bar **MDM7000-DP**

MICROSENSOR

AUTHORIZED DISTRIBUTOR

RANGE

Nominal Range	Minimum range	Lower (LRL)	Upper (URL)	Line pressure range	One-sided high pressure overload	One-sided low pressure overload
60mbar	2mbar	-60mbar	60mbar	420bar	250bar	250bar
0.4bar	4mbar	-0.4bar	0.4bar	420bar	250bar	250bar
2.5bar	25mbar	-2.5bar	2.5bar	420bar	250bar	250bar
10bar	0.1bar	-10bar	10bar	420bar	250bar	250bar
30bar	0.3bar	-30bar	30bar	420bar	250bar	250bar
LRV/URV setting: the lower limit value (LRV) and upper limit value (URV) are achieved between the upper and lower limits. If | URV |≥ | LRV |, | URV | must be larger than the minimum pressure; if | URV |≤ | LRV |, | LRV | must be larger than the minimum pressure. It is recommended to choose a range ratio with the minimum possible value.						

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ACCURACY

1. Stated reference accuracy include best fit straight line(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 indoor temperature accuracy, ambient temperature effects and static pressure effects, calculated by the following formula:Total performance=±√ ($(E1)^2$ + $(E2)^2$ + $(E3)^2$) ;

E1=Indoor temperature accuracy E2=Ambient temperature effects E3=Static pressure effects

Linear output accuracy	TD ① ≤5	0.075%	60mbar ②
		0.05% ③ , 0.075%	0.4bar, 2.5bar, 10bar, 30bar
	TD>5	±(0.001+0.0148TD) %	60mbar ②
		±(0.0025+0.0095TD) %	0.4bar, 2.5bar, 10bar, 30bar
Square root output accuracy is 1.5 times linear output accuracy.			
Note: : ① TD(Turn down) represents the range 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 60mbar output accuracy of ±0.075% SPAN is only available for TD≤2. ③ Optional linear output accuracy is 0.05%. Please consult the engineer for details.			

SPECIFICATIONS

Accuracy	±0.05% ① , ±0.075%URL
Range	0.06bar~30bar, see the specifications for details
Long-term stability	±0.1% Span/5 years
Ambient temperature effects	At 60mbar, the total effect per 10°C is (0.1+0.05TD)% SPAN; For other ranges: total effect per 10°C :(0.075+0.0375TD)% SPAN
Voltage effects	When the power supply voltage changes within 10.5V/16.5V ② ~55V DC, its zero point and range change should not exceed ±0.005% SPAN/V
Mounting position effects	Less than 4mbar at any position, which can be corrected by PV(primary value)=0 reset
Vibration effects	< 0.1% SPAN as per GB/T18271.3/IEC61298-3
Output signal	4mA~20mA DC, HART
IP rating	IP67
Weight	About : 4kg (without mounting bracket and process connection accessories)
Note: ① The accuracy is dependent on the range. Please consult the engineer for details. ② 16.5V is the voltage required for adding a 250 Ω resistor to the HART carrier.	

ENVIRONMENTAL CONDITIONS

Items	Conditions
Operating temperature	Without LCD display: -40°C ~85°C ; with LCD display: -20°C ~70°C
Storage temperature	Without LCD display: -40°C ~100°C ; with LCD display: -40°C ~85°C
Medium temperature ①	Silicone oil filled: -40°C ~105°C
	Inert oil filled: -45°C ~160°C
Operating humidity	5%RH~100%RH@40°C
Note: ① This item is related to the type of silicone oil used and the O- ring used; the non-silicone oil temperature range is limited by the lowest material temperature range in the system.	

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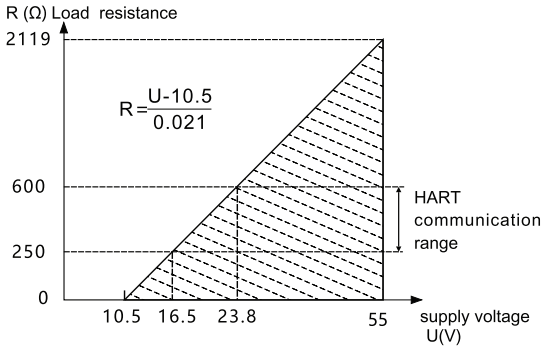
POWER SUPPLY AND LOAD REQUIREMENTS

Items	Conditions
Power supply voltage	HART communication protocol: 16.5V~55V DC ①
	Intrinsically safe HART communication protocol: 18.5V~28V DC
Load resistance	0Ω~2119Ω ② for operation mode; 250Ω~600Ω for HART communication
Transmission distance	<1000m
Power consumption	
4mA~20mA	≤500mW@24V DC, 20.8mA



Note: ① Non intrinsically safe power supply voltage can be selected as 10.5V. Please consult engineers for details.

② 2119Ω=(55V-10.5V)/21mA

EMC EFFECTS

SN	Test items	Basic Standards	Test Conditions	Performance Level
1	Radiated interference (case)	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 (ESD) immunity test	GB/T 17626.2/IEC61000-4-2	8kV(Contact), 8kV(Air)	A
4	Radiated, radio-frequency, electromagnetic field immunity test	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 test	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 is 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 (Note: This item is related to the sensor type and whether there is a diaphragm component.)
Turn-on time: ≤6s
Factory reset time: ≤31s

STATIC PRESSURE EFFECTS

Range	Effects
Range ≤ 0.1bar	δ≤±0.5%F.S./100bar
0.1bar < Range ≤ 0.4bar	δ≤±0.1%F.S./100bar
2.5bar≤ Range ≤ 10bar	δ≤±0.075%F.S./100bar
30bar ≤ Range ≤ 100bar	δ≤±0.15%F.S./100bar

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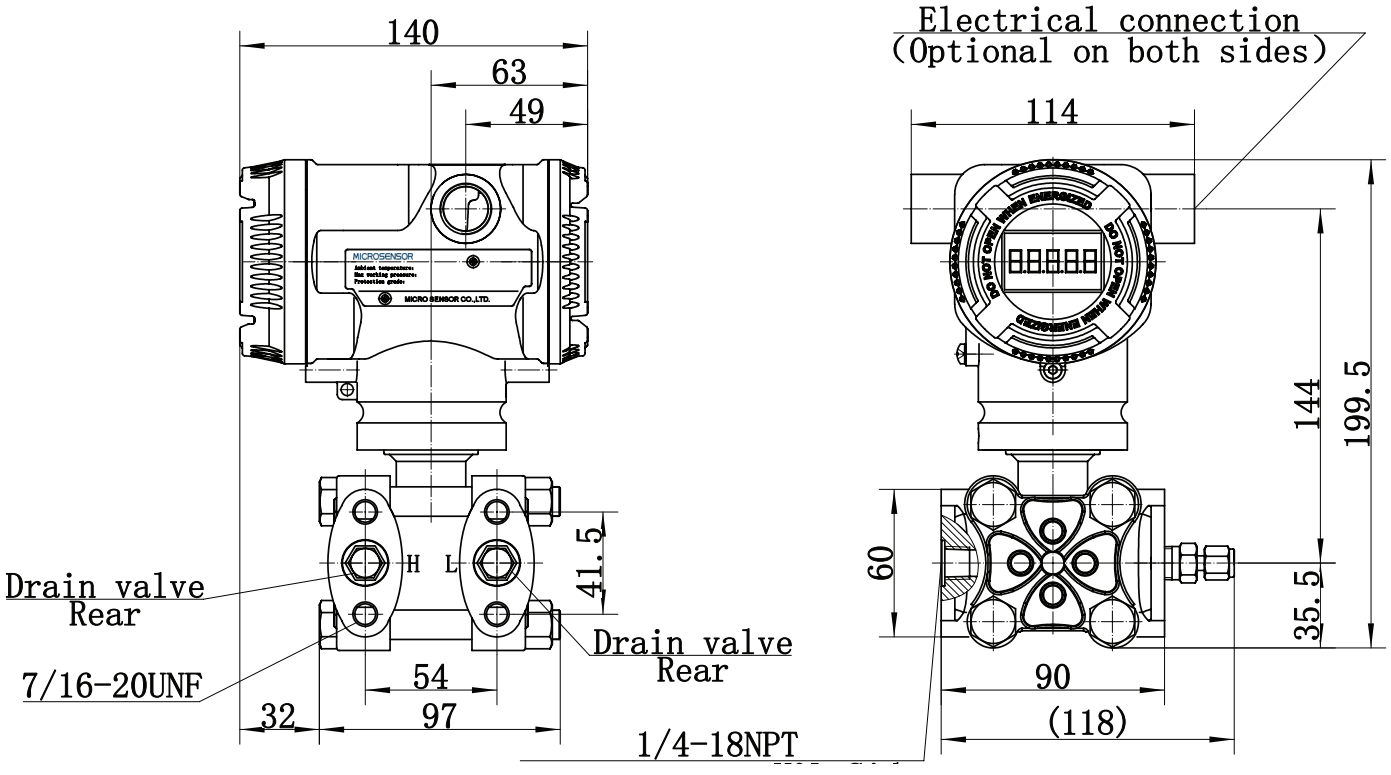
HAZARDOUS AREA

Hazardous area ①	PCEC	Ex db IIC T6 Gb Ex ia IIC T4 Ga
	NEPSI	Ex tb III C T85°C Db
	ATEX	Ex ia IIC T4 Ga II 2G Ex db IIC T6 Gb II 2D Ex tb IIIC T80°C Db
	IECEX	Ex ia IIC T4 Ga Ex db IIC T6 Gb Ex tb IIIC T80°C Db
	CSA	Class I, Division 1, Group A, B, C and D T6 Class II, Division 1 Group E, F and G T80°C Class III Ex db IIC T6 Gb Class I, Zone 1, AEx db IIC T6 Gb Ex tb IIIC T80°C Db Zone 21, AEx tb IIIC T80°C Db
Note: ① Please consult engineers for details.		

OUTLINE DIMENSIONS (UNIT:mm)

Note: The gland head is sent as an accessory with the product when it leaves the factory, and it is to be installed by the user.

MDM7000 Transmitter With Display (Same as Without Display)



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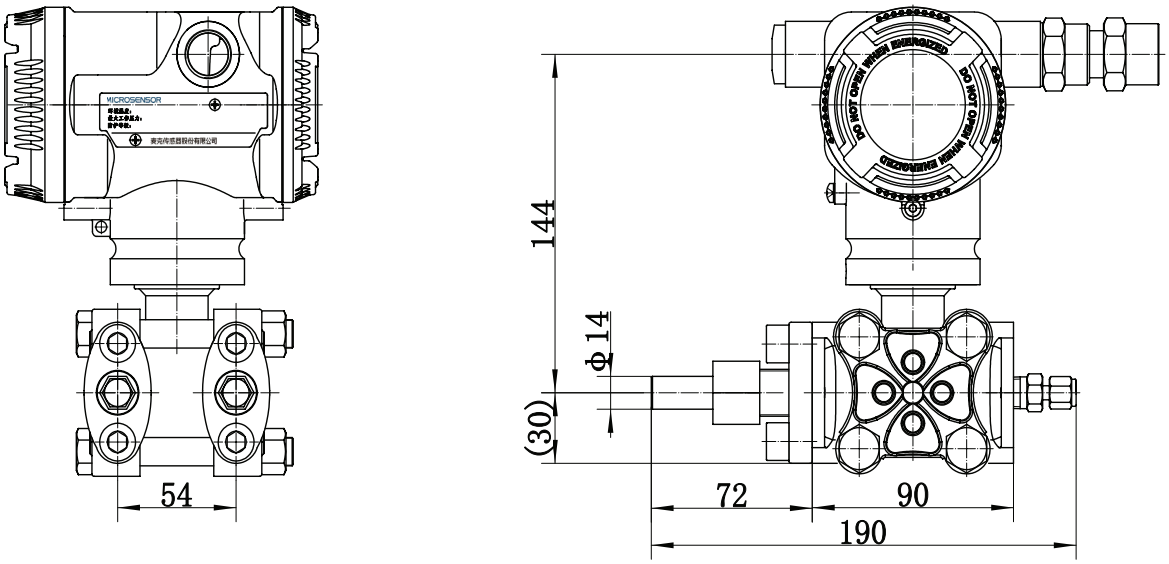
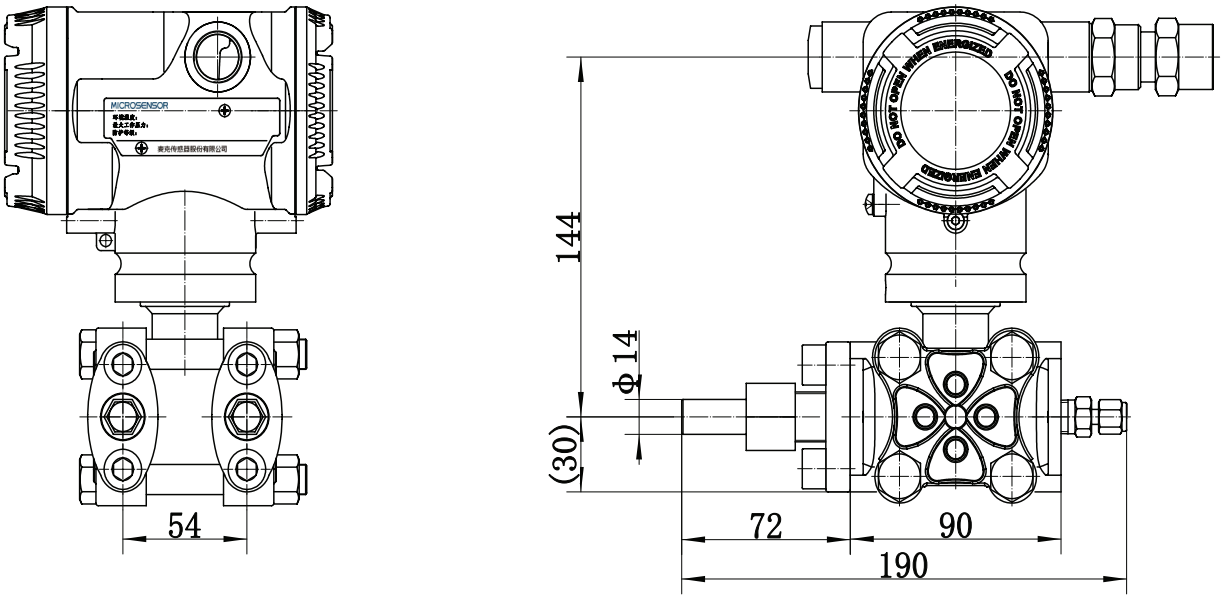
MDM7000 Transmitter with D1 Adapter



MDM7000 Transmitter with D2 Adapter



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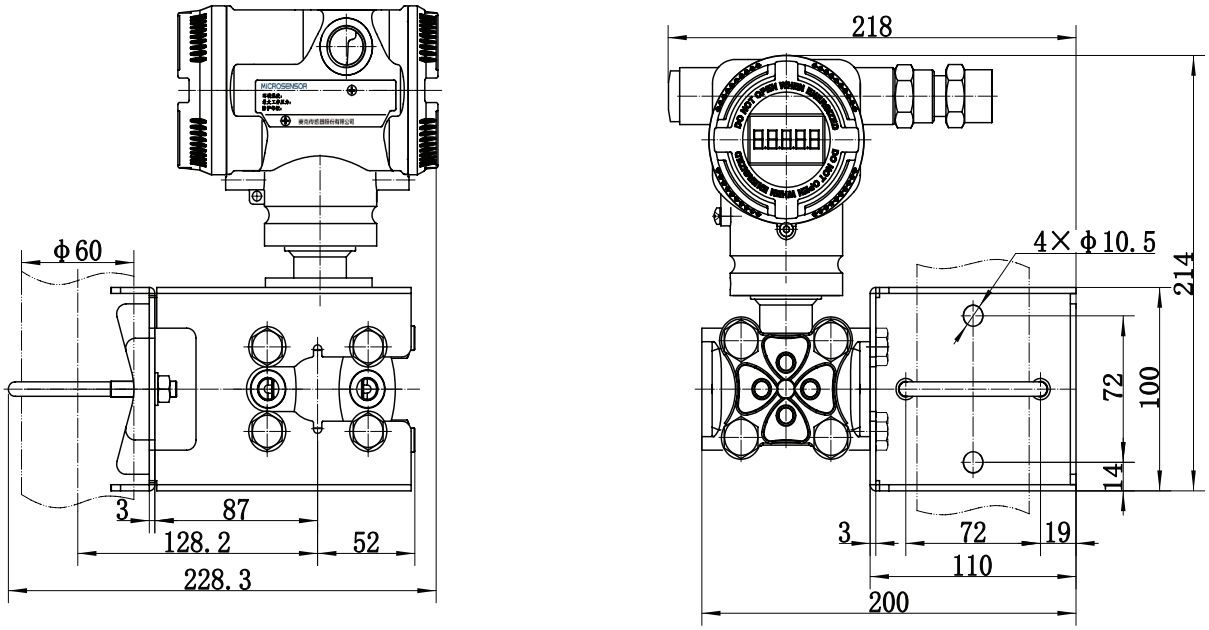
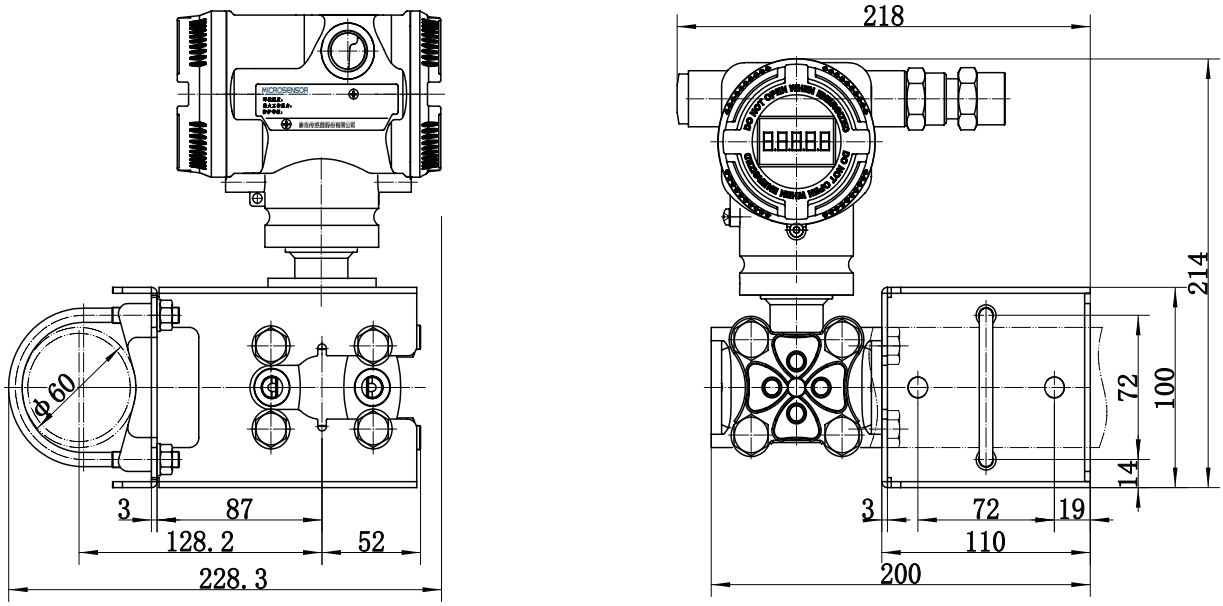
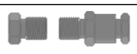
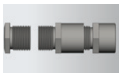
G1 Mounting Bracket Accessories - Vertical Installation



G1 Mounting Bracket Accessories - Vertical Installation



ORDER GUIDE

MDM7000-DP Smart Differential Pressure Transmitter						
Items	**Code**	**Description**				
MDM7000-DP	—	Smart Differential Pressure Transmitter				
	—					
Application of hazardous area						
	1	China, Flameproof certificate, No.CE23.6650 Ex db IIC T6 Gb, GB/T3836.1-2021, GB/T3836.2-2021				
	2	China, Intrinsically safe certificate, No.CE23.7688X Ex ia IIC T4 Ga, GB/T3836.1-2021, GB/T3836.4-2021				
	3	China, Dust explosion-proof certificate, GYB24.1215X Ex tb III C T85°C Db, GB/T3836.1-2021, GB/T 3836.31-2021				
	4	China, Flameproof certificate, Intrinsically safe certificate				
	A	CSA, Flameproof certificate				
	B	CSA, Intrinsically safe certificate				
	C	CSA, Flameproof certificate, Intrinsically safe certificate				
	E	ATEX, Flameproof certificate				
	F	ATEX, Intrinsically safe certificate				
	G	ATEX, Flameproof certificate, Intrinsically safe certificate				
	J	IECEx, Flameproof certificate				
	K	IECEx, Intrinsically safe certificate				
	L	IECEx, Flameproof certificate, Intrinsically safe certificate				
	0	Non-hazardous area				
	T	Other certificate				
Output signal	H	4mA~20mA DC, HART				
Case	S	Stainless steel case with two outlet ports (F) M20×1.5				
	U	Stainless steel case with two outlet ports (F) 1/2NPT				
	P	Aluminum alloy case with two outlet ports (F) M20×1.5				
	N	Aluminum alloy case with two outlet ports (F) 1/2NPT				
Note: Please pay attention to the item of lithium battery (Code: LD)						
Waterproof/explosion-proof connector						
		Specification	**Material**	**Applicable wire diameter**	**IP rating**	
	1	M20×1.5 waterproof connector, with plug	PVC	6mm~8mm	IP67	
	2	Non-flameproof adapter (F) M20×1.5, with plug	316 SS	6mm~8mm	IP67	
	3	Flameproof adapter (F) 1/2NPT, with plug	316 SS	6mm~8mm	IP67	
	4	Flameproof adapter (F) M20×1.5, with plug	316 SS	6mm~8mm	IP67	
	5	Flameproof adapter (F) G1/2, with plug	316 SS	6mm~8mm	IP67	
Note: Flameproof configuration is applicable to PCEC/ATEX/IECEx standards. Please contact the engineer if double sealing is required.						
Display	N	Without LCD display				
	L	Display module, -20°C ~70°C				
	—					

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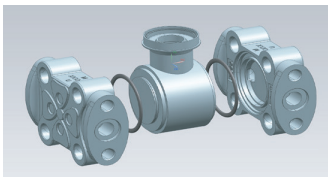
Range

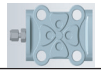
	Nominal range	Minimum range	Lower (LRL)	Upper (URL)	Static pressure range	One-sided high/low pressure overload
1	60mbar	2mbar	-60mbar	60mbar	420bar	250bar
2	0.4bar	4mbar	-0.4bar	0.4bar	420bar	250bar
3	2.5bar	25mbar	-2.5bar	2.5bar	420bar	250bar
4	10bar	0.1bar	-10bar	10bar	420bar	250bar
5	30bar	0.3bar	-30bar	30bar	420bar	250bar

Wetted parts material

	Diaphragm	Flange block	Discharge valve/ plug	Sealings
A	316L	316	316	FKM
B	316L	316	316	Glass-filled PTFE
C	HC-276	316	316	FKM
D	HC-276	316	316	Glass-filled PTFE



Process connection

	Specifications	Drain/vent valve position	Thread	Mounting method	
1	Female 1/4-18NPT	Rear end of flange	7/16-20UNF(F)	Horizontal	
2	Female 1/4-18NPT	Above the side of flange	7/16-20UNF(F)	Horizontal	
3	Female 1/4-18NPT	Under the side of flange	7/16-20UNF(F)	Horizontal	
4	Female 1/4-18NPT	Side drain/vent valve*	7/16-20UNF(F)	Vertical	

Note: The side drain/vent valve is not specified as left or right when it leaves the factory.

Fill oil	S	Silicone oil: -40°C ~105°C
	D	Inert oil: -45°C ~120°C
Flange block fastener	1	Bolts, nuts, and other components, alloy*, high static pressure applications
	6	Bolts, nuts, and other components, 316 SS

Note: Please consult the engineer for specific material details.

Flange block mounting	H	Horizontal mounting
	E	Vertical mounting
Factory calibration range	CAL	Provide Micro Sensor standard verification report based on the range, default linear output **Contract specifies:** LRL - URL, display unit*

Options		**Description (Detailed specifications as following, multiple options or null)**
Mounting bracket accessories	/G1	Bending Bracket, 316 SS 
Process connection accessories	/D1	T-shaped adapter(M) M20×1.5 and vent tube Φ14mm×2mm×30mm, 316 SS
	/D2	Waist-shaped adapter, 1/2-14NPT (F), 316 SS
Output signal mode	/SQ	Both the output signal and display are in “square root” format, with the LRL set to zero
Verification report	/Q1	Provide the Micro Sensor verification data according to user requirements **Contract specifies:** LRL - URL, display unit and other requirements*

Note: Standard format follows the Micro Sensor’s specifications. Select this option and provide the template if the customer specifies a format.

Damping time setting	/ST	Adjustable range 0s~100s, default 0s **Contract specifies:** Damping time*

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Fault alarm setting	/WH	High alarm current value, 20.8mA	
	/WL	Low alarm current value, 3.8mA, default	
	/WS	Other saturation current values, specified within the range of 3.6mA~3.8mA or 20mA~22mA **Contract specifies:** Fixed current value*	
Product certificate	/QE	Standard format follows the Micro Sensor's specifications. Select this option and provide the template if the customer specifies a format.	
Identification plate	/PT	Product is shipped with a identification plate **Contract specifies:** Identification number, not exceeding 16 characters*	
Integrated value manifold	/VT	Differential pressure transmitter is factory assembled with Micro Sensor valve manifold. See attachment for order guide of valve manifold. **Contract specifies:** Complete model of Micro Sensor valve manifold*	
Leakage test report	/QD1	Nitrogen (N2) or air, 160bar, pressure holding for 1 minute, provide Micro Sensor standard leakage test report	
	/QD2	Nitrogen (N2) or air, 250bar, pressure holding for 1 minute, provide Micro Sensor standard leakage test report	
HART configuration	/H5	HART5 configuration	
Diaphragm with gold plated	/J2	High and low pressure side diaphragm with gold plated (5μ)	
Oil-free treatment	/CL1	Degreasing and cleaning treatment of the wetted parts	
Note: Please check the fill oil. Determine whether the inert filling oil is required (code: D).			
Certificates	/CS1	CCS, China Classification Society, TJ23PTB00014	
	/CS2	DNV, Det Norske Veritas	
	/CS3	BV, Bureau Veritas	
	/CS4	ABS, American Bureau of Shipping	
	/CS5	LR, Lloyd's Register of Shipping	
	/CS6	KR, Korean Register of Shipping	
	/CS7	NK, Nippon Kaiji Kyokai	
	/CS8	RS, Russian Maritime Register of Shipping	
Note: Except for the CCS certificate, please consult the engineer for others.			
Lithium battery	/LD	General requirements for low copper and zinc in the lithium battery industry	
High-accuracy	/HAC	High-accuracy calibration according to the user's specified range **Contract specifies:** Range of use (within sensor's limit), LRL - URL, display unit, accuracy*	
Language	/LE	English nameplate, operation manual, product certificate, etc.	
Delivery service	/XM	Provide customer requested content according to project delivery standards	
Extended warranty period	/Y3	3-year warranty	
	/Y5	5-year warranty	
***Note: The specifications required for these options should be specified in the contract.**			
Example: MDM7000—DP—0HS1L—1A1S6H/G1—		**[CAL: 0-50mbar]**	