青岛澳威
QINGDAO ADD VALUE

CORIOLIS MASS FLOW METERS

Mass flow meters that can be used for custody transfer

Superbness
Succeed
Stability

QINGDAO ADD VALUE FLOW METERING CO.,LTD.

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QINGDAO ADD VALUE FLOW METERING CO.,LTD.

Add Value Introduction




Qingdao Add Value Flow Metering Co., Ltd. is located in Qingdao Free Trade Zone. It is a high-tech enterprise integrating R & D, production, sales and service. Since its establishment, Qingdao Add Value has always focused on the research and development and manufacture of fluid metering products. We have independently developed two series of products including Coriolis Mass Flow Meters and Vibration Tube Liquid Density Meter on Line, and have obtained national invention patents. The company has advanced equipment, established a complete production inspection process, and certified by ISO9001 and ISO14001. Currently, the Qingdao Add Value products are installed in most cities across the country. And they are widely used in various occasions such as quantitative loading automation and chemical process quality control in Sinopec, PetroChina and many major refineries. Stable and accurate fluid metering services have won unanimous praise from customers.

Qingdao Add Value is committed to innovation, with the business philosophy of "Stable performance creates excellent quality", focusing on the development of core competitiveness, and the original core technology perfectly solves the problem of zero drift, effectively ensuring the long-term stable operation of products, all products of the company are provided 12-month warranty.

We aspire to be your trusted supplier.

Contents

Flow Meter

The mass flow meter uses the Coriolis effect principle. By measuring the Coriolis force of fluid received in the tube, it can directly measure the mass flow of the fluid in the tube. The Coriolis force is only related to the mass and speed of the fluid. In principle, it eliminates the influence of temperature, pressure, fluid state, density and other parameters on the measurement accuracy, and directly obtains the accuracy flow value and density value of various media under complex environmental conditions. It doesn' t need to go through the conversion of intermediate parameters, avoiding measurement errors due to the intermediate conversion, so as to realize the high-precision and accurate measurement.

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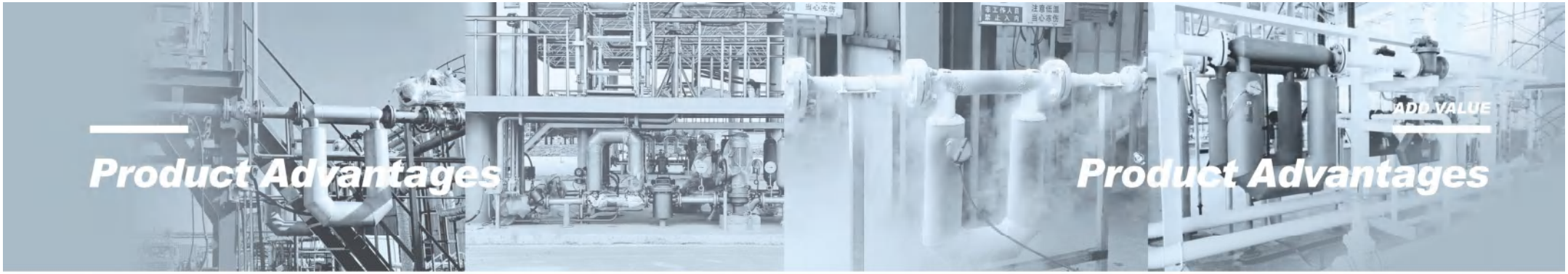
K Series Mass Flow Meter

Coriolis effect principle

Coriolis effect is a description of the deviation of a linear motion particle in a rotating system due to inertia relative to the linear motion of the rotating system.

The mass flow meter is a typical application of Coriolis Effect. It allows the measured fluid to pass through a measuring tube in vibration. The flow of fluid in the tube is equivalent to linear motion. The vibration of the measuring tube will produce an angular velocity. Because the vibration is driven by an applied electromagnetic field, it has a fixed frequency, so the Coriolis effect received by the fluid in the tube is only related to its mass and speed of motion, and the product of mass and speed of motion, that is, the flow velocity is the mass flow rate that needs to be measured, so by measuring the Coriolis effect of the fluid in the tube its mass flow can be obtained.

Schematic diagram



Product Advantages

Product Advantages

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High Mass Accuracy

Measurement error is less than ±0.1%

Through the optimization of the structural parameters of the mass flow meter sensor and the application of digital technology to the transmitter, the mass measurement error of the K Series Mass Flow Meters r is less than ± 0.1%, and the repeatability is higher than ± 0.025%.

High Density Accuracy

Measurement error is less than ±0.0005g/cm³

K Series Mass Flow Meters realize direct online real-time density measurement, which is safe, convenient and reliable. It eliminates the disadvantages of manual measurement and improves the efficiency of operators.

High Temperature Accuracy

Measurement error is less than ±0.2℃

K Series Mass Flow Meters use pt100 temperature sensors, cooperate with precision measurement circuits and advanced temperature compensation algorithms, to provide reliable guarantee for accurate measurement of flow rate and density.

Good Zero Stability to Ensure Long-Term Stable Operation

Zero stability is an important indicator for evaluating the measurement accuracy and long-term stability of mass flow meters.

K Series Mass Flow Meter uses the original technology with national invention patent and American invention patent, which makes the product itself have ultra-high zero stability, even under harsh working conditions, it can operate accurately and stably for a long time.

Fast Response Time

Suitable for small batch and short time filling

K Series Mass Flow Meter transmitters use digital algorithms to increase the sampling rate, greatly shorten the response time, and ensure the consistency of small batch and short time filling.

Wide Range Ratio

Range ratio up to 20:1

K Series Mass Flow Meters use digital algorithms to filter out more noise and ensure the measurement accuracy of low flow rates. The range ratio can reach 20:1.

Long Service Life

Product design life is 10 years

The gears, rotors and other components of traditional Positive Displacement Flow Meter are easily affected by fluid erosion and need to be cleaned or replaced regularly.

The principle of the K Series Mass Flow Meter determines that it has no obstacles and moving parts inside, and there are no problems such as wear and tear. It fully guarantees its service life and accurately measures and greatly reduces maintenance costs, saving time, effort, and energy .

Other Advantages

More reminder functions

K Series Mass Flow Meter transmitters can measure more variables and achieve more accurate status indications, such as gas-liquid two-phase flow status reminders.

Product Function

The K Series Mass Flow Meter can directly measure the mass flow, total mass, volume flow, total volume, temperature, density, etc. of the process medium.

Direct display of total mass
Direct display of mass flow

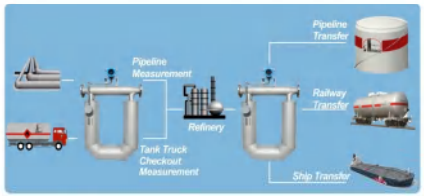
Direct display of total volume
Direct display of volume flow

Direct display of apparent density

Direct display of total mass, total volume V_{20}, standard density ρ_{20}, temperature

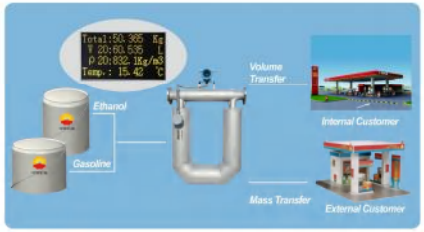
Reminder function

Applications



Application in mass custody transfer

The mass measurement error of K Series Mass Flow Meter is less than ± 0.1%, with high stability and can realize custody transfer.



Application in standard volume (V_{20}) handover

The mass measurement error of the K Series Mass Flow Meter is less than ± 0.1%, the density measurement error is less than ± 0.0005 / cm³, the temperature measurement error is less than ± 0.2 ℃, and the measurement error of the standard volume (V_{20}) is guaranteed to be less than ± 0.15%.

Application in ultra-low temperature media

K Series Mass Flow Meters can be applied to ultra-low temperature media such as LNG and liquid nitrogen with a temperature not lower than -240 ° C

Application in high temperature and high viscosity media

K Series Mass Flow Meters can be applied to high temperature and high viscosity media such as maleic anhydride, residual oil, crude oil, resin, maltose etc., whose temperature is not higher than 204 ° C.

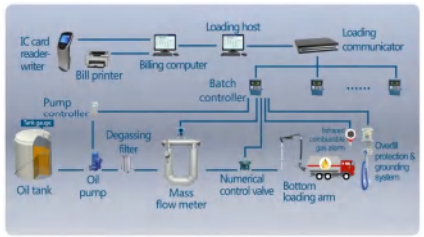
Applications

Application in quantitative loading

1. The measurement error of the mass flow meter is less than ± 0.1% to achieve accurate loading and improve loading efficiency;
2. The measurement accuracy is not affected by changes in medium density.

Schematic diagram of quantitative loading automatic pipeline

Application of K Series Mass Flow Meter in quantitative loading system



Application in process control

K Series Mass Flow Meters are used for process control, reaction kettle feeding, and directly measure the mass of the medium without being affected by density, simplify the production process, and improve work efficiency.

Application in batch filling

The flow response time of K Series Mass Flow Meter is 50ms, and the response speed is fast, which ensures the consistency of batch filling.

Applications

Application in gas measurement

K Series Mass Flow Meters can be used to measure gas under high pressure, high flow rate and other working conditions.

Application in oil field

K Series Mass Flow Meters have good zero stability and can be used for intermittent flow measurement, ensuring accurate measurement of oil output from oil wells.

Application in density measurement

K Series Mass Flow Meters have no choke or moving parts, its pipeline is wear resistance and its density measurement accuracy is high. It is suitable for the measurement of parameters such as lime slurry concentration, pulp concentration, ammonia concentration, alcohol content, sugar Baume degrees and water content.

Application in high-power equipment fuel detection

K Series Mass Flow Meters has a wide range ratio, fast response speed, strong anti-interference ability and can detect intermittent flow, suitable for fuel monitoring of large equipment, such as marine fuel monitoring and large equipment fuel consumption monitoring.

Case Study

Case 1 Ethanol gasoline blending

K Series Mass Flow Meters are used for CNOOC ethanol gasoline custody transfer. DN80 caliber mass flow meter is used to measure the mass of component oil. DN50 caliber mass flow meter is used to measure the mass of ethanol gasoline. Cooperated with automation equipment according to the required ratio, directly display in units of mass in the warehouse.

Case 2 Side-mounted

The K Series Mass Flow Meters is directly installed the reaction kettle in the pharmaceutical factory, and at the same time monitor the density of the medium. The side-mounted installation is used due to the insufficient installation space, which solves the problem of insufficient space and at the same time ensures the aesthetics and consistency of the site.

Case Study

Case 3 Sites with insufficient installation space

It is a transformed oil depot, which is limited by the height of the pipeline, so a ground groove is added below the flow meter, and both ends are fixed to reduce the impact of pipeline vibration on the accuracy of the flow meter. This installation method can be used when the installation space is insufficient.

Case 4 Top installation

When the bottom installation space is insufficient, the K Series Mass Flow Meters can be installed on the top on the premise of ensuring that the pipeline medium does not contain gas.

Technical Specifications

Technical specifications related to accuracy

	Model	Rated flow⑤(kg/h)	Max flow (kg/h)
Maximum flow	K010 (DN10/DN15)	280	400
	K025 (DN15/DN20)	1,010	1,440
	K050 (DN15/DN20)	3,050	4,350
	K100 (DN25/DN32)	15,200	21,700
	K200 (DN40/DN50)	52,500	75,000
	K300 (DN80/ DN100)	155,000	220,000
	K400 (DN150/ DN200)	462,000	654,000
Mass flow error①	Within 20:1 range ratio②	±0.1%	
Mass flow repeatability	Within 20:1 range ratio	±0.025%	
Volume flow error③	Within 20:1 range ratio	±0.1%	

	Model	kg/h
Zero stability④	K010 (DN10/DN15)	0.008
	K025 (DN15/DN20)	0.029
	K050 (DN15/DN20)	0.087
	K100 (DN25/DN32)	0.43
	K200 (DN40/DN50)	1.50
	K300 (DN80/ DN100)	4.42
	K400 (DN150/ DN200)	21.95

① The stated flow error includes the combined effects of repeatability, linearity and hysteresis. All liquid indicators are based on water at 20 ~ 25 ℃ and 0.1 ~ 0.2Mpa reference conditions, unless otherwise stated.

② Range ratio is the ratio of rated flow and minimum flow.

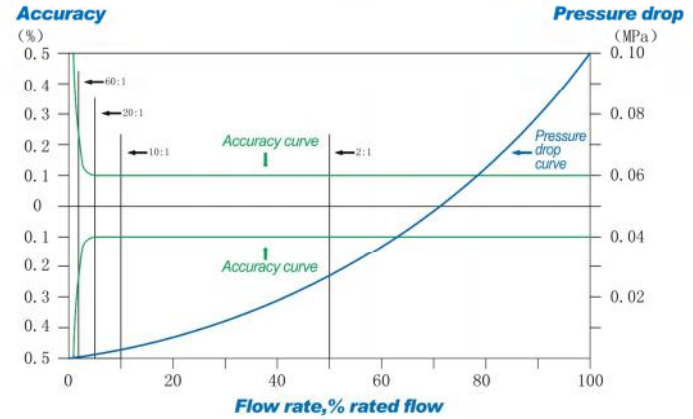
③ The volume flow error is based on the process fluid with a density of 1g / cm³. For process fluids with a density other than 1g / cm³, the volume flow is equal to the mass flow divided by the fluid density.

④ When the flow value is close to the low end of the flow range, the accuracy of the flow meter begins to deviate from the stated accuracy. At this time, the zero point stability must be considered. The zero point stability is measured under the condition of no installation stress.

⑤ Rated flow rate refers to the corresponding flow rate when the instrument pressure drop caused by water flow under reference conditions is about 0.1MPa.

Technical Specifications

K300 Typical Accuracy, Flow and Pressure Drop Curve



Range ratio	60:1	20:1	10:1	2:1	1:1
Accuracy(±%)①	0.25	0.1	0.1	0.1	0.1
Pressure drop(Mpa)	~0	0.0003	0.001	0.026	0.1

① The accuracy is the actual measurement accuracy. Since the highest accuracy class of《JJG 1038-2008 Coriolis Mass Flow Meter》 is 0.15, the relevant certificates and qualifications can only be 0.15.

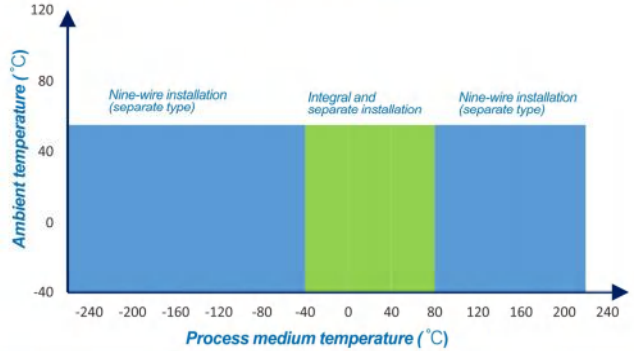
Density Accuracy (For Liquid)

Density error②	±0.0005g/cm³	±0.5kg/m³
Repeatability	±0.00025g/cm³	±0.25kg/m³
Measuring range	(0.2~2.0)g/cm³	(200~2000)kg/m³

② Density error includes the combined effects of repeatability, linearity and lag . The density error of ± 0.0005 g / cm³ (± 0.5kg / m³) is based on water at 20 ℃ and a reference condition of 0.1 ~ 0.2Mpa. Under different operating conditions, accuracy may be reduced.

Technical Specifications

Temperature Accuracy



Error	±0.2℃
Repeatability	±0.1℃
Temperature Limit ①	Temperature Range(-240~204)℃

①If installed in a hazardous location, the explosion-proof certification shall define the applicable temperature range.

Temperature display range	(-240~204)℃	pt100 Temperature measurement
Process medium temperature	Integral	(-40~80)℃
	Four-wire system (separate type)	(-40~80)℃
	Nine-wire system (separate type)	(-240~204)℃
Ambient temperature	Operating temperature	(-40~60)℃
	Storage temperature	(-40~70)℃

General specifications

Power supply (AC / DC compatible)	AC Power supply	(85~265) VAC， 50/60 Hz
	DC Power supply	(18~100) VDC
Pressure resistance and sealing	Perform compressive strength test on the pressure part of the flow meter, the test medium is water. The test pressure is 1.5 times the nominal pressure, which lasts 5 minutes, and there is no penetration or leakage at each connection.	

Technical Specifications

Output signal and integration

Analog communication (Two optional output channels)	It can be set according to site requirements: two-way current communication, two-way pulse communication or one-way current communication and one-way pulse communication.
Pulse output	Output range (0 ~ 10) kHz
	Basic error ± 0.01%
	Temperature effect ± 0.001% F.S / ℃
Current output	Output range (4 ~ 20) mA
	Basic error ± 0.05%
	Temperature effect ± 0.005% F.S / ℃
Digital communication	RS485 interface, Modbus communication protocol, Baud rate can be selected: 9600, 19200, 38400, etc. Multi-machine communication and bus connection are available.
Power consumption	BPM transmitter maximum power ≤11W

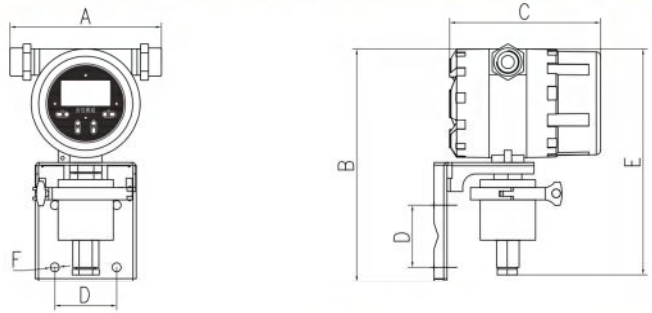
Hazardous Area Classifications

		Explosion-proof mark
	Sensor	Exib IICT1-T6Gb
	Transmitter	Exd[ib] IICT4 Gb
Explosion-proof grade	Explosion-proof performance conforms to GB3836.1-2010, GB3836.2-2010,GB3836.4-2010. Application: Suitable for Zone 1 and Zone 2 of explosive hazardous locations, Equipment category IIC, backward compatible with IIA, IIB, temperature group T1-T6.	
Protection level	Sensor	IP67
	Transmitter	IP65

⚠ Separate or integrated installation of the sensor and transmitter does not affect the explosion-proof performance.

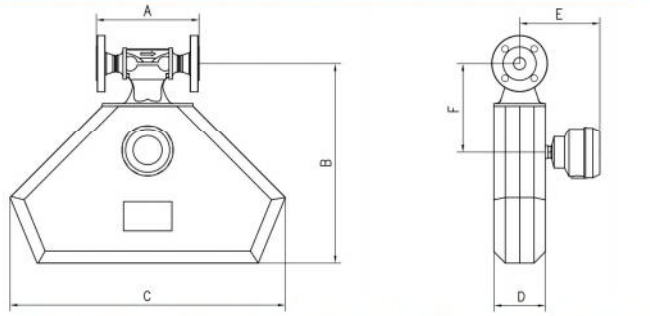
Installation Dimensions

BPM-D Transmitter dimensions (Unit: mm)



Model	A	B	C	D	E	F
BPM-D	174	267	174	71	259	4 x Φ10

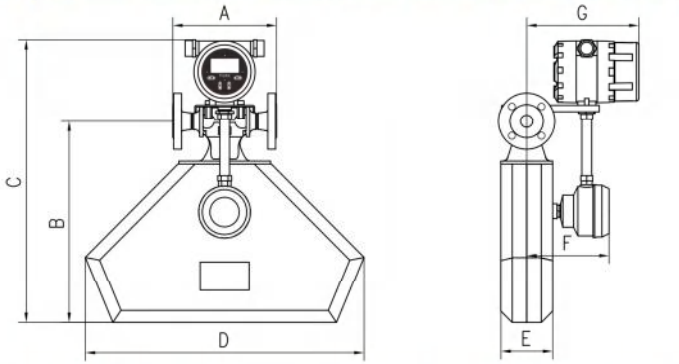
K Series Mass Flow Meters (separate type) (Unit: mm)



Model	Specification	A(customizable)	B	C	D	E	F
K025	DN15/DN20	188	255	356	63	139	121
K050	DN15/DN20	188	300	408	63	139	169
K100	DN25/DN32	212-252	412	568	106	167	185

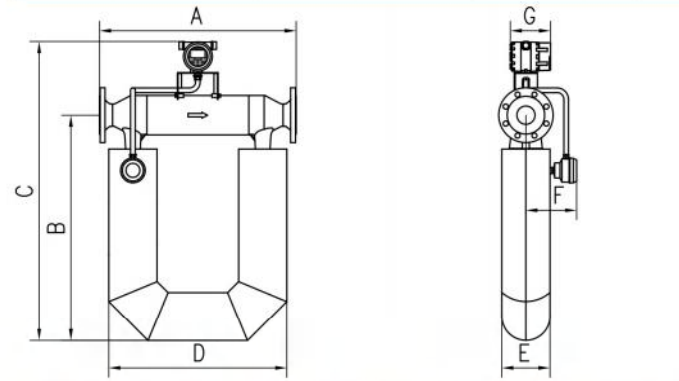
⚠ The flange standard adopts GB / T 9115-2010, HG / T 20592-2009

K Series Mass Flow Meters (integrated type) (Unit: mm)



Model	Specification	A(customizable)	B	C	D	E	F	G
K100	DN25/DN32	212~252	412	578	568	106	168	229

⚠ The flange standard adopts GB / T 9115-2010, HG / T 20592-2009



Model	Specification	A(customizable)	B	C	D	E	F	G
K200	DN40/DN50	580~606	727	1003	496	140	186	174
K300	DN80/DN100	832~930	976	1292	768	208	220	174
K400	DN150/DN200	1107~1173	1095	1391	860	300	260	174

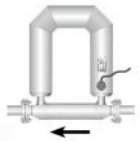
⚠ The flange standard adopts GB / T 9115-2010, HG / T 20592-2009

Installation Precautions

K Series sensor installation

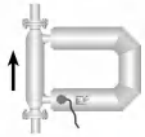
Horizontal installation—bottom mounted
Applicable medium: liquid

⚠ Generally, the sensor is installed with the shell facing down to prevent air from accumulating in the sensor measurement tube, thereby achieving the purpose of accurately measuring the mass flow.



Horizontal installation—top mounted
Applicable medium: gas

⚠ Generally, the sensor is installed with the shell facing upward to avoid the accumulation of condensate in the measuring tube of the sensor.



Flag installation—side mounted
Applicable medium: liquid or solid-liquid mixing

⚠ Generally, the sensor is installed on the vertical pipeline to avoid the accumulation of particles in the measuring tube of the sensor.

Notes on installation location

The sensor should be away from interference sources that can cause mechanical vibration of the pipeline, such as the pump on the process pipeline.

The sensor should pay attention to the expansion and deformation of the process pipeline due to temperature changes, especially cannot be installed near the expansion joint of the process pipeline.

The sensor should be far away from industrial electromagnetic interference sources, such as high-power motors, transformers, etc. .

The measuring tube of the sensor should always be filled with liquid and have a certain back pressure, which requires the installation position to be at the lower end of the pipeline.

The sensor flange must be coaxially connected to the pipeline flange to ensure no installation stress.

The upstream and downstream of the sensor should be installed with shut-off valves respectively.

⚠ When installing the sensor, you must choose a suitable installation location. In order to eliminate the impact of vibration on the measurement, in addition to staying away from the vibration source, a support rod is also required to fix the pipeline and valve firmly during installation. The lower end of the support rod must be fixed on a stable foundation, and the upper end is matched with the pipe clamp to fix the process pipeline. (Do not use the sensor housing to support sensors, pipelines, valves, pumps, etc.)

⚠ After the sensor is installed, its housing should be in a free floating state.

Calibration System

The top domestic calibration system certified by the China Academy of Metrology-Uncertainty ± 0.03%

Calibration System	Verification Accuracy	Maximum Flow Rate
Qingdao Add Value	**±0.03%**	**10m/s**
Other Factories	±0.05%	7~8m/s

⚠ The key components of the calibration system all use the best original imported equipment: weighing instrument-METTLER TOLEDO's highest-precision electronic scale to ensure calibration accuracy; water pump- Grundfos variable frequency control water pump to ensure stable flow rate.

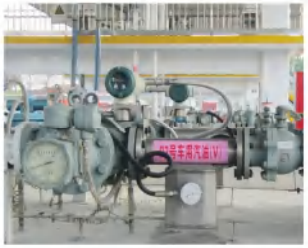
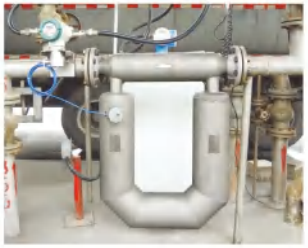
Obtained the verification certificate of "Static Mass Water Flow Standard Device" issued by the National Institute of Metrology of China.

Achievements









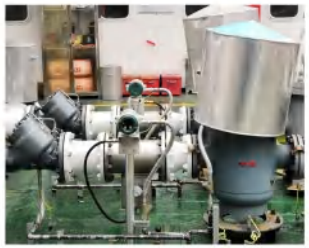
Achievements









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