

Product Specification

S500 -Series

Gas Mass Flow Controller



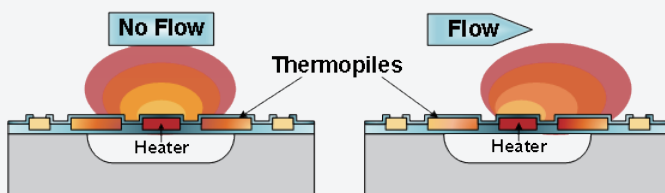
Perfect combination of new generation industrial mass flow sensor chip and advanced gas channel structure

Digital mass flow controller: adopting industrial-grade flow chip independently developed by our company, combined with low pressure loss structure and high-precision digital control circuit and algorithm, to achieve high precision, high stability and wide range ratio control in a wide temperature range. The product is equipped with on-site debugging screen and independent power supply interface, which is perfect for semiconductor, vacuum coating, photovoltaic and other application environments.

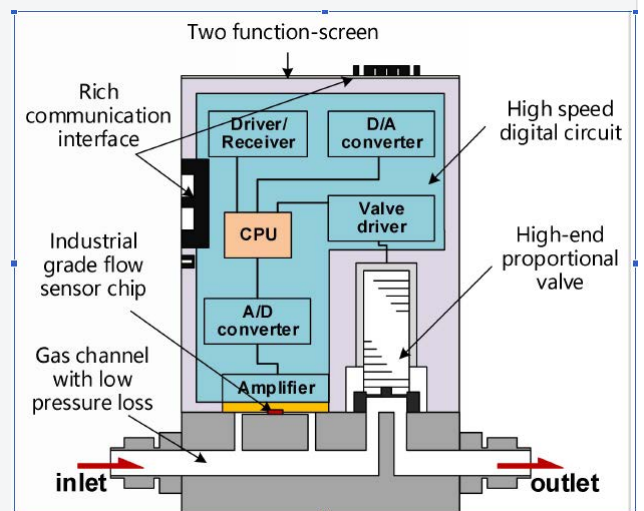


Working principle of MEMS flow rate chip

Developed based on Thomas' theory "Heat absorption or release of a gas is proportional to its mass flow". When there is no gas flow, the temperature field is symmetrically distributed with Heater as the center; when there is gas flow, the temperature field distribution shifts, which leads to a temperature difference between upstream and downstream thermopiles. By measuring the temperature difference, the mass flow through the chip surface can be calculated.



Temperature Distribution



Advantages

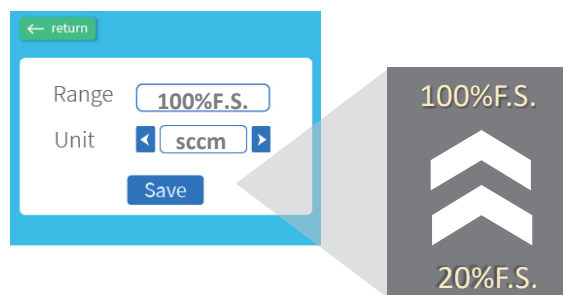
S1 Double screen display

Main screen is on front side(display+touch operation),top side has minor screen and switch of encoding. Double screen realize easy reading and operating, which makes the on-site monitoring and controlling is more easier.



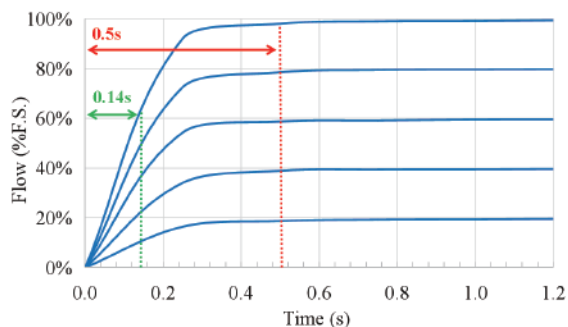
S2 Flow range adjustable

Users can adjust range according to needs (can be 20% ~100% original range)to better adapt to the operating environment.



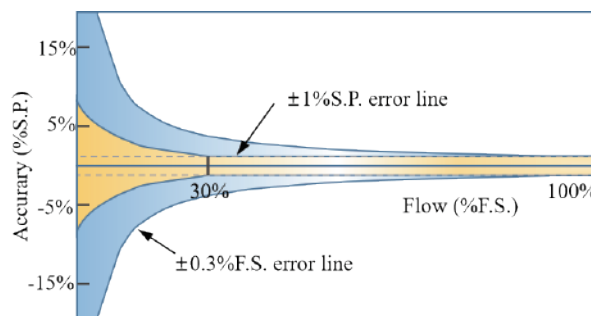
S3 Fast response

1.5ms chip response time, 0.1~0.5s instrument system response time, so MFC-S500 can catch the minor flow rate change.



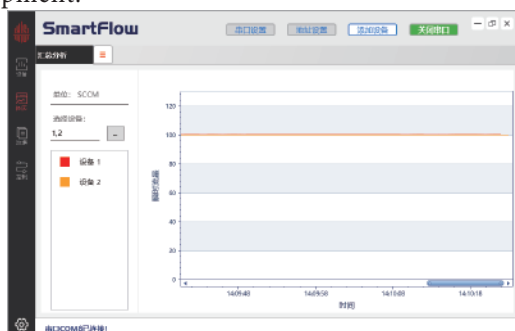
S4 High accuracy

1.0%-100%F.S. full range keep high accuracy:0.3% F.S. ($\leq 30\%$ F.S.);1.0%S.P. ($>30\%$ F.S.)



S5 Be equipped with host computer

Equipped with powerful SmartFlow and multiple link,which is convenient to monitor and configure equipment.



S6 Certificate approval

Authorized by TUV International certification, CE&EMC certification, metering institute certification, etc., and meet several SEMI standards.



Specifications

Parameters	
Requirements	Clean, dry and non-corrosive
Gas type	Air, N ₂ , O ₂ , CO ₂ , He, H ₂ , CH ₄ , Ar, etc.
Full scale ^①	(0~10, 20, 50, 100, 200, 500) SCCM (0~1, 2, 5, 10, 20) SLM
Accuracy	0.3%F.S. (≤30%F.S.) 1.0%S.P. (^② >30%F.S.) ^③
Control range	100:1
Response time ^④	≤ 0.5s
Repeatability	±0.2%S.P.
Leakage rate	1×10 ⁻¹⁰ Pa m ³ /s He
Max.withstand pressure	9.8 bar
Environmental requirements	
Operating temp.	0~50 °C
Operating Humidity	10%~90%R.H. (no icing, no frost)
Operating pressure ^⑤	≥ 2SLM, 0.5~4 bar < 2SLM, 0.5~6 bar
Storage temp.	-20~85°C
Electric parameters	
Power voltage	DC24V, Ripple≤50mV
Power consumption	≤ 4 W
Startup time	< 1 s

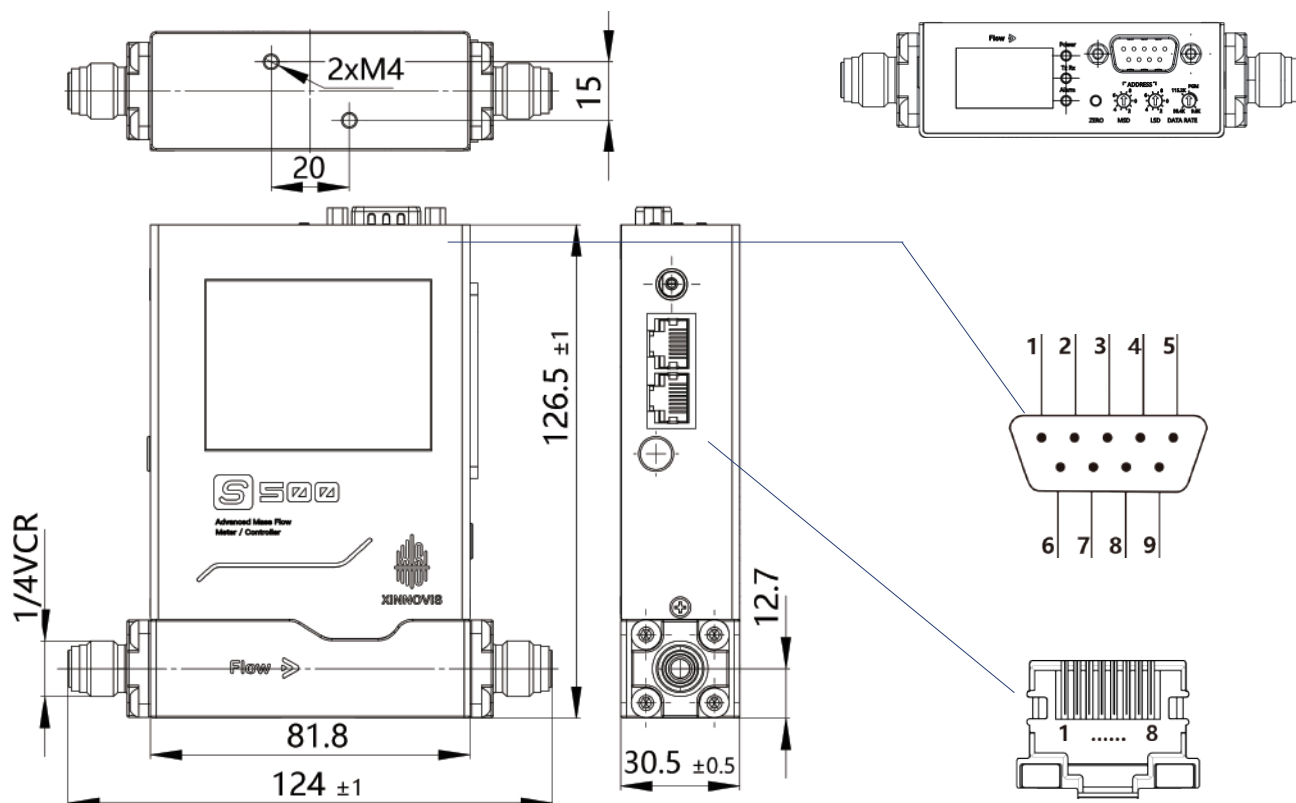
Communication interface	
Interface type	D-SUB9, RJ45
Analog	0~5V, 4~20mA
Digital	RS485, RS232
Digital signal (RS485)	
Interface type	D-SUB9, RJ45
Com. rate	9600, 38400, 115200(Default), (Can be modified by instruction or upper computer)
protocol	RS485 (Modbus-RTU default, Private protocols can be customized)
Address	1(Default)~99 (Can be modified by instruction or upper computer)
Number of nodes	99
Mechanical parameters	
Connector	Compressing sleeve: 8mm, 1/4inch, 1/8inch VCR: 1/4 in. Others are optional.
Body material	Gas channel: 316L Stainless steel Shell: Aluminum alloy
Wetted material	FKM rubber
Weight	0.95kg

Note

- * Unless otherwise stated, this product is calibrated under the following conditions: N₂, temperature 25 °C, 2 bar pressure difference(inlet 3bar absolute pressure, outlet 1bar absolute pressure), horizontally placed and installed.
- * Recommend to install a straight pipe section of appropriate size at the inlet. Otherwise, the accuracy may be biased.
- * Suggest the interface connector should be as large as possible to avoid extra pressure loss.
- ① The range shown is the optional range of N₂.
- ② %F.S. is the percentage of error value to full range.
- ③ %S.P. is the error value to setting point.
- ④ Response time means the time need to reach to the setting point within ± 2%.
- ⑤ Working pressure is the pressure difference between inlet and outlet.

Dim. and Comm

Remark: the products dimension will be different according to flow range.



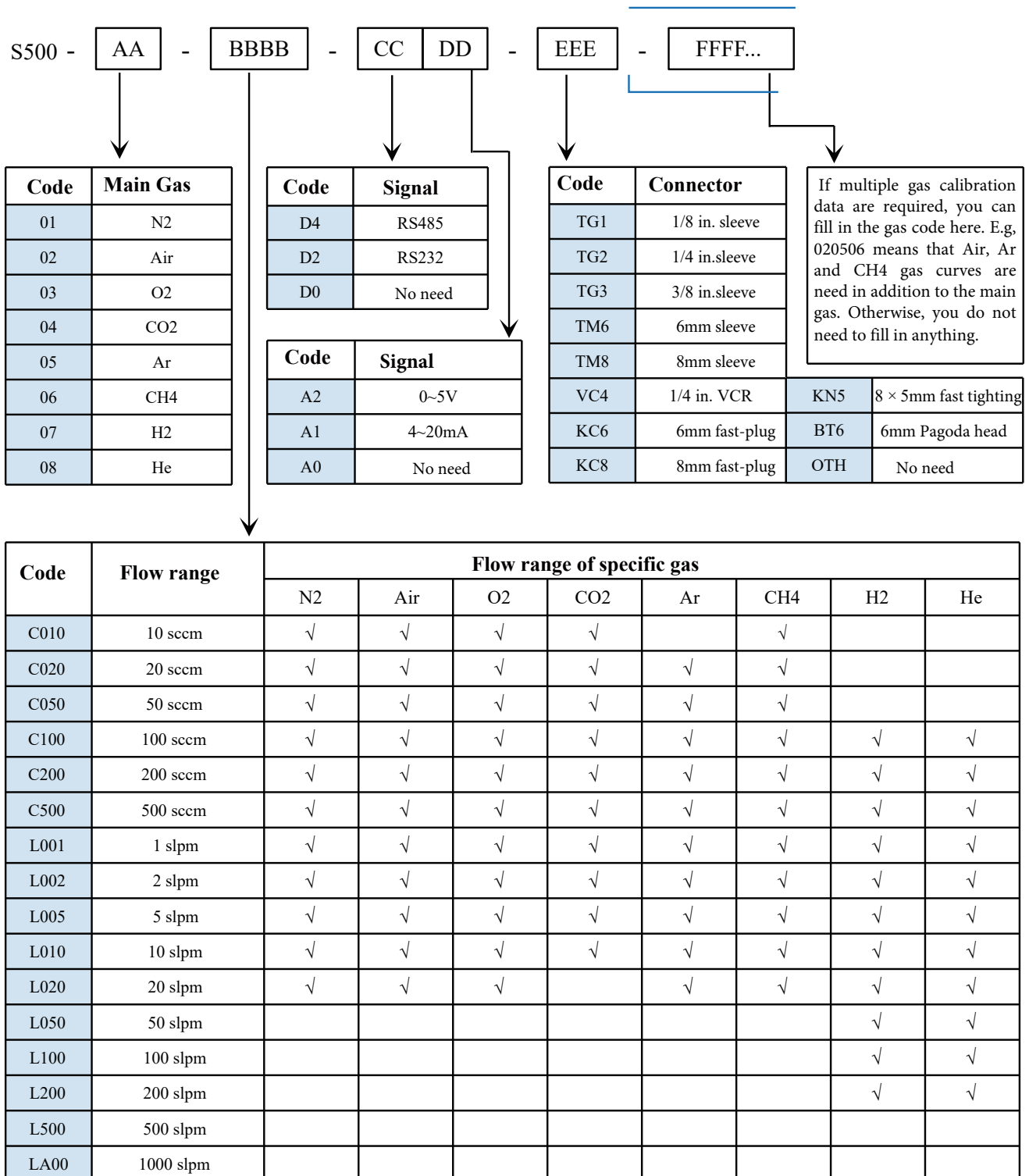
D-SUB9 Line sequence definition

D-SUB9 instrument pin sequence number	Line sequence definition
1	Valve open/close
2	Analog output
3	Power (DC24V)
4	GND
5	RS485-A
6	Analog control
7	GND
8	GND
9	RS485-B

RJ45 Line sequence definition

RJ45 instrument pin sequence number	Line sequence definition
1	/
2	/
3	/
4	RS485-A
5	RS485-B
6	/
7	/
8	/

Selection Guide



Sample 1: S500-01-C100-D4A0-TM8-020506

Sample 2: S500-02-L010-D4A1-VC4

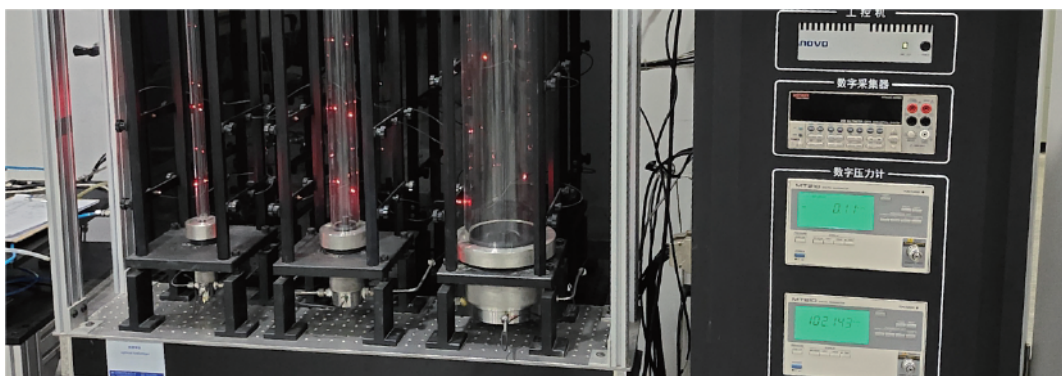
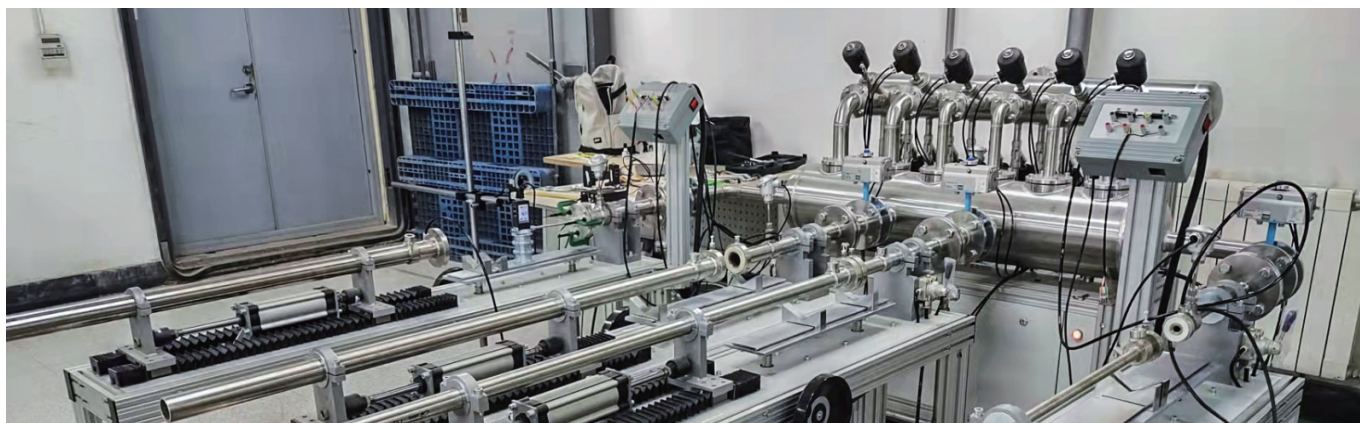
Service

Benefits

- Fast delivery, prestigious pre-sales and after-sales services;
- Tailored product configuration according to environment conditions;
- Economical, help clients to save purchasing and maintenance cost;
- Distinguished stability and long time service life;
- Professional research and development team, which can provide great technical support and guarantee
- Based on the principle of MEMS thermal conduction, the gas flow rate can be measured with high precision, which is not affected by environmental parameters such as temperature and pressure.

Calibration

In the calibration process, we have several high-end equipment, such as piston standard flow device (accuracy $\pm 0.3\%$ S.P.), sonic nozzle standard flow device (accuracy $\pm 0.13\%$ S.P.), Fluke Molbox flow device (accuracy $\pm 0.125\%$ S.P.), they help to ensure product accuracy.





Safety & Warranty

Safety

When products are used for harmful gas or explosive gas, it must be strictly follow the operation instructions or consult with Kunke technicians. For the latest information on product applications, please contact with Kunke or visit our website. Strong corrosive or fluoride gases may affect the normal operation or even damage of the product. The products have been sealed and underwent leakproof testing before package. The operation under high pressure must follow the limits of the product instructions, otherwise it will cause leakage and safety problems.

Note: Unauthorized alteration or improper operation of the product without Kunke permission can cause unforeseen damage, personal injury and other harmful consequences, Kunke will not take any responsibility.

Warranty

The product must be installed, operated and maintained strictly in accordance with the proper methods under the normal working conditions described in the specification. Product warranty period, 365 days free warranty from the date of delivery. Products which have been repaired or replaced, the warranty period is 90 days or extension of the original warranty period (whichever is the longer).

Kunke Microsystem Technology Co., Ltd (hereinafter referred to as Kunke) shall not be liable for any direct or indirect damage and loss caused by installation, disassembly and replacement (but not limited to installation, disassembly and replacement). In order to avoid unnecessary disputes, clients should return their questionable products to Kunke. After Kunke confirms the problem, it determines the maintenance or replacement. The returning fee and possible risks are at client's expense. Kunke undertake the cost and possible risks of returning the product to clients. All sales contracts of Kunke confirm that clients automatically accept this warranty and the limited liability of Kunke. Only Kunke has the right to change, revise warranty conditions or decide not to implement its terms.

Note that warranty clauses do not apply in the following conditions:

1)The product has been altered, modified, in an abnormal (or otherwise) environment as specified in the specification and in any other situation which may be considered as abnormal operation; 2)not the original product of Kunke.

Environmental-friendly Requirements

For packaging box, filling materials, anti-static bags and other materials, please classify them into paper, plastic and other garbage. For items that reach service life, please refer to the relevant national scrapping regulations for electronic and electrical products.