MDM7000-GP/AP

Smart Gauge/Absolute Pressure Transmitter

Introduction

MDM7000-GP/AP smart gauge/absolute pressure transmitter adopts advanced monocrystalline silicon piezoresistive technology. The product is used to measure the level, density, and pressure of liquid, gas or steam, and then converts the pressure signal into 4mA~20mA DC analog current signal output, and can realize supports 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.
- High overload protection diaphragm to achieve high pressure overload protection function.
- 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

GP accuracy	± 0.075%, ±0.1%, ±0.2% URL See the specifications for details
AP accuracy	± 0.1%, ±0.2% URL See the specifications for details
GP range	0.4bar~400bar, see the ordering table
AP range	0.4bar~100bar, see the ordering table
Long-tem stability	±0.1%SPAN/5 years
Ambient temperature effects	See the specifications for details
Power supply effect	When the supply voltage varies from 10.5V/16.5V to 55V DC, the zero and span change should be less than ±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 1.56kg (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℃ ±5℃ , based on Zero value.				
Linear output accuracy	GP	TD≤5	±0.1%SPAN	0.4bar
			±0.075%SPAN	2.5bar,10bar,30bar,100bar,400bar
		TD>5	± (0.025+0.015TD) %SPAN	0.4bar
			± (0.0025+0.0145TD) %SPAN	2.5bar,10bar,30bar,100bar,400bar
	AP	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: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|)].				

Ambient temperature effects

Product type	Influence quantity	Range
GP	± (0.075+0.035TD) % 10°C of SPAN	40kPa、250kPa 1 MPa、3MPa、10MPa、40MPa
AP	± (0.125+0.075TD) % 10°C of SPAN	40kPa
	± (0.115+0.065TD) % 10°C of SPAN	250kPa、1 MPa、10MPa

Range

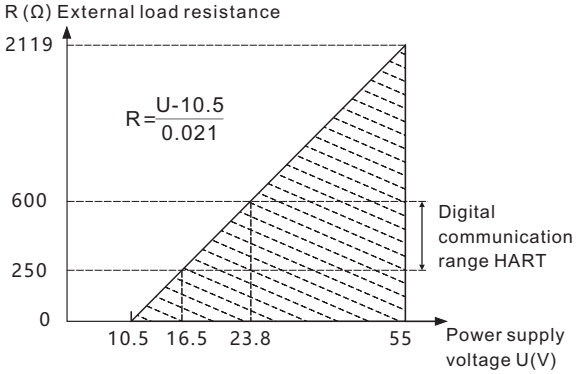
Model	Nominal Range	Min. Range	Lower (LRL)	Upper (URL)	Overload
GP	0.4bar	20mbar	-0.4bar	0.4bar	10bar
	2.5bar	125mbar	-1bar	2.5bar	40bar
	10bar	0.5bar	-1bar	10bar	60bar
	30bar	1.5bar	-1bar	30bar	150bar
	100bar	5bar	-1bar	100bar	200bar
	400bar	50bar	-1bar	400bar	800bar
AP	0.4bar	0.2bar	0bar	0.4bar	10bar
	2.5bar	0.5bar	0bar	2.5bar	40bar
	10bar	2bar	0bar	10bar	60bar
	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 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 value: Depending on the pressure value of the weakest pressure bearing capacity, this overload pressure is the maximum pressure that the sensor can withstand, not the maximum pressure that the product itself can withstand.					

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		

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

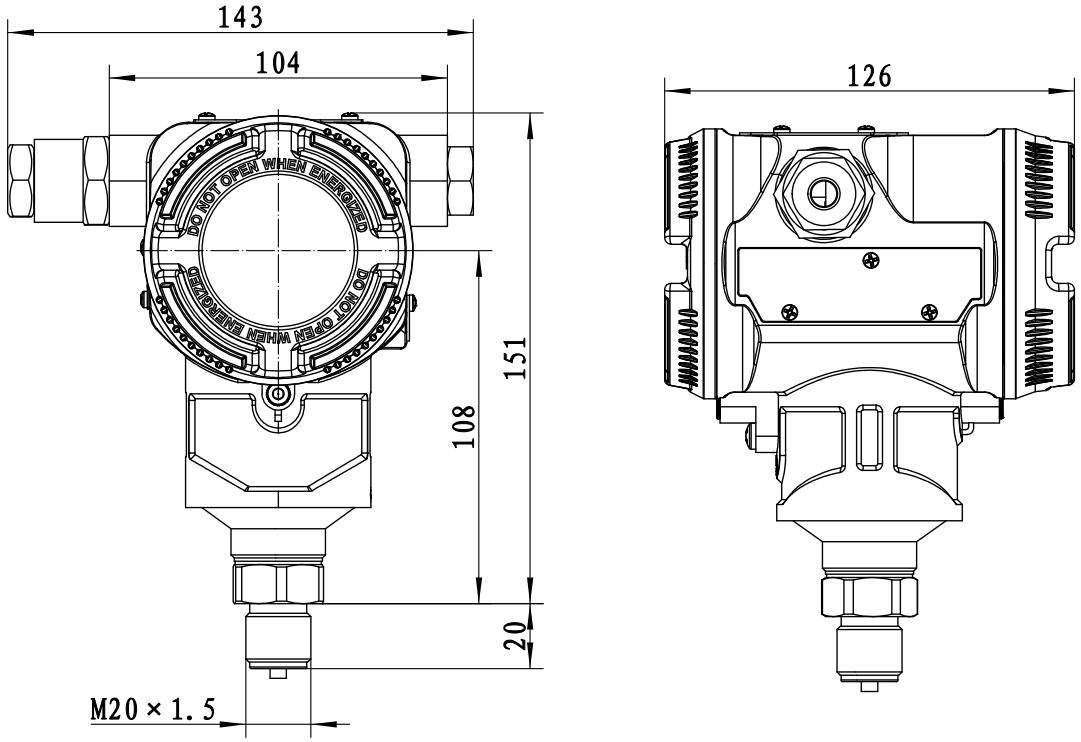
Electromagnetic Compatibility

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 Immu-nity 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.				

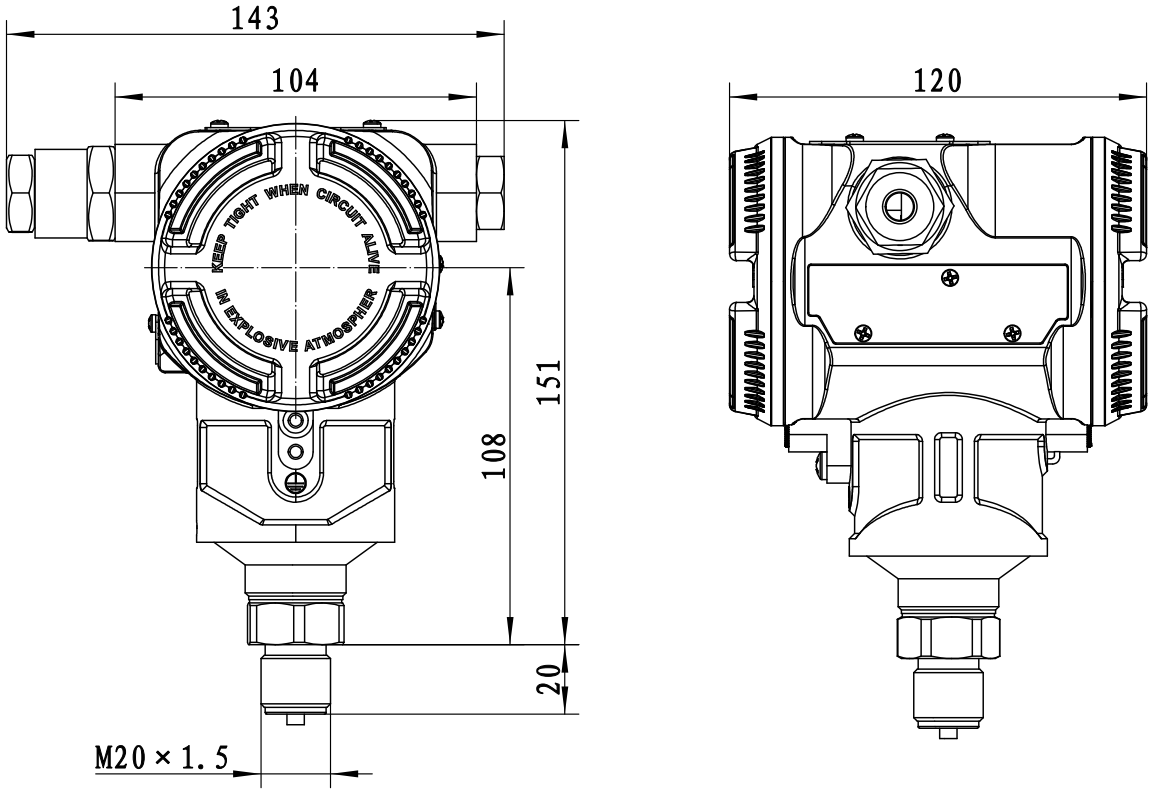
Dimension

unit: mm

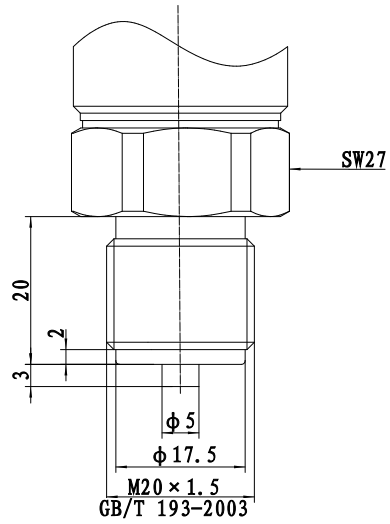
MDM7000 With Display



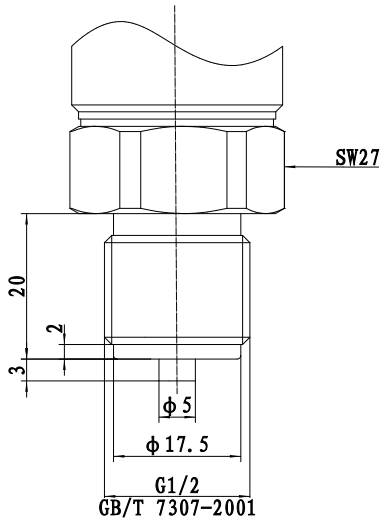
MDM7000 Without Display



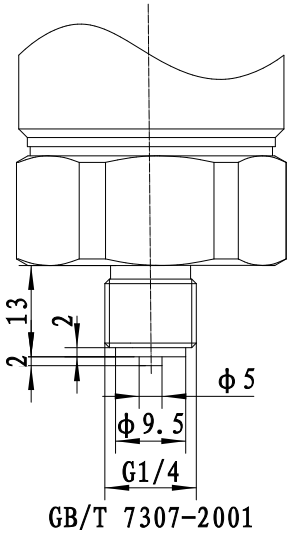
Process connection (M01)



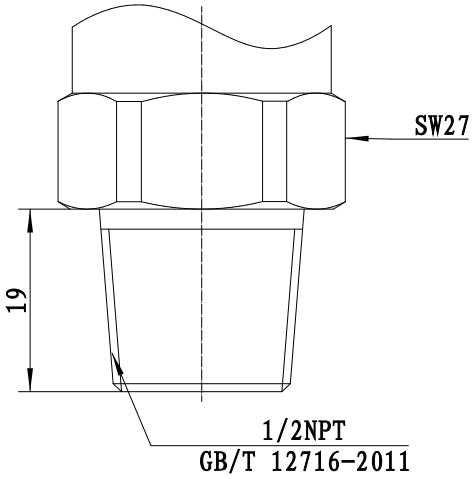
Process connection (G01)



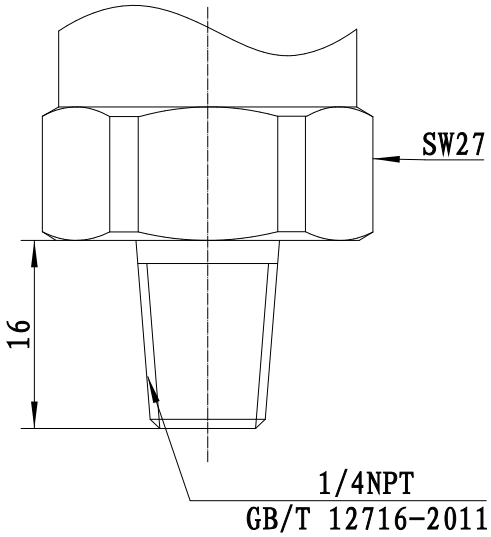
Process connection (G02)



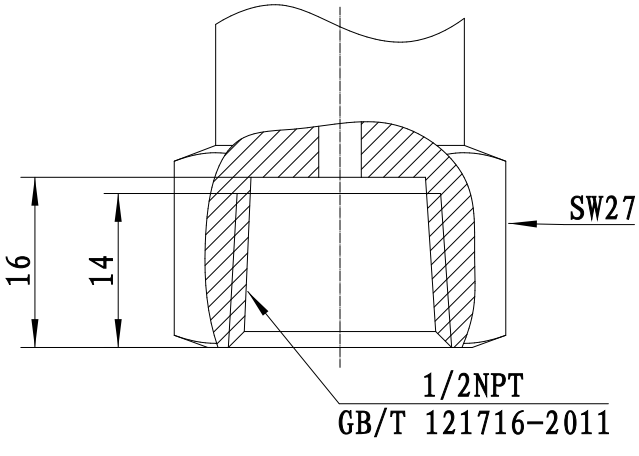
Process connection (R01)



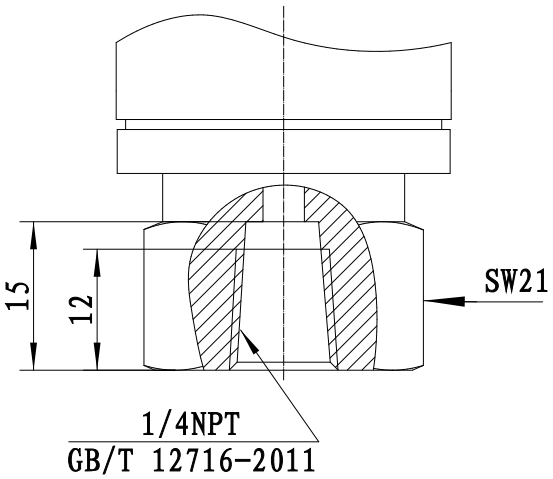
Process connection (R02)



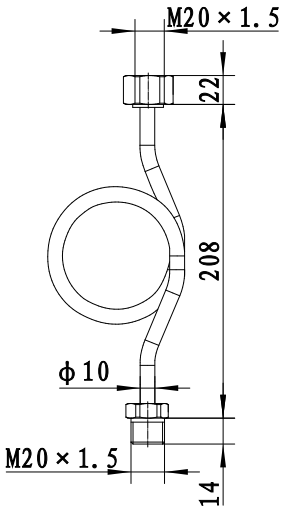
Process connection (R03)



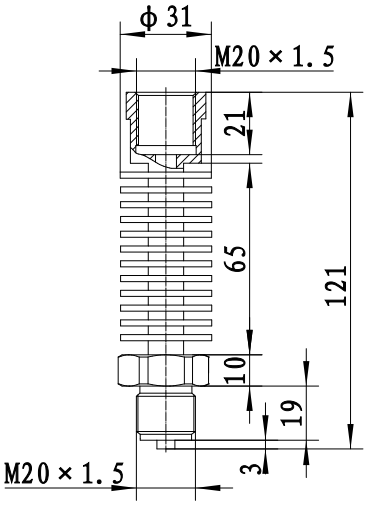
Process connection (R04)



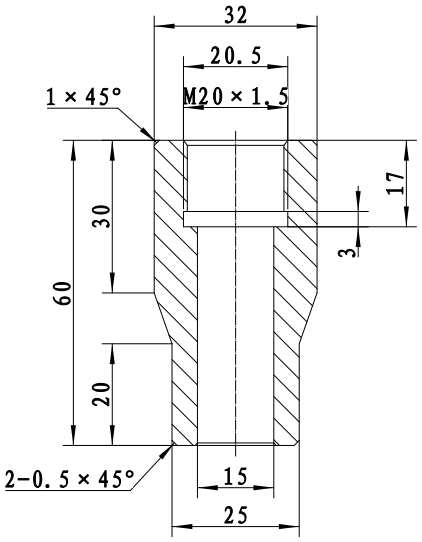
Heat exchange link (N1)



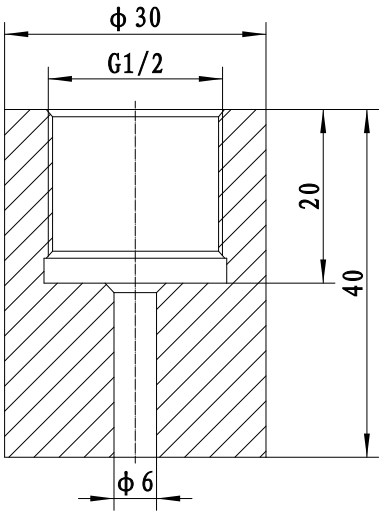
Heat exchange link (N2)



Welded connector (Z1)



Welded connector (Z2)



Order Guide

Items	Parameter	Code	Description
	Model	MDM7000-GP/AP	Smart Gauge/Absolute Pressure Transmitter
Sensor	Separator	-	Detailed specifications as following
	GP range	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
	AP range	S403A	Nominal value(URL): 0.4bar
		S254A	Nominal value(URL): 2.5bar
		S105A	Nominal value(URL): 10bar
		S106A	Nominal value(URL): 100bar
	Isolated diaphragm material	S	SS316L
		H	Hastelloy C
		L	SUS316L + gold plated
	Fill oil	S	silicone oil
		D	Inert filler
	Sensor seal	F	Stainless steel welded seal
		S	Viton o-ring
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

	Specification	M01	M20×1.5 Male, φ3 pressure lead hole, GB/T 193-2003
		G01	G1/2 Male, φ3 pressure lead hole, GB/T 7307-2001
		G02	G1/4 Male, φ3 pressure lead hole, GB/T 7307-2001
		R01	1/2-14NPT Male, φ6 pressure lead hole, GB/T 12716-2011
		R02	1/4-18NPT Male, φ3 pressure lead hole, GB/T 12716-2011
		R03	1/2-14NPT Female, φ6 pressure lead hole, GB/T 12716-2011
		R04	1/4-18NPT Female, φ3 pressure lead hole, GB/T 12716-2011
options	Separator	-	Detailed specifications as following
	Process connection mounting fittings	/N1	Heat exchange link, M20×1.5 female to M20×1.5 male thread, SUS304 stainless steel (condenser)
		/N2	Heat exchange link, M20×1.5 female thread to M20×1.5 male thread, SUS304 stainless steel (heat sink)
		/Z1	Welded connector, internal thread M20×1.5, SUS304 stainless steel
		/Z2	Welded connector, internal thread G1/2, SUS304 stainless steel
		0	None
	Fixed mounting accessories	/B9	Bracket, SS304
		0	None
	Validation report	/Q1	Calibration report provided by MicroSensor
		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