

MDM7000-DGP/DAP

Smart Differential Pressure

Mounted Gauge/Absolute Pressure Transmitter



Introduction

MDM7000-DGP/DAP Smart Differential Pressure Mounted Gauge/Absolute Pressure Transmitter adopts advanced monocrystalline silicon piezoresistive technology. The product is used to measure the level, density, pressure and flow of liquid, gas or steam, convert the pressure signal into 4mA~20mA DC analog current signal output, and realize remote setting, monitoring and other functions through communication equipment. It is suitable for the demanding process chemical industry.

Feature

- Monocrystalline silicon piezoresistive sensor technology with stable performance, and high accuracy up to 0.075%FS.
- Maximum 100:1 turndown ratio available for flexible measured range adjustment.
- Adopts high performance EMC protection circuit module with strong anti-interference ability.
- Excellent long-term stability: $\pm 0.1\%$ SPAN/5 years.

Application

- Oil and gas industry
- Food processing
- Pulp and Paper
- Power and Energy
- Chemical Industry
- Marine Equipment

Specification

DGP accuracy	$\pm 0.075\%$, $\pm 0.1\%$, $\pm 0.2\%$ URL, See the specifications for details
DAP accuracy	$\pm 0.1\%$, $\pm 0.2\%$ URL, See the specifications for details
DGP range	60mbar~400bar, see the ordering table
DAP range	0.4bar~100bar, see the ordering table
Long-term Stability	$\pm 0.1\%$ Span/5 years
DGP Ambient temperature effects	$\pm (0.075+0.0375TD) \% / 10^{\circ}\text{C}$ of Span
DAP Ambient temperature effects	$\pm (0.0875+0.0625TD) \% / 10^{\circ}\text{C}$ of Span
Voltage influence	When the power supply voltage changes within 10.5V/16.5V~55V DC, its zero point and range change should not exceed $\pm 0.005\%$ URL/V
Mounting position effects	less than 4mbar at any position, which can be corrected by PV=0 reset.
Vibration effect	$< 0.1\%$ URL as per GB/T18271.3/IEC61298-3
Output signal	4mA~20mA DC+HART
Protection rating	IP67
Weight	About : 4kg (without mounting bracket and process connection parts)

Accuracy

Stated reference accuracy include linearity(BFSL),hysteresis,and repeatability as per the standard and reference test conditions. Calibration Temperature: 20°C ±5°C ,based on Zero value.

Linear output accuracy	DGP	TD≤5	±0.075%SPAN	60mbar*,0.4bar,2.5bar,10bar,30bar,100bar,400bar
		TD>5	±(0.001+0.0148TD) %SPAN	
	DAP	TD≤5	±0.2%SPAN	0.4bar
			±0.1%SPAN	2.5bar,10bar,100bar
TD>5	±(0.025+0.035TD) %SPAN	0.4bar		
	±(0.025+0.015TD) %SPAN	2.5bar,10bar,100bar		

Note: ① TD represents the turn down ratio, TD= Maximum range / Current range, [Maximum range = URL (range starts with 0, same as factory calibration range); Current range = SPAN (equivalent to |URV-LRV|)].

② 6kPa* linear output accuracy of ±0.075% SPAN is only available for TD≤2.

Range

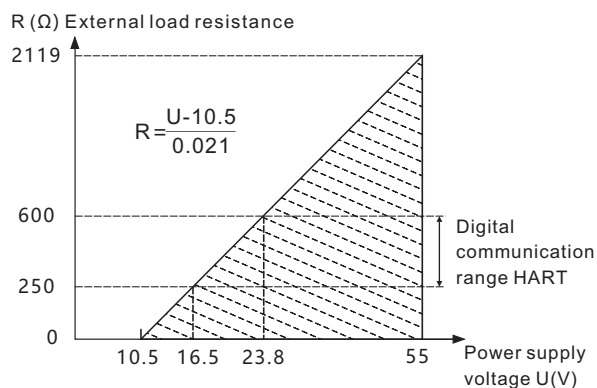
Model	Nominal Range	Min. Range	Lower (LRL)	Upper (URL)	Overload
DGP Gauge	60mbar	2mbar	-60mbar	60mbar	160bar
	0.4bar	4mbar	-0.4bar	0.4bar	160bar
	2.5bar	25mbar	-1bar	2.5bar	160bar
	10bar	0.1bar	-1bar	10bar	160bar
	30bar	0.3bar	-1bar	30bar	160bar
	100bar	1bar	-1bar	100bar	200bar
	400bar	4bar	-1bar	400bar	800bar
DAP Absolute	0.4bar	0.2bar	0bar	0.4bar	160bar
	2.5bar	0.5bar	0bar	2.5bar	160bar
	10bar	2bar	0bar	10bar	160bar
	100bar	10bar	0bar	100bar	200bar

LRV/URV setting: the lower limit value (LRV) and upper limit value (URV) are achieved between the upper and lower limits. If $IURV \geq ILRV$, IURV must be larger than the minimum pressure; if $IURV \leq ILRV$, ILRV must be larger than the minimum pressure.

Overload: depends on the pressure value of the weakest pressure-bearing component. This overload pressure is the maximum pressure that the sensor can withstand, not the maximum pressure that the product itself can withstand.

Power Supply& Load Requirements

Items	Condition
Power supply	HART communication protocol: 16.5V~55V DC
	Intrinsically safe HART communication protocol: 18.5V~28V DC
Load resistance	0Ω~2119Ω (working state) 250Ω~600Ω (HART communication)
Transmission Distance	< 1000m
Power consumption	
4mA~20mA	≤500mW@24V DC, 20.8mA
Modbus-RTU/RS485	≤240mW@24V DC, 10mA



Note: The power supply voltage can be selected as 10.5V, please consult the engineer for details.

Environment Condition

Items	Condition	
Working temperature	-40°C ~85°C ,LCD display:-20°C ~70°C	
Storage temperature	-40 °C ~100°C ,LCD display:-40°C ~85°C	
Media temperature	Silicone oil filled:-40 °C ~105°C	
	Inert oil filled:-45°C ~85°C	
Working humidity	5%RH~100%RH@40°C	
Hazardous area *	PCEC	Ex db IIC T6 Gb Ex ia IIC T4 Ga
	ATEX	Ex db IIC T6 Gb,Ex tb IIIC T70°C Db Ex ia IIC T4 Ga
	IECEX	Ex db IIC T6 Gb,Ex tb IIIC T70°C Db Ex ia IIC T4 Ga
	CSA	Class I,Division 1,Group A,B,C and D T6 Class II,Division 1 Group E,F and G T70°C Class III
* Please consult engineers for details		

Electromagnetic Compatibility

No	Test Items	Basic Standards	Test Conditions	Performance Level
1	Radiated interference	GB/T 9254.1/CISPR 32	30MHz ~ 1000MHz	Qualified
2	Conducted interference (DC power port)	GB/T 9254.1/CISPR 32	0.15MHz ~ 30MHz	Qualified
3	Electrostatic discharge immunity test (ESD)	GB/T 17626.2/IEC61000-4-2	8kV (Contact), 8kV (Air)	A
4	Immunity to radio frequency EM-fields	GB/T 17626.3/IEC61000-4-3	10V/m (80MHz ~ 1GHz)	A
5	Power frequency magnetic field Immunity test	GB/T 17626.8/IEC61000-4-8	30A/m	A
6	Electrical fast transient / Burst Immunity test	GB/T 17626.4/IEC61000-4-4	4kV(5/50ns,100kHz)	A
7	Surge immunity requirements	GB/T 17626.5/IEC61000-4-5	1kV (Line to line) 2kV (Line to ground) (1.2/50µs)	A
8	Immunity to conducted disturbances induced by radio frequency fields	GB/T 17626.6/IEC61000-4-6	3V(150kHz ~ 80MHz)	A
Note: Performance level A: The performance within the limits of normal technical specifications.				

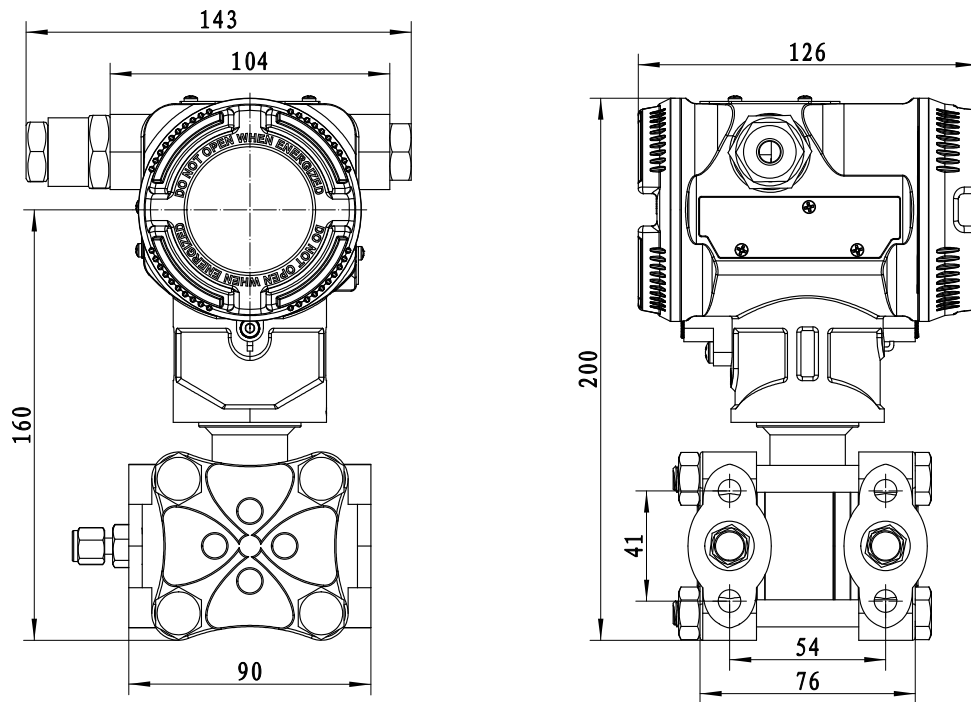
Time index

Damping time constant: equals to the combined damping time of electronic components and sensor module.
Electronic components damping time: 0s~100s configurable
Sensor module damping time(sensor isolated diaphragm and filled silicone oil): ≤ 0.2s
Turn-on time: ≤ 6s
Factory reset time: ≤ 31s

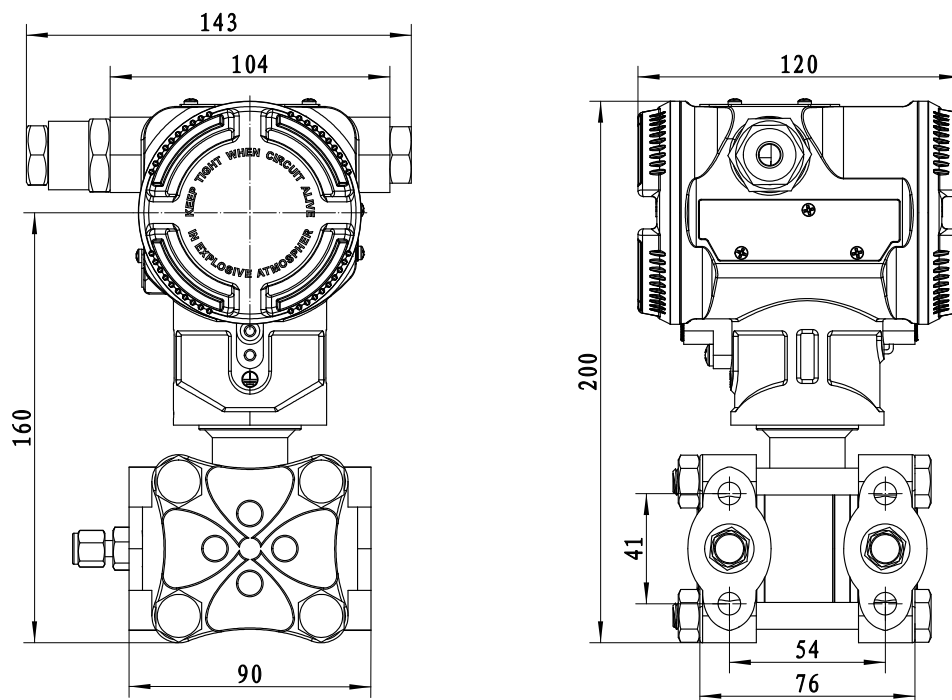
Dimension

unit: mm

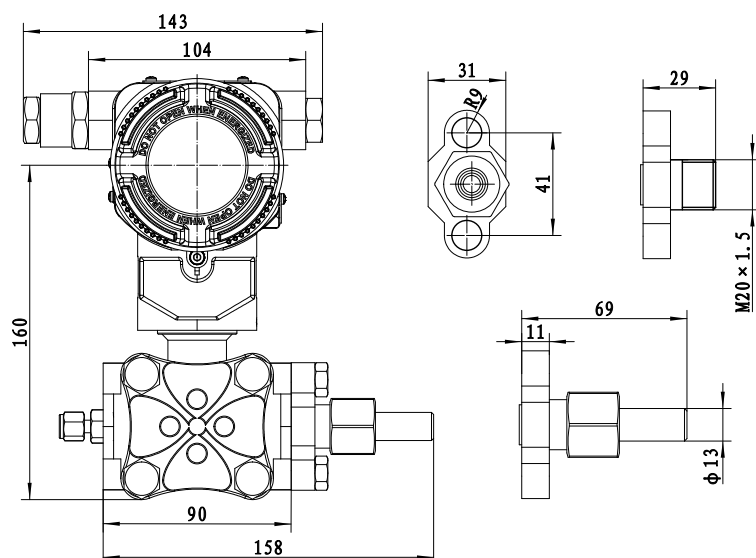
MDM7000 With Display



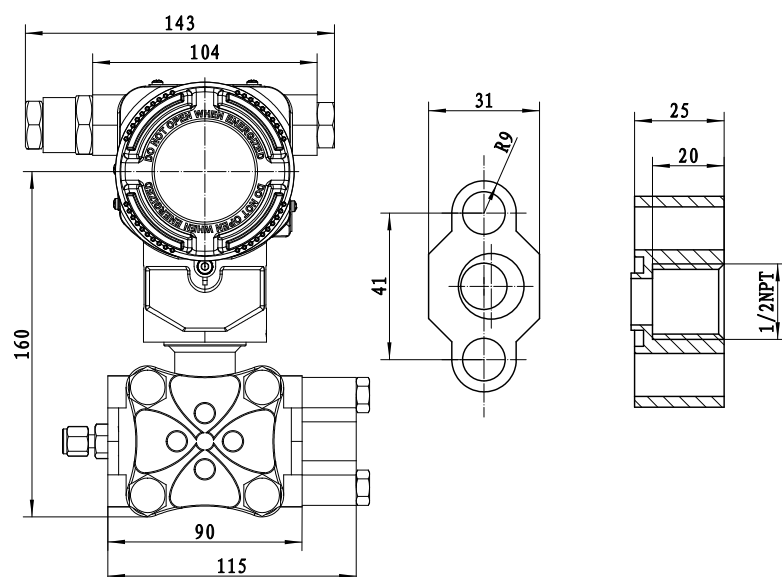
MDM7000 Without Display



MDM7000 Transmitter With A1 Adapter



MDM7000 Transmitter With A2 Adapter



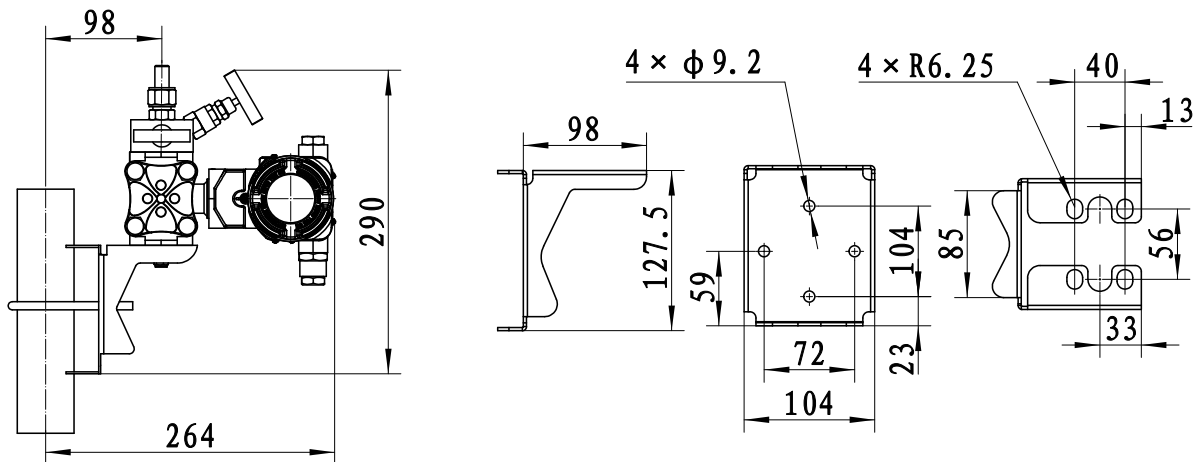
Schematic diagram with adapter A1



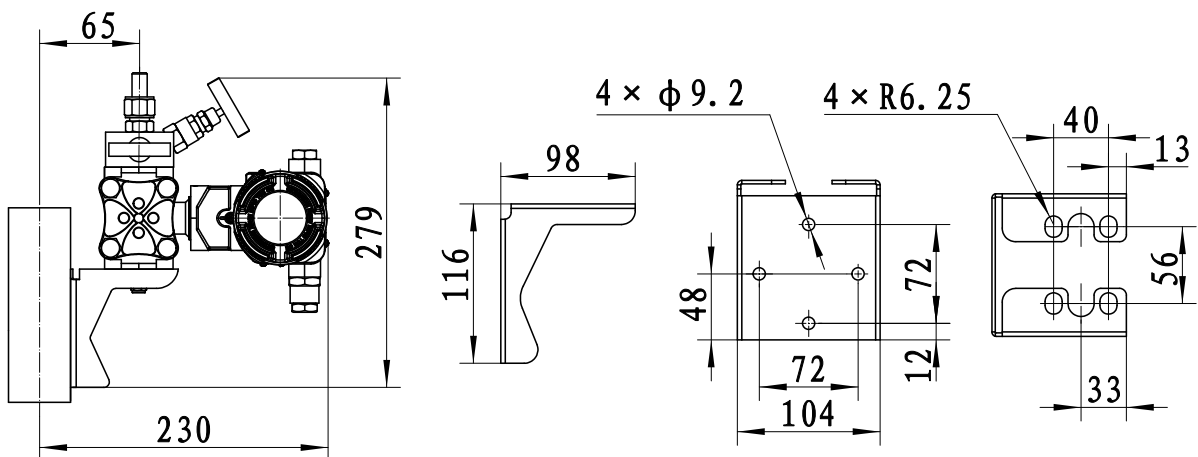
Schematic diagram with adapter A2



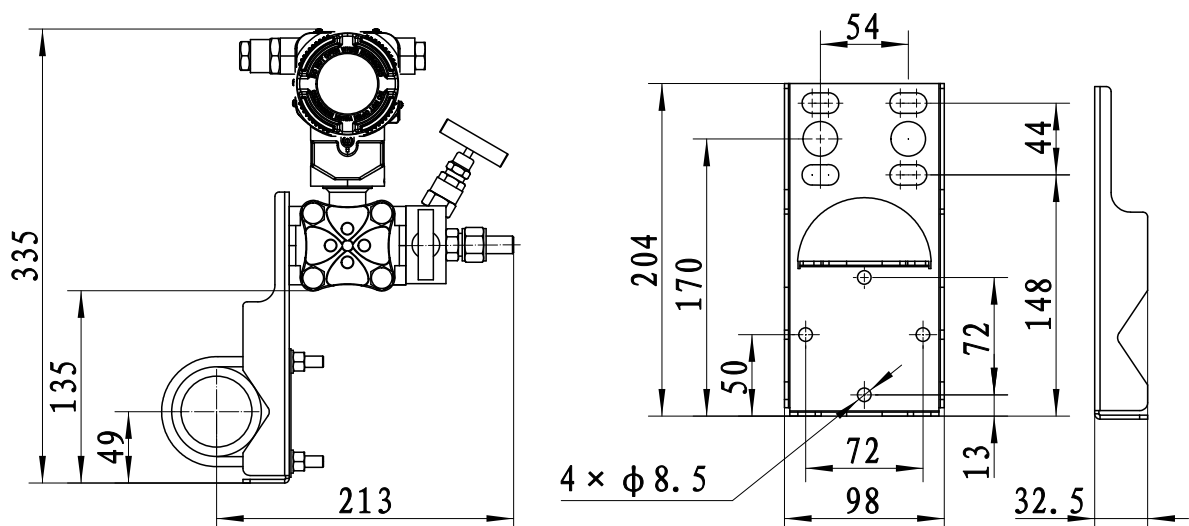
MDM7000 Mounting bracket (B6) for 2" Pipe Mounting

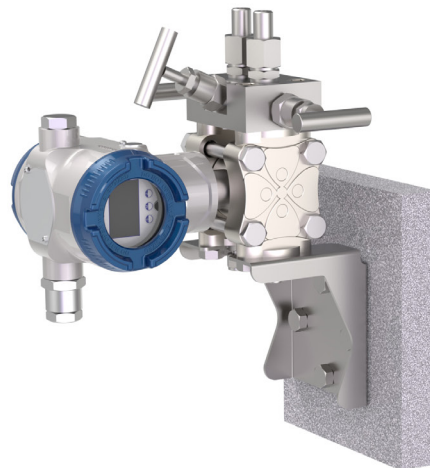


MDM7000 Mounting bracket (B10) for Panel Mounting

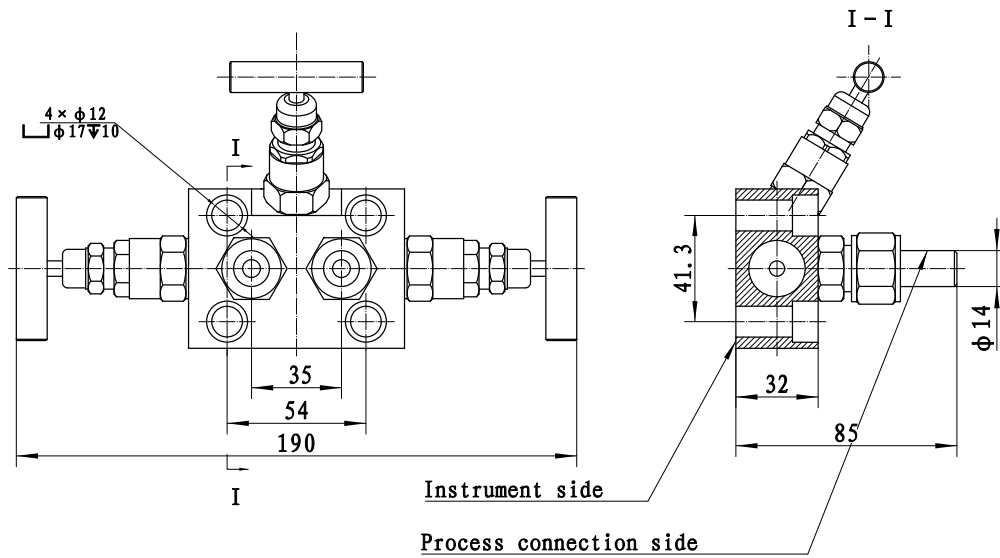


MDM7000 Flat Mounting Bracket (B8) for Vertical Mounting On 2" Pipe

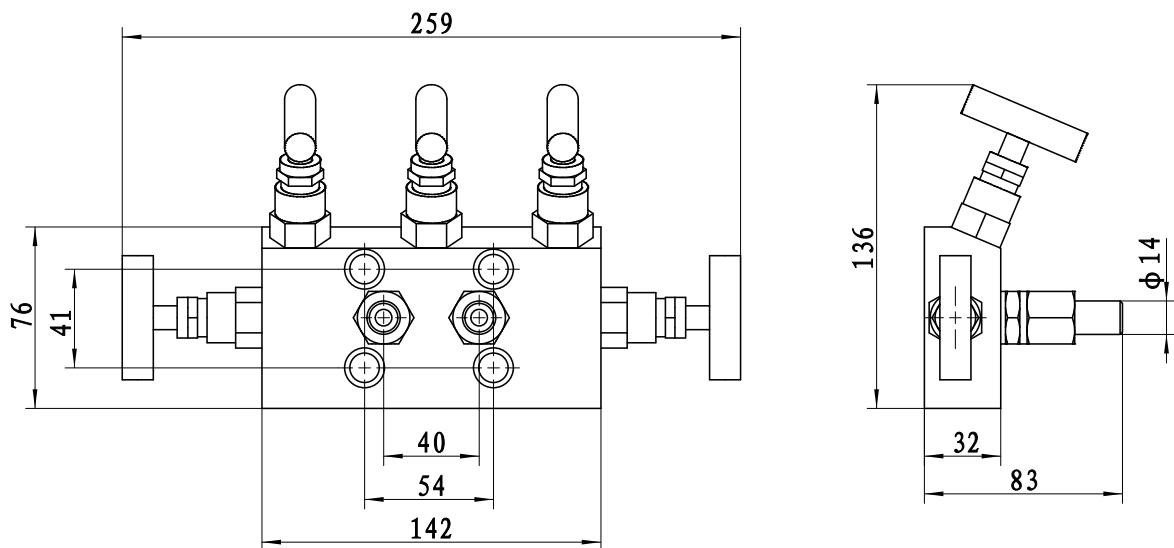


Bending Bracket (B6) for 2" Pipe Mounting**Bending Bracket (B10) for Panel Mounting****Flat Bracket (B8) for 2" Pipe Mounting**

Three Valve Manifold



Five Valve Manifold



Note: Please consult the engineer for other specifications.

Order Guide

Items	Parameter	Code	Description
	Model	MDM7000-DGP/DAP	Smart Differential Pressure Mounted Gauge/Absolute Pressure Transmitter
Sensor	Separator	-	Detailed specifications as following
	DGP range	S602G	Nominal value(URL): 60mbar
		S403G	Nominal value(URL): 0.4bar
		S254G	Nominal value(URL): 2.5bar
		S105G	Nominal value(URL): 10bar
		S305G	Nominal value(URL): 30bar
		S106G	Nominal value(URL): 100bar
		S406S	Nominal value(URL): 400bar
	DAP range	S403A	Nominal value(URL): 0.4bar
		S254A	Nominal value(URL): 2.5bar
		S105A	Nominal value(URL): 10bar
		S106A	Nominal value(URL): 100bar
	Diaphragm material	S	SUS316L
		H	Hastelloy C
	Fill oil	S	Silicone oil
D		Inert oil	
Sensor seal	N	Low temperature resistant fluorosilicone rubber (temperature range: -40°C ~85°C)	
	P	Square washer, PTFE (temperature range: -20°C ~70°C)	
Electrical Connection	Separator	-	Detailed specifications as following
	Cable entry protection	R1	A waterproof connector M20×1.5 at one side and a gland at the opposite side, PVC material, applicable for 6mm~8mm diameter cable, IP67
		R2	Flame proof, 1/2 NPT(F) at one side, gland at the opposite side, stainless steel material, applicable for 6mm~8mm diameter cable, IP67
		R3	Flame proof, M20×1.5 (F) at one side, gland at the opposite side, stainless steel material, applicable for 6mm~8mm diameter cable, IP67
		R7	Flame proof, G1/2 (F) at one side, gland at the opposite side, stainless steel material, applicable for 6mm~8mm diameter cable, IP67
Output	Separator	-	Detailed specifications as following
	Output signal	H	4mA~20mA DC+HART two wire, power supply: 16.5V~55V DC
		B	4mA~20mA DC+HART two wire, Intrinsically safe, power supply: 18.5V~28V DC
	Display	A	Without LCD display
		C	LCD display
Process connection	Separator	-	Detailed specifications as following

	Process connection	H1	Process connection 1/4-18NPT (F) , drain valve on the rear end of flange, material SS 316, mounting thread M10×1.5	
		H2	Process connection 1/4-18NPT (F) , drain valve on the up part of flange, material SS 316, mounting thread M10×1.5	
		H3	Process connection 1/4-18NPT (F) , drain valve on the down part of flange, material SS 316, mounting thread M10×1.5	
		H4	Process connection 1/4-18NPT (F) , drain valve on the rear end of flange, material SS 304, mounting thread M10×1.5	
		H7	Process connection 1/4-18NPT (F) , drain valve on the rear end of flange, material SS 316, mounting thread 7/16-20UNF	
options	Separator	-	Detailed specifications as following	
	Process connection accessories	/A1	Adaptor, M20×1.5 (M) with pressure-guided pipe Φ14×2×30, SS304, spherical seal	
		/A2	Adaptor, 1/2-14NPT (F) , SS 304	
		0	None	
	Fix mounting accessories	/B6	Tube bending bracket, 2 inch tube, matching mounting kit, stainless steel 304	
		/B10	Plate bending bracket, matching mounting kit, stainless steel 304	
		/B8	Flat bracket for tubes, 2 inch tube, matching mounting kits, stainless steel 304	
		0	None	
	Calibration report	/Q1	Calibration report provided by MicroSensor	
		/Q2	Calibration report provided by Chinese authorised third party	
		0	None	
	Flameproof certification	/E1/AT	Flameproof certification, ATEX certification	
		/E1/IE	Flameproof certification, IECEx certification	
		/E1/PC	Flameproof certification, PCEC certification	
		/E2	Flameproof certification, CSA certification	
		0	None	
	Intrinsically safe certification	/I1/AT	Intrinsically safe certification, ATEX certification	
		/I1/IE	Intrinsically safe certification, IECEx certification	
		/I1/PC	Intrinsically safe certification, PCEC certification	
		0	None	
	CCS certification	/CCS	CCS certification	
		0	None	
	Wetted parts treatment	/G1	Ungrease treatment	
		0	None	
	Note: Please consult the engineer for product certification details.			

Certifications

RoHS		CE
The name of the certification organization		TÜV SÜD
License scope	MDM7000 Series smart Pressure Transmitters	
mark	RoHS	CE
directives	2015/863/EU	2014/30/EU
Verification criteria	IEC62321-1:2013 IEC62321-5:2014 IEC62321-2:2013 IEC62321-6:2015 IEC62321-4:2014 IEC62321-7-1:2015	EN IEC 61326-1:2021

Flameproof certification		
The name of the certification organization	PCEC	CSA
License scope	MDM7000 Series smart Pressure Transmitters	
Explosion-proof signs	Ex db IIC T6 Gb	Class I, Division 1, Group A, B, C and D T6 Class II, Division 1 Group E, F and G T70°C Class III
Use ambient temperature	-40°C ~70°C	-40°C ~70°C

Intrinsically safe certification	
The name of the certification organization	PCEC
License scope	MDM7000 Series smart Pressure Transmitters
Explosion-proof signs	Ex ia IIC T4 Ga
Use ambient temperature	-40°C ~70°C
Description of intrinsically safe parameters	Maximum input voltage U_i (V): 28
	Maximum input current I_i (mA): 100
	Maximum input power P_i (W): 0.7
	Highest internal equivalent parameter C_i (nF): 20
	Highest internal equivalent parameter L_i (μH): 20