

Product introduction

Description



SMP131-TBD



SMP131-TBH

Piezoresistive ceramic gauge pressure transmitter

Piezoresistive ceramic gauge pressure transmitter combined with all the latest available technologies of the modern electronic pressure measurement fields. It's the most cost-effective products after 10 year's research and development. The sensor adopts full-automatic linear and temperature compensation technology to ensure the efficiency and quality of mass production. Fully-sealed and isolated air cavity design to ensure the long term reliability. Signal transmitting module adopts original calibration technology to realize parameters setting easily without any tools.

Main parameters

Pressure type	Gauge pressure
Measuring range	50kPa-60MPa, please refer to the ordering information chapter
Output signal	4-20mA, 0-5VDC, others
Reference accuracy	±0.5% URL

Measuring medium

The fluids which compatible with wetted parts

Application

Pressure, level measurement

Approvals



Technical Specifications

Measuring range and limit

Nominal value	Smallest calibratable span	Lower range limit (LRL)	Upper range limit (URL)	Overload limit
100kPa	50kPa	-100kPa	100kPa	150kPa
200kPa	100kPa	-100kPa	200kPa	300kPa
500kPa	200kPa	-100kPa	500kPa	750kPa
1MPa	500kPa	-0.1MPa	1MPa	1.5MPa
2MPa	1MPa	-0.1MPa	2MPa	3MPa
5MPa	2MPa	-0.1MPa	5MPa	7.5MPa
10MPa	5MPa	-0.1MPa	10MPa	15MPa
20MPa	10MPa	-0.1MPa	20MPa	30MPa
25MPa	12.5MPa	-0.1MPa	25MPa	37.5MPa
40MPa	20MPa	-0.1MPa	40MPa	60MPa
60MPa	30MPa	-0.1MPa	60MPa	90MPa

Above measurement range can be replaced by kg/cm<sup>2</sup>, MPa and kPa units .Which can provide other measurement range according to the requirements. Adjust requirements: lower range value (LRV) and upper range value (URV) can be adjusted within the scope of the upper and lower range limit, smallest calibratable span ≤ | URV-LRV | ≤ upper range limit

Standard specifications and reference conditions

Test standard: GB/T28474/IEC60770; Zero based-calibration span

Performance specifications

The overall performance including but not limited to 【reference accuracy】 , 【environment temperature effects】 and other comprehensive error

Typical accuracy: ±0.5%URL

Stability: ±0.1% URL/ year

Reference accuracy

Including linearity, hysteresis and repeatability. calibration temperature: 20°C ± 5°C

Linear output accuracy	Typical	±0.5% URL	Nominal value: 100kPa 200kPa, 500kPa, 1MPa 2MPa, 5MPa, 10MPa 20MPa, 25MPa, 40MPa 60MPa

Ambient temperature effects(Typical)

Within the range -20-80°C total impact ±0.2% URL/10K

Power supply effects

Zero and span change should not be more than ±0.005% URL/V

Loading effects

Zero and span change should not be more than ±0.05% URL/kΩ

Vibration effects

Vibration resistance According to IEC60068-2-6, 10g RMS (25-2000HZ)

Impact resistance According to IEC60068-2-27, 500g/1ms

Output signal

Signal	Type	Output
4-20mA	Linearity	Two wire
0-5VDC	Linearity	Three wire

## Technical Specifications

### Insulation resistance

≥ 20M Ω@, 100VDC

### 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

Startup after power off : ≤3S

Normal services after data recovery:≤4S

### Environment condition

Items	Operational condition
Working temperature	-40-85°C
Storage temperature	-40-100°C
Media temperature	-30-80°C
Working humidity	0-95%RH
Protection class	IP65
Dangerous condition	ExiaIICT4(GYB16.1964X)*
*Only for 4-20mA output	

## Technical Specifications

Signal output	4-20mA	0-5VDC
Power supply voltage	12-30VDC	6-30VDC
Electric current	≤20.8mA	≤3.5mA
Load resistance(Ω)	<(U-10)/0.0208	≥5k, recommend 100k
Transmission distance	<1000m	<5m
Power consumption	≤500mW(20.8mA output@24VDC)	≤60mW(0-5VDC output, @24VDC)

\*For this output type, the load resistance value in communication is 250Ω

\*\*The load resistance value 0-2119Ω is in nominal working condition, 250-600Ω is HART communication

## EMC environment (not RS485 signal output)

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/IEC61000-4-2	4kV(Contact), 8kV(Air)	B(Note2)
4	Immunity to radio frequency EM-fields	GB/T 17626.3/IEC61000-4-3	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.

Product selection instruction

Sensor select instruction

Code	Nominal value	Description
B104G	100kPa	Range -100kPa-100kPa, smallest calibratable span 50kPa
B204G	200kPa	Range -100kPa-200kPa, smallest calibratable span 100kPa
B504G	500kPa	Range -100kPa-500kPa, smallest calibratable span 200kPa
B105G	1MPa	Range -100kPa-1MPa, smallest calibratable span 500kPa
B205G	2MPa	Range -100kPa-2MPa, smallest calibratable span 1MPa
B505G	5MPa	Range -100kPa-5MPa, smallest calibratable span 2MPa
B106G	10MPa	Range -100kPa-10MPa, smallest calibratable span 5MPa
B206G	20MPa	Range -100kPa-20MPa, smallest calibratable span 10MPa
B256G	25MPa	Range -100kPa-25MPa, smallest calibratable span 12.5MPa
B406G	40MPa	Range -100kPa-40MPa, smallest calibratable span 20MPa
B606G	60MPa	Range -100kPa-60MPa, smallest calibratable span 30MPa

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

Code	Parts	Description
C	Diaphragm material	Ceramic(96% AL2O3)
N	Filling fluid	None
S	Sensor seal	O-ring, FKM (Process temperature: -20-200°C)

Seal(S)



Electrical connection select instruction

Code	Description
D1	DIN43650, IP65
H1	Aviation plug, M12*1, 4 pin, IP67

DIN43650 (D1)

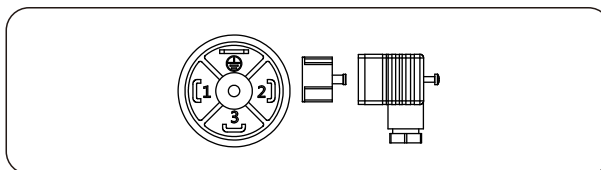


Aviation plug, M12\*1, 4 pin (H1)



Electrical connection

DIN43650 (D1)



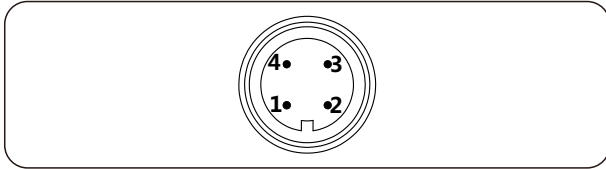
Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1	Power+	Power+	Power+	Power+
2	Power-	Power-	Power-	Power-
3	Key-z	Signal+	Signal+	A+
⊕			Signal-	B-

Note: Key-z is modified zero pressure

**Product selection instruction**

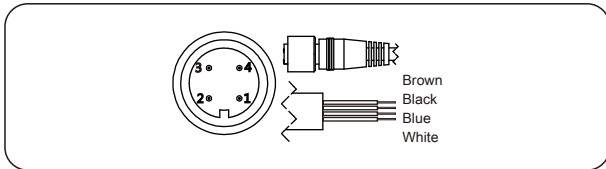
**Electrical connection accessory**

Aviation plug, M12\*1, 4 pin (H1)



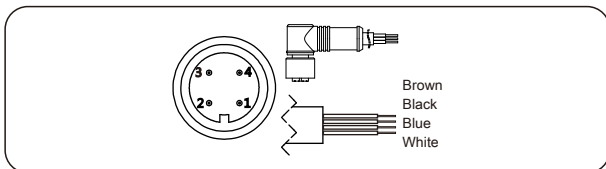
Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1	Power+	Power+	Power+	Power+
2			Signal-	B-
3	Key-z	Signal+	Signal+	A+
4	Power-	Power-	Power-	Power-

Aviation plug straighter(J1)



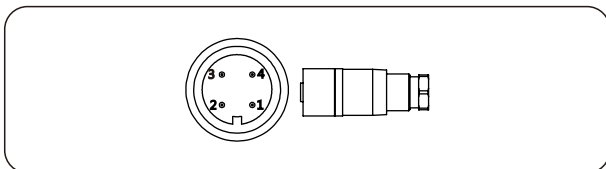
Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1/Brown	Power+	Power+	Power+	Power+
2/White			Signal-	B-
3/Blue	Key-z	Signal+	Signal+	A+
4/Black	Power-	Power-	Power-	Power-

Aviation plug elbow (J2)



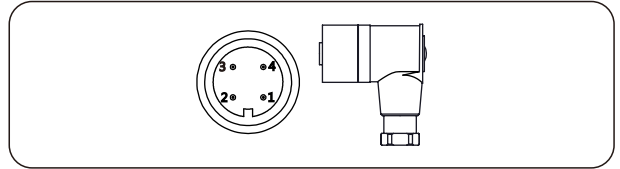
Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1/Brown	Power+	Power+	Power+	Power+
2/White			Signal-	B-
3/Blue	Key-z	Signal +	Signal+	A+
4/Black	Power -	Power -	Power-	Power-

Aviation plug straighter(J4)



Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1	Power+	Power+	Power+	Power+
2			Signal-	B-
3	Key-z	Signal+	Signal+	A+
4	Power-	Power-	Power-	Power-

Aviation plug elbow (J5)

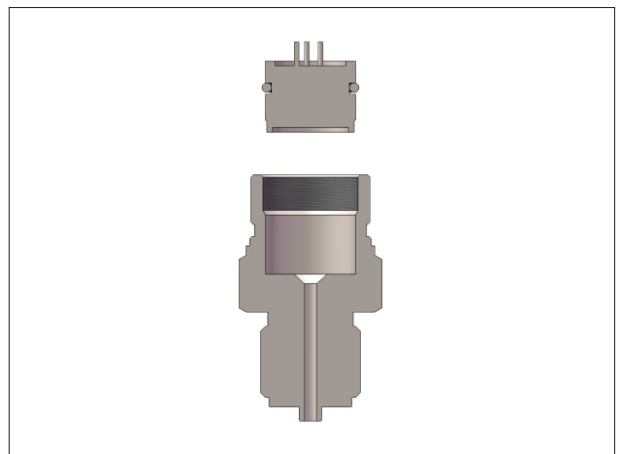


Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1	Power+	Power+	Power+	Power+
2			Signal-	B-
3	Key-z	Signal +	Signal+	A+
4	Power -	Power -	Power-	Power-

**Electrical connection select instruction**

Code	Description
F	4-20mA two wire, power supply: 12-30VDC
1	1-5V DC three wire, power supply: 12-30VDC
2	0-5VDC three wire, power supply: 6-30VDC
5	0.5-4.5VDC three wire, power supply: 6-30VDC
A	4-20mA two wire, Intrinsic safety, power supply: 10-30VDC

**Wetted Parts**



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

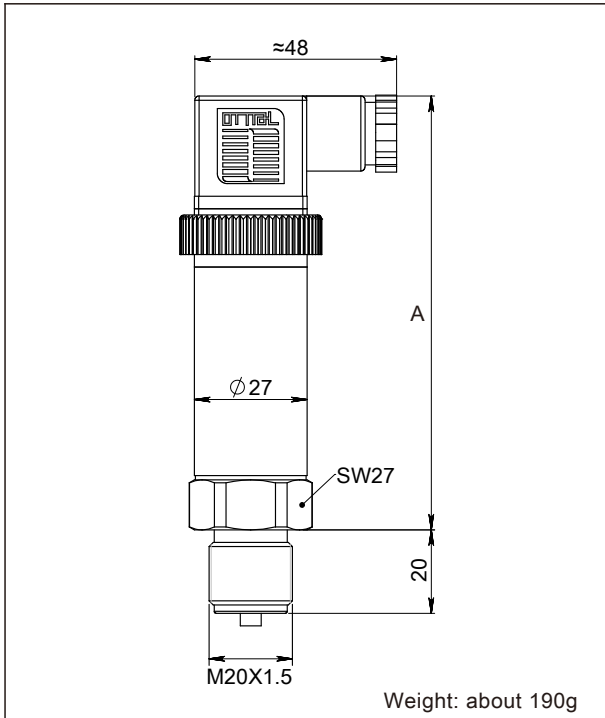
Product selection instruction

Process connection select instruction

Code	Type	Description
4	Material	SUS304
5		PVDF
6		SUS316
M01	Specification	M20*1.5(M), Φ3 pressure lead hole, GB/T193-2003, ISO261
G01		G1/2(M), Φ3 pressure lead hole, EN837
G02		G1/4(M), Φ3 pressure lead hole, EN837
G08		G1/4(M), Φ3 pressure lead hole , GB/T7307, ISO228, DIN16288, BS2779, seal reference DIN3852-E ( back-end seal ) Max measuring range 60MPa
R01		1/2-14NPT(M), Φ3 pressure lead hole, GB/T12716, ANSI/ASME B1.20.1
R02		1/4-18NPT(M), Φ3 pressure lead hole, GB/T12716, ANSI/ASME B1.20.1
R03		1/2-14NPT(F), Φ3 pressure lead hole, GB/T12716, ANSI/ASME B1.20.1
R04		1/4-18NPT(F), Φ3 pressure lead hole GB/T12716, ANSI/ASME B1.20.1

Product drawing and dimension

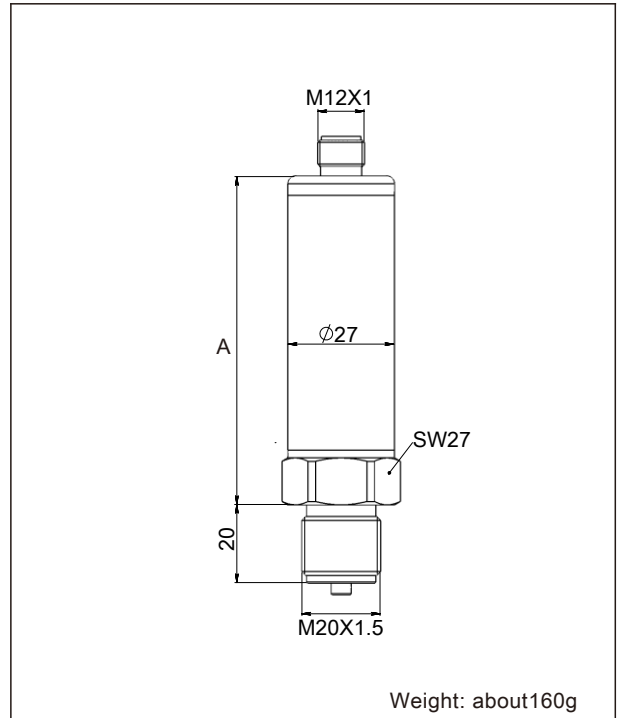
Drawing and dimension with DIN43650(D1) (unit: mm)



Value of A in different output signal types(DIN43650 adaptor)

Output signal code	(Accuracy $\leq$ 0.1% URL)	Other accuracy code
F, A	123	108
1, 2, 5	-	108

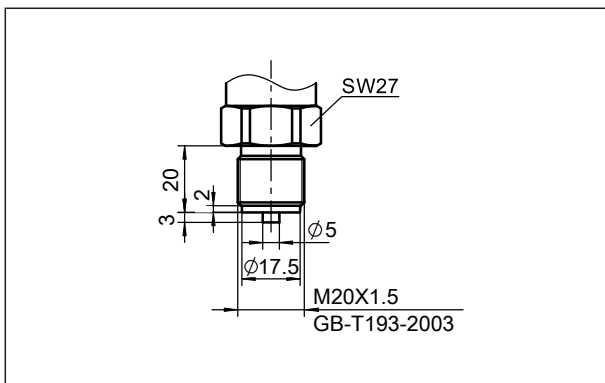
Drawing and dimension with aviation plug(H1) (unit: mm)



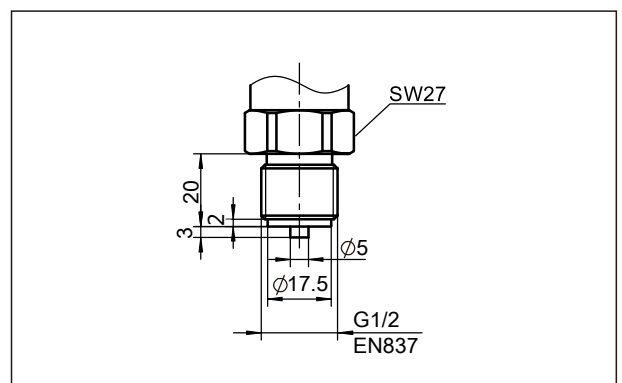
Value of A in different output signal types(Aviation plug)

Output signal code	(Accuracy $\leq$ 0.1% URL)	Other accuracy code
F, A	83	68
1, 2, 5	-	68

Process connection(M01) (unit: mm)

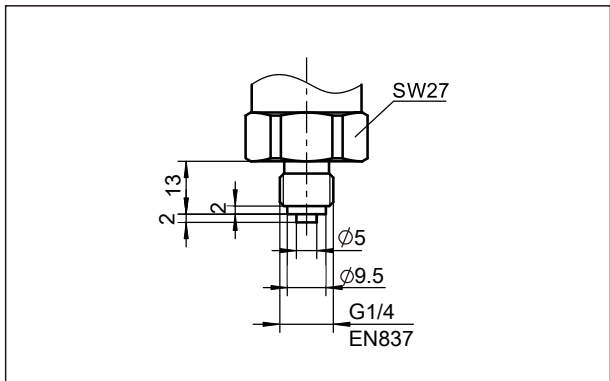


Process connection(G01) (unit: mm)

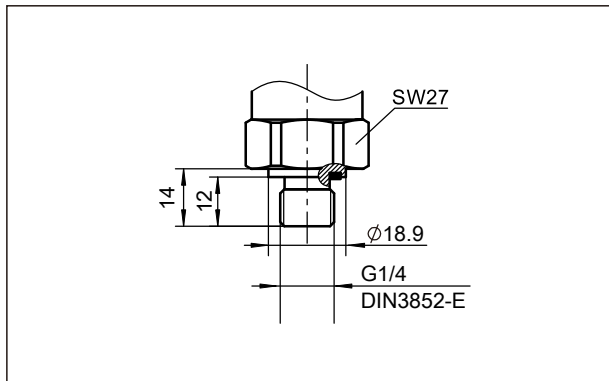


Product drawing and dimension

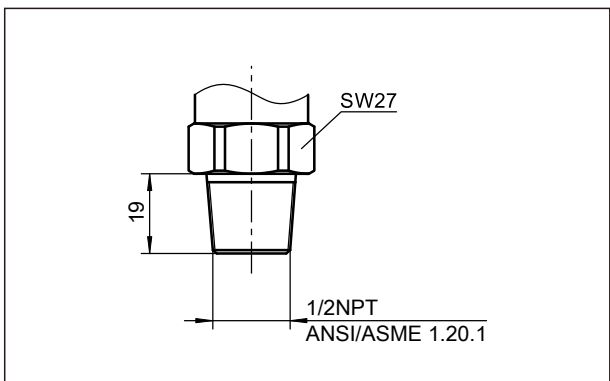
Process connection(G02) (unit: mm)



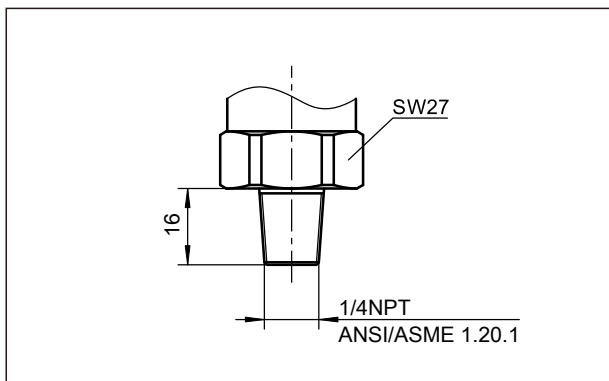
Process connection(G08) (unit: mm)



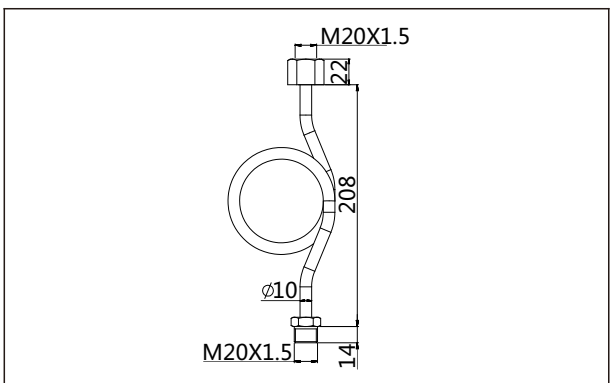
Process connection(R01) (unit: mm)



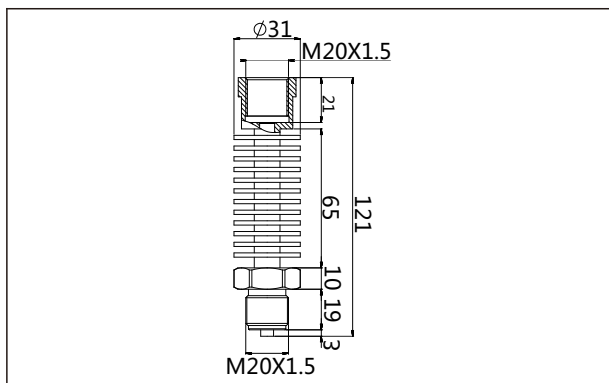
Process connection(R02) (unit: mm)



Heat exchange connector (N1) (unit: mm)



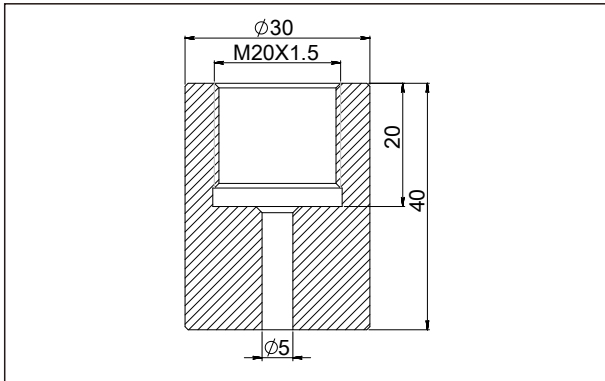
Heat exchange connector (N2) (unit: mm)



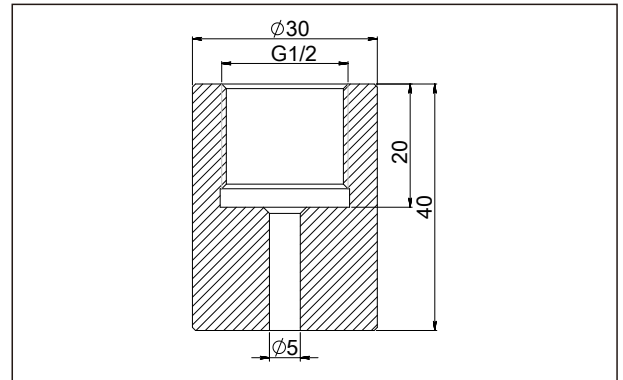


Product drawing and dimension

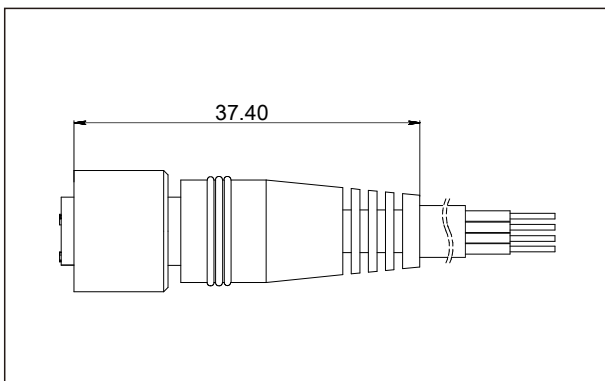
Welding adaptor(Z1) (unit: mm)



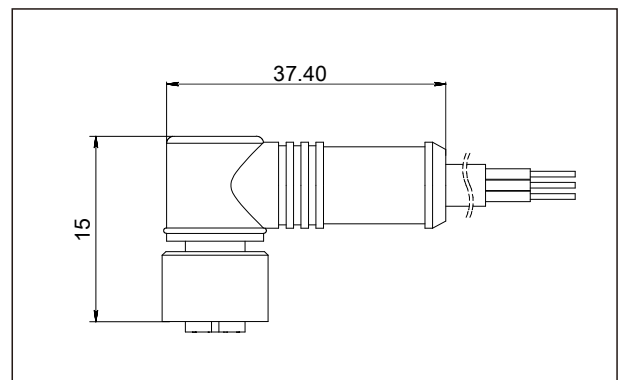
Welding adaptor(Z2) (unit: mm)



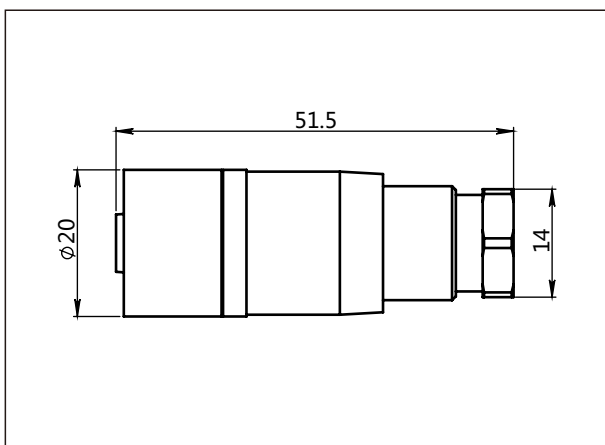
Aviation female plug straighter(J1) (unit: mm)



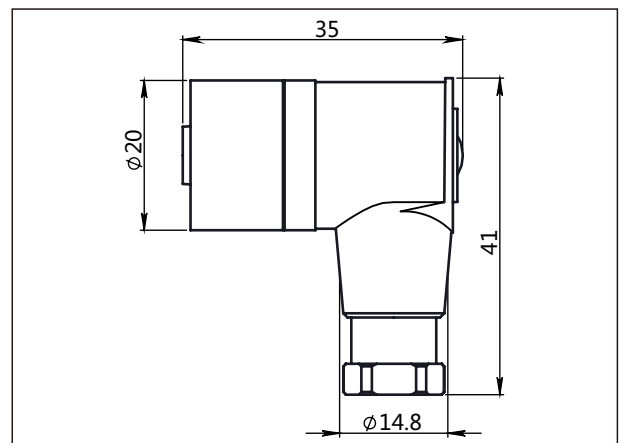
Aviation female plug elbow(J2) (unit: mm)



Aviation female plug straighter (J4) (unit: mm)



Aviation female plug straighter (J5) (unit: mm)



**Ordering information chapter**

Item	Parameters	Code	Instruction	(*)fast delivery available
	Model	SMP131-TBD	Piezoresistive ceramic gauge pressure transmitter (The first letter of electrical connection type is D)	*
		SMP131-TBH	Piezoresistive ceramic gauge pressure transmitter (The first letter of electrical connection type is H)	*
Sensor	Separator	-	Detailed specifications as following	
	Pressure range code	B104G	Nominal value(URL): 100kPa	*
		B204G	Nominal value(URL): 200kPa	*
		B504G	Nominal value(URL): 500kPa	*
		B105G	Nominal value(URL): 1000kPa	*
		B205G	Nominal value(URL): 2500kPa	*
		B505G	Nominal value(URL): 5MPa	*
		B106G	Nominal value(URL): 10MPa	*
		B206G	Nominal value(URL): 20MPa	
		B256G	Nominal value(URL): 25MPa	
		B406G	Nominal value(URL): 40MPa	*
	B606G	Nominal value(URL): 60MPa		
	Diaphragm material	C	Ceramic(96% AL2O3)	*
	Filling fluid	N	None	*
Sensor seal	S	O-ring, FKM(Process temperature: -20-200°C)	*	
Electrical connection	Separator	-	Detailed specifications as following	
	Electrical connection	D1	DIN43650, IP65	*
		H1	Aviation plug, M12*1(4pins), IP67	*
	Cable entry protector	R0	None	
Output	Separator	-	Detailed specifications as following	
	Output signal	F	4-20mA two wire, power supply: 12-30VDC	*
		1	1-5VDC three wire, power supply: 12-30VDC	
		2	0-5VDC three wire, power supply: 6-30VDC	
		A	4-20mA two wire, intrinsic safety, power supply: 10-30VDC	
Body tube	Separator	-	Detailed specifications as following	
	Body tube	53	Stainless steel tube length: 53mm (HART, ModbusRTU/RS485 is not available)	*
		37	Stainless steel tube length: 37mm (HART, ModbusRTU/RS485 is not available)	
		65	Stainless steel tube length: 65mm (with HART, Modbus, accuracy ≤ 0.1%)	
		85	Stainless steel tube length: 85mm (with HART, Modbus, accuracy ≤ 0.1%)	

**Ordering information chapter**

Process connection	Separator	-	Detailed specifications as following		
	Material	4	SUS304	*	
		5	PVDF		
		6	SUS316		
	Specification	M01	M20*1.5(M), Φ3 pressure lead hole, GB/T193-2003, ISO261		*
		G01	G1/2(M), Φ3 pressure lead hole, EN837		*
		G02	G1/4(M), Φ3 pressure lead hole, EN837		
		G08	G1/4(M), Φ3 pressure lead hole, GB/T7307, ISO228, DIN16288, BS2779, seal refer to DIN3852-E(back-end seal), max measuring range 60MPa		
		R01	1/2-14NPT(M), Φ3 pressure lead hole, GB/T12716, ANSI/ASME B1.20.1		
		R02	1/4-18NPT(M), Φ3 pressure lead hole, GB/T12716, ANSI/ASME B1.20.1		
		R03	1/2-14NPT(M), Φ3 pressure lead hole, GB/T12716, ANSI/ASME B1.20.1		
R04	1/4-18NPT(M), Φ3 pressure lead hole, GB/T12716, ANSI/ASME B1.20.1				
Additional options	Separator	-	Detailed specifications as following		
	Process connection mounting accessory	/N1	Heat exchange connector, M20*1.5 (F) change to M20*1.5(M), SUS304 (Condenser pipe)	*	
		/N2	Heat exchange connector, M20*1.5 (F) change to M20*1.5(M), SUS304 (Cooling fin)	*	
	Process connection accessory	/Z1	Welding adaptor, M20*1.5(F), SUS304	*	
		/Z2	Welding adaptor, G1/2(F), SUS304	*	
	Electrical connection accessory	/J1	Aviation female plug (straighter) without cable, 4 pin, M12*1, IP67	*	
		/J2	Aviation female plug (elbow) without cable, 4 pin, M12*1, IP67		
		/J4	Aviation female plug (straighter) with 2m cable, 4 pin, M12*1, IP67	*	
		/J5	Aviation female plug (elbow) with 2m cable, 4 pin, M12*1, IP67		
	Approvals (multiple)	/I1	Intrinsic safety certificate, ExialICT4, NEPSI	*	
		/F3	CE certificate	*	
Wetted parts treatment	/G1	Ungrease treatment			
	/G2	Electropolishing treatment			

**Approvals**

**Factory certificate**

Certification organization	Intertek
Quality management system	ISO9001-2008
Scope of certification	Design and production of pressure transmitter
Registration number	110804039

**CE**

Certificate organization	ISET
License scope	SMP131 series pressure transmitter
Mark	CE
EMC instruction	2014/30/EU
Standard	EN61326-1: 2013
Registration number	IT031353LG161207

**Intrinsic safety certificate**

Certification organization name	NEPSI
Licenses range	SMP131 series pressure transmitter
Explosion-proof mark	ExialIICT4
Ambient temperature	-40-+60°C
Medium maximum temperature	+120°C
Registration number	GYB16.1964X
Intrinsically safe parameter description	Maximum input voltage: 28VDC
	Maximum input current: 100mA
	Maximum input power: 0.7w
	Maximum internal equivalent parametersCi(uF): 0
	Maximum internal equivalent parametersLi(mH): 0



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