MDM7000-DP

Smart Differential Pressure Transmitter

Introduction

MDM7000-DP smart differential 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 0.05%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: ±0.1% SPAN/5 years.

Application

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

Specification

Accuracy	± 0.05%,± 0.075%, ±0.1% URL, See the specifications for details
Range	60mbar~100bar,see the Ordering table for details
Measured media	Medias that are compatible with the wetted material
Long-term Stability	±0.1%Span/5 years
Ambient temperature effects	See the specifications for details
Voltage influence	When the power supply voltage changes within 10.5V/16.5V~55V DC, its zero point and range change should not exceed ±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
Weigh	About : 4kg (without mounting bracket and process connection parts)

Accuracy

① 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.
② Total performance is based on combined errors of reference accuracy, ambient temperature effect and static pressure effect, calculatedby the following formula:Total Performance=$\pm\sqrt{(E1)^2+(E2)^2+(E3)^2}$;
E1=Reference accuracy E2=Ambient temperature effects E3=Static pressure effect

Linear output accuracy	TD≤5	±0.075%SPAN	60mbar*
		±0.05%SPAN	0.4bar,2.5bar,10bar,30bar,100bar
	TD>5	±(0.001+0.0148TD) %SPAN	60mbar*
		±(0.0025+0.0095TD)%SPAN	0.4bar,2.5bar,10bar,30bar,100bar

Square root output accuracy is 1.5 times linear output accuracy.

Note: ① TD represents the turn down ratio, TD= Maximum range / Current range, [Maximum range = URL (range starts with 0, same asfactory calibration range); Current range = SPAN (equivalent to |URV-LRV|)].
② 6kPa* linear output accuracy of ±0.075% SPAN is only available for TD≤2.

Ambient temperature effects

6kPa	±（0.1+0.05TD）%/10°C of Span
40kPa 、250kPa、1MPa、3MPa、10MPa	±（0.075+0.0375TD）%10°C of Span

Range

Norminal Range	Min. Range	Lower（LRL）	Upper（URL）	Line pressure range	One-sided High pressure side Overload	One-sided Low pressure side Overload
60mbar	2mbar	-60mbar	60mbar	400bar	250bar	250bar
0.4bar	4mbar	-0.4bar	0.4bar	400bar	250bar	250bar
2.5bar	25mbar	-2.5bar	2.5bar	400bar	250bar	250bar
10bar	0.1bar	-10bar	10bar	400bar	250bar	250bar
30bar	0.3bar	-30bar	30bar	400bar	250bar	250bar
100bar	1bar	-30bar	100bar	400bar	250bar	250bar

LRV/URV setting: the lower limit value (LRV) and upper limit value (URV) are achieved between the upper and lower limits. If IURV I ≥ ILRV I, IURVI must be larger than the minimum pressure; if IURVI ≤ ILRV I, ILRV I 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.

Electromagnetic Compatibility

No	Test Items	Basic Standards	Test Conditions	Perfor-mance 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

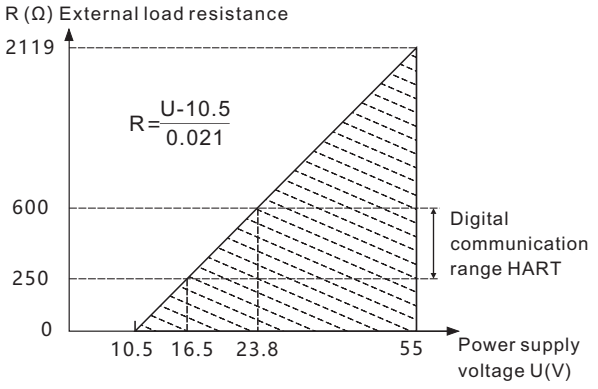
Note: Performance level A: The performance within the limits of normal technical specifications.

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 T70ºC Class III
* Please consult engineers for details		

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.

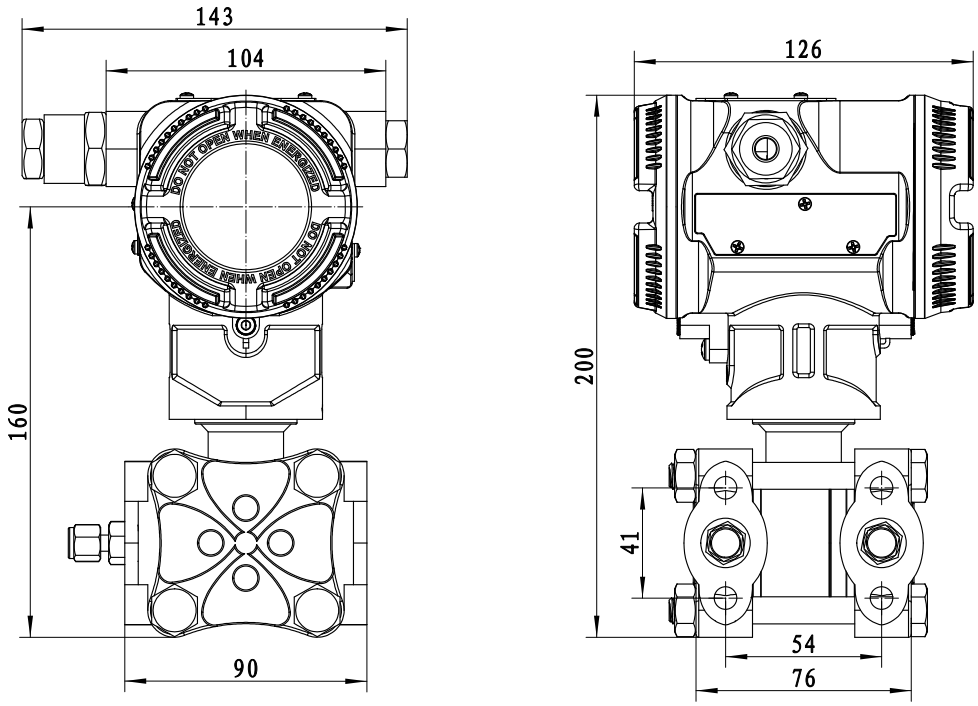
Time index

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

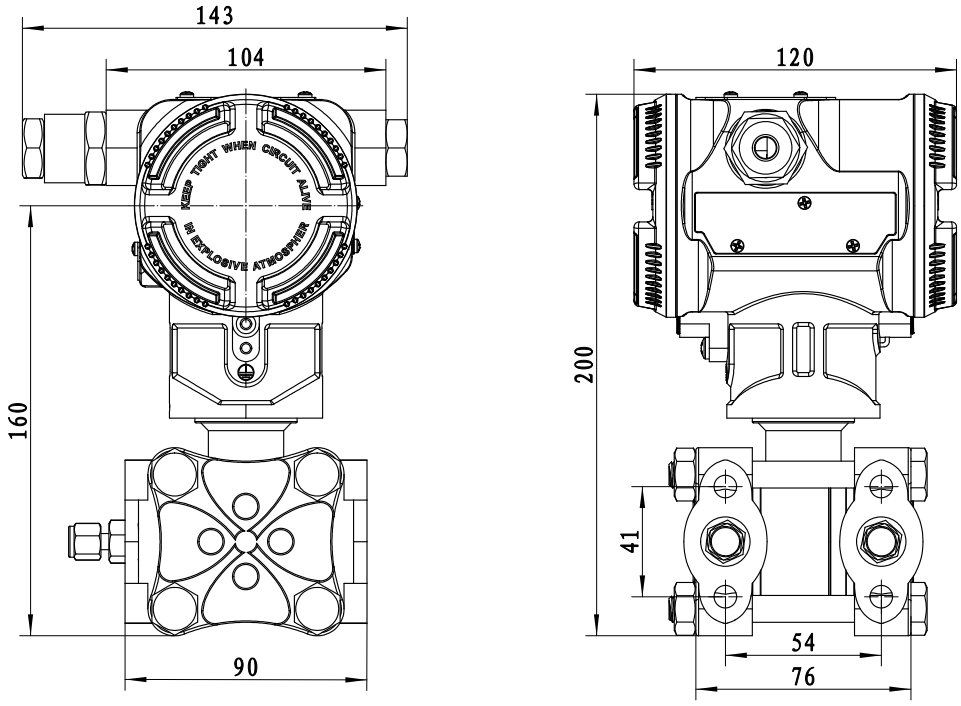
Dimension

unit: mm

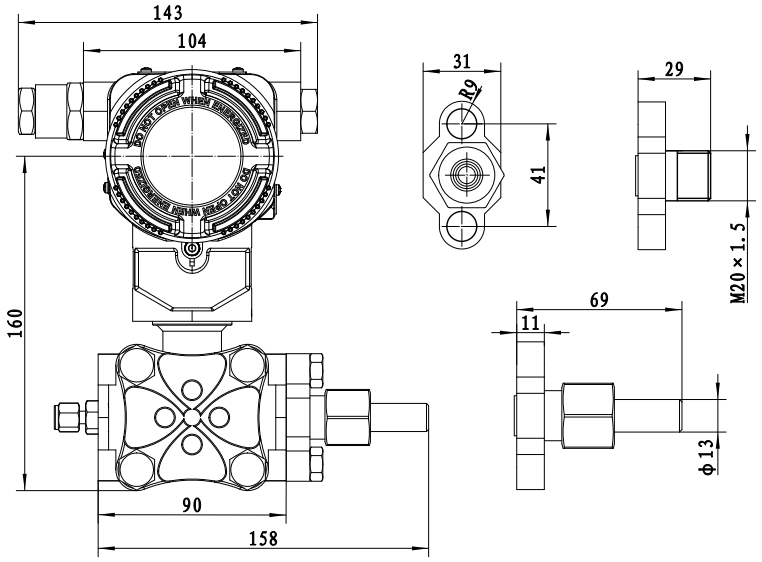
MDM7000 With Display



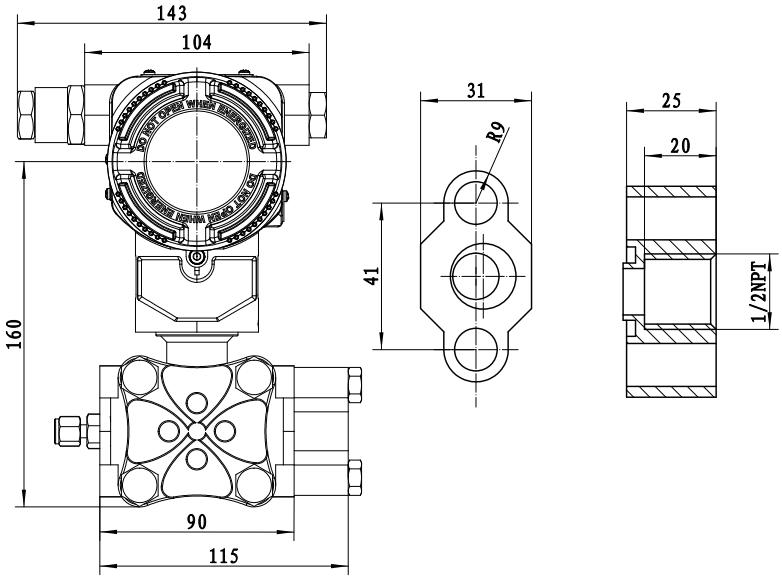
MDM7000 Without Display



MDM7000 Transmitter With A1 Adapter



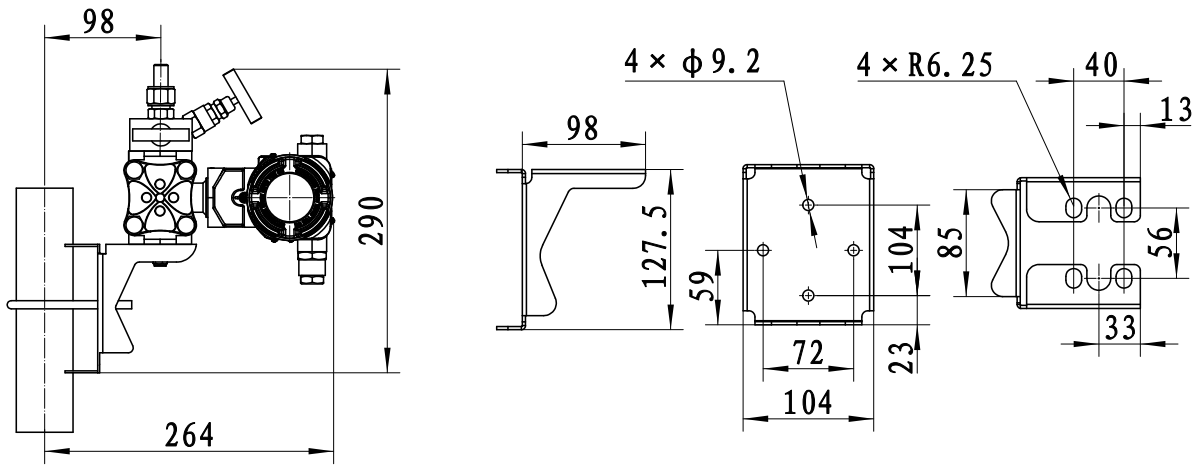
MDM7000 Transmitter With A2 Adapter



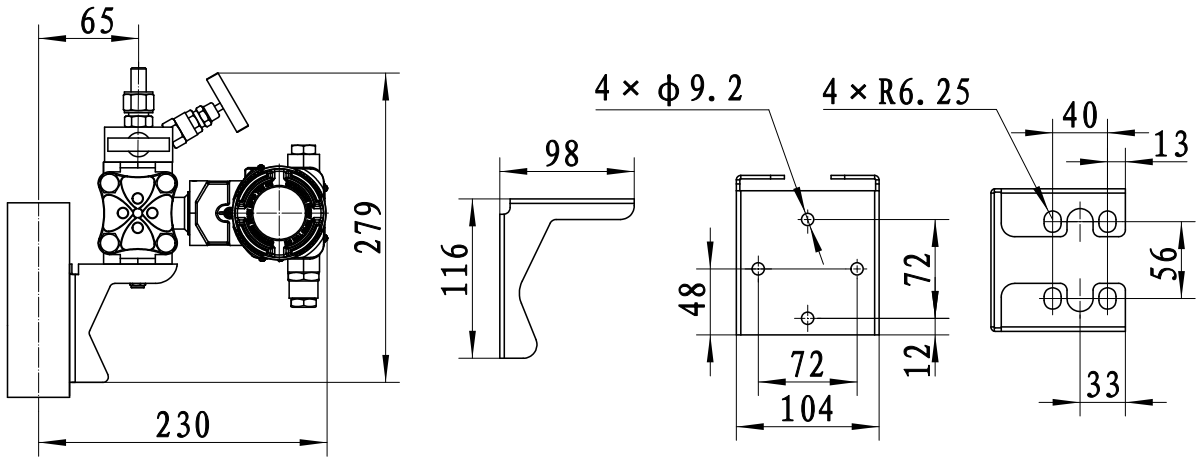
Schematic diagram with adapter A1

Schematic diagram with adapter A2

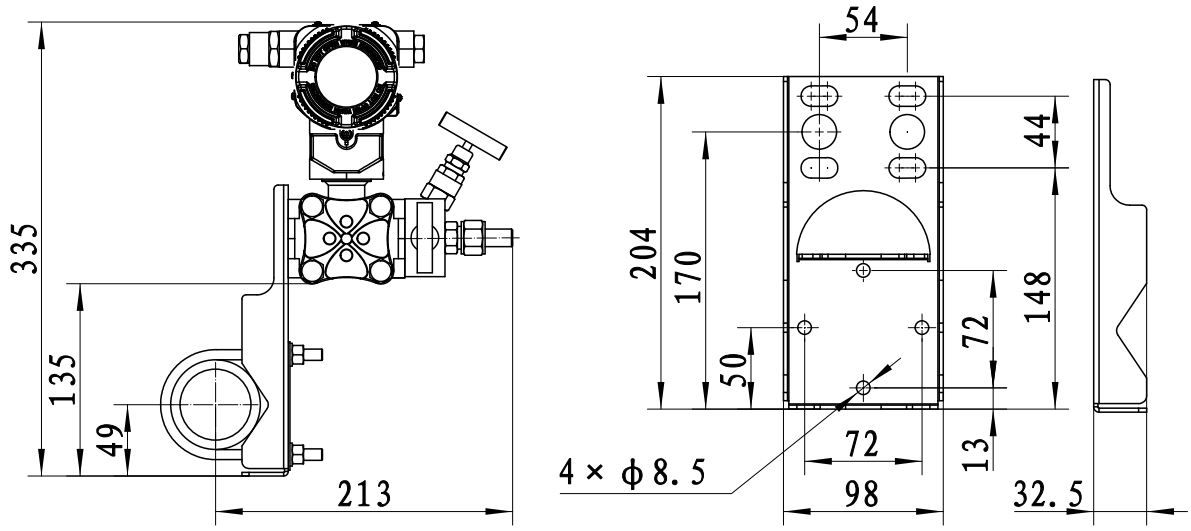
MDM7000 Mounting bracket (B6) for 2" Pipe Mounting



MDM7000 Mounting bracket (B10) for Panel Mounting

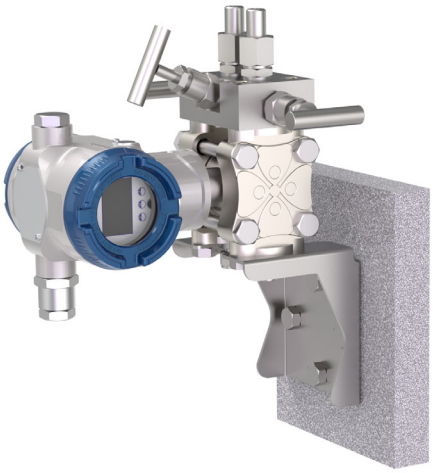


MDM7000 Flat Mounting Bracket (B8) for Vertical Mounting On 2" Pipe



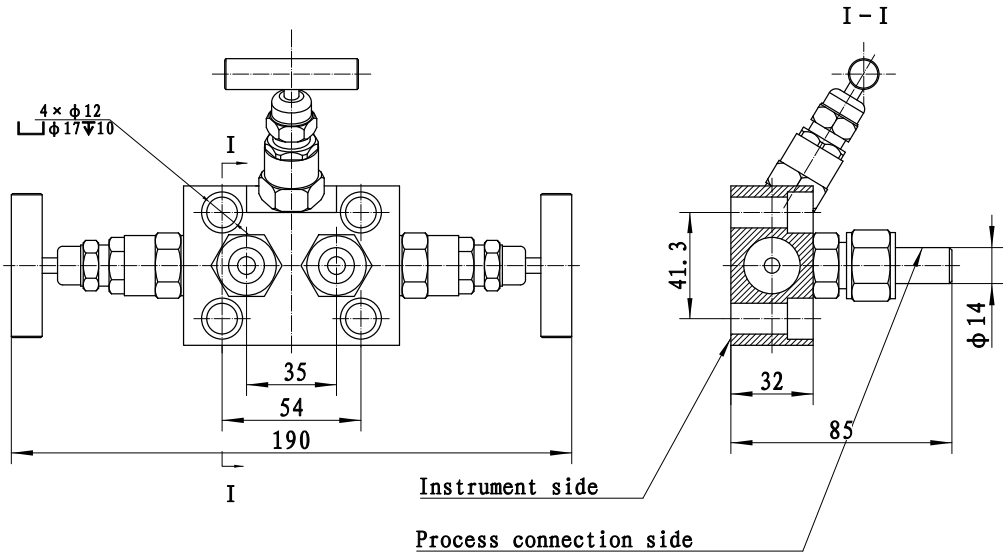
Bending Bracket (B6) for 2" Pipe Mounting

Bending Bracket (B10) for Panel Mounting

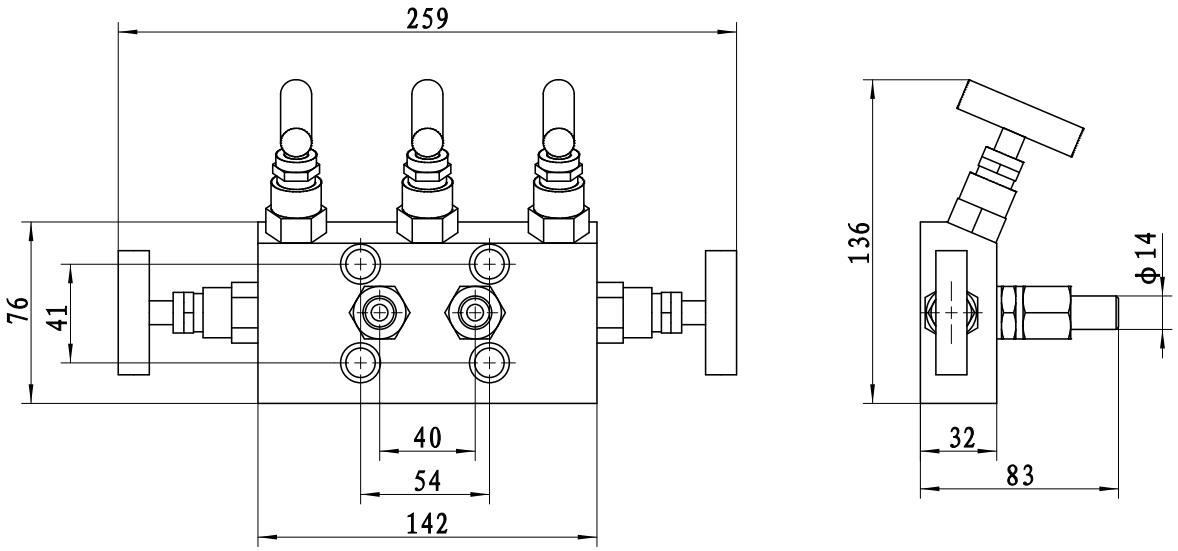


Flat Bracket (B8) for 2" Pipe Mounting

Three Valve Manifold



Five Valve Manifold



Note: Please consult the engineer for other specifications.

Order Guide

Items	Parameter	Code	Description
	Model	MDM7000-DP	Smart Different Pressure Transmitter
Sensor	Separator	-	Detailed specifications as following
	range	S602D	Nominal value(URL): 60mbar
		S403D	Nominal value(URL): 0.4bar
		S254D	Nominal value(URL): 2.5bar
		S105D	Nominal value(URL): 10bar
		S305D	Nominal value(URL): 30bar
		S106D	Nominal value(URL): 100bar
	Diaphragm material	S	SS316L
		H	Hastelloy C
	Fill oil	S	Silicone oil
		D	Inert filler
	Sensor seal	N	Low temperature resistant fluorosilicone rubber (temperature range: -40℃ ~85℃)
		P	Square washer, PTFE (temperature range: -20℃ ~70 ℃)
Electrical Connection	Separator	-	Detailed specifications as following
	Cable outlet 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 T70ºC 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 Ui (V): 28
	Maximum input current Ii (mA): 100
	Maximum input power Pi (W): 0.7
	Highest internal equivalent parameter Ci (nF): 20
	Highest internal equivalent parameter Li (μH): 20