developing solutions





Operating manual DA12



Differential pressure - Measuring device



Masthead

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Subject to technical amendments.



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Version history

Rev. ST4-A 03/18	Version 1 (first edition)
Rev. ST4-B 11/21	Version 2 (Correction perm. stat. operating pressure)

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1 Safety instructions

1.1 General

This operating manual contains basic instructions for the installation, operation and maintenance of the device that must be followed without fail. It must be read by the installer, the operator and the responsible specialist personnel before installing and commissioning the device.

This operating manual is an integral part of the product and therefore needs to be kept close to the instrument in a place that is accessible at all times to the responsible personnel.

The following sections, in particular instructions about the assembly, commissioning and maintenance, contain important information, non-observance of which could pose a threat to humans, animals, the environment and property.

The instrument described in these operating instructions is designed and manufactured in line with the state of the art and good engineering practice.

1.2 Personnel Qualification

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

1.3 Risks due to Non-Observance of Safety Instructions

Non-observance of these safety instructions, the intended use of the device or the limit values given in the technical specifications can be hazardous or cause harm to persons, the environment or the plant itself.

The supplier of the equipment will not be liable for damage claims if this should happen.

1.4 Safety Instructions for the Operating Company and the Operator

The safety instructions governing correct operation of the instrument must be observed. The operating company must make them available to the installation, maintenance, inspection and operating personnel.

Dangers arising from electrical components, energy discharged by the medium, escaping medium and incorrect installation of the device must be eliminated. See the information in the applicable national and international regulations.

Please observe the information about certification and approvals in the Technical Data section.

1.5 Unauthorised Modification

Modifications of or other technical alterations to the instrument by the customer are not permitted. This also applies to replacement parts. Only the manufacturer is authorised to make any modifications or changes.

1.6 Inadmissible Modes of Operation

The operational safety of this instrument can only be guaranteed if it is used as intended. The instrument model must be suitable for the medium used in the system. The limit values given in the technical data may not be exceeded.

The manufacturer is not liable for damage resulting from improper or incorrect use.

1.7 Safe working practices for maintenance and installation work

The safety instructions given in this operating manual, any nationally applicable regulations on accident prevention and any of the operating company's internal work, operating and safety guidelines must be observed.

The operating company is responsible for ensuring that all required maintenance, inspection and installation work is carried out by qualified specialized personnel.

1.8 Pictogram explanation



Type and source of danger

This indicates a **direct** dangerous situation that could lead to death or **serious injury** (highest danger level).

1. Avoid danger by observing the valid safety regulations.



Type and source of danger

This indicates a **potentially** dangerous situation that could lead to death or **serious injury** (medium danger level).

1. Avoid danger by observing the valid safety regulations.



Type and source of danger

This indicates a **potentially** dangerous situation that could lead to slight or serious injury, damage or **environmental pollution** (low danger level).

1. Avoid danger by observing the valid safety regulations.



NOTICE

Note / advice

This indicates useful information of advice for efficient and smooth operation.

2 Product and functional description

2.1 Delivery scope

- Differential pressure measuring device DA12
- Operating Manual

2.2 Device versions

Pressure chamber aluminium

Pressure chamber stainless stee



Fig. 1: Models and options

Type plate

This type plate serves as an example of the information that is stated. The data shown is purely fictive, but does correspond to the actual conditions. For more information, please see the order code at the end of these instructions.

Order co	ode	
Article no.	DA1209EA0100	FISCHER
Measuring range	025 bar	MESS- UND REGELTECHNIK
p stat. max	25 bar	MESS- UND
Overpressure-proof on one side up	to 25 bar	REGELTECHNIK
Prod. no.	2006096.03.001	GmbH
Made	in Ger⁄nany	D-32107 Bad Salzuflen

Serial number

Fig. 2: Type plate

2.3 Intended use

The DA12 is a display unit for differential pressure, over-pressure and underpressure for gas-like and fluid media. This series is ideally suited for various measuring tasks in rough environments.

Typical applications are measuring differential pressure between the supply and return in heating systems and monitoring filters and pumps.

Please contact the manufacturer before using this device with dirty or aggressive media because the device needs to be adapted in terms of the parts that come into contact with the media.

The device is to be exclusively used for the applications agreed between the manufacturer and the user.

2.4 Function diagram



Fig. 3: Function diagram

- 1 Pressure chamber 2 Motion train
- 3 Tappet
- 4 Measuring springs
- 5 Measuring diaphragm

2.5 Design and mode of operation

A sturdy non-sensitive diaphragm measuring unit that is suitable for measuring differential pressure, and over and under-pressure is used as a measuring system. The unit uses the same measuring principle for all three measuring applications.

In the rest position, the spring forces on both sides of the membrane are balanced out. Due to the pressure or under-pressure to be measured, a singlesided force is created on the membrane which shifts the membrane system against the measurement range springs up to compensation of the spring forces. In case of overload, the membrane supports against the metallic support surfaces.

A centrally positioned tappet transfers the movement of the membrane system on the motion train.

3 Assembly

3.1 General information

The device can be mounted in one of the following ways:

1. Wall mounting

The device is designed for installation onto flat assembly plates.

2. Panel fitting

The device is equipped with a special front panel set and is suitable for mounting in front panels with a wall thickness of 2 to 3 mm.

At the factory, the device is calibrated for vertical installation, but the installation position is arbitrary. For installation positions that are not vertical, the zero point signal can be corrected via the correction screw.

To ensure safety during installation and maintenance, we recommend installing a suitable shut-off valve on the system (see accessories).

3.2 Process connection

- By authorized and qualified specialized personnel only.
- The pipes need to be depressurized when the instrument is being connected.
- Appropriate steps must be taken to protect the device from pressure surges.
- Check that the device is suitable for the medium being measured.
- Maximum pressures must be observed (cf. Tech. data)

All supply lines are arranged so that there are no mechanical forces acting on the device.

The pressure lines must be kept as short as possible and installed without any tight bends to avoid delays.

The pressure lines must be installed at an inclination so that when fluids are measured no air pockets are created or when measuring gases, no water pockets are created. If the required inclination is not reached, water or air filters must be installed at suitable places.

The pressure lines need to be vented for fluid measuring media...

If water is used as a measuring medium, the unit must be protected against frost.

If the pressure sensing lines are already pressurised at the time of commissioning, zero-point control and adjustment cannot be performed. In such cases, the device should be only connected to the mains without the pressure sensing lines.

The process connections are marked with (+) and (-) symbols on the device. The pressure lines must be mounted according to these symbols.

1. Differential pressure measurement

Higher pressure

 \bigcirc lower pressure

2. Pressure measurement

- Pressure
- \bigcirc open



Fig. 4: Process connection

3.2.1 Cutting ring screw connection



Fig. 5: Mounting the cutting ring screw connection

Preparation

- Assembly is only possible with tubes that are cut off at right angles. The usual tolerances for minimum tube length, angle and chamber apply.
- Pre-mount the cutting ring.
- Use a lubricant with stainless steel.

Assembly at the assembly site

- Place the pre-mounted tube end with the cutting ring and union nut into the tube screw connection.
- Apply counter-pressure on the tube screw connection with a wrench.
- Use a wrench to tighten the union nut approx. 1/4 to 1/3 turns until a noticeable increase in force is felt.

3.2.2 Connecting shanks



Fig. 6: Mounting the connection pin acc. to DIN EN 837

3.2.3 Pressure hammer damping

Pulsating pressure on the system side can lead to wear and functional problems. To safeguard this, we recommend installing absorption elements in the pressure line.

Fluid media

Gas-like media



In the operational status, the reactor pin need to be set so that the measurement display follows the pressure changes with a delay.

Adjustable Damping chokes MZ 40



Capillary chokes MZ401

Fig. 7: Damping

4 Start-up

4.1 General

All pressure lines must have been correctly installed before commissioning. All connections are arranged so that there are no mechanical forces acting on the device.



A CAUTION

Leak test

The pressure lines need to be checked for leaks before commissioning.

4.2 Zero point correction

The devices are set in the factory before delivery so that adjustment at the assembly site is usually unnecessary. Nevertheless, a zero-point correction on site is possible and is carried out as follows:



Fig. 8: Zero point correction

- Depressurize the pressure measuring line or only exert the existing static system pressure.
- Open the unit at the front by removing the screws of the hood.
- Set the measurement value pointer using zero point correction screw to scale zero point.
- Close the casing again and ensure that the seal and hood sit correctly.

5 Servicing

5.1 Maintenance

The instrument is maintenance-free. We recommend the following regular inspection to guarantee reliable operation and a long service life:

- Check the function in combination with downstream components.
- · Check the leak-tightness of the pressure connection lines.

The exact test cycles need to be adapted to the operating and environmental conditions. In combination with other devices, the operating instructions for the other devices also need to be observed.

5.2 Transport

The measuring device must be protected against impacts. It should be transported in the original packaging or a suitable transport container.

5.3 Service

All defective or faulty devices should be sent directly to our repair department. Please coordinate all shipments with our sales department.



Process media residues

Process media residues in and on dismantled devices can be a hazard to people, animals and the environment. Take adequate preventive measures. If required, the devices must be cleaned thoroughly.

Return the device in the original packaging or a suitable transport container.

5.4 Disposal

Please help to protect the environment by always disposing of the work pieces and packaging materials in compliance with the valid national waste and recycling guidelines or reuse them.

6 Technical data

6.1 General Information

Reference conditions (acc. to IEC 61298-1)					
Temperature	+15 +25 °C				
Relative humidity	45 75 %				
Air pressure	86 106 kPa	860 1060 mbar			
Installation position	vertical				

6.2 Input variables

Measuring ranges	Measuring accur- acy	Allowed static op- erating pressure	Overpres- sure	Under- pressure
0 … 250 mbar	± 6.25 mbar	16 bar	25 bar	- 1 bar
0 … 400 mbar	± 10 mbar	16 bar		
0 … 0.6 bar	± 0.015 bar	16 bar		
0 1 bar	± 0.025 bar	16 bar		
0 … 1.6 bar	± 0.04 bar	25 bar		
0 … 2.5 bar	± 0.625 bar	25 bar		
0 4 bar	± 0.1 bar	25 bar		
0 6 bar	± 0.15 bar	25 bar		
0 … 10 bar	± 0.25 bar	25 bar		
0 … 16 bar	± 0.4 bar	25 bar		
0 … 25 bar	± 0.625 bar	25 bar		
-0.6 … 0 bar	± 0.015 bar	16 bar		
-1 … 0 bar	± 0.025 bar	16 bar		
-1 … +0.6 bar	± 0.04 bar	25 bar		
-1 … +1.5 bar	± 0.0625 bar	25 bar		
-1 … +3 bar	± 0.1 bar	25 bar		
-1 … +5 bar	± 0.15 bar	25 bar		
0 … 30 psi	± 0.75 psi	25 bar		

Rated pressure of the measuring 25 bar system

Test pressure	1.5 times the rated pressure
Zero-point setting	Arranged in the front panel of the scale
Measuring accuracy	± 2.5% of the upper range value

6.3 Operating conditions

Increase ambient temperature	-10 to +70 °C
Media temperature	-10 to +70 °C
Storage temperature	-15 to +75 °C
Enclosure protection class	IP55 as per EN 60529

6.4 Construction design

Process connection	Inner thread G 1/4				
Brass, CrNi steel	Connection shank G¼ B DIN EN 837				
Brass, CrNi steel, galvanised steel	Cutting ring connection in brass for 6 mm pipe				
	Cutting ring connection in brass for 8 mm pipe				
	Cutting ring connection in brass for 10 mm pipe				
Installation position	vertical				
Dimensions	See dimensional drawings				
Weight	Pressure chamber in aluminium 1.2 kg				
	Pressure chamber in stainless 3.5 kg steel				

6.4.1 Materials

Parts in contact with the me- dium			
Pressure chamber	Aluminium GKAISi10(Mg), painted black		
	Aluminium GKAlSi10(Mg); HART-COAT [©] surface protection		
	Chromium nickel steel 1.4305		
Measuring diaphragm	NBR		
	VITON®		
	Inconel 718		
Seals	NBR		
	VITON®		
Other inner parts	Rustproof steel 1.4310, 1.4305		
Process connection	Brass		
Connection shanks	Chromium nickel steel		
Process connection	Brass		
Cutting ring screw connection	Galvanised steel		
	Chromium nickel steel		
Parts with no contact with the medium			
Cover hood	Makrolon		
Dial face and needle	Aluminium		

6.4.2 Dimensional drawings

All dimensions in mm unless otherwise stated

The following are the dimensional diagrams for the pressure chambers in aluminium. The dimensional diagrams for the pressure chambers in stainless steel are similar. For this reason, there is no illustration.



Fig. 9: Dimensional drawing, pressure chamber in aluminium

Process connection variants



Connecting shanks	d1	d2	11	12	13	14	A/F
	5	9.5	13	15	3	2	19
Cutting ring screw con	nection			11		D	A/F
				19	6	. 8. 10	19

7 Order Codes



			Measuring d	iaphragm
[1.2]	Measuring range)	NBR / VITON	Inconel 718
82	0 to 250 mbar		Х	
83	0 to 400 mbar		Х	
01	0 to 0.6 bar		Х	
02	0 to 1 bar		Х	
03	0 to 1.6 bar		Х	
04	0 to 2.5 bar		Х	
05	0 to 4 bar		Х	
06	0 to 6 bar		Х	
07	0 to 10 bar		Х	
08	0 to 16 bar		Х	
09	0 to 25 bar			х
30	-0.6 to 0 bar		Х	
31	-1 to 0 bar		Х	
32	-1 to +0.6 bar		Х	
33	-1 to +1.5 bar		Х	
34	-1 to +3 bar		Х	
35	-1 to +5 bar		Х	
[0]	Mecouving die	Coolont	Commont	
႞ႄၪ	phragm	Sealant	Comment	
Ν	NBR	NBR		
V	VITON®	VITON®		
D	Inconel 718	NBR	Only measuring rar bar	nges 0 25
E	Inconel 718	VITON®	Only measuring rar bar	nges 0 25
[4]	Pressure chambe	er	Comment	
Α	Aluminium		Only measuring rar bar	nge ≤ 0 16
D	Aluminium HART	COAT®		
W	Stainless steel 1.4	1305		

[5.6]Process connectionMaterial01Inner thread G 1/4

[5.6]	Process connection	Material
06	Connection shanks with external thread G¼ B	Brass
11	Connection shanks with external thread G¼ B	CrNi steel
20	Cutting ring connection in brass for 6 mm pipe	Galvanised steel
21	Cutting ring connection in brass for 8 mm pipe	Galvanised steel
22	Cutting ring connection in brass for 10 mm pipe	Galvanised steel
24	Cutting ring connection in brass for 6 mm pipe	CrNi steel 1.4571
25	Cutting ring connection in brass for 8 mm pipe	CrNi steel 1.4571
26	Cutting ring connection in brass for 10 mm pipe	CrNi steel 1.4571
28	Cutting ring connection in brass for 6 mm pipe	Brass
29	Cutting ring connection in brass for 8 mm pipe	Brass
30	Cutting ring connection in brass for 10 mm pipe	Brass

Accessories

Please go to our website fischermesstechnik.de for the data sheets of the measuring device accessories.

- DZ11 Installation set for retrofitting from wall mounting to switch panel installation. Please state the precise device type of the DA12 because there are different switch panel installtion sets depending on the model.
- DZ23/24 The shut-off valve DZ23 with three spindles and DZ24 with four spindles can be of a decisive benefit when mounting the differential pressure measuring device DA12.

The following can be used for example:

- is a system is to be depressurized or taken out of operation
- for repairs or tests to disconnect differential pressure devices within the affected systems from the mains supply

The shutoff devices can therefore also be used for function tests on site. In contrast to DZ23, the DZ24 also has a venting valve to vent the connected pipe system. The shut-off and venting valves are designed for the rated pressure level PN40. The housing can be selected in aluminium, brass or chrome-nickel-steel 1.4301. There are various pressure connections available for process-side screw connections or connection threads.

MZ Measuring device accessory (throttles, siphons, etc.)

Notes





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