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Note: All pictures inside the manual are for reference only, please refer to the actual product.

1. Product Introduction

1.1 Purpose and characteristics

FC10FD Mass flow Controller / Flow Meter (Abbreviated as MFC&MFM) are used for precision measurement and control of the mass flow of gases. They play an important role in research and production in the semiconductor and integrated circuit industries, specialty materials disciplines, The chemical industry, the petroleum industry, pharmaceuticals, environmental protection and vacuum in a variety of fields. typical applications include: electronic process equipment, such as diffusion, epitaxy, CVD, oxidation, plasma etching, sputtering, ion implantation; as well as coating equipment, fiber optic melting, micro-reaction devices, gas mixing and distribution systems, capillary measurements, gas chromatographs and other analytical instruments.

- ◆ Thermal principal, fast response, high accuracy
- ◆ Tubular diversion, not easily blocked
- ◆ Suitable for various low-pressure and high-pressure pipelines
- ◆ Small zero drift and high reliability, preheat time is short
- ◆ Analog input/output can be controlled and displayed using secondary meters or flow computers

FC10FD adopts the principal of calorimetry of temperature difference before and after capillary heat transfer to measure the mass flow rate of gas, which is not affected by temperature and pressure. The flow signal measured by the sensor is amplified and then compared with the set voltage, and the difference value obtained is used to drive the control valve to control the flow rate through the channel in a closed-loop so that it is equal to the set flow rate.

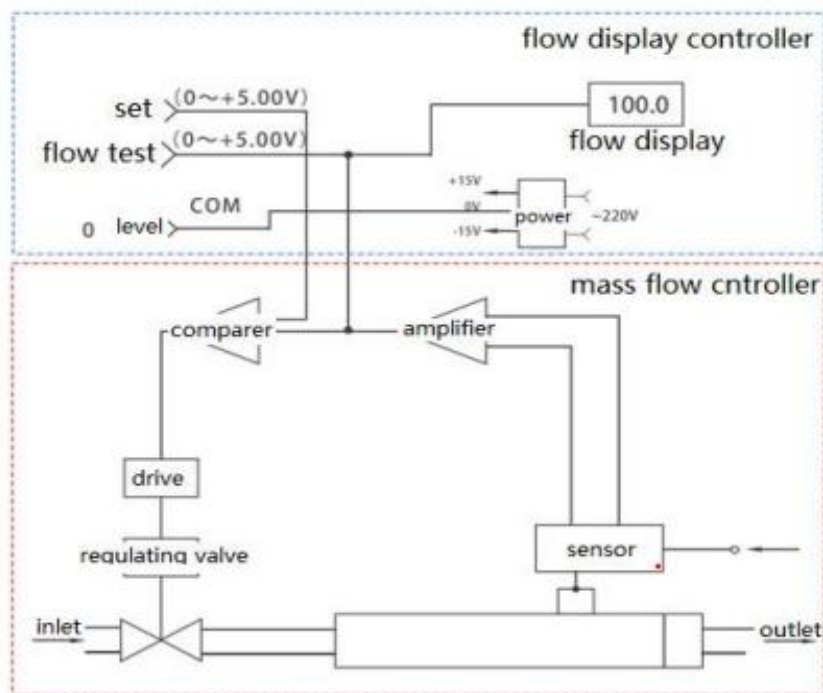


1.1 Specifications

1	Range	(0-5, 10, 20, 30, 50, 100, 200, 300, 500...) SCCM (0~1, 2, 3, 5, 10, 50...200...3000) SLM
2	Accuracy	±1.0%F. S
3	Linearity	±0.5~1.5%F. S
4	Repeatability	±0.2%F. S
5	Operating pressure differential	0.1~0.5MPa
6	Pressurization	3MPa
7	Ambient Temperature	General temperature
8	Digital output	RS485 / RS232 MODBUS protocol
9	Analog output	0~5V, 1~5V, 4~20mA Optional
10	Power supply	DC±15V/24V Optional, MFA<400mA, MFC<600mA
11	Electrical connection	DB15
12	Leakage rate	1×10^{-9} Pa m ³ /S
13	Base material	Stainless steel
14	Sealing material	Viton, Nitrile Rubber, Perfluoroether, etc
15	Pipeline connector	Ferrules, Pagodas, Quick inserts, Flanges, etc

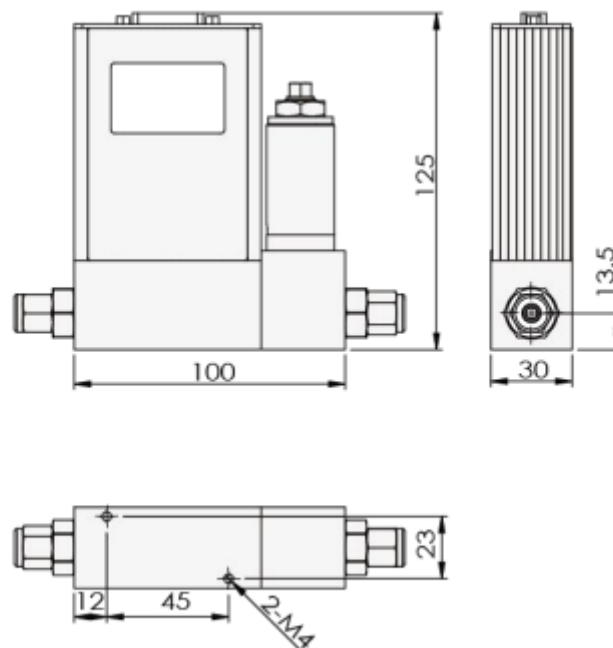
1.3 Working principal

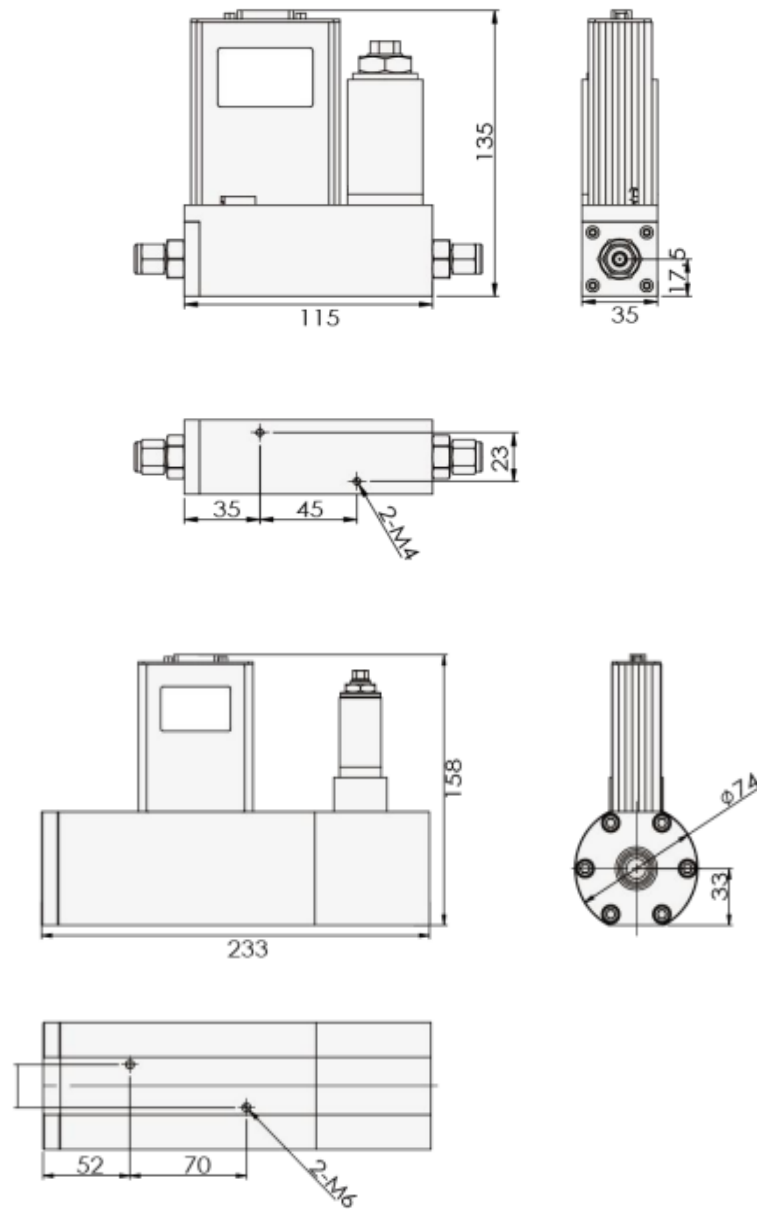
FC10FD the excellent accuracy, robustness, and reliability of the gas mass flow controller come from our company's unique sensor probe. The sealed probe consists of two sensing elements – a flow sensor and a temperature sensor, which can automatically correct the effects of temperature and pressure changes. The instrument circuit heats the flow sensor to a constant value higher than the gas temperature, and then measures the cooling effect of the gas flow rate. Calculate the flow rate by measuring the principle that the electrical power consumed to maintain a constant temperature difference is proportional to the mass flow rate of gas. Both sensors are standard grade platinum resistance temperature detectors (RTDs). The platinum RTD wire is wrapped around a sturdy 316L core shaft, which is firm and reliable, and the entire sensor is sealed inside an aluminum shell.



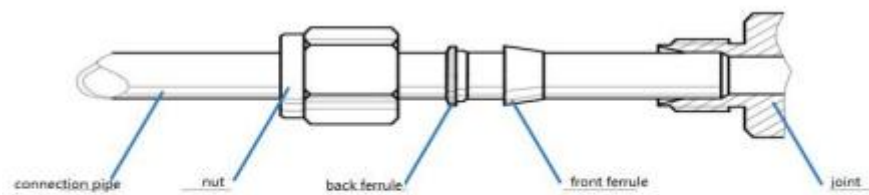
2 . Installation guidance

2.1 Appearance and installation dimensions (please refer to the final physical item)



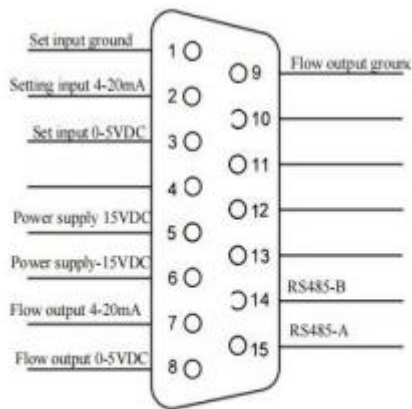


2.2 Pipeline joint form

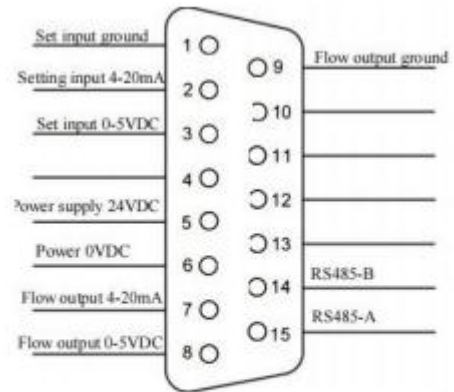


When installing the connecting pipe as shown in figure 7, After installing the front sleeve, rear sleeve, and nut, tighten the nut and joint by hand first, and then tighten with a wrench to ensure no air leakage. Attention should be paid to using a double wrench for operation. Use one wrench to hold the joint and use the other wrench to rotate the nut. Especially when disassembling the connecting pipe, it is necessary to use a double wrench operation, otherwise it will cause the joint to loosen and affect the sealing.

2.3 Cable connection plug



24VDC Power Supply Schematic Diagram



± 15VDC Power Supply Diagram

3. Detailed explanation of function operation

3.1 Summarize

The FC10FD flow controller uses a dot-matrix liquid crystal display with backlight, which intuitively and clearly displays various flow data, including instantaneous flow rate, cumulative flow and temperature, etc. the flow meter has different display screens, which depend on the model of the order, such as the flow meter or controller, current output or voltage output, etc. FC210FD mass flow controller/flow meter has a unified main display screen, gas selection screen (this screen may be invalid for specific gases), calibration screen, equipment information, etc.

In the main screen state, lightly press the [MENU] button at the lower right corner of the meter to switch the display screen to the menu screen.

3.2 Common operations

Description of the interface

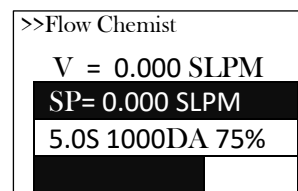
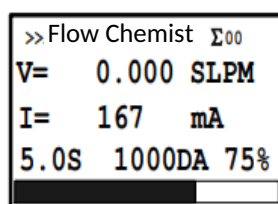


Fig.1 Main interface display status

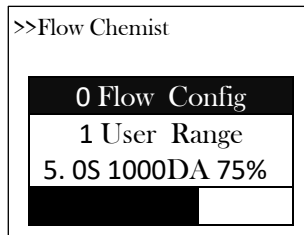


Fig.2 Valve control setting state

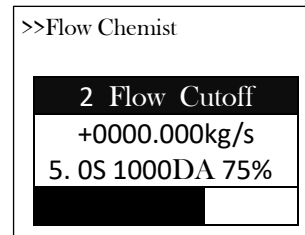


Figure.3 Menu display status

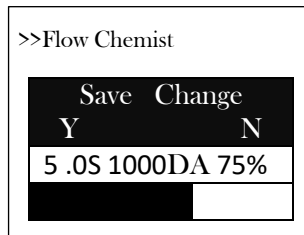


Fig.4 Parameter input dialog box

Storage Inquiry dialog box

The functions of the keys in different display scenarios are as follows:

Under "Main Interface Display Status":

Press [left] [Right] key to switch the current display parameters: I sensor signal, Ts analog input percentage, Q debugging parameters, M cumulative flow, etc.

Press [MENU/OK] to enter the menu display status.

Under the menu display status:

Press [right] to switch the menu items.

Press [left] to return to the first level menu.

Press [MENU/OK] to enter the next level menu or parameter input dialog box.

Under the parameter input dialog box":

Press [upper] key to set the number by 1;

Press the [lower] key to set the number by 1;

Press the [right] key, the cursor is right to move one bit;

Press [left] key, the cursor left one bit;

Press the [MENU/OK] key to confirm.

Under the storage Inquiry dialog box:

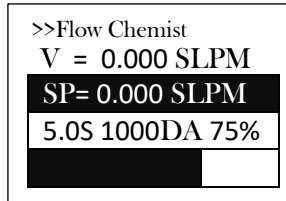
Press [right] key to store data or options, back to the menu items before the storage inquiry dialog box;

Press [left] to store the data or options and return to the menu item before the storage inquiry dialog box.

3.3 Operation explanation

3.3.1 Flow settings:

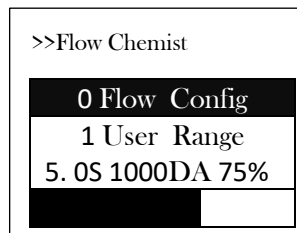
Press [VALVE] to enter the flow setting interface



Press [upper] key to increase the flow setting, press [lower] key to reduce the flow setting, press [left] key to set the flow to 0, and press [right] key to set the flow to the full range. Press [VALVE] to save and return to the main interface display status.

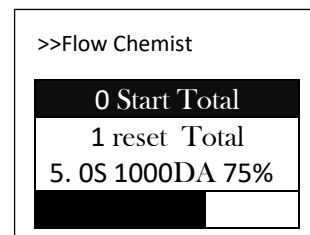
3.3.2 Start/stop Flow accumulation:

(1) Under the main interface display status”, press [MENU/OK] to enter the menu display status;

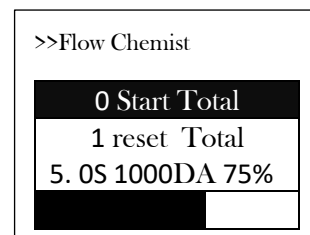


(2) Press [MENU/OK] to display the flow submenu.

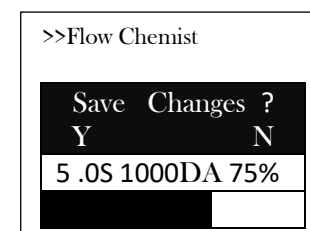
If the cumulative function is stopped, the following screen is displayed



If the cumulative flow meter has been started the following screen is displayed



Press [MENU/OK] to enter the storage Inquiry dialog box as described below



Press [Left] to modify and store, and press [Right] to exit to the previous menu.

3.3.3 Reset the cumulative flow:

(1) Under the main interface display status”, press [MENU/OK] to enter the menu display status;

>>Flow Chemist	
0 Flow Config	
1 User Range	
5.0S 1000DA	75%

(2) Press [MENU/OK] to enter the traffic setting submenu, and press [right] to make the menu item “1 Reset Total” in the focus state;

>>Flow Chemist	
1 Reset Total	
2 flow cutoff	
5.0S 1000DA	75%

(3) Press the [MENU/OK] key to display the storage inquiry dialog box;

>>Flow Chemist	
Save Changes ?	
Y	N
5.0S 1000DA	75%

(4) Press the [left] key to modify and store, and press the [right] key to exit to the previous menu.

3.3.4 Flow coefficient:

(1) Under the main interface display status”, press [MENU/OK] to enter the menu display status;

>>Flow Chemist	
0 Flow Config	
1 User Range	
5.0S 1000DA	75%

(2) Press [MENU/OK] to display the flow submenu, and press [right] to keep “3 Coefficient” in focus;

>>Flow Chemist	
3 Coefficient	
0.000	
0.0S	ODA 0%

(3) Press [MENU/OK] to enter the parameter input dialog box and enter the required data;

>>Flow Chemist	
3 coefficient	
+ 0000.000	
0.0S	ODA 0%

(4) After modifying the last character, press the [MENU/OK] key to display the storage inquiry dialog box;

>>Flow Chemist	
Save	Changes ?
Y	N
5.0S 1000DA 75%	

At this point, press [left] to store data, press [right] to discard storage and return to the previous menu.

3.3.5 Flow zero setting:

(1) Under the main interface display status”, press [MENU/OK] to enter the menu display status;

>>Flow Chemist	
0	Flow Config
1	User Range
5.0S 1000DA 75%	

(2) Press the [right] key to make the menu item “2 Zero Offset” in the focus state;

>>Flow Chemist	
2	Zero Offset
3	Sensor Trim
5.0S 1000DA 75%	

(3) Press [MENU/OK] to display the submenu of entering the installation position zero; keep the menu item “1 Set Zero” in focus; press [MENU/OK] to set the flow zero;

>>Flow Chemist	
1	Set Zero
1	Clear Zero
5.0S 1000DA 75%	

(4) Press [right] key to make the menu item “2 Clear Zero” in focus; set the zero operation to cancel the flow;

>>Flow Chemist	
2	Clear Zero
1	Set Zero
5.0S 1000DA 75%	

(5) Press [MENU/OK] to enter the storage query dialog box;

>>Flow Chemist	
Save	Changes ?
Y	N
5 .0S 1000DA 75%	

At this point, press [left] to store the zero value, press [right] to discard the storage and return to the previous menu.

3.3.6 Device polling parameter settings:

(1) Under the main interface display status”, press [MENU/OK] to enter the menu display status;

>>Flow Chemist	
0 Flow Config	
1 User Range	
5. 0S 1000DA 75%	

(2) Press the [right] key to make the menu item “6 Hart Address” in focus;

>>Flow Chemist	
6 Hart Address	
7 Loop Test	
5. 0S 1000DA 75%	

(3) Press [MENU/OK] to display the Hart Address Settings submenu; row 3 shows the current polling Address;

>>Flow Chemist	
1 Polling Add	
0	
5. 0S 1000DA 75%	

(4) Press [MENU/OK] to enter the parameter input dialog box, and enter the expected value (address range 0~31);

>>Flow Chemist	
1 Polling Add	
+0000.000 kPa	
5. 0S 1000DA 75%	

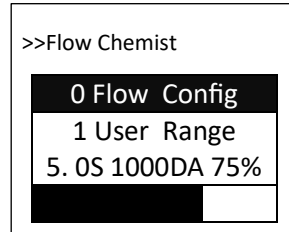
(5) After modifying the last character, press the [MENU/OK] key to display the storage inquiry dialog box;

>>Flow Chemist	
Save	Changes ?
Y	N
5 .0S 1000DA 75%	

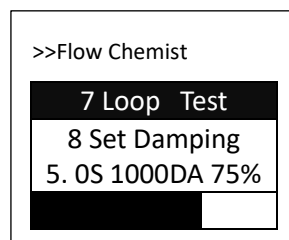
At this point, press [left] to store data, press [right] to discard storage and return to the previous menu.

3.3.7 Loop output test:

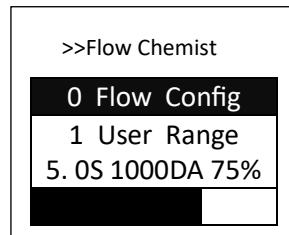
(1) Under the main interface display status”, Press [MENU/OK] to enter the menu display status;



(2) Press the [right] key to make the menu item “7 Loop Test” in the focus state;

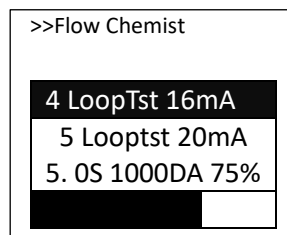


(3) Press [MENU/OK] to display the enter circuit test submenu;



Note: The output current of the instrument is locked to 4 mA.

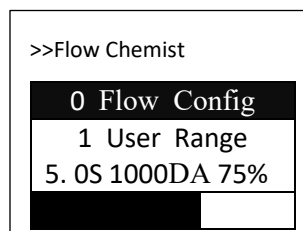
(4) Press the [right] key and scroll the menu item to lock the instrument output current to the corresponding value; (For example, the lock is 16, as shown in the figure below)



(5) Under the circuit test menu, press the [left] key to exit the loop test, return to the previous menu, and the instrument current returns to automatic.

3.3.8 Control mode conversion:

(1) Under the main interface display status”, press [MENU/OK] to enter the menu display status;



(2) Press [MENU/OK] to display the flow submenu, and press [right] to make “4 Calculate mode” in focus;

>>Flow Chemist	
4 Calculate Mode	
5 Designed T	
500S 1000DA 75%	

(3) Press the [MENU/OK] key to display the select submenu of entering the operation mode;

>>Flow Chemist	
☒ Auto Mode	
☐ Water steam	
500S 1000DA 75%	

(4) Press [right] key to scroll the options. When selecting "Analog Input", it is external analog signal control mode; selecting local / RS485, it is local key operation control or RS485 communication control;

>>Flow Chemist	
☐ Water Steam	
☐ General Gas	
500S 1000DA 75%	

(5) At this point, press [MENU/OK] to display the storage inquiry dialog box;

>>Flow Chemist	
Save	Changes ?
Y	N
5 .0S 1000DA 75%	

(6) Press [left] key to store data, press [right] key, discard storage, and return to the previous menu. If stored, the box before the selected item is filled with dots.

4. Note

4.1 Installing a filter

Gas must be purified when used, and dust, liquids, and oil stains must be avoided. If necessary, install a filter. If there is a liquid source bottle connected to the outlet of the flow controller, a one-way valve should be installed at the outlet of the flow controller to prevent liquid backflow from damaging the flow controller.

4.2 Using corrosive gases

The material used for the mass flow controller channel is corrosion-resistant materials such as stainless steel and fluororubber. Under the conditions of no water vapor, low leakage, frequent

cleaning, and proper use in the user system, it can be used to control general currosive gases. When using highly corrosive gases, it should be declared at the time of ordering. All sealing materials must be modified accordingly when using special corrosive gases.

4.3 Installation position

This controller is not particularly sensitive to position during installation and can be installed at any position, but it is best to maintain a horizontal installation, if zero point deviation is found during non horizontal installation, the zero point can be adjusted before operation.

4.4 Valve port sealing

The solenoid valve of the mass flow controller is a regulating valve, not a shut-off valve, and cannot be used as a shut-off valve. Users should equip a shut-off valve separately. Especially when users use corrosive gases, they should usually add a shut-off valve at the inlet and outlet of the mass flow controller to ensure work safety. After long- term operation, if the leakage rate of the controller valve port is within 2% F.S., it is considered normal. If the leakage is higher than 2% F.S., repair should be carried out.

5. Judgment and handling of general abnormal situations

Phenomenon	Possible causes	Handle
No fluid flow after startup	Fluid not open, pipeline blocked	Connect the fluid and open the pipeline
	No target traffic set	Refer to Operation Details 3.3
	Filter clogged	Replace filter
	Circuit fault	Repair circuit
	Zero deviation	Refer to Operation Details 3.3
Unstable flow control	Sensor fault	Replace the sensor
	Circuit fault	Repair circuit
	Valve contamination	Clean the valve and replace the seal
	Pressure too low or unstable	Increase and stabilize pressure
With the valve closed, there is still a large flow rate flowing through it	Regulating valve malfunction	Readjust the regulating valve
	High inlet pressure	Reduce inlet pressure
	Channel blockage	Clean channel
The flow displayed cannot reach the full-scale value	Set target flow rate below full scale	Check the set valve
	Other circuit faults	Repair circuit
Zero point instability when not ventilated	Circuit fault	Repair circuit
	Sensor fault	Replace the sensor

6. Guarantee Warranty and Service

6.1 Product warranty and maintenance

6.1.1 Within 1 year from the shipment, if the user uses our MFC/MFM according to the instructions and the products have not suffered physical damage, pollution, modification or refurbishment, we guarantee the qualilty of the materials, processing, and performace of the products. If there are any problems, free maintenance is provided.

- 6.1.2 After receiving the goods the user has the responsibility to inspect and verify the goods, and promptly notify the sales department of our company about the receiving situation through fax, phone or email.
- 6.1.3 During the warranty period, the product must be repaired by our company or an authorized service center. Otherwise, the product warranty will be invalid.
- 6.1.4 Within the one- year warranty period, free maintenance shall be provided. After the warranty period, the user will be notified, of the parts that need to be replaced and the repair cost before maintenance. After repair, provide a warranty for the repaired parts within 90 days, including vulnerable parts.
- 6.1.5 If users have used products with toxic, polluting or corrosive media and do not provide proof of pollution removal and purification treatment, our company will not be responsible for repair or warranty.

6.2 Warranty requirements for use

- 6.2.1 Gas must be clear and free of particles and no liquids, which requires installation of $<30\mu\text{m}$ filter in the upstream gas path of MFC/MFM.
- 6.2.2 The input gas pressure must meet the product's pressure resistance standard and cannot exceed the maximum pressure required by the product.
- 6.2.3 The gas used in the product must be suitable for the sealing material selected by the user, and the user is responsible for using each gas in accordance with the available safety regulations. Incorrect use of the product will void the warranty, and any damage caused by incorrect use cannot be attributed to our company.
- 6.2.4 Requirements for electronic circuits: The wiring of the system must be connected according to regulations. Incorrect wiring can cause permanent damage to the internal circuit board of the product. The MFC power supply requires a high anti-interference voltage regulator with a voltage fluctuation of less than 5m V.
- 6.2.5 Pipeline connection: Sealing fittings must be carefully installed to ensure that all sealing fittings have been individually inspected and have no scratches.
- 6.2.6 It is prohibited to disassemble the MFC/MFM by oneself. If damage is caused by self disassemble, the warranty promised by our company will be invalid.

7. Instructions for using conversion coefficients

The mass flow controller and mass flow meter are generally calibrated with air when leaving the factory. In actual use, if it is other gases, the reading can be corrected if necessary by multiplying the flow rate displayed on the flow display instrument by the flow conversion coefficient. If it is a single component gas, its conversion coefficient can be found in our factory's product technical manual; If it is a multi component gas (assuming it is composed of n gases), please calculate its conversion coefficient C according to the following formula

Basic formula: $C=0.3106N/p (Cp)$

Wherein: p — the density of a gas in its standard state

Cp — the specific heat of a gas at constant pressure

N — the composition of the gas molecules (related to the
Composition of the molecules, as shown in the table below)

Gas molecular composition	Example	N value
Monatomic molecule	Ar He	1.01
Diatomic molecule	CO N ₂	1.00
Triatomic molecule	CO ₂ NO ₂	0.94
Polyatomic molecule	NH ₃ C ₄ H ₈	0.88

For mixed gases: $N = N_1 (\omega_1/\omega_T) + N_2 (\omega_2/\omega_T) + \dots + N_n (\omega_n/\omega_T)$

$$\text{Export formula: } C = \frac{0.3106 [N_1 (\omega_1/\omega_T) + N_2 (\omega_2/\omega_T) + \dots + N_n (\omega_n/\omega_T)]}{p_1 C_{p1} (\omega_1/\omega_T) + p_2 C_{p2} (\omega_2/\omega_T) + \dots + p_n C_{pn} (\omega_n/\omega_T)}$$

Wherein:

$\omega_1 \dots \omega_n$ — the flow rate of the corresponding gas

ω_T — the flow rate of the mixed gas

$p_1 \dots p_n$ — the density of the corresponding gas in the standard state
(Values can be found in the gas conversion coefficient table)

$C_{p1} \dots C_{pn}$ — the specific heat of the corresponding gas at constant pressure
(Values can be found in the gas conversion coefficient table)

$N_1 \dots N_n$ — the molecular composition coefficient of the corresponding gas,
(Values can be found in the gas molecular composition coefficient table)

Gas	Code	Specific heat (cal/g °C)	Density (g/L 0°C)	Conversion Coefficient
Air	008	0.2400	1.2930	1.006
Ar	004	0.1250	1.7837	1.415
AsH ₃	035	0.1168	3.4780	0.673
BBr ₃	079	0.0647	11.1800	0.378
BCl ₃	070	0.1217	5.2270	0.430
BF ₃	048	0.1779	3.0250	0.508
B ₂ H ₆	058	0.5020	1.2350	0.441
CCl ₄	101	0.1297	6.8600	0.307
CF ₄	063	0.1659	3.9636	0.420
CH ₄	028	0.5318	0.7150	0.719
C ₂ H ₂	042	0.4049	1.1620	0.581
C ₂ H ₄	038	0.3658	1.2510	0.598
C ₂ H ₆	054	0.4241	1.3420	0.481
C ₃ H ₄	068	0.3633	1.7870	0.421
C ₃ H ₆	069	0.3659	1.8770	0.398
C ₃ H ₈	089	0.3990	1.9670	0.348
C ₄ H ₆	093	0.3515	2.4130	0.322
C ₄ H ₈	104	0.3723	2.5030	0.294
C ₄ H ₁₀	111	0.4130	2.5930	0.255
C ₅ H ₁₂	240	0.3916	3.2190	0.217
CH ₃ OH	176	0.3277	1.4300	0.584
C ₂ H ₆ O	136	0.3398	2.0550	0.392
C ₂ H ₃ Cl ₃	112	0.1654	5.9500	0.278
CO	009	0.2488	1.2500	1.000
CO ₂	025	0.2017	1.9640	0.737
C ₂ N ₂	059	0.2608	2.3220	0.452
C ₁₂	019	0.1145	3.1630	0.858
D ₂	014	1.7325	0.1798	0.998
F ₂	018	0.1970	1.6950	0.931
GeCl ₄	113	0.1072	9.5650	0.267
GeH ₄	043	0.1405	3.4180	0.569
H ₂	007	3.4224	0.0899	1.010

HBr	010	0.0861	3.6100	1.000
HCL	011	0.1911	1.6270	1.000
HF	012	0.3482	0.8930	1.000
HI	017	0.0545	5.7070	0.999
H2S	022	0.2278	1.5200	0.844
He	001	1.2418	0.1786	1.415
Kr	005	0.0593	3.7390	1.415
N2	013	0.2468	1.2500	1.000
Ne	002	0.2464	0.9000	1.415
NH3	029	0.5005	0.7600	0.719
NO	016	0.2378	1.3390	0.976
NO2	026	0.1923	2.0520	0.741
N2O	027	0.2098	1.9640	0.709
O2	015	0.2196	1.4270	0.992
PC13	193	0.1247	6.1270	0.358
PH3	031	0.2610	1.5170	0.691
PF5	143	0.1611	5.6200	0.302
POC13	102	0.1324	6.8450	0.302
SiC14	108	0.1270	7.5847	0.284
SiF4	088	0.1692	4.6430	0.348
SiH4	039	0.3189	1.4330	0.599
SiH2C12	067	0.1472	4.5060	0.412
SiHC13	147	0.1332	6.0430	0.340
SF6	110	0.1588	6.5160	0.264
SO2	032	0.1489	2.8580	0.687
TiC14	114	0.1572	8.4650	0.206
WF6	121	0.0956	13.2900	0.215
Xe	006	0.0397	5.8580	1.415

Appendix: Communication Protocol

Physical layer: RS485/232 optional (depending on order selection)

Communication protocol: MODBUS protocol

Transmission format: 8-bit data, 1 stop bit, no verification, RTU mode

Baud rate: 115200bps

Note: All floating point numbers in this agreement are single precision floating point numbers conforming to IEEE standards. Low bit to high bit, byte order is 3412 (CDAB) Taking device address I as an example, the following illustrates the format of various functional commands:

1. Read instantaneous flow: (the value is 1 floating point numbers starting from device register address 16)

PC SENDS COMMANDS: TX: 01 03 00 10 00 02 C5 CE

Device address	Read	Start address		Number of read		CRC	
		High	Low	High	Low	Low	High
01	03	00	10	00	02	C5	CE

PC RECEIVES RESPONSES: RX: 01 03 04 XX XX XX XX XX (Note: XX is the value that varies based on the actual value read)

Device Address	Read	Upload Bytes	Actual value read				CRC	
			Low		High		Low	high
01	03	04	XX	XX	XX	XX	XX	XX

2. Cumulative flow: (the value is 1 floating point starting from the device register address 28, the measurement unit is the default unit)

(1) Read cumulative traffic

PC SENDS COMMANDS: TX: 01 03 00 1C 00 02 C5 CE

Device Address	Read	Start Address		Number of read		CRC	
		High	Low	High	Low	Low	High
01	03	00	1C	00	02	05	CD

PC RECEIVES RESPONSES: RX:01 03 04 XX XX XX XX XX (Note: XX is the value that varies based on the actual value read)

Device Address	Read	Upload Bytes	Actual values read				CRC	
			Low		High		Low	High
01	03	04	XX	XX	XX	XX	XX	XX

(2) The cumulative flow is cleared (write the floating point number 0)

PC SENDS COMMANDS: TX:01 10 00 1C 00 02 04 00 00 00 00 F2 F6

(Writing the floating point number 0 means that cumulative flow is cleared)

Device Address	Write Command	Start address		Number of read		Write Bytes	Floating point0				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	1C	00	02	04	00	00	00	00	F2	F6

3. Set control mode: 1 floating point starting from address 116 represents the control mode (27 analog mode, 28 digital mode, and default 27). Note: when writing values, 25 is analog mode, 26 is digital mode, and the system will automatically add 2.

(1) Set the control mode to digital control mode

PC SENDS COMMANDS: TX:01 10 00 74 00 02 04 00 00 41 D0 C4 B4

Device Address	Write Command	Start Address		Number of read		Write Bytes	Floating point26				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	74	00	02	04	00	00	41	D0	C4	B4

(2) Set the control mode to analog control mode

PC SENDS COMMANDS: TX:01 10 00 74 00 02 04 00 00 41 C8 C4 BE

Device Address	Write Command	Start address		Number of read		Write Bytes	Floating point26				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	74	00	02	04	00	00	41	C8	C4	BE

4. Set the flow (valid in digital control mode, the value is floating point number starting from the device register address 106, and the measurement unit is the default unit)

PC SENDS COMMANDS: TX:01 10 00 6A 00 02 04 XX XX XX XX XX XX (Note: XX is the value that varies based on the actual values read)

Device Address	Write Command	Start address		Number of read		Write Bytes	Set value				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	6A	00	02	04	XX	XX	XX	XX	XX	XX

5. Zero setting (the value is 1 floating point starting from the device register address 118, writing 0 means setting zero, and writing 1 means canceling zero)

(1) Set zero point (Note: When the instantaneous flow zero point shifts, this command can be used to set the zero point. When using this command to reset, it is necessary to ensure that the flow meter has no flow passing through.)

PC SENDS COMMANDS: TX:01 10 00 76 00 02 04 00 00 00 00 74 AI

Device Address	Write Command	Start address		Number of read		Write Bytes	Set value				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	76	00	02	04	00	00	00	00	74	AI

(2) Cancel zero point (this operation can be used to cancel and reset the zero point in the correct state when setting a zero point error)

PC SENDS COMMANDS: TX:01 10 00 76 00 02 04 3F 80 00 00 79 5D

Device Address	Write Command	Start address		Number of read		Write Bytes	Set value				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	76	00	02	04	3F	80	00	00	79	5D

6. Set gas coefficient (valid in digital control mode, the value is 1 floating point number starting from the device register address 114, and the measurement unit is the default unit)

PC SENDS COMMANDS: TX:01 10 00 72 00 02 04 XX XX XX XX XX XX (Note: XX is the value that varies based on the actual values read)

Device Address	Write Command	Start address		Number of read		Write Bytes	Set value				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	72	00	02	04	XX	XX	XX	XX	XX	XX

7. Set batch function (valid in digital control mode, the value is 1 floating point number starting from the device register address 122, and the measurement unit is the default unit) (Note: this function is only applicable to devices equipped with batch function (quantitative control function))

PC SENDS COMMANDS: TX:01 10 00 80 00 02 04 (XX XX XX XX) XX XX

Device Address	Write Command	Start address		Number of read		Write Bytes	Set value				CRC	
		High	Low	High	Low		Low		High		Low	High
01	10	00	80	00	02	04	XX	XX	XX	XX	XX	XX