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LYNSB Gas Ultrasonic Flow Meter



LYNSB Ultrasonic gas flowmeter is China National Key Technologies R&D Program of 863, and it's high-value product researched and developed by Yinuo with Independent Intellectual Property Rights...

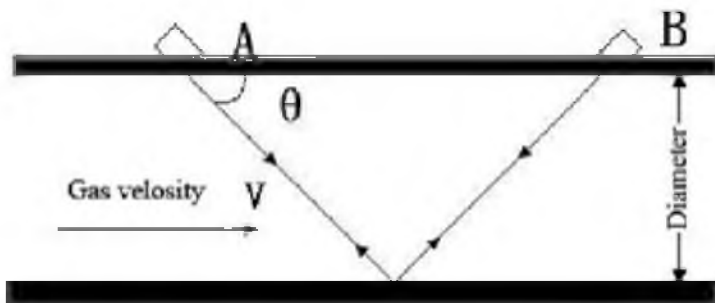
Description

- Description
- Principle
- Features
- Specification
- Installation
- Model Selection

LYNSB Ultrasonic gas flowmeter is China National Key Technologies R&D Program of 863, and it's high-value product researched and developed by Yinuo with Independent Intellectual Property Rights. It gets an invention patent and a practical new-type patent. It can be extensively applied to the supply, transmission, distribution of most dry gas in fields such as underground air storage, power stations, petrochemical industry, aluminum melters etc. A wide range of gas can be measured by LYNSB including natural gas, compact gas, air, fuel gas, corrosive gas, poisonous gas, high-pure gas, etc.



Ultrasonic gas flowmeter is based on the theory of acoustic transit time to calculate the average gas move velocity by measuring upstream and downstream time, in which the ultrasonic waves generated by a pairs of by-directional transducers assembled with an angle respect to axis.



(1) Flow velocity is calculated by

$$v = \frac{D}{\sin\theta \cos\theta} \left(\frac{1}{t_1 - \tau_1} - \frac{1}{t_2 - \tau_2} \right)$$

(2) Sound velocity is

$$v = \frac{D}{\sin\theta \cos\theta} \left(\frac{1}{t_1 - \tau_1} - \frac{1}{t_2 - \tau_2} \right)$$

(3) Flow volume is $Q=3600 \times$

Where: v: Gas velocity, m/s;

C: Sound velocity, m/s;

Q: Volume of flowing medium, m³/h;

D: Diameter of pipe (m);

θ: Angle of path to the flow (°);

t₁, t₂: Upstream and downstream transit time (s);

τ₁, τ₂: The upstream/downstream sound delay time by circuit, cable and transducer (s)

No moving parts, low pressure drop, long life span;

Bi-directional measurement;

Simple installation, easy maintenance;

High accuracy and good reliability;

Ex-proof: Exd(ib) IIBT4(exclude ecetylene);

Temperature and pressure compensation;

Suitable for small flowrate and large size pipe.

Accuracy: ±0.5%, ±1.0%, ±1.5%;

Communication Protocol: Modbus;

Output signal: pulse, 4 to 20mA, RS485;

Working temperature: -25°C to +55°C ;

Ambient temperature: -40°C to +70°C-

Working pressure: 0.6 to 2.5MPa ;

Humidity: ≤80%(25°C) ;

Power supply: 24V (600mA) ;

Flowrange: as following table 1~3

Table1

DN (mm)	Flowrange at 0.5% (m ³ /h)
	Velocity(1.6~24)m/s
25	2.83~42.42
40	7.25~108.6
50	11.3~169.7
80	28.9~434.3
100	45.23~678.5
150	101.8~1526.8
200	180.9~2713.8
250	282.7~4240.5
300	407.1~6106.5

Table2

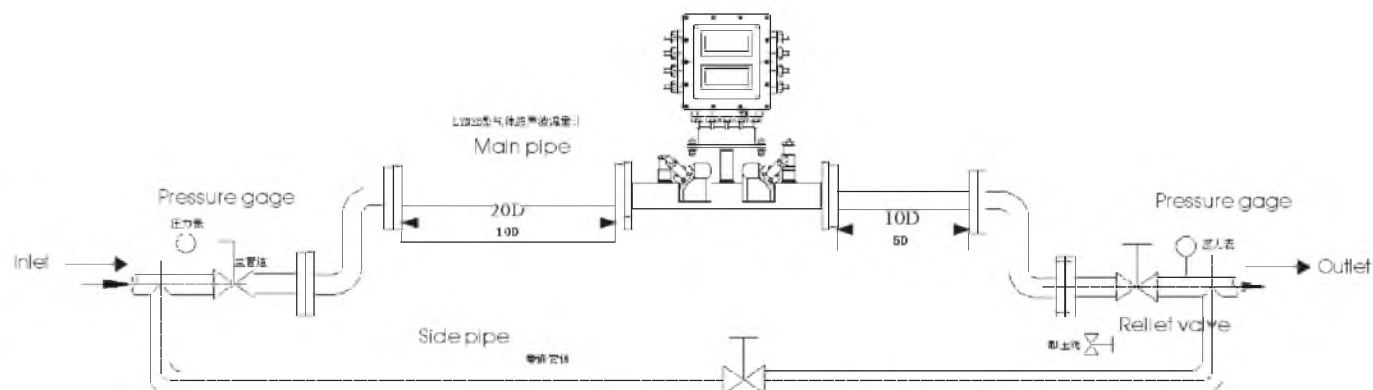
DN (mm)	Flowrange at 1.0% (m ³ /h)
	Velocity(1.3~26)m/s
25	2.3~45.9
40	5.9~117.6
50	9.2~183.8
80	23.5~470.5
100	36.7~735.1
150	82.7~1654.0
200	147.0~2940.5
250	229.7~4594.6
300	330.8~6361.7

Table3

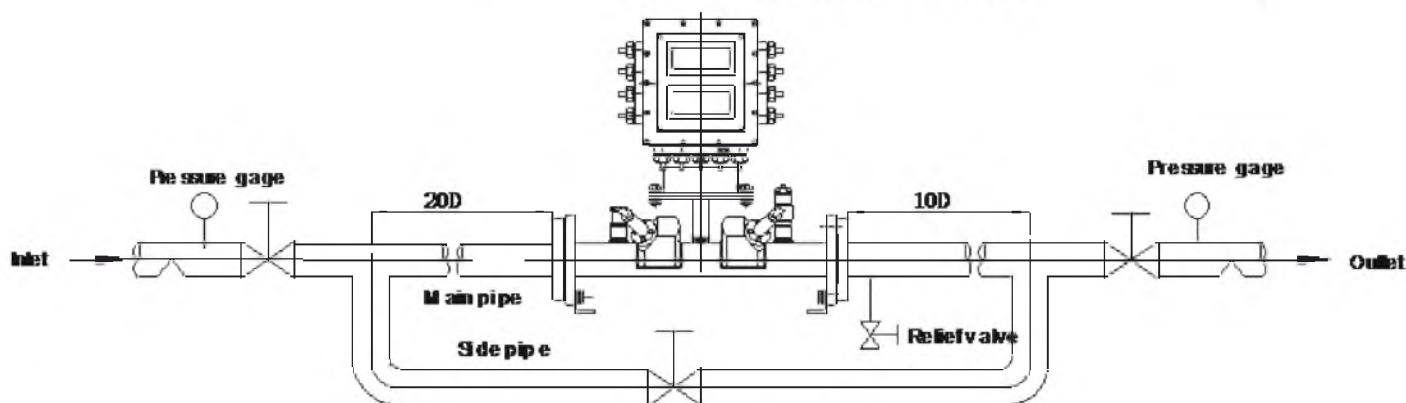
DN (mm)	Flowrange at 1.5% (m ³ /h)
	Velocity(1.04~26)m/s
25	1.84~45.9
40	4.70~117.6
50	7.35~183.8
80	18.82~470.5
100	29.41~735.1
150	66.16~1654
200	117.6~2940.5
250	183.8~4594.6
300	264.6~6361.7

1. Installation type

Generally, the flowmeter should be installed horizontally. The length of pipe line both up stream and down stream of flowmeter is no less than 10 DN. When install flowmeter in other mode, it should be installed where pipe upward, in case of water to be left in meter body. Direction of medium flow should be the same as marked arrow. No leakage is allowed at joints between pipes and the sealing washer can't protrude into the pipe which would change the current flow and give rise to vortex that could influence the accuracy of flowmeter.



Picture 1 Installation for wet gas



Picture .2 Installation for dry gas

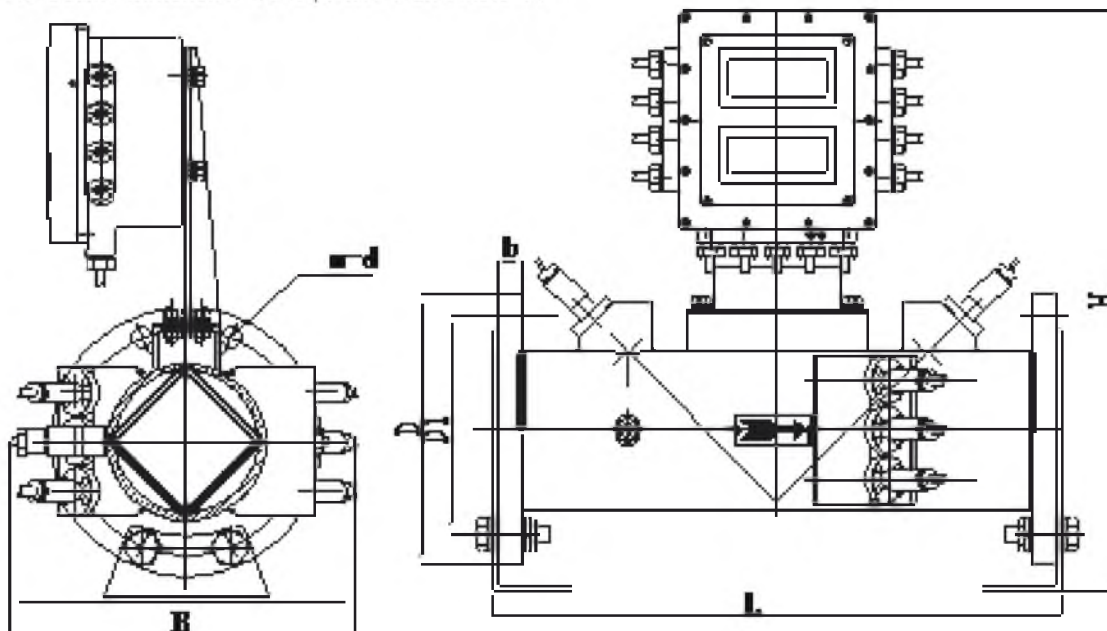
2. Pipe requirements

Make sure the straight pipes upstream and downstream is clean inside without any dents, rust, and delamination etc. There should be no obstacles or branch pipes except pressure tap, and thermowell in those pipes. Plus, flanges and pipes upstream and downstream should have same inside diameter and be smooth at joints.

Installation Notes :

- Installation of intrusive transducer: It should be installed by specialists with professional tool, transducers should be installed at 45° to the pipe. After installation, there should be no gas leakage where transducers are inserted.
- Two transducers are not interchangeable and they are in match with the meter. And it should be recalibrated when the transducer is changed.
- To ensure the performance of LYNSB, the pipe length upstream should not be less than 10DNs, and same with downstream.
- Cable length of transducer is not allowed to change except by specialists. And flowmeter shall be recalibrated after changing cable length.
- Ultrasonic gas flowmeter shall be installed by specialist and be fixed with pipes by flanges and the arrow marked on meter shall be the same to flow direction.
- The meter should be protected from being interfered because the signal received by transducer is very small. Non-professional staff shall not touch elements on circuit board.

5.5 Outline Dimension (See picture 3 and table 4)



Picture 3

Table 4

DN (mm)	Dimension			Flange connection dimension (mm)				
				PN 1.6MPa JB/T 82-94, GB 9119.4-2000				
	L	B	H	D	D ₁	n-d	Th	b
25	500	230	460	115/115	85	4-φ14	M12	18
40	500	270	470	145/150	110	4-φ18	M16	18
50	500	280	480	160/165	125	4-φ18	M16	24
80	600	310	510	195/200	160	8-φ18	M16	24
100	600	320	520	230/235	190	8-φ23	M20	28
150	600	360	580	300/300	250	8-φ25	M22	30
150	700	410	630	335/340	295	12-φ22	M20	26
200	700	460	680	400/405	355	12-φ25	M22	28
300	800	480	730	460/460	410	12-φ25	M22	32

Explanation:

0. Yinuo ultrasonic gas flowmeter

1. DN (mm): 025-25, 032-32, 040-40, 050-50, 065-65, 080-80, 100-100, 125-125, 150-150, 200-200, 250-250, 300-300 ;

2. Medium: Q- Gas ;

3. Electricity Shield: A- General Type, B- Ex-proof Type Exd(ib) II BT4 (exclude acetylene)

4. Power Supply: 1-24VDC ;

5. Modbus Output: R2- RS232, R4-RS485, R0-NO

6. Structure: 1-Integrate Type, 2- Separate Type (to be developed) , 3- Flush-mounted type (to be developed) , 4- Portable Type (to be developed)

7. Compensation Function: W-with temperature and pressure compensation, N- no compensation

8. Nominal Pressure (MPa): 1-0.6, 2-1.0, 3- 1.6, 4- 2.5 ;

9. Output signal: F- pulse signal, I-(4~20)mA current signal

10. Accuracy : 0.5- 0.5%, 1.0- 1.0%, 1.5- 1.5%

e.g. LYNSB-080 Q B 1 R2 2 W 1.6 2 I 0.5

Yinuo ultrasonic gas flowmeter, DN80, to measure gass, ex-proof type, power supply is 24VDC, output port is RS232, separate type, with temperature and pressure compensation, Nominal Pressure is 1.6MPa, output signal is current (4~20)mA, accuracy is 0.5%.

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