Principle characteristics

FM506 gear flow sensor built-in double gear operation, through the high precision gear wheel volume to calculate the medium through volume, to achieve the micro fluid medium measurement. Is a new type of positive displacement flow sensor, used for precision continuous or intermittent measurement of liquid flow in the pipeline or instantaneous flow.

- Analog switch dual output
-PNP/NPN Switchover is optional
-LED LCD display
- High pressure resistance (1.0-45MPa)
- High and low temperature resistance (-30℃~180℃)
- Can measure various viscous media
- High precision and repeatability
- Range width (1:100)
- Wide measuring range
- Strong anti-corrosion and anti-fouling ability (acid and alkali)

Product application

The FM506 gear flow sensor is widely used for precise low-flow measurement in various industries. It is suitable for media such as additive fuels, flotation cells in water treatment, corrosion inhibitors, catalysts, emulsifiers, oils, fats, fragrances, adhesives, solvents, inks and insecticides, as well as some high-viscosity media. The application industries include automobiles, aviation, mining, power, chemical engineering, pharmaceuticals, food, coatings, petroleum, environmental protection, printing and other industries. It is particularly suitable for heavy oil. Flow measurement of media with high viscosity such as polyvinyl alcohol and resin.(Capable of measuring fluids with viscosity up to 10,000 pa.s) Small in volume, light in weight, low vibration and noise during operation, and stable in operation. It can also be used for measuring the tiny flow rate of small pipe diameters. It has a small starting flow rate, a wide range ratio, and is suitable for measuring the flow of liquids with large fluctuations. The measurement accuracy is not affected by pressure and flow rate changes. It features stable performance, long service life, and large flow capacity.

- Resin and glue measurement
- Measurement of hydraulic oil, lubricating oil and grease
- Fuel oil measurement
- Ink and asphalt measurement
- Measurement of liquid nitrogen, refrigerant and solvent
- Edible oil, fish oil
- Fluid measurement for chemical and anti-corrosion requirements

Technical parameter

◇ Measuring range: 0.1~150 L/min (support custom measuring range)

◇ Output type: switching, analog, pulse, IO-link, RS485

◇ Measuring accuracy: 0.5%F.S

◇ Repeatability: 0.1%F.S

◇ Power supply: 12... 30Vdc

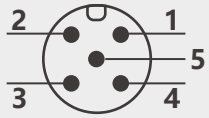
◇ Medium temperature: -30~80℃ (high temperature customized 150℃)

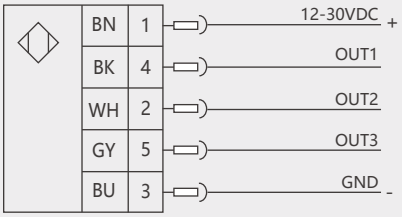
◇ Pressure resistance: Aluminum (50bar), stainless steel (100bar, 250bar, 400bar)

◇ Material: Shell: aluminum, stainless steel,

Case: stainless steel/engineering plastic

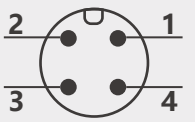
Wiring diagram

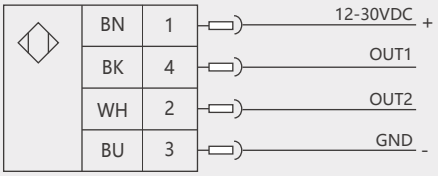




A3: Two switches + one analog								
colour	stitch	instructions	Colour	stitch	instructions	Colour	stitch	instructions
BN	1	power supply (+)	BU	3	power supply (-)	GY	5 (OUT3)	Flow: 4-20mA (factory default) Flow: 1-5v Flow : 0-10v
BK	4 (OUT1)	Flow switch PNP (Factory default) Flow switch NPN Linear pulse (full scale 100Hz) Original pulse Quantitative pulse (full scale *0.1)	WH	2 (OUT2)	Flow switch PNP (Factory default) Flow switch NPN			

AR: RS485 communication/analog								
colour	stitch	instructions	colour	stitch	instructions	colour	stitch	instructions
BN	1	power supply (+)	BU	3	power supply (-)	GY	5 (OUT3)	Flow: 4-20mA (factory default) Flow: 1-5v Flow : 0-10v
BK	4 (OUT1)	RS485(B)	WH	2 (OUT2)	RS485(A)			

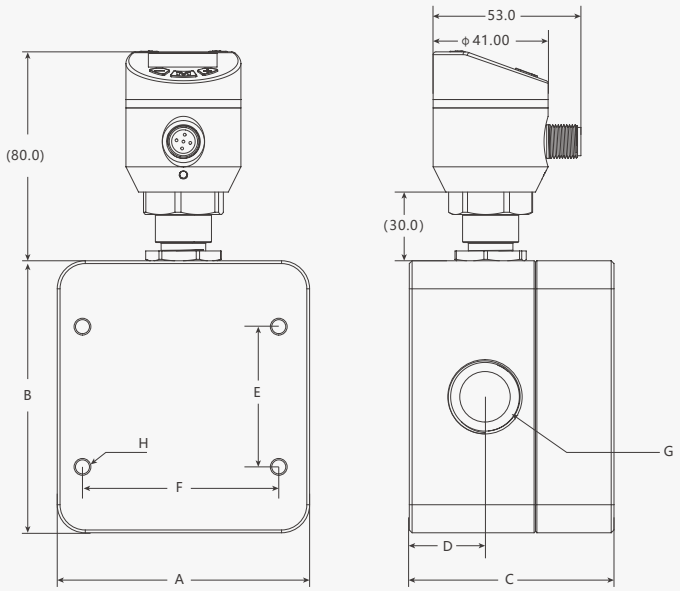




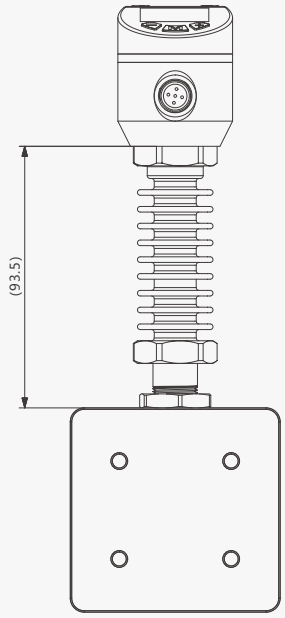
SA: Analog (flow/temperature)/switch/pulse/frequency /IO-Link					
colour	stitch	instructions	colour	stitch	instructions
BN	1	power supply (+)	BU	3	power supply (-)
BK	4 (OUT1)	Temperature: 4-20mA(Factory default) Temperature: 1-5v Temperature: 0-10v Flow switch PNP Flow switch NPN Temperature switch PNP Temperature switch NPN Linear pulse (full scale 100Hz) Original pulse Quantitative pulse (full scale *0.1) IO-Link	WH	2 (OUT2)	Flow: 4-20mA (factory default) Flow: 1-5v Flow: 0-10v Temperature: 4-20mA Temperature: 1-5v Temperature: 0-10v

Dimension drawing (mm)

■ standard type

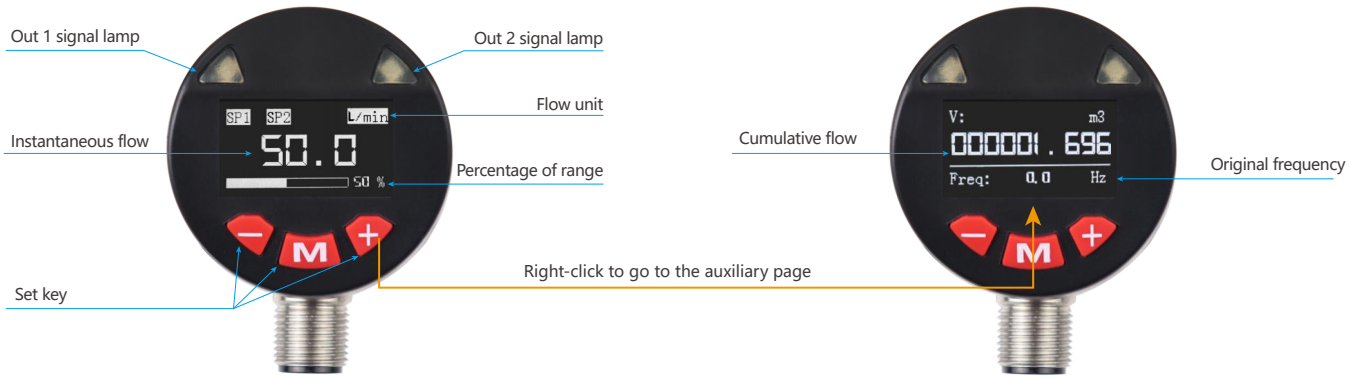


■ High temperature type



Model number	A	B	C	D	E	F	G	H	Measuring range		Reference coefficient (P/L)
									Conventional type	High pressure type	
M4	75	73	47	18	35	40	G3/8	4*M6	0.1-3L/min	0.4-3L/min	≈2500
M10	75	73	57	24	35	40	G1/2	4*M6	0.2-20L/min	0.8-20L/min	≈1500
M15	90	97	73	27	50	70	G3/4	4*M6	3-50L/min	6-50L/min	≈570
M25	104	110	88	36	65	65	G1	4*M6	10-150L/min	20-150L/min	≈170

Panel diagram



Main interface **Auxiliary interface**

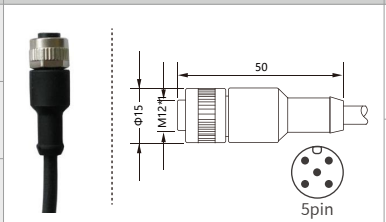
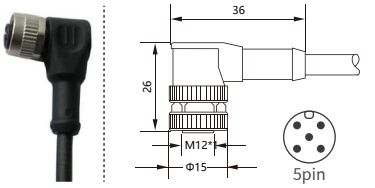
Selection list

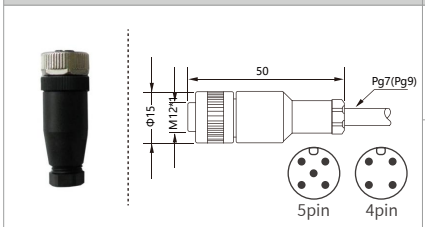
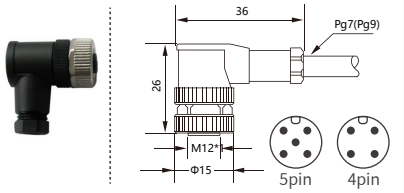
FM506	M15	A3	F	L	-	-	Instructions
FM506-							FM506 Non-magnetic high precision gear flowmeter
	M4						Measuring range: 0.1-3L/min
	M10						Measuring range: 0.2-20L/min
	M15						Measuring range: 3-50L/min
	M25						Measuring range: 10-150L/min
		A3					Two way switch/pulse/frequency + analog
		SA					Analog (flow/temperature)/switch/pulse/frequency /IO-Link
		AR					RS485 communication + analog
			F				Sealing material: FKM (standard type)
			T				Sealing material: PTFE
				L			Body material: aviation alumina
				S			Body material: 304SS
				3L			Body material: 316L
					-		Conventional type: stainless steel 100 bar, aviation aluminum 50 bar
					M		Medium pressure type: stainless steel 250 bar
					H		High pressure type: stainless steel 400bar
						-	Medium temperature < 120℃
						T	Medium temperature < 150℃ Note: Aluminum /PP material does not support high temperature option
						H	Medium temperature < 180℃ Note: Aluminum /PP material does not support high temperature option
* Special model Special custom remarks							

Flow calculation method

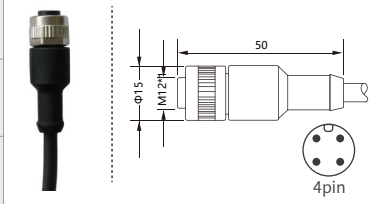
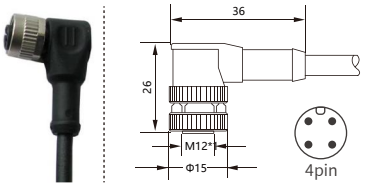
K-factor of FM506 gear flow sensor
(Flow coefficient) precisely defines the number of pulses per liter per unit flow. Q=f×60/K
Q= instantaneous flow liters per minute
F= output pulse frequency HZ
K= Coefficient pulse/min of gear flowmeter

Optional accessories - Electrical accessories (M12-5Pin: Factory default ZL05-PC02G)

name	Outline drawing/dimension drawing (unit :mm)	material	Model number	Shielded wire
M12*1-5Pin (2m cable)		PUR	ZL05-PU02G	-P
M12*1-5Pin (5m cable)			ZL05-PU05G	
M12*1-5Pin (10m cable)			ZL05-PU010G	
		PVC	ZL05-PC02G	
			ZL05-PC05G	
			ZL05-PC010G	
M12*1-5Pin (2m cable)		PUR	ZL05-PU02W	
M12*1-5Pin (5m cable)			ZL05-PU05W	
M12*1-5Pin (10m cable)			ZL05-PU010W	
		PVC	ZL05-PC02W	
			ZL05-PC05W	
			ZL05-PC010W	

M12*1-4Pin/5Pin self-connector/Dimensions (Unit :mm)	Model number
	GL04 (4 Pin connector)
	GL05 (4 Pin connector)
	WL04 (4 Pin connector)
	WL05 (5 Pin connector)

Optional accessories - Electrical accessories (M12-4Pin: Factory default ZL04-PC02G)

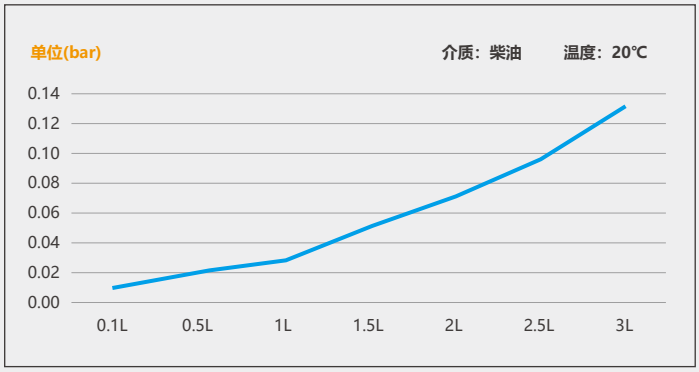
name	Outline drawing/dimension drawing (unit :mm)	material	Model number	Shielded wire
M12*1-4Pin (2m cable)		PUR	ZL04-PU02G	-P
M12*1-4Pin (5m cable)			ZL04-PU05G	
M12*1-4Pin (10m cable)			ZL04-PU010G	
		PVC	ZL04-PC02G	
			ZL04-PC05G	
			ZL04-PC010G	
M12*1-4Pin (2m cable)		PUR	ZL04-PU02W	
M12*1-4Pin (5m cable)			ZL04-PU05W	
M12*1-4Pin (10m cable)			ZL04-PU010W	
		PVC	ZL04-PC02W	
			ZL04-PC05W	
			ZL04-PC010W	

Optional accessories - Protective cover

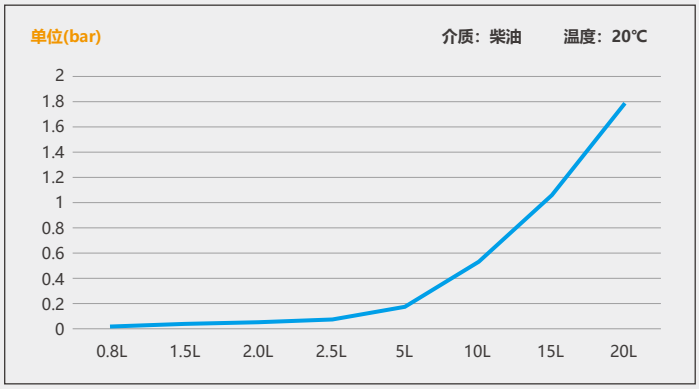
Color crystal screen series (switch) sensor

Order number: KTCS33661

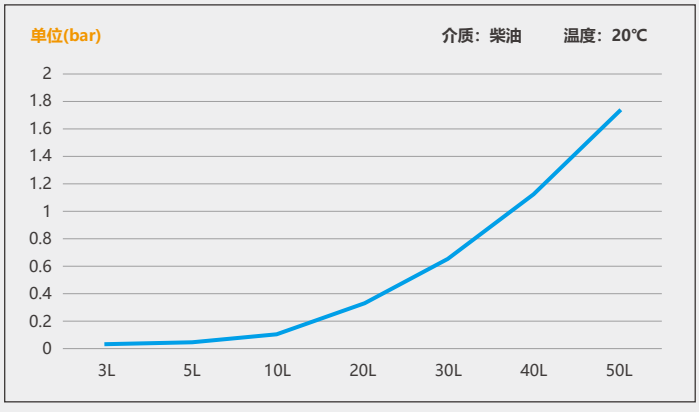
M4压损表（常规型）



M10压损表（常规型）



M15压损表（常规型）



Sensor and controller

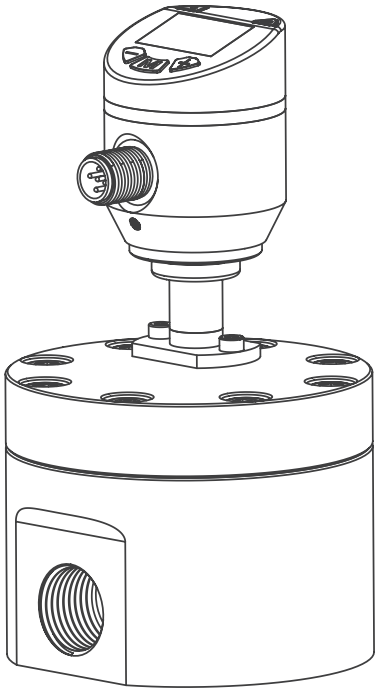
■ Flow ■ pressure ■ temperature ■ level ■ position

KATU 卡图

Operation instruction

gear flowmeter

500 Series



Safety statement

- Before installing this device, please read this document to ensure that the product is suitable for your application and is not limited in any way;
- Failure to follow the operating instructions or technical data may result in personal injury or property damage;
- Check the compatibility of the product material with the medium to be tested in all applications;
- The equipment is only used as the medium to be tested, and it must only be ensured that the equipment is used correctly for long-term stable operation.

Ensure that the tested medium will not cause damage to the tested part of the product;

! The responsibility for determining whether the measurement sensor is suitable for the application lies with the operator, and the manufacturer accepts no responsibility for the consequences of improper use by the operator. Improper installation and use of the sensor results in invalid claims under warranty.

Flow sensors monitor the medium flow of fluids

Precautions: Beware of personal injury, overpressure danger!

catalogue

1.1 Product profile

FM500 gear flow sensor built-in double gear operation, through the high precision gear wheel volume to calculate the medium through the volume, to achieve the micro fluid medium measurement. Is a new type of positive displacement flow sensor, used for precision continuous or intermittent measurement of liquid flow in the pipeline or instantaneous flow.

1.2 Product characteristics

- Analog switch dual output
-PNP/NPN Switchover is optional
- Color crystal display unit
- Withstand pressure (10~400bar)
- High and low temperature resistance (-30℃~150℃)
- Can measure various viscous media
- High precision and repeatability
- The range is wider than that
- Support communication function
- Strong anti-corrosion and anti-fouling ability (acid and alkali)

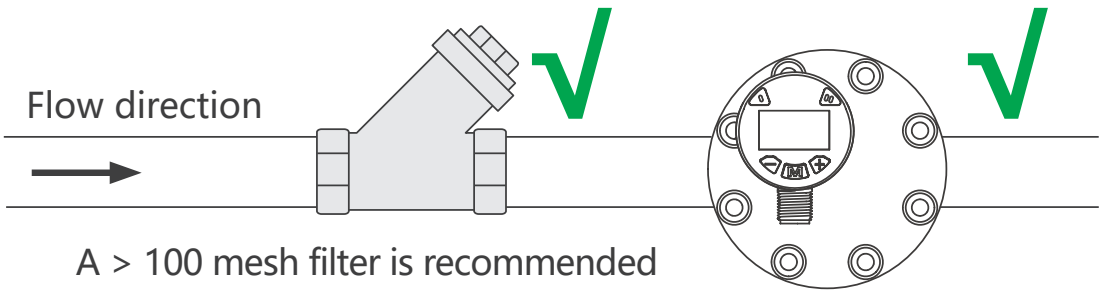
1.3 Product application

- Resin and glue measurement
- Measurement of hydraulic oil, lubricating oil and grease
- Fuel oil measurement
- Ink and asphalt measurement
- Measurement of liquid nitrogen, refrigerant and solvent
- Edible oil, fish oil
- Fluid measurement for chemical and anti-corrosion requirements

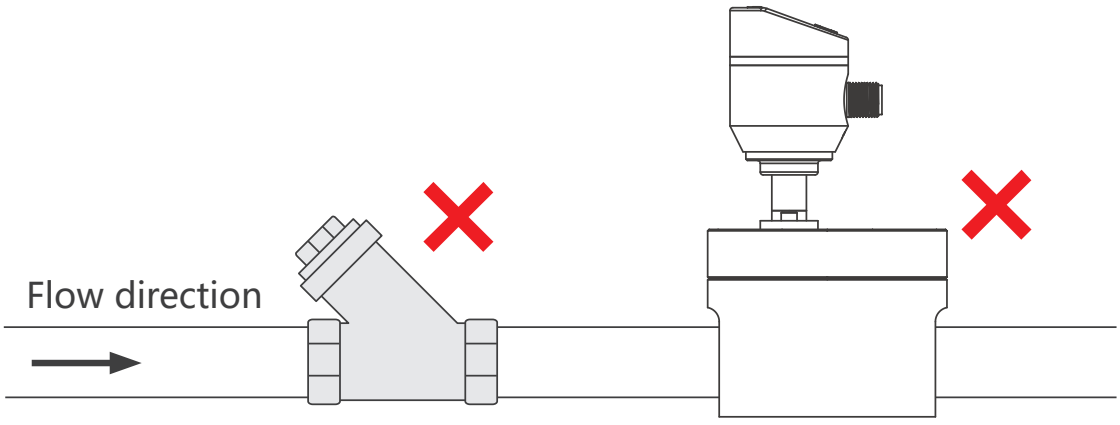
2.1 Installation diagram (For reference only)

Flow meter installation diagram

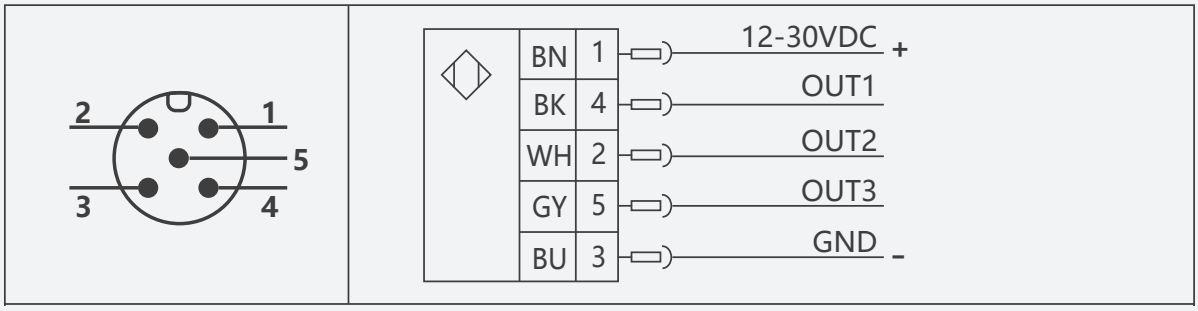
right



wrong

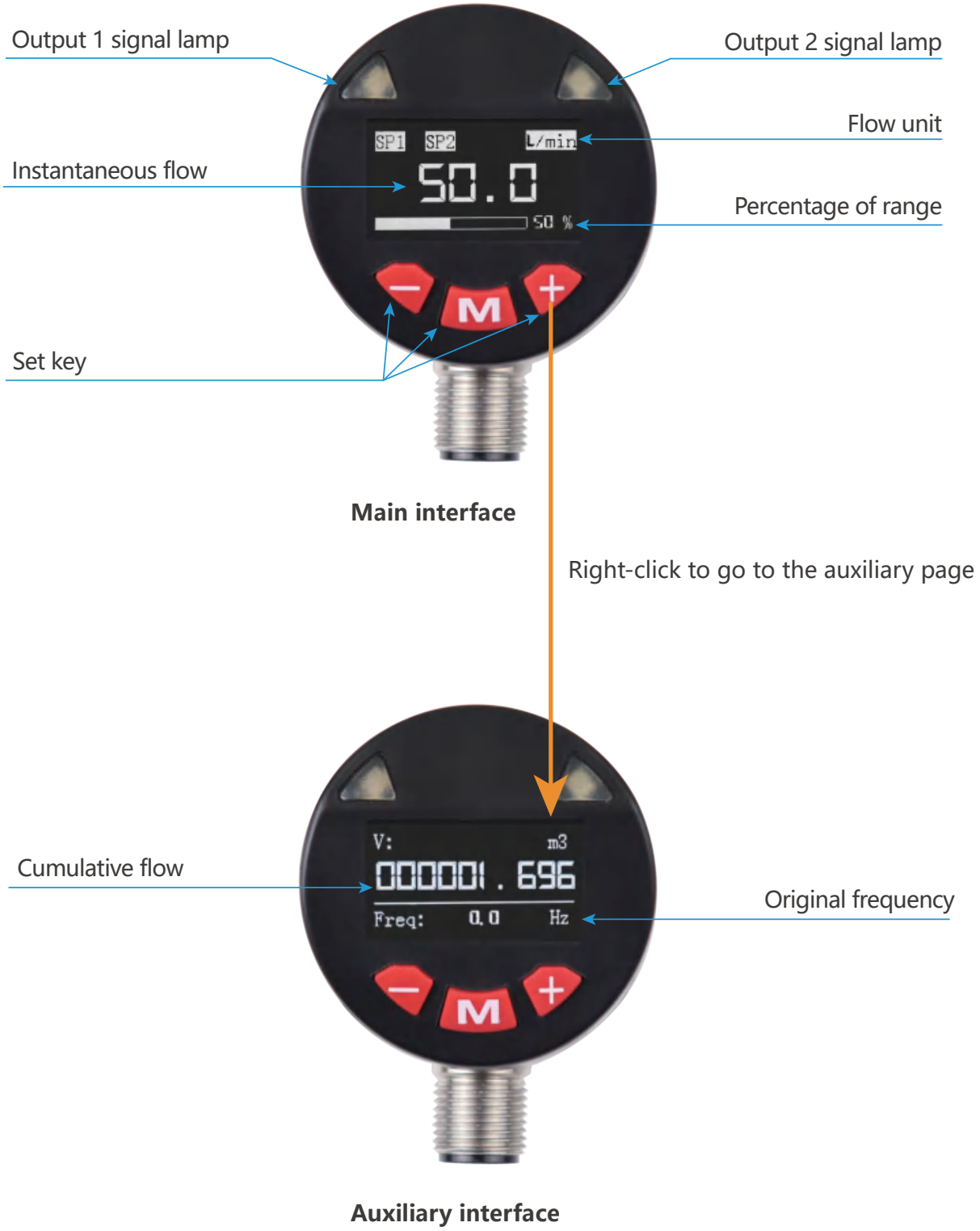


3.1 Wiring diagram



A3: Two switches + one analog		
color	**stitch**	**Instructions**
BN	1	power supply (+)
BU	3	power supply (-)
BK	4 (OUT1)	Flow switch PNP (Factory default) Flow switch NPN Linear pulse (full scale 100Hz) Original pulse Quantitative pulse (full scale *0.1)
WH	2 (OUT2)	Flow switch PNP (Factory default) Flow switch NPN
GY	5 (OUT3)	Flow: 4-20mA (factory default) Flow: 1-5v Flow: 0-10v

3.2 Panel diagram



3.3 Menu description

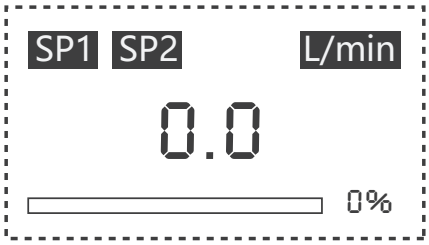
Level 1 menu	
SP1 Set	Switch 1 sets the value
RP1 Set	Switch 1 resets the value
SP2 Set	Switch 2 sets the value
RP2 Set	Switch 2 resets the value
F-URV	range
Menu 2 Set	Menu 2 Enter

Level 2 menu	
Factory Reset	factory data reset.
out1 Set	OUT1 Output mode
	W-NC: The window is always closed W-NO: The window is always open H-NC: hysteresis normally closed H-NO: normally open with hysteresis S-Hz-OUT: sets the pulse output F-Hz-OUT: indicates the original pulse output
out2 Set	OUT2 utput mode
	W-NC: The window is always closed W-NO: The window is always open H-NC: hysteresis normally closed H-NO: normally open with hysteresis
ds1 Set	Switch 1 output delay
dr1 Set	Switch 1 Reset delay
ds2 Set	Switch 2 output delay
dr2 Set	Switch 2 Reset delay

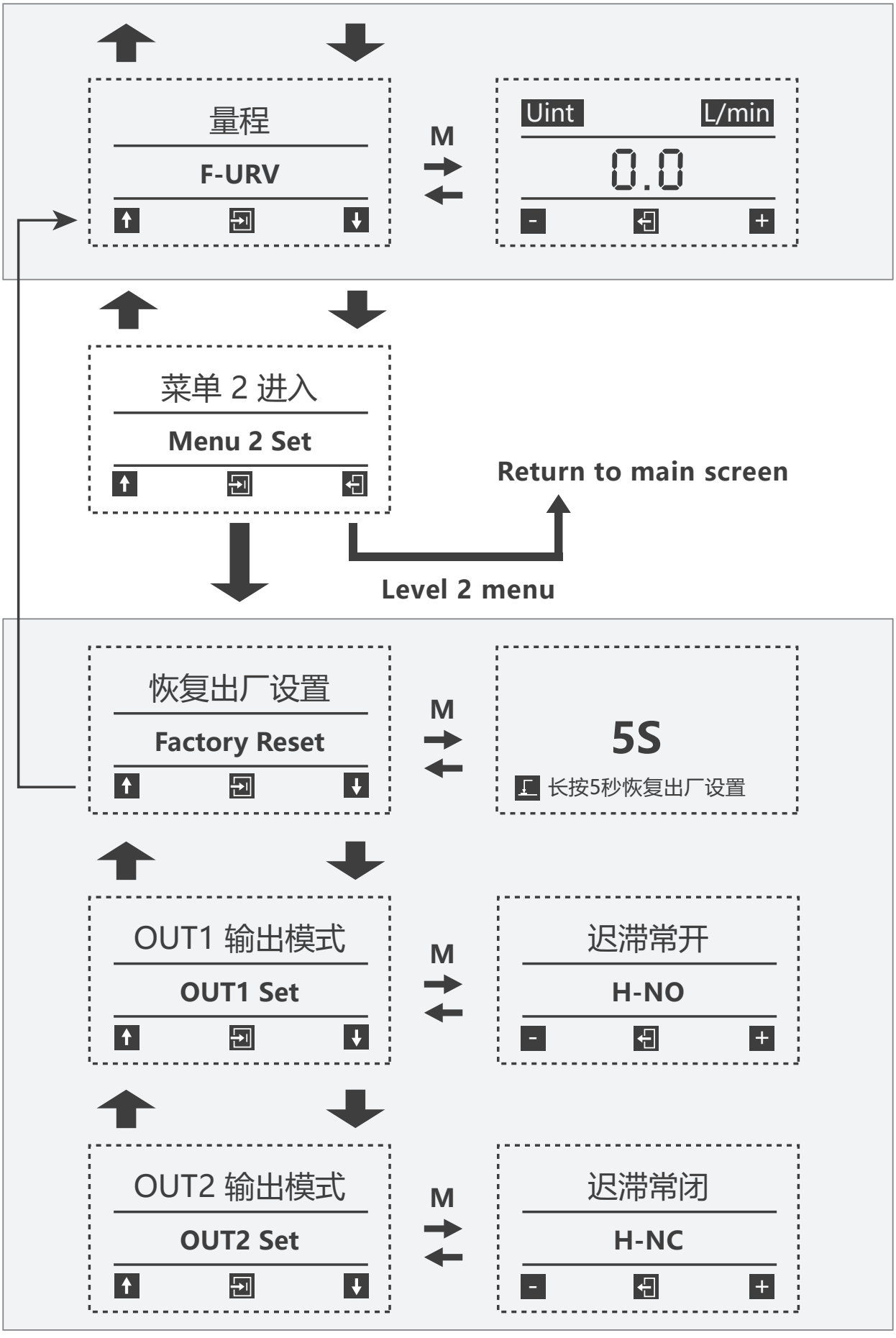
unit Set	Unit setting
	L/min, mL/min, m^3/h
PNP/NPN Set	PNP/NPN Settings
F-L-data	Historical minimum
F-H-data	Historical maximum
P-PACE	Filter damping
Low flow cut	Lower flow rate excision
A0-Mode	Analog output
	4-20mA 0-20mA 1-5V 0-5V 2-10V 0-10V
d-P-set	Decimal place
digit colour	Master data color
BG colour	Main background color
SCRN-Set	Screen off setting value

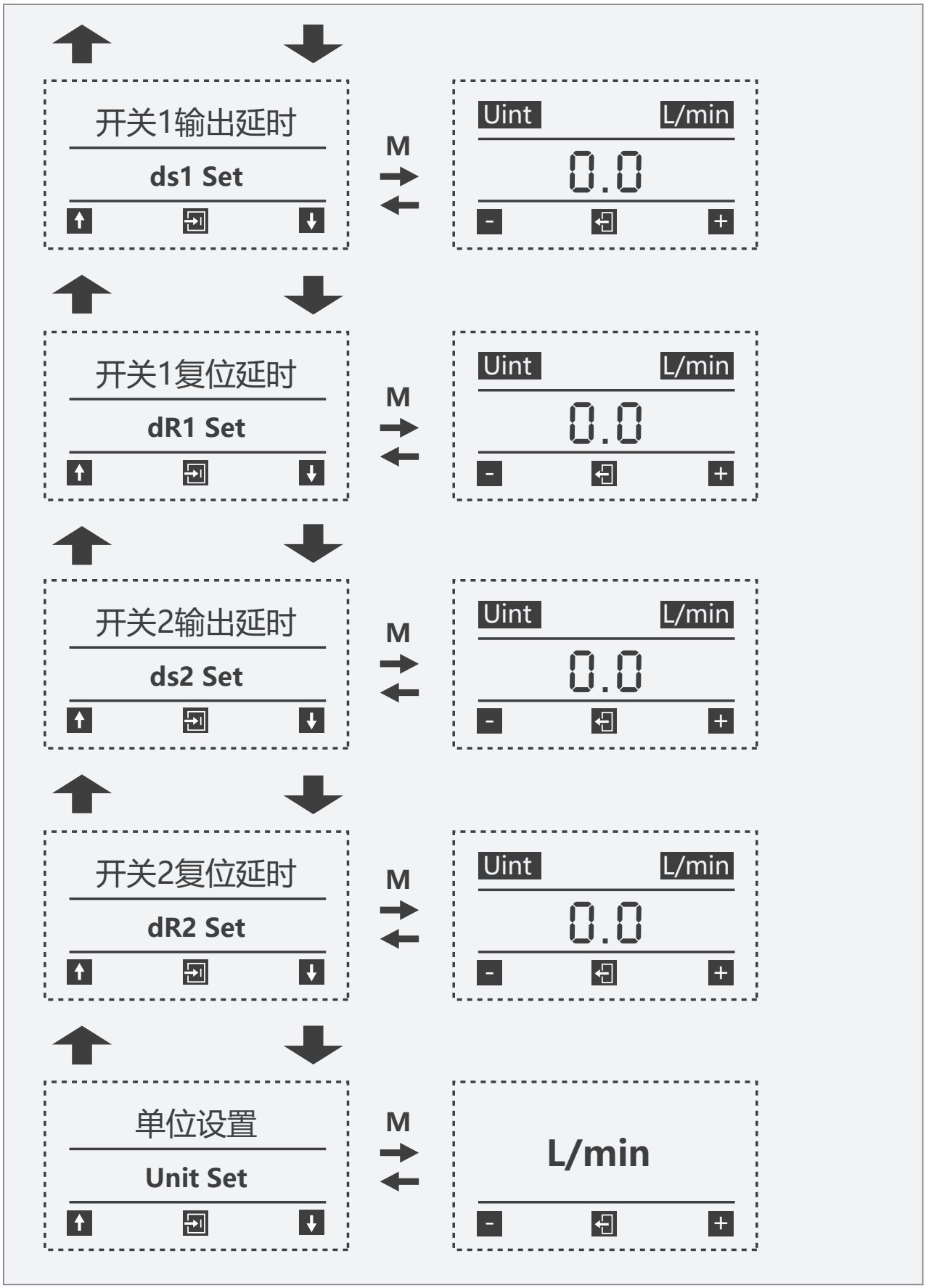
3.4 Menus and Settings

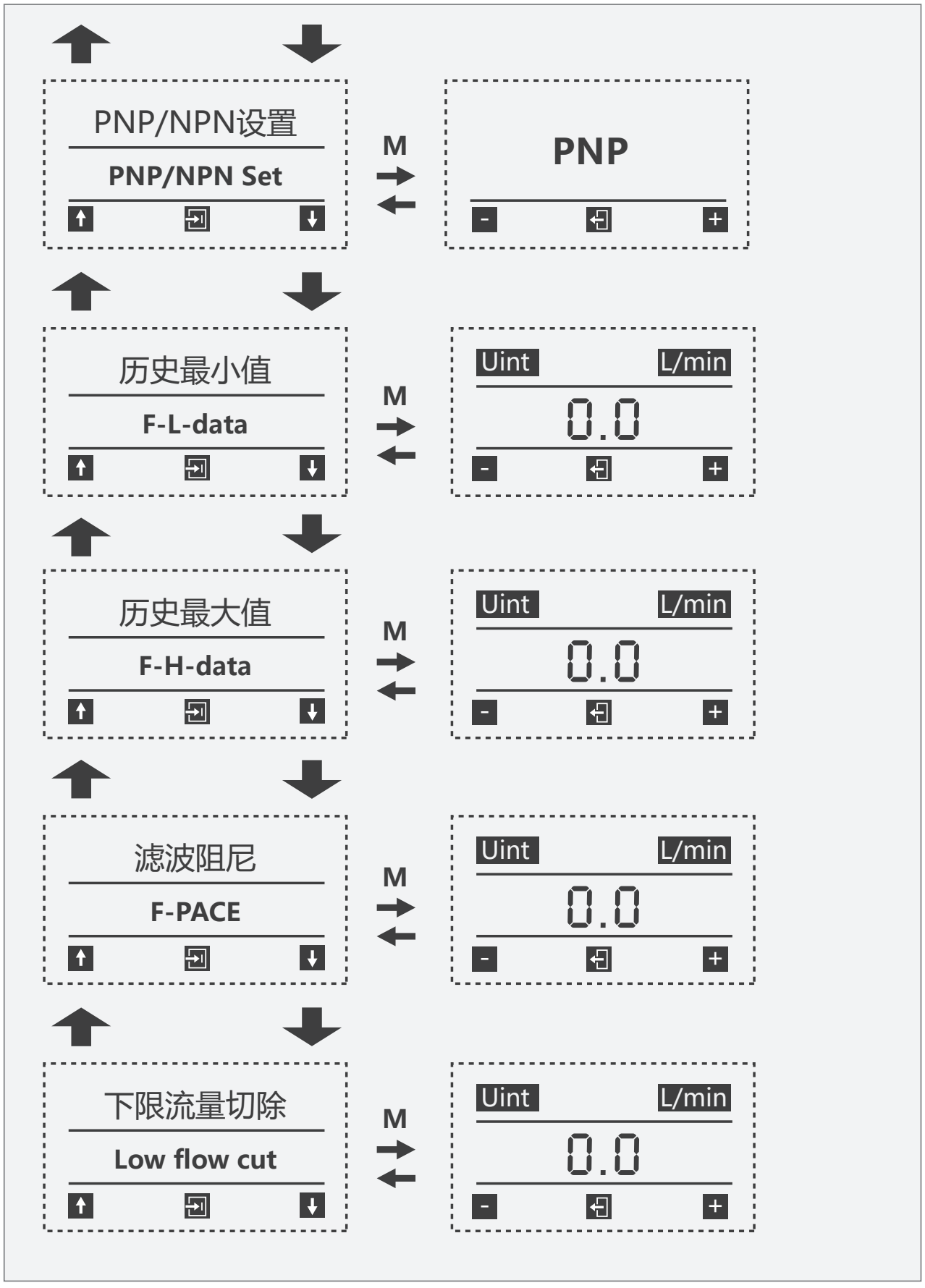
Main interface

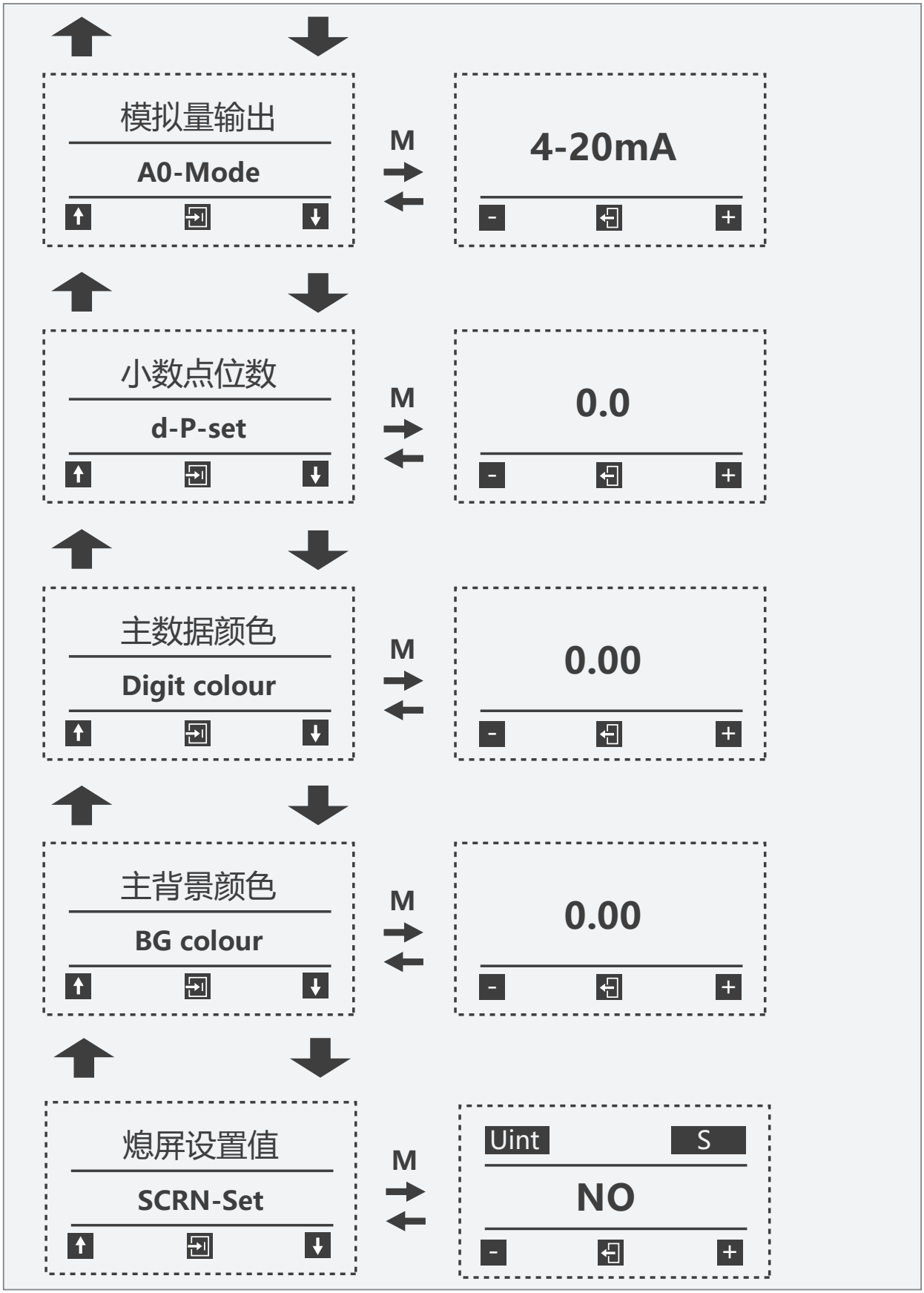


M Level 1 menu


量程
F-URV
M
Uint
L/min
0.0
菜单 2 进入
Menu 2 Set
Return to main screen
Level 2 menu
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
迟滞常开
H-NO
OUT2 输出模式
OUT2 Set
M
迟滞常闭
H-NC

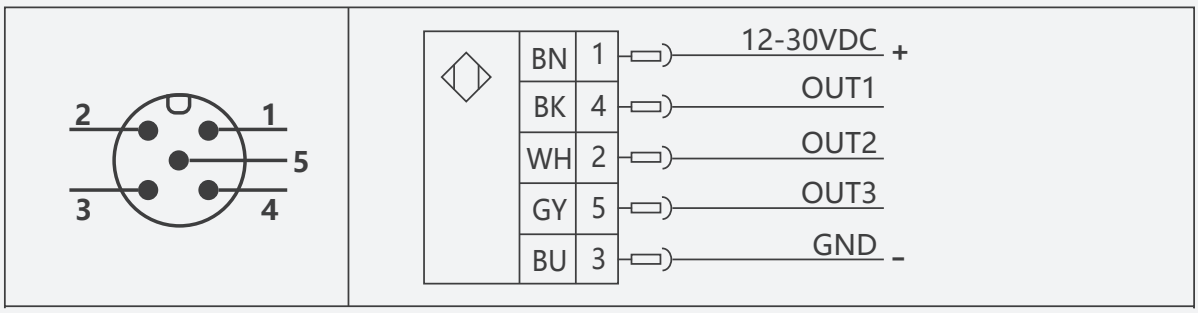

开关1输出延时
ds1 Set
M
Uint
L/min
0.0
开关1复位延时
dR1 Set
M
Uint
L/min
0.0
开关2输出延时
ds2 Set
M
Uint
L/min
0.0
开关2复位延时
dR2 Set
M
Uint
L/min
0.0
单位设置
Unit Set
M
L/min


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
0.0
-
+
下限流量切除
Low flow cut
M
Uint
L/min
0.0
-
+



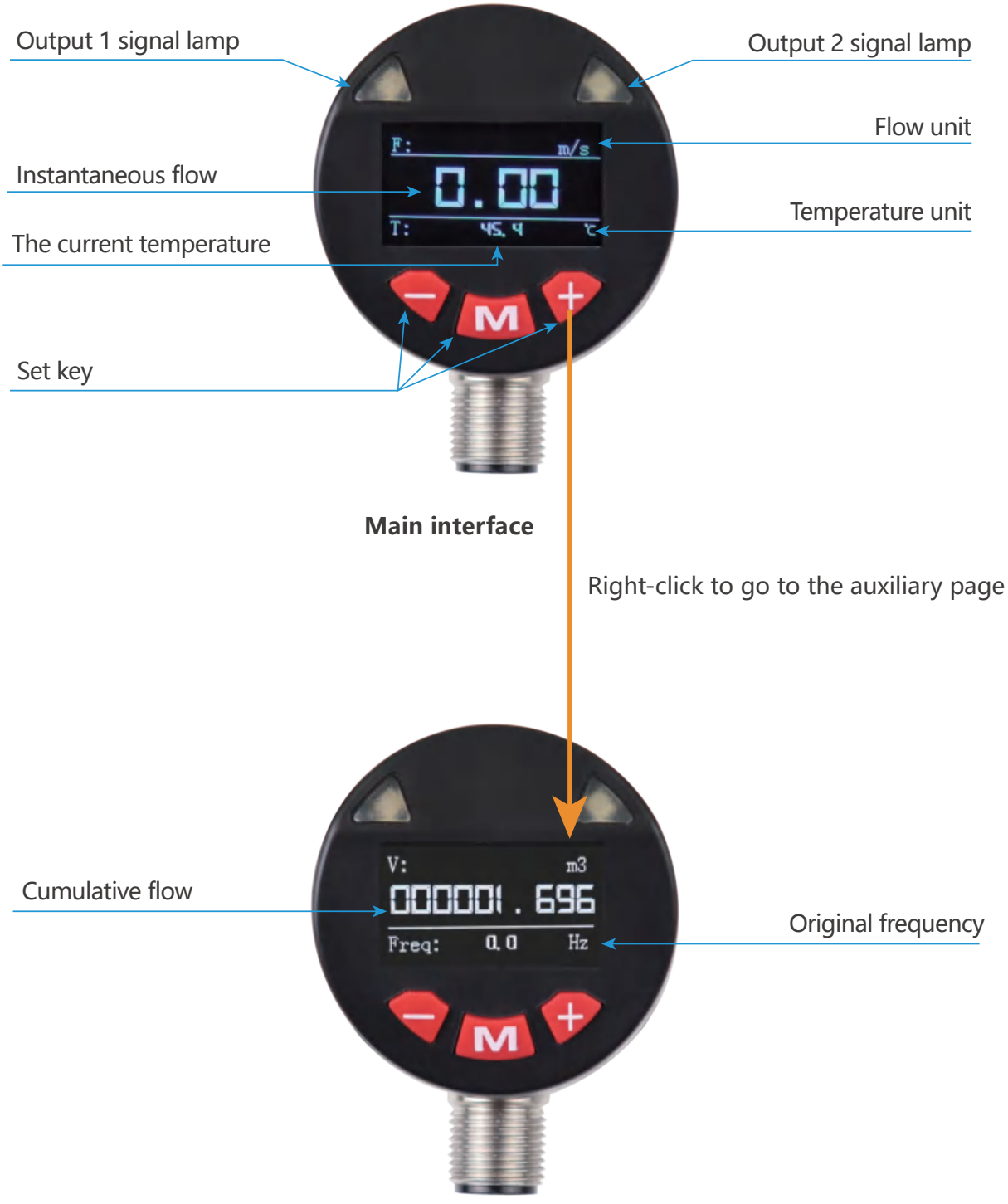
➤ **Main interface**

4.1 Wiring diagram



AR: RS485 Communication/analog		
color	**stitch**	**Instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	RS485(B)
WH	2 (OUT2)	RS485(A)
GY	5 (OUT3)	Flow: 4-20mA (factory default) Flow: 1-5v Flow: 0-10v

4.2 Panel diagram



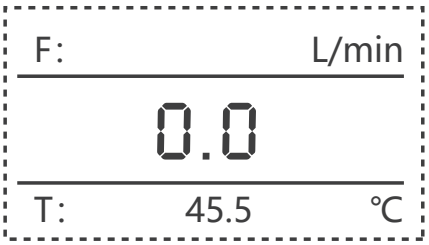
4.3 Menu description

Level 1 menu	
485 ID	485 address
Baud set	Baud rate setting
parity set	Check bit setting
stop bit set	Stop bit setting
F-URV	range
Menu 2 set	Menu 2 Enter

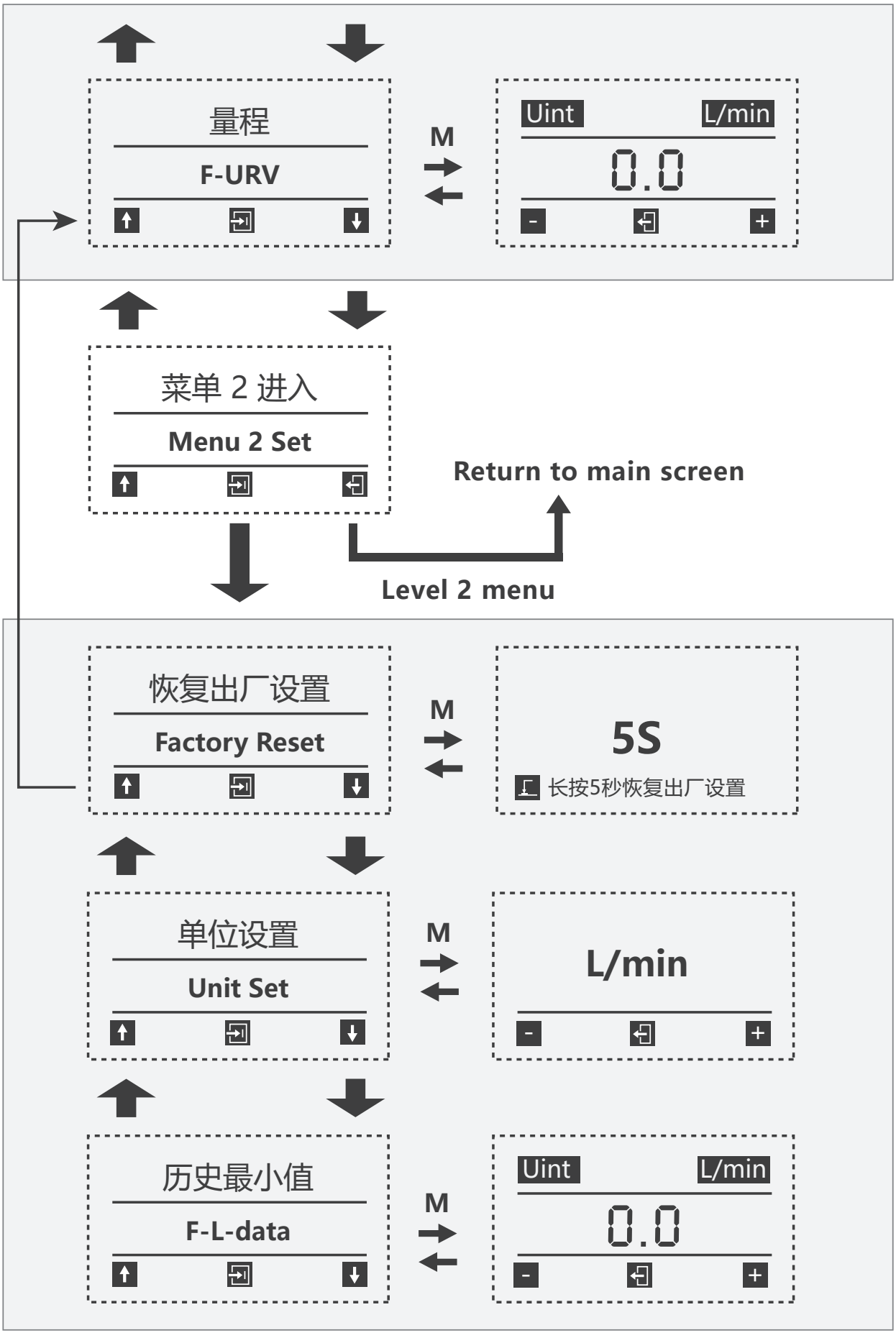
Level 2 menu	
factory reset	factory data reset.
unit set	Unit Settings (L/min, ml/min, m^3/h)
F-L-data	Historical minimum
F-H-data	Historical maximum
F-PACE	Filter damping
Low flow cut	Lower flow rate excision
A0-Mode	Analog output
	4-20mA
d-P-set	Decimal place
digit colour	Master data color
BG colour	Main background color
SCRN-Set	Screen off setting value

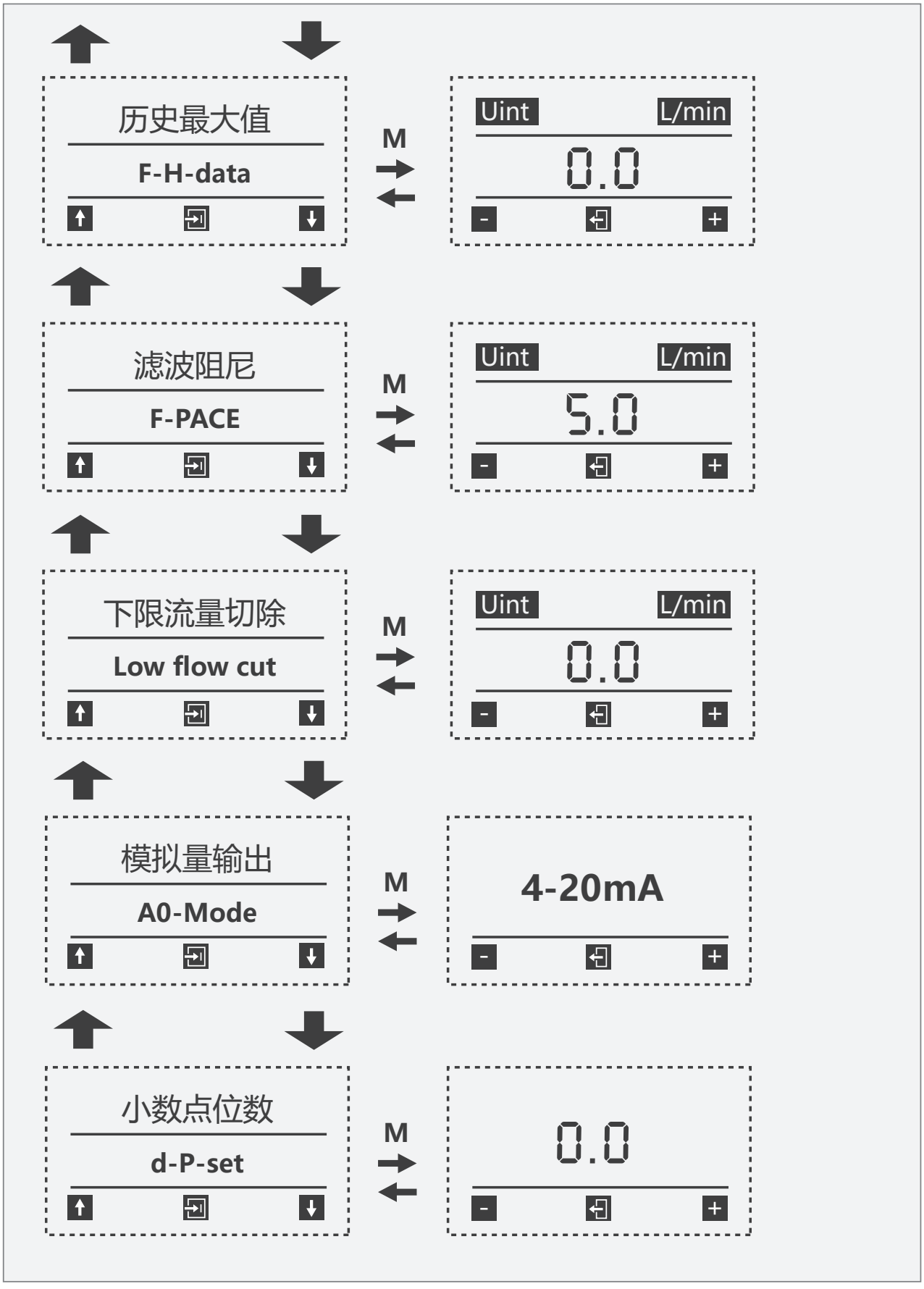
4.4 Menus and Settings

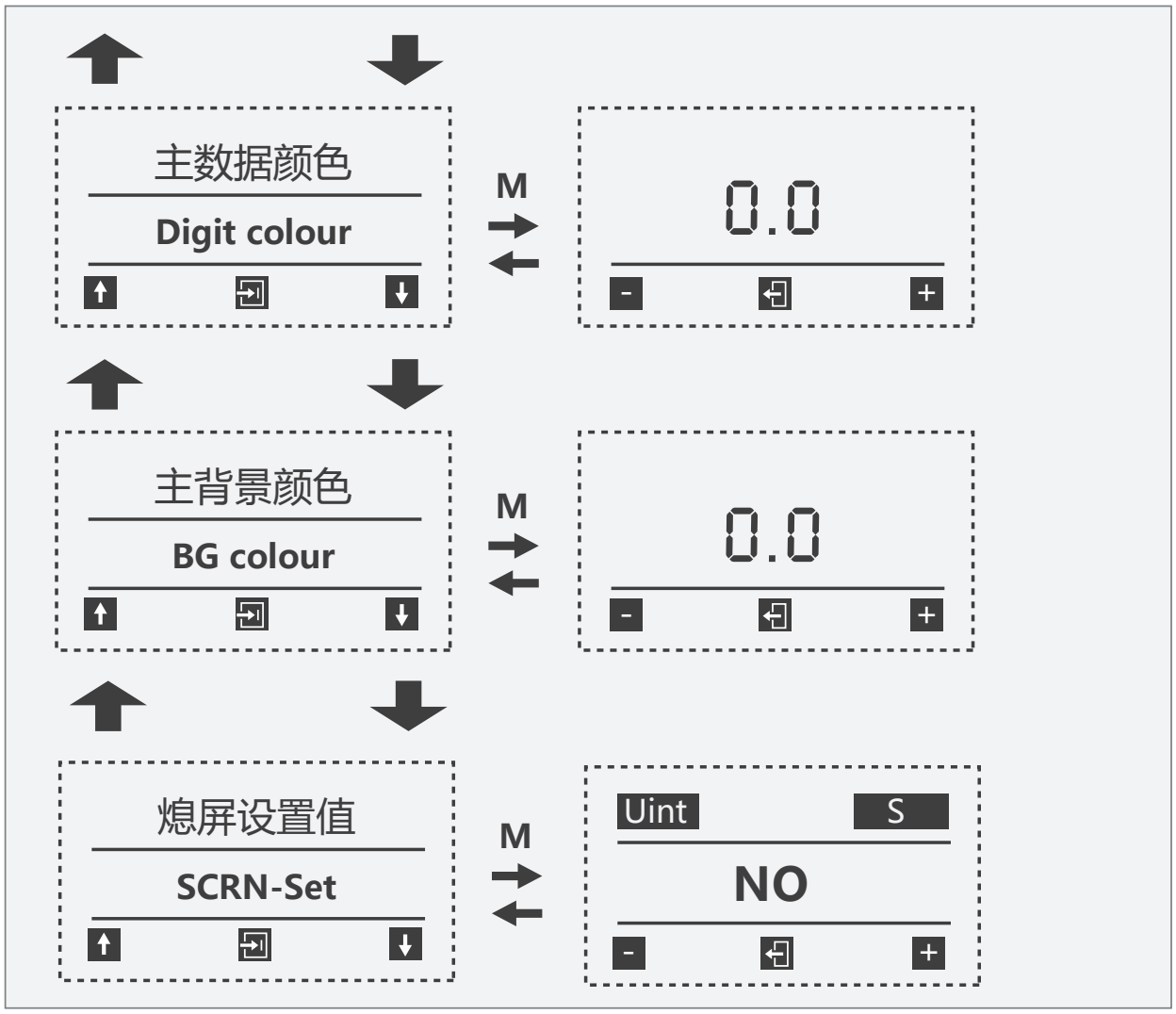
Main interface



M Level 1 menu

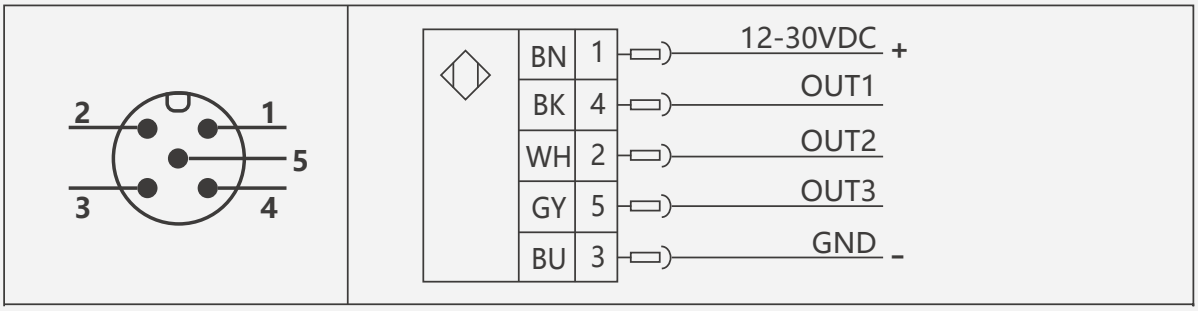

量程
F-URV
M
Uint
L/min
0.0
-
+
菜单 2 进入
Menu 2 Set
Return to main screen
Level 2 menu
恢复出厂设置
Factory Reset
M
5S
长按5秒恢复出厂设置
单位设置
Unit Set
M
L/min
-
+
历史最小值
F-L-data
M
Uint
L/min
0.0
-
+


历史最大值
F-H-data
M
Uint
L/min
0.0
滤波阻尼
F-PACE
M
Uint
L/min
5.0
下限流量切除
Low flow cut
M
Uint
L/min
0.0
模拟量输出
A0-Mode
M
4-20mA
小数点位数
d-P-set
M
0.0



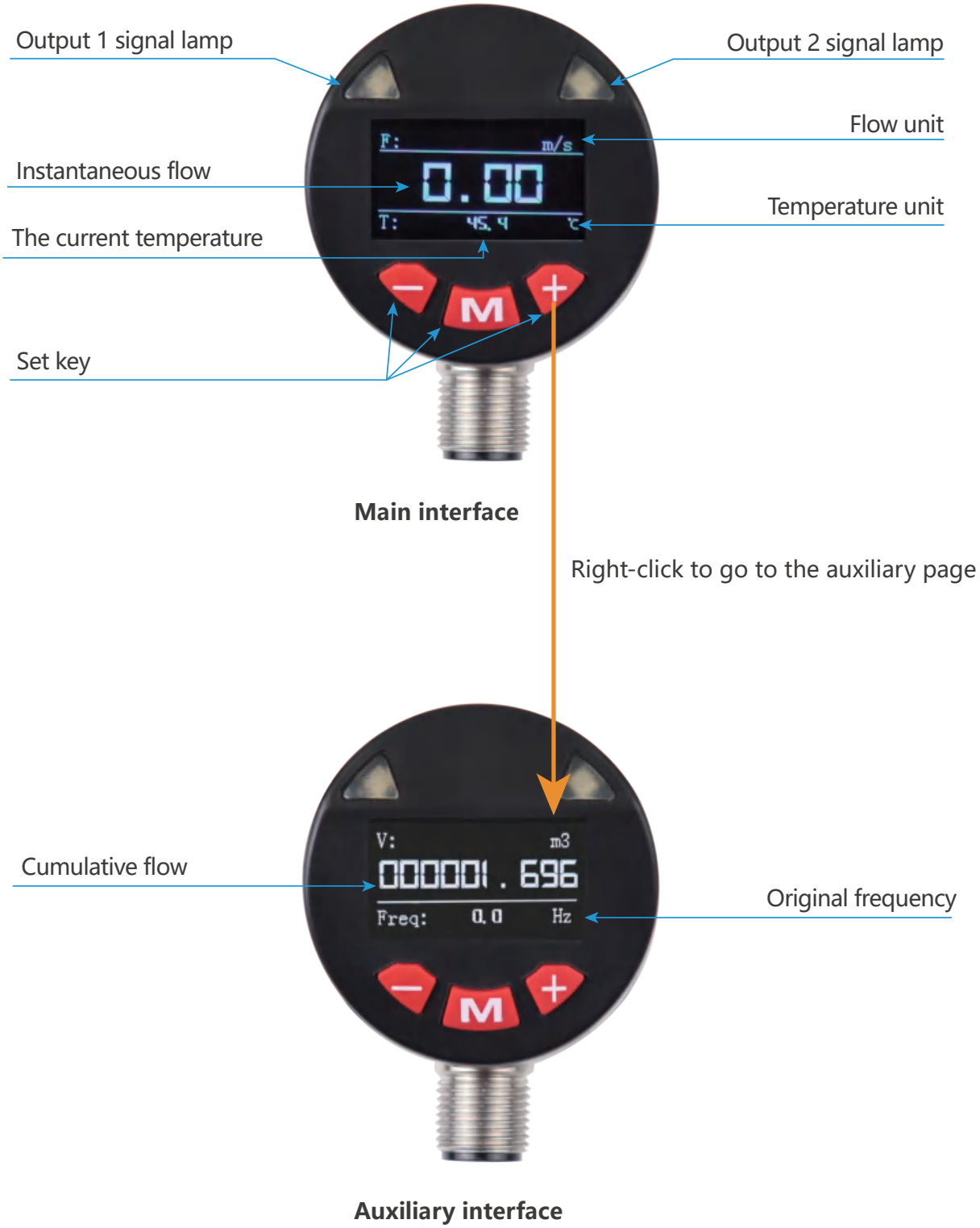
Main interface

5.1 Wiring diagram



SA: Analog (flow/temperature)/switch/pulse/frequency /IO-Link		
color	**stitch**	**Instructions**
BN	1	power supply（+）
BU	3	power supply（-）
BK	4 (OUT1)	Flow switch PNP Flow switch NPN Temperature switch PNP Temperature switch NPN Linear pulse (full scale 100Hz) Original pulse Quantitative pulse (full scale *0.1) IO-Link
WH	2 (OUT2)	Flow: 4-20mA (factory default) Flow: 1-5v Flow: 0-10v
GY	5 (OUT3)	Temperature: 4-20mA(Factory default) Temperature: 1-5v Temperature: 0-10v

5.2 Panel diagram



5.3 Menu description

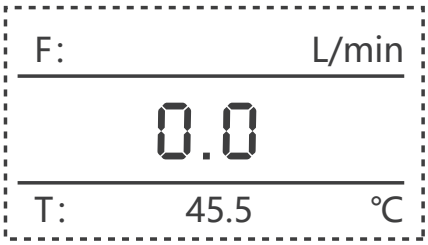
Level 1 menu	
SP1 Set	Switch 1 sets the value
RP1 Set	Switch 1 resets the value
T-LRV	Lower limit of temperature
T-URV	Upper temperature limit
F-URV	Flow range
Menu 2 Set	Menu 2 Enter

Level 2 menu	
Factory Reset	factory data reset.
out1 Set	OUT1 Output mode
	F-W-NC: The flow window is normally closed F-W-NO: The flow window is normally open F-H-NO: Flow hysteresis is normally open F-H-NC: Flow hysteresis is normally closed T-W-NC: The temperature window is normally closed T-W-NO: The temperature window is normally open T-H-NO: Temperature hysteresis is normally open T-H-NC: Temperature hysteresis is normally closed F-Hz-OUT: Flow pulse output
out2 Set	OUT2 Output mode
	F-A-OUT: Flow analog output T-A-OUT: Temperature analog output
ds1 Set	Switch 1 output delay
dr1 Set	Switch 1 Reset delay
T-ofst	Temperature offset
Flow-C	Flow coefficient value

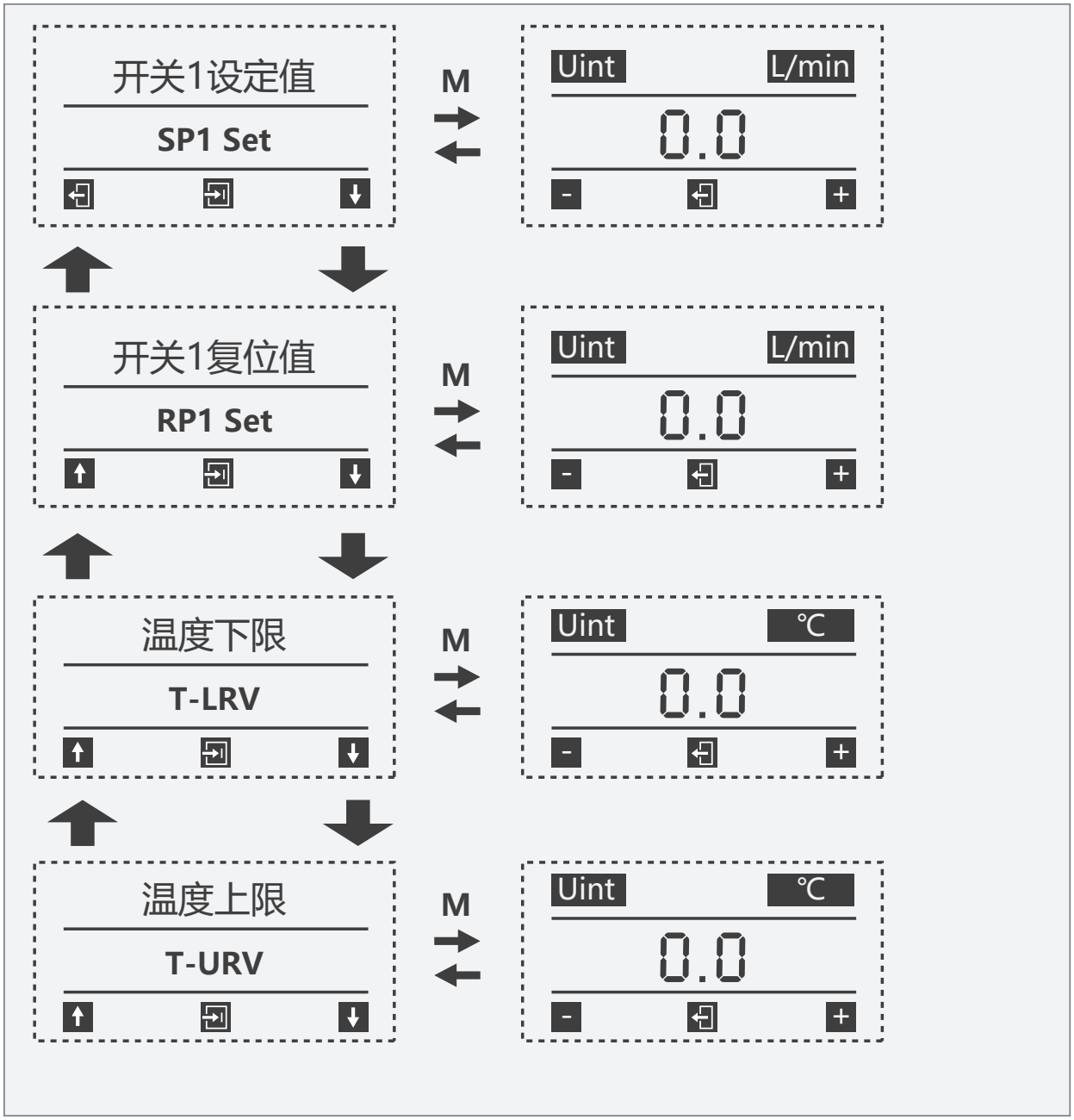
unit Set	Unit setting
	L/min, mL/min, m^3/h
PNP/NPN Set	PNP/NPN Settings
F-L-data	Historical minimum
F-H-data	Historical maximum
P-PACE	Filter damping
Low flow cut	Lower flow rate excision
A0-Mode	Analog output
	4-20mA 0-20mA 1-5V 0-5V 2-10V 0-10V
d-P-set	Decimal place
digit colour	Master data color
BG colour	Main background color
SCRN-Set	Screen off setting value

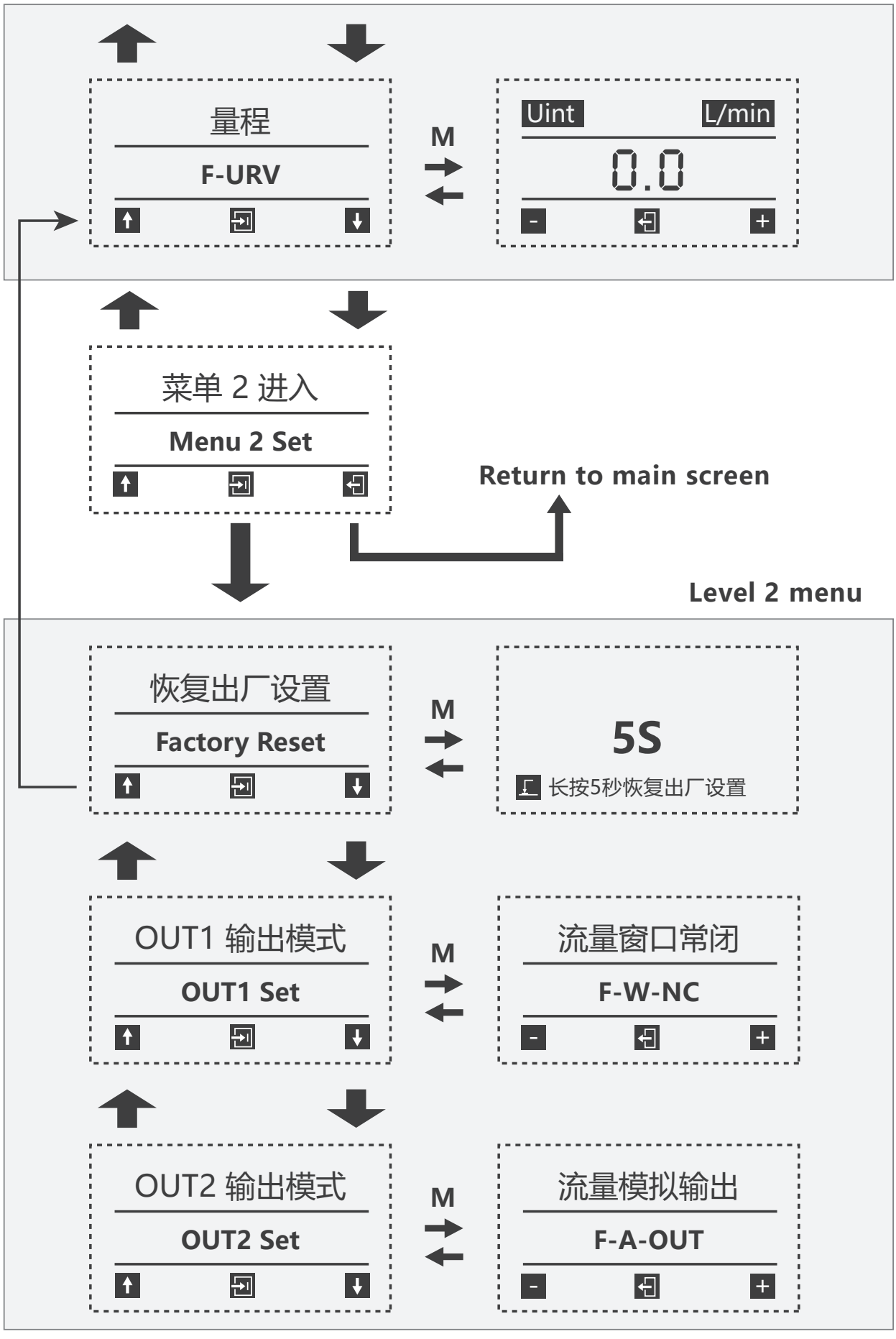
5.4 Menus and Settings

Main interface

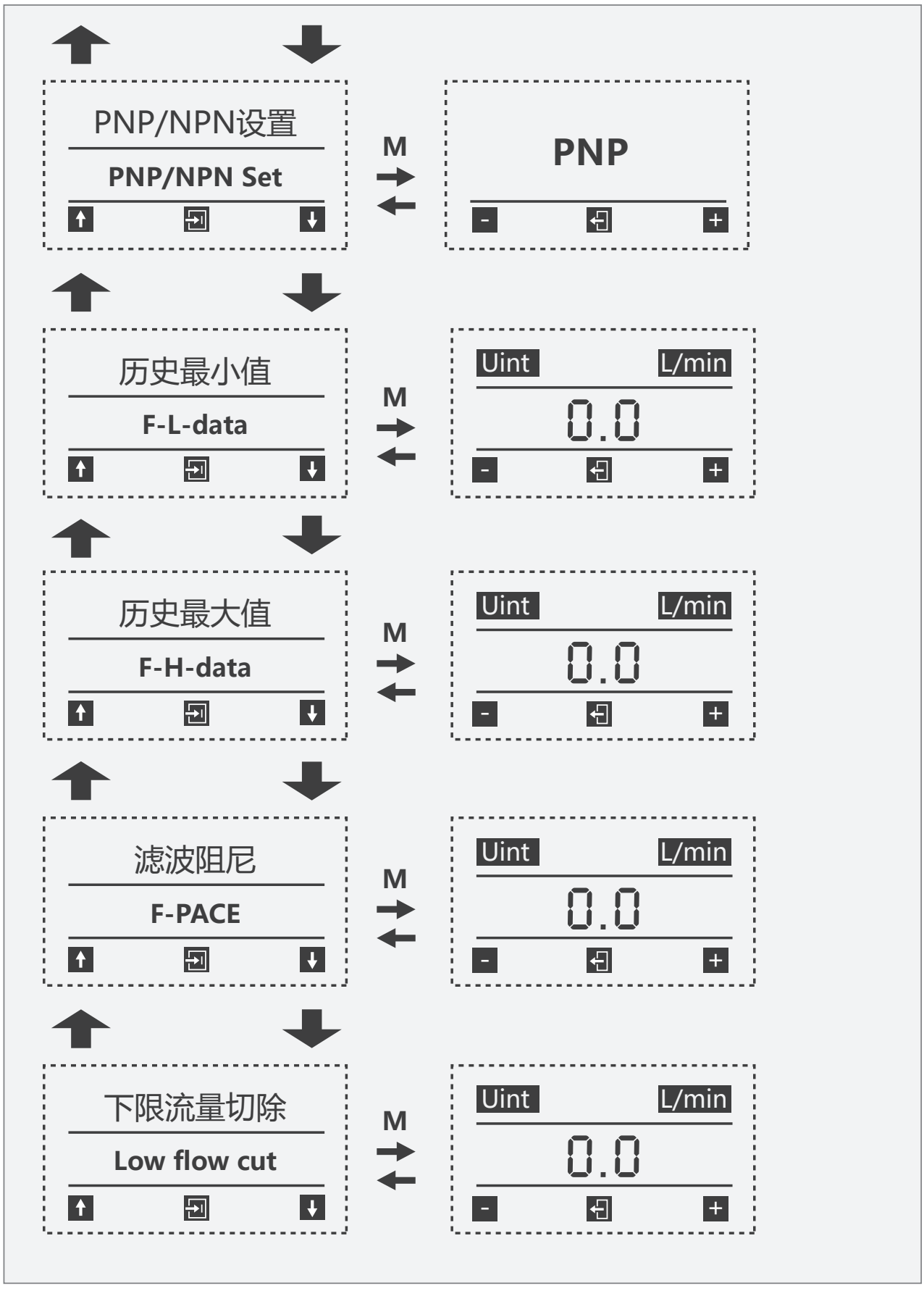


M Level 1 menu




量程
F-URV
M
Uint
L/min
0.0
菜单 2 进入
Menu 2 Set
Return to main screen
Level 2 menu
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
流量模拟输出
F-A-OUT


开关1输出延时
ds1 Set
M
Uint
L/min
0.0
开关1复位延时
dR1 Set
M
Uint
L/min
0.0
温度偏移量
T-ofst
M
Uint
℃
0.0
流量系数值
Flow-C
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
0.0
下限流量切除
Low flow cut
M
Uint
L/min
0.0

Main interface

6.1 Fault situation and handling method

Fault phenomenon	Possible cause	Elimination method
There is no output signal after the power is turned on	1. No medium flow in the pipeline or the flow rate is lower than the starting flow rate; 2. The power supply is incorrectly connected to the output cable. 3. The display circuit is damaged	1. Increase the medium flow rate or change to a smaller diameter flowmeter to meet the requirements of the flow range; 2. Connect cables correctly. 3. Replace the flowmeter
The flowmeter has signal output when there is no flow	1. Poor grounding of the flowmeter and interference of strong electricity and other ground lines; 2. The sensitivity of the amplifier is too high or produces self-excitation; 3. The power supply is unstable. Poor filtering and other electrical interference.	1. Connect the ground correctly to eliminate interference; 2. Replace the preamplifier; 3. Repair and replace the power supply to eliminate interference.
The instantaneous flow indicator is unstable	1. The medium flow is unstable; 2. The sensitivity of the amplifier is too high or too low, and there are multiple and missing pulse phenomena; 3. There are debris in the shell; 4. Poor grounding; 5. The flow rate is lower than the lower limit; 6. Foreign matter enters the pipe, forming a disturbance.	1. Test after the flow rate is stable; 2. Replace the preamplifier; 3. Remove dirt; 4. Check the ground cable to ensure that it is normal
The indicated cumulative flow does not match the actual cumulative flow	1. Incorrect input of meter coefficient; 2. The normal flow rate of the user is lower than or higher than the normal flow range of the selected flowmeter; 3. The flow meter itself is out of tolerance	1. Enter the correct instrument coefficient after re-calibration; 2. Adjust the flow rate of the pipeline to make it normal or choose a flowmeter of appropriate specifications; 3. Recalibrate.
Key exception	The converter key is in poor contact or locked.	Replace the display board.

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