Mass flow controller

Application fields: aerospace, semiconductor processing, medical biology, electronic automobile, iron and steel metallurgy, Marine electronics, industrial gas production and other industries.

一、 Product introduction

Micro gas mass flow controller is specially designed for the measurement and control of all kinds of small flow gas. This series of sensors are made of advanced micro-electromechanical system (MEMS) flow sensing chip, combined with digital signal processing technology and flow control algorithm, to achieve accurate control and intelligent processing of various gas flow sizes.

二、 Product features

★ Using micro-electromechanical system (MEMS) flow sensing chip, bypass shunt and electromagnetic proportional valve design, the sensor has high precision, strong anti-interference characteristics, the bypass fluid of the shunt laminar flow state, so that the measurement and control more stable and accurate. The electromagnetic proportional valve has the characteristics of long service life and high sensitivity.

★ The zero point of the sensor is stable.

★ High precision and good repeatability in the range.

★ Fast response time.

★ Standard mechanical interface for easy installation.

★ RS485 communication output, standard MODBUS RTU protocol.

★ LCD display instantaneous flow and cumulative flow, clear and intuitive, easy to read, through the key input control flow, control flow and real-time flow value directly displayed on the LCD screen

★ Standard 4-20mA input/output control.

★ 0-5V or 0-10V input/output control can be customized

三、 Parameters

Power supply	DC24V/6W
Accuracy (%)	Control accuracy: ±1.0% SP, measurement accuracy 0-50L/min 1%fs greater than 50L/min 1.5fs%
Range ratio	1:100
Valve type	Normally closed type
Temperature	- 10 ~ 55 ℃
Humidity	<95%RH(no frost, no ice)
Working pressure range	Measurement: 0-1.5MPA Control: 100SCCM-30SPLM Pressure: 0.1-1.0MPA 100SPLM pressure: 0.1-0.65MPA 300SPLM pressure: 0.1-0.5MPA
Typical control response time	Less than 1.5S (T90)
Response time	<50mS
Output mode	4-20mA or 1-5V
Communication method	RS485(Modbus Rtu protocol)
Control mode	Push-button operation,Modbus,4-20mA(1-5V), customizable 0-5V
Mechanical connection	G1/4, PT1/2 internal thread
Class of protection	IP40

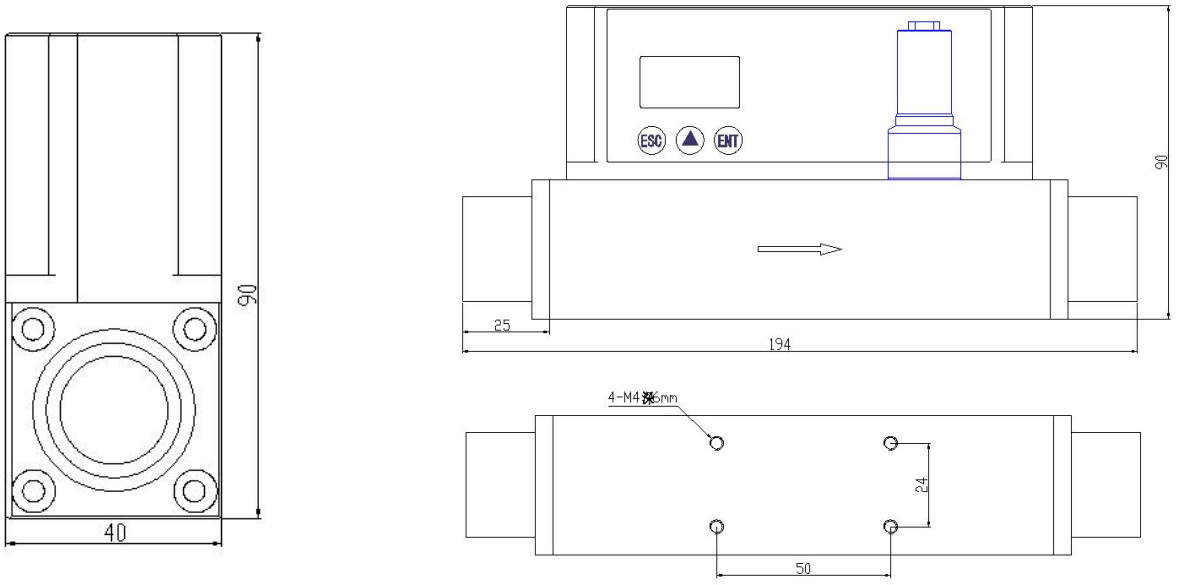
Note: The above data is measured at 25℃, 101.32kPa, dry air

Other Characteristics

Selectable scale temperature conditions	0°, 20°, 25°, user adjustable, default 25°
Gas type selectable	Air, N2, O2, CH4, Ar, CO2, He, H2, C3H8
Operating pressure difference	50 SPLM 0.1MPA -0.7MPA 100SPLM 0.1MPA-0.6MPA 300SPLM 0.1MPA-0.4MPA

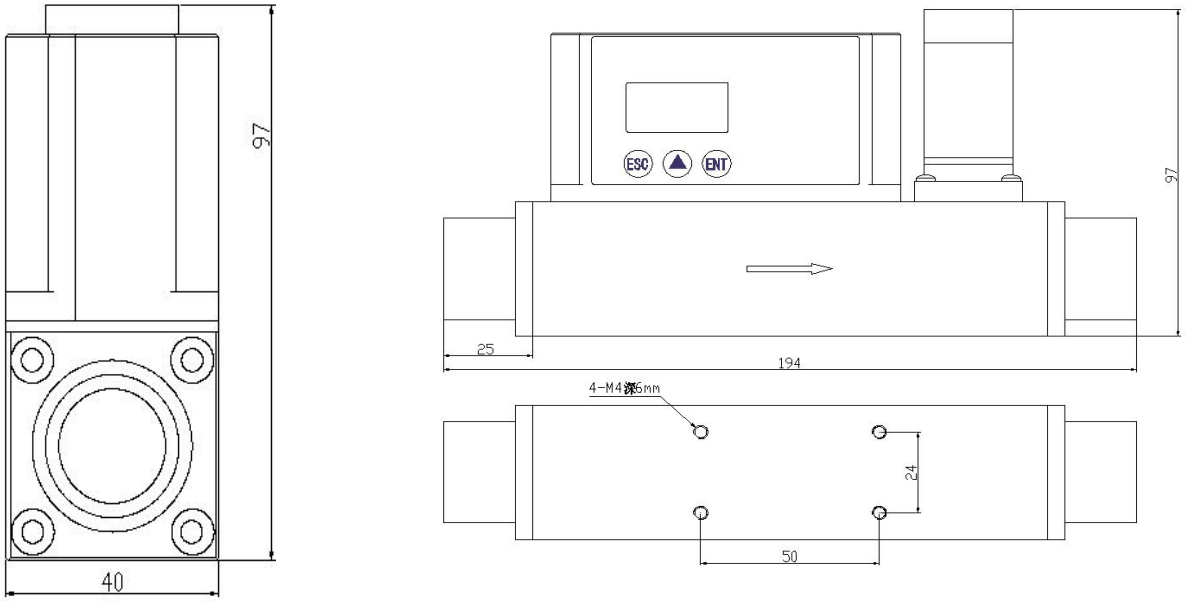
四、 Mechanical dimensions

S0	1~100SCCM
S1	5~500SCCM
S2	10~1000SCCM
S3	0.1 ~ 10 SLPM
S4	0.3 ~ 30 SLPM
S5	0.5 ~ 50 SLPM
S6	1~100SLPM
S7	2~200SLPM
S8	3~ 300SLPM



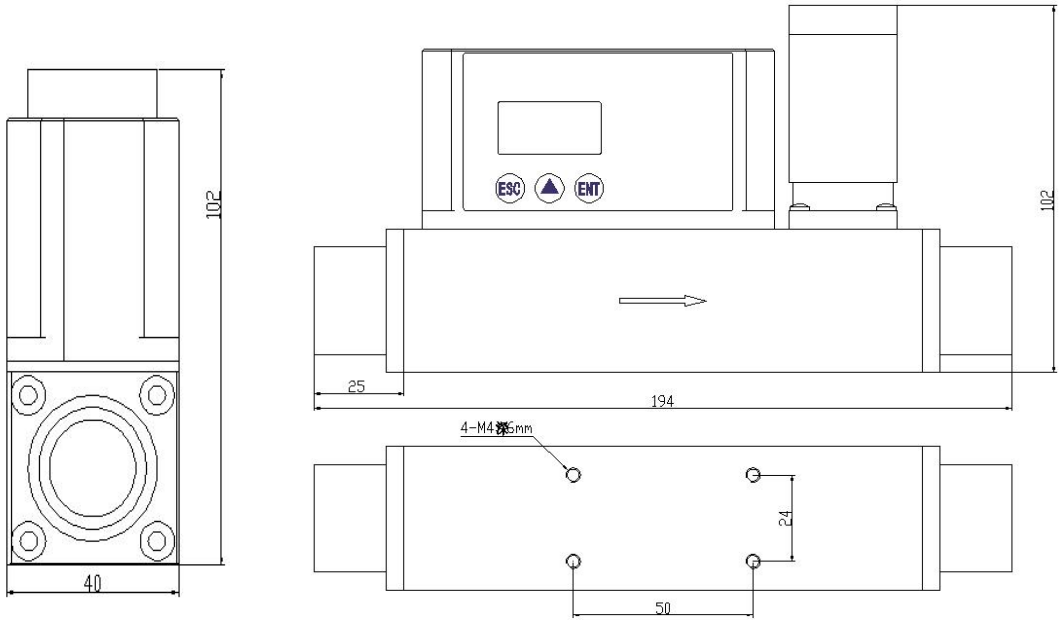
Mechanical interface connection size S0-S5

G1/4 OR PT1/2internal thread



Mechanical connector connection size S6

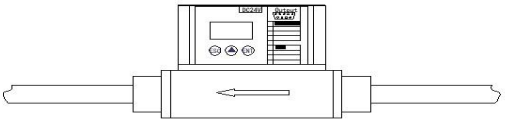
PT1/2 internal thread -1



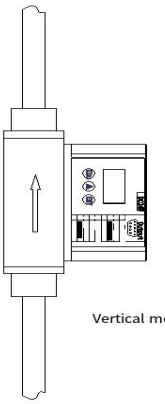
Mechanical connector connection size S7-S8
PT1/2 internal thread -2

Interface conversions can be made using standard joints, or custom joints, as required

Turn the bushing joint	Turn the quick-insert connector	Turn the pagoda connector
		



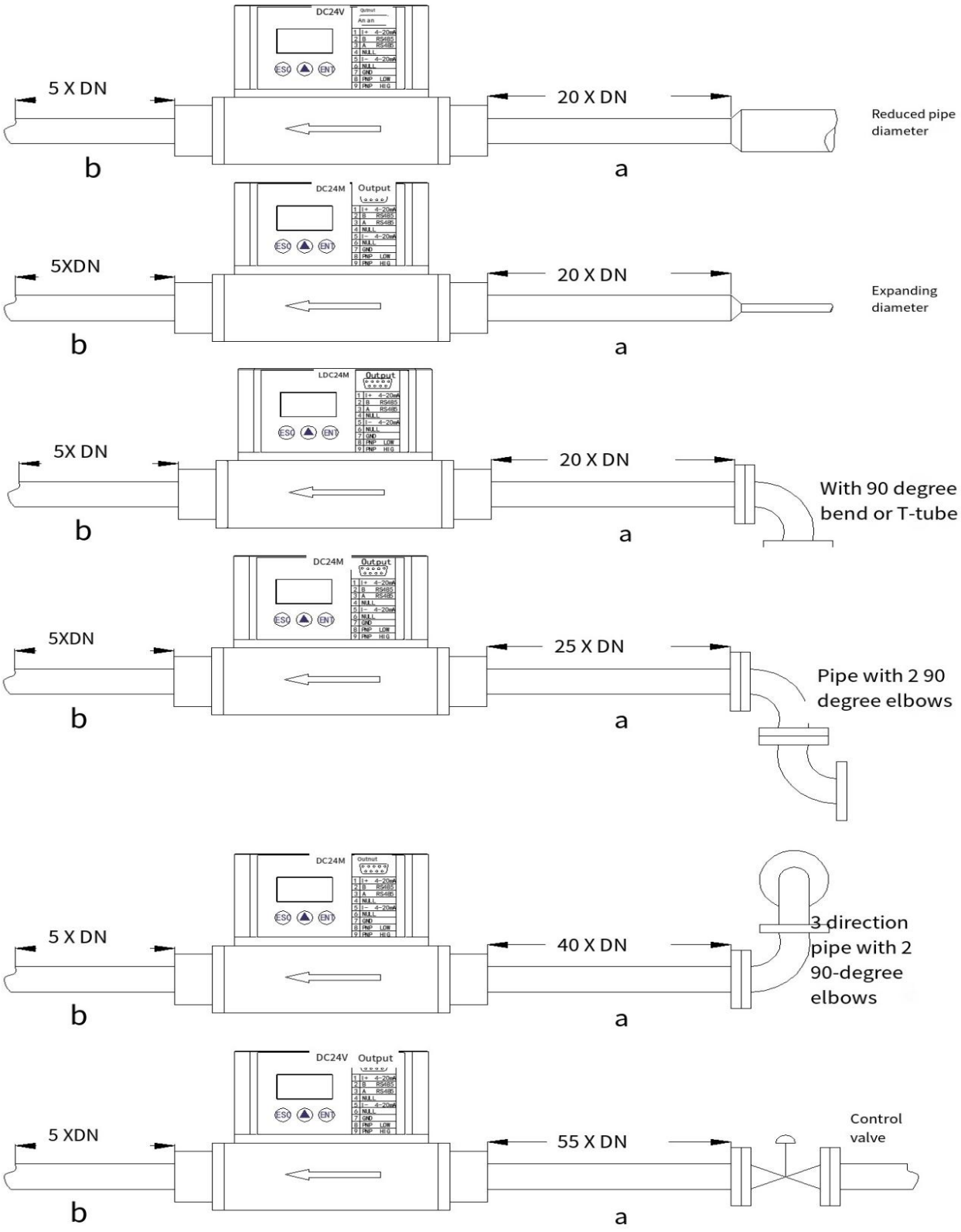
Horizontal installation



Vertical mounting

五、 Installation method

a = front straight pipe section b = back straight pipe section

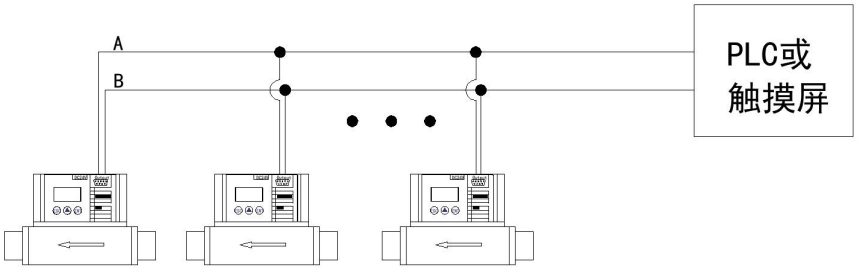


六、 Wiring instructions

DB9 interface definition	
PIN	**Meaning**
1	4-20mA current I+
2	RS485 communication output B
3	RS485 communication output A
4	4-20mA current input I+ (optional)
5	4-20mA current I + (optional)
6	24V power supply positive
7	GND Power positive
8	PNP LOW(optional)
9	PNP HIG(optional)

DB9 lead instructions	
colour	**Meaning**
green	Power supply positive
blue	Power supply negative
red	RS485 Communication Output A
brown	RS485 Communication Output B
black	Current 4-20mA I+ output/voltage control output
white	Current 4-20mA I+ input control/voltage control input

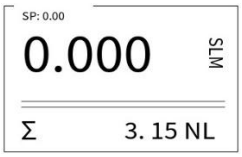
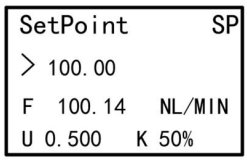
RS485 bus wiring instructions

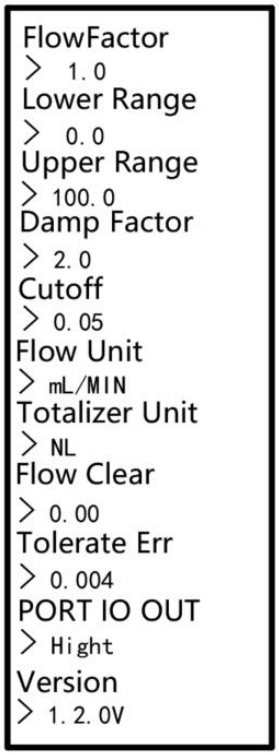


485总线通讯默认配置为32台

七、 Operation description

Key description		
Signage	**Meaning**	
	Short press	Press and hold (1.2 seconds or more)
ESC	Exit	Go to System Configuration
▲	Shift/Select	Enter communication configuration
ENT	Adjust upwards	Confirm configuration

Display and control interface	
	First line: Display set point traffic. Line 2: Display measurement flow and unit. Line 3: Show cumulative flow and units.
	Press ENT to enter the control screen and ESC to return. SP to set the flow point. F indicates the test flow value. V is the sensor voltage and K is the solenoid valve opening.

System Configuration menu (Long press ESC key for more than 1.2 seconds to enter)	
	FlowFactor: Calibration correction factor can be changed to compensate for fluid cross section velocity distribution interference and the impact of the specific application environment. FlowFactor is a product factor of the linear flow signal. Display value = Instrument factor x actual measured value
	Lower Range corresponds to the current output of 4 mA
	Upper Range corresponds to the current output of 20mA
	Damp Factor: default 0, range 0-20 Reducing the damp factor can quickly detect the flow jump,Increasing the damping coefficient can smooth the current flow display value.
	Cutoff: Percentage value, default 0.05, range 0-100Flow values that are less than a percentage of the maximum range are excised.
	Flow Unit: Flow unit selection, optional mL/MIN, NL/MIN, m^3 /H,SCCM,NL/H
	Totalizer Unit: Cumulant unit selection, m^3 and NL are optional
	Flow Clear: The cumulative data is cleared to zero
	Tolerate Err: Valve control error, default 0.004V.
	PORT IO OUT: Alarm output high or Low level, optional Hight or low.
	Version:Current software version.

Communication Menu(Long press ▲ key for more than 1.2 seconds to enter)	
Device ID > 001 BaudRate 9600 Parity None StopBit 1bit	Device ID for MODBUS communication,0-255
	Baud rate select 4800/9600/19200
	P: None/Odd/Even
	Stop bit: 1bit/2bit

八、 Quality assurance and after-sales service

Follow the ISO9001 quality management and control system, this product uses new raw materials and components production and through strict

Factory test, product quality and product performance in line with relevant standards and technical texts. However, due to transportation or use of the process may

In the event of uncertainty, we undertake the following terms of service guarantee:

★ Within two weeks from the date of delivery, if the product you purchased has acceptable quality defects, we will be responsible for the replacement free of charge;

★ Within one year from the date of delivery of the product, if the product you purchased is found in the normal course of use, which is not due to improper use or man-made

If the product is damaged due to the factors, we will be responsible for free repair;

★ Equipment damage caused by the following reasons during use does not belong to the scope of free replacement or maintenance:

- In violation of the relevant requirements and provisions of this manual of installation or use conditions;
- Wrong or in violation of the country's relevant instrument installation, wiring or use specifications;
- Use with other products that are electrically incompatible with this product or have no exact quality assurance and valid certification;
- Self-disassembly or maintenance
- Natural aging or loss of equipment more than one year;
- Force majeure as defined by applicable law

★ For the products within the warranty period, the user shall bear the cost of sending the products, and we shall bear the cost of replacing or repairing the products and returning them;

★ When the products sent by the user are confirmed by us to be free from defects or damage, the related transportation premium shall be borne by the user;

★ Once the products sent by the user are confirmed, unless the circumstances are special, we will send the new or finished products within 48 hours or two working days

Repaired products;

★ Please contact your local supplier or us if you find any defects or damages.

Appendix I: MODBUS Register address Table

Communication baud rate: 9600,8,1, NONE, floating point data arrangement: 2143

Read data function code: 03 (HOLDING REGISTER read hold register)

Meter address: can be set via menu, 0-255

Register address	Register name	Number of registers	Data type	Data format
4x0001-4x0002	Instantaneous flow	2	float	IEEE754
	Sent	01 03 00 00 00 02 C4 0B		
	Receive	01 03 04 00 00 00 00 FA 33		
4x0003-4x0004	Flow Settings	2	float	IEEE754
	Sent	01 03 00 02 00 02 65 CB		
	Receive	01 03 04 00 00 00 00 FA 33		
4x0005	Zero point calibration	1	Unsigned int	Unsigned int
	Send	01 06 00 04 55 AA 77 24		
	Receive	01 06 00 04 55 AA 77 24		
4x0007-4x0008	Cumulative integers	2	Unsigned long	Unsigned long integer
	Send	01 03 00 06 00 02 24 0A		
	Receive	01 03 04 00 00 00 00 FA 33		
4x0009-4x0010	Accumulating decimals	2	float	IEEE754
	Sent	01 03 00 08 00 02 45 C9		
	Receive	01 03 04 00 00 00 00 FA 33		
4x0011-4x0012	Cumulant floating-point number	2	float	IEEE754
	Sent	01 03 00 0A 00 02 E4 09		
	Receive	01 03 04 00 00 00 00 FA 33		
4x0013-4x0014	Negative cumulative floating point number	2	float	IEEE754
	Sent	01 03 00 0C 00 02 04 08		
	Receive	01 03 04 BA 4A 41 F8 CF 2F		
4x0015-4x0016	Current acquisition signal value	2	float	IEEE754
	Sent	01 03 00 0E 00 02 A5 C8		
	Receive	01 03 04 82 1F 40 36 52 5B		
4x0021	Register write protection	1	Unsigned int	Unsigned int
	Send	01 06 00 16 55 AA D7 21		
	Receive	01 06 00 16 55 AA D7 21		
	Instructions	Write protection is unlocked after 0x55AA is written to the register, and other registers can be written at this time. After 10 seconds, the write protection locks automatically and needs to be unlocked again to continue writing.		