

Instruction Manual

DA01 || Differential Pressure Gauge

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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 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, UVW 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.

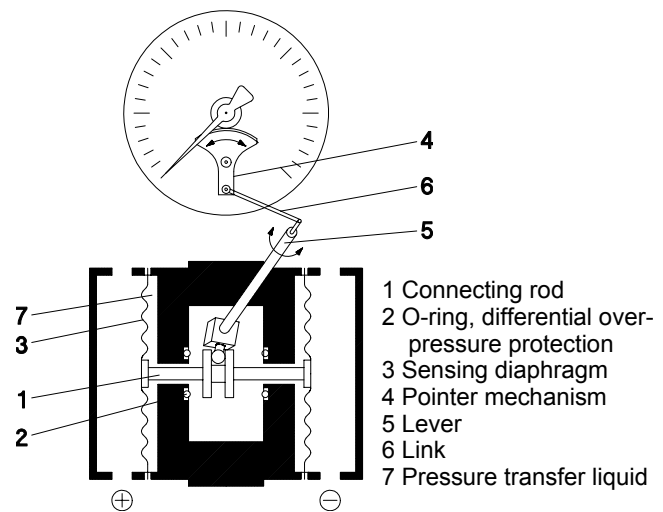
It is the responsibility of the users to ensure that only suitably qualified and experienced technical personnel are used for installation, operation and servicing of this equipment.

2. Intended Applications

The DA01 is used for indication and switching differential pressure of gaseous and liquid media. The product must be used only for applications and under conditions specified by the manufacturer.

3. Product Description and Functions

3.1. Schematic Diagram



3.2. Principles of Operation

The pressures to be compared act on flexible stainless steel diaphragms on either side of the sensing capsule. The two diaphragms are mechanically linked by a rigid connecting rod. To compensate high static pressures, the cavity between the two diaphragms is filled with hydraulic fluid. When pressures are equal on both diaphragms, they are at zero position. When there is a difference in pressures acting on the two diaphragms, they are deflected away from the high pressure side, towards the lower pressure side, causing a displacement of the connecting rod. A precision mechanism translates the linear displacement of the diaphragm connecting rod to angular movement of the gauge's dial pointer. The pointer's displacement range of 270° corresponds to the full scale differential pressure.

The connecting rod has intermediate flanges on either side, which protects the diaphragms against excess differential pressure. When differential pressure exceeds the specified limit, the flange towards the lower pressure side is pressed against the sealing O-ring on the inside of the sensing capsule. This action isolates the fluid adjacent to the diaphragm exposed to lower pressure, from the fluid at higher pressure on the other side. This limits the pressure differential across the lower pressure diaphragm, and equalizes the pressure across the higher pressure diaphragm. Thus both diaphragms are protected against excess deflection and risks of rupturing.

4. Installation

The instrument is intended for plate mounting. There are 2 boreholes (M8) on the rear to fix the instrument on the mounting plate.

The instrument is intended and factory adjusted for vertical mounting, pressure ports downward. When mounted in other orientation the pointers' zero position needs to be adjusted (see 5.2).

Types with inbuilt limit switches need matching connection to fixed cable connection to guarantee protection class IP65. Its outer diameter needs to be between 7 and 13 mm.

4.1. Process Connection

- Only qualified technicians authorized for this type of work should undertake installation.
- 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 Connection

- 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 energy-limiting safety device (isolation or zener barrier).

5. Commissioning

- Power supply, pressure lines 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 in-

serted into the pressure lines.

- Pressure lines must be kept as short as possible and must not have short bends to avoid measurement errors induced by pressure line delays.
- When used with liquid media the pressure lines must be vented, for different heights in head of liquid in lines cause measuring errors. The instrument and lines must be protected against frost when used with water.
- Carefully check the tightness of all pressure connections before start-up.

5.1. Pressure Connection

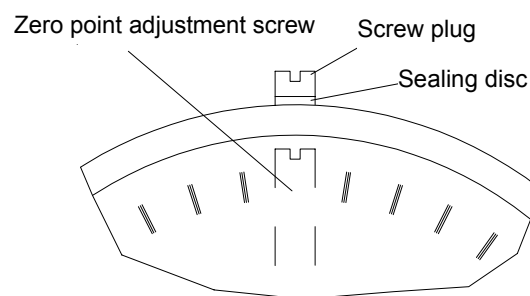
The instruments pressure ports are marked by "+" and "-" symbols. For differential pressure applications the "+" port must be connected to the higher pressure and the "-" port should be connected to the lower pressure.

5.2. Zero Point Adjustment

The differential pressure gauge is factory adjusted therefore in normal case adjustment during installation is not necessary.

- Equalize pressure in both chambers.
- Unmount screw plug.
- Use zero point adjustment screw to set the pointer to zero.
- Mount screw plug.

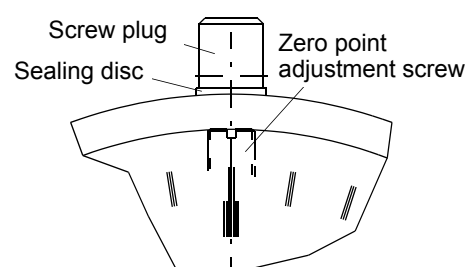
5.2.1. Zero Point Adjustment Screw Position



5.2.2. Zero Point Adjustment Screw Position (Filled Models)



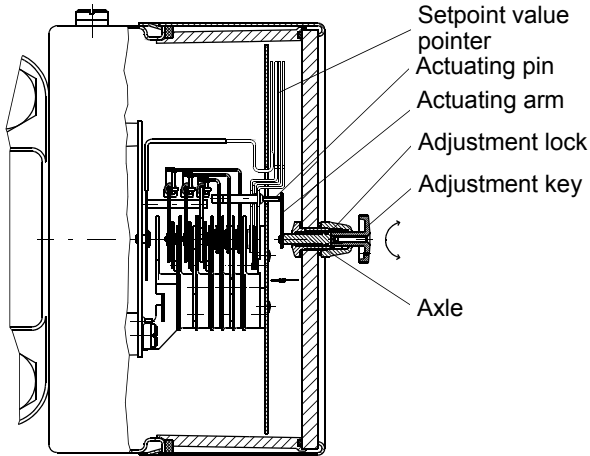
Filled Models need to be vented before commissioning by opening the air valve on the upper side of instrument!



5.3. Setting of Switching Points

An adjustment lock is located in the instruments sight glass. The switching contacts located on the setpoint value indicators can be adjusted to any point of scale by the removable adjustment key.

For reasons of switching accuracy and products life span switching points should be within range of 10% to 90% of scale.



Adjustment Sequence:

- Attach adjustment key on axle of adjustment lock.
- Press axle inwards until the actuating arm interlocks with the actuating pins.
- Turn adjustment key until setpoint value pointer reaches the desired switching point.
- Release axle and remove adjustment key.

5.4. Connection Scheme / Contact Function

See connection scheme on instrument and datasheet Limit Transducer KE... .

Contact Function:

Function 1: Contact closes when the pointer increments clockwise.

Function 2: Contact opens when the pointer increments clockwise.

Contact Assignment:

- Contact 1 - setpoint value pointer on the left
- Contact 2 - setpoint value pointer in the middle
- Contact 3 - setpoint value pointer on the right

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 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 instrument 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

N.A.

10. Disposal



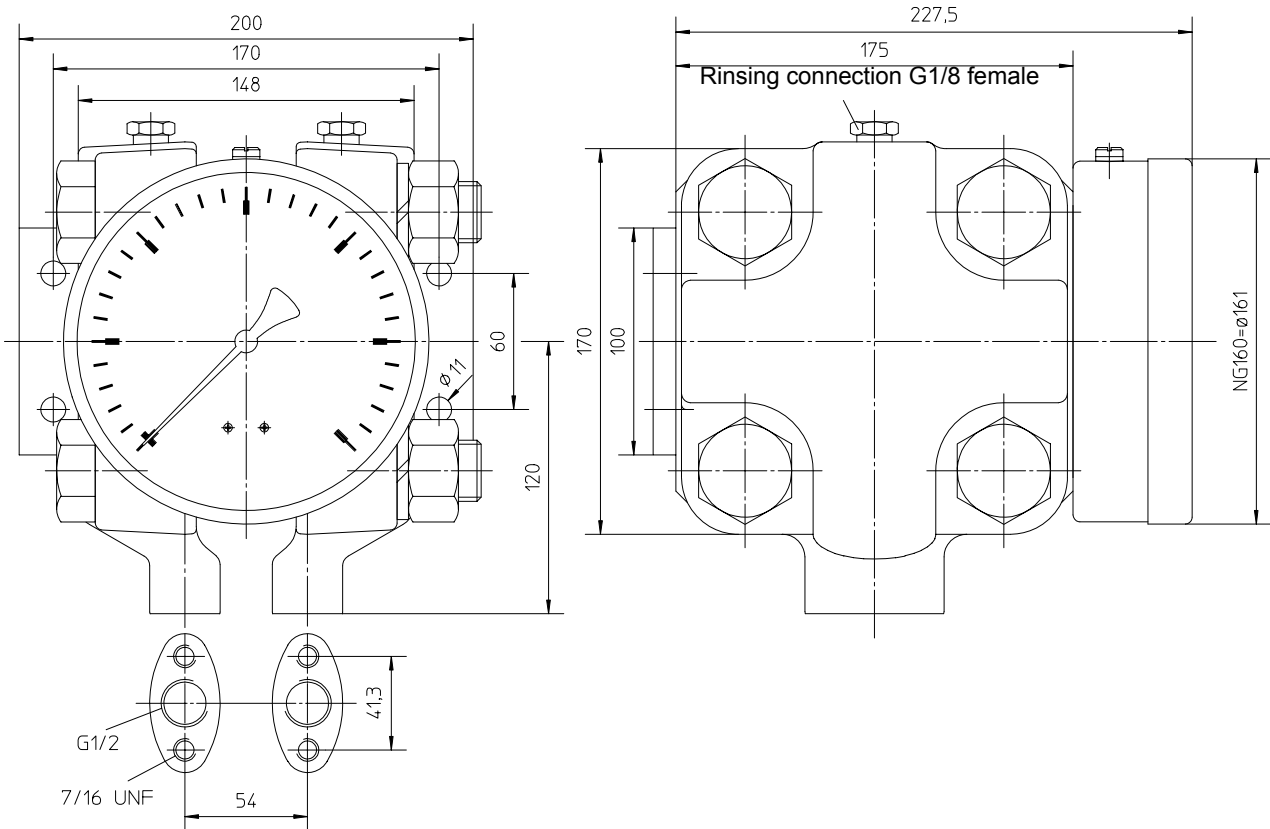
Protect your environment!

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.

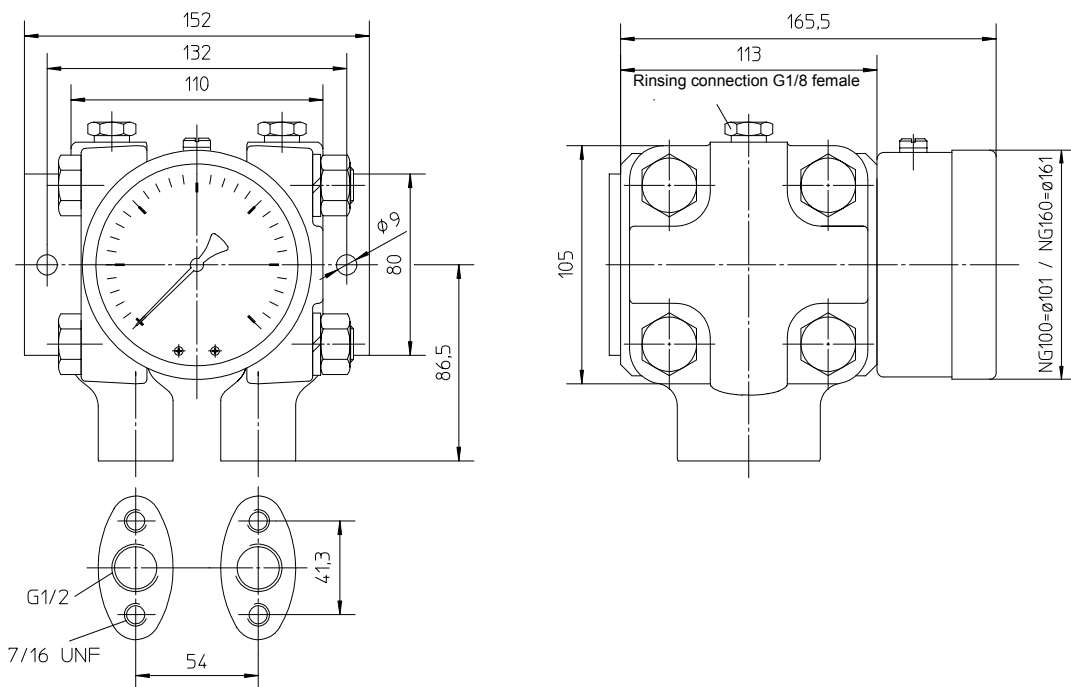
11. Specifications

General	
Range	See Ordering Code
Max. pressure load	Overpressure safe up to max. operating pressure
Max. static operating pressure	PN 250; PN 400 (see Ordering Code)
Indication	Circular dial type 100 or 160 diameter Scale design acc. to DIN, 270°
Accuracy	± 1.6% FS
Perm. ambient temperature (housing)	-20 ... +80°C
Perm. medium temperature	-20 ... +80°C
Zero adjustment	Accessible through marginal openings of the housing, max. ±30% FS
Pressure connection	Flange connection acc. to DIN EN 61518, female thread G1/2
Pressure chamber	Plain walls without undercuts, even measuring diaphragm; Rinsing and venting connection G1/8
Protection class	IP54 acc. to DIN EN 60529 IP65 acc. to DIN EN 60529 for filled models
Materials, Mounting	
Pressure chamber	1.4404
Measuring diaphragm	For ranges ≤ 400 mbar: 1.4571 stainless steel For ranges ≥ 0.6 bar: NiCrCo alloy (Duratherm®)
Pressure transfer liquid	Silicone oil
Inner plate	AlMgSiPb HART-COAT®
Indicator and housing	1.4301 stainless steel
Gaskets	Viton® O-Rings
Glass	Multi layer laminated safety glass
Dial and Indicator	Aluminium
Mounting	Pressure acc. to indicated symbols Wallmounting by mounting plate

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



Differential Pressure Gauge DA01 Model: Range (60 ... 400) mbar



Differential Pressure Gauge DA01 Model: Range (0.6 ... 25) bar

13. Ordering Code

Differential Pressure Gauge		DA01		[][][][][][][][][][][][][][][]										0		
Range				↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑												
0 ... 60 mbar.....	>	5	8													
0 ... 100 mbar.....	>	5	9													
0 ... 160 mbar.....	>	6	0													
0 ... 250 mbar.....	>	8	2													
0 ... 400 mbar.....	>	8	3													
0 ... 0.6 bar.....	>	0	1													
0 ... 1 bar.....	>	0	2													
0 ... 1.6 bar.....	>	0	3													
0 ... 2.5 bar.....	>	0	4													
0 ... 4 bar.....	>	0	5													
0 ... 6 bar.....	>	0	6													
0 ... 10 bar.....	>	0	7													
0 ... 16 bar.....	>	0	8													
0 ... 25 bar.....	>	0	9													
0 ... 40 kPa.....	>	E	8													
0 ... 100 kPa.....	>	F	2													
0 ... 250 kPa.....	>	F	4													
0 ... 600 kPa.....	>	F	6													
0 ... 1000 kPa.....	>	F	7													
0 ... 1600 kPa.....	>	F	8													
0 ... 10 PSI.....	>	H	3													
0 ... 15 PSI.....	>	H	4													
0 ... 30 PSI.....	>	H	5													
Other ranges on request.....	>	9	9													
Nominal Pressure Rating																
PN 250.....	>	N														
PN 400 (only for ranges ≥ 0.6 bar).....	>	P														
Measuring System Material																
Pressure chamber chrome-nickel-steel 1.4404 / AISI 316L/ standard diaphragm .	>	R														
Hastelloy *)	>	H														
Pressure Connection																
Flange connection acc. to DIN EN 61518 with G1/2 (F).....	>	0	3													
Threaded connectors 1/4-18 NPT (F).....	>	0	4													
Threaded connectors 1/2-14 NPT (F).....	>	0	5													
Threaded connectors G1/2 (M) stainless steel.....	>	1	3													
Threaded connectors 1/4-18 NPT EXT (M) stainless steel	>	1	4													
Threaded connectors 1/2-14 NPT EXT (M) stainless steel	>	1	5													
Dial Size																
Bayonet ring case ø100 (Range 0.6 up to 25 bar) 1.4301 stainless steel.....	>	L														
Bayonet ring case ø160, 1.4301 stainless steel	>	M														
Mounting																
Pipe mounting (only for bar ranges)	>	R														
Wall mounting (standard).....	>	W														
Panel mounting set (only for bar ranges / without additional superstructural parts)	>	T														
Front cover ring for panel mounting.....	>	G														
Liquid Filling																
Without liquid filling.....	>	0														
Dial with liquid filling: glycerine	>	1														
Dial with liquid filling with inbuilt contacts (Napvis) *)	>	2														
Dial with liquid filling: silicone oil.....	>	5														
Additional Pointer																
Without additional pointer	>	0														
Adjustable reference pointer.....	>	1														
Contacts / Transmitter																
Without contacts / transmitter*)	>	0														
Built-in limit switches, per Data Sheet KE... (ranges ≥ 100 mbar) **).....	>	1														
Built-in pointer position transducer, per Data Sheet KE... (ranges ≥ 100 mbar) **).....	>	2														

*) Shaded marks are not indicated in the data sheet and only available on request!
 **) Built-in contacts and pointer position transducer only on request and technical clarification!

14. Declaration of Conformity



Konformitätserklärung

Wir erklären in alleiniger Verantwortung, dass nachstehend genannte Produkte

Declaration of Conformity

We declare under our sole responsibility that the products mentioned below

**Differenzdruck-Meßgerät / Differential Pressure Gauge
mit eingebauten Kontakten KE / with inbuilt contacts KE
DA01 #####0**

mit den Schutzanforderungen entsprechend der Niederspannungsrichtlinie 73/23/EWG und deren Änderung 93/68/EWG übereinstimmen.

meet the requirements of protection according to the low voltage directive 73/23/EEC and its modification 93/68/EEC.

Fachgrundnormen

**Sicherheitsbestimmungen:
EN 61010-1**

Sicherheitsbestimmungen für elektrische Meß-, Steuer-, Regel- und Laborgeräte

Generic standards

**Safety requirements:
EN 61010-1**


Safety requirements for electrical equipment for measurement, control and laboratory use

Die Geräte werden gekennzeichnet mit



The gauges are marked with

Bad Salzuflen, 02.10.2007
(Ort, Datum / place, date)


(rechtsverb. Unterschrift / authorized signature)

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Stiz: Bad Salzuflen
Amtsgericht Lemgo HRB 226
Geschäftsführer:
Günter B. Gödde