

## INTRODUCTION

### Product Introduction and Principle

Gas mass flow controllers (MFC) and mass flow meters (MFM) are used to control and measure the mass flow of gases precisely. The measurement and control of gas mass flow are not affected by temperature or pressure, and automatic mass flow control can be achieved.

Gas mass flow controllers (MFC) and mass flow meters (MFM) have important applications in scientific research and production in various fields such as semiconductor and integrated circuit technology, special materials disciplines, chemical industry, petroleum industry, medicine, environmental protection, and vacuum. Its typical applications include coating equipment, microelectronic process equipment, such as diffusion furnaces, oxidation furnaces, epitaxial furnaces, CVD, plasma etching machines, sputtering tables, ion implanters, etc.; optical fiber melting, micro-reactors, gas mixing Gas distribution systems, biological fermentation systems, petrochemical equipment, gas chromatographs, and other analytical instruments.

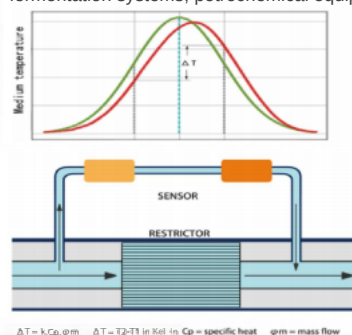


Figure 1 Sensor schematic diagram

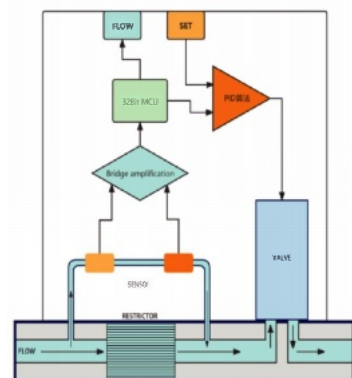


Figure 2 MFC structural diagram

### Thermal gas mass flow meter principle

The core sensor of the thermal mass flow meter (MFM) is the capillary thermal temperature difference principle, composed of a stainless steel capillary tube with a thermal sensor and a heating element. A part of the gas flows through the bypass sensor and is heated by the heating element. The gas flow causes an asymmetric temperature distribution so that the temperature difference between the thermal elements can be measured. This temperature difference is proportional to the mass flow rate through the sensor. The main flow channel is perfectly diverted by the laminar flow element so that the output of the sensor is linearly related to the total mass flow rate.

### Thermal gas mass flow controller principle

The thermal mass flow controller (MFC) amplifies the output signal of the sensor compares it with the user-set signal, and uses the PID algorithm to control the opening of the solenoid valve, adjust the flow rate, and achieve closed-loop control of the mass flow rate.

## FAC-Series



### INTRODUCTION

The FAC series uses a capillary thermal temperature difference sensor. The measurement accuracy is not affected by temperature and pressure. The base body is made of 316L stainless steel, which is suitable for toxic and corrosive gases. The maximum working pressure can reach 750 Psi. Analog measurement control circuit, output signal 0~5V/4~20mA, electrical interface part adopts surge suppression and overvoltage and overcurrent protection circuit to ensure stable and reliable operation of the system. The FAC series has passed CE and Rohs certification and is the best solution for low-cost applications.

### APPLICATION AREA

Food processing, atmosphere furnace, pharmaceutical manufacturing, bioengineering, surface treatment, vacuum coating equipment, and other fields.

### CHARACTERISTIC

- ◆ Precise measurement and control
- ◆ Fast response, high repeatability
- ◆ Unaffected by temperature and pressure
- ◆ Analog communication 0~5V/4~20mA
- ◆ Can be used in corrosive gases
- ◆ low cost application

## SPECIFICATIONS

### Control range and working pressure

| Model     | Maximum full scale (N2 standard) | Minimum full scale (N2 standard) | Maximum working pressure |
|-----------|----------------------------------|----------------------------------|--------------------------|
| FAC-320/1 | 30 SLM                           | 10 SCCM                          | 750 Psi/50 Bar           |

Note: SCCM (standard milliliters per minute) SLM (standard milliliters per minute) standard conditions (0°C, 101.3Kpa)

## Performance

|                         |                                                                 |
|-------------------------|-----------------------------------------------------------------|
| Flow Accuracy           | ±%1 F.S;                                                        |
| Repeatability           | ±0.2% F.S                                                       |
| Control Range           | 2%~100% F.S                                                     |
| Response Time           | <2s                                                             |
| Temperature Coefficient | Zero: <0.05% of F.S/°C. Span: <0.1% of S.P / °C                 |
| Pressure Coefficient    | 0.2% of S.P/ Bar                                                |
| Operating Temperature   | 0~50 °C                                                         |
| Leak Rate               | 1x10 <sup>-5</sup> atm. cc/sec He                               |
| Preheat Time            | 5 min accuracy to ±2% F.S (30 min to achieve the best accuracy) |

## Electrical parameters

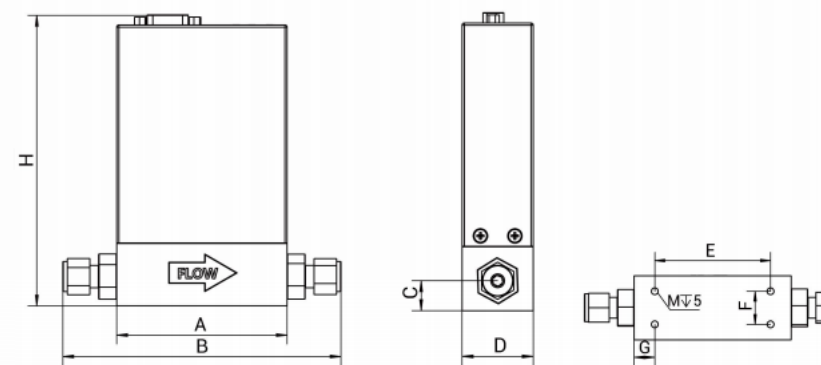
|                           |                          |
|---------------------------|--------------------------|
| Power Supply              | +15~24 V dc              |
| Maximum Power Consumption | 10W (MFC) ;3W (MFM)      |
| Digital Communication     | 0~5 V / 4~20mA           |
| Analog Communication      | 9-pin D-connector (male) |

## Mechanical parameters

|                    |                                                             |
|--------------------|-------------------------------------------------------------|
| Valve Type         | Normally closed (MFM meaningless)                           |
| Substrate Material | 316L stainless steel                                        |
| Sealing Material   | Fluorine rubber, EPDM rubber, nitrile rubber                |
| Fittings           | 1/8、1/4、3/8、 $\phi$ 3、 $\phi$ 6、 $\phi$ 9card sleeve or VCR |

SIZE(mm)&WEIGHT (kg)

| Model     | A  | B   | C  | D  | H   | E  | F  | G  | M  | Weight |
|-----------|----|-----|----|----|-----|----|----|----|----|--------|
| FAC-320/1 | 76 | 124 | 13 | 31 | 125 | 56 | 17 | 10 | M4 | 0.6    |



## Selection table

## SIZE&WEIGHT

