MADECO Differential Pressure Transmitter

Model:MDDP100

Product Overview



MDDP100 series of intelligent pressure transmitters adopt high-performance single-product silicon composite pressure sensing technology to measure the pressure/differential pressure, liquid level/level, density and flow information of various media (liquids, gases, mixed liquids, etc.). A variety of output modes are available, including standard 4~20mA analog current signals, HART communication protocols and other industrial bus protocols. Parameters can be set, monitored and tested through buttons, handheld operators or PC terminals at the application site, providing efficient and reliable measurement solutions for the automation control of industrial processes.

Applications

MDDP100 series products have passed multiple industry certifications with excellent performance, and have a variety of forms, functional modules and materials to choose from, which can cope with more complex working conditions. They are widely used in industrial fields such as oil and gas, chemical industry, lithium battery, electric power, papermaking, metallurgy, shipbuilding, food and pharmaceuticals.

Special Features

- Using single crystal silicon piezoresistive technology, the performance is stable and the accuracy can reach 0.05%FS;
- The maximum range ratio is 100:1, and the measurement range can be adjusted flexibly;
- The high-performance EMC protection circuit module is used to effectively reduce the impact of electromagnetic disturbance on the output of the product
- Strong stability can reach ±0.1%SPAN/5 years.
- Automatic temperature compensation
- Intrinsically safe and explosion proof
- Easy menu-guided commissioning via local display,
- 4 to 20mA with HART, PROFIBUS PA, FOUNDATION Fieldbus

Range

Norminal Range	Minimum range	Lower (LRL)	Upper (URL)	Line pressure range	One-sided high pressure overload	One-sided low pressure overload
10mbar	1mbar	-10mbar	10mbar	60bar	30bar	30bar
60mbar	2mbar	-60mbar	60mbar	100bar	100bar	100bar
400mbar	4mbar	-400mbar	400mbar	160bar	160bar	160bar
1bar	25mbar	-1bar	1bar	250bar	160bar	160bar
5bar	100mbar	-5bar	5bar	250bar	160bar	160bar
30bar	300mbar	-30bar	30bar	250bar	160bar	160bar
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.						

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=$\pm\sqrt{(E1)^2 + (E2)^2 + (E3)^2}$;
E1=Indoor temperature accuracy E2=Ambient temperature effects E3=Static pressure effects

Linear output accuracy	TD①≤ 5	0.075%	10mbar
			60mbar
		0.05%③、0.075%	40mbar,1bar,5bar,10bar,30bar
	TD>5	±（0.001+0.0148TD）%	60mbar
		±（0.0025+0.0095TD）%	40mbar,1bar,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 MADECO for details.

Specification

Accuracy	±0.05%①, ±0.075%URL
Range	10mbar~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 18.3V~44V 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 /IEC61298-3
Output signal	4mA~20mA DC，HART /Bluetooth
IP rating	IP67
Weight	About : 4kg (without mounting bracket and process connection accessories)
Over pressure limit	250 bar standard, 350bar, 420bar (option)
Transfer function	Linear, squar root
Response time	0.1 second
Diaphragm material	Stainless steel 316, Hastelloy, Monel, Tantalum(option)
Process connection	Stainless steel 316, Hastelloy, Monel, Tantalum(option)
Vent material	Stainless steel 316, Hastelloy, Monel, Tantalum(option)
Damping	0...60 sec adjustable
Pressure type	Differential, Gauge, Absolut
Intrinsically safe	II 1/2 Ex ia IIC T4/T5
Explosion-proof	II 1/2 Exia/d IIC T5/T6
Pressure port	1/2NPTF, 1/4NPTF or customize
Housing material	Aluminum, Stainless steel
shock	50g /11ms
Message	Self diagnosis message

Note: ① This accuracy is related to the range.For specific details,please consult the engineer
② A voltage of 16.5V is the voltage required when a 250Ω resistor is applied on the HART carrier

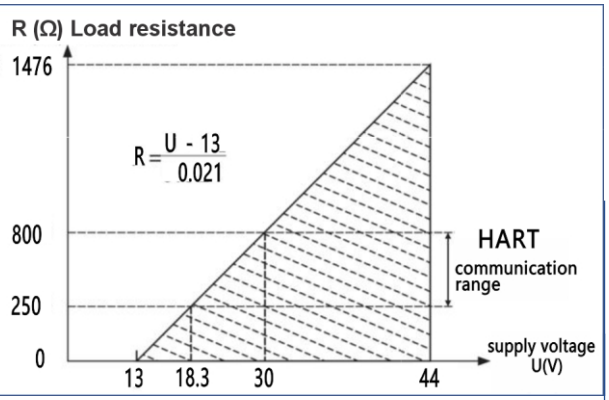
Environmental Conditions

Items	Conditions
Operating temperature	-40°C~85°C,L CDd isplay:- 20°C~70°C
Storage temperature	-40°C~100°C,L CDd isplay:- 40C~85°C
Measuringmedium temperaturer ange	Filledwithnormaltemperatures iliconeo il:- 40°C~105°C
	Inertfillingfluid:- 45°C~160°C
	Filledwithlowtemperatures iliconeo il:- 55°C~200°C
Operating humidity	5%RH~100%RH@40°C

Note:① This item is related to the type of silicone oil filled and the sealing ring used; the non-silicone oil temperature range is limited by the lowest material temperature range in the system.

Power Supply and Load Requirements

Items	Conditions
Power supply voltage	HART communication protocol: 18.3V~44V DC ①
	Intrinsically safe HART communication protocol: 18.3V~30V DC
Load resistance	0Ω~1476Ω ② for operation mode; 250Ω~800Ω 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 13V. Please consult engineers for details.
② 1476Ω=（44V-13V）/21mA

SN	Test items	Basic Standards	Test Conditions	Performance Level
1	Radiated interference (Casing)	CISPR 32	30MHz~1000MHz	Qualified
2	Conducted interference (DC power port)	CISPR 32	0.15MHz~30MHz	Qualified
3	Electrostatic discharge immunity test	IEC61000-4-2	8kV (Contact), 15kV (Air)	B
4	Immunity to radio frequency EM-fields	IEC61000-4-3	10V/m (80MHz~1GHz)	A
5	Power frequency magnetic field Immunity test	IEC61000-4-8	30A/m	B
6	Electrical fast transient / Burst Immunity test	IEC61000-4-4	4kV (5/50ns,100kHz)	B
7	Surge immunity requirements	IEC61000-4-5	2kV (line to line) 4kV (line to ground) (1.2/50μs)	B
8	Immunity to conducted disturbances induced by radio frequency fields	IEC61000-4-6	3V (150kHz~80MHz)	A

Note : At performance level A, the performance is normal within the limits of the technical specifications.
At performance level B, functions or performance are temporarily reduced or lost, but can be restored by themselves, and the actual operating conditions, storage and data remain unchanged.

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
Response time: ≤100ms

Static Pressure Effects

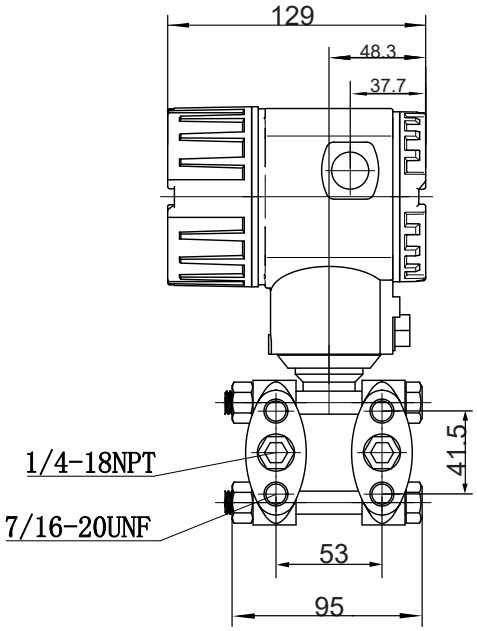
Range	Effects
Range ≤ 0.1bar	δ≤±0.5%F.S./100bar
0.1bar ＜ Range ≤ 0.4bar	δ≤±0.1%F.S./100bar
2.5bar≤ Range ≤ 10bar	δ≤±0.075%F.S./100bar
30bar ≤ Range ≤ 100bar	δ≤±0.15%F.S./100bar

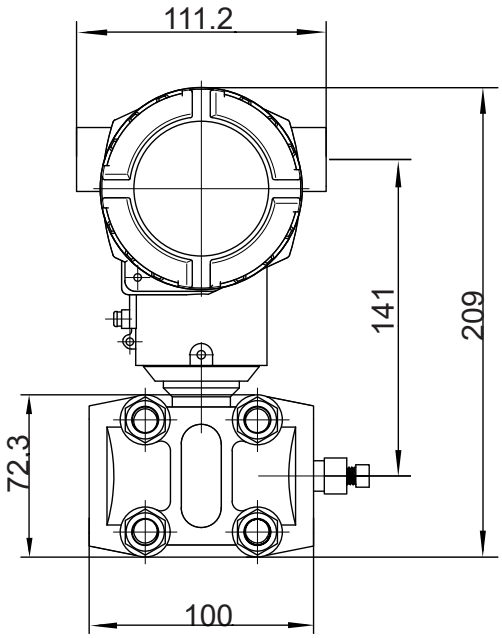
Dimensions

Note: The cable gland is sent as an accessory when the product leaves the factory and must be installed by the user

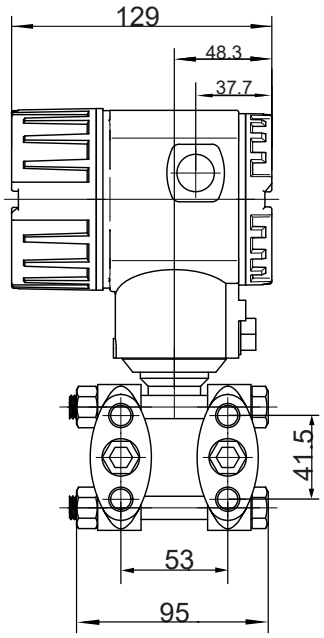
Dimensions of the whole machine with display

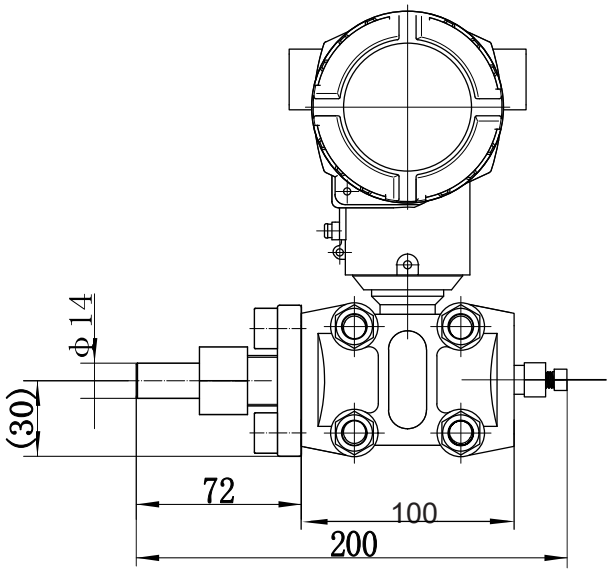
Unit: mm



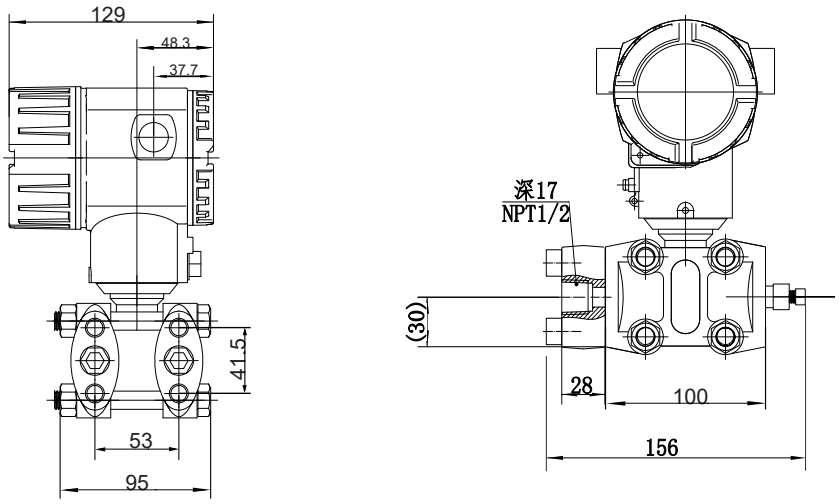


Process adapter D1 Dimensional drawing (code: D1)

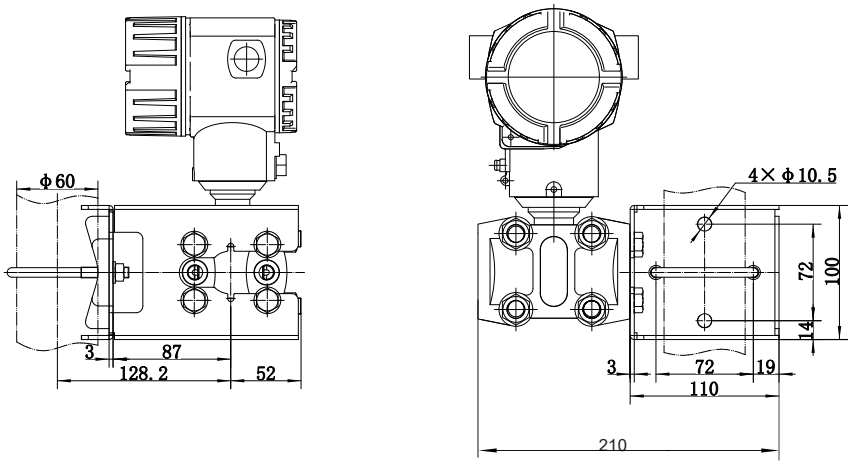




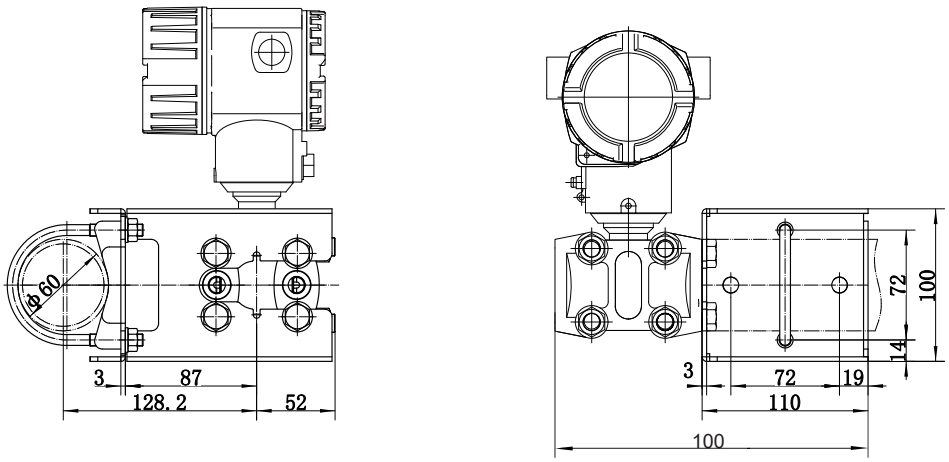
Process adapter D2 dimensional drawing (code: D2)



Mounting bracket (code: G1) Dimensions - Vertical installation



Mounting bracket (code: G2) Dimensions - Horizontal installation

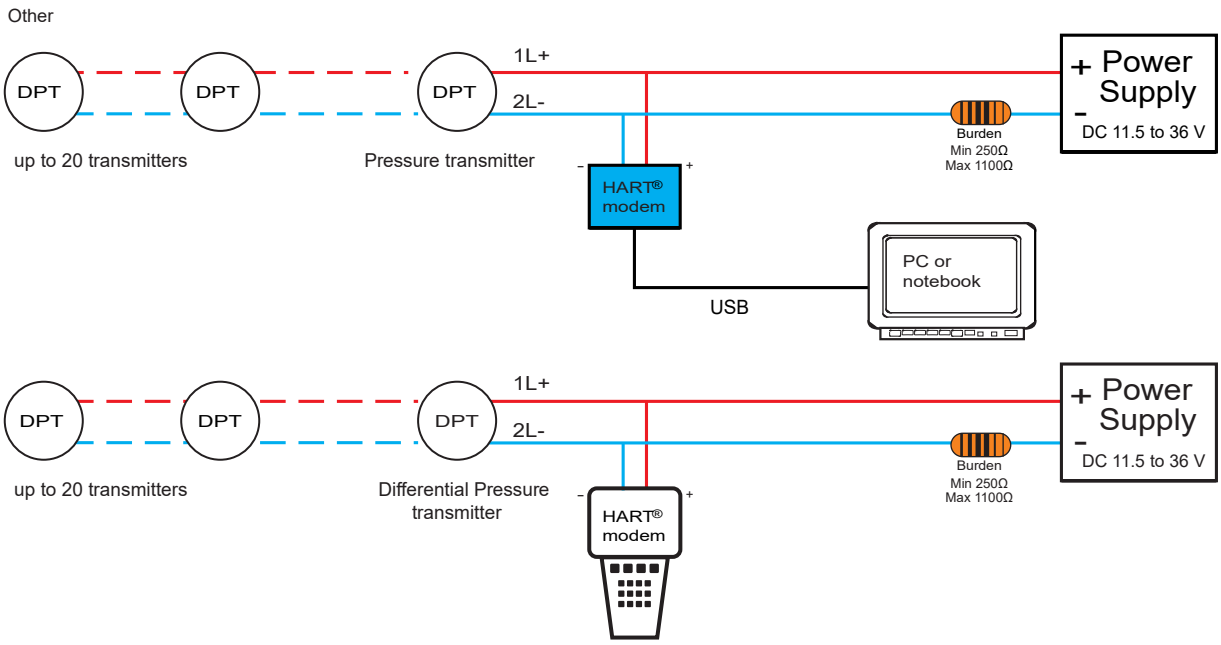


MDDP100 Differential Pressure Transmitter

ORDERING CODE	Example: MDDP100	D	4	4	A	2	M	S	I	P	AT
Measurement Type											
D - Differential		D									
A - Absolute											
G - Gauge											
Process Connection Size											
4 - 1/2 NPTF			4								
6 - 1/4 NPTF											
8 - 1/2 BSPM											
C - Customer											
Pressure Range											
2 - (-10...10 mbar)											
4 - (-60...60 mbar)				4							
6 - (-400...400 mbar)											
8 - (-1...1bar)											
10 - (-5...5 bar)											
12 - (-30...30 bar)											
C - Customer											
Housing material											
A - Aluminum					A						
S - Stainless Steel											
C - Customer											
Conduit Entry Size											
2 - 1/2NPT						2					
4 - M20*1.5											
C - Customer											
Isolating Diaphragm											
S - 316L Stainless steel											
M - Monel® 400							M				
H - Hastelloy											
T - Tantalum											
G - Gold plated											
C - Customer											
Process Connection Material											
S - 316L Stainless steel								S			
M - Monel® 400											
H - Hastelloy											
T - Tantalum											
G - Gold plated											
C - Customer											
Sensor Fill Fluid											
S - Silicone fill &FPM viton gasket											
I - Inert Oxygen services- Fluorolube &NBR v									I		
Oring											
P - Glass filled PTFE										P	
G - Graphite-filled PTFE											
Accuracy											
AT - 0.075% (std.)											AT
AC - 0.04%											

MDDP100 Differential Pressure Transmitter

ORDERING CODE	Example: MDDP100	H	N	2	N	WC	S	AS	Note
Transmitter Output									
H - 4...20mA signal based on HART®protocol		H							
F - Foundation™fieldbus protocol									
P - PROFIBUS®PA Protocol									
L - Low power 1...5 VDC									
W - Wireless									
C - Customer									
Certificate									
N - None			N						
I - Intrinsically safe (II 1/2 Ex ia IIC T4/T5)									
E - Explosion proof (II 1/2 Exia/d IIC T5/T6)									
M - Marine certificate-DNV									
Remote Seals									
2 - Not required				2					
4 - One side Assemble to MADECO MDD1 capillary and Diaphragm seals									
6 - Two side Assemble to MADECO MDD1 capillary and Diaphragm seals									
Display									
N - None					N				
D - LCD display									
Bracket type									
G1 - Vertical installation						G1			
G2 - Horizontal installation									
Bolt Material									
S - Austenitic 316 SS bolt							S		
C -ASTM A193 Grade B7M bolt									
A - Alloy k-500 bolts									
Options									
AS - Assemble 3way manifold								AS	
AM - Assemble 3way manifold									
CC - Calibration certificate									
CM - Material Traceability certification									
CP - Hydrostatic testing with certificate									
CL - Cleaning for special service									
BT - Bluetooth configurable mobile APP and maintenance									
HM - MADECO HART modem calibrator									
CR - special calibrated range (please specify the range)									
AN - Analog zero and span trim									
NC - NACE MR i75									
NH - Stainless steel tag wired to case									
AT - ATEX									
EC - ECM certificate									
W3 - 3 year warranty									
W5 - 5 year warranty									
Other									


Other
DPT
DPT
DPT
1L+
2L-
up to 20 transmitters
Pressure transmitter
HART®
modem
Burden
Min 250Ω
Max 1100Ω
+ Power
Supply
-
DC 11.5 to 36 V
PC or
notebook
USB
DPT
DPT
DPT
1L+
2L-
up to 20 transmitters
Differential Pressure
transmitter
HART®
modem
Burden
Min 250Ω
Max 1100Ω
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Supply
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DC 11.5 to 36 V



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