

# Instruction Manual

## DE13 || Differential Pressure Transmitter

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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

Differential pressure transmitter for differential, negative and positive pressure measurement of gaseous and liquid media. The instrument must be used only for applications and under conditions specified by the manufacturer.

## 3. Product Description and Functions

### 3.1. Schematic Diagram

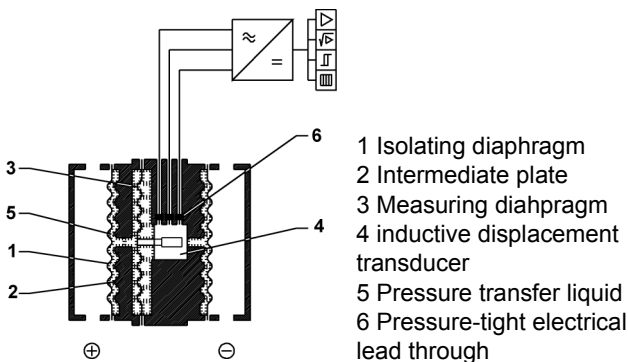


Fig. 1

### 3.2. Principles of Operation

The pressures to be compared each act on an outer flexible stainless steel isolating diaphragm. They are transferred to the sensing diaphragm by the pressure transfer fluid. When pressures are equal on both sides of the sensing diaphragm, it is at zero position.

Pressure difference across the sensing diaphragm causes it to deflect away from the higher pressure side, resulting in linear displacement of the LVDT core. This displacement is sensed by the LVDT's coils, and converted by an electronic module to an output signal proportional to the differential pressure.

Inward deflection of each isolating diaphragm is limited by the intermediate plate behind it. This also limits the pressure that can be transferred to the sensing diaphragm. Thus, all three diaphragms are fully protected against excess differential pressure in either direction, and also against high static pressures.

## 4. Installation

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).

Model „W“ is intended for wall or plate mounting. Model „R“ may be mounted directly on vertical or horizontal 2" pipes.

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 fuse.

Fig. 2 2-wire connection

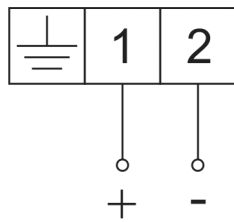
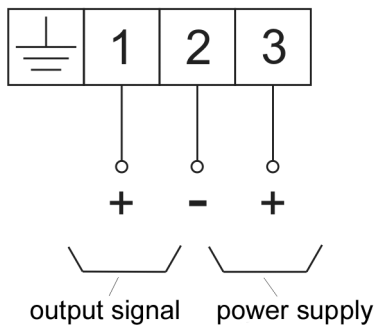


Fig. 3 3-wire connection



The potentiometers are accessible after the bayonet ring case and the front plate are dismantled (fig. 4). The instrument must be connected acc. to its electrical output signal (see fig. 5 or 6)

Fig. 4 Potentiometer

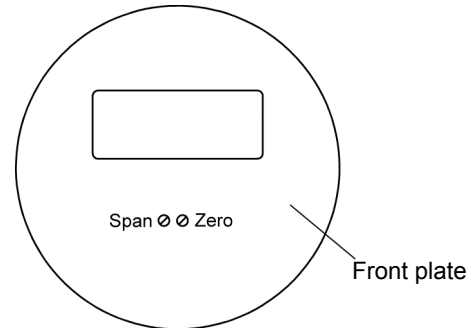


Fig. 5 Zero Adjustment (2-wire)

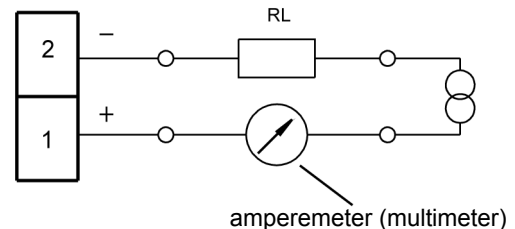
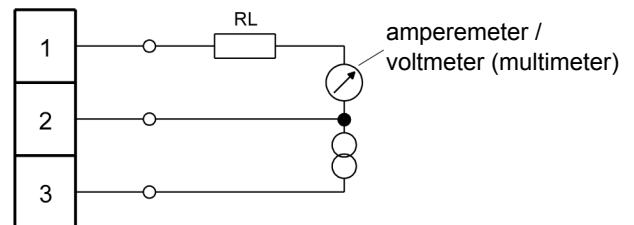


Fig. 6 Zero Adjustment (3-wire)



## 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 inserted 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.
- Carefully check the tightness of all pressure connections before start-up.

### 5.1. Pressure Line 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 and Span Adjustment

The instrument is factory adjusted therefore in normal case adjustment during installation is not necessary. The output signal can be adjusted using span and zero potentiometer.

#### Adjustment:

- Connect auxiliary power.
- Instrument pressureless:  $\Delta p = 0$   
Display for standard ranges  
= 4.0 mA 2-wire  
= 0 mA 3-wire  
= 0 V DC 3-wire  
Variations indicated by the multimeter may be corrected using zero potentiometer.
- Set pressure to end of scale (i.e. pressure generation at the "+"-side by handpump and pressure comparison instrument, "-"-side open to atmosphere)  
Display 20 mA  
Variations indicated by the multimeter may be corrected using span potentiometer
- Double-check zero and span, correct again if needed.

## 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

### 9.1. 3-Spindle Blocking and Equalising Valve DZ36

The optional 3-spindle blocking/equalising valve DZ36 may be flanged directly onto connection flanges acc. to DIN EN 61518. Differential pressure transmitters should be connected using valves for they then can be shut off the system easily (for inspection, maintenance etc.).

### 9.2. Mounting kit for 2" pipes DZ10

See 12. Dimensions.

## 10. Disposal



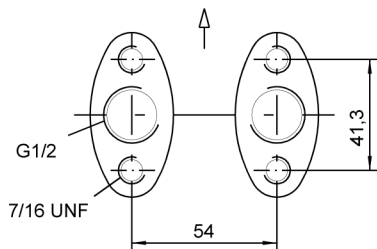
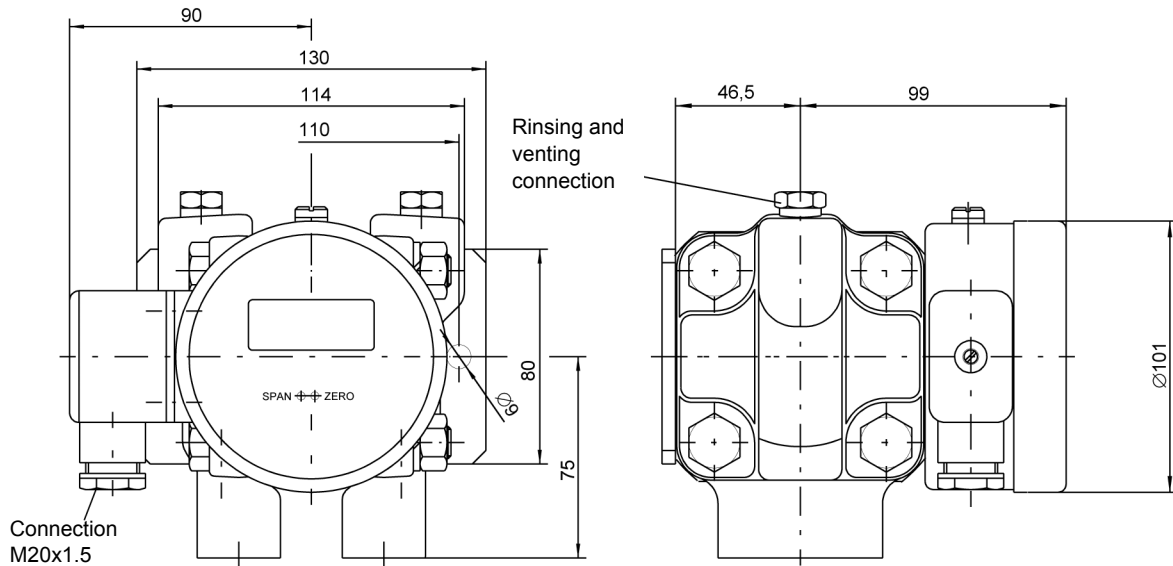
*Protect your environment!*

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.

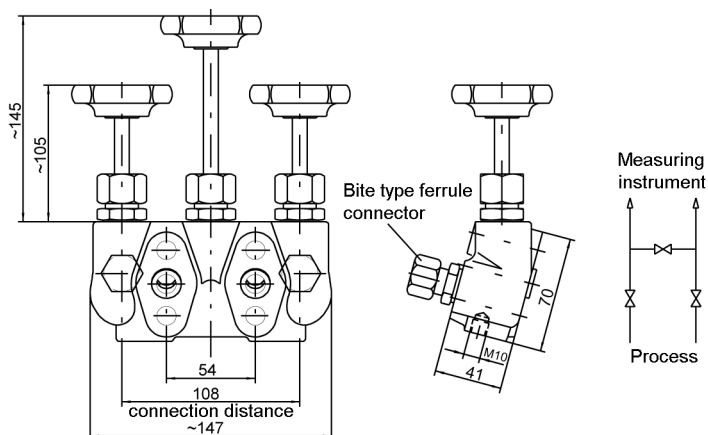
## 11. Specifications

	<b>General</b>		
Measuring range	0 - 40 mbar to 0 - 25 bar (see Ordering Code)		
Nominal pressure	100 bar		
Max. static operating pressure	100 bar		
Max. pressure load	overpressure safe up to max. static operating pressure		
Linearity	< 1% FS		
Hysteresis	< 0.3% FS		
Temperature drift	< 0.5% / 10 K		
Perm. ambient temperature	-10°C bis +60°C		
Perm. medium temperature	70°C		
Protection class	IP 65 acc. to DIN EN 60529		
	<b>Electrical Data</b>		
Operating voltage	24 V AC	24 V AC	
	24 V DC	24 V DC	24 V DC
Power consumption	approx. 3 VA / 3 W	approx. 3 VA / 3 W	approx. 3 W
Electrical connection	3-wire	3-wire	2-wire
Output signal	0 - 20 mA	0 - 10 V DC	4 - 20 mA
Load	max. 1000 Ω	> 2 k Ω	max. 450 Ω
Current limiting	approx. 30 mA	-	approx. 30 mA
Voltage limiting	-	approx. 12 V DC	-
Indication	3½ digit LC-Display		
Slope adjustment	approx. 10% FS		
Zero adjustment	approx. 10% FS		
	<b>Connection</b>		
Electrical connection	Plug connection		
Pressure connection	Flange connection acc. to DIN EN 61518 female thread G ½ (other connections on request)		
Rinsing and venting connection	G 1/8 female thread with sealing plug		
	<b>Materials, Mounting</b>		
Pressure chamber, diaphragms (isolating/sensing)	Chrome-nickel-steel 1.4404 (AISI 316L - in contact with medium)		
Gaskets	Viton® / in contact with medium		
Intermediate plate	Aluminium, hard coated		
Electronics housing	Chrome-nickel-steel 1.4301		
Materials on request	Pressure chamber and isolating diaphragms of Hastelloy C® (PTFE-coated sealing)		
Mounting / Pressure connection	Process pipe connection to be erected by using bite type ferrule connectors or direct fitting of pipe into G½ F thread. Make sure that the connection is firmly sealed. The instrument can be wall mounted using wall mounting plate or pipe mounted using mounting kit DZ10.		
	<b>Accessories</b>		
DZ36	Blocking/equalising valve The optional 3-spindle blocking/equalising valve DZ36 may be flanged directly onto connection flanges acc. to DIN EN 61518. Differential pressure transmitters should be connected using valves for they then can be shut off the system easily (for inspection, maintenance etc.).		
DZ10	Mounting kit for 2" pipes		

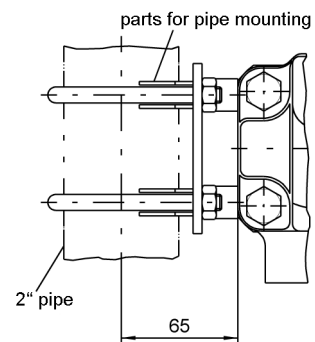
**12. Dimensions** (all units in mm unless otherwise stated)



Accessory: DZ36 blocking/equalising valve



Accessory: Mounting kit for 2" pipe DZ10



**13. Ordering Code**

Differential Pressure Transmitter DE13 

												0	0	0	0
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**Measuring range**

0 ... 40 mbar .....	>	5	7	↑
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	↑
- 40 ... 60 mbar .....	>	7	0	
- 60 ... 100 mbar .....	>	7	2	
-100 ... 150 mbar .....	>	7	4	
-150 ... 250 mbar .....	>	7	6	
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	
-1 ... 0.6 bar .....	>	3	2	
-1 ... 1.5 bar .....	>	3	3	
-1 ... 3 bar .....	>	3	4	
-1 ... 5 bar .....	>	3	5	

**Pressure connection**

Flange connection acc. to DIN EN 61518 with female thread G1/2 .....	>	0	3
Connection branch with female thread 1/2 -14 NPT .....	>	0	5
Connection shank with male thread G1/4 B stainless steel .....	>	1	1
Connection shank with male thread G1/2 B stainless steel .....	>	1	3
Byte type ferrule connector of 1.4571 for 12 mm pipe .....	>	2	7

**Electrical output signal**

0 - 20 mA 3-wire (STANDARD) .....	>	A
4 - 20 mA 2-wire <b>only for 24 V DC</b> .....	>	B
0 - 10 V DC 3-wire (STANDARD) .....	>	C
4 - 20 mA 3-wire (STANDARD) .....	>	P

**Operating voltage**

24 V AC ±10% .....	>	4
24 V DC ±10% .....	>	9

**Indication / Switching function**

Without indication / switching function .....	>	0
3½-digit indication .....	>	1

**Mounting**

Rear mounting holes .....	>	E
Wall mounting kit .....	>	W
Pipe mounting kit .....	>	R

**14. Declaration of Conformity**



**EG-Konformitätserklärung**

**EC Declaration of Conformity**

Wir erklären in alleiniger Verantwortung, dass nachstehend genannte Produkte

We declare under our sole responsibility that the products mentioned below

**Differenzdrucktransmitter / Differential Pressure Transmitter**

**DE13 #####**

gemäß gültigem Datenblatt übereinstimmen mit der

specified by the actual data sheet complies with the

**EG-Richtlinie**

**EC Directive**

2004/108/EG (EMV)

2004/108/EC (EMC)

Die Produkte wurden entsprechend der folgenden Normen geprüft (Störfestigkeit für Industriebereich, Störaussendung für Wohnbereich):

The instruments have been tested in compliance with the norms (Immunity for industrial environments, emission for residential environments):

DIN EN 61326-1:2004-05  
DIN EN 61326-2-3  
DIN EN 61010-1:2002-08

DIN EN 61326-1:2004-05  
DIN EN 61326-2-3  
DIN EN 61010-1:2002-08

Die Geräte werden gekennzeichnet mit:

The gauges are marked with:



Bad Salzflufen, 07.02.08  
(Ort, Datum / place, date)

  
(rechtsverb. Unterschrift / authorized signature)

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