HR3051-DP Differential Pressure Transmitter

The HR3051-DP differential pressure transmitter measures the level, density, pressure, and flow of a liquid, gas, or vapor and converts it into a 4-20 mA DC HART current signal output. The HR3051-DP can also communicate with the RST375 handheld terminal or the RSM100 Modem for parameter setting, process monitoring, and more.

Standard Specification
(Standard zero as the reference calibration range, Stainless steel 316L diaphragm, filling liquid is silicone oil.)

1. Performance specification
Reference Basic error for range calibration(including linearity, hysterisis and repeatability from zero): ± 0.075%
If TD>10 (TD=Max. Pressure range/calibration range), the Basic error is ±(0.0075×TD)%
The Basic error of square root output is 1.5 times of above reference Basic error.

Environmental Temperature Effect

Range code	-20℃～65℃ Total effect value
A	±(0.45×TD+0.25)%×Span
B	±(0.30×TD+0.20)%×Span
C/D/E	±(0.20×TD+0.10)%×Span
Range code	-40℃～-20℃& 65℃～85℃ Total effect value
A	±(0.45×TD+0.25)%×Span
B	±(0.30×TD+0.20)%×Span
C/D/E	±(0.20×TD+0.10)%×Span

Over range effect：±0.075%×Span

Static pressure effect

Range code	Effect Value
A	±(0.15%URL+0.10%Span)/4MPa
B	±(0.10%URL+0.075%Span)/16MPa
C/D/E	±(0.05%URL+0.05%Span)/16MPa

Over Pressure effect

Range code	Effect Value
A	±0.2%×Span/4MPa
B	±0.2%×Span/16MPa
C/D/E	±0.1%×Span/16MPa

Long-term stability

Range code	Effect Value
A	±0.5%×Span/1year
B	±0.2%×Span/1year
C/D/E	±0.1%×Span/1year

Power effect: ±0.001% /10V (12V ～ 42V DC), negligible.

2.Functional specification

Pressure range and limits

range/limit		kPa	mbar
A	range	0.1～1	1～10
	limits	-1～1	-10～10
B	range	0.2～6	2～60
	limits	-6～6	-60～60
C	range	0.4～40	4～400
	limits	-40～40	-400～400
D	range	2.5～250	25～2500
	limits	-250～250	-2500～2500
E	range	20～2000	0.2～20 bar
	limit	-500～2000	-5～20bar

Pressure range limit

The pressure is adjustable within the upper and lower limit.

It is recommended to choose the range code with the lowest pressure range proportion to optimize the performance specification.

Zero setting

The zero and pressure range could be adjusted to any value within the measured rang in the table, only the calibrated range ≥ Min. Range is valid.

Mounting position effect

The change of mounting position parallel to diaphragm could not influence the zero drift. If the angle between mounting position and diaphragm is over 90° , the zero drift is <0.4kPa which could be calibrated by zero setting. No other effect on pressure range.

Output

2-wire system, 4- 20mA DC, optional HART output digital communication, selectable linear or square root output.

Output signal limit：Imin=3.9mA，Imax=20.5mA

Under report mode (minimum)：3.7 mA

High-report mode (maximum)：21 mA

No report mode (hold): Maintain the effective current value before the fault

Alarm current standard setting: high-report mode

Response time

The damping constant of amplifier parts is 0.1s, time constant of sensor is 0.1s～1.6s, which is decided by the pressure range and pressure range ratio. The additional adjustable time constant is 0.1s～60s. The non-linearity output(eg. Square root output) is influenced by this function and could be calculated by it.

Warm-up time: < 15s

Environmental temperature

-40～85℃

With LCD and viton sealing ring, the temperature is -20℃~65℃.

Storage temperature/ transportation temperature

-50℃~85℃；with LCD display：-40℃~85℃

Operating pressure

Rated operating pressure are：16MPa、25MPa、40MPa

Static pressure limit

From 3.5 kPa absolute pressure to rated pressure, the protection pressure can be greater than 1.5 times the rated pressure and applied to both sides of the transmitter.

One-way overload limit：One-way overload up to rated pressure

Electromagnetic compatibility (EMC)

Please refer Electromagnetic Compatibility Schedule on the next page.

3.Installation

Power and load conditions

The power supply voltage is 24V，R≤(Us-12V)/Imax kΩ among them Imax=23 mA

Maximum supply voltage：42VDC

Minimum supply voltage：12VDC，15VDC（Backlight liquid crystal display）

Digital communication load range： 250～600Ω

Electrical connections

M20×1.5 cable sealing buckle, terminals are suitable for (0.5~2.5)mm2 wire.

Process connection

NPT 1/4 and UNF 7/16″ female at both sides of process connection flange.

4. Physical specification Material

Measuring capsule: Stainless Steel 316L

Diaphragm: Stainless Steel 316L, Hast-alloy C

Process flange: Stainless steel 304

Nut and bolt: Stainless steel(A4)

Filling liquid: silicone oil

Sealing ring: NBR, FKM, PTFE
Transmitter housing: Aluminum alloy material, epoxy resin glue sprays on the surface
Housing sealing ring: NBR
Nameplate: Stainless steel 304

Weight

3.3kg(not including LCD display, mounting support and process connection)

Housing protection

IP67

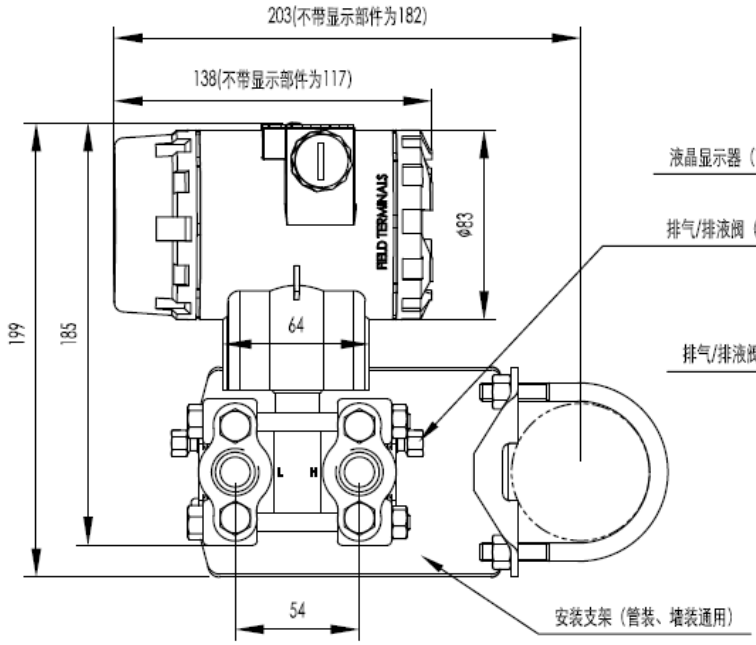
Electromagnetic compatibility table

No.	Test terms	Basic standard	Test Conditions	Performance degree
1	Radiation interference (shell)	GB/T 9254-2008 table 5	30MHz～1000MHz	qualified
2	Conducted interference （DC power port）	GB/T 9254-2008 table1	0.15MHz～30MHz	qualified
3	Electrostatic discharge (ESD) immunity	GB/T 17626.2-2006	4kV(contact) 8kV(air)	B
4	Radio frequency electromagnetic field immunity	GB/T 17626.3-2006	10V/m (80MHz～1GHz)	A
5	Power frequency magnetic field immunity	GB/T 17626.8-2006	30A/m	A
6	Electrical fast transient burst immunity	GB/T 17626.4-2008	2kV(5/50ns,5kHz)	B
7	Surge immunity	GB/T 17626.5-2008	1kV（Between lines） 2kV（Between line and ground）(1.2us/50us)	B
8	Radio frequency field induced conducted interference immunity	GB/T 17626.6-2008	3V (150KHz～80MHz)	A

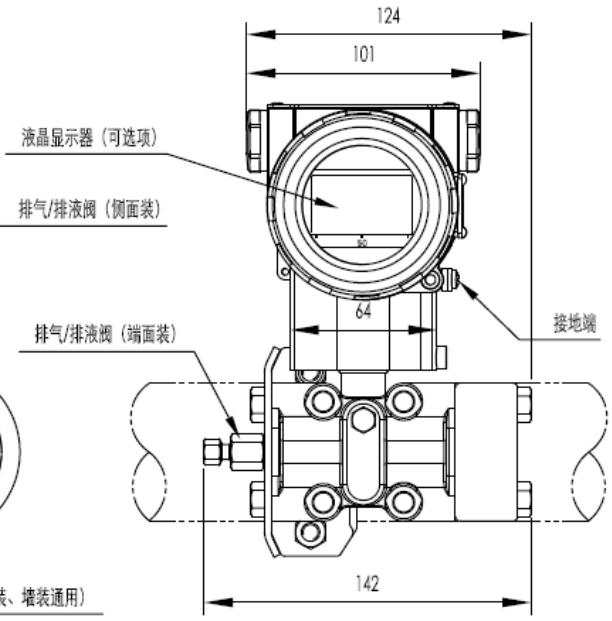
Note：(1) A degree: performance is normal within the technical standard range during testing. (2) B degree: During testing, the function or performance is lowered or lost temporarily, but it could be recovered by itself. Actual operation state, storage and data will keep the same.

Dimensions unit（mm）

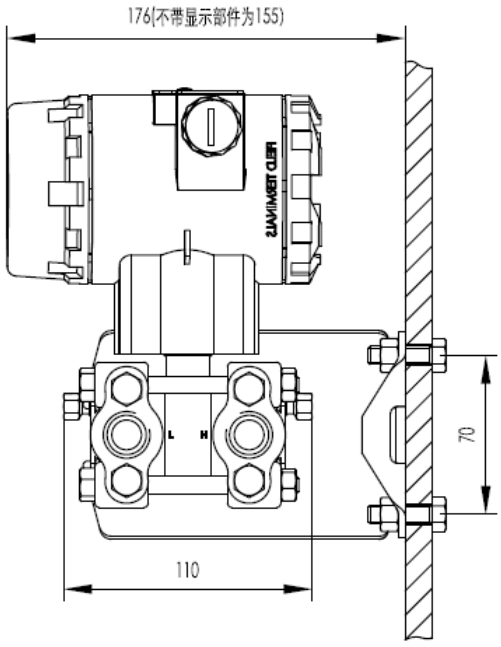
Horizontal piping connection (side)



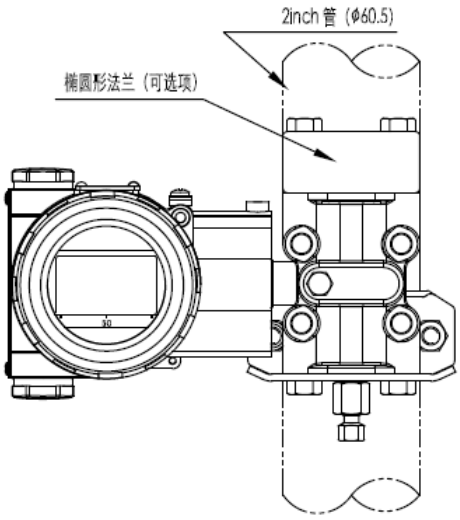
Horizontal piping connection (front)



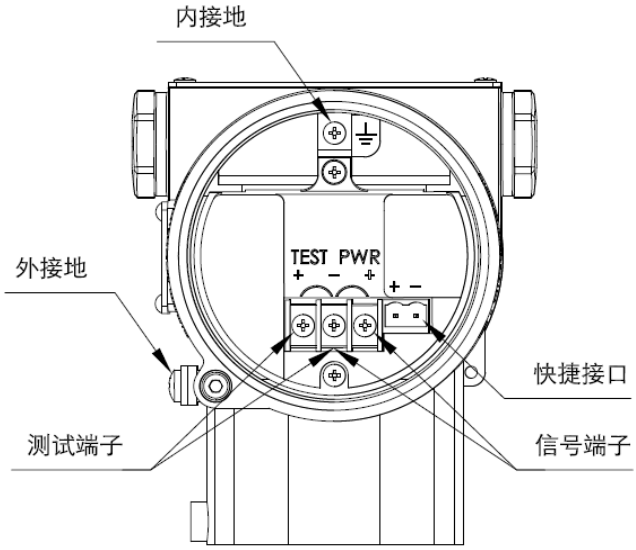
Wall connection



Vertical piping connection



5. Electrical connection diagram

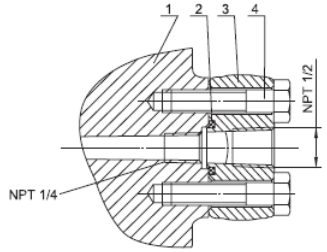


Note: The shortcut interface function is equivalent to the signal terminal.

6 Process connection instructions

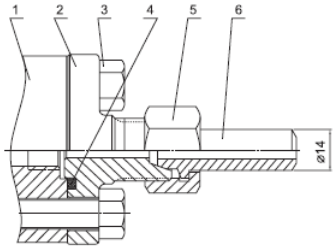
过程法兰接头

1/2-NPT不锈钢椭圆形法兰(代码1)



1. 压力腔法兰
2. O 型密封圈
3. NPT 1/2椭圆形连法兰
4. 螺栓

M20x1.5不锈钢丁字形接头（代码2）



1. 压力腔法兰
2. M20 × 1.5 丁字形阳螺纹接头
3. 螺栓
4. O 型密封圈
5. 螺母 M20 × 1.5
6. 引压管

7.Model and specification code table

Differential pressure transmitter selection HR3051-DP							
10	Precision Output						
	U	Basic error ±0.04% 4-20Ma with Hart communication					
	B	Basic error ±0.075% 4-20Ma with Hart communication					
	A	Basic error ±0.05% 4-20Ma with Hart communication					
	C	Basic error ±0.1% 4-20Ma with Hart communication					
	N	4-20Ma analogue output					
20	range						
		A	0-100Pa～1kPa（0-10～100 mmH_2O）/(0-1～10mbar)				
		B	0-200Pa～6kPa（0-20～600 mmH_2O）/(0-2～60mbar)				
		C	0-400Pa～40kPa（0-40～4000 mmH_2O）/(0-20～400mbar)				
		D	0-2.5kPa～250kPa（0-0.25～25 mH_2O）/(0-25～2500mbar)				
		E	0-20kPa～2MPa（0-2～200 mH_2O）/(0-0.2～20bar)				
		F	0-30kPa～3MPa（0-3～300 mH_2O）/(0-0.3～30bar)				
30	Diaphragm material Filling fluid						
				A	Stainless steel 316L	Silicone oil	
				B	Stainless steel 316L	Fluorine oil	
				C	Hastelloy C	Silicone oil	
				D	Hastelloy C	Fluorine oil	
				E	Stainless steel 316L gold plated	Silicone oil	
				F	Stainless steel 316L gold plated	Fluorine oil	
				G	FEPStainless steel 316L coated with FEP	Silicone oil	
				T	Ta	Silicone oil	
40	Fixed operating stress						
					0	0.2MPa（Only for A range）	
					7	7MPa （Only for A range）	
					1	16MPa	
					2	25MPa	

					3	40MPa						
50	Process connection											
						N	1/4" NPT and 7/16" UNF tapped holes				No bleed valve	
						B	1/4" NPT and 7/16" UNF tapped holes				The relief valve is mounted on the rear end of the flange	
						U	1/4" NPT and 7/16" UNF tapped holes				The relief valve is mounted on the upper side of the flange	
						D	1/4" NPT and 7/16" UNF tapped holes				The relief valve is mounted on the lower side of the flange	
						V	1/4" NPT and 7/16" UNF tapped holes				Vertical mounting flange (with relief valve)	
60	Sealing material for contact liquid											
							N	（NBR）				
							F	(FKM)				
							P	(PTFE)				
70	Special function											
								N	None			
								F	Square root output			
								P	Lightning protection			
								O	Oil-free treatment (oxygen measurement limit fluorine oil filling liquid, fluorine rubber sealing ring, <6MPa, <60°C)			
80	Mounting brackets											
									N	None		
									1	stainless steel		
									2	Galvanized carbon steel		
90	Process connection accessory											
										N	None	
										1	1/2" NPT internal thread stainless steel oval flange	
										2	M20x1.5 external thread stainless	

	steel T-shaped joint	
100	LCD	
	N	No LCD display
		（-20℃）LED backlit
	2	LCD display (-20 °C)
	3	OLED display (-40 °C)
110	Explosion-proof treatment	
	N	None
	A	Intrinsic，NEPSI
		Flameproof,NEPSI
		excl.explosion-proof cable
	D	connector）
120	Additional options	
		Flameproof cable introduction
	D	device
		Increased cable introduction
	E	device
	V	voltage type
	S	All stainless steel case