

Electromagnetic flow meter



EM-Flow Environmental Technology Co., Ltd.

General situation of the company



General situation of the company

EM-Flow Environmental Technology Co., Ltd. was established in 2002, located in Taiwan



EM-FLOW

It has been 20 years that EM-Flow Environmental Technology Co., Ltd. produces a variety of flow meters since 2002 in which our promoter Mr. Lin Shi-Tswan established the firm. Our 5000m² factory is located in Tayuan Hsiang, Taoyuan County, neighboring the only international airport of Taiwan.



EM-FLOW

Advanced production capacity and scale

- The company's designed production capacity is 10,000 sets per year, and the caliber is DN6mm - DN3000mm.



EM-FLOW

Advanced production capacity and scale

- The company designs and produces electromagnetic flowmeter, vortex flowmeter, throttle device, metal tube float and other flow meters and metering equipment.



Advanced production capacity and scale

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Liquid flow calibration installation

- The company has DN 10 mm ~ DN 800 mm liquid flow standard device.



Quality management

- **EM-Flow** Environmental Technology Co., Ltd. passed the ISO 9001: 2008 quality management system certification in 2018.
- The company implements a one-vote system, establishes product files for each electromagnetic flowmeter, and records and monitors each process from parts processing to whole machine warehousing to ensure production progress and product quality.
- Carry out weekly inspection of measuring instruments to ensure the correct and reliable transmission of values.

Advanced production equipment

- EM-Flow Environmental Technology Co., Ltd. has advanced production and testing equipment such as semi-automatic gas shielded welding machine, automatic welding positioner, plasma cutting machine and automatic test press.

Production and quality



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Brief introduction of products

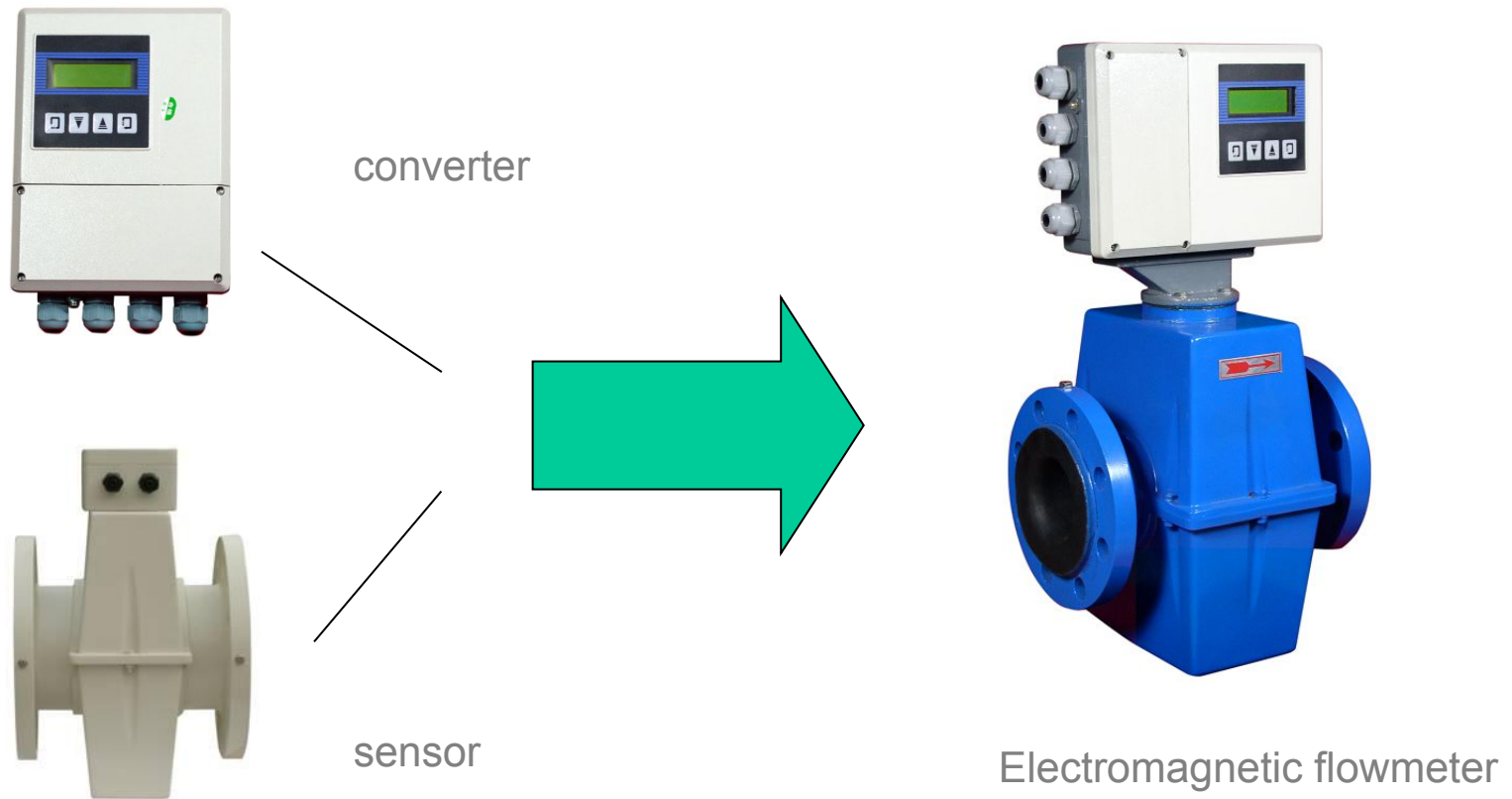


I. Electromagnetic Series

- Conventional electromagnetic flowmeter
- High pressure electromagnetic flowmeter
- Clamping electromagnetic flowmeter
- Plug-in electromagnetic flowmeter
- Submersible electromagnetic flowmeter
- Sanitary electromagnetic flowmeter
- Battery-powered electromagnetic flowmeter
- Electromagnetic heat meter

A. Conventional electromagnetic flowmeter

- Electromagnetic flowmeter consists of converter and sensor.



Main characteristics of conventional electromagnetic flowmeter

- Conventional electromagnetic flowmeter can be used in almost all conductive fluid measurement places.
- *High measurement accuracy: 0.5% to 0.2%. Even reached 0.1%.*
- **Wide measuring range: the aperture of electromagnetic flow sensor can cover 3 mm ~ 3000 mm.**

Any caliber can meet the measurement of flow range of almost all large and small pipelines, and

The measuring range of velocity can reach 0 m/s ~ 15 m/s.

- **Wide application range: it can not only be used to measure and measure water supply and drainage in cities and towns,**

It can be widely used in petroleum, chemical industry, steel, metallurgy, mining,

Agricultural irrigation, sewage treatment, papermaking, medicine, food and other industries and agriculture.

Department's production process flow measurement and control.

- The length requirements of front and rear straight pipe sections are low: generally, it is 10 times before and 5 times after d,

Easy to install and use.

- **The inside of the measuring tube of the sensor is completely empty, which is simple in structure and works.**

Reliable and long service life.

Main characteristics of conventional electromagnetic flowmeter

- Chinese and English menu, easy to operate, easy to learn and understand.
- High-definition backlight LCD screen can read clearly under strong light and no light.
- The converter has the function of automatic forward and backward flow measurement and can display the volume at the same time.

A number of measurement parameters such as percentage of product flow, instantaneous flow and cumulative flow.

- There are three integrators in it, which record and display the forward cumulative quantity and the reverse cumulative quantity respectively.

Cumulative quantity and differential quantity are convenient for fluid measurement and trade settlement.

- The power supply voltage range is wide, and the application range is between 90 V/AC and 250 V/AC.
- It has the function of fault self-diagnosis, air traffic control detection and alarm, and the upper and lower limits of flow exceed the limit.

Alarm, excitation fault alarm and other functions.

- With RS232, RS485, GPRS, HART, MODBUS protocol, etc.

A variety of communication methods.

- Advanced non-volatile memory can be used effectively for a long time.

Protection setting parameters and measurement data.



Main technical parameters and indicators

- Nominal diameter: DN10~DN3000
- Accuracy: 0.5% of the indicated value, and 0.3% or 0.2% of the indicated value can be selected.
- Medium temperature: separated type-10°C ~+80°C (PTFE and F46 lining-10°C ~+160°C)

Integral-10°C ~+80°C

- Ambient temperature:-20°C ~+50°C
- Ambient humidity: 5 ~ 85% RH (relative humidity)
- Dielectric conductivity: $\geq 20\mu\text{s}/\text{cm}$
- Measuring range (flow rate): 0 ~ 15m/s
- Installation form: integrated and separated.
- Protection grade: sensors IP65 and IP68 are optional.

(IP65: dust-tight, water-proof; IP68: The seal can be continuously immersed in water.)

Main technical parameters and indicators

- Display: backlight LCD liquid crystal display, which displays instantaneous flow, cumulative flow, Percentage flow, flow rate, alarm prompt, etc.
- Counter: cumulative value of forward total, reverse total and difference total.
- Cumulative flow display digits: 10 digits, instantaneous flow display digits: 5 digits.
- Output signal: 4 ~ 20mA current output, pulse output. Alarm output.
- Communication: optional RS232, RS485, GPRS and HART protocols.
- Power supply: switching power supply form
Ac 90v/AC ~ 250v/AC (45hz ~ 63hz),
20 v/DC ~ 36 v/DC.
- Power loss: < 15W (matching power consumption).
- Ambient temperature:-10°C ~+50°C
- Structural form: one body, divided body.
- Protection grade: IP65.
- Power failure protection: EEPROM can keep the data record of total flow for 10 years.

Second, the high-voltage electromagnetic flowmeter

- High pressure electromagnetic flowmeter is mainly used for more than 10MPa.

High-pressure measuring pipeline below 32MPa.

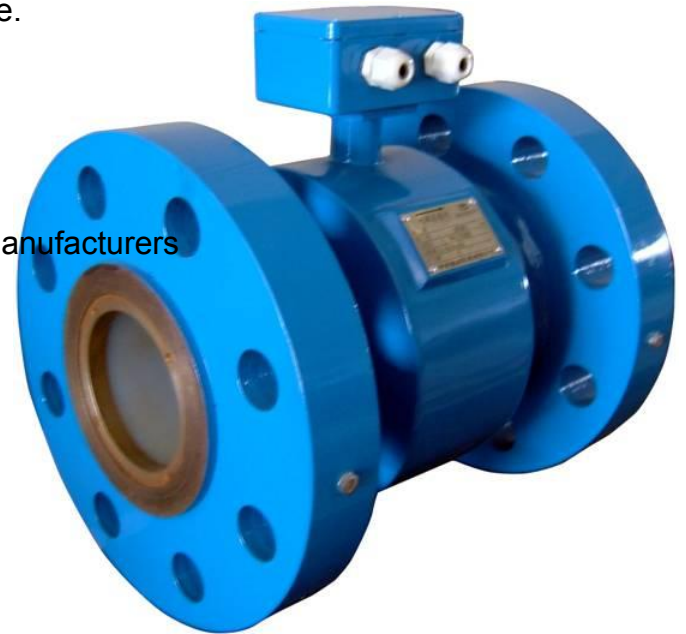
- Adopt proprietary technology and special technology to produce.
- Mainly used in geology, petroleum exploration and oil fields.

Mud, cement slurry,

High-pressure water injection and high pressure from water pump manufacturers

Water pump flow measurement and other places.

- The main feature is that the flowmeter can withstand higher Pipeline pressure, suitable for higher pressure environment. Flow measurement under.



Main technical parameters of high-pressure electromagnetic flowmeter

- Nominal diameter: DN20~DN200
- Accuracy: 0.3% or 0.2% of the indicated value can be selected.
- Lining: F46
- Electrode material: 316L stainless steel.
- Dielectric conductivity: $\geq 20\mu\text{s}/\text{cm}$
- Nominal pressure: 10, 16, 26 and 32MPa.
- Ambient temperature: $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$
- Medium temperature: $-30^{\circ}\text{C} \sim +160^{\circ}\text{C}$
- Ambient temperature: $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$
- Power supply: 220V/AC or 24V/DC.
- Connection mode: flange type; Youren style



3. Clamping electromagnetic flowmeter

- Clamping electromagnetic flowmeter adopts new generation lining technology.

Technology, and use special mirror polishing treatment lining.

Process, so that the inner wall and micro-wall of the sensor pipeline

Hanging effect Suitable for the environment with hygienic requirements.

- Small size, no connecting flange, more installation and maintenance.

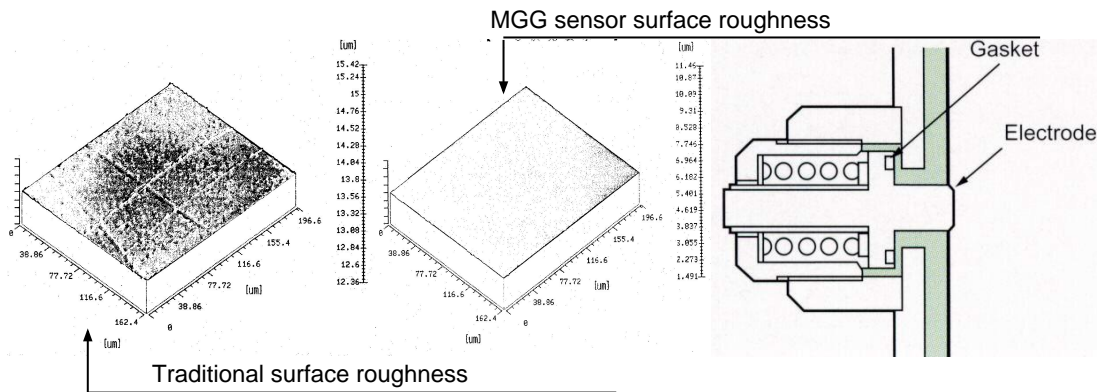
Simple and convenient.



Main technical parameters of clamping electromagnetic flowmeter

- Nominal size: 10mm ~200mm
- Accuracy: 0.5% of the indicated value, and 0.3% or 0.2% of the indicated value is optional.
- Medium temperature: integrated -10°C ~+70°C, separated -30°C ~+170°C
- Ambient temperature: -20°C ~+55°C
- Working pressure: ≤1.6MPa
- Dielectric conductivity: ≥20μs/cm
- Lining: PFA, F46, rubber
- Electrode materials: 316L, HB, HC, titanium, tantalum, platinum-iridium alloy.
- Electrode form: plug-in, plug-out or detachable.
- Installation: One-piece, separated type
- Enclosure protection grade: sensor IP65, optional IP68.
- Converter IP65

Clamping electromagnetic flow sensor

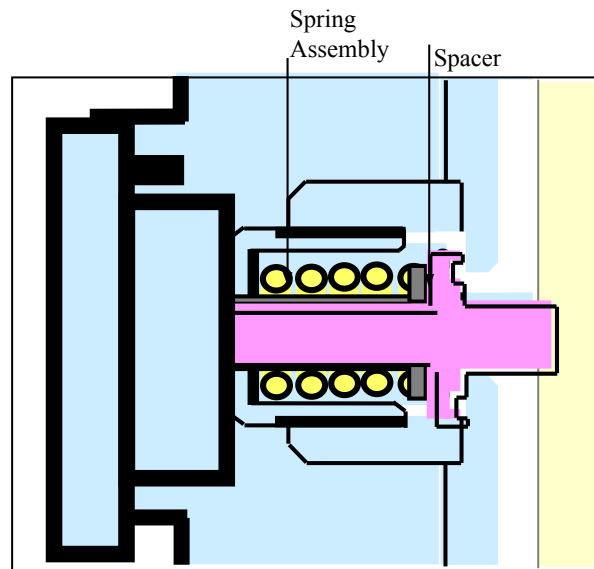


Pure white PFA without additives is used to make new lining.
Mirror-polished PFA lining is especially suitable for the measurement of viscous pulp and gypsum slurry.

Mirror-polished lining in the case of viscous slurry
When applied, it can be maintenance-free for at least 2 years.

Clamping electromagnetic flow sensor

The electrode can be replaced and cleaned on site.



The field replaceable electrode structure makes the maintenance simple.

4. Plug-in Electromagnetic Flowmeter

- Plug-in electromagnetic flowmeter is a variation of conventional electromagnetism,

It has the advantages of simple structure, convenient installation, high reliability,

Low production and installation cost.

- Its biggest advantage is that installation and maintenance need not be disassembled and measured.

Pipe, can realize online installation operation without stopping water.

- Adopting a brand-new disposable die-casting sensor measuring head,

Plug-in installation type with high reliability.

- High reliability, high stability and high cost performance.



Insertion of electro-magnetic special point

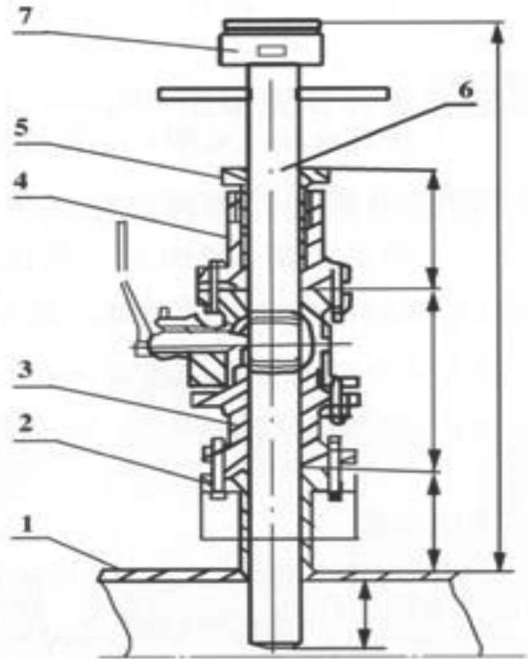
- Simple structure, firmness and reliability, no moving parts and long service life.
- Small size, light weight, convenient installation and small maintenance.
- Can be installed and disassembled without stopping water.
- The manufacturing cost and installation cost are low, which is suitable for large pipeline meas

Installation conditions

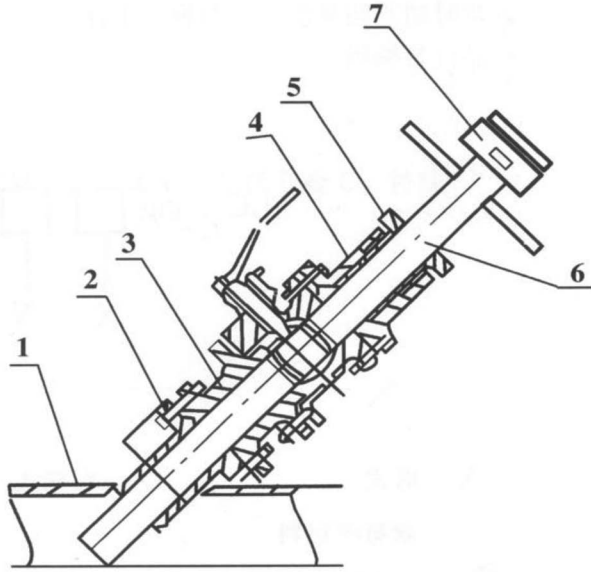
- The upstream straight pipe section of the pipeline shall not be less than 15D, and the downstream pipe section shall not be less than 10D.
- Vertical installation and inclined installation.
- Two positions of the insertion point: 1. Inserting into the central axis of the measured pipeline;
2. Insert the inner wall of the pipeline at 0.25D of the pipeline.



Insert electromagnetic installation schematic diagram



- 1. Pipeline
- 2. Connection flange
- 3. Ball valve
- 4. Connection flange
- 5. Head
- 6. Plug-in electromagnetic flow sensor
- 7. Junction box



- 1. Pipeline
- 2. Connection flange
- 3. Ball valve
- 4. Connection flange
- 5. Head
- 6. Plug-in electromagnetic flow sensor
- 7. Junction box

Sensor installation location diagram

Five, submersible electromagnetic flowmeter

- Submersible electromagnetic flowmeter should mainly use river channel and

Measurement of water flow in channels.

- High measurement accuracy, stable and reliable work and applicability.

Trade settlement of water used in rivers and channels.

- The measurement accuracy is not affected by the change of upstream and downstream water levels.
- By installing the shunt model, large-scale Water flow measurement of rivers and canals.

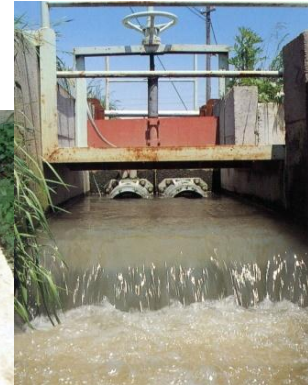


Applicable to:

- Drinking water
- Sewage
- Industrial water
- Irrigation water
- Seawater
- Drain water



Installation example



Characteristics of submersible electromagnetic flow meter

- It is suitable for water flow measurement in open channels, culverts and rivers.
- It is suitable for channel measurement in rectangular, trapezoidal, circular and other shapes.
- Free from the influence of river rising, tide and downstream water level change,
- The simulation sensor can expand the flow measurement range.

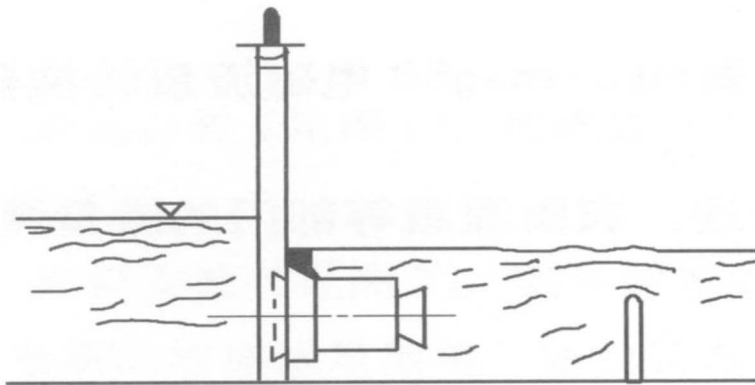
Main technical performance

- Nominal diameters: DN50, 100, 200, 400, 600 and 800 mm.
- Maximum diving depth: 10m.
- Temperature range of measured medium: 0°C ~+40°C
- Measuring range (flow rate): 0.05 m/s ~ 10 m/s.

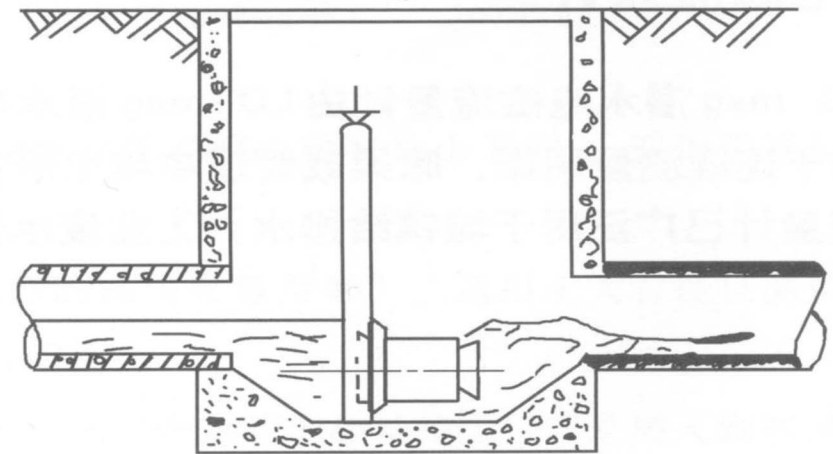
Installation and application requirements of submersible electromagnetic flowmeter

- Select the location where the cross section of the open (dark) canal is uniform and the water flow is stable as the sensor installation location. The sensor is installed on the gate, and it is ensured that all the sensors are submerged under the water surface. The gate must have sufficient strength to support the sensor and withstand the hydrodynamic action. The length of the straight section of the channel should be at least 5 times the width of the channel.

Schematic diagram of the installation on the channel



Installation diagram in the well



Six, sanitary electromagnetic flowmeter

- Sanitary electromagnetic flowmeter is mainly used in food processing, pharmaceutical production,

Beverage production and other industries.

- The sensor adopts a new generation of sanitary quality lining material.

Material, and use special production technology, and mirror.

Polishing process makes the inner wall of sensor pipeline

And micro wall hanging effect.

- Quick installation structure, loading and unloading, maintenance, Cleaning is more convenient.



Main technical parameters of sanitary electromagnetic flowmeter

- Nominal size: 10mm ~200mm
- Accuracy: 0.5% of the indicated value, and 0.3% or 0.2% of the indicated value is optional.
- Medium temperature: integrated -10°C ~+70°C, separated -20°C ~+160°C
- Ambient temperature: -20°C ~+55°C
- Working pressure: ≤1.6MPa
- Dielectric conductivity: ≥20μs/cm
- Lining: PFA
- Electrode materials: 316L, HB, HC, titanium, tantalum, platinum-iridium alloy.
- Electrode form: plug-in, plug-out or detachable.
- Installation: One-piece, separated type
- Enclosure protection grade: sensor IP65, optional IP68.
- Converter IP65



Seven, battery-powered electromagnetic flowmeter

- With the increasing application scope of electromagnetic flowmeter, electricity
The practical application of magnetic flowmeter has also encountered some problems, such as
Many use sites are very remote without power supply (to some reservoirs, water
Irrigation, etc.); Some use sites cannot be connected to the power supply in the middle of the road.
(This phenomenon is the most common to water companies all over the world), such a situation
It is very inconvenient to use the conventional electromagnetic flowmeter.
- Battery-powered electromagnetic flowmeter is for this kind of special no electricity.
An electromagnetic flowmeter designed at the source site, without any external connection.
Lead wire, simple installation and convenient use.



Main characteristics of battery-powered electromagnetic flowmeter

- Adopting specially designed sensor excitation system and high-performance lithium battery power supply system, micro-power consumption design,

Four 3.6V lithium batteries can work continuously for 4 ~ 8 years, and it is convenient to replace the batteries.

- The display adopts LCD liquid crystal display, which can display instantaneous flow rate, flow rate (pipeline pressure),

Forward and backward cumulative total and alarm prompt and other traffic parameters.

- There are no resistance parts in the measuring tube, so the phenomenon of winding and blocking will not occur.

No pressure loss, long-term reliable continuous operation.

- Wide measuring range: the measuring range of velocity can reach 0.05m/s ~ 10m/s.
- High measurement accuracy: 0.5% ~ 1.0%.
- Nominal diameter: DN10~DN800
- Nominal pressure: 0.6~ 4.0Mpa (special pressure can be customized)
- Ambient temperature: -10°C~55°C
- Protection grade: IP65, IP68 (optional)
- It has the function of RS485 interface and GPRS wireless data remote transmission.



Eight, electromagnetic heat meter

- With the continuous strengthening of national energy consumption management, the application of heat energy meter is becoming more and more common.

Electromagnetic heat meter is a kind of heat metering instrument that appears in this environment.

- Electromagnetic calorimeter is a kind of instrument to measure the heat released by heat-carrying fluid in heat exchange system.

Measuring instrument. It uses high-precision and high-reliability electromagnetic flowmeter as flow measurement;

Use platinum thermal resistance with high precision and stability as the temperature.

Measurement; Do it with a 16-bit single chip microcomputer with high performance and high speed.

Data operation, so the heat meter has excellent performance.

Measurement performance of. It is widely used in civil residential quarters,

Central heating, heating and air-conditioning in office buildings, enterprises and institutions

Measurement of cooling heat.



Main characteristics of electromagnetic heat meter

- High measurement accuracy: flow 0.5%; 1.0% ~ 2.0% of heat
- Wide measuring range: the caliber is 50 mm ~ 1000 mm.

Temperature-30°C ~+160°C

The flow rate is 0.05 m/s to 10 m/s.

Almost all heat measuring pipes can be used.

- Display all data: cumulative heat, cumulative flow, instantaneous heat, instantaneous flow,

Data such as inlet and outlet water temperature and temperature difference are displayed at the same time.

- Convenient reading: LCD backlight display mode, which can clearly read under strong light and no light.
- It has standard DC signal and frequency signal output function, and this function can be used in heat and flow

Switch between quantity parameters.

- With RS-485(RS-232, optional) digital communication interface, it is convenient to realize remote communication.
- Compared with other heat meters, it is more stable and reliable.



Technical training



EM-FLOW



Electromagnetic flowmeter

Technical training course for business personnel



EM-FLOW

First, the main purpose of electromagnetic flowmeter

Electromagnetic flowmeter is a kind of flow measuring instrument, which is widely used. It can be used not only for measuring and measuring water supply and drainage in cities and towns, but also for measuring and controlling the flow in the production process of petroleum, chemical industry, steel, metallurgy, mining, agricultural irrigation, sewage treatment, papermaking, medicine, food and other industrial and agricultural departments. It is also suitable for the total amount measurement and trade settlement of conductive liquids.

For example, the measurement of pulp liquid in a paper mill; mine

Measurement of mining slurry; Caustic soda and sulfuric acid in chemical plants

Measurement; Measurement of sewage from sewage treatment plant; food processing

Measurement of industrial beverages; Cooling water in steel and electric power industries

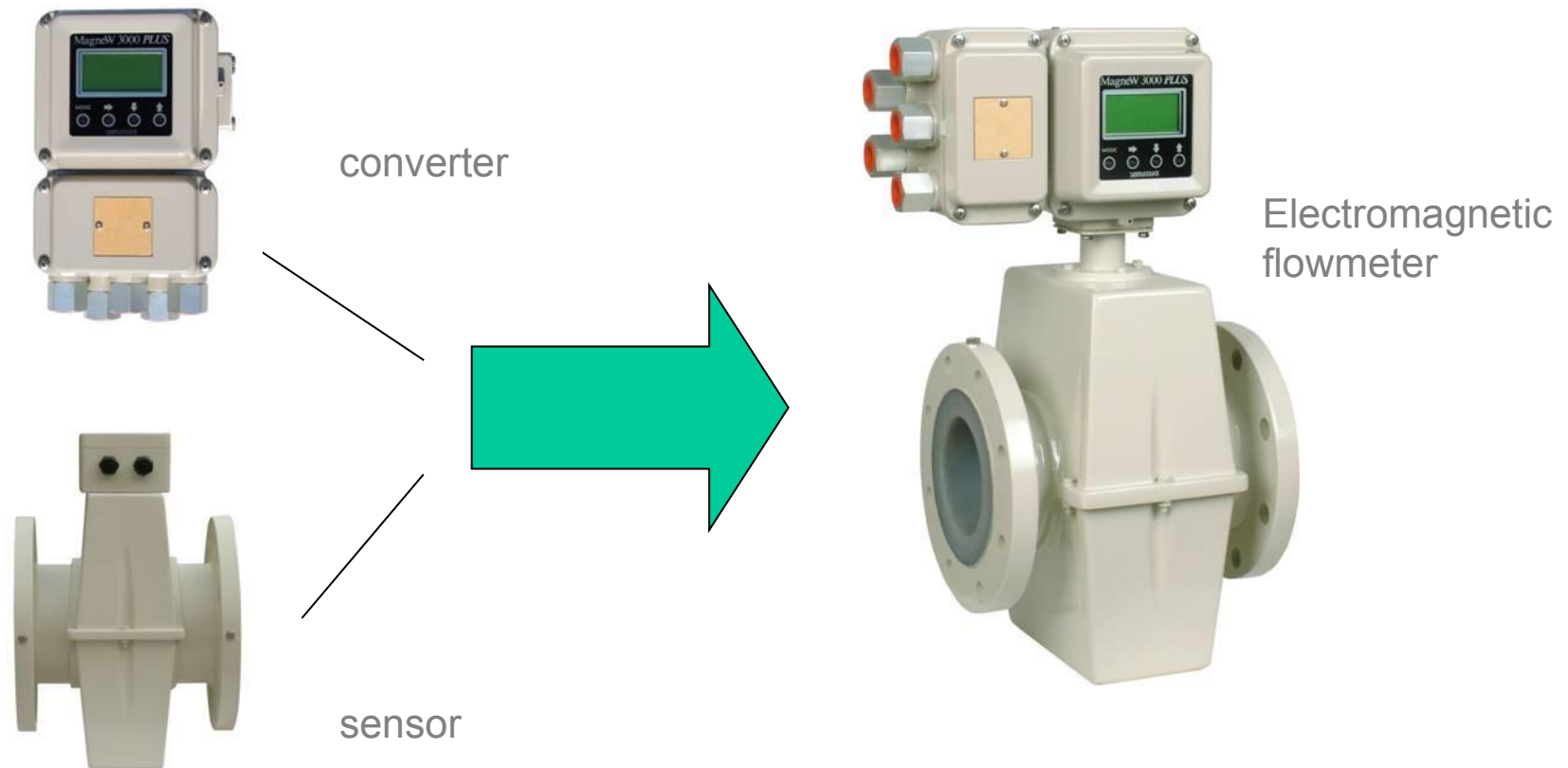
Measurement, etc.



Second, the composition of electromagnetic flowmeter

Electromagnetic flowmeter consists of two parts, converter and sensor.

Similarly, its use and installation also have two structural forms: divided type and integrated type.



Composition of electromagnetic flowmeter

Sensors and converters have different functions, and their respective functions and functions are as follows:

The function of the sensor is to convert the flow signal of the measured fluid in the pipeline into a voltage signal proportional to the flow signal, and then send this voltage signal to the converter.

The function of the converter is to convert the voltage signal sent by the sensor into a standard 4-20 mA current signal and a frequency signal of 0-5KHz, which are directly proportional to the flow signal in the measurement pipeline, and display it directly on the display screen of the converter in digital form, so as to realize the flow measurement.

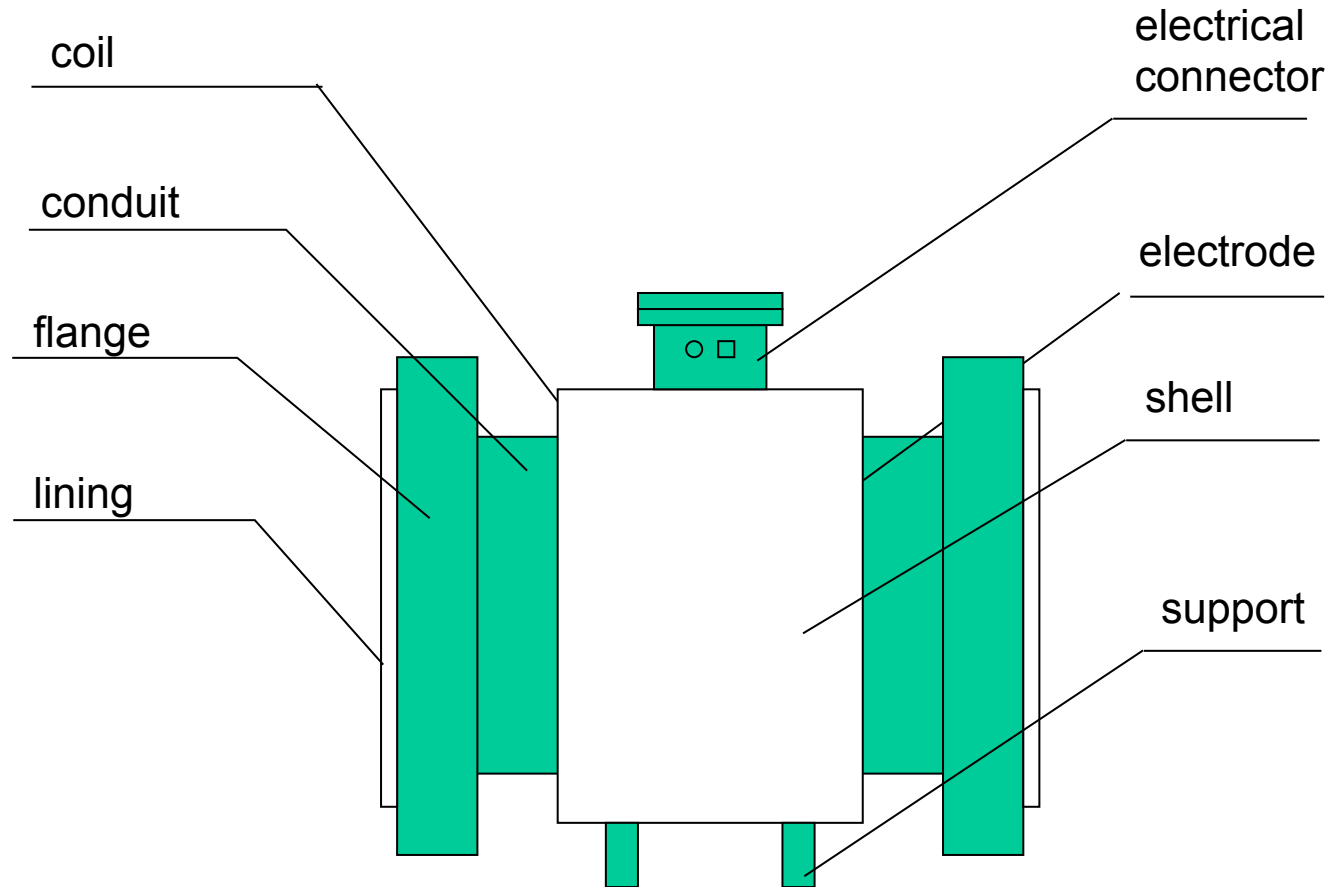
Electromagnetic flow sensor

Electromagnetic flow sensor



Electromagnetic flow sensor

Sensor structure



Third, the basic principle of electromagnetic flowmeter

Electromagnetic flowmeter is a kind of flow measuring instrument made by Faraday's electromagnetic induction principle.

Its principle is that when the conductive liquid moves perpendicular to the magnetic field lines along the measuring pipeline in an alternating magnetic field, the conductive liquid cuts the magnetic field lines to generate an induced potential (voltage); At this time, a pair of electrodes are installed on the tube wall perpendicular to the axis and magnetic field lines of the measuring tube, and the electrodes detect the induced potential (voltage).

This induced potential (voltage) is proportional to the liquid flow in the measuring pipe. By measuring this potential (voltage), the liquid flow in the measuring pipe can be deduced.



Basic principle of electromagnetic flowmeter

This flow signal is amplified by the converter and processed by the single-chip microcomputer in the converter, and then converted into a standard 4-20 mA current signal which is proportional to the flow signal in the measuring pipeline, and output with a frequency pulse of 0-5KHz, and is directly displayed in the converter in digital form.

On the display screen (see the picture below).

From the above basic measurement principles, we

It can be seen that the electromagnetic flowmeter can only be used for

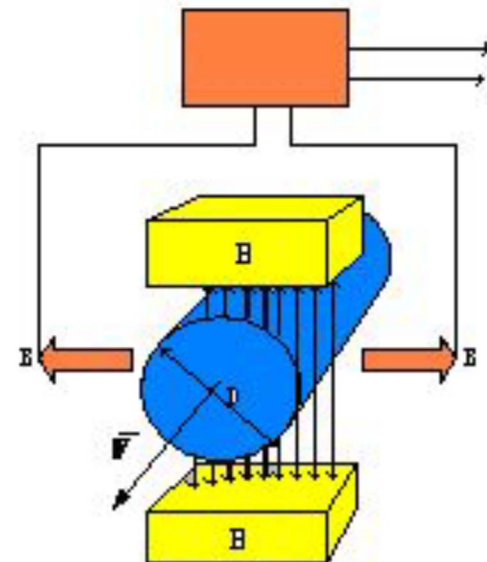
Measurement of conductive liquid, non-conductive medium

Can't be measured, such as gas, oil,

Ketones, benzenes, etc. In the future work.

We will often encounter these problems, which is

What we must know and be familiar with.



Basic principle of electromagnetic flowmeter

Flow equation

$$E = BDV$$

$$Q = 3600VA = 3600 \cdot \frac{E}{BD} \cdot \frac{\pi D^2}{4} \cdot \frac{E}{B} = \frac{900\pi D^3}{4B^2} E^2$$

E: induced potential d: inner diameter of measuring tube.

B: magnetic induction intensity q: measured flow value.

A: measuring tube area v: average velocity of fluid passing through the electrode plane in the measuring tube.

Four, the main characteristics of electromagnetic flow sensor

- There are no moving parts and resistance parts in the sensor, no pressure loss and low energy consumption.
- There will be no blockage and entanglement in the pipeline.
- The measurement accuracy of the flowmeter is not affected by the pressure, temperature, density, viscosity,
- The influence of physical parameters such as conductivity.
- High measurement accuracy: 0.5% to 0.2%. Even reached 0.1%.
- Wide measuring range: the aperture of electromagnetic flow sensor can cover 3 mm ~ 3000 mm.
- Any caliber can meet the measurement of flow range of almost all large and small pipelines, and
- The measuring range of velocity can reach 0 m/s ~ 15 m/s.
- Wide application range: it can not only be used to measure and measure water supply and drainage in cities and towns,
- It can be widely used in petroleum, chemical industry, steel, metallurgy, mining and agriculture.
- Industry irrigation, sewage treatment, papermaking, medicine, food and other industrial and agricultural departments
- Flow measurement and control in production process.



Main characteristics of electromagnetic flow sensor

- The length requirements of front and rear straight pipe sections are low, generally 5 times before and 2 times after d ,
- Easy to install and use.
- The inside of the measuring tube of the sensor is completely empty, which is simple in structure and works.
- Reliable and long service life.



Five, the main technical indicators of electromagnetic flow sensor

- Caliber range: DN3mm~DN3000mm.
- Measuring range (flow rate): 0m/s ~ 15m/s.
- Measurement accuracy: 0.5% of the indicated value, with optional 0.3% or 0.2%.
- Connection mode: flange connection, threaded connection, clamping connection and quick joint connection.
- Structural form: one-piece and sub-piece.
- Pressure range: 0.6, 1.0, 1.6, 2.0, 2.5 and 4.0MPa~(32MPa).
- Lining materials: PTFE, F46, PFA, polychloroprene rubber and polyurethane rubber.
- Electrode materials: 316L stainless steel, HC, HB, Ti, Ta, platinum/iridium alloy, Monel.
- Conductivity of measured medium: greater than 20us/cm.
- Protection grade: IP65, IP68
- Ambient temperature:-20°C ~+60°C
- Medium temperature:-30°C ~+160°C



Electromagnetic flux converter

- LCD screen with backlight

Reading is easy under direct sunlight or in a dark room.



Show at the same time:

- Percentage of volume flow
- Instantaneous flow
- Cumulative flow

Six, the characteristics of electromagnetic flow converter

- Programmable low-voltage and low-frequency rectangular wave excitation mode is adopted, which has stable measurement and low power consumption.
- Using 16-bit microprocessor, the operation speed is fast and the precision is high.
- Fully digital processing, strong anti-interference ability, reliable measurement, high precision and flow rate

The measurement ratio can reach 1000:1.

- Chinese and English menus are simple and convenient to operate, easy to learn and understand.
- High-definition backlight LCD screen can read clearly under strong light and no light.
- The converter has the function of automatic forward and backward flow measurement and can display the volume at the same time.

A number of measurement parameters such as percentage of product flow, instantaneous flow and cumulative flow.

- There are three integrators in it, which record and display the forward cumulative quantity and the reverse cumulative quantity respectively.

Cumulative quantity and differential quantity are convenient for fluid measurement and trade settlement.

- The total amount display adopts 10-digit decimal carry mode, and the cycle record is longer.
- Ultra-low EMI switching power supply, wide range of applicable power supply voltage and high efficiency.

The range of power supply is between 90 v/AC and 250 v/AC.

Characteristics of electromagnetic flow converter

- The converter has the function of fault self-diagnosis, air traffic control detection and alarm, and the upper and lower limits of flow exceed the limit.

Alarm, excitation fault alarm and other functions.

- With optional RS232, RS485, GPRS, HART protocol, MODBUS protocol, etc.

A variety of communication methods.

- Advanced non-volatile memory is adopted, which has higher circuit reliability and can be used effectively for a long time.

Protection setting parameters and measurement data.



Seven, the main technical indicators of electromagnetic flow converter

- Measurement accuracy: 0.2% ~ 0.5% (matching accuracy).
- Measuring range (flow rate): (0-15) m/s.
- Input signal range: (0.15 ~ 0.2) mv/m/s-1.25 Hz ~ 25 Hz rectangular wave.
- Display: backlight LCD liquid crystal display, which displays instantaneous flow, cumulative flow, Percentage flow, flow rate, alarm prompt, etc.
- Counter: cumulative value of forward total, reverse total and difference total.
- Cumulative flow display digits: 10 digits, instantaneous flow display digits: 5 digits.
- Output signal: 4 ~ 20mA current output, pulse output. Alarm output.
- Communication: optional RS232, RS485, GPRS and HART protocols.
- Power supply: switching power supply form

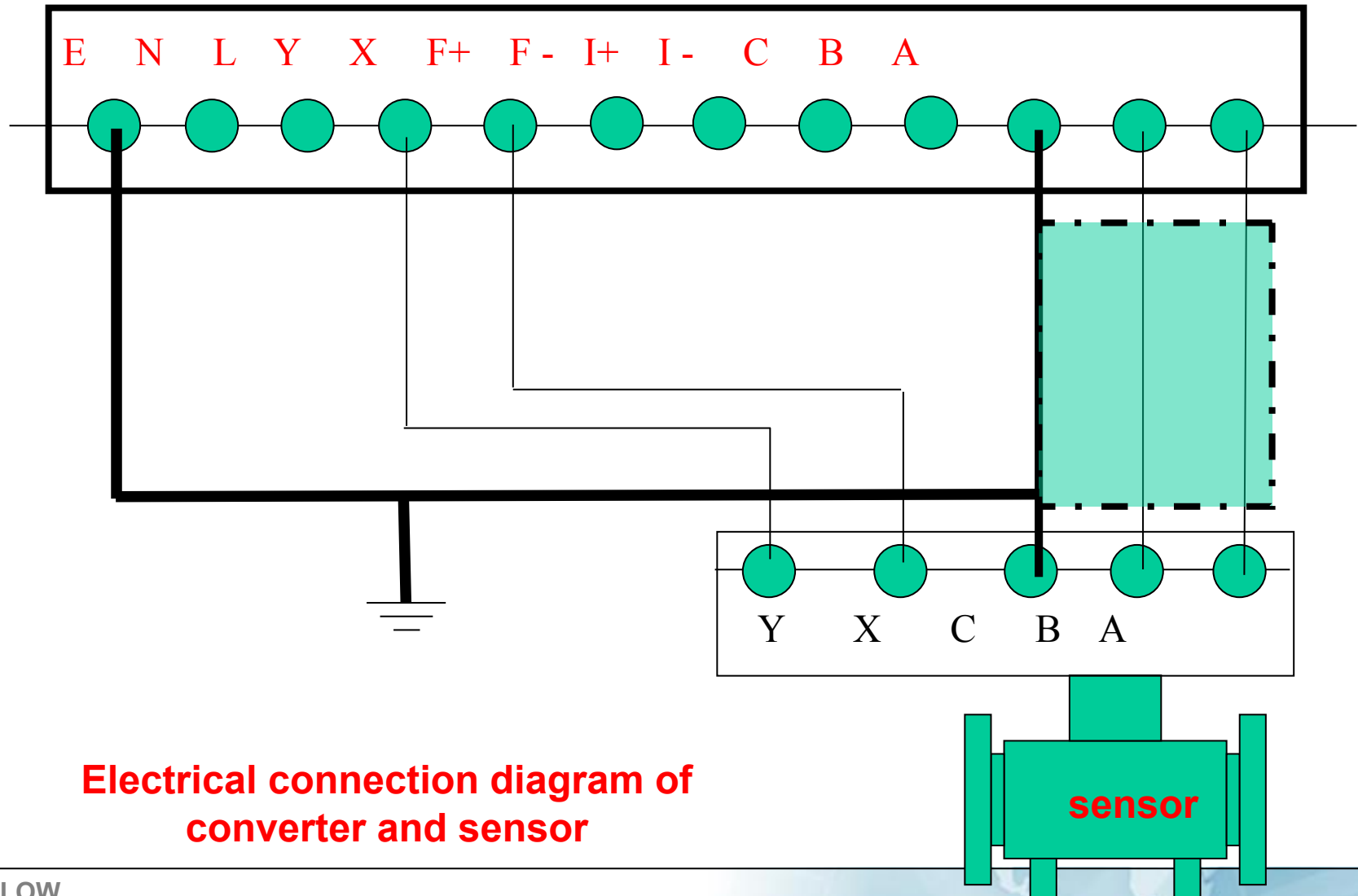
Ac 90v/AC ~ 250v/AC (45hz ~ 63hz),

20 v/DC ~ 36 v/DC.

Main technical indexes of electromagnetic flow converter

- Power loss: < 15W (matching power consumption).
- Ambient temperature: -10°C ~+50°C
- Structural form: one body, divided body.
- Protection grade: IP65.
- Power failure protection: EEPROM can keep the data record of total flow for 10 years.

Eight, the basic connection form of converter and sensor



Electrical connection diagram of converter and sensor

Nine, the basic points of electromagnetic flowmeter selection (product point of view)

1. Selection of caliber: (mainly determined according to the user's process pipeline, and measured under special circumstances.

Quantity medium composition and measurement accuracy factors)

- ① The caliber is the same as that of the connecting process pipeline.
- ② The caliber is different from that of the connecting process pipeline.

2. Selection of lining material: (Mainly consider the corrosiveness, abrasion and corrosion resistance of the medium to be tested.

With temperature, pressure and other factors)

- ① Common lining
- ② Special lining

3. Selection of electrode materials:

(Mainly consider the corrosiveness, abrasion, temperature and pressure of the medium to be measured)



Basic points of electromagnetic flowmeter selection

① Common electrodes

② Special electrode

(3) the structure of the electrode, built-in, external, scraper, detachable, capacitive, etc.

4. Selection of nominal pressure grade and sensor flange:

(mainly consider the nominal pressure of the user's process pipeline, the flange form of the user and

Factors such as standards implemented by flanges)

① Common flanges

② Special flange

③ Flange connection forms: threaded connection, clamping connection, quick joint connection, etc.

5. the choice of protection level:

Generally, IP65 and IP68 are implemented.

(Mainly consider the environmental factors of the installation site and user requirements)

6. the choice of structural form:

Basic points of electromagnetic flowmeter selection

Electromagnetic flowmeter has two basic structural forms: one-piece type and divided type.

(Mainly consider protection performance requirements, explosion-proof requirements, medium temperature, process requirements and users.

Requirements and other factors)

7. the choice of instrument function requirements:

(mainly consider the signal output interface, control output interface, data communication interface of the instrument, Communication protocol and display parameters of the instrument)

8. the choice of working power supply:

The working power supply of electromagnetic flowmeter mainly includes 220V/AC, 24V/DC and 3.6V/DC.

(Mainly consider the user's site environment, explosion-proof requirements, process requirements and other factors)

Basic points of electromagnetic flowmeter selection (user's point of view)

1. Water supply and drainage industry (water conservancy, agricultural irrigation, etc.): The main measuring medium is normal temperature.

State of small water, non-corrosive, using conventional electromagnetic, the main considerations are as follows;

- ① caliber
- ② Pressure grade
- ③ Protection standard
- ④ Connection and installation form
- ⑤ Instrument function



These are also the five basic elements necessary for the selection of electromagnetic flowmeter.

2. Heating industry: The only characteristic is that the temperature of the measuring medium is relatively high, except for the above five items.

The key consideration of this element is lining material.

Basic points of electromagnetic flowmeter selection (user's point of view)

3. Metallurgy, mining and papermaking: The characteristic measuring medium contains a large number of solid particles or long fibers.

D and other substances. The main consideration is the wear resistance of the lining.

4. Petroleum and geological exploration: the characteristic pressure is extremely high, and the measuring medium contains a lot of solids.

Particles. The main consideration is the wear resistance and pressure resistance of the lining.

5. Chemical industry: The characteristic measuring medium is corrosive and the temperature changes greatly. The main considerations are as follows.

The factors are as follows;

In addition to the above five basic elements, focus on the following aspects:

- ① lining material
- ② electrode materials
- ③ Grounding form



Basic points of electromagnetic flowmeter selection (user's point of view)

6. medicine, food: high sanitary conditions for characteristic measurement. The main consideration is lining. Hygienic performance of.



X. Data-Table of Main Properties of Lining Materials

Lining material	Principal and essential performance	Suitable range
Polytetrafluoroethylene (PTFE)	<ol style="list-style-type: none"> 1. It is a material with the most stable chemical properties in plastics, which can resist boiling hydrochloric acid, sulfuric acid and aqua regia, strong alkali and various organic solvents, and is not resistant to the corrosion of chlorine trifluoride, high-speed liquid fluorine, liquid oxygen and ozone. 2. Poor wear resistance 	<p>Strong corrosive media such as concentrated acid and alkali.</p> <p>-40°C~180°C</p>
PFA	Corrosion resistance is the same as PTFE	<p>Can be used in negative pressure state.</p> <p>-40°C~170°C</p>
F46	<ol style="list-style-type: none"> 1. Corrosion resistance is the same as PTFE. 2. Low wear resistance 3. Strong negative pressure resistance. 	<ol style="list-style-type: none"> 1. Same as PTFE -40°C~170°C 2. It can be used in low abrasion media.
Polychloroprene rubber	<ol style="list-style-type: none"> 1. Excellent elasticity, high breaking force and good wear resistance. 2. Resistant to corrosion of ordinary low-concentration acid, alkali and salt media, but not resistant to oxidizing media. <p>Corrosion.</p>	<p>Water, domestic sewage, weakly abrasive mud, mine</p> <p>Pulp, -10°C~80°C</p>
polyurethane rubber	<ol style="list-style-type: none"> 1. Excellent wear resistance (equivalent to 10 times of natural rubber). 2. Poor acid and alkali resistance. 3. It cannot be used in water mixed with organic solvents. 	<p>Neutral and highly abrasive pulp, coal slurry, mud, etc.</p> <p>-10°C~60°C</p>

Data-Table of Electrode Materials and Corrosion Resistance

Electrode material	Corrosion resistance
316l stainless steel	Used for industrial water, domestic water and domestic sewage, with weak corrosiveness, and can be widely used in petroleum, chemical industry, urea, vinylon and other industries.
Stainless steel coated tungsten carbide	Used for non-corrosive, highly abrasive media.
Hastelloy B (HB)	It has good corrosion resistance to all concentrations of hydrochloric acid below the boiling point, and is also resistant to corrosion of non-oxidizing acids, bases and non-oxidizing salt solutions such as sulfuric acid, phosphoric acid, hydrofluoric acid and organic acid. Monel material is better for hydrofluoric acid.
Hastelloy C (HC)	Resistant to the corrosion of oxidizing acids, such as nitric acid, mixed acid or mixed medium of chromic acid and sulfuric acid, and also resistant to the corrosion of oxidizing salts such as Fe^{+++} , Cu^{++} or other oxidants. Such as hypochlorite solution above normal temperature and seawater corrosion.
Titanium (Ti)	Resistant to the corrosion of seawater, various chlorides and hypochlorite, oxidizing acids (including fuming nitric acid), organic acids, alkali, etc., and not resistant to the corrosion of pure reducing acids (such as sulfuric acid and hydrochloric acid). However, if the acid contains oxidants (such as nitric acid, Fe^{+++} , Cu^{++}), the corrosion is greatly reduced.
TanTalum (ta)	It has excellent corrosion resistance, similar to glass, and can resist the corrosion of almost all chemical media (including hydrochloric acid, nitric acid, sulfuric acid and aqua regia) except hydrofluoric acid, fuming sulfuric acid and alkali.
Platinum-iridium alloy	Applicable to almost all chemicals, but not to aqua regia and ammonium salts.

A brief introduction to the equal performance of material-protection

- IP65 spray-proof type: the nozzle sprays water 3 meters away from the instrument.

Does not affect the normal operation of the instrument.

- IP67 anti-immersion type: the instrument will be completely in 30min.

Immerse in water and take it out,

Does not affect the normal operation of the instrument.

- IP68 submersible type: The instrument can work in water for a long time.

Data-the relationship between measuring range and caliber

The relationship between measuring range and caliber

The flow measurement range of electromagnetic flowmeter is very wide. Its wide adjustable range is incomparable to other flowmeters. Generally, regardless of the diameter of the sensor, its flow measurement can ensure the measurement accuracy in the range of 0.5-10m/s, and the lower limit measurement value can reach 2-5m/s.. Sensors are available in diameters from 3mm to 3000 mm. Generally, the diameter of electromagnetic flowmeter is the same as that of the pipeline to be measured. Electromagnetic flowmeter sensors larger or smaller than the diameter of the pipeline to be measured can be used for special needs. Of course, when using reducer, reducer should be installed according to the standard or the technical requirements provided by the manufacturer. When it is needed, it refers to the conditions that meet the measurement range and accuracy requirements. Electromagnetic flow sensors smaller than the process pipeline diameter can be used to save instrument costs.

In order to prevent solid matter from depositing, scaling and adhering, a flow sensor smaller than the diameter of the process pipeline (the average flow rate in the sensor should be not less than 1.5m/s) should be adopted. In the case that solid particles are prone to wear of electrodes and conduit linings, a flow sensor with a diameter larger than that of the process pipeline can be used (usually, the flow rate in the electromagnetic flow sensor should not be greater than 3m/s). In any case, the conduit of the flowmeter sensor should be filled with fluid at all times.

Eleven, electromagnetic flowmeter installation requirements

- The flow direction sign on the flowmeter should be consistent with the flow direction of the measured medium in the pipeline.
- The installation position of the flowmeter must ensure that the measuring tube is always filled with the measured medium, and at the same time

To facilitate the installation, maintenance and daily operation of the flowmeter.

- Choose a place where the fluid flow pulse is small, that is, away from the water pump and local resistance parts (valves, doors, bends, etc.).
- Try to avoid installation in the place with negative pressure in the pipe.
- In order to facilitate the installation and maintenance of the flowmeter, the expansion joint should be installed on the process pipeline as much as possible.

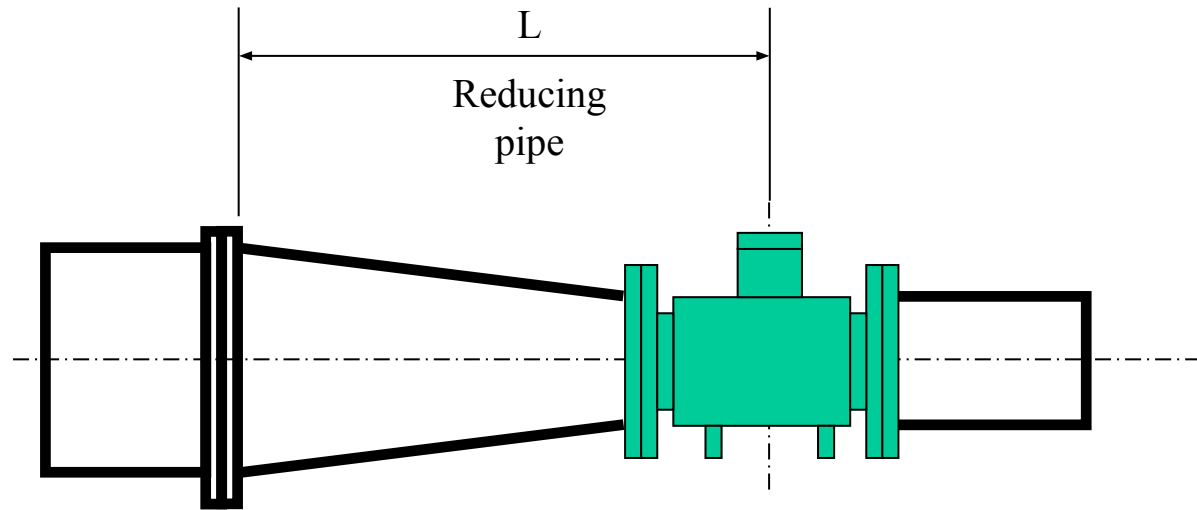
Especially large-diameter pipelines.

- Stay away from strong magnetic fields, such as large transformers, large motors, frequency conversion equipment and high-voltage lines.

And other places.

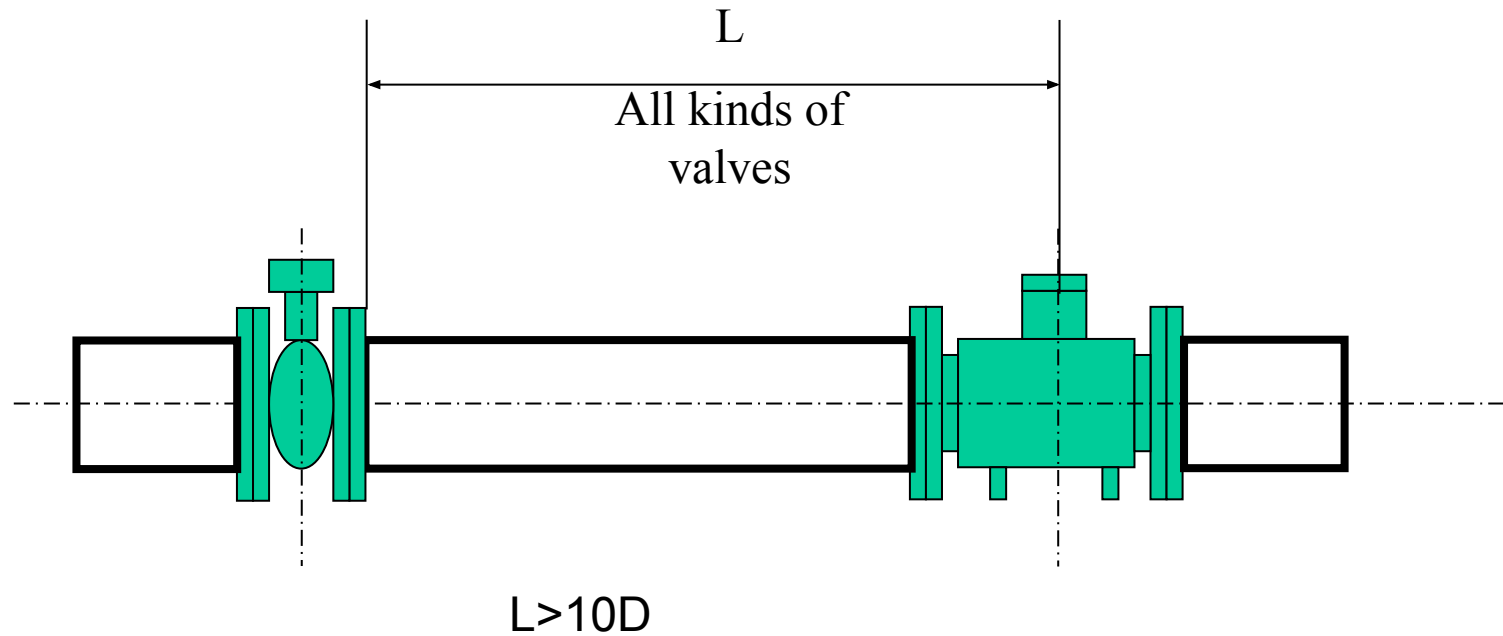
- Ensure that there are enough measuring straight pipe sections upstream and downstream of the flowmeter.
- Grounding the flowmeter.

Installation and use requirements of electromagnetic flowmeter - straight pipe section

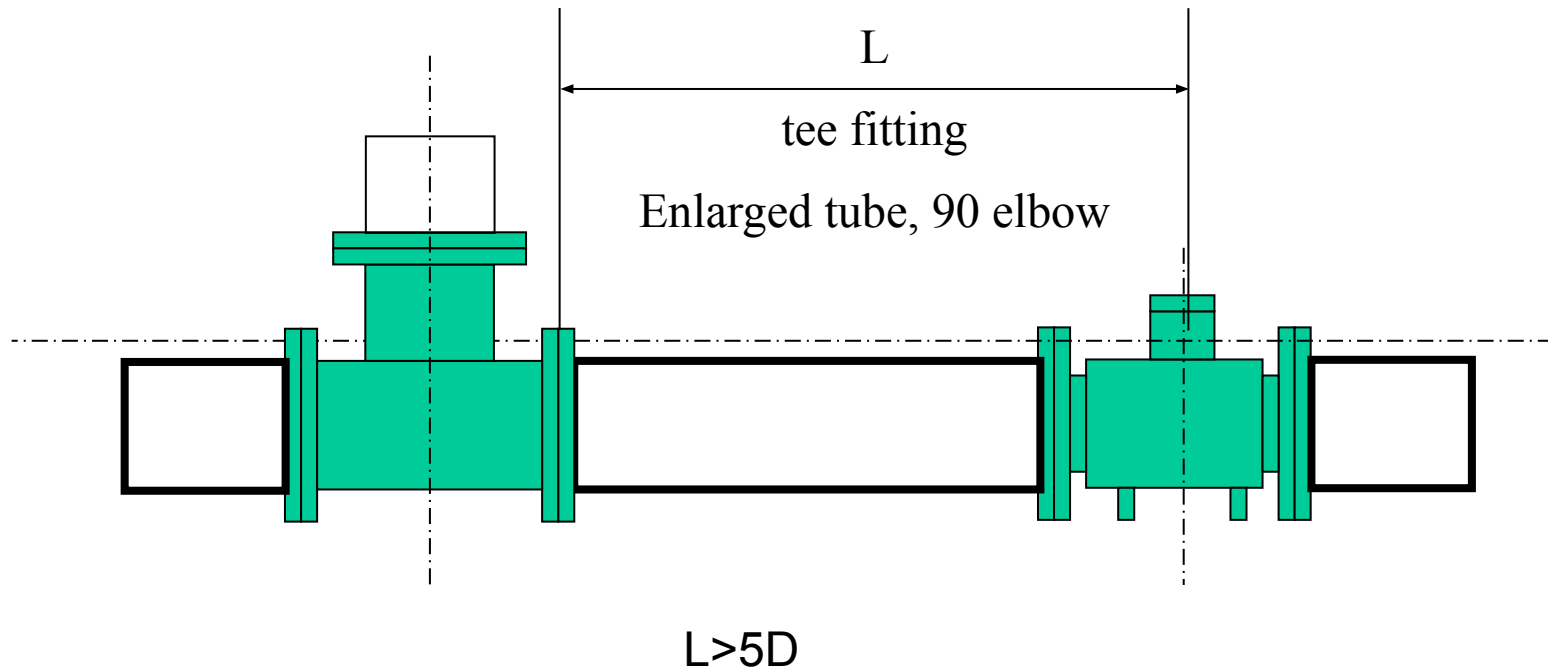


$L=0D$ can be regarded as a straight pipe section.

Installation and use requirements of electromagnetic flowmeter - straight pipe section

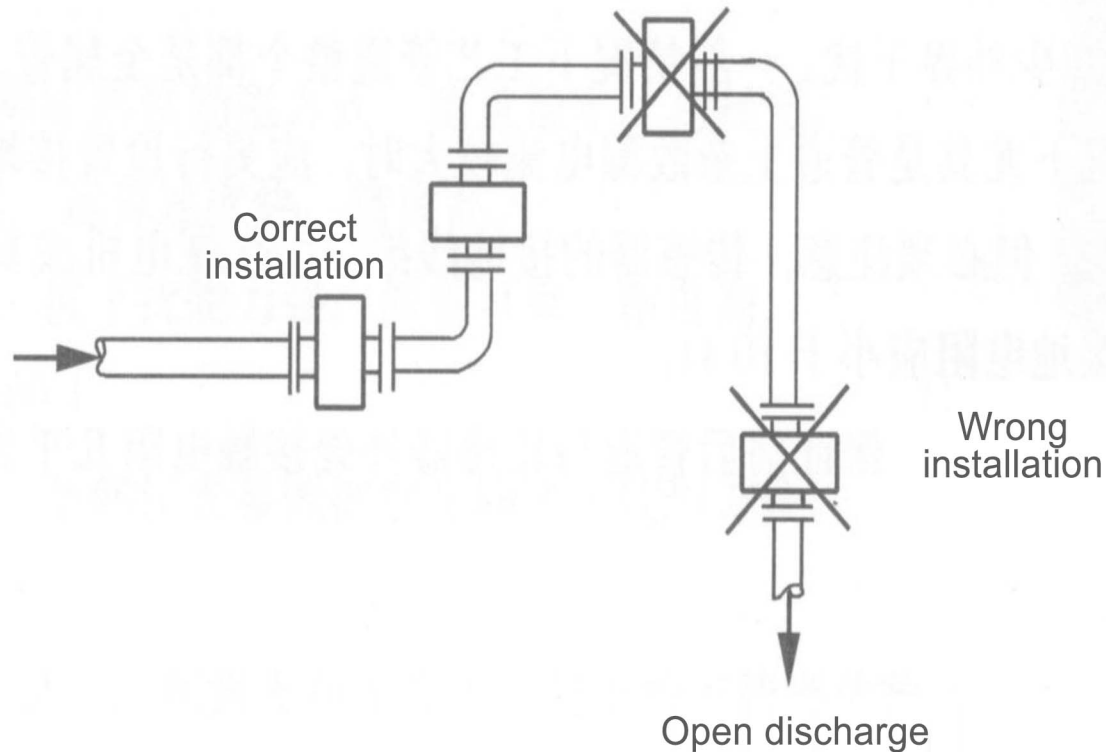


Installation and use requirements of electromagnetic flowmeter - straight pipe section



Electromagnetic flowmeter installation requirements - installation location

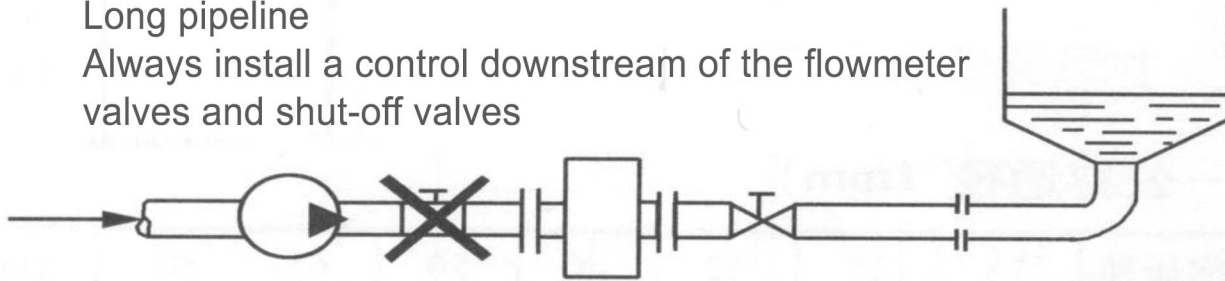
Installed in the pipeline towards the highest point
(easy to collect air bubbles in the measuring tube -
wrong installation)



Electromagnetic flowmeter installation requirements - installation location

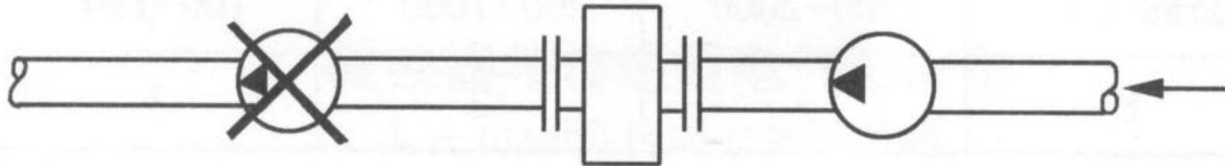
Long pipeline

Always install a control downstream of the flowmeter valves and shut-off valves

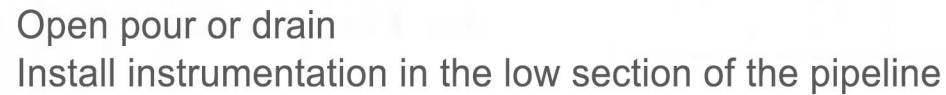
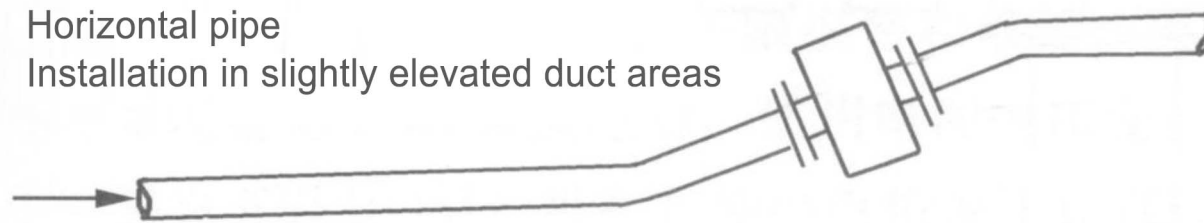


Pump

Never install a flow meter on the suction side of the pump (to prevent vacuum)

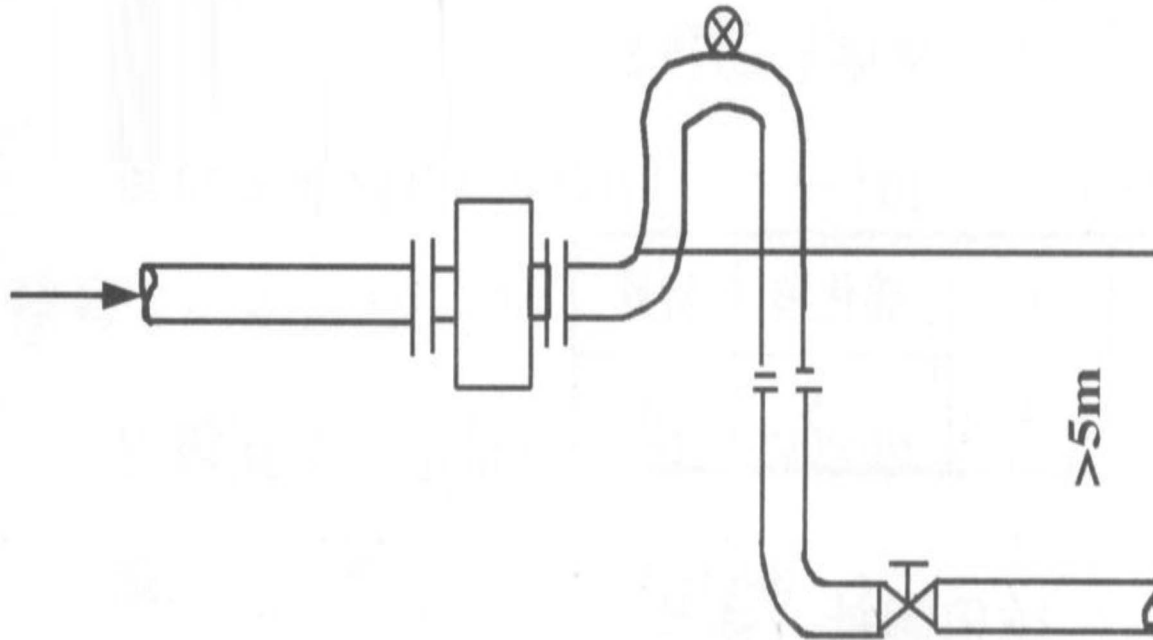


Electromagnetic flowmeter installation requirements - installation location



Electromagnetic flowmeter installation requirements - installation location

drop pipe
over 5m (16ft) long,
At the highest position downstream of the flowmeter
Install automatic exhaust valve (to prevent vacuum)



Installation requirements of electromagnetic flowmeter - grounding points

- The grounding terminal of the sensor and converter and the shielding layer of the flow signal line must be the same as that of the

The measuring media are connected.

- In order to reduce external interference, the earth is at zero potential. Generally, an additional grounding device should be provided.

The grounding wire shall be multi-strand copper wire greater than 4mm². The grounding resistance is preferably less than 10 ω . receive

The ground wire cannot be connected with the safety ground wire of other electrical equipment.

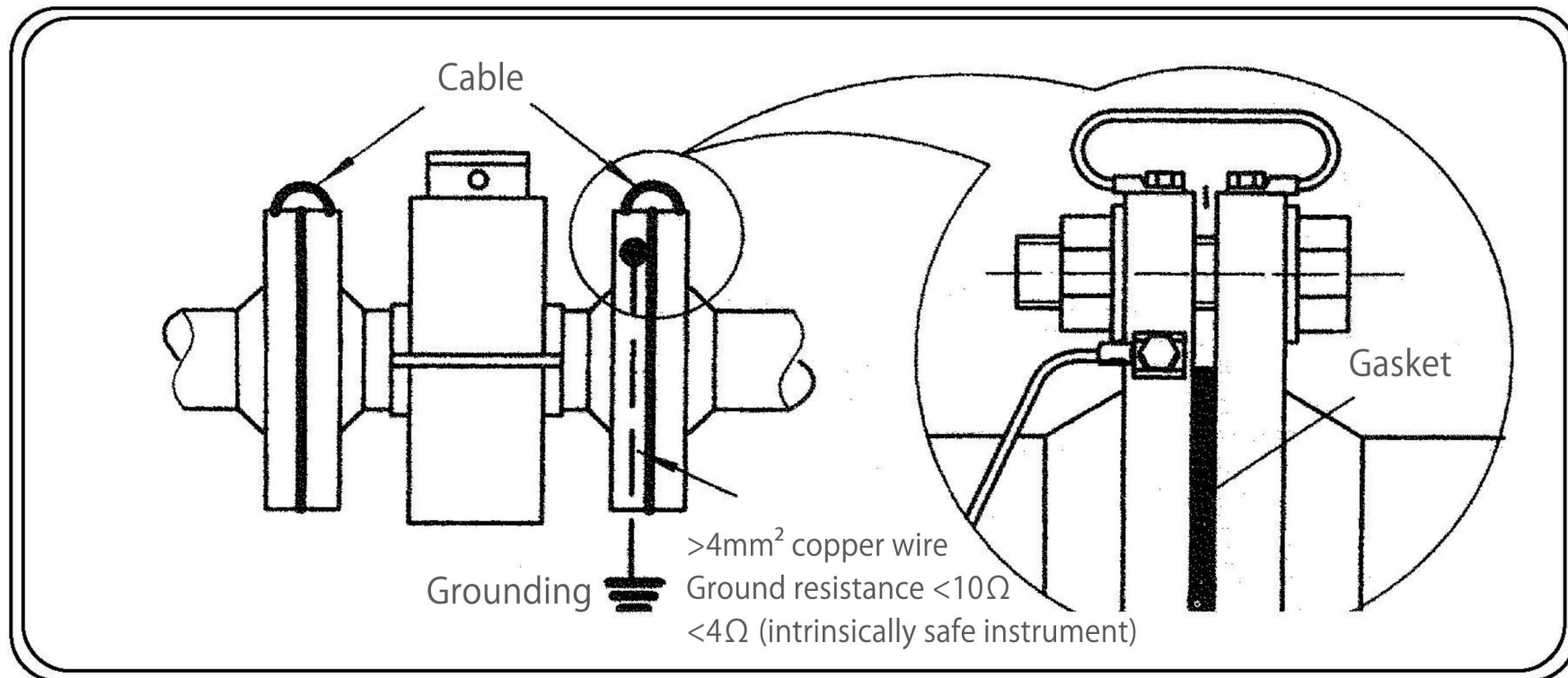
- When the process pipeline is metal pipeline, ensure that the front and rear pipelines are connected with the sensor housing.

The contact resistance is almost zero.

- If the process pipeline is nonmetallic, grounding rings must be installed before and after the flowmeter.

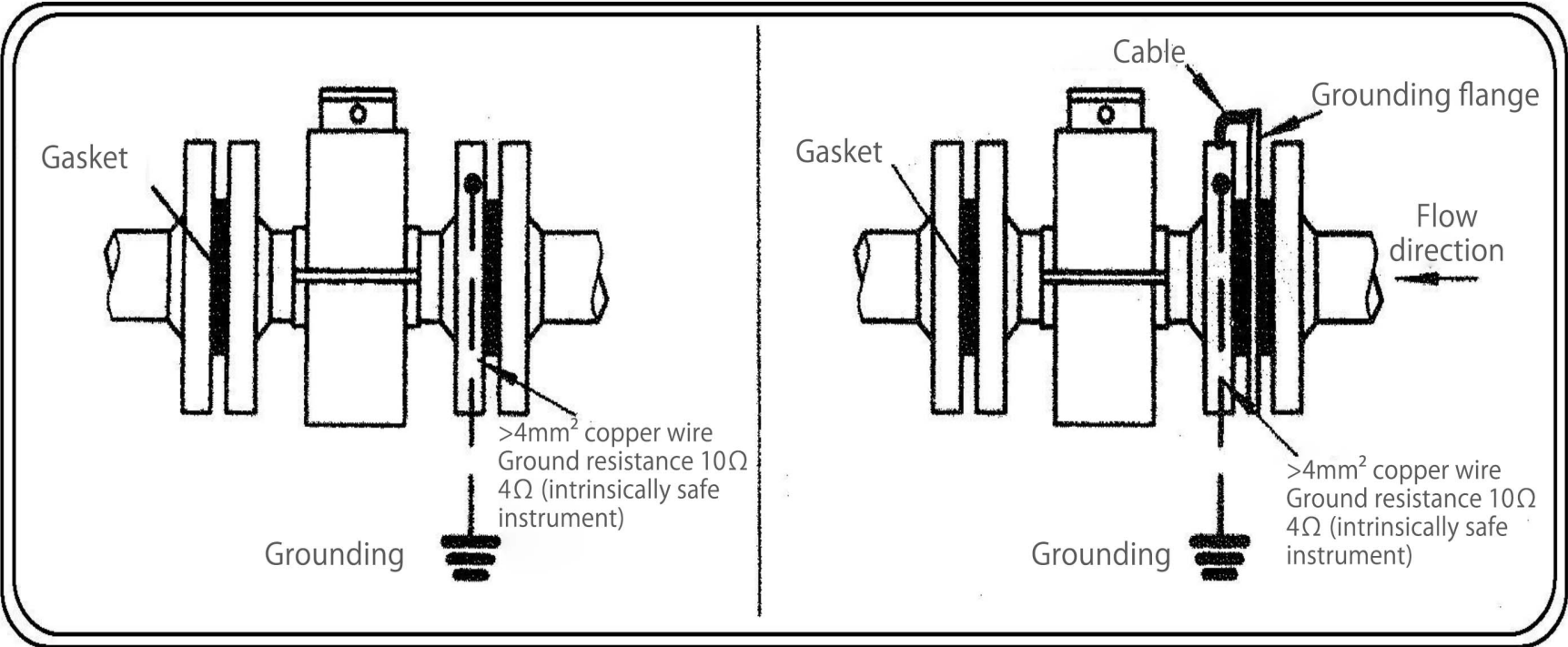
Or a ground electrode.

Installation requirements of electromagnetic flowmeter - grounding points



Metal pipe

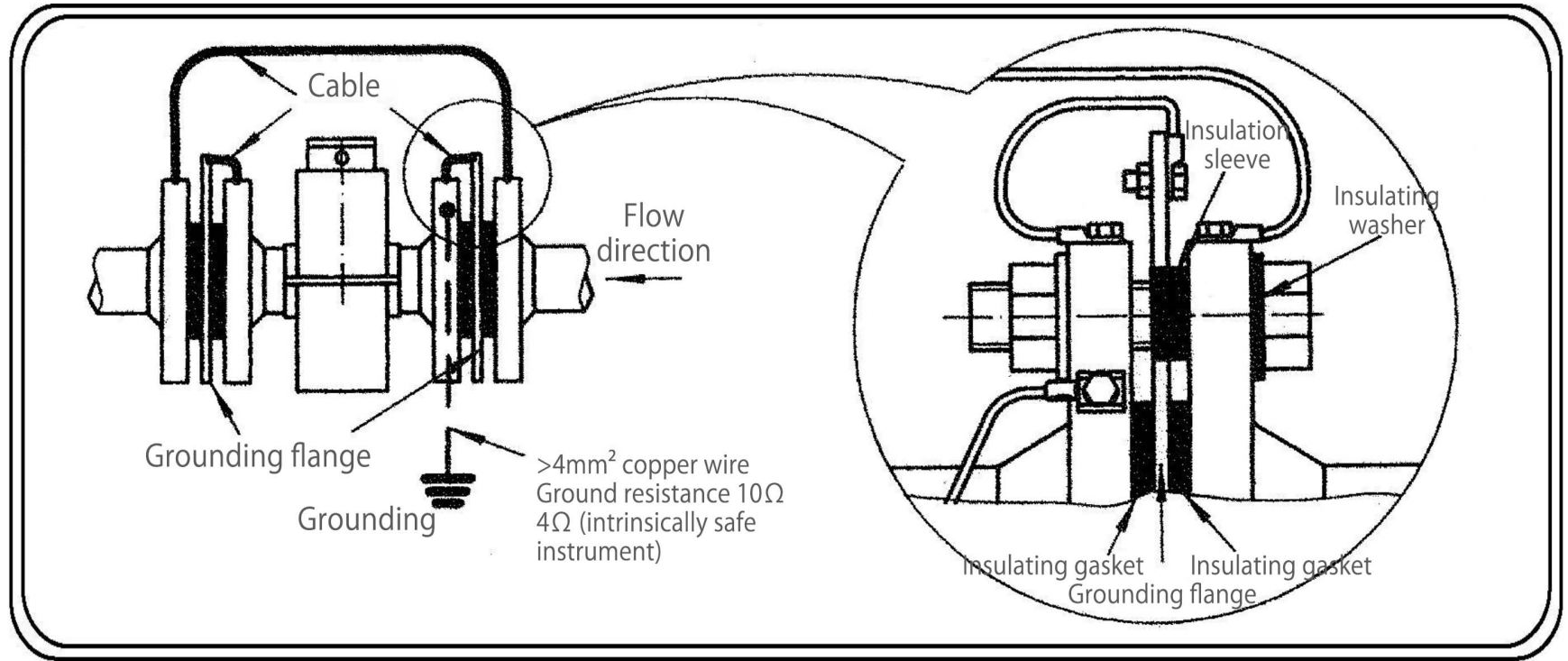
Installation requirements of electromagnetic flowmeter - grounding points



Non-metallic pipeline, sensor is equipped with grounding electrode.

Non-metallic pipeline, sensor without grounding electrode

Installation requirements of electromagnetic flowmeter - grounding points



Pipeline with cathodic protection

Thank you for your participation.

EM-Flow Environmental Technology Co., Ltd.

29/F, No.68, Section 5, Zhongxiao East Road,
Taipei City, Taiwan 11065 R.O.C

Tel: +886-961-612-974

E-mail: sales@emfow.tw

Website: <https://emflow.tw>

