Differential Pressure Meters

Media 6 · Media 6Z

Application

Microprocessor-controlled transmitters for measuring and indicating the differential pressure or measured variables derived from it · Suitable for gases or liquids · Measuring ranges between 0 to 100 and 0 to 3600 mbar · Nominal pressure PN 50

CE Ex certified

Measurement tasks

- Liquid level measurement in stationary pressure vessels and transportation vehicles, in particular for cryogenic gases, such as argon, oxygen and nitrogen
- Differential pressure measurement between flow and return flow pipe
- Pressure drop measurement across valves and filters
- Flow rate measurement according to the differential pressure method

Liquid level measurement

When used in combination with an appropriate power supply unit (e.g. SAMSON Type 5024-1), the tank content (function of hydrostatic pressure, tank geometry data and liquid density of the stored gas) is converted into a 4 to 20 mA signal, which is proportional to the tank content and displayed on a LCD in the selected unit of measure. Additionally, limit values can be monitored and indicated.

Flow rate measurement

When used in combination with an orifice plate assembly (Type 90 Orifice Flange), the Media 6 devices can be used for continuous flow measurement or totalizing the flow rate [1] of gases, vapors and liquids (differential pressure method).

Special features

- Suitable for liquids, gases or vapors
- Microprocessor-controlled transmitter with RS-232 interface for configuration and programming on site
- Two adjustable software limit contacts
- Gas selection by switch
- Programming using a memory pen
- Digital display (LCD) for temperatures down to –40 °C with 100 % bar graph as well as alarm and warning markers
- Zero and span adjustment activated by key without influencing each other
- Two-wire connection for 4 to 20 mA signal
- Easy configuration using TROVIS-VIEW software
- Overloadable on one side up to the permissible static pressure
- Indicating unit with burst protection
- Field unit with degree of protection IP 65
- Battery operation [2] activated by key

Fig. 1: *Media 6*

- Digital display can be switched on or off by pressing a key
- Eight-figure pulse reading [1]
- Pulse output proportional to quantity for external meter [1]
- Selectable modes: Level, flow rate or differential pressure measurement

Versions

Media 6 with LCD · Transmitter with digital display · Two-wire system · 4 to 20 mA output signal · Power supply 12 to 36 V DC or 9 V DC when battery operation is activated [2] (without 4 to 20 mA output signal), consisting of:

LCD Ø 90 mm with 100 % bar graph and blinking alarm and warning markers · Two software limit contacts or one software limit contact according to NAMUR and a pulse output [1] · dp cell made of CW617N (brass) or stainless steel · Free of oil and grease for oxygen · Measuring ranges from 100 to 3600 mbar · ECO measuring diaphragm · Zero and measuring span adjustment activated by key · Process connections G ⅜ A · RS-232 interface

Media 6 optionally available with:

- Version as above, but for hazardous areas · Input circuit with type of protection Ⓔx II 2G Ex ia IIC T6
- Directly connectable valve block with connection to monitor the tank pressure and with connection for pressure switch

[1] Only with Media 6Z · [2] Only in level measurement mode

Principle of operation (Fig. 3)

The differential pressure meter mainly consists of a dp cell (1) with a measuring diaphragm (1.1), range springs (1.2) designed to match the span and the indicating unit (7) with LCD.

The differential pressure $\Delta p = p_1 - p_2$ causes a deflection of the diaphragm shaft (1.5) at the measuring diaphragm (1.1) supported by the range springs (1.2). The change in travel, which is proportional to the differential pressure, is transmitted by a lever (1.3) and the flexible disk (1.4) out of the pressure chamber to the travel sensor (2). This sensor converts the travel into an electric signal.

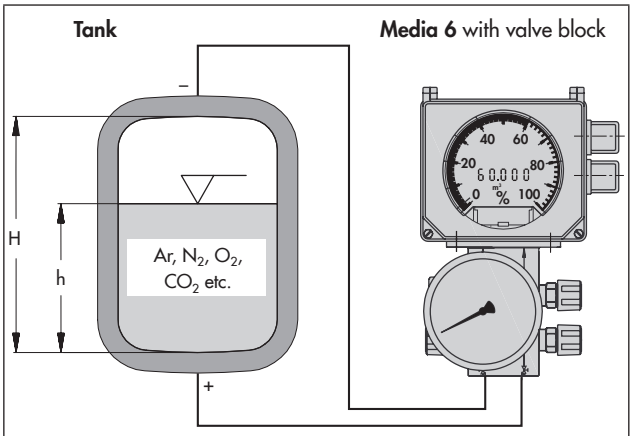
The signal of the travel sensor (2) is compared to the data stored in the FRAM (4) and processed in the microprocessor (3). It controls both the LCD and the D/A converter (9) for the output signal.

The output signal, which is proportional to the measured value, is a load-independent direct current signal from 4 to 20 mA issued at the connector A. Optionally, the meter can be switched to run on batteries. The 4 to 20 mA current loop is automatically deactivated in this case.

At the connector B, two software limit contacts (8) for alarm 1 (e.g. minimum filling level) and alarm 2 (e.g. maximum filling level) are connected to the switching amplifier according to EN 60947-5-6. A software limit contact (alarm 1) and a pulse output proportional to quantity (in place of alarm 2) to operate an external meter are used in Media 6Z.

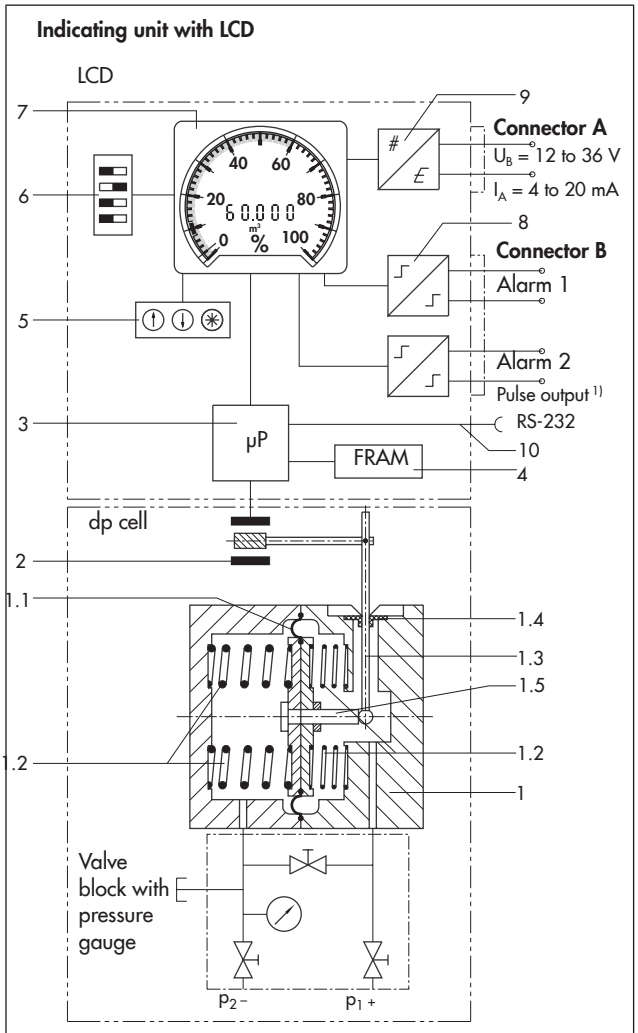
The RS-232 interface (10) enables the meter to be configured with a special memory pen or directly at a PC using SAMSON's TROVIS-VIEW software. The user-specific data are saved in the data memory (FRAM) (4). This way, a backup copy of the data can be saved until they are overwritten. The operating data of the Media 6 can also be copied and loaded on site.

Four types of gas as well as the span and write protection function can be set at the DIP switch (6). In combination with three keys (5), several operating functions (zero and span adjustment, max. alarm limit switch and test function settings, etc.) as well as the operating status (load/save operating values) can be activated.



H Measuring range
h Measured height (≈ tank content)

Fig. 2: *Sample application · Principle of level measurement for cryogenic gases*



1) Only with Media 6Z

1	dp cell
1.1	Measuring diaphragm
1.2	Range spring
1.3	Lever
1.4	Flexible disk
1.5	Diaphragm shaft
2	Travel sensor
3	Microprocessor
4	Data memory (FRAM)
5	Keys for operating functions
6	DIP switch (for selecting gas type, span protection and write protection)
7	Indicating unit with LCD
8	Limit switch and pulse output (Media 6Z only)
9	D/A converter
10	RS-232 interface

Fig. 3: *Functional diagram*

Table 1: *Technical data · All pressure stated as gauge pressure*

Media 6 Differential Pressure Meter										
Measuring range in mbar		0 to 100	0 to 160	0 to 250	0 to 400	0 to 600	0 to 1000 [1]	0 to 1600 [1]	0 to 2500 [1]	0 to 3600 [1]
Adjustable measuring span in mbar										
Class ±1 %	to from	–	–	≤250 ≥125	≤400 ≥100	≤600 ≥150	≤1000 ≥250	≤1600 ≥320	≤2500 ≥500	≤3600 ≥720
Class ±1.6 %	to from	≤100 ≥60	<160 ≥60	<125 ≥50	<100 ≥80	<150 ≥120	<250 ≥200	–	–	–
Class ±2.5 %	to from	<60 ≥35 [2]	<60 ≥32	–	–	–	–	–	–	–
Nominal pressure		PN 50, overloadable on one side up to 50 bar								
Display		LCD Ø 90 mm								
Characteristic		Output and reading linear or square root extraction depending on operating mode								
Deviation from terminal-based linearity		<±1.0 % to <±2.5 % (including hysteresis) depending on measuring span selected								
Sensitivity		<0.25 % or <±0.5 % depending on measuring span selected								
Effect of static pressure		<0.03 %/1 bar								
Effect of ambient temperature in the range from −20 to +70 °C on zero on span		<±0.2 %/10 K <±0.2 %/10 K								
Limit contacts		Two configurable software limit contacts or one software limit contact acc. to EN 60947-5-6 and pulse output [5]								
Control circuit, in 1 % steps		Specifications corresponding to connected switching amplifier [3]								
Switching accuracy		1 % based on MCN or SCN [4]								
Pulse output [5]		Max. possible counting frequency: 120 pulses/min or 7200 pulses/h								
Dead band, approx.		<0.6 %								
Degree of protection according to DIN VDE 0470		IP 65								
Weight		Approx. 3.0 kg without valve block · Approx. 5.0 kg with valve block								
Version		**5006-... 0 ...**					**5006-... 1 ...**			
Two-wire connection		4 to 20 mA output								
Perm. load R_B in Ω		$R_B = (U_B - 12\ V)/0.020\ A$								
Output circuit		–					Intrinsically safe acc. to PTB 00 ATEX 2074			
Supply voltage U_B for two-wire transmitter		12 to 36 V DC					12 to 28 V DC (only in conjunction with an intrinsically safe circuit)			
Battery operation [6] Power supply		9 V DC (6 x 1.5 V LR6 alkaline batteries)								
Use of with gaseous oxygen		Max. temperature: +60 °C · Max. oxygen pressure: 30 bar								
Perm. ambient temperature range		−40 to +70 °C					T6: −20 to +60 °C · T5: −20 to +70 °C			
Perm. storage temperature range		−40 to +80 °C								

[1] A class accuracy of 0.6 % can be expected in these measuring ranges with measuring spans ≤100 % to ≥50 % of the nominal range.

[2] The accuracy of class 2.5 can be exceeded when this measuring span is not reached. · [3] e.g. KFA6-SR2-Ex2.W according to EN 60947-5-6

[4] MCN = Maximum Capacity Nominal; SCN = Save Capacity Nominal · [5] Pulse output only with Media 6Z · [6] Battery operation only possible for level measurement and level measurement for transportation vehicles. The A1 and A2 limit contacts are deactivated.

Note

- All pressure stated as gauge pressure
- All errors and deviations are specified in % of the adjusted measuring span.
- The Media 6 Differential Pressure Meter is not approved for measuring flammable gases or liquids in hazardous areas of Zone 0!
- Oxygen service: When the device is used for oxygen service, make sure that the dp cell and any SAMSON accessories (e.g. valve block) only come into contact with gaseous oxygen.
- Refer to ▶ EB 9527-3 for more details.

Table 2: *Materials*

Media 6 Differential Pressure Meter	
dp cell	CW617N (brass) or CrNi steel
Measuring diaphragm and seals	ECO, NBR, FPM, EPDM
Springs, diaphragm plates and functional parts, lever	CrNi steel
Housing of indicating unit	Polycarbonate

Electrical connection

In combination with a power supply unit (e.g. SAMSON Type 5024), the tank content can be transmitted and displayed over a 4 to 20 mA signal proportional to the tank content. In addition, the limits values can be monitored and signalized.

Data can be transmitted directly to the control room.

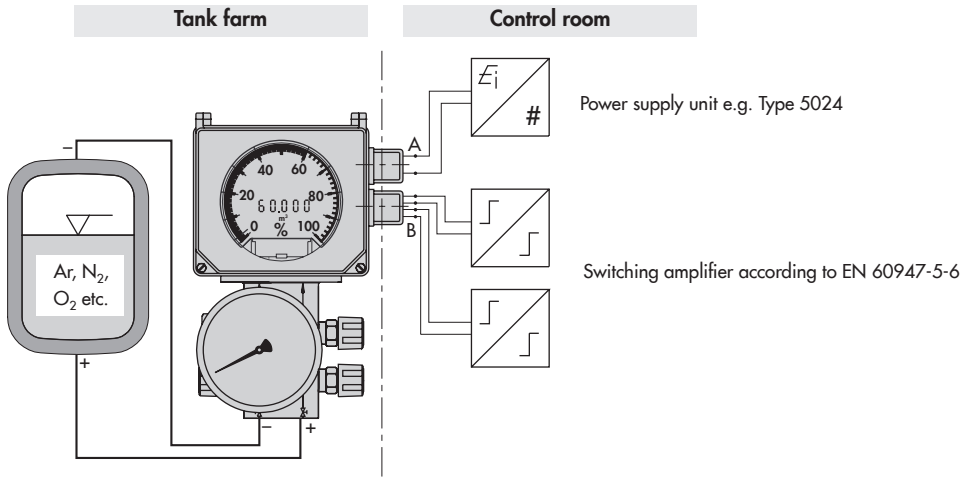


Fig. 4: *Data transmission*

Terminal assignment

The Media 6 Differential Pressure Meter is designed for a two-wire circuit. Both the 4 to 20 mA measuring signal and the required supply voltage U_B = 12 to 36 V DC for the two-wire transmitter are transmitted by the same pair of wires.

The Media 6 is connected over a DIN 43650 connector, type 1, 4-pole.

Connector **A** · Two-wire connection for 4 to 20 mA signal

Perm. load in Ω: $R_B = \frac{U_B - 12\ V}{0.020\ A}$

Rated supply voltage U_B = 24 V DC

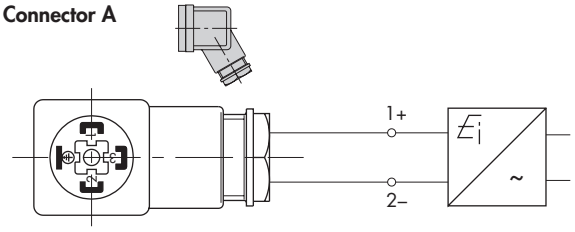
The permissible voltage range at the connector of the Media 6 is between 12 V und 36 V DC taking into account the lead resistance.

Optionally, battery operation possible with 9 V DC power supply

Connector B · Software limit contacts/pulse output

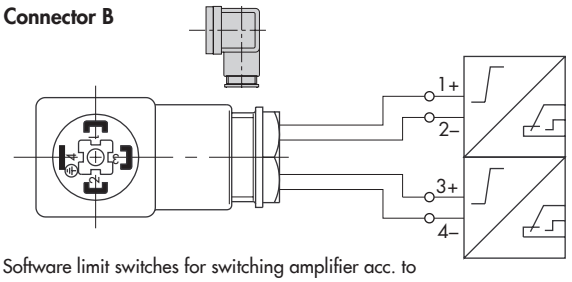
Connection for two software limit contacts to connect to switching amplifiers conforming to NAMUR and EN 60947-5-6 or pulse output (pins 3 and 4) to an external meter.

Connector A



Two-wire connection/connection for battery operation

Connector B



Software limit switches for switching amplifier acc. to EN 60947-5-6 or pulse output (pins 3 and 4) to an external meter (Media 6Z only).

Fig. 5: *Electric connection and terminal assignment*

Table 3: *Overview of functions of both software limit contacts A1 and A2 at connector B*

Proximity switch for ...	**1 min./1 max. contact** (gas withdrawal/tank filling)		**Two min. contacts** (gas withdrawal)		**Two max. contacts** (tank filling)	
Alarm contact	A1	A2	A1	A2	A1	A2
Value below limit	High resistance	Low resistance	High resistance	High resistance	Low resistance	Low resistance
Value above limit	Low resistance	High resistance	Low resistance	Low resistance	High resistance	High resistance

Both limit contacts A1/A2 can be configured separately as minimum or maximum alarms.

Contact with low resistance
Switching signal "ON" · Function: Contact closed or output effectively conducting, power consumption ≥ 3 mA

Contact with high resistance
Switching signal "OFF" · Function: Contact opened or output effectively non-conducting, power consumption ≥ 1 mA

Table 4: *Technical data for software limit contacts (connector B) in type of protection Ex ia IIC T6*

U_i	20 V
I_i	60 mA
P_i	250 mW
C_i	5.3 µF
L_i	~ 8 µH

Maximum values only apply to the connection to a certified intrinsically safe circuit.

Installation

The following points must be observed during installation:

- Attach the Media 6 to a pipe, wall or mounting plate free of vibration.
- Use mounting part with clamp for pipe mounting to attach it to a vertical or horizontal pipe.
- Use mounting part without clamp for wall mounting.
- Refer to Fig. 6 for panel mounting.
- We recommend installing a shut-off valve in each measuring line as well as an equalizing valve. SAMSON provides for this purpose a valve block designed as a compact unit (see ▶ T 9555) for direct connection to the Media 6 device.

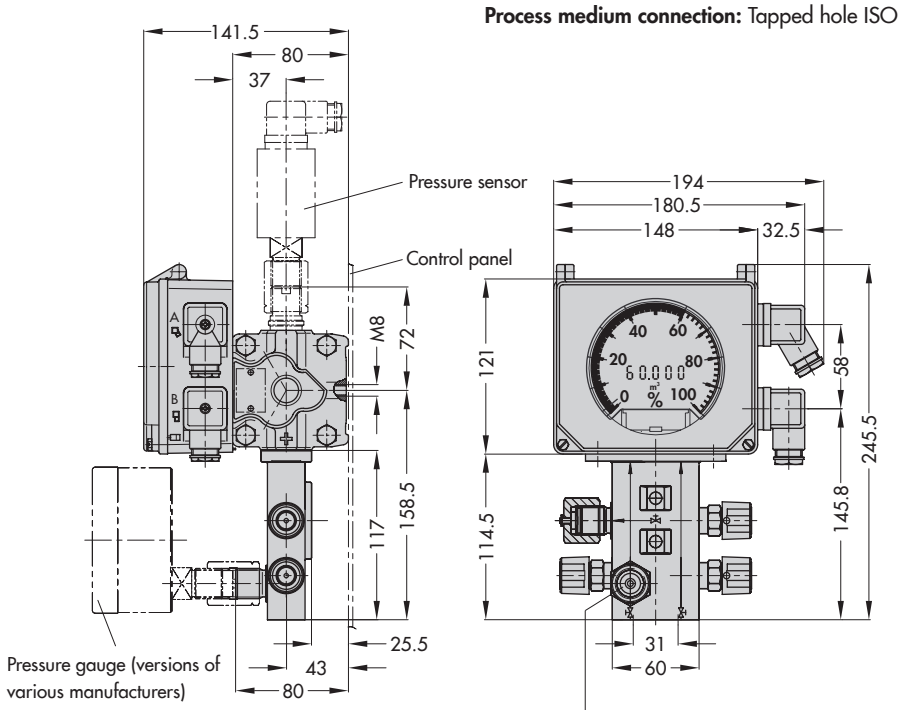
Dimensions in mm

Mounting versions

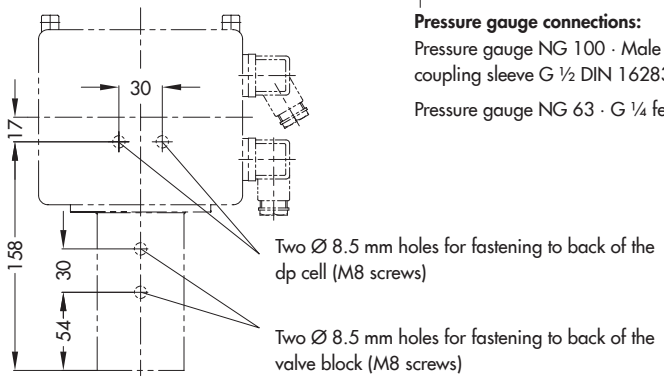
Wall/panel mounting · Using two M8 tapped holes located at the rear of the dp cell or two Ø 8.3 mm holes in the valve block

Pipe mounting · With mounting device and clamp for attachment to a vertical or horizontal 2" pipe.

Process medium connection: Tapped hole ISO 228 G ⅜



Drill pattern for wall/panel mounting



Pressure gauge connections:

Pressure gauge NG 100 · Male thread G ½ B-LH with coupling sleeve G ½ DIN 16283 and O-ring 12x2

Pressure gauge NG 63 · G ¼ female thread with seal

Fig. 6: *Dimensional drawing*

Table 5: *Device configuration with order numbers*

Complete the order number with the order codes for the selected options

Order no.		Type 5006-	...	...	...	...	...	...	...	...
Device	Media 6		**1**							
	Media 6Z		**2**							
Explosion protection	Without			**0**						
	Ex ia IIC T6			**1**						
Display and output	LCD, 4 to 20 mA output				**1**					
Material	Brass					**0**				
	Stainless steel					**1**				
Measuring range	100 mbar						**03**			
	160 mbar [1]						**04**			
	250 mbar						**05**			
	400 mbar [1]						**06**			
	600 mbar [1]						**07**			
	1000 mbar						**08**			
	1600 mbar [1]						**09**			
	2500 mbar [1]						**10**			
	3600 mbar [1]						**11**			
Diaphragm	ECO diaphragm (–40 to +80 °C)							**0**		
	NBR diaphragm (–30 to +80 °C)							**2**		
Version according to TD 1010-4300	Standard								**00**	
	Cryogenic gases (free of oil and grease for oxygen)								**10**	
	Compatible with paint and tobacco industry								**50**	
Special version										**000**

[1] Only for Media 6

Data acquisition

Data need to be made available about the tank characteristics and the stored gas for the factory settings of the LCD reading and the 4 to 20 mA signal to ensure that they are proportional to the tank content and flow rate.

You can enter these data in the Specification Sheet for Media 6 parameterization ▶T 9527-9.

A SAMSON Questionnaire for Flow Rate Measurement according to the Differential Pressure Method ▶T 9500-9 is available to record the relevant data for flow rate measurement.

Accessories ▶T 9555

Certificates and approvals

- CE compliance
- Certification for hazardous areas
- Registered by the metrological service of the federal agency for technical regulation and metrology for use in the Russian Federation
- Oxygen service, test report No. 2012/R249a based on DIN EN ISO 7291

Ordering text

Media 6/6Z Differential Pressure Meter

Order no.: **Type 5006 –** ... ... (refer to Table 5)

Special version ...

Specifications subject to change without notice

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