



Datasheet

Vortex Flow Meter

SUP-FVC240

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Datasheet

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The FVC240 vortex flow meter is a kind of velocity flow meter, which is designed based on the research and design of the Karman vortex principle. It is mainly used for flow measurement of medium fluid in industrial pipelines, such as gas, steam, or liquid, and other media. Flow control and metering. The LUGB vortex flow meter can realize the following functions according to different types: measure the temperature, pressure, instantaneous flow, and cumulative flow of the industrial pipeline medium fluid, and has pulse output, (4~20)mA analog signal output, RS485 communication (Modbus RTU protocol), IoT GPRS and other functions.

Applications

- Energy industry
- Chemical industry
- Environmental Industry
- Metallurgy
- Textile
- Steel
- Pharmaceutical
- Paper-making

Features

- Ability to measure flow accurately and reliably.
- Low maintenance requirements.
- Easy to install and operate.
- Offer excellent long-term stability.
- Small pressure loss, wide range, high-accuracy.
- It has both analog standard signals and digital pulse signal output to match with computers and other digital systems.



Vortex flow meter

Principle

The vortex flow meter measures the flow of steam, gas and low-viscosity liquid based on the theory of Kamen and Strohal about the generation of vortex and the relationship between vortex and flow. As shown in Figure 1, a triangular column is vertically inserted into the body, which is the source of the vortex. When the medium flows through the body, Karman vortices with opposite directions and regularity are alternately generated behind the triangular column. The separation frequency of the vortex is F . It is proportional to the flow velocity V of the medium. By detecting the number of vortices through the sensor head, the fluid flow rate can be measured, and then the volume flow rate of the measured medium can be calculated according to the diameter of the meter body.

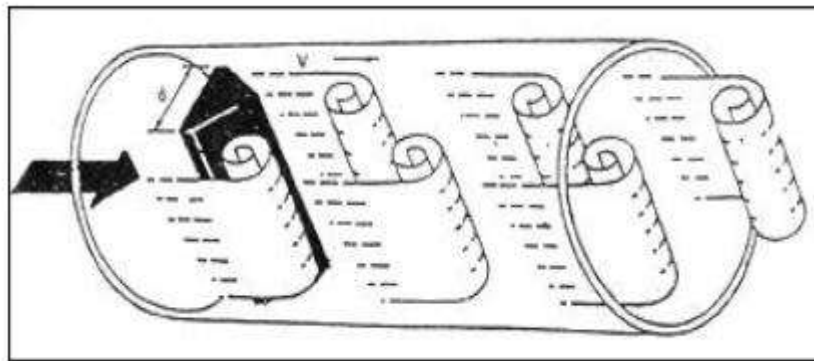


Figure 1

Calculated as follows:

$$F = St \cdot V / m_d \dots \dots \dots \text{Formula 1}$$

$$Q = 3600 \cdot F / K \dots \dots \dots \text{Formula 2}$$

$$M = Q \cdot \rho \dots \dots \dots \text{Formula 3}$$

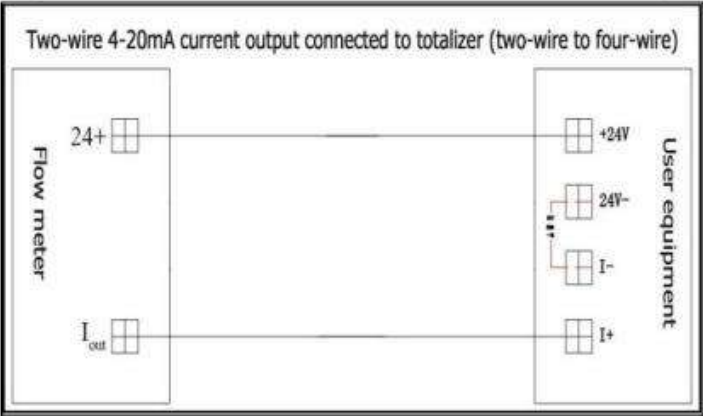
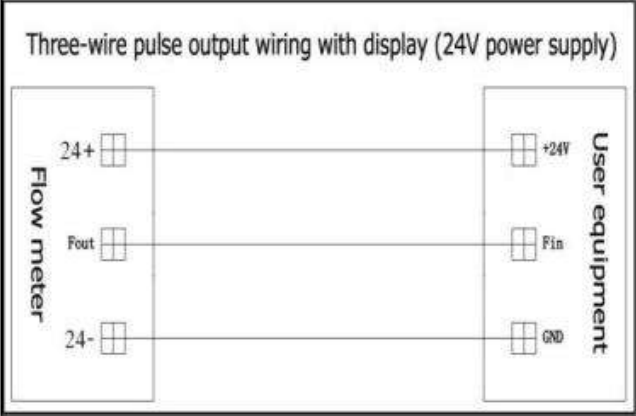
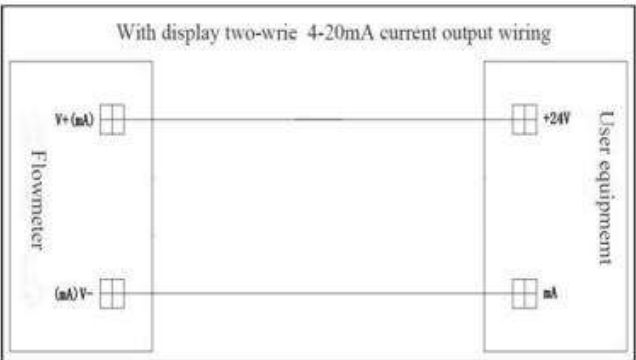
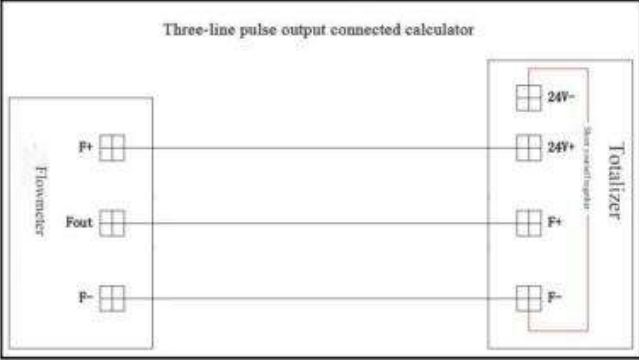
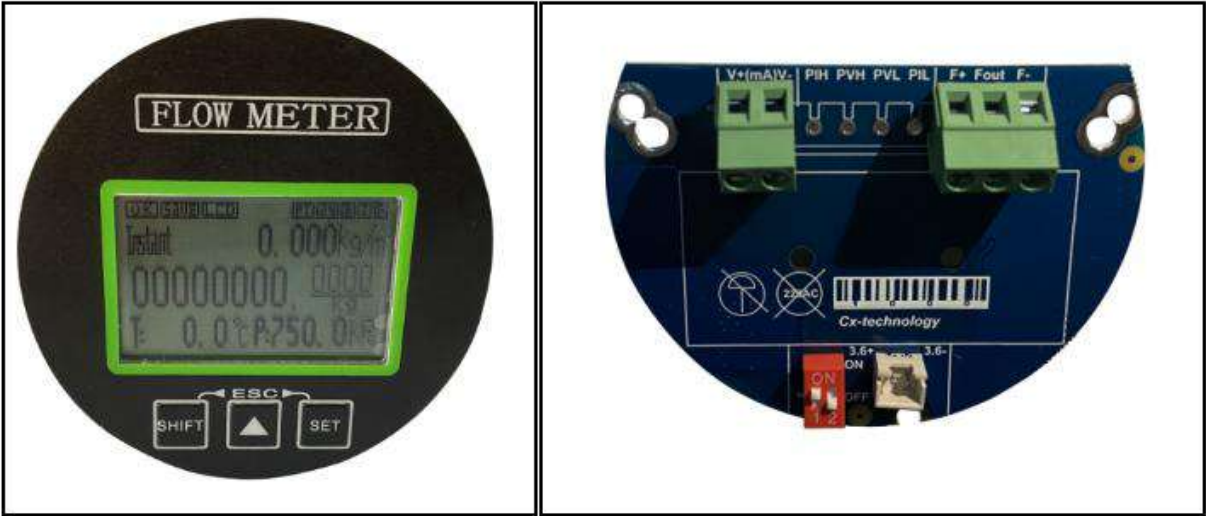
In the formula:

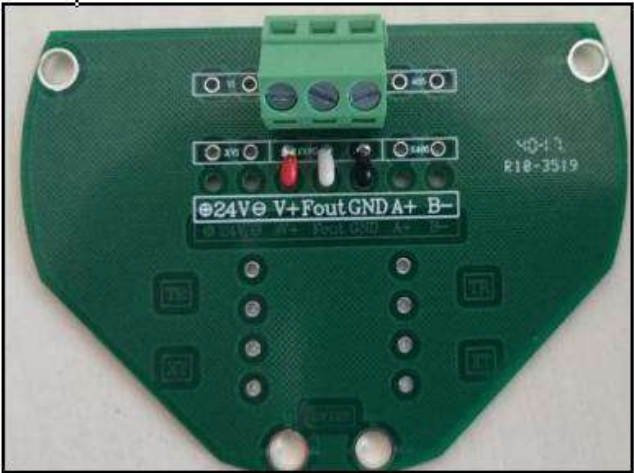
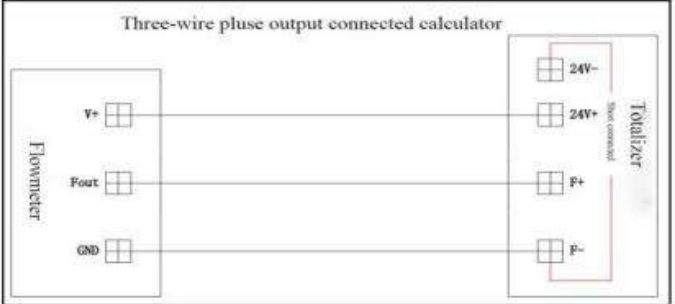
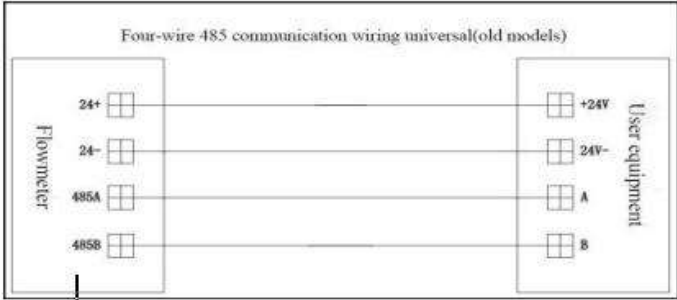
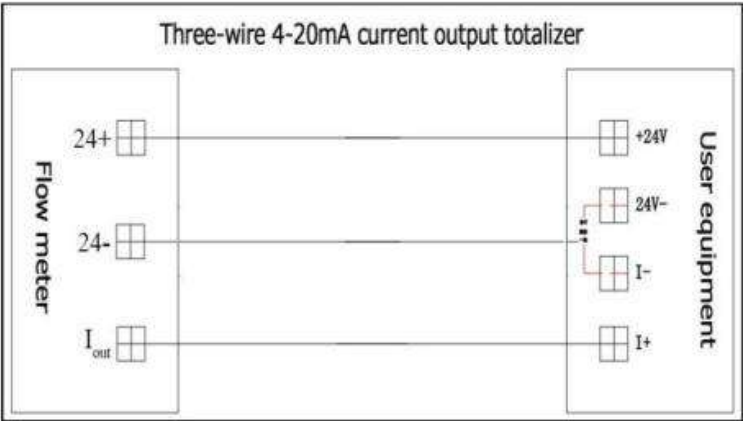
1. F ...the vortex frequency generated by the fluid flowing through the triangular column of the vortex flow meter (unit: Hz)
2. St ...Strohal's constant (dimensionless)
3. V ... the average velocity of the fluid in the pipeline (unit: m/s)
4. m ...The ratio of the arc flow area on both sides of the triangular column to the cross-sectional area of the measuring pipe (unit: dimensionless)
5. d ...Width of the upstream surface of the triangular column in the meter body of the vortex flow meter (unit: m)
6. D ...The inner diameter of the vortex flow meter meter (unit: m)
7. Q ...Instantaneous volume flow rate (unit: m³/h)
8. K ...The instrument coefficient of the vortex flow meter (unit: number of pulses/cubic meter)
9. M ...Instantaneous mass flow rate (unit: kg/h)
10. ρfluid density (unit: kg/m³)

11. Note: The vortex flow meters with different calibers have different instrument coefficient K values, and the specific values are obtained through the actual calibration of the flow calibration device. That is, the number of pulses output by the sensor for one cubic meter of fluid flowing through the working condition.

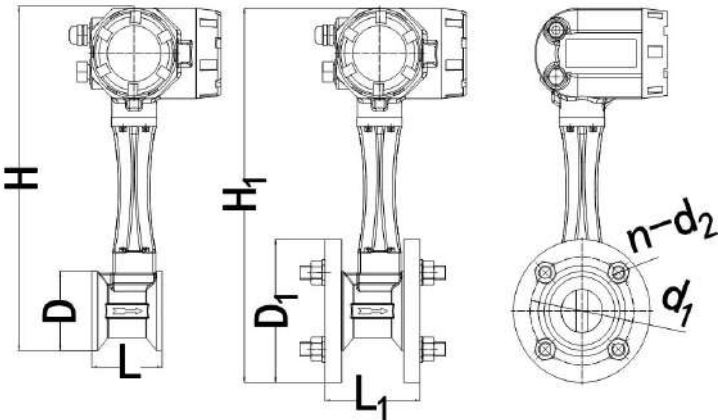
Parameters	
Nominal diameter (mm)	15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 300-1000 (plug-in)
Pressure Resistance	Flange connection: DN15~DN50, pressure 4.0MPa; DN65~DN100, withstand pressure 2.5MPa Above DN125, pressure resistance 1.6MPa Flange connection: DN15~DN50, pressure resistance 2.5MPa; DN65~DN300, withstand pressure 1.6MPa
Conditions of Use	Medium temperature: normal temperature type: (-40~100)°C; medium temperature type: (-40~250)°C; high temperature type: (-40~330)°C Ambient temperature: (-20~55)°C Relative humidity: 5% to 90% Atmospheric pressure: (86~106)kPa
Material	Body: 304 Totalizer housing: Die-cast aluminum
Allowable vibration acceleration	Piezoelectric: 0.2g
Accuracy	Flow: $\pm 1.5\%R$; plug-in type: $\pm 2.5\%R$ Temperature: $\pm 0.8^{\circ}C$ Pressure: $\pm 0.3\%FS$
Turndown ratio	1:6~1:25
Supply voltage	Sensor: DC +24V Transmitter: DC +24V Battery powered type: 3.6V battery
Output signal	Pulse output, (4~20)mA current, RS485Modbus-RTU protocol)
Pressure loss coefficient	Conform to JB/T9249 standard $C_d \leq 2.4$
Protection grade	IP65
Electrical Interface	Internal thread M20*1.5 or others
Applicable medium	Gas, liquid, steam
Transmission distance	Three-wire pulse output type: $\leq 300m$; Two-wire standard current output type (4~20) mA: $\leq 1500m$, load resistance $\leq 500\Omega$; RS485: $\leq 1200m$.

Wiring

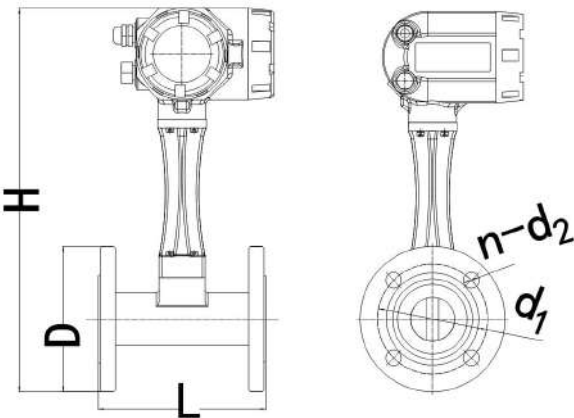




Dimension



Flange and clamp connection fig. 1



Flange connection fig. 2

Flange and clamp connection ordinary on-site display dimensions table 1

Size	Pressure MPa	Common L(mm)	Common L ₁ (mm)	D mm	D ₁ mm	H mm	H ₁ mm	d ₁ mm	d ₂ mm	n Number of holes
DN15	0~4.0	70	95	55	100	366	393	78	14	3
DN20		70	95	55	100	366	393	78	14	3
DN25		70	95	55	100	366	393	78	14	3
DN32		70	95	55	100	366	393	78	14	3
DN40		85	113	80	140	378	405	105	18	4
DN50		85	113	90	145	387	418	115	18	4
DN65	0~1.6	85	113	105	165	402	438	130	18	4
DN80		85	113	120	180	417	453	145	18	6
DN100		85	113	140	210	437	478	175	18	6

DN125		85	119	165	235	462	503	200	18	8
DN150		100	132	194	270	489	533	230	22	8
DN200		100	132	248	325	541	588	285	22	8
DN250		115	151	300	375	592	638	330	24	10
DN300		130	166	350	425	642	688	380	24	10

Note:

- ① The above dimensions are clamped without temperature and pressure compensation, the error is $\pm 2\text{mm}$, and the length L/L1 of the temperature and pressure compensation size DN15-DN32 is increased by 15mm;
- ② Medium and high temperature ($\geq 100^\circ\text{C}$), the height is increased by 30mm (one heat sink).

Flange connection ordinary on-site display dimensions table 2

Size mm	Pressure MPa	L (mm)	D (mm)	H (mm)	d1 (mm)	d2 (mm)	n Number of holes
DN10	0~4.0	170	90	395	60	14	4
DN15		170	95	397	65	14	4
DN20		170	105	402	75	14	4
DN25		170	115	407	85	14	4
DN32		170	140	420	100	18	4
DN40		170	150	425	110	18	4
DN50		170	165	432	125	18	4
DN65	0~1.6	190	185	455	145	18	8
DN80		190	200	470	160	18	8
DN100		200	220	490	180	18	8
DN125		200	250	520	210	18	8
DN150		200	285	550	240	22	8
DN200		200	340	605	295	22	12
DN250		240	405	665	355	26	12
DN300		240	460	715	410	26	12

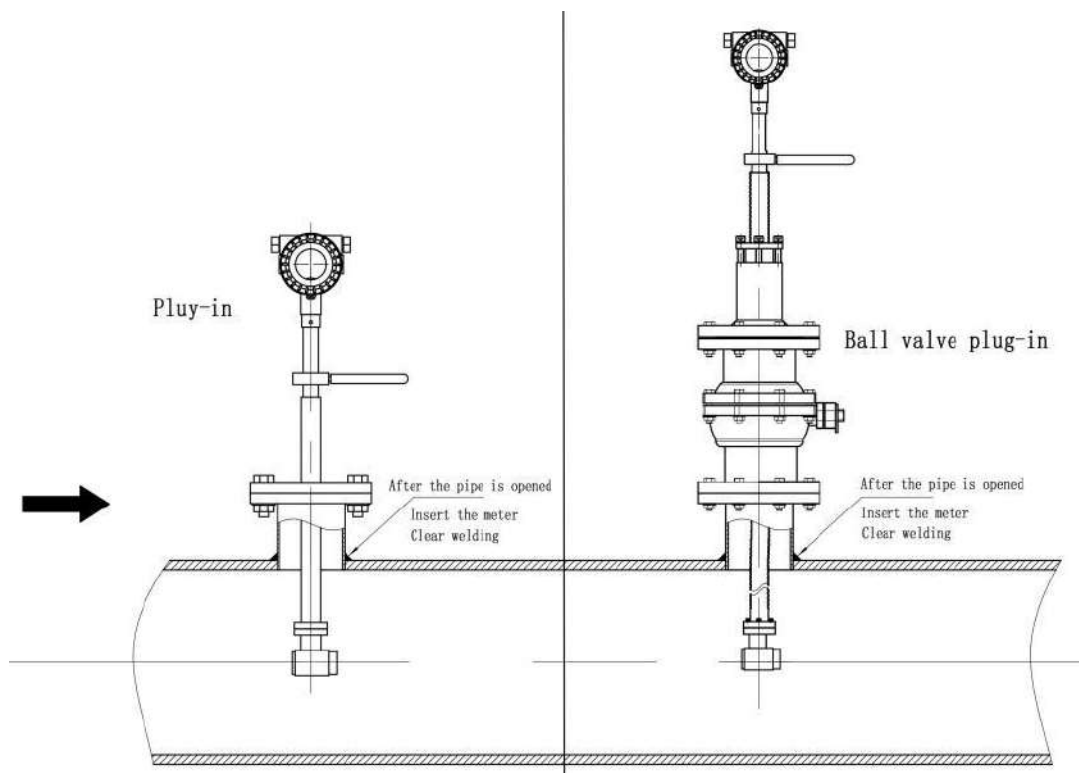
Note: For medium and high temperature ($\geq 100^\circ\text{C}$), the height should be increased by 30mm (one heat sink).

Installation

■ Installation

1. A circular hole slightly smaller than 100mm with gas welding on the pipe, And the round hole around the burr clean, to ensure that the probe rotating smoothly;
2. Weld the flange provided by the manufacturer at the round hole of the pipe. The flange axis is required to be perpendicular to the pipe axis.
3. Install the ball valve and sensor on the welded flange;
4. Adjust the lead screw to make the insertion depth meet the requirements(ensure that the central axis of the probe and the central axis of the pipeline coincide), the flow direction of the fluid must be consistent with the direction indicated by the arrow;
5. Tighten the screws on the gland evenly.(note: the tightness of the gland determines the sealing degree of the instrument and whether the lead screw can rotate);

Check whether all links are completed, slowly open the valve to observe whether there is leakage(Special attention should be paid to personal safety)Repeat steps 5 and 6 if there is leakage.



Ordering code

SUP-FVC240 -15-U1-M-A-M-0-K0-T1-WG-PC										Description
Nominal diameter	SUP-FVC240	-	-	-	-	-	-	-	-	
	15									DN15 (1/2")
	20									DN20 (3/4")
	25									DN25 (1")
	32									DN32 (1.25")
	40									DN40 (1.5")
	50									DN50 (2")
	65									DN65 (2.5")
	80									DN80 (3")
	1C									DN100 (4")
	1E									DN125 (5")
	1G									DN150 (6")
	2C									DN200 (8")
	2G									DN250 (10")
	3C									DN300 (12")
Process connection and body material	U1									Carbon Steel Clamping Flange, 304SS
	U2									304SS Clamping flange, 304SS
	HA									GB/T9119 flange connection, 304SS
	XX									other
Measuring medium	A									steam
	B									gas
	C									liquid
accuracy									M	1.5 class
Compensation method									0	Standard structure without compensation
									1	Temperature and pressure compensation
									2	temperature compensation
									3	pressure compensation
Output, display and power supply									K0	Pulse, No Display, 24VDC
									K3	Pulse + 2-wire 4-20mA, display, 24VDC
									K4	Pulse + 2-wire 4-20mA, display, 24VDC + battery dual power supply
									K5	Pulse + 3-wire 4-20mA + RS485, Display, 24VDC
									K6	Pulse + 2-wire 4-20mA + Hart, Display, 24VDC
									R1	RS485, Display, 24VDC
									XX	other
heat-resistant temperature									T1	-40~100°C
									T4	-40~250°C

Electrical interface, housing material and protection class	TR	WG	-40-330°C
	XX		other
			M20*1.5 cable plug, aluminum alloy, IP65
Accessories		WJ	NPT1/2 Cable Plug, Aluminum, IP65
		PC	Matching Flange 304SS