OPERATING INSTRUCTIONS

GM901
Carbon Monoxide Measuring Device

Installation
Operation
Maintenance

SICK
Sensor Intelligence.

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Purpose of this document

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This instruction manual describes the standard scope of supply of the GM901 CO Measuring System, as well as the standard range of accessories available. The purpose of this document is to explain the functioning of the GM901 and describe the procedures for mounting, installing, starting up, and operating the device.

Note Make sure to read these instructions carefully before carrying out any work on the device. All warnings must be observed at all times!

Symbols

The following symbols are used in this manual to identify important safety information for the user. The symbols mark sections of the text where this information is required. The safety information and warnings, in particular, must be observed at all times.

Warning:

Indicates potential danger to personnel, particularly from electrical equipment.

- Always read the warnings carefully and observe them at all times.

Danger

Provides information for preventing (fatal) injury.

- Always read this information carefully and observe it at all times.

Attention

Indicates risks to system components or possible functional impairments.

- Always read this information carefully and observe it at all times.

Note Indicates additional information on the system or system components, as well as useful tips.

1 Safety Information

1.1 Intended Use

The GM901 CO Analyzer must only be used to monitor CO concentrations in gas ducts. If the device is used for any other purpose or changed in any way, also during installation and assembly, any warranty claims vis-à-vis SICK AG will be rendered invalid.

The person(s) responsible for safety must ensure that all potential risks of danger are recognized in good time and avoided.

1.2 Qualified Personnel

All planning, mounting, installation, commissioning, maintenance, and repair work must be carried out by adequately trained personnel only and checked by experts.

Personnel responsible for maintaining health and safety standards need to make sure that:

- Only qualified personnel are to carry out any safety-related operations
- All work on the device components is carried out by qualified personnel only. These persons must be qualified by virtue of their expertise (training, education, experience) or understanding of the relevant standards, specifications, accident prevention regulations, and properties of the system. It is crucial that these persons are able to identify and avoid potential hazards in good time
- They always have access to the operating instructions supplied with the device as well as the associated system documentation when carrying out work and observe this documentation to avoid hazards and damage.

1.3 Correct Handling

You must make sure that:

- The system is used in accordance with the technical data and specifications regarding usage, assembly, connection, ambient, and operating conditions (see order documentation, user information, rating plates, etc.) and the documentation supplied.
- Users act in accordance with the local, system-specific conditions and with due consideration paid to operational hazards and specifications.
- All value-maintenance measures (i.e. for transportation, storage, maintenance, and inspection) are observed.

1.4 Safety Devices and Measures

Preventive measures for improving operational safety

Incorrect use and insufficient maintencace of the CO measuring device GM901 can cause serious personal injury or damage.

- ▶ Please observe safety regulations at all times to prevent accidents.

If the GM901 is used as a sensor in conjunction with a control system, the operator must make sure that a failure or malfunction cannot lead to operating conditions that cause damage or lead to other hazardous operating conditions.

Danger from electrical equipment

The GM901 system components are designed for use in industrial power installations. Please observe all relevant norms and regulations at all times.

- ▶ When working on Power supply connections or voltage carrying parts switch feeder cables to zero potential.

Protective measures against dangers caused by gases

- ▶ Always use protective clothing and a protective mask when working at installations carrying hot and/or agressive gases or high dust contents.
- ▶ Never try to open the housing or switch off the purge air supply whilst there are high pressure inside the duct without having the protective measures in place.

Preventive measures to treat malfunctions

The operator has to ensure that

- competent maintenance personnel can be contacted within an appropiate time span.
- the maintenance personnel is suffciently trained to react appropiately to malfunctions of the GM901 and associated operating procedure.
- suitable protective equipment, tools and operating resources are always available .
- error histories are analyzed by qualified personnel, the source of malfunctions are removed and the operating process optimized in such a way as to prevent further malfunctions.

1.5 Responding to Purge-Air Failure

The purge air unit (optional) is used to cool the sender and receiver units, and protects the optical boundary areas from dirt, corrosive flue gases, and high flue-gas temperatures.

1.6 Environmental Information

The GM901 was designed in accordance with ecological criteria. The modules can be easily separated, sorted, and recycled. All of the materials used in the GM901 are groundwater-neutral.

2 GM901 Overview

2.1 Components Overview

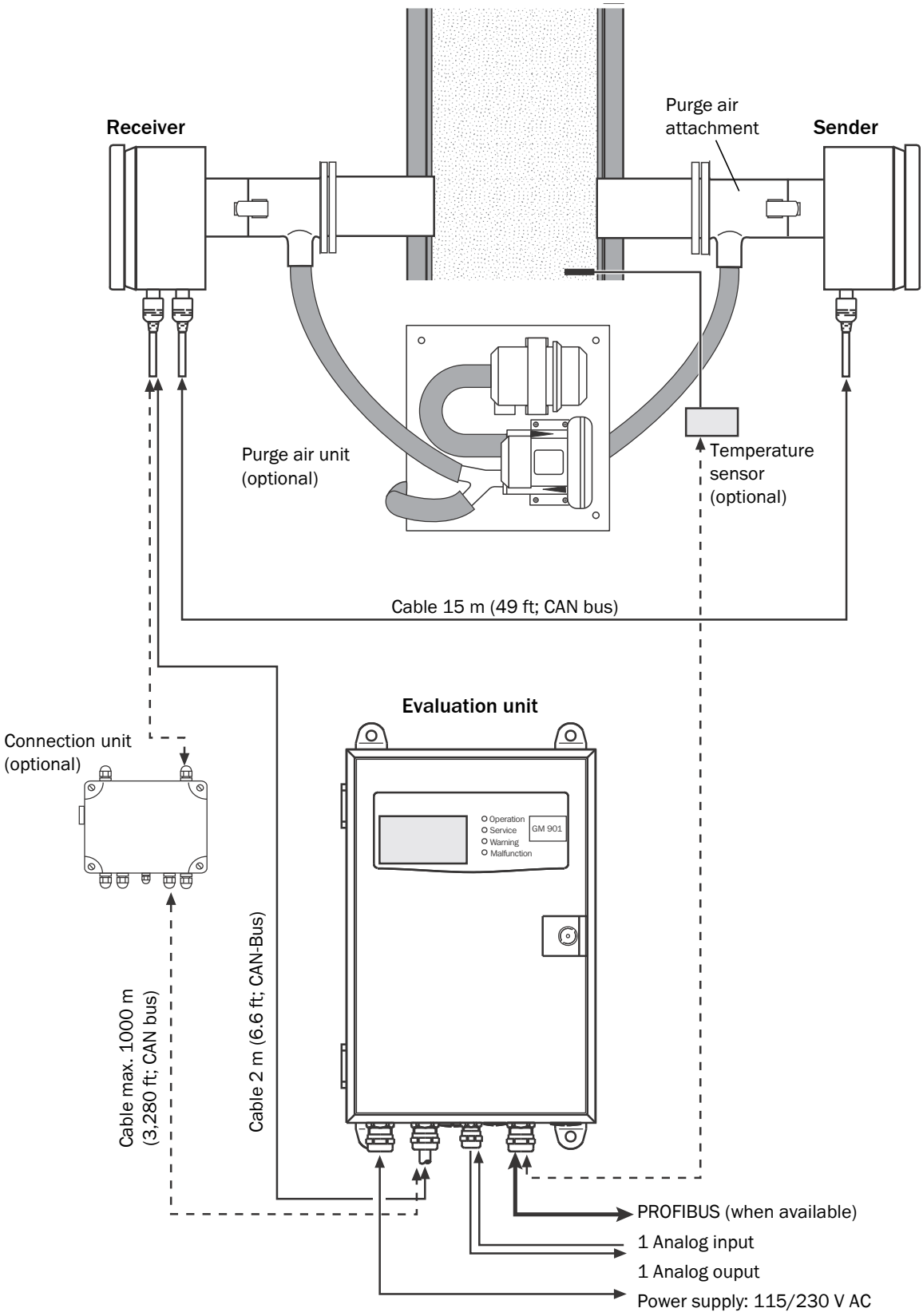


Fig. 1 Components overview

2.2 Standard Scope of Supply

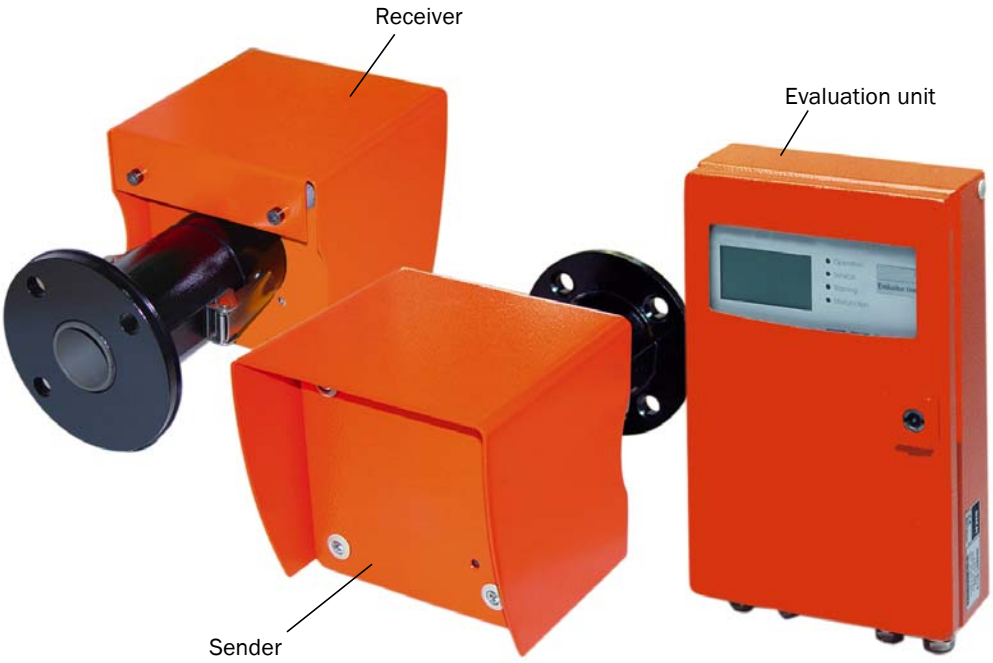


Fig. 2 CO Measuring Device GM901

The basic configuration of the GM901 consists of:

- Sender
- Receiver
- Evaluation unit with connecting cable (2 m/6.6 ft)
- Cable for connecting the sender and receiver units (15 m/50 ft)

2.3 Optional Accessories

- Connection unit for distances larger than 17 m (55.8 ft) up to 1000 m (3.280 ft)
- Purge-air unit for protecting the optical boundary areas on the sender and receiver units
- Flanges
- Optical adjustment device
- CO test cells with bracket (span test)
- Alignment bracket for establishing a zero-point reference path
- Blind flanges
- PT 100 temperature sensor

2.3.1 Evaluation unit

The evaluation unit serves as user interface. Its functions are the processing and the output of data as well as control and monitoring of the operation. The evaluation unit can be fitted either in close proximity to the sender or up to ca. 1000 m (3,281 ft) distance from the measuring point, i.e. in the control room of the industrial plant.

Display- and control elements of the evaluation unit

The evalation unit serves to display, input and adjust parameters as well as a having the control function for the system. The control panel with display, the status signals and the key pads are easily accessible by opening the swing door of the housing.

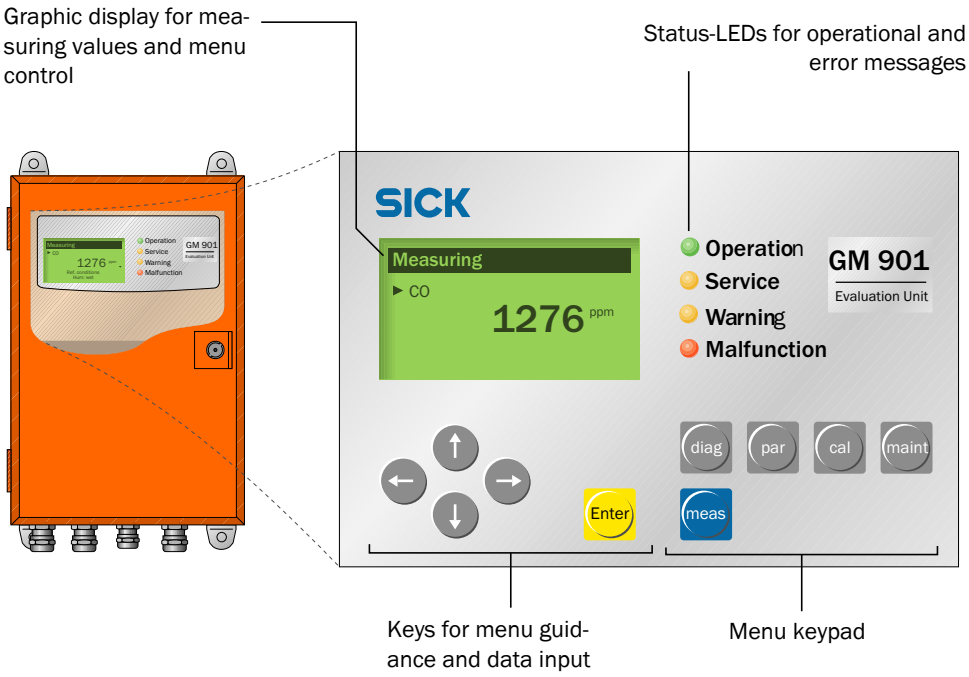


Fig. 3 Display- and control elements of the evaluation unit

2.3.2 PROFIBUS interface (when available)

The PROFIBUS connects process management level (i.e. host system, host, control room) to the measuring device. With the help of the PROFIBUS measuring values, status and error signals are being queried . The GM901 supports the PROFIBUS-DP-V1 with data transfer rates of 9.6 to 187 kBit/s. A device master data file (GSD) to specify the interface is available for the evaluation unit. It contains information about device manufacturer, identification number data transfer rates and so on . This file may be used as profile (Profile-GSD) for project planning purposes of the PROFIBUS.

Each participant of the bussystem is identified by a 7-bit-device adress (1 – 127) which is entered into the evaluation unit when setting the parameters. Of adresses 1 – 127, 126 and 127 are reserved and cannot be used.

Note A terminator has to be fitted onto the end device.

- Available measuring data

  The measuring values provided by the GM901, serving as pathway to the process management level are defined in the device master data file (GSD). You find the measuring sizes and their corresponding measuring unit in the table below:

Measuring size	CO
CO	ppm
CO	mg/m^3 norm. value
CO	mg/m^3 actual value

3 Mounting

3.1 Fitting of the Flange with Tube

Important notes for installing the flanges with tube

- During installation, the axes of the flanges with tube must be carefully aligned with each other. The angular deviation must not exceed 1°. Bracings or other suitable supports must be used for thin-walled steel ducts .
- With easily accessible measuring paths of up to 2 m (6.5 ft), the flanges with tube can be aligned using a suitable auxiliary tube (for a standard flange, diameter 70 mm (2.3 ft)).

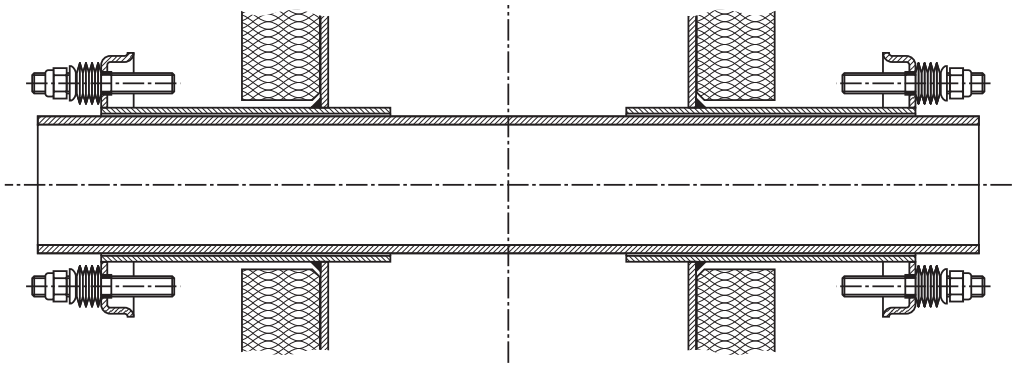


Fig. 4 Auxiliary tube for aligning the flanges in measuring paths of up to 2 m (6.5 ft)

With longer or less easily accessible meas. paths, an optical alignment device must be used.

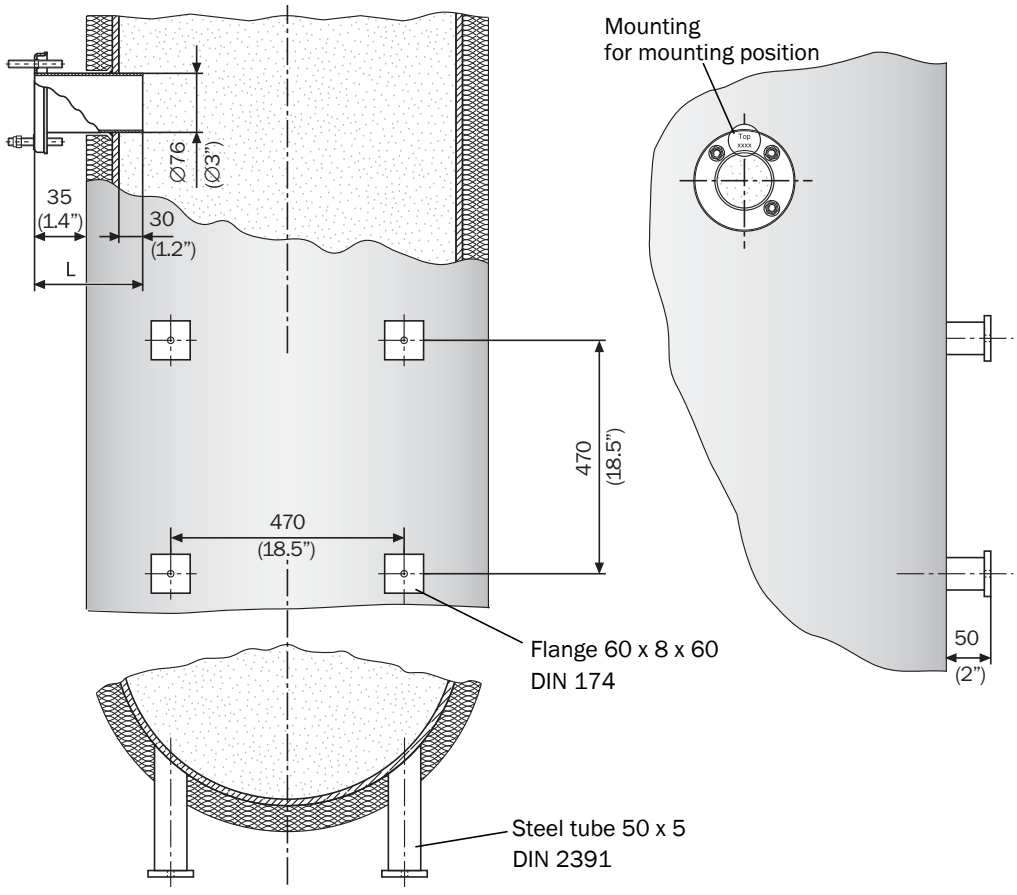


Fig. 5 Recommendation for mounting the flange

3.1.1 Mounting the Standard Flange

ATTENTION

Potential damage when opening the duct!

Make sure that parts do not fall into the duct.

- Mark the mounting location for the flange with tube and flame-cut a hole.
- The glands for the flange with tube should project approx. 30 mm (1 ft) into the duct. Adjust the tube glands if necessary.
- Tack the flanges with tube to the duct, making sure that you note the marking for the mounting position ("top"), the precise flange-to-flange measuring path, and the dimensions.

Standard flange with tube

L mm	Best.-Nr.	Mat.
130	2 017 845	ST37
240	2 017 847	ST37
130	2 017 846	1.4571
240	2 017 848	1.4571

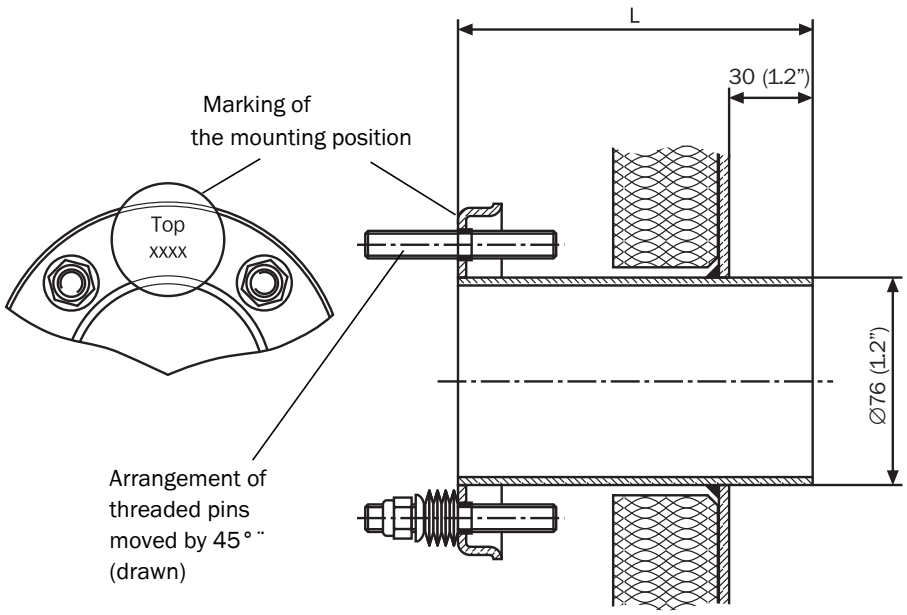


Fig. 6 Flange wih pipe, standard version

- To align the flange at the installation location, use a tube or alignment device

Fig. 7 Aligning of flange by using an optical alignment device

- When using the alignment device, attach the light source and receiver unit as shown in Fig.7

1. Align flange 1 until the light spot from the light source is at the center of the alignment target on the receiver unit. Tack-weld flange 1.

2. Attach the alignment device the other way round.
1. Align and tack-weld flange 2.

When welding and aligning the device, make sure that the flange-to-flange measuring path is observed exactly in case a zero-point comparison path has already been commissioned or supplied. The zero-point measuring path will otherwise have to be adjusted (see Chapter 5.3.2, page 33).

3.1.2 Defining the Measuring Path

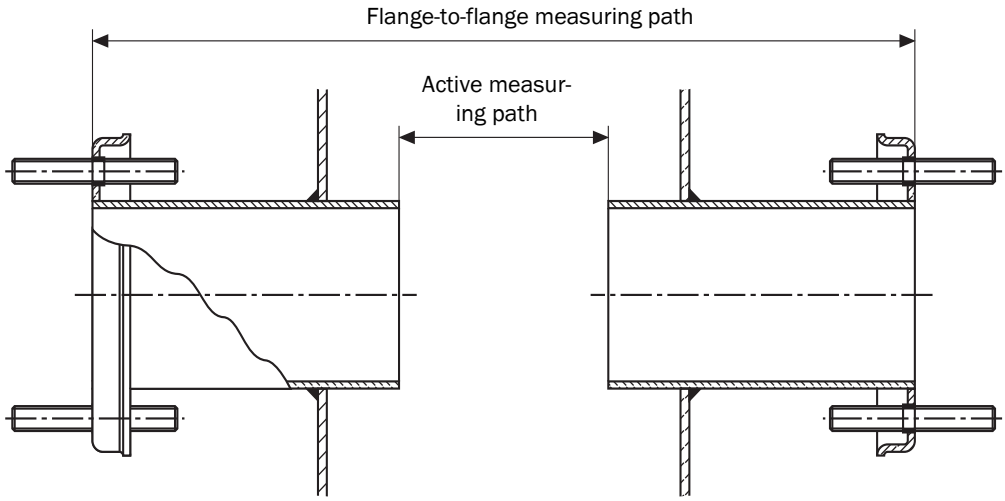


Fig. 8 Measuring path from flange to flange

The flange with tube must be aligned exactly to 1°.

- If necessary, correct the alignment (peripheral weld).
- Once you have finished installing the flanges, measure and record the exact distance from flange to flange as well as the active measuring path. Keep the measurements for commissioning.

3.1.3 Variant Installation for Brick Ducts

For brick ducts, the customer must attach suitable armature plates to the duct wall and weld the flanges with tube onto them

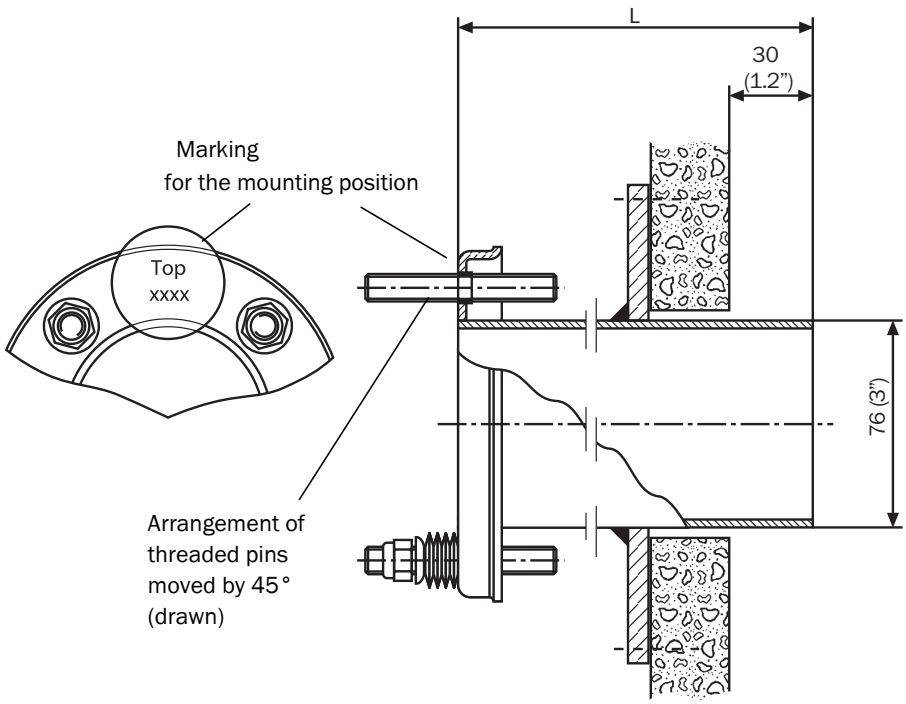


Fig. 9 Flange with tube for brick ducts

3.1.4 Variant Installation for Thin-Walled Ducts

Thin-walled ducts or mounting locations that are subject to vibration must be reinforced by the customer by welding on reinforcing junction plates.

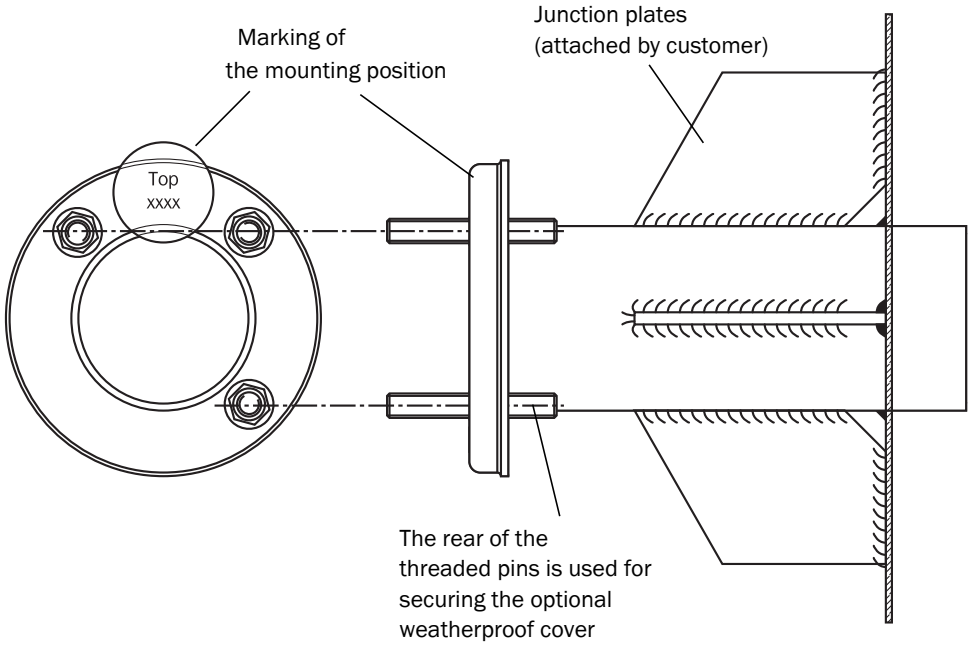


Fig. 10 Example of reinforced mounting location

3.2 Mounting the Purge air unit

Note For mounting of the purge air unit, see mounting proposals; see *Fig. 5, Seite 11*

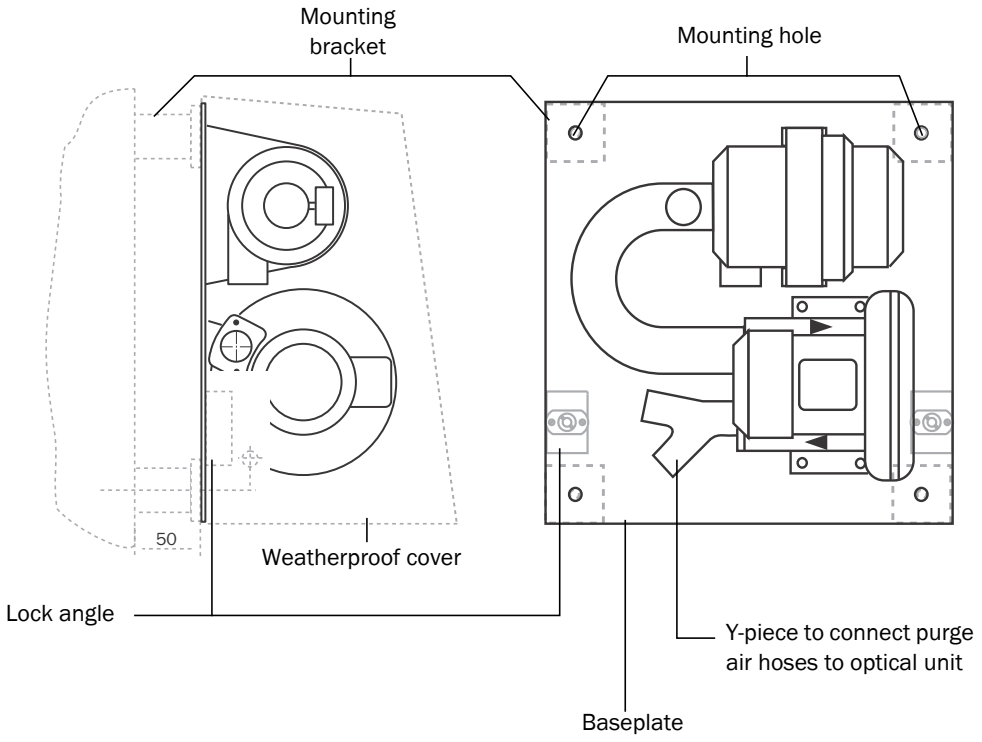


Fig. 11 Mounting the purge air unit SLV 4

- Construct and mount fixings in accordance with the mounting proposals (*Fig. 5, Seite 11*)
- Affix Baseplate to purge air unit wih 4 bolts

Mounting of he purge air pipes

- Prepare the hose length:
  - Cut off purge air hoses at same length and fix with a hose clamp to the Y-piece of the purge air unit.
- Seal hose ends if purge air unit is not used for a longer time span.

With optional Weatherproof cover

The Weatherproof cover consists of a cover and a set of locks .

- Secure lock angle with bolts onto the basis plate of the purge air unit.
- Mount the cover
- Insert the locking bolts positionend at each side in to their counter piece, turn until it has snapped in.

3.3 Mounting the CO Measuring device GM901

To ensure that the GM901 is installed and started correctly, the unit should be adjusted first. A CO-free environment is required for this zero-point adjustment. If the installation is not in operation and the duct is free of CO, the adjustment can also be carried out at the measuring point. See *Chapter 5.3.3, page 32*

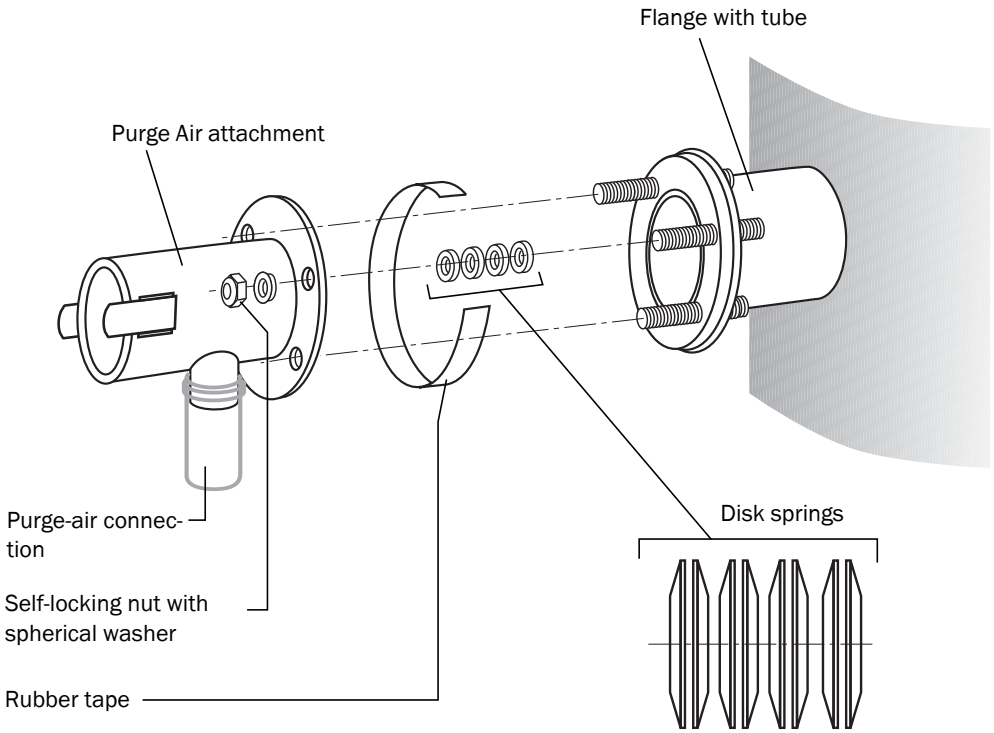


Fig. 12 Mounting the purge-air attachment to the flange with tube

1. Purge air unit is mounted, see *Chapter 3.2, page 15*
2. Connect the purge-air hoses to the glands on the purge-air attachments and secure them with hose clamps.
3. Switch on the power supply to the purge-air unit, see, see *Chapter 4.4, page 24*
4. Check whether purge air is supplied at the purge-air attachments of the sender and receiver.
5. Pull the rubber tape onto the flange with tube.
6. Place 4 disk spring pairs on each of the 3 screw bolts.
7. Mount the purge-air attachments for the sender and receiver on the flange.
8. Place the spherical washers on the 3 screw bolts.
9. Mount and tighten the self-locking nuts (w/s 17) so that there is a gap of 8.5 ... 10 mm (0.3 ... 0.4 in) between the two flange plates.
10. Pull the rubber tape over this gap.

3.3.1 Aligning the optical axis

An optional alignment device with a lamp and alignment tube is available for generally aligning the purge-air attachments.

Fig. 13 Alignment device (optional)

- Secure the lamp to the sender using the clamps on the purge-air attachment.

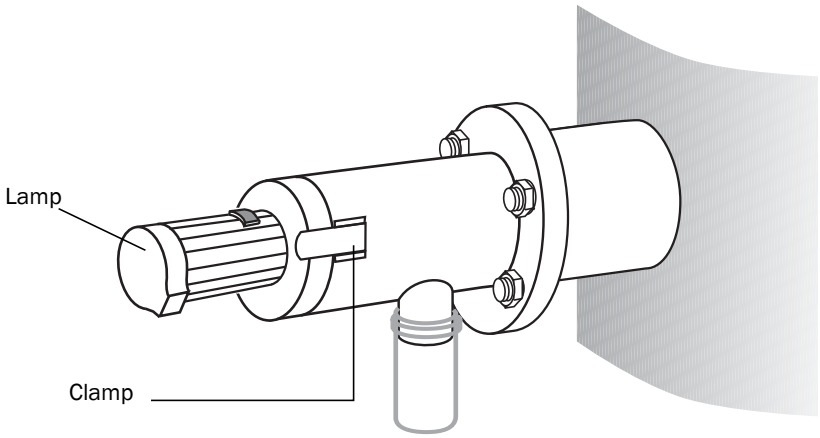
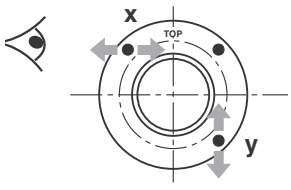


Fig. 14 Optical alignment device (lamp)

- Secure the adjustment tube to the receiver using the clamps on the purge-air attachment.

X/Y adjustment



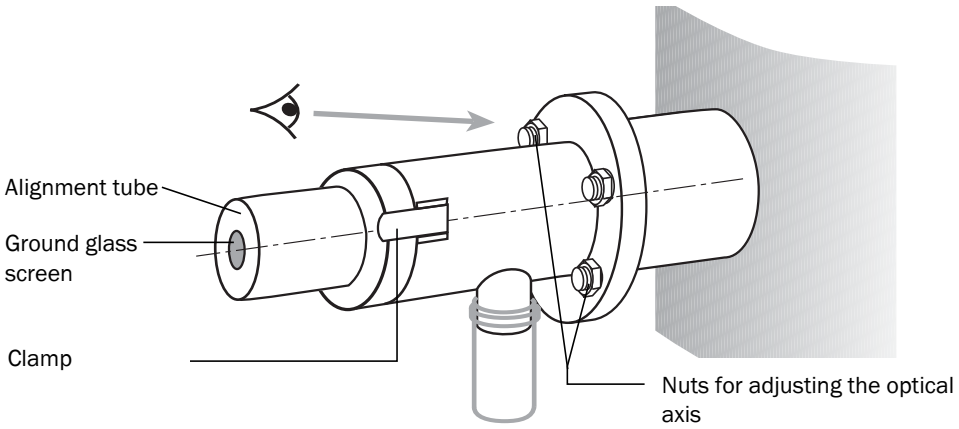
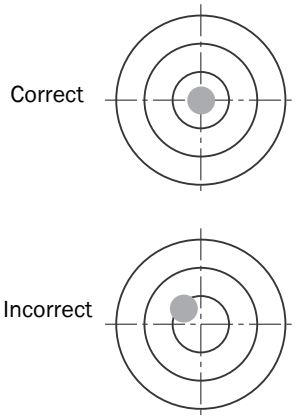


Fig. 15 Aligning the optical axis between the sender and receiver

Alignment on the screen



At the receiver

- Tighten the 2 nuts for the horizontal adjustment (X) and vertical adjustment (Y) so that the light spot appears in the center of the adjustment tube window.
- Swap the optical alignment device on the purge-air attachments on the sender or receiver side.

At the sender

- Tighten the 2 nuts for the horizontal adjustment (X) and vertical adjustment (Y) so that the light spot appears in the center of the adjustment tube window.
- Check the alignment of the purge-air attachments again.

3.3.2 Mounting the sender and receiver

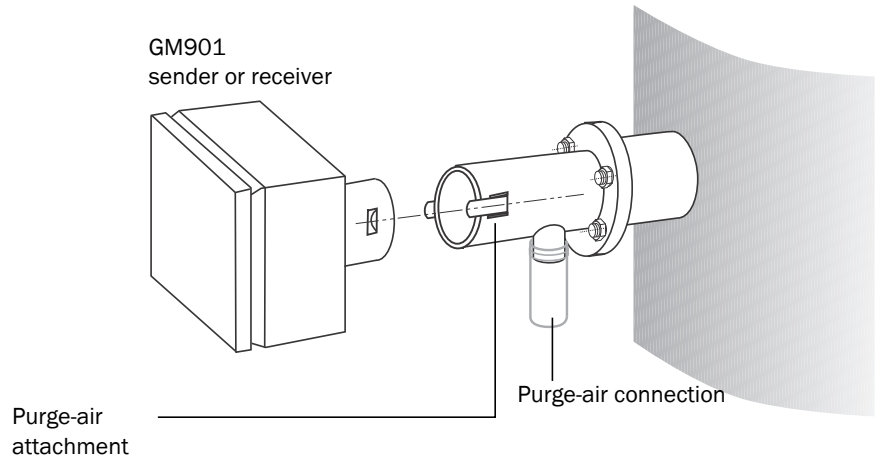


Fig. 16 Mounting the GM901

- Remove the alignment device and secure the sender and receiver into position using the clamps

3.3.3 Installing the weatherproof cover for the GM901

The optional weatherproof cover consists of a baseplate (with lock bracket) and a cover.

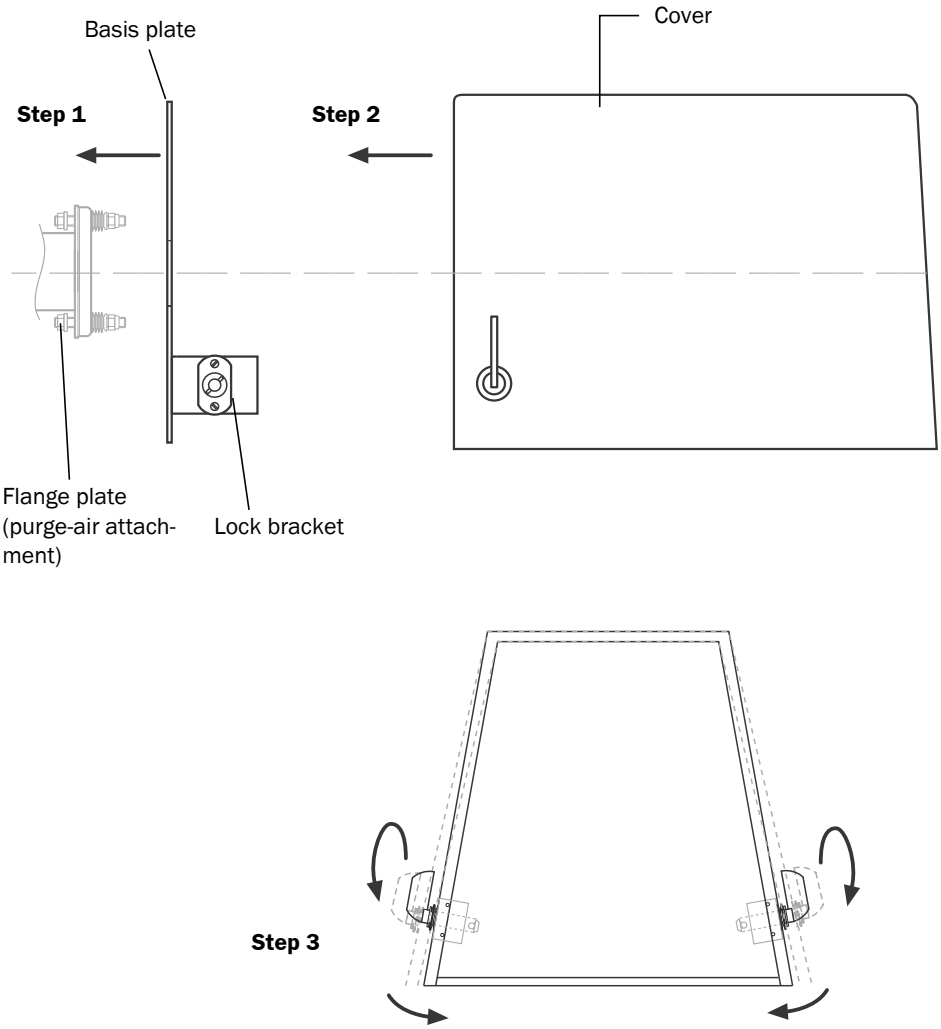


Fig. 17 Installing the weatherproof cover for the GM901

1. Mount the baseplate sideways on the flange with tube and secure it to the surface of the flange plate on the duct (purge-air attachment) using the threaded pins provided.
2. Mount the cover on the baseplate from above; to do so, pull the walls of the cover outwards slightly.
3. Insert the side lock bolts in the counterparts, and rotate them until they latch into place

3.4 Mounting the Evaluation unit

Note Ensure unobstructed access. Especially the swing-door of the mounted evaluation unit should be able to be openend without any hinderances.

- ▶ Mount the evaluation unit on a level surface that is protected and easily accessible.
- ▶ Drill holes ∅7.2 mm (0.28 in; for M8) into the mounting point according to drill plan.
- ▶ Secure the evaluation unit at with suitable bolts at 4 fastening brackets.

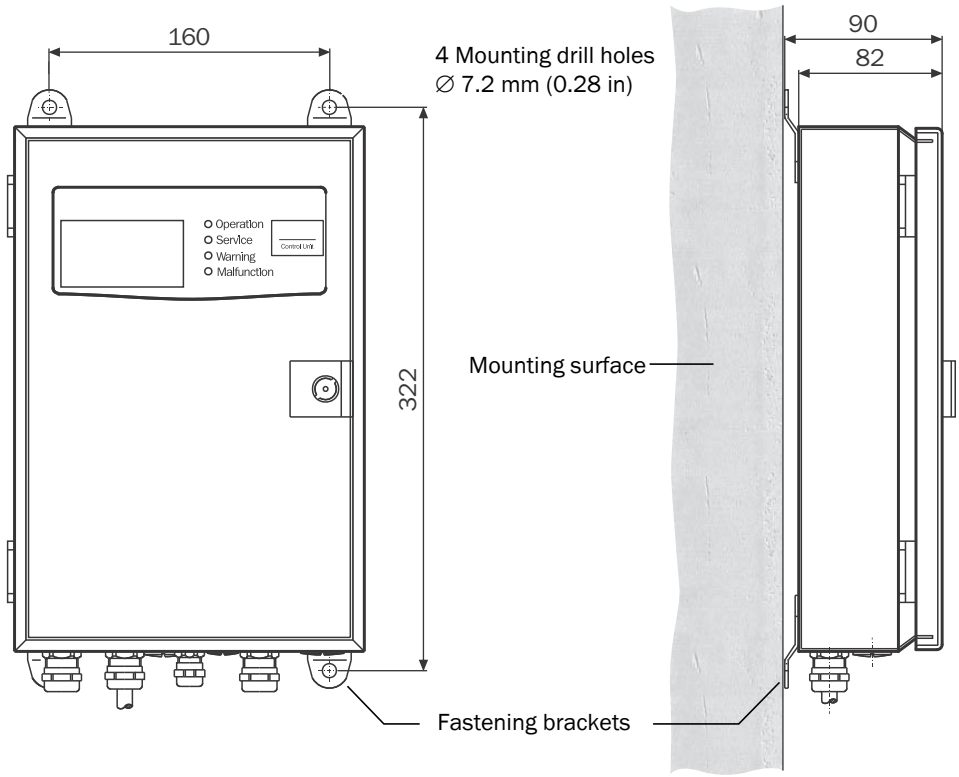


Fig. 18 Mounting the evaluation unit

4 Electrical Installation

4.1 Planning Guide for Electrical Installation

The installation and final wiring must be carried out on site by the customer, unless otherwise agreed with SICK.

Important information regarding electrical installation

- The standard measuring device contains one individual purge-air unit. With significant duct overpressure (> 10 mbar/0.15 psi), a stronger fan or a purge-air unit for each of the optical units may be required.
- A wide range of purge-air motors with different performance levels for different power connections are available. Before installation, determine the version and number of purge-units to be delivered and change the wiring plan accordingly.
- The power connection for the connection unit and purge-air motor must be stationary (VDE 0411/8.8).
- The power supply for the evaluation unit and purge-air unit must be configured and fused separately.
- For the purge-air unit, a separate disconnector (if possible, a starting circuit-breaker) must be installed in the vicinity of the measuring devices (VDE 0411/5.1.2.2.2).
- Provide a clearly visible warning sign to prevent the disconnector from being deactivated inadvertently.
- A phase-failure switch is recommended for three-phase motors.
- The evaluation unit has a separate mains switch.

The following must be provided by the customer:

- ☒ The power supply for the GM901 and purge-air unit (3-phase)
- ☒ Signal cables suitable for the application
- ☒ PE conductors for connecting to the exterior of the connection unit (in accordance with EMC requirements)

4.2 Electric Wiring for Standard Version

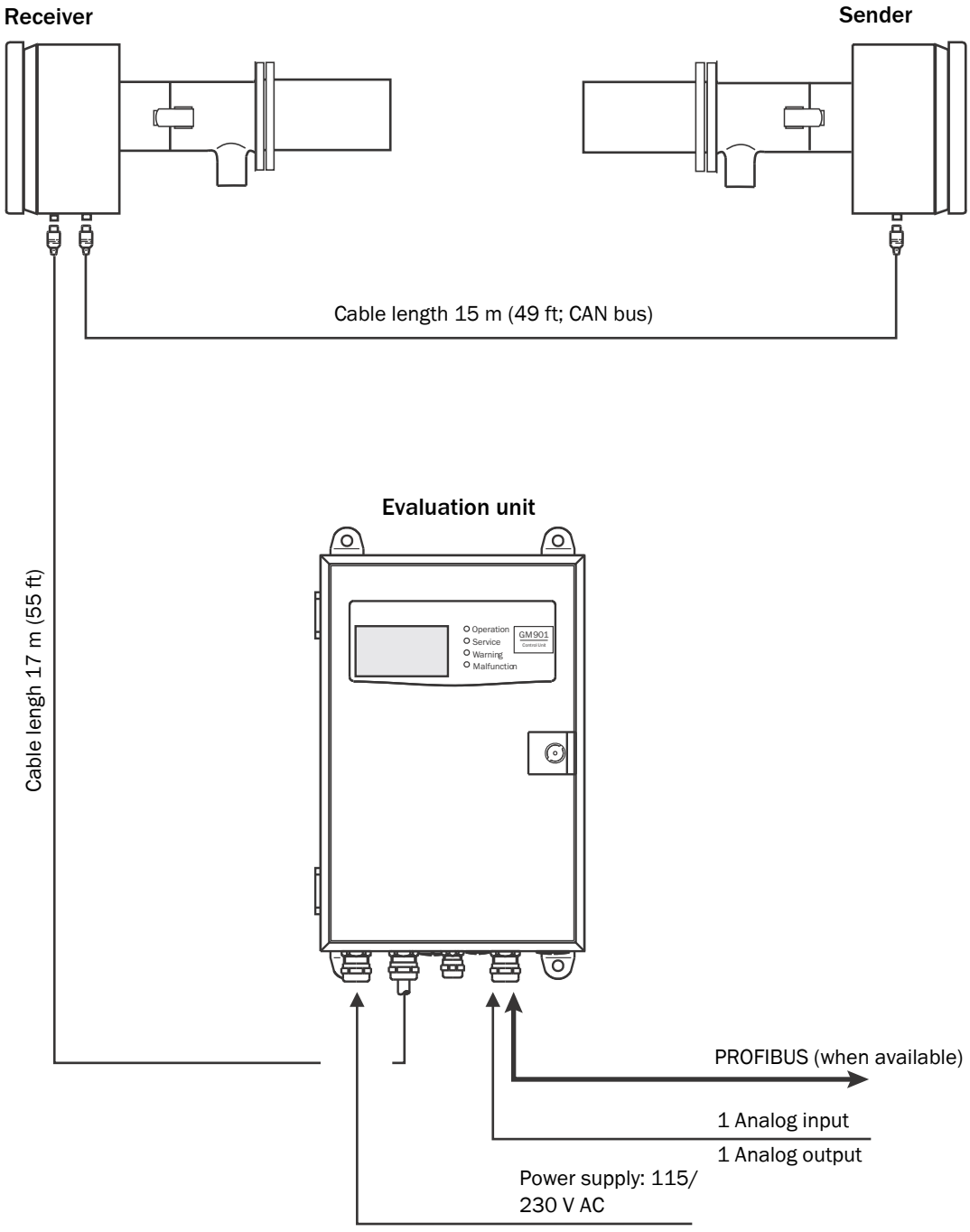


Fig. 19 Electrical connection GM901 (standard)

▶ Connect system components according to *Fig. 19*.

4.3 Electrical Wiring for Evaluation unit

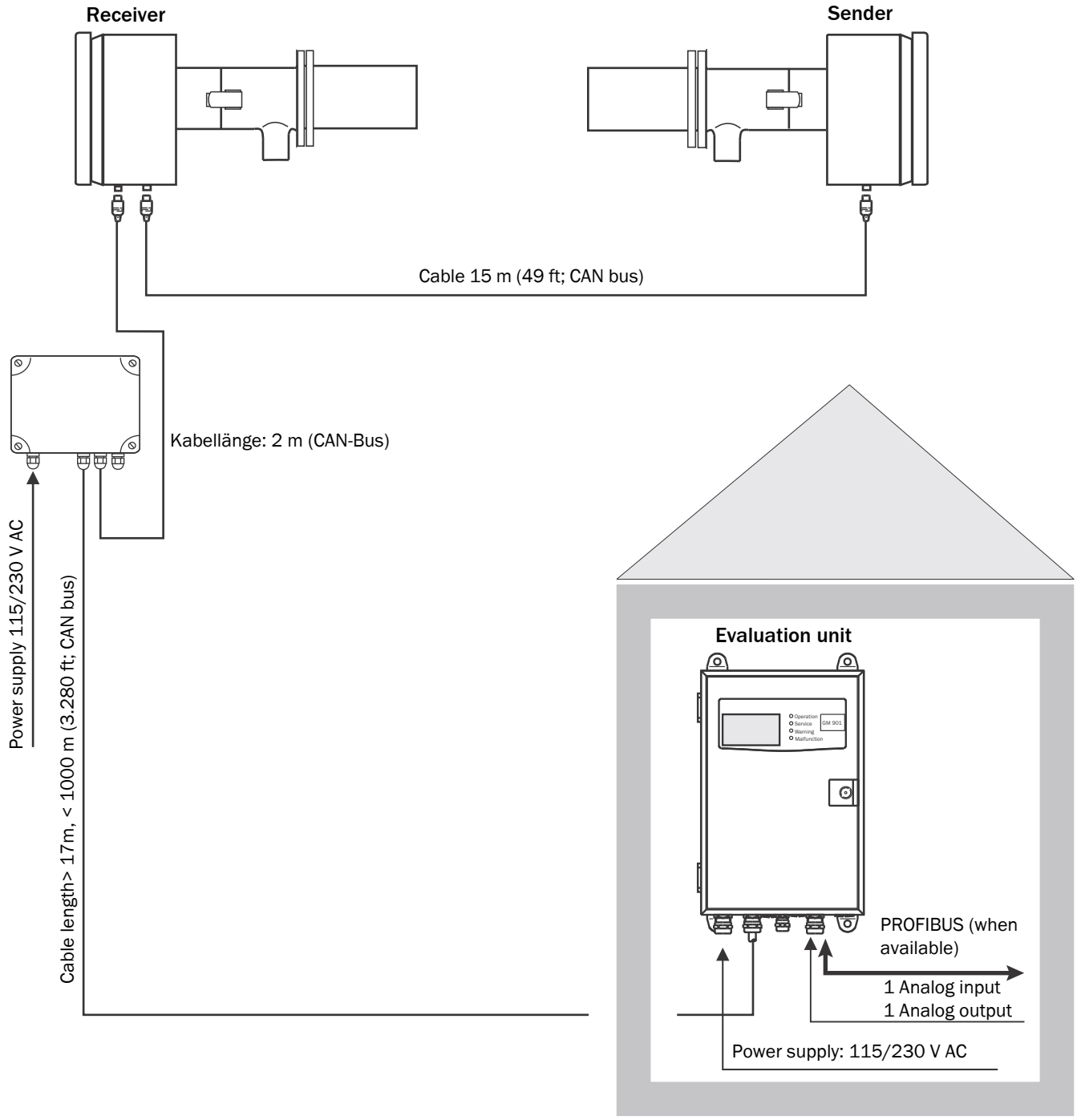


Fig. 20 Connection unit at distances of up to 1,000 m (3,281 ft)

► Connect system components according to *Fig. 20*

4.4 Electrical Connections for the Purge air motor

The purge-air units can be equipped with different motors. Before connection, check the power supply and supply type against the specifications on the rating plate of the purge-air motor. Do not connect the purge-air unit if the values do not match.

	Rated voltage V AC	Rated current A	Power kW	Motor type	Order no.
50 Hz	Δ 200 ... 240 Y 345 ... 415	Δ 2.6 Y 1.5	0.4	2BH1300-7AH16	1 012 409 with 10 m (32 ft) hose 1 012 424 with 5 m (16 ft) hose
60 Hz	Δ 220 ... 275 Y 380 ... 480	2.6 1.5	0.5		

DANGER

Power supply!

Before you begin work, switch off the power supply. Observe the required safety precautions.

- Switch off the power supply.
- Connect the purge-air motor in accordance with the specifications in the terminal box and the description supplied.

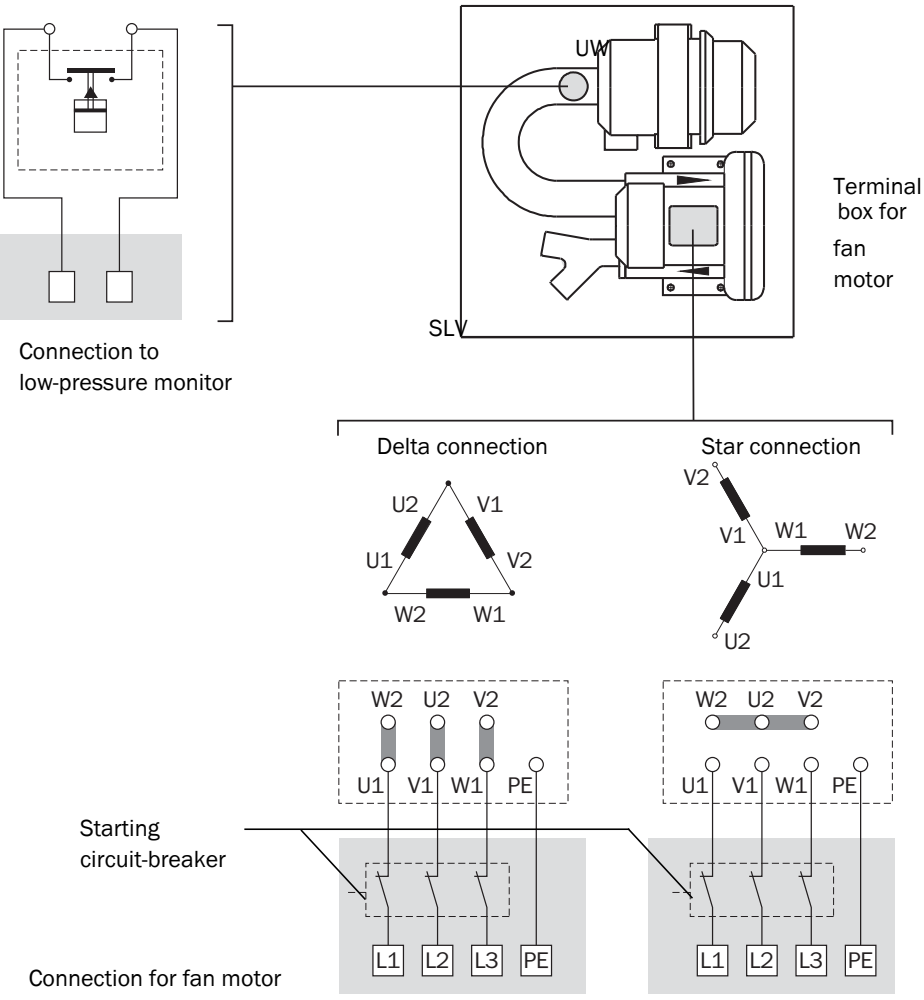


Fig. 21 Electrical connections for the purge-air supply

- ▶ Switch on the motor and check the direction of rotation: The correct direction of rotation is indicated by an arrow on the front of the compressor. If necessary, swap the connections.
- ▶ Check the starting circuit-breaker (if installed) to ensure that it works properly and set it to a value 10 % than the rated current. For the rated current, check the rating plate or see *Chapter 8.2*.
- ▶ Connect the purge-air motor

Direction of motor rotation!

Check the direction of rotation. Make sure that no air is blown out of the extraction aperture. If the motor is rotating in the wrong direction, the purge-air fan sucks gas out of the duct and can irreparably damage the device and purge-air unit. If necessary, swap the voltage connections for the motor.

4.5 Power Supply and Signal Cables for the Evaluation Unit (Standard)

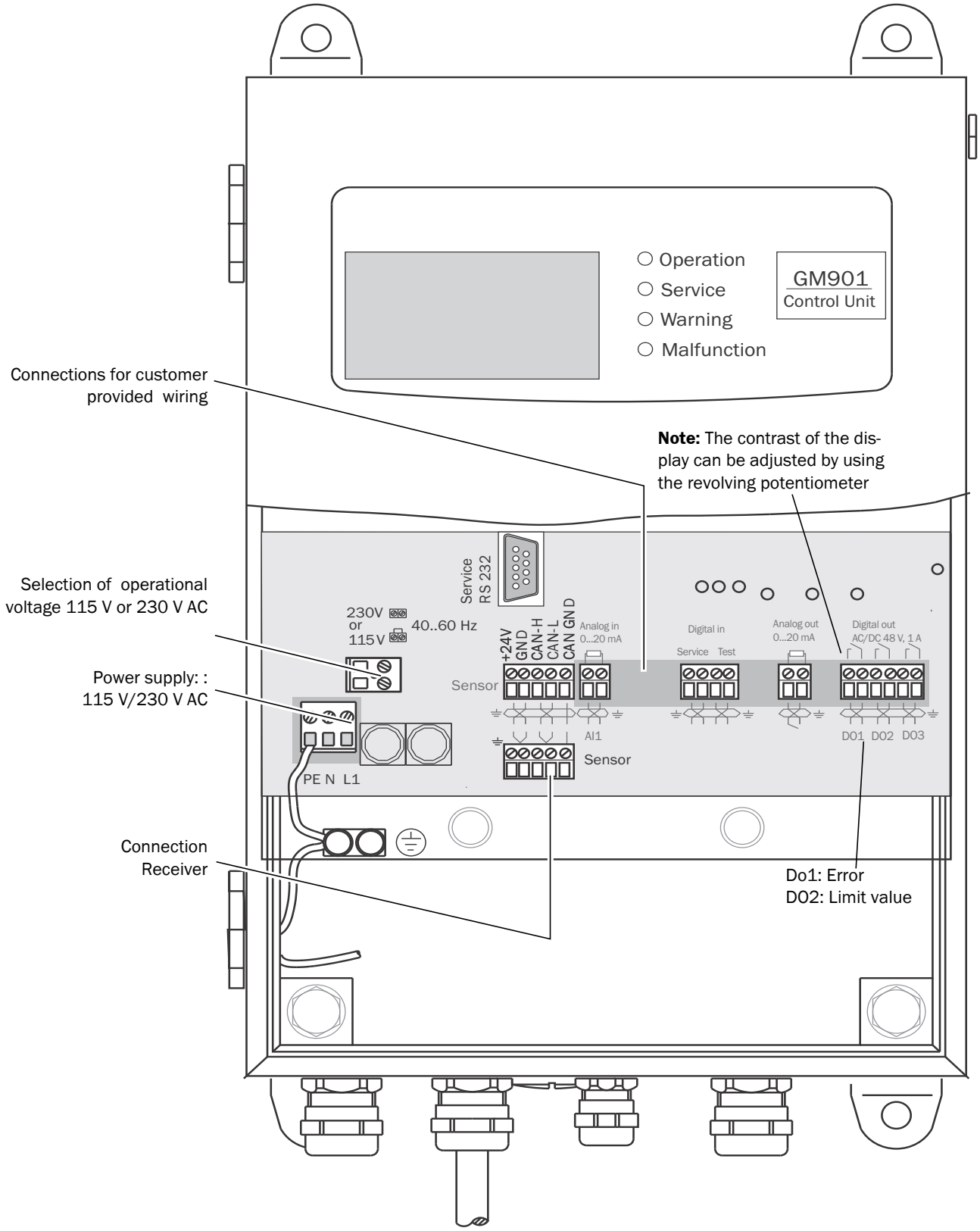
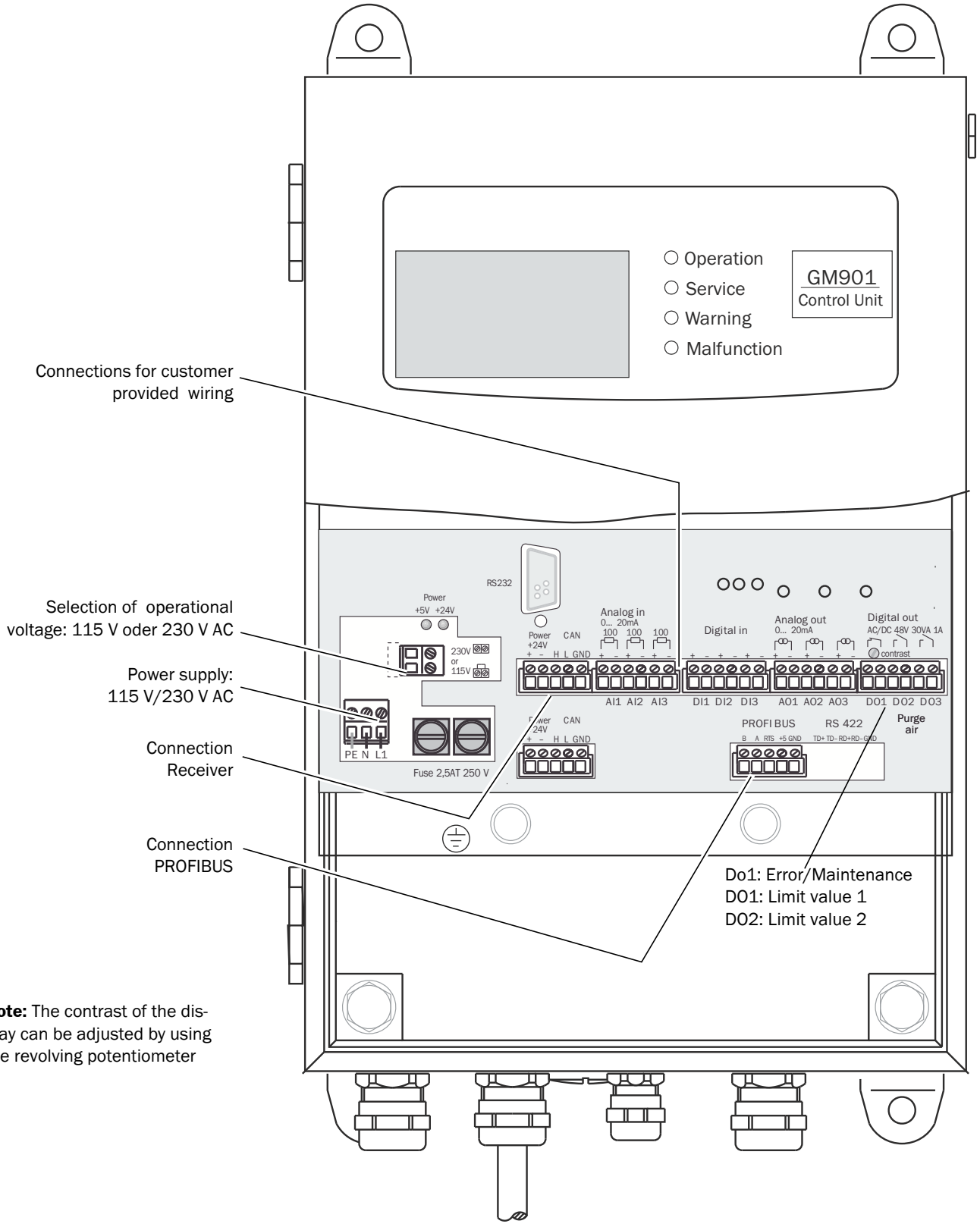


Fig. 22 Electrical connection – standard (customer provided)

Note The factory setting of the evaluation unit is 230 V AC

4.6 Electrical wiring of the Evaluation Unit – PROFIBUS



Note: The contrast of the display can be adjusted by using the revolving potentiometer

Fig. 23 Electrical connection to the connection unit – PROFIBUS (customer provided)

Note The factory setting of the evaluation unit is 230 V AC

4.7 Electrical Connections inside the Connection Unit - PROFIBUS

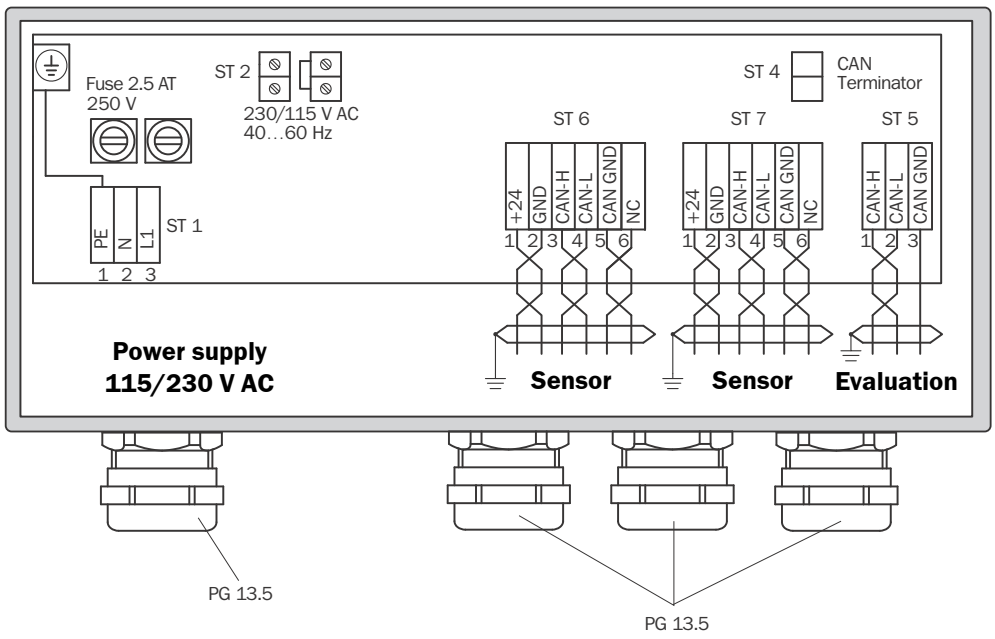


Fig. 24 Electrical Connections in the Connection Unit

Connecting the evaluation unit - terminal strip ST 5

Cable length: max. 1000 m (3,280 ft)

CAN-H / CAN-L / CAN GND

Connecting the GM901 receiver - terminal strip ST 6 or ST 7

Standard cable (17 m/55.8 ft))

+24 V	pk
GND	gy
CAN-H	ye
CAN-L	gn
CAN-GND	bn

5 Commissioning

5.1 Requirements for Commissioning

You must complete and check the following before you start the system:

- Check the electrical installations
- Check and perform a functional test on the purge-air unit (option)
- Align the flanges
- Check (measure) the active measuring distance, see *Chapter 3.1.2, page 13*

5.2 Control elements of the Evaluation unit

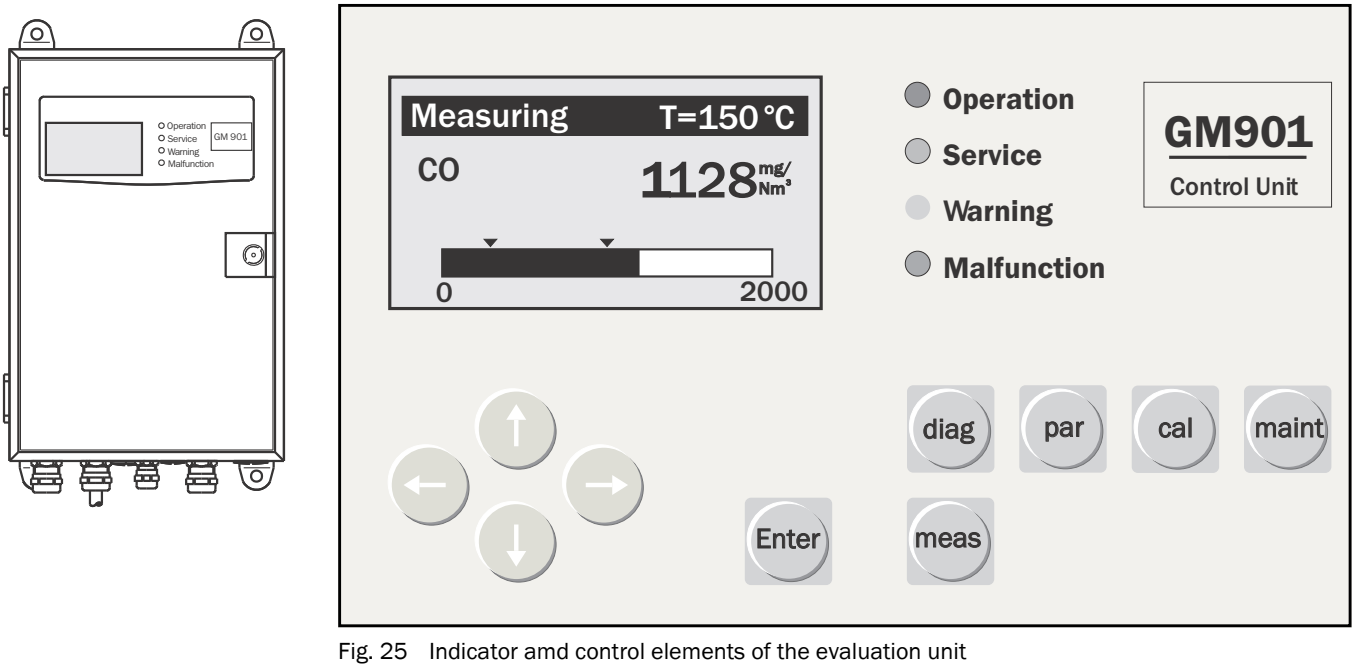
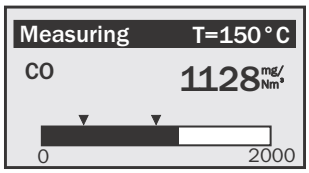


Fig. 25 Indicator amd control elements of the evaluation unit

Arrow keys for editing units and digits



T=150 °C/300 °F	Measuring value of an external temperature source or an internal adjustable substitute value
1128 mg/Nm³	Actual measuring value
0	Start value of the measuring range
2000	End value of the measuring range, adjustable
t	Adjustable limit values

5.2.1 Function keys and Sub menus

Diagnosis

- Malfunction
- Warning
- Sensor values

Parameter

• Settings	For setting of parameters
– Pysical Unit	Selection of 3 physical units : ppm, mg/m³ N, mg/m³
– Normalization	For correction of humidity levels
– Response Time	Adjustable from 5 s to 360 s
Measuring Range	Adjustable from 100 ppm to 20,000 ppm
– Limit Value	Limit value freely adustable within the measuring range
– Meas. Distance	Adjustable, range: 100 ... 10,000 mm (4 ...390 in)
– Temperature	Waste gas temp. as analog input signal or set value adjustable up to 500 °C (930 °F)
– Humidity	Humidity of waste gas: Set value input for for calibration and correction
– Pressure	Set value input for calibration
– Analog Out	Live Zero 0 mA up to 4 mA
– Calibration	SPAN-und Zero-Correction
• Device Device data	
– Serial Number	Serial number
– Software Revision	Software Version
– Configuration	Configuration of evaluation unit
• Service	
– Calibration Values	Device specific calibration values

Calibration

• Zero Adjust	Zero point check
• SPAN-Test	SPAN-Test

Maintenance

• Reset System	Restart of system
• Maint-Mode	Maintenance mode
• Test Analog Outputs	Checking current values at analog output
• Test Relays	Relais test
• Reset Parameter	Resetting of parameters to default value

Measurement

- Measuring

5.3 Zero-point Adjustment

5.3.1 Conditions for the zero-point adjustment

- Only ever perform a zero-point adjustment before initial startup or a subsequent startup! A CO free environment is required for this purpose. If the installation is not in operation and the duct is free of CO, the adjustment can also be carried out at the measuring point. If this is not possible, the zero-point adjustment must be carried out with the GM901 sender and receiver on mounting brackets.
- The system reaches stabil operation after switching on the power supply and a warm-up phase of approx. 30 minutes
- Never change the alignment of the mounting brackets during the zero-point adjustment

Note Once fitted to the duct the purge air attachments of the GM901, a new adjustment needs to be carried out, see *Chapter 3.3, p. 16*! Device parameters are altered by adjustments made to the measuring distance. These values need to be reset before the zero-point adjustment is carried out.

LL_{Fl-Fl}... flange – flange dimension in the duct measuring distance

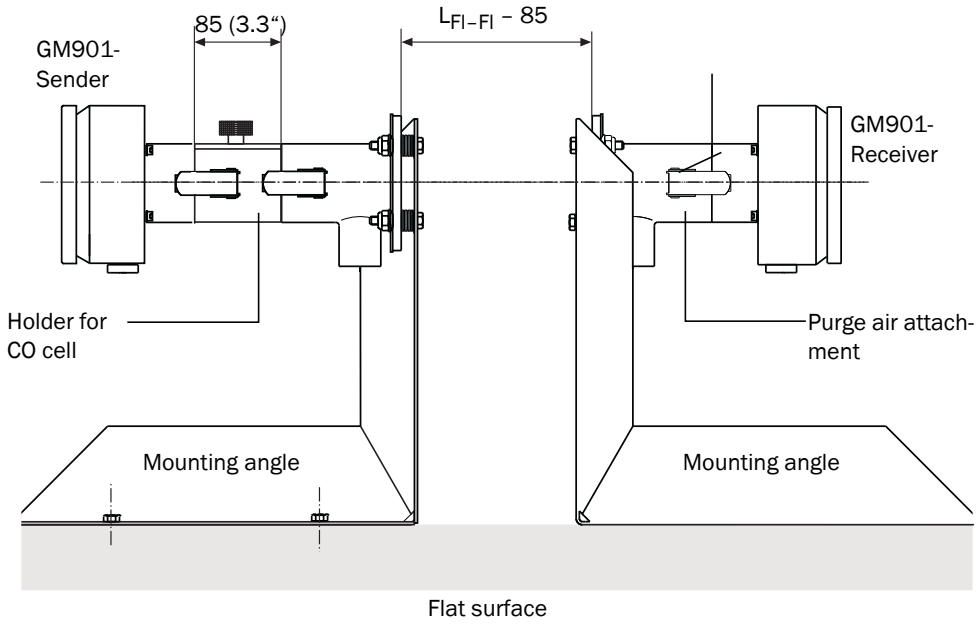
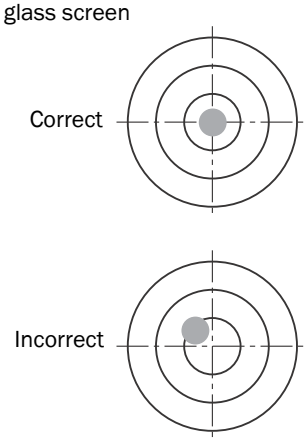


Fig. 26 Zero-point comparison path of the GM901

5.3.2 Establishing the zero-point comparison path

- ▶ Provide the mounting brackets for the zero-point adjustment.
- ▶ Remove the purge-air attachments from the sender and receiver and secure them to the mounting bracket (available as an option).
- ▶ Attach the bracket for the CO cell to the sender, for example; do **not** use a cell filled with CO if a sensitivity test is also intended.
- ▶ Adjust the mounting bracket to the flange – flange dimension of the duct measuring distance as shown in *Fig. 26*; the distances from the cell bracket (85 mm/3.3 in) and aperture between the purge-air flange and flange with tube are already taken into account,
- ▶ Align the purge-air attachments optically with the help of an alignment device.
- ▶ Secure the sender and receiver to the purge-air attachments

Representation on the ground glass screen



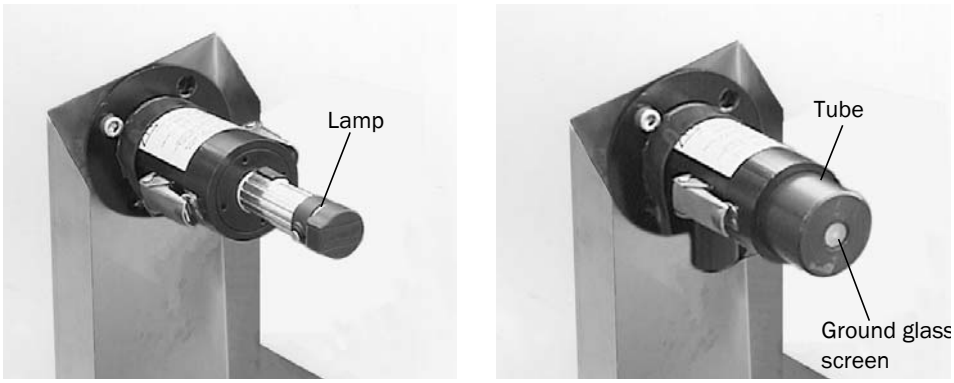


Fig. 27 Alignment with an adjusting device (Lamp, Tube)

ATTENTION

Important:

Don‘t change the alignment of the mounting angle.

5.3.3 Start the zero-point and check-point adjustment

- To start zero point adjustment press the key „CAL“on the control pad of the evaluation unit. (see *Chapter 6.3.1, p. 51*)

5.3.4 Mounting the GM901 CO Monitor on the duct

- Remove the sender and receiver from the purge-air attachments
- Remove the bracket for the CO cells
- Remove the purge-air attachments from the mounting bracket
- Keep the parts for the zero-point comparison (mounting bracket, bracket for the CO cells) in a safe place
- Mount the GM901 at the measuring point, see *Chapter 3.3.2, p. 18*.
- To check linearity carry out manual SPAN test (optionally)

5.3.5 Test cells

Test cells are available depending on the application-specific measuring range, measuring path and check value (e.g.: 70%)

5.3.6 Determining the Test Concentration

The test concentration (test cell value) is calculated using the following formula:

TW [ppm • m] = MB [ppm] • x • S[m]

TW = check value

MB = full scale

S = active measuring range

x = position of the check value

Note To convert mg/m³ N to ppm: **1 mg/m³ N = 0.8 ppm**

Example:

full scale MB = 1,500 ppm

active measuring rangeS = 4 m

check value at 70 % of the MBx = 0.7

TW [ppm · m] = MB [ppm] • x • S[m]

TW [ppm · m] = 1500 [ppm] • 0.7 • 4 [m]

TW [ppm · m] = 4200 [ppm • m]

The test cell should have the value 4,200 ppm • m.

5.3.7 Performing the SPAN Test

- The preparations for performing the SPAN test are described in *Chapter 6.2, p. 37*.
- Insert the test cell holder on the sender.

Note

- Do not insert a cell filled with CO yet

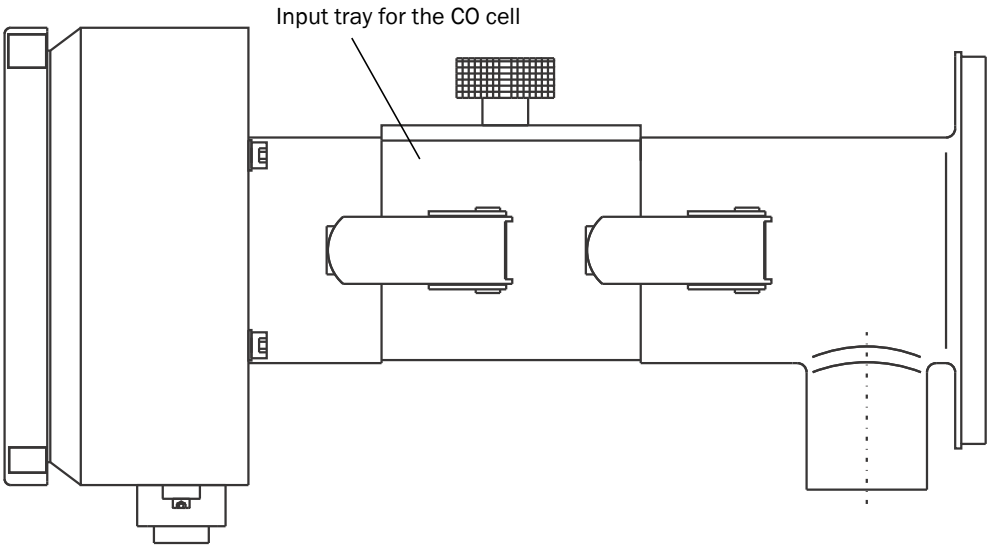


Fig. 28 GM901 Sender with test cell holder

- To start the SPAN test, press the CAL button on the evaluation unit (see *Chapter 6.3.2, p. 53*) and follow the instructions displayed.

5.4 Default Parameter Settings

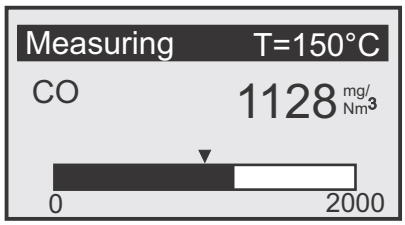
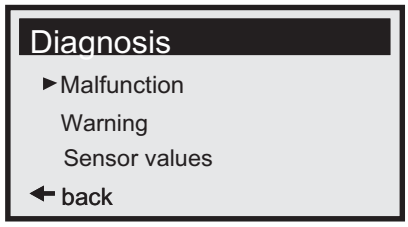
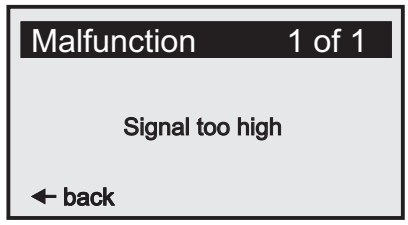
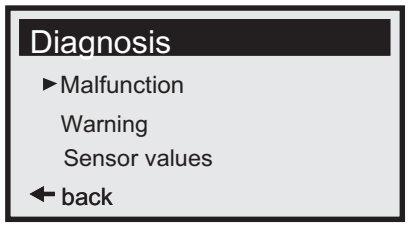
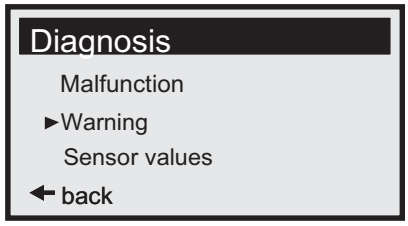
- Parameter Settings
  - Physical Unit mg/Nm³
  - Normalization wet
  - Response Time 30 s
  - Measuring Range 1000 mg/Nm³
- Measuring Distance
  - Flange to flange _2,500 mm (98.4 in)
  - Aktive Measuring Distance _2,000 mm (78.7 in)
- Temperature
  - Substitute 150 °C (302 °F)
  - External Ana-In
  - Scale Low __0 °C (32 °F)
  - Scale High 250 °C (480°F)
  - Input Low _4.0 mA
  - Input High 20.0 mA
- Humidity
  - Substitute 00.0 %(Vol.)
- Pressure
  - Substitute 1013 hPa (14.7 psi)
- Analog Out
  - Live Zero 4 mA
- Calibration
  - Span 1.00
  - Zero +000
- Parameter Device
  - Serial Number _ _ _ _ _ _ _ _entered following final inspection
- Software Revision
  - Sensor Unit _ _ _ _ _ _ _ _ _ _ _ _ current software revision
  - Evaluation Unit _ _ _ _ _ _ _ _ _ _ _ _ current software revision
  - Configuration _ _ _ _ type code of evaluation unit
- Service
  - C1 Determined by the zero adjustment
  - C2 Determined by the zero adjustment
  - C3 Factory data
  - C4 assigned to the GM901
  - C5 receiver.
  - C6 (individual for each device)
  - C7
  - C8

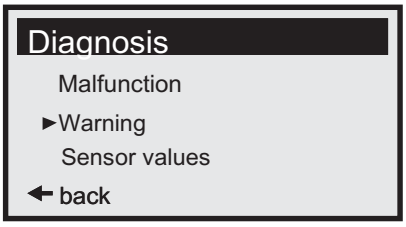
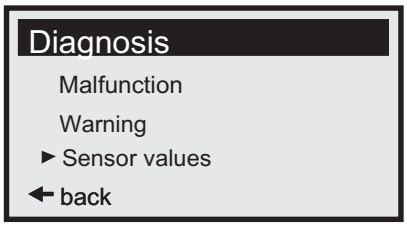
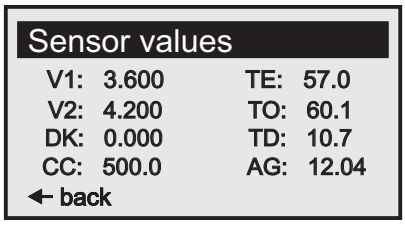
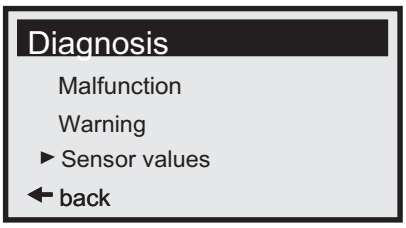
6 Setting the Parameters

6.1 Diagnosis

Note To cancel or return to the previous menu, press "**Arrow left**" (return)

To return to measuring mode at any time: press "**meas**"

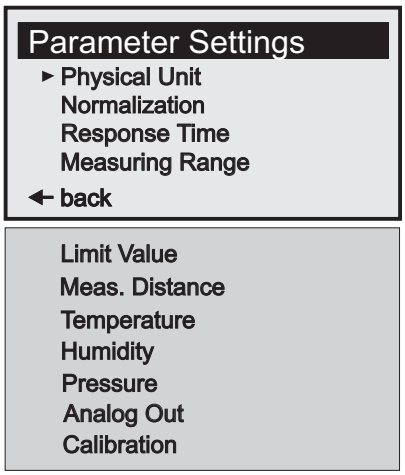
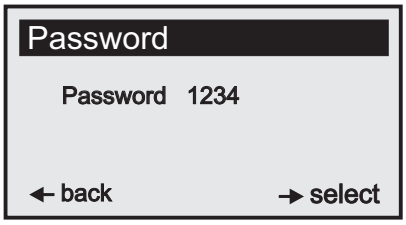
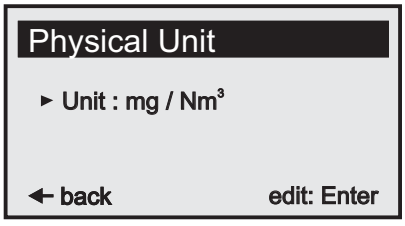
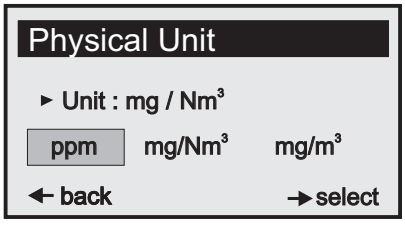
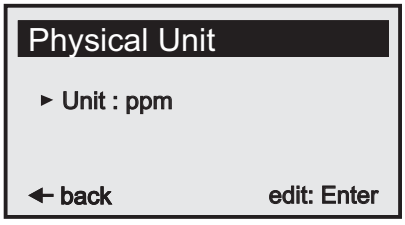
Display	Action	Note
	Press key "**diag"**	Display switches to Diagnosis mode
	► Choose Malfunction with "**Arrow down**" ► Press "**Enter**"	Display malfunction messages
	► Press "**Arrow back**"	See *Chapter 10.2, p. 71* for displaying malfunctions
		
	► Choose Warning with "**Arrow down**" ► Press **"Enter"**	Display warning messages
	► Press "**Arrow back**"	See *Chapter 9.1, p. 64* for displaying warnings and *Chapter 10.2, p. 71* for malfunctions (and further troubleshooting tips *Chapter 9.3, p. 66*)

		
	► Choose Sensor Values with "**Arrow down**" ► Press "**Enter**"	Display sensor measuring values for troubleshooting
		Note values in remote diagnosis standard form, see *Fig. 34, page 70*
		

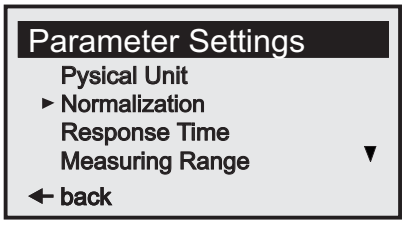
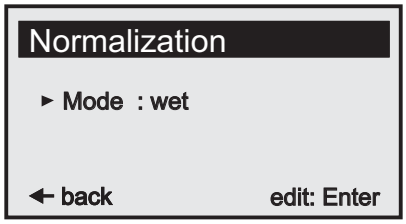
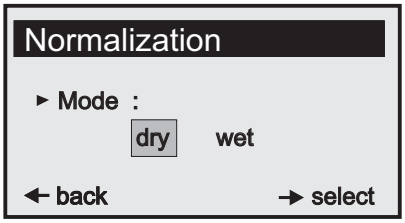
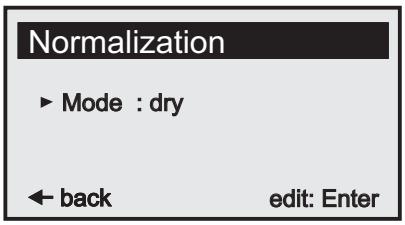
6.2 Setting the Parameters

6.2.1 Settings

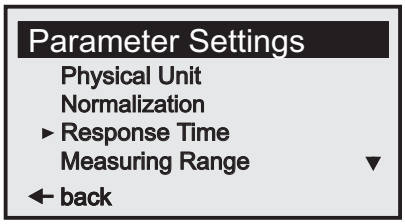
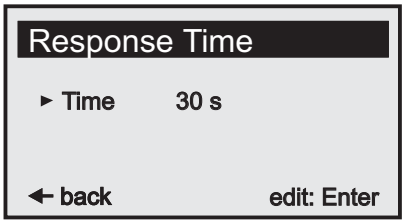
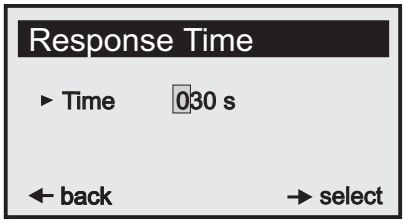
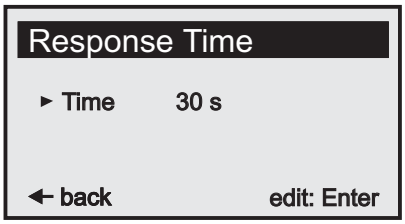
6.2.1.1 Physical Unit

Display	Action	Note
	► Choose "**Physical Unit**" ► Confirm with "**Enter**"	All of the parameters that can be edited are accessible in this menu
	► Enter password and press "**Enter**"	The password is 1234 The password remains active for 30 minutes after it is entered
	► Press "**Enter**"	Display physical unit
	► Choose with "**Arrow right**" ► Confirm with "**Enter**"	Choose the physical unit
	► Press "**Arrow left**" (back)	Display returns to selection screen

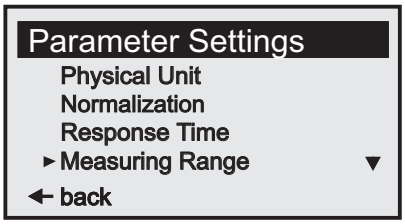
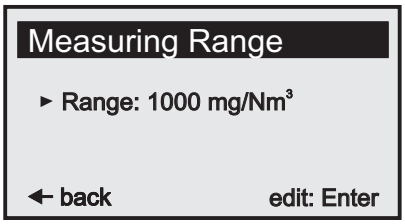
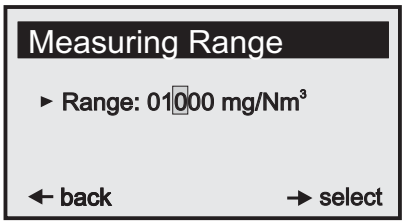
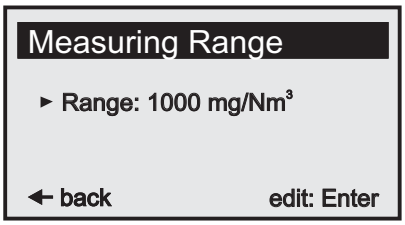
6.2.1.2 Normalization

Display	Action	Note
	► Choose "**Normalization**" ► Press "**Enter**"	Measured value normalization
	► Press "**Enter**"	Default (factory) settings
	► Choose with "**Arrow right**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new mode.
	► Press "**Arrow left**"	Display switches to selection screen

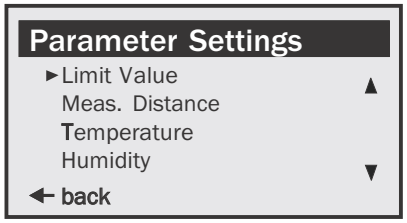
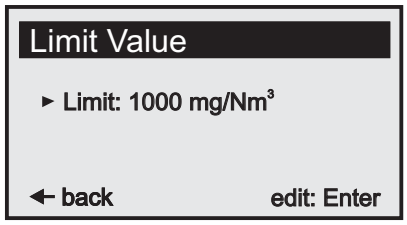
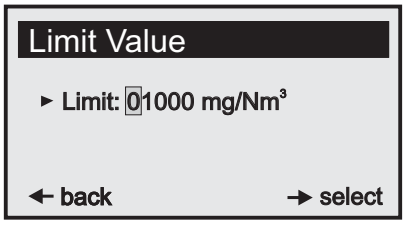
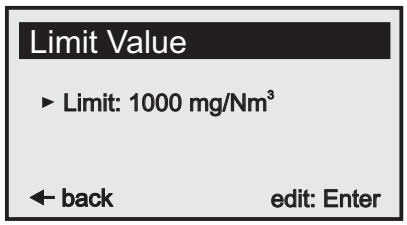
6.2.1.3 Response time

Display	Action	Note
	► Choose "**Response Time**" ► Press "**Enter**"	Response time
	► Press "**Enter**"	Default setting: 30 s min: 5 s max: 360 s
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new mode.
	► Press "**Arrow left**"	Display switches to selection screen

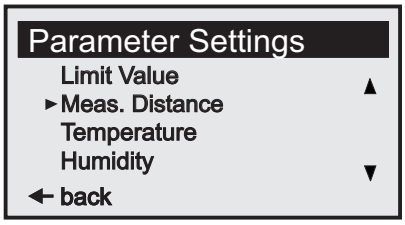
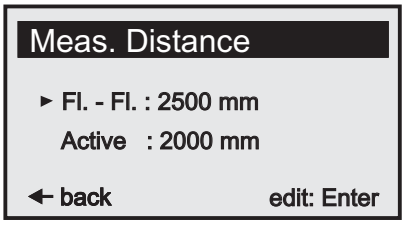
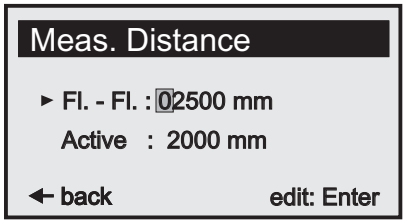
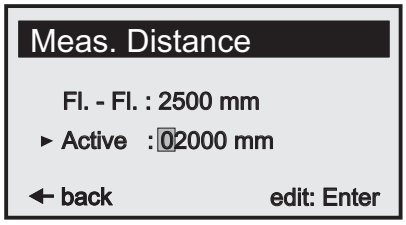
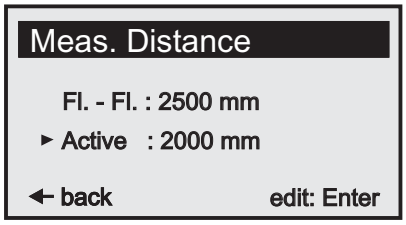
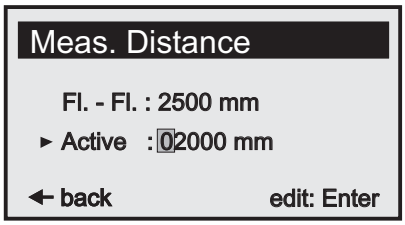
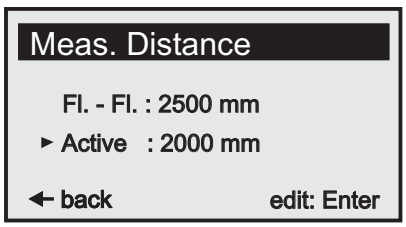
6.2.1.4 Measuring range

Display	Action	Note
	▶ Choose "**Measuring Range**" ▶ Press "**Enter**"	Measuring Range
	▶ Press "**Enter**"	Default setting: 1000 mg/Nm³ min: 100 max: 60 000
	▶ Choose with "**Arrow right**" ▶ Enter new value with "**Arrow up**" or "**Arrow down**" ▶ Press "**Enter**"	Confirm with "**Enter**" to save the new mode.
	▶ Press "**Arrow left**"	Display switches to selection screen

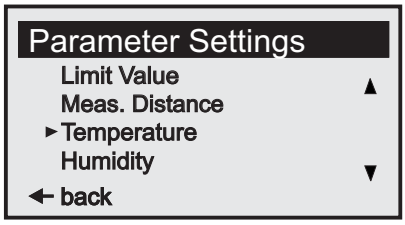
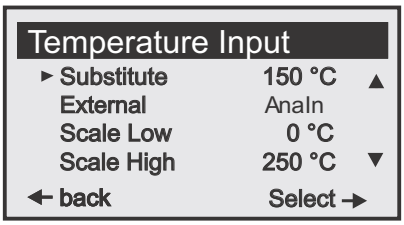
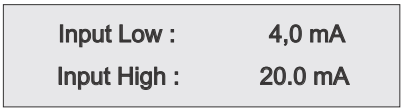
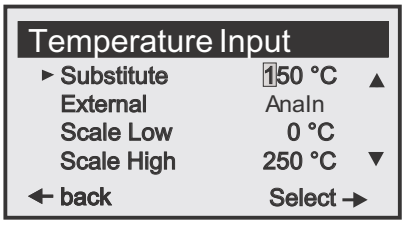
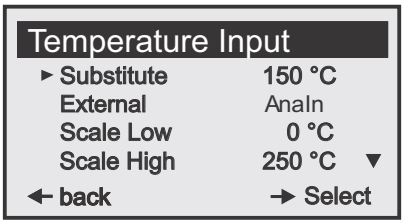
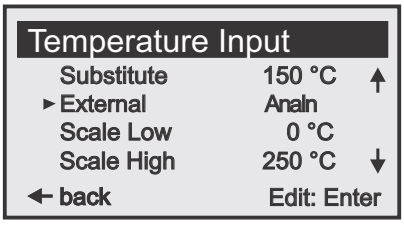
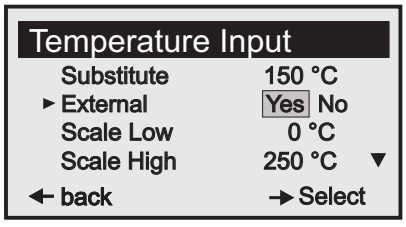
6.2.1.5 Limit value

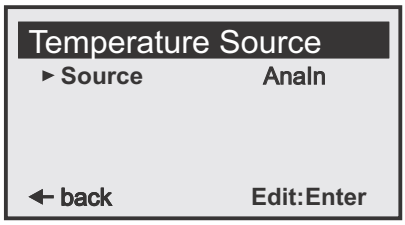
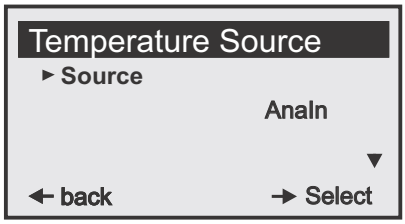
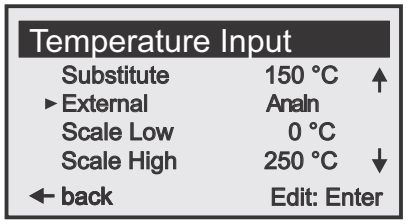
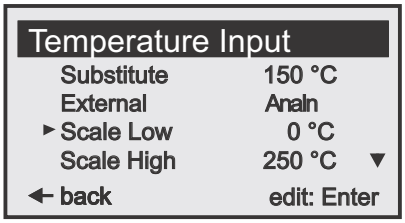
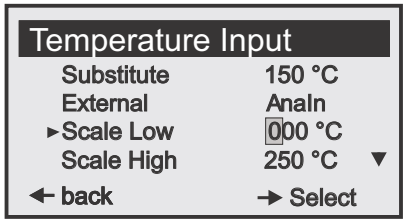
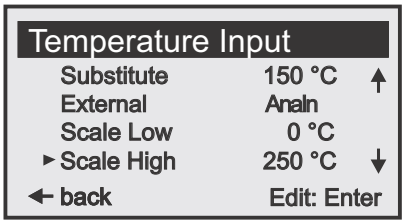
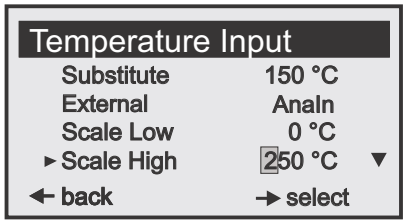
Display	Action	Note
	► Choose "**Limit Value**" ► Press "**Enter**"	Limit value
	► Press "**Enter**"	Default setting: 1000 mg/Nm³ **Important**: Is the value within the selected measuring range?
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new mode.
	► Press "**Arrow left**"	Display switches to selection screen

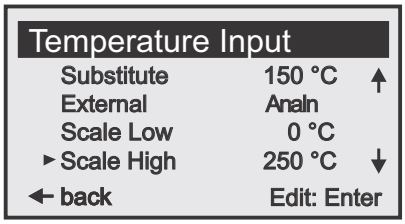
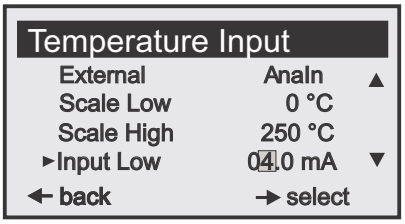
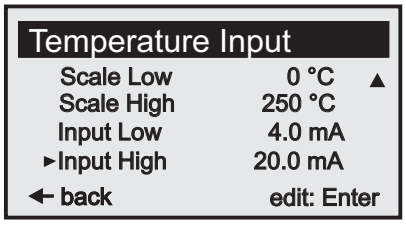
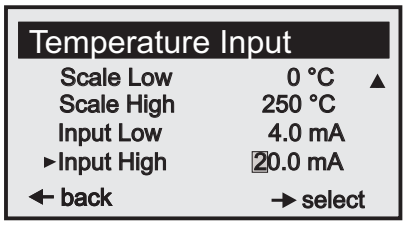
6.2.1.6 Flange to Flange Measuring Distance and Active Measuring Distance

Display	Action	Note
	► Choose "**Meas. Distance**" ► Press "**Enter**"	Measuring distance
	► Choose "**Fl.–Fl.**" and confirm with "**Enter**"	Default flange – flange measuring distance: 2500 mm (98.4 in) min: 500 mm (19.7 in) max: 8 000 mm (315 in)
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Enter the **exact fange to flange (fl.–fl.)** measuring distance! Confirm with "**Enter**" to save the new value.
		
	► Choose "**Active**" with "**Arrow down**" ► Press "**Enter**"	Enter the **active measuring distance** The **exact measuring distance** must be entered (±1 %)!
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Default active measuring distance setting: 2000 mm (78.7 in) Confirm with "**Enter**" to save the new value.
	► Press "**Arrow left**"	Display switches to selection screen

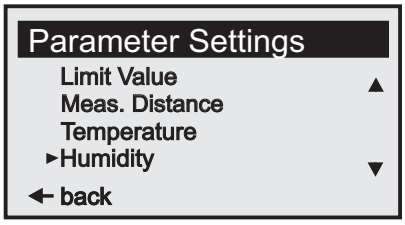
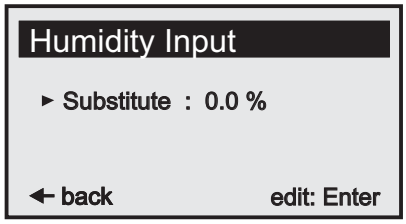
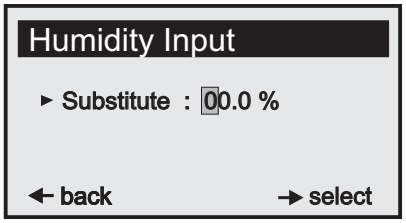
6.2.1.7 Temperature

Display	Action	Note
	► Choose "**Temperature**" ► Press "**Enter**"	Flue-gas temperature
 	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Enter the substitute temperature value The other input options are explained in the following screens
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Default substitute temperature value: 150 °C
		
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	For using an external temperature sensor
	► Choose with "**Arrow right**" ► Press "**Enter**" **Note**: source PROFIBUS possible	Confirm with "**Enter**" to save your selection.

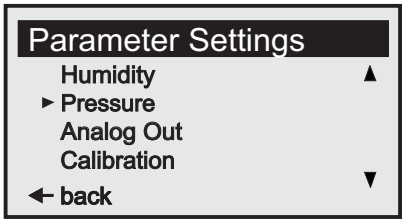
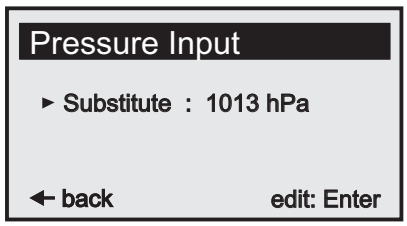
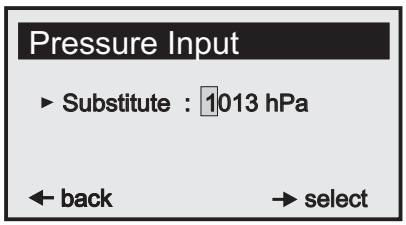
	►	
	►	
		
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Default setting: 0 °C (32 °F)
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value.
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Factory setting: 250 °C (482 °F) max: 500 °C (932 °F)
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	

	► Choose with "**Arrow down** or "**Arrow up**" ► Press "**Enter**"	Signal for the onset of the measuring range Factory setting : 4.0 mA
	► Choose with "**Arrow right**" ► Input of new value with "**Arrow down**" or "**Arrow up**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value.
	► Choose with "**Arrow down**" or "**Arrow up**" ► Press "**Enter**"	Signal for end of measuring range Factory setting: 20.0 mA
	► Chose with "**Arrow right**" ► Input of new value with "**Arrow down**" or "**Arrow up**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value.

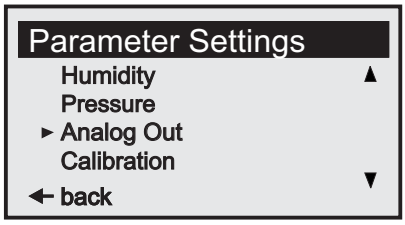
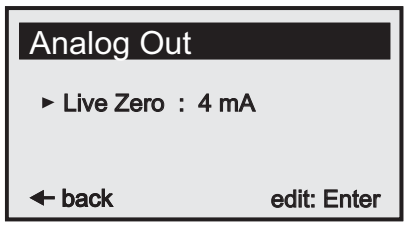
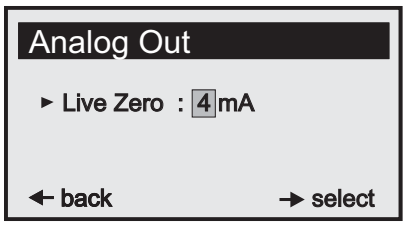
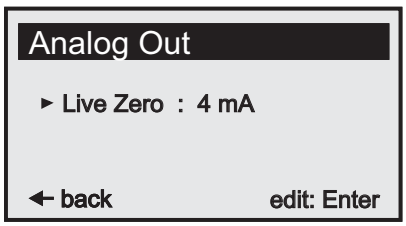
6.2.1.8 Humidity

Display	Action	Note
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Flue-gas humidity
	► Press "**Enter**"	Default setting: 0.0 % This is the dry correction value max: 99.9 %
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value.

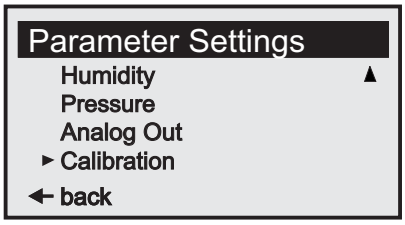
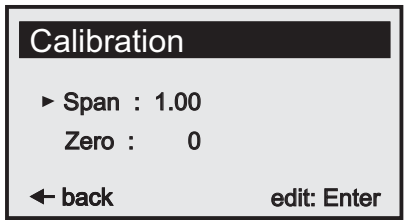
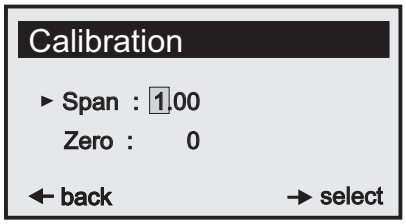
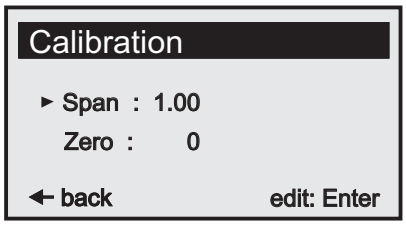
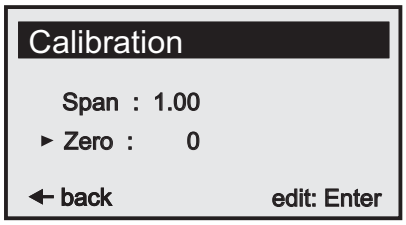
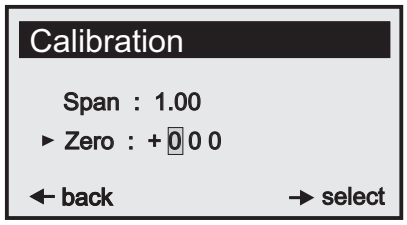
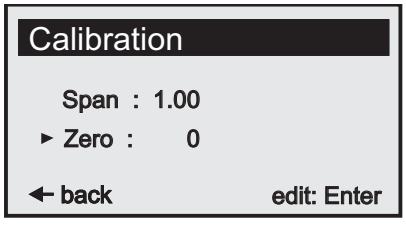
6.2.1.9 Pressure

Display	Action	Note
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Flue-gas pressure
	► Press "**Enter**"	Default setting: 1013 hPa (14.7 psi) min: 800 max: 1 200
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value. This is the pressure correction value (in ppm or standard)

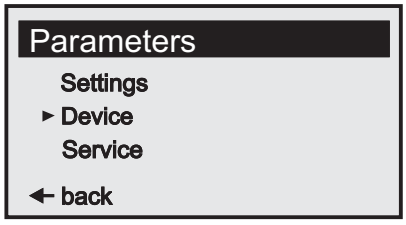
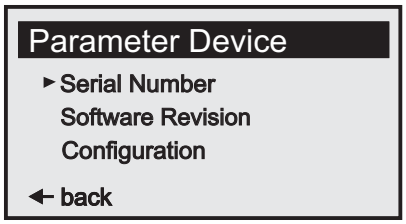
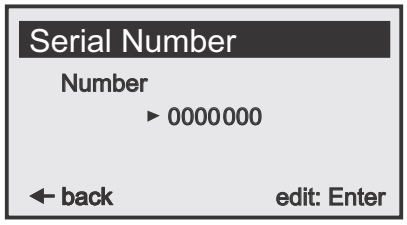
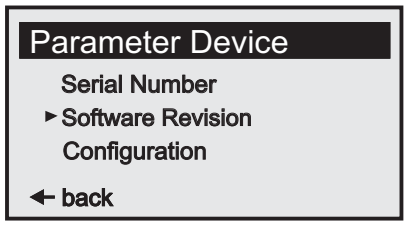
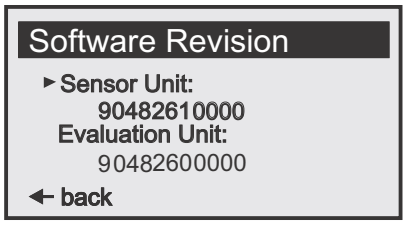
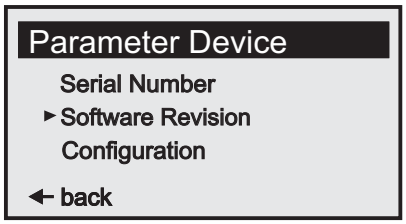
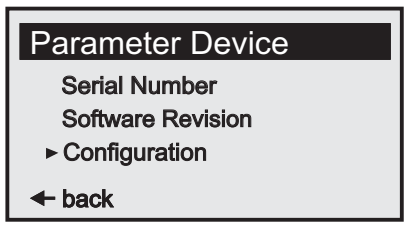
6.2.1.10 Analog output

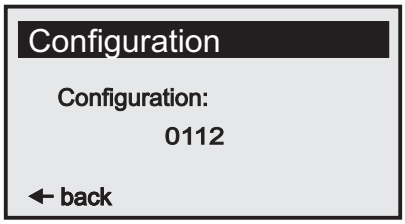
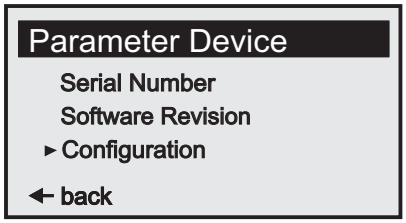
Display	Action	Note
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Analog Output / live zero
	► Press "**Enter**"	Default setting: 4 mA
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value. Possible values: 0 to 4 mA
		

6.2.1.11 Calibration

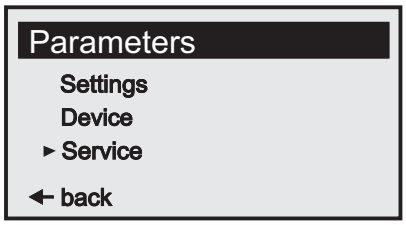
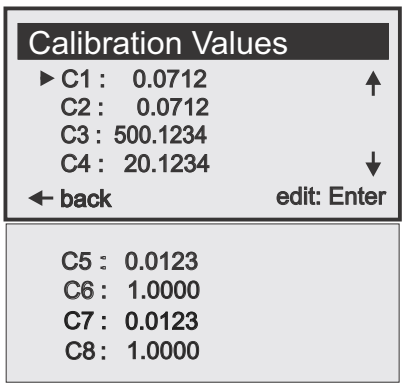
Display	Action	Note
	► Choose with "**Calibration**" ► Press "**Enter**"	On-site calibration
	► Press "**Enter**"	SPAN / characteristic slope Default setting: 1.00 Can be changed, e.g. after SPAN test
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value. Possible setting range for Span: 0.50 ... 1.99
		
	► Press "**Enter**"	Default setting: 0 Offset correction possible, e.g. after comparative measurement
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Confirm with "**Enter**" to save the new value.
	► Press "**Arrow left**"	Display switches to selection screen

6.2.2 Device Data

Display	Action	Note
	► Choose with "**Device“** ► Press "**Enter**"	Key device data
	► Press "**Enter**"	
	► Press "**Arrow left**"	Display serial number of device
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Display software version
	► Press "**Arrow left**"	
		
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Device Configuration

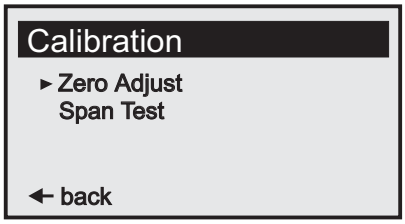
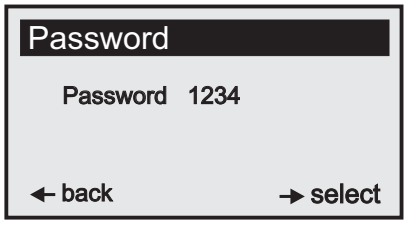
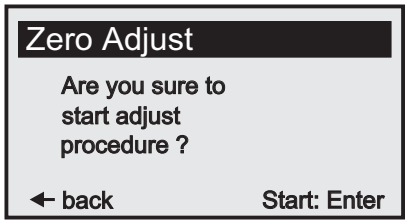
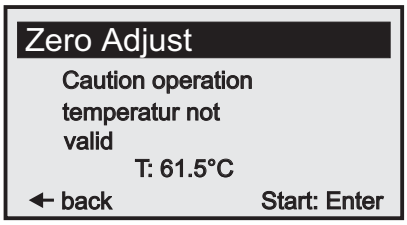
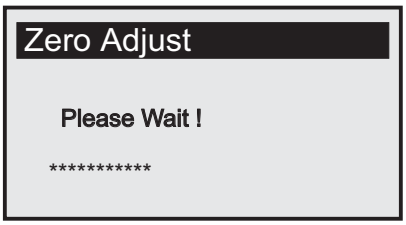
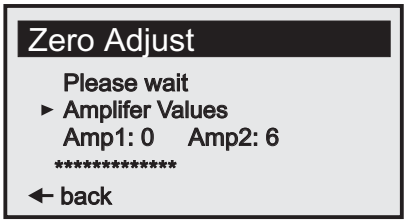
	▶ Press "**Arrow left**"	Display the device configuration 0112 = standard No inputs allowed
	▶ Press "**Arrow left**"	

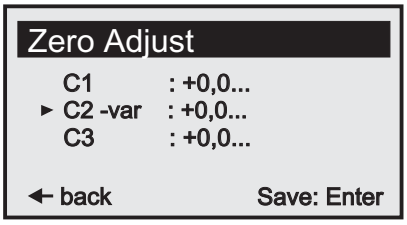
6.2.3 Service

Display	Action	Note
	▶ Choose with "**Arrow up**" or "**Arrow down**" ▶ Press "**Enter**"	Sensor calibration parameters **Important**: changes can lead to deviations in the measured values
	▶ Press "**Arrow left**"	These values may only be changed in exceptional cases, e.g. when the receiver is replaced

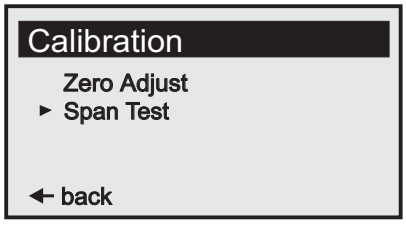
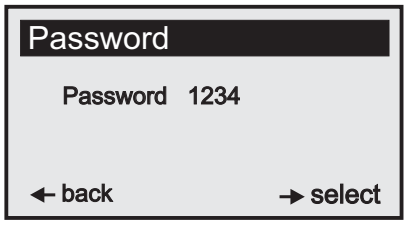
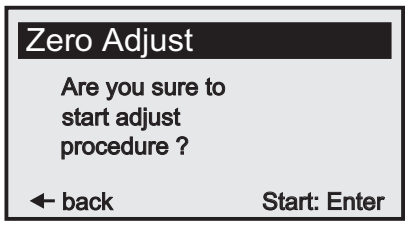
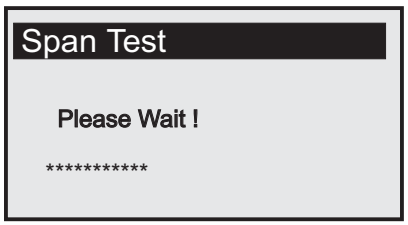
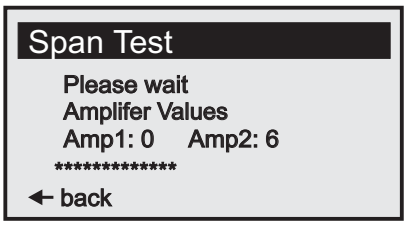
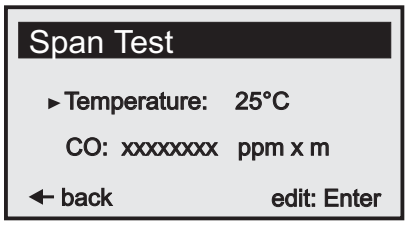
6.3 Calibration

6.3.1 Zero-Point Adjustment

Display	Action	Note
	► Press "**CAL**" ► Choose with "**Zero Adjust**" ► Press "**Enter**"	
	► Type in password "**1234**"	Abfrage kommt nur bei ausstehender Warnung (z.B. Gerätetemperatur)
	► Press "**Enter**" ► Cancel with "**Arrow left**" (back)	
		Wait until device temperature has been reached Message is only displayed if the temperature has not stabilized yet
	► Press "**Enter**" (for T=60 °C/140 °F ±0,5 °C) ► Cancel with "**Arrow left**"	No inputs can be made during the calibration procedure
		No inputs can be made during the calibration procedure

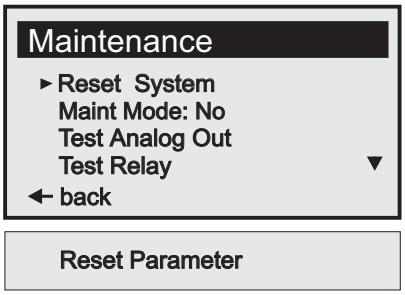
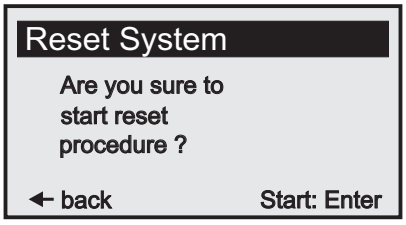
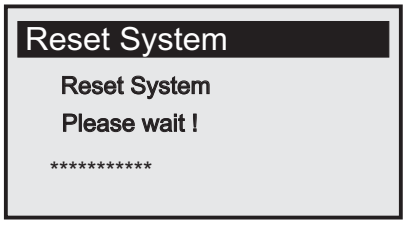
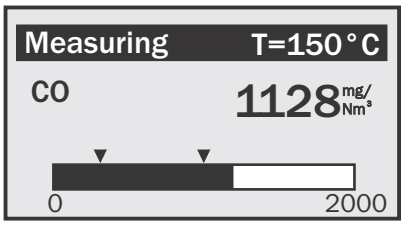
	► Press "**Enter**"	Data is saved

6.3.2 SPAN-Test

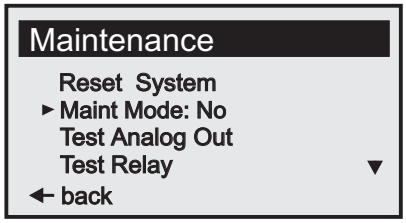
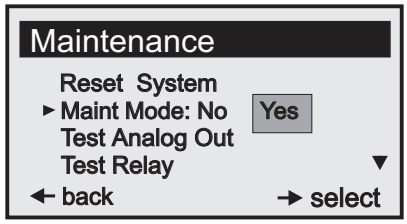
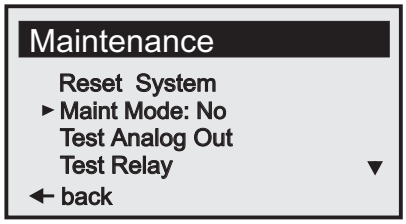
Display	Action	Note
	► Choose "**SPAN Test**" ► Press "**Enter**"	
	► Type in password "**1234**"	Prompt is displayed only when a warning is pending (e.g. device temperature)
	► Press "**Enter**"	Start the zero-point adjustment for the SPAN test
		Zero-point adjustment is performed No inputs allowed on device
		Zero-point adjustment is performed No inputs allowed on device
	► Edit ambient temperature ► Insert test cell in the holder	Set the temperature to the current ambient temperature Compare the measured value displayed with the value on the test cell Deviations can be corrected with the SPAN value, if necessary The span factor setting is calculated from the setpoint (label on test cell) divided by the displayed measured value. Press Back to terminate span adjustment

6.4 Maintenance

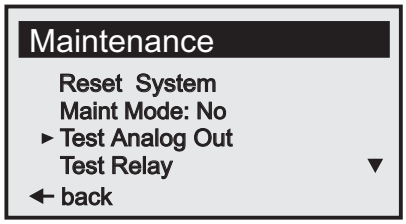
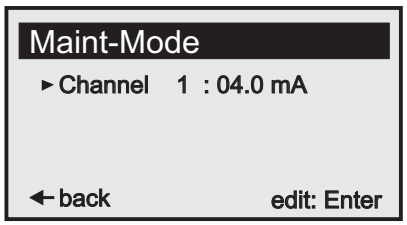
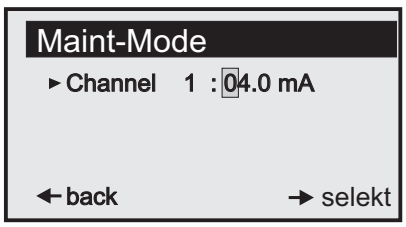
6.4.1 Reset System

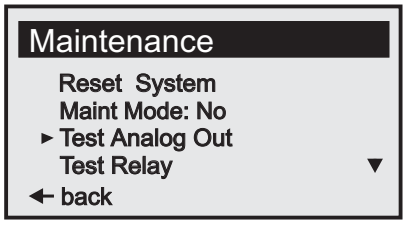
Display	Action	Note
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Restart the device
	► Press "**Enter**"	
		No inputs allowed on device
		The device is restarted

6.4.2 Maintenance Mode

Display	Action	Note
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	
	► Choose with "**Arrow right**" ► Press "**Enter**"	If you choose YES, the display switches to Maintenance Mode Output relay drops out Analog output keeps the last value
		

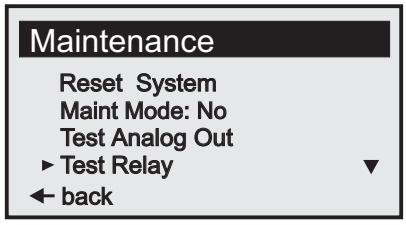
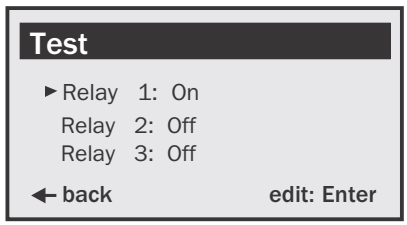
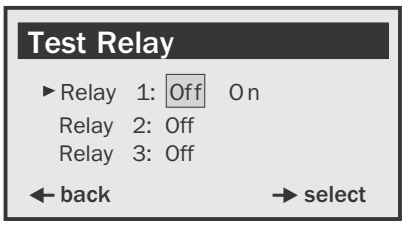
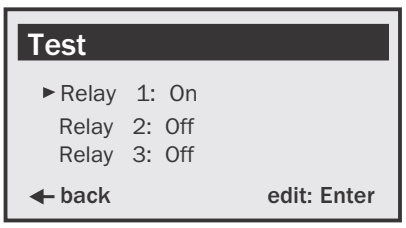
6.4.2.12 Analog Output Test

Display	Action	Note
	► Press "**Enter**"	
	► Press "**Enter**"	The set value must be output at the analog output
	► Choose with "**Arrow right**" ► Enter new value with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	

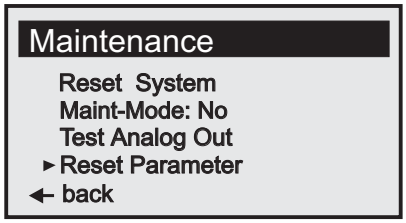
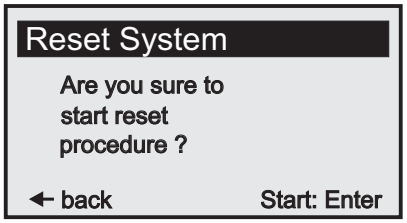
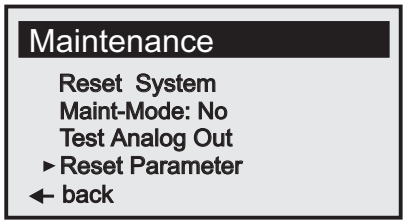
		

Note: Analog-In can be tested using the displayed sample gas temperature

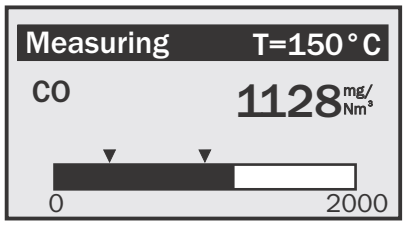
6.4.3 Test Relais

Display	Action	Note
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	Test relay 1 and relay 2
	► Choose with "**Arrow up**" or "**Arrow down**" ► Press "**Enter**"	
	► Choose with "**Arrow right**" ► Press "**Enter**"	
		

6.4.4 Reset Parameter

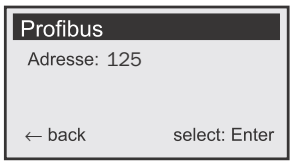
Display	Action	Note
	► Press "**Enter**"	
	► Press "**Enter**"	**Caution:** All values are reset to default. Calibration data will be lost!
		No inputs allowed on device

6.5 Measuring Mode

Display	Action	Note
		You can press "**Meas**" at any time to switch to Measuring mode

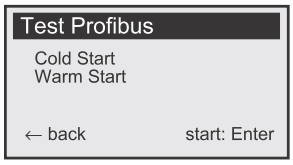
6.6 Connection of the PROFIBUS for Commissioning (when in use)

- Activate paramerization mode (**par**) .



- Select menu Profibus and choose adress.
- Enter appropiate 7-Bit-adress by using the arrow keys and confirm with **Enter** .

Note: The addresses 126 and 127 are reserved and cannot be used.



- Activate maintenance mode (**maint**) to start the Profibus menu .
- Choose **Init PBUS Cold**.

This initializes the new adress of the Profibus software. The device master file(GSD) can now be configured via PROFIBUS-Master to the operational requirements of the GM901.

- Choose **Init PBUS Warm**.

Restart of the PROFIBUS stack.

7 Decommissioning of the GM901

7.1 Dismantling the Sender and the Receiver

It is recommended to decommission the GM901 device during longer periods of plant shut downs. It is essential to dismount the GM901 if the optional purge air unit is decommissionend.

Hot, toxic gases may be released!

Toxic gases may be released from the duct when the GM901 system components are removed from the wedge flange or socket.

- ▶ Always take suitable safety precautions.

Execution

- ▶ Disconnect the cable connectors from the sender and receiver and stored them in a safe place (e.g. away from dirt and moisture) if the system is not to be used for a longer period of time.
- ▶ Remove the GM901 sender and receiver by loosening the clamps
- ▶ Seal the purge-air attachments with optional flange cover

Note The optical alignment of the Purge air attachment is not affected.

7.2 Decommissioning

Safety instructions

The steps involved must be carried out in line with VDE specifications and national guidelines. When disassembling system components, make sure that:

- No live wires are accessible.
- Open cable ends are always insulated and protected from dirt and moisture.

Switches that may not be activated for safety reasons are labeled accordingly and safeguarded to prevent unintentional activation.

8 Technical Data

8.1 Overview

Measuring range	100 ppm to 60, 000 ppm *)
Measuring distance (GM901-05)	0.5 m to 8.0 m (1.6 to 26 ft)
Gas temperature	max. 250 °C (482 °F) extented calibration: 400 °C (752 °F)
Linearity	±5% of measuring range end value
Resolution	approx. 10 ppm
Response time	5 to 360 sec
Ambient temperature	–20 °C to +55 °C (–4 °F to 130 °F)
Degree of protection	IP 65/NEMA4X
Supply voltage	115 V / 230 V
Power frequency	50 / 60 Hz
Max. power consumption	75 VA

*) depending on active measuring distance

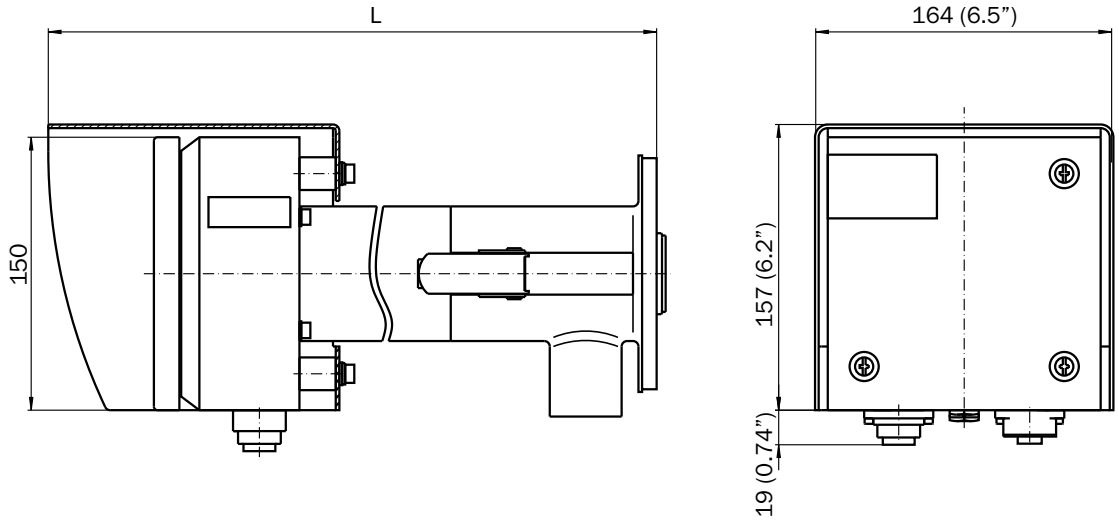
8.2 Sender and Receiver of the GM901-5

Dimensions (L x W x H)	462 mm x 164 mm x 164 mm (18.2 in x 6.5 in x 6.5 in) Length incl. purge-air attachment
Weight	3 kg (6.6 lb) incl. purge-air attachment
Lamp service life	approx. 20,000 hours

8.3 Evaluation Unit

Analog input:	0 to 20 mA Input resistance 100 W
Analog output electrically isolated	0 to 20 mA; max. load 500 W
Relay 1 *Contacts open at device error / Warning*	Floating 125 V, 1A, 150 VA DC NC contact for malfunction
Relay 2 normally closed contact when exceeding the limit	Value Floating, NO contact, 125 V, 1A, 150 VA DC
Status input	Status input for maintenance Max. contact load 5 V / 2 mA
Interfaces	RS 232 für Service PROFI BUS -DP-V1 (when in use) CAN bus (optional)
Dimensions (L x W x H)	200 mm x 90 mm x 300 mm (7.9 in x 3.5 in x 11.8 in)
Weight	4.3 kg (9.5 lb)

8.4 Dimensioned Drawing – Sender



L ... length
sender298 (11.7“)
receiver462 (18.9“)

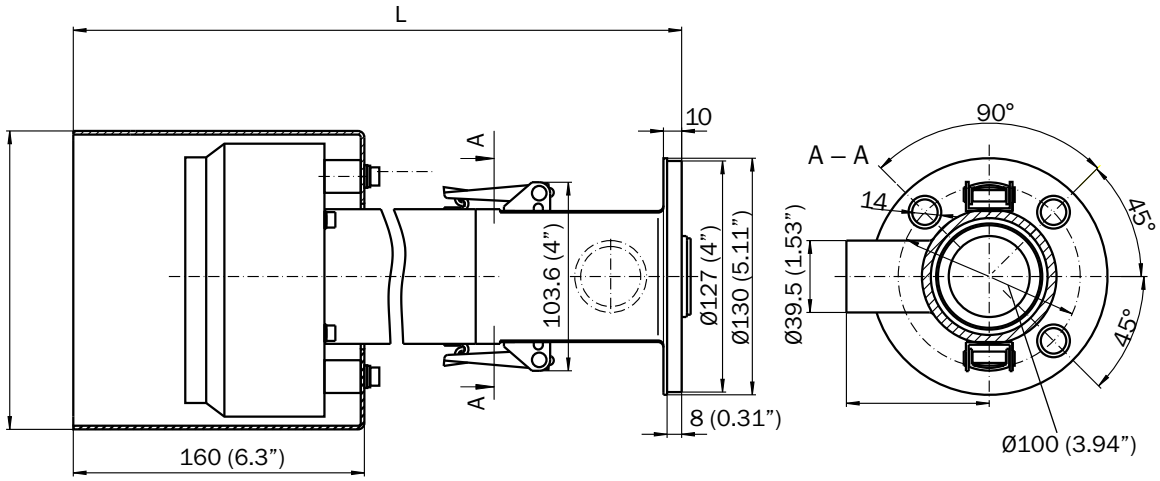


Fig. 29 Dimensioned Drawing - Sender

8.5 Dimensioned Drawing – Evaluation Unit

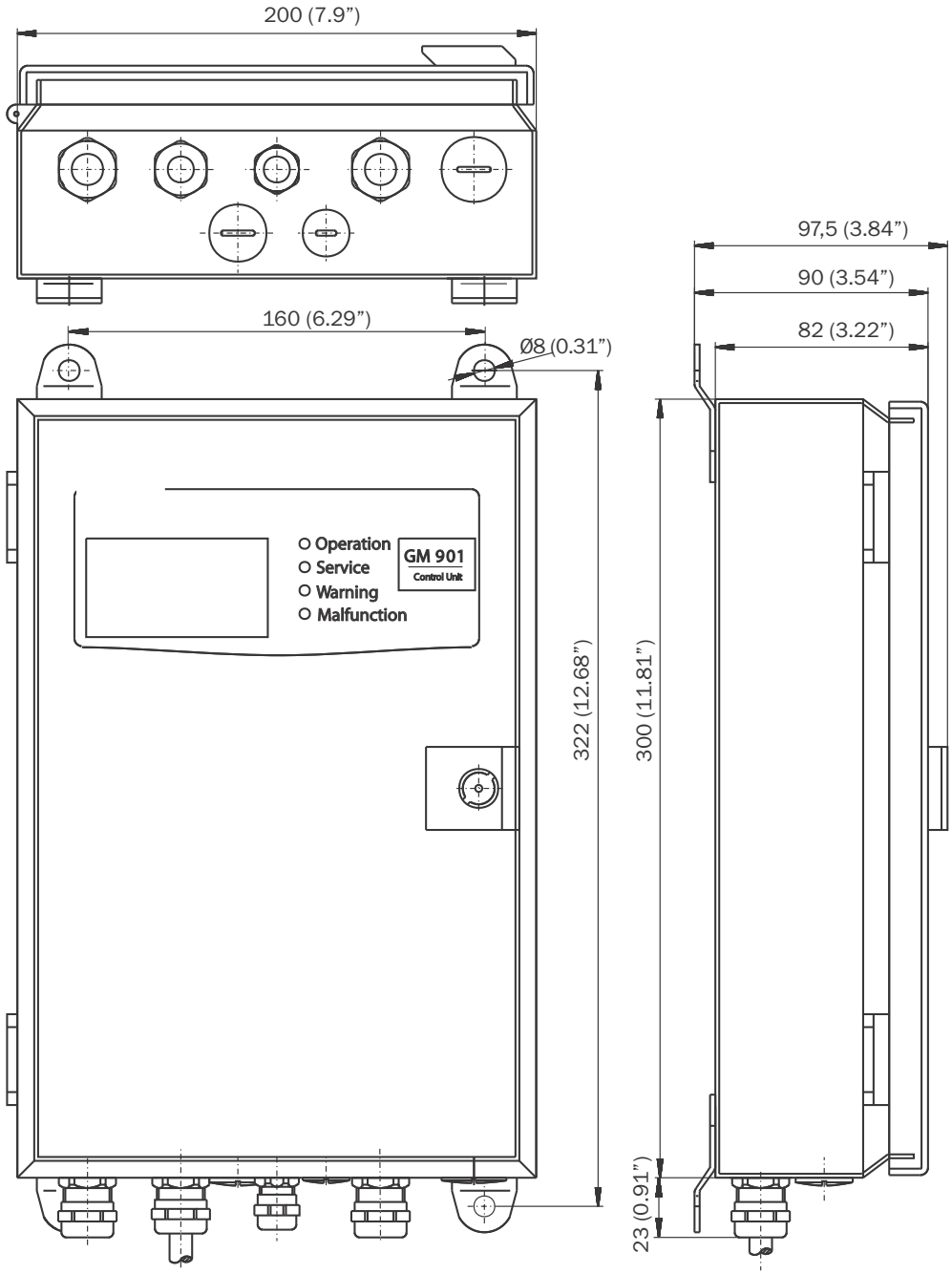


Fig. 30 Dimensioned Drawing - Evaluation Unit

9 Warnings and Malfunctions

9.1 Warnings

Message	Possible cause	Remedy
Analog input temperature out of range	• The input signal (0...20 mA) of the temperature measurement is outside the set parameter limits, the system will continue to use the substitute value	▶ Check temperature sensor ▶ Check cable connection ▶ Check parameters
Temperature low, no humidity correction	• The measured gas temperature is so low that a plant shutdown is assumed. For this reason, a cross-sensitivity correction for the flue-gas humidity will not be performed	▶ Check temperature sensor ▶ Check parameters The switching point is 70 °C (158 °F) or half the substitute temperature, depending on which value is lower ▶ No action required if the system has been shut down
Sensor low signal	• Dust content too high • Fog formation • Optical boundary areas of the device are contaminated • Device is not adjusted correctly	▶ Check the alignment of the device ▶ Clean the optical boundary areas ▶ Check whether the light path through the duct is obstructed ▶ Warning is still displayed after the above actions have been carried out ▶ New zero-point adjustment
Warming up	• The required operating temperature is not reached shortly after the device is switched on, the displayed measured values could be out of tolerance	▶ Wait approx. 30 minutes

9.2 Malfunctions

Message	Possible cause	Remedy
EEPROM Parameter	• Invalid parameters • Evaluation unit defective	▶ Reset parameters see *Chapter 6.4.4, p. 57* ▶ Renew parameter settings ▶ New zero-point adjustment
Sensor communication	• Data communication error between receiver and evaluation unit	▶ Check cable connection and whether the connector is positionend correctly ▶ For further measures see *Chapter 9.3, p. 66*
Sensor amplifier has reached maximum value	• Device adjusted incorrectly • Opt. boundary areas contaminated • Light path interrupted	▶ Check the alignment of the device ▶ Clean opt. boundary areas ▶ Check light path
Sensor no signal	• Device adjusted incorrectly • Opt. boundary surfaces contaminated • Light path interrupted • Receiver unit defective	▶ Check the alignment of the device ▶ Clean opt. boundary areas ▶ Check whether the light path through the duct is obstructed
Signal too high	• Flange to Flange measuring distance < 0.5 m (1.96 in)	▶ Correct Fl.-Fl. measuring distance
IR source fault	• IR source defective • Voltage supply defective	▶ Check the lamp connector (**Attention**: the lamp is extremely hot when in operation) ▶ Replace the sender unit if necessary
Chopper fault	• Chopper in sender unit defective	▶ Check the chopper connection in the sender unit (**Attention**: the lamp is extremely hot when in operation) ▶ Replace the sender unit if necessary
Device not ready, warming up	• The required operating temperature is not reached shortly after the device is switched on • Device not operational	▶ Wait approx. 30 minutes
Motor fault	• Motor in receiver unit defective	▶ Replace receiver unit

9.3 Further Troubleshooting Tips

9.3.1 Troubleshooting on the Sender

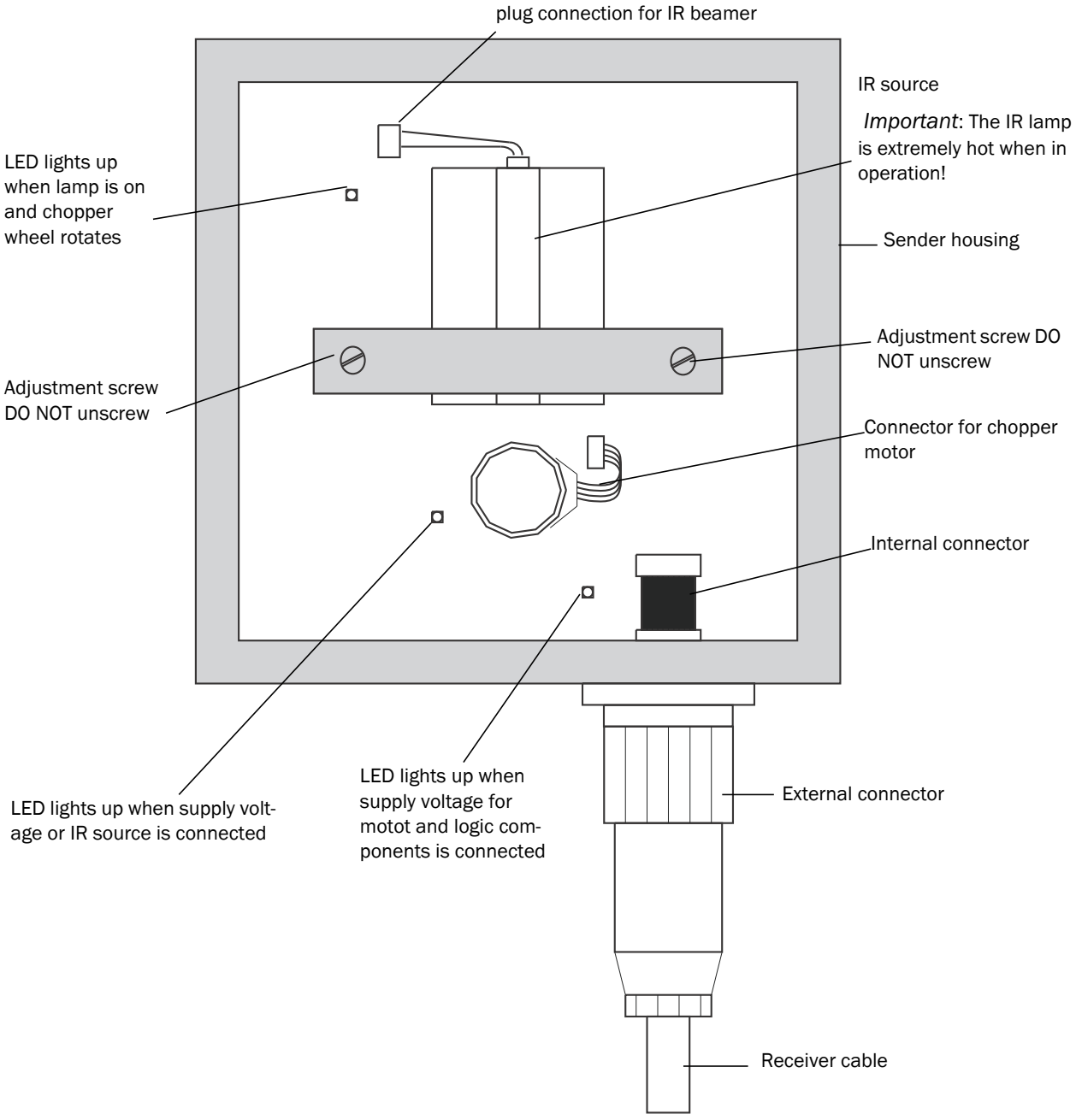


Fig. 31 Troubleshooting on the Sender

ATTENTION

Loosening the 2 adjustment screws will cause the sender to become misaligned

- The sender can only be realigned at the factory!

9.3.2 Troubleshooting on the Receiver

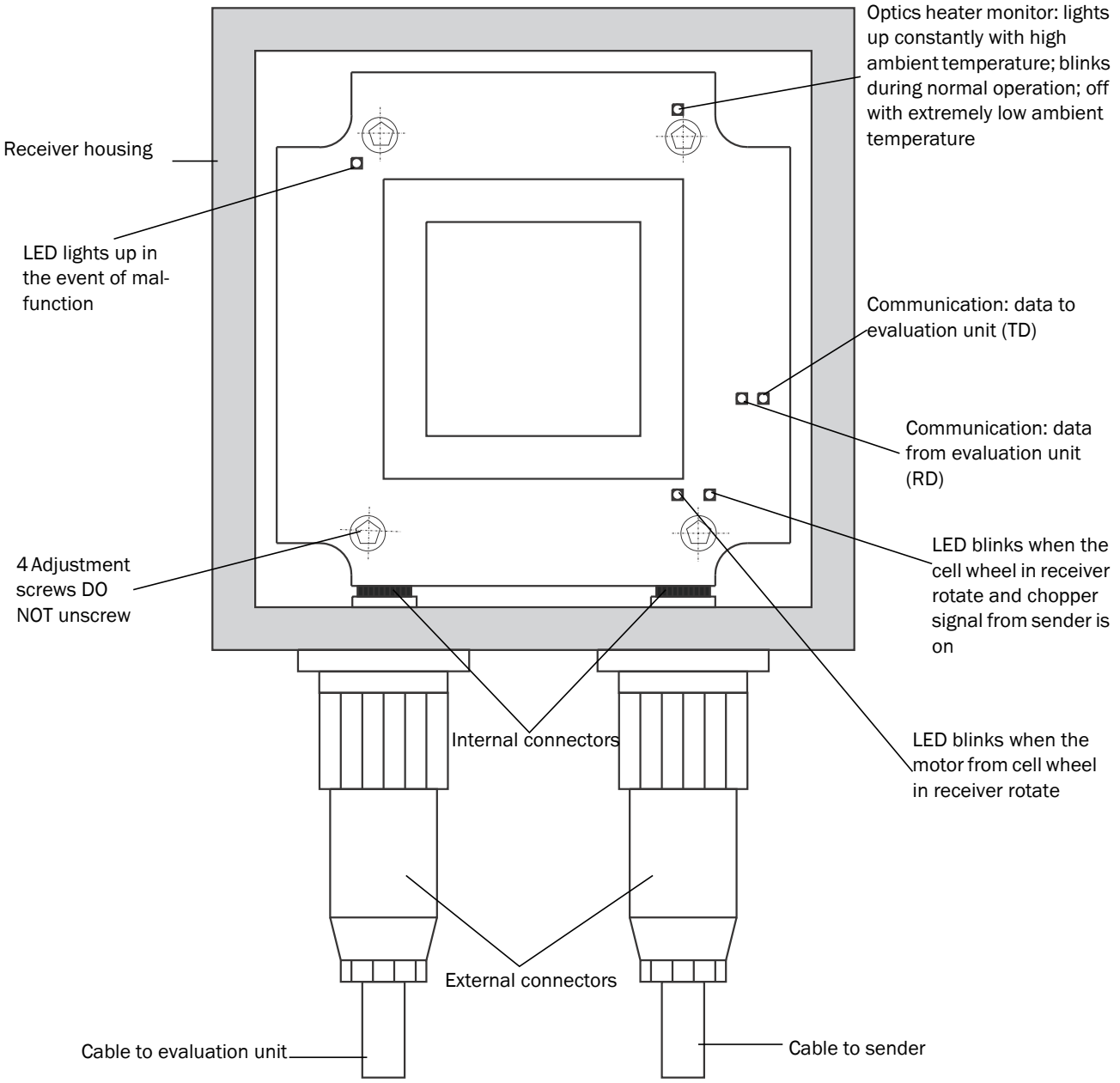


Fig. 32 Troubleshooting at the receiver

ATTENTION

Loosening the 4 adjustment screws will cause the sender to become misaligned

- The sender can only be realigned at the factory!

9.3.3 Troubleshooting on the Evaluation Unit

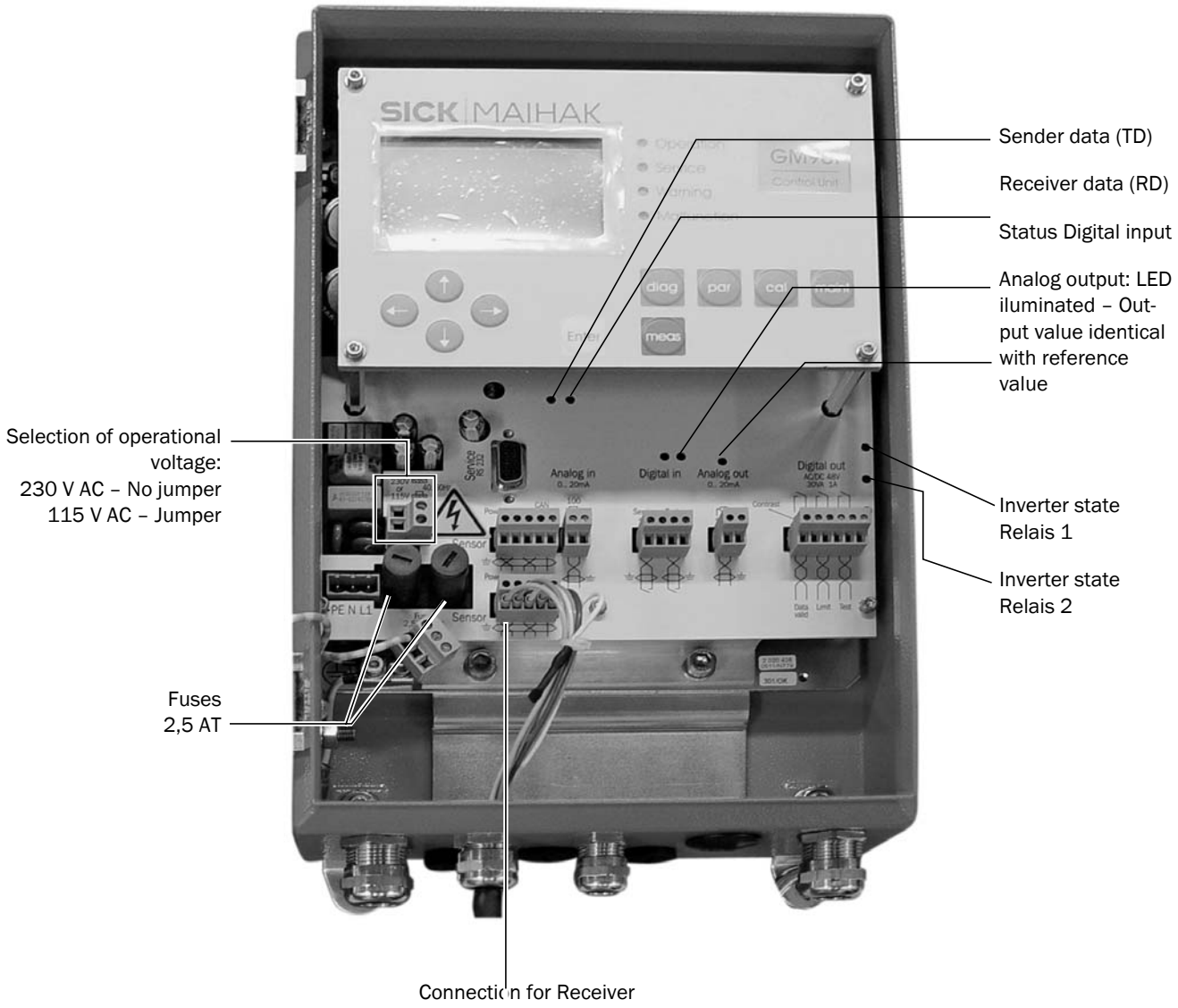


Fig. 33 Trouble shooting at the Sender – Standard

9.3.4 No Response from Device

- ▶ Check power supply
- ▶ Check operating voltage setting
- ▶ Check fuse in the evaluation unit
- ▶ Check 24 V -/ 5 V display on the evaluation unit; disconnect the plug-in terminal of the receiver cable if necessary.
  If this display only appears when the connector has been removed, check the cable first.

If no faults on the cable are found, connect the system components one after the other.

1. First connect the cable from the evaluation unit to the receiver
2. Connect the receiver

3. Lay cable from the receiver to the sender
4. Connect the sender

If the fault occurs again, it is caused by the component that was connected last. Replace the component.

9.3.5 Communication Error Between the Evaluation Unit and Receiver

Error message: Sensor communication

The receiver is transmittmitting constantly data to the evaluation unit. The data gets automatically checked if the unit does not receive the data.

Check the following connections:

- Connection between the evaluation unit and receiver
- Cable connection at the plug-in terminal in the evaluation unit
- Receiver cable
- External connector on the receiver
- Internal connector in the receiver

9.3.6 Sensor Values

The sensor values specified in the table apply to normal operation within the specified limits (and with the sensor in position).

To call up this data, see *Chapter 6.1, p. 35* **or press diag.**

Unit	Description	Min. Value	Typ. Value	Max.Value
V1	Signal-Value 1	0.5 V	Depends on current conditions	5.0 V
V2	Signal-Value 2	0.5 V	Depends on current conditions	5.0 V
DK	Variability of k-Value	0	Depends on current conditions	
CC	Cooler Current	0 mA	Depends on ambient temperature	1200 mA
TE	Temperature of Electronic Unit	20 °C (68 °F)	Depends on ambient temperature	80 °C (176 °F)
TO	Temperature of Optic Unit	50 °C (122 °F)	60 °C (140 °F)	80 °C (176 °F)
TD	Detector Temperature	9 °C (48.2 °F)	10.7 °C (51.26 °F)	12 °C
AG	Amplifier Gain	00.00	Depends on measuring distance	31.31

If the sensor values of the GM901 are outside this range, please contact the SICK Service Department for remote diagnosis.

9.3.7 Remote Diagnosis

If the information in this section is not sufficient to correct an error and return the GM901 to its operating state, please read the following messages on the GM901 display and send it to the SICK Customer Service Department quoting the device data so that we can carry out a remote diagnosis .

Fig. 34 Remote diagnosis standard form

Customer: _____**System:** _____

Contact person:_____**Tel:**_____

FAX: _____

Diagnosis:

Malfunction messages: _____

_____

Warning messages:_____

_____

Sensor Values: V1: _____TE: _____

V2: _____TO: _____

DK: _____TD: _____

CC: _____AG: _____

Parameter: Physical Unit:_____Normalization: _____

Response Time:_____ sMeasuring Range: _____

Limit Value:_____

Measuring Distance: Fl.-Fl.: _____ mmActive: _____ mm

Temperature: Substitute: _____ °CExternal: _____

Scale Low: _____ °CScale High:_____ °C

Input Low: _____ mAInput High:_____ mA

Humidity: Substitute: _____ %

Pressure: Substitute:_____ hPa

Analog Out: Live Zero: _____ mA

Calibration SPAN:_____Zero: _____

Parameter Device: Serial Number:_____

Software Revision: Sensor Unit:_____Evaluation Unit: _____

Configuration: _____

Service: C1: _____ C2: _____C3: _____ C4: _____

C5: _____ C6: _____ C7: _____ C8: _____

Current Measuring:

Measured value:_____ _____ / _____ mA

Flue-gas temperature: _____ °C

Ambient temperature: _____ °C

10 Spare Parts, Accessories

10.1 Spare Parts

Description	Number	Order Nr.
GM901-05 Sender without purge-air attachment	1	2 032 400
GM901-05 Receiver without purge-air attachment, part exchange (only available when a defect part is returned to the manufacturer)	1	2 02 0 655
Receiver GM901-05	1	2 032 347
GM901 Evaluation unit	1	2 020 428
Evaluation unit , part exchange	1	2 020 400
Receiver connection cable, 17 m	1	2 043 415
Connection cable (15 m/49.2 ft)	1	2 020 439
Electronics card module evaluation unit	1	2 019 774
Touch-sensitive keypad (GM901 Evaluation unit)	1	6 020 400
Cell wheel mit motor	1	2 032 124

10.2 Options, Accessories

Description	Number	Order Nr.
Optical adjustment device	1	2 020 436
Mounting bracket for zero-point comparison path	2	2 020 445
Purge-air unit with distributor and hose (5 m/16.4 ft)	1	1 012 424
Purge-air hose D=40 m/131 ft	1	5 304 683
Connection unit with 230 V / 24 V power supply for sender and receiver	1	2 020 440
Extension cable (5 m/16.4 ft)		2 020 437
Extension cable (10 m/32.8 ft)		2 020 438
Extension cable (15 m/49.2 ft)		2 020 439
Weatherproof cover for purge-air unit	1	5 306 108
Weatherproof cover for GM901 Evaluation unit	1	4 029 146
Blind flange with seal	2	2 020 435
Air filter kit	1	2 020 442
Testing set for SPAN testing		2 019 639
Adapter flange GM910 -> GM901	1	2019 369

11 General maintenance

11.1 General

Maintenance activities are principally application-dependent because the influences are also individual. Typically, the maintenance interval is determined based on experience..

11.2 Maintenance intervals of individual components of GM901 CO systems

GM901 (sender, receiver, evaluation unit)

Interval	Action
Half-yearly	► Check optics and optical equipment for cleanness and clean as required.
Yearly	► Drift check (zero point/adjustment and sensitivity check with test cells).

Spüllufteinheit

Interval	Action
Half-yearly	► Clean purge-air filter and replace, if required.
Yearly	► Calibration of measuring system with test gas or filter check in cooperation with SICK.

GM901

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SICK worldwide

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www.sick.com

Your local sales and service partner

Sensor Intelligence.