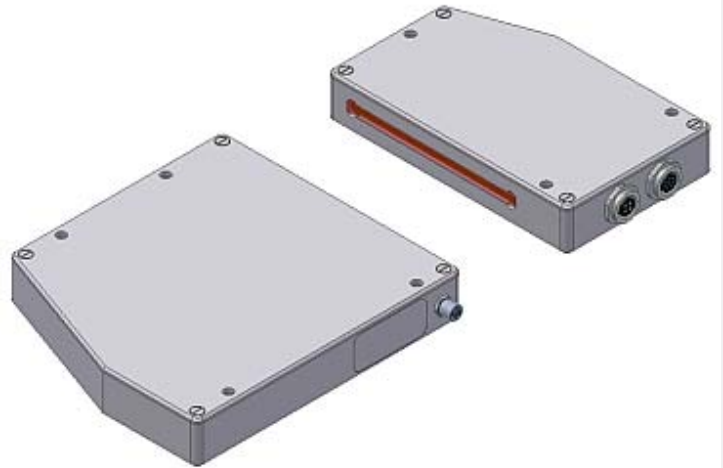


OZLS Series

► OZLS-75-EM1 (engineering model 1)

- Laser line sensor, through-beam principle, with integrated trigger sensor
- Class 2 laser transmitter (Popt. <=1mW)
- Visible laser line (red light, $\lambda=670\text{nm}$)
- Working range typ. 65 mm
- Resolution typ. 16 μm
- Working distance up to 200 mm
- Integrated interference filter
- CCD line detector with 1024 pixel (4096 subpixel)
- RS232 interface and Windows® user interface
- 1 digital input, 2 digital outputs
- 1 analog output (0 ...+10V)
- Switching state indication via two-color-LED (2x grn/red)



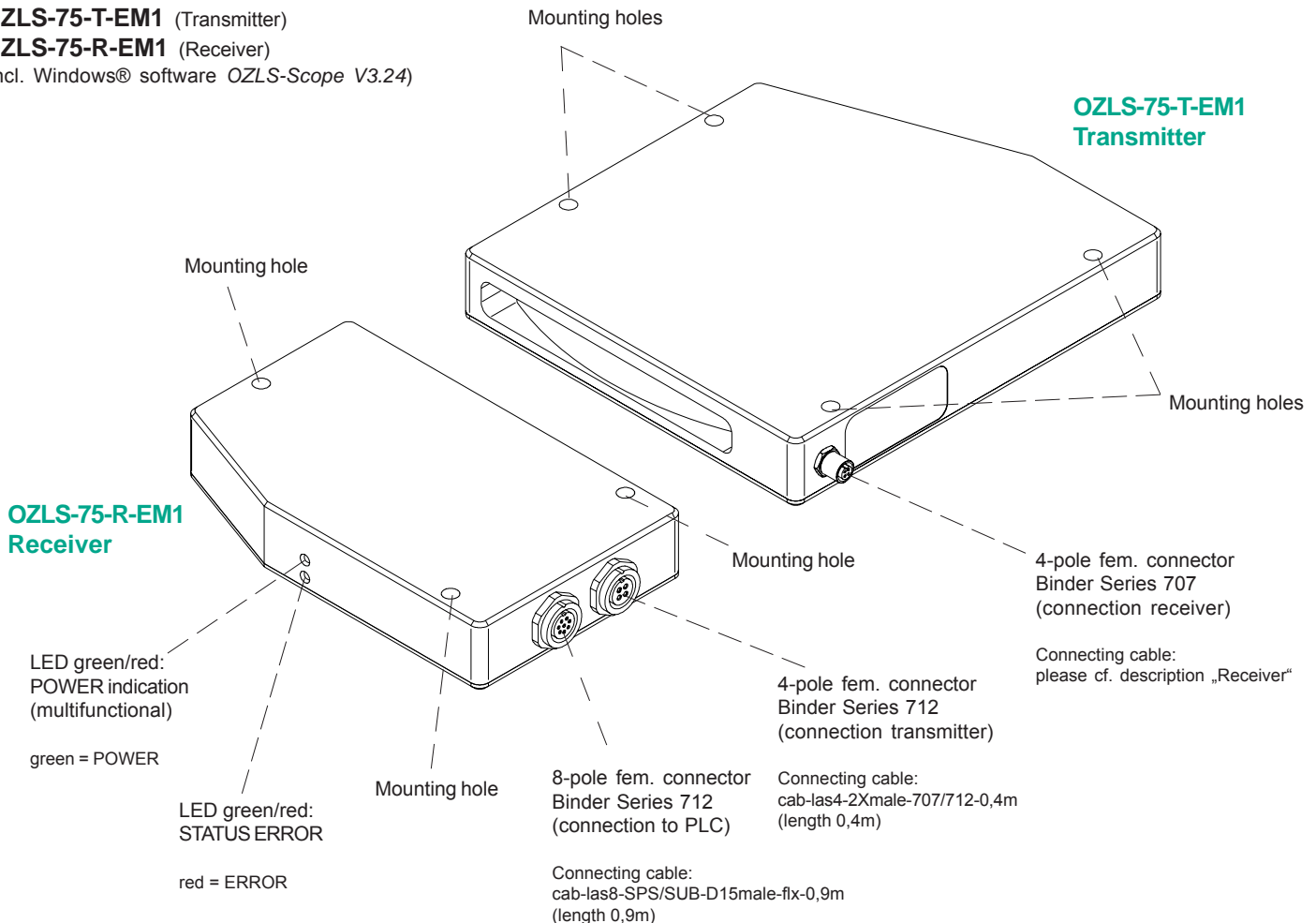
Design

Product name:

OZLS-75-T-EM1 (Transmitter)

OZLS-75-R-EM1 (Receiver)

(incl. Windows® software OZLS-Scope V3.24)



**Technical Data****Mechanical Data**

Design	CCD line sensor, trigger sensor, through-beam principle
Working range	up to 200 mm
Outer dimensions	Transmitter: L x W x H approx. 127 mm x 115 mm x 20 mm (without flange connectors) Receiver: L x W x H approx. 70 mm x 115 mm x 20 mm (without flange connectors)
Housing material	Aluminium (not anodized)
Weight	Transmitter: approx. 320 g Receiver: approx. 200 g
Connection	Transmitter: 4-pole circular fem. connector Binder Series 707 Receiver: 8-pole circular fem. connector Binder Series 712 (to PLC), 4-pole circular fem. connector Binder Series 712
Mounting of housing	Transmitter: 4 through holes, each 4,5 mm in diameter Receiver: 3 through holes, each 4,5 mm in diameter
Enclosure rating	Housing: IP64, optics: IP65
Operating temperature range	0 ... 50 °C

Optical Data Transmitter

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

Optical Data Receiver

Receiver	CCD line sensor (charge coupled device), 4096 subpixel, position of pixel 1 = 92.5 mm to reference line
Paper trigger sensor	High speed photo diode, center position = 102 mm to reference line
Measuring range	typ. 65 mm
Resolution	typ. 16 µm
Linearity	typ. 0.08% FSR (full scale range)
Optical filter	Interference filter RG645
Mechanical aperture	80 mm x 1 mm

Electrical Data

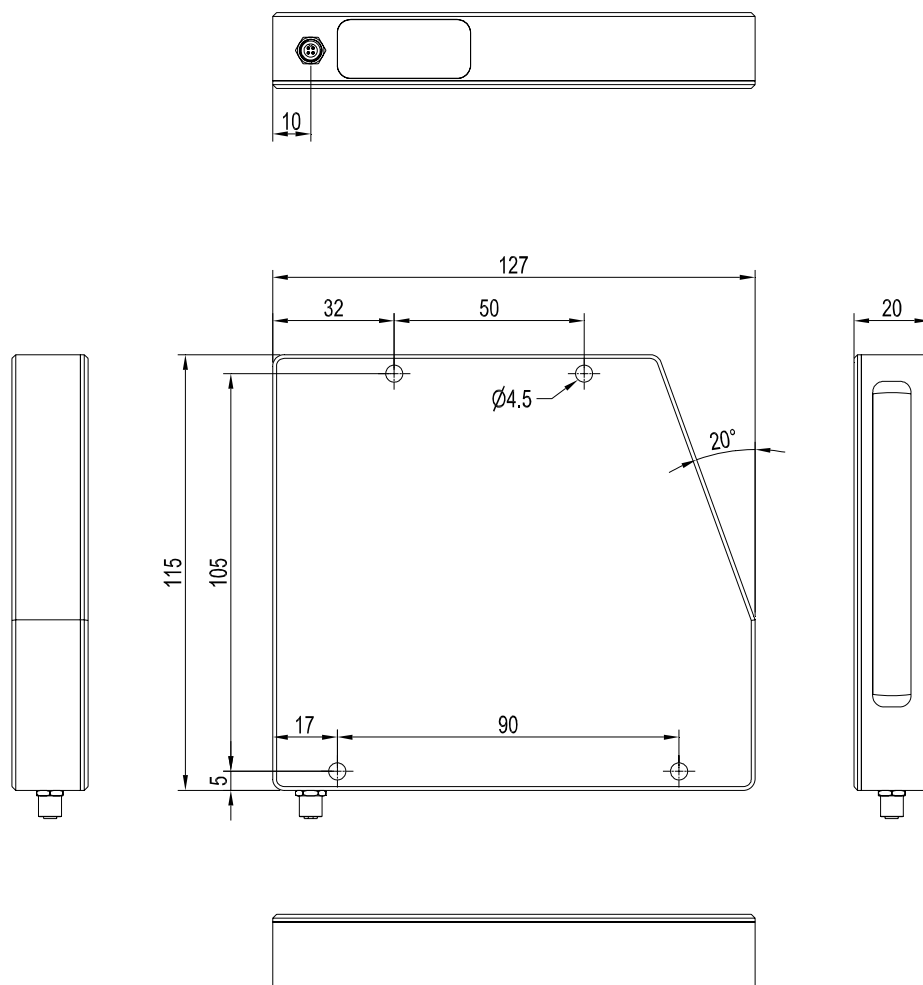
Distribution voltage	24 VDC (± 10% residual ripple), reversed polarity protected
Power consumption at unloaded outputs	approx. 2.6 W (24 VDC, 110 mA)
Indication LED for POWER	Two-color LED, green/red (LED green = POWER)
Input digital (IN0)	Trigger input, 24 VDC Input level: low ≤ 1.5 VDC high ≥ 20 VDC
Outputs digital (OUT0, OUT1)	PNP/NPN, can be switched under Windows® at PC Output level low ≤ 0.5 VDC high UB - 1 VDC
Output load (digital)	max. 100 mA, short-circuit proof
Indication LED OUTPUT	Two-color LED green/red
Output analog (ANALOG)	0 ... +10V, max. 3 mA load
Computer interface (service data)	standard RS232, 3-wire, no hardware handshake
Scan frequency	typ. 500 Hz
EMC test acc. to	DIN EN 60947-5-2





Dimensions

OZLS-75-T-EM1 (Transmitter)

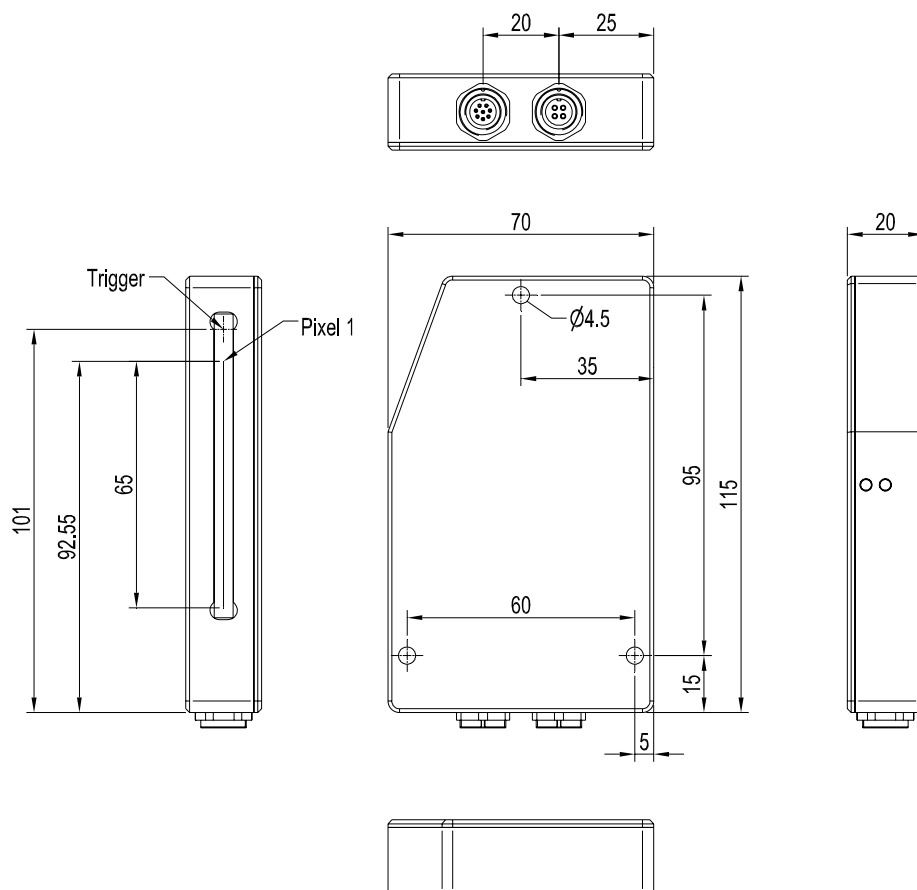


All dimensions in mm



Dimensions

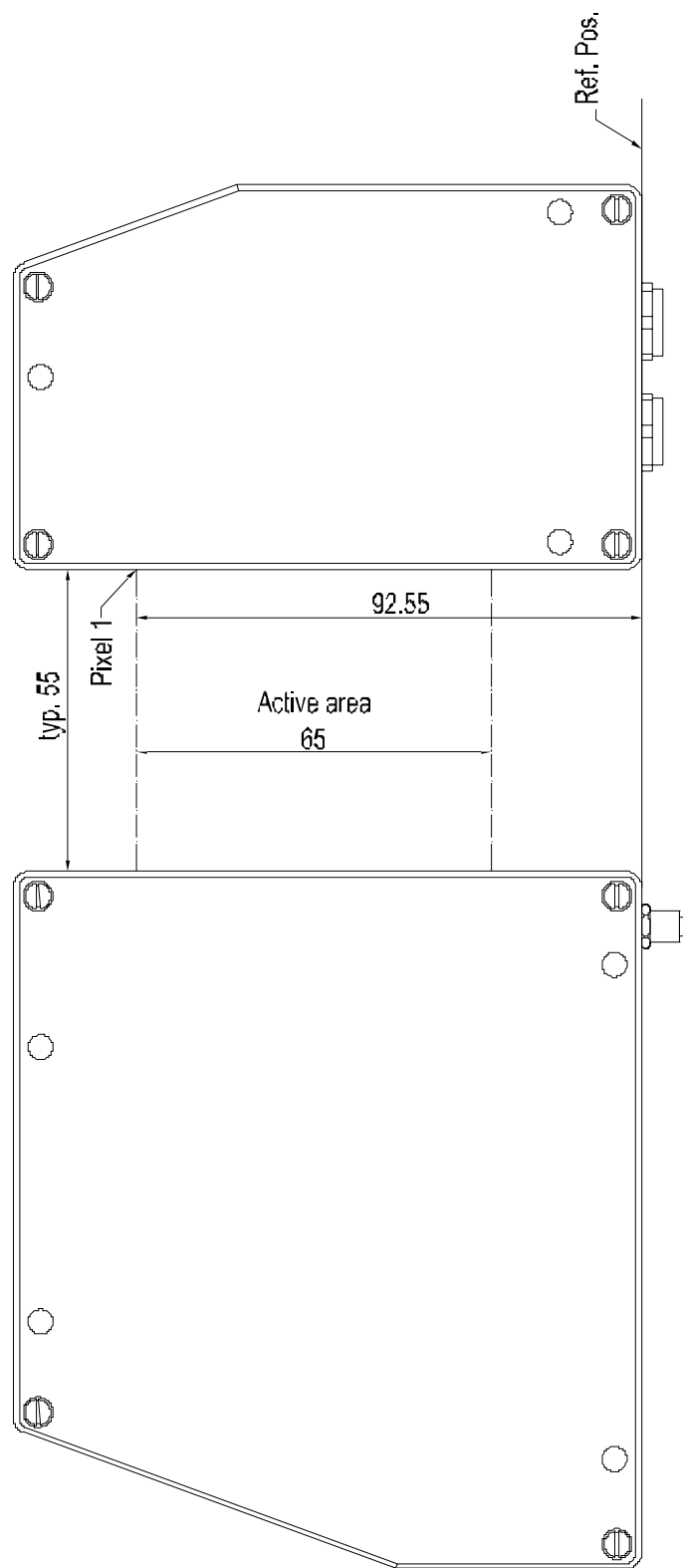
OZLS-75-R-EM1 (Receiver)



All dimensions in mm

▶

Mounting of Receiver/Transmitter - Reference Position



All dimensions in mm

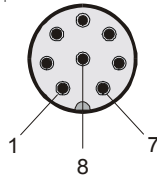


Connector Assignment and Connecting Cables

Connector assignment RECEIVER OZLS-75-R-EM1

8-pole fem. connector Binder series 712 (connection to PLC and RS232):

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 INPUT)	Digital 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	ANALOG (0 ... +10V)	Analog output (0...+10V)
9		not connected	
10		not connected	
11		not connected	
12		not connected	
13		not connected	
14		not connected	
15		not connected	



Connecting cable:
cab-las8-SPS/SUB-D15male-flx-0,9m
(suitable for use in power chains, length 0,9m)

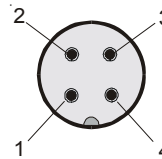
Connecting cable OZLS-75-R-EM1 to PLC/RS232:



Picture:
cab-las8-SPS/SUB-D15male-flx-0,9m
(suitable for use in power chains, length 0,9m)

4-pole fem. connector Binder series 712 (connection to transmitter OZLS-75-T-EM1):

Pin:	Belegung:	Pin function:
1	GND (0V)	Ground (0V)
2	+5VDC	Positive supply voltage
3	I-SET	Laser intensity control (0...+5VDC)
4	not connected	

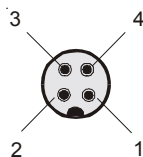


Connecting cable:
cab-las4-2Xmale-707/712-0,4m
(length 0,4m)

Connector assignment TRANSMITTER OZLS-75-T-EM1:

4-pole fem. connector Binder series 707 (connection to receiver OZLS-75-R-EM1):

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...+5V)



Connecting cable:
cf. description above
(connector assignment receiver
OZLS-75-R-EM1)

Connecting cable: Transmitter OZLS-75-T-EM1
and receiver OZLS-75-R-EM1:



Picture:
cab-las4-2Xmale-707/712-0,4m
(length 0,4m)

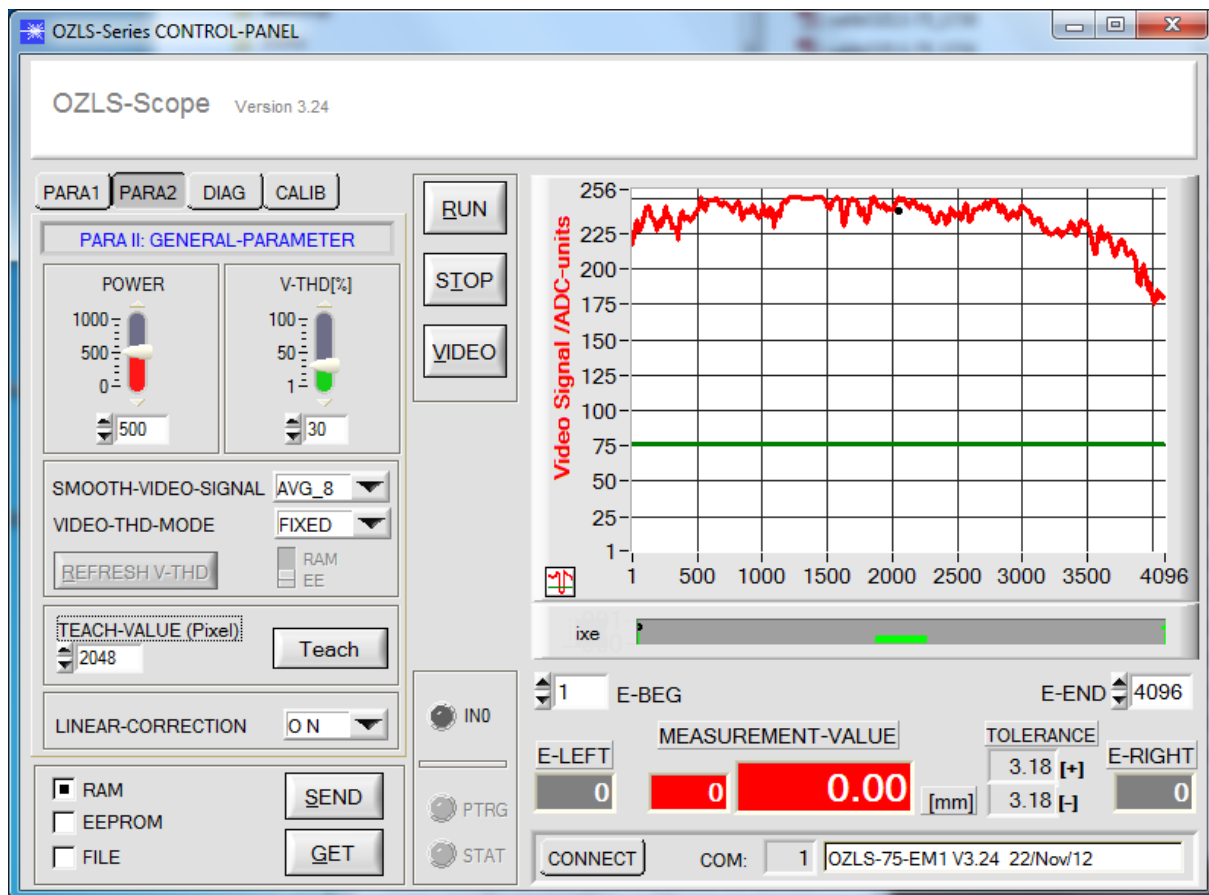


Parameterization

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).

Windows® user interface:



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

- Setting of laser power
- Polarity of digital outputs
- Different evaluation modes
- Setting of tolerance ranges for monitoring the measured value

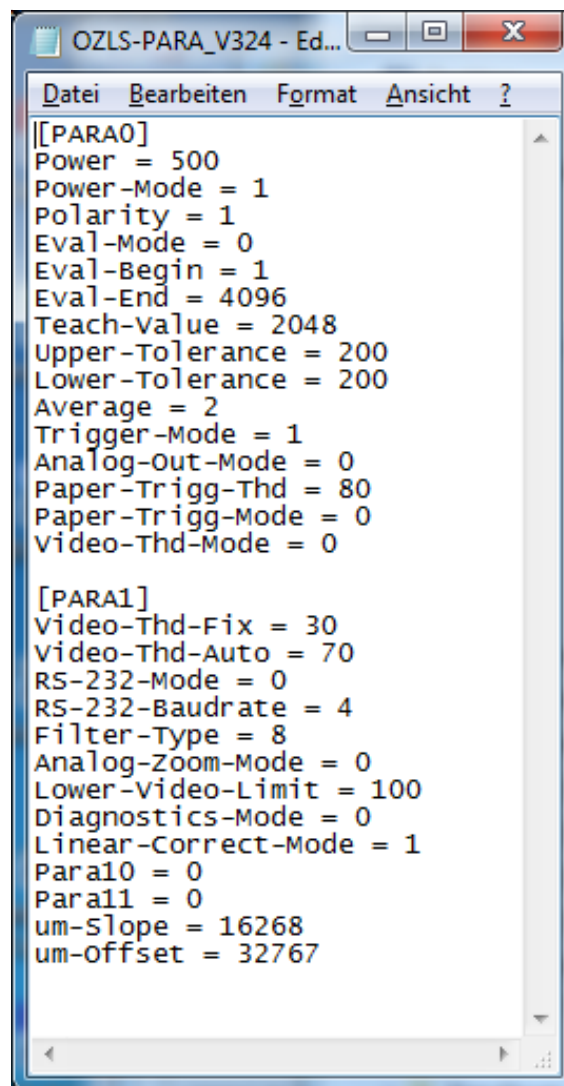
Furthermore, various numerical and graphical measured quantities can be visualized with the OZLS-Scope software. For example, the raw data of the CCD line sensor can be displayed graphically and numerically.

**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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**Laser Warning**

The laser line sensors of OZLS Series comply with laser class 2 according to EN 60825-1. The use of these laser transmitters therefore requires no additional protective measures.

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



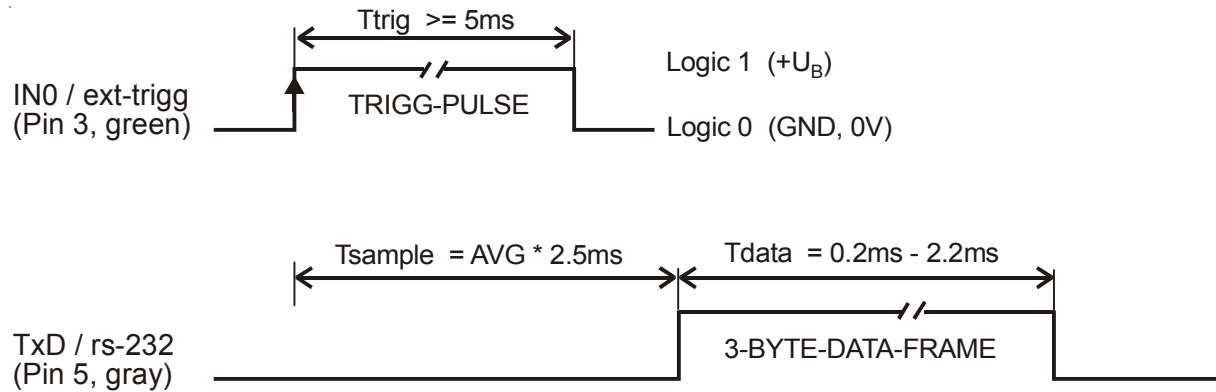
LASER RADIATION
DO NOT STARE INTO THE BEAM
CLASS II LASER PRODUCT



Timing

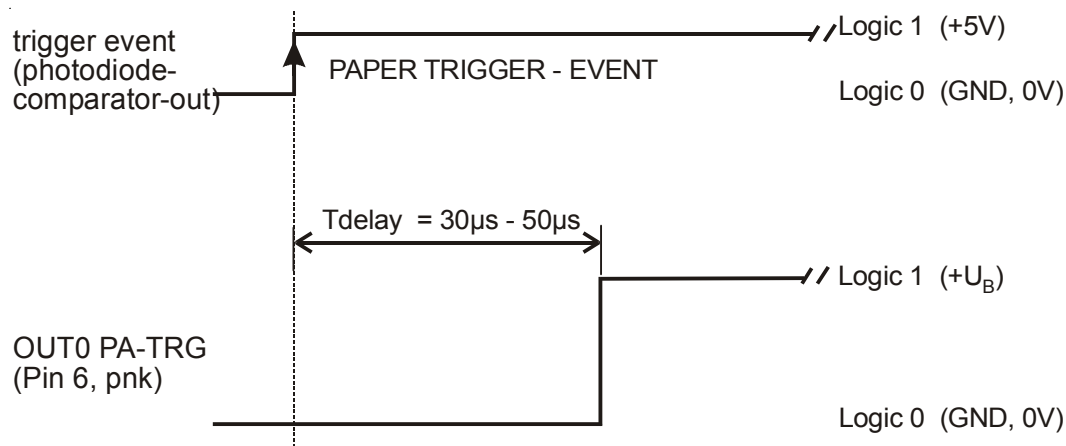
Input/Output Timing (3-byte-transfer):

Ttrig:	Trigger pulse length $T_{trig} \geq 5\text{ms}$, pos. edge sensitive
Tsample:	Time delay trigger-pulse to 3-byte data output, $T_{sample} = \text{AVG} \cdot 2.5\text{ms}$. 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 500Hz the interval between two scans = 2.5ms.
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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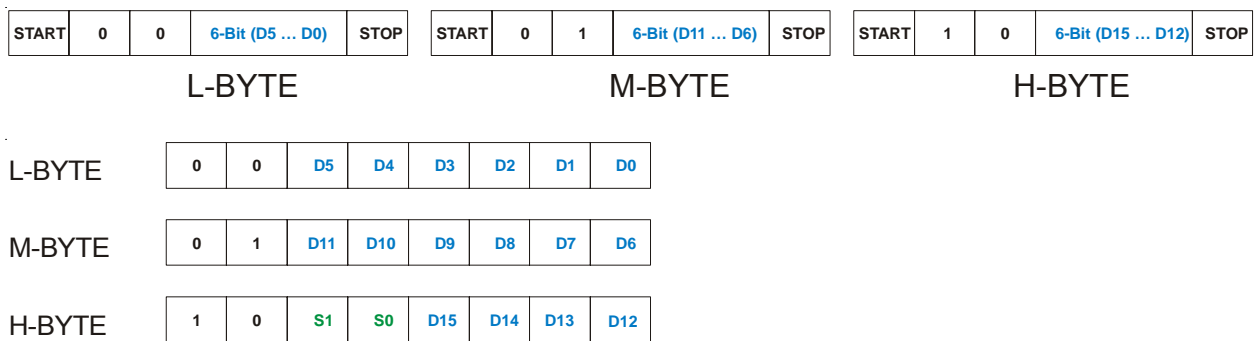


RS232 Transfer

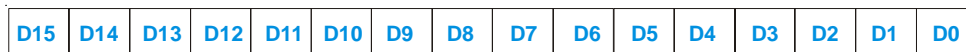
3-byte RS232 measurement data transfer:

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 deduced from Low-Byte , Middle-Byte and High-Byte:

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 measuring-section at pixel

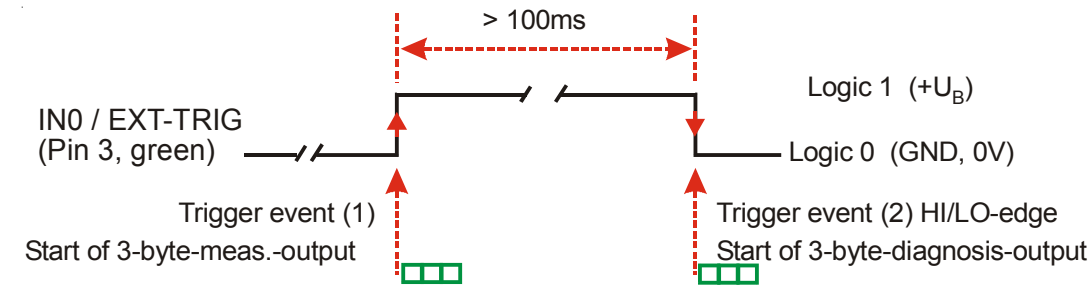
Digital-value = 2+4+8+16+32 + 64+128+256+512+1024+2048=4094
(ccd sensor fully covered)

▶

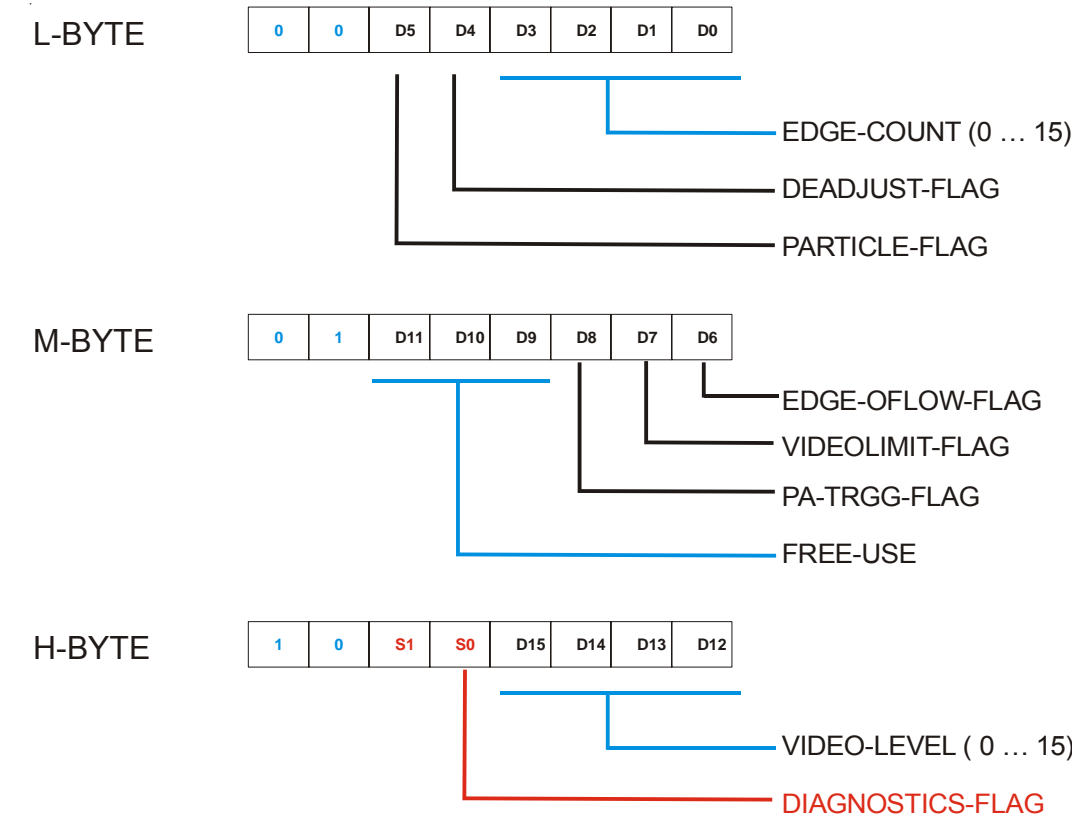
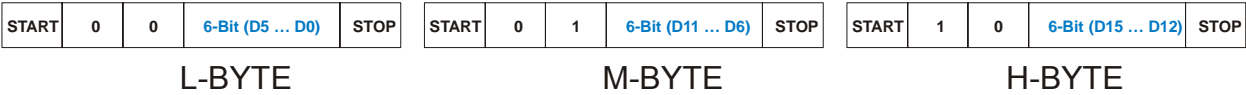
RS232 Transfer

3-byte RS232 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:





Part List

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;
user manual)



Part number
8050.1106



Part number
809073

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

Part number 8050.1105
(line sensor transmitter)



Part number
8050.1105

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

Part number 8080.7049
(connecting cable, l=0.9m)



Part number
8080.7049

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

Part number 8080.7047
(connecting cable, l=0.4m)



Part number
8080.7047