Indicating Electric Two-Wire Transmitter for Differential Pressure

Media 4A – 2-Wire
Type 5014

Application

Differential pressure and liquid level indicator with electronic transmitter

For differential pressure spans from 40 to 2500 mbar at static pressures of up to 40 bar

The Media 4A – 2-wire indicating unit is used for measuring and indicating the differential pressure and liquid level in industrial plants and building services. For connection of this unit to measuring and control equipment, the measured values are converted into standard d.c. current signals of 4 to 20 mA.

When used in conjunction with the Type 5024 Power Supply and Indicator Unit, the liquid level in a tank can be indicated on a LCD panel in a control room. In addition, limit alarm signals are provided.

The instrument consists essentially of a differential pressure cell with measuring diaphragm and measuring spring and the indicating unit with pointer mechanism, transmitter unit and scale.

Features

Applicable for liquids, gases and steam

Easily exchangeable measuring spring

Overloadable on one side up to the permissible static pressure

Designed for field installations (degree of protection IP 54) and panel mounting

Zero adjustment from the front

Output signal proportional to differential pressure

Versions

Media 4A – 2-wire Type 5014-0... (Figures 1 and 2)

Two-wire transmitter for differential pressure. Output signal from 4 to 20 mA (20 to 4 mA), 24 V– power supply from a two-wire circuit

Measuring cell designed for measuring spans of either
40 to 600 mbar **or** 250 to 1600 mbar **or** 1600 to 2500 mbar
Scale optionally available
from 0 to 100 % linear or squared **or** according to DIN 19204 **or** exchangeable for different media **or** as special version

Media 4A – 2-wire Type 5014-1...

Version as described above, but applicable in hazardous locations. Input circuit in type of protection EEx ib IIC T6

Special version Media 4A – 2-wire for oxygen services

Applicable for operating pressures up to 40 bar and operating temperatures of 60 °C

Special version with measuring cell manufactured of A 351 CF8M according to ASTM

Details on request. Depending on where the instrument is used, accessories are required.

Fig. 1 · Media 4A – 2-wire (front view)

Fig. 2 · Media 4A – 2-wire (side view)

Principle of operation

The differential pressure cell (1), operating according to the deflection principle, contains a measuring diaphragm (1.6) which is designed for the respectively desired measuring spans (see "Technical data"). The spring-guided (1.9) diaphragm shaft (1.8) is connected to the lever (1.11) by means of the connection link (1.10), to the measuring diaphragm via the diaphragm plates (1.7), and to the measuring spring (1.5) using the spring plate. The deflection of the measuring system is transmitted via the lever (1.11) out of the pressure cell. The flexible gasket (1.12) seals the pressure chamber. The tension bands (1.13) connected to the lever and the housing ensure that the lever position is independent of the static pressure. The differential pressure cell can be overloaded on one side, because the measuring diaphragm flexes against the housing wall when the measured differential pressure values are out of range.

The differential pressure $\Delta p = p_1 - p_2$ creates a force on the measuring diaphragm (1.6). This force is balanced by the measuring spring (1.5). The deflection of the diaphragm (1.6) and the lever (1.11), which is proportional to the differential pressure, is transmitted from the pressure cell to the flexible gasket (1.12) and then to the pointer via the adjustable coupling element (2.1) and the ball-supported gear mechanism (2.2).

In the transmitter unit, the pointer deflection, proportional to the pressure sensed, is transmitted to a solenoid system. This motion changes the magnetic field and, as a result, the voltage in a Hall sensor (3.1). The following electronic circuitry converts this voltage into a standard current signal of 4 to 20 mA.

The span and therefore also the upper range value (pointer deflection) can be preset at a 7-position rotary switch. Fine adjustment of zero and span is to be done at the two potentiometers.

In case of a pointer deflection of 270 ° (rotary switch at position •), the output signal can be changed to 20 to 4 mA by turning a range plug 180 °.

Ordering text

Indicating Electric Two-Wire Transmitter for Differential Pressure Media 4 A – 2-Wire

With measuring cell for ... to ... mbar, measuring span ... to ... mbar

Transmitter with output 4 to 20 mA / 20 to 4 mA

Power supply 24 V–

Scale 0 to 100 % linear / scale according to DIN 19204 / special scale...

Optional special version ...

Optional accessories ...

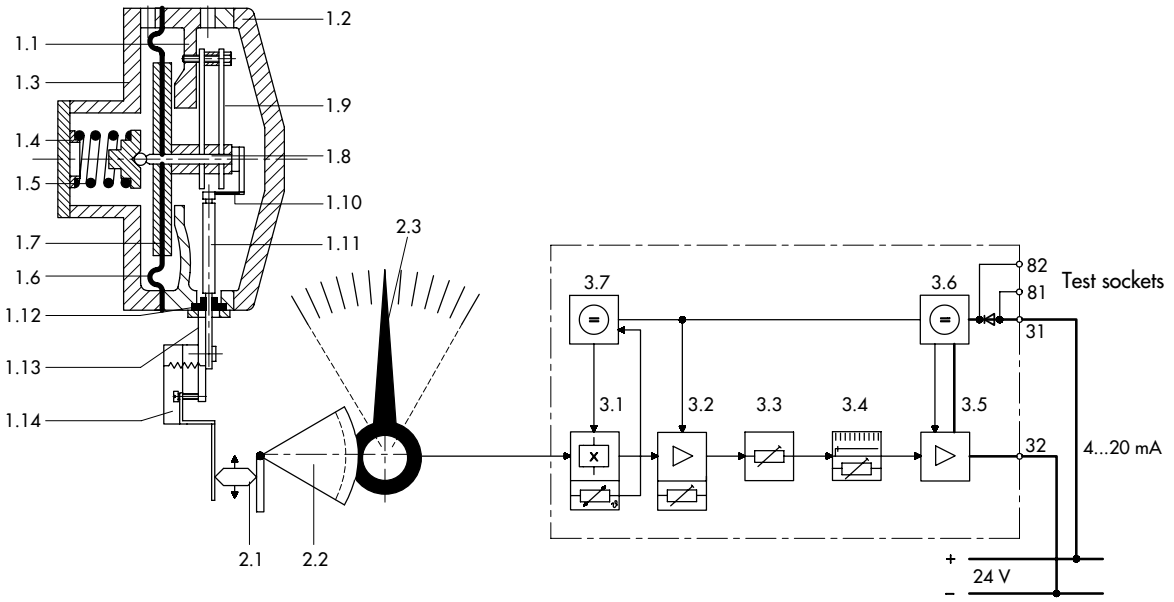


Fig. 3 · Functional diagram

1 Differential pressure cell
1.1 Housing
1.2 High pressure head
1.3 Low pressure head
1.4 Spring plate
1.5 Measuring spring
1.6 Measuring diaphragm
1.7 Diaphragm plates
1.8 Diaphragm shaft
1.9 Guide springs
1.10 Connection link
1.11 Lever
1.12 Gasket
1.13 Tension bands
1.14 Coupling with overload protection

2 Indicating unit
2.1 Adjustable coupling element
2.2 Pointer mechanism
2.3 Pointer

3 Transmitter
3.1 Sensor with resistor
3.2 Measuring amplifier
3.3 Potentiometer for ZERO adjustment (fine and coarse)
3.4 Rotary switch and potentiometer for SPAN adjustment (fine and coarse)
3.5 Output stage
3.6 Constant-voltage source
3.7 Constant-current source

Technical data
All pressures stated in bar (gauge)

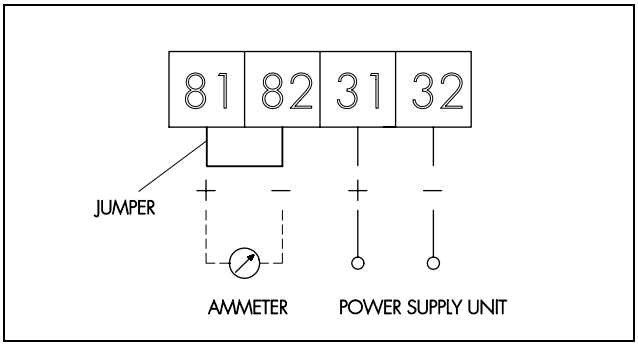
Differential pressure transmitter										
Measuring span	Max. mbar	60	100	160	250	400	600	1000	1600	2500
	Min. mbar	40	60	100	160	250	400	600	1000	1600
Nominal pressure		PN 40, overloadable on one side up to 40 bar								
Measuring spans of the measuring diaphragm		40 to 600 mbar, 250 to 1600 mbar or 1600 to 2500 mbar								
Volume of dp-cell		High pressure chamber: approx. 80 cm^3; low pressure chamber: approx. 25 cm^3								
Displacement volume		Max. 9 cm^3 (for min. measuring span: 5 cm^3)								
Scale Division of scale available on request		Scale: 270 °; approx. 300 mm scale length 0 to 100 % linear for any linear measured variables								
Performance		Indications linear to differential pressure								
Terminal based non-conformity		< ±2.5 %	< ± 1.6 % (hysteresis included)							
Sensitivity		< 0.5 %	< 0.25 %							
Effects in % of span		Static pressure: < 0.03% / 1 bar								
Degree of protection		IP 54								
Total weight		Approx. 3.6 kg								
Transmitter		**5014-0**				**5014-1**				
Two-wire system		Input: 0 to 270 ° pointer deflection Output: 4 to 20 mA or 20 to 4 mA								
Permissible load		$R_B = \frac{U_B - 12\ V}{20\ mA}$								
Output circuit		–				Intrinsically safe				
Power supply		Two-wire system: 24 V								
		Voltage range: 12 to 45 V–				12 to 25 V– Only in combination with an intrinsically safe circuit				
Measuring span		130 ° to 270 ° pointer deflection, adjustable with rotary switch and potentiometer								
Characteristic		Linear								
Pick-off accuracy		± 0.25 % of the upper range value								
Environmental conditions Perm. ambient temperature		– 20 to +70 °C				Max. 60 °C Temperature class T6				
Perm. storage temperature		– 30 to +85 °C				Max. 70 °C Temperature class T5				

Note: All errors and deviations stated in % of span. Measuring span correction by changing the transmission ratio in the limits of approx. 1: 0.6. The technical data of the special version are the same as for the standard version.

Materials (WN = Material Number)

Measuring diaphragm	ECO
Housing and heads	Cu Zn 40 Pb
Spring plate	Cu Zn 40 Pb
Measuring and guide spring	WN 1.4310
Diaphragm plate	WN 1.4571
Lever	WN 1.4310
Housing of indicating unit	Polycarbonate
Special version – measuring cell with stainless housing	
Housing and heads	A 351 CF8M
Spring plate	WN 1.4301
Lever	WN 1.4571

Electrical connection



For instruments designed for application in hazardous areas, the installation regulations in accordance with VDE 0165 are to be observed.

Mounting (see Fig. below)

Tube mounting – with mounting device and clamp for attachment to a horizontal or vertical 2″ tube.

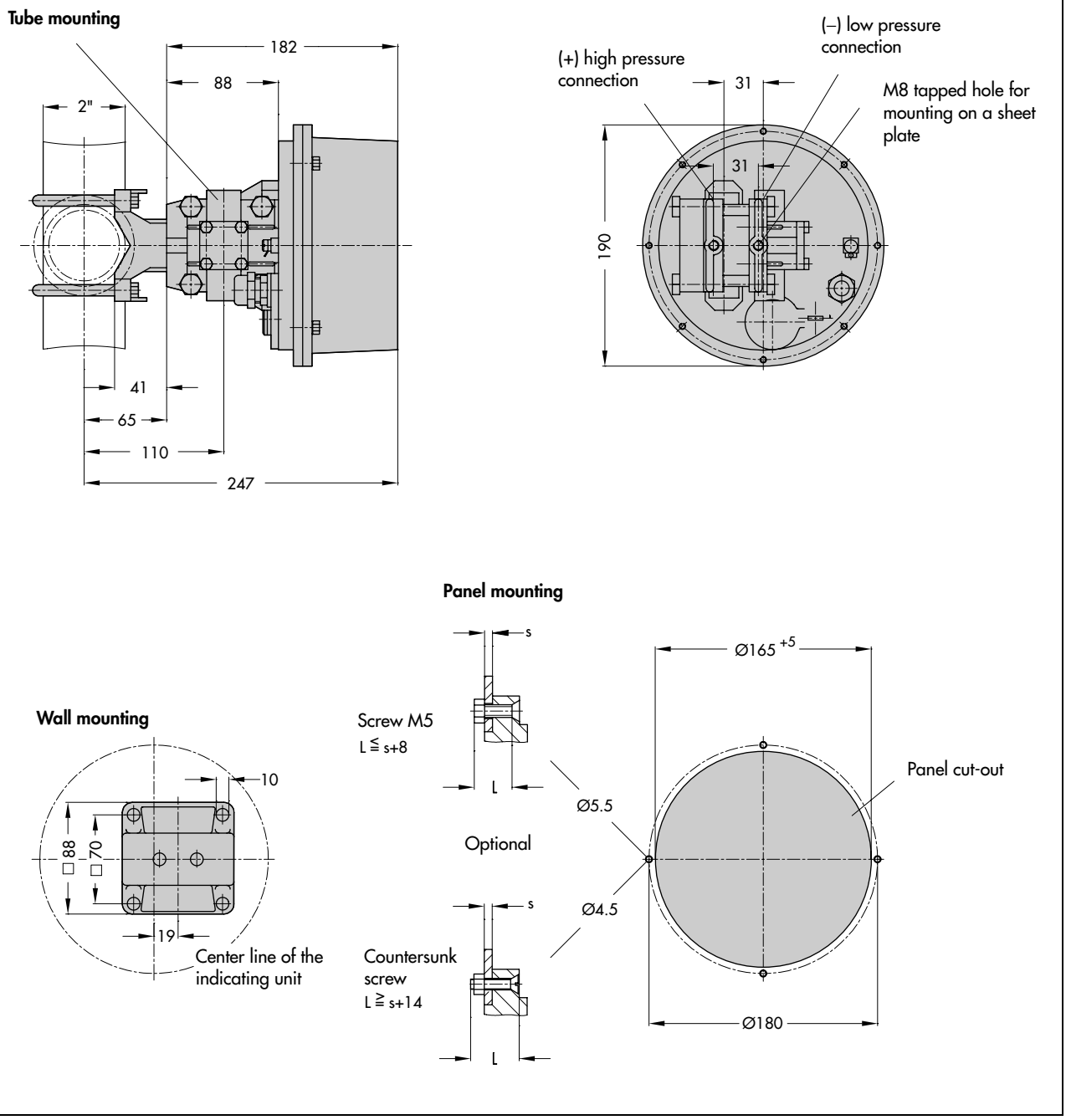
Housing with burst protection in the rear wall of the indicating unit casing.

Wall mounting – without mounting device for attachment to a mounting plate or with mounting device for attachment on a wall.

Panel mounting – optionally with 4 M5 screws or countersunk screws (M4 DN 963) and M4 hexagonal nuts.

Process fluid connection: tapped hole ISO 228/1- G 3/8

Dimensions in mm



Summary of the approved explosion protection certifications

Type of certificate	Certificate number	Date	Comments
Certificate of Conformity	PTB No. Ex-92.C.2019	23.03.1992	EEx ib II C T6
SEV Certification	93.1 00906.11	03.09.1993	EEx ib II C T5, T6

The test certificates are enclosed in the "Mounting and operating instructions" or are available on request.

Specifications subject to change without notice.

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main
Postfach 10 19 01 · 60019 Frankfurt am Main
Telefon 069 4009-0 · Telefax 069 4009-1507