red (LED green=POWER)
Input digital (IN0)	Trigger input, 24VDC Input level: low $\leq 1.5\text{VDC}$ high $\geq 20\text{VDC}$
Output digital (OUT0, OUT1)	PNP/NPN, can be switched by software Output level: low $\leq 0.5\text{V}$ high = $U_b - 1\text{VDC}$
Output load (digital)	Max. 100mA, short-circuit proof
Indication LED for OUTPUT	Bi-colour LED green/red
Output analog (ANALOG)	0... +10VDC, max. 3mA load
Computer interface	Standard RS232, 3-wire, no hardware handshake
Scan frequency	Typ. 500 Hz
EMC test	Acc. to DIN EN 60947-5-2

Connector Assignment RECEIVER:

8-pole fem. connector Binder Series 712, connection to PLC
(connecting cable: cab-las8-SPS/SUB-D15male-flx-0,9m)

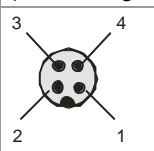
	Pin:	Color:	Assignment	Pin Function:
	1	white	GND (0V)	Ground (0V)
	2	brown	+24VDC $\pm 10\%$	Positive Supply Input Voltage VDC
	3	green	IN0 (TRIGGER)	Digital input Input (3-byte-transfer)
	4	yellow	RxD (RS-232)	RS232 receive-data-line
	5	grey	TxD (RS-232)	RS232 transmit-data-line
	6	pink	OUT0 (PA-TRG)	Digital output (paper-trigger)
	7	blue	OUT1 (STAT/ERR)	Digital output (status/diagnostics-error)
	8	red	ANA (0 ... +10V)	Analog output (0 ... +10V)

4-pole fem. connector Binder Series 712, connection to TRANSMITTER
(connecting cable: cab-las4-2Xmale-707/712-0,4m)

	Pin:	Assignment	Pin Function:
	1	GND (0V)	Ground (0V)
	2	+5VDC	Positive supply voltage
	3	I-SET	Laser intensity control (0 ... +5VDC)
	4	N.C.	Not connected

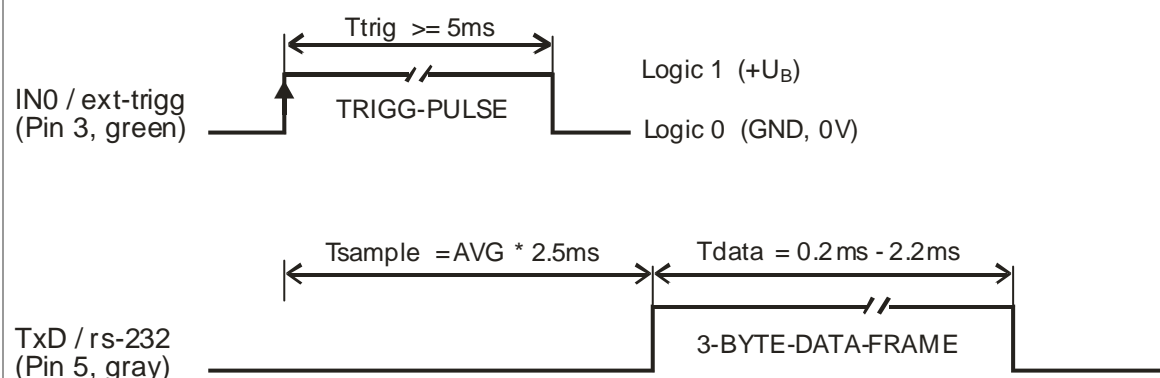
Connector Assignment TRANSMITTER:

4-pole fem. connector Binder Series 707, connection to RECEIVER
(connecting cable: as described above)

	Pin:	Color	Assignment	Pin Function:
	1	brown	+5VDC	Positive supply for transmitter
	2	white	GND (0V)	Ground (0V)
	3	blue	GND (0V)	Ground (0V)
	4	black	I-SET	Laser intensity control (0 ...+5VDC)

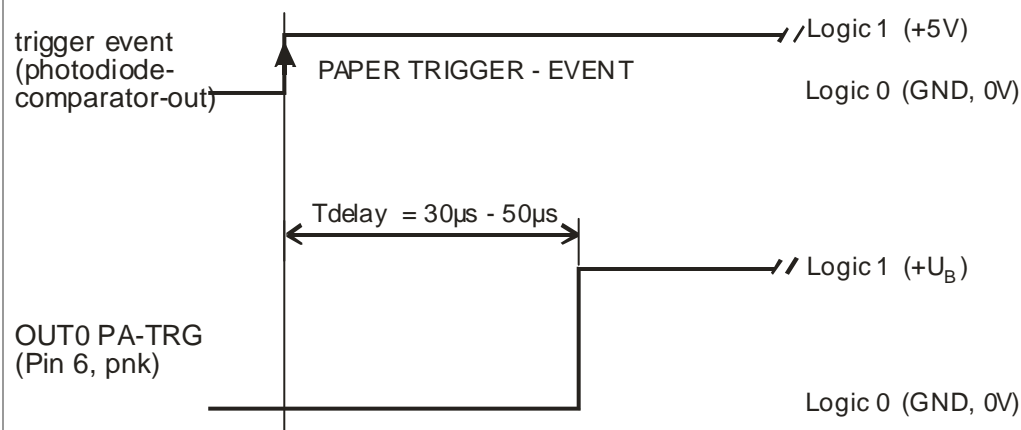
Input/Output Timing (3-byte-measurement-data-transfer):

Ttrig:	Trigger pulse length $T_{trig} \geq 5\text{ms}$, pos. edge sensitive
Tsample:	Time delay trigger-pulse to 3-byte data output, $T_{sample} = AVG * 2.5\text{ms}$. $AVG= AVERAGE = \text{number of samples to be scanned} \rightarrow \text{refresh of mean-value calculation after AVG-samples are sampled in ring-buffer. Because of the scan-frequency of } 500\text{Hz the interval between two scans} = 2.5\text{ms}.$
Tdata:	Time duration for 3-byte rs232 data-frame transfer depends on baudrate: 9600Baud: $T_{data}=2.2\text{ms}$, 19200Baud: $T_{data}=1.1\text{ms}$, 38400Baud: $T_{data}=0.6\text{ms}$, 57600Baud: $T_{data}=0.4\text{ms}$, 115.2kBaud: $T_{data}=0.2\text{ms}$



Output Timing (paper trigger):

Tdelay:	Time span between paper-trigger-event and OU0 digital output change $T_{delay}(\text{min}) = 30\mu\text{s}$ $T_{delay}(\text{max}) = 50\mu\text{s}$
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3-Byte RS-232 measurement-data transfer:

Interface Settings:

- Standard RS232 serial interface, no hardware handshake
- 3-wire-connection: GND, TXD, RXD
- Speed: 9600 baud, 19200 baud, 38400 baud, 57600 baud or 115200 baud
- 8 data-bits
- NO parity-bit
- 1 stop-bit
- binary-mode
- transmission is initiated by Low/High edge at IN0 digital input

Transmission Format of the 3-Byte-Data-Transfer:



Digital value DV (=pixel-value) is educed from Low-Byte , Middle-Byte and High-Byte:



Conversion of pixel-values into [mm]:

$$\text{Measurement value [mm]} = \text{OFFSET [mm]} + \text{DV} * 0.015875$$

Slope : 15.875µm (pixel-pitch)

Offset: 0.0mm (based upon pixel 1 position)

Example: 3-Byte-Output (received with HTerm Hyperterminal-Shareware Program)

Received Data		
1	2	3
00	40	80
000	064	128
00000000	01000000	10000000
2A	5D	80
042	093	128
00101010	01011101	10000000
3E	7F	80
062	127	128
00111110	01111111	10000000

Digital-value = pixel-value = 0
(ccd sensor not covered)

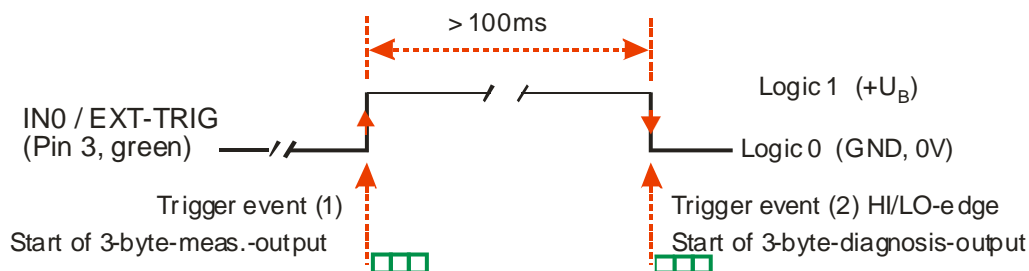
Digital-value = 2+8+32 + 64+256+512+1024 + 0=1898
(object in measureing-section at pixel

Digital-value = 2+4+8+16+32 + 64+128+256+512+1024+2048=4094
(ccd sensor fully covered)

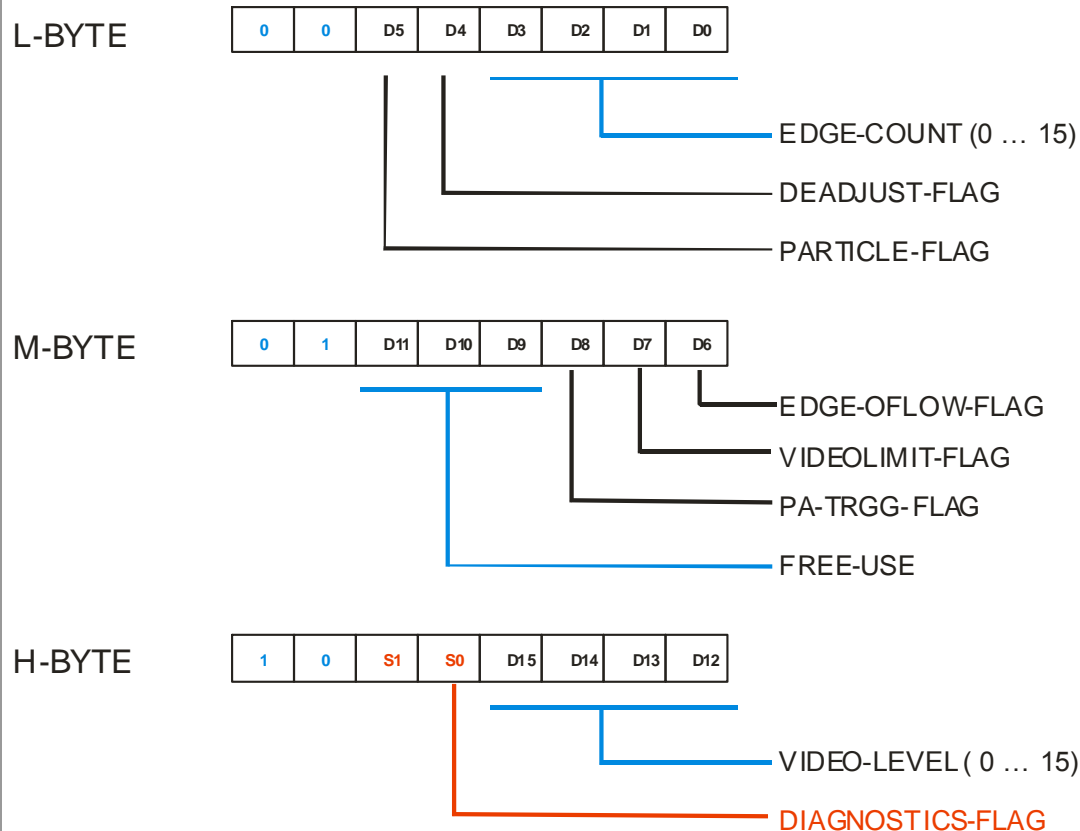
3-Byte RS-232 diagnostics-data transfer:

Interface Settings:

The 3-Byte Diagnosis-Data-Transfer is done similar to the 3-Byte-Measuring-Data-Transfer. The data-frame is split to a LOW-Byte, MEDIUM-Byte and HIGH-Byte. The first two bits after the RS-232-START-Bit marking the sequence of the byte (1st byte = 0|0, 2nd byte = 0|1, 3rd byte = 1|0). By applying a digital pulse of more than 100ms ($t > 110\text{ms}$...) duration the measurement transfer is initiated as usually by the L/H edge at IN0, with the HIGH/LOW edge transition additionally the diagnosis-frame is transmitted via the rs232 interface (must be activated in PC-software before).

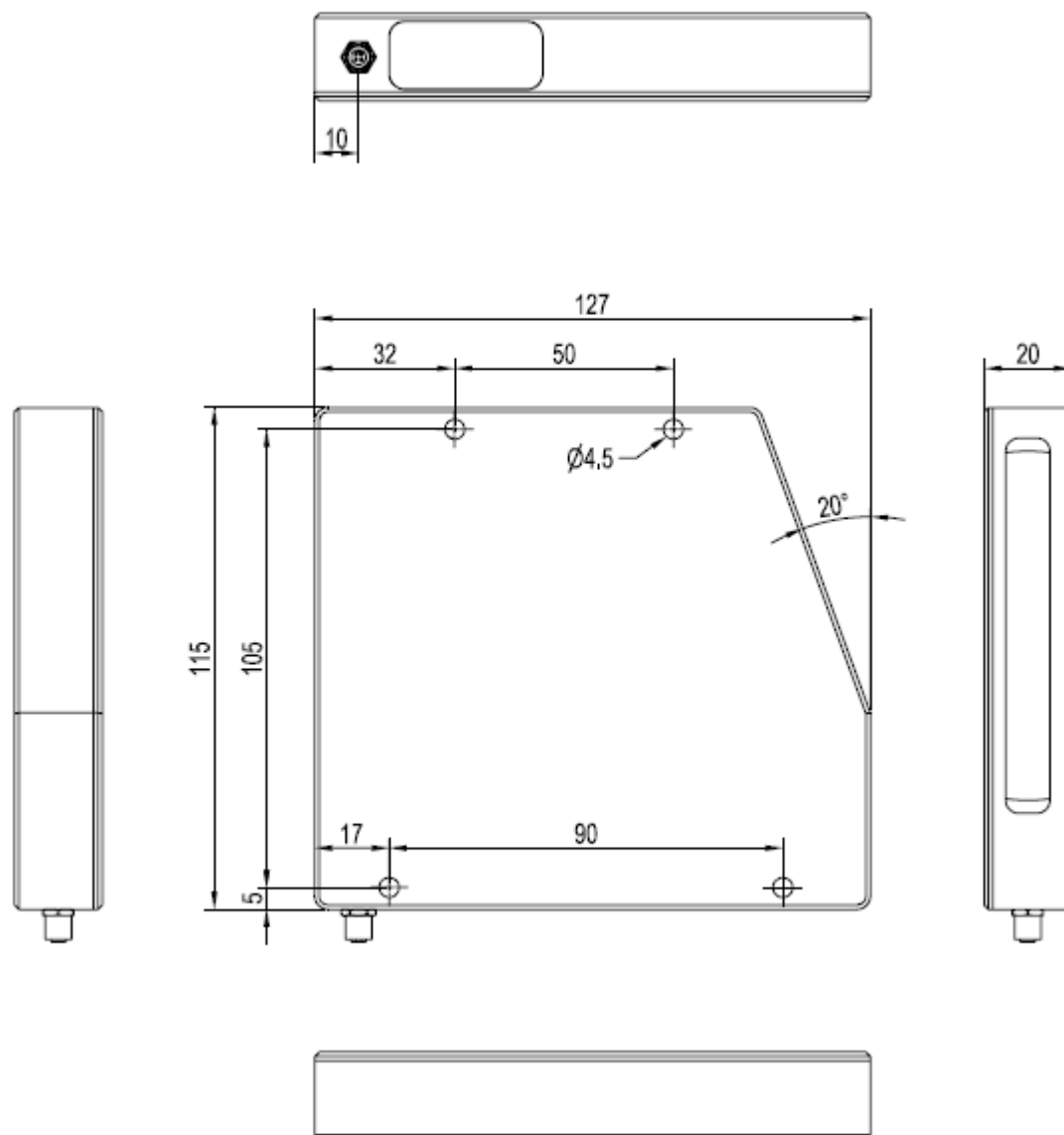


Transmission Format of the 3-Byte-Data-Transfer:



Housing Dimensions Transmitter:

OZLS-75-T-EM1



All dimensions in mm

Laser Warning:

The laser line sensors of OZLS Series comply with laser class 2 according to EN 60825-1.

The use of the laser transmitters OZLS-75-T-EM1 therefore requires no additional protective measures.

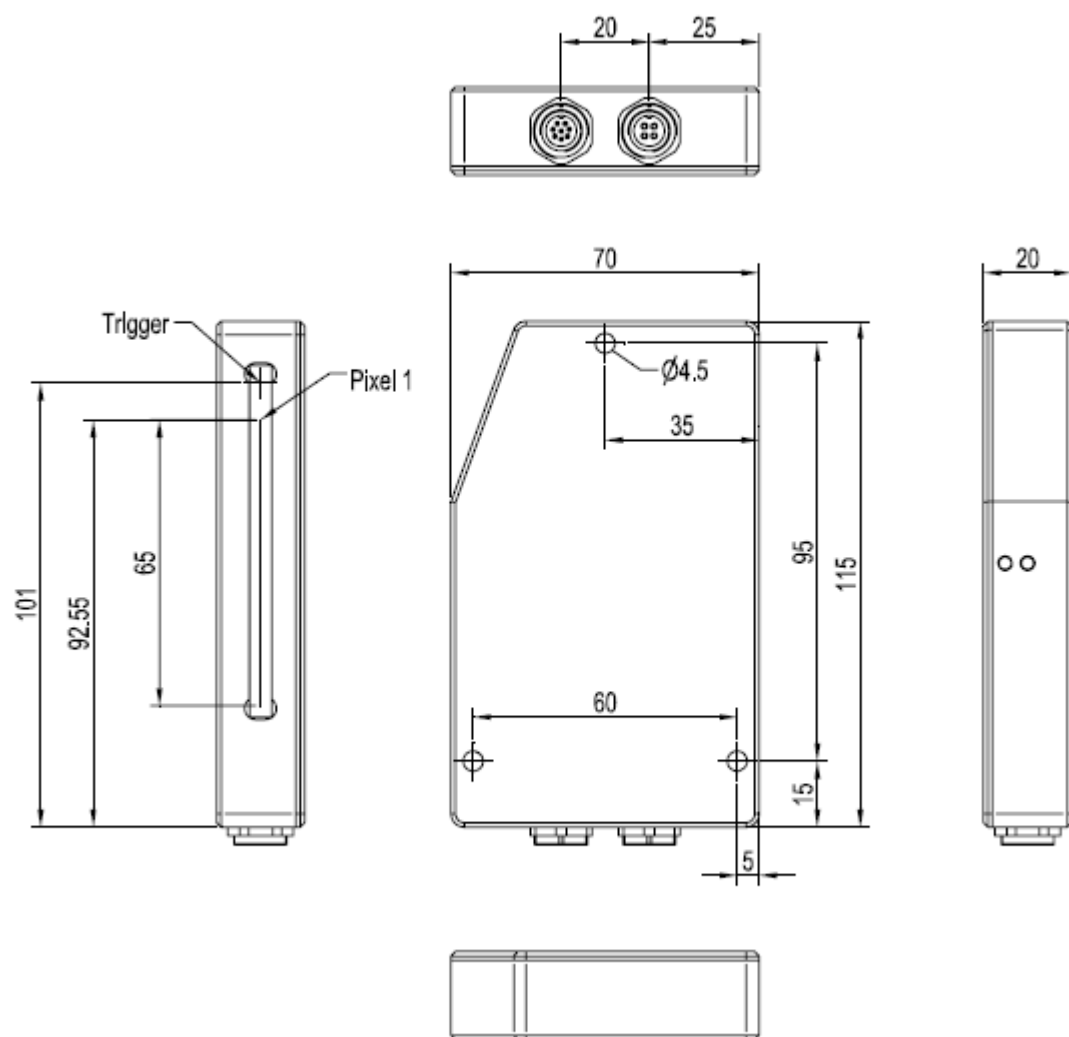
The laser line sensors of OZLS Series are supplied with a laser warning label.



LASER RADIATION
DO NOT STARE INTO THE BEAM
CLASS II LASER PRODUCT

Housing Dimensions Receiver:

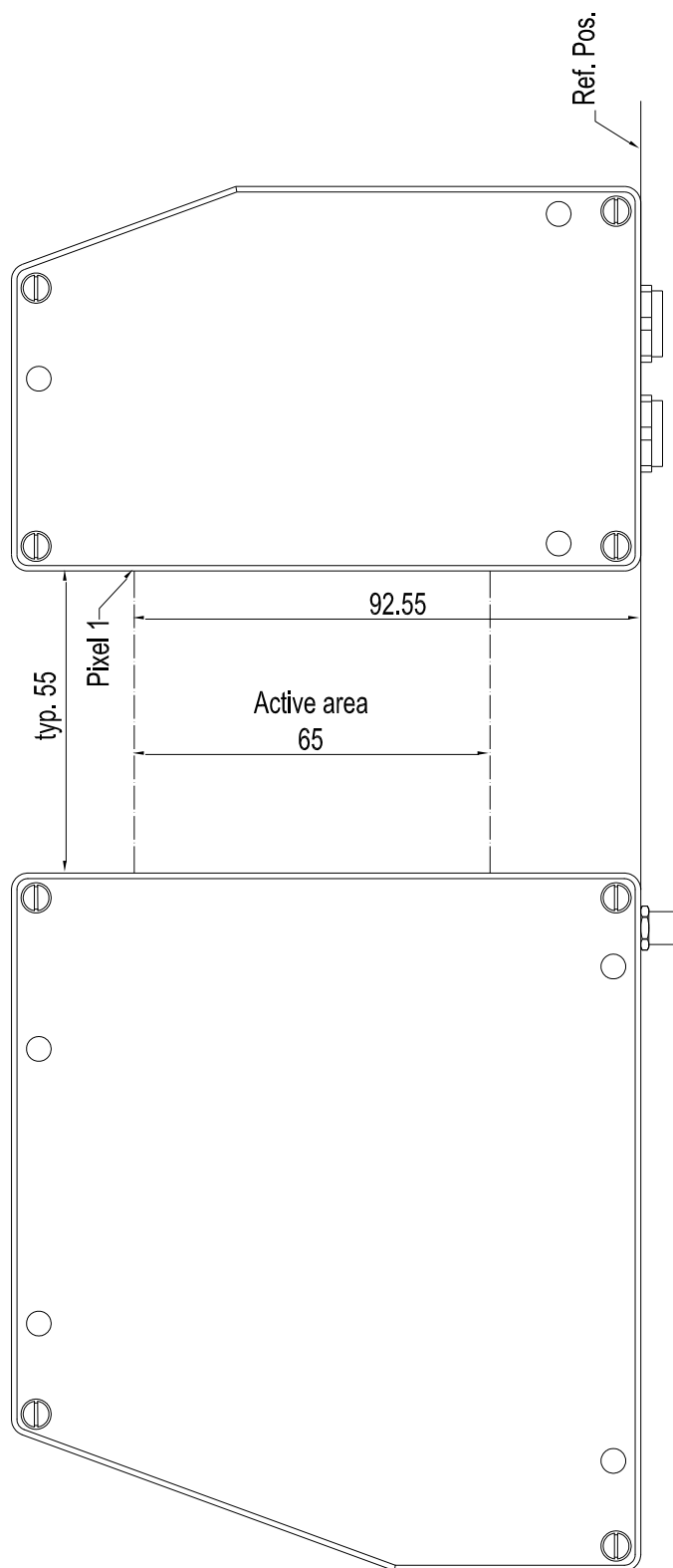
OZLS-75-R-EM1



All dimensions in mm

Mounting of receiver / transmitter - reference-position

OZLS-75-R-EM1

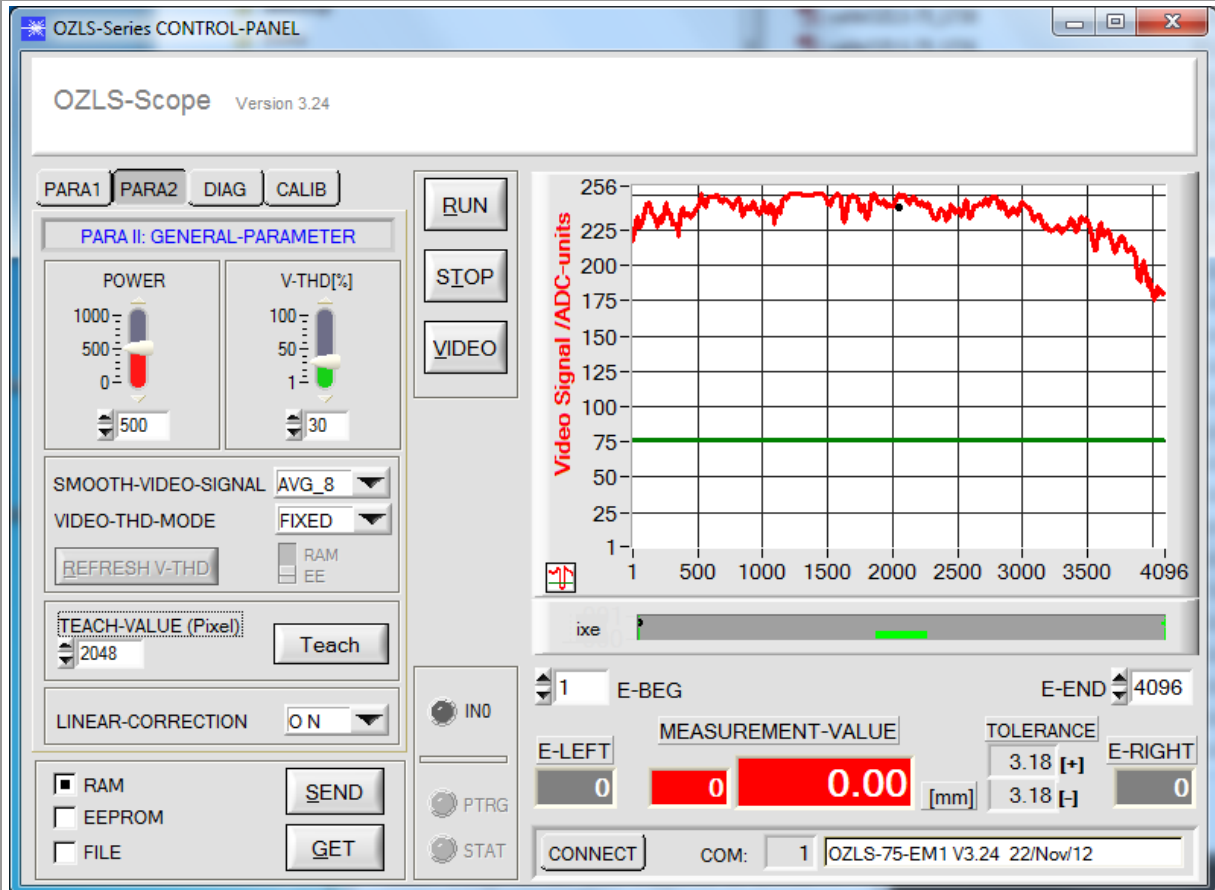


All dimensions in mm

Software Parameterization:

Windows Software OZLS-Scope:

The OZLS-75-EM1 laser line sensor can be easily parameterised with the Windows® user interface. For this purpose the sensor is connected to the PC with a serial 3-wires-RS232 connection (by means of cable cab-las8/SPS-SUB-D15male-flx-0,9m).



With the help of the OZLS-Scope software the following settings can be made at the sensor hardware:

- Setting of the laser power
- Polarity of digital outputs
- Setting of the evaluation mode
- Checking the receiver/transmitter adjustment

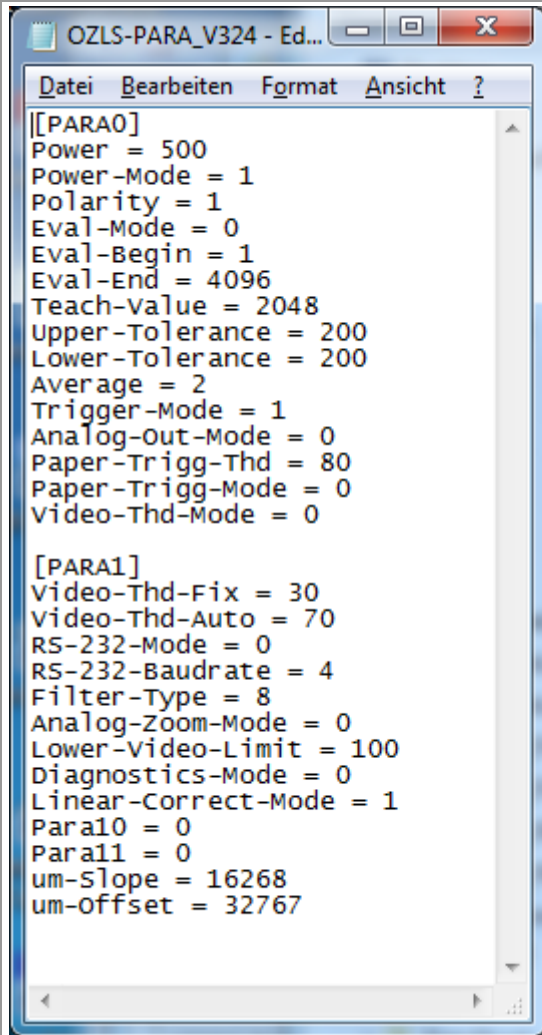
Furthermore, various numerical and graphical measured quantities can be visualized with the OZLS-Scope software.

Standard Parameters:

The standard parameters of the OZLS-75-EM1 laser line sensor are as follows:

Firmware version:

CONNECT	COM:	1	OZLS-75-EM1 V3.24 22/Nov/12
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Part list:

One complete system **OZLS – 75 – T / R – EM1** consists of the following parts:

Part 1a:**OZLS-75-R-EM1**

Part number 8050.1106
(line sensor receiver)

**Part 1b:****OZLS-Scope V3.24**

Part number 809073
(CD-ROM with PC software,
necessary for Part 1a receiver;
user manual)

**Part 2:****OZLS-75-T-EM1**

Part number 8050.1105
(line sensor transmitter)

**Part 3:****cab-las8-SPS/SUB-D15male-flx-0,9m**

Part number 8080.7049
(connecting cable, l=0,9m)

**Part 4:****cab-las4-2Xmale-707/712-0,4m**

Part number 8080.7047
(connecting cable, l=0,4m)

