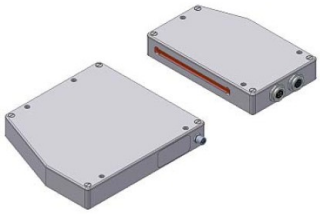
Datasheet – Technical Specification:		
Product:	**OZLS – 75 – T / R – EM1** (engineering model 1)	
Description:	Laser line sensor, through-beam principle, with integrated trigger sensor. Class 2 (Popt <=1mW, λ=670nm) laser transmitter, ccd-line receiver with 4096 pixel, 65mm working range, 16 µm resolution, rs232-output, analog (0..10V) and digital interface.	
		
Date:	22.08.2012	
Revision History / Date:	Rev 1.0 / 04.11.2010 (wk) Rev 1.1 / 22.08.2012 (wk)	Initial release for engineering model 1 (- EM1) Diagnostics-data-transfer-option (Firmware V. 3.22)

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 temperatrure range	0 … 50 °C

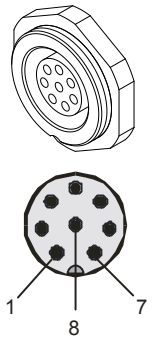
Optical Data Transmitter:	
Light source	Semiconductor laser diode, 670nm, DC-operation, 1mW max. optical power, laser class 2 acc. To DIN-EN 60825-1. The use of this laser transmitter therefore requires no additional protective measures.
Life time of laser diode	Typ. 150.000 h (1% MTTF)
Dimension of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

Optical Data Receiver:	
Receiver	CCD line sensor (charge coupled device), 4096 subpixel, position of pixel1 = 92.5mm to reference line
Paper trigger sensor	High-speed photodiode, center position = 102mm to reference line
Measureing range	Typ. 65mm
Resolution	Typ. 16µm
Optical filter	Interference filter RG645
Mechanical aperture	80mmx1mm

Electrical Data:	
Distribution Voltage	24 VDC (± 10% residuall ripple), reversed polarity protected
Power consumption at unloaded outputs	Approx. 2.6W (24VDC, 110mA)
Indication LED for POWER	Two-color LED, green/red (LED green=POWER
Input digital (IN0)	Trigger input, 24VDC Input level: low <= 1.5VDC high >= 20DCD
Output digital (OUT0, OUT1)	PNP/NPN, can be switched by software Output level: low <= 0.5V high = Ub – 1VDC
Output load (digital)	Max. 100mA, short-circuit proof
Indication LED for OUTPUT	Two-color LED green/red
Output analog (ANALOG)	0… +10VDC, max. 3mA load
Computer interface	Standard RS232, 3-wire, no hardware handshake
Scan frequency	Typ. 400 Hz
EMC test	Acc. to DIN EN 60947-5-2

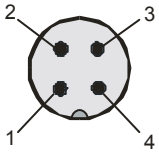
Connector Assignment RECEIVER:

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 +/- 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)

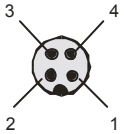
4-pole fem. connector Binder Series 712, connection to TRANSMITTER
(connecting cable: cab-las4-2Xmale-707/712-0,4m)



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

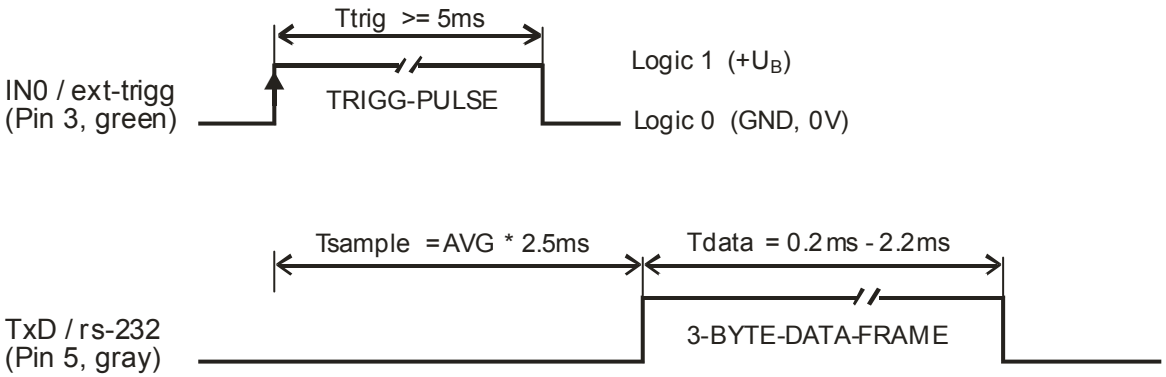
Connector Assignment TRANSMITTER:

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

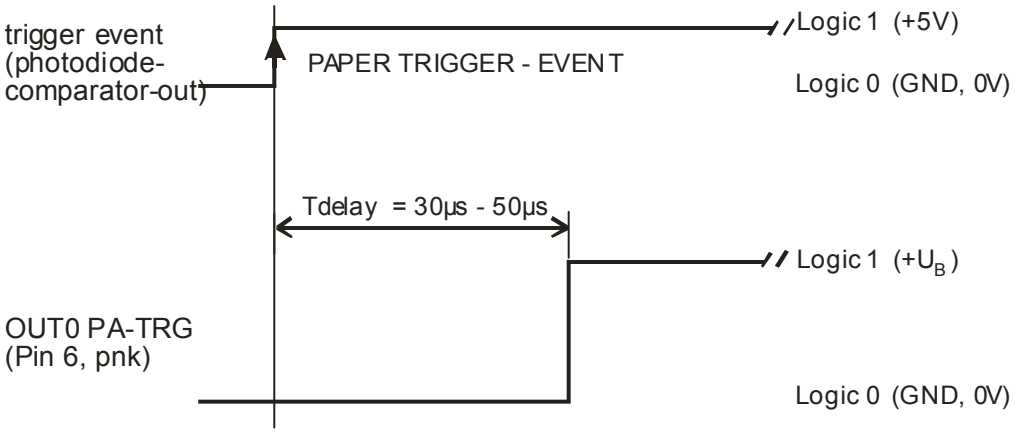


Pin:	Color	Assignment	Pin Function:
1	brown	+5VDC	Positive supply for transmitter
2	white	GND (0V)	Ground (0V)
3	blue	GND (0V)	Ground (0V)
4	black	I-SET	Laser intensity control (0 …+5VDC)

Input/Output Timing (3-byte-measurement-data-transfer):	
Ttrig:	Trigger pulse length Ttrig >= 5ms, pos. edge sensitive
Tsample:	Time delay trigger-pulse to 3-byte data output, Tsample = AVG * 2.5ms. AVG=AVERAGE=number of samples to be scanned ->refresh of mean-value calculation after AVG-samples are sampled in ring-buffer. Because of the scan-frequency of 400Hz the interval between two scans = 2.5ms.
Tdata:	Time duration for 3-byte rs232 data-frame transfer depends on baudrate: 9600Baud: Tdata=2.2ms, 19200Baud: Tdata=1.1ms, 38400Baud: Tdata=0.6ms, 57600Baud: Tdata=0.4ms, 115.2kBaud: Tdata=0.2ms



Output Timing (paper trigger):	
Tdelay:	Time span between paper-trigger-event and OU0 digital output change Tdelay (min) = 30µs Tdelay (max) = 50µs



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:

START	0	0	6-Bit (D5 ... D0)	STOP

L-BYTE

START	0	1	6-Bit (D11 ... D6)	STOP

M-BYTE

START	1	0	6-Bit (D15 ... D12)	STOP

H-BYTE

L-BYTE	0	0	D5	D4	D3	D2	D1	D0
M-BYTE	0	1	D11	D10	D9	D8	D7	D6
H-BYTE	1	0	S1	S0	D15	D14	D13	D12

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

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0

Conversion of pixel-values into [mm]:

Measurement value [mm] = OFFSET [mm] + 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)

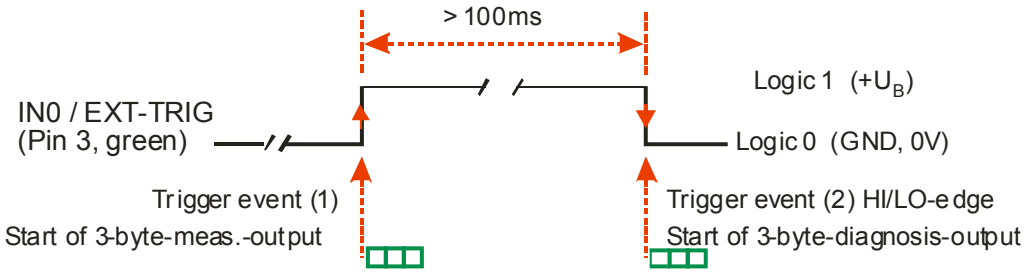
Digital-value = 2+8+32 + 64+256+512+1024 + 0 =1898
(object in measureing-section at pixel

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

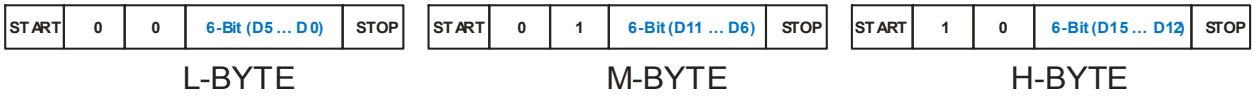
3-Byte RS-232 diagnostics-data transfer:

Interface Settings:

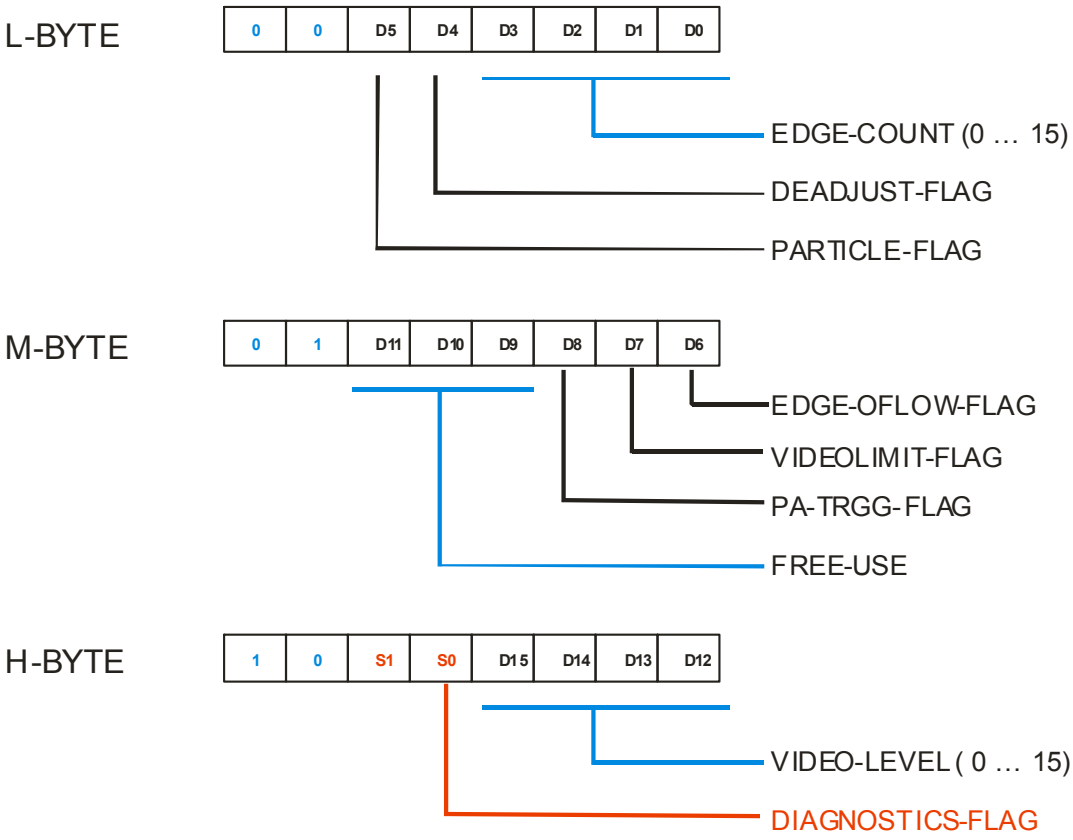
The 3-Byte Diagnosis-Data-Transfer is done similar to the 3-Byte-Measuring-Data-Transfer.
The data-frame is split to a LOW-Byte, MEDIUM-Byte and HIHG-Byte. The first two bits after the RS-232-START-Bit marking the sequence of the byte (1st byte = 0|0, 2nd byte = 0|1, 3rd byte = 1|0).
By applying a digital pulse of more than 100ms (t >110ms ...) 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:

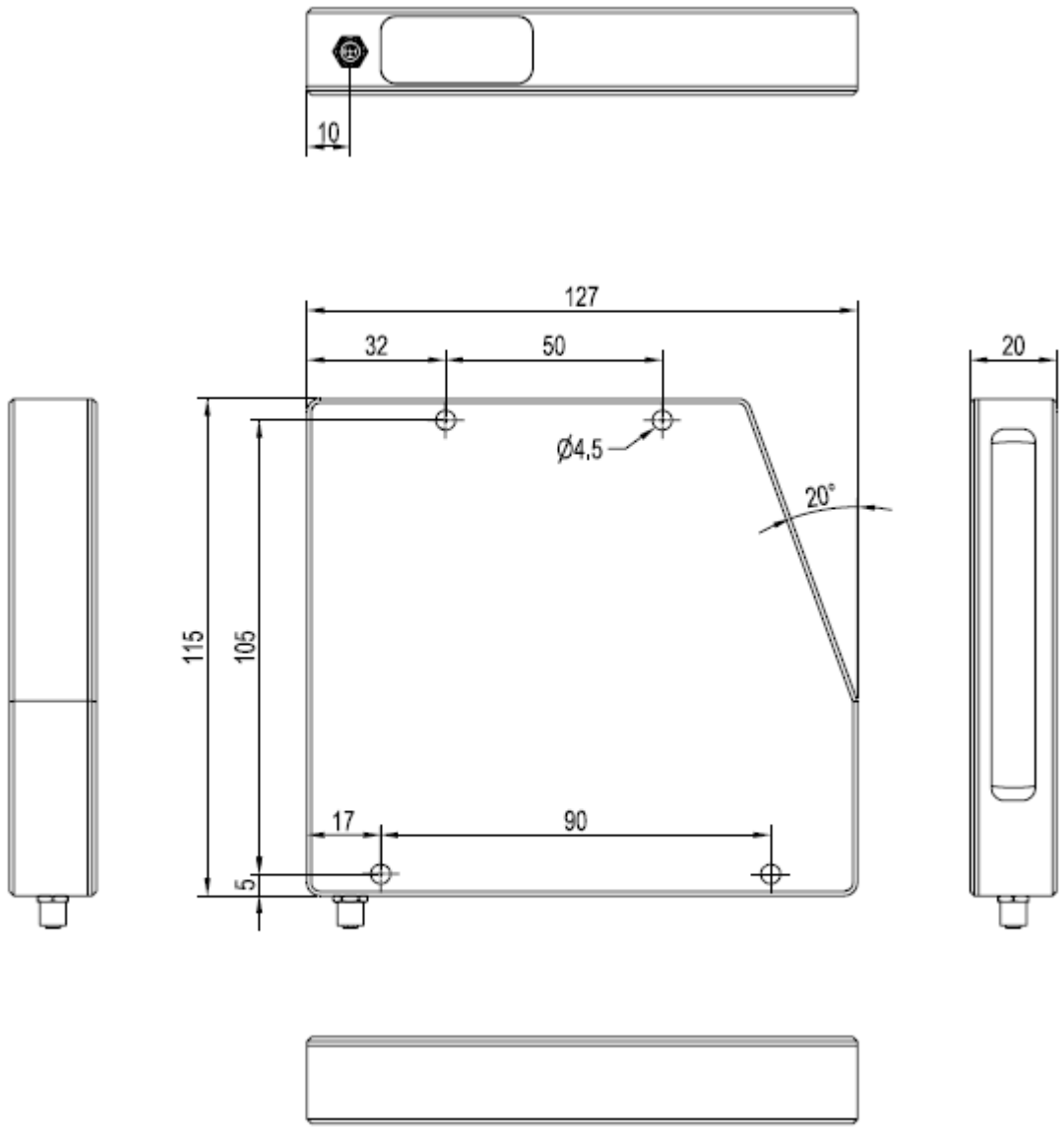


L-BYTE M-BYTE H-BYTE



Housing Dimensions Transmitter:

OZLS-75-T-EM1



All dimensions in mm

Laser Warning:

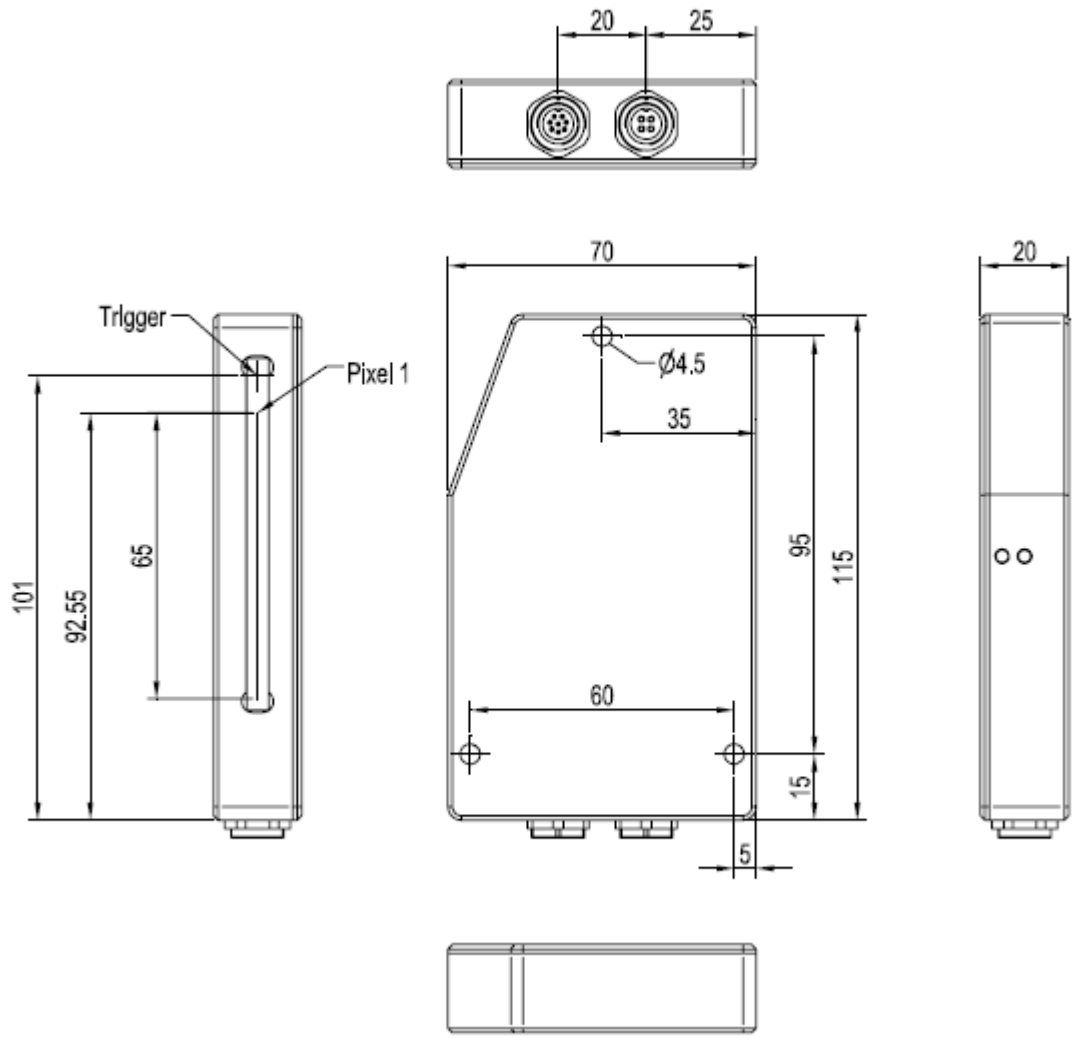
The laser line sensors of OZLS Series comply with laser class 2 according to EN 60825-1.

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.

Housing Dimensions Receiver:

OZLS-75-R-EM1

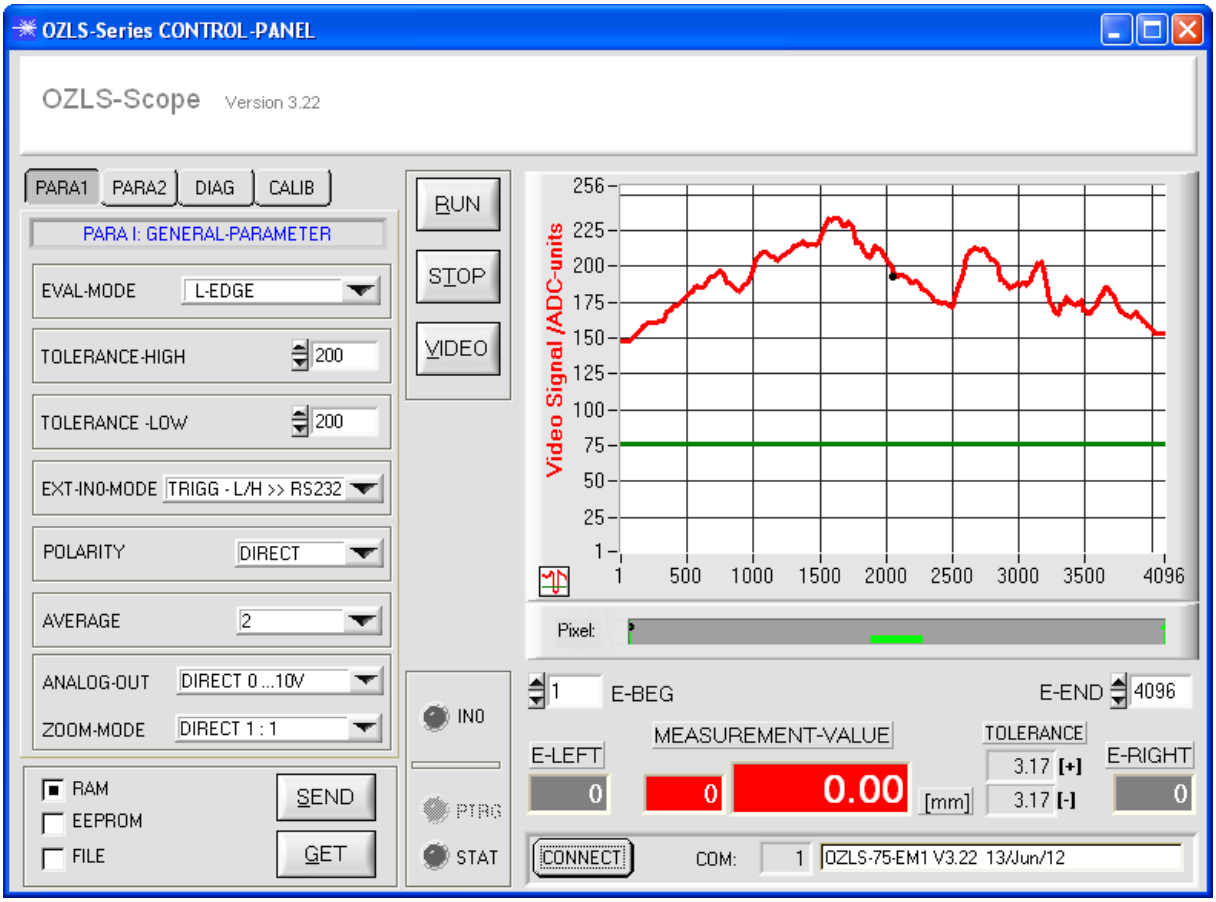


All dimensions in mm

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:

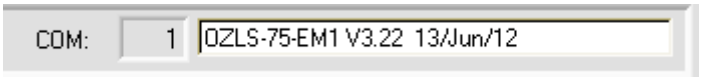
- Setting of the laser power
- Polarity of digital outputs
- Setting of the evaluation mode
- Checking the receiver/transmitter adjustment

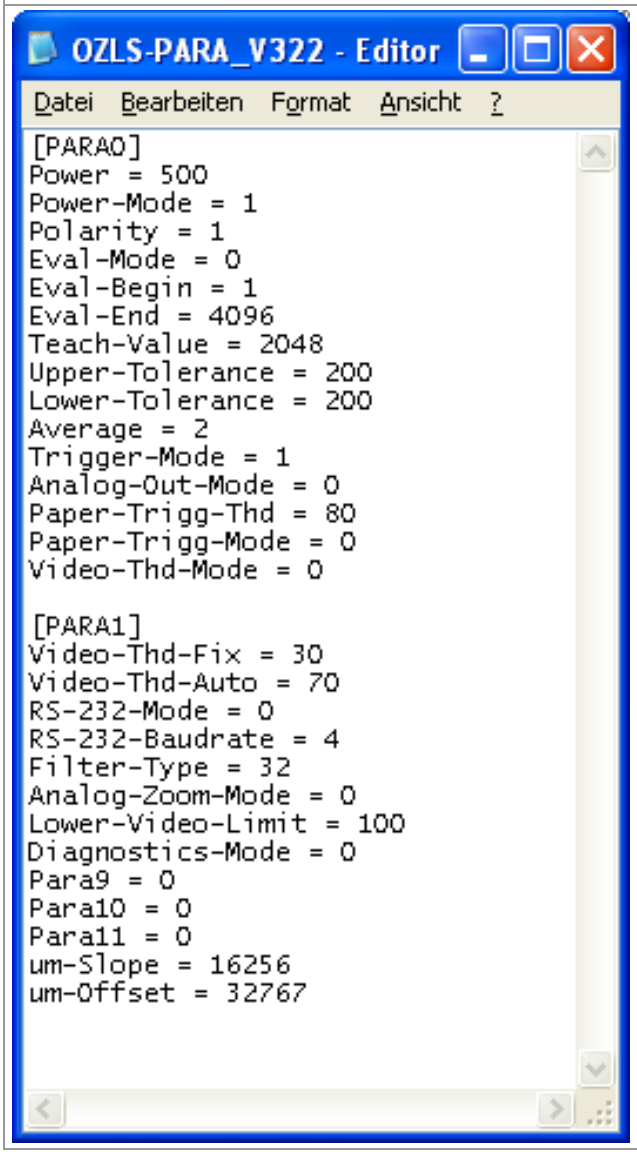
Furthermore, various numerical and graphical measured quantities can be visualized with the OZLS-Scope software.

Standard Parameters:

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

Firmware version:





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 V3.22** Part number 809072 (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)