

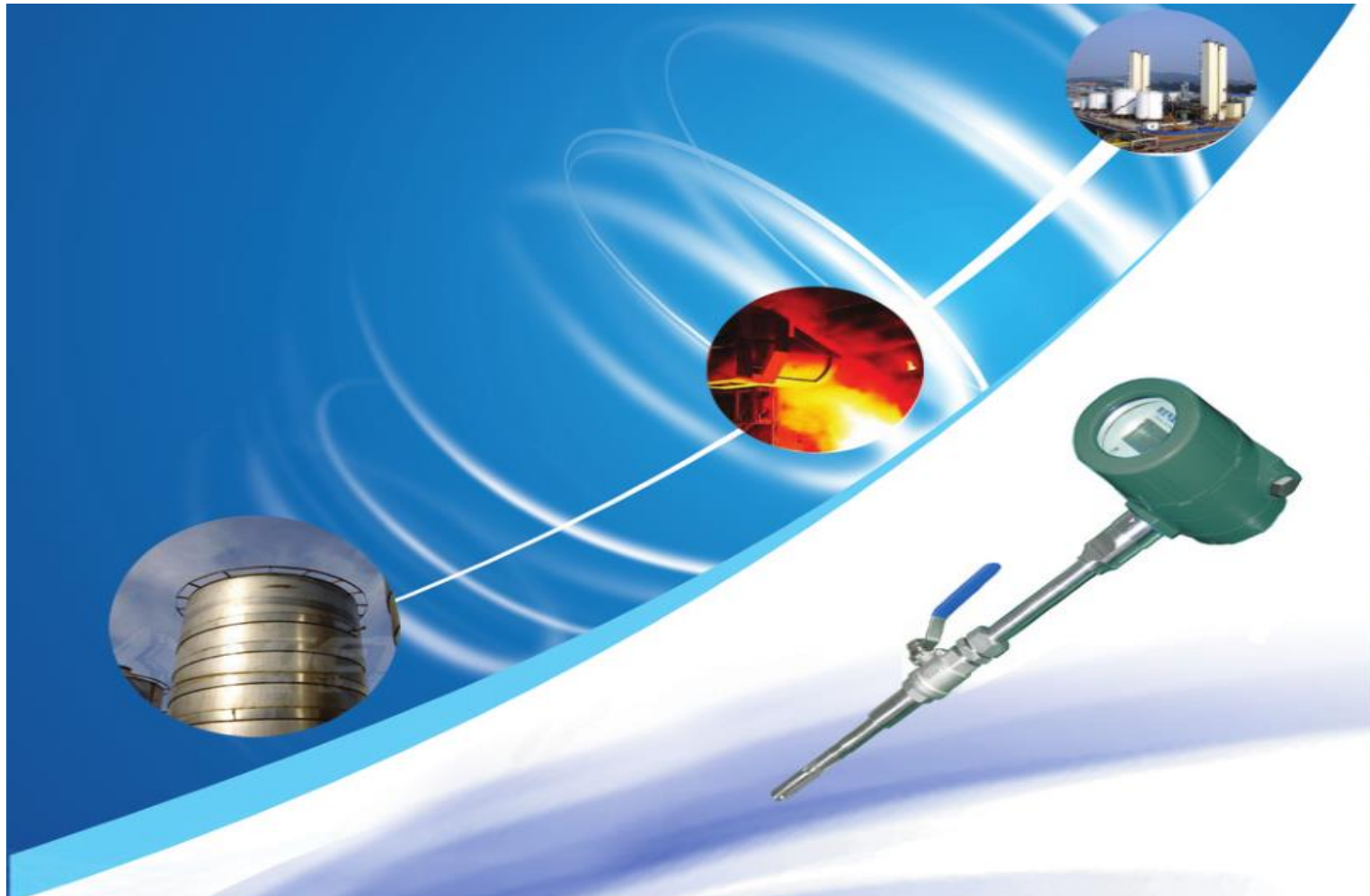


ECR - Equipamentos de Medição e Controle

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Catalogue Thermal Gas Mass Flowmeter



Introduction

- Thermal gas mass flow meter is designed on the basis of thermal dispersion, and adopts method of constant differential temperature to measuring gas flow. It has advantages of small size, easy installation, high reliability and high accuracy, etc.
- The meter contains two platinum resistance temperature sensors. The thermal principle operates by monitoring the cooling effect of a gas stream as it passes over a heated sensor.
- Gas flowing through the sensing section passes over two sensors one of which is used conventionally as a temperature sensor, whilst the other is used as a heater.
- The temperature sensor monitors the actual process values whilst the heater is maintained at a constant differential temperature above this by varying the power consumed by the sensor.
- The greater the gas velocity, the greater the cooling effect and power required to maintain the differential temperature. The measured heater power is a measure of the gas mass flow rate.

Features

- Measuring the mass flow or volume flow of gas
- Do not need to do temperature and pressure compensation in principle with accurate measurement and easy operation.
- Wide range: 0.5Nm/s ~ 100Nm/s for gas. The meter also can be used for gas leak detection
- Good vibration resistance and long service life. No moving parts and pressure sensor in transducer, no vibration influence on the measurement accuracy.
- Easy installation and maintenance. If the conditions on site are permissible, the meter can achieve a hot-tapped installation and maintenance. (Special order of custom-made)
- Digital design, high accuracy and stability
- Configuring with RS485 or HART interface to realize factory automation and integration



Technical Parameters

| Description | Specification |
|-------------------------|--|
| Medium | Gas(Except acetylene) |
| Pipe size | DN10-4000mm |
| Velocity | 0.1-100N/ms |
| Accuracy | $\pm 1\sim 2.5\%$ |
| Working temperature | Sensor: $-40\sim +220^{\circ}\text{C}$ Transmitter: $-20 \sim +45^{\circ}\text{C}$ |
| Working pressure | Medium pressure $\leq 1.6\text{MPa}$ |
| Power supply | Compact type: 24VDC or 220VAC, Power consumption $\leq 18\text{W}$ Remote type: 220VAC, Power consumption $\leq 19\text{W}$ |
| Response time | 1S |
| Output | 4-20mA (optoelectronic isolation, maximum load 500Ω), Pulse, RS485 (optoelectronic isolation) and HART |
| Alarm output | 1-2 line Relay, Normally Open state, 10A/220V/AC or 5A/30V/DC |
| Display | 4 lines LCD Mass flow, Volume flow in standard condition, Flow totalizer, Date and Time, Working time, and Velocity, etc. |
| Pipe material | Carbon steel, stainless steel, plastic, etc |
| Sensor type | Standard Insertion, Hot-tapped Insertion and Flanged |
| Sensor Housing material | SS304 or SS 316 |
| Protection class | IP65 |

Insertion type



Streamline type thermal gas mass flow meter
Application: DN80<Pipe Dia.<DN500



Flange clamp type gas mass flow meter



Streamline remote type display gas mass flow meter



Flange insert type gas mass flow meter



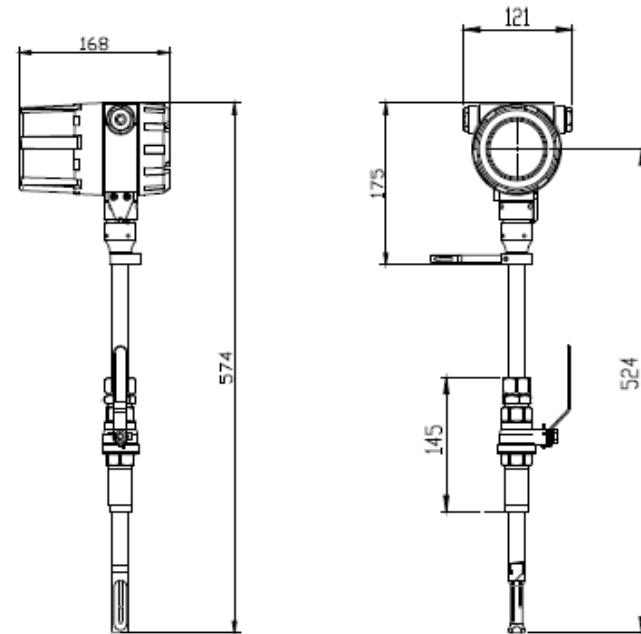
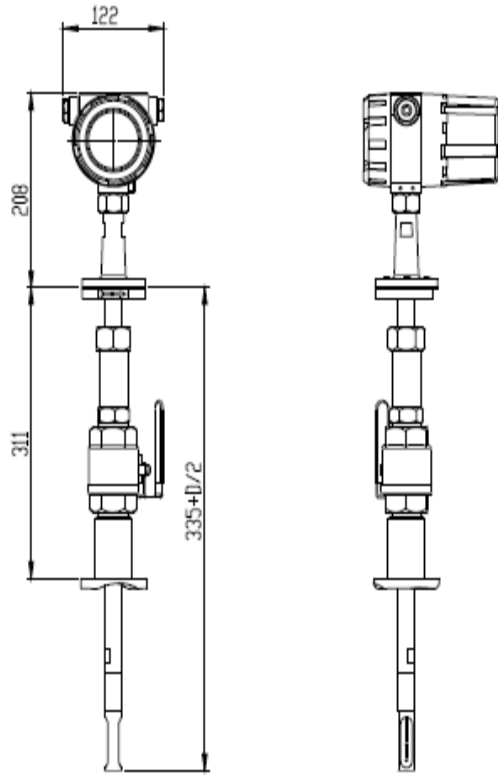
Standard thermal gas mass flow meter
Application: DN80<Pipe Dia.<DN4000



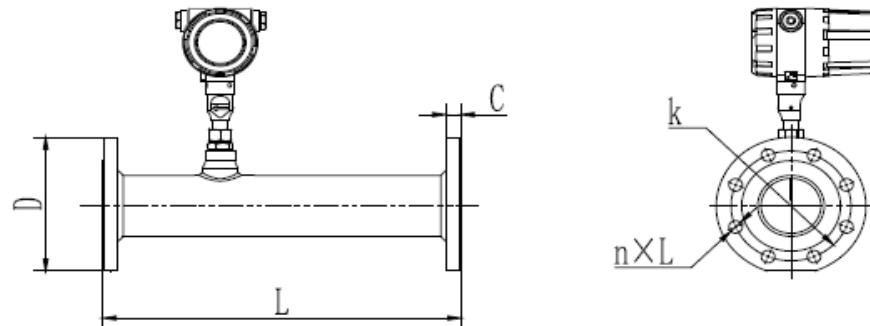
Dimensions

Dimensions of standard insertion sensor

Dimensions of hot-tapped insertion sensor



The dimensions of flanged sensor



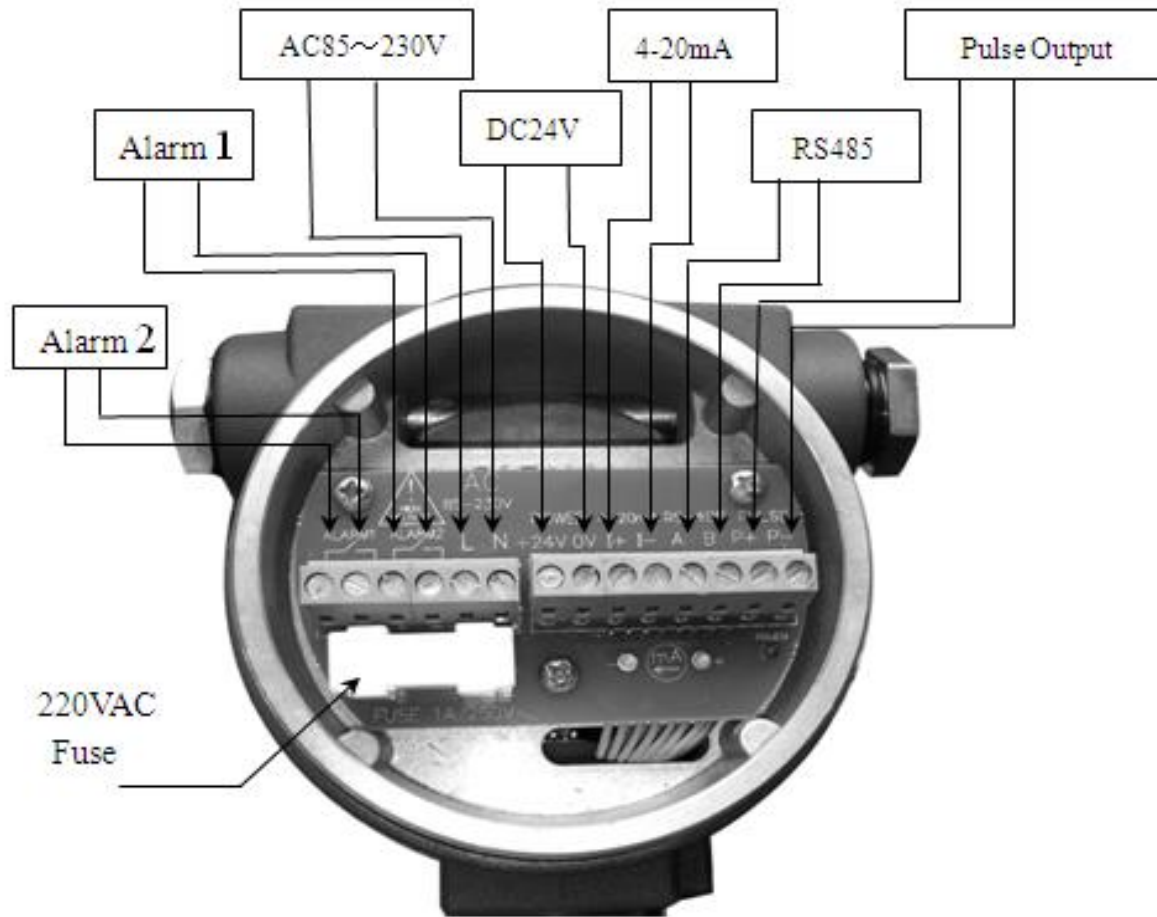
PN1.6Mpa Plane and surface plate flat welding steel pipe flanges (Unit: mm)

| Nominal Dia. | Flange Outer Diam | Center Hole | Screw Hole | Screw Thread | Sealing Face | | Flange Thickness | Pipeline Length |
|--------------|-------------------|-------------|------------|--------------|--------------|---|------------------|-----------------|
| | | | | | d | f | | |
| DN | D | K | NxL | | d | f | C | L |
| 15 | 95 | 65 | 4x14 | M12 | 46 | 2 | 14 | 280 |
| 20 | 105 | 75 | 4x14 | M12 | 56 | 2 | 16 | 280 |
| 25 | 115 | 85 | 4x14 | M12 | 65 | 2 | 16 | 280 |
| 32 | 140 | 100 | 4x18 | M16 | 76 | 2 | 18 | 350 |
| 40 | 150 | 110 | 4x18 | M16 | 84 | 2 | 18 | 350 |
| 50 | 165 | 125 | 4x18 | M16 | 99 | 2 | 20 | 350 |
| 65 | 185 | 145 | 4x18 | M16 | 118 | 2 | 20 | 400 |
| 80 | 200 | 160 | 8x18 | M16 | 132 | 2 | 20 | 400 |
| 100 | 220 | 180 | 8x18 | M16 | 156 | 2 | 22 | 500 |

For DN15-DN80, the meter can be made with threading to connect.

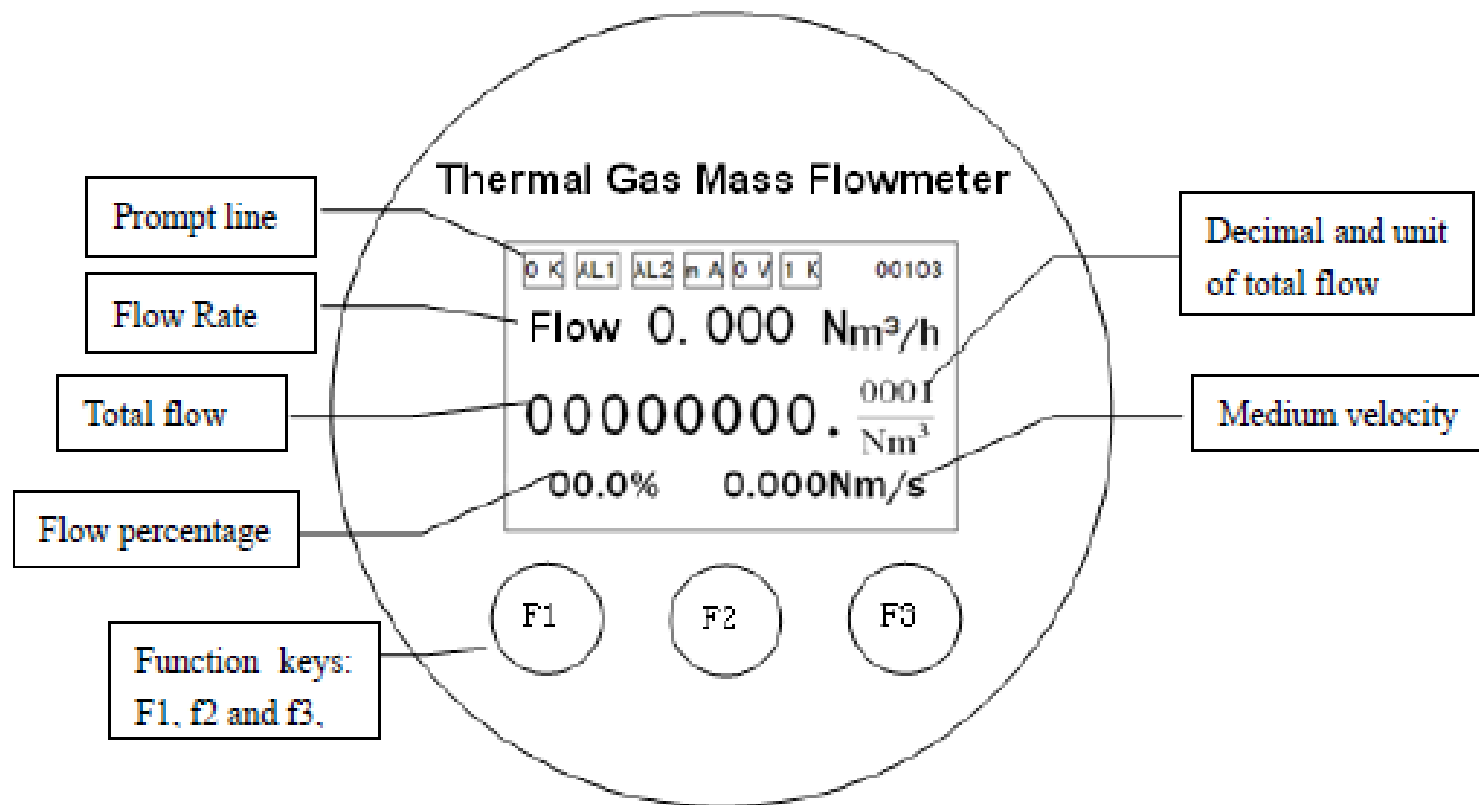
The above table is used for rated pressure of 1.6MPa. If the rated pressure is more than 1.6MPa, please contact us for special order.

Instruction of Transmitter Wirings

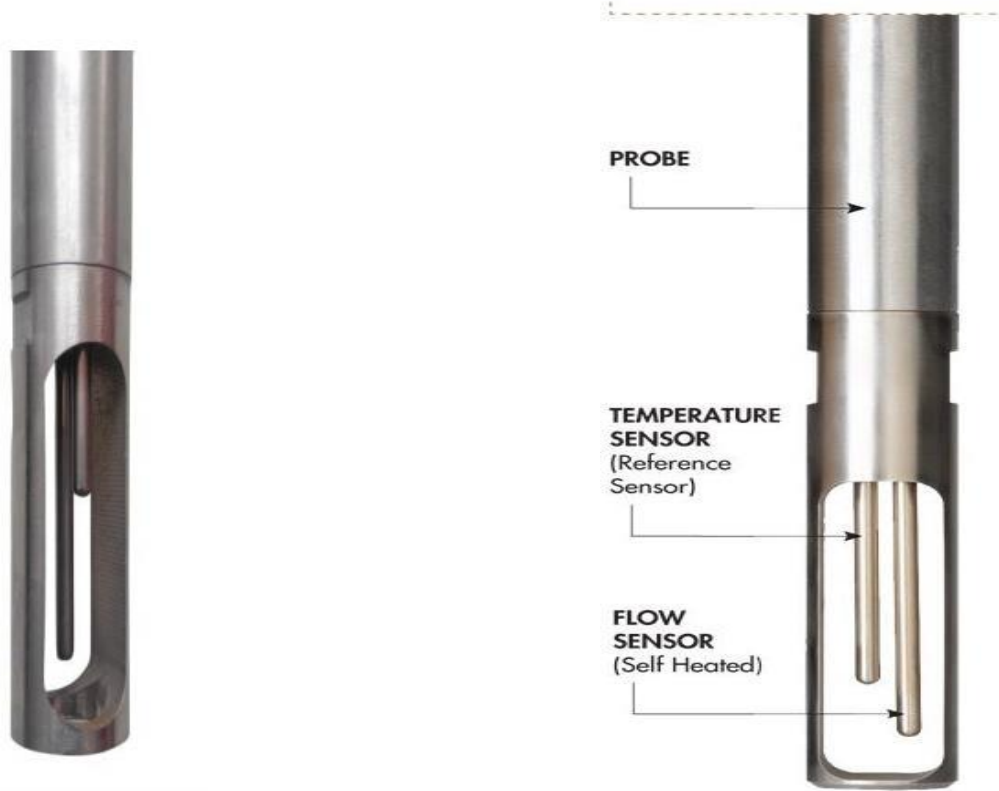


Display

The display of meter in working status is shown as below.



Insertion type Structure



- ✎ Integral insertion should be inserted into the the axis pipe,so the length of measurement bar is decided by the pipe size.When placing order,if the gas mass flow meter can't reach the pipe axis,factory will supply the calibration coefficient so that to finish the accuracy measurement



Upper Range Value of Common Gas

(Unit: Nm³/h. The follow table can be extended)

| Nominal Dia.(mm) | Air | Nitrogen (N ₂) | Oxygen (O ₂) | Hydrogen(H ₂) |
|------------------|--------|----------------------------|--------------------------|---------------------------|
| 15 | 65 | 65 | 32 | 10 |
| 25 | 175 | 175 | 89 | 28 |
| 32 | 290 | 290 | 144 | 45 |
| 40 | 450 | 450 | 226 | 70 |
| 50 | 700 | 700 | 352 | 110 |
| 65 | 1200 | 1200 | 600 | 185 |
| 80 | 1800 | 1800 | 900 | 280 |
| 100 | 2800 | 2800 | 1420 | 470 |
| 125 | 4400 | 4400 | 2210 | 700 |
| 150 | 6300 | 63000 | 3200 | 940 |
| 200 | 10000 | 10000 | 5650 | 1880 |
| 250 | 17000 | 17000 | 8830 | 2820 |
| 300 | 25000 | 25000 | 12720 | 4060 |
| 400 | 45000 | 45000 | 22608 | 7200 |
| 500 | 70000 | 70000 | 35325 | 11280 |
| 600 | 100000 | 100000 | 50638 | 16300 |
| 700 | 135000 | 135000 | 69240 | 22100 |
| 800 | 180000 | 180000 | 90432 | 29000 |
| 900 | 220000 | 220000 | 114500 | 77807 |
| 1000 | 280000 | 280000 | 141300 | 81120 |
| 1200 | 400000 | 400000 | 203480 | 91972 |
| 1500 | 600000 | 600000 | 31800 | 10152 |
| 2000 | 700000 | 700000 | 565200 | 18048 |

The flow rate in standard condition:
The flow rate is in the condition of 20°C temperature
and 101.325kPa pressure



Model selection

| Model | | | | | | | | | | | | |
|----------------|---|--|--|--|--|---|----|--|--|---|------------------------------|-----------------------------|
| TMF | | | | | | | | | | | | Instruction |
| Sensor type | C | | | | | | | | | | | Thermal gas mass flow meter |
| | D | | | | | | | | | | | Streamline insertion type |
| | E | | | | | | | | | | | Line insertion type |
| | F | | | | | | | | | | | Flange type |
| | G | | | | | | | | | | | Clamp type |
| Caliber(mm) | Tube Inner Dia.:10-6000mm | | | | | | | | | | Direct Input Dia. | |
| | Square tube need supply side length:25*25-2000*2000 | | | | | | | | | | *Special pipe need be marked | |
| Material | | | | | | A | | | | | | 1Cr18Ni9Ti |
| | | | | | | B | | | | | | 0Cr18Ni9 |
| | | | | | | C | | | | | | 0Cr17Ni12Mo2 |
| | | | | | | D | | | | | | Anti-corrosion coating |
| | | | | | | E | | | | | | Other material |
| Pressure(MPa) | | | | | | S | | | | | | 1.6 |
| | | | | | | M | | | | | | 2.5 |
| | | | | | | T | | | | | | 4 |
| Temperature(C) | | | | | | | I | | | | | -40~200C |
| | | | | | | | II | | | | | -40~450C |
| Output | | | | | | | | | | 1 | | RS-485 |
| | | | | | | | | | | 2 | | 4-2mA |
| | | | | | | | | | | 3 | | PULSE |
| | | | | | | | | | | 4 | | Relay normally open contact |
| | | | | | | | | | | 5 | | HART |
| Power supply | | | | | | | | | | | DC | 24VDC |
| | | | | | | | | | | | AC | 220VAC |
| Display | | | | | | | | | | | | J Status display |
| | | | | | | | | | | | | S Remote display |

Note: 1. Integral insertion should be inserted into the the axis pipe, so the length of measurement bar is decided by the pipe size.

When placing order, if the gas mass flow meter can't reach the pipe axis, we will supply the calibration coefficient so that to finish the accuracy measurement

Application



Industry:Electric power

Application:Measure air volume of the Primary air, and secondary air

Advantage:No moving parts.Don't clog pipes

High measurement range ratio,small pressure loss



Industry:Water treatment

Application:Measure the air flow in the aeration tank

Advantage:Measure the small flow ,Resistance soiling,dust-fast



Industry:Petrochemical industry,Natural gas

Application:Torch gas emissions,Flue gas,Fertilizer Plant ammonia gas measurement,Natural gas measurement

Advantage:High sensitivity measurement for small flow,High measurement range ratio,Easy to remove and clean



Industry:Glass,Ceramics and building materials industry

Application:Gas furnace inlet control ,Cement industry vertical mills discharge hot air flow control

Advantage:Directly mass flow measurement,high accuracy,actual component calibration





Industry:Food industry,Beverage industry,Pharmacy

Application:Carbon dioxide treatment in the brewery,Exhaust gas flow monitoring in the fermentation container,Food processing operations in the fresh air is added,bottle sterilization in the pharmaceutical industry flow monitoring of hot air

Advantage:High sensitivity measurement for small flow,directly mass measurement,high accuracy



Industry:Air separation unit

Application:Measure the gas of different pipes and confirm the distribution of the gas inside

Advantage:Directly measure mass

High measurement range ratio,small pressure loss



Industry:Machine manufacturing,Electronic

Application:All kinds of gas flow measurement in the fuel cell factory,Various kinds of pure gas measurement in the laboratory

Advantage:Without temperature and pressure compensation,high sensitivity for small flow,Mass flow measurement,high measurement range ratio and small pressure loss



Industry:Metallurgical

Application:Blast furnace gas,Coke oven gas,Steel aerated,Rolling gas, Hydrogen Oxygen ,Nitrogen

Advantage:Easy installation,Easy cleaning,High measurement range ratio,small pressure loss,high accuracy.

