

MOUNTING AND OPERATING INSTRUCTIONS

SAMSON

EB 9519 EN

Translation of original instructions



Media 5 with 4 to 20 mA current output



Media 5 with limit switch

Mounted valve block and pressure gauge for operating pressure

Media 5 Differential Pressure and Flow Meter

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service Department (aftersaleservice@samson.de).



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samson.de > **Service & Support** > **Downloads** > **Documentation**.

Definition of signal words

DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

1	Safety instructions	5
2	Design and principle of operation	6
2.1	Optional modules	6
3	Technical data	8
4	Installation	10
4.1	Arrangement of instruments for liquid level measurement	10
4.2	Arrangement of devices for flow rate measurement	10
4.3	Media 5 indicating unit	10
4.4	Differential pressure lines	10
4.5	Orifice flange (orifice plate assembly)	12
4.5.1	Accessories	12
4.5.2	Valve block	12
4.5.3	Shut-off and equalizing valves	13
4.5.4	Compensation chambers	13
4.5.5	Accessories for connection	13
5	Start-up	14
5.1	Liquid level measurement	14
5.2	Flow rate measurement	14
6	Operation	15
6.1	Zero calibration	15
6.2	Checking zero	15
6.3	Water drainage	16
6.4	Adjusting and modifying the measuring range	16
7	Limit switch (optional)	18
7.1	Electrical connection	18
7.2	Adjusting the alarm contacts	19
7.3	Retrofitting/replacing the contact unit	20
8	4 to 20 mA current output (optional)	23
8.1	Retrofitting	23
8.2	Settings	26
8.3	Nameplate	29

9	Dial faces.....	30
9.1	Attachable dial plates.....	30
10	Dimensions	32

NOTICE

Devices intended to measure gaseous oxygen are labeled **Oxygen! Keep free of oil and grease!**



These versions are cleaned and assembled under special conditions. When replacing parts that come into contact with gaseous oxygen, e.g. range springs, wear suitable gloves and make sure that the parts do not come into contact with oil or grease.

When returning devices for oxygen service for repair, the sender assumes full responsibility that the devices are handled to meet all requirements stipulated by VBG 62 or similar regulations until they are handed over to the manufacturer. Otherwise, SAMSON does not accept any responsibility.

1 Safety instructions

- The device is to be mounted, started up or operated only by trained and experienced personnel familiar with the product. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- Any hazards that could be caused in the device by the process medium or operating pressure are to be prevented by taking appropriate precautions. To ensure appropriate use, only use the device in applications where the operating pressure and temperatures do not exceed the specifications used at the ordering stage.
- The Media 5 Differential Pressure and Flow Meter without limit contacts may be used to measure flammable gases and liquids in which hazardous area conditions of Zone 0 are to be expected, provided the operator observes the applicable regulations for measuring flammable gases and liquids in Zone 0. This means that measuring instrument suited for the connection to Zone 0 can be installed provided:
 1. The pipes connecting the instruments have been sized and installed according to the German Technical Regulations for Flammable Liquids TRbF 50 or
 2. Flame arresters or endurance burning flame arresters have been installed in the two measuring lines.

Whether you have to install flame arresters or endurance burning flame arresters depends on the conditions on site. However, endurance burning flame arresters are preferably to be installed. You are required to contact the appropriate regulatory authority to agree on the necessary measures.

The operator is responsible for meeting the above specified requirements specified (1 and 2). SAMSON does not assume any responsibility if the operator fails to do so.

- Proper shipping and storage are assumed.
- Devices with a CE marking fulfill the requirements of the Directive 2014/34/EU (ATEX) and the Directive 89/336/EEC. This EC declaration of conformity can be provided on request.

2 Design and principle of operation

The Media 5 Differential Pressure and Flow Meter measures the differential pressure or derived measuring variables and displays the measuring signal. It is suitable for measuring gases or liquids, e.g. liquid level measurement on pressure vessels, differential pressure measurement between flow and return flow pipes, pressure drop measurement on valves and filters as well as flow rate measurement according to the differential pressure method.

The device comprises a differential pressure cell including a measuring diaphragm and range springs as well as an indicating unit including a pointer mechanism and dial plate.

The differential pressure $\Delta p = p_1 - p_2$ produced at the orifice plate creates a force at the measuring diaphragm (1.5), which is opposed by the range springs (1.4).

The movement of the measuring diaphragm and lever (1.8), which is proportional to the differential pressure, is routed from the pressure chamber by a flexible disk (1.9) and transmitted to the pointer mechanism (2.3) over the adjustable transmission element (2.1).

The zero adjuster (see Fig. 6) is used to adjust the pointer according to the scale value.

The differential pressure is shown linear on the dial and the flow rate is shown as a square root graduation.

2.1 Optional modules

The standard version of the Media 5 can be upgraded by installing a limit switch or a 4 to 20 mA current output.

Both options (limit switch or current output) are fitted in the housing of the indicating unit in place of the cover plate. The housing must be opened to operate and adjust them.

Version with limit switch

The gear segment (2.2) supports the metal tags (3.1) and activates the limit switch unit by moving the metal tags into the adjustable proximity switches (3.2).

When the metal tag enters the inductive field of the associated proximity switch, it assumes a high resistance (contact open). When the metal tag leaves the inductive field, it assumes a low resistance (contact closed).

The switching function is triggered when the metal tag leaves or enters the proximity switches, depending on the setting of the contacts.

Version with 4 to 20 mA current output

The angle of the pointer axis is measured by a magnetoresistive measuring system and converted into a 4-to-20 mA two-wire measuring signal.

Zero calibration, span calibration, characteristic selection and issuing of a 4 mA or 20 mA test signal are selected over keys on the front.

For the measuring signal output and power supply, a supply voltage U_b in the range from 12 to 36 V (DC) is required.

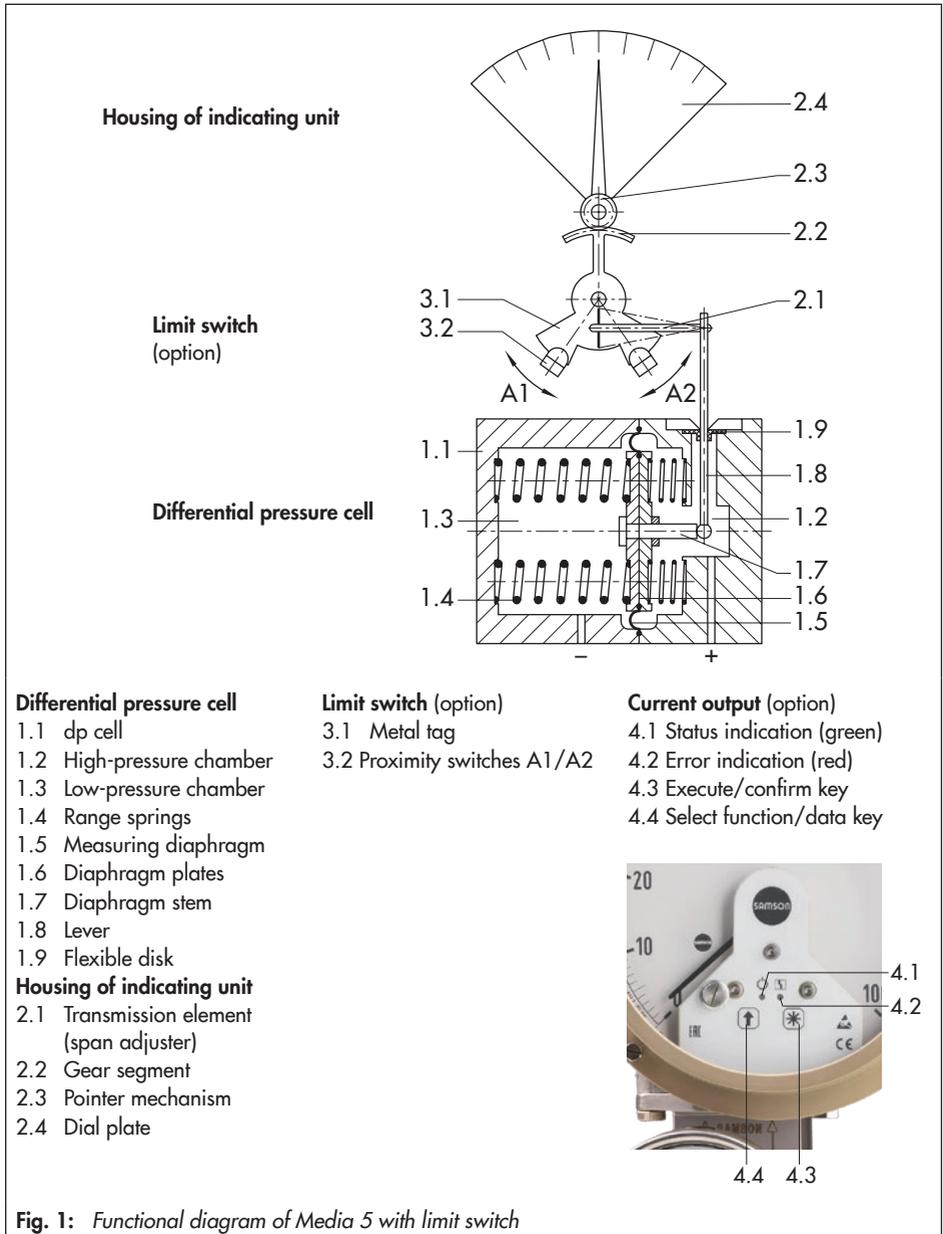


Fig. 1: Functional diagram of Media 5 with limit switch

3 Technical data

Table 1: Technical data · All pressure in bar (gauge) · All errors and deviations are specified in % of the adjusted measuring span

Media 5 Differential Pressure and Flow Meter											
Measuring range in mbar		0 to 60	0 to 100	0 to 160	0 to 250	0 to 400	0 to 600	0 to 1000	0 to 1600	0 to 2500	0 to 3600
Measuring span in mbar	min. max.	40 to 60	50 to 100	80 to 160	125 to 250	200 to 400	300 to 600	500 to 1000	800 to 1600	1250 to 2500	1800 to 3600
Accuracy class		±4.0 %	±2.5 %		±1.6 %						
Nominal pressure	PN 50, overloadable on one side up to 50 bar										
Indicator	Ø160 mm										
Characteristic	Reading linear to the differential pressure										
Deviation from terminal-based linearity	<±2.5 %	<±1.6 % including hysteresis									
Sensitivity	<±0.5 %	<±0.25 %									
Effect of static pressure	<0.03 %/1 bar										
Degree of protection acc. to DIN EN 60529	IP 54										
Weight	Approx. 3 kg without valve block Approx. 5 kg with valve block										
Compliance											
Limit switch (optional)											
Version	Max. 3 alarm contacts A1, A2 and A3 (limit switches) with inductive pick-up and LED according to EN 60947-5-6										
Control circuit	Values corresponding to connected isolating switch amplifier according to EN 60947-5-6, e.g. KFA6-SR2-Ex2.W										
Proximity switch	SJ3.5-N-LED, for hazardous areas according to PTB 99 ATEX 2219X										
Switching accuracy	<±2 %										
Dead band, approx.	<0.6 %										
Current output (optional)											
Version	Magnetoresistive measuring system										
Supply voltage U_B	12 to 36 V (DC)										
Output signal	4 to 20 mA, two-wire system										
Perm. load R_B in Ω	$R_B = (U_B - 12 \text{ V})/0.020 \text{ A}$ ($R \leq 600 \Omega$ at 24 V and 20 mA)										
Power consumption	103 mW										
Settings	Zero calibration Span calibration Characteristic selection Test function										

Characteristic	Output and reading linear or square root extraction depending on installed flow characteristic Characteristic set at the factory
Deviation from terminal-based linearity	<±0.2 %, related to 270° measuring span
Sensitivity	<±0.05 %, related to 270° measuring span
Effect of ambient temperature in the range from -40 to +80 °C	<0.1 %/10 K for zero and span

Ambient conditions	
Permissible ambient temperature range	-40 to +80 °C
Perm. storage temperature range	-40 to +100 °C
Use of Media 5 with gaseous oxygen	
Max. oxygen pressure	50 bar
Permissible ambient temperature range	-40 to +60 °C

Table 2: Materials

Media 5 Differential Pressure and Flow Meter		
Version	Standard version	
dp cell	CW617N (brass)	CrNi steel
Measuring diaphragm and seals	ECO ¹⁾	
Springs, diaphragm plates and functional parts, lever	CrNi steel	
Housing of indicating unit	Polycarbonate	

¹⁾ Other materials on request

i Note

The standard version of the Media 5 Differential Pressure and Flow Meter can be used to measure flammable gases and liquids in which hazardous area conditions of Zone 0 are to be expected. The relevant regulations on the measurement of flammable gases and liquids of Zone 0 must be observed.

Oxygen service: When the device is used for oxygen service, make sure that the dp cell and any SAMSON accessories (e.g. valve block) only come into contact with gaseous oxygen.

4 Installation

See Fig. 2 on page 11.

4.1 Arrangement of instruments for liquid level measurement

In arrangements as illustrated in the second schematic drawing, the additional height z is included in the measurement. As a result, this height must be as low as possible.

The dimension K (compensation height, Diagram 3) can be as large as required by the conditions in the plant.

4.2 Arrangement of devices for flow rate measurement

The decision whether the meter is to be mounted above or below the measuring point or whether compensation chambers are required depends on the process medium and the specific conditions in the plant. The installation drawing shows standard and reverse installation. Standard installation is preferable in any case. Reverse installation can only be used when there is no other possibility, particularly for steam measurements. Refer to VDE/VDI 3512 Sheet 1 for details.

4.3 Media 5 indicating unit

Make sure that the high-pressure line is connected to the high-pressure connection and the low-pressure line to the low-pressure connection.

Special screw fittings are required to connect the differential pressure lines. Depending on the device arrangement, seal any connections left unused with stoppers or vent plugs.

Carefully clean the connections before attaching the differential pressure lines. Do not rinse the device with compressed air or pressurized water.

Mount the device to a pipe, wall or mounting plate free of vibration.

Use mounting part with clamp for pipe mounting to attach it to a vertical or horizontal pipe. Use a mounting part without clamp for wall mounting. A bracket is required for panel mounting (see section 10).

4.4 Differential pressure lines

Install the differential pressure lines (pipes with 12 mm outside diameter) as shown in Fig. 3. Observe the proper sequence. Use appropriate screw fittings to ensure that the lines do not leak.

Install line sections, which would usually run horizontally, with a constant downward slope of at least 1:20, starting the slope either at the orifice plate or at the point where venting is possible. The smallest permissible bending radius is 50 mm. Thoroughly flush the differential pressure lines before connecting them to the device. Make sure that the high-pressure line is connected to the high-pressure connection and the low-pressure line to the low-pressure connection.

Liquid level measurement

Illustration with SAMSON valve block

- H Measuring range
- h Measured height
- z Additional height
- K Compensation height

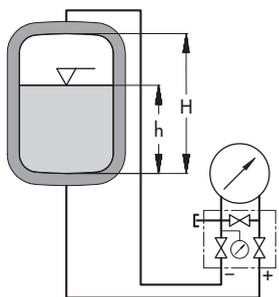


Diagram 1

Measurements in cryogenic systems (liquefied gases)

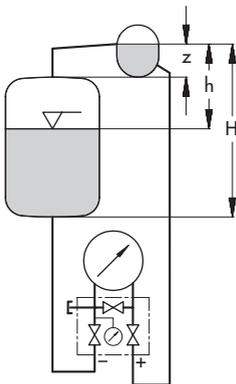


Diagram 2

Measurement on pressure vessels with condensing or non-condensing pressure cushion

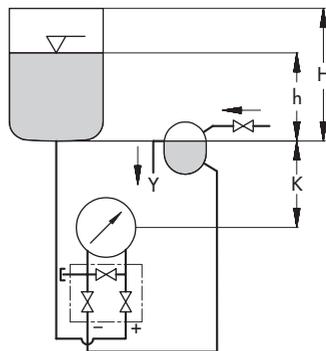


Diagram 3

Measurements on open vessels with the meter located in a low position

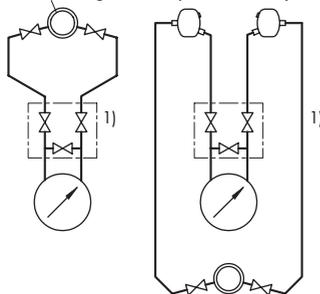
Flow rate measurement

Measurement of liquids

Measurement of steam

Measurement of gases

Orifice flange (orifice plate assembly)

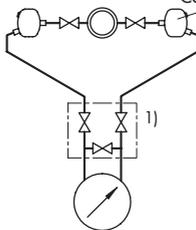


Installation

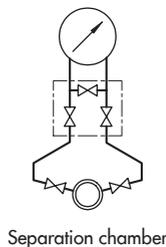
Standard

Reverse

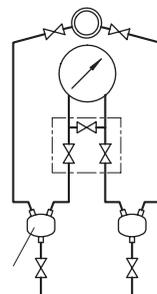
Compensation chamber



Standard



Standard



Reverse

1) SAMSON valve blocks can be mounted upside down to ensure the assignment of plus (+) to plus (+) and minus (-) to minus (-) remains unchanged.

Fig. 2: Arrangement of devices

4.5 Orifice flange (orifice plate assembly)

The direction of flow must correspond to the arrow on the orifice plate. Unobstructed pipe sections are required upstream and downstream of the orifice plate assembly. For the orifice tubes delivered by SAMSON, these sections are ensured by the weld-on calibration pipes. For orifice flanges, the unobstructed pipe section upstream of the orifice plate is specified in the order confirmation. Make sure the orifice plate assembly as well as the gaskets are properly aligned with the pipeline.

Do not install any control valves that constantly change the operating state of the process medium (e.g. manually operated control valves or temperature regulators) upstream of the orifice plate assembly. The operating state must match the conditions calculated during sizing as closely as possible. It is, however, favorable to install equipment that keep the operating state constant (e.g. pressure regulators) upstream of the assembly.

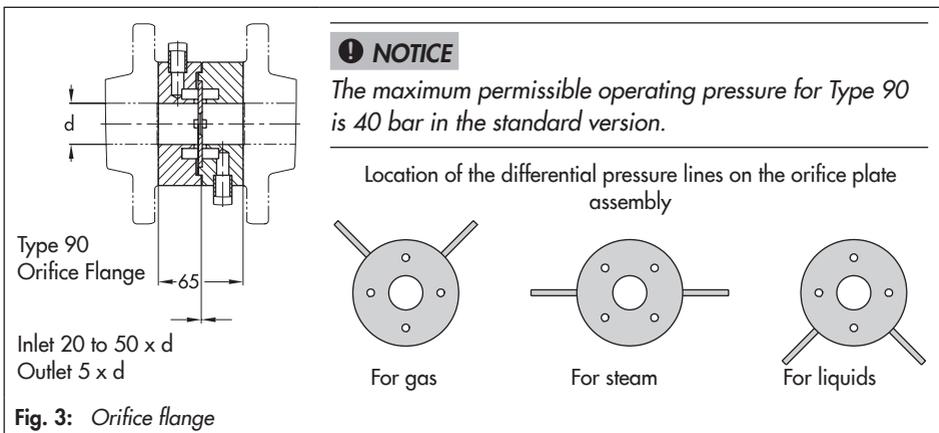
4.5.1 Accessories

We recommend installing a shut-off valve in the differential pressure lines as well as an equalizing valve. They can be used to shut off both differential pressure lines and to bypass the indicating unit when checking zero.

4.5.2 Valve block

A valve block comprising three valves (see Fig. 4) is available (accessories). It is bolted directly to the bottom of the dp cell.

When measuring the flow rate of liquids and gases, the SAMSON valve block can also be mounted upside down. As a result, the assignment of plus (+) to plus (+) and minus (-) to minus (-) remains unchanged. Due to this reverse installation, the pressure gauge connection cannot be used anymore and must be sealed with an O-ring and a G 1/2 - LH screw cap.



4.5.3 Shut-off and equalizing valves

As an alternative to the SAMSON valve block, the two shut-off valves as well as the bypass valve/equalizing valve can also be installed as illustrated in Fig. 5.

4.5.4 Compensation chambers

Compensation chambers that establish a constant liquid column are required when measuring steam. When measuring liquids, they are only required when the indicating unit is mounted above the measuring point. For gas measurements, separation chambers are required for condensate separation when the indicating unit is installed below the measuring point.

4.5.5 Accessories for connection

The devices are delivered without screw fittings (oxygen versions are protected against contamination by four NBR blanking plugs). Required screw fittings, screw plugs or vent screws as well as screw joints with restrictions to dampen medium-induced vibration (particularly when measuring gases) must be ordered separately.



Tip

The screw fittings and SAMSON valve blocks with their associated order numbers are listed in Data Sheet ► T 9555.

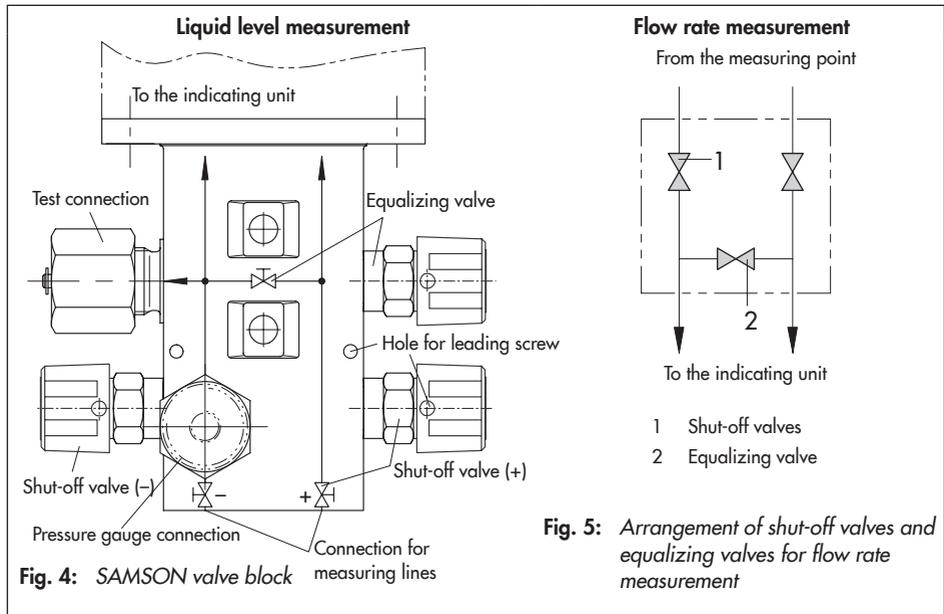


Fig. 5: Arrangement of shut-off valves and equalizing valves for flow rate measurement

5 Start-up

See Fig. 2, Fig. 3, Fig. 4 and Fig. 5.

Based on the following valve positions on the valve block upon delivery:

- Open high-pressure shut-off valve (+) and low-pressure shut-off valve (–)
- Closed equalizing valve

! NOTICE

In cryogenic applications, the process medium circulates during measurement when the equalizing valve is opened, causing the valve block to ice up.

During measurement, therefore, the equalizing valve must be closed and the shut-off valves open.

If necessary, check zero at the dp cell and put the device back into operation.

5.1 Liquid level measurement

1. Slowly **open** the low-pressure line.
2. **Close** the equalizing valve or bypass of the valve block.
3. Slowly open the high-pressure line.

5.2 Flow rate measurement

For steam measurement

Make sure that the steam does not have direct contact with the measuring diaphragm of the device. To prevent this, screw off the differential pressure lines below the shut-off valves or valve block and fill the device with water.

Alternatively, make sure the shut-off and equalizing valves or valve block are shut off and wait approx. 20 min after start up of the plant (steam in the system) until condensate has collected in the differential pressure lines above the valve and up to the orifice plate.

1. Open the high-pressure line.
2. Close the equalizing valve or bypass of the valve block.
3. Open the low-pressure line.
4. Wait a while. Open both vent screws of the dp cell one after the other until the escaping condensate is free of bubbles. Retighten the screws.

Vent the compensation chambers in the same way.

Lightly tap the housing of the indicating unit or the compensation chambers to help let the air escape.

5. Check zero as described in section 6.2 and put the device back into operation.

i Note

When using reverse installation (with the device mounted above the measuring point), the differential pressure lines may partly get drained when depressurizing the system.

When starting up the system again, vent the measurement setup to allow it to fill with condensate.

For liquid measurement

1. Slowly open the high-pressure line (turn slowly).

2. Close the equalizing valve or bypass of the valve block.
3. Open the low-pressure line.
4. Undo the vent screw on the dp cell until all the air has escaped. Retighten the screw.
5. Check zero (see section 6.2). Put the device back into operation.

6 Operation

6.1 Zero calibration

The devices are calibrated before delivery. However, after installation, we recommend performing a zero calibration to take the pressure conditions on site in the plant into account.

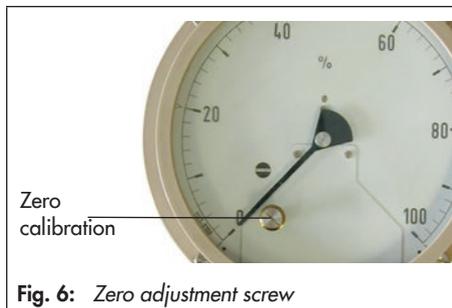


Fig. 6: Zero adjustment screw

As a result, errors caused by the mounting position or static pressure are eliminated.

i Note

To perform a zero calibration, the equalizing valve on the valve block must be open and all filled control lines must have the correct filling level.

Use the adjustment screw for zero calibration to perform a zero calibration.

1. Remove housing cover, if necessary. In this case, loosen the four hex screws and lift off the cover.
2. Use a screwdriver to place the pointer in the zero position.
3. Replace on the housing cover and fasten it.

6.2 Checking zero

Zero can also be checked while the system is running, provided the differential pressure lines are equipped with shut-off and equalizing valves.

1. Close the shut-off valve in the high-pressure line.
2. Open the equalizing valve.
3. Close the shut-off valve in the low-pressure line to allow the pressures to equalize in the dp cell.

The pointer must indicate zero.

If this is not the case, readjust the zero screw (see Fig. 6) until zero position is reached.

To start-up:

1. Open the low-pressure line.
2. Close the equalizing valve.
3. Slowly but gradually open the high-pressure line all the way.

The device is in operation again.

If a valve block is installed, proceed as described above.

6.3 Water drainage

When measuring gas, drain condensed water from the separation chambers from time to time.

Close valves in the differential pressure lines (valve block) before opening the drain plugs.

6.4 Adjusting and modifying the measuring range

The measuring range of the differential pressure and flow meter is determined by the installed set of range springs.

The device is delivered with the measuring range specified in the order. This means that, subsequently, it can only be modified continuously up to approx. 50 % of the maximum measuring span.

For best results, adjust it on the test bench (Fig. 7, top).

Adjusting zero and checking the measuring range:

1. Unscrew the case cover.
2. Adjust zero in the depressurized measuring chamber using the zero adjustment screw (see section 6.2).
3. Apply pressure to the high-pressure measuring chamber until the pointer indicates 100 % while the low pressure connection is open.
4. Read off the adjusted pressure value at the pressure gauge. It corresponds to the current end value of the measuring range.
5. Disconnect the pressure again.

Correcting and modifying the measuring range:

1. Insert an Allen key or a 3 mm ball end hex tool at the side behind the dial plate into the cone-shaped end of the span adjuster.
2. For adjustment, turn the span adjuster upwards or downwards.

If you want to increase the measuring range, turn the Allen key downwards in the clockwise direction, a little further away from the fulcrum of the toothed segment.

3. Correct zero as described in section 5.1.
4. Pressurize measuring chamber again until the pointer indicates the end value.
5. Check the end value of the measuring range on the pressure gauge.

If it does not correspond with the required measuring range, repeat adjustment procedure until zero and end value are properly adjusted.

i Note

Be aware that the adjustment is performed on a moving part and, therefore, do not exert any force to it. Do not apply any pressure with the screwdriver in the axial direction. If the spring is mispositioned while adjusting the measuring range and is located on the tag instead of the toothed segment, the pointer goes beyond the 100 % scale range and not to 0 % when there is an input pressure of 0 mbar. In this case, reposition the spring as shown in Fig. 7.

NOTICE

The test medium must be free of oil and grease when the device is used to measure oxygen.

Process medium: gaseous oxygen · Max. temperature: +60 °C, max. oxygen pressure: 50 bar

When the device is used for oxygen service, make sure that the dp cell and any SAMSON accessories only come into contact with gaseous oxygen.

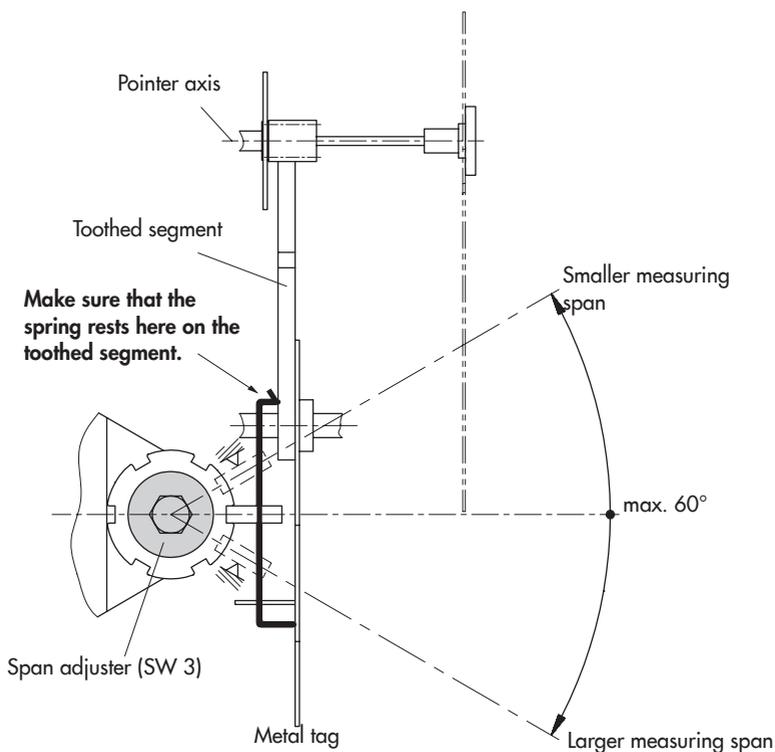
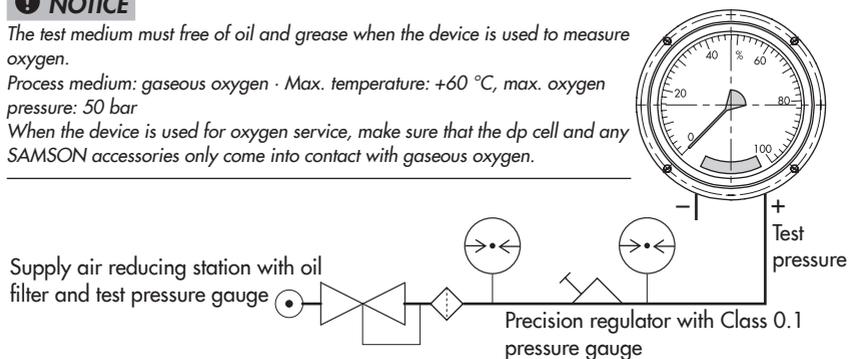


Fig. 7: Test arrangement and modifying the measuring range

Limit switch (optional)

7 Limit switch (optional)

The option module can be added to the standard version of the Media 5 and installed in the indicating unit.

The limit switch can either be ready installed in the Media 5 device on delivery or retrofitted later.

7.1 Electrical connection

The alarm contacts A1, A2 and A3 of the indicator must be connected to an isolating switch amplifier for power supply connection as illustrated in Fig. 8.

The listed maximum values in the table apply concerning the connection of proximity switches to certified intrinsically safe circuits

in the type of protection Ex ia IIC T6 (PTB 99 ATEX 2219 X):

Table 3: Technical data for limit switch in type of protection Ex ia IIC T6 (PTB 99 ATEX 2219 X)

Circuit	Type 1	Type 2				
U_i	16 V	16 V				
I_i	25 mA	25 mA				
P_i	34 mW	64 mW				
C_i	50 nF	50 nF				
L_i	250 μ H	250 μ H				
Temperature class	T6	T5	T4	T6	T5	T4
	73 °C	88 °C	100 °C	66 °C	81 °C	100 °C

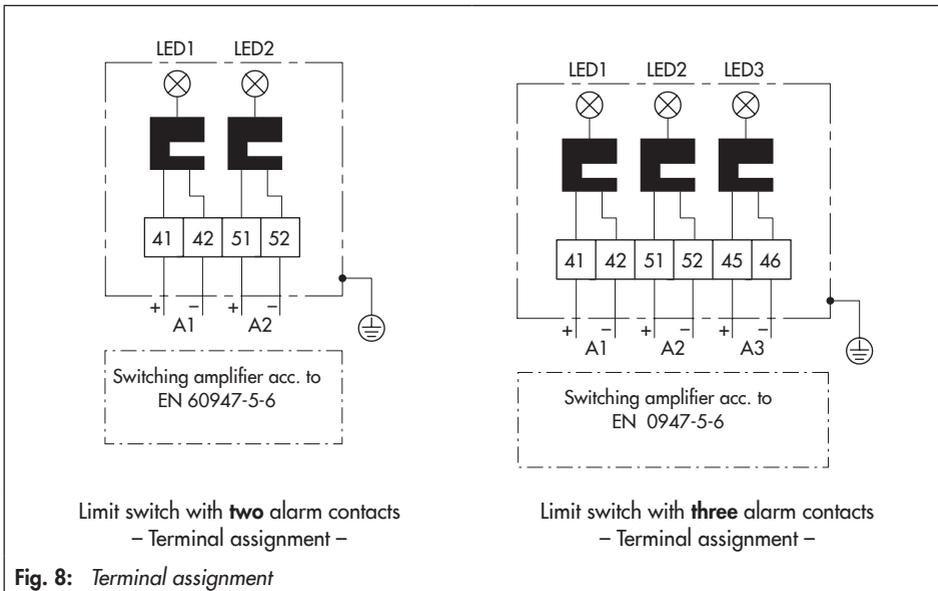


Fig. 8: Terminal assignment

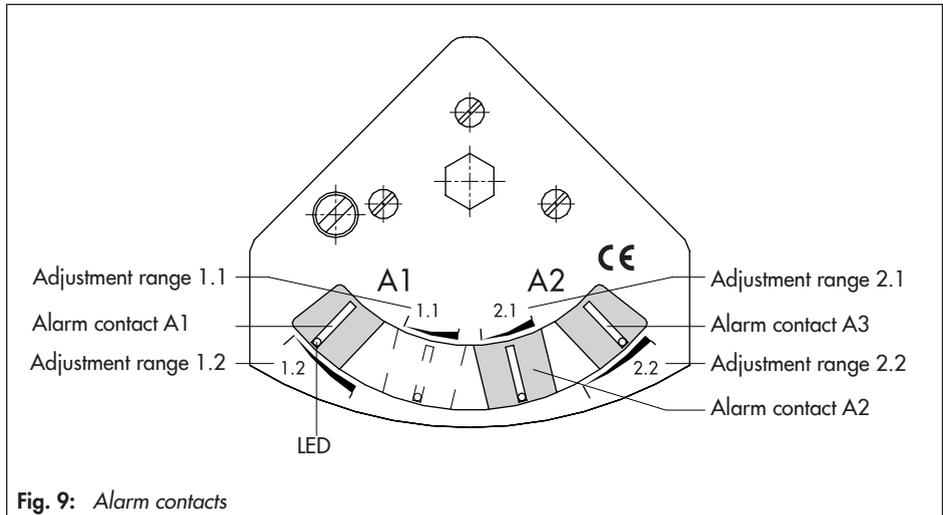
7.2 Adjusting the alarm contacts

The alarm contacts A1, A2 and A3 can be shifted in the assigned adjustment ranges 1.1 and 1.2 or 2.1 and 2.2 using a screw-driver.

Depending on the selected function as a minimum or maximum contact, contact is made when the tag moves into or out of the proximity switch. See Overview of functions for alarm contacts on page 20.

For a more accurate adjustment (test bench), pressurize the measuring chamber to check if the alarm signal is released at the required scale value through the movement of the tag (check the LED of the proximity switch).

If necessary, correct the position of the alarm contact accordingly.



Proximity switches with normally closed function

Metal tag outside the inductive field (LED on)

Switching signal "ON" (L signal of the proximity switch) · Function: contact closed or output effectively conducting, low resistance (undamped), power consumption ≥ 3 mA

Metal tag inside the inductive field (LED off)

Switching signal "OFF" (0 signal of the proximity switch) · Function: contact open or output effectively non-conducting, high resistance (damped), power consumption ≤ 1 mA

Limit switch (optional)

Overview of functions for alarm contacts

Table 4: Overview of functions for two alarm contacts A1 and A2

Overview of functions	Adjustment ranges			
	Min. contact (gas withdrawal)		Max. contact (tank filling)	
Alarm contacts	A1	A2	A1	A2
Metal tag inside	1.2	2.1	1.1	2.2
Metal tag outside	1.1	2.2	1.2	2.1

Table 5: Overview of functions for three alarm contacts A1, A2 and A3

Overview of functions	Adjustment ranges		
	Two min. contacts (gas withdrawal)		One max. contact (tank filling)
Alarm contacts	A1	A2	A3
Activation when metal tag inside field	1.2	2.1	2.2

Switching points

Min. contact with decreasing reading

Max. contact with increasing reading

7.3 Retrofitting/replacing the contact unit

The contacts can only be retrofitted or replaced as a complete unit.

Table 6: RoHS-compliant retrofit contact module for Media 5 · Order numbers

Retrofit contact module	Function	Order no.
Media 5		
2 inductive limit contacts, SC3,5-NO-BU, acc. to ATEX	Two universal adjustable contacts	1400-8839
3 inductive limit contacts, SC3,5-NO-BU, acc. to ATEX	Two min. and one max. contacts	1400-8840
2 inductive limit contacts, SJ3,5-SN, acc. to ATEX, SIL 3	Two universal adjustable contacts	1402-1772
2 inductive limit contacts, SB3,5-E2-LED, without explosion protection ¹⁾	Two universal adjustable contacts	1402-1778

¹⁾ Three-wire version, 10 to 30 V (DC), without isolating switch amplifier, controllable

How to proceed:

1. Unscrew the case cover.
2. Unscrew the two dial plate screws (2) and remove the cover plate. Retighten dial plate screws.

i Note

Before mounting the contact unit, position the alarm contacts A1 and A2 in such a way that one of them rests in the recess of the metal tag and the other one to the side of the tag.

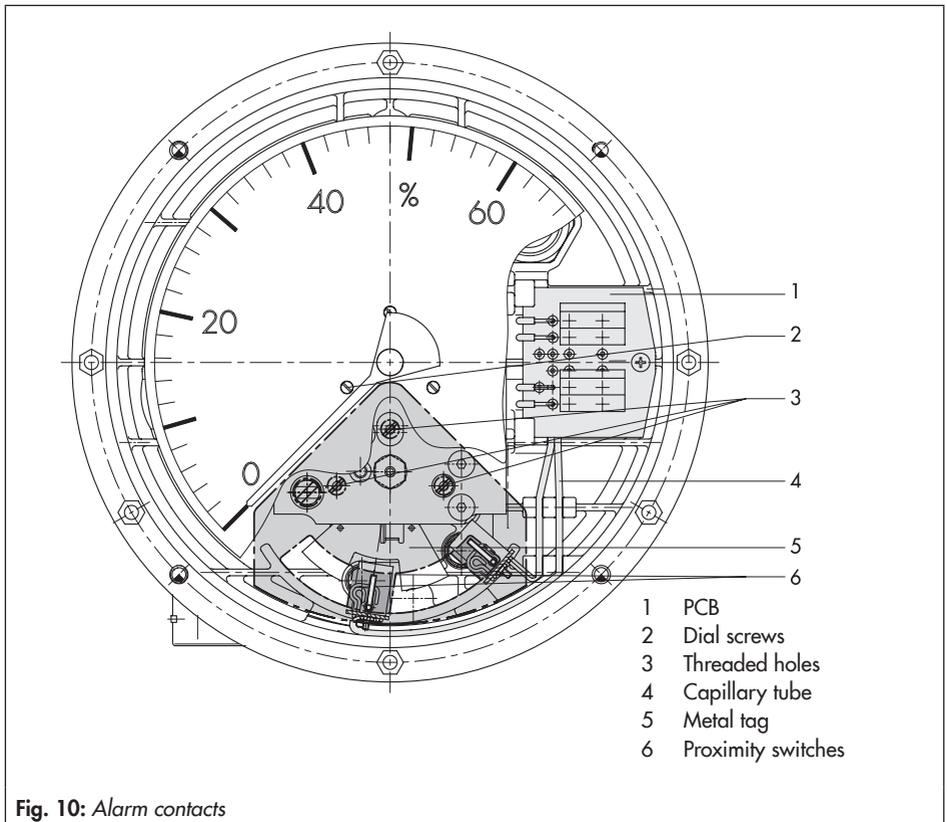


Fig. 10: Alarm contacts

Limit switch (optional)

3. Insert the contact unit in the measuring unit, ensuring that the spacer sleeves are aligned with the three tapped holes (3) of the indicating unit.
4. Insert M3 screws. Fasten the contact unit, ensuring that the tag can move into the proximity switches without making contact.
5. Place connecting cables (4) in the ducts of the indicating unit housing.
6. Slide the printed circuit board (1) into the bracket and tighten it.
7. Replace the screw plug on the bottom of the housing with the M20x1.5 cable gland.
8. Perform electrical wiring as described in section 6.1 and adjust the contacts as described in section 6.2.
9. Place on the housing case and fasten it.

8 4 to 20 mA current output (optional)

i Note

Current firmware version: **1.02**

The option module can be added to the standard version of the Media 5. It is installed in the indicating unit and can either be ready installed in the device on delivery or retrofitted later.

The current output option module upgrades the analog reading of the device by issuing the current signal which can be used as a reading or for further processing.

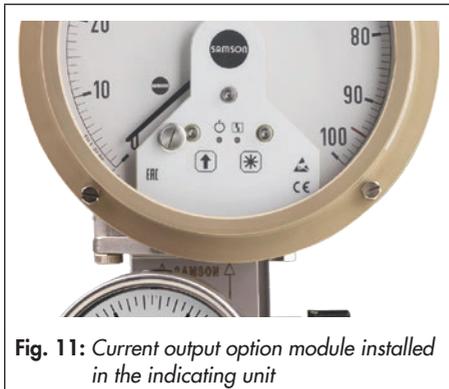


Fig. 11: Current output option module installed in the indicating unit

Zero calibration, span calibration, characteristic selection and issuing of a 4 mA or 20 mA test signal (ammeter function) are selected over keys.

The angle of the pointer axis is measured by the magnetoresistive measuring system and converted into an electric signal.

To operate the unit, a transmitter supply voltage of $U_B = 12$ to 36 V is required for the 4 to 20 mA measuring circuit.

For this purpose, the SAMSON Type 5024-1 Power Supply and Indicator Unit can be used (► EB 9539). It supplies the voltage and indicates the measuring signal.

⚠ WARNING

The current output option module is **not** suitable for use in hazardous areas.

8.1 Retrofitting

The retrofit kit (item no. 1402-1501) includes the following parts:

- 1 Printed circuit board with operating controls
- 2 Terminal board
- 3 Magnetoresistive measuring system with mating plate
- 4 Self-adhesive dot on film
- 5 Cable gland
- 6 Nameplate (label)

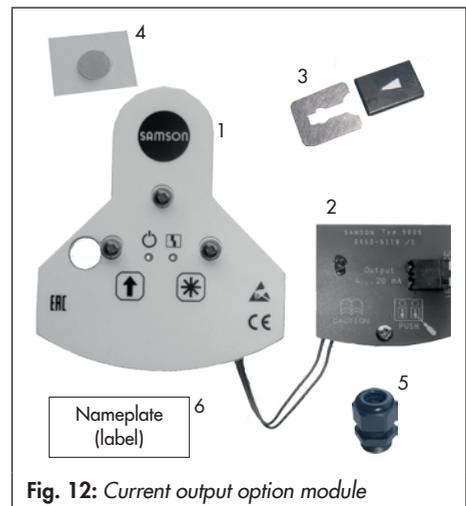


Fig. 12: Current output option module

4 to 20 mA current output (optional)

Installing the current output option module

How to proceed:

Installing the printed circuit board, magneto-resistive measuring system and terminal board

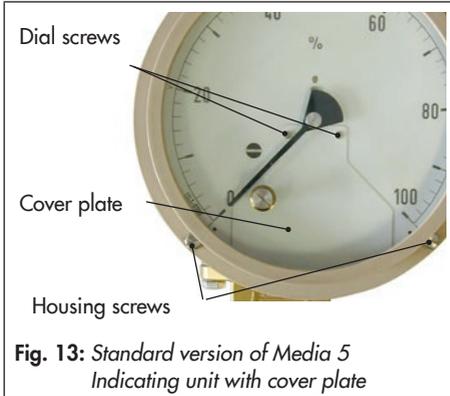


Fig. 13: Standard version of Media 5 Indicating unit with cover plate

1. Undo the four housing screws. Remove the housing cover.
2. Unscrew the two dial plate screws and remove the cover plate. Retighten dial plate screws.
3. Place the magneto-resistive measuring system on the pointer.

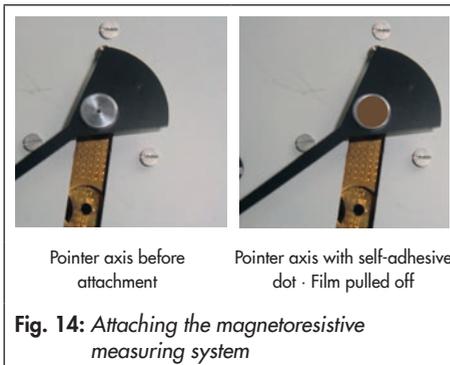


Fig. 14: Attaching the magneto-resistive measuring system

- Self-adhesive dot on film: pull off brown backing.
 - Stick the film with self-adhesive dot, adhesive side facing downward, centrally on the pointer axis (see Fig. 24).
 - Pull off film. Make sure that the self-adhesive dot remains stuck on.
 - Place the magneto-resistive measuring system, with the **arrow** pointing toward the **pointer**, onto the pointer axis. Press it down.
4. Turn the pointer from the zero position to the approx. 90° position.
 5. Slide the mating plate underneath the pointer and magneto-resistive measuring system to fasten the elements together. Make sure it fits properly.

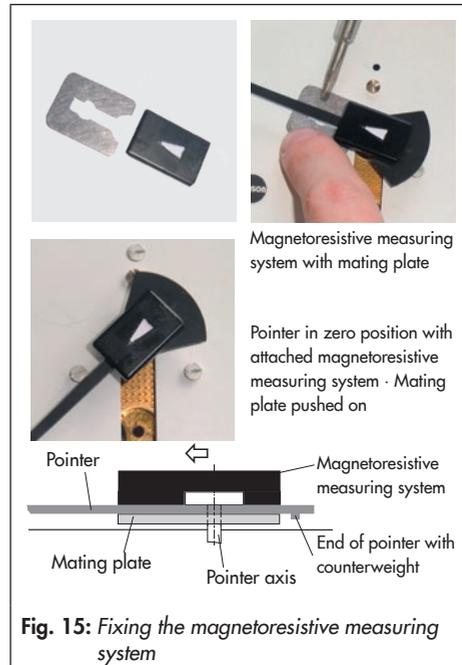


Fig. 15: Fixing the magneto-resistive measuring system

i Note

The mating plate must rest flat underneath the pointer.
Pay particular attention to the counterweight at the end of the pointer.

- If the terminal board has not yet been connected, connect the connecting cable and connector at the back of the printed circuit board.

Plug the micro connector into the socket on the printed circuit board.

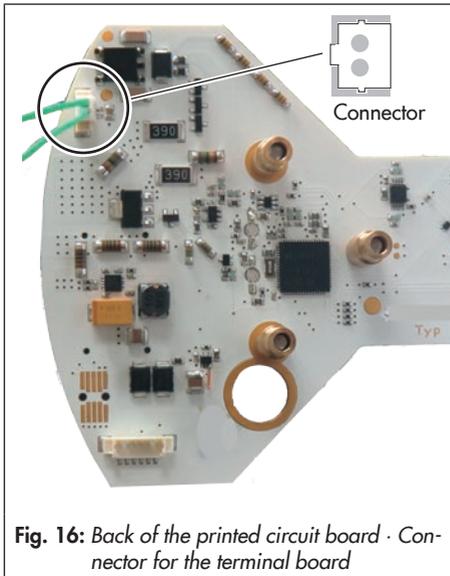


Fig. 16: Back of the printed circuit board · Connector for the terminal board

- Place on the current output option module with connected terminal board in place of the cover plate.

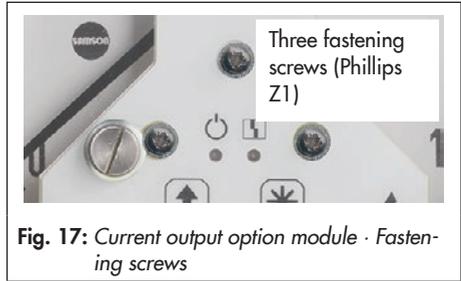


Fig. 17: Current output option module · Fastening screws

- Fasten the option module using the three fastening screws (Phillips Z1)
- Insert the terminal board at the side underneath the dial plate.
Use Phillips screwdriver to tighten the retaining screw.
- Insert the connecting cable into the guiding of the indicating unit.

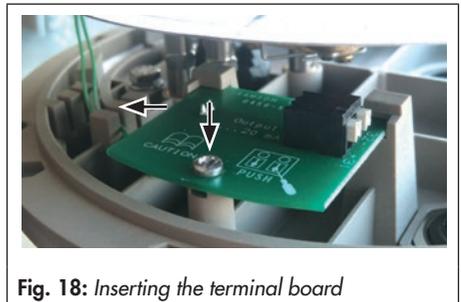


Fig. 18: Inserting the terminal board

- Guide the measuring signal lines (min. 8 mm stripped length) through the cable gland and connect them to the spring-cage terminal (31, 32) on the terminal board (see Fig. 20). Observe the correct polarity.

4 to 20 mA current output (optional)

Measuring signal connection

The current output option module is designed as a two-wire system.

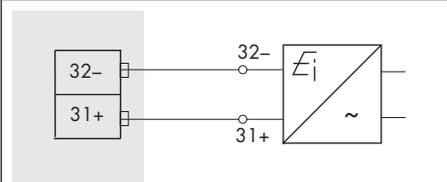


Fig. 19: Measuring signal connection in two-wire system

The same pair of conductors transmit the 4 to 20 mA measuring signal and the required power supply ($U_B = 12$ to 36 V DC) for the two-wire transmitter.

It is connected to the terminal board over two spring-cage terminals.



Fig. 20: Terminal board · Connecting the measuring signal lines

⚠ WARNING

The current output option module is **not** suitable for use in hazardous areas.

8.2 Settings

To operate the option module, a transmitter supply voltage of $U_B = 12$ to 36 V (DC) is required for the 4 to 20 mA measuring circuit.

For this purpose, the SAMSON Type 5024-1 Power Supply and Indicator Unit can be used. It supplies the voltage and indicates the measuring signal.

The option module has a **green** LED (1) and a **red** LED (2) as well as a **↑** key (3) and ***** key (4) to perform settings.

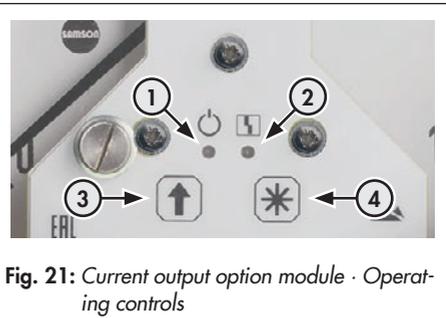


Fig. 21: Current output option module · Operating controls

Green LED	Status indication (standard operation)
Red LED	Error indication (LED permanently on) Press * key to confirm. The unit is restarted.
* key	Execute/confirm The red LED blinks briefly once to indicate that a function is being performed. After completion, the unit returns to standard operation.
↑ key	Select function/data

The **green** LED indicates standard operation of the option module. Four different levels can be selected.

Press the \uparrow key to change between levels. The LED blinking pattern indicates which level has been selected.

The required function can be set or performed in the selected level.

Level	Blinking pattern
<i>Zero calibration</i>	■ ■ ■
<i>Span calibration</i>	■ ■
<i>Characteristic</i>	■■ ■■ ■■
<i>4 mA/20 mA ammeter</i>	■■■ ■■■ ■■■

Zero calibration

The electric zero is adapted to the mechanical zero. As a result, a 4 mA signal is also issued at $\Delta p = 0$ bar corresponding to the pointer's zero point.

Zero can be calibrated in the scale range between approx. -5° and 135° (see Fig. 22).

Activate **zero calibration** level

Key	LED	Function
1x \uparrow key	Green	Blinking pattern ■ ■ ■
* key	Red	Zero calibration active The red LED blinks briefly once to indicate that calibration is in progress. Current pointer position \cong 4 mA.
	Green	Change to standard operation

The red LED is permanently lit (error indication) if the calibration range is exceeded.

Span calibration

The measuring span can be calibrated continuously without affecting zero or the measuring accuracy (see Fig. 22). The pointer

position corresponds to the end point with 20 mA output signal.

As a result, the end points can easily be adapted to the measured medium, especially when attachable or multiple dial plates are used.

A measuring span calibration is possible in the pointer range $>95^\circ$ (based on the pointer's zero point, see Fig. 22).

The red LED is permanently lit (error indication) if the calibration range is exceeded.

Activate **span calibration** level

Key	LED	Function
2x \uparrow key	Green	Blinking pattern ■ ■
* key	Red	Span calibration active The red LED blinks briefly once to indicate that calibration is in progress. Current pointer position \cong 20 mA.
	Green	Change to standard operation

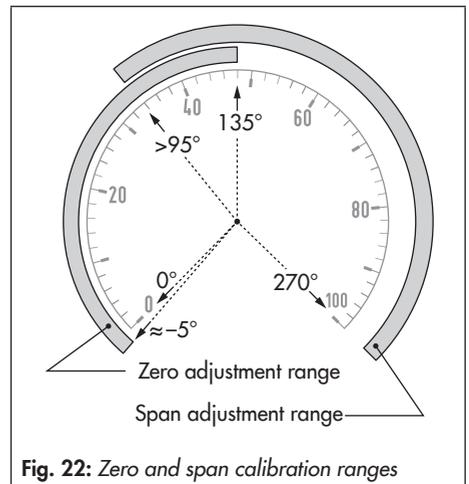


Fig. 22: Zero and span calibration ranges

4 to 20 mA current output (optional)

Characteristic

Three characteristics are available.

- Linear ■ ■ ■
- Root-extracting ■ ■
- User-defined ■ ■ ■ ■ (factory setting)

Activate **characteristic** level

Key	LED	Function
3x↑ key	Green	Blinking pattern ■ ■ ■ ■ ■ ■
* key	Red	The blinking pattern indicates which characteristic is currently selected.
↑ key	Red	Every time the key is pressed, the blinking pattern changes: ■ ■ ■ ↑ ■ ■ ↑ ■ ■ ■ ■ ■ ■ Blinking pattern $\hat{=}$ Characteristic.
* key	Red	Confirm.
	Green	Change to standard operation

4 mA/20 mA ammeter

To calibrate the assessment unit, 4 and 20 mA test signals are issued.

Activate **4 mA/20 mA ammeter** level

Key	LED	Function
4x↑ key	Green	Blinking pattern ■ ■ ■ ■ ■ ■ ■ ■
* key	Red	Blinking pattern ■ ■ ■ $\hat{=}$ 4 mA output.
↑ key	Red	Blinking pattern ■ ■ $\hat{=}$ 20 mA output.
* key	Red	Exit function.
	Green	Change to standard operation

Canceling the operation

Operation can be canceled at all times without data being saved.

→ Press ↑ key together with the * key:

The option module returns to standard operation.

Error message

A permanently lit red LED indicates an error (e.g. zero or span calibration range exceeded, ammeter defective).

→ Press * key to confirm.

The option module is restarted and goes into standard operation.

Operation timeout

If no key is pressed within three minutes while a level is active, the unit automatically returns to standard operation.

The option module returns to standard operation.

9 Dial faces

Dial face versions (see ► T 9545)

In addition to the dial plates according to EN 837 shown in Fig. 23, the dial faces can be designed in various indication ranges and sizes:

- With linear or square root graduation
- Customized inscriptions
- A maximum of four attachable dial plates supplied with the meter for various media and applications
- Units, such as m³, kg, liter, %, mmWS, inchH₂O, mbar, bar, m³/h, kg/min etc.
- Others customized details

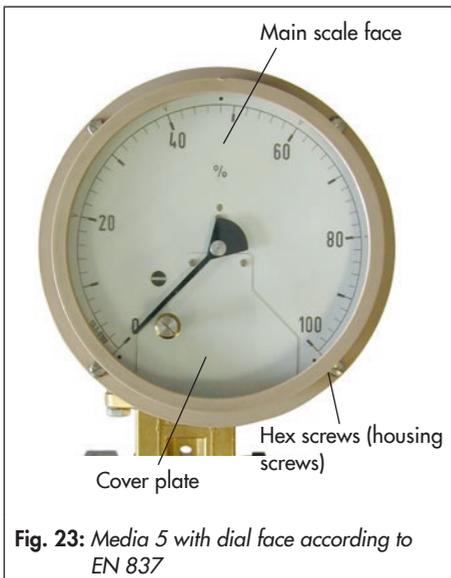


Fig. 23: Media 5 with dial face according to EN 837

This allows, for example customized dials for filling level measurement to be calculated based on the tank geometry data.

The customized dial face is adapted to the specified application range.

9.1 Attachable dial plates

To allow the indicator to be used for several applications, SAMSON offers exchangeable dial plates which are attached depending the application.

This way the indicator can be fitted with up to five different dial plates. In this case, to adapt indicator to a special application, place the attachable dial plate over the main dial face.

The associated attachable dial plates are stored behind the main dial face.

Inserting the attachable dial plate

1. To remove the housing cover, loosen the four hex screws (housing screws).
2. Remove the housing cover.
3. Select suitable dial plate and push it over the front dial face. Use the three pins on the main dial face to position the dial plate.

i Note

*A cover plate (if mounted) must **not** be removed.*

*For the version with limit switch or current output, the contact unit must **not** be removed as well.*

4. Place on the housing cover and fasten it.

10 Dimensions

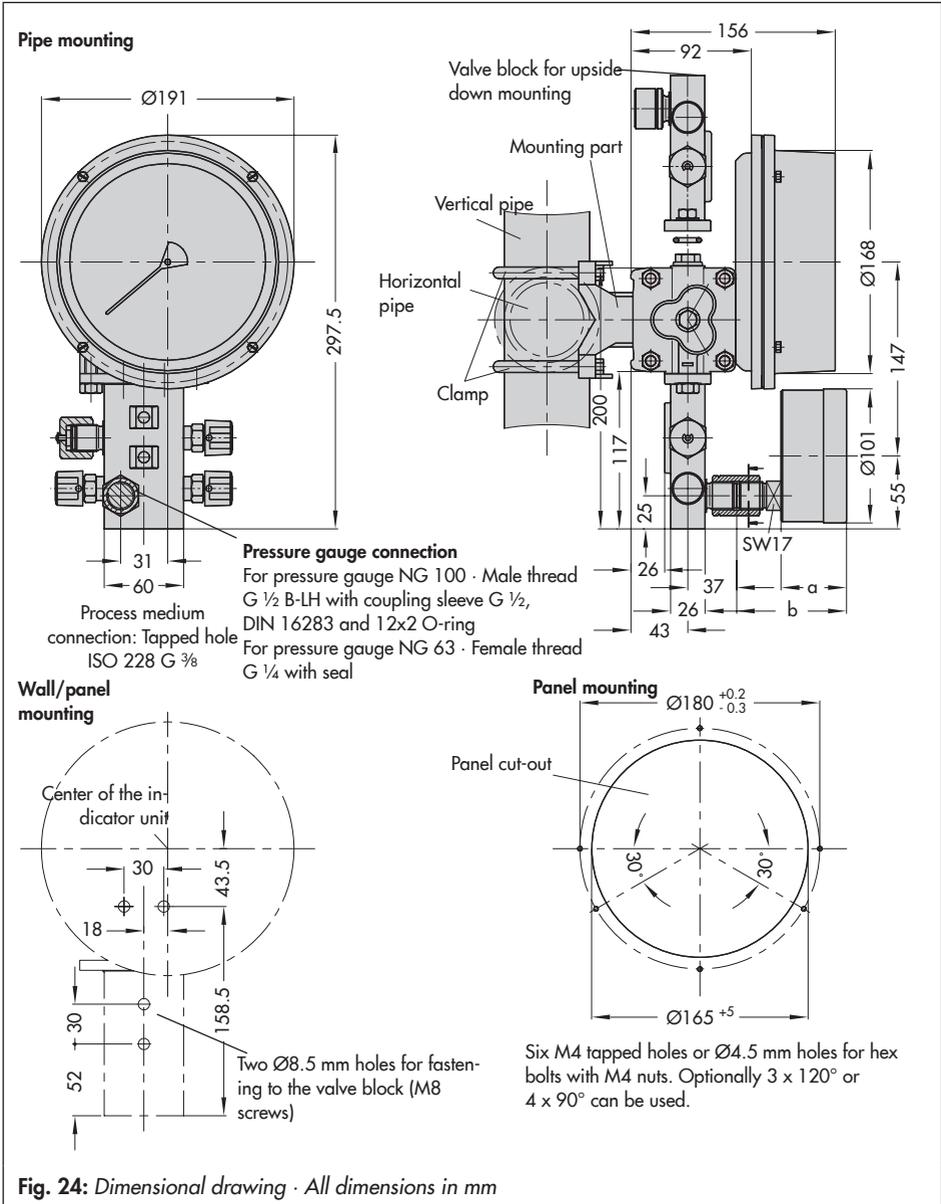


Fig. 24: Dimensional drawing · All dimensions in mm

EB 9519 EN



SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samson.de · www.samson.de