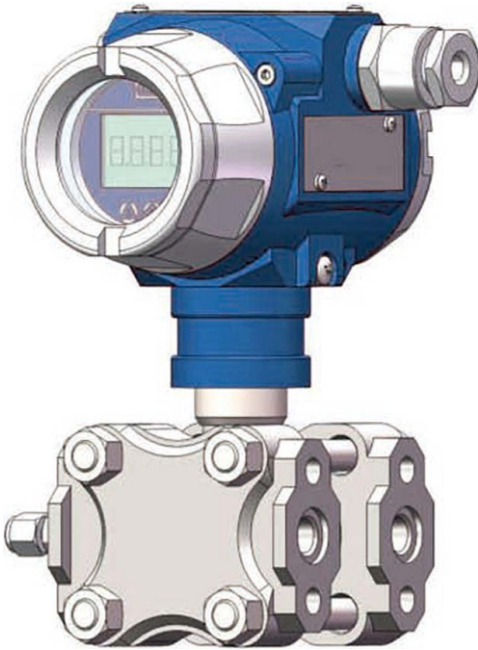


## Description



SPD905X is a high-performance digital pressure transmitter using MEMS (Micro-Electro-Mechanical System) monosilicon technology worldwide to meet rigorous and demanding industrial applications with optimum accuracy, linearity and repeatability.

The monosilicon sensor element is mounted within a capsule and measures the transfer of pressure through the insulated diaphragm and filling fluid. The complete insulation of the encapsulation prevents the sensor from being affected by changes in ambient temperature, electrical interference and mechanical vibration.

All this technology enables the SPD905X to easily handle extreme chemical and mechanical situations with strong resistance to electromagnetic interference (EMI) sufficient to respond to the most demanding environments and industrial applications.

Through the display and electronic module (via 3 buttons) or via HART communication protocol, the transmitter can be configured in the field or remotely for a new measuring range, definition of a new unit of measurement, type of alarms and type of analog output.

The LCD display shows the adjustment parameters and the process variable. The display can be rotated allowing installation in any position.

The robust housing has a viewing window for the LCD display and external push buttons which makes it easy to set parameters safely when applied in a classified area.

Both the housing and the electronic module have certifications to work in classified areas:  
 - Flameproof (Exd IIC T6)  
 - Intrinsically safe (Exia IIC T4)

## Main parameters

Pressure types	Differential pressure
Measuring range	200Pa - 10MPa, Please refer to the ordering information chapter
Output signal	4-20mA, 4-20mA+HART, customer
Reference accuracy	0.075% URL, optional 0.05% URL

## Measuring medium

Liquid, gas, or steam flow as well as liquid level, density and pressure

## Field of application

Pressure, level, differential pressure, density, interface, flow

## Approvals



## Technical specifications

## Measuring range and limit

Nominal value	Smallest calibratable span	Lower range limit (LRL)	Upper range limit (URL)	Static pressure limit	High pressure side overload limit	Low pressure side overload limit
6kPa	200Pa	-6kPa	6kPa	25MPa	25MPa	16MPa
40kPa	400Pa	-40kPa	40kPa	40MPa	25MPa	16MPa
250kPa	2.5kPa	-250kPa	250kPa	40MPa	25MPa	16MPa
1MPa	10kPa	-500kPa	1MPa	40MPa	25MPa	16MPa
3MPa	30kPa	-500kPa	3MPa	40MPa	25MPa	16MPa
10MPa	100kPa	-500kPa	10MPa	40MPa	25MPa	16MPa

Adjust requirements: lower range value (LRV) and upper range value (URV) can be adjusted within the scope of the upper and lower range limit, when  $|URV| \geq |LRV|$ , needs  $|URV| \geq$  smallest calibratable span  
 when  $|URV| \leq |LRV|$ , needs  $|LRV| \geq$  smallest calibratable span

## Standard specifications and reference conditions

Test standard: GB/T28474 / IEC60770; zero based-calibration span, linear output, silicone oil filling, 316L stainless steel isolation diaphragm.

## Performance specifications

The overall performance including but not limited to **【Reference accuracy】**, **【Environment temperature effects】**, **【Static pressure effects】** and other comprehensive error

Typical accuracy: 0.075% URL

Stability:  $\pm 0.2\%$  URL/60 months

## Reference accuracy

Including linearity, hysteresis and repeatability. calibration temperature:  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$

Linear output accuracy	$TD \leq 10$ (note 1)	$\pm 0.075\%$	Nominal value 6kPa, 40kPa 250kPa, 1MPa 3MPa, 10MPa
	$10 < TD \leq 100$	$\pm 0.0075TD\%$ URL	

Square root output accuracy is 1.5 times linear output accuracy

Note 1: TD is Turn down,  
 when  $|URV| \geq |LRV|$ ,  $TD = URL / |URV|$   
 when  $|URV| \leq |LRV|$ ,  $TD = URL / |LRV|$

## Ambient temperature effects

Within the range  $-20-80^{\circ}$  total impact  $\pm(0.1+0.1TD)\%$  URL

## Static pressure effects

Effect on zero  $\pm 0.15TD\%$  URL/10MPa

Effect on full scale  $\pm 0.2\%$  URL/10MPa

## Mounting position effects

Install error less than 400Pa, which can be corrected by PV=0 reset.

## Vibration effects

According to IEC61298-3,  $< 0.1\%$  URL

## Output signal

Two wire 4-20 mA output with digital communications, linear or square root output programmable, HART protocol is superimposed on the 4-20mA signal.

## Technical specifications

## Damping time

Total damping time constant: equal to the sum of damping time of amplifier and sensor capsule
Damping time of amplifier : 0-100S adjustable
Damping time of sensor capsule (isolation sensor diaphragm and silicon filling oil) $\leq 0.2S$
Startup after power off: $\leq 6S$
Normal services after data recovery: $\leq 31S$

## Weight

Net weight: about 4 kg ( without mounting bracket and process connection adaptor )

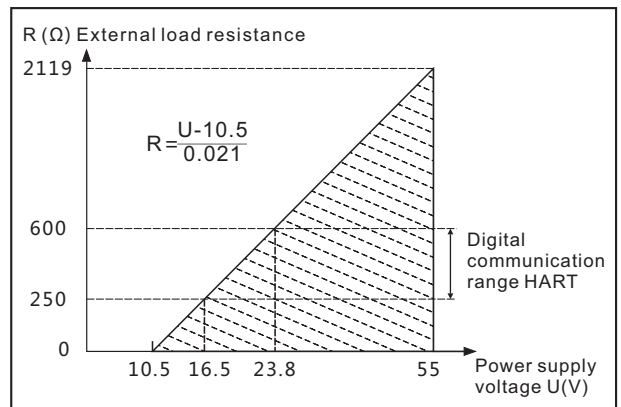
## Environment condition

Items	Operational condition
Working temperature	-40-85°C, LCD display unit: -20-70°C
Storage temperature	-40-110°C, LCD display unit: -40-85°C
Media temperature	With silicone oil -40-120°C
	With fluorocarbon oil -10-80°C
Working humidity	5-100%RH@40°C
Proction class	IP67

## Power supply

Item	Operating conditions
Standard/flame proof	10.5-55VDC
HART protocol	16.5-55VDC, communication load resistance 250Ω
Load resistance	0-2119Ω for operation, 250-600Ω for HART protocol
Transmission distance	<1000 meters
Power consumption	$\leq 500mW@24VDC, 20.8mA$

## Power supply and load requirements



## EMC environment

NO.	Test items	Basic standards	Test conditions	Performance level
1	Radiated interference	GB/T 9254/CISPR22	30MHz-1000MHz	OK
2	Conducted interference (DC power port)	GB/T 9254/CISPR22	0.15MHz-30MHz	OK
3	Electrostatic discharge immunity test (ESD)	GB/T 17626.2/IEC61000-4-	4kV(Contact), 8kV(Air)	B(Note2)
4	Immunity to radio frequency EM-fields	GB/T 17626.3/IEC61000-4-	10V/m(80MHz-1GHz)	A(Note1)
5	Power frequency magnetic field Immunity test	GB/T 17626.8/IEC61000-4-8	30A/m	A(Note1)
6	Electrical fast transient / Burst Immunity Test	GB/T 17626.4/IEC61000-4-4	2kV(5/50ns, 100kHz)	B(Note2)
7	Surge immunity requirements	GB/T 17626.5/IEC61000-4-5	1kV(Line to line) 2kV(Line to ground) (1.2us/50us)	B(Note2)
8	Immunity to conducted disturbances induced by radio frequency fields	GB/T 17626.6/IEC61000-4-6	3V(150kHz-80MHz)	A(Note1)

(Note 1) Performance level A: The performance within the limits of normal technical specifications.

(Note 2) Performance level B: Temporary reduction or loss of functionality or performance, it can restore itself. The actual operating conditions, storage and data will not be changed.

## Menu function

## Specific menu

## Transmission module type

Output signal	Local control	Remote control
4-20mA+HART	LCD/3 buttons on body	HART
4-20mA	LCD/3 buttons on body	-

## LCD display unit

Display mode	Details
PV	Process variable shows on main screen, percentage and progress bar shows on secondary screen
mA	Current shows on main screen, percentage and progress bar shows on secondary screen
%	Percentage shows on main screen, percentage and progress bar shows on secondary screen

## Unit

Unit	Definition
kPa	Kilopascal
MPa	Megapascals
bar	Bar
psi	Pounds per square inch
mmHg	Millimetre(s) of mercury@0°C
mmH2O	Millimeter of water@4°C
mH2O	Meter of water@4°C
inH2O	Inches of water@4°C
ftH2O	Feet of water@4°C
inHg	Inches of mercury@0°C
mHg	Meter mercury column@0°C
TORR	Torr
mbar	Millibar
g/cm2	Gram per square centimeter
kg/cm2	Kilogram per square centimeter
Pa	PA
ATM	Standard atmospheric pressure
mm	Millimeter(Note1)
m	Meter(Note1)

Note1: length unit need mark medium density

## Measuring menu set

Mark	State
URV	Upper range value
LRV	Lower range value

## Damping time

Units	Setting range
S	0-100

## Analog output type

Parameters	Output type
mA LINER	Linearity
mA $\sqrt{\quad}$	Square root

## Alarm signal

Parameters	Alarm signal
ALARM NO	None
ALARM H	20.8mA
ALARM L	3.8mA

## Fix output

Parameters	Fix output value
FIX/C NO	None
3.8000	3.8000mA
4.0000	4.0000mA
8.0000	8.0000mA
12.000	12.000mA
16.000	16.000mA
20.000	20.000mA
20.800	20.800mA

## Quick menu

Parameter	Instruction
PV=0	Set current output to zero value, used to correct the error caused by static pressure and installation.
Zero adjustment	4mA re-range with pressure
Span adjustment	20mA re-range with pressure
Restore factory setting	Restore backup data when error

## Product selection instruction

## Sensor select instruction

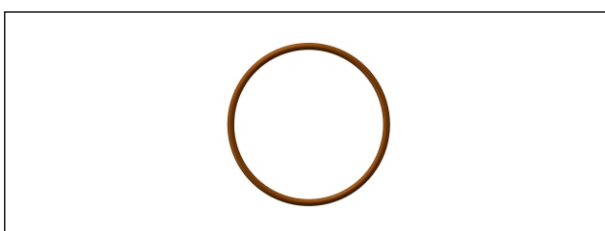
Code	Nominal value	Description
S602D	6kPa	Range -6...6kPa, smallest calibratable span 200Pa
S403D	40kPa	Range -40...40kPa, smallest calibratable span 400Pa
S254D	250kPa	Range -250...250kPa, smallest calibratable span 2.5kPa
S105D	1MPa	Range -0.1...1MPa, smallest calibratable span 10kPa
S305D	3MPa	Range -0.5...3MPa, smallest calibratable span 30kPa
S106D	10MPa	Range -0.5...10MPa, smallest calibratable span 100kPa

Code	Parts	Description
S	Diaphragm material	SS 316L
H		Hastelloy C
S	Filled fluid	Sillicon Oil, process temperature: -45-205°C
F		Neobee M-20, process temperature: -10-180°C
S	Sensor seal	O-ring, FKM

## Diaphragm(S/H)



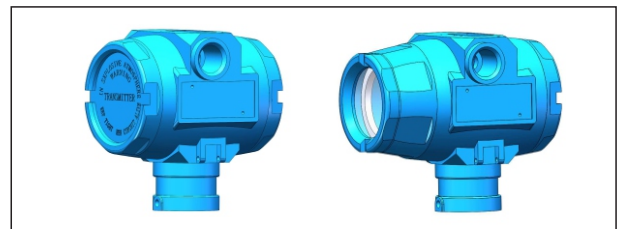
## Seal(S)



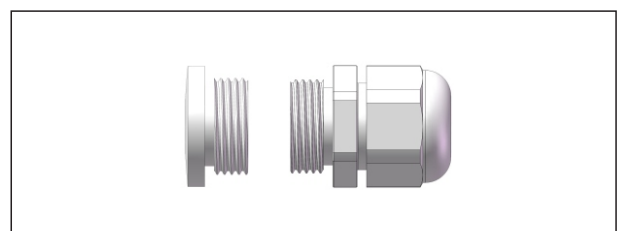
## Electrical connection select instruction

Code	Item	Description
T1	Electrical connection	Aluminum-alloy terminal, 2 cable entry M20*1.5(F)
R1	Cable entry protector	Waterproof connector M20X1.5 one side, blind plug another side, PVC material, 6-8mm diameter cable only, IP67
R2		Flame proof, 1/2 NPT(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67
R3		Flame proof, M20X1.5(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67

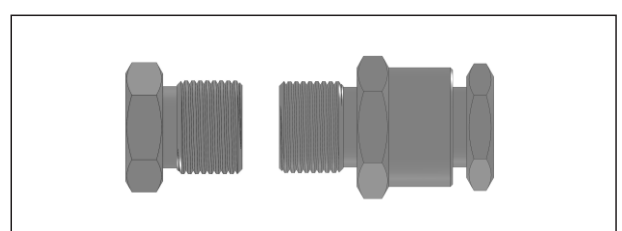
## Housing (T1)



## Standard cable entry protective adaptor(R1)



## Flame proof cable entry protective adaptor(R2/R3)



## Product selection instruction

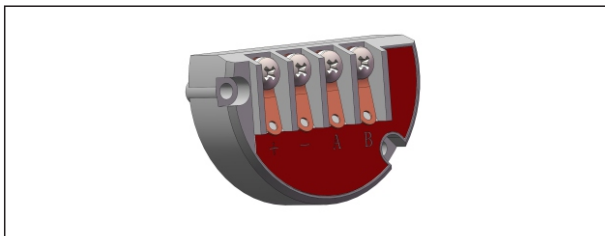
## Transmission module

Code	Items	Description
F	Output signal	4-20mA two wire, power supply: 10.5-55VDC
H		4-20mA+HART two wire, power supply: 16.5-55VDC
A	Display	Without display
C		With LCD display

## Display module(C)



## Terminals(N1)



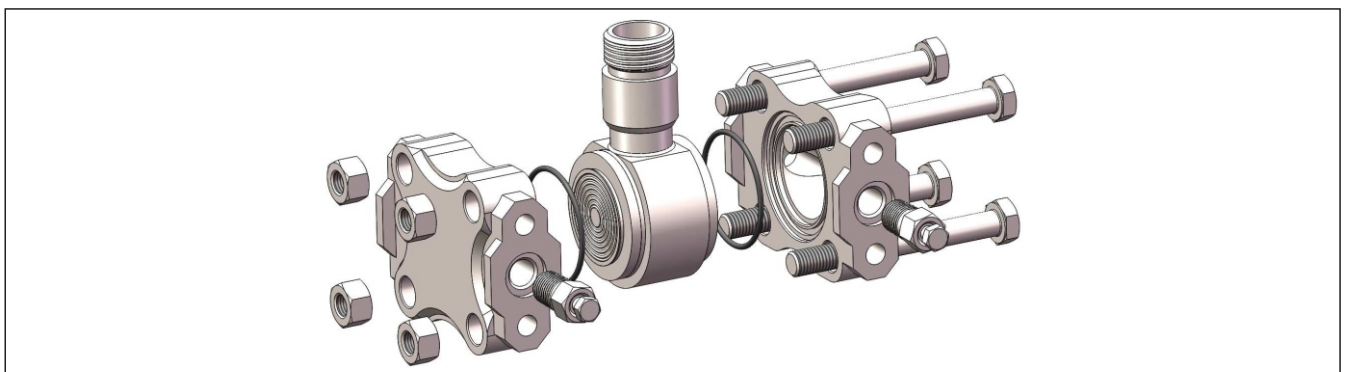
## Process connection selection

Code	Item	Description
H1	Flange/ Drain Valve	H structure, double flanges, process connection 1/4-18NPT(F), drain valve on the rear end of flange, material SS 316
H2		H structure, double flanges, process connection 1/4-18NPT(F), drain valve on the up part of flange, material SS 316
H3		H structure, double flanges, process connection 1/4-18NPT(F), drain valve on the down part of flange, material SS 316

## Flange

H1	
H2	
H3	

## Wetted parts

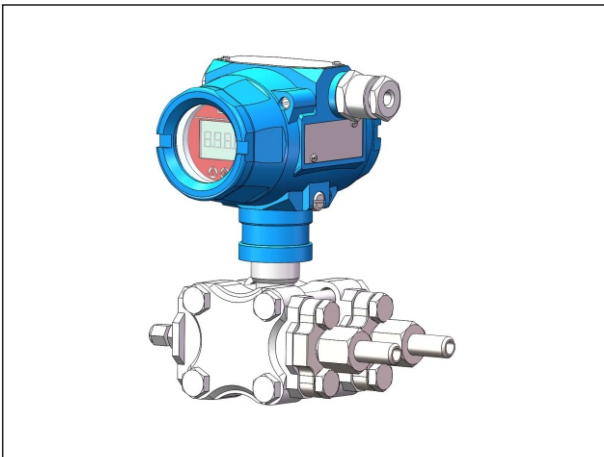


## Product selection instruction

## Process connection adaptor

Code	Item	Description
A1	Process connection adaptor	Adaptor, M20*1.5 (M) with pressure-guided pipe $\Phi 14*2*30$ , SS304, apply to H-structure
A2		Adaptor, 1/2-14NPT(F), SS 304, apply to H-structure

## Adaptor, M20\*1.5 (M) with pressure-guided pipe(A1)



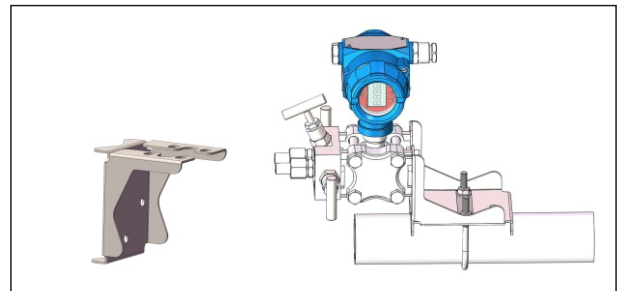
## Adaptor, 1/2-14NPT(F) (A2)



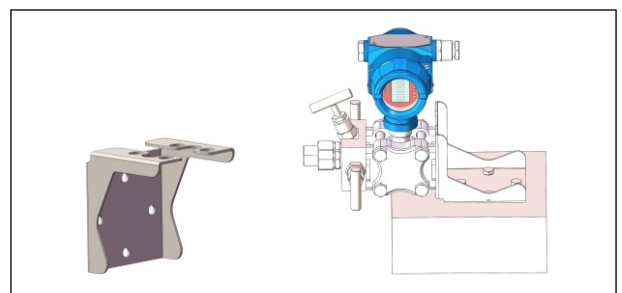
## Brackets

Code	Items	Details
B1	Fixed mounting	Pipe mounting bend bracket, 2" pipe, carbon steel, apply to H-structure
B2		Plate mounting bent bracket, carbon steel, apply to H-structure
B3		Pipe mounting flat bracket, 2" pipe, carbon steel, apply to H-structure

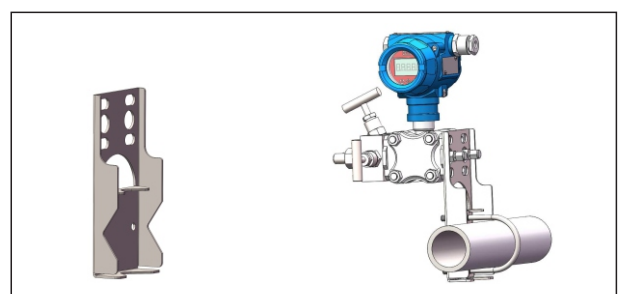
## Pipe mounting bend bracket(B1)



## Plate mounting bent bracket(B2)

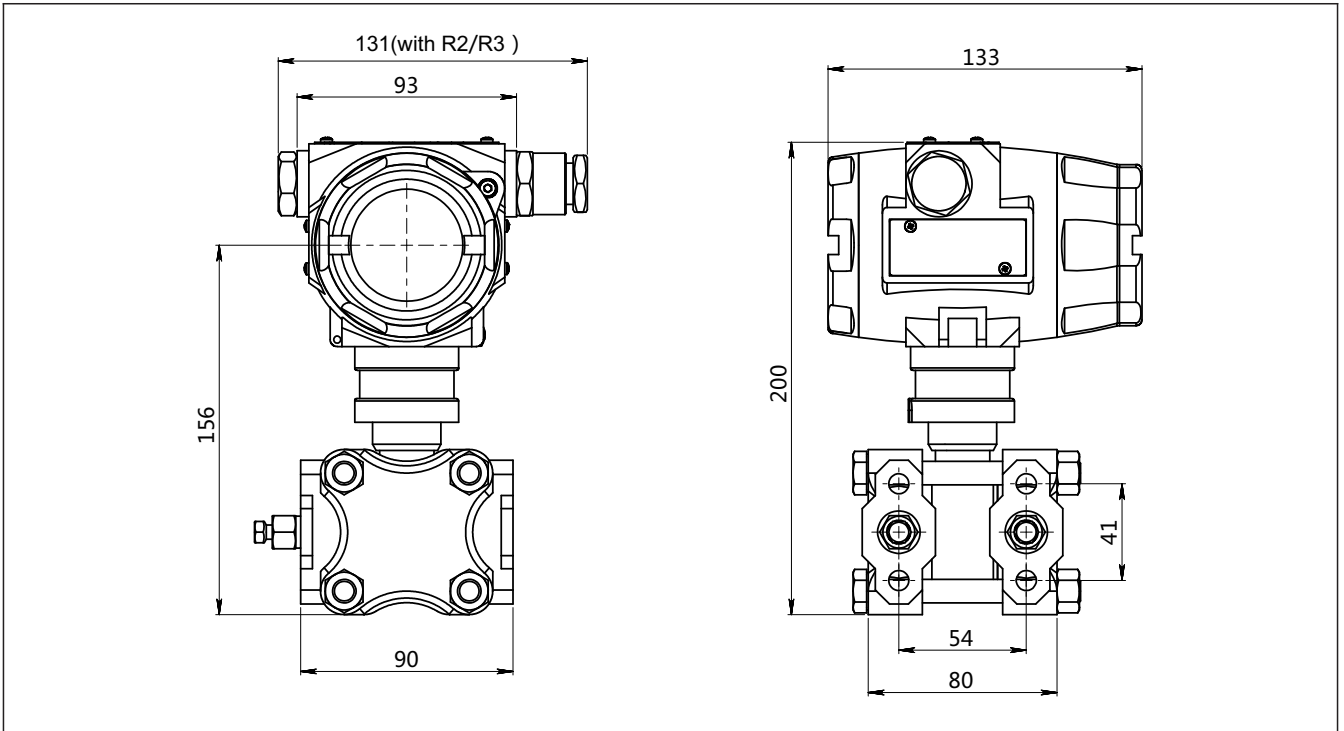


## Pipe mounting flat bracket(B3)

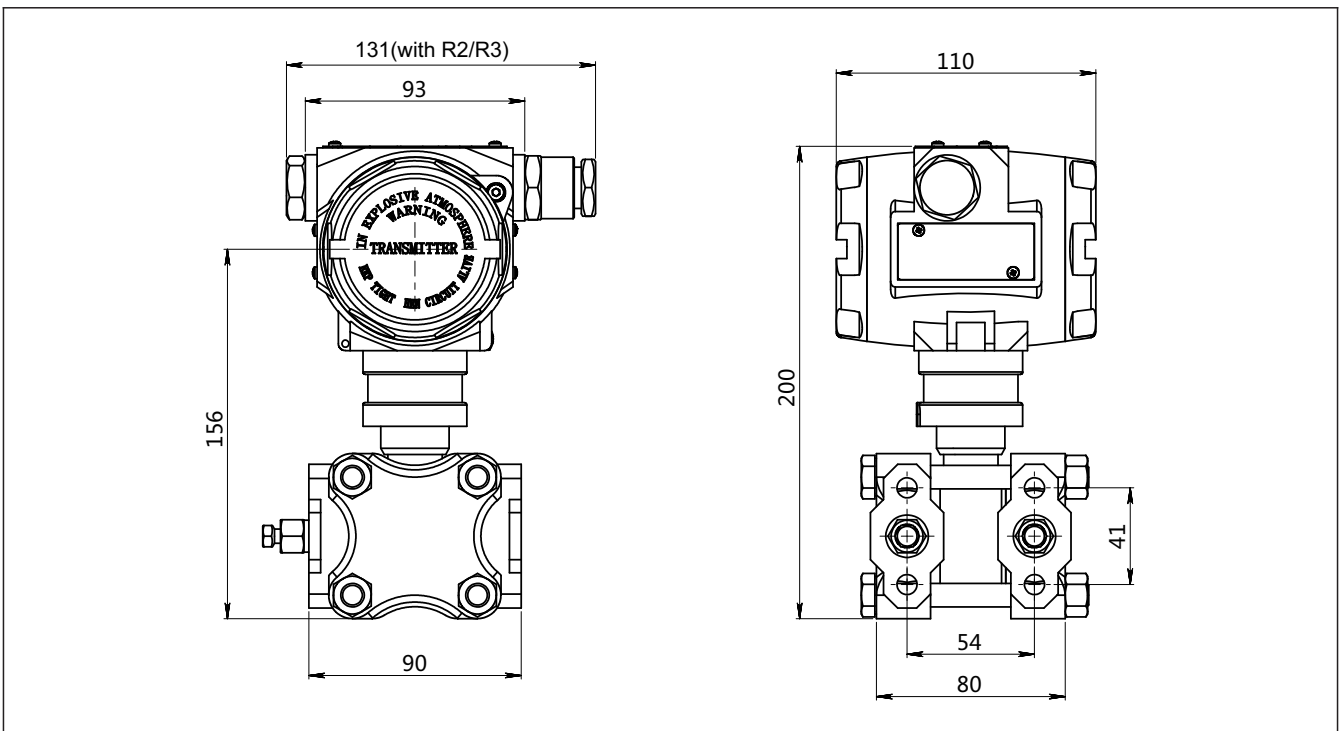


Product drawing and dimension

Drawing and dimension with display(C)(unit:mm)



Drawing and dimension without display(A)(unit: mm)

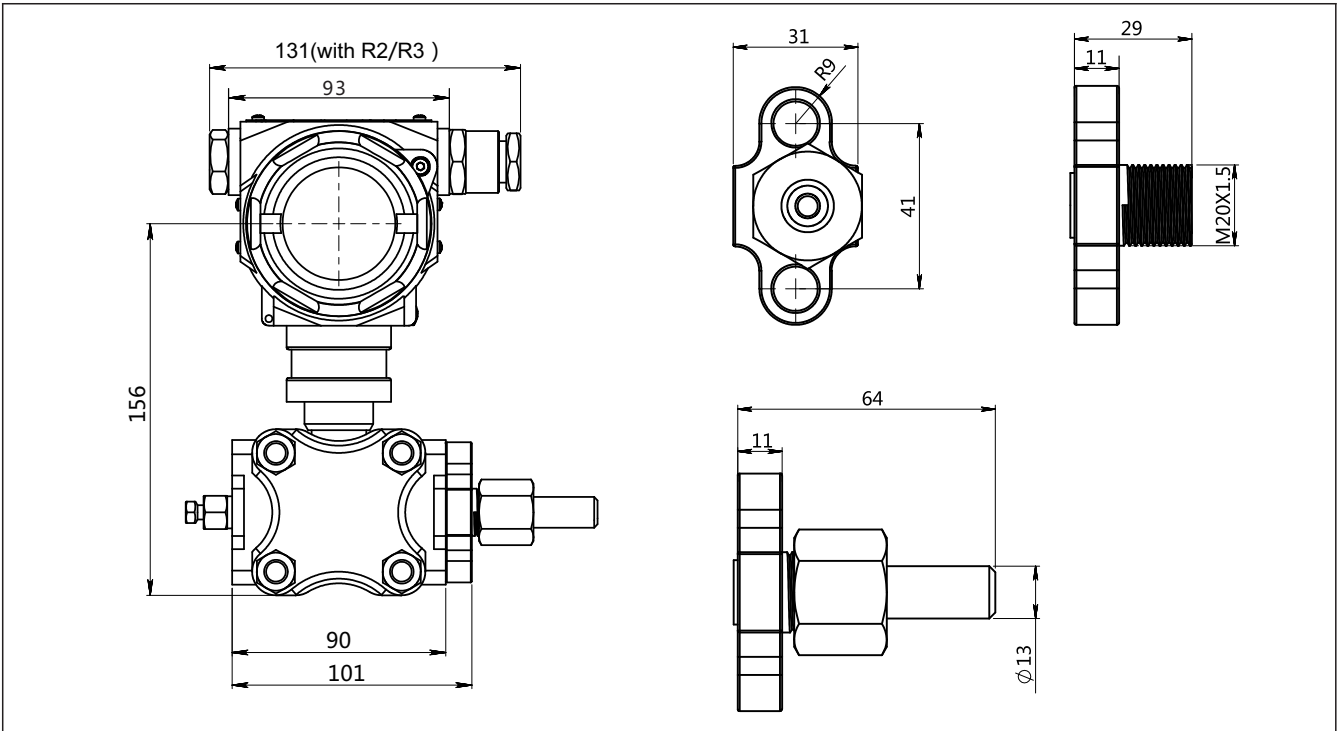


Disclaimer: all the data used in the product description is not legally binding. Relevant technical details may be changed due to further improvement

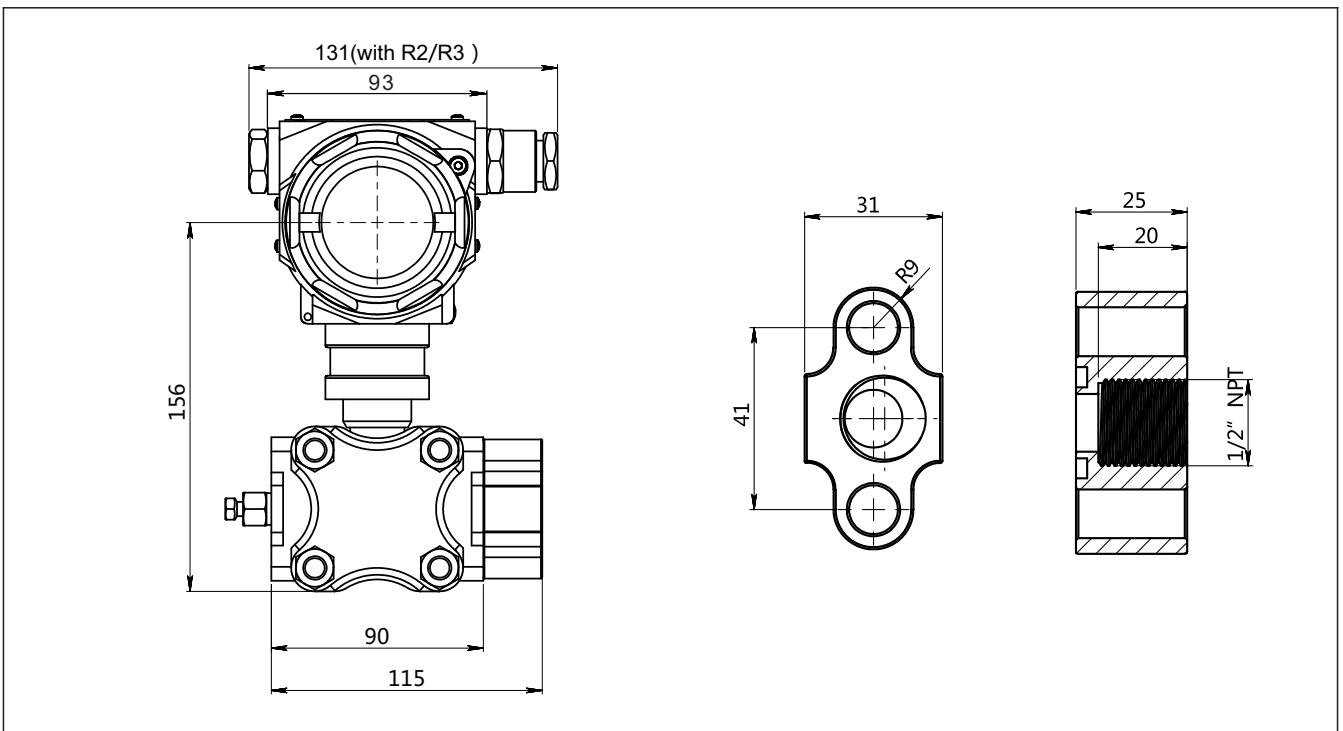


Product drawing and dimension

Adaptor(A1) drawing and dimension(unit:mm)



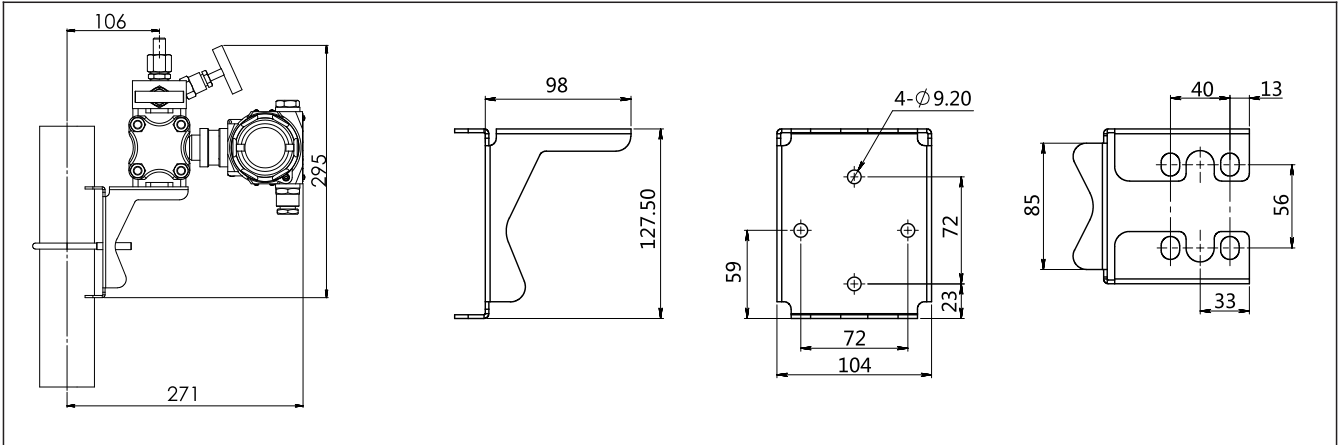
Adaptor(A2) drawing and dimension(unit:mm)



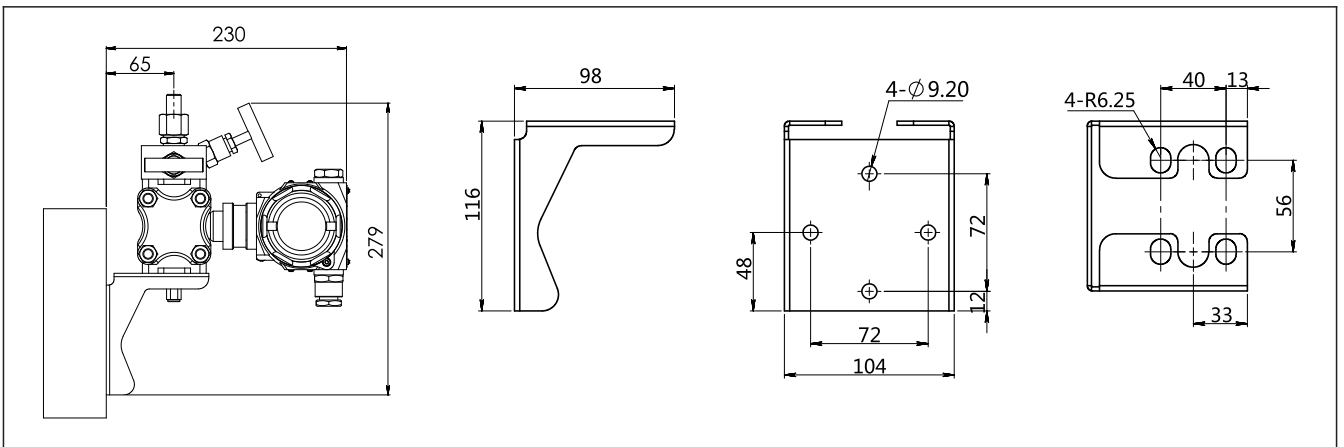
Disclaimer: all the data used in the product description is not legally binding. Relevant technical details may be changed due to further improvement

## Installation drawing and dimension

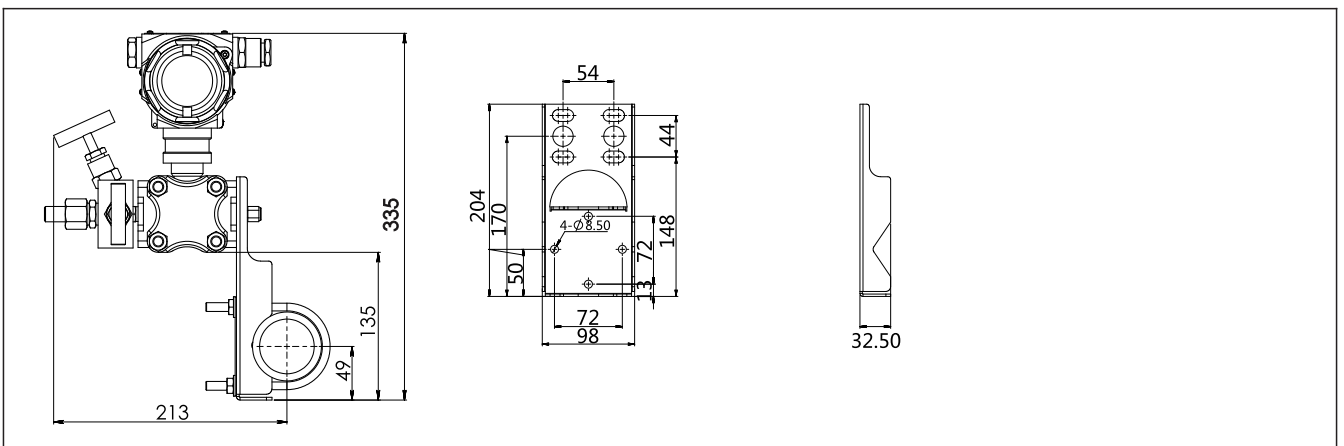
## Pipe mounting bend bracket (B1) drawing and dimension (unit:mm)



## Plate mounting bent bracket(B2) drawing and dimension (unit:mm)



## Pipe mounting flat bracket (B3) drawing and dimension (unit:mm)



Disclaimer: all the data used in the product description is not legally binding. Relevant technical details may be changed due to further improvement

## Ordering information chapter

Item	Parameters	Code	Instruction		
	Model	SPD905X	Piezoresistive single crystal silicon differential pressure transmitter		
Sensor	Separator	-	Detailed specifications as following		
	Pressure range code	S602D	Nominal value(URL): 6kPa	*	
		S403D	Nominal value(URL): 40kPa	*	
		S254D	Nominal value(URL): 250kPa	*	
		S105D	Nominal value(URL): 1MPa		
		S305D	Nominal value(URL): 3MPa		
		S106D	Nominal value(URL): 10MPa		
	Diaphragm material	S	SS316L		*
		H	Hastelloy C		
	Filling fluid	S	Silicone oil: -45-205°C		*
		D	Fluorocarbon oil -45-160°C		
Sensor seal	S	O-ring, FKM: -10-120°C			
Electrical connection	Separator	-	Detailed specifications as following		
	Electrical connection	T1	Aluminum-alloy terminal, 2 cable entry M20*1.5(F),	*	
	Cable entry protector	R1	Waterproof connector M20X1.5 one side , blind plug another side, PVC material, 6-8mm diameter cable only, IP67	*	
		R2	Flame proof, 1/2 NPT(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67		
		R3	Flame proof, M20X1.5(F) one side, blind plug another side, stainless steel material, 6-8mm diameter cable only, IP67	*	
Output	Separator	-	Detailed specifications as following		
	Output signal	H	4-20mA+HART two wire, power supply:16.5-55VDC	*	
		F	4-20mA two wire, power supply: 10.5-55VDC		
	Display	C	LCD display	*	
		A	Without LCD display		
Process connection	Separator	-	Detailed specifications as following		
	Process connection	H1	H structure, double flanges, process connection 1/4-18NPT(F) ,drain valve on the rear end of flange, material SS 316	*	
		H2	H structure, double flanges, process connection 1/4-18NPT(F), drain valve on the up part of flange, material SS 316		
		H3	H structure, double flanges, process connection 1/4-18NPT(F),drain valve on the down part of flange, material SS 316		

## Selection

Additional options	Separator	-	Detailed specifications as following	(*)fast delivery available
	Process connection accessory	/A1	Adaptor, M20*1.5 (M) with pressure-guided pipe $\Phi$ 14*2*30,SS304, apply to H-structure	*
		/A2	Adaptor, 1/2-14NPT(F), SS 304, apply to H-structure	
	fix mounting accessory	/B1	Pipe mounting bend bracket, 2" pipe, carbon steel, apply to H-structure	
		/B2	Plate mounting bent bracket, carbon steel, apply to H-structure	
		/B3	Pipe mounting flat bracket, 2" pipe, carbon steel, apply to H-structure	*
	Display mode	/D1	According to your requirement	
	Calibration report	/E1	Calibration report provide by our company	
		/E2	Calibration report provide by chinese authorised third party	
		/E3	Static pressure report ( Differential pressure only)	
	Approvals	/F1	Flame proof certificate, ExdIICT6, NEPSI	*
		/F2	Intrinsic safety certificate, ExialICT4, NEPSI	
		/F3	CE certificate	
	Wetted parts treatment	/G1	Ungrease treatment	
		/G2	Electropolishing treatment	

## Factory settings and parameters

Item	Menu mark	Factory setting value
Tag position	None	0(No specific settings)
Analog output type	mA	Liner
Display mode	DISP	PV
Alarm signal	ALARM	No

Item	Menu mark	Factory setting value
Damping value	DAMP	0(No specific settings)
4mA Lower range value	LRV	According to the order value
20mA Upper range value	URV	According to the order value
Process unit	U	According to the order

## Approvals

## CE

Licence scope	PRESSURE TRANSMITTER
Standard	EN61000-6-2 : 2005
	EN61000-6-4 : 2007
Registered number	AC/0100708



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