

The selection is detailed on page 13



SP10

Threaded Type Intelligent Pressure Transmitter

Product application

Chemical and petrochemical industries
 Technological process
 Pulp and paper industry
 Water/sewage treatment
 Dangerous area

Functional characteristics

Explosion proof Ex d (gas and dust)
 [Reference ATEX, NEPSI, and EAC]
 Linearity 0.05 %; Adjustable range ratio: 1:50
 Easy operation with rotary button
 Program setting
 LCD display with bar chart
 Display select measurement unit
 Display sensor temperature
 Displays maximum and minimum pressure
 Current generator function

Product description

The SP10 pressure transmitter is available in both intrinsic safety and explosion-proof housing ignition protection (ATEX and IECEx compliant) versions, and both versions support 4... 20mA, 4... 20mA HART, PROFIBUS, PA or FOUNDATION Fieldbus™ output signals for applications that require high measurement technology. The case can be freely rotated 330° and is available in plastic, aluminum and stainless steel. Electrolytically polished stainless steel (316L) housing is also available for the food and pharmaceutical industries with high application requirements.

Rugged and highly accurate

Ceramic capacitance measuring elements provide highly accurate measurement values, especially in small measurement ranges. Thanks to the special sealing concept, the meter is suitable for almost all industries and applications. A variety of different enclosures are available to suit different operating environments.

Easy to configure and operate

The meter can be configured and serviced by the user through the display (optional) and the operation module, which can be installed in four different locations. The action menu is simple in structure and supports multiple languages (optional). In addition, the user can use software to set operating parameters, and the instrument dedicated DTM can easily integrate the instrument into the corresponding process control system. Pressure transmitters with HART® interfaces combine maximum precision and simple operation to measure gauge or absolute pressure of gases, vapors and liquids. Integrated LCD display displays measurement values and equipment data.

Pressure transmitters with flameproof housing can be installed to zone 0. The housing and sensors are made of high-grade stainless steel. A variety of embedded process connections are available for hygienic applications, including the PECK connection system.

Diaphragm seals can also be used for specific process technology applications.

The transmitter is programmable, so it is easy to adapt to a variety of different measurement tasks. An easy-to-use setup program comes as an attachment to initiate operations through the interface. Rotary keys make field manual operation very convenient and fast. Pressure transmitters with 4 to 20 mA and HART® protocols are evaluated for safety functions according to DIN EN 61508/-1/-2 version 2.0 and certified by TUV Nord. These measuring devices are suitable for monitoring process levels and pressures up to SIL2.



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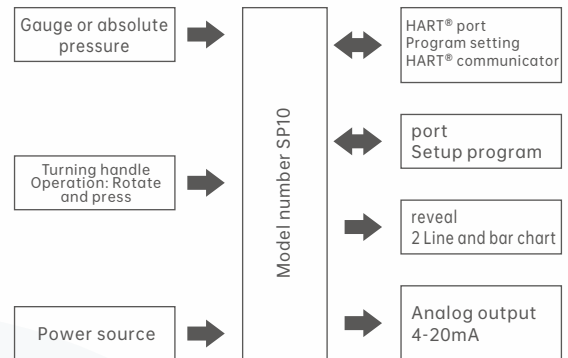
For more product information, please visit www.ludwig-schneider.com.cn



LUDWIG
INSTRUMENT

Working principle

The electrical component that feels the pressure is generally the resistance strain gauge, which is a sensitive device that converts the pressure on the measured part into an electrical signal. The most widely used resistance strain gauges are metal resistance strain gauges and semiconductor strain gauges. There are two kinds of metal resistance strain gauge: wire strain gauge and metal foil strain gauge. Usually, the strain gauge is tightly bonded to the mechanical strain matrix by a special adhesive. When the stress of the matrix changes, the resistance strain gauge also deforms, so that the resistance value of the strain gauge changes, and the voltage applied to the resistance changes.



Technical parameter

Reference condition	DIN EN 60770 和 DIN EN 61298
Allowable temperature	-40 °C ~ +85°C
Air pressure	1000 hPa (±25hPa)
Power source	DC 24 V
impedance	50 Ω
Sensor system	Stainless steel separated film silicon sensor
Pressure transfer medium	
Measuring system filling medium 0	Transmissionless medium
Measuring system filling medium 1	Silicone oil, FDA compliant
Allowable load variation	> 10 million times
position	
Installation position	At will
Calibration position	Place the device vertically with the process connection facing down
Zero offset position	Zero offset can be performed in the field or through Settings
Show ¹⁾	LCD, double line with bar chart
aligning	The display unit can be rotated 90°; The housing can be rotated ±160°
dimension	Display 22 x 35 mm, font size 7 mm, 5 digits
colour	black
Modifiable measurement unit	
Input pressure	mH ₂ O, inH ₂ O, inHg, ftH ₂ O, mmH ₂ O, mmHg, psi, bar, mbar, kg/cm ² , kPa, to rr, MPa
Measured value	% or freely adjustable measuring unit
Output current	Unit: mA
Sensor temperature	Unit: °C, °F
Other display data	Minimum pressure, maximum pressure, error, overrun, underrun, working hours, equipment parameters
Controls	
scene	With rotary button and LCD
Setup program	Through the interface
port	
Standard	Interface ²⁾
Output 410 (4 to 20 mA with HART®)	Interface ²⁾ and HART® interface

1) Optional: SIL version tape display

2) The interface cannot be used in potential explosive areas! In this case, a rotary key or HART® interface is available.

Input

Manometer pressure						
Rated measuring range	-0.6 to +0.6 bar	-1 to +2.5 bar	-1 to +4 bar	-1 to +10 bar		
Overload capacity	6 bar	15 bar	30 bar	60 bar		
Breaking pressure	12 bar	30 bar	60 bar	100 bar		
Manometer pressure						
Rated measuring range	-1 to +25 bar	-1 to +100 bar	-1 to +250 bar	-1 to +600 bar		
Overload capacity	150 bar	300 bar	600 bar	1200 bar		
Breaking pressure	250 bar	400 bar	700 bar	2000 bar		
Absolute pressure						
Rated measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar	0 to 25 bar	0 to 100 bar
Overload capacity	6 bar	15 bar	30 bar	60 bar	150 bar	300 bar
Breaking pressure	12 bar	30 bar	60 bar	100 bar	250 bar	400 bar

Exportation

Analog output	
Output 410	4 to 20 mA, two-wire with HART® version 7
(4 to 20 mA with HART®) stage	(Optional with HART® version 5, additional code 932, with SIL version)
Jump response T60	≤ 190 ms No attenuation
Attenuation	Adjustable from 0 to 100 s
Impedance	
Output 410	Impedance ≤ (UB-12V) ÷ 0.022A; Other: Min. 250 Ω, Max. 1100 Ω
(4 to 20 mA with HART®)	


Power source

Power source	DC 12 to 36 V
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Mechanical property

Process connection	
Materials	
Process Connection 20 (stainless steel)	316 L, flush front process connection or 316 Ti
Process Connection 82 (HASTELLOY®)	2.4819 NiMo
surface	Ra ≤ 0.8 μm
Process seal	
Process connection 571	FPM
(G 3/4 face flush)	
Process connection 652	
(with fluted can connection)	
Process Connection 997 (PEKA)	Compliant with FDA: FPM, VMQ, optional EPDM, see data sheet 409711
All other processes are connected	unsealed
Measuring film	
Material 20 (stainless steel)	1.4542, -1 to +250 bar gauge pressure (measuring range 508) and -1 to +600 bar gauge pressure (measuring range 516)
	Other 316 L
Material 82 (Plastic)	2.4819 NiMo
surface	Ra ≤ 0.8 μm

Mechanical property

shell	
Housing material	Precision casting 1.4408
Surface material	Precision cast 1.4408, sealed FPM
Control knob material	
Operation 0 (no control button)	-
Operation 1 (with control knob)	PA
anti-explosion	EC type inspection certificate CNEx21.4102X  Ex d IIC T6 Gb
weight	about 1.6 kg

Environmental impact

Allowable temperature					
Controls	Edition	Temperature class	Maximum medium temperature	Allowable temperature ^a	Allowable temperature spread(Additional code 681) ^{a,b,c}
	II 1/2G Ex d	T6	70 °C	-40 to +60 °C	-50 to +60 °C
		T5	85 °C	-40 to +70 °C	-50 to +70 °C
		T4	115 °C	-40 to +85 °C	-50 to +85 °C
	II 2D Ex tb	T105 °C	100 °C	-40 to +85 °C	-50 to +85 °C
store	-40 to +85 °C				
Allowable humidity					
Controls	100 % rel. Humidity, including condensation on the device housing				
store	90% rel. Humidity does not include condensation				
Allowable mechanical load					
Shock resistance	2 g, 10 to 2000 Hz Reference DIN EN 60770-3				
Impact resistance	15 g, 6 ms Refer to IEC 60068-2-27				
Resistance to electromagnetic interference	See EN 61326				
Interference emission	Class B ^d				
Anti-interference property	industry				
Protection type	IP66 refers to DIN EN 60529				

a Below -20°C limit function: fixed use, cable breakage risk increases, display no function; The temperature below -30 °C does not work.

b In the range of -40 to -50 °C, the equipment must be continuously operated. In addition, the equipment has a lid with inspection glass to protect against mechanical shock and shock effects.

c SIL free

d The product is suitable for industrial, residential and small businesses

Measuring range

Manometer pressure				
MPa	0 ... 0.01	0 ... 0.04	0 ... 0.1	0 ... 0.25
	0 ... 0.5	0 ... 1	0 ... 2.5	0 ... 6
	0 ... 10	0 ... 25	0 ... 60	0 ... 100
Absolute pressure				
MPa	0 ... 0.01	0 ... 0.04	0 ... 0.1	0 ... 0.25
	0 ... 0.5	0 ... 1	0 ... 2.5	0 ... 6
	0 ... 10	0 ... 25	0 ... 60	-
Vacuum and +/- measuring range				
KPa	-100 ... 0			

Other measuring ranges can be set by range ratio (to scale).

Maximum pressure setting range: -20... +120 %

For example, the range is 0... 1 MPa (0 ... 150 psi) gauges are also suitable for -0.1... +1 MPa (-14.5... +150 psi) pressure range.

However, values less than 0 MPa (absolute pressure, 0 psi) cannot be set or measured.

Vacuum/overload safety	
Vacuum safety	Yes (measuring range from 0... 0.1MPa [0... 15] psi)
	Minimum pressure 0... 0.0025MPa [0... 0.4psi] : -0.05MPa [-0.8psi]
	Minimum pressure 0... 0.01MPa [0... 1.5psi] : -0.02MPa [-3 psi]
	Minimum pressure 0... 0.04 MPa [0... 5 psi] : -0.08 MPa [-14 psi]
Overload safety	
Measuring range \leq 0.1MPa [15psi]	35 times
Measuring range \leq 1MPa [150psi]	9 times
Measuring range \leq 6MPa [900psi]	3 times
Measuring range \leq 10MPa [1450psi]	2 times

Output signal

Output signal	
Signal type	4 ... 20mA
	4 ... 20mA HART® with overlapping communication signals (Option: SIL certification)
	HART® Specification: 7.3
	FOUNDATION™ Fieldbus
	PROFIBUS® PA
	Differential pressure driven electronics (Option: SIL certified)
Load, unit: Ω	(UB-UBmin) / 0.022A
	UB = Power supply (see "Power Supply" table)
	UBmin = Minimum power supply (Enter "Power Supply" table)
damping	0... 999 seconds, adjustable
	After the set damping time, the instrument will output 63% of the operating pressure as an output signal.
	Example: After 2 seconds of damping, the pressure pulse rises from 0 to 1MPa.
	After 2 seconds, a pressure of 0.63MPa will be displayed.
Step response time	< 80ms (= Dead time < 25ms + rise time 10... 90% < 5ms)

Power supply (non-explosion-proof and Ex d)

Signal type	backlight	
	nonactivated	Activate
4... 20mA	DC 9.6 ... 35V	DC 16 ... 35V
4... 20mA with overlapping communication signal HART®	DC 9.6 ... 35V	DC 16 ... 35V

Power Supply (Ex ia)

Signal type	backlight	
	nonactivated	Activate
4 ... 20mA	DC 9.6 ... 30V	DC 16 ... 30V
4 ... 20mA with overlapping communication signal HART®	DC 9.6 ... 30V	DC 16 ... 30V

Accuracy specification

Accuracy specification	
Accuracy at room temperature	0.05% of the range (options: 0.1% or 0.2%)
adjustability	
zero	- 20... +95% (downward, adjustability is always limited by a minimum absolute pressure of 0 MPa.)
range	- 120... There is a difference between + 120% zero point and a range with a nominal measuring range of up to 120% (down, adjustability is always subject to 0 MPa minimum absolute pressure limit.)
Range ratio	Unrestricted (maximum range ratio 10:1 for SIL applications)
nonlinearity	
Accuracy 0.05% at room temperature	≤ 0.05% FS BFSL (IEC 61298-2)
Accuracy 0.1% at room temperature	≤ 0.1% FS BFSL (IEC 61298-2)
The accuracy was 0.2% at room temperature	≤ 0.2% FS BFSL (IEC 61298-2)
non-repeatability	
Accuracy 0.05% at room temperature	≤ 0.05% FS BFSL (IEC 61298-2)
Accuracy 0.1% at room temperature	≤ 0.1% FS BFSL (IEC 61298-2)
The accuracy was 0.2% at room temperature	≤ 0.2% FS BFSL (IEC 61298-2)
Range ratio characteristics	
1:1... 5:1	No change in accuracy
> 5:1	(Basic accuracy /5) x range ratio
Long-term stability under standard conditions	
Measuring range 0... 0.0025MPa	< 0.1% x range ratio (1 year)
	< 0.2% x range ratio (5 years)
	< 0.4% x range ratio (10 years)
	< 0.05 % x range ratio (1 year)
	< 0.1% x range ratio (5 years)
	< 0.2% x range ratio (10 years)
Thermal variation, zero point and range (base temperature 20 ° C [68°F])	
Compensation range 0... 100°C [32 ... 212 ° F]	< 0.075% / 10 K (Max. 0.15 %)
Out of range of compensation	< 0 ° C < 0.15 % / 10 K
	> 100°C < 0.05% / 10 K
Thermal variation of current output(base temperature 20 ° C [68 ° F])	> 0.05% < / 10 K (Max. 0.15%)
Deviation through a strong electromagnetic field within EN 61326-1	For 4... 20 mA output, temperature range -40... +80 ° C (-40... +176 ° F) < ± 150µA

Reference condition

Reference conditions (according to IEC 61298-1)	
temperature	15 ... 25 °C (59..77 °F)
Atmospheric pressure	860 ... 1,060 mbar (86..106 kPa, 12.5..15.4 psig)
Air humidity	45... 75% relative humidity
Characteristic curve measurement	Terminal method, according to IEC 61298-2
Characteristic curve	linearity
Reference installation position	Vertical, diaphragm point down

Operating condition

Operating condition	
Allowable temperature range	Be aware of global explosion-proof certification limits on temperature ranges
Ambient temperature	- 20... +70 °C (-4... +158 °F) with digital display - 40... +80 °C (-40... +176 °F) without digital display
Medium temperature	View sealing materials
Storage temperature	-60... +80 °C (-76... +176 °F)
Limitation of the temperature of the medium due to the sealing material	Oxygen application up to 60 °C [140 °F]
FKM	- 20... +130 °C (Option: -20... +150 °C) - 4... +266 °F (Option: -4... +302 °F)
EPDM	- 40... +130 °C (Option: -40... +150 °C) - 40... +266 °F (Option: -40... +302 °F)
FFKM	- 20... +130 °C (Option: -20... +150 °C) - Four... +266 °F (Option: -4... +302 °F)
Vibration resistance meets the requirements of EN 60068-2-6(Vibration under resonant conditions)	4 g (5 ... 200 Hz), in accordance with GL characteristic curve 2 Stainless steel double chamber housing: 0.75g, according to GL characteristic curve 1
Impact resistance according to IEC 60068-2-27 (mechanical shock)	50g (2.3ms) 2 g (double chamber housing, forged stainless steel)
Instrument safety	
Level of protection according to IEC/EN 60529	IP66/67 IP66/IP68 (0.02MPa) for absolute pressure sensors Options: IP66/IP68 (0.1 MPa) or IP68 (2.5 MPa)
Electrical safety	Class II overvoltage, Class I protection
SIL, in accordance with IEC61508:2010	Single channel operation to SIL 2 Multichannel operation (homogeneous, redundant, up to SIL 3)

Materials

Materials	
Process connection	Stainless steel 316L
	PVDF
	Alloy C22 (2.4602)
	Alloy C276 (2.4819)
	Duplex steel (1.4462)
	Secondary titanium
septum	Sapphire ceramic, glass seal (99.9% alumina ceramic)
Measure component seals	
Standard process connection	FKM (Optional: EPDM, FFKM)
Flat insert diaphragm process connection	FKM (Optional: EPDM, FFKM)
FKM (Optional: EPDM, FFKM)	Not included in the delivery
	Exception: G 1 A IS0228-1 flat insert diaphragm with O-ring
	FKM (Optional: EPDM)
Single chamber outside bright, plastic	PBT, polyester fiber
Single chamber housing, aluminum	Die cast AlSi10Mg, powder coated on PE basis
Single chamber housing, forged stainless steel	Stainless steel 316L
Single chamber housing, electropolished stainless steel, deep drawn	Stainless steel 316L
Double chamber housing, plastic	PBT, polyester fiber
Double chamber housing, aluminum	Die cast AlSi10Mg, powder coated on PE basis
Double chamber housing, forged stainless steel	Stainless steel 316L

Electrical connection

Materials	
Spring loading terminal	Cross-sectional area:
	Wire or harness: 0.2... 2.5 mm ² (AWG 24... 14)
	Wire with terminal piece: 0.2... 2.5 mm ² (AWG 24... 16)
Cable connector M20 x 1.5	
Plastic, PA	NBR seal
	Cable diameter: 5... Nine, six... 12, 10... 14 mm
Nickel plated brass	NBR seal
	Cable diameter: 5... Nine, six... 12, 9... 13 mm(armored cable)
Stainless steel	NBR seal
	Cable diameter: 7... 12 mm
Cable connector 1/2 NPT	
Blind plug seal	-
Plastic, PA	Cable diameter: 5... 9 mm
Nickel plating	Cable diameter: 6... 12 mm
Brass, nickel-plated	Cable diameter: 6... 12 mm
Electrical safety	Reverse polarity protection

Precision

Manometer pressure				
Rated measuring range	-0.6 to +0.6 bar	-1 to +2.5 bar ^a	-1 to +4 bar	-1 to +10 bar ^a
Default measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar
Minimum MSP ^b	0.06 bar	0.1 bar	0.1 bar	0.5 bar
Transformer ratio (r) ^c	$r \leq 20$	$r \leq 50$	$r \leq 50$	$r \leq 50$
Nonlinear, reference condition ^d	0.06 %	0.04 %	0.04 %	0.04 %
Accuracy of -20 to +60 °C to set MSP	$r \times 0.12 \%$	$r \times 0.08 \%$	$r \times 0.08 \%$	$r \times 0.08 \%$
Percentage representation	$1 \leq r \leq 20$	$1 \leq r \leq 50$	$1 \leq r \leq 50$	$1 \leq r \leq 50$
Accuracy of -40 to -20 °C or 60 to 85 °C,	$r \times 0.18 \%$	$r \times 0.12 \%$	$r \times 0.12 \%$	$r \times 0.12 \%$
Expressed as a percentage of the set MSP	$1 \leq r \leq 20^e$	$1 \leq r \leq 50$	$1 \leq r \leq 50$	$1 \leq r \leq 50$
% long-term stability (rated measuring range)	0.1 %/years			
Manometer pressure				
Rated measuring range	-1 to +25 bar	-1 to +100 bar	-1 to +250 bar ^a	-1 to +600 bar ^a
Default measuring range	0 to 25 bar	0 to 100 bar	0 to 250 bar	0 to 600 bar
Minimum MS ^p	0.5 bar	5 bar	12.5 bar	30 bar
Transformer ratio (r) ^c	$r \leq 52$	$r \leq 20$	$r \leq 20$	$r \leq 20$
Nonlinear, reference condition ^d	0.04 %	0.04 %	0.04 %	0.08 %
Accuracy of -20 to +60 °C to set MSP	$r \times 0.08 \%$	$r \times 0.08 \%$	$r \times 0.08 \%$	$r \times 0.16 \%$
Percentage representation	$1 \leq r \leq 52$	$1 \leq r \leq 20$	$1 \leq r \leq 20$	$1 \leq r \leq 20$
Accuracy of -40 to -20 °C or 60 to 85 °C,	$r \times 0.12 \%$	$r \times 0.12 \%$	$r \times 0.12 \%$	$r \times 0.24 \%$
Expressed as a percentage of the set MSP	$1 \leq r \leq 52$	$1 \leq r \leq 20$	$1 \leq r \leq 20$	$1 \leq r \leq 20$
% long-term stability (rated measuring range)	0.1 %/years			
Absolute pressure				
Rated measuring range	0 to 0.6 bar	0 to 2.5 bara	0 to 4 bar	0 to 10 bar ^a
Default measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar ^a
Minimum MSP ^b	0.06 bar	0.1 bar	0.1 bar	0.5 bar
Transformer ratio (r) ^c	$r \leq 10$	$r \leq 20$	$r \leq 40$	$r \leq 20$
Nonlinear, reference condition ^d	0.12 %	0.04 %	0.04 %	0.04 %
Accuracy of -20 to +60 °C to set MSP	$r \times 0.24 \%$	$r \times 0.08 \%$	$r \times 0.08 \%$	$r \times 0.08 \%$
Percentage representation	$1 \leq r \leq 10$	$1 \leq r \leq 20$	$1 \leq r \leq 40$	$1 \leq r \leq 20$
Accuracy of -40 to -20 °C or 60 to 85 °C,	$r \times 0.36 \%$	$r \times 0.16 \%$	$r \times 0.16 \%$	$r \times 0.16 \%$
Expressed as a percentage of the set MSP	$1 \leq r \leq 10^e$	$1 \leq r \leq 20$	$1 \leq r \leq 40$	$1 \leq r \leq 20$
% long-term stability (rated measuring range)	0.1 %/years			
Absolute pressure				
Rated measuring range	0 to 25 bar	0 to 100 bar		
Default measuring range	0 to 25 bar	0 to 100 bar		
Minimum MSP ^b	0.5 bar	5 bar		
Transformer ratio (r) ^c	$r \leq 50$	$r \leq 20$		
Nonlinear, reference condition ^d	0.04 %	0.04 %		
Accuracy of -20 to +60 °C to set MSP	$r \times 0.08 \%$	$r \times 0.08 \%$		
Percentage representation	$1 \leq r \leq 50$	$1 \leq r \leq 20$		
Accuracy of -40 to -20 °C or 60 to 85 °C,	$r \times 0.16 \%$	$r \times 0.12 \%$		
Expressed as a percentage of the set MSP	$1 \leq r \leq 50$	$1 \leq r \leq 20$		
% long-term stability (rated measuring range)	0.1 %/years			

a SIL free

b MSP = Measurement amplitude

c r = rated measuring range span ÷ adjusted measuring range

d Reference conditions: Allowable temperature 20 °C (±3 K), air pressure 1000 hPa (±25 hPa)

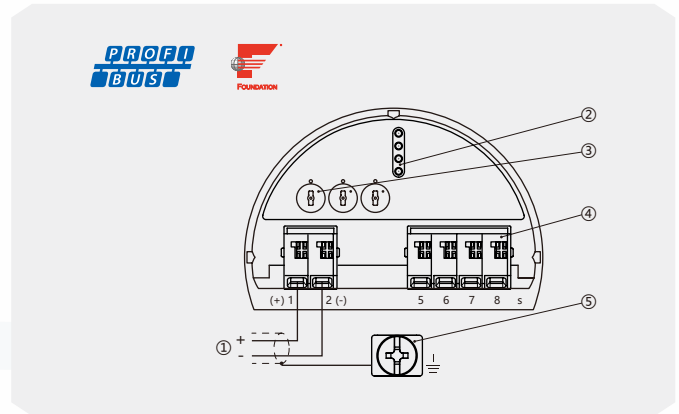
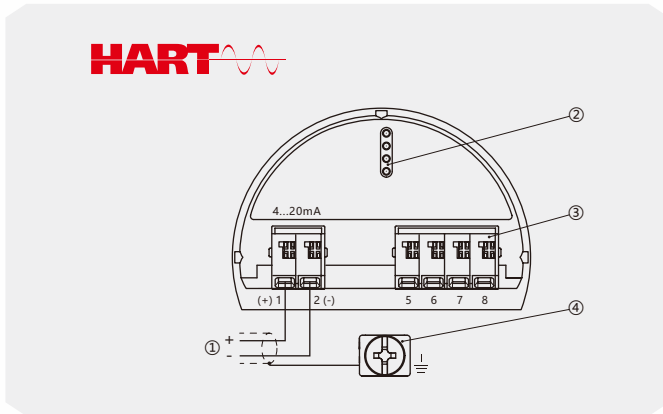
e Minimum to -30 °C



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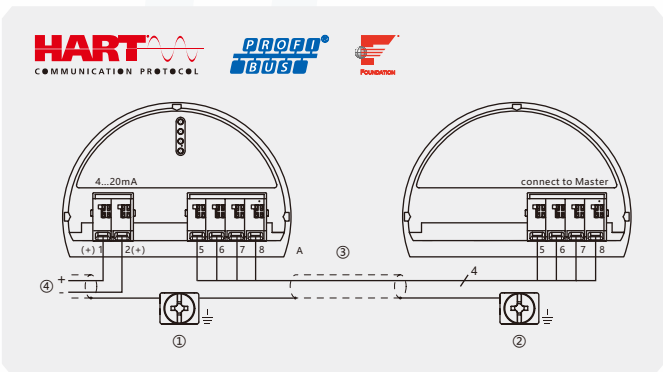
Single chamber housing connection chamber



4 ... 20mA or 4 ... 20mA / HART	
①	Supply voltage/signal output
②	Digital display instrument interface
③	Terminals for external displays and operating units and for electronic differential pressure measurement Slave electronics (not applicable to meters without HART)
④	Cable shield ground terminal

PROFIBUS® PA/FOUNDATION™ Fieldbus	
①	Supply voltage/signal output
②	Digital display instrument interface
③	Analog switch (1= Run, analog release)
④	Terminals for external displays and operating units and for electronic differential pressure measurement Slave electronics
⑤	Cable shield ground terminal

Pressure measurement, master/slave

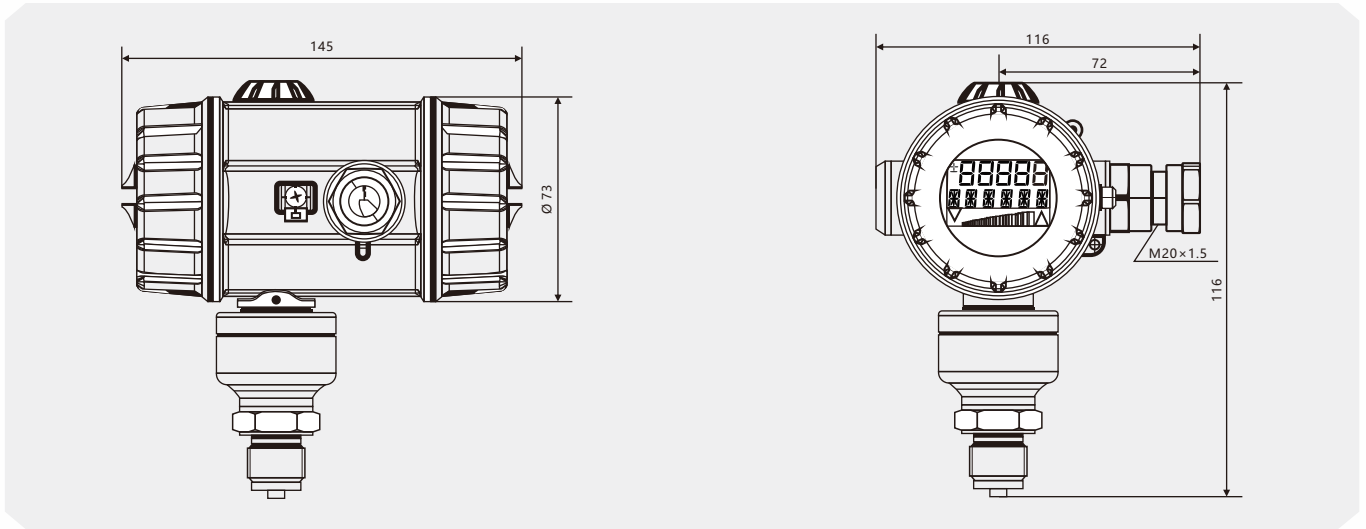


Master/slave ①	
②	The main
③	from
④	Master/slave connection cable (marked cable length 5m, cable maximum 25m)
	Supply voltage/Signal output (main)

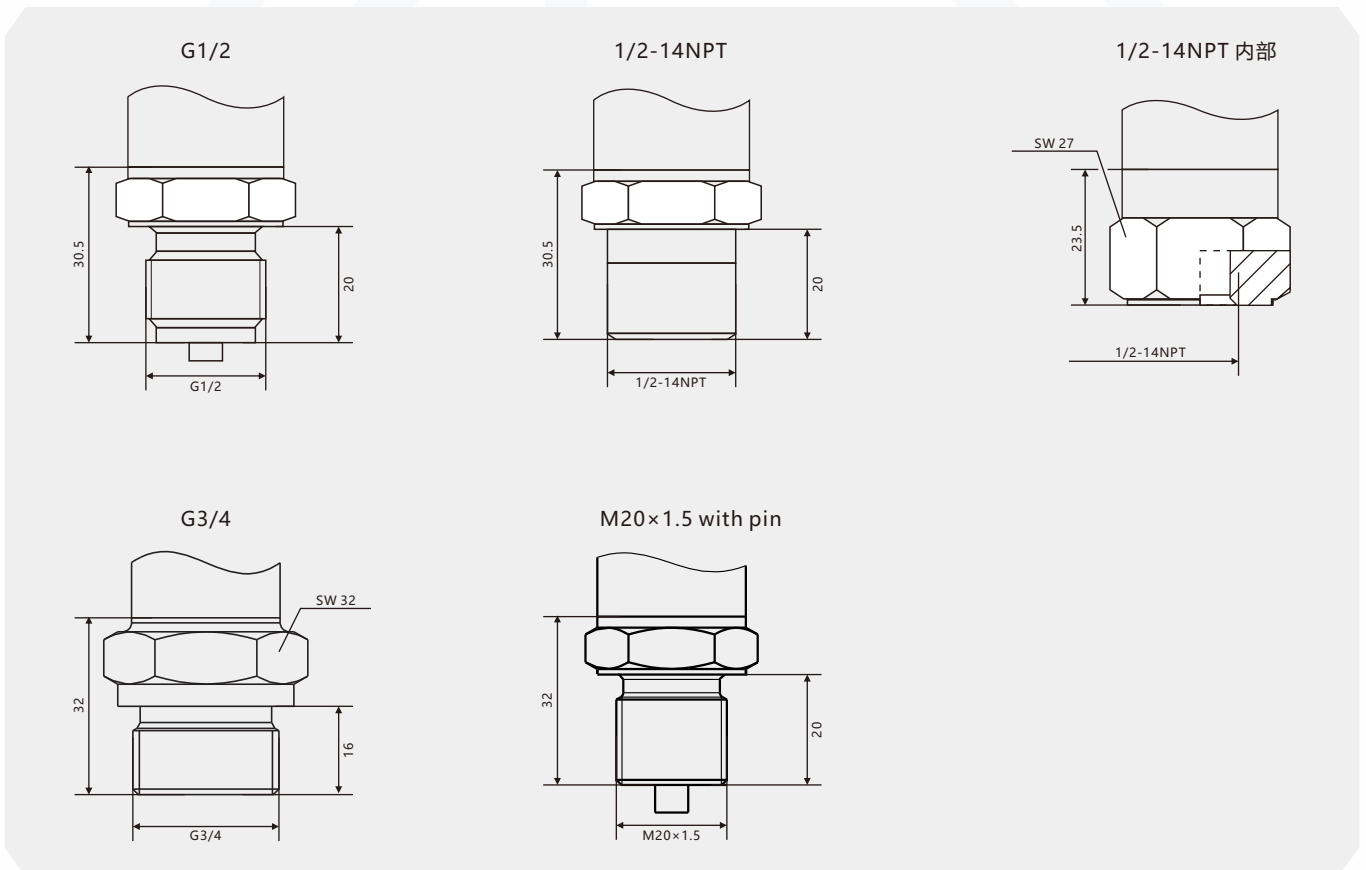
Process connection

The SP10 meter is connected with a standard process	
EN 837	G 1/2 M20×1.5
ISO 228-1	G 1/4 A Internal thread, G 1/2 A Male thread
ANSI/ASME B1.20.1	1/4 NPT Internal thread, 1/2 NPT Male thread
The SP10 meter uses a flat process connection	
ISO 228-1	G 1/2 G 1 A
DIN 3852-A	G 1 ½ A
Model SP10 instrument aseptic process connection	
DIN 32676, ISO 2552	clamp 1 " clamp 1 ½ " clamp 2 "

Size mm




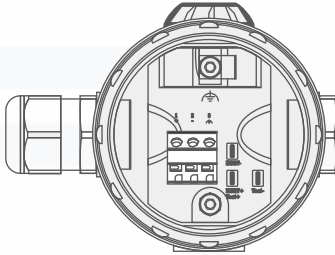


Process connection



Connection diagram

This includes nonlinearity, hysteresis, non-repeatability, zero point and final value deviations (corresponding to measurement deviations, refer to IEC 61298-2). Calibration in vertical mounting position with process connection at bottom.

Join	wiring
Power source DC 12 to 36 V 	1 L+ 2 L-
exportation 4 to 20 mA, two-wire Load independent current: 4 to 20 mA 	1 L+ 2 L-
Test the connection current output Ammeter inherent resistance $\leq 10\Omega$	TEST + TEST -
HART® test connection There must be resistance!	HART + HART -
FE (Functional grounding) 	3
Grounding or potential equalization	shell
Cable joint 	-

SP10-Selection composition

Selection example **SP10**

1	G	2	A	3	E	4	G	5	P	6	Y	7	B	8	X	9	L	10	O	13	N
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	---	----	---

1.Type of stress	G	Gauge pressure
	A	Absolute pressure
	N	Negative pressure
2.Measuring range	A	-0.6...100MPa (G- gauge pressure)
	B	0~60MPa (A- absolute pressure)
	C	-100~0kPa (N- negative pressure)
3.Display type	E	Field LED digital display
	F	Field LCD digital display
4.measurement accuracy	G	0.1%
	H	0.075%
	I	0.05%
	T ()	Other accuracy
5.Output signal	N	0~5V DC (three-wire)
	O	1 ~ 10 DC (three-wire)
	P	4~20mA
	Q	4~20mA, HART protocol
	R	0-5V DC, HART protocol
	S	FF bus
	U	Profibus
	T ()	Other output signals
6.Electrical interface	X	1/2NPT
	Y	M20*1.5
	Z	G1/2
	T ()	Other electrical interfaces
7.procedure linkage	A	G1 ½ external thread
	B	G1 external thread
	C	G3/4 external thread
	D	G1/2 external thread
	E	1½NPT external thread
	F	1NPT external thread
	G	3/4NPT external thread
	H	1/2NPT external thread
	I	M27*2 external thread
	J	M20*1.5 external thread
T ()	Other thread specifications	
8.Shell material	U	Aluminum, polyurethane coating
	X	Stainless steel
	T ()	Other materials
9.Body material	S	304
	L	316L
	T ()	Other materials
10.Liquid material	U	304SS
	O	316L
	T ()	Other materials

SP10-Selection composition

Selection example **SP10** **G** **A** **E** **G** **P** **Y** **B** **X** **L** **O** **N**

1 2 3 4 5 6 7 8 9 10 13

11.Mounting bracket (optional)	R	2 Inch pipe mounting (stainless steel)
	T ()	Other bracket types
12.Instrument valve group accessories	A	316L two valve group
	C	Cooling tower
	T ()	Other valve group types
13.Authentication	B	Intrinsically safe explosion protection
	V	Flameproof
	D	SIL certification
	E	CE certification
	N	Non-explosion proof
	T ()	Other

Instructions:

Representing the SP10 intelligent pressure transmitter, the pressure type is gauge pressure, with a measurement range of 0~10MPa, equipped with LED digital display, accuracy of 0.1%, output signal of 4-20mA, electrical interface of M20 * 1.5, process connection of G1 external thread, room temperature type, shell material of stainless steel, body material of 316L stainless steel, and liquid connection material of 316L stainless steel. The 11th/12th item in the table is optional and not explosion-proof.

Product Certification

Compliance and approval; Ludwig pressure gauges meet key standards and certifications for process measurement technology; Thus guaranteeing the highest reliability in such Settings;

