Differential Pressure Meters

Media 6
Media 6 Z

Application

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

Scope of application

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

Level measurement

When used in combination with an appropriate power supply unit (e.g. SAMSON Type 5024-1) for the electric power supply, 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 counting the flow rate[1] of gases, vapors and liquids (differential pressure method).

Special features

- Suitable for liquids, gases and vapors
- Microprocessor-controlled transmitter with RS-232 interface for configuration and programming on site
- Two adjustable software limit switches
- 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 point 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

1) Only with Media 6 Z
2) Only in level measurement mode

Fig. 1 · Media 6

- Field unit with degree of protection IP 65
- Battery operation[2] activated by key
- Digital display can be switched on or off by a switch
- Eight-figure counting flow rate 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 connection · 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 switches or one software limit switch acc. 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 point and span adjustment activated by key · Process connections G 3/8 A · RS-232 interface

Media 6 optionally available with:

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

Principle of operation (Fig. 3)

The measuring device 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 shift in the axis (1.5) of 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 displacement sensor (2). This sensor converts the travel into an electric signal.

The signal of the displacement 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.

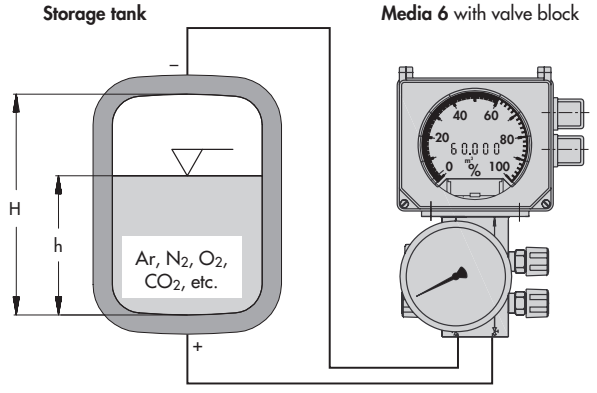
The output signal, which is proportional to the measured value, is a load-independent direct current signal from 4 to 20 mA issued at the connector A. Optionally, the device can be switched to run on batteries. The 4 to 20 mA current loop is automatically deactivated in this case.

At the connector B, two software limit switches (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 switch (Alarm 1) and a pulse output proportional to quantity (in place of Alarm 2) to operate an external meter are used in Media 6 Z.

The RS-232 interface (10) enables the device to be configured with a special memory pen or directly via a PC with SAMSON's TROVIS-VIEW Configuration and Operator Interface. 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.

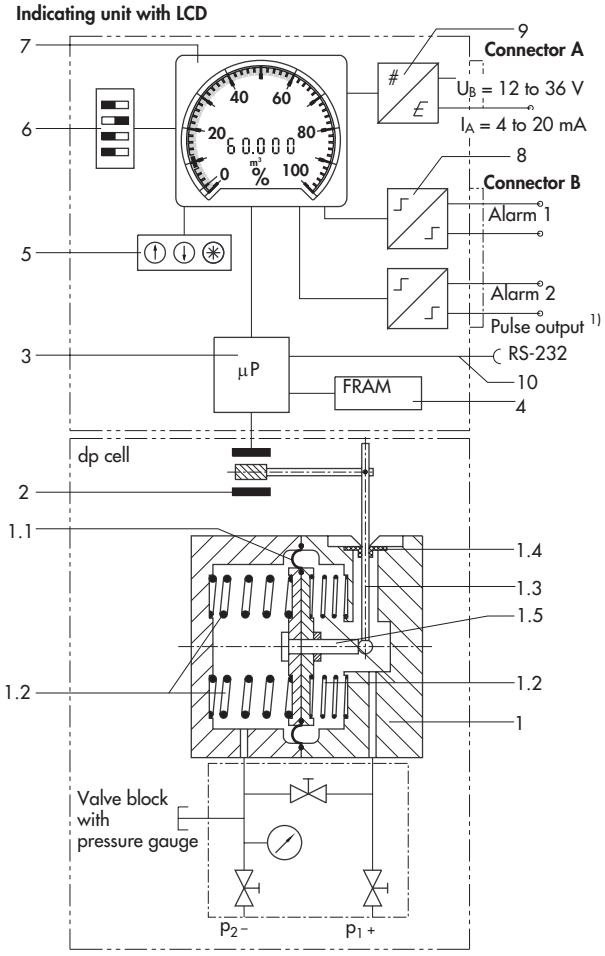
Four types of gas as well as the span and write protection function can be set at the DIL switch (6). In combination with three keys (5), several operating functions (zero point and span adjustment, max. alarm limit switch and test function settings, etc.) as well as the operating status (load/save operating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

Typical application



H Measuring range
h Measured height (≈ tank content)

Fig. 2 · Principle of level measurement for liquefied gases in cryogenic service



1) Only with Media 6 Z

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

Fig. 3 · Principle of operation

Table 1 · **Technical data** · All pressures in bar or mbar (gauge)

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 %	From	–	–	≤ 250	≤ 400	≤ 600	≤ 1000	≤ 1600	≤ 2500 to	≤ 3600 to
	to			≥ 125	≥ 100	≥ 150	≥ 250	≥ 320	≥ 500	≥ 720
Class ± 1.6 %	From	≤ 100	<160	< 125	< 100	< 150	< 250	–	–	–
	to	≥ 60	≥60	≥ 50	≥ 80	≥ 120	≥ 200			
Class ± 2.5 %	From	< 60	< 60	–	–	–	–	–	–	–
	to	≥ 35 [2]	≥ 32							
Nominal pressure		PN 50, overloadable on one side up to 50 bar								
Indicator		LCD Ø 90 mm								
Performance		Output and reading linear or square root extraction depending on operating mode								
Conforming error		< ±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 point on span		 < ±0.2 %/10 K < ±0.2 %/10 K								
Limit switches		Two variably configurable software limit switches or one software limit switch acc. to EN 60947-5-6 and pulse output [5]								
Control circuit, in 1 % steps		Rating according to the connected switching amplifier [3]								
Switching accuracy		1 % based on MCN or SCN [4]								
Range of inversion, approx.		< 0.6 %								
Degree of protection		IP 65								
Weight		Approx. 3.0 kg without valve block · Approx. 5.0 kg with valve block								
Version		**5006- _0 ...**					**5006- _1 ...**			
Two-wire circuit		Output 4 to 20 mA								
Perm. load R_B in Ω		$R_B = \frac{U_B - 12\ V}{0.020\ A}$								
Output current 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 Media 6 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 as per EN 60947-5-6
[4] MCN = Maximum Capacity Nominal; SCN = Save Capacity Nominal · [5] Pulse output only with Media 6 Z · [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 specifications stated in bar (gauge)*
- *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 EN 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
Range springs	CrNi steel
Diaphragm plates and function parts	
Lever	
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.

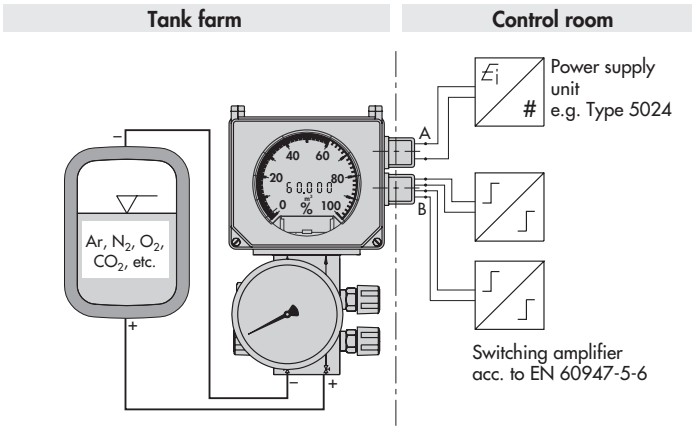


Fig. 4 · Data transmission

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 circuit for 4 to 20 mA signal

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

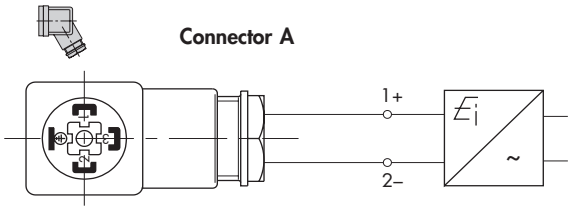
The rated supply voltage U_B = 24 V DC

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.

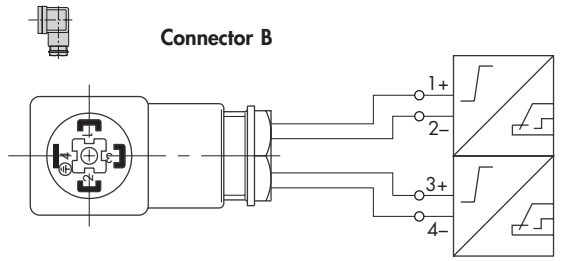
Optionally, battery operation possible with 9 V DC power supply

Connector B · Software limit switches/pulse output

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



Two-wire connection/connection for battery operation



Software limit switches for switching amplifier acc. to EN 60947-5-6

Software pulse output for external meter, contacts 3 and 4 (Media 6 Z only)

Fig. 5 · Electric connection and terminal assignment

Table 3 · Overview of functions of both software limit switches A1 and A2 at connector B

Proximity switch for ...	**One min./1 max. contact** (gas tapping/tank filling)		**Two min. contacts** (gas tapping)		**Two max. contacts** (tank filling)	
Alarm contact	A1	A2	A1	A2	A1	A2
Value below limit value	High resistance	Low resistance	High resistance	High resistance	Low resistance	Low resistance
Limit value exceeded	Low resistance	High resistance	Low resistance	Low resistance	High resistance	High resistance

Both limit switches 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 open or output effectively non-conducting, power consumption ≤ 1 mA

Table 4 · Technical data for software limit switches (connector B) in type of protection EEx 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 network connection to a certified intrinsically safe circuit.

Mounting

On mounting the Media 6, the following points must be observed:

- Attach it 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.
- See bottom diagram in Fig. 6 for control 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 EN) 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 (see diagram below).

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

Process medium connection: Tapped hole ISO 228 G 3/8.

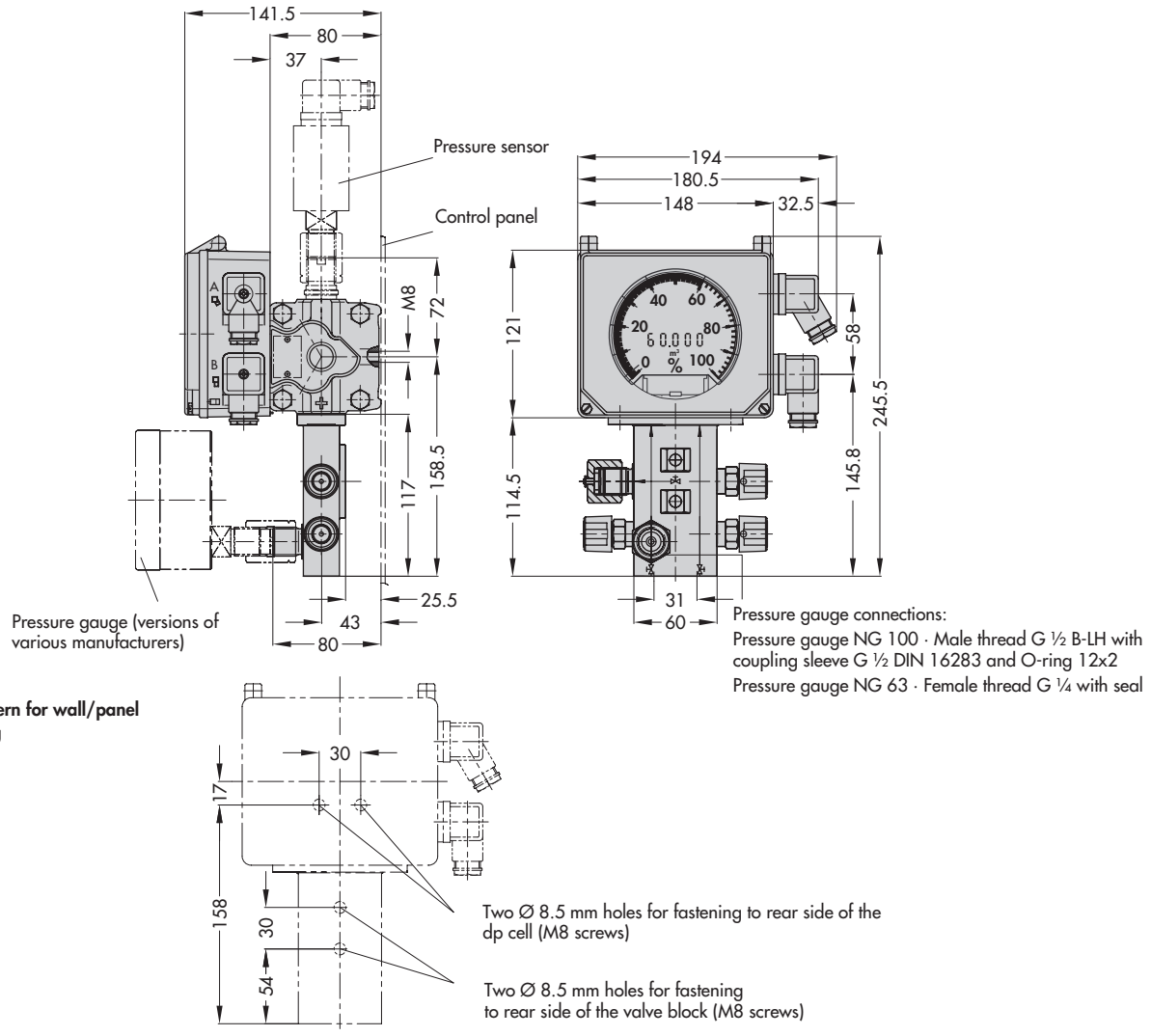


Fig. 6 · Dimensional diagram

Table 5 · Device configuration with ordering number

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

Version	**Type 5006–**							
Device								
Media 6	1							
Media 6 Z	2							
Explosion protection								
Without		0						
EEx 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*)					04			
250 mbar					05			
400 mbar*)					06			
600 mbar*)					07			
1000 mbar					08			
1600 mbar*)					09			
2500 mbar*)					10			
3600 mbar*)					11			
Diaphragm								
ECO diaphragm (–40 to +80 °C)						0		
NBR diaphragm (–30 to +80 °C)						2		
Version acc. to specification sheet 1010-4300								
Standard							00	
Cryogenic gases (free of oil and grease for oxygen)							10	
Paint compatibility and tobacco industry							50	
Special version								000

*) For Media 6 only

Data logging

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 9529-9 EN).

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

Ordering text

Differential pressure meter **Media 6/6Z**

Order no.: Version **Type 5006** – _ _ _ _ _ _ _ _

Special version …

Accessories · Refer to T 9555 EN for accessories and details

Specifications subject to change without notice.

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: http://www.samson.de