

Instruction Manual

DS13 || Differential Pressure Switch

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1. Safety Instructions

1.1. General



This manual contains detailed information about the product, and instructions for its installation, operation and maintenance. Operators and other technical personnel responsible for the equipment must read this thoroughly before attempting to install or operate this equipment. A copy of this manual must always be kept accessible at the place of work for reference by concerned personnel.

Chapter 1 (sections 1.2 through 1.7) contains general as well as specific safety instructions. Chapters 2 through 10, covering topics ranging from intended purpose of the equipment to its final disposal, also include important points relating to safety. Overlooking or ignoring any of these safety points can endanger humans and animals, and possibly cause damage to other equipment.

1.2. Personnel Qualification

Personnel responsible for installation, operation, maintenance and inspection of this product must have the qualifications, training and experience necessary to carry out such work on this type of equipment.

1.3. Risks of Disregarding Safety Instructions

Disregarding safety instructions, use of this product for purposes for which it is not intended, and/or operation of this product outside the limits specified for any of its technical parameters, can result in harm to persons, the environment, or the plant on which it is installed. Fischer Mess- und Regeltechnik GmbH will not be responsible for consequences in such circumstances.

1.4. Safety Instructions for Operators

Safety instructions for the proper use of this product must be followed. This information must be available at all times to by personnel responsible for installation, operation, maintenance and inspection of this product. Adequate steps must be taken to prevent the occurrence of hazardous conditions that can be caused by electric energy and the convertible energy of the process media. Such conditions can, for example, be the result of improper electrical or process connections. Detailed information is available in relevant published norms (DIN EN, UVV in Germany; and equivalents in

other countries), industrial standards such as DVWG, Ex-, GL-, VDE guidelines, as well as regulations of the local authorities (e.g., EVUs in Germany).



1.5. Modifications Forbidden

Modification or other technical alteration of the product is not permissible. This also applies to the use of unauthorized spare parts for repair / maintenance of the product. Any modifications to this product, if and as necessary, should be done only by Fischer Mess- und Regeltechnik GmbH.

1.6. Operational Restrictions

The operational reliability of the product is guaranteed only when used for intended purposes. The product must be selected and configured for use specifically with defined process media. The limiting values of operating parameters, as given in the product specification sheet, must never be crossed.

1.7. Safety Considerations during Installation and Maintenance

The safety instructions given in this manual, existing national regulations relating to accident prevention, and the internal safety rules and procedures of the user organization regarding safety during installation, operation and servicing must all be followed meticulously.

It is the responsibility of the users to ensure that only suitably qualified and experienced technical personnel are used for installation, operation and servicing of this equipment.

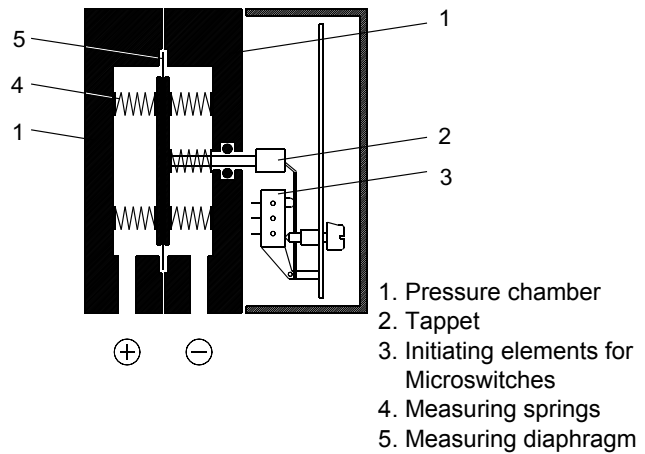
2. Intended Applications

Differential Pressure Switch for overpressure, partial vacuum and differential pressure. The product may be used only for applications and under conditions specified by the manufacturer.

Please confer with Fischer Mess- und Regeltechnik prior to using this instrument along with polluted or aggressive media. For use with this media it needs to be adjusted in every part with direct contact to the media.

3. Product Description and Functions

3.1. Functional Scheme



3.2. Principles of Operation

This differential pressure instrument is based on a rugged and uncomplicated diaphragm movement, suitable for overpressure, partial vacuum and differential pressure measurements.

The system's operating principle is identical for all applications of this type. In a state of balance, forces of springs on both sides of diaphragm are balanced. The Pressure or differential pressure to be measured creates an unbalanced force of springs for measuring range until a new balance is reached. When subjected to excessive pressure, the diaphragm rests on metal supporting plates. A centre-mounted tappet transfers motion of the diaphragm system to indicator movement and to initiating elements of the microswitches.

4. Installation

The instrument is intended for wallmounting by default. It can be wall-mounted by 3 fastening elements casted on housing. Optionally the instrument can be panel-mounted by accessory DZ11.

To ensure safety during installation and maintenance integrate adequate shut-off valves. By recommended accessories (see 9.) the instrument can be

- depressurized or shut down,
- cut off a plant to enable controlling or repairing,
- operational checked on site.

4.1. Process Connections

- Only qualified technicians authorized for this type of work should undertake installation.
- Only for intended mechanical process connection (for model information see ordering code on instruments' type plate).
- Ensure that process equipment and pressure lines are at atmospheric pressure before making pressure connections.
- The instrument should be provided with suitable protection against pressure surges (e.g., snubber or pulsation damper).
- Ensure that the mechanical configuration and materials of construction of the instrument are compatible with the process media.
- Ensure that process pressure is always less than the specified safe pressure rating.

4.2. Electrical Connections

- Only qualified technicians authorized for this type of work should undertake installation.
- Electrical connections must comply with relevant international, national and local regulations and norms relating to electrical and instrumentation installations.
- Switch off electrical power to the plant before attempting electrical installation work of any kind.
- Make electrical connections to the instrument through a suitable fuse.

5. Commissioning

- Power supply and signal cabling to the instrument must be correctly selected to meet operational requirements, and installed in a way that does not cause physical stress to the instrument.
- Pressure lines must have a downward gradient throughout, from the pressure instrument to the process vessel / pipe. This is to prevent formation of air / gas pockets (for liquid applications) and liquid plugs (for air / gas applications). If this continuous downward gradient cannot be provided for any reason, then suitable water and / or air separation devices must be inserted in the pressure line.
- The instrument and lines must be protected against frost when used with water.
- The pressure lines must be kept as short as possible and must not have short bends to avoid measurement errors induced by pressure line delays.
- Carefully check the pressure-tightness of pressure connection before start-up.

5.1. Pressure Connections

The instruments pressure ports are marked by “+” and “-” symbols. The pressure applications need to be installed according to the label.

Differential pressure measurement: + higher pressure
- lower pressure

Pressure measurement: + pressure port

Negative pressure measurement: - negative pressure port

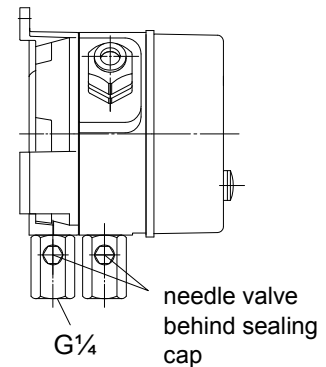
5.2. Pulsation Damping

During pulsating pressure on the plant mechanical wear and disturbances in functional capability may occur. To avoid this we recommend installing absorbers into the pressure lines.

For Liquid Media

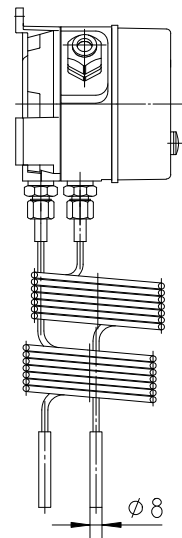
Adjustable attenuator valve **MZ41**

During operating condition adjust needle valve that way, that the indicator follows changes of pressure delayed.



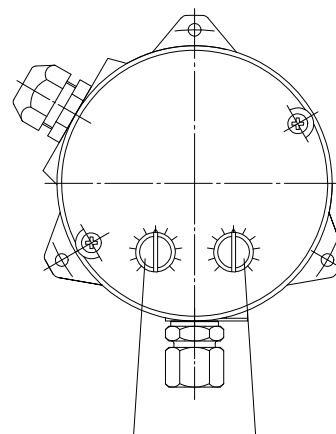
For Gaseous Media

Capillary reactive coil **MZ401**



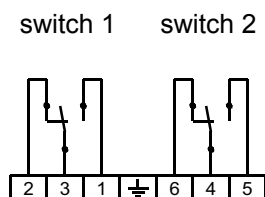
5.3. Switching Point Adjustment

- Unscrew plugs from cover.
- Set desired switching points according to marks on reference value scale by screwdriver. Achievable accuracy: 5% FS. More exact settings can be achieved by using accessories like testing manometer, ohmmeter on site or ex factory.
- Screw plugs in.



setting of switching points

5.4. Connection Diagram



6. Maintenance

The instrument is inherently maintenance-free.

However, to ensure reliable operation and maximize the operating life of the instrument, it is recommended that the instrument, its external electrical and process connections, and external connected devices be regularly inspected, e.g.:

- Check the display.
- Check the switching function in connection with external devices.
- Check all pressure connections for leak-tightness.
- Check the integrity of all electrical connections of the instruments.

Inspection and test schedules depend on operating and site conditions. The operating manuals of other equipment to which the differential pressure transmitter is connected must be read thoroughly to ensure that all of them work correctly when connected together.

7. Transport

The product must be protected against shock and vibration during transport. It must therefore be properly packed, preferably in the original factory packaging, whenever it is to be transported.

8. Service

Any defective devices or devices with missing parts should be returned to Fischer Mess- und Regeltechnik GmbH. For quick service contact our service department.



Remaining medium in and on dismantled measuring instruments may cause danger to persons, environment and equipment. Take reasonable precautions! Clean the instrument thoroughly if necessary.

9. Accessories

9.1. Panel mounting kit DZ11

Panel mounting kit \varnothing 132 mm consisting of front ring, spacer and fastening screws.

9.2. DZ13/14

Three- and four-spindle shut-off and equalizing valves DZ13/14 are especially suited for mounting differential pressure instruments. For example they are used for:

- Depressurizing or shutting down of plant.
- Cutting differential pressure instruments off a plant to enable controlling or repairing.
- Shut-off valves may be used for operational checks on site.

DZ14 - additional to DZ13 - is provided with a venting valve to ventilate the connected pipe system. Nominal pressure of these shut-off and equalizing valves is PN40. Case is available in aluminium, brass or stainless steel 1.4301. Several process connections acc. to Ordering Code are available.

10. Disposal



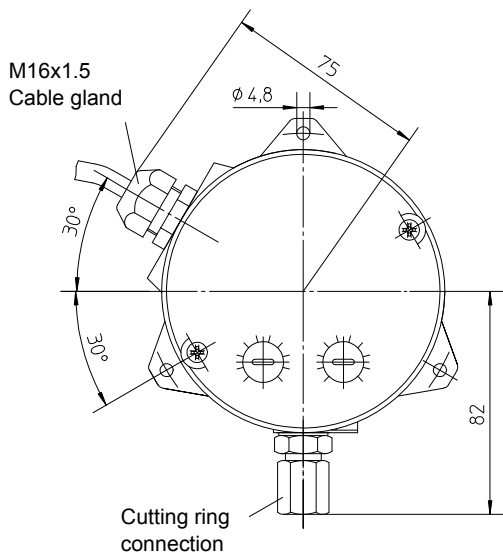
Protect your environment!

Use the product in accordance with relevant regulations. Please be aware of environmental consequences of disposal at the end of the product's life, and take care accordingly.

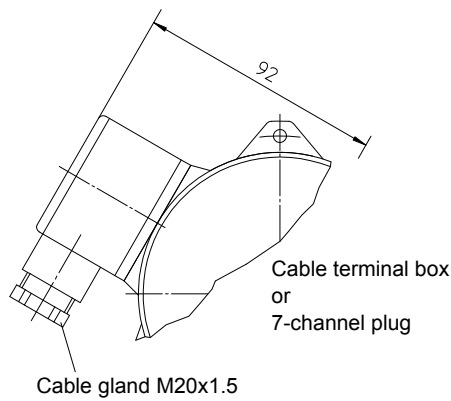
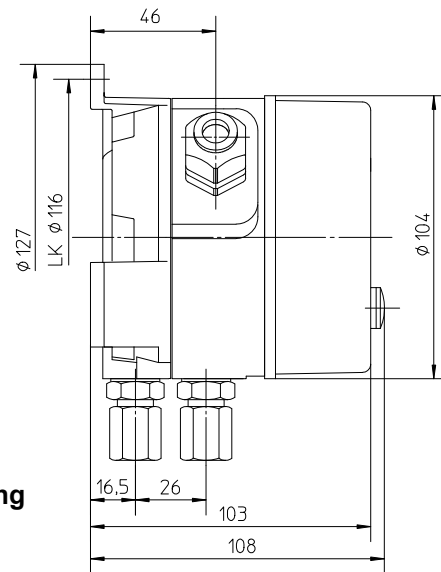
11. Specifications

General	
Measuring range	0... 400 mbar up to 0... 25 bar (see ordering code)
Nominal pressure	25 bar
Max. static operating pressure	acc. to measuring range (see ordering code)
Max. pressure load	one-sided overpressure protected up to nominal pressure on (+) - and (-) side of diaphragm, partial vacuum protected
Perm. ambient temperature	-10... +70°C
Perm. medium temperature	70°C
Protection class	IP 54 acc. to DIN EN 60529
Mounting position	as desired
Measuring accuracy	± 2.5% FS
Zero adjustment	located in the dial
Measuring System	
Measuring ranges < 16 bar	diaphragm measuring system, diaphragm of fabric back stayed elastomer
Measuring range 0-25 bar	diaphragm measuring system, diaphragm of DURATHERM®
Switching Elements	
Contact output	1 or 2 microswitches, 1-channel change-over contacts
Adjustment of switching points	external adjustment by standard value scales smallest adjustable value: approx. 5% FS
Switching hysteresis	approx. 2.5% FS
Load data / contacts	U ~ max. = 250 V AC, I max. = 5 A, P max. = 250 VA U = max. = 30 V DC, I max. = 0.4 A, P max. = 10 W
Electrical Connection	numbered cable, prewired terminal box, 7-channel plug
Pressure Connection	thread G1/4 female, cutting ring connection for 6, 8, 10, 12 mm Ø tube of brass, zinc steel or chrome nickel steel connection shank G1/4 male DIN EN 837
Materials	
Pressure chamber	aluminium GkAlSi10(Mg), varnished black aluminium GkAlSi10(Mg) HART-COAT® chrome nickel steel 1.4305
Measuring diaphragm	diaphragm measuring system and gaskets of NBR or Viton®, diaphragm of DURATHERM® NiCrCo-alloy
Materials: medium	stainless steel 1.4310, 1.4305
Materials: housing	macrolon
Weight	pressure chamber of Al = 1.2 kg, pressure chamber of 1.4305 = 3.5 kg
Mounting	
	pipe mounting, pressure connections = (+), (-) symbols
	• by screwed-in cutting ring or clamping ring connection
	• by screwed-in connection shank acc. to DIN EN 837 for nipple fitting acc. to DIN 16288
	wallmounting
	• 3 fastening elements

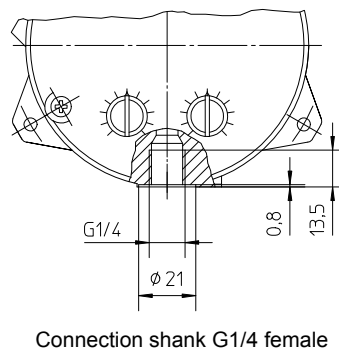
12. Dimensions (all units in mm unless stated otherwise)



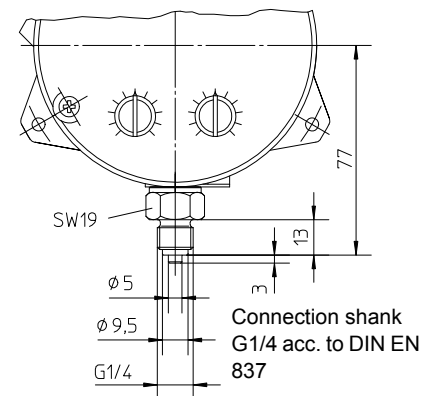
DS13 Wallmounting (standard)



Variants of electrical connection

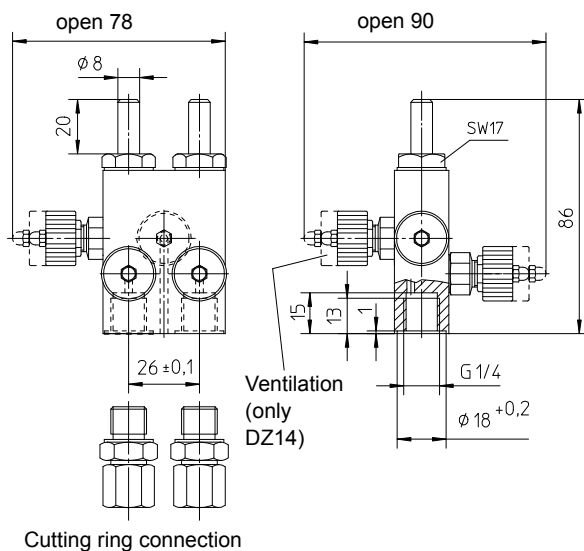


Connection shank G1/4 female

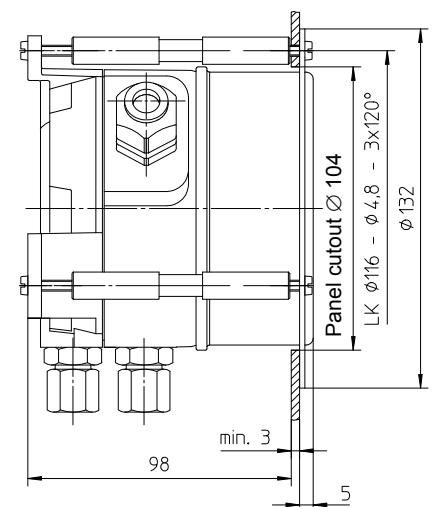
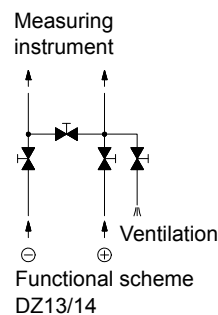


Connection shank G1/4 acc. to DIN EN 837

Variants of process connection



DZ13/14 Four-spindle shut-off and equalizing valve



Panel mounting

13. Ordering Code

Differential Pressure Switch

DS13

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Measuring Range	(max. Static. Operating Pressure)						
0 ... 400 mbar	6 bar	>	8	3			
0 ... 0.6 bar	10 bar	>	0	1			
0 ... 1 bar	16 bar	>	0	2			
0 ... 1.6 bar	25 bar	>	0	3			
0 ... 2.5 bar	25 bar	>	0	4			
0 ... 4 bar	25 bar	>	0	5			
0 ... 6 bar	25 bar	>	0	6			
0 ... 10 bar	25 bar	>	0	7			
0 ... 16 bar	25 bar	>	0	8			
0 ... 25 bar	25 bar	>	0	9			
-0.6 ... 0 bar	10 bar	>	3	0			
-1 ... 0 bar	16 bar	>	3	1			
-1 ... 0.6 bar	25 bar	>	3	2			
-1 ... 1.5 bar	25 bar	>	3	3			
-1 ... 3 bar	25 bar	>	3	4			
-1 ... 5 bar	25 bar	>	3	5			
-1 ... 9 bar	25 bar	>	3	6			
Measuring Diaphragm /	Gaskets						
NBR	NBR (all ranges up to 16 bar)	>	N				
Viton®	Viton® (all ranges up to 16 bar)	>	V				
DURATHERM®	NBR (range 0-25 bar only)	>	D				
DURATHERM®	Viton® (range 0-25 bar only)	>	E				
Pressure Chamber							
Aluminium		>	A				
Aluminium HART-COAT®		>	D				
Chrome nickel steel 1.4305		>	W				
Pressure Connection							
Female thread G1/4		>	0	1			
Connection shank G1/4 male of brass		>	0	6			
Connection shank G1/4 male of stainless steel 1.4305		>	1	1			
Cutting ring connection for 6 mm tube of steel		>	2	0			
Cutting ring connection for 8 mm tube of steel		>	2	1			
Cutting ring connection for 10 mm tube of steel		>	2	2			
Cutting ring connection for 6 mm tube of stainless steel 1.4571		>	2	4			
Cutting ring connection for 8 mm tube of stainless steel 1.4571		>	2	5			
Cutting ring connection for 10 mm tube of stainless steel 1.4571		>	2	6			
Cutting ring connection for 6 mm tube of brass		>	2	8			
Cutting ring connection for 8 mm tube of brass		>	2	9			
Cutting ring connection for 10 mm tube of brass		>	3	0			
Switches							
1 adjustable microswitch		>	A				
2 adjustable microswitches		>	B				
Electrical Connection							
Numbered cable, 1 m long, prewired		>	1				
Numbered cable, 2.5 m long, prewired		>	2				
Numbered cable, 5 m long, prewired		>	5				
Cable terminal box		>	K				
7-channel plug		>	W				

14. CE-Certificate

						
						
<p>EG-Konformitätserklärung</p> <p>Wir erklären in alleiniger Verantwortung, dass nachstehend genannte Produkte</p>	<p>EC Declaration of Conformity</p> <p>We declare under our sole responsibility that the products mentioned below</p>					
<p>Differenzdruckschalter / Differential Pressure Switch</p> <p>DS13 #####</p>						
<p>gemäß gültigem Datenblatt übereinstimmen mit der</p> <p>EG-Richtlinie</p> <p>2006/95/EG (NSR)</p> <p>Die Produkte wurden entsprechend der folgenden Norm geprüft:</p> <p>DIN EN 61010-1:2002-08</p> <p>Die Geräte werden gekennzeichnet mit:</p> <p>Bad Salzuflen, 02.09.08 (Ort, Datum / place, date)</p>	<p>specified by the actual data sheet complies with the</p> <p>EC Directive</p> <p>2006/95/EC (LVD)</p> <p>The instruments have been tested in compliance with the norm</p> <p>DIN EN 61010-1:2002-08</p> <p>The gauges are marked with:</p> <p style="font-size: 2em; text-align: center;">CE</p> <div style="text-align: center; margin-top: 20px;">  (rechtsverb. Unterschrift / authorized signature) </div>					
<table border="0" style="width: 100%;"> <tr> <td style="width: 25%;">Fischer Mess- & Regeltechnik GmbH Bielefelder Strasse 37a D-32107 Bad Salzuflen USt-IdNr.: DE124602659 Steuer-Nr.: 313/5729/0559</td> <td style="width: 25%;">Fon: +49 (0) 52 22-9740 Fax: +49 (0) 52 22-71 70 Web: www.fischermesstechnik.de Mail: info@fischermesstechnik.de</td> <td style="width: 25%;">Sparkasse Lemgo BLZ 482 501 10 Konto-Nr.: 11 841 BIC: WELADED1LEM IBAN: DE90482501100000011841</td> <td style="width: 25%;">Postbank Hannover BLZ 250 100 30 Konto-Nr.: 0201 830 307 BIC: PBNKDEFF IBAN: DE 98 2501 0030 0201 8303 07</td> <td style="width: 20%;">Sitz/reg. office: Bad Salzuflen Amtsgericht Lemgo HRB 226 Geschäftsführer/ Manag. Dir.: Günter B. Gödde</td> </tr> </table>		Fischer Mess- & Regeltechnik GmbH Bielefelder Strasse 37a D-32107 Bad Salzuflen USt-IdNr.: DE124602659 Steuer-Nr.: 313/5729/0559	Fon: +49 (0) 52 22-9740 Fax: +49 (0) 52 22-71 70 Web: www.fischermesstechnik.de Mail: info@fischermesstechnik.de	Sparkasse Lemgo BLZ 482 501 10 Konto-Nr.: 11 841 BIC: WELADED1LEM IBAN: DE90482501100000011841	Postbank Hannover BLZ 250 100 30 Konto-Nr.: 0201 830 307 BIC: PBNKDEFF IBAN: DE 98 2501 0030 0201 8303 07	Sitz/reg. office: Bad Salzuflen Amtsgericht Lemgo HRB 226 Geschäftsführer/ Manag. Dir.: Günter B. Gödde
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