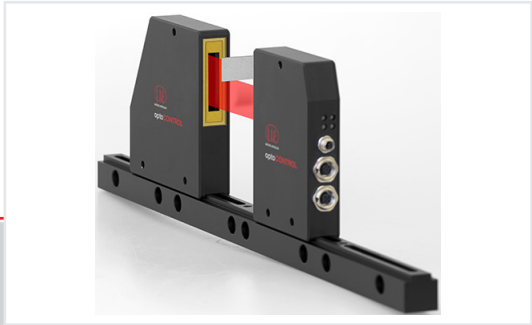
MICRO-EPSILON



Instruction Manual

optoCONTROL 1220

optoCONTROL 1220-28

Non-contact laser micrometer

MICRO-EPSILON Eltrotec GmbH
Manfred-Wörner-Straße 101

73037 Göppingen / Germany

Tel. +49 (0) 7161 / 98872-300
Fax +49 (0) 7161 / 98872-303
eltrotec@micro-epsilon.de
www.micro-epsilon.com

Certified acc. to DIN EN ISO 9001: 2008

Contents

1. Safety 5
1.1 Symbols Used 5
1.2 Warnings 5
1.3 Notes on CE Identification 6
1.4 Proper Use 7
1.5 Proper Environment 7

2. Laser Class 8

3. Functional Principle, Technical Data 10
3.1 Functional Principle 10
3.2 Technical Data 12

4. Delivery 14
4.1 Unpacking 14
4.2 Storage 14

5. Installation and Mounting 15
5.1 Sensor Mounting 15
5.2 Electrical Connections 18
Power Supply, Inputs and Outputs 20
Serial Interface 22

6. Operation 23
6.1 Control and Display Elements 23
6.2 Evaluation Mode 24
6.3 Analog Output 25
6.4 Limit Monitoring, Digital Outputs 26
6.5 External Triggering, IN0 27
6.6 RESET Function, IN1 28
6.7 TEACH Function, IN1 28
6.8 Software Tool 29
6.9 Sensor Mounting with Video Signal 30

7. Calibration 31
8. Warranty 31
9. Service, Repair 32
10. Decommissioning, Disposal 32
11. Optional Accessories 33
12. Factory Setting 33

1. Safety

The handling of the system assumes knowledge of the instruction manual.

1.1 Symbols Used

The following symbols are used in the instruction manual.

⚠ CAUTION	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injuries.
NOTICE	Indicates a situation which, if not avoided, may lead to property damage.
➡	Indicates a user action.
i	Indicates a user tip.

1.2 Warnings

⚠ CAUTION

Connect the power supply and the display / output device in accordance with the safety regulations for electrical equipment.
> Danger of injury

> Damage to or destruction of the transmitter/receiver

NOTICE

Avoid shock and vibration to the sensor and controller.
> Damage to or destruction of the transmitter/receiver

The power supply must not exceed the specified limits.
> Damage to or destruction of the transmitter/receiver

Protect the connection cable against damage
> Damage to or destruction of the transmitter/receiver

Avoid damage (scratches) to the protective windows of the transmitter and receiver through unsuitable cleaning methods or cleaning solvents.
> Inaccurate, erroneous measuring values

Do not touch the protective windows of the laser and receiver with the fingers. Wipe off any fingerprints immediately.
> Inaccurate, erroneous measuring values

Avoid permanent action of dust or splashed water on the measurement channel. Use protective housings.
> Damage to or destruction of the transmitter/receiver

1.3 Notes on CE Identification

The following applies to the optoCONTROL 1220:
- EU directive 2014/30/EU
- EU directive 2011/65/EU, “RoHS” category 9

Products which carry the CE mark satisfy the requirements of the quoted EU directives and the European standards (EN) listed therein. The EC declaration of conformity is kept available according to EC regulation, article 10 by the authorities responsible at

MICRO-EPSILON Eltrotec GmbH
Manfred-Wörner-Straße 101
73037 Göppingen / Germany

The measuring system is designed for use in industry and satisfies the requirements.

1.4 Proper Use

- The optoCONTROL 1220 is designed for use in industrial area.
- It is used
  - for edge acquisition, width or diameter measurement, position acquisition of components or machine parts.
  - for measuring and testing problems in the process quality control.
- The measuring system may only be operated within the limits specified in the technical data, see Chap. 3.2.
- Use it in such a way that with malfunctions or total failure of the sensor, persons are not endangered and machines are not damaged.
- Take additional precautions for safety and for damage prevention with safety-related applications.

1.5 Proper Environment

- Protection class
  - Electronics: IP 54
  - Optics: IP 67
- Operating temperature: -10 to +50 °C (+14 to +122 °F)
- Storage temperature: -20 to +85 °C (-4 to 185 °F)
- Humidity: 5 - 95 % (non-condensing)
- Ambient pressure: Atmospheric pressure

2. Laser Class

The optoCONTROL 1220 sensor operates with a semiconductor laser with a wavelength of 670 nm (visible/red). The maximum optical output is ≤ 0.39 mW. The sensors are classified in Laser Class 1 (Class I).

The accessible radiation is harmless under predictable conditions.

The following warning labels are attached to both sides of the cover of the sensor housing:

IEC label

Impairment of color vision and inconvenience may not excluded for class 1 laser devices, e. g. through glare.

Consequently, you can use Class 1 laser equipment without further protective measures.

Class 1 lasers are not subject to registration and a laser protection officer is not required.

The laser warning label for Germany is included in delivery. The version applicable to the user's country must be applied before the equipment is used for the first time.

If both information labels are hidden in the installed state, the user must ensure that additional labels are fitted at the point of installation.

i The housing of the transmitter and receiver may only be opened by the manufacturer! For repair and service purposes the sensors must always be sent to the manufacturer!

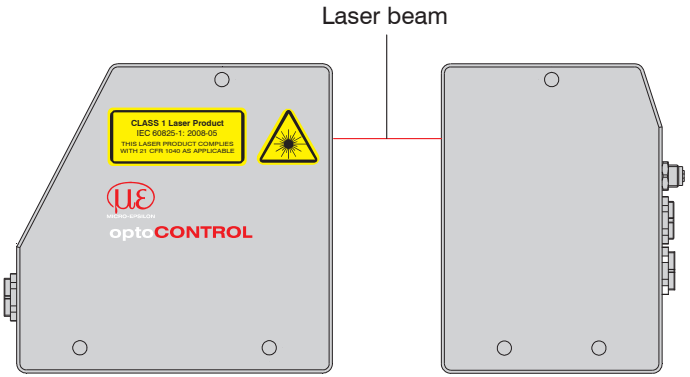


Fig. 1 True reproduction of the sensor with its actual location of the warning labels, view on top side.

3. Functional Principle, Technical Data

3.1 Functional Principle

In the laser line sensors of the optoCONTROL series 1220 the laser beam is emitted from the optical transmitter unit as a laser line, that is as a parallel laser light with homogeneous light distribution, through suitable collimators and apertures. In the optical receiver unit the laser line impinges on a CCD line receiver. This CCD line comprises many closely adjacent individual receiver elements (pixels) that are arranged in a line. The light quantity of each of these receiver elements that is collected during the integration time can be separately read out as an analog voltage. After performing analog-digital conversion, it is stored in a data field as a digital value.

When there is a non-transparent measuring object in the laser line, the parallel laser light only illuminates those receiver elements (pixels) of the line that lies outside the shadow zone of the measuring object. As a result the pixels within the shadow zone give off a considerably lower analog voltage compared to the illuminated pixels. With suitable software algorithms the areas of the shadow zones can be determined from the previously stored data field. Since the distance of the pixels on the CCD line is known, the size and position of the measuring object can therefore be determined.

The micro-controller of the ODC 1220 sensors can be parameterized through the serial RS232 interface by means of a Windows PC software:

- Setting the evaluation mode
- Setting the output polarity of the two digital outputs [1] (OUT0, OUT1)

The housing of the sensor features a TEACH/RESET button [2] and a potentiometer for tolerance setting. Switching states are visualized by means of 4 LEDs which are integrated in the housing of the receiver.

Two digital inputs (IN0, IN1) enable an external TEACH/RESET functionality and an external TRIGGER functionality through a PLC.

In addition the receiver features a high-speed analog output (0 ... +10 V) with 12-bit digital/analog resolution.

1) ODC1220 series has two digital outputs (OUT0, OUT1)
2) not available for ODC1220 series

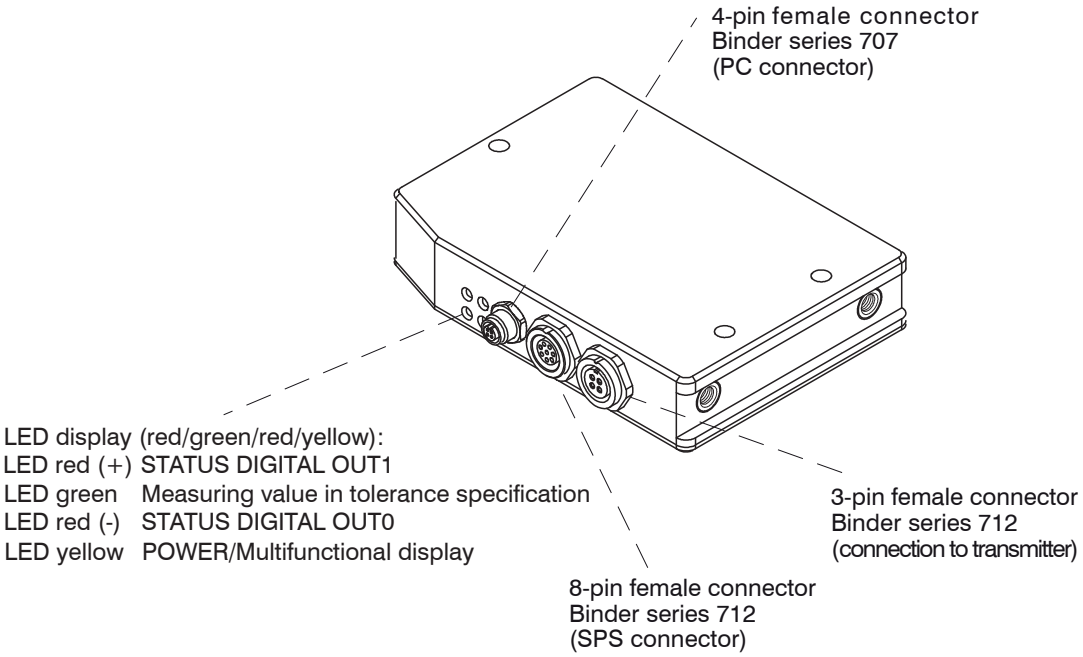


Fig. 2 Laser micrometer, series optoCONTROL 1220

3.2 Technical Data

Model	ODC1220-28
Laser	semiconductor laser, 670 nm, DC operation, ≤ 0.39 mW max. optical power, laser class 1 [3] the use therefore requires no additional protective measures.
Operating distance	distance transmitter - receiver up to 2000 mm
Measuring range	typ. 28 mm
Resolution	typ. 2 µm
Repeatability [1]	typ. ±4 µm
Linearity [2]	Typ. ±0.08 % of full scale (FSR) [typ. ±22 µm]
Measuring rate	max. 200 Hz
Optical filter	interference filter RG645 / polarization filter
Analog output (ANA)	1x voltage output 0 ... +10 V (scalable)
Digital outputs (OUT0, OUT1)	OUT0: (-) measuring value < lower tolerance threshold; OUT1: (+) measuring value > upper tolerance threshold pnp-bright-switching/npn-dark-switching or pnp-dark-switching/npn-bright-switching, adjustable using Windows®, 100 mA, short-circuit proof
Digital inputs (IN0, IN1)	IN0: external trigger, IN1: teach/reset (double function); input voltage +Ub/0V, with protective circuit
Power supply	+24 VDC (± 10 %); typ. 200 mA
Sensitivity adjustment	using Windows® via PC
Laser adjustment	adjustable under Windows® via PC
Protection class	electronics: IP 54, optics: IP 67
Operating temperature	-10 to +50 °C (+14 to +122 °F)

Model	ODC1220-28
Storage temperature	-20 to +85 °C (-4 to 185 °F)
Housing material	aluminum, anodized in black
Connector receiver	8-pin. female connector type Binder series 712 (PLC/Power) 4-pin. M5 female connector type Binder series 707 (RS232/PC) 4-pin. female connector type Binder 712 (connection to the transmitter)
Connector transmitter	4-pin. female connector type Binder 712 (connection to the receiver)
LED displays	LED red (+): measuring value > upper tolerance threshold; LED green: measuring value lies with tolerance threshold LED red (-): measuring value < lower tolerance threshold; LED yellow: Power-LED (multifunction)
Max. switching current	100 mA, short-circuit proof
Interface	measuring values via RS232, parametrizable via Windows using the ODC1220 tool (included in delivery)
Connection cable	connection to PC: SCD1202 (RS232) or SCD12xx (USB version incl. driver) power and connection to PLC: SCA1202 connection cable transmitter/receiver: CE1220
Mounting rail	ODC1220-L220/L420/L620 (max. distance transmitter/ receiver ≤ 220/420/620 mm)
Output polarity	bright/dark switching, adjustable using Windows®

All specifications are measured at a constant temperature of 20 °C after a warm-up time of 30 minutes.

1) Valid for ΔT≤5°C and ambient leight 5000lx. For stable measurement shadowing of the receiver is advisable. Smooth video AVG 64 values.
2) Is only valid with the adaption of the THD threshold and the laser performance as well as the execution of an calibration; 20mm target-receiver distance; 250mm transmitter-receiver distance
3) Laser class 1 according to DIN EN 60825-1: 2008-05

4. Delivery

4.1 Unpacking

➡ Check for completeness and shipping damage immediately after unpacking.

The delivery includes:

1 transmitter ODC1220-T
1 receiver ODC1220-R
1 product CD
1 instruction manual
1 software manual

In case of damage or missing parts, please contact MICRO-EPSILON Eltrotec or the supplier.

4.2 Storage

- Storage temperature: -20 to +85 °C (-4 to +185 °F)
- Humidity: 5 - 95 % (non-condensing)

5. Installation and Mounting

The measurement system optoCONTROL 1220 is an optical system for measurements with µm accuracy.

Make sure it is handled carefully when installing and operating.

5.1 Sensor Mounting

NOTICE

Mount the sensor only to the existing holes on a flat surface. Clamps of any kind are not permitted.

> Inaccurate, erroneous measuring values

Mount the transmitter and receiver above every the three through holes (dia. 4.5) or above every the two tapped blind holes M5.

	Bolt connection			
Housing	**Push through length**	**Screw**	**Washer**	**Tightening torque per screw**
		ISO 4762 - A2	ISO 7089 - A2	$\mu = 0.12$
	mm			Nm
ODC1220-28-T	20	M4	A4.3	2
ODC1220-28-R	20	M4	A4.3	2

	Direct fastening			
Housing	**Screw-in depth**		**Screw**	**Tightening torque per screw**
	Minimum	Maximum	ISO 4762 - A2	μ = 0.12
	mm	mm		Nm
ODC1220-28-T		5 [1]	M5	4
ODC1220-28-R		5 [1]	M5	4

1) Screw-in depth (sustaining thread length 2.6)

Recommended tightening torque -> max. +10 % valid, min. -20 % do not fall below

The tightening torques named in the table are recommended values and can vary according to each case of application. Basis of consideration: μ =0.12

- Pay attention to the exact alignment of the housing edges with respect to each other when mounting the transmitter and receiver freely. The housing edges must lie within one plane.
- Use a try square or other suitable aids for alignment of transmitter and receiver.
- Pay attention on the alignment of target for avoiding measurement inaccuracies, see Fig. 3.

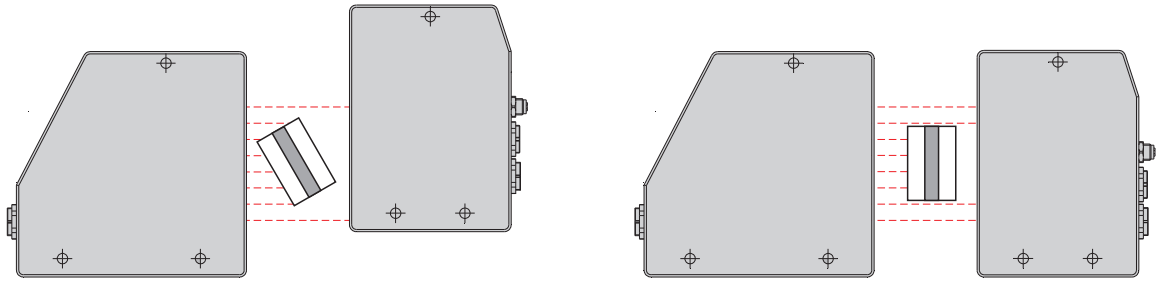


Fig. 3 Measurement inaccuracy at tilted targets

➡ Do not touch the optical windows. Contamination on the optical windows impairs correct functioning.

The optional available mounting rail for fixing of transmitter and receiver allows operating distances up to 2,000 mm.

➡ Fix the mounting rail so that it is not bended respectively twisted.

i Minimum distance between transmitter and receiver: 20 mm.
Maximum distance between transmitter and receiver: 2,000 mm

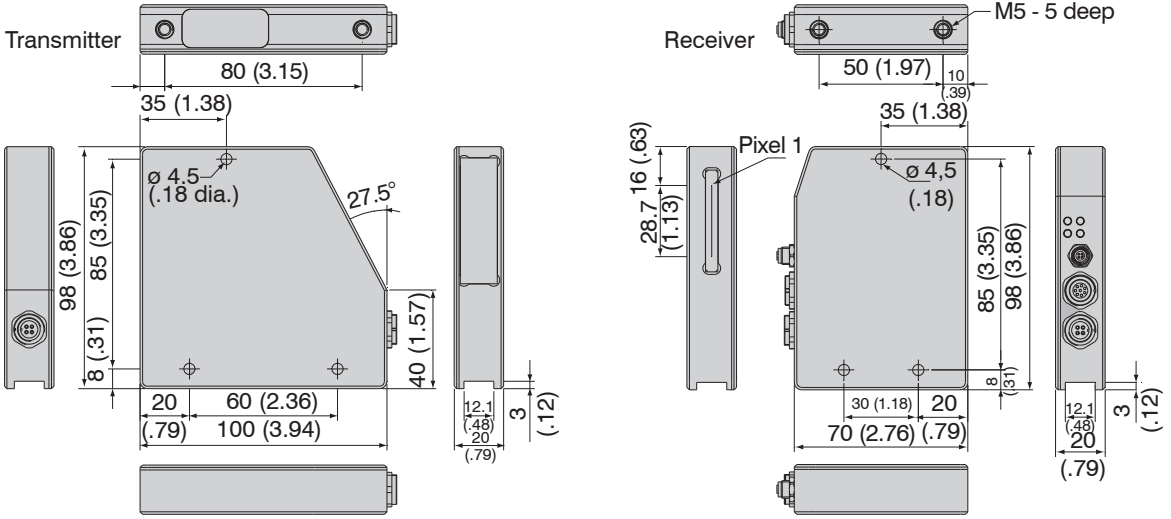


Fig. 4 Dimensional drawing optoCONTROL 1220-28, dimensions in mm (inches), not to scale

5.2 Electrical Connections

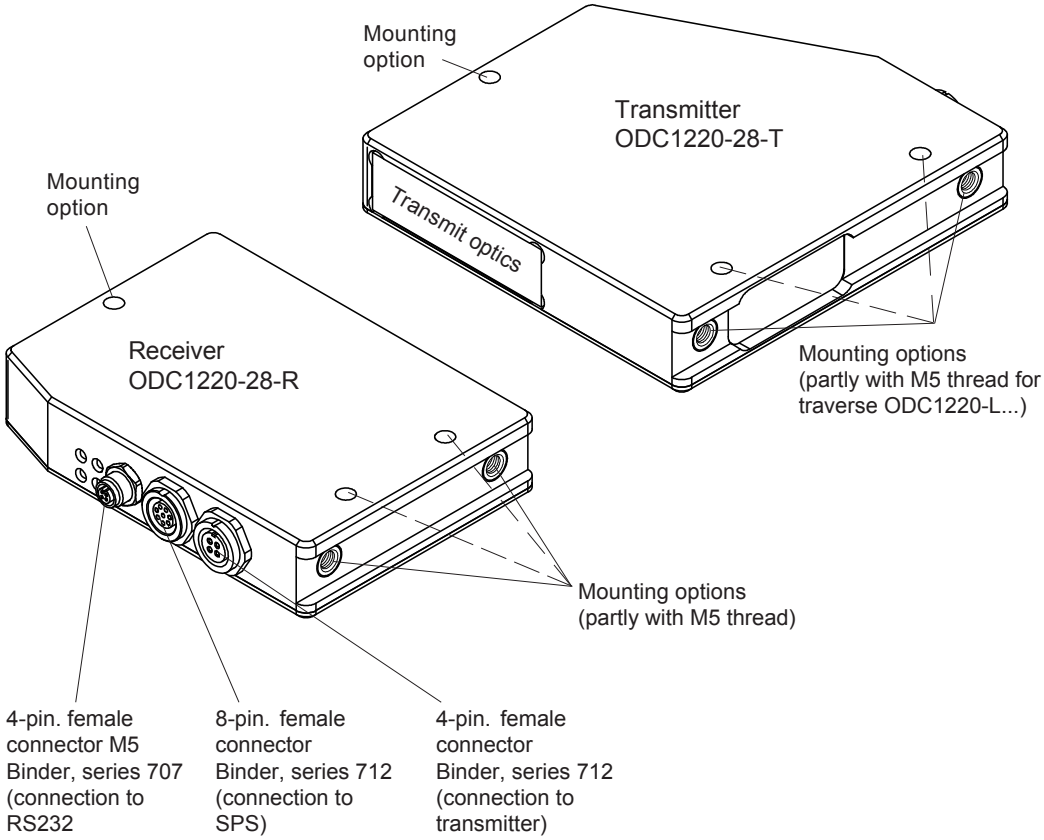


Fig. 5 Electrical connections of transmitter and receiver

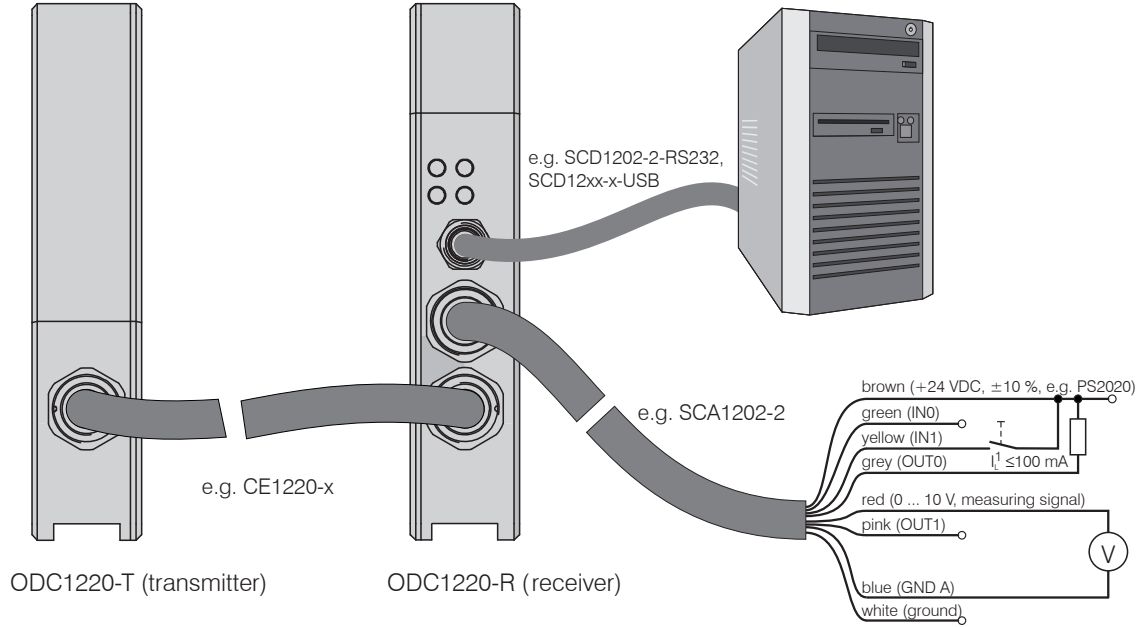


Fig. 6 Typical wiring of transmitter and receiver, control the digital input IN1 and the digital output OUT0

Bending radii cables:
SCD1202-x / SCA1202-x / CE1220-x: minimal 80 mm flexible or 53 mm fixed.

1) High side/low side switch. Drives the load in direction to power supply or to ground.

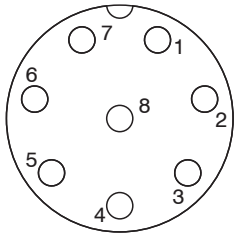
Power Supply, Inputs and Outputs

The connections of power supply, inputs and outputs are effected via a 8-pin cable connector, Binder, series 712. As a matching part you require an adequate cable connector.

Different converted cables with open ends are optionally available.

The optional available power supply-/output cables SCA1202-x feature following bending radii:
- 80 mm (flexible)
- 53 mm (fixed),

Pin	Assignment	Color SCA1202-x
1	Ground (0 V)	white
2	Power supply +24 VDC, ±10 %	brown
3	INO (external trigger)	green
4	IN1 (Teach/Reset)	yellow
5	OUT0 (-) UT	grey
6	OUT1 (+) OT	pink
7	GND 0V ANA	blue
8	Analog output (0 ... 10 V)	red



View on solder pin side male cable connector

Fig. 7 Pin and color assignment for 8-pin. male connector and output cable SCA1202-x

External Triggering, IN0

When a HIGH-pulse is applied at the digital input INO, the external triggering (measuring value output) is set at the hardware. The max. trigger speed is 5 ms.

RESET-Function, IN1

When a HIGH-pulse of less than 750 ms duration is applied, the RESET function is performed at the receiver. This resets the current maximum and minimum values.

TEACH-Function, IN1

When a HIGH-pulse of more than 1.5 s duration is applied, the TEACH function is performed at the receiver.

Digital outputs OUT0, OUT1

Characteristics:

- High side/low side switch
- HIGH = +Ub (24 VDC)
- LOW = 0 V
- max. 0.1 A, short circuit proof

The polarity of the digital outputs can only be changed via the parameter “POLARITY“ in the software tool:

- POLARITY > DIRECT: Activated digital output is on +UB (+24 VDC),
- POLARITY > INVERSE: Activated digital output is on 0 V.

Serial Interface

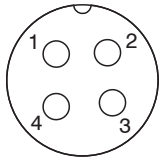
Characteristics:
- 3-line-connection: GND, TXD, RXD
- Speed: 19200 Baud
- 8 Data bits, no parity, 1 stop bit, binary, MSB first

The connection of the serial interface is effected via a 4-pin cable connector, series 707 Binder. As matching part you require an adequate cable connector.

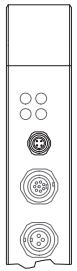
Different converted cables are optionally available.

The optional available interface cables SCD1202-x-RS232 feature following bending radii:
- 80 mm (flexible)
- 53 mm (fixed)

Pin 4-pin.	Assignment
1	Power supply
2	Ground (0 V)
3	TxD
4	RxD



View on solder-pin side male cable connector



Pin 9-pin. Sub-D

5
2
3

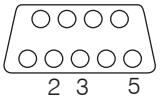


Fig. 8 Pin assignment for 4-pin. male connector respectively SCD1202-x-RS232 for connection to a PC

6. Operation

- Insulate all, not required cable ends at the power supply- and output cable before switching-on of the supply voltage. Therewith you avoid short circuits.
- Connect the cable connections according to the designated use.
- Check the screw connections at transmitter and receiver on attached hub.
- Switch on the supply voltage for the sensor. The yellow LED at the receiver flashes.
- Parameterize the sensor via the RS232/USB interface.

6.1 Control and Display Elements

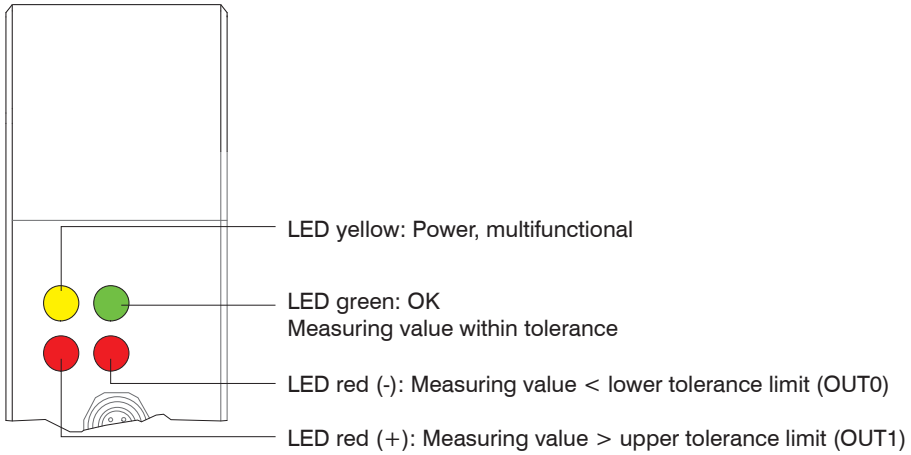


Fig. 9 Control and display elements at the receiver

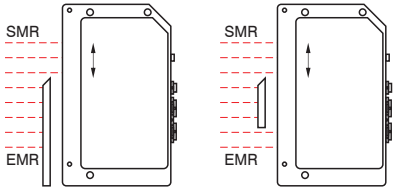
There are no display elements located at the transmitter. The selection of mode, the video threshold et cetera is effected with the software tool exclusively.

6.2 Evaluation Mode

The optoCONTROL is delivered with the mode L-EDGE factory-made. You can change the mode only via the software tool.

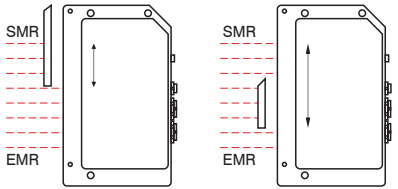
L-EDGE:

The first detected edge in the intensity profile of the CCD line is evaluated.



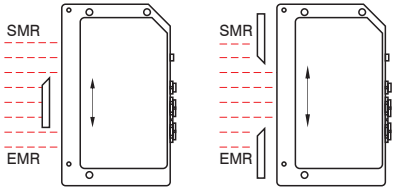
R-EDGE:

The first detected edge in the intensity profile of the CCD line is evaluated.



WIDTH:

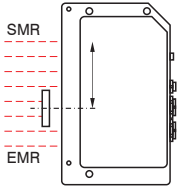
The difference between the last edge and the first edge (for width and gap) in the intensity profile of the CCD is evaluated.



CENTER:

The mean value of the first and second edge is used as measurement value:

CENTER = (R-EDGE+L-EDGE)/2



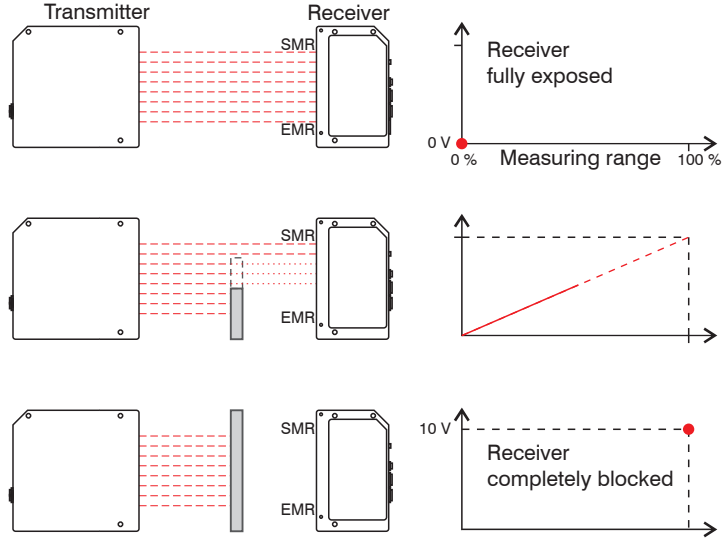
6.3 Analog Output

Characteristics: Voltage output
- 0 V ... 10 V, max. 3 mA
- Resolution: 12-bit DA converter

Computation of a value:

$x\ [mm] = \frac{U_{OUT} * MR}{10\ V}$	Output signal U_{OUT} = 100 % measuring signal; MR = Measuring range	Example: U_{OUT} = 4.6 V Measuring range = 28.6 mm Value = 13.16 mm

Consider a possible offset!



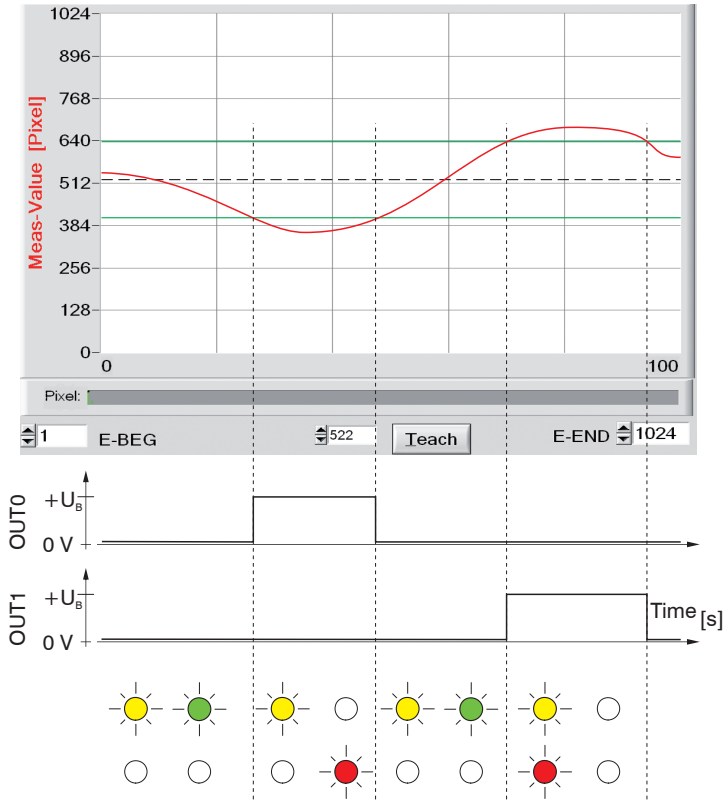
The system outputs 0 V if no object blocks any light and the receiver is fully exposed.

As the light for the receiver increases the output voltage linearly.

If the light curtain is fully covered by a target the receiver outputs a signal of 10 V.

Fig. 10 Analog signal bahavior with different target positions

6.4 Limit Monitoring, Digital Outputs



If the receiver detects a signal below the tolerance limit for example, the according digital output is set. Also LED‘s on the receiver indicate the states of digital outputs.

Thereto a measuring window must be parameterized. The setup is effected via the software tool

- “Teach“ and
- “TOLERANCE-VALUE“, see software description.

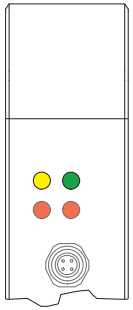


Fig. 11 Switching behavior of the digital outputs, output polarity (POLARITY) = DIRECT

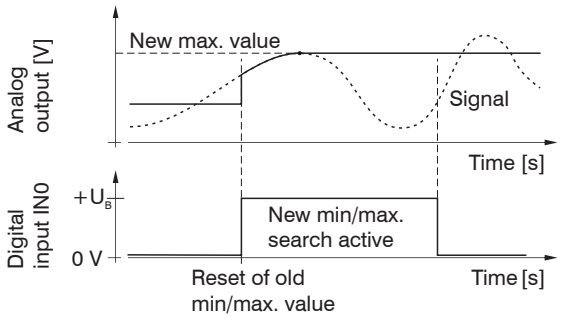
6.5 External Triggering, IN0

When a HIGH-pulse at digital input INO is applied the external triggering at the hardware is activated.

i The trigger mode is only possible in the both trigger modes “EXT. IN0 L/H“ and “EXT. IN0 HIGH“, see the software description.

Depending on the adjusted analog output mode the analog outputs and digital outputs are only updated, if the trigger requirement is performed.

The receiver electronics resets the MAX/MIN value on INO with the new LOW/HIGH edge. During the HIGH-pulse at IN0 (window) the MAX-MIN search to the drag indicator principle is active. The respectively actual MAX/MIN value is inside this window output at pin 8/red. If the HIGH-pulse is reset on IN0, the during the window detected MAX/MIN value persists on the analog output. First the next LOW/HIGH edge of the thereon following window resets the analog value.



Within the MAX/MIN search the analog output can be reset
- by pressing the RESET key
- or a pulse at input IN1 (t < 750 m)

Fig. 12 Function of external triggering

The example, see Fig. 12, requires a TRIG-MODE “EXT. INO HIGH“ (trigger mode) and a ANA-OUT “MAXI-MA“ (Analog Output Mode).
The trigger mode EXT IN0 L/H provides the actual measuring value with the rising edge at analog output.

6.6 RESET Function, IN1

When a HIGH-pulse of less than 750 ms duration is applied at input IN1, see Fig. 13, the RESET function is performed at the receiver. This resets the current maximum and minimum values. If the receiver detects a RESET pulse, the yellow LED at the housing of the receiver blinks shortly one time, see Fig. 14.

6.7 TEACH Function, IN1

When a HIGH-pulse of more than 1.5 s duration is applied at Input IN1, see Fig. 13, the TEACH function is performed at the receiver. If the receiver detects a TEACH pulse, the yellow LED at the housing of the receiver shortly blinks three times.

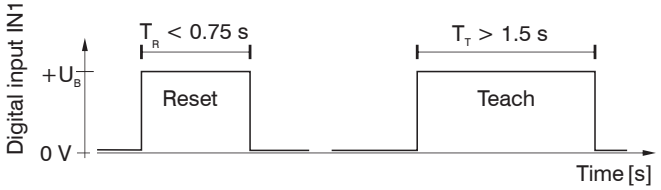


Fig. 13 Pulse duration at digital input IN1 decides about Reset or Teach function

On: Visualization operating voltage
1x shortly blinking: Reset- max/min function
3x shorty blinking: Teach function

Fig. 14 Yellow multifunction LED on the receiver

6.8 Software Tool

The ODC1202 tool software is used for parameterizing and controlling the optoCONTROL 1220.

The measured values provided by the receiver can be visualized with the PC software. The software provides you among other things

- at the adjustment of transmitter and receiver
- at setting of suitable tolerance limits.

The data exchange between the PC and the receiver is effected through a standard RS232 interface. For this purpose the receiver is connected to the PC with the serial interface cable SCD1202-x-RS232. When parameterization is finished, the setting values can be permanently saved in an EEPROM memory of the receiver. The optoCONTROL 1220 then continues operation in the “STAND-ALONE“ mode without PC.

Functions of software:

- Visualization of measurement data in numeric and graphic output fields
- Setting of the laser power for the laser transmitter
- Setting of the polarity of the digital switching outputs OUT0 and OUT1
- Selection of a suitable evaluation mode
- Presetting of setpoint value and tolerance band.
- Saving of parameters in a EEPROM memory at the receiver, or in a configuration file on the hard disk of the PC

i You will find a detailed description of the software as file on the provided CD-ROM.

Hardware requirements for the software:

- 100 MHz Pentium-compatible processor or better
- CD-ROM or DVD-ROM drive
- Approximately 8 MByte of free hard disk space
- SVGA graphics card with at least 800x600 pixel resolution and 256 colors or higher
- Windows 98, Windows NT4.0, Windows 2000, Windows XP, Windows Vista or Windows 7
- Free serial RS232 interface or USB port with USB-RS/232 adapter on PC

6.9 Sensor Mounting with Video Signal

Requirements:

- optoCONTROL completely mounted and wired, operating voltage fits, see Chap. 5.
- There is no target between transmitter and receiver.
- The software tool is installed.

After clicking on the VIDEO button, the fine adjustment between the ODC transmitter unit and the receiver can be observed in the graphic display window. In the graphic display the intensity profile is shown as a red curve. The numerical values 1 ... 1024 on the x-axis represent the individual pixels of the CCD line. The analog values of the CCD line are converted by way of an AD converter and displayed in a y-axis value range of 0 ... 1023. The scaling varies according to firmware and software version.

Transmitter and receiver are optimally adjusted, if the receiver is uniformly illuminated, see Fig. 15.

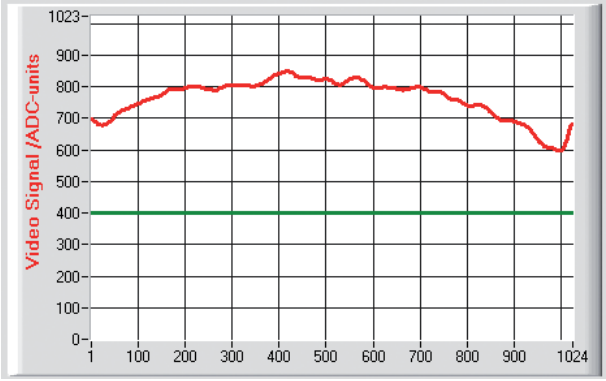


Fig. 15 Intensity distribution on receiver at optimal mounting of transmitter and receiver

i You will find a detailed description of the transmitter mounting with the support of the video signal as file on the provided CD-ROM.

7. Calibration

You will find a detailed description of the system calibration for the width/ thickness measurement, mode “Width“, in the software description.

8. Warranty

All components of the device have been checked and tested for perfect function in the factory.

In the unlikely event that errors should occur despite our thorough quality control, this should be reported immediately to MICRO-EPSILON Eltrotec. The warranty period lasts 12 months following the day of shipment. Defective parts, except wear parts, will be repaired or replaced free of charge within this period if you return the device free of cost to MICRO-EPSILON Eltrotec.

This warranty does not apply to damage resulting from abuse of the equipment and devices, from forceful handling or installation of the devices or from repair or modifications performed by third parties. No other claims, except as warranted, are accepted. The terms of the purchasing contract apply in full.

MICRO-EPSILON Eltrotec will specifically not be responsible for eventual consequential damages.

MICRO-EPSILON Eltrotec always strives to supply the customers with the finest and most advanced equipment.

Development and refinement is therefore performed continuously and the right to design changes without prior notice is accordingly reserved.

For translations in other languages, the data and statements in the German language operation manual are to be taken as authoritative.

9. Service, Repair

In the event of a defect in the controller, light source, receiver or the sensor cable, the complete system must be sent back for repair or replacement.

In the case of faults the cause of which is not clearly identifiable, the whole measuring system must be sent back to

MICRO-EPSILON Eltrotec GmbH
Manfred-Wörner-Straße 101
73037 Göppingen / Germany

Tel. +49 (0) 7161 / 98872-300
Fax +49 (0) 7161 / 98872-303
eltrotec@micro-epsilon.de
www.micro-epsilon.com

10. Decommissioning, Disposal

➪ Disconnect the power supply and output cable on the light source and receiver.

Incorrect disposal may cause harm to the environment.

➪ Dispose of the device, its components and accessories, as well as the packaging materials in compliance with the applicable country-specific waste treatment and disposal regulations of the region of use.

11. Optional Accessories

PS2020	Power supply (mounting on DIN-rail), output 24 VDC, input 240 VAC, switchable for 110 VAC
CE1220-1	Connection cable transmitter-receiver, length 1 m
CE1220-2	Connection cable transmitter-receiver, length 2 m
CE1220-5	Connection cable transmitter-receiver, length 5 m
SCD1202-2-RS232	Digital output cable for connection to a RS232 interface, length 2 m
SCD1202-5-RS232	Digital output cable for connection to a RS232 interface, length 5 m
SCD12xx-2-USB	Digital output cable for USB connection incl. driver, length 2 m
SCA1202-2	Power supply and output cable, length 2 m
SCA1202-5	Power supply and output cable, length 5 m
ODC1220-L220	Mounting rail, max. distance between transmitter and receiver 220 mm
ODC1220-L420	Mounting rail, max. distance between transmitter and receiver 420 mm
ODC1220-L620	Mounting rail, max. distance between transmitter and receiver 620 mm
EK1100/CSP2008	Bus terminal
EL3162/CSP2008	Bus terminal 2 channel analog input terminal
CSP2008	Universal controller for displacement sensors

12. Factory Setting

Mode: L-Edge

Average number: 2 values

MICRO-EPSILON Eltrotec GmbH
Manfred-Wörner-Straße 101 · 73037 Göppingen / Germany
Tel. +49 (0) 7161 / 98872-300 · Fax +49 (0) 7161 / 98872-303
eltrotec@micro-epsilon.de · www.micro-epsilon.com

X9751311-A031069SWE