Intelligent metal tube rotameter

Operating Manual

VER 5.0

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1. Overview

CF100 series of indicators for measuring the magnetic field lines or angular displacement and displacement digital design and development of multi-functional magnetic transmitter. It MCU microprocessors at the core, using magnetic sensors, digital filtering through, such as software that digital signal processing technology, to achieve the purpose of measuring changes in the magnetic field. And through double LCD, provide a good man-machine interface, the signal can be output current, minimum and maximum levels alarm, and the cumulative signal pulse, and other ways for users with a wider range of choice.

CF100 Series indicator installed in the metal tube rotameter measuring tube, constitutes a smart metal tube rotameter.

2. the main function

☆ angular displacement measuring the magnetic field lines or displacement
☆ double LCD can also showed that the instantaneous flow rate and cumulative flow
☆ set functional parameters can be realized
☆ multi-parameter calibration function
☆ data recovery functions
☆ data backup functions
☆ data power-fail protection
☆ Alarm or accumulated pulse output function
☆ optional backlit LCD display
☆ optional battery-powered display locally

3. the main technical indicators

1） Indicator LCD
Numerical instantaneous flow show that the range of :0 --- 500000
The cumulative flow show that numerical range :0 --- 99999999

2） Indicator conversion accuracy
Instantaneous:0.5%FS ±1msd
The cumulative value: 0.5% FS ±1msd

3） Indicator measuring the magnetic field rotation angle for the best: 70 °---80 °, a resolution of 0.07 °

4） LCD display normal environmental temperature range: -25 °C ---+85 °C

5） Indicator normal working environment temperature range: -40 °C ---+85 °C

6） Environment humidity less than 90% RH

7） Power Fail data protection time is about 10

8） Form of power supply: Two - 10.8 VDC - 36VDC

9） Alarm mode: to pave the way to maximize collector current 100 mA @ 30VDC internal impedance 100 Ω

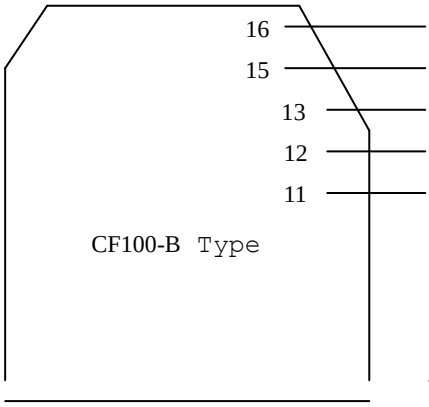
10） Pulse output: accumulated pulse output, a minimum interval of 50 ms pulse

11） Optional An explosion-proof of this: Exia Ⅱ CT4

12） Rechargeable battery: 4.4 AH@3.6V 一 group can be used 2000 - 3000 hours, about 3-4 months

4. CF100 Series indicator wiring

1) PCB wiring



16 The minimum level alarm or pulse output

15 Alarm or pulse output ceiling

13 Next backlight

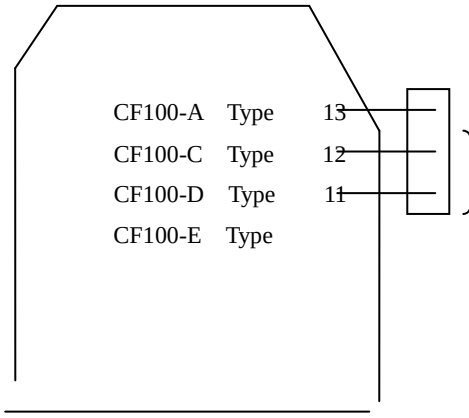
12, 11 Two-loop 4—20mA

a. Second-tier system: then 11, 12-, 11 for the power supply is, 12 to the negative power supply

b. With backlighting: 11 to power is, 13 to the negative power supply, 12 to current output

c. Zone Alarm or pulse output: Zone Alarm or pulse output power is load-through to 15 or 16，Negative termination Instrument 24 VDC power supply negative side, 11, 12, 13 to the same law a, b。

2) Indicator terminal wiring



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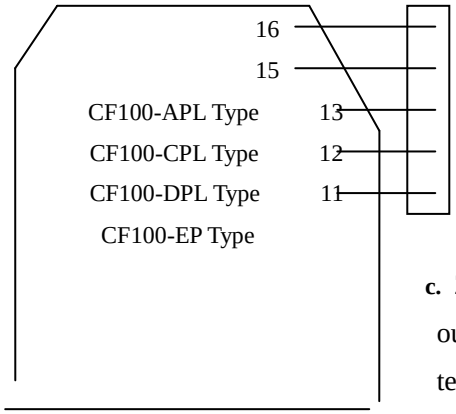


c. Zone Alarm or pulse output: Zone Alarm or pulse output power is load-through to 15 or 16，Negative termination Instrument 24 VDC power supply negative side, 11, 12, 13 to the same law a, b

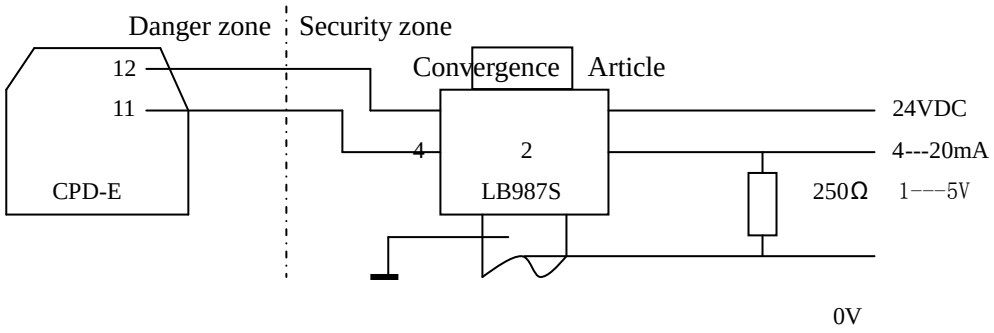
5. CF100 Series indicator of spectrum

CF100-	Intelligent indicator series of metal tube flowmeters			
	A	Ordinary indicator (with a few significant and guide)		
	B	Ordinary indicator line (PCB)		
	C	Ordinary indicator (with only a few significant)		
	D	Ordinary indicator (only with indicators)		
	E	An indicator of the explosion-proof		
	F	Battery indicator		
		O	Without warning or pulse output	
		P	Zone Alarm or pulse output	
			O	Without backlighting
			L	With backlighting

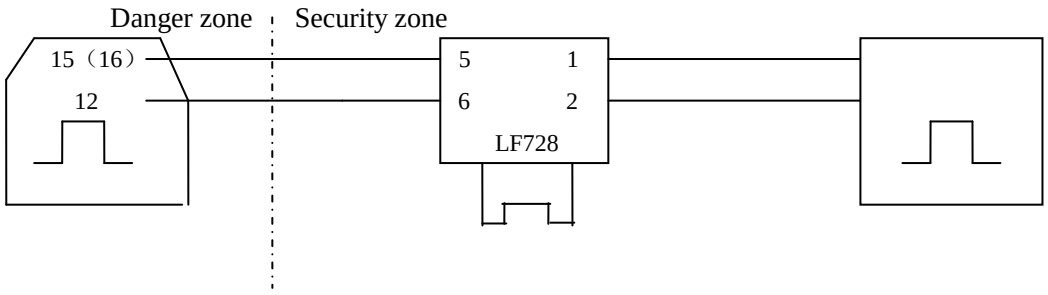
Note:

1. An explosion-proof indicator of this election, With only optional alarm or pulse output, This output also assigned and the corresponding Safety fence.
2. To achieve the requirements of the loop, Below may match the safety fence:

a. LB901（R）、LB987S、MTL728、MTL787 And so on uneven natrium safety fence



b. Alarm or the pulse output matches the LF728 unevennatrium safety fence output PLC or computer access



6. CF100 Series indicator software instructions

1）. Indicator summary:

This indicator has one pair of eight LCD display and three button operation, all the shows and their operation is completed by them.

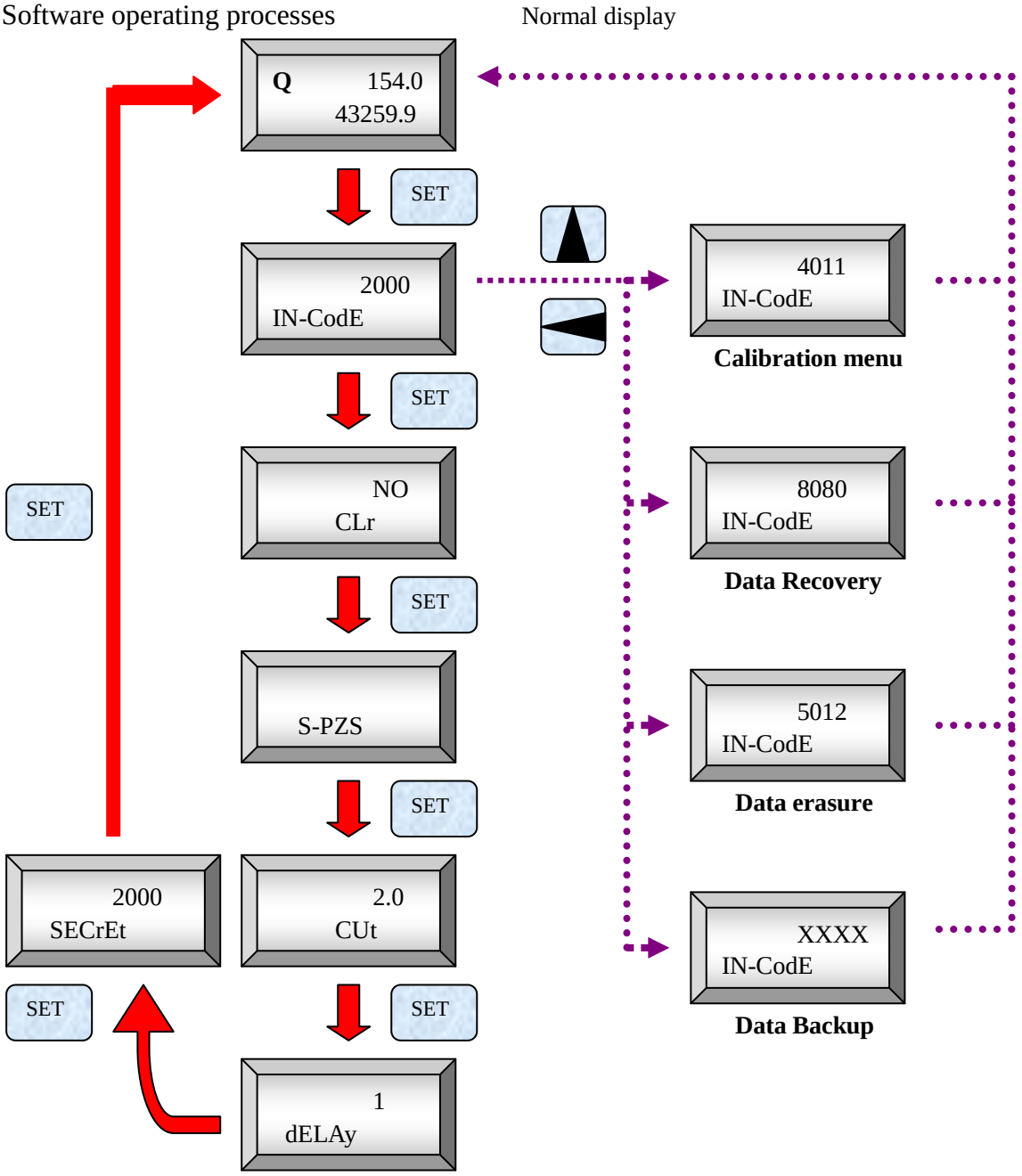
1.1 LCD display higher authority and his party for instantaneous flow, The above his party for the show that the cumulative flow.

1.2 Function keys SET The cycle for the main menu and parameter settings shows that the confirmation. Short S bond.

1.3 Augend bond For the 0 to 9 digit revision and withdrawal of sub-menu. As I bond

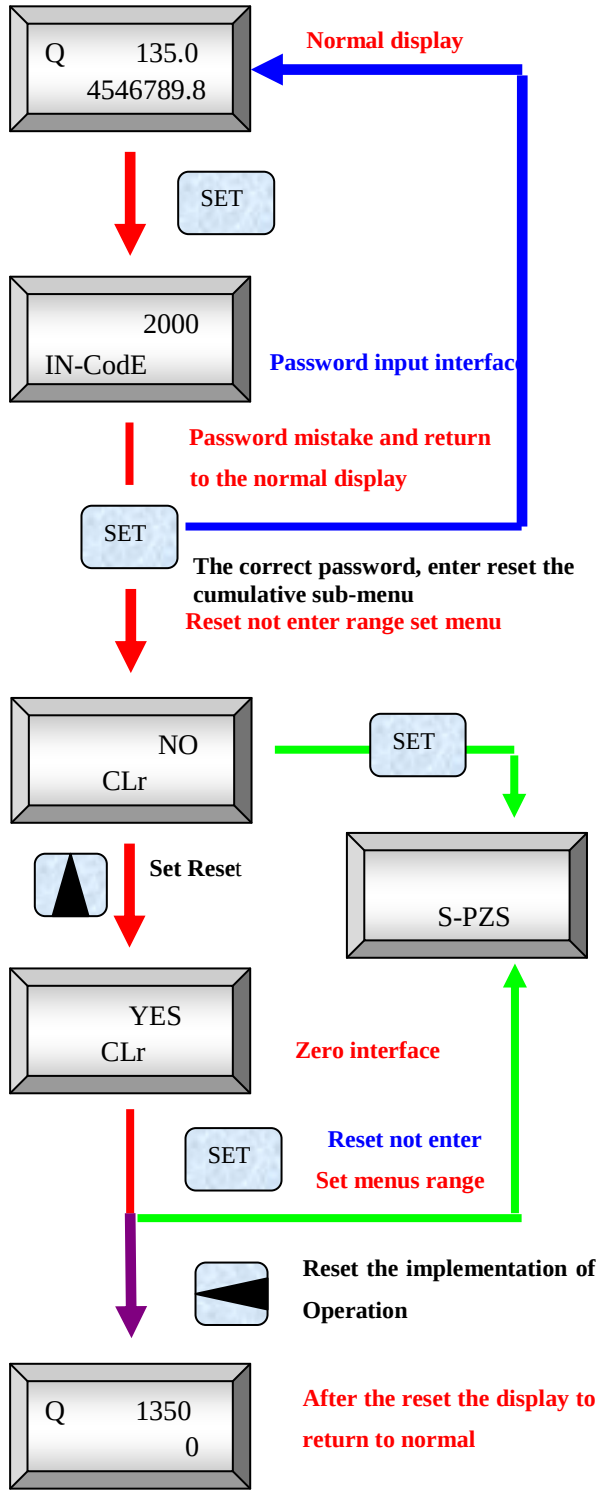
1.4 Shift keys The revised figures for the control and location of the sub-menu entry. Short D bond.

2). Software operating processes

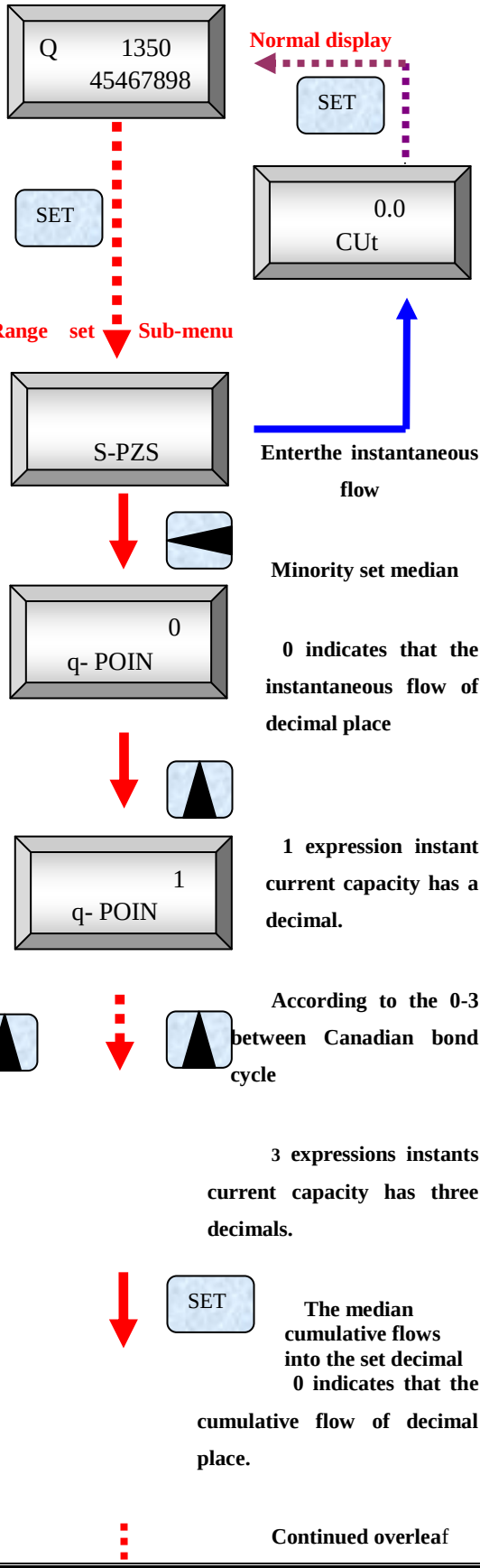


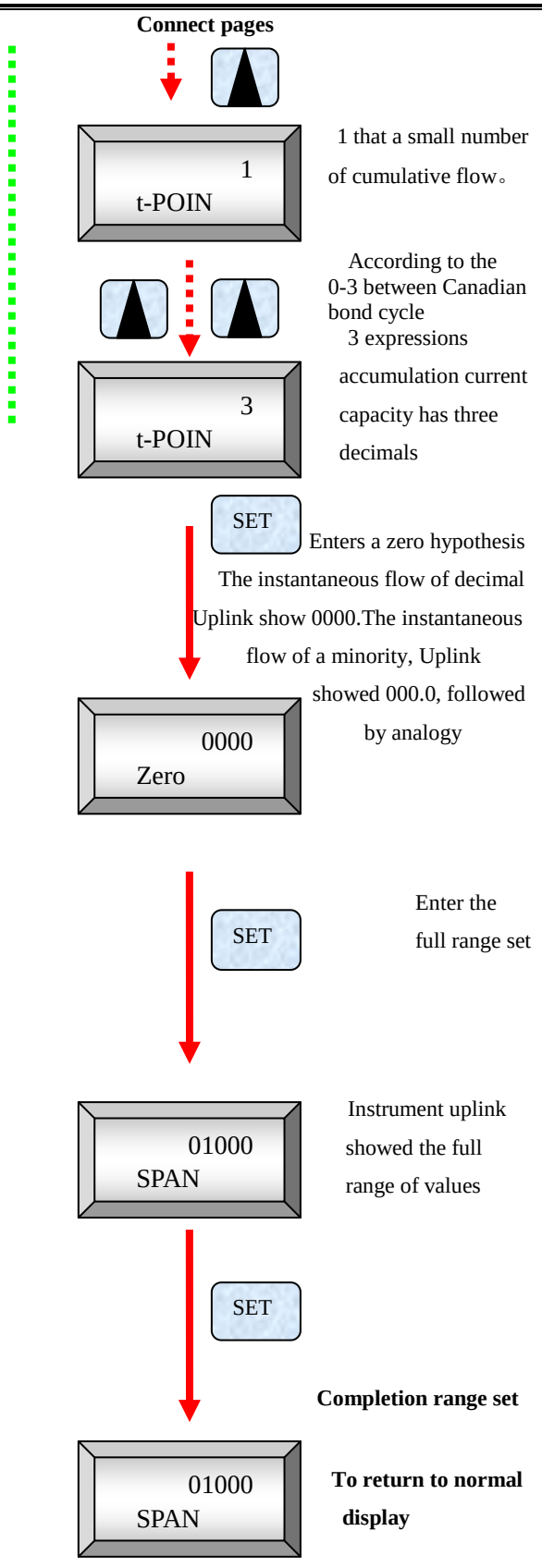
3). Parameter settings sub-menu operations

3.1 cumulative operating reset

Operations processes and display	Note
	Left to normal work flow meter display interface. Q: show that the normal state, Uplink showed instantaneous flow value, the maximum was 99999.(The median value and the decimal, If the instantaneous flow set to a decimal, The maximum instantaneous flow to 9999.9). Downlink shown as cumulative flow value, Max 99999999 (with the median cumulative decimal),Automatically reset. Under normal display interface, according to S keys to enter password input interface, Password defaults to 2000. This interface, Input different password to be able to enter the operation of different sub-menu. The cumulative flow operation, reset the default password is 2000. **Note:** This kind of accumulation current capacity clear zero operation forthorough clear zero. Cautious asks the user to use. For removal of the accumulated value shows，But long presses the D key then to complete. If users need to reset the cumulative operation，In the Password input interface directly by SET Enters accumulates the clear zero sub- menu contact surface. As shown in the left. If the user has previously changed the password, After must input the change the password, To enter, reset the cumulative sub-menu interface. Otherwise, Password errors, To return to the normal display. Password input through Canada in the past several keys and shift keys completed. Reset in the sub-menu interface cumulative, According to Enter the cumulative confirmed reset the interface, As shown in the left. If unclear zero, According to SET Skip reset the cumulative operation，Access to the range set menu。 Or, reset the interface does not accumulate According to SET Skip reset the cumulative operation，Access to the range set menu。 If reset, According to The cumulative total completed, reset, reset the operation and return to normal after the show state, As shown in the left.

3.2 range set operation

Operations processes and display	Note
	Under normal display, according to SET keys， To password input interface, Users input the correct password, Lacks the province password is 2000, According to continue SET keys. Until the range set interface. As shown in the left. Set in the range interface, according to SET Resection flow into the small sub-menu. (As shown left), If we do not change the parameters of the back of the menu, According to SET button can continue until the withdrawal to the normal display. Set in the range interface, according to The first to reach the instantaneous flow to a small number of median settings, As shown in the left. according to Cycle show decimal digit (0-3), Until users median requested by the minority. Button confirmed SET and entered the median cumulative flow minority set. **Note:** cumulative flow decimal place can mean instantaneous flow decimal place， But not more than instantaneous flow decimal digit. The instantaneous flow rate and cumulative flow can be set up to three decimal. At this time, the instantaneous flow measurement range maximum SPAN should meet the following requirements： No small number of instantaneous flow -- SPAN≤500000 The instantaneous flow for a minority -- SPAN≤50000.0 The instantaneous flow for two decimal - SPAN≤5000.00 The instantaneous flow for the three decimal--SPAN≤500.000



The median cumulative flow minority set with the instantaneous flow minority set median method

Set a cumulative flow because of a small number of, The largest reduction is cumulative flow rate corresponding value change, As follows:

No decimal place---- Reset value is 99999999

A minority--- Reset value is 99999999

Two decimal--- Reset value is 99999999

The three decimal--- Reset value is 99999999

Set cumulative flow decimal place after the end of, According to SET Enters to a measuring range zero hypothesis May change a zero value, The 4 mA output counterparts revealed that the set value . Can be set above zero a few, But the full range value than small.

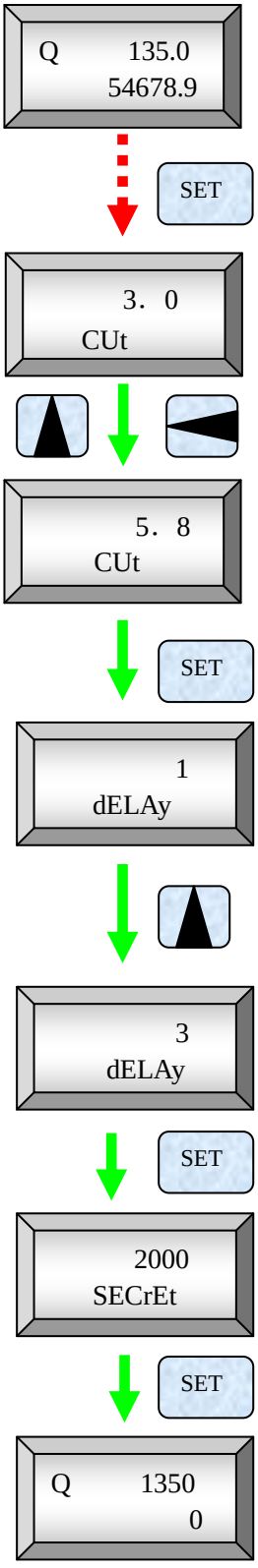
The change zero hypothesis contact surface on line of demonstrationvalue namely completes a zero hypothesis. In the ordinary circumstances, a zero value is 0, does not have tochange. In the peculiar circumstance changes a zero value passable to shiftthe key and the addend key completes.

At this time to identify and enter keys SET to the full range settings interface. Revision measuring range Man of valuesmethod same zero hypothesis method. Namely use shifting key and addend key, Full measuring range hypothesis contact surface on line ofdemonstration value, Changed to 20 mA output shows that the corresponding value.

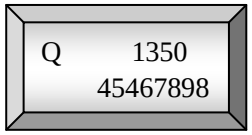
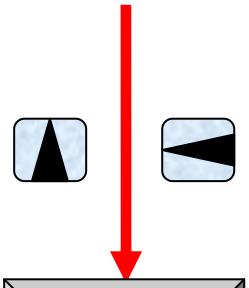
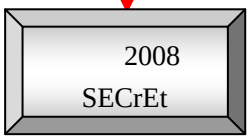
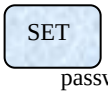
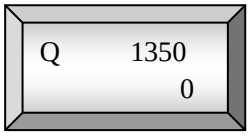
At the same time, we must pay attention to is: full value of the size of the instantaneous flow with a small number of settings, that is, to meet not more than the median SPAN decimal maximum.

The full range of value creation has been completed, according to SET bond from the state to the normal display. When the measuring appliance leaves the plant, the decimal figure, thezero spot, the measuring range press produces when the measuringappliance the technical parameter request hypothesis to finish, in thenot peculiar circumstance, the user does not need to revise.

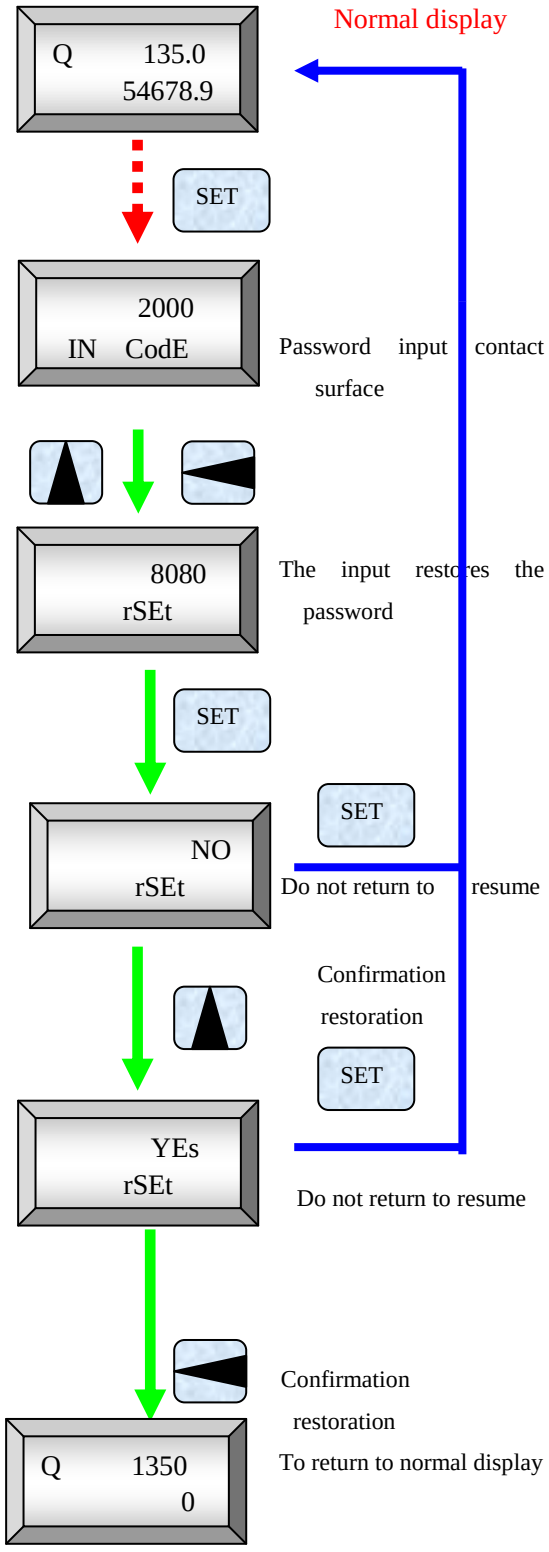
3.3 low flow rate and damping values set resection operation

Operations processes and display	Note
 **Normal display** **Resection interface** Resection of change Confirmation set resection value Damper setting interface Changes damping value Preservation damping value To return to normal display	Under normal display, keypad SET to interface with small flow. Resection of the uplink display interface for the current flow with small percentages, With shifts the key and the addend key changes on the good value tohave to excise the value to the user. The flow can be set with small value 0.0 - 9.9% FS. Resection including display and output signal of resection. If the full value of the 100, Resection value is set to 5.0, Then when the actual flow of 0-5, shown as 0, the output of 4 mA, When the instantaneous flow rate greater than 5:00, it shows that the actual flow rate of output current with the actual values. If no need to change the value of resection can skip directly by the SET button, and enter the damper settings menu. After the removal value set by SET button to enter damper settings interface. The role of damping to overcome jitter flow, stable output and display changes in the damping value is 0 - 3 four options, respectively, corresponding 0 - 3 seconds, the general set to 1. Presses the addend key, causes the damping value in 0-3 betweencyclic changes, until changes needs the value to the user Pressed key, SET confirmation and preserved user hypothesis damping value.And enters to the user password contact surface. Presses the SET keyonce more, returns to the normal demonstration condition. Damping value hypothesis bigger, the measuring appliance anti-vibration ability is stronger, but the measuring appliance respondedfast goes past slowly, must suitably select

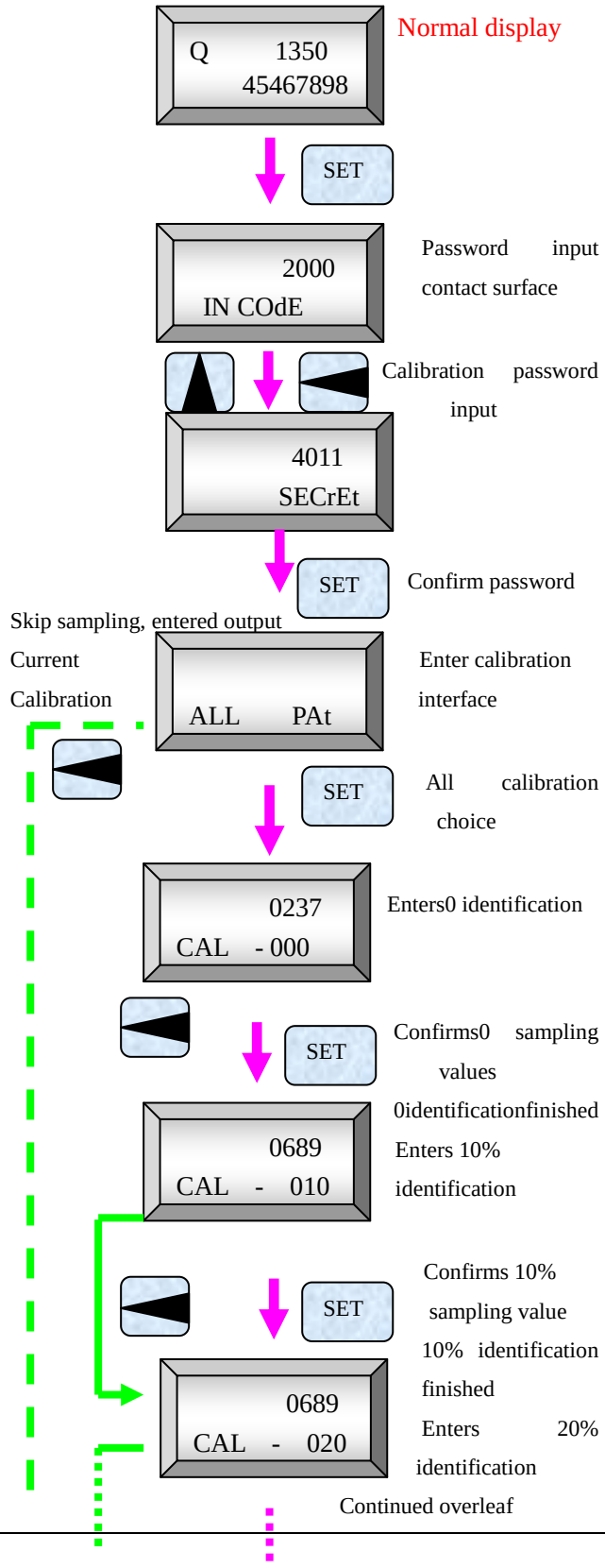
3.4. passwords hypotheses

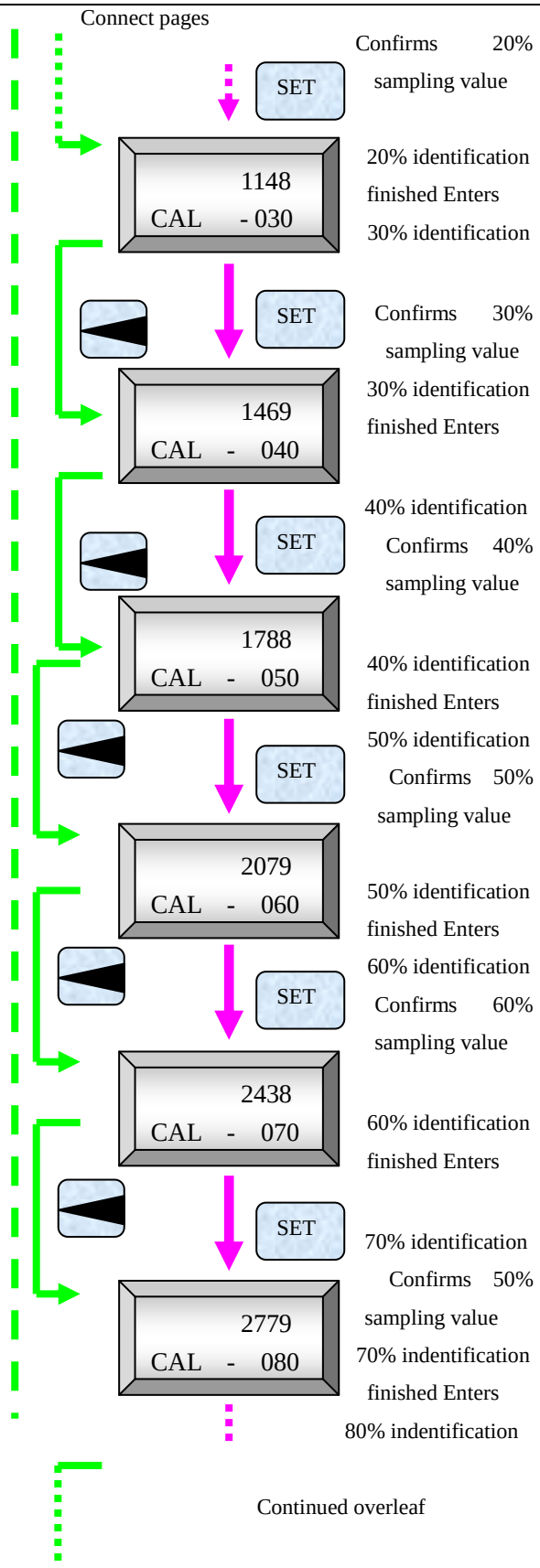
Operations processes and display	Note
 **Normal display** Password Change interface  Change password for 2008   Confirms the password and the withdrawal  To return to normal display	Under normal demonstration contact surface, Presses a key SET 6 time enters to the user password change contactsurface ， The password tacitly approves the value is 2,000。Changes this to tacitly approve the value to be allowed to preventother irrelevant personnel revise the measuring appliance interior theengineering data. But simultaneously, next time will enter must inputrevises after the password. With shifts the key and the addend key 2,000 changes the userexpectation the password value, if the user must change 2008, the leftchart shows。 **Note: If changes for 2008, if a user reset, the range setting, with small flow, damper settings sub-menu, the interface must IN COdE imported in 2008, before they can enter a sub-menu for operation.** After the pressed key SET confirmation change password, withdraws to thenormal demonstration contact surface。 This time, after the user must keep firmly in mind the change thepassword, if the not peculiar circumstance, suggested the user usetacitly approves the password。

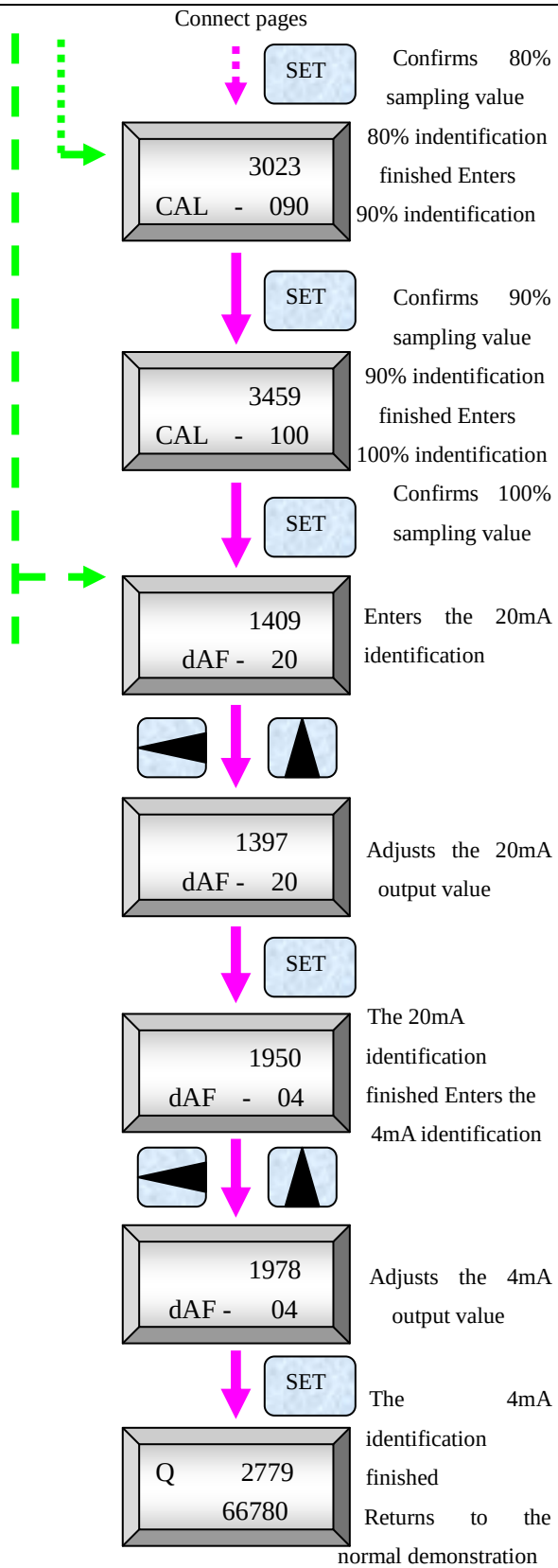
4) data restore the operation

Operations processes and display	Note
	Under the normal demonstration condition, the pressed key, SET to thepassword input contact surface, the data-in restores the operationpassword, the password is 8,080, continues the pressed key SET to restorethe sub- menu until the data. If the left chart shows. The data restores the project which the function restores to include:The decimal figure, zero, full of value, leave the plant the rating data,the small current capacity excision value, the damping value The pressed key , the data input restores the password input contactsurface, the data which the procedure tacitly approves restores thepassword is 8,080 Restores password 8080 with the addend key and the shifting keydata-in. Namely presses shifts the key to cause to glitter moves tothe position which must change, then through presses the addend key tochange this position the value, until causes four demonstrationsvalues is 8,080, this time the pressed key SET determined and enters tothe data whether restores the choice contact surface The pressed key SET for does not restore the data, and returns to thenormal demonstration condition. The pressed key restores the data for the confirmation, and returns toleaves the plant when the normal demonstration condition。 **When the user operation appears the mistake or the adjustment ischaotic, may use the data to restore the function to restore forleaves the plant the data.**

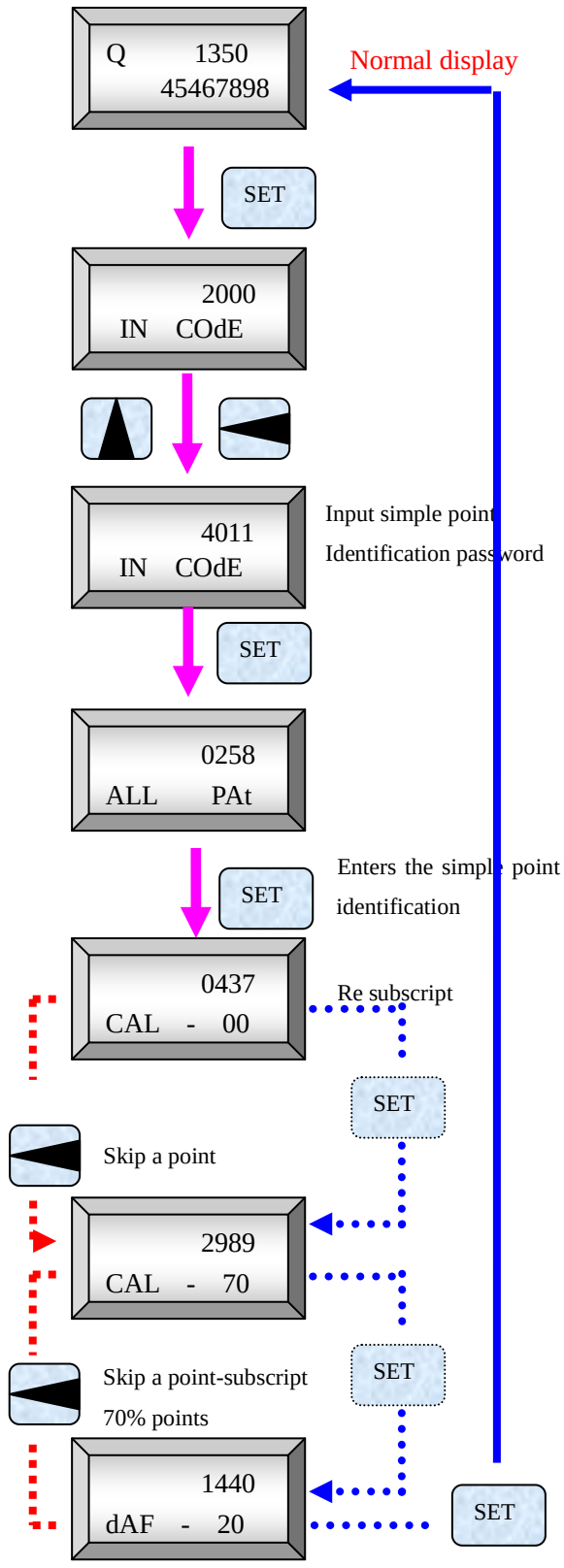
5). identification menus operation

Operations processes and display	Note
	Under the normal demonstration condition, the pressed key SET enters tothe password input contact surface.。 Enters the identification menu the password is 4,011 With shifts the key and the addend key inputs 4011, the input method:First uses the shifting key to cause to glitter moves to the positionwhich must change, then through presses the addend key to change thisposition the value, until causes each position the value to become4011, this time the pressed key SET determined and enters to theidentification contact surface. **After enters the identification contact surface, may choose thecomplete identification and the electric current output calibration.The SET key chooses the complete identification (ALL), shifts the keychoice electric current output calibration (Pat). When completeidentification presses shifts the key to be possible to jump thissampling, presses the SET key for to confirm this sampling value.** The left chart shows for a zero identification. Is in the zero currentcapacity position the flowmeter, on the liquid crystal a line ofdemonstration is this sampling value, next line of demonstration CALis the identification designator, 000 for zero identification. Afterthe current capacity and the sampling value are stable,the pressed key SET preservation zero sampling value, simultaneously enters 10%identification. Presses shifts the key to jump this identificationsampling, following is same. Is in 10% current capacity position the flowmeter, in this time thegood sampling value is bigger than 0 sampling values, after treats thecurrent capacity and the sampling value is stable, presses down thekey SET, preserves 10% sampling data, simultaneously enters 20%identification condition. Is in 20% current capacity position the flowmeter, in this time thegood sampling value is bigger than 10% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET, preserves 20% sampling data.

Operations processes and display	Note
	20% identification finished enters 30% identification. Is in 30% current capacity position the flowmeter, in this time thegood sampling value is bigger than 20% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET , preserves 30% sampling data, enters to 40% identification. Is in 40% current capacity position the flowmeter, in this time thegood sampling value is bigger than 30% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET , preserves 40% sampling data, enters to 50% identification. Is in 50% current capacity position the flowmeter, in this time thegood sampling value is bigger than 40% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET , preserves 50% sampling data, enters to 60% identification Is in 60% current capacity position the flowmeter, in this time thegood sampling value is bigger than 50% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET , preserves 60% sampling data, enters to 70% identificati. Is in 70% current capacity position the flowmeter, in this time thegood sampling value is bigger than 60% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET , preserves 70% sampling data, enters to 80% identification.

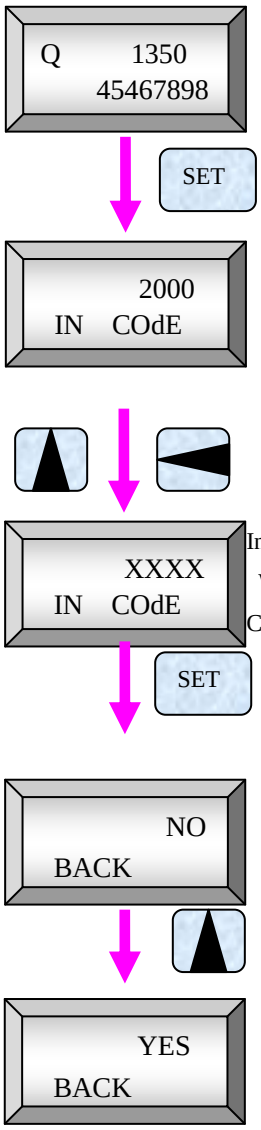
Operations processes and display	Note
Connect pages  	Is in 80% current capacity position the flowmeter, in this time thegood sampling value is bigger than 70% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET preserves 80% sampling data, enters to 90% identification Is in 90% current capacity position the flowmeter, in this time thegood sampling value is bigger than 80% sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET preserves 90% sampling data, enters to 100% identification Is in 100% current capacity position the flowmeter, in this time thegood sampling value is bigger than 90% sampling value but to besupposed to be smaller than the biggest sampling value, after treatsthe current capacity and the sampling value is stable, presses downthe key SET , preserves 100% sampling data, enters to 4 ~ 20mAidentification Enters in the 24VDC return route the ampere meter string, theobservation electric current output value, through shifts the key andthe addend key changes the output value, until causes the output is20mA. This time, may see on the liquid crystal the good digitalchange, the electric current also along with it change. After waits20mA to be stable, the pressed ke SET , preserves and enters to the 4mA identification The 4mA identification method and the 20mA identification method issame. Demonstrated after the ampere meter the 4mA stable pressed key SET preservation and the withdrawal identification menu, returns normallyto demonstrate the condition. **To this, the identification finished.** **Receives must carry on the examination, examines the measuringappliance to output with demonstrated whether tallies with thestandard current capacity and the output, whether satisfies theprecision request.** **The addend key presses a time of Canada 10, shifts the key to presstime reduces 1, must quickly reduce, first holds down shifts the key,is pressing the SET key.**

6). simple points identification menu operation

Operations processes and display	Note
	Under the normal demonstration condition, the pressed key SET enters tothe password input contact surface The simple point identification only was suitable a Yu sampling errorto surpass the accuracy of instrument request, had again to carry onthe revision to some sampling spot, this time will not need to possessthe data cleaning which the sign edited punctuation to establish The simple point identification password is 4,011. The use shiftingkey and the addend key input simple point identification password,presses down the key SET to enter the simple point to demarcate the menu.This time wants the identification to have almost must press the SETkey by mistake to enter If 0% must carry on rerevises, after then enters the simple pointidentification, the adjustment current capacity to 10%, after treatsthe sampling value and the standard current capacity is stable,presses down the key SET sampling, this time place may duplicate thesampling in this, until satisfaction. If must revise other samplingdata, may press down the key to jump this spot, until must revise thespot, this time adjusts the current capacity, after treats thesampling value and the standard current capacity is stable, pressesdown the key SET to carry on again the sampling to this spot,simultaneously enters to next, or jumps until 100% again sampling hasentered to the electric current identification. After the electriccurrent calibration finished, withdraws to the normal demonstrationcondition. **Attention: In some again sampling pressed key** SET **Must jump some pressed key**

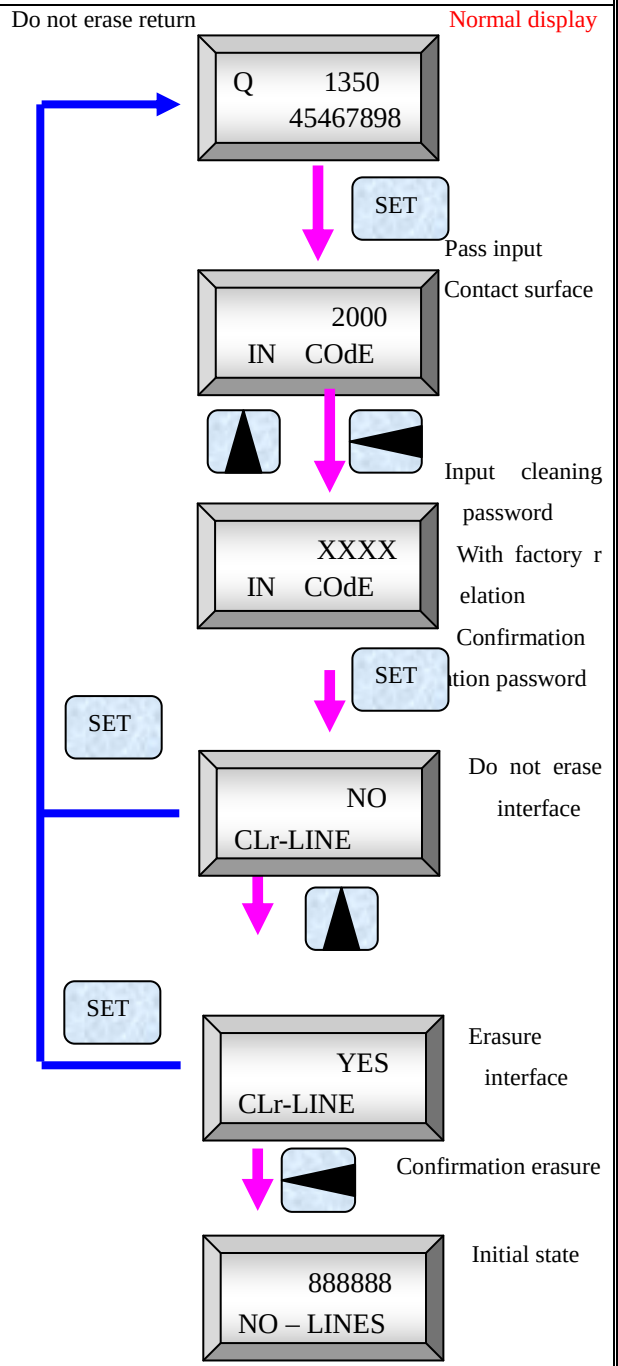
7). data backups and cancellation data manipulation

Backup operation flow and demonstration explanation	Cleaning data manipulation flow and demonstration explanation



Under the normal demonstration, the pressed key SET enters the passwordinput contact surface, with shifts the key and the addend key inputbackup password XXXX (please with factory relation).

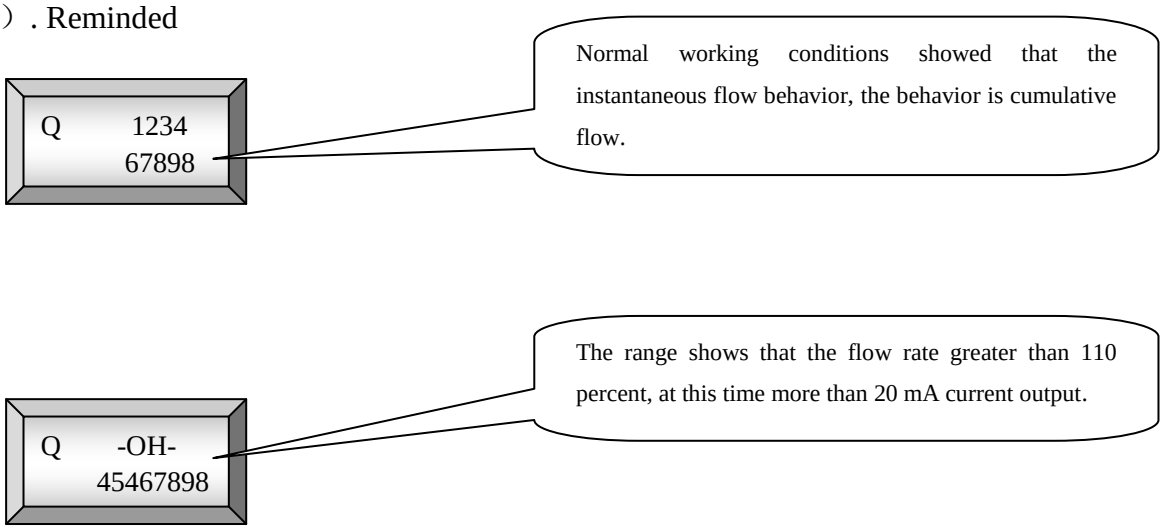
Did not suggest the user carries on the backup operation, if the userscene carries on the parameter hypothesis or the identificationoperation, the data already saved in the operating process, could notlose. The backup operation will only be restricted in the measuringappliance to leave the plant the identification data and thehypothesis primitive parameter record, user's backup operation coversleaves the plant the data.



The data cancellation operation was suitable for the originalidentification data already is useless, had the again data-in and anewthe identification

In the measuring appliance normal use, the user please do not carry onthis operation, this operation quite Yu Biansong the initialization,the prime number according to completely will lose。

8）. Reminded



This version of the operating software for V2. 0 version of the following improvements:

1, the maximum instantaneous flow for the 99999 (the median and set the decimal).

2, a bond can be shown remove the accumulated flow (not affect the total cumulative value); may also reset the total cumulative flow. Will now be forced to the cumulative flow storage (at Bond 2-3 seconds after I loosened).

3, the new Instrument Factory No. storage, easy instrument aftermarket management. Output more stable, operation more convenient.

4, can view calibration data, the original set parameters, the current total cumulative flow value. (Not recommend that users use, in this non-narrative)

With the continuous improvement of the functions of the product, the methods of operation may vary, and then see corresponding to the product version operating manual, I improved products and the company retained the right to explain.