CDS-3151M Series

Smart Transmitters

Catalogue

Version 2009.06.23

Beijing Huakong Technology Co., Ltd

Contents

Brief Introduction

Company Profile

Beijing Huakong Technology Co., Ltd, registered in Zhongguancun Science and Technology Zone, is an innovative and high-tech corporation specialized in the research of automation control technology and the developing, manufacturing and selling of automation products. It was set up in March 1996, with the registered capital of over 50,000,000 RMB. Beijing Huakong Technology Co., Ltd., which is held by Beijing Huakong Group, is a limited liability company with clear property and canonical operation. It is a knowledge and technology intensive corporation, for 70% of its employees have junior college degrees.

Products Development

Based on the research fruit of 95 Program, Beijing Huakong Technology Co., Ltd. now produces and sells all kinds of industrial automation intelligent instruments in conformity with HART, FF, including temperature transmitter, pressure transmitter, and differential pressure transmitter etc. At the same time, we also provide instrument-manufacturing companies with high-quality Fieldbus products, OEM components and relevant optional parts as we do before.

Our main products include: CDS-3151M series smart transmitters based on HART protocol and Fieldbus Foundation; SDS system based on CAN and Profibus protocol; Fieldbus control system; intelligent module; signal conditioning module; data gathering system; I/O cards; as well as all kinds of relevant software.

In order to cooperate better with our worldwide customers, we have become the members of Fieldbus Foundation, HART Communication Foundation and OPC Foundation since 1996. We dedicate ourselves to the development and research of Fieldbus technology, constantly putting out new Fieldbus products, in order to make great contribution to the development of Fieldbus in China.

Quality Control

Beijing Huakong Technology Co., Ltd. possesses a set of advanced and self-contained equipment system, carrying out developing, manufacturing, testing and examining for all its products. The company executes strictly the ISO9001 standard, and has passed the international ISO9001 (2000) Quality System. Now it has acquired the ISO9001 Quality System Authentication from both China and UK. That is to say, the company is able to carry out effective quality control throughout the whole process of products manufacturing.

Marketing Service

Until now, Beijing Huakong Technology Co., Ltd. has set up a group of offices, branches and agencies in Beijing, Nanjing, Xi'an, Chengdu, Chongqing, and Ha'erbin etc. Depending on our marketing net system, now we provide our customers with full marketing services aimed at the satisfaction of all of our customers. Our website provides all kinds of convenient services, such as information download, technology intercommunion, and online orders. So our customers could take full advantage of our website to get the latest information of our company at the first time, and meantime enjoy our satisfactory services of getting the effective technology support, timely information feedback, perfect problem solution and convenient order supply etc.

Hand-in-hand Cooperation

Beijing Huakong Technology Co., Ltd. takes all kinds of opportunities by all means to enhance the cooperation with all researching institutes, designing academies, junior colleges as well as specialists and

scientists in automation control field, in order to develop high-level new technology and new products jointly. We also explore actively the overseas market, participating in the international competition. Beijing Huakong Technology devotes itself in Fieldbus technology and has set up Xi'an Fieldbus Intelligent Instruments Co., Ltd. as its manufacturing base, which we believe will bring the automation instrument industry a brand-new revolution and add great power to the development of national automation industry. We hope sincerely that we could set up comprehensive relationship with all circles home and abroad, getting together to make great contribution to the industry control enterprise of China.

Brief Introduction of CDS-3151M Transmitters

CDS-3151M series Capacitive Smart Pressure Transmitters are high-precision smart instruments that are developed and manufactured solely by Beijing Huakong Technology Co., Ltd. Based on our research and practice in this area for years, we have invested and set up Xi'an Fieldbus Intelligent Instrument Co., Ltd. as our manufacturing base for this kind of products.

CDS-3151M series Capacitive Smart Transmitters applied the high accuracy small smart sensor with aboard advanced technology. Its conversion principle is to replace the analog signal amplifying circuit and A/D conversion circuit with isolated digital capacitive circuit, and meantime take the digital compensation technology to compensate temperature and static pressure, which greatly improves the measurement precision and reduces the temperature drift. The complete unit transmitter is characterized by its long-term stability, high reliability and self-diagnosis capability. With extremely high performance price ratio, it has become the mainstream products in the transmitter market.

This series of products are characterized by the novel design principle, complete specifications, simplicity in installation and use, as well as the safety in explosion proof. It is famous especially for its high precision, small size, light weight, easy adjustment, long-term stability, applicability in rough conditions and perfect performance on one-way overload protection. Therefore, this series of products enjoy high reputation in both domestic and overseas markets. CDS-3151M series Capacitive Smart Transmitters include Pressure Transmitter, Differential Pressure Transmitter, Absolute Pressure Transmitter, Remote Transmission Transmitter, Liquid Level Transmitter and other relevant optional parts. This series of products in conformity with the current ''IEC'' standards in China, are applicable comprehensively in many areas, such as electrical, metallurgical, petrochemical, pharmacal and curing etc.

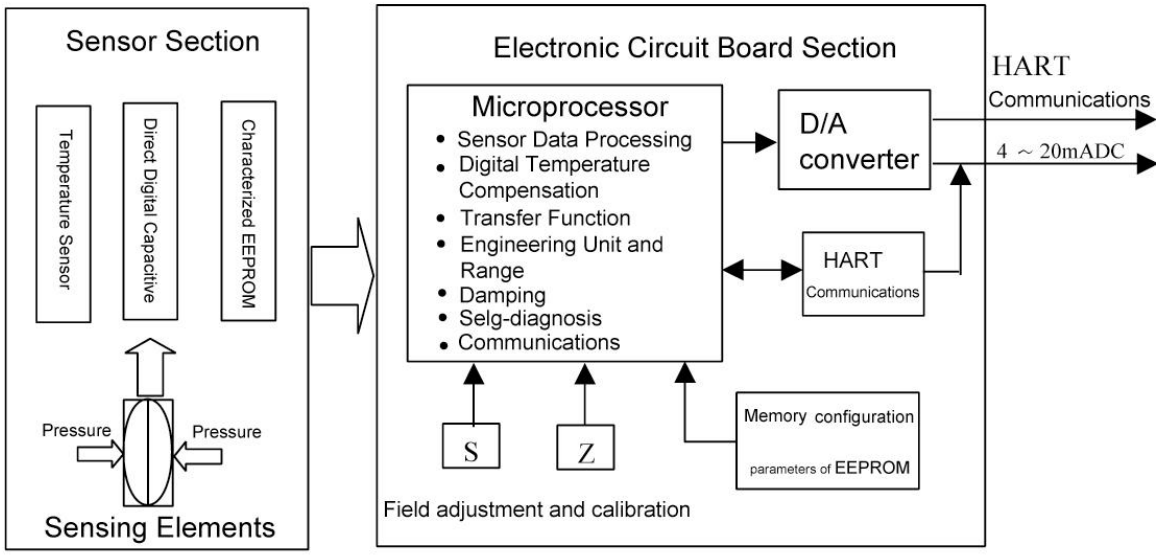
Features

- Real electrical isolation, thoroughly eliminating the ground influence, and meantime improving the anti-jamming performance;
- Enhanced anti-jamming design, thus better field anti-jamming performance;
- Embedded all CDS-3151M core circuits into the sensor part and sealed whole, which greatly improve the reliability of the transmitter. This technology is original in China.
- Small temperature drift; we make the unified temperature compensation to the circuit board and sensor in the same temperature environment, thus better compensation effect, and reduced temperature drift;
- Powerful field configuration function: setting zero, span, shift display, unit, URL & LRL, damping etc.;
- Highlight backlight LCD display, reading in darkness available; LCD display could rotate 360°, easy for field reading;
- Measurement range: 0~0.2kPa~41.37Mpa;
- Accuracy up to 0.075%; rangeability up to 100:1;
- No interaction between zero-setting and range adjustment;
- Two-wire system in conformity with HART® protocol that enables digital communications with ROSEMOUNT275 or Huakong HK-HART375 without intermitting the output of the analog value;
- Built-in non-losable memory;
- High stability, high precision, adjustable damping and strong ability on one-way overload protection;
- No mechanical transmission parts therefore less maintenance; sturdy and vibration proof;
- Optional materials for the chaff that contacts the medium;

- Explosion-proof housing;
- Proved excellent performance and reliability.

Working Principle

CDS-3151M transmitter is composed by integrated sensor, conversion board, and LCD display. The sensor section includes sensing elements, isolated digital capacitive circuit, temperature sensor and HK-H100A main circuit module etc. The conversion board, which has two non-contact key-press buttons. The principle is summarized as follows:

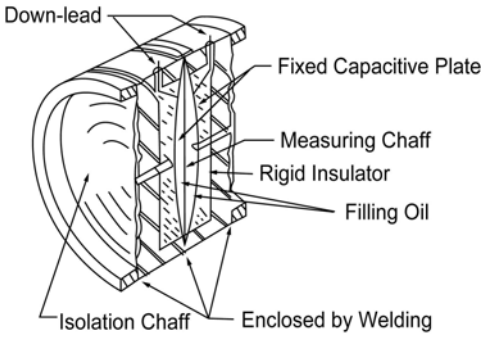


Principle Block Diagram of CDS-3151

Function Introduction:

Sensing Elements:

The medium pressure is transferred to the measuring chaff in the center of the chamber through isolation chaff and filling oil. The measuring chaff is a loaded elastic element used to check and measure the pressure acted on it. The displacement of the measuring chaff (Max. 0.004inch(0.10mm)) is in direct proportion to the differential pressure. The position of the measuring chaff is detected by the fixed capacitive plates at two sides by means of direct digital capacitive circuit.



Drawing of Sensing Elements

Isolated Digital Capacitive Circuit:

This circuit is used to convert the pressure borne by the sensing elements to frequency signal and make the signal in direct proportion to the pressure signal for the CPU to sample.

Temperature Sensor:

It is used to measure the working medium temperature of the pressure sensor, convert it to digital signal and provide it for microprocessor to carry out digital temperature compensation.

Specialized EEPROM:
It is used to save temperature compensation for transmitter, specialized curve and specialized data of sensor, and digital inching data. The data can still be stored in the memory intact even if the power is shut off. The total storage capacity of EEPROM is 512 bytes.

HK-H100A Main Circuit Module:
Microprocessor controls the running of the transmitter by checking and measuring the operating pressure and working medium temperature of the sensing elements with isolated digital capacitive circuit and temperature sensor. Microprocessor makes linearization treatment and compensation operation to the data in the specialized EEPROM of the sensor, works out the working medium pressure, and transmits it to the D/A converter and HART® Communications section. In addition, the microprocessor has such functions as the calculation of transfer function, the conversion of engineering unit and range, damping adjustment and self-diagnosis.

D/A Converter:
D/A converter converts the pressure digital signal corrected by microprocessor to 4~20mA analog signal according to the output style and transmits it to the output circuit.

HART® Communications：
Digital communications circuit provides an interface between transmitter and HK-HART375 manual operating instrument or control system. This circuit checks and measures FSK (Frequency Shift Keying) signal superposed on the 4~20mA loop, on which the transmit section superposes the signal at the same style.

LCD Display:
It could display pressure, current, %, ambient temperature etc. With key-press buttons, it could also achieve field adjustment function.

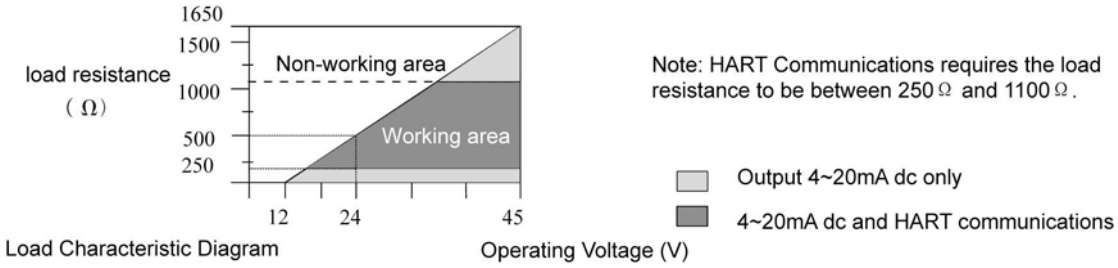
Technical Performance

Application Object: liquid, gas or steam

Output Signal: 4~20mA output superposed with HART® protocol digital signal (two-wire system)

Power Supply: External power supply 24V DC, (power range: 12V~36V)

Load Characteristic: The maximum load resistance allowed by the load resistance circuit R_{max}=(E-12)/0.02(Ω), as shown in the figure below.



Load Characteristic Diagram

Migration Characteristic: Under whatever output conditions, neither the upper limit nor the lower limit of the range can exceed the range limit after positive/negative migration.

Temperature Range:

Medium Temperature	-40~104℃
Storage Temperature	-40~85℃
Operating Temperature for the complete unit	-40~85℃
	-20~70℃(with LCD optional)

Relative Humidity: 0~100%

Volume Deviation: Less than 0.16 cm^3

Damping: Adjustable time constant between 0.2~32.0s

Start Time: 3s, warm-up free

Connecting Fitting for Pressure Import:

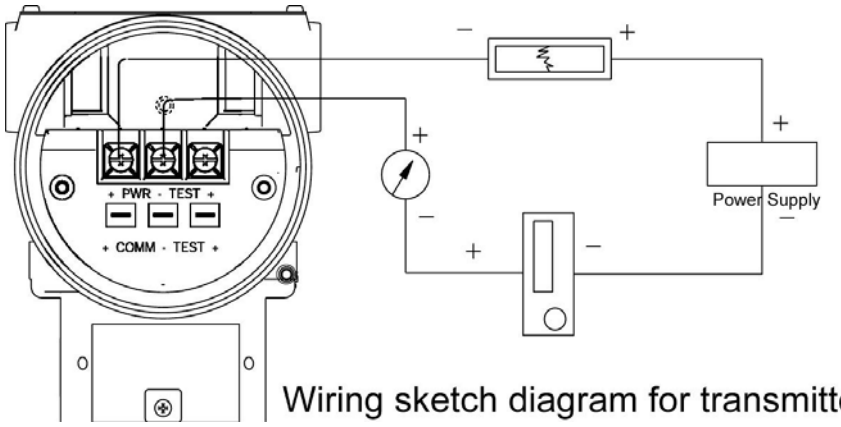
Flange 1/4-18NPT (tapered tube thread);

Coupling 1/2-14NPT (tapered tube thread).

Electric Connection: 1/2-14NPT conductor conduits with thread ends, wiring terminals and matching teat block.

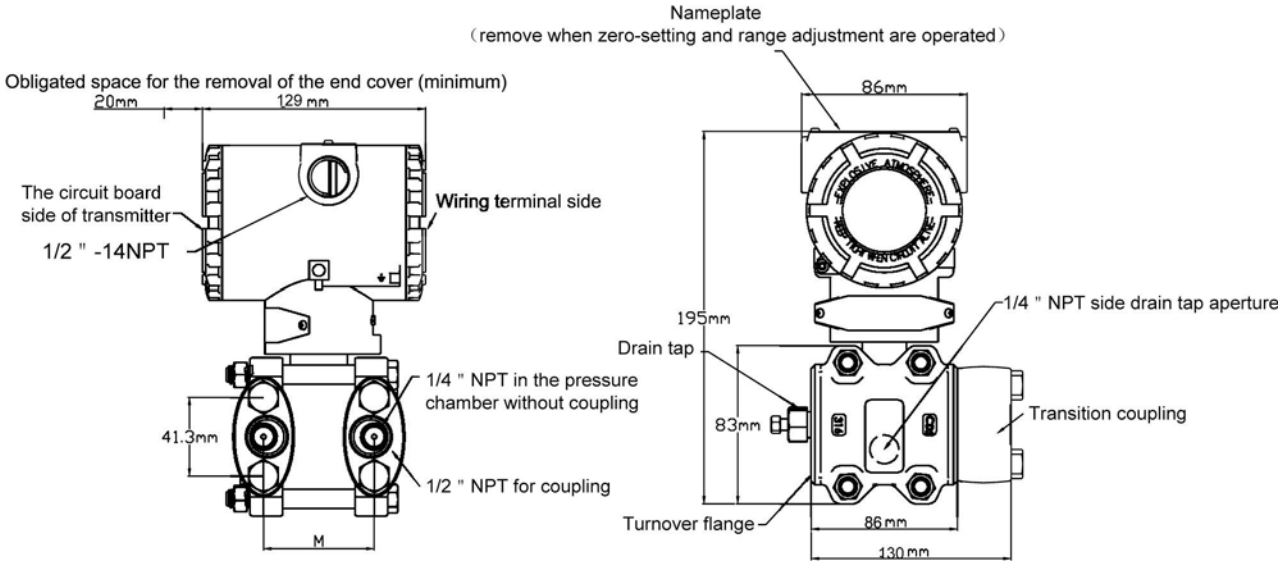
Weight: 3.5Kg (optional parts not included)

Wiring Sketch Diagram

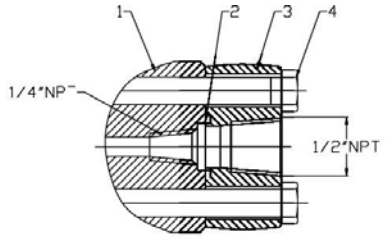


Wiring sketch diagram for transmitter

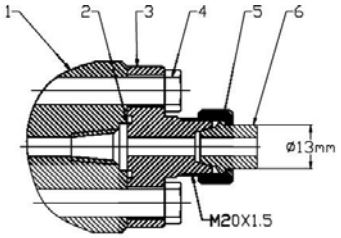
Dimensions



Measuring Range (Code)	3,4,5	6,7	8	9	0
M (mm)	54	56	57	58	59



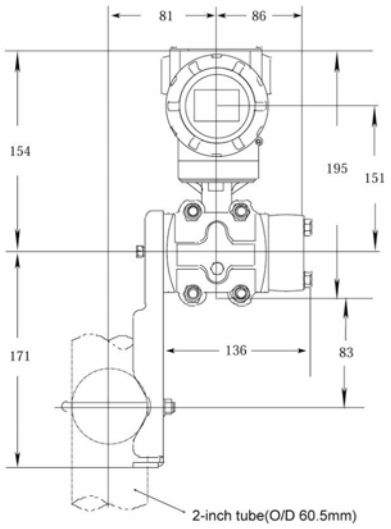
(a) Tapered tube female thread connection
(model code: N)
1-Flange for the pressure cavity of transmitter;
2-"O" ring;
3-coupling for tapered tube female thread connection;
4-bolt

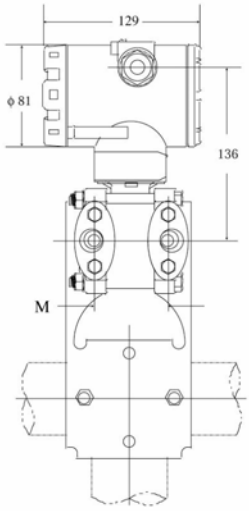


(b) Spherical taper connection
(model code: D4)
1-Flange for the pressure cavity of transmitter;
2-"O" ring;
3-Coupling for spherical taper connection, M20x1.5 male thread;
4-Bolt；5-Nut；6-Spherical coupling;
（To be welded to the pressure import tube at Φ13）

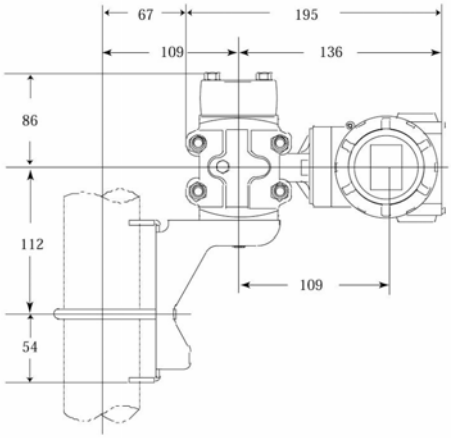
Drawing for Mounting and Connection

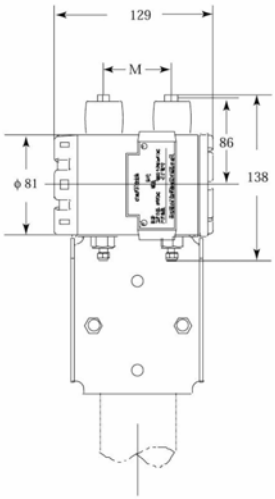
Drawing for horizontal pipe-type



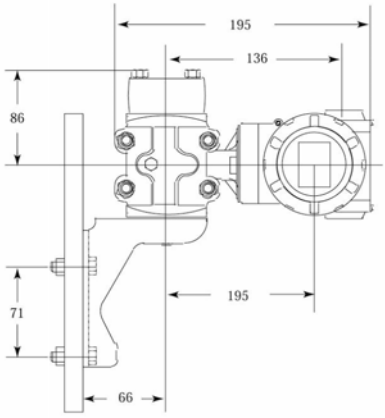


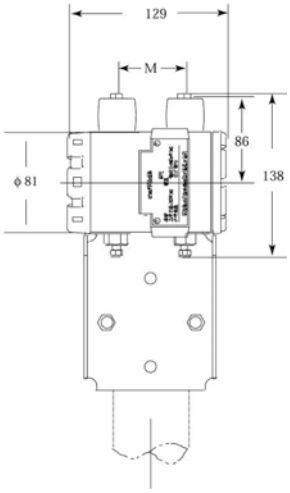
Drawing for vertical tube mounting





Drawing for vertical plate mounting





CDS-3151MGP Smart Pressure Transmitters

Technical Performance

Application Object: liquid, gas or steam

Measurement Range:

Range 3 0-0.2~7.0kPa (0-20~715mm H_2O)

Range 4 0-0.4~37.4kPa (0-38~3810 mm H_2O)

Range 5 0-1.8~186.8kPa (0-190~19050 mm H_2O)

Range 6 0-6.9~690kPa (0-0.07~7kgf/cm^2)

Range 7 0-20.6~2068kPa(0-0.021~21kgf/cm^2)

Range 8 0-68.9~6890kPa(0-0.7~70kgf/cm^2)

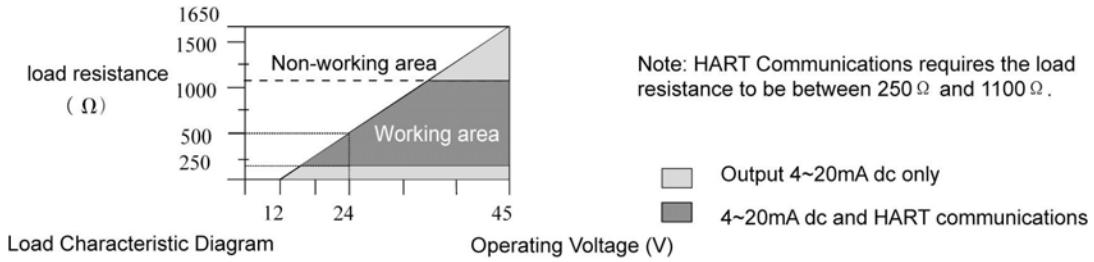
Range 9 0-206.8~20680kPa(0-2.1~210kgf/cm^2)

Range 0 0-413.7~41370kPa(0-4.22~422kgf/cm^2)

Output Signal: 4~20mA output superposed with HART® protocol digital signal (two-wire system)

Power Supply: External power supply 24V DC, (power range: 12V~36V)

Load Characteristic: The maximum load resistance allowed by the load resistance circuit R_{max}=(E-12)/0.02(Ω), as shown in the figure below.



Load Characteristic Diagram

Installation in dangerous places:

Explosion Proof dIICT5

Intrinsical Safety iaIICT5

Migration Characteristic: Neither the upper limit nor the lower limit of the range can exceed the range limit after positive/negative migration. At the minimum range, the maximum positive migration is 0.99URL while the maximum negative migration is – URL.

Temperature Range:

Medium Temperature	-40~104℃
Storage Temperature	-40~85℃
Operating Temperature for the complete unit	-40~85℃
	-20~70℃(with LCD optional)

Relative Humidity: 0~100%

Overpressure Limit: The transmitter will not be damaged when 0 (absolute pressure) ~13.8MPa is applied for the range of below 6.89 Mpa; 0 (absolute pressure) ~31.2MPa for the range of 20.68 MPa; or 0 (absolute pressure) ~51.45MPa for the range of 41.37 MPa. The normal operating pressure ranges from 3.45kPa (absolute pressure) to the upper limit of the transmitter range. The flange can bear the pressure of 68.9 Mpa.

Volume Deviation: Less than 0.16 cm^3

Damping: Adjustable time constant between 0.2~32.0s

Start Time: 3s, warm-up free

Performance Index

（Under the circumstance of no migration, isolation chaff of 316 stainless steel and other standard measuring conditions）

Range Ratio: 100:1

Precision:

For ranges of 3,4 and 5

±0.075% of the calibration range at range ratio from 1:1 to 10:1;

±0.0375 (1+0.1URL/range)1% of the range at range ratio from 10:1 to 100:1;

For ranges of 6,7,8,9 and 0

±0.15% of the calibration range at range ratio from 1:1 to 10:1;

±0.075 (1+0.1URL/range)% of the range at range ratio from 10:1 to 100:1;

Stability: With error of ±0.15% of the maximum range within six months

Temperature Effect:

For ranges of 4,5,6,7 and 8

The general error including zero and range is ±(0.15+0.05URL/range)%/28℃.

Note: The temperature error is doubled for the ranges of 3,9 and 0.

Overpressure Effect: The error is ±0.25% of the maximum range when the pressure of 140kgf/cm^2 is applied.

Power Supply Effect: Less than ±0.005%/V of the output range.

Vibration Effect: The error is ±0.05%/g of the maximum range in any axial direction at the frequency of 200Hz.

Load Effect: No load effect in the load working area as long as the voltage applied to the transmitter is higher than 12V.

Installation Position Effect: The Zero Point Error of no more than 0.25kPa can be generated at most. It can be calibrated and has no effect on the range. The rotation of the flange has no effect on the measurement.

Electromagnetic Radiation: In conformity with IEC801.

Construction Index

Construction Materials:

Isolation Chaff and Drain Tap: 316 stainless steel, Hastelloy C, Monel alloy and Tantalum;

O-shaped Ring in contact with measured medium: Bura-N, Viton and Ethylene-propylene;

Filling Liquid: Silicone oil

Flange and Coupling: 316 stainless steel, Hastelloy C and Monel;

Bolt: Carbon steel, galvanized, 1Cr18Ni9, 0Cr17Ni4CuNb and 42CrMo;

Electrical Housing: Low copper aluminium alloy

Coating: Polyester resin

Connecting Fitting for Pressure Import:

Flange 1/4-18NPT (tapered tube thread);

Coupling 1/2-14NPT (tapered tube thread).

Electric Connection: 1/2-14NPT conductor conduit with thread ends, wiring terminals and matching teat block.

Weight: 3.5Kg (optional parts not included)

CDS-3151MGP Smart Pressure Transmitter Catalogue

CDS-3151MGP Smart Pressure Transmitter							
CDS-3151MGP		Smart Gauge Pressure Transmitter					
	Code	Measurement Range					
	3	0-0.2～7.0kPa					
	4	0-0.4～37.4kPa					
	5	0-0.18～186.8kPa					
	6	0-6.9～690kPa					
	7	0-20.6～2068kPa					
	8	0-68.9～6890kPa					
	9	0-206.8～20680kPa					
	0	0-413.7～41370kPa					
		Code	Output				
		E	4~20mA DC output with HART protocol digital signal (two-wire system)				
			Code	Material			
				Flange Coupling	Drain Tap	Isolation Chaff	Filling Liquid
			22	316L SST	316L SST	316L SST	Silicone oil
			23	316L SST	316L SST	Hastelloy C	Silicone oil
			24	316L SST	316L SST	Monel	Silicone oil
			25	316L SST	316L SST	Tantalum	Silicone oil
			33	Hastelloy C	Hastelloy C	Hastelloy C	Silicone oil
			44	Monel	Monel	Monel	Silicone oil
				Code	Optional Parts		
				M4	LCD display		
				B1	Bend bracket for pipe-type		
				B2	Bend bracket for disk-type		
				B3	Flat bracket for pipe-type		
				D1	With flange drain tap on the top		
				D2	With flange drain tap on the bottom		
				N	1/4NPT		
				Y	1/2NPT		
				Da	Explosion proof		
				Fa	Intrinsically safe		

CDS-3151MAP Smart Absolute Pressure Transmitters

Technical Performance

Application Object: liquid, gas or steam

Measurement Range:

Range 4 0-0.4~37.4kPa (0-2.8~280mmHg) Absolute Pressure

Range 5 0-1.8~186.8kPa (0-0.26~26.9psi) Absolute Pressure

Range 6 0-6.9~690kPa (0-0.99~99.4psi) Absolute Pressure

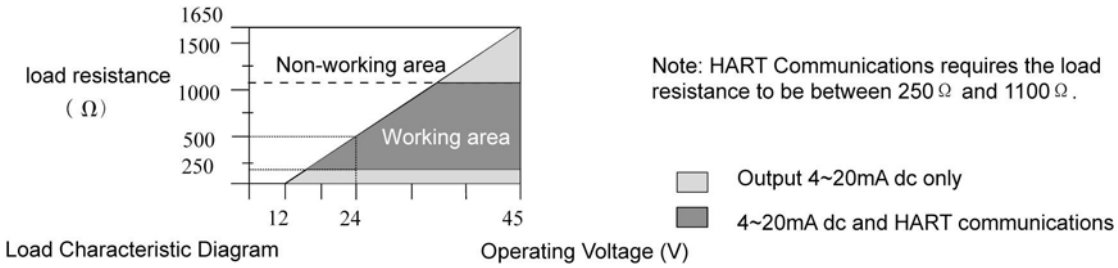
Range 7 0-20.6~2068kPa (0-2.9~298psi) Absolute Pressure

Range 8 0-68.9~6890kPa (0-9.92~992.2psi) Absolute Pressure

Output Signal: 4~20mA output superposed with HART® protocol digital signal (two-wire system)

Power Supply: External power supply 24V DC, (power range: 12V~36V)

Load Characteristic: The maximum load resistance allowed by the load resistance circuit R_{max}=(E-12)/0.02(Ω), as shown in the figure.



Load Characteristic Diagram

Installation in dangerous places:

Explosion Proof dIICT5

Intrinsical Safety iaIICT5

Migration Characteristic: Under whatever output conditions, neither the upper limit nor the lower limit of the range can exceed the range limit after positive/negative migration. The maximum positive migration is 0.975URL. There is no negative migration for absolute pressure transmitter.

Temperature Range:

Medium Temperature	-40~104℃
Storage Temperature	-40~85℃
Operating Temperature for the complete unit	-40~85℃
	-20~70℃(with LCD optional)

Relative Humidity: 0~100%

Overpressure Limit: The transmitter will not be damaged when 0 (absolute pressure) ~13.78MPa is applied. The flange can bear the pressure of 68.9 Mpa. The normal operating pressure ranges from 0kPa (absolute pressure) to the upper limit of the transmitter range.

Volume Deviation: Less than 0.16 cm^3

Damping: Adjustable time constant between 0.2~32.0s

Start Time: 3s, warm-up free

Performance Index

（Under the circumstance of no migration, isolation chaff of 316 stainless steel and other standard measuring conditions）

Range Ratio: 100:1

Precision:

±0.15% of the calibration range at range ratio from 1:1 to 10:1;

±0.075(1+0.1URL/range)%of the calibration range at range ratio from 10:1 to 100:1;

Stability: With error of ±0.2% of the maximum range within six months

Temperature Effect:

The total error including range and zero is ±(0.15+005URL/range)%/28℃.

Overpressure Effect: The error is ±0.25% of the maximum range when the pressure of 140kgf/cm^2 is applied.

Power Supply Effect: Less than ±0.005%/V of the output range.

Vibration Effect: The error is ±0.05%/g of the maximum range in any axial direction at the frequency of 200Hz.

Load Effect: No effect of load in the load working area as long as the voltage applied to the transmitter is higher than 12V.

Installation Position Effect: The Zero Point Error of no more than 0.25kPa can be generated at most. It can be calibrated and has no effect on the range. The rotation of the flange has no effect on the measurement.

Electromagnetic Radiation: In conformity with IEC801.

Construction Index

Construction Materials:

Isolation Chaff and Drain Tap: 316 stainless steel, Hastelloy C and Monel alloy;

Flange and Coupling: 316 stainless steel, Hastelloy C and Monel;

O-shaped Ring in contact with measured medium: Bura-N, Viton and Ethylene-propylene;

Filling Liquid: Silicone oil

Bolt: Carbon steel, galvanized, 1Cr18Ni9, 0Cr17Ni4CuNb and 42CrMo;

Electrical Housing: Low copper aluminium alloy

Coating: Polyester resin

Connecting Fitting for Pressure Import:

Flange 1/4-18NPT (tapered tube thread);

Coupling 1/2-14NPT (tapered tube thread).

Electric Connection: 1/2-14NPT conductor conduit with thread ends, wiring terminals and matching teat block.

Weight: 3.5Kg (optional parts not included)

CDS-3151MAP Smart Absolute Pressure Transmitters Catalogue

CDS-3151MAP Smart Absolute Pressure Transmitter Specifications

CDS-3151MAP	Smart Absolute Pressure Transmitter				
Code	Measuring Range（absolute pressure）				
4	0-0.4～37.4kPa				
5	0-1.8～186.8kPa				
6	0-6.9～690kPa				
7	0-20.6～2068kPa				
8	0-68.9～6890kPa				
	Code	Output			
	E	4~20mA DC output with HART protocol digital signal (two-wire system)			
		Code	Material		
			Flange Coupling	Drain Tap	Isolation Chaff
		22	316L SST	316L SST	316L SST
		23	316L SST	316L SST	Hastelloy C
		24	316L SST	316L SST	Monel
		33	Hastelloy C	Hastelloy C	Hastelloy C
		44	Monel	Monel	Monel
			Code	Optional Parts	
			M4	LCD display	
			B1	Bend bracket for pipe-type	
			B2	Bend bracket for disk-type	
			B3	Flat bracket for pipe-type	
			D1	With flange drain tap on the top	
			D2	With flange drain tap on the bottom	
			N	1/4NPT	
			Y	1/2NPT	
			Da	Explosion proof	
			Fa	Intrinsically safe	

CDS-3151MDP Smart Differential Pressure (Flow) Transmitters

Technical Performance

Application Object: liquid, gas or steam

Measurement Range:

Range 3 0-0.2~7.0kPa (0-7.15~715mmH_2O)

Range 4 0-0.4~37.4kPa (0-38.1~3810 mmH_2O)

Range 5 0-1.8~186.8kPa (0-190.5~19050 mmH_2O)

Range 6 0-6.9~690kPa (0-0.07~7kgf/cm^2)

Range 7 0-51.7~2068kPa (0-0.525~21kgf/cm^2)

Range 8 0-68.9~6890kPa (0-0.7~70 kgf/cm^2)

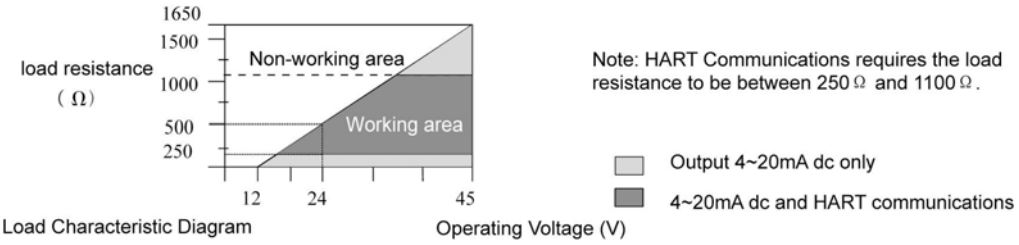
Output Signal:

Linear output: 4~20mA output superposed with HART® protocol digital signal (two-wire system)

Square root output: Output and differential pressure are in square root relationship at input pressure from 1.0% to 100%, and are in linear relationship in divided sections at input pressure from 0% to 1.0%. There is no saltus in 4~20mA DC output with HART® protocol digital signal (two-wire system). The user can choose linear output or square root output according to the field conditions.

Power Supply: External power supply 24V DC, (power range: 12V~36V)

Load Characteristic: The maximum load resistance allowed by the load resistance circuit R_{max}=(E-12)/0.02(Ω), as shown in the figure below.



Load Characteristic Diagram

Installation in dangerous places:

Explosion Proof dIICT5

Intrinsical Safety iaIICT5

Migration Characteristic: Neither the upper limit nor the lower limit of the range can exceed the range limit after positive/negative migration. At the minimum range, the maximum positive migration is 0.975URL while the maximum negative migration is – URL.

Positive/negative migration can calibrate 10% of the flow range at Square root output.

Temperature Range:

Medium Temperature	-40~104℃
Storage Temperature	-40~85℃
Operating Temperature for the complete unit	-40~85℃
	-20~70℃(with LCD optional)

Relative Humidity: 0~100%

Overpressure Limit: The transmitter will not be damaged when 0 (absolute pressure) ~13.76MPa is applied to any side of the transmitter. The flange can bear the pressure of 68.9 Mpa. The normal operating pressure ranges from 3.45kPa (absolute pressure) to the upper limit of the transmitter range.

Volume Deviation: Less than 0.16 cm^3

Damping: Adjustable time constant between 0.2~32.0s

Start Time: 3s, warm-up free

Performance Index

（Under the circumstance of no migration, isolation chaff of 316 stainless steel and other standard measuring conditions）

Range Ratio: 100:1

Precision:

For ranges of 3,4 and 5

±0.075% of the calibration range at range ratio from 1:1 to 10:1;

±0.0375(1+0.1URL/range)1% of the range at range ratio from 10:1 to 100:1;

For ranges of 6,7 and 8

±0.15% of the calibration range at range ratio from 1:1 to 10:1;

±0.075(1+0.1URL/range)% of the range at range ratio from 10:1 to 100:1;

Stability: With error of ±0.15% of the maximum range within six months

Temperature Effect:

For ranges of 4,5,6,7 and 8

The total error including range and zero is ±(0.15+0.05URL/range)%/28℃.

Note: The temperature error is doubled for the ranges of 3.

Overpressure Effect: The error is ±0.25% of the maximum range when the pressure of 140kgf/cm^2 is applied.

Static Pressure Effect:

The Zero Point Error at Linear Output: After the static pressure of 140kgf/cm^2 is applied, the Zero Point Error for ranges of 4 and 5 is ±0.25% of the maximum range; and the Zero Point Error for ranges of 3,6,7 and 8 is ±0.5% of the maximum range.

Range Error: The range error for ranges of 4,5,6,7 and 8 is -1±0.25%/6.89Mpa of the maximum range. The range error for range 3 is –1.5±0.25% of the maximum range. This is a system error that can be eliminated by actual static pressure calibration before installation.

Power Supply Effect: Less than ±0.005%/V of the output range.

Vibration Effect: The error is ±0.05%/g of the maximum range in any axial direction at the frequency of 200Hz.

Load Effect: No effect of load in the load working area as long as the voltage applied to the transmitter is higher than 12V.

Installation Position Effect: The Zero Point Error of no more than 0.25kPa can be generated at most. It can be calibrated and has no effect on the range. The rotation of the flange has no effect on the measurement.

Electromagnetic Radiation: In conformity with IEC801.

Construction Index

Construction Materials:

Isolation Chaff and Drain Tap: 316 stainless steel, Hastelloy C and Monel;
Flange and Coupling: 316 stainless steel, Hastelloy C and Monel;
O-shaped Ring in contact with measured medium: Bura-N, Viton and Ethylene-propylene;
Filling Liquid: Silicone oil
Bolt: Carbon steel, galvanized, 1Cr18Ni9, 0Cr17Ni4CuNb and 42CrMo;
Electrical Housing: Low copper aluminium alloy
Coating: Polyester resin

Connecting Fitting for Pressure Import:

For ranges of 3,4 and 5, the connecting thread of the two flanges is 1/4-18NPT, the hole spacing is 54mm, the connecting thread of the two couplings is 1/2-14NPT, the hole spacing is 51mm, 54mm or 57mm.

For great differential pressure transmitter with the ranges of 6,7 and 8, the connecting thread of the two flanges is 1/4-18NPT, the hole spacing is more than 54mm, the connecting thread of the two couplings is 1/2-14NPT (tapered tube thread).

Electric Connection: 1/2-14NPT conductor conduit with thread ends, wiring terminals and matching teat block.

Weight: 3.5Kg (optional parts not included)

CDS-3151MDP Smart Differential Pressure (Flow) Transmitters Catalogue

CDS-3151MDP Smart Differential Pressure (Flow) Transmitter							
CDS-3151MDP		Smart Differential Pressure (Flow) Transmitter					
	Code	Measurement Range					
	3	0-0.2～7.0kPa					
	4	0-0.4～37.4kPa					
	5	0-1.8～186.8kPa					
	6	0-6.9～690kPa					
	7	0-20.6～2068kPa					
	8	0-68.9～6890kPa					
		Code	Output				
		E	4~20mA DC linear output with HART protocol digital signal				
		J	4~20mA DC square root output with HART protocol digital signal				
			Code	Material			
				Flange Coupling	Drain Tap	Isolation Chaff	Filling Liquid
			22	316L SST	316L SST	316L SST	Silicone oil
			23	316L SST	316L SST	Hastelloy C	Silicone oil
			24	316L SST	316L SST	Monel	Silicone oil
			25	316L SST	316L SST	Tantalum	Silicone oil
			33	Hastelloy C	Hastelloy C	Hastelloy C	Silicone oil
			35	Hastelloy C	Hastelloy C	Tantalum	Silicone oil
			44	Monel	Monel	Monel	Silicone oil
				Code	Optional Parts		
				M4	LCD display		
				B1	Bend bracket for pipe-type		
				B2	Bend bracket for disk-type		
				B3	Flat bracket for pipe-type		
				D1	With flange drain tap on the top		
				D2	With flange drain tap on the bottom		
				N	1/4NPT		
				Y	1/2NPT		
				Da	Explosion proof		
				Fa	Intrinsically safe		

CDS-3151MHP Smart High Static Pressure Differential Pressure (Flow) Transmitters

Technical Performance

Application Object: liquid, gas or steam

Measurement Range:

Range 4 0-0.4~37.4kPa (0-38~3810 mmH_2O)

Range 5 0-1.8~186.8kPa (0-190.5~19050 mmH_2O)

Range 6 0-6.9~690kPa (0-0.07~7kgf/cm^2)

Range 7 0-20.6~2068kPa (0-0.21~21kgf/cm^2)

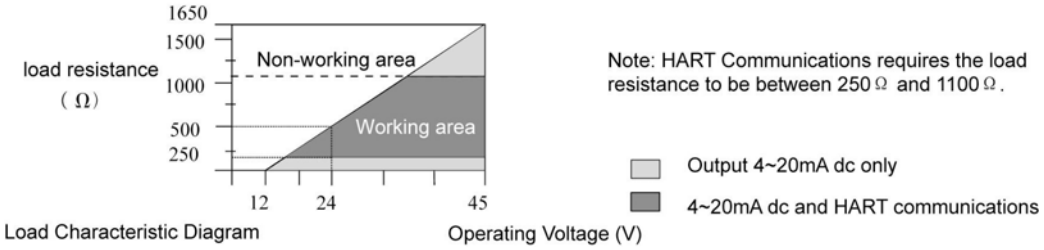
Output Signal:

Linear output: 4~20mA output superposed with HART® protocol digital signal (two-wire system)

Square root output: Output and differential pressure are in square root relationship at input pressure from 1.0% to 100%, and are in linear relationship in divided sections at input pressure from 0% to 1.0%. There is no saltus in 4~20mA DC output that is superposed with HART® protocol digital signal (two-wire system). The user can choose linear output or square root output according to the field conditions.

Power Supply: External power supply 24V DC, (power range: 12V~36V)

Load Characteristic: The maximum load resistance allowed by the load resistance circuit R_{max}=(E-12)/0.02(Ω), as shown in the figure below.



Load Characteristic Diagram

Installation in dangerous places:

Explosion Proof dIICT5

Intrinsical Safety iaIICT5

Migration Characteristic: Neither the upper limit nor the lower limit of the range can exceed the range limit after positive/negative migration. At the minimum range, the maximum positive migration is 0.975URL while the maximum negative migration is – URL.

Temperature Range:

Medium Temperature	-40~104℃
Storage Temperature	-40~85℃
Operating Temperature for the complete unit	-40~85℃
	-20~70℃(with LCD optional)

Relative Humidity: 0~100%

Static Pressure and Overpressure Limit:

Maximum operating static pressure: 31.2 Mpa

Maximum safety static pressure: 44.1 Mpa

Maximum one-way pressure: 31.2Mpa

Bearable pressure of flange: 68.9Mpa

Normal operating pressure: 3.45kPa (absolute pressure) to the upper limit of the transmitter range.

Volume Deviation: Less than 0.16 cm^3

Damping: Adjustable time constant between 0.2~32.0s

Start Time: 3s, warm-up free

Performance Index

（Under the circumstance of no migration, isolation chaff of 316 stainless steel and other standard measuring conditions）

Range Ratio: 100:1

Precision:

±0.15% of the calibration range at range ratio from 1:1 to 10:1;

±0.075(1+0.1URL/range)% of the range at range ratio from 10:1 to 100:1;

Stability: With error of ±0.15% of the maximum range within six months

Temperature Effect:

For ranges of 4,5,6 and 7,

The total error including range and zero is ±(0.15+0.05URL/range)%/28℃.

Overpressure Effect:

The changes in zero-setting when the pressure of 31.2MPa is applied

Range 4: less than ±1.0% of the maximum range

Range 5: less than ±2.0% of the maximum range

Range 6: less than ±5.0% of the maximum range

The Effect of Static Pressure:

The Zero Point Error at Linear Output: The Zero Point Error is less than ±2.0% of the maximum range after the static pressure of 31.2Mpa is applied

Range Error: -1±0.25%/6. 9Mpa of the range. This is a system error that can be eliminated by actual pressure calibration before installation.

Power Supply Effect: Less than ±0.005%/V of the output range.

Vibration Effect: The error generated is ±0.05%/g of the maximum range in any axial direction at the frequency of 200Hz.

Load Effect: No effect of load in the load working area as long as the voltage applied to the transmitter is higher than 12V.

Installation Position Effect: The Zero Point Error of no more than 0.25kPa can be generated at most. It can be calibrated and has no effect on the range. The rotation of the flange has no effect on the measurement.

Electromagnetic Radiation: In conformity with IEC801.

Construction Index

Construction Materials:

Isolation Chaff and Drain Tap: 316 stainless steel;

Flange and Coupling: 316 stainless steel;

O-shaped Ring in contact with measured medium: Bura-N, Viton and Ethylene-propylene;

Filling Liquid: Silicone oil

Bolt: Carbon steel, galvanized, 1Cr18Ni9, 0Cr17Ni4CuNb and 42CrMo;

Electrical Housing: Low copper aluminium alloy

Coating: Polyester resin

Connecting Fitting for Pressure Import:

The connecting thread of the two flanges is 1/4-18NPT (tapered tube thread);

The connecting thread of the two couplings is 1/2-14NPT (tapered tube thread).

Electric Connection: 1/2-14NPT conductor conduit with thread ends, wiring terminals and matching teat block.

Weight: 3.5Kg (optional parts not included)

CDS-3151MHP Smart High Static Pressure Differential Pressure (Flow) Transmitters Catalogue

CDS-3151MHP Smart High Static Pressure Differential Pressure (Flow) Transmitter							
CDS-3151MHP	Smart High Static Pressure Differential Pressure (Flow) Transmitter						
Code	Measurement Range						
4	0-0.4～37.4kPa						
5	0-1.8～186.8kPa						
6	0-6.9～690kPa						
7	0-20.6～2068kPa						
	Code	Output					
	E	4~20mA DC linear output with HART protocol digital signal					
	J	4~20mA DC square root output with HART protocol digital signal					
		Code	Material				
			Flange Coupling	Drain Tap	Isolation Chaff	Filling Liquid	
		22	316L SST	316L SST	316L SST	Silicone oil	
			Code	Optional Parts			
			M4	LCD display			
			B1	Bend bracket for pipe-type			
			B2	Bend bracket for disk-type			
			B3	Flat bracket for pipe-type			
			D1	With flange drain tap on the top			
			D2	With flange drain tap on the bottom			
			N	1/4NPT			
			Y	1/2NPT			
			Da	Explosion proof			
			Fa	Intrinsically safe			

CDS-3151MLT Smart Liquid Level Transmitters

Technical Performance

Application Object: liquid level in open or closed vessel

Measurement Range:

Range 4 0-0.4~37.4kPa(0-38~3810 mm H_2O)

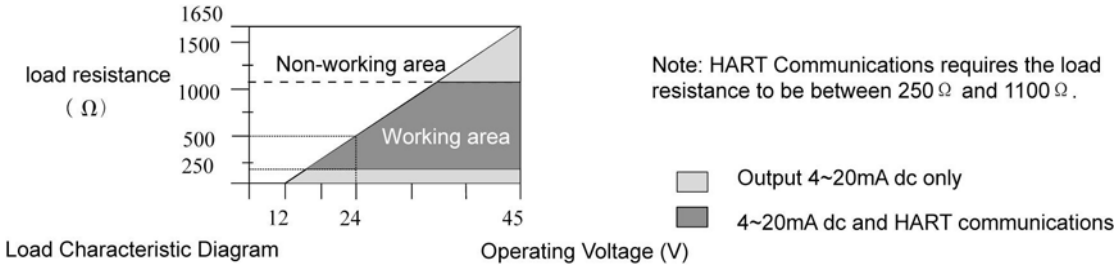
Range 5 0-1.8~186.8kPa(0-190.5~19050 mm H_2O)

Range 6 0-6.9~690kPa(0-0.07~7kgf/ cm^2)

Output Signal: 4~20mA output superimposed with HART protocol digital signal (two-wire system)

Power Supply: External power supply 24V DC, (power range: 12V~36V)

Load Characteristic: The maximum load resistance allowed by the load resistance circuit R_{max}=(E-12)/0.02(Ω), as shown in the figure below.



Installation in dangerous places:

Explosion Proof dIICT5

Intrinsical Safety iaIICT5

Migration Characteristic: Under whatever output conditions, neither the upper limit nor the lower limit of the range can exceed the range limit after positive/negative migration. At the minimum range, the maximum positive migration is 0.975URL while the maximum negative migration is -URL.

Temperature Range:

Medium Temperature	-40~149℃(filled with silicone oil)
Storage Temperature	-18~204℃(filled with inert liquid)
Operating Temperature for the complete unit	-40~85℃
	-20~70℃(with LCD optional)

Relative Humidity: 0~100%

Static Pressure and Overpressure Limit:

150lb flange: 41.37kPa (absolute pressure) ~4.9MPa (at 37℃, filled with silicone oil)

300lb flange: 41.37kPa (absolute pressure) ~4.9MPa (at 37℃, filled with silicone oil)

Volume Deviation: Less than 0.16 cm^3

Damping: Adjustable time constant between 0.2~32.0s

Start Time: 3s, warm-up free

Performance Index

（Under the circumstance of no migration, isolation diaphragm of stainless steel 316 and other standard measuring conditions）

Range Ratio: 100:1

Precision:

±0.15% of the calibration range at range ratio from 1:1 to 10:1;

±0.075(1+0.1URL/range)% of the range at range ratio from 10:1 to 100:1;

Stability: With error of ±0.15% of the maximum range in six months

Temperature Effct:

The Zero Point Error is ±0.375%/55℃ of the maximum range.

The total error including range and zero setting is ±0.75%/55℃ of the maximum range.

Power Supply Effect: Less than ±0.005%/V of the output range.

Vibration Effect: The error generated is ±0.05%/g of the maximum range in axial at the frequency of 200Hz.

Load Effect: No effect of load in the load working area as long as the voltage applied to the transmitter is higher than 12V.

Installation Position Effect:

The maximum Zero Point Error might be 0.25kPa when the pressure transmission diaphragm is at vertical position; maximum Zero Point Error might be 0.98kPa when the pressure transmission diaphragm is at horizontal position. The variables of the inserted length should be added for the insert flange. This error has no impact on range and can be eliminated by calibration.

Electromagnetic Radiation: In conformity with IEC801.

Construction Index

Construction Materials:

Diaphragm in contact with medium including washer and other contact surface: Stainless steel 316, Hastelloy C and Tantalum;

Inserted section: stainless steel 316 and Hastelloy C;

Exhaust valve: stainless steel 316 and Hastelloy C;

Flange and Joint: stainless steel 316 and Hastelloy C;

O-shaped Ring in contact with measured medium: Bura-N, Viton and Ethylene-propylene;

Installation flange (not in contact with medium): cadmium plating carbon steel or stainless steel 316;

Bolt: Galvanized carbon steel, 1Cr18Ni9, 0Cr17Ni4CuNb and 42CrMo;

Filling Liquid: Silicone oil or inert liquid

Electrical Housing: Low copper aluminium alloy

Coating: Polyester resin

Connecting Fitting for Pressure Import:

High-pressure side: 3"or 4" 150lb flange or 300lb flange;

Low-pressure side: The connecting thread of the flange is 1/4-18NPT (taper-pipe-thread);
The connecting thread of the joint is 1/2-14NPT (taper-pipe-thread).

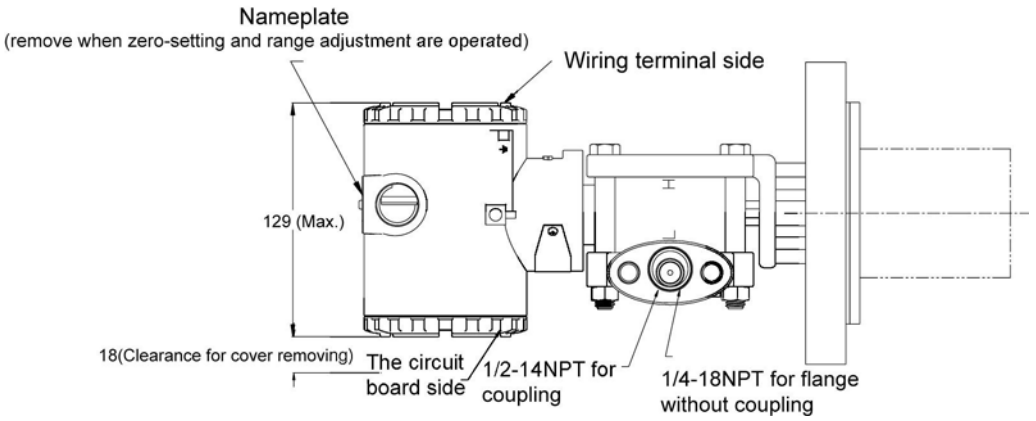
Electric Connection: 1/2-14NPT conductor conduit with thread ends, wiring terminals and matching teat block.

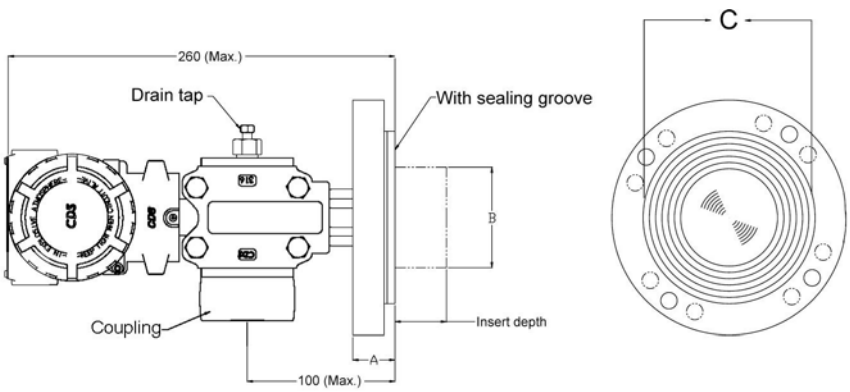
Weight:

Isolation chaff for liquid level / Installation flange		Flat flange	2" insert tube	4" insert tube	6" insert tube
3"	150lb	8.9kg	9.8kg	10.3kg	10.7kg
4"	150lb	11.6kg	12.9kg	13.9kg	14.8kg
3"	300lb	11.1kg	12.1kg	12.5kg	12.9kg
4"	300lb	15.7kg	17kg	18kg	22.9kg

Flange size:

Flange size (mm)							Bolt hole (mm)		
Code	Size	Specification	Diameter	A	B	C	Amount	Diameter	Distribution diameter
A	3"	150lb	190.5	30	66	127	4	19	152
B	4"	150lb	228.6	30	89	157	8	19	190
C	3"	300lb	209.6	35	66	127	8	22.2	168
D	4"	300lb	254	38	89	157	8	22.2	200





CDS-3151MLT Smart Flange Liquid Level Transmitters Catalogue

CDS-3151MLT	Smart Flange Liquid Level Transmitter
Code	Measurement Range
4	0-0.4～37.4kPa
5	0-1.8～186.8kPa
6	0-6.9～690kPa

Code	Output
E	4~20mA DC linear output with HART protocol digital signal

Code	Size	Length Inserted	Material of Chaff at High Pressure Side
A0	3"	0	316L SST
A2	3"	50.8mm(2inch)	316L SST
A4	3"	101.6mm(4inch)	316L SST
A6	3"	152.4mm(6inch)	316L SST
B0	4"	0	316L SST
B2	4"	50.8mm(2inch)	316L SST
B4	4"	101.6mm(4inch)	316L SST
B6	4"	152.4mm(6inch)	316L SST
C0	3"	0	Hastelloy C
C2	3"	50.8mm(2inch)	Hastelloy C
C4	3"	101.6mm(4inch)	Hastelloy C
C6	3"	152.4mm(6inch)	Hastelloy C
D0	4"	0	Hastelloy C
D2	4"	50.8mm(2inch)	Hastelloy C
D4	4"	101.6mm(4inch)	Hastelloy C
D6	4"	152.4mm(6inch)	Hastelloy C
E0	3"	0	Tantalum
F0	4"	0	Tantalum

Code	Installation Flange
A	3" 150 lb
B	4" 150 lb
C	3" 300 lb
D	4" 300 lb

	Material		
Code	Flange Coupling	Isolation Chaff	Filling Liquid
22	316L SST	316L SST	Silicone oil
23	316L SST	Hastelloy C	Silicone oil
25	316L SST	Tantalum	Silicone oil
33	Hastelloy C	Hastelloy C	Silicone oil
35	Hastelloy C	Tantalum	Silicone oil
2A	316L SST	316L SST	Inert liquid

					2B	316L SST	Hastelloy C	Inert liquid
					2D	316L SST	Tantalum	Inert liquid
					3B	Hastelloy C	Hastelloy C	Inert liquid
					3D	Hastelloy C	Tantalum	Inert liquid
						Code	Filling Liquid at High Pressure Side	Operation Temperature
						D	Silicone oil	-40~149℃
						F	Inert liquid	-18~204℃
						S	Syltherm800 silicone oil	-40~205℃
							Code	Optional Parts
							M4	LCD display

CDS-3151M GP/DP Smart Transmitters Pressure/

Differential Pressure Transmitters

Summary

GP/DP Smart Transmitters Pressure/ Differential Pressure Transmitter can be used in order to avoid the direct contact between the Isolation chaff of GP Pressure Transmitter/DP Differential Pressure Transmitter and the measured medium.

Remote Transmission Transmitter is applicable in the following conditions:

1. High temperature medium and transmitter are required to be isolated;

2. The measured medium is corrosive to sensing elements;

3. Suspend liquid or high viscidity mediums are measured;

4. The measured medium is solidified or crystallized as a result of the temperature change of conditions or flow.

5. The probe is required to be strictly cleaned when measured medium is changed.

6. The probe is required to be kept clean.

Refer to related transmitter for Technical Performance and Performance Index.

Classification

1199 remote transmission device is connected to the process by means of thread, flange and snap ring which is use in sanitary system. The flange includes flange with bottom sleeve and flat flange (in conjunction with standard 3''-150lb and 300lb flanges). Therefore, the remote transmission device can be classified as thread style, flange style, flat style, insert tube style and snap ring style.

Technical Performance

Operating Temperature:

Silicone oil: -29℃~149℃

Inert liquid: -18℃~204℃

Pressure Limit:

Thread style: 14Mpa;

Flange style, insert tube style and flat style: the rated pressure of the flange;

Snap ring style: 2Mpa.

Start Time: Warm-up free. The time to response is relevant to temperature, pressure, remote transmission style, length of capillary, diameter and filling liquid.

See next page for the catalogue of CDS-3151M GP/DP Intelligent Transmitters Pressure/ Differential Pressure Transmitters

CDS-3151M GP/DP Series Smart Transmitters Pressure/ Differential Pressure Transmitters Catalogue

CDS-3151M GP/DP Smart Remote Transmission Pressure/ Differential Pressure Transmitter						
CDS-3151MGP	Smart Remote Transmission Gauge Pressure Transmitter					
CDS-3151MDP	Smart Remote Transmission Differential Pressure Transmitter					
Code	Measurement Range					
4	0-0.4～37.4kPa					
5	0-1.8～186.8kPa					
6	0-6.9～690kPa					
7	0-20.6～2068kPa					
8	0-68.9～6890kPa					
	Code	Output				
	E	4~20mA DC output with HART protocol digital signal (two-wire system)				
		Code	Material			
			Flange Coupling	Drain Tap	Isolation Chaff	
		22	316L SST	316L SST	316L SST	
			Code	Remote Transmission Device		
			S1	One remote transmission device		
			S2	Two remote transmission device		
				Code	Optional Parts	
				M4	LCD display	
				B1	Bend bracket for pipe-type	
				B2	Bend bracket for disk-type	
				B3	Flat bracket for pipe-type	
				Da	Explosion proof	
				Fa	Intrinsically safe	

CDS-3151M Optional Parts Catalogue

Optional Parts							
Code	**Mounting Brackets**	**GP**	**AP**	**DP**	**HP**	**LT**	**Remote**
B1	Bracket, 2-inch, Pipe Mount	●	●	●	●	×	●
B2	Bracket, Panel Mount	●	●	●	●	×	●
B3	Bracket, Flat, 2-inch, Pipe Mount	●	●	●	●	×	●
B4	2-inch bent support frame for pipe-type c/w 300SST bolt	●	●	●	●	×	●
B5	Support frame for disk-type c/w 300SST bolt	●	●	●	●	×	●
B6	2-inch flat support frame for pipe-type c/w 300SST bolt	●	●	●	●	×	●
Code	**Display**						
M4	Multifunctional LCD	●	●	●	●	●	●
Code	**Bolts**						
L1	1Cr18Ni9	●	●	●	●	●	●
L2	0Cr17Ni4CuNb	●	●	●	●	●	●
L3	42CrMo	●	●	●	●	●	●
Code	**Process Connections**						
D1	Side Drain/Vent, Top	●	●	●	●	●	×
D2	Side Drain /Vent, Bottom	●	●	●	●	●	×
Code	**O-shaped Ring Contacting With Medium**						
W2	Buna-N	●	●	●	●	●	●
W3	Ethylene-propylene	●	●	●	●	●	●
Code	**Output**						
V1	Reverse output	●	×	●	●	×	●
Code	**Explosion Proof**						
Fa	Intrinsically safe	●	●	●	●	●	●
Da	Explosion proof	●	●	●	●	●	●

CDS-1199 Series

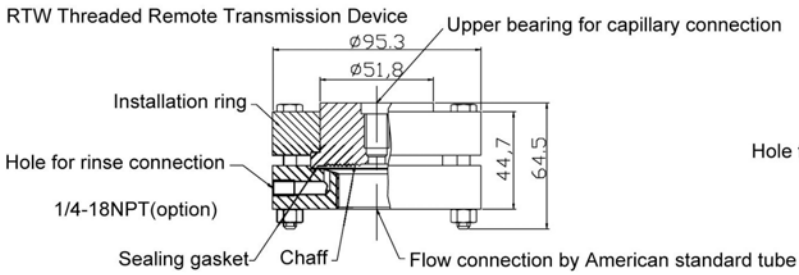
Remote Transmission Devices

Catalogue

1199 Series Remote Transmission Devices

Table I: Thread Style Remote Transmission Device

1199RTW	Thread Style Remote Transmission Device						
	Code	Hole for Rinse					
	11	No					
	21	Yes					
		Code	Material of Chaff for Remote Transmission Devices				
		A	316L SST				
		B	Hastelloy C				
		C	Tantalum				
			Code	Material of Upper Bearing			
			11	316L SST, carbon steel installation ring, white asbestos gasket			
				Code	Material of Lower Bearing		
				A	316L SST		
				B	Hastelloy C		
				C	Cadmium plating carbon steel		
					Code	Connecting Hole for Pressure Import	
					11	1/4"NPT(taper-pipe-thread)	
					12	3/8"NPT(taper-pipe-thread)	
					13	1/2"NPT(taper-pipe-thread)	
					15	1"NPT(taper-pipe-thread)	
					17	1-1/2"NPT(taper-pipe-thread)	



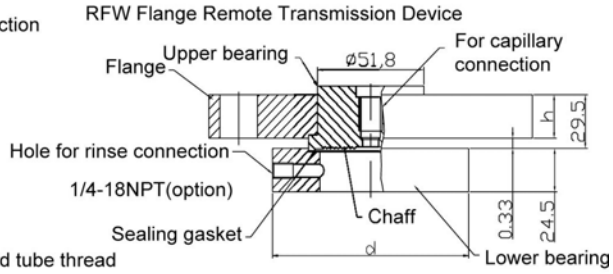


Table II: Flange Style Remote Transmission Device

1199RFW	Flange Style Remote Transmission Device						
	Code	Hole for Rinse					
	11	No					
	21	Yes					
		Code	Material of Chaff for Remote Transmission Devices				
		A	316L SST				
		B	Hastelloy C				
		C	Tantalum				
			Code	Material of Upper Bearing			
			11	Stainless steel 316, carbon steel installation ring, white asbestos gasket			
				Code	Material and Size of Lower Bearing		
				A21	1"	1501b	316L SST
				B21	1"	1501b	Hastelloy C
				E21	1"	1501b	Carbon steel
				A41	$1^1/_2$"	1501b	316L SST
				B41	$1^1/_2$"	1501b	Hastelloy C
				E41	$1^1/_2$"	1501b	Carbon steel
				A51	2"	1501b	316L SST
				B51	2"	1501b	Hastelloy C
				E51	2"	1501b	Carbon steel
				A71	3"	1501b	316L SST
				B71	3"	1501b	Hastelloy C
				E71	3"	1501b	Carbon steel
				A22	1"	3001b	316L SST
				B22	1"	3001b	Hastelloy C
				E22	1"	3001b	Carbon steel
				A42	$1^1/_2$"	3001b	316L SST
				B42	$1^1/_2$"	3001b	Hastelloy C
				E42	$1^1/_2$"	3001b	Carbon steel
				A52	2"	3001b	316L SST
				B52	2"	3001b	Hastelloy C
				E52	2"	3001b	Carbon steel
				A72	3"	3001b	316L SST
				B72	3"	3001b	Hastelloy C
				E72	3"	3001b	Carbon steel

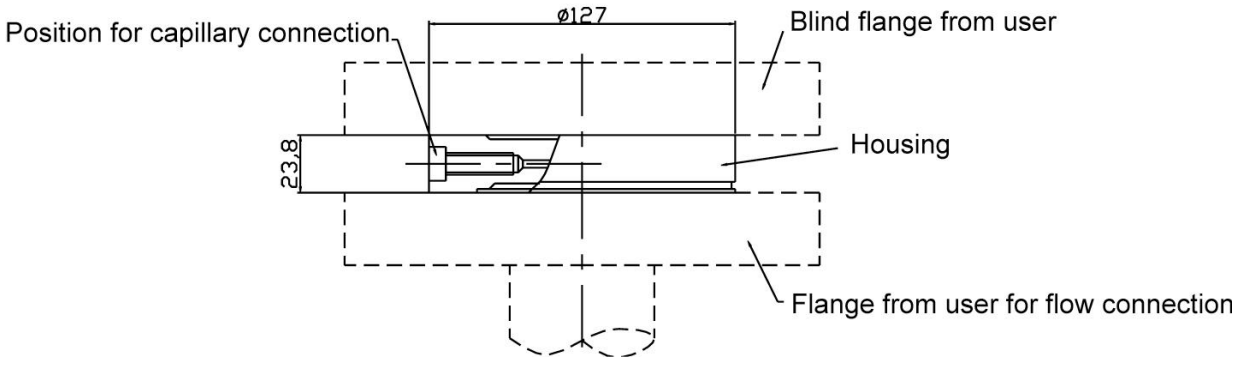
Table II (continued): Flange Style Remote Transmission Device

Tube Size	Grade of Rated Pressure	D	h	d	Bolt Hole		
					Distribution Diameter	Amount	Diameter of Hole
1"	1501b	Φ108	14.3	Φ66.6	Φ79.4	4	Φ15.7
	3001b	Φ124	17.5	Φ66.6	Φ88.9	4	Φ19.1
$1^1/_2$"	1501b	Φ127	17.5	Φ78.7	Φ98.4	4	Φ15.7
	3001b	Φ156	20.6	Φ78.7	Φ114.3	4	Φ22.1
2"	1501b	Φ152	19.1	Φ95.3	Φ120.7	4	Φ19.1
	3001b	Φ165	22.2	Φ95.3	Φ127	8	Φ19.1
3"	1501b	Φ190	23.8	Φ127	Φ152.4	4	Φ19.1
	3001b	Φ210	28.6	Φ127	Φ168.3	8	Φ22.4

Table III: Flat Style Remote Transmission Device

1199PFW	Flat Style Remote Transmission Device			
	Code	Model		
	11	Standard 3"-1501b		
	12	Standard 3"-3001b		
		Code	Material of Chaff for Remote Transmission Device	
		A	316L SST	
		B	Hastelloy C	
		C	Tantalum	
			Code	Material of Housing
			11	316L SST

RFW Flat Remote Transmission Device



EFW Inset Tube Style Remote Transmission Device

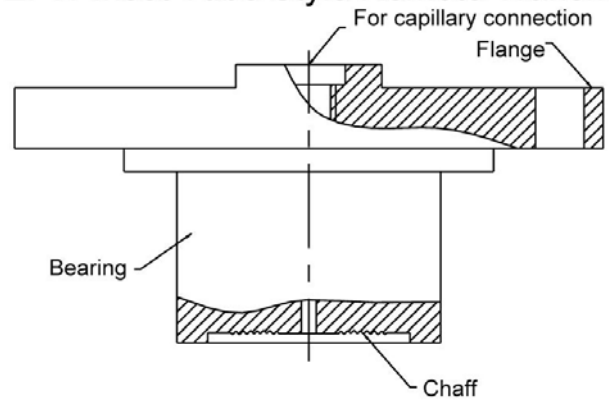


Table IV: Insert Tube Style Remote Transmission Device

1199EFW	Insert Tube Style Remote Transmission Device					
	Code	Diameter and Material of the Insert Tube				
	11	3"(76.2mm) 316L SST				
	12	3"(76mm) Hastelooy C				
	13	4"(101.6mm) 316L SST				
	14	4"(101.6mm) Hastelooy C				
		Code	Material of Chaff			
		A	316L SST for 11, 13 only			
		B	Hastelloy C for 12, 14 only			
			Code	Length Inserted	Material	
			20	2"(50.8mm)	316L SST	
			2C		Hastelloy C	
			40	4"(101.6mm)	316L SST	
			4C		Hastelloy C	
			60	6"(152.4mm)	316L SST	
			6C		Hastelloy C	
				Code	Material of Flange	
				A	45# steel	
					Code	Specification of Flange
					11	Maximum operating pressure1.89MPa for 1501b
					12	Maximum operating pressure 4.9MPa for 3001b

The flange has the same size as that of 1199RFW, see table II (continued)

Table V: Snap Ring Style Remote Transmission Device （applicable in sanitary and food systems）

1199SCW	Snap Ring Style Remote Transmission Device			
	Code	Model of Remote Transmission Device		
	12	3" snap ring (for capillary connection)		
	14	3" snap ring (for liquid level connection)		
		Code	Material of Remote Transmission Device	
		A	316L SST	
			Code	Material of Housing
			11	316L SST

SCW Snap Ring Style Remote Transmission Device

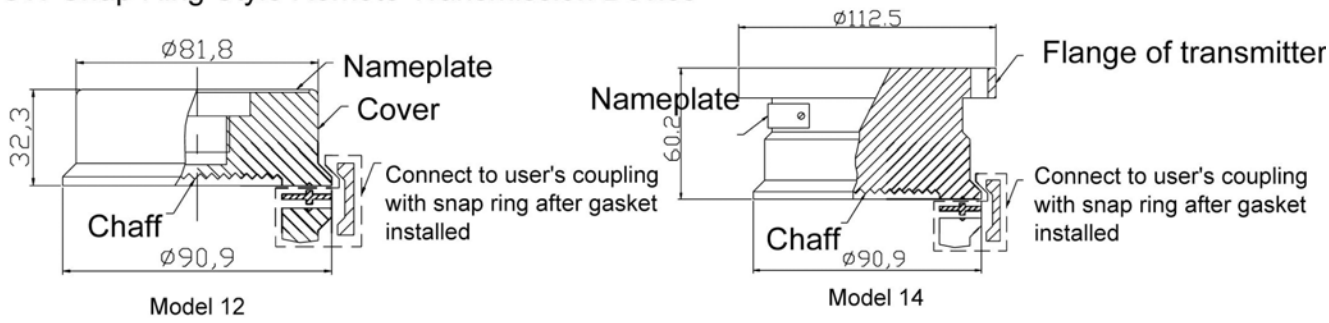
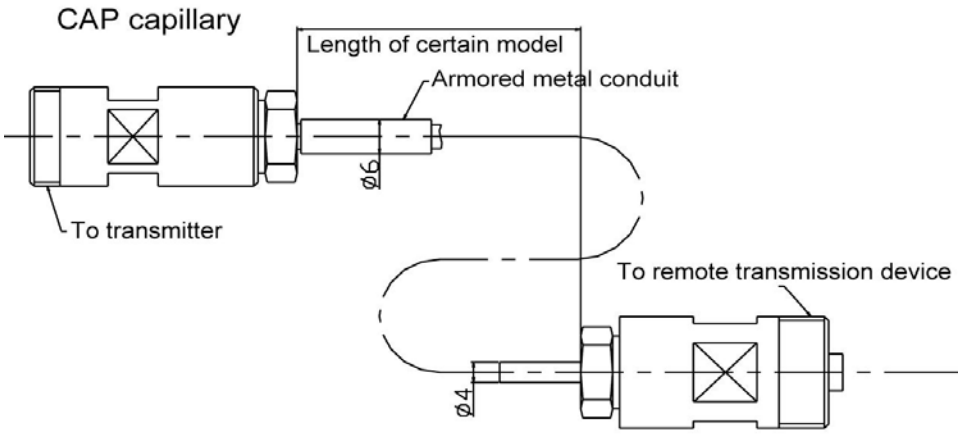


Table VI: Filling Liquid for Remote Transmission Device

Code	Filling Liquid of Remote Transmission Device
C10485-0007	Stable range of -29～149℃ for silicone oil (low temperature)
C11513-0001	Stable range of -18～204℃ for inert liquid

Table VII Capillary

1199CAP	Capillary						
	Code	Material and Size of Capillary					
	11	316L SST, inside diameter 0.71mm					
	13	316L SST, inside diameter 1.09mm					
		Code	Terminal Parts of Transmitter				
		A	Low volume flange, 316L SST				
			Code	Length of Capillary			
			5	5 feet 1524mm			
			10	10 feet 3048mm			
			15	15 feet 4572mm			
			20	20 feet 6096mm			
			25	25 feet 7620mm			
				Code	Terminal Parts of Remote Transmission Device		
				A	1/2-20UNF－2A thread tube without support		
					(applicable to 1199RFW、RTW、SCW)		
				C	1/2-20UNF－2Athread tube without support		
					(applicable to 1199RFW、EFW)		
					Code	Material of Protective Conduit	
					11	Armour 316L SST	



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