Type HQ-3051DP
Differential Pressure Transmitter

Hongqi Automatic control (JiangSu) Co., LTD.

JSHQ
INSTRUMENT

Contents

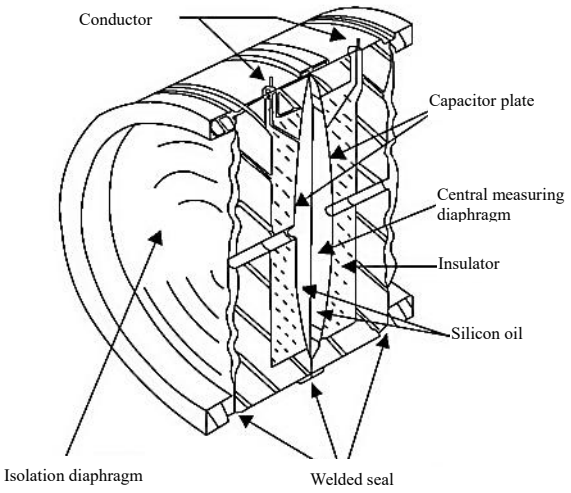
HQ-3051 Capacitive Transmitter

Product Overview

The HQ-3051 small-size capacitive pressure (differential pressure) transmitter is a new type of transmitter produced by our factory with the foreign advanced technology and equipment. The key raw materials, components and parts are imported, and the complete machine has been strictly assembled and tested. The product is equipped with an advanced design principle, and its categories and specifications are complete. It is easy to install and use. And it, with the strong versatility and substitution ability, directly replaces the traditional 1151 and other well-known similar products. To adapt to the continuously improved and developed automation level in China, this series of products are not only small and exquisite, but also have the intelligent function of HART field bus protocol.

Features

- High precision
- Good stability
- Two-wire system (four-wire system for special one)
- Solid-state components, plug-in printed circuit board
- Small-size, light weight, solid and vibration-resistant
- Adjustable external connection of measuring range and null point
- Positive migration up to 500%, negative migration up to 600%
- Adjustable damping
- Good one-way overload protection
- No mechanical movable parts and low maintenance
- All series of unified structure, with high interchangeability of components
- The diaphragm material of contact medium can be selected (316L, TAN, NAS-C, MONEL and other corrosion-resistant materials)
- Blast-resistant design, all-weather use
- Intelligent HART field bus protocol



Structure Diagram of δ Component

Working Principle

The process pressure is transmitted to the central measuring diaphragm of the δ chamber through the isolation diaphragm and filling liquid on both sides or one side. The central diaphragm is a tensioned elastic element, which produces corresponding deformation displacement for the pressure difference between the two sides acting on it. Its displacement is directly proportional to the differential pressure, and the maximum displacement is about 0.1 mm. This displacement is converted into a differential capacitor formed on the capacitor plate, then the differential capacitor is converted into a two-wire 4-20mA DC signal by the electronic circuit for output. (See the figure above)

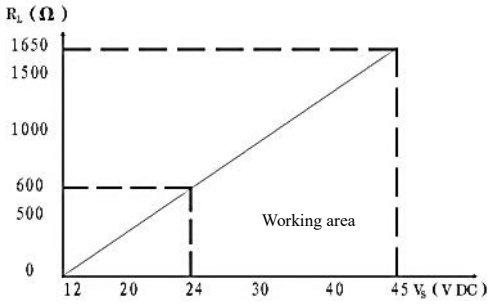
Functional Parameters

Applicable object: Liquid, gas and steam

Measuring range: 0-0.1kPa to 0-40MPa

Output signal: 4-20mA DC (four-wire 220V power supply, 0-10mA DC output for special one)

Power supply: 12-45V DC, generally 24V DC (see load characteristics in the right figure)



Load characteristics

Load characteristics: It is related to the power supply, with the load capacity shown in the above figure (load characteristics) at a certain supply voltage. The relation between load impedance RL and supply voltage V_S is: RL≤50 (V_S-12)

Dial indicator: Pointer linear indication with 0-100% evenly divided scale or LCD, LED display.

Explosion protection: a. Flame-proof type dIIBT4

b. Intrinsic safety iaIICT6

Measuring range and null point: Adjustable external connections

Positive and negative migration: After positive or negative transfer of the null point, the absolute values of the upper and lower limit values of the measuring range and measuring scope cannot exceed 100% of the upper limit of the measurement. (Intelligent: range ratio 15: 1)

The maximum positive transfer volume is 500% of the minimum calibration range; The maximum negative transfer volume is 600% of the minimum calibration range.

Temperature range: Operating temperature range of amplifier: -29-+93℃ (-25-+70℃ for type LT)

Measuring elements filled with silicone oil: -40-+104℃

The flange transmitter is filled with high-temperature silicone oil: -20-+315 ℃, general silicone oil: -40-+149℃

Static pressure: 1, 4, 10, 25, 32 MPa

Humidity: Relative humidity is 0-100%

Volume suction: ＜0.16cm^3

Damping (step response): When filled with silicone oil, it is generally between 0.2s and 1.67s and can be adjusted continuously

Technical Data

(Without transfer, filled with silicone oil under standard operating conditions, 316 stainless steel isolation diaphragm)

Accuracy: ±0.25%, ±0. 5%, ±0.1% (intelligent)

Dead zone: None (≤0.1%)

Stability: Within six months, the absolute value of fundamental error of maximum range is not exceeded

Vibration effects: In any axial direction, when the vibrational frequency is 200Hz, the error is 0. 05%/g of the upper limit of the measuring range

Power supply effects: Less than 0.005%V of the output range

Loading effects: If the power supply is stable, the load has no effect

Others

Isolation diaphragm: 316 stainless steel, hastelloy C-276, Monel and tantalum

Exhaust/drain valve: 316 stainless steel, hastelloy C, Monel

Flanges and joints: 316 stainless steel, hastelloy C or Monel

Contact medium "O"-ring: Nitrile rubber buna, fluororubber

Filling liquid: Silicone oil or inert oil

Bolt: 316L stainless steel

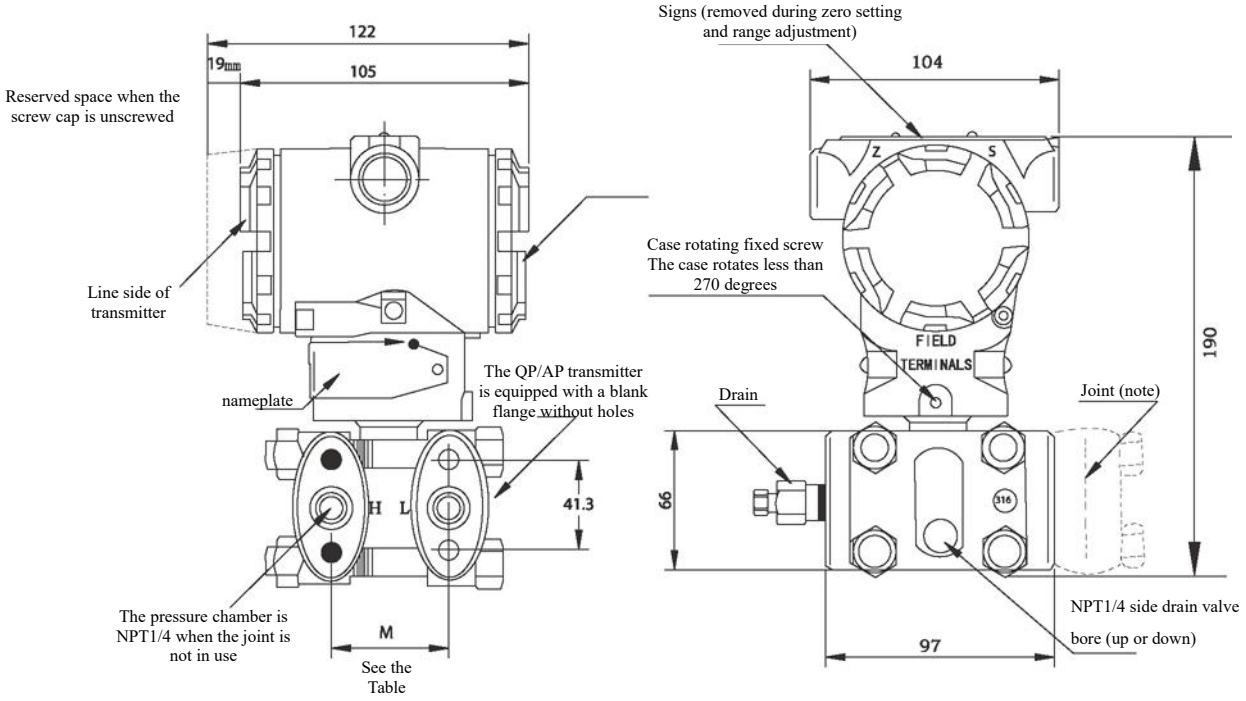
Electronic shell material: low copper aluminum alloy

Impulse adapting piece: Flange, NPT1/4, with center distance of 54mm; Joint NPT1/2 or M20×1.5 male thread spherical cone seal, with center distance of 50.8, 54 and 57.2mm (NPT taper pipe thread conforms to GB/T12716-91)

Connecting hole of signal line: G 1/2″

Weight: 2.4kg

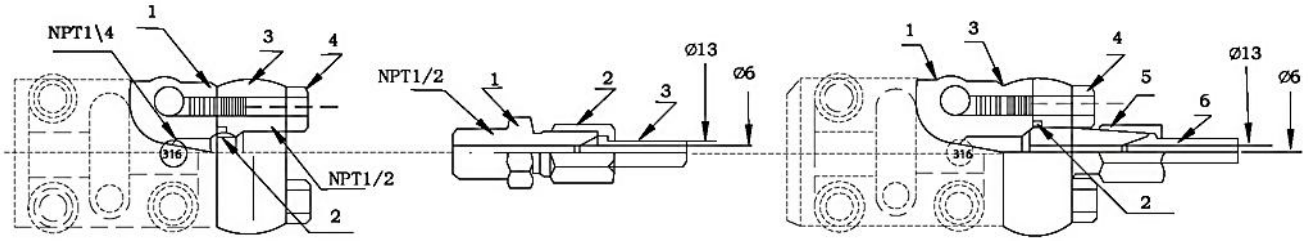
Dimensions and Installation Diagram



Outline Dimensional Drawing of Transmitter

Measuring range (code)	2,3,4,5	6	7	8	9
M (mm)	54	55.2	56	57.2	59

See the following figure for the impulse joint



a: NPT1/2 Tapered pipe internal thread joint (the selection code is "C0")
1- Pressure chamber flange of transmitter

2- "O"-shaped circle

3-Tapered internal thread joint

4- Bolt

b: NPT1/2 Welded impulse piping at the back of impulse joint (the code is "C1")
1- NPT1/2 transition joint connected with spherical cone
2- Nut M20×1.5

3- Spherical joint (At ϕ13, it can be welded with the impulse piping)
B: M20×1.5 T-shaped screwed joint (the selection code is "C2")

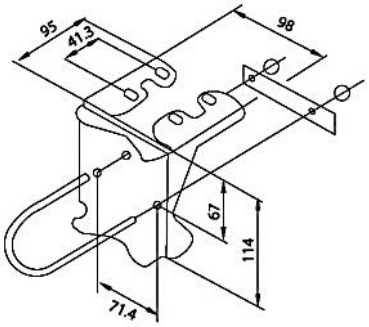
1- Pressure chamber flange of transmitter
2- "O"-shaped circle

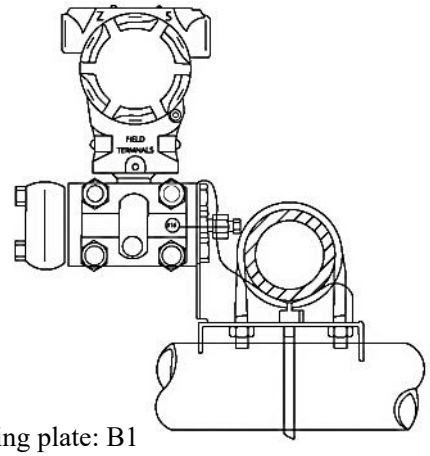
3- Spherical cone joint M20×1.5 internal thread
4- Bolt

5- Nut M20×1.5
6- Spherical joint (At φ13, it can be welded with the impulse piping)

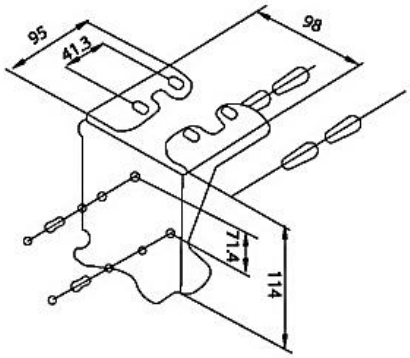
Impulse joint

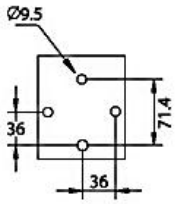
Outline Dimensions and Installation Diagram

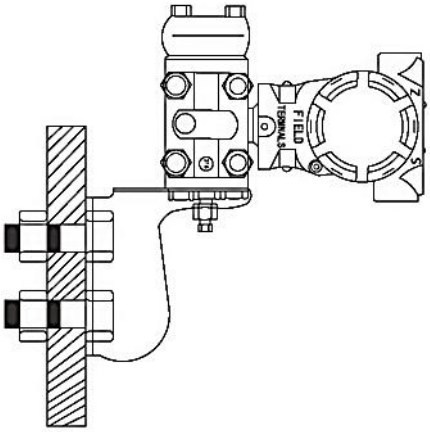




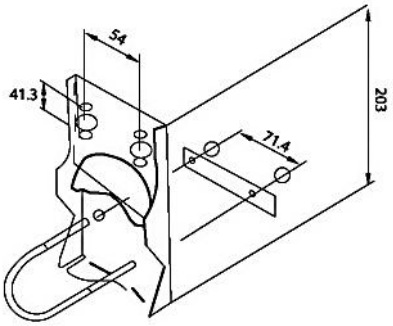
Piping bending mounting plate: B1

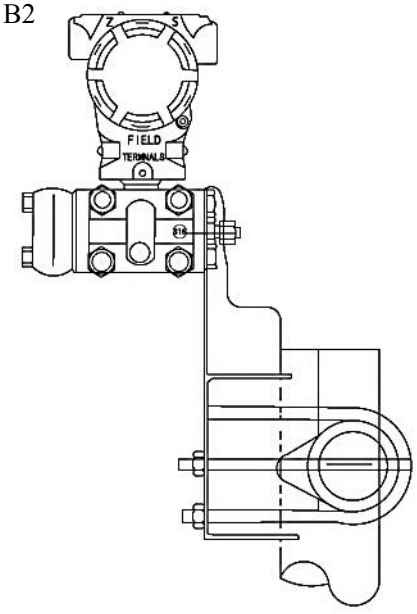






Piping bending mounting plate: B2





Piping flat mounting plate: B3

Outline Dimensions and Installation Diagram

Connection Diagram of Field Conductors and Block Diagram of Circuit

Connection of non-intelligent field conductors

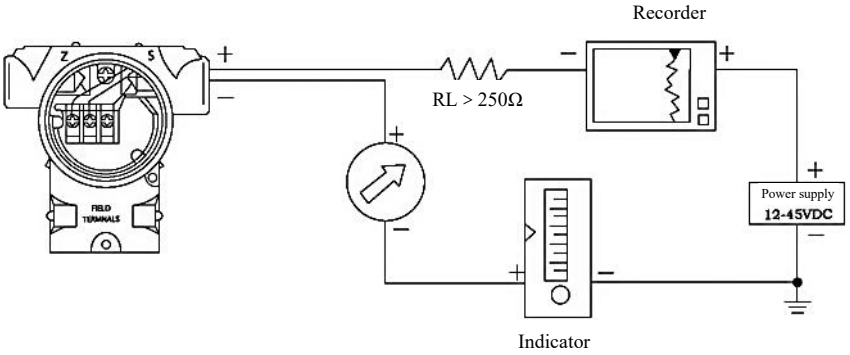


Figure 6 Connection of Non-intelligent Field Conductors

Connection of non-intelligent field conductors

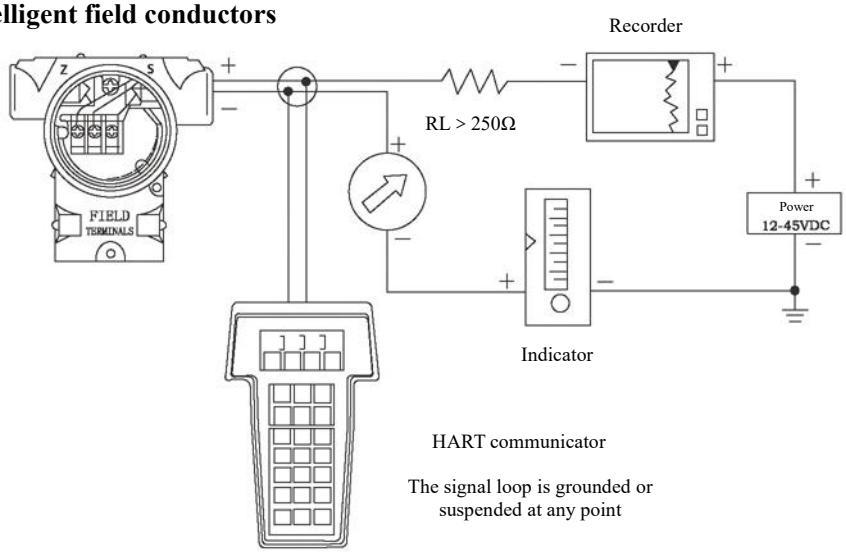
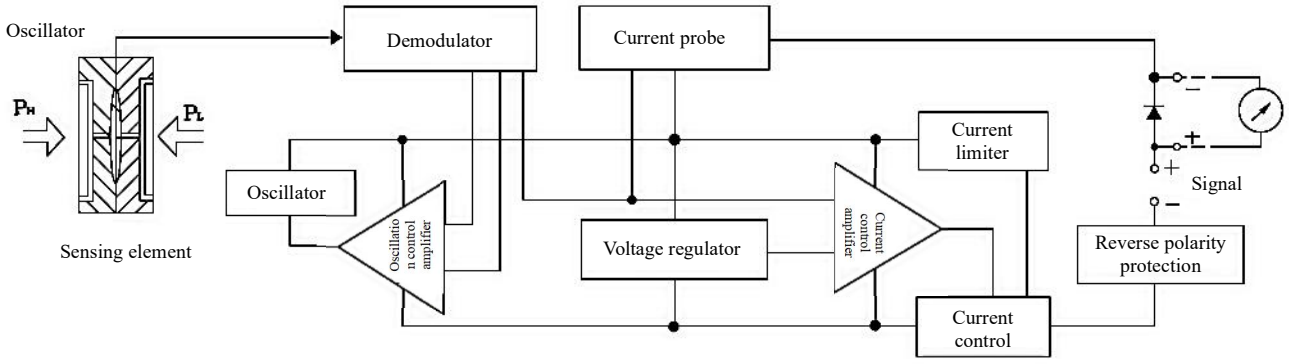
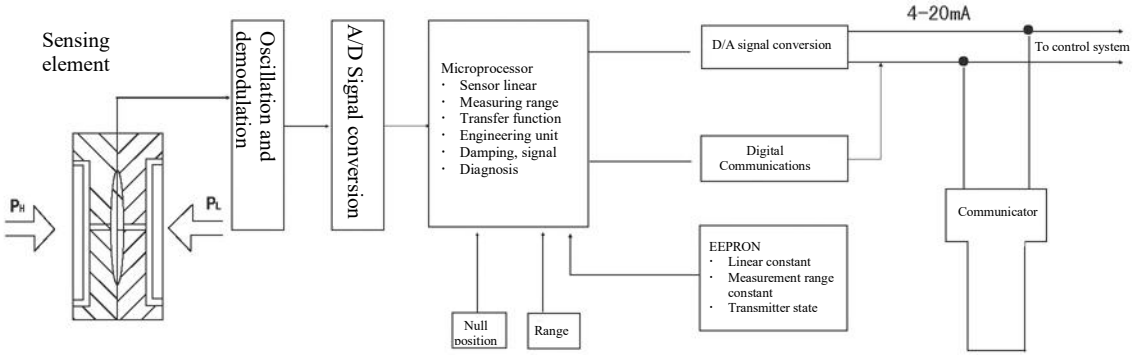


Figure 7 Connection of Non-intelligent Field Conductors

Block Diagram of Non-intelligent Circuit



Block Diagram of Intelligent Circuit



Molding method

HQ-3051

Required

Additional/opti

Code	Static pressure MPa
A	1
B	4
C	10
E	25
F	32

Code	Variety
DR	Micro-differential pressure transmitter
DP	Differential Pressure Transmitter
HP	High hydrostatic pressure differential pressure transmitter
AP	Absolute pressure transmitter
GP	Pressure transmitter
LT	Flange liquid level transmitter
DP/GP	Remote transmission differential pressure, pressure transmitter

Code	Structure materials			
	Flange joint	Exhaust/drain valve	Isolation diaphragm	Filling liquid
22	316 stainless steel	316 stainless steel	316 stainless steel	Silicon oil
23	316 stainless steel	316 stainless steel	Hastelloy C	
24	316 stainless steel	316 stainless steel	Monel	
25	316 stainless steel	316 stainless steel	Tantalum	
33	Hastelloy C	Hastelloy C	Hastelloy C	
35	Hastelloy C	Hastelloy C	Tantalum	
44	Monel	Monel	Monel	

Code	Scope of range (KPa)
2	0-0.1-1.0
3	0-0.6-6
4	0-4-40
5	0-20-200
6	0-70-700
7	0-200-2000
8	0-700-7000
9	0-2000-20000
0	0-4000-40000

Code	Additional functions
M1	0-100% Linear dial indicator
M2	LED Digital displayer meter
M3	LCD Display meter
B1	Piping bending mounting plate
B2	Piping bending mounting plate
B3	Piping flat mounting plate
C0	1/2-14NPT tapered pipe internal thread joint
C1	1/2-14NPT Welded impulse piping at the back of impulse joint
C2	T-shaped screwed joint M20×1.5
d	Flame-proof type d II BT4
i	Intrinsic safety type ia II CT6

Code	Output
E	Non-intelligent (4-20mA output)
S	Intelligent (HART protocol + 4-20mA) output
J	Intelligent extraction output (HART protocol + 4-20mA output)

Detailed List of Transmitter Classification

S/N	Name	Model	Measuring range	Static pressure (MPa)	Accuracy grade
1	Micro-differential pressure transmitter	3051DR2E	0-0.1-1.0KPa	1	0.5
				4	
2	Differential Pressure Transmitter	3051DR3E	0-0.6-6KPa	4	0.1 or 0.2 or 0.5
3		3051DR4E	0-4-40KPa	10	
4		3051DR5E	0-40-200KPa		
5		3051DR6E	0-0.16-700KPa		
6		3051DR7E	0-0.4-2.0KPa		
7		3051DR8E	0-1.6-7.0KPa		
8	High hydrostatic pressure differential pressure transmitter	3051DR4E	0-4-40KPa	25	0.2 or 0.5
				32	
9		3051DR5E	0-40-250KPa	25	
				32	
10	Pressure transmitter	3051DR3E	0-0.6-6KPa		0.1 or 0.2 or 0.5
11		3051DR4E	0-4-40KPa		
12		3051DR5E	0-40-250KPa		
13		3051DR6E	0-1.6-1KPa		
14		3051DR7E	0-0.4-2.5KPa		
15		3051DR8E	0-1.6-10.0KPa		
16		3051DR9E	0-2-25KPa		
17		3051DR0E	0-4-40KPa		
18	Absolute pressure transmitter	3051DR4E	0-4-40KPa		0.2 or 0.5
19		3051DR5E	0-40-250KPa		
20		3051DR6E	0-0.16-1.0KPa		
21		3051DR7E	0-0.4-2.5KPa		
22		3051DR8E	0-1.6-10.0KPa		
23	Flange liquid level transmitter	3051DR4E	0-4-40KPa	2.5	0.2 or 0.5
24		3051DR5E	0-40-250KPa		
25		3051DR6E	0-0.16-1.0KPa		
26	Remote pressure transmitter	3051DR4E	0-4-40KPa		0.5
27		3051DR5E	0-40-250KPa		
28		3051DR6E	0-0.16-1.0KPa		
29		3051DR7E	0-0.4-2.5KPa		
30		3051DR8E	0-1.6-10.0KPa		
31	Differential pressure transmitter	3051DR3E	0-0.6-6KPa	2.5	0.5
32		3051DR4E	0-4-40KPa	2.5	
33		3051DR5E	0-40-250KPa		
34		3051DR6E	0-0.16-1.0KPa		
35		3051DR7E	0-0.4-2.5KPa		

Ordering instruction

1） The transmitter model can be determined according to the specification table as required.
2） The figures and symbols in the form of specifications must be filled out clearly and accurately.
3） In case of positive and negative transfer, the transfer value must be indicated.
4） If the differential pressure transmitter needs to be equipped with the tri-valve set and liquid saving device, it shall be noted separately.
5） The transmitter shall be calibrated according to the range specified by the user. If the user does not specify, the transmitter shall be calibrated to the maximum range, and the calibration shall be carried out at room temperature and normal pressure.
6） If the Tag No. is required, it shall be indicated when ordering.
7） When purchasing a remote transmitter, it shall also be determined according to Model Selection Table of Different Remote Flanges.
8） If the remote transmitter is to be used in vacuum or high temperature, it shall be specially marked when ordering.
9） The contact medium O-ring is made of nitrile rubber buna and fluororubber.

Type HQ-3051 Differential Pressure Transmitter

The capacitive transmitter is composed based on the testing principle of differential capacitance. The input pressures are 0-6 kPa, 0-40 kPa, 0-200 kPa, etc., respectively.

Use object: Liquid, gas and steam

HQ-3051DP	Differential Pressure Transmitter						
	3	0-0.6-6KPa					
	4	0-4-40KPa					
	5	0-40-200KPa					
	6	0-0.16-700KPa					
	7	0-0.4-2.0KPa					
	8	0-1.6-7.0KPa					
		Code	Functions				
		E	Non-intelligent (4-20mA output)				
		S	Intelligent (HART protocol)				
		J	Intelligent extraction output				
			Code	Structure materials			
				Flange joint	Exhaust/drain valve	Isolation diaphragm	Filling liquid
			22	316 stainless steel	316 stainless steel	316 stainless steel	Silicon oil
			23	316 stainless steel	316 stainless steel	Hastelloy C	
			24	316 stainless steel	316 stainless steel	Monel	
			25	316 stainless steel	316 stainless steel	Tantalum	
			33	Hastelloy C	Hastelloy C	Hastelloy C	
			35	Hastelloy C	Hastelloy C	Tantalum	
			44	Monel	Monel	Monel	
				Code	Static pressure MPa		
				B-	4		
				C-	10		
					Code	Additional functions	
					M1	0-100% Linear dial indicator	
					M2	LED Digital displayer meter	
					M3	LCD Display meter	
					B1	Piping bending mounting plate	
					B2	Piping bending mounting plate	
					B3	Piping flat mounting plate	
					C0	1/2-14NPT tapered pipe internal thread joint	
					C1	1/2-14NPT Welded impulse piping at the back of impulse joint	
					C2	T-shaped screwed joint M20×1.5	
					d	Flame-proof type d II BT4	
					i	Intrinsic safety type ia II CT6	
HQ-3051DP	5	S	22	C-	M1B1C0	←Model selection example	

Hongqi Automatic control (JiangSu) Co., LTD.

Address: No.16, Runlou Road, Dailou Industry Concentration Zone, Jinhu County, Huai 'an City, Jiangsu Province
Tel.: 0517-86880701
Fax: 0517-86880702
Postal code: 211600
Website: http://www.0517yqyb.com
E-mail: yb86880701@163.com