

—— Sensor and controller ——

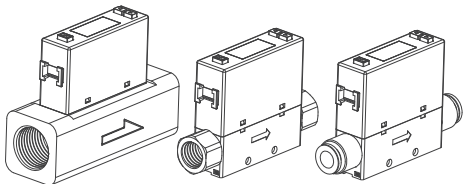
■ Flow ■ pressure ■ temperature ■ level ■ position

KATU 卡图

Operation instruction

Gas flow sensor

FM312/FM313



Purpose of product application

The 500 Series sensor (switch) has two switch outputs and one analog output.



danger

The sensor (switch) can only be used in the specified application range.

The temperature range must be within the permissible range. Do not exceed the rated pressure and power load value.

Assembly, commissioning and operation must be carried out in accordance with applicable national and local safety instructions.

The switch is designed to be used as a safety device for pressurizing the system in accordance with "Pressure Equipment Directive 97/23 / EC(PED)".

Standard

The standards applied during development, manufacturing and configuration are listed in the CE Compliance and manufacturer declarations.

Quality assurance

Our scope of delivery and service is subject to legal warranties and warranty periods.

Warranty clause

We guarantee that the functions and materials of the dual pressure switch meet the statutory requirements under normal operation and maintenance conditions.

Security of loss

Such as:

- Incorrect use,
- Incorrect installation
- Incorrect operation or operation in violation of the provisions of this operation manual.

No liability shall be assumed for any damage resulting therefrom or consequential.

Safety instruction

Safety instructions are intended to protect users from dangerous situations and /or prevent material damage.

In the operating instructions, the severity of the potential risk can be indicated by the following signal words:



danger

An imminent danger to the user. Failure to comply may result in fatal injury.



warning

An identifiable hazard.

Failure to comply may result in fatal injury and damage to equipment or plant parts.



caution

It means a danger.

Non-compliance may result in minor injury and material damage to the sensor (switch) and/or plant.



important

Information that is important to the user.



Deal with

Sensors (switches) must be handled correctly in accordance with national or local regulations for electrical/electronic equipment.

Sensors (switches) cannot be disposed of with household waste!

Switching function

If the switch is higher or lower than the set switching limit (SP, rP), its switching state is changed.
The following switch functions can be selected:

- Hysteresis function normally open: = [Hno] (→ Figure 1)
- Hysteresis function normally closed: = [Hnc] (→ Figure 1)

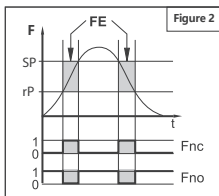
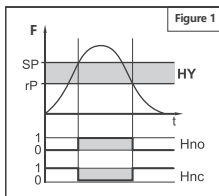
First set the switch point: (SP), Then set the reset point: (rP).

If SP changes again, the hysteresis will change with it.

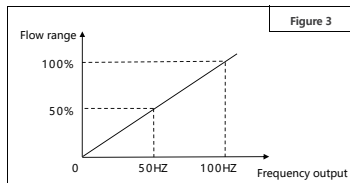
- Window function usually open: = [Fno] (→ Figure 2)
- Window function normally closed: = [Fnc] (→ Figure 2)

The width of the window can be set by the difference between SP and rP.

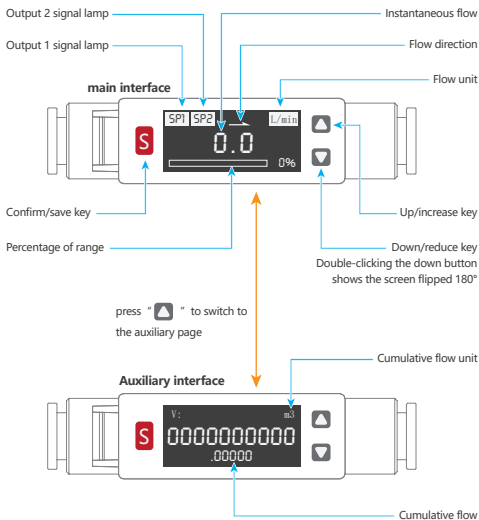
SP = Upper limit value, rP = Lower limit value.



F = System flow; HY = lag; FE = window

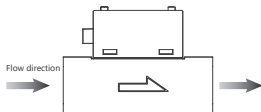


Panel diagram



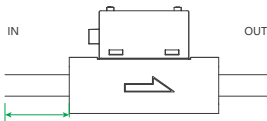
Piping installation instructions

Please arrange the pipes in accordance with the flow direction of the fluid and the direction indicated by the main body



Please install a straight pipe of 8cm or more (with an inner diameter of 9mm or more) on the IN side of the product. Bending of the piping or changes in the cross-sectional area may result in an accuracy of $\pm 2\%$ F.S. The changes.

Do not directly discharge the product into the atmosphere when there is no piping on the OUT side, as it will affect the accuracy.
(3000L-10000L with an inner diameter of 15 or more)

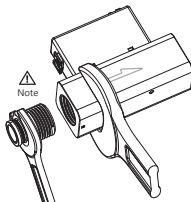


The straight pipe should be over 8cm in length and over 9mm in inner diameter

When piping a metal body, please refer to the table below for the applicable torque.

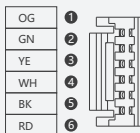
When the joint part is tightened beyond the appropriate torque, there is a possibility of damage to the product. When the locking torque is insufficient, the thread of the connecting pipe may loosen and cause air leakage. After installation is completed, add gas and connect the power supply. Perform appropriate operations and leakage tests to verify if the installation is correct.

Takeover specifications	Applicable torque
Rc1/2", G1/2"	28 ~ 30 N. m
Rc3/4", G3/4"	



Note

Wiring diagram (standard type)



Two switches + one analog (voltage output 1-5V)

color	stitch	Instructions
RD	6	power supply (+)
OG	1	power supply (-)
BK	5 (OUT1)	SP1 switch PNP (factory default) SP1 switch NPN
WH	4 (OUT2)	SP2 switch PNP (factory default) SP2 switch NPN
YE	3 (OUT3)	/
GN	2 (OUT4)	Analog voltage output: 1-5V

Two switches + one analog (current output 4-20mA)

color	stitch	Instructions
RD	6	power supply (+)
OG	1	power supply (-)
BK	5 (OUT1)	SP1 switch PNP (factory default) SP1 switch NPN
WH	4 (OUT2)	SP2 switch PNP (factory default) SP2 switch NPN
YE	3 (OUT3)	/
GN	2 (OUT4)	Analog voltage output: 4-20mA

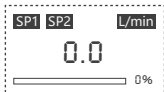
Debugging/Operation (Standard)

Menu 1	
SP1 Set	Switch 1 Set value (default full scale 20%)
RP1 Set	Switch 1 Reset value (default SP1 90%)
SP2 Set	Switch 2 Set value (default full scale 80%)
RP2 Set	Switch 2 Reset value (default SP2 90%)
F-URV	range
Menu 2 Set	Menu 2 Enter

Menu 2 Set	
Factory Reset	factory data reset
out1 Set	OUT1 Output mode
	H-NO: Hysteresis normally open (factory default)
	Hz-OUT: Pulse output
	W-NC: Window normally closed
	W-NO: Window always open
out2 Set	H-NC: hysteresis normally closed
	OUT2 Output mode
	H-NO: Hysteresis normally open (factory default)
	W-NC: Window normally closed
	W-NO: Window always open
ds1 Set	H-NC: hysteresis normally closed
	Switch 1 Output delay (factory default 0.0s)
	dr1 Set
	Switch 1 Reset delay (factory default 0.0s)
	ds2 Set
dr2 Set	Switch 2 Output delay (factory default 0.0s)
	Switch 2 Reset delay (factory default 0.0s)

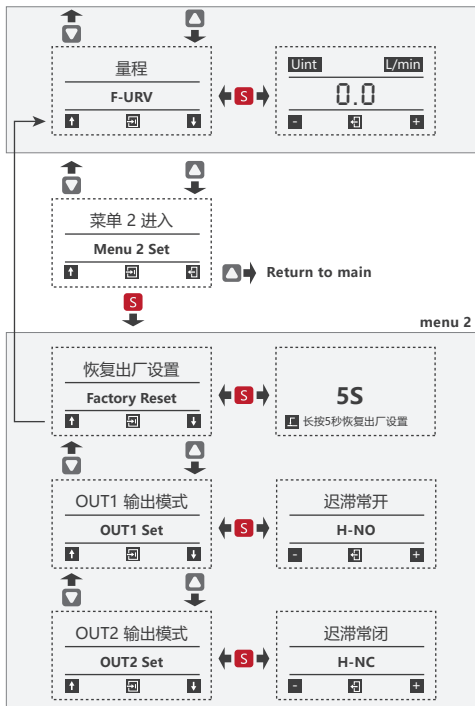
unit Set	Unit setting (Factory default: L/min)
PNP/NPN Set	PNP/NPN Settings (Factory default PNP)
F-C-data	Flow coefficient value (factory default 1.00)
F-ofst	Flow offset value (Factory default 0.0)
F-PACE	Filter damping (factory default 0.5)
Low flow cut	Lower flow rate excision
A0-Mode	Analog output (4-20mA)/(1-5V)
d-P-set	Decimal number (factory default: 0.0)
K-INIT	Initialization delay (factory default: 0.0)
digit colour	Master data color
BG colour	Main background color
out 0 colour	Logical 0 color (factory default red)
out 1 colour	Logic 1 Color (Factory default green)
SCRN-Set	Screen off setting value (factory default: NO)

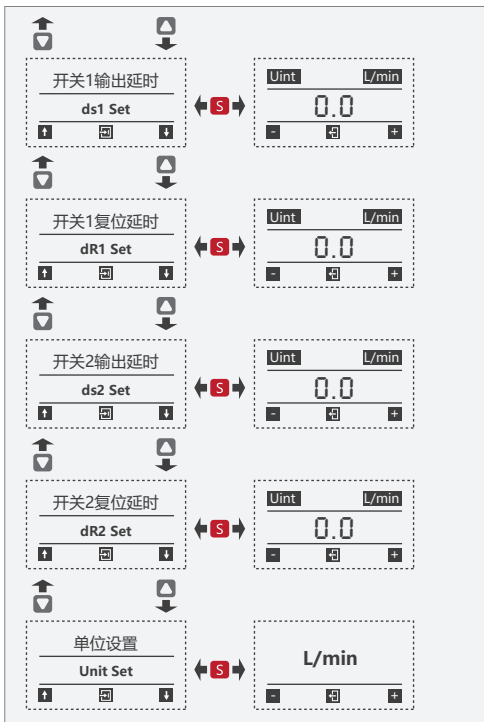
➤ Display menu

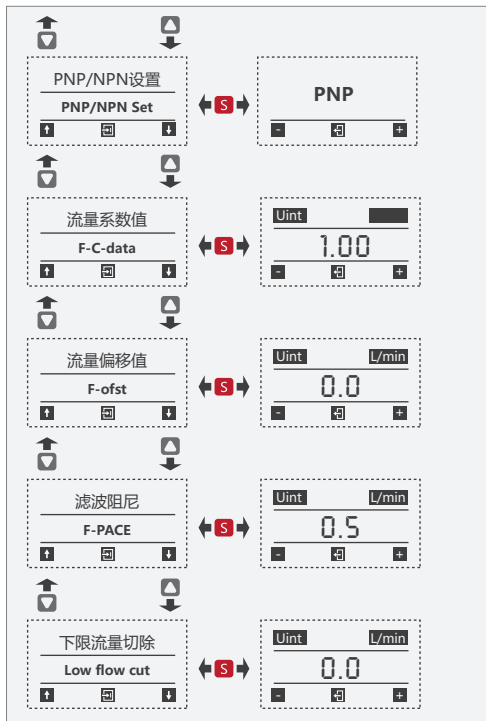


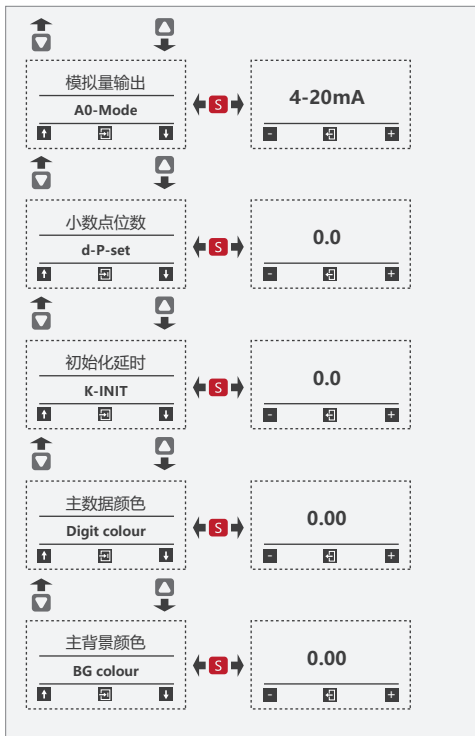
menu 1

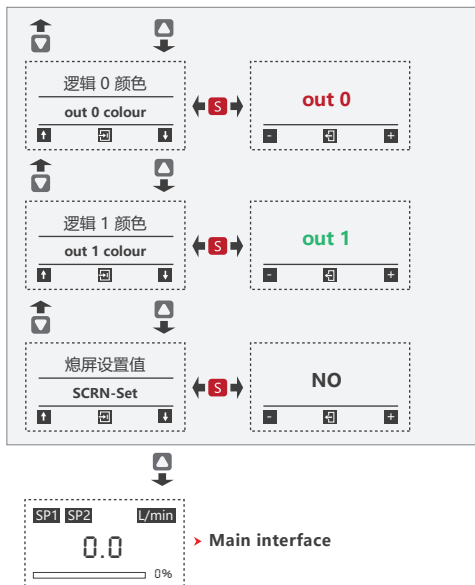




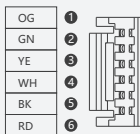








Wiring diagram (RS485)



Two-way switch+RS485

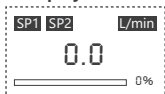
color	stitch	Instructions
RD	6	power supply (+)
OG	1	power supply (-)
BK	5	RS485(A)
WH	4	RS485(B)
YE	3 (OUT1)	SP1 switch PNP (factory default) SP1 switch NPN
GN	2 (OUT2)	SP2 switch PNP (factory default) SP2 switch NPN

Menu 1	
SP1 Set	Switch 1 Set value (factory default full scale 20%)
RP1 Set	Switch 1 Reset value (factory default SP1 90%)
SP2 Set	Switch 2 Set value (factory default full scale 80%)
RP2 Set	Switch 2 Reset value (factory default SP1 90%)
F-URV	range
485 ID	485 address (Factory default 1)
Baud set	Baud Rate Settings (Factory default 9600)
parity set	Check bit setting (factory default None)
stop bit set	Stop bit Settings (factory default 1 bit)
Menu 2 Set	Menu 2 Enter

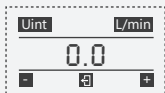
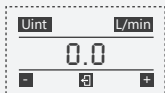
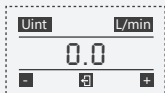
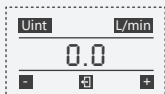
Menu 2 Set	
Factory Reset	factory data reset
out1 Set	OUT1 Output mode
	H-NO: Hysteresis normally open (factory default)
	Hz-OUT: Pulse output
	W-NC: Window normally closed
	W-NO: Window always open
out2 Set	H-NC: hysteresis normally closed
	OUT2 Output mode
	H-NO: Hysteresis normally open (factory default)
	W-NC: Window normally closed
	W-NO: Window always open
ds1 Set	H-NC: hysteresis normally closed
	Switch 1 Output delay (factory default 0.0s)
	Switch 1 Reset delay (factory default 0.0s)
	Switch 2 Output delay (factory default 0.0s)
dr2 Set	Switch 2 Reset delay (factory default 0.0s)

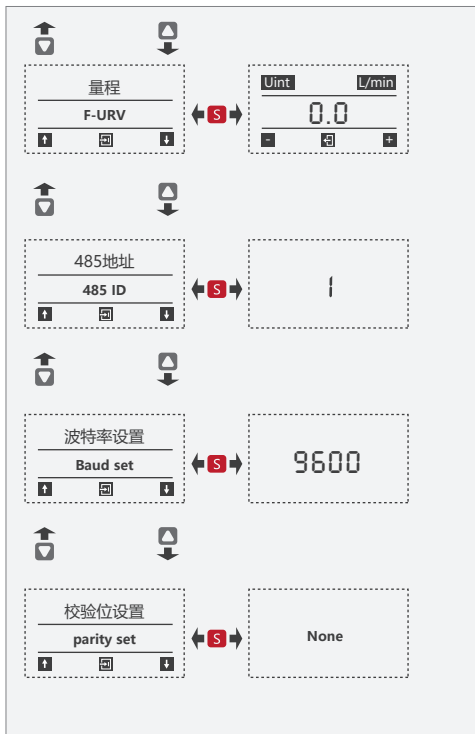
unit Set	Unit setting
	L/min (factory default)
PNP/NPN Set	PNP/NPN Settings (Factory default PNP)
F-C-data	Flow coefficient value (factory default 1.00)
F-ofst	Flow offset value (Factory default 0.0)
F-PACE	Filter damping (factory default 0.5)
Low flow cut	Lower flow rate excision
Fi-C-set	Filter coefficient value (factory default: 10.0)
d-P-set	Decimal number (factory default: 0.0)
digit colour	Master data color
BG colour	Main background color
SCRN-Set	Screen off setting value (factory default: NO)

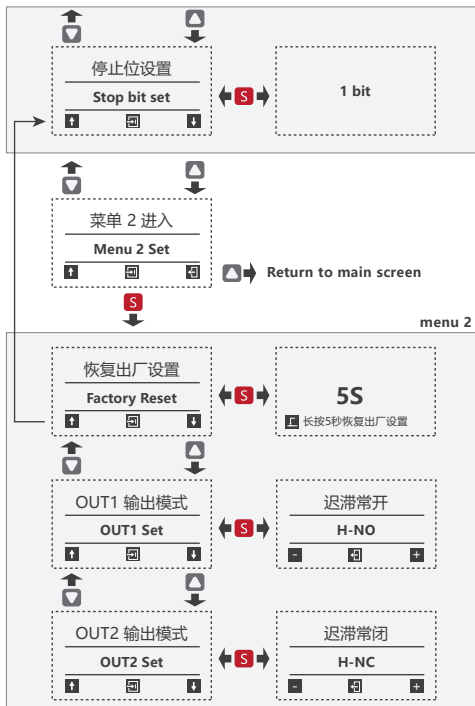
► Display menu

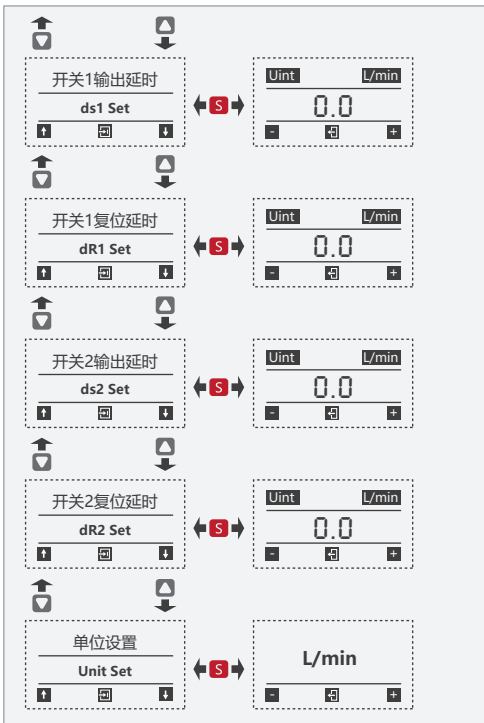


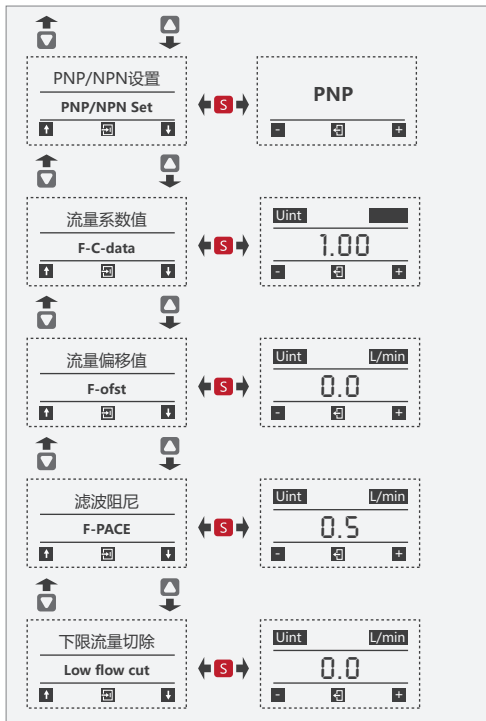
menu 1

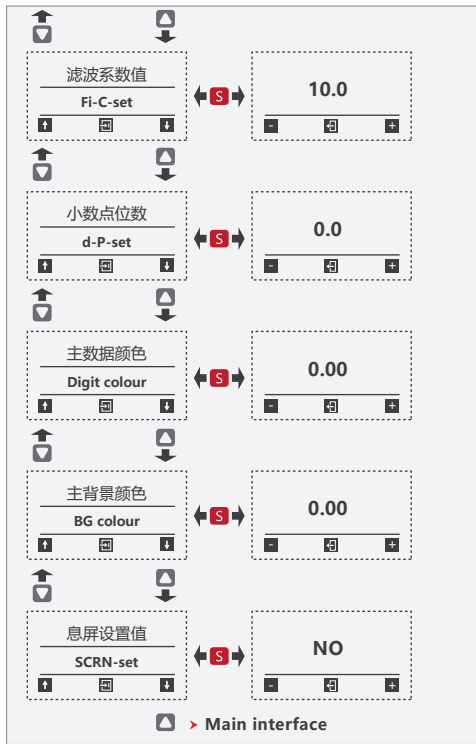












Maintenance/cleaning

Sensors (switches) do not require maintenance.



warning

Periodically check whether the switch is working properly.

If the switch does not work properly, stop the operation immediately.



caution

Use of improper cleaning agent may damage the switch.

The following cleaning agents can be used to clean polycarbonate: mild soap or detergent Isopropyl alcohol

Immediately after cleaning, rinse with water. Do not leave cleaner on the surface of the product. Do not clean products in high heat or direct sunlight.

The following cleaning agents are known to affect the integrity of polycarbonate components and should not be used: ZEP Fast 505, Pinesol, Formula 409

Halogenated solvents (benzene, gasoline, acetone or carbon tetrachloride)

Strong alkalinity

Methyl ethyl ketone

Abrasive substance

disassemble



danger

Only remove the switch in case of power failure (electrical, hydraulic/pneumatic).

Switch disconnection from pressure and power supply must be performed by trained or directed personnel in accordance with the most advanced standards.



warning

Be aware that the surface of the shell may become very hot if the operating temperature is higher!

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