Differential Pressure and Flow Meter

Media 05 · Indicator 100∅ · PN 50

Application

Device for measuring and indicating the differential pressure or measured variables derived from it · Suitable for gases or liquids Measuring spans between 0 to 40 and 0 to 3600 mbar · Static pressures up to 50 bar · Optionally with limit switch with max. two inductive alarm contacts

Measurement tasks

- **Liquid level measurement** in pressure tanks, especially for cryogenic gases
- **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

Special features

- Suitable for liquids, gases or vapors
- Limit switch (optional) with max. two alarm contacts can be subsequently installed
- Adjustment of measuring span 1:1.6
- Overloadable on one side up to the permissible static pressure
- Housing of indicating unit with burst protection
- Housing with degree of protection IP 54
- Nominal pressure PN 50
- Housing suitable for field and panel mounting
- Directly connectable valve block (optional) with connection to monitor the tank pressure and with connection for pressure switch

Versions (Fig. 1)

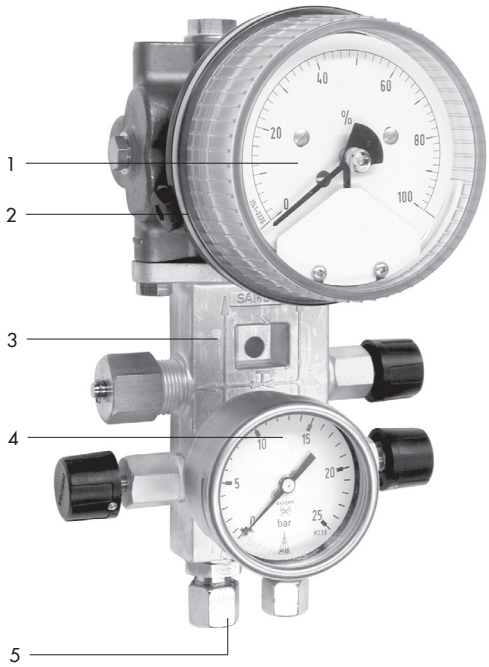
Media 05 consisting of:

Indicator NG 100 with pointer mechanism · dp cell made of CW617N (brass) or stainless steel, PN 50 · Free of oil and grease for oxygen · Measuring ranges from 40 to 3600 mbar · ECO measuring diaphragm · Zero adjustment at the front · Process connections G ⅜ A

Options available:

- Dials · Scale 0 to 100 % linear or square root graduation, dial plates according to DIN EN 837-3, detachable dial plates for different media, special dial plates
- Inductive limit switch with max. two alarm contacts A1/A2 (proximity switches) · Version for hazardous locations
- Valve block which can be directly mounted onto Media 05 devices
- Screw fittings
- Pressure gauge

Special versions on request



1 Housing of indicating unit
2 dp cell
3 Valve block with pressure gauge and shut-off valves
4 Pressure gauge NG 63 for operating pressure
5 Screw fittings

Fig. 1: *Media 05 with valve block and pressure gauge for operating pressure*

Principle of operation (see Fig. 3)

The meter consists of a dp cell (1.1) with a measuring diaphragm (1.5), range springs (1.4) designed to match the span and an indicating unit with pointer mechanism (2.2) and dial plate (2.3).

The differential pressure $\Delta p = p_1 - p_2$ (or the differential pressure of the orifice plate) causes a deflection of the diaphragm shaft (1.7) at the measuring diaphragm (1.5) supported by the range springs (1.4). The change in travel, which is proportional to the differential pressure, is transmitted by a lever (1.8) and the flexible disk (1.9) out of the pressure chamber to the pointer mechanism (2.2). The differential pressure is shown linear on the dial plate and the flow rate is shown as a square root graduation.

The range springs (1.4) installed in the dp cell determine the upper and lower limit of each measuring span (measuring span limit) of the device (see Table 1). The span can be continuously adjusted within these limits in the ratio of 1:1.6 at the transmission element. This adjustment changes the transmission ratio between the lever (1.8) and the pointer mechanism (2.2).

Version with limit switch

Maximum two alarm contacts (A1, A2) can be installed. The gear segment (2.1) supports the metal tags (3.2) and activates the limit switch unit by moving the metal tags into the adjustable proximity switches (3.3).

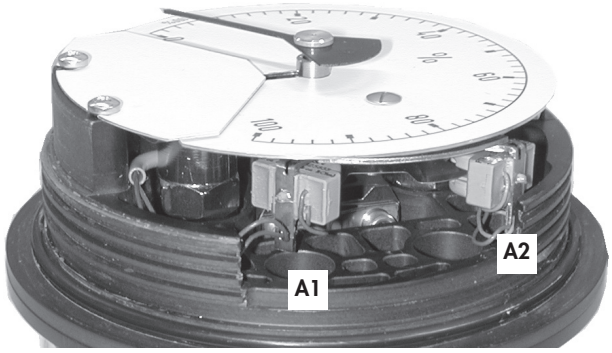
When the metal tag enters the inductive field of the associated proximity switch, it assumes a high resistance (contact open). When the metal tag leaves the inductive field, it assumes a low resistance (contact closed). The switching function is triggered when the metal tag leaves or enters the proximity switches, depending on the setting of the contacts.

Limit switch with alarm contacts A1/A2

– Media 05, version with limit switch –

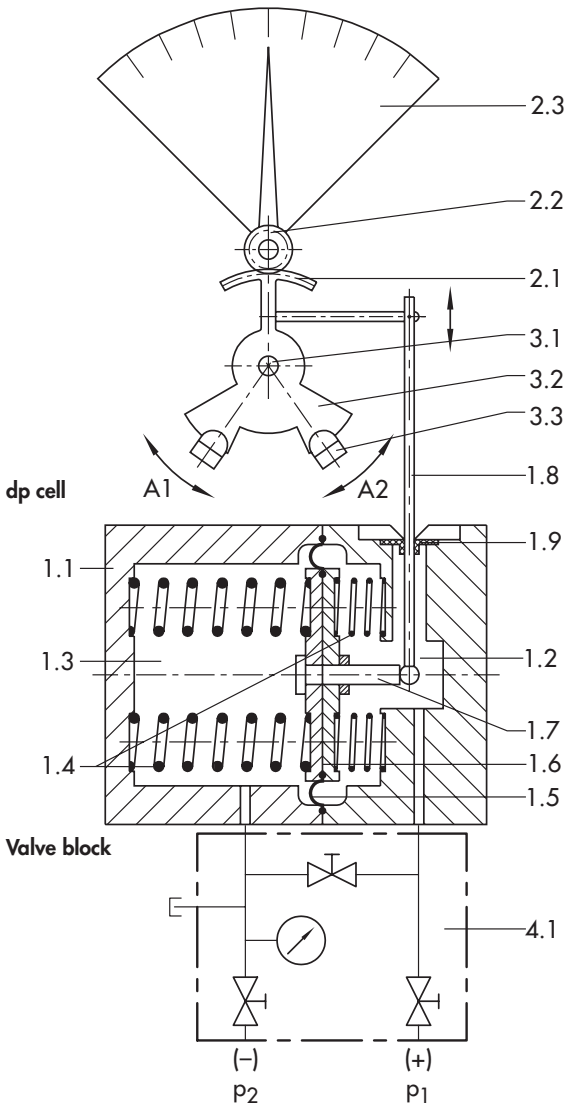
The inductive alarm contacts A1/A2 can be adjusted over the whole measuring range as required. They provide a signal when the differential pressure either increases or decreases and the metal tags enter or leave the inductive field of the switch.

The contacts can be pushed manually to the required switching position. Isolating switch amplifiers conforming to EN 60947-5-6 must be connected in the output circuit of the inductive alarm contacts to ensure they meet the operational requirements of any connected control and signaling equipment.



Location of alarm contacts A1/A2, dial plate cover removed

Fig. 2: *Alarm contacts in the housing of the indicating unit*



1 Differential pressure cell
1.1 dp cell
1.2 High pressure chamber
1.3 Low pressure chamber
1.4 Range springs
1.5 Measuring diaphragm
1.6 Diaphragm plates
1.7 Diaphragm shaft
1.8 Lever
1.9 Flexible disk

2 Housing of indicating unit
2.1 Gear segment
2.2 Pointer mechanism
2.3 Dial plate

3 Limit switch (optional)
3.1 Shaft of measuring unit
3.2 Metal tag
3.3 Proximity switches A1/A2

4 Valve block (accessories)
4.1 Valve block with pressure gauge, shut-off valves and screw fittings

Fig. 3: *Functional diagram of version with limit switch*

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

Media 05 Differential Pressure and Flow Meter										
Measuring range in mbar		0 to 60	0 to 100	0 to 160	0 to 250	0 to 400	0 to 600	0 to 1000	0 to 1600	0 to 2500	0 to 3600
Measuring span in mbar	min.	40 to 60	60 to 100	100 to 160	160 to 250	250 to 400	400 to 600	600 to 1000	1000 to 1600	1600 to 2500	2500 to 3600
	max.										
Nominal pressure		PN 50, overloadable on one side up to 50 bar									
Indicator		Ø 100 mm									
Characteristic		Output and reading linear to the differential pressure									
Deviation from terminal-based linearity		<±2.5 % including hysteresis [1]									
Sensitivity		<±0.5 %	<0.25 %								
Effect of static pressure		<0.03 %/1 bar									
Media 05 with gaseous oxygen max. temperature max. oxygen pressure		+60 °C 30 bar									
Perm. ambient temperature range for oxygen		−40 to +80 °C −40 to +60 °C									
Perm. storage temperature range		−40 to +100 °C									
Degree of protection according to DIN 40050		IP 54									
Weight without SAMSON valve block with SAMSON valve block		Approx. 2.6 kg Approx. 4.6 kg									
Limit switch (option)											
Operating principle		Max. 2 inductive alarm contacts A1 and A2 acc. to EN 60947-5-6 (limit contacts)									
Control circuit		Values corresponding to connected isolating switch amplifier e.g. KFA6-SR2-Ex2.W									
Proximity switch		SJ2-SN, for hazardous areas according to PTB 00 ATEX 2049 X									
Switching accuracy		<±2 %									
Dead band, approx.		<±0.6 %									

[1] Based on upper measuring range value

Note

- All errors and deviations are specified in % of the adjusted measuring span.
- Refer to Data Sheet ▶ T 9550 EN for flow rate measurement.
- A correction of the measuring span is possible by changing the ratio in the limits of approx. 1:1.6.
- The Media 05 Differential Pressure and Flow Meter without limit switches may be used to measure flammable gases and liquids in which hazardous area conditions of Zone 0 are to be expected. The relevant regulations on the measurement of flammable gases and liquids of Zone 0 must be observed.
- 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 9520 EN for more details.

Table 2: *Materials*

Media 05 Differential Pressure and Flow Meter	
dp cell	CW617N (brass) or CrNi steel
Measuring diaphragm and seals	ECO [1]
Springs, diaphragm plates and functional parts, lever	CrNi steel
Housing of indicating unit	Polycarbonate

[1] Other on request

Terminal assignment

– Only for version with inductive limit switch –

Electrical connection

The device can be equipped with maximum two alarm contacts. The alarm contacts A1 and A2 of the indicator must be connected to an isolating switch amplifier for the power supply connection. We recommend using isolating switch amplifers from Pepperl + Fuchs. For two contacts, e.g. KFA6-SR2-Ex2.W and for one contact, KFA6-SR2-Ex1.W.

Switching characteristic of the proximity switches with normally closed function

Metal tag outside inductive field · Switching signal "ON" (L signal)

Function: Contact closed or output effectively conducting. Low resistance (undamped), power consumption ≥ 3 mA

Metal tag inside inductive field · Switching signal "OFF" (0 signal)

Function: Contact opened or output effectively non-conducting. High resistance (damped), power consumption ≥ 1 mA

The listed maximum values in the table apply concerning the connection of proximity switches to certified intrinsically safe circuits in the type of protection EEx ia IIC T6 (PTB 00 ATEX 2049 X):

Table 2: *Connection values for intrinsically safe circuits*

Circuit	Type 1			Typ e2		
U_i	16 V			16 V		
I_i	25 mA			25 mA		
P_i	34 mW			64 mW		
C_i	50 nF			50 nF		
L_i	250 µH			250 µH		
Temperature class	T6	T5	T4	T6	T5	T4
	73 °C	88 °C	100 °C	66 °C	81 °C	100 °C

Electrical connection of alarm contacts

Limit switch with **two** alarm contacts A1/A2
– Terminal assignment –

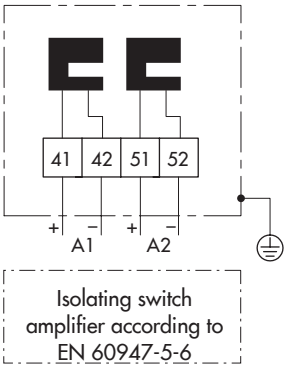


Fig. 4: *Terminal assignment of A1 and A2*

Installation

Wall/panel mounting · Using two M8 tapped holes located at the back of the dp cell or two Ø 8.5 mm holes in the valve block

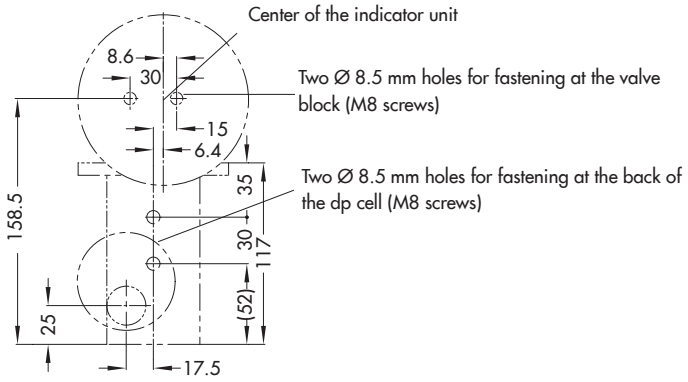
Pipe mounting with mounting part and clamp for attachment to a vertical or horizontal 2″ pipe.

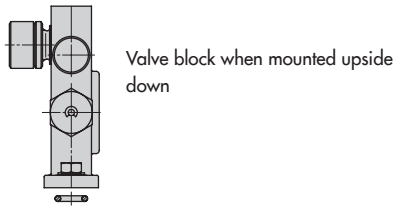
Housing with burst protection in the rear wall of the indicator unit.

Process medium connection: Tapped hole ISO 228 G ⅜

Dimensions in mm

Drill pattern for wall/panel mounting





Pipe mounting

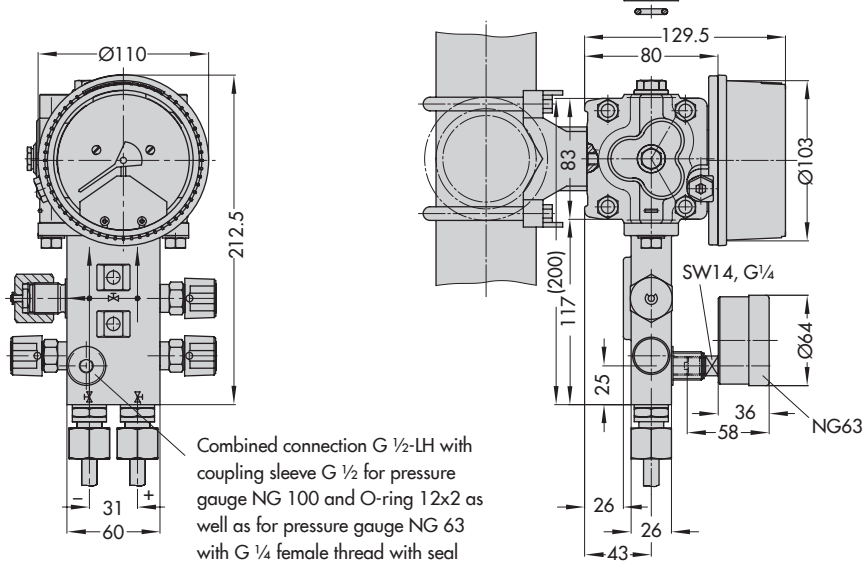


Fig. 5: *Dimensional drawing*

Accessories

The SAMSON product range includes a wide assortment of accessories (e.g valve blocks, pressure gauges, high-pressure valves, condensation chambers, screw joints with restrictions, contact retrofit kits, range springs, etc.) for the Media series.

Refer to Data Sheet ▶ T 9555 EN for further details.

Refer to Data Sheet ▶ T 9545 EN for a description of dial plates available at SAMSON.

Table 3: *Device configuration with order numbers*

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

Order no.		Type 5005-	...	...	...	...	...	...
Device	Media 05, dp cell made of CW617N (brass)		**5**					
	Media 05, dp cell made of 1.4581 (stainless steel)		**6**					
Version	Standard version			**0**				
	Free of oil and grease for oxygen acc. to SAMSON Standard 1.34-2, sheet 1			**1**				
Measuring range (measuring span)	0 to 60 mbar/min. 40 mbar · max. 60 mbar				**0**	**2**		
	0 to 100 mbar/min. 60 mbar · max. 100 mbar				**0**	**3**		
	0 to 160 mbar/min. 100 mbar · max. 160 mbar				**0**	**4**		
	0 to 250 mbar/min. 160 mbar · max. 250 mbar				**0**	**5**		
	0 to 400 mbar/min. 250 mbar · max. 400 mbar				**0**	**6**		
	0 to 600 mbar/min. 400 mbar · max. 600 mbar				**0**	**7**		
	0 to 1000 mbar/min. 600 mbar · max. 1000 mbar				**2**	**0**		
	0 to 1600 mbar/min. 1000 mbar · max. 1600 mbar				**2**	**1**		
	0 to 2500 mbar/min. 1600 mbar · max. 2500 mbar				**2**	**2**		
	0 to 3600 mbar/min. 2500 mbar · max. 3600 mbar				**2**	**3**		
Zero point calibration	With concealed zero screw						**1**	
Limit switch [1]	Without alarm contacts							**0**
	With one inductive alarm contact, SJ2-SN (one min. contact A1)							**1**
	With two inductive alarm contacts, SJ2-SN (one min. contact A1 and one max. contact A2)							**4**
	With two inductive alarm contacts, SJ2-SN (two min. contacts A1 and A2)							**5**

Additionally required ordering specifications

Complete specifications

	Measured value setting [2]	**Unit**
Alarm contacts adjusted to:	0 to ...	mbar

Version with limit switch, additional order specifications

		Contact **A1**		**Standard**
A1 Min. contact = Value decreasing	Metal tag:	Inside/ outside [3]	at ... mbar	22_{-2} %
		Contact **A2**		
A2 Min. contact = Value decreasing	Metal tag:	Inside/ outside [3]	at ... mbar	42_{-2} %
A2 Max. contact = Value increasing	Metal tag:	Outside/ inside [3]	at ... mbar	93^{+2} %

[1] When delivered with installed limit switch: without settings

[2] With default settings of measured value: 0 to max. measured value

[3] Delete specification that does not apply

Accessories ▶ T 9555 EN · **Dial plates** ▶ T 9545 EN

Certificates and approvals

- CE compliance
- 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 05 Differential Pressure and Flow Meter

Order no.: **Type 5005-** ... ... (see Table 3)

Special version ...

Specifications subject to change without notice

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