

Vortex Flowmeter

Model: PT124B-503



Descriptions:

ZHYQ's PT124B-503 vortex flowmeter is a kind of advanced speed flowmeter and has a wide range of applications. Flow metering, measurement and control of liquids, vapors and most gases.

Applications:

Widely used in Paper, sugar, various beverages
Water supply and drainage, environmental protection,
Water conservancy engineering, steel, petroleum, mining,
Pharmaceutical, heating, water supply,
Hot steam, saturated steam, compressed air.

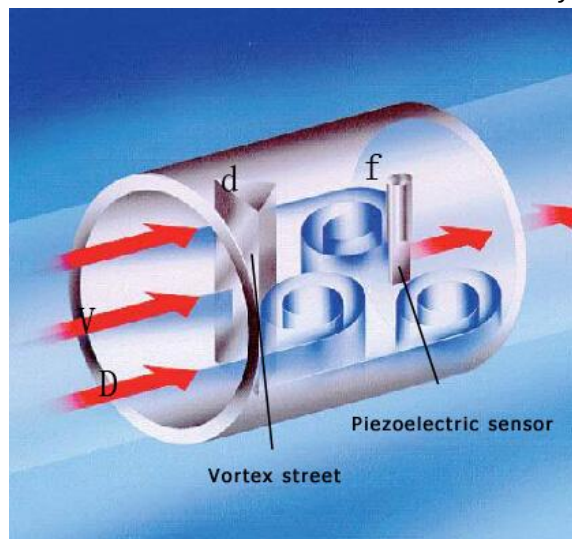
Features

- ◆With a sophisticated low-power LCD display, the local display shows instantaneous flow, cumulative flow, frequency, pressure, temperature, density, current, percentage etc .
- ◆Probe used four piezoelectric ceramic technologies to effectively eliminate the influence of external vibration on the measurement
- ◆No moving parts, no wear, no mechanical maintenance and long service life
- ◆The probe and signal converter are universally interchangeable
- ◆Split type signal converter can be used, the cable can be up to 10 meters long.
- ◆Output 4-20mA current signal / pulse signal, or Modbus RS485 signal
- ◆Two types of intrinsic safety explosion-proof: Exia II CT6Ga; flameproof: Exd II CT6Gb
- ◆With HART–Protocol communication protocol, Modbus RS485 interface.



Working principal:

A column is inserted into the fluid, and regular vortices alternately occur from both sides of the column (see the figure below). This vortex column is called the Karman vortex street. The frequency of the Karman vortex street is proportional to the flow velocity of the fluid. Therefore, the vortex frequency is detected by the piezoelectric sensor, and the flow rate of the fluid can be calculated by the converter.



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Specifications

Description		Parameters
Nominal diameter(mm)		Claming connection DN15~DN300
		Flange connection DN15~DN500
Measuring medium		Gas, liquid, steam
Pressure (MPa)		1.6、2.5、4.0、6.3
		Others are optional
Medium temp.		Standard temp. (-40 ~ +150) °C medium temp. (-40 ~ +250) °C high temp. (-40 ~ +350) °C
Material		SUS304 / SUS316/ SUS316L, others are optional
Accuray		1.0%FS
Repeatability		≤±0.33%
Range ratio		1: 10 ~ 1: 20
converter	Type	Intergrated type, split type, temp. & pressure compensation type
	Power supply	12VDC/24VDC, battery
	Display type	LCD display
	Telecommunication	HART , Modbus RS485
	Signal output	Three wires, 4-20mA two wires
	Ex-proof grade	Intrinsically safe ex-proof Exia II CT6FGa flameproof Exd II CT6Gb
	Protection	IP65,IP67,IP68
	Electrical connection	M20×1.5,1/2NPT
Ambient condition	Temp.	(-30 ~ +60) °C
	Humidity	5% ~ 90%
	Air pressure	(86 ~106) kPa

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Flow range and diameter size ;

Flow table (Gas)

Diameter (mm)	Standard range (m ³ /h)	Optional range(m ³ /h)	Output frequency range (Hz)
15	5-20	5-50	460-2500
20	6-50	6-60	220-3400
25	8-60	8-120	180-2700
32	14-100	14-150	130-1400
40	18-180	18-230	90-1550
50	30-300	30-480	80-1280
65	50-500	50-800	60-900
80	70-700	70-1230	40-700
100	100-1000	100-1920	30-570
125	150-1500	140-3000	23-490
150	200-2000	200-4000	18-360
200	400-4000	320-8000	13-325
250	600-6000	550-11000	11-220
300	1000-10000	800-18000	9-210
350	1500-15000	1100-24000	8-175
400	1800-18000	1500-30800	7-143
450	2100-21000	2000-35000	6-90
500	2500-25000	2000-48000	5-120

reference medium:air (20℃,1.103bar, $\rho = 1.205\text{kg/m}^3$)

Density of common gaseous medium in standard condition

Name	Density (kg/m ³)
Dry air	1.2928
Acetylene	1.1717
oxygen	1.4289
Carbon onoxide	1.2504
Carbon dioxide	1.9770
Fluorine gas	1.7840
Propylene	1.9140
Ammonia	0.7710
Ethylene	1.2604
Hydrogen	0.08988
Methane	0.7167
Ethane	1.3567
Propane	2.0050
Butane	2.7030
Nitrogen	1.2506
Helium	0.9000
Nitric oxide	1.3401
Nitrogen dioxide	2.0550

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Flow table (saturated steam) [kg/h]

Absolute pressure	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	2.0
Temp. (°C)	133.54	143.62	151.84	158.94	164.96	170.71	175.36	179.88	187.96	198.4	212.37
Density	1.651	2.163	2.669	3.170	3.667	4.162	4.655	5.147	6.127	7.602	10.05
DN15 Qmin	11	12	13	15	16	17	18	19	20	23	26
Qmax	63	73	81	88	85	101	107	112	123	136	160
DN20 Qmin	13	15	16	18	19	20	21	22	24	27	31
Qmin	102	116	129	141	151	161	170	179	196	218	250
DN25 Qmin	17	19	21	23	25	27	28	30	32	36	42
Qmax	133	153	170	185	199	212	224	236	257	287	330
DN32 Qmin	30	34	38	41	44	47	50	52	57	63	73
Qmax	236	271	301	328	352	375	397	417	455	507	583
DN40 Qmin	24	39	43	47	51	54	57	60	66	73	84
Qmax	340	390	430	470	510	540	570	600	660	730	840
DN50 Qmin	63	73	81	88	95	101	107	112	122	136	157
Qmax	630	730	810	880	950	1010	1070	1120	1220	1360	1570
DN65 Qmin	106	121	134	146	158	168	178	187	204	227	261
Qmax	1060	1210	1340	1460	1580	1680	1780	1870	2040	2270	2610
DN80 Qmin	148	170	188	205	221	235	249	262	285	318	366
Qmax	1480	1700	1880	2050	2210	2350	2490	2620	2850	3180	3660
DN100	222	242	269	293	315	336	355	374	408	454	522
Qmax	2220	2420	2690	2930	3450	3360	3550	3740	4080	4540	58220
DN125	318	363	404	440	473	504	533	561	612	6681	783
Qmax	3180	3630	4040	4400	4730	5040	5330	5610	6120	6810	7830
DN150	423	484	538	586	631	672	711	747	815	908	1044
Qmax	4230	4840	5380	5860	6310	6720	7110	7470	8150	9080	10440
DN200	847	969	1076	1173	1262	1344	1421	1495	1631	1815	2089
max	8470	9690	10760	11730	12620	13440	14210	14950	16310	18160	20890
DN250	1270	1453	1614	1969	1892	2016	2132	2242	2446	2725	3133
Qmax	12700	14530	16140	17690	18920	20160	21320	22420	24460	27250	31330
DN300	2116	2422	2691	2932	3154	3360	3553	3737	4077	4541	5221
Qmax	21160	24220	26910	29320	31540	33600	35530	37370	40770	45410	52210
DN350	3175	3634	4037	4399	4732	5041	5331	5606	6116	6813	7833
Qmax	31750	36340	40370	43990	47320	50410	53310	56060	61160	68130	78330
DN400	3810	4361	4844	5279	5678	6049	6397	6727	7339	8175	9400
Qmin	38100	43610	48440	52790	56780	60490	63970	67270	73390	81750	94000
DN450	4445	5087	5651	6159	6624	7057	7463	7847	8562	9537	10966
Qmax	44450	50870	56510	61590	66240	70570	74630	78470	85620	95370	109660
DN500	5291	6056	6728	7332	7886	8401	8894	9343	10193	11354	13055
Qmax	52910	60560	67280	73320	78860	84010	88940	93430	101930	113540	130550
DN600	6771	7751	8610	9383	10092	10751	11370	11956	13045	14530	16707
Qmax	67710	77510	86100	93830	100920	107510	113700	119560	130450	145300	167070

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Flow table (Liquid)

Diameter (mm)	Standard Range(m ³ /h)	Optional range (m ³ /h)	Output Frequency range (Hz)
15	0.6-6	0.6-8	58-780
20	1.2-8	1-15	40-600
25	2-16	1.6-18	35-400
32	2.2-20	1.8-30	20-250
40	2.5-25	2-48	10-240
50	3.5-35	3-70	8-190
65	6-60	5-85	7-150
80	13-130	10-170	6-110
100	20-200	15-270	5-90
125	30-300	25-450	4.5-76
150	50-500	40-630	3.8-60
200	100-1000	80-1200	3.2-48
250	150-1500	120-1800	2.5-37.5
300	200-2000	180-2500	2.2-30.6
350	300-3000	220-3500	1.7-27
400	350-3500	300-4500	1.4-21
450	420-4200	400-6000	1.2-15
500	500-5000	400-7100	1.0-17.8

Pipe installation design:

Basic requirements:

- ◆ The vortex flowmeter can be installed horizontally, vertically and obliquely on the pipe. When measuring liquid, the pipe must be filled with liquid, and the liquid is installed vertically. The flow direction should be from bottom to top.
- ◆ If the flowmeter is installed in the well and it is flooded, the submersible vortex flowmeter should be used.
- ◆ The inner diameter of the pipe of the flowmeter must be the same as the inner diameter of the flowmeter. Then the pipe must be tapered.
- ◆ When welding the clamping flange, the body and gasket should be removed and welded.

After the connection is completed, reinstall the watch body; to prevent high temperature against the instrument. Cause damage. Clean the pipe debris before installing the flow record Slag, debris, stones, etc.

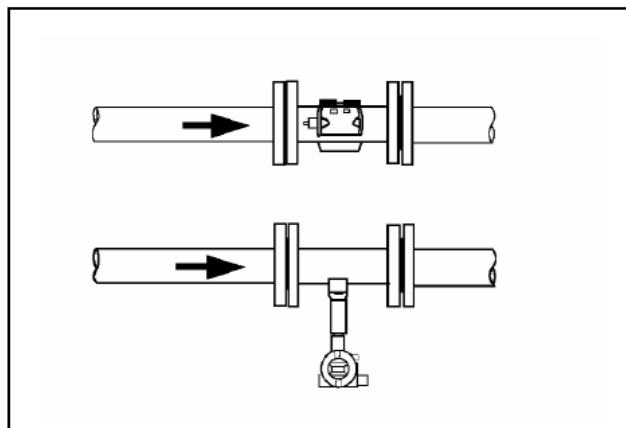
- ◆ When designing the pipeline installation, the upper end of the flowmeter amplifier should be left 300mm space for commissioning and overhaul.
- ◆ When using the instrument, ensure that the pipe is filled with medium.
- ◆ When the pipe is vibrating, install brackets on both sides of the instrument.
- ◆ When measuring liquid, if there is any possibility of air bubbles, gas separation should be installed.

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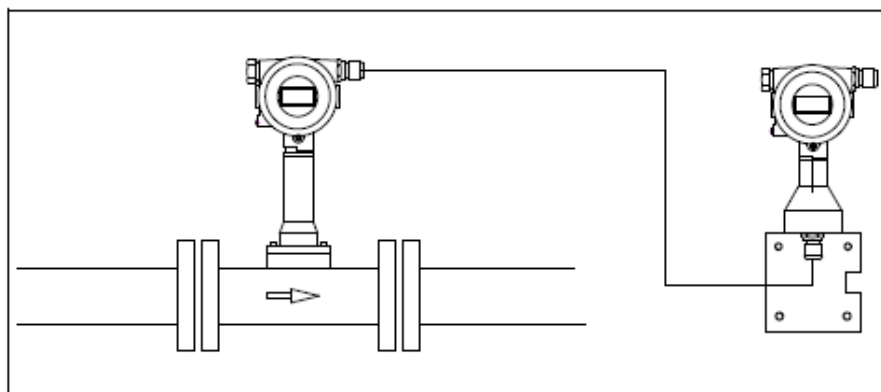


- ◆ Horizontal installation. temperature $>150^{\circ}\text{C}$. it is recommended to install as shown below.



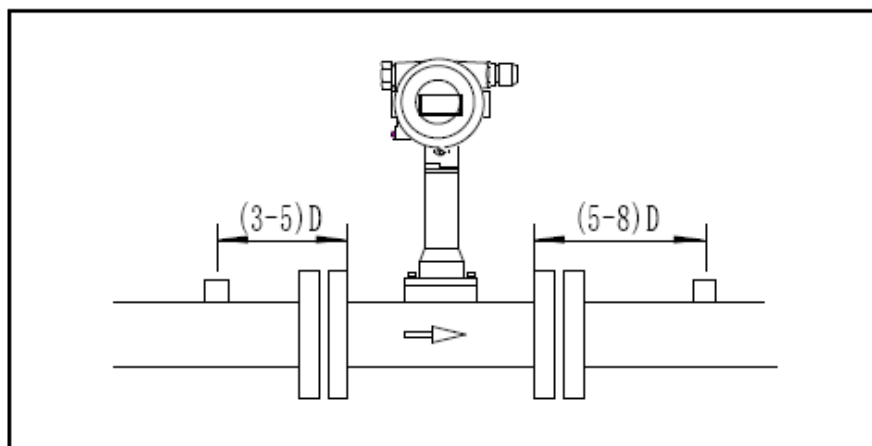
Split type flowmeter installation:

The split type flow meter is used in a humid environment or a place with high temperature. The signal processing part is separated from the watch body and can be applied to various harsh industrial sites. The longest transmission distance between the signal converter and the sensor is 10 meters, and the connecting cable is a 2-core shielded cable. Its installation is shown below.



Mounting position for temperature and pressure compensation condition:

When temperature and pressure compensation are required, the front pressure is taken and the rear temperature is taken. The recommended installation distance is shown in the figure below:



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The flowmeter requirements for the length of the straight pipe before and after are shown in the figure below.

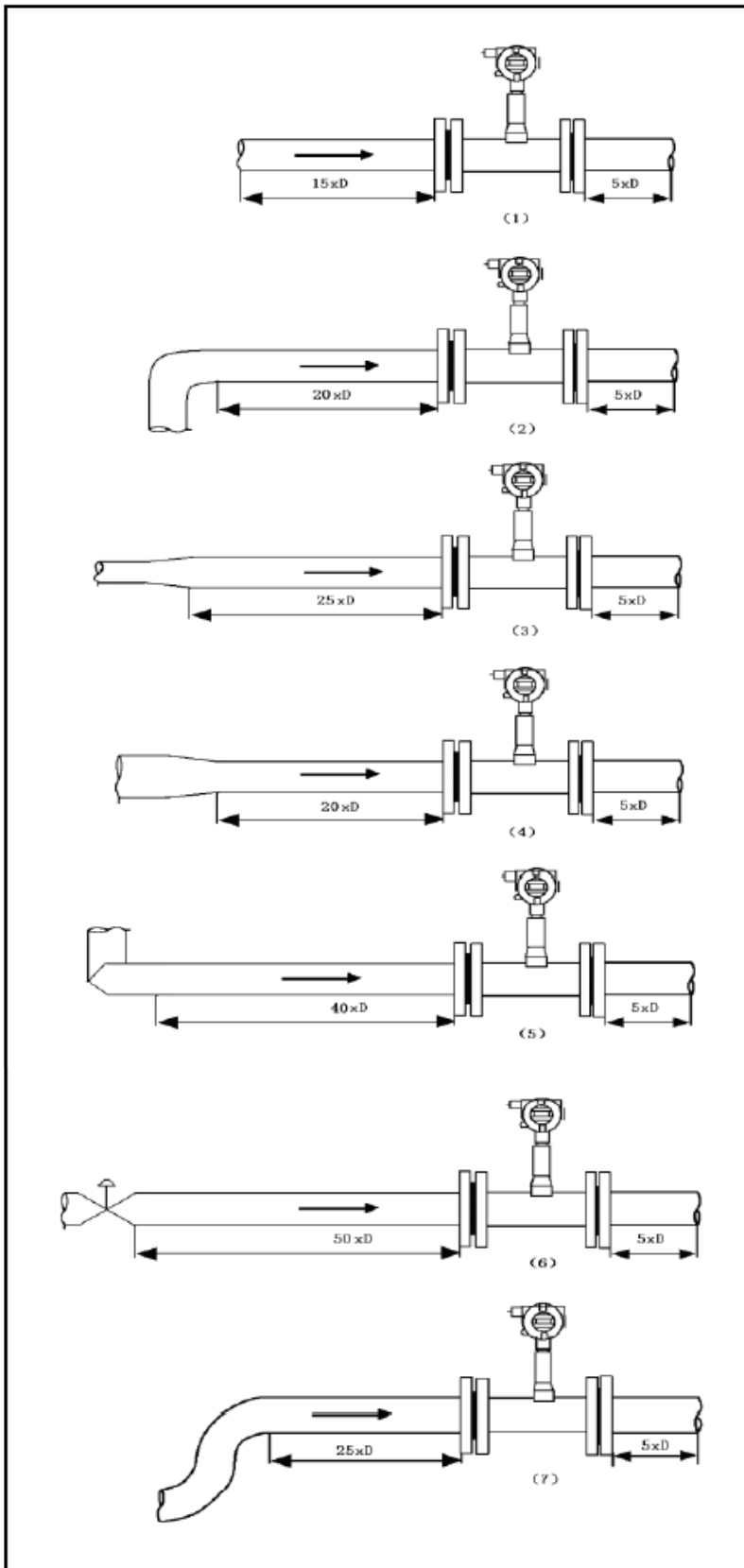


Fig (1) Straight pipe

Fig (2) One 90 degree elbow

Fig (3) Concentric pipe expansion

Fig (4) Concentric contraction fully open valve

Fig (5) Two 90 degree elbows in different planes

Fig (6) Regulating valve half open valve

Fig (7) Two 90 degree elbows in the same plane

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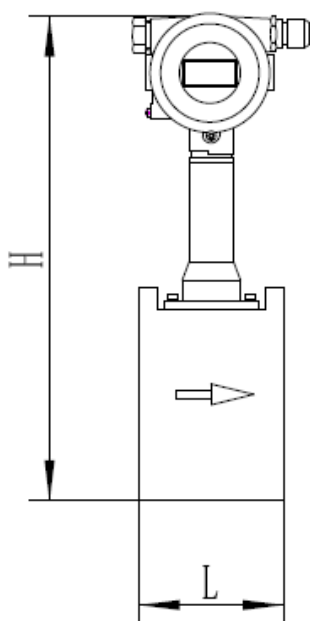
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Structure and demensions:

Clamping type

The main geometric dimensions of the flowmeter show as below drawing and table. We can provide matching flanges, bolts and gaskets.



Nominal Diameter (mm)	Pressure (Mpa)	flowmeter's length (L)	flowmeter's height (H)
15	4.0	65	350
20	4.0	65	350
25	4.0	65	350
32	4.0	65	357
40	4.0	65	357
50	4.0	65	367
65	2.5	65	387
80	2.5	65	397
100	2.5	65	417
125	2.5	65	440
150	2.5	65	465
200	2.5	85	515
250	2.5	100	565
300	2.5	120	615

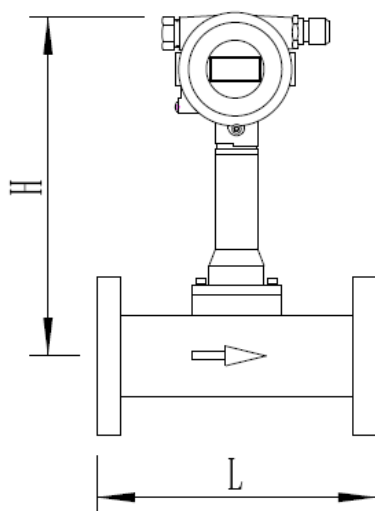
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Flange type:

The main geometric dimensions of the flowmeter show as below drawing and table.



Nominal Diameter (mm)	Pressure (Mpa)	Total length	Total height
15	4.0	150	323
20	4.0	150	323
25	4.0	150	323
32	4.0	150	317
40	4.0	150	322
50	4.0	150	326
65	2.5	150	334
80	2.5	150	340
100	2.5	200	350
125	2.5	200	366
150	2.5	200	375
200	1.6	200	406
250	1.6	250	431
300	1.6	300	456
350	1.6	350	481
400	1.6	350	506
450	1.6	350	521
500	1.6	350	556

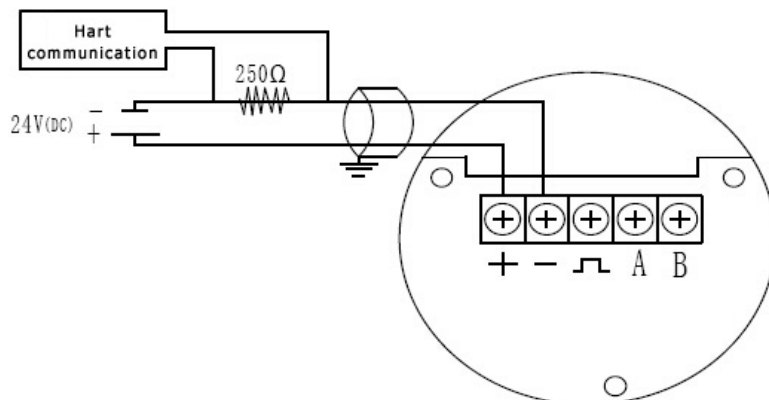
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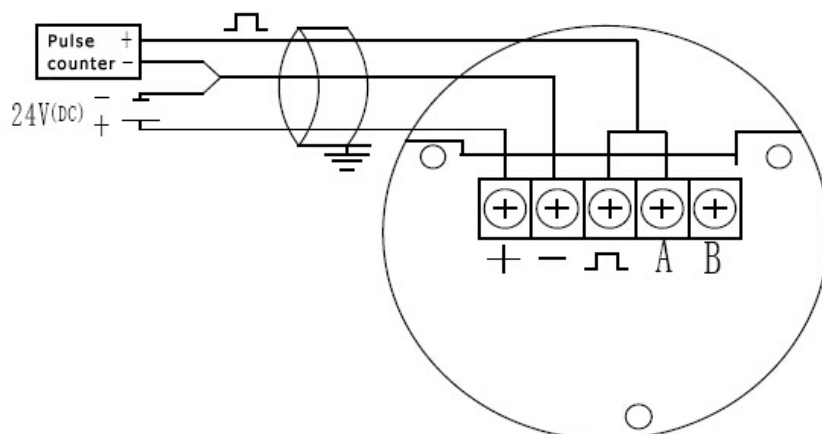


Electrical connection:

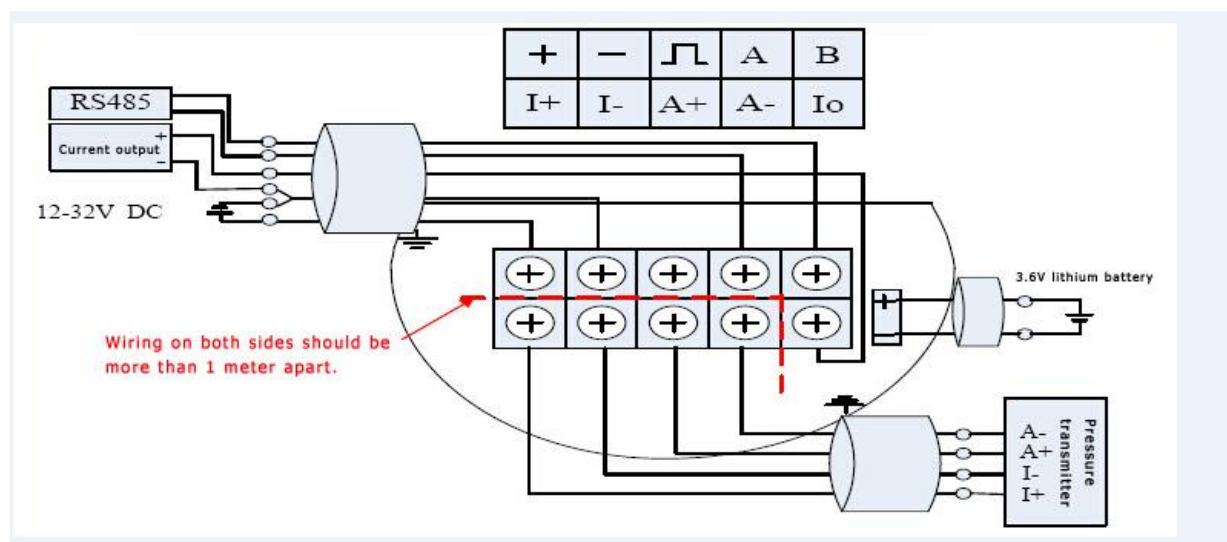
Two-wire power supply / LCD / 4-20mA output



Two-wire power supply / LCD display / pulse output



RS485 with current output and using H880TDZ-485 terminal board wiring as below:



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Ordering guide:

Nominal diameter	Display type	Connection type	Converter type	Measuring medium	Material	Pressure grade	Probe type	Test report	Explosion proof	Power supply	Other optional
DN15- DN500	X										
Without display	A										
With display	B										
Clamping type		0									
Flange type		1									
Integrated type			Y								
Split type			F								
Submersible type			Q								
Liquid				0							
Gas				1							
Steam				2							
SUS304					A						
SUS316L					B						
Others					C						
PN 16						1					
PN 25						2					
PN40						4					
Others						9					
Low temp. (-40℃~+150℃)							A				
Midium temp.(-40℃~+250℃)							B				
High temp. (-40℃~+350℃)							C				
By factory								0			
By third party								1			
Without EX-proof									A		
Exiall CT6 Ga									B		
Ex dII CT6 Gb									C		
24V DC										2	
3.6V battery										3	
RS485											/R
HART											/H
Temp. compensation											/T
Pressure compensation											/P

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Remarks:

When you place order, please let us know your requirments as below:

Process conditions:

1. Measuring medium: Air, liquid, or steam? If it is steam, what's the temperature of it?
2. Viscosity of medium:
3. Pressure range: (min. normal, max)

Installation and environmental conditions:

1. Pipe outer diameter:
2. Pipe inner diameter:
3. Pipe material:
4. Install direction: Vertical, Horizontal, or flange installation? If is flange, please supply the size and standard of flange.
5. Power supply
6. Explosion proof: Intrinsical safety explosion proof or flameproof type?
7. Protection grade
8. Other requirements:

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