DH800 serise Vortex Flowmeter

Reliable flow measurement of gas, steam and liquids

Operating Instruction

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INTRODUCTION

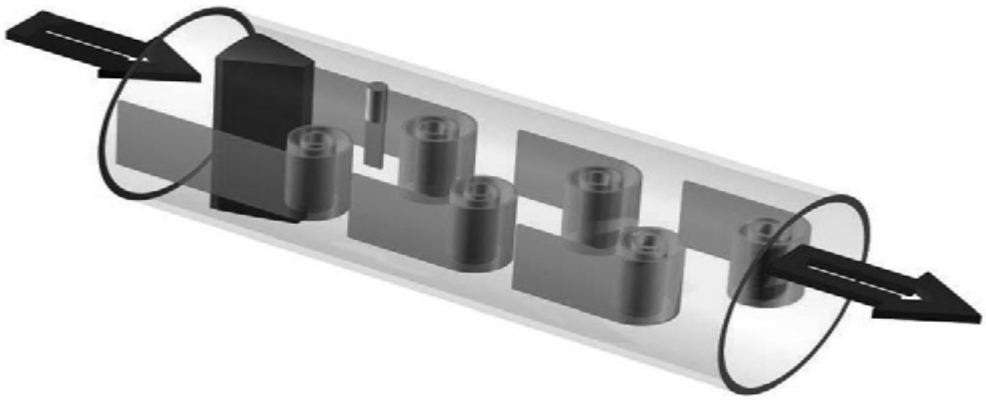
1. Summary

Darhor Technology Co., Ltd used international advanced testing technologies to developed piezoelectric intelligent DH900 type vortex flowmeter, the products have made a breakthrough progress in the anti-

vibration, reliability, high temperature, etc. They comply with JB/T9249-1999 "Vortex Flow Sensor" industry standard and can be used in measure saturated steam, superheated steam, high and low temperature liquids, gases and other media, They widely used in metallurgical chemical, light industry, food and sewage treatment industries.

2. The working principle

Vortex flowmeter is based on "Karman vortex street" principle of the development of a fluid oscillation type flowmeters, use of modern electronic detection technology to detect the vortex frequency, through the treatment of convertor ,it sends 4-20mA current signal , By using our company ‘s temperature transmitter and display monitor ,It can show high quality test results.



Computational formula as follows:

F=St*V/md ……..……. Formula 1

Q=3600*F/K ……..…… ……Formula 2

M=Q*ρ ……..……. Formula 3

Among Formula:

F……Fluid flow through bluff body generate frequency of vortex (Unit : Hz)

St…Strouhal constant (zero dimension)

V……Mean velocity of fluid inside the pipeline (Unit : m/s)

m……The ratio between Lune Circulation area of bluff body at both sides and cross-sectional area (Unit: zero dimension)

d……Upstream face width of bluff body inside vortex flowmeter (Unit : m)

D……Inside diameter (ID) of vortex flowmeter (Unit : m)

Q……Instantaneous volume flow (Unit : m3 / h)

K……Instrument coefficient of vortex flowmeter (Unit : pulses / m3)

M……Instantaneous mass flow (Unit : kg/ h)

ρ...…Fluid density (Unit : kg/ m3)

Note: vortex flowmeter "K" coefficient is corresponding with one diameter, the exact "K" value should be calibrated in practice. Viz. one cubic meter fluid through sensor output numbers of pulse under working condition.

3. Main characteristics

3.1 Simple structure , high reliability and trouble-free long-term use;

3.2 Series, DN25-DN600-mounted structure using Wafer version or Flange version, can be selected to adapt to different users;

3.3 Two-wire output current pulse, three-wire voltage pulse 4-20mA analog voltage signal, to adapt to a variety of end-user

3.4 Intelligent, wide variety of medium-caliber amplifier common, including non-traffic signal automatic recognition software has greatly enhanced anti-jamming performance instrumentation;

3.5 Built-in LI- battery(3.6VDC) can be displayed at the screen, can be 24VDC for the screen outside the show that, can be displayed outside the screen at the same time for the 24VDC output 4-20mA analog current signal;

4.Technical parameters

4.1 Normal diameter DN (mm):

15,20,25,40,50,80,100,125,150,200,250,300 ,350,400,450,500,600

4.2 Connection type **:** Wafer connection or Flanged connection ,

4.3 Normal pressure (Mpa): 1.6, 2.5, 4.0 level , the other pressure class recommend priority or supply agreement

4.4 Medium temperature (℃)

(1) -40 ℃ ~ 150 ℃; (2) -40 ℃ ~ 250 ℃ (3)-40 ℃ ~ 350 ℃

(4)-40 ℃ ~ 425 ℃

4.5 Accuracy: liquid ± 1% of reading , gas and steam ± 1.5% of reading

4.6 Meter material : the casing of the transmitter is made in aluminum alloy ,the material of contacting medium: SUS304,SUS316,SUS316L,HC-276, or other special materials according to customers' requirement.

4.7 Medium: liquid , gas (including natural gas), steam (saturated steam and superheated steam.etc

4.8 Medium viscosity:Range of Reynolds numbers: normally 20000-7000000 , extensionally 8000-7000000.

4.9 Velocity scope of flow : Liquid (0.30 m/s…7 m/s), gas (3.0 m/s…60 m/s) ,steam (3.0 m/s…70 m/s)

4.10 Output signal: (Two versions are available:)

(1) Remote version

three-wire voltage pulse (supplier agreement)

lower PWL<1V, higher PWL>6V)

lower [0] 1V [1] 5V

（2）compact version

status display instantaneous flow rate，cumulative flow rate ，output 4-20mA signal

4.11 Working Power Supply:

(1) voltage pulse output without status display

Type :three-wire voltage pulse output: AC220V

(2) status display

Type:two-wire 4-20mA output: DC 24V

(3) status display

Type:Li Battery-3.6VDC /5Ah (> 2 years service life)

4.12 Resistance coefficient: Ca<2.4

4.13 Amospheric pressure: 86kPa-106kPa

4.14 Ambient temperature: -40 ℃ ~ +55 ℃ ,humidity:<90% RH

4.15 Explosion-proof class: Intrinsic safety Exia Ⅱ CT1-4;

Flame-proof Exd Ⅱ CT1-4

4.16 Protection grade**:**IP65,IP68 (IP68 supply by negotiation)

5. Measuring range (Model Selection Parameters)

Model Selection (LUGB Pipeline-version Vortex Flowmeter)

DH900 .A B C D E F G H

A. Pipelined Vortex Flowmeter Connection amplifier and sensor:

1. flange Connection (P/T compensation required)

2. wafer Connection (Priority)

B. Measurable medium:

1. Gas, Liquid, Steam

2. Liquid

3. Gas

4. Saturated steam & superheated steam

C. Diameter of Vortex Flowmeter

DN（mm）： 15,20,25,32,40,50,65,80,100,125,200,250,300,350,400,450,500,600

D: Explosion-proof class

null. without explosion-proof certificate and its protection level - IP65 (IP67, IP68)

B. intrinsic safety Exia Ⅱ CT4; Exib Ⅱ CT4

2. flame-proof Exd Ⅱ CT6

E. Signal output

Null: voltage pulse (12/24VDC)

C: 4-20mA , LCDstatus display (24VDC)

D : without signal output and status display (3.6V Li Battery)

F. Measurable pressure class

Null: 1.6MPa

2: 2.5Mpa

4: 4.0Mpa

G: Meter body material

Null : SUS304

M : SUS316

L : SUS316L

H: Flange material

Null : carbon steel

S :SUS304

Order Notice:

Diameter: DN -------- mm

Name of liquid: -------

Chemical characteristics: -------

Velocity scope of flow: Max--------- ,Min---------

Medium temperature: -------℃

Medium pressure: -------- MPa

Medium density: ---------kg/dm3 t/m3

Meter Output signal: ----------

Explosion-proof class: ----------

Protection grade**:** ----------

5.1、Gas (Air)

Nominal Size DN(mm)	Normal work flow (m3/h)	Measurable flow (m3/h)	Nominal Pulse Rate (Hz)
15	5 ~ 30	5 ~ 40	460 ~ 3700

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 ~ 310	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	250 ~ 2500	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
600	3200 ~ 32000	2500 ~ 70000	3.5 ~ 98

Notes:

(1)This table assumes standard conditions of: Air, t0=20 ℃ , 0.1MPa, ρ0=1.205kg/m3,v0=3~60m/s

(2)The air in other conditions (very temperature, atmospheric pressure) the flow through the following formula:

Q condition = Q0 * p0 / P * T/T0

Q0: the upper corresponds to the minimum flow (flow from the upper limit condition of pressure and temperature effects)

P0: standard atmosphere (0.101325MPa)

P: pressure condition = gauge pressure + atmospheric pressure (Mpa)

T: temperature condition = 273 + t ℃ (K)

T0: standard temperature (273K)

5.2 Fluid liquid

Nominal Size DN(mm)	Normal work flow (m3/h)	Measurable flow (m3/h)	Nominal Pulse Rate (Hz)
15	1 ~ 6	0.8 ~ 8	90 ~ 900
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
600	700 ~ 7000	500 ~ 10000	0.7 ~ 14

Note:

(1) The table refers to liquid water at room temperature t = 20 ℃, ρ0 = 1000kg/m3, v0=1~10m/s

(2) if the measurement of liquid rather than water, and liquid density is known, according to the formula:

$Q\rho = Q0 \times \sqrt{(\rho 0 / \rho)}$

Qρ: working conditions in the medium-density traffic conditions under the lower limit;

Q0: the upper table in the same caliber flow of the lower limit ρ0: the density of water taken 1000kg/m3

ρ: the density of the measured medium

5.3、Saturated steam

Flow range of staturated steam (unit kg/h)

AP (MPa)	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	2.0
T (℃)	133.54	143.62	151.84	158.94	164.96	170.71	175.36	179.88	187.96	198.4	212.37
D (kg/m^3)	1.651	2.163	2.669	3.170	3.667	4.162	4.655	5.147	6.127	7.602	10.05
DN15 Maxm	63	83	102	121	140	159	178	197	234	290	383
Maxn	63	73	81	88	85	101	107	112	123	136	160
Minn	11	12	13	15	16	17	18	19	20	23	26
DN20 Maxm	112	147	181	215	249	282	316	349	415	515	681
Maxn	102	116	129	141	151	161	170	179	196	218	250
Minn	13	15	16	18	19	20	21	22	24	27	31

DN25 Maxm	175	229	283	336	389	441	493	546	649	806	1065

Maxn	2220	2420	2690	2930	3450	3360	3550	3740	4080	4540	5220
Minn	222	242	269	293	315	336	355	374	408	454	522
DN125 Maxm	4373	5730	7070	8397	9714	11025	12331	13634	16230	20137	26622
Maxn	3180	3630	4040	4400	4730	5040	5330	5610	6120	6810	7830
Minn	318	363	404	440	473	504	533	561	612	681	783
DN150 Maxm	6299	8252	10182	12094	13990	15878	17759	19636	23375	29002	38341
Maxn	4230	4840	5380	5860	6310	6720	7110	7470	8150	9080	10440
Minn	423	484	538	586	631	672	711	747	815	908	1044
DN200 Maxm	11197	14669	18101	21499	24870	28227	31570	34907	41553	51557	68159
Maxn	8470	9690	10760	11730	12620	13440	14210	14950	16310	18150	20890
Minn	847	969	1076	1173	1262	1344	1421	1495	1631	1815	2089

	11			747	815	908	1044	
101	21499	24870	28227	31570	34907	41553	51557	68159
760	11730	12620	13440	14210	14950	16310	18150	20890
076	1173	1262	1344	1421	1495	1631	1815	2089
281	33589	38856	44101	49324	54538	64922	80551	106490

DN200 Maxm	11197	14669	1
Maxn	8470	9690	1
Minn	847	969	1
DN250 Maxm	17494	22919	2
Maxn	12700		

116	2422	2691	2932	3154	3360	3553	3737	4077	4541	5221
293	44928	55438	65844	76167	86449	96689	106908	127264	157901	208749
750	36340	40370	43990	43720	50410	53310	56060	61160	68130	78330
175	3634	4037	4399	4372	5041	5331	5606	6116	6813	7833

Minn
DN350 Maxm
Maxn
Minn

DN400 Maxm	44792	58682	72410	86002	99486	112915	126290	139638	166226	206242	272657
Maxn	38100	43610	48440	52790	56780	60490	63970	67270	73390	81750	94000
Minn	3810	4361	4844	5279	5678	6049	6397	6727	7339	8175	9400
DN450 Maxm	56689	74269	91643	108845	125910	142906	159834	176727	210377	261022	345077
Maxn	44450	50870	56510	61590	66240	70570	74630	78470	85620	95370	109660
Minn	4445	5087	5651	6159	6624	7057	7463	7847	8562	9537	10966
DN500 Maxm	69986	91690	113139	134376	155444	176427	197325	218181	259724	322249	426020
Maxn	52910	60560	67280	73320	78860	84010	88940	93430	101930	113540	130550
Minn	5291	6056	6728	7332	7886	8401	8894	9343	10193	11354	13055
DN600 Maxm	100780	132033	162921	193503	223841	254057	284151	314186	374004	464041	613472
Maxn	67710	77510	86100	93830	100920	107510	113700	119560	130450	145300	167070
Minn	6771	7751	8610	9383	10092	10751	11370	11956	13045	14530	16707

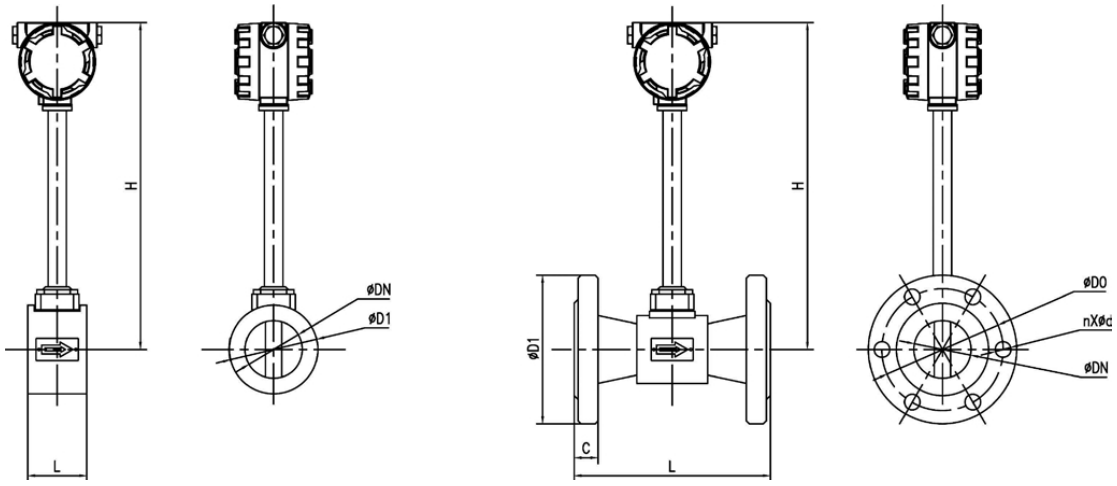
Note :**AP**：Absolute pressure (MPa) **T**：Temperature (℃) **D**：Density (kg/m3), **Maxm**：Max measurable flow(kg/h) **Maxn**： Max normal work flow(kg/h) **Minn**： Min normal work flow(kg/h)

5.4 Superheated steam

DN (mm)	Max measurable Flow (kg/h)	Max normal work Flow (kg/h)	Min normal orkflow (kg/h)
15	38.2× ρ	49.5× ρ	8.24× ρ
20	67.8× ρ	79× ρ	9.88× ρ
25	106× ρ	104× ρ	13.12× ρ
32	174× ρ	184× ρ	23× ρ
40	271× ρ	265× ρ	26.65× ρ
50	424× ρ	494× ρ	49.41× ρ
65	716× ρ	823× ρ	82.35× ρ
80	1085× ρ	1153× ρ	115.3× ρ
100	1696× ρ	1647× ρ	164.7× ρ
125	2649× ρ	2471× ρ	247.1× ρ
150	3815× ρ	3294× ρ	329.4× ρ
200	6782× ρ	6588× ρ	658.8× ρ
250	10596× ρ	9882× ρ	988.2× ρ
300	15260× ρ	16470× ρ	1647× ρ
350	20771× ρ	24710× ρ	2471× ρ
400	27130× ρ	29650× ρ	2965× ρ
450	34336× ρ	34590× ρ	3459× ρ
500	42390× ρ	41180× ρ	4118× ρ
600	61042× ρ	52700× ρ	5270× ρ

Note： ρ : the density of superheated steam in working conditions , (reference thermo-technical handbook by temperature and pressure)

6. EXTERNAL DIMENSIONS



A Wafer version (type A) **B** Flanged version (type B)

6.1 Dimensions of Wafer version (mm) (type **A**:DN,D1,L,H. type **B**:D1,D0,C,n,d)

DN	D1	L	H	D1	D0	C	n	d
15	85	78	345	148	118	20	4	18
20	85	65	350	148	118	20	4	18
25	85	65	350	148	118	20	4	18
32	85	65	350	148	118	20	4	18
40	85	65	350	148	118	20	4	18
50	95	80	355	155	125	20	4	18
65	105	80	362	172	142	20	4	18
80	120	80	370	180	150	20	4	18
100	140	100	380	200	170	25	4	18
125	160	110	390	224	194	25	6	18
150	185	150	405	265	225	27	6	22
200	245	165	432	313	277	30	8	22
250	295	200	460	375	331	32	10	26
300	345	200	484	425	381	35	10	26
350	395	230	510	475	431	35	16	26
400	445	230	534	525	481	35	16	26
450	500	280	560	580	536	45	16	30
500	550	320	584	635	591	45	16	30
600	650	360	634	745	701	60	20	30

Note :

(1) Wafer-version vortex flowmeter assemble made-to-order flanges, when flowmeter leave factory including companion flanges(reference (type B)). we are able to provide GB(China); ANSI; DIN; JIS and etc.), pressure class recommend priority level.

(2) If the temperature of the measured medium rather than 150 ℃ ,H=H+75,radiator is installed.

6.2 Dimensions of Flanged version (mm) (type **A**:DN,D1,L,H. type **B**:D1,D0,C,n,d)

DN	P(MPa)	D1	C	L	H	D0	n*φd
15	1.6 ~ 4.0	95	14	180	345	65	4*14
20	1.6 ~ 4.0	105	16	180	350	75	4*14
25	1.6 ~ 4.0	115	16	180	350	85	4*14
32	1.6 ~ 4.0	140	18	180	350	100	4*18
40	1.6 ~ 4.0	150	18	180	350	110	4*18
50	1.6 ~ 4.0	165	20	200	355	125	4*18
65	1.6	185	22	200	362	145	4*18
80	1.6	200	24	200	370	160	8*18
100	1.6	235	26	250	380	190	8*18
125	1.6	270	28	250	390	220	8*18
150	1.6	300	30	300	405	250	8*22
200	1.6	375	36	350	432	320	12*22

250	1.6	450	42	400	460	385	12*26
300	1.6	515	48	500	484	450	12*26
350	1.6	580	55	550	510	510	16*26
400	1.6	660	60	600	534	585	16*30
450	1.6	685	66	600	560	610	20*30
500	1.6	755	72	600	584	670	20*33
600	1.6	890	84	600	634	795	20*36

P:pressure under working condition (unit: Mpa)

Note :

(1)Wafer-version vortex flowmeter assemble made-to-order flanges, when flowmeter leave factory including companion flanges(reference (B)). we are able to provide GB(China); ANSI; DIN; JIS and etc.), pressure class recommend priority level.

(2) If the temperature of the measured medium rather than 150 ℃ ,H=H+75, radiator is installed.

7. Installation Instruction

7.1 Straight length requirement

In order to correct measurement, upstream or downstream of flow meter should obligate enough straight length. No components to effect fluid velocity in upstream of flow meter. All types of straight length installation reference:

Vortex Flowmeter Straight Length Size Drafts (Fig 7.1)

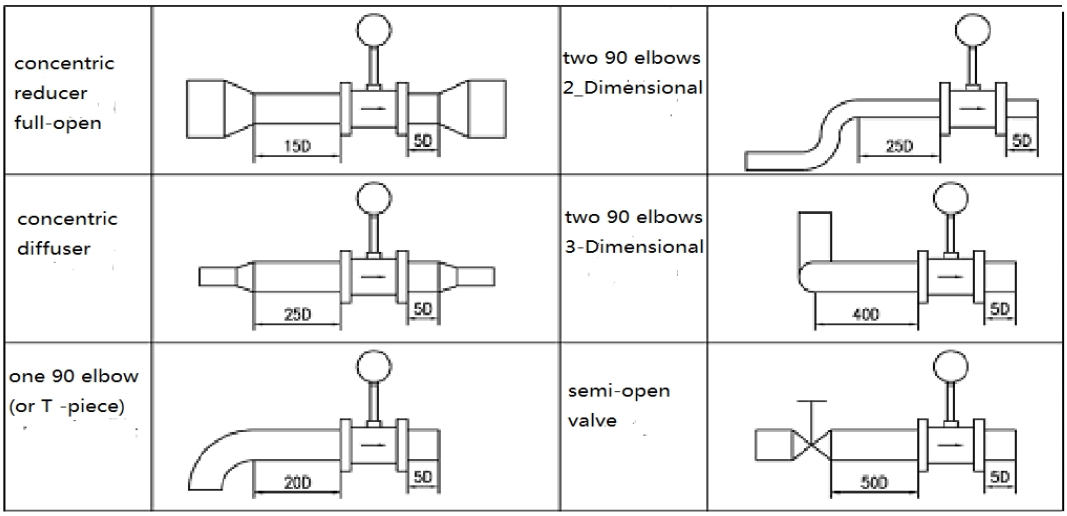


Fig 7.1

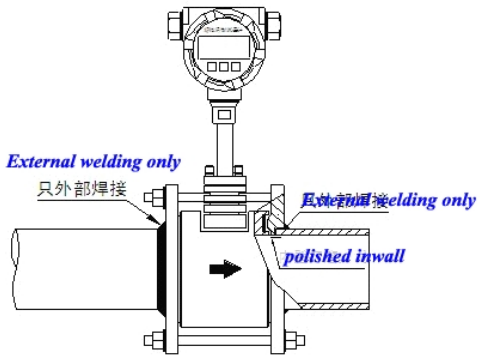
Reducer pipe: Ensure the upstream straight pipe length to be 15D or more, and the downstream straight pipe length to be 5D or more for per reducer

Expander pipe: Ensure the upstream straight pipe length to be 25D or more, and the downstream st raight pipe length to be 5D or more for per expander pipe.

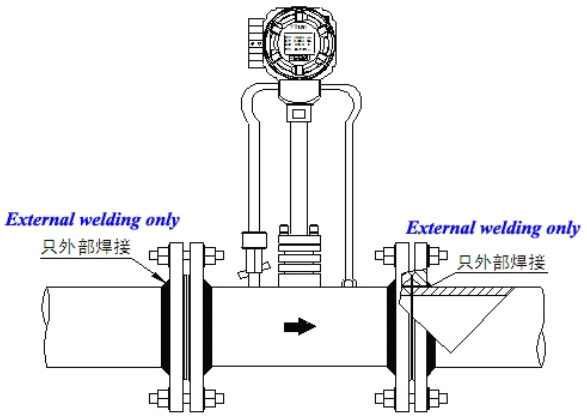
Valve position and straight pipe length: In case the valve has to be installed on the upstream of th e flowmeter, ensure the upstream straight pipe length to be 50D or more, and the downstream straight pipe length be 5D or more

7.2 Vortex diameter is accordant to upstream and downstream tubing diameter at installation point; sensor is concentric with pipeline; prohibit gaskets between sensor and flanges bulge out into pip eline. Make sure that the connection end face of

insertion-version(Wafer type) vortex flowmeter parallel to the pipe axis. Details as *No.1-No.2*



No. 1 : wafer version installation



No. 2 : flange connection installation

7.3 use our special gaskets for Vortex diameter, Fit a gaskets inside the groove of the flang e.

7.4 Horizontal, vertical and slanting installation. Liquid measuring ensure flow direction from low to high. Gas measuring, direction no required.

7.5 Try to avoid strong shock pipeline, or take some measures of shock absorption. It should be av oided to install the Vortex diameter to long overhead pipes, as the drooping of the transmitter can easily cause the seal leakage between flange and itself; if there is no alternative but to install the t ransmitter to long overhead pipes, pipeline clamp devices must be set at 2D upstream and downstre am of the transmitter.

7.6 Try to avoid high-temp thermal source and source of radiant heating; outdoor insta-

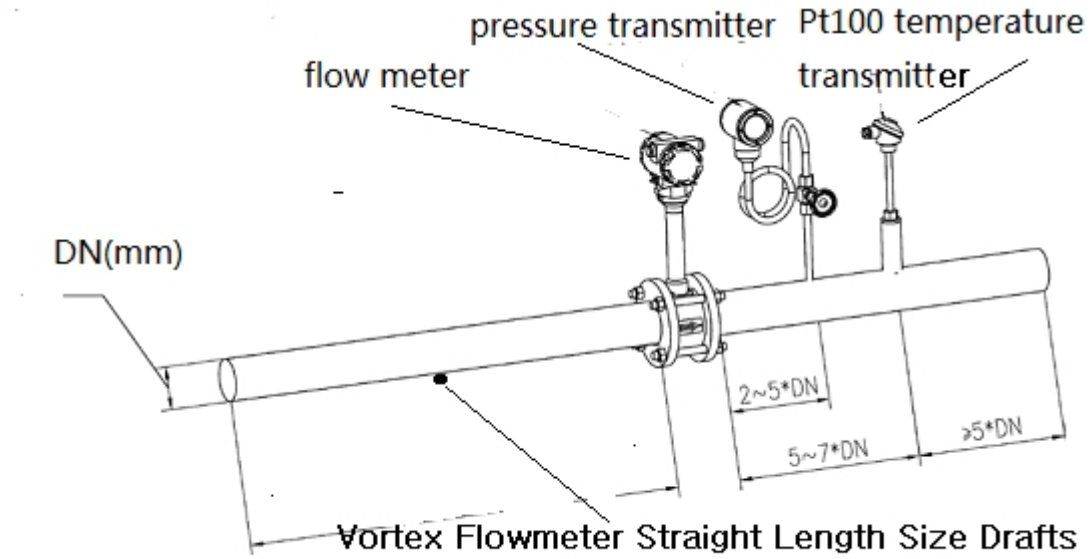
ll-ation should do some measures of sun-shading and rain shelter.

7.7 Grounding requirement.

When pipelines without available grounding conditions, a ground-wire is essential between housing and earth.

7.8 Try to avoid shock places and corrosion environment ; meanwhile, easy maintenance should be considered.

7.9 If it needs to measure the pressure and temperature around the flow transmitter, the pressure measuring point should be at over 2D-5D downstream of the transmitter and the temperature measuring point should be at over 5D-7D downstream of the transmitter.

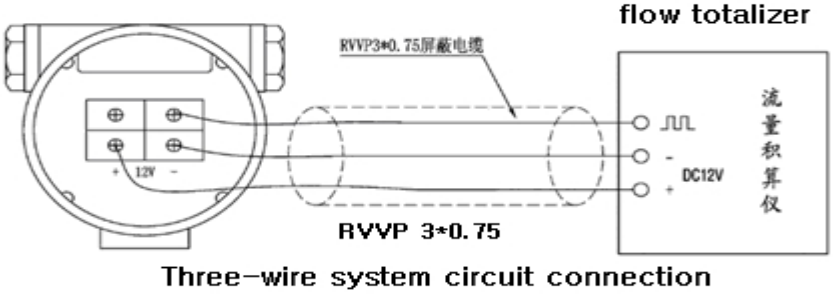


Vortex Flowmeter Straight Length Size Drafts
(Fig 7.1)

7.10 After initial installation, when medium is steam or other high-temp medium, flanges & bolts should be re-tightened when medium full of pipeline. Do heat reservation measures for pipeline in order to protect amplifier.

8. Connection of Meters

8.1 Three-wire system circuit connection



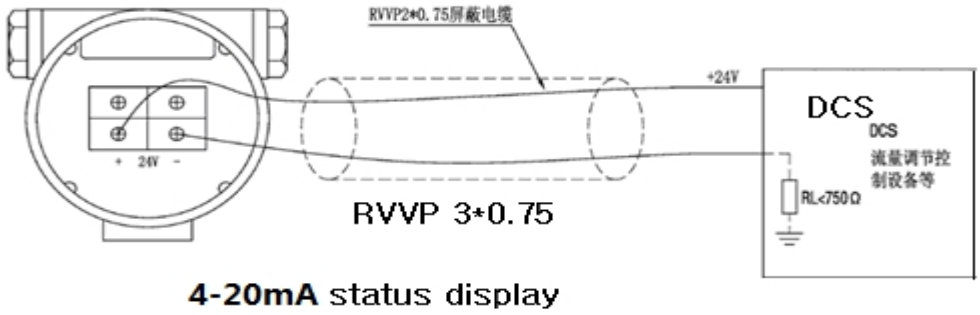
Three-wire system circuit connection

8.1.1 Main power supply and output signal terminals .(Use the Three-wire shielded cable.RVV P 3*0.75)

8.1.2 External 12VDC power source.

8.1.3 When the "+" "-" terminal of the meters are connected to external power so-urces, the circuit begins to work (the battery-powered type changes into the state of power-on) and the pulse output is drawn out from meters.

8.2 Two-wire system circuit connection(which displays the instantaneous flow rate and cumulative flow rate measurement on the spot.)



8.2.1 Main power supply and output signal terminals (Use the Two-wire shielded cable RV VP 2*0.75).

8.2.2 External 24VDC power source.

8.2.3 When the "+" "-" terminal of the meters are connected to external power sour-ces, the circ uit begins to work (the battery-powered type changes into the state of power-on) and the 4-20mA cu rrent output is drawn out from meters.

9. Attentions

9.1 Dryness of saturated steam>85%, If the liquid impurities, regular cleaning

9.2 Try to avoid strong power equipment, high-frequency equipment and strong power switchge ar

9.3 If a valve is installed near the upstream of the mount point of the flow tran-smitter, the constant opening and closing of the value will greatly influence the ser-vice life of the flow transmitter and cause permanent damage to the flow transmitter.

9.4 The meter has been debugged before delivery and does not need adjustment

commonly. the vortex flowmeter "K" coefficient is corresponding with one diameter, refer name plate.

10. Parameter setting/configuration

10.1 Status display (displays the instantaneous flow rate and cumulative flow rate measurement on the LCD spot. Include model version A ,version B)

Version A : LCD screen without signal output, (inner 3.6VDC Li Battery)

(1) Twin-row numerical LCD displays instantaneous flow rate and cumulativ flow rate ,

(2) With external temperature sensors to make temperature corrections and realizes full real-time linear compensation automatically when measuring saturated steams and convert the working condition flow rate into mass flow or volume flow . The measurement is simple and accurate.

(3) Inner 3.6VDC,5Ah ,Li Battery, > 2 years service life

Version B: LCD screen with signal output , 4-20mA, two-wire system

(1) It has the function of Type-A and output 4-20mA current singal .,

(2) The 4-20mA current output signal can meet remote various requirements of industrial auto-equipments , such as DCS (Distributed Control System)……

(3) remote transfer distant :1200m

10.2 Operating Procedures

10.2.1 The calculation formula

(1) The calculation of the mass flow under instantaneous condition:

F=3.6*Fr*De/U

F: instantaneous flow rate Fr: frequency De:refers to the density of the measured medium. U: flow rate coefficient.

(2) FL= ∫ F (FL=F & T integral)

FL（Kg/M³）: cumulative flow rate , F（Kg/M³）: instantaneous flow rate

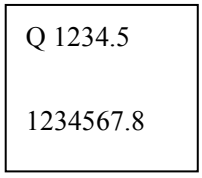
T: cumulative time

10.2.2 Notes on the LCD optional digital display

The two-line LCD shows measured values,dialog texts,fault messages and notice messages.

(1) main status (working status)

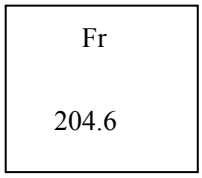
displays the instantaneous flow rate and cumulative flow rate measurement



instantaneous flow rate(t/h) 5-digital value

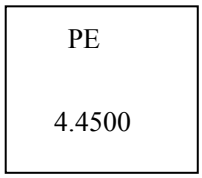
cumulative flow rate (t) 8-digital value

(2) displays the vortex frequency (Hz)



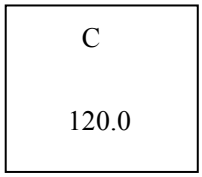
vortex frequency values

(3) displays the output current (mA)

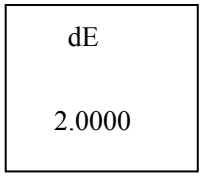


Note:Version A without current signal output

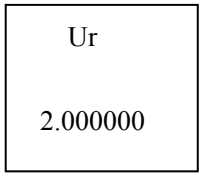
(4) displays the temperature (℃)



(5) displays the density compensation



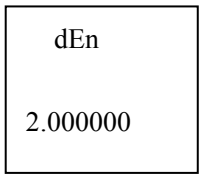
(6) displays the approaches of density compensation



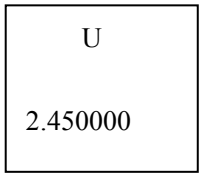
Ur: 1.00 setting density

Ur: 3.00 density of temperature compensation

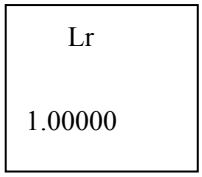
(7) displays the setting density



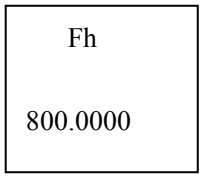
(8) displays the flow coefficient



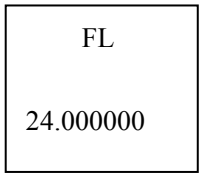
(9) displays the damping coefficient (s) (efficient range :1 - 9)



(10) displays the upper limit flow rate (t/h)



(11) displays the removing micro-signal



when instantaneous flow rate less than the setting valve, instantaneous flow rate is 0.00000 ,not cumulative

(12) Note: if flow rate unit (kg), then flow coefficient U (Hz/dm3)

10.2.3 Displays the measuring range of instantaneous flow (right LCD bar)

upper limit: setting upper limit flow rate

10.2.4 Operating Elements

The transmitter is operated by using pushbuttons(keys) and the local display.This enables individual functions to be selected and parameters or values to be entered.

Button Key	left key (**Q**)	middle key(**F**)	right key(**C**)
state of Working	cumulative flow rate	vortex frequency	item

	instantaneous flow rate	(Hz)	
state of setup	selected **Q,F,C**	set parameters	enter or pgup/ pgdn

(1) State of Working

Press the "**Q**" to display instantaneous flow rate and cumulative flow rate.

Press the "**F**" to display vortex frequency

Press the "**C**" step by step to display **Fr,PE,C,dE,Ur,dEn,U,Lr,FH,FL** etr.

(2) State of setup

Press the "**Q**" to modify setting for present position (flicker bit)

Press the "**F**" to modify setting for present number (flicker bit)

Press the "**C**" to confirm your data entires and pgup/pgdn

(3) Operation

Press and hold down "**C**" key for longer than 3 seconds State of setup density **Ur** (flicker bit) . Press the "**Q**" to modify setting for present position (flicker bit) ⟶ Press the "**F**" to modify setting for present number (flicker bit) ⟶ Press the "**C**" to confirm the your data entires and proceed to next (pgup/pgdn.),such as to change setting of **Fr,PE,C,dE,Ur,dEn,U,Lr,FH,FL ……**

Press and hold down "**C**" key for longer than 3 seconds to save the new setting and return main status, or else, the setting is null.

If you do not press any key within 3 minutes following return to the main status.

10.2.5 Reset cumulant (Zero- cumulative flow rate adjustment)

Under state of setup, Set the correction coefficients of the **Un,Un=0.110000,** Press the "**C**" to confirm the your data entires.Cumulative flow rate is resetted.

Un --
0.110000

10.2.6 Calibration of output current signals(except Type A)

The flowmeter can set the Maximum Output current signals(20mA) and Minimum Output current signals(4mA).

Meter Operation: Under State of setup, Press the "**C**" step by step to display,.

At last,. the display contents is

(1)

oUh-
3329.000

This is Maximum Output current signals(20mA)

(2)

oUL-
666.0000

This is Minimum Output current signals(4mA)

For most applications, these factory settings are ideal and should not require adjustment by the user.

10..2.7 Electrical connection

(1) Electrical amplifier board : S,T terminal for transmitter electrical signal

(2) Electrical converter board :

Model: Version A (Inner 3.6V Li Battery)

V＋: DC12V+ （DC12V + ,power supply）

B- : DC12V- （DC12V- ,power supply）

B+ : 3.6V+ (3.6V Li Battery)

B- : 3.6V- (3.6V Li Battery)

GND: Ground of output frequency

FOUT: Output frequency

T+ : Input platinum resistance signal(1) (Pt100)

T- : Input platinum resistance signal(2) (Pt100)

Model: Version B: 4-20mA

24+: DC24V+ （DC24V + ,power supply）

24- : DC24V- （DC24V- ,power supply）

GND: Output frequency of electrical amplifier board(with 24V- terminal isolation, connected with the other GND)

FOUT: Output frequency

T+ : Input platinum resistance signal(1) (Pt100)

T- : Input platinum resistance signal(2) (Pt100)

FIN+: Input frequency of electrical amplifier board

GND: supply electrical amplifier board with DC power negative pole (-)

+5V : supply electrical amplifier board with 5VDC .

10.2.8 Note

(1). IF instantaneous flow rate lower than the ”FL”. LCD no display..

(2). Connect shield to the ground in the transmitter housing and keep as sh-ort as possible.

(3) Electrical amplifier board type has two groups of dial switches:

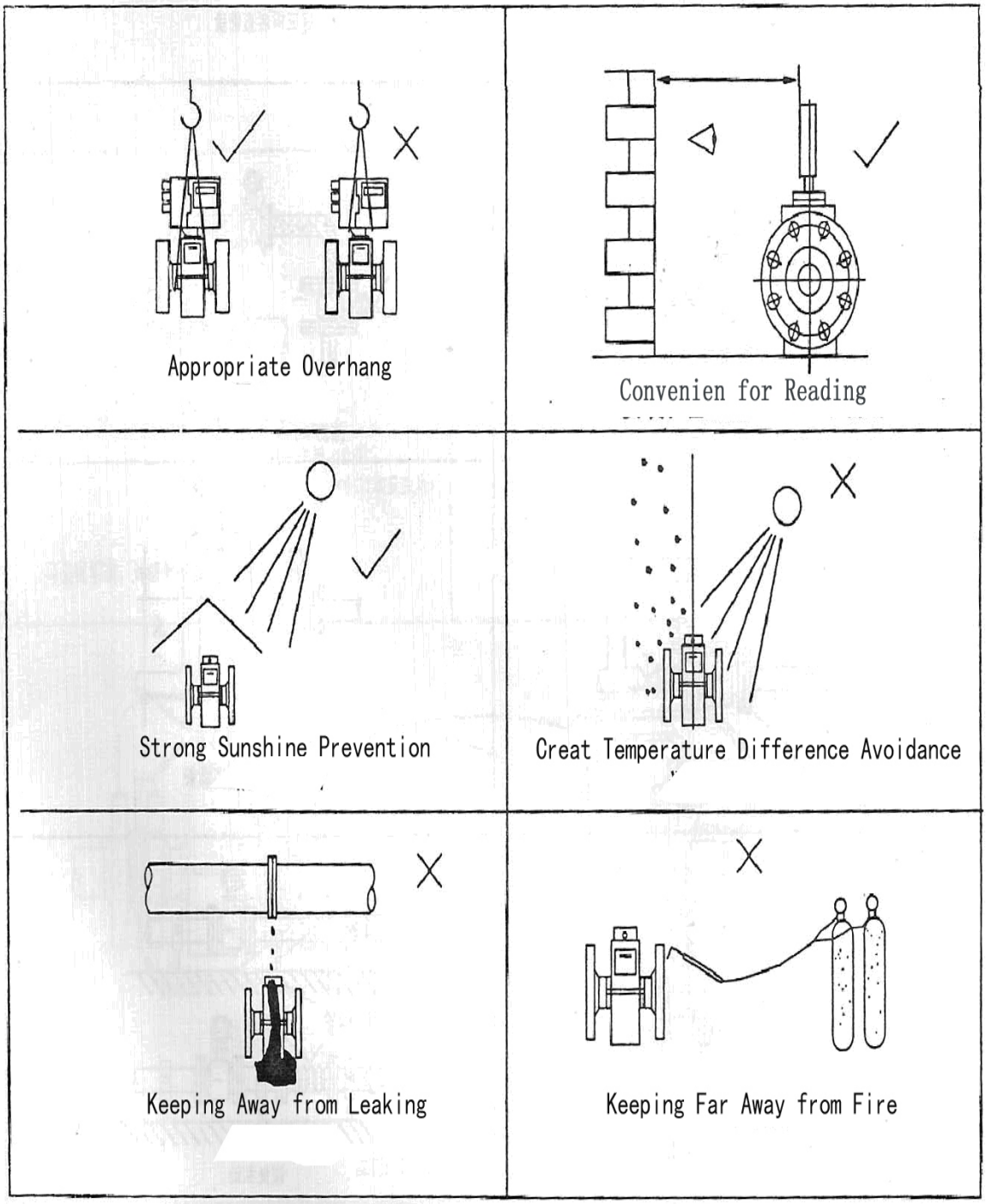
Trigger level and Sensitivity

(4) Ambient temperature of LCD: 0℃~+50℃ (unless special order)

10.3 Explosion-proof

(1) Sensor installed in dangerous area and converter installed in safe area: Exia II CT4

Using safety-grid, reference the safety-grid manual.



The correct installation flowmeter