Principle and Characteristics

- Vortex street principle
-2 groups of 4-20mA analog signal output;
- Support digital output, RS485 can be customized
- Can monitor gas, liquid
- Unaffected by static pressure of the pipe
- Simple structure, no moving parts
- Easy installation, no need for on-site calibration and commissioning, maintenance free

Product Application

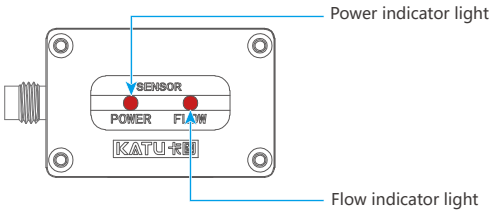
- Monitoring of cooling water, circulating water and critical water flow
- flow monitoring
- gas of organic matter, inorganic matter solution (oxygen, nitrogen, ammonia gas, natural gas, etc.) flow monitoring
- Frost protection, spray system, sewage protection, etc
- Strong anti-fouling ability

Technical parameters

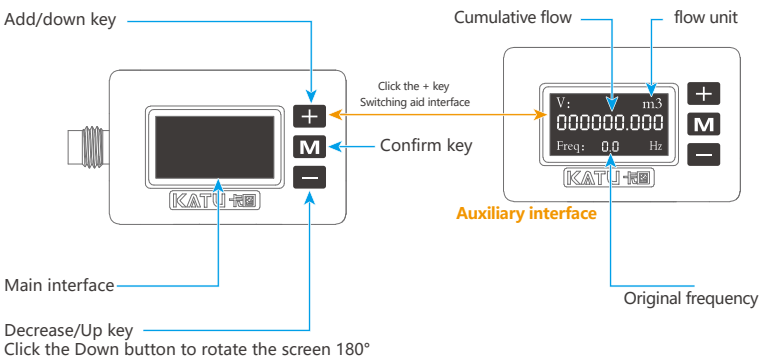
Cardiac flow range:	◇ Process connection:
liquid: 0.5-400 L/min, depending on the pipe size.	Thread type: 3/8~2"
For the specific standard traffic, refer to the traffic range table.	◇ Power supply: 18-30VDC
Gas: Calculated according to specific application	◇ Linearization: 5-point flow linear curve
◇ Temperature range: 0~100℃	◇ Signal output:
Accuracy: < ±3.0%F.S (flow), ≤2.0℃ (temperature)	Three-wire system 4-20mA, linear relationship with flow,
◇ Repeatability: < 2.0%	temperature, maximum 500Ω,
◇ Liquid connection material: PPS (<100L) /SUS304 (stainless steel) /PA66 (>100L)	Pulse frequency, maximum 1 kHz, user configurable,
◇ Pressure rating: 10bar (maximum pressure 16bar)	For example, 1 pulse/liter or 1 liter/pulse
◇ Ambient temperature: -10~65℃	IO-Link/PNP/NPN/RS485
◇ Medium temperature: -20~90℃	◇ PNP/NPN switch load: 24VDC/200mA

Panel diagram

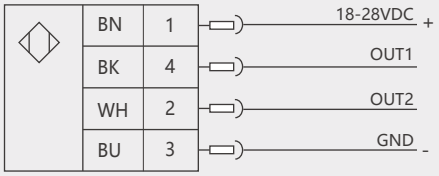
No display



Tape display



Wiring diagram



A2: Two analog (4-20mA)

color	stitch	Instructions	color	stitch	Instructions
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow: 4-20mA (factory default) Temperature: 4-20mA	WH	2 (OUT2)	Temperature: 4-20mA (factory default) FlowTemperature: 4-20mA

V2: Two analog (1-5V)

color	stitch	Instructions	color	stitch	Instructions
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow: 1-5V(factory default) Temperature: 1-5V	WH	2 (OUT2)	Temperature: 1-5V (factory default) FlowTemperature: 1-5V

SA: one switch output/pulse frequency /IO-Link+ analog (4-20mA) - with temperature

color	stitch	Instructions	color	stitch	Instructions
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow switch: PNP(factory default) Flow switch: NPN Temperature switch: PNP Temperature switch: NPN Original frequency Linear frequency (full scale 100Hz) IO-Link	WH	2 (OUT2)	Flow: 4-20mA (factory default) Temperature: 4-20mA

SA: one switch output/pulse frequency /IO-Link+ analog (4-20mA) - without temperature

color	stitch	Instructions	color	stitch	Instructions
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow switch: PNP (factory default) Flow switch: NPN Original frequency Linear frequency (full scale 100Hz) IO-Link	WH	2 (OUT2)	Flow: 4-20mA (factory default)

SV: one switch output/pulse frequency /IO-Link+ analog (1-5V) - with temperature					
color	**stitch**	**Instructions**	**color**	**stitch**	**Instructions**
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow switch: PNP(factory default) Flow switch: NPN Temperature switch: PNP Temperature switch: NPN Original frequency Linear frequency (full scale 100Hz) IO-Link	WH	2 (OUT2)	Flow: 1-5v (factory default) Temperature: 1-5v

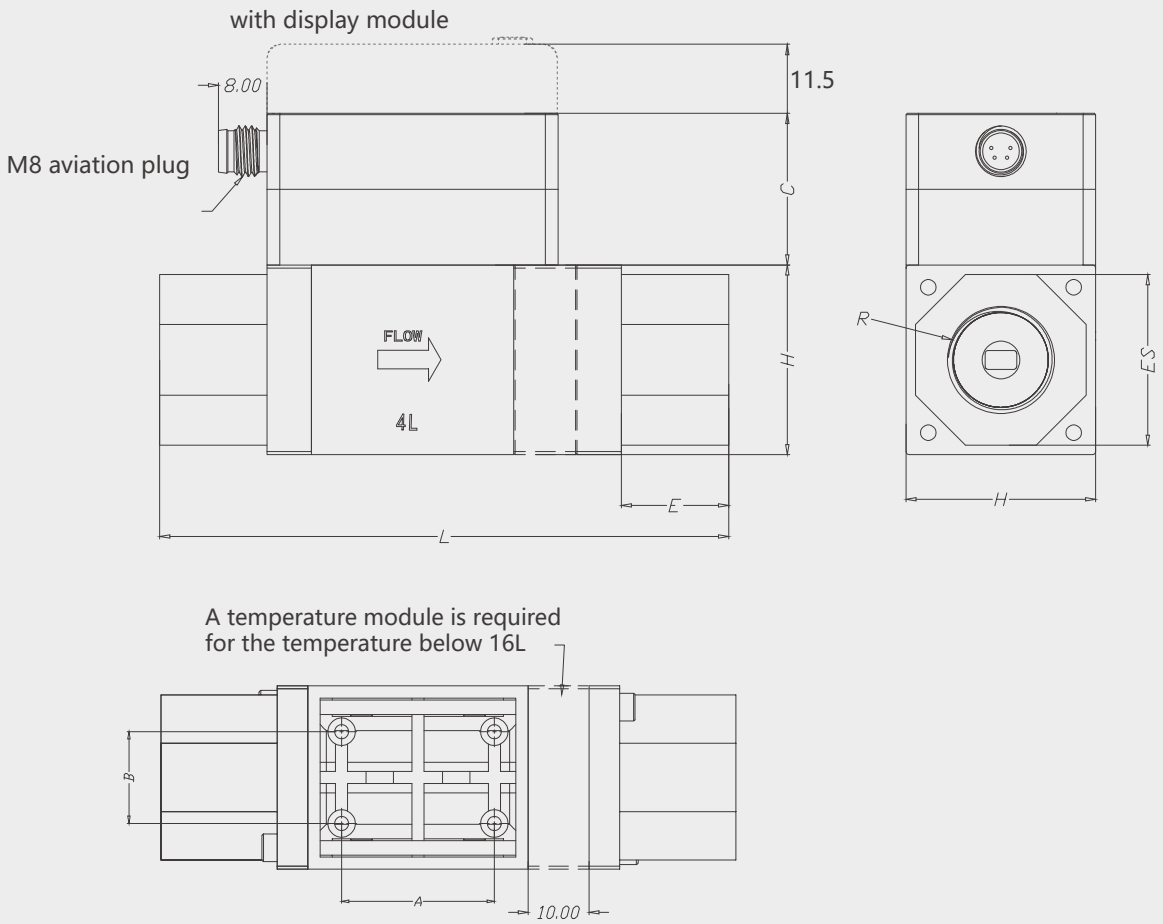
SV: one switch output/pulse frequency /IO-Link+ analog (1-5V) - without temperature					
color	**stitch**	**Instructions**	**color**	**stitch**	**Instructions**
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow switch: PNP (factory default) Flow switch: NPN Original frequency Linear frequency (full scale 100Hz) IO-Link	WH	2 (OUT2)	Flow: 1-5v(factory default)

S2: two switch output/pulse frequency /IO-Link - with temperature					
color	**stitch**	**Instructions**	**color**	**stitch**	**Instructions**
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow switch: PNP (factory default) Flow switch: NPN Temperature switch: PNP Temperature switch: NPN Original frequency Linear frequency (full scale 100Hz) IO-Link	WH	2 (OUT2)	Flow switch: PNP (factory default) Flow switch: NPN Temperature switch: PNP Temperature switch: NPN

S2: two switch output/pulse frequency /IO-Link - without temperature					
color	**stitch**	**Instructions**	**color**	**stitch**	**Instructions**
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Flow switch: PNP (factory default) Flow switch: NPN Original frequency Linear frequency (full scale 100Hz) IO-Link	WH	2 (OUT2)	Flow switch: PNP (factory default) Flow switch: NPN

RS485 communication					
color	**stitch**	**Instructions**	**color**	**stitch**	**Instructions**
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	RS485(A)	WH	2 (OUT2)	RS485(B)

dimension figure (mm)



Selection code	Mounting hole position (A) mm	Mounting hole position (B) mm	Height of shell (C) mm	Body height (H) mm	Body length (L) mm	Lock bit (E) mm	Connector hex/square (ES/H) mm	Flow range L/min	Process connection (R/G)
004A	25	15	24	30*30	78 (Without temperature) 88 (Band temperature)	17	ES 27	0.5-4	3/8 (Effective screw 15mm)
004B									1/2 (Effective screw 15mm)
016A	25	15	24	30*30	84 (Without temperature) 94 (Band temperature)	19	ES 27	2-16	3/8 (Effective screw 15mm)
016B									1/2 (Effective screw 15mm)
040A	40	15	20	40*40	110	18	ES 34	5-40	1/2 (Effective screw 15mm)
040B									3/4 (Effective screw 15mm)
100A	40	20	20	45*45	120	23	ES 41	10-100	3/4 (Effective screw 20mm)
100B									1" (Effective screw 20mm)
200A	32	31	22	58*58	114	22	H 58	20-200	1-1/4 (Effective screw 20mm)
200B									1-1/2 (Effective screw 20mm)
250A	32	31	22	58*58	114	22	H 58	50-250	1-1/4 (Effective screw 20mm)
250B									1-1/2 (Effective screw 20mm)
400A	32	31	22	65*65	130	30	H 65	150-400	1-3/4 (Effective screw 25mm)
400B									2 " (Effective screw 25mm)

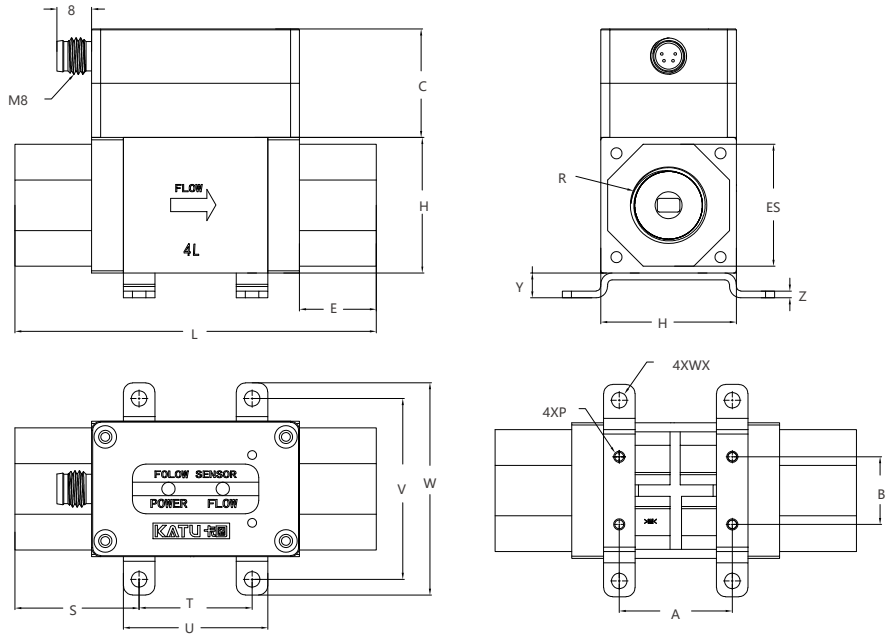
Selection table

FTS520-	004A	GK	M	-	-	-	-	Expatiate
FTS520								FTS520- Electronic flow switch/sensor
	004A							Flow range: 0.5-4L/min (3/8 thread)
	004B							Flow range: 0.5-4L/min (1/2 thread)
	016A							Flow range: 2-16L/min (3/8 thread)
	016B							Flow range: 2-16L/min (1/2 thread)
	040A							Flow range: 5-40L/min (1/2 thread)
	040B							Flow range: 5-40L/min (3/4 thread)
	100A							Flow range: 10-100L/min (3/4 thread)
	100B							Flow range: 10-100L/min (1 "thread)
	200A							Flow range: 20-200L/min (1-1/4 thread)
	200B							Flow range: 20-200L/min (1-1/2 thread)
	250A							Flow range: 50-250L/min (1-1/4 thread)
	250B							Flow range: 50-250L/min (1-1/2 thread)
	400A							Flow range: 150-400L/min (1-3/4 thread)
	400B							Flow range: 150-400L/min (2 "thread)
		GK						Process connection: internal thread G teeth
		RK						Process connection: internal thread R teeth
		NK						Process connection: internal thread NPT
			M					Electrical connection: M8-4Pin aviation plug (standard 2m, customizable wire length)
				-				No temperature measurement function
				T				With temperature measurement function
No display					-			Output signal: Analog (4-20mA) Factory default
					V			Output signal: Analog (1-5V)
					S			Output signal: IO-Link/ pulse frequency (factory default pulse frequency; Support IO-Link command wake up function)
					R			Output signal: RS485 signal
with display					A2			Output signal: two analog channels (4-20mA) — Optional with temperature only
					V2			Output signal: two analog channels (1-5V) — Optional with temperature only
					SA			Output signal: one switch output/pulse frequency /IO-Link+ analog (4-20mA)
					SV			Output signal: one switch output/pulse frequency /IO-Link+ analog (1-5V)
					S2			Output signal: two switch output/pulse frequency /IO-Link
					RL			Output signal: RS485 signal
						-		No regulating valve (factory default)
						F		With straight-through regulating valve (optional for ≤40L)
							-	No bracket (factory default)
							T	Supported by a bracket

⚠ Attention

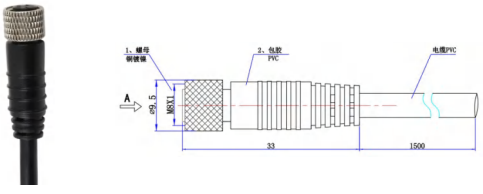
Our company's products are developed, designed and manufactured as automatic control component products, and are targeted at the manufacturing industry for the purpose of peaceful use.
It is not applicable when used outside the manufacturing industry.
The products manufactured and sold by our company cannot be used for transactions or certifications as stipulated by the metrology laws of various countries.
According to Japan's new measurement law, Japan can only use the SI unit.

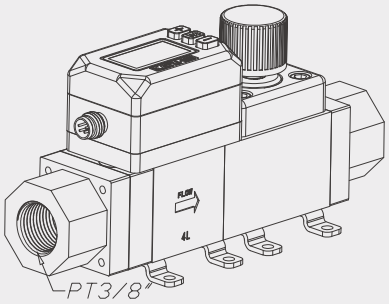
Dimensions drawing of mounting bracket (mm)



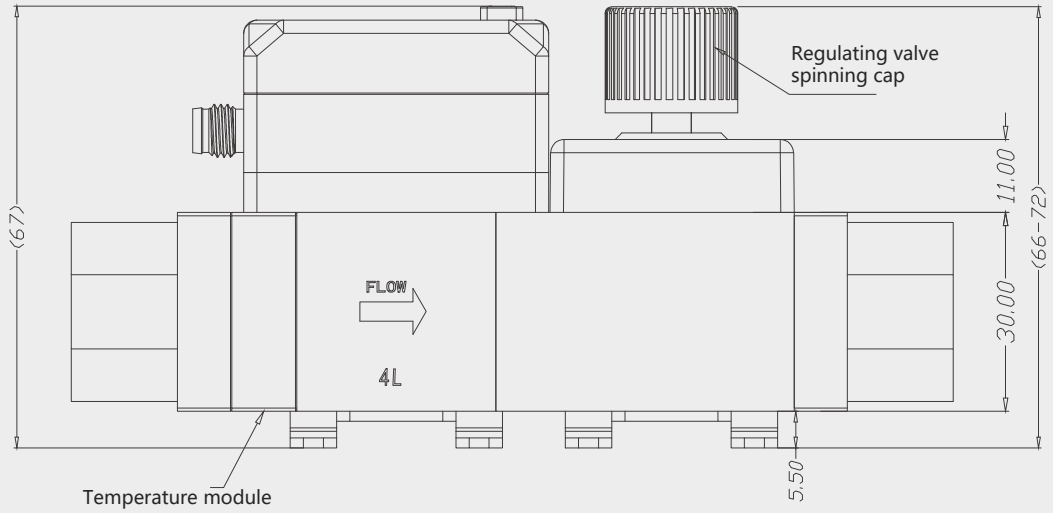
Selection code	Bracket mounting holes		Overall dimensions of bracket		lock screw	Mounting hole diameter	Height of bracket	Thickness of bracket plate	margin
	T (mm)	V (mm)	W (mm)	U (mm)	P (mm)	WX (mm)	Y (mm)	Z (mm)	S (mm)
FTS520-004T	25	40	47	32	M2.5*10 deep	3.5	5.5	1.5	28
FTS520-016T	25	40	47	32	M2.5*10 deep	3.5	5.5	1.5	30
FTS520-040T	40	50	60	49	M4*10 deep	4.5	5.5	1.5	35
FTS520-100T	40	55	65	49	M4*10 deep	4.5	5.5	1.5	40
FTS520-200T	32	68	78	41	M4*10 deep	4.5	5.5	1.5	41
FTS520-250T	32	68	78	41	M4*10 deep	4.5	5.5	1.5	41
FTS520-400T	32	75	85	41	M4*10 deep	4.5	5.5	1.5	49

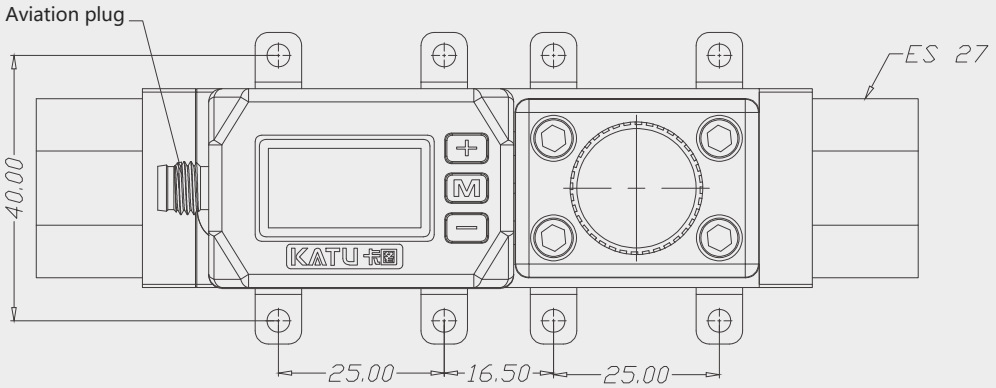
Optional accessories - electrical accessories

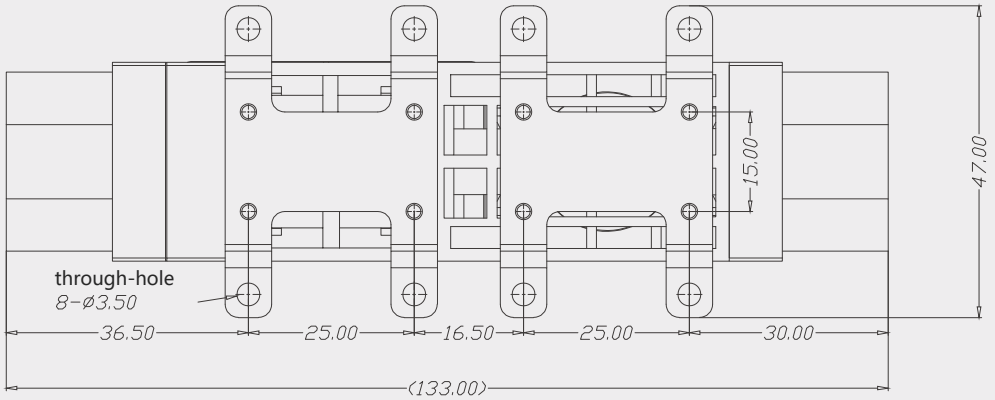
name	Contour drawing/dimension drawing (Unit :mm)	material	Model number
M8-4Pin (2m cable)		PVC	M84PC02G
M8-4Pin (5m cable)			M84PC05G
M8-4Pin (10m cable)			M84PC010G

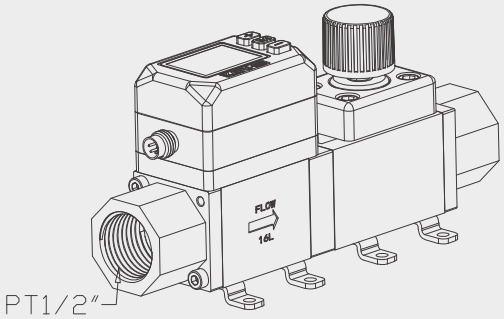


4L with through valve dimensions (mm)

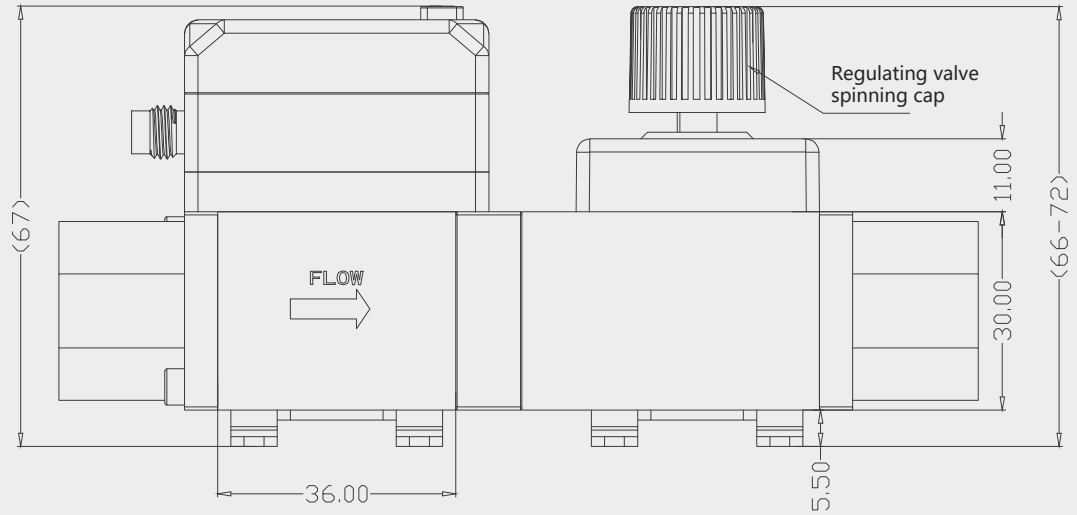


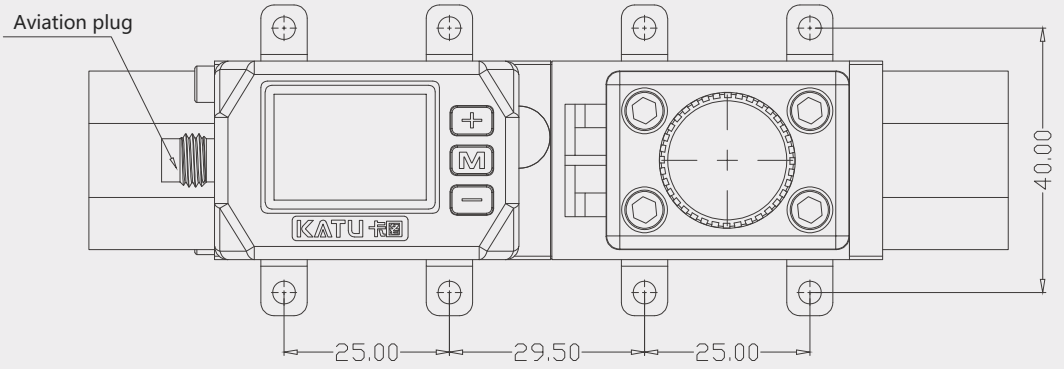


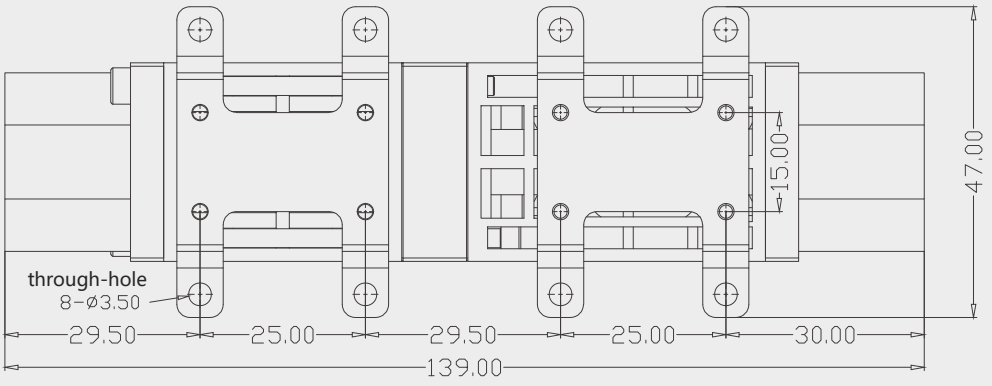




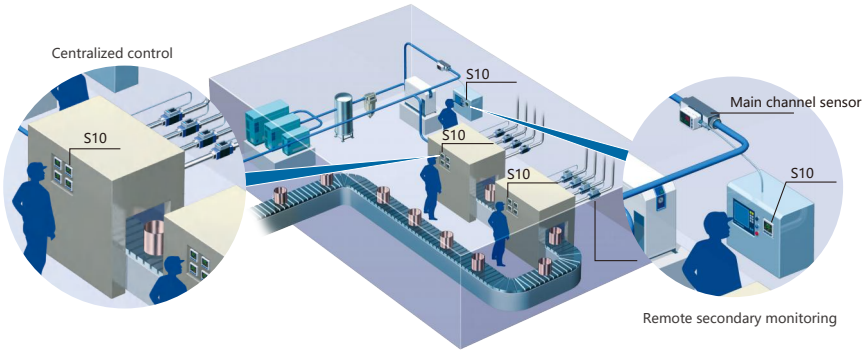
16L with through valve dimensions (mm)







Application drawing



Technical parameter

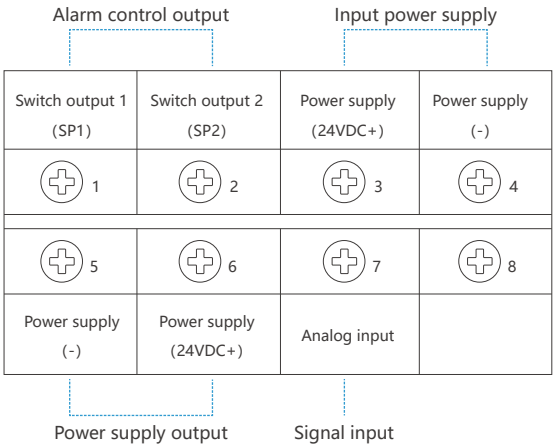
- Input specification: Analog quantity (pulse)/PT100 is optional
- Display range: -199.9~999.9
- Temperature drift: ≤ ±0.015%FS /℃ (typical value about ±75ppm/℃)
- Electromagnetic compatibility:

  IEC61000-4-4 (electrical fast transient pulse group), ±4KV/5KHz;

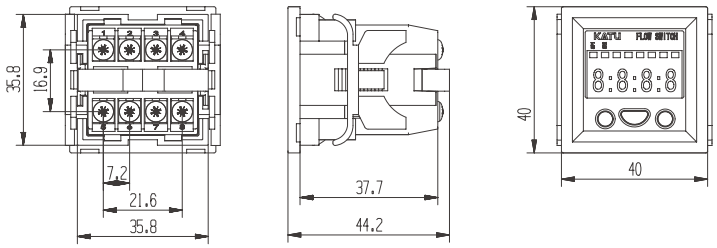
  IEC61000-4-5 (Surge), 4KV
- Output function: Switch/analog quantity is optional
- Power supply: 24VDC ±20%
- Power consumption: ≤ 3W
- Operating environment: temperature -10~+60℃;

  Humidity ≤ 90%RH

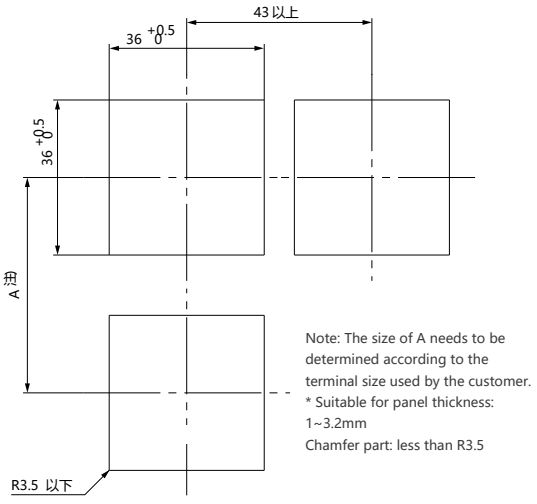
Wiring diagram



Size drawing (mm)

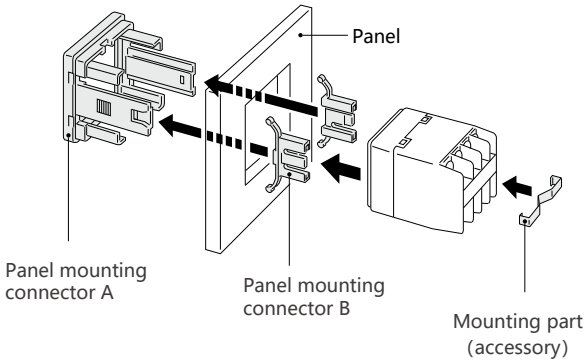


Panel opening size



Note: The size of A needs to be determined according to the terminal size used by the customer.
* Suitable for panel thickness: 1~3.2mm
Chamfer part: less than R3.5

Panel mounting



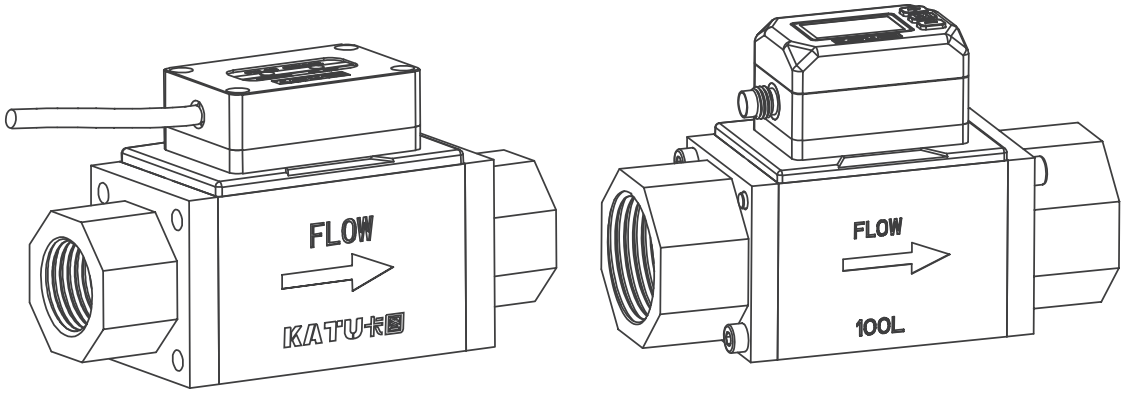
Order model	Technical Description	
S10-21	Input signal: Analog quantity Output signal: Output by two switches	Display unit: L/min

Sensor and controller

■ Flow ■ pressure ■ temperature ■ level ■ position

KATU 卡图

Operation instruction
Electronic flow switch/sensor
FTS520 Series



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.

Failure to comply may result in minor injury and material damage to the switch and /or plant.

important

Information that is important to the user.

Deal with

Switches must be properly handled in accordance with national or local regulations for electrical/electronic equipment.

Switches cannot be disposed of with household waste!

Technical parameter

◇ Flow range:

liquid: 0.5-400 L/min, depending on pipe size.

Please refer to the flow range table for specific standard flow rate.

Gas: calculate according to the specific application

◇ Temperature range: 0~90℃

Cardiac precision: "plus or minus 3.0% F.S (traffic), 2.0 ℃ or less (temperature)

◇ Repeatability: < 2.0%

◇ Liquid material: PPS/SUS304 (stainless steel)

◇ Pressure rating: 10bar (maximum pressure 16bar)

Derive the environment temperature: - 10 ~ 65 ℃

◇ Medium temperature: -20~90℃

◇ Process connection:

Thread type: 3/8~2"

◇ Power supply: 18-28VDC

◇ Linearization: 5-point flow linear curve

◇ Signal output: 4-20 ma, three-wire system and flow,

a linear relationship with temperature, maximum 500 Ω,

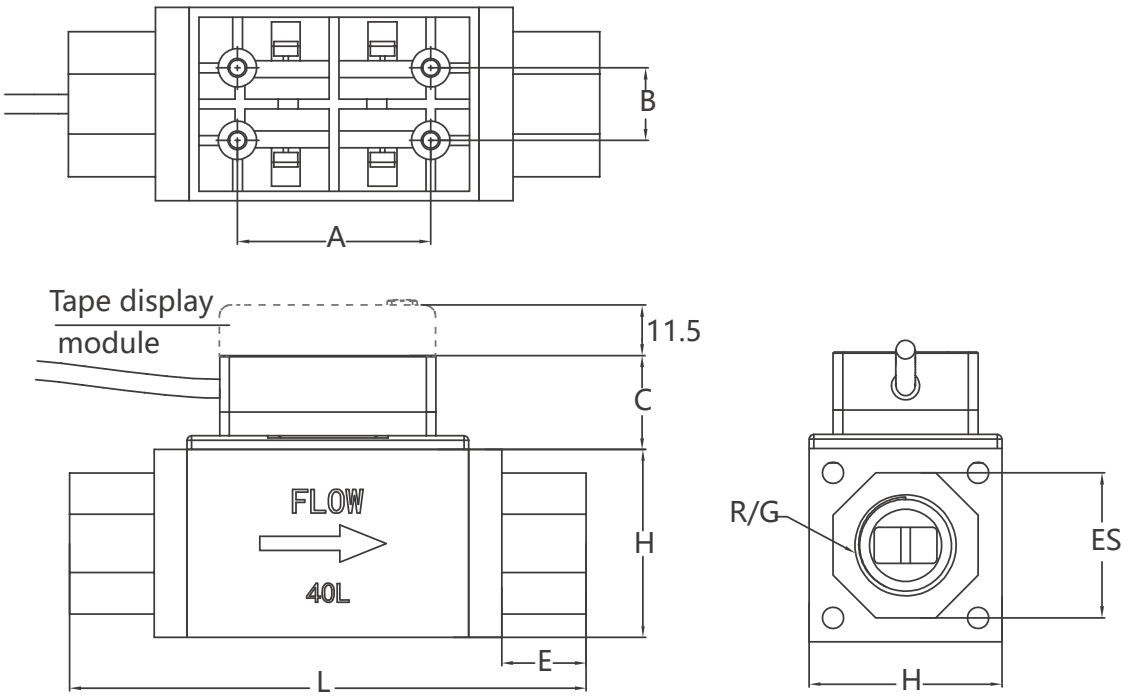
Pulse frequency, maximum 1 kHz, user configurable,

For example, 1 pulse/L or 1 liter/pulse

IO-Link/PNP/NPN/RS485

◇PNP/NPN switch load: 24VDC/200mA

Dimensional drawing

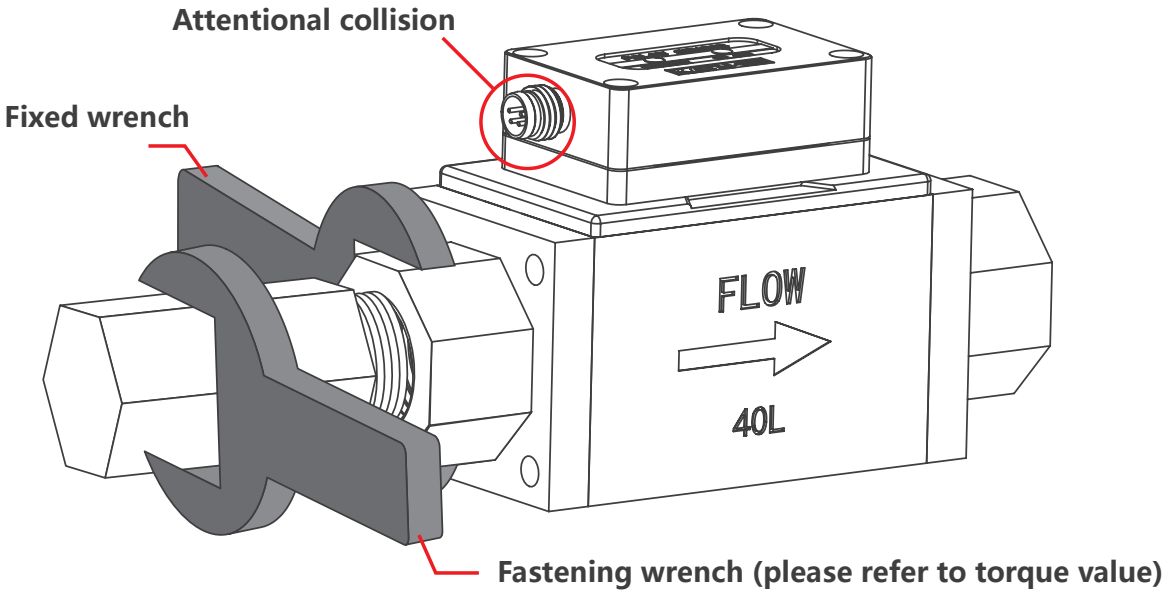


Selection code	Mounting hole position (A)	Mounting hole position (B)	Height of shell (C)	Body height (H)	Body length (L)	Lock bit (E)	Joint hexagon (ES)	Flow range L/min	Process connection (R/G)
004A	25	15	18	30*30	78（Without temperature）	16	27	0.5-4	3/8
004B									1/2
016A	25	15	18	30*30	84（Without temperature）	19	27	2-16	3/8
016B									1/2
040A	40	15	20	40*40	110	18	34	5-40	1/2
040B									3/4
100A	40	20	20	45*45	120	23	41	10-100	3/4
100B									1"
250A	32	31	22	58*58	114	22	58	50-250	1-1/4
250B									1-1/2
400A	32	31	22	65*65	130	30	65	100-400	1-3/4
400B									2“

（unit:mm） Effective screw 15mm

Install

- Piping method:
  When piping a product, use a wrench to pipe the metal parts (pipe fittings) that are integrated with the piping part.
  If you use a wrench in other parts, the flow switch may be damaged.
  In particular, no spanner can be used on the M12 connector.
  Otherwise, the connector may be damaged



Please strictly observe the safe torque value of piping:

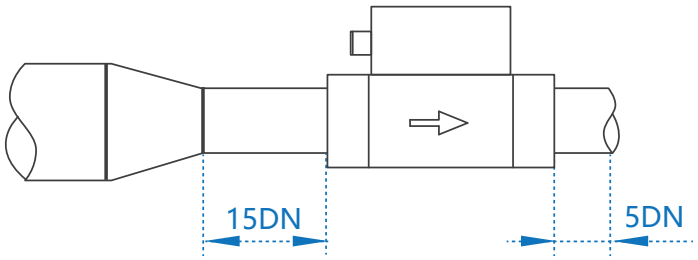
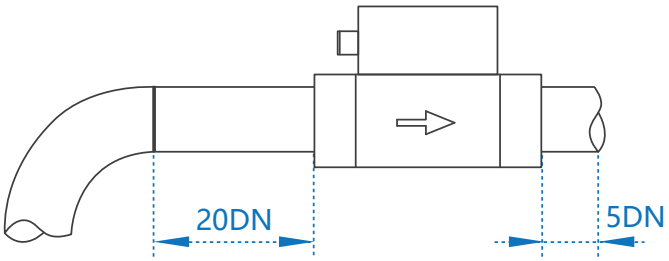
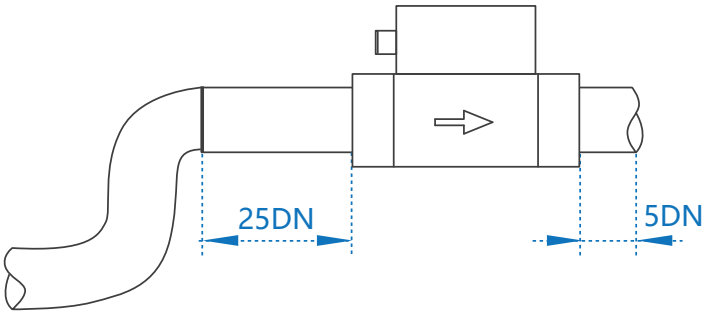
thread	Applicable torque range	Torque safe range
G 3/8	22~24 N·m	< 200N·m
G 1/2	28~30 N·m	
G 3/4	28~30 N·m	
G 1	36~38 N·m	
G 1-1/4	40~42 N·m	< 250N·m
G 1-1/2	48~50 N·m	

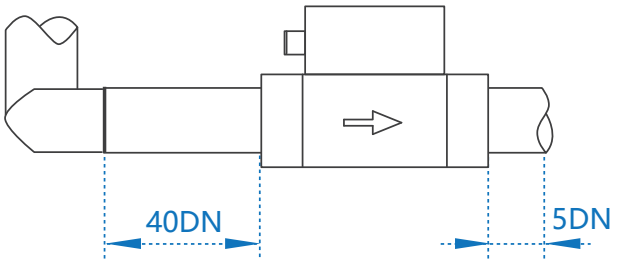
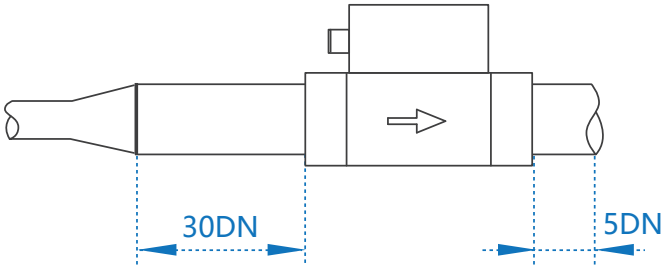
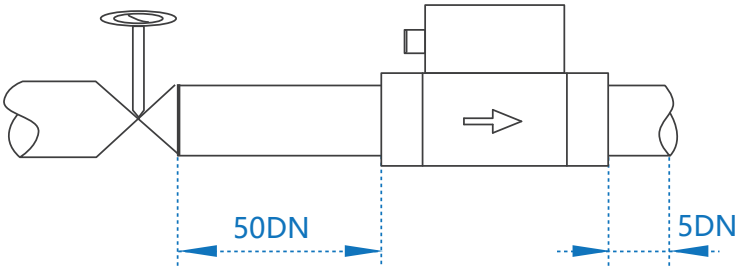
Installation of piping:
Please do not let the sealing tape into the tube.

Piping connection:
Please do not relax and cause liquid leakage.

If the switch is tightened outside the torque range, it may be damaged. If assembled without a specified tightening torque, it may loosen the joint thread.

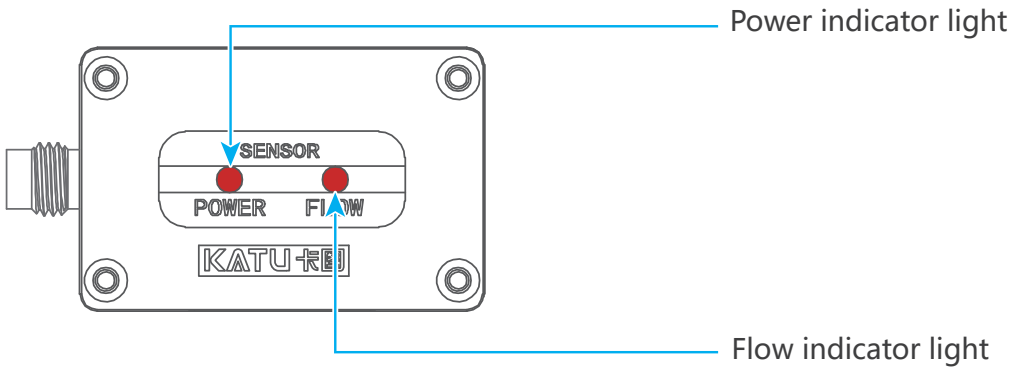
■ **DN is the gauge gauge** **unit:mm**

Sensor upstream pipeline type	Length of front and rear straight pipe section
Concentric contraction Fully open valve	
A 90-degree bend	
Two on the same plane A 90-degree bend	

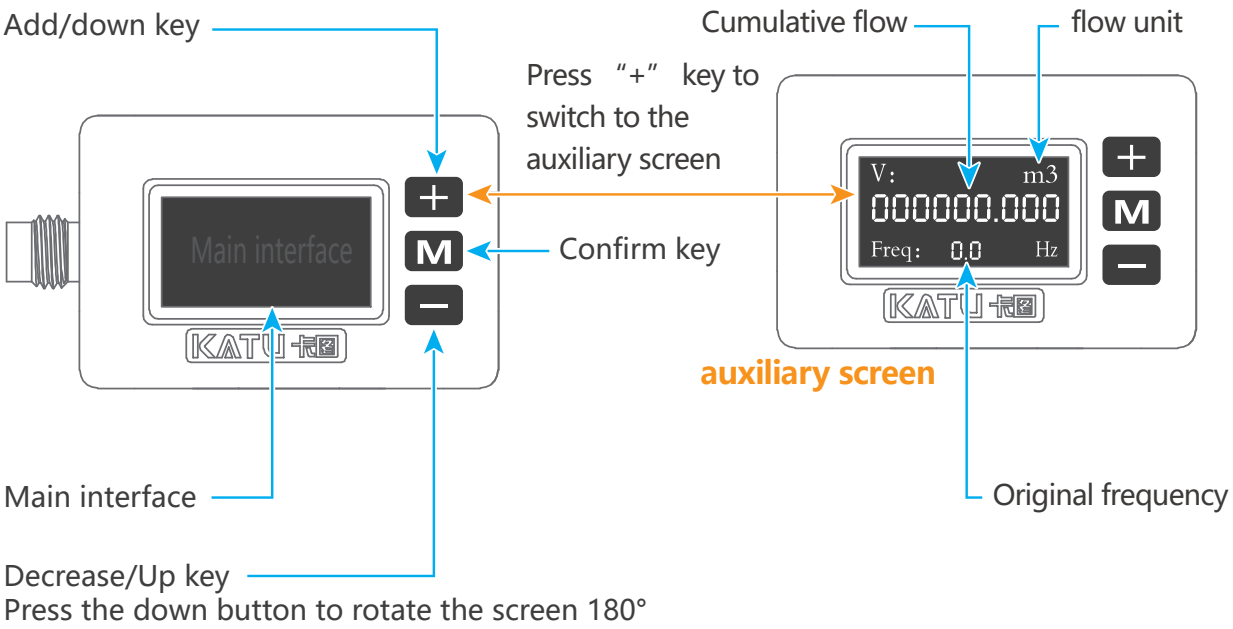
Two different planes A 90-degree bend	
Concentric expansion	
Regulating valve Half open Valve (not recommended)	

Panel diagram

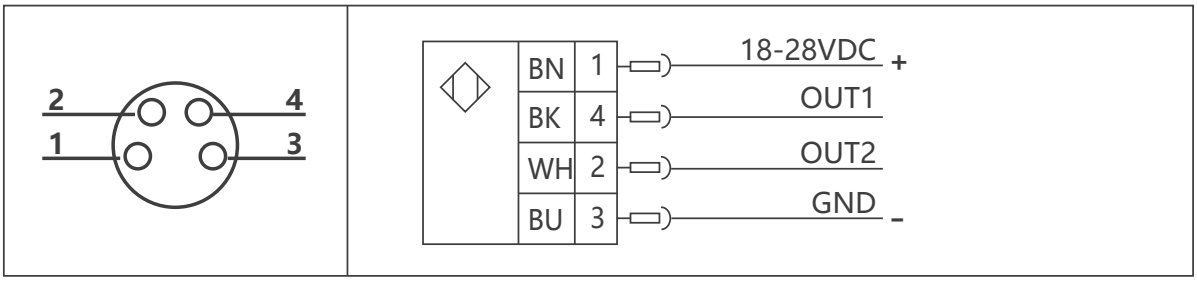
No display



Tape display

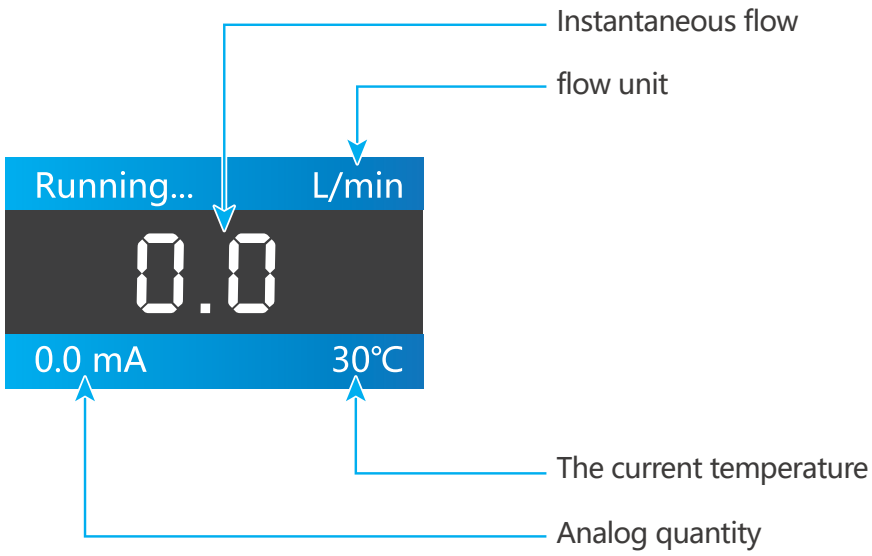


Connection mode (Standard type)



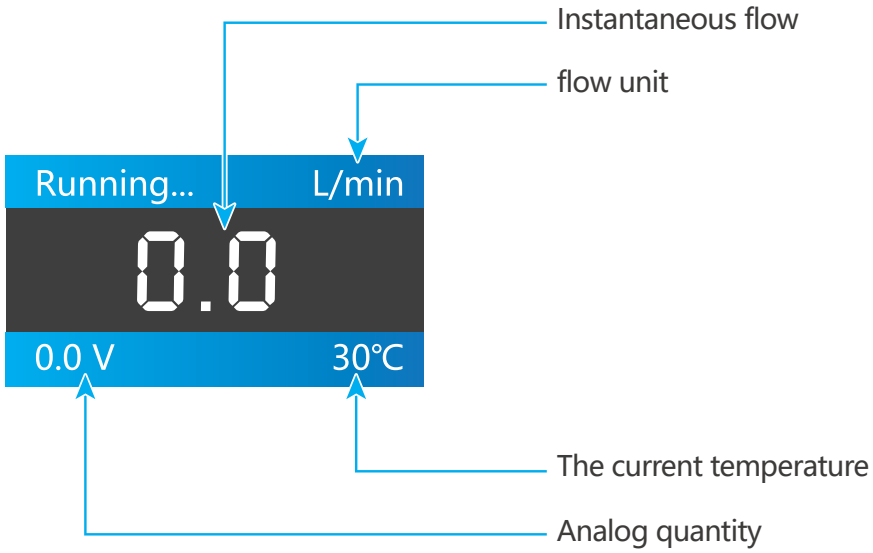
A2: Two analog channels (4-20mA)		
color	**stitch**	**Instructions**
BN	1	power supply (+)
BU	3	power supply (-)
BK	4 (OUT1)	Flow: 4-20mA (factory default) Temperature: 4-20mA
WH	2 (OUT2)	Temperature: 4-20mA (factory default) Flow: 4-20mA

Main interface display



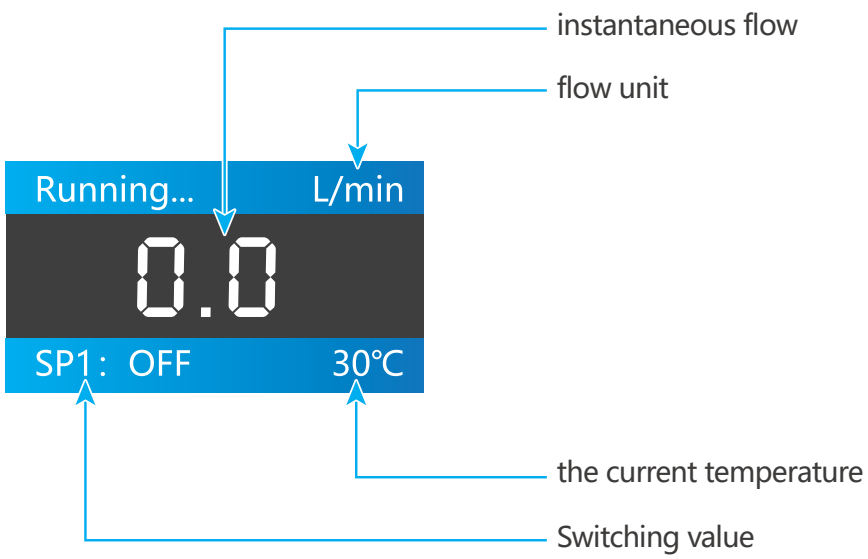
V2：Two analog channels（1-5V）		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	Flow: 1-5V (factory default) Temperature: 1-5V
WH	2 (OUT2)	Temperature: 1-5V (factory default) Flow: 1-5V

Main interface display



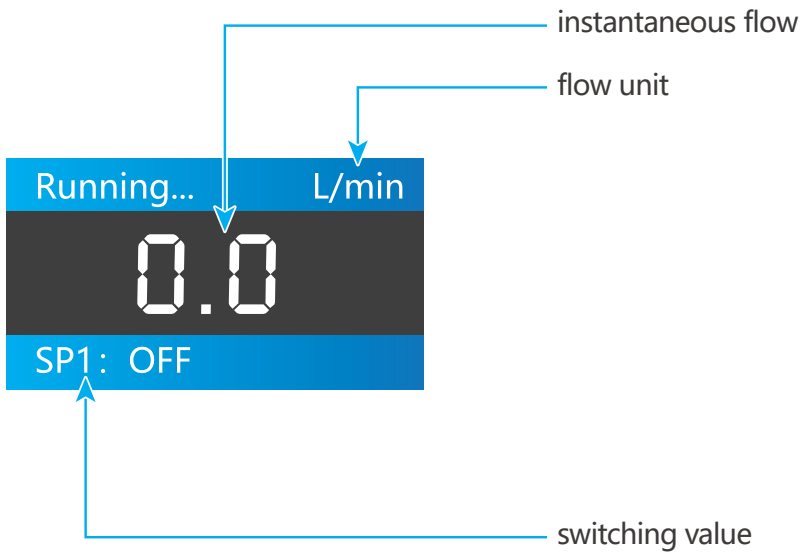
SA: one switch output/pulse frequency /IO-Link+ analog (4-20mA) - with temperature		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	flow switch：PNP（factory default) flow switch：NPN temperature switch：PNP temperature switch：NPN original frequency linear frequency (full scale 100Hz) IO-Link
WH	2 (OUT2)	flow：4-20mA（factory default) temperature：4-20mA

main interface display



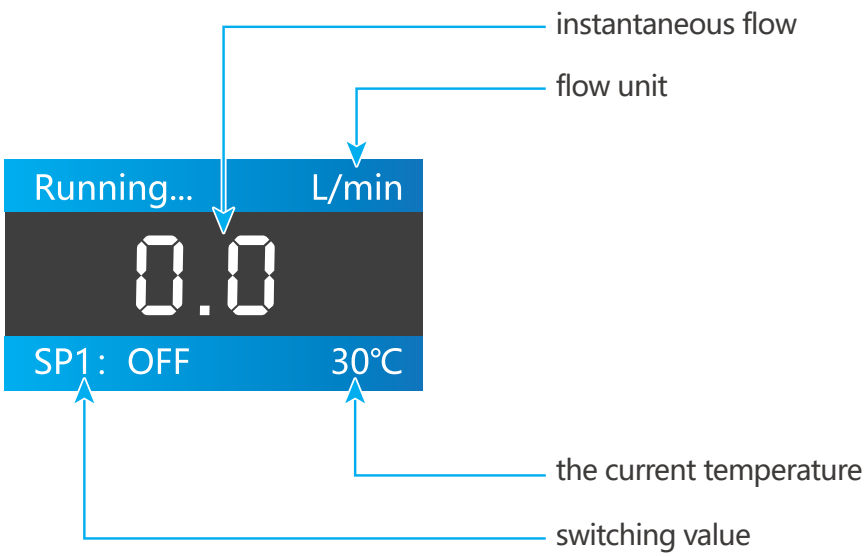
SA: one switch output/pulse frequency /IO-Link+ analog (4-20mA) - without temperature		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	flow switch：PNP（factory default) flow switch：NPN original frequency linear frequency（full scale 100Hz） IO-Link
WH	2 (OUT2)	flow：4-20mA（factory default）

main interface display



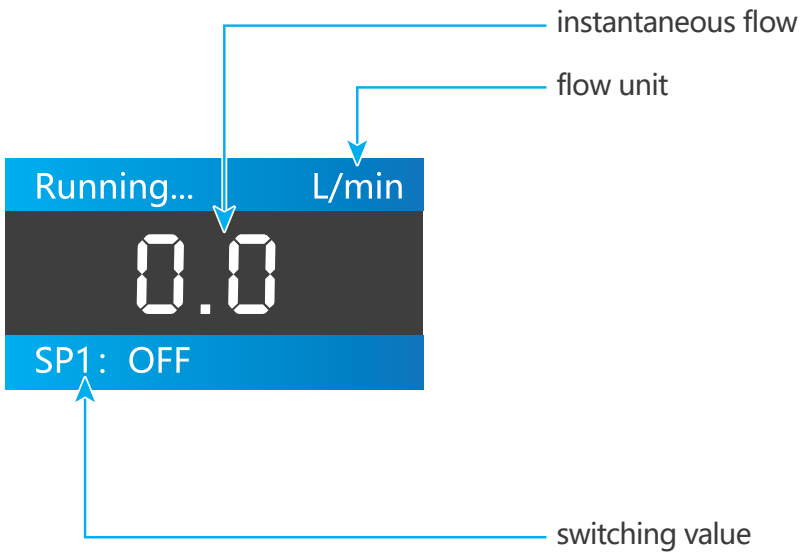
SV: one switch output/pulse frequency /IO-Link+ analog (1-5V) - with temperature		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	flow swich：PNP（factory default) flow swich：NPN temperature switch：PNP temperature swich：NPN original frequency linear frequency（full scale 100Hz) IO-Link
WH	2 (OUT2)	flow：1-5V（factory default) temperature：1-5V

main interface display



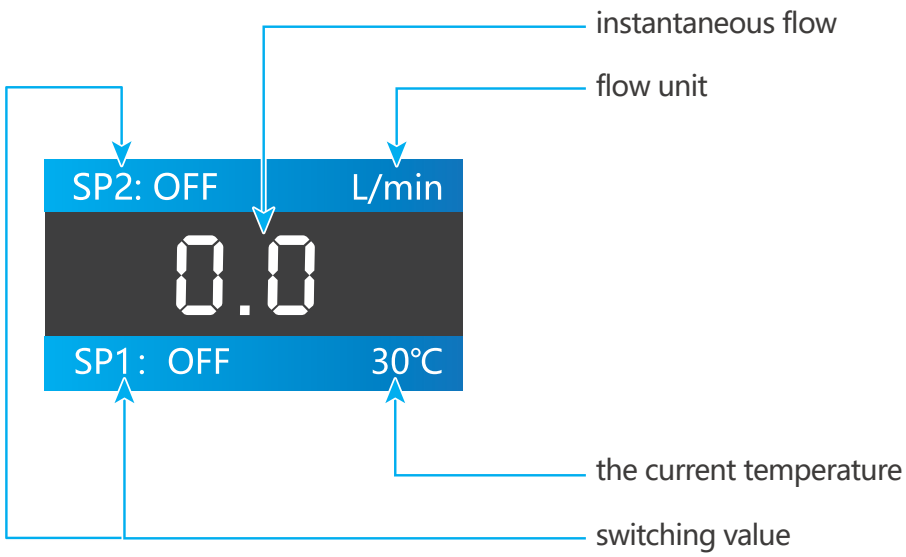
SV: one switch output/pulse frequency /IO-Link+ analog (1-5V) - without temperature		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	flow switch：PNP（factory default) flow switch：NPN original frequency linear frequency（full scale100Hz) IO-Link
WH	2 (OUT2)	flow：1-5V（factory default)

main interface display



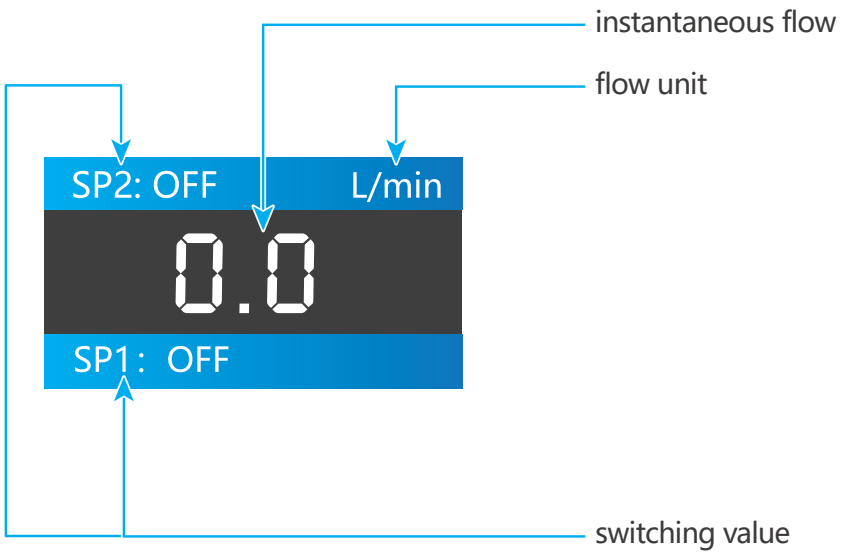
S2: two switch output/pulse frequency /IO-Link - with temperature		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	flow swich：PNP（factory default) flow swich：NPN temperature switch：PNP temperature swich：NPN original frequency linear frequency（full scale 100Hz) IO-Link
WH	2 (OUT2)	flow swich：PNP（factory default) flow swich：NPN temperature switch：PNP temperature swich：NPN

main interface display



S2: two switch output/pulse frequency /IO-Link - without temperature		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	flow switch：PNP（factory default) flow switch：NPN original frequency linear frequency（full scale100Hz) IO-Link
WH	2 (OUT2)	flow switch：PNP（factory default) flow switch：NPN

main interface display



menu 1	
SP1 Set	Switch 1 Set value (factory default: 20% of full scale)
rP1 Set	Switch 1 Reset value (Factory default: SP1-0.5)
T-LRV	Temperature lower limit (Factory default: 0.0)
T-URV	Temperature upper limit (Factory default: 100.0)
F-URV	Flow range
Menu 2 Set	enter menu 2

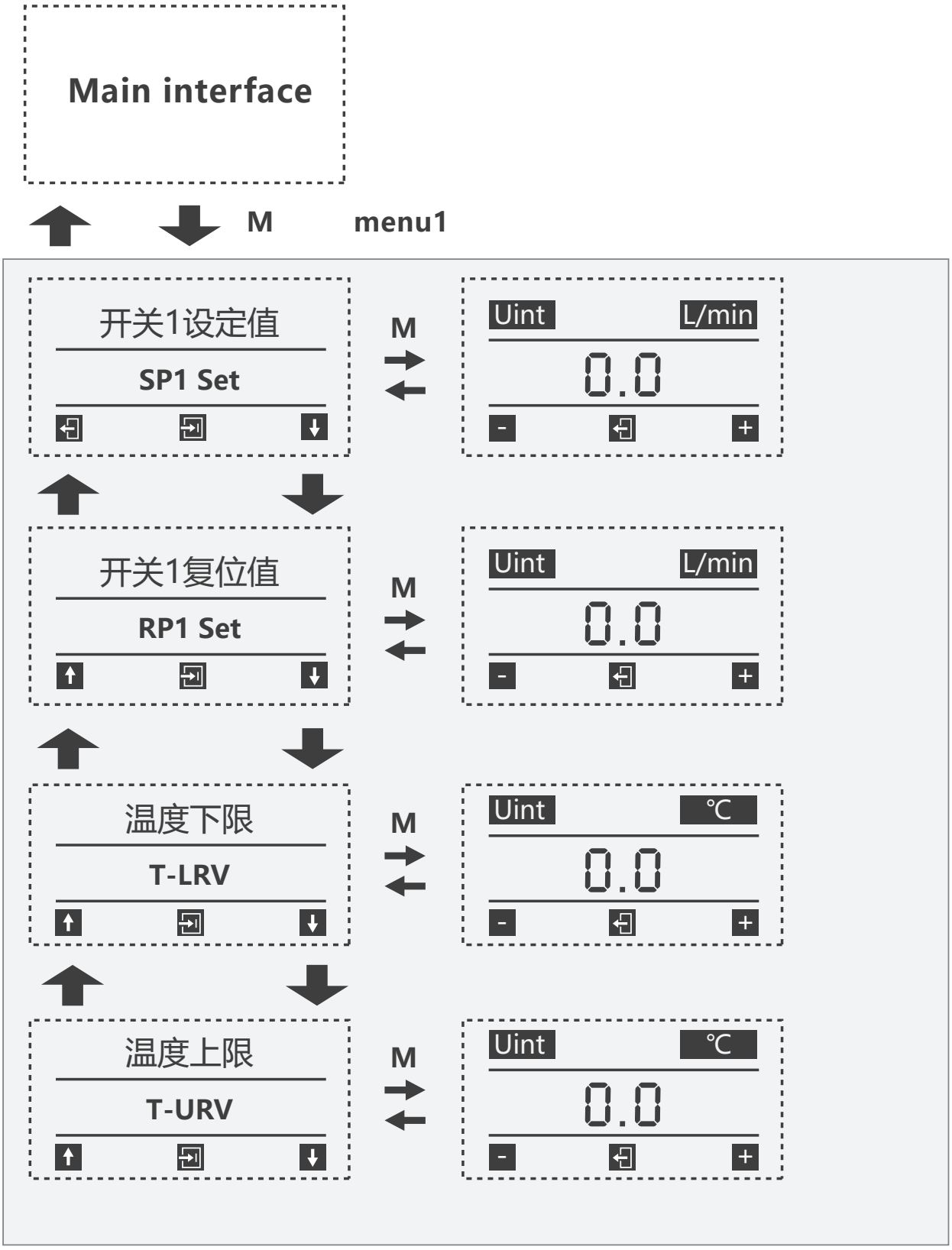
menu 2	
Factory Reset	factory data reset
A2: Two analog channels (4-20mA)	Out1 Set : OUT1 output mode
	Flow analog: F-4-20MA (Factory default) Temperature analog: T-4-20MA
	Out2 Set : OUT2 Output mode
	Temperature analog output: T-4-20MA (factory default) Flow analog output: F-4-20 mA
V2: Two analog channels (1-5V)	Out1 Set : OUT1 output mode
	Flow analog output: F-1-5V (Factory default) Temperature analog output: T-1-5V
	Out2 Set : OUT2 output mode
	Temperature analog output: T-1-5V (factory default) Flow analog output: F-1-5V
SA: One switch output / Pulse frequency/IO - Link + analog quantity (4-20mA) - with temperature	Out1 Set : OUT1 output mode
	IOLink Temperature hysteresis is Normal open: T-H-NO The flow pulse output: F-Hz-OUT The flow window is normally closed: F-W-NC The flow window is normally open: F-W-NO The flow retardation is normally closed: F-H-NC The flow hysteresis is normally open: F-H-NO (factory default) The temperature window is normally closed: T-W-NC The temperature window is usually open: T-W-NO Temperature hysteresis is normally closed: T-H-NC
	Out2 Set : OUT2 output mode
	Flow analog F-4-20MA (Factory default) Temperature analog T-4-20MA

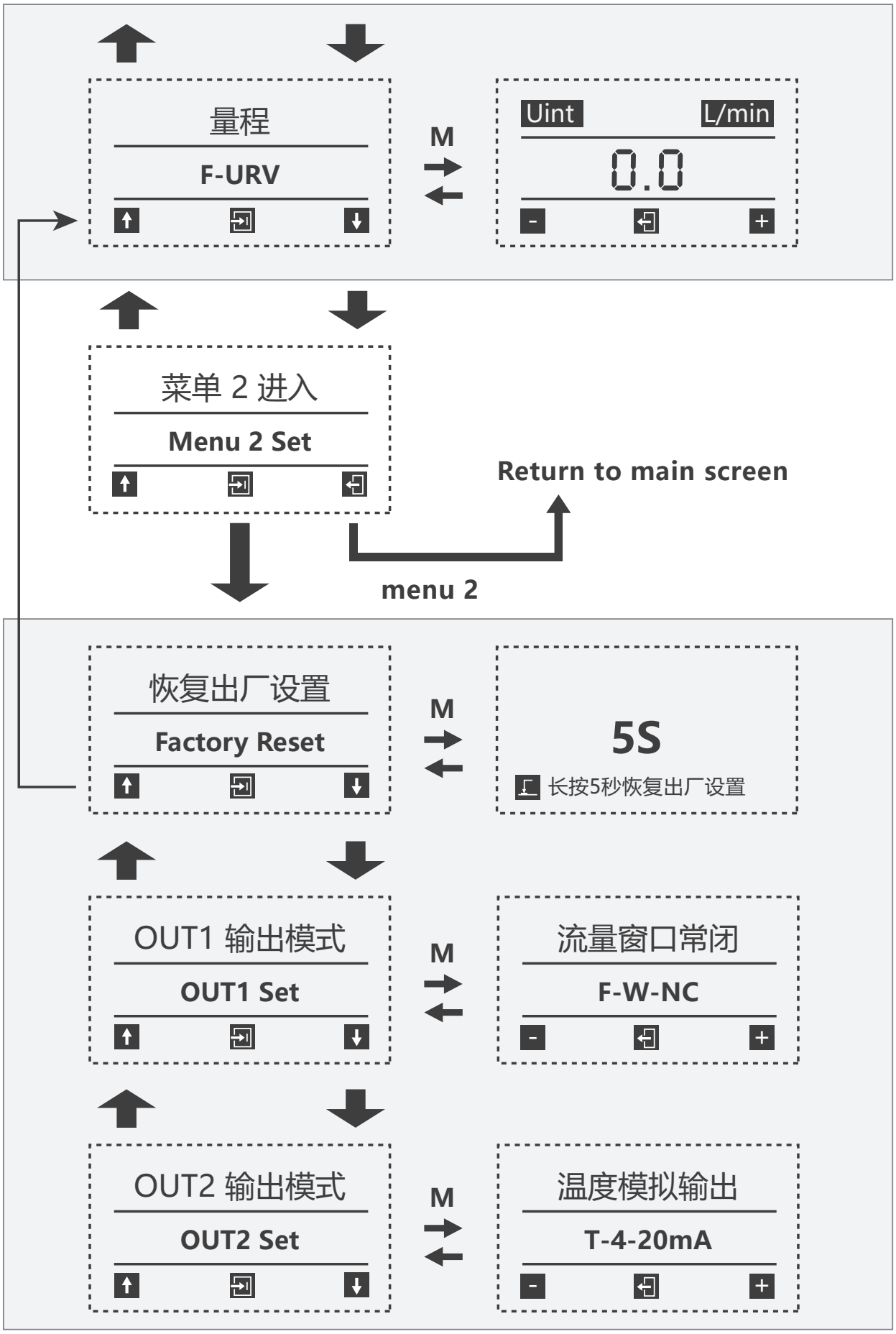
SA: One switch output / Pulse frequency /IO-Link + analog quantity (4-20mA) - without temperature	Out1 Set : OUT1 output mode
	Flow hysteresis is normally open：F-H-NO (factory default) The flow pulse output：F-Hz-OUT The flow window is normally closed：F-W-NC The flowc window is normally open：F-W-NO The flow hysteresis is normally closed：F-H-NC IOLink
	Out2 Set : OUT2 output mode
	Flow Analog Output F-4-20MA (Factory default)
SV: One switch output / Pulse frequency /IO-Link + analog quantity (1-5 v) - with temperature	Out1 Set : OUT1 output mode
	IOLink Temperature hysteresis is Normal open：T-H-NO The flow pulse output：F-Hz-OUT The flow window is normally closed：F-W-NC The flow window is normally open：F-W-NO The flow retardation is normally closed：F-H-NC The flow hysteresis is normally open：F-H-NO（factory default） The temperature window is normally closed：T-W-NC The temperature window is usually open：T-W-NO Temperature hysteresis is normally closed：T-H-NC
	Out2 Set : OUT2 output mode
	Flow analog output：F-1-5V (Factory default) Temperature analog output：T-1-5V
SV: One switch output / Pulse frequency /IO-Link + analog quantity (1-5 v) - without temperature	Out1 Set : OUT1 output mode
	Flow hysteresis is normally open：F-H-NO (factory default) The flow pulse output：F-Hz-OUT The flow window is normally closed：F-W-NC The flowc window is normally open：F-W-NO The flow hysteresis is normally closed：F-H-NC IOLink
	Out2 Set : OUT2 output mode
	Flow analog output F-1-5V (Factory default)

S2: two switch output / Pulse frequency /IO-Link - with temperature	Out1 Set : OUT1 output mode
	IOLink Temperature hysteresis is Normal open：T-H-NO The flow pulse output：F-Hz-OUT The flow window is normally closed：F-W-NC The flow window is normally open：F-W-NO The flow retardation is normally closed：F-H-NC The flow hysteresis is normally open：F-H-NO(factory default) The temperature window is normally closed：T-W-NC The temperature window is usually open：T-W-NO Temperature hysteresis is normally closed：T-H-NC
	Out2 Set : OUT2 output mode
	Temperature hysteresis is Normal open：T-H-NO The flow window is normally closed：F-W-NC The flow window is normally open：F-W-NO The flow retardation is normally closed：F-H-NC The flow hysteresis is normally open：F-H-NO(factory default) The temperature window is normally closed：T-W-NC The temperature window is usually open：T-W-NO Temperature hysteresis is normally closed：T-H-NC
S2: two switch output / Pulse frequency /IO-Link - without temperature	Out1 Set : OUT1 output mode
	Flow hysteresis is normally open：F-H-NO (factory default) The flow pulse output：F-Hz-OUT The flow window is normally closed：F-W-NC The flowc window is normally open：F-W-NO The flow hysteresis is normally closed：F-H-NC IOLink
	Out2 Set : OUT2 output mode
	Flow hysteresis is normally open：F-H-NO (factory default) The flow window is normally closed：F-W-NC The flowc window is normally open：F-W-NO The flow hysteresis is normally closed：F-H-NC

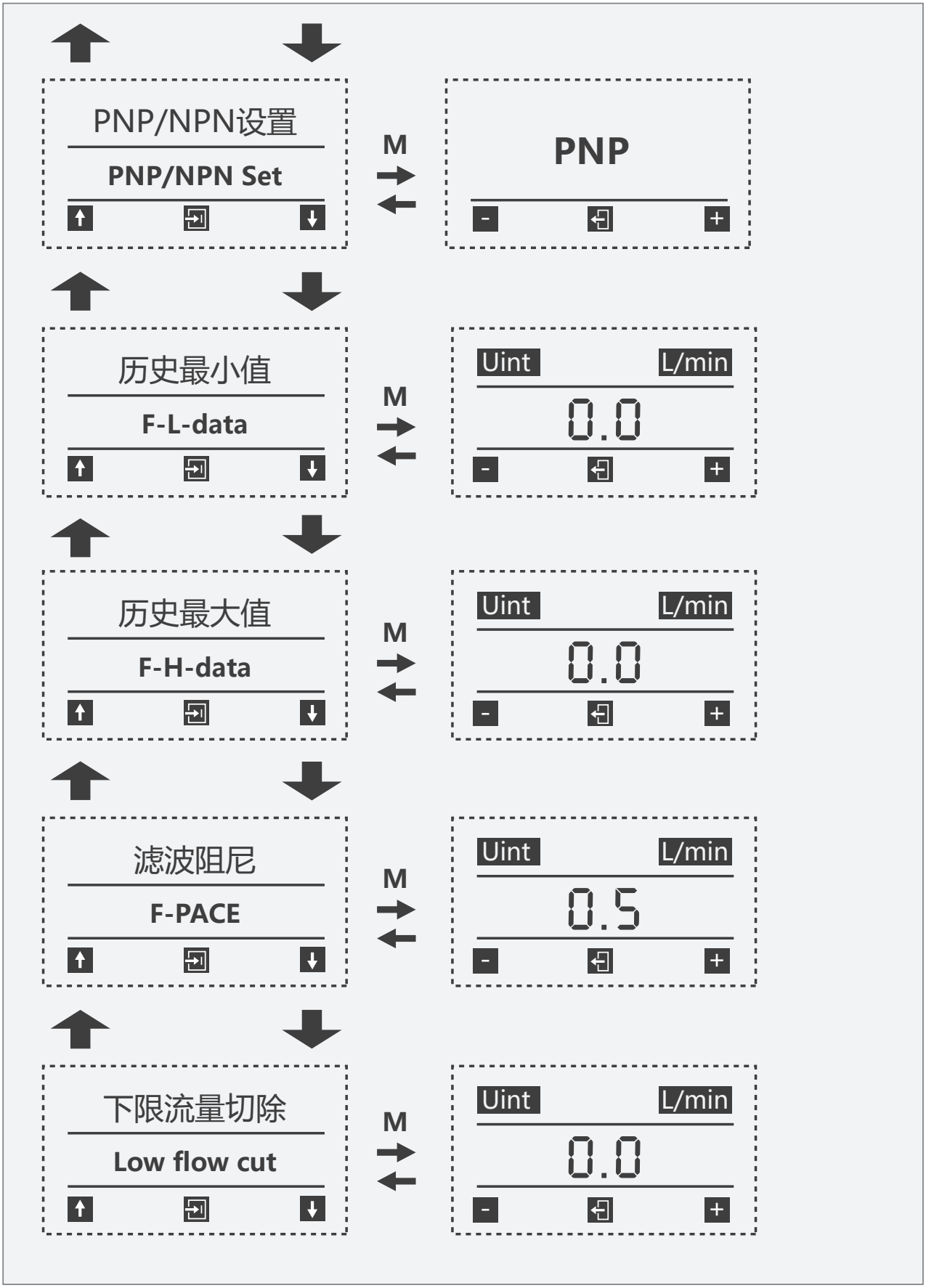
ds1-Set	Switch 1 output delay (factory default: 0.0)
dR1-Set	Switch 1 reset time delay (factory default: 0.0)
T-Ofst	Temperature offset (factory default: 0.0)
F-Ofst	Flow coefficient correction
Unit Set	Unit setting (Factory default: L/min)
PNP/NPN Set	PNP/NPN Settings (Factory default: PNP)
F-L-data	History of the minimum
F-H-data	Historical maximum
F-PACE	Filtering damping (factory default: 0.5)
Low flow cut	Lower flow rate excision
d-P-set	Decimal digits (factory default: 0.0)
Digit colour	Master data color
BG colour	Main background color
SCRN-Set	Screen off setting value (factory default: NO)

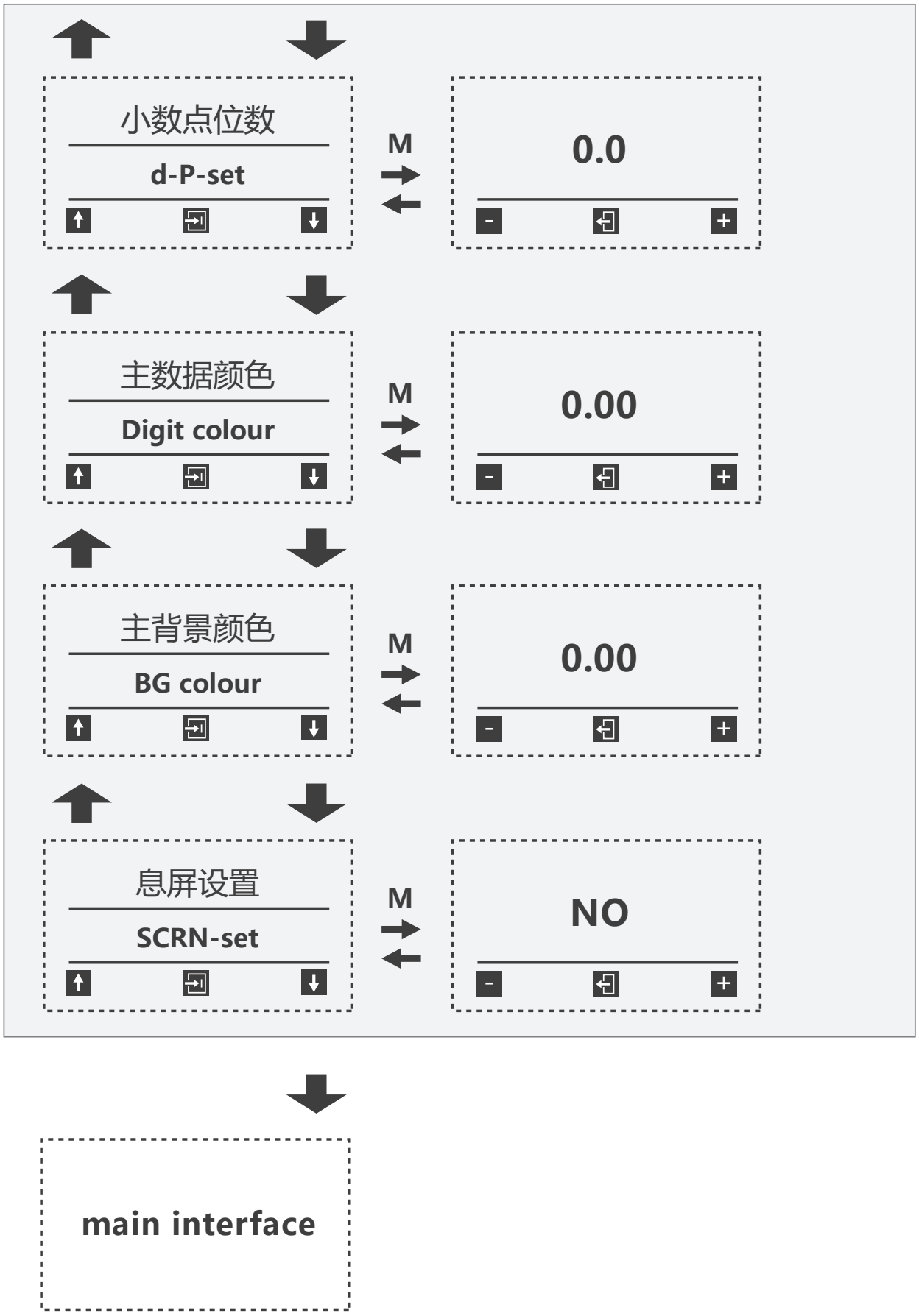
Display menu



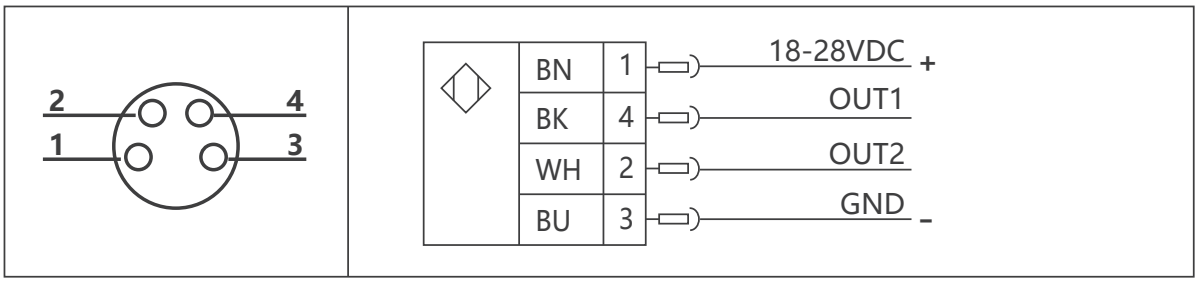

量程
F-URV
M
Uint
L/min
0.0
菜单 2 进入
Menu 2 Set
Return to main screen
menu 2
恢复出厂设置
Factory Reset
M
5S
长按5秒恢复出厂设置
OUT1 输出模式
OUT1 Set
M
流量窗口常闭
F-W-NC
OUT2 输出模式
OUT2 Set
M
温度模拟输出
T-4-20mA


开关1输出延时
ds1 Set
M
Uint
S
0.0
开关1复位延时
dR1 Set
M
Uint
S
0.0
温度偏移量
T-ofst
M
Uint
℃
0.0
流量系数值
Flow-ofst
M
Uint
P-L
0.0
单位设置
Unit Set
M
L/min


PNP/NPN设置
PNP/NPN Set
M
PNP
-
+
历史最小值
F-L-data
M
Uint
L/min
0.0
-
+
历史最大值
F-H-data
M
Uint
L/min
0.0
-
+
滤波阻尼
F-PACE
M
Uint
L/min
0.5
-
+
下限流量切除
Low flow cut
M
Uint
L/min
0.0
-
+

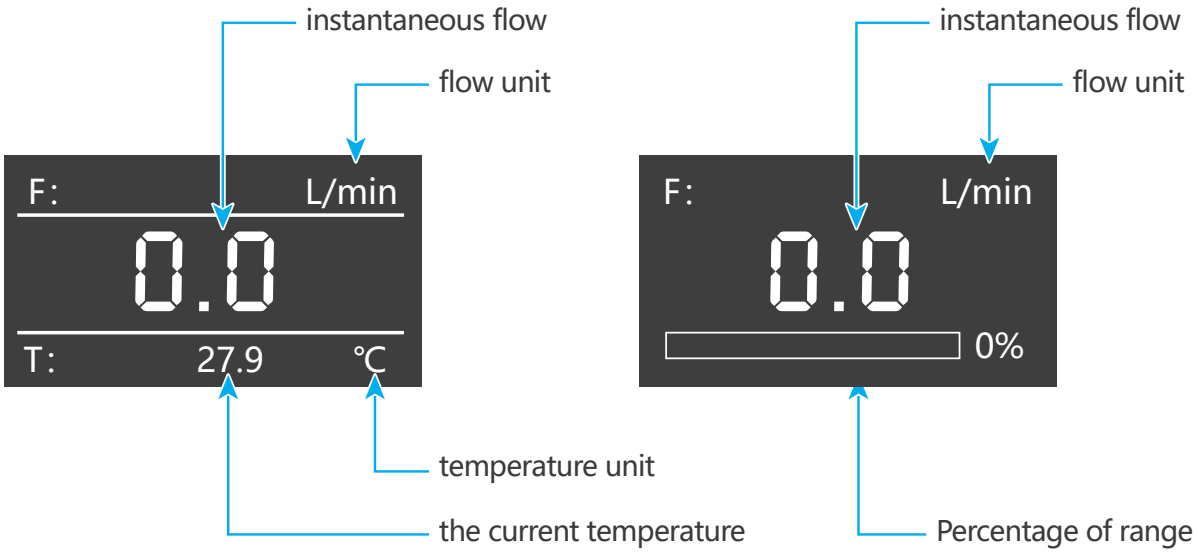

小数点位数
d-P-set
M
0.0
主数据颜色
Digit colour
M
0.00
主背景颜色
BG colour
M
0.00
息屏设置
SCRN-set
M
NO
main interface

Connection mode/Channel Description (RS485)



RS485 communication		
color	**stitch**	**instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	RS485（A）
WH	2 (OUT2)	RS485（B）

main interface display

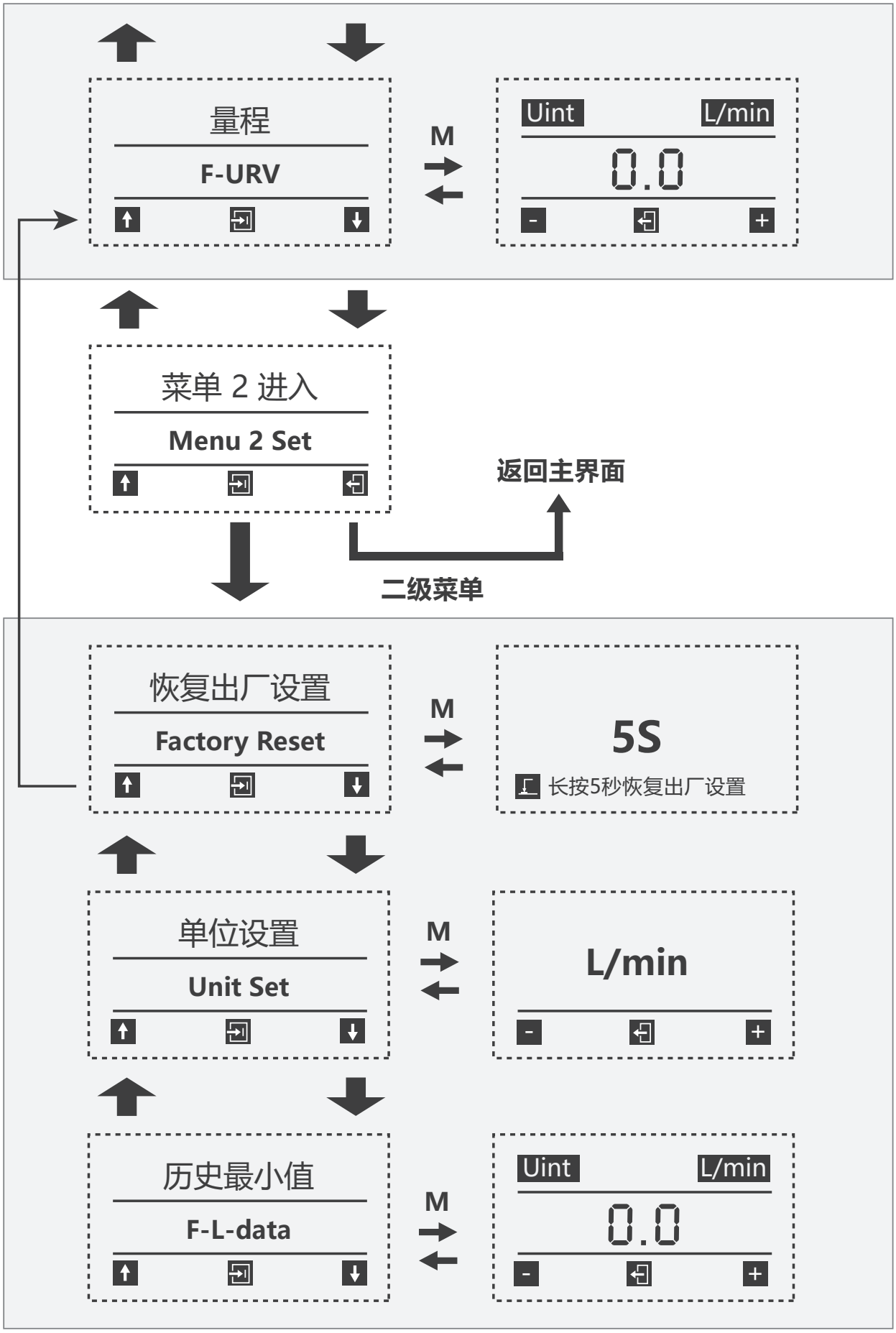


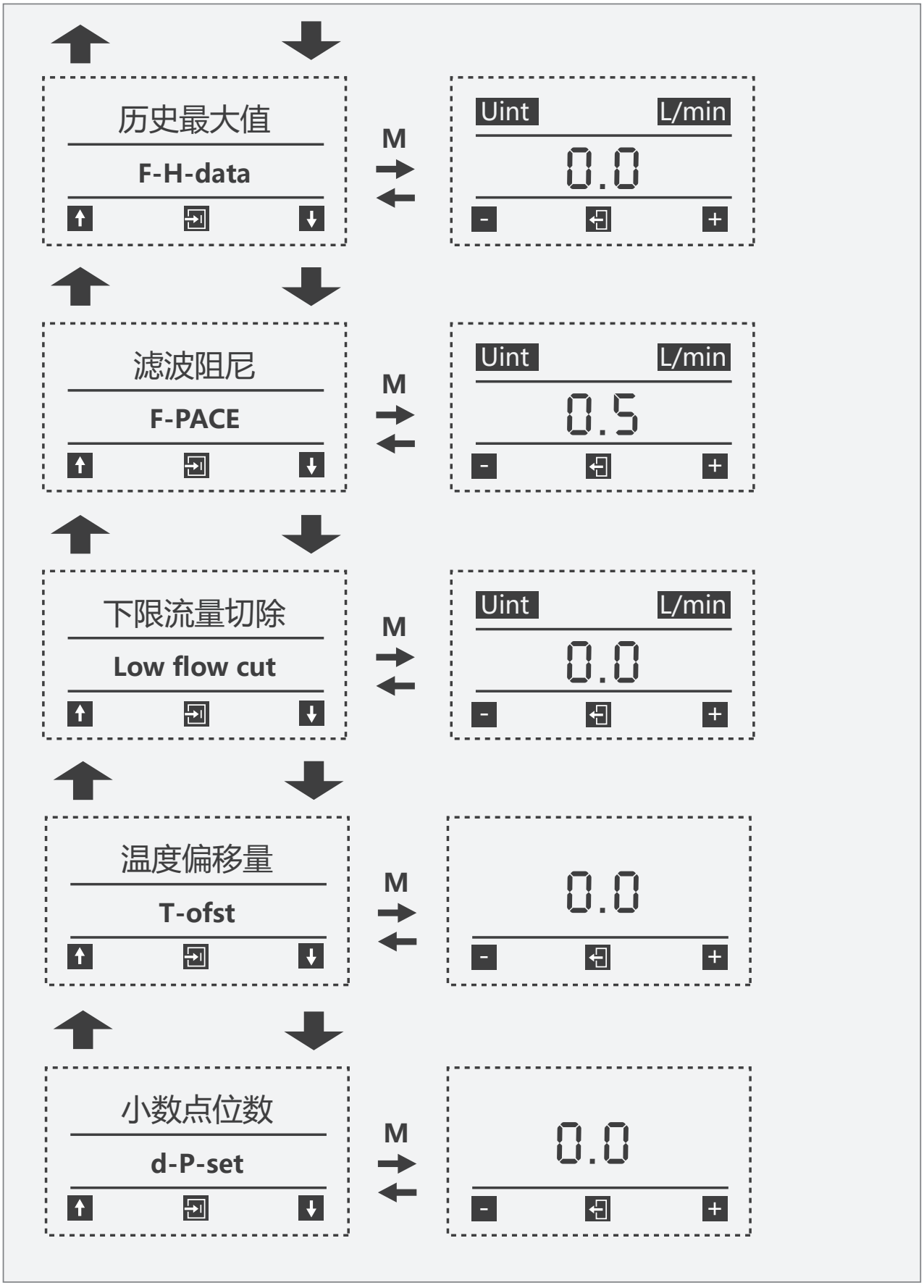
with temperature **without temperature**

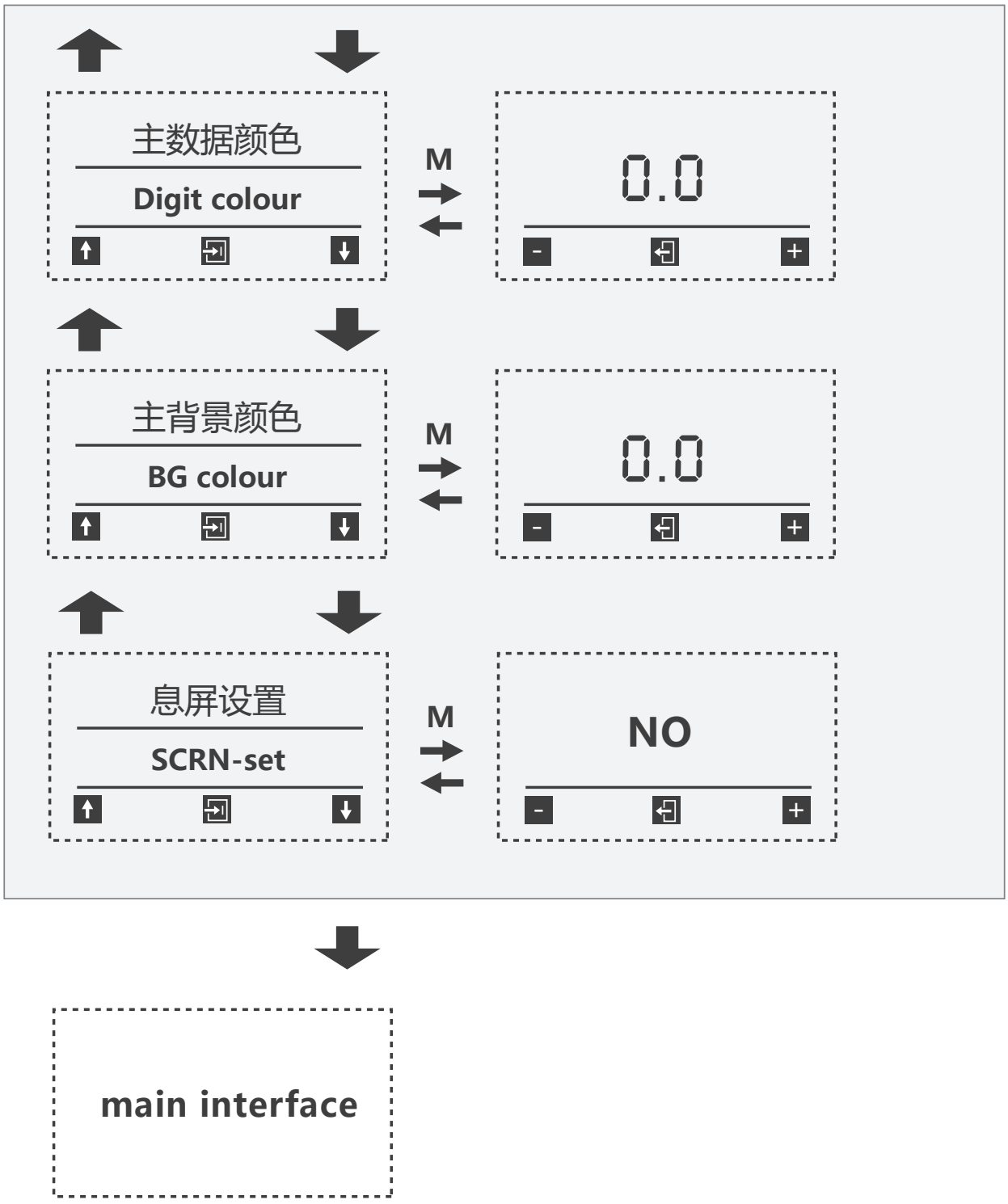
menu 1	
passage	function instructions
485 ID	485 address (Factory default: 1)
Baud Set	Baud rate Settings (Factory default: 9600)
Parity Set	Check bit Settings (factory default: None)
Stop bit Set	Stop bit Settings (Factory default: 1bit)
F-URV	range
Menu 2 Set	Menu 2 Enter

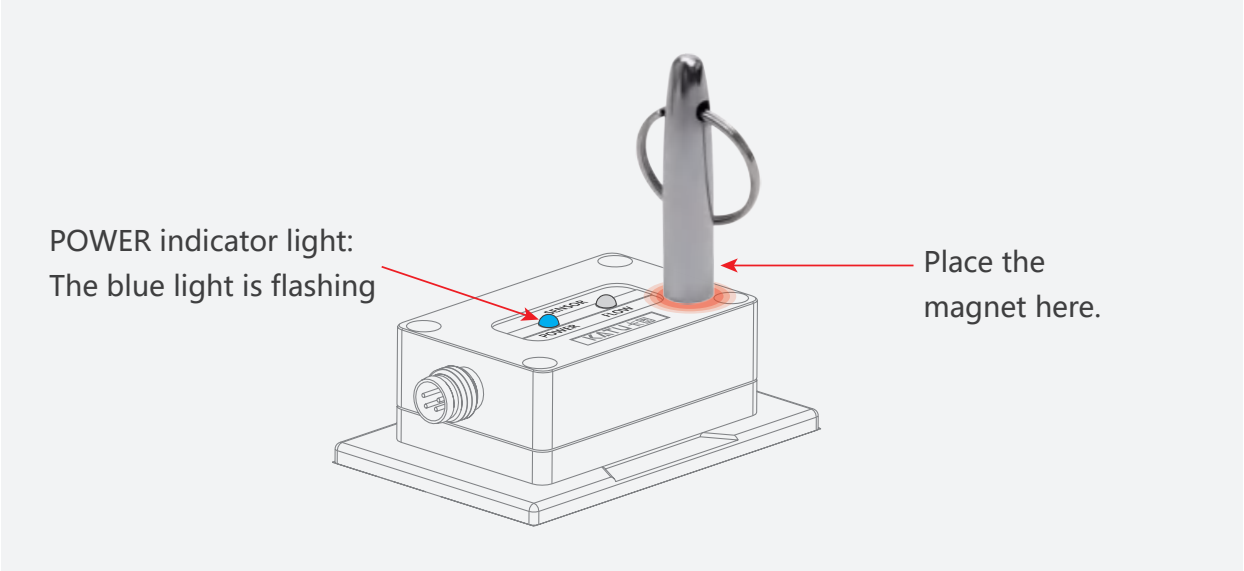
menu 2	
passage	function instructions
Factory Reset	factory data reset
Unit Set	Unit setting (Factory default: L/min)
F-L-data	Historical minimum
F-H-data	Historical maximum
F-PACE	Filter damping (factory default: 0.5)
Low flow cut	Lower flow rate excision
T-Ofst	Temperature offset (factory default: 0.0)
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)

main interface


量程
F-URV
M
Uint
L/min
0.0
菜单 2 进入
Menu 2 Set
返回主界面
二级菜单
恢复出厂设置
Factory Reset
M
5S
长按5秒恢复出厂设置
单位设置
Unit Set
M
L/min
历史最小值
F-L-data
M
Uint
L/min
0.0


历史最大值
F-H-data
M
Uint
L/min
0.0
滤波阻尼
F-PACE
M
Uint
L/min
0.5
下限流量切除
Low flow cut
M
Uint
L/min
0.0
温度偏移量
T-ofst
M
0.0
小数点位数
d-P-set
M
0.0


主数据颜色
Digit colour
M
0.0
主背景颜色
BG colour
M
0.0
息屏设置
SCRN-set
M
NO
main interface



For the related problems that may be encountered during the use of the no-display - analog quantity series

Place the magnet at the lower right corner of the plastic housing with the lamp. The phenomenon of being placed for 60 seconds:

▶ For the first 30 seconds, every 10 seconds, the POWER light will flash blue, red and green in sequence.

▶ For the next 30 seconds, every 10 seconds, the FLOW light will flash blue, green and red in sequence.

(1) Some interfering factors cause the flow rate not to return to zero when no liquid flows through

The flow can be cut off by a magnet to make the flow zero. The following three steps can be selected for different working conditions.

●During the 10-second period when the blue light of the POWER light flashes, remove the magnet. Its function is to cut off the 50HZ interference. If it is not removed, it is regarded as skipping the function of cutting off the 50HZ.

●During the 10-second red light flashing of the POWER light, remove the magnet. Its function is to cut off 60HZ interference. If it is not removed, it is regarded as skipping the function of cutting off 60HZ.

●During the 10-second green light flashing of the POWER light, remove the magnet. Its function is to cut off the current flow. If it is not removed, it is regarded as skipping the function of cutting off the current flow.

(2) There is a requirement for the response speed of reading the flow

The response speed of the read flow can be adjusted by the magnet to select the desired response speed.

●During the 10-second period when the blue light of the FLOW lamp flashes, remove the magnet. Its function is to adjust the response speed of the current flow to 0.5 seconds (fast). If it is not removed, it is regarded as skipping the function of adjusting the response speed to 0.5 seconds.

●During the 10-second green light flashing of the FLOW lamp, remove the magnet. Its function is to adjust the response speed of the current flow to 2 seconds (medium). If it is not removed, it is regarded as skipping the function of adjusting the response speed to 2 seconds.

●During the 10-second red flash of the FLOW light, remove the magnet. Its function is to adjust the response speed of the current flow to 5 seconds (slow). If it is not removed, it is regarded as skipping the function of adjusting the response speed to 5 seconds.

(3) Some parameters were messed up or unclear during the usage process

The factory Settings can be restored through a magnet. The factory default response time is 0.5 seconds

●After the red light of the FLOW light stops flashing, if the magnet is not removed, both the POWER light and the FLOW light will flash simultaneously. Removing the magnet during the simultaneous flashing period serves to restore the factory Settings.

Maintenance/cleaning

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!

FTS520-RS485

Temperature and Flowmeter Communication Protocol (MODBUS-RTU)

1. RTU Data Format Description

1.1 Communication Mode

The instrument adopts MODBUS RTU format, and the protocol is used for master-slave query mode data communication.

1.2 Data Format

In RTU mode, each byte (11 bits) is formatted as follows: the encoding system is 8-bit binary.

Bits per byte: 1 start bit, 8 data bits (send the least significant bit first), no parity bit, 1 stop bit

Note: When using unverified mode, you can select either 1 stop bit or 2 stop bits (**with display, you can modify the verified bit and stop bit; without display, they cannot be changed)**. The baud rate options are: 2400,4800,9600,14400,19200,28800,115200

Modbus message

Origin	Address	FC	Data	CRC verification	Finish
≥3.5 character	8 bit	8 bit	n*8 bit	16 bit	≥3.5 character

pour :

(1) In RTU mode, idle intervals lasting at least 3.5 character time are used to separate message frames.

(2) The whole frame must be sent as a continuous character stream.

(3) The idle interval between two characters should not exceed 1.5 character time.

1.3 Address

The protocol specifies that the instrument addresses range from 0 to 255, with 0 reserved for broadcast (which this protocol does not support), and the remaining addresses are reserved.

2. Command Description

2.1 This Instrument Utilizes Two Commands from the MODBUS Protocol:

Command 03	Read single hold register
Command 06	Write single hold register

The Format of Command 03 Is as Follows (read Register Command):

pour :

MODBUS request

Instrument address	1 BYTE	01-255
FC	1 BYTE	0x03
Start address	2 BYTE	00-06
Read count	2 BYTE	1-7
CRC low-order	1 BYTE	
CRC high-order	1 BYTE	

MODBUS response

Instrument address	1 BYTE	01-255
FC	1 BYTE	0x03
Byte count	1 BYTE	02-0E
Input mode	N*2 BYTE	
CRC low-order	1 BYTE	
CRC high-order	1 BYTE	

The format of command 03 is as follows (read register command):

Send a read command to the 01 sensor to retrieve data from 7 registers in the MODBUS request

Instrument address (default)	FC	Register address	Read count	CRC verification
01	03	00 00	00 07	04 08

MODBUS response

Instrument address	FC	Return the number of bytes	Register 1	Register 2 and 3	Register 4	Register 5	Register 6	Register 7	CRC verification
01	03	0E	00 00	00 00 01 12	00 00	00 E1	00 00	00 01	17 A6

Explanation: 01 The sensor responds to the read command and returns 14 bytes.

00 00: The decimal value is 0, indicating a flow rate of 0.0 L/min;

00 00 01 12 : The decimal value is 274, indicating a cumulative flow of 274 liters.

00 00: The decimal value is 0, indicating a positive temperature.

00 E 1: The decimal value is 225, which corresponds to a temperature of 22.5°C.

00 00: The unit is L/mim;

00 01:1 decimal place;

Flow rate: 0.0 L/min Temperature: 22.5°C Total flow: 274L

The format of command 06 is as follows (write register command):

Clear accumulated count: Write register value 1 to register address 1

MODBUS request

Instrument address (default)	FC	Register address	Read-in data	CRC verification
01	06	00 01	00 01	19 CA

MODBUS response

Instrument address (default)	FC	Register address	Read-in data	CRC verification
01	06	00 01	00 01	19 CA

3. Data Item Definition

10 16 base,**modbus** register is the same parameter in different writing, different upper computer software writing is different, one does not recognize when you can try another 2 kind.

(Recommended polling interval: more than 100ms. Wait 100ms after reading the previous sensor before reading this one)

03H instruction

10 address in base	16 address in base	Modbus address	Register data type	Explain
0	0	40001	16 unsigned integer	Instantaneous flow rate (displayed as *0.1 L/min when one decimal place)
1	1	40002	32 unsigned integer	Cumulative flow (m^3) (read value*0.001)
3	3	40004	16 unsigned integer	Temperature ± (positive: 0, negative: 1)
4	4	40005	16 unsigned integer	Absolute value of current temperature
5	5	40006	16 unsigned integer	Display the unit for the current value (default: L/min)
6	6	40007	16 unsigned integer	Display the decimal place of the current value (default: 1 decimal place)

The following applies to FTS520 models without display-RS485

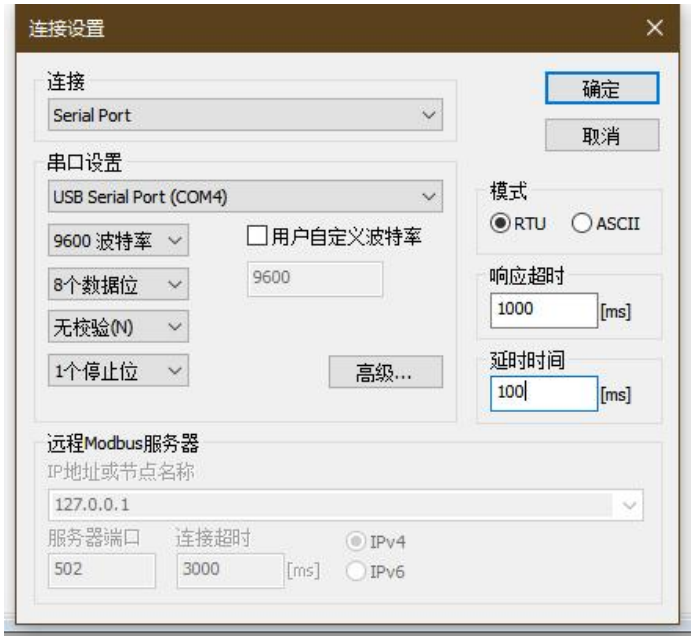
Modbus address	Register length	Explain
19	16 unsigned integer	485 Slave address (1-250)
20	16 unsigned integer	485 Baud rate 0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps 4: 115200 bps

4. Modbus Poll Communication Reference

(1) Open modbus-poll, click Settings in the menu, set the slave ID to 1, function to 03 Read, address to 0, and quantity to 7

(2) Click Menu> Connect-Connect

Connection method: Serial Port (select serial port), baud rate 9600,8-bit data, no parity, 1-bit stop bit, RTU mode, delay time 100ms.



(3) You Can See the Current Read Value

Address 0 is 0, and the current flow rate is 0.0 L/min.

Address 1 is 0,

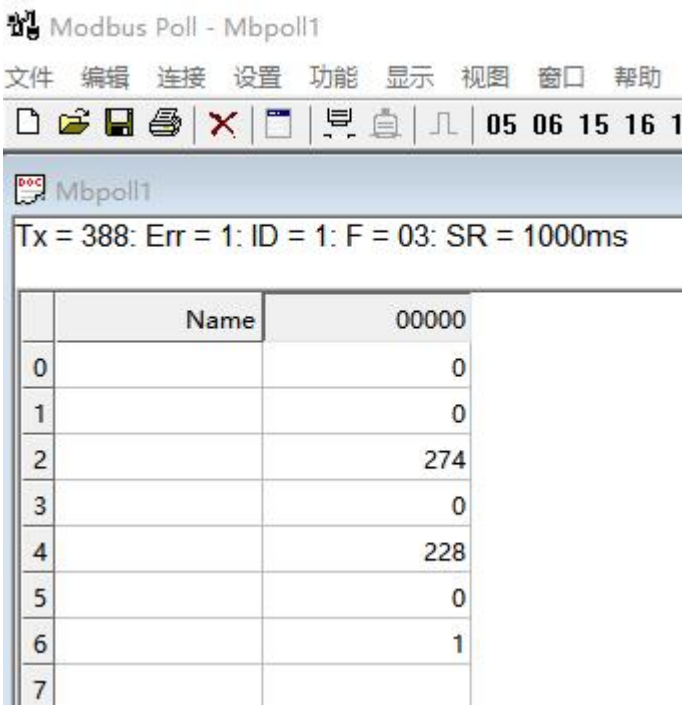
Address 2 is 274. Address 1 and Address 2 together form a 32-bit unsigned integer, with a cumulative traffic of 274L.

Address 3 is 0, and the temperature is positive.

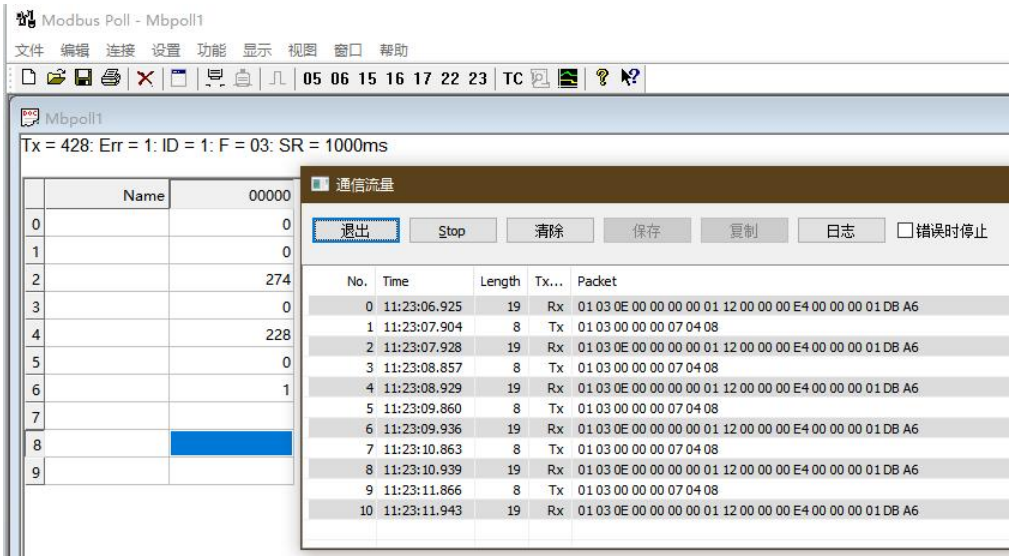
Address 4 is 228, and the temperature is 22.8℃;

Address 5 is 0, in units of L/mim;

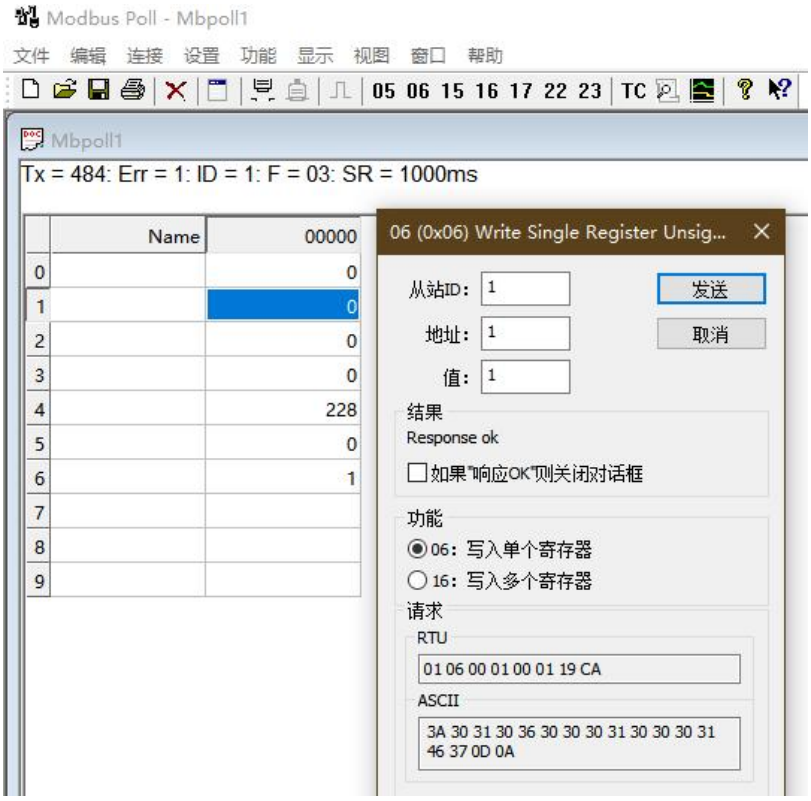
Address 6 is 1.1;



(4) Click the Communication Menu to View Real-Time Command Sending and Receiving.



(5) Double-Click the Address 1 Value, Change It to 1, and Click Send. You Will See the Accumulated Traffic Reset to Zero.



File revision history

Revise	Description	Date
V1.0	Initial version	
V1.1	Add 4. Modbus-poll communication reference	2025.12.20

The company reserves the right to modify the specifications contained herein without prior notice.

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