



Dk2400L Ethernet communication process controller



- 0.1-level precision measurement, five-digit digital tube display and status display window
- Standard MODBUS RTU communication protocol, optional Ethernet communication interface
- High-speed master-slave controller online communication function simplifies the process curve setting and automatically synchronizes SV
- Support 9 process curves, each of which can be set with 24 program curves
- 20 group PID and group PID limiting, suitable for various characteristic loads
- Remote analog setting, communication control, heater disconnection protection and other functions
- Support 47 common industrial signals such as PT1000 input.
- Using improved DK PID algorithm to make the control more precise
- With sensor power supply function, anti-interference design
- Enhanced valve position controller, supports feedback valve position control, no valve position feedback control
- Support custom 8-point curve input correction, non-standard custom sensor, automatic switching of high and low temperature sensors

DK2400L Ethernet process control instrument Installation and User Manual

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2400L series process controller

Chapter 1 Overview

1.1 Product introduction

The 2400 series program process controller is an industrial process control instrument that uses a high-speed measurement and control chip and an improved PID algorithm to achieve high-precision measurement and control.

Supports 9 process curves, each of which can be set with 24 program curves. In the process control, practical functions such as relay action output, 20 groups of PID calls and 20 groups of amplitude limiting can be realized in the 24 segments of the curve as needed. Realize the complex requirements of curve process control.

The process controller of this program has dual output control functions for heating and cooling.

The process controller has 32 common industrial signal sensor input functions.

The second auxiliary input channel has: heater disconnection alarm function, remote DCS remote control set value SV, support dual input sensor high and low temperature switching function.

There are 2 groups of switch light input, which can realize flexible application switching of various application functions.

Control output types are: relay, analog linear signal, solid state relay output (transistor), thyristor (which can directly drive electrical equipment below 5A).

This program controller has a very convenient man-machine dialogue interface design, and the button operation is simple and convenient. The local editing and input of the program curve is simple and convenient. When the program curve is executed, it can prompt the current remaining time and current set value. The program segment curve has the function of power-off data retention.

Power-on alarm exemption function.

Support MODBUS RTU and MODBUS TCP communication protocol.

1.11 Technical Specifications

1. Control cycle: 50mS/100mS
2. Measurement accuracy: 0.1% FS (using 24-bit AD)
3. Sampling rate: 20Hz/10Hz
4. Control output:
 - Analog signal: 4-20MA, 0-20MA (<500Ω), 0-10MA (<1kΩ)
 - Relay: 2A (250V AC)
 - Solid state relay (transistor): 22V 20MA
 - Thyristor: 6A 250V AC
5. LED digital tube: three rows of display
 - 5 in the first row of PV, 5 in the second row of SV, 3 in the third row of information window
6. Signal measurement input impedance: voltage $\geq 500K\Omega$ (5V, 10V $\geq 100K\Omega$), current $\leq 120\Omega$, thermocouple $\geq 500K\Omega$
7. The resistance is measured by a three-wire system, and the resistance of each signal transmission wire is not more than 10 ohms
- 8.1 Standard MODBUS RTU communication protocol. Two-wire RS485
 - Check mode: no check, odd check, even check

Communication speed: 4800BPS, 9600BPS, 19200BPS

Communication address range: 1~247

8.2 Standard MODBUS TCP protocol.

Mailing address: 0-255

Subnet mask: 0-255

Gateway: 0-255

9. Equipment power supply: 86~260V AC (47~63HZ) / DC24V

10. Isolation voltage: input, output, and power supply isolation voltage 2300V AC /1MIN

11. Operating temperature: 0~50℃

12. Storage conditions: temperature -40℃~80℃; humidity 10%~90%RH

13. Dimensions: 96*96*136.5mm (opening size 92*92mm),
96*48*136.5mm (opening size 92*44mm)

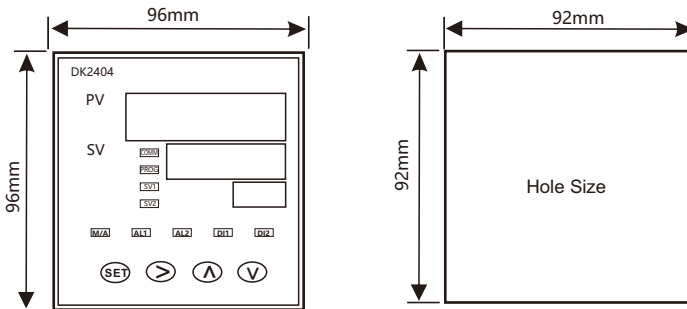
14. EMC standard: EN61326*

15. Safety standards: EN61010 and UL3121

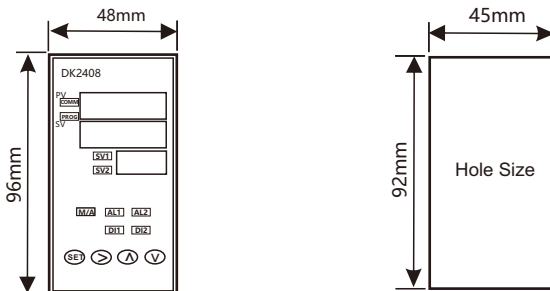
16. Protection level: IP66

17. Power consumption: 7W

DK2404L outline and hole size diagram

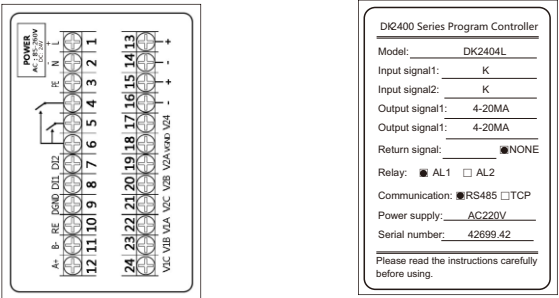


DK2408L outline and hole size diagram



1.2 Label description

Take DK2404L as an example, one side of the meter is for terminal wiring instructions, and the other side is for meter parameters as shown below:



1.3 The contents of the product packaging

When you open the box, please check whether the following products and accessories are in the box.

- I. DK2408L or DK2404L controller



The DK2400L controller is a modular design instrument. By changing the internal integrated modules, it can achieve multiple functions such as communication, alarm, transmission, etc., which can be configured as required. The ordering parameters of the product are printed on the side label of the instrument. Please check whether the specific configuration matches your ordering requirements before use.

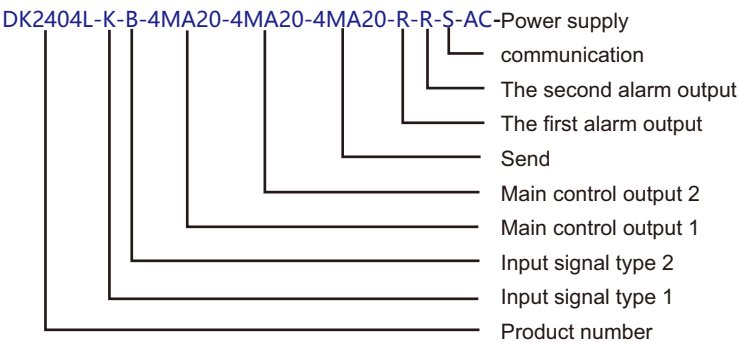
- II. Panel mounting fixture

There are two fixing brackets to fix the instrument case on the control panel.

1.4 Selection instructions:

Example: The customer needs to measure and collect 1 K-type thermocouple signal, 1 B-type thermocouple signal, with 2 alarm outputs, with 485 communication, the main control output 2 4-20MA signals, and the transmitter outputs 4-20MA signals. The required opening size is 92*92mm.

The selection code is:



1.41 Product model

The DK2400L series has two models to choose from, with different dimensions.
DK2404L panel size is 96X96mm, DK2408L panel size is 96X48mm.

1.42 Input type 1

The DK2400L series supports 32 common industrial signal inputs. See the input type selection table on page 5 for details.

1.43 Input type 2

Same as input type 1.

1.44 Main control output 1 (Main control output selection table)

Number	Types of	Selection code	the meter shows
1	4-20MA	4MA20	4-20
2	0-20MA	0MA20	0-20
3	0-10MA	0MA10	0-10
4	Relay output	R	RELAY
5	Transistor solid state output	P	TRANS
6	SCR output	T	SCR
7	no	N	

1.45 Main control output 2

Main control output 2 is the same as main control output 1.

1.46 Transmit

There are three types of transmission: 4-20MA, 0-20MA, and 0-10MA.

1.47 The first alarm output

The default is with one alarm output, the selection code is R.

1.48 The second alarm output

Optional, if there is R, N if not.

1.49 Communication

Optional standard Modbus RTU communication protocol, or S if available.

Optional standard Modbus TCP communication protocol, or TCP. No communication is N

1.A power supply

The default power supply is AC 220V, and the selection code is AC.

Optional DC24V power supply, the selection code is DC.

Selection table of 32 supported input types:

Serial number	Instrument display	Selection code	Signal type	Measuring range
0	K	K	K	-200~1300℃
1	S	S	S	0~1700℃
2	R	R	R	0~1700℃
3	T	T	T	-200~400℃
4	E	E	E	0~1000℃
5	J	J	J	0~1200℃
6	B	B	B	400~1800℃
7	Ns	Ns	N	0~1300℃
8	WRe3	WRe325	WRe3-WRe25	0~2300℃
9	WRe5	WRe526	WRe5-WRe26	0~2300℃
10	Cu50	Cu50	Cu50	-50.0~150.0℃
11	Pt100	Pt100	Pt100	-200.0~850.0℃
12	Pt500	Pt500	Pt500	-200.0~850.0℃
13	Pt1000	Pt1000	Pt1000	-200.0~850.0℃
14	0~80	0Ω80	0~80Ω	0~80Ω
15	0~400	0Ω400	0~400Ω	0~400Ω
16	0~4K	0Ω4000	0~4000Ω	0~4000Ω
17	0~10	0mA10	0~10mA	0~10mA
18	0~20	0mA20	0~20mA	0~20mA
19	4~20	4mA20	4~20mA	4~20mA
20	0~20	0MV20	0~20mV	0~20mV
21	0~100	0MV100	0~100mV	0~100mV
22	±20	20MV	-20~+20mV	-20~+20mV
23	±100	100MV	-100~+100mV	-100~+100mV
24	0~1	0V1	0~1V	0~1V
25	0~2	0V2	0~2V	0~2V
26	0~5	0V5	0~5V	0~5V
27	1~5	1V5	1~5V	1~5V
28	0~10	0V10	0~10V	0~10V
29	2~10	2V10	2~10V	2~10V
30	±5	5V	-5V~+5V	-5V~+5V
31	±10	10V	-10V~+10V	-10V~+10V

1.5 Installation

1.5 Installation

1.51 Unpacking inspection

1. Open the controller package and check whether the controller host is in good condition and whether the accessories are complete.

Please save the packaging for future use.

2. If there is damage or incomplete accessories, please contact us immediately for verification.

1.52 Installation

Please check whether the label parameters are consistent with the order before installation. Contact us if you have any questions.

Note: All installations need to be completed by trained and experienced staff.

1.53 Use shielded cables

All analog signals must use shielded cables to minimize electromagnetic interference. The wiring should be as short as possible. The cable should be grounded at one end, and a suitable grounding location is close to the sensor and transmitter.

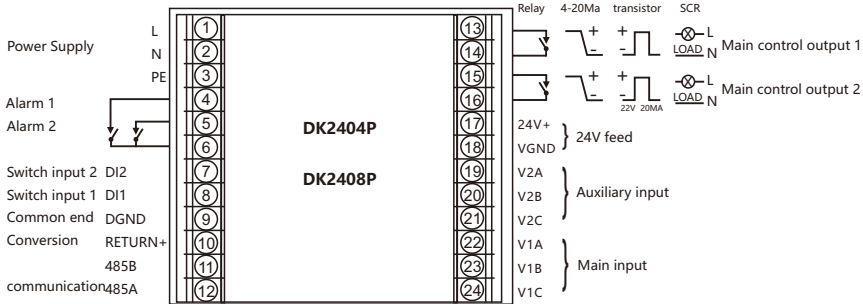
1.54 Measures to suppress interference

Under normal circumstances, if the wiring is good, no other anti-interference measures are required. In the case of very serious interference, you can consider using an RC network or a diode network to suppress the interference.

Anti-interference of electromagnetic coil-parallel connection of RC network and diode can reduce the instantaneous interference of inductance coil.

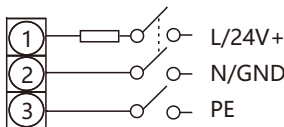
The RC network is used to reduce the contact arc when the contactor is switched on and off. If the current is below 3A, use a 47 ohm resistor and a 0.1uf capacitor to form a network. When the current is 3-5A, use 2 RC networks in parallel.

1.6 Electrical connection

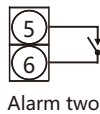
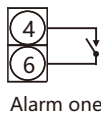


(Feeding 24V: Two-wire sensor dedicated isolation power supply, the maximum current does not exceed 50MA, do not use for other purposes. The product is designed to isolate input, output, and voltage.)

A. Power wiring (AC 90~260V):



B. Alarm output wiring:

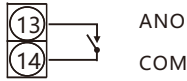


C. Communication wiring:

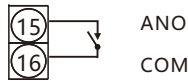


E. Main control output wiring:

Relay :



Main control output 1
When the valve position
is controlled, open the valve

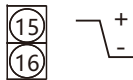


Main control output 2
During valve position control,
close the valve

4-20MA:



Main control output 1

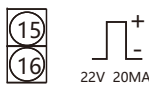


Main control output 2

transistor :

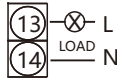


Main control output 1

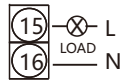


Main control output 2

SCR :

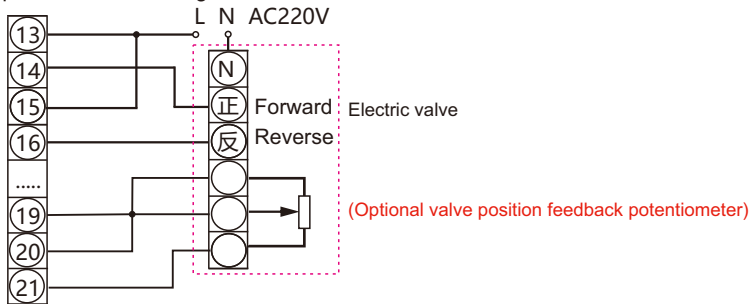


Main control output 1



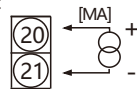
Main control output 2

Valve position control wiring:

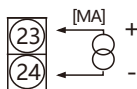


F. Input wiring of different types of sensors:

MA input:

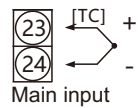
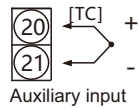


Auxiliary input

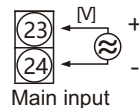
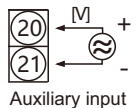


Main input

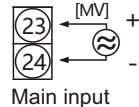
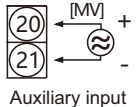
Thermocouple input:



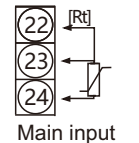
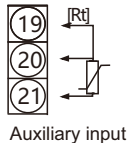
V input:



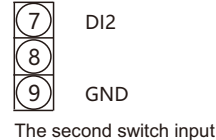
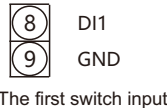
Mv input:



Thermal resistance input:



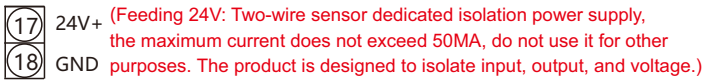
G. Switch input:



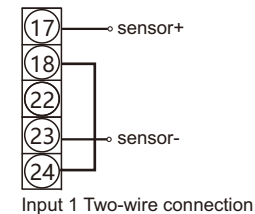
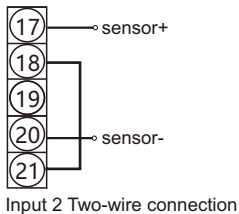
H. Transmission output:



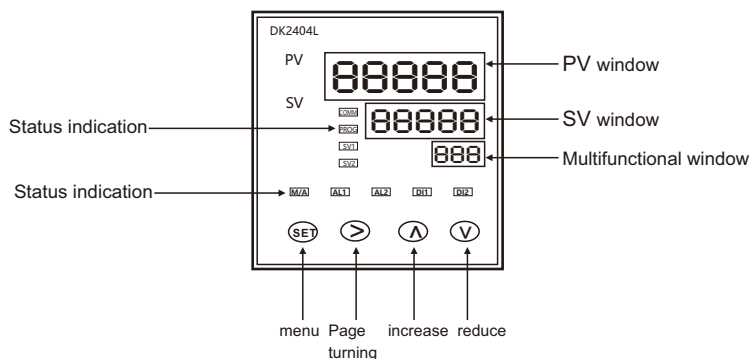
I.24V feed:



Two-wire sensor connection method:



Chapter 2 Display and Operation



2.1 Panel introduction

PV window: indicates the current real-time measured value. The secondary menu is displayed when setting parameters.

SV window: indicates the currently set value. The parameter is displayed when setting the parameter.

Multi-function window: program mode, display current segment number/remaining time of current segment (settable).

Fixed SV mode, display output percentage.

During auto-tuning, the output percentage and **AL1** flash alternately.

M/A light: When the light is on, it indicates that the current state is manual.

AL1 light: When this light is on, it means that the currently set alarm has an alarm. Or it means that the block operation enables the relay to act.

AL2 light: When this light is on, it means that the currently set alarm 2 has an alarm. Or it means that the block operation enables the relay to act.

DI1 light: When this light is on, it means that the external switch 1 is closed.

DI2 light: When this light is on, it means that the external switch 2 is closed.

SV1 light: When this light is on, it means that the current set value SV is SV1.

SV2 light: When this light is on, it means that the current set value SV is SV2.

COMM light: When this light is on, it means there is communication.

PROG light: When this light is on, it means that the current set value SV is the program segment curve PROG.

(SET) Key: Press 3 seconds to enter the main menu, and a single key returns the superior menu from the submenu.

(>) Key: Click to enter the next menu function.

(^) Key: Modify the parameter to add the key and flip through the next parameter.

(V) Key: Modify the parameter to reduce the key and flip through the previous parameter.

Program mode:

1. Program segment operation mode, the combination of **PROG+SV1** lights is always on
2. In other states of the program, the Sv value and status information are displayed alternately

2.2 Operating instructions

A. System power on the first row display instrument model, the second row display program version number. After 3S, the first row shows channel one input type and the second row shows channel two input types. After 33, it enters the normal display mode. The first row displays the measured values, and the second row displays the set values.

B. Enter menu:

The initial interface presses **SET** and presses 3S to enter the system menu, and presses **▲/▼** to change the submenu. Press **➤** to enter the password interface. Press **➤** to select the bit, press **▲/▼** to enter the password, enter the password correctly, wait 2 seconds, display PASS, enter the menu. Password error. No action. Press **SET** to return to the next level menu and press **➤** to enter the next level menu.

Parameter modification:

After the parameters are modified by **▲/▼**, wait 2 seconds and the parameter value is automatically saved by the interface flicker.

Exit menu:

Any interface can press **SET** to return to the previous level menu.

C. **➤** key usage instructions:

Parameter	Upper row display	Lower row display	Description
SV current value	SV-S	SV1/SV2/PROG/Remote SV	➤ Switch
SV1 setting value	SV1	SV1 setting value	➤ Switch
Sv2 setting value	SV2	SV2 setting value	➤ Switch
PV1 measured value	PV1	Enter 1 measurement value	➤ Switch
PV2 measured value	PV2	Input 2 measurement value	➤ Switch
PID parameter group number of the current call	PIDS	0-20	➤ Switch
Current call output limiter group number	OPEA	0-20	➤ Switch
Current valve opening	VFB	0.0-100.0%	➤ Switch

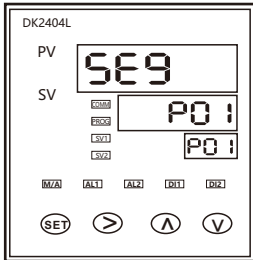
➤ key function-program mode

Parameter	Upper row display	Lower row display	Description
Output percentage	OUT	Output percentage	➤ Switch
Current segment information	Current segment number	Remaining time of current period	➤ Switch
Total remaining time of the program	time	Total remaining time	➤ Switch
Number of program cycles	cycl	Cycles	➤ Switch
Program time unit	tunit	time unit	➤ Switch
PV1 measured value	PV1	Input 1 measurement value	➤ Switch
PV2 measured value	PV2	Input 2 measurement value	➤ Switch
Current process curve number	PG-S	0-8	➤ Switch
PID parameter group number of the current call	PIDS	0-20	➤ Switch
Current call output limiter group number	OPEA	0-20	➤ Switch
Current valve opening	VFB	0.0-100.0%	➤ Switch

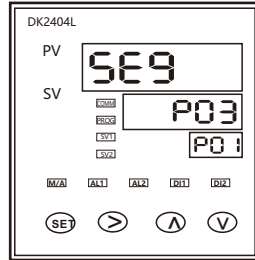
D. **▲/▼** key usage instructions:

Manual: Modify the output signal percentage by **▲/▼** .
Automatic: Fixed SV mode, changing the setting value SV by **▲/▼** .
Program running mode, pause / run switch by **▲** 3 seconds, end by **▼** 3 seconds.

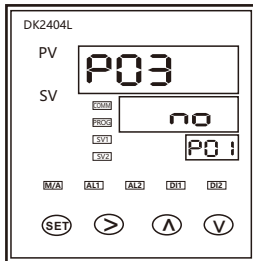
Panel key skip function: This function can only be executed when the program is paused and running. The program cannot start the skip function when the program is not running or stopped. During the program running, press **(V)** and the screen will pop up the skip interface. The segment operation is as follows:



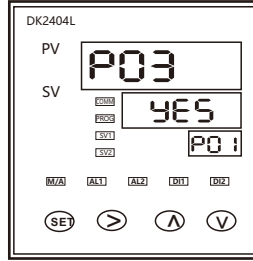
When the program is paused and running, press **(V)** to enter the skip interface.



Press **(A)** / **(V)** to select the segment to jump. For example, to jump to segment 3, the display is shown in the above figure.



Wait for 2S. Display NO, press **(SET)** to exit to the measurement interface.



Press **(A)** / **(V)** key to change NO to YES. Display YES and wait for 2S to automatically execute the skipping process.

E. Normal display interface, press **(SET)** alone, enter the setting value selection interface **SU-S**, change the setting value selection by **(A)** / **(V)**. After the setting value has been changed, it enters the determination interface in 2 seconds. Press **(A)** / **(V)** to select **YES** to confirm the modification. After 2 seconds of the confirmation interface, the settings are automatically saved and returned to normal display mode.

- (1) **SU-S** interface, fixed SV mode, switch SV1, SV2 by **(A)** / **(V)**.
- (2) **SU-S** interface, allowing program control mode, switch SV1 and PROG by **(A)** / **(V)**.

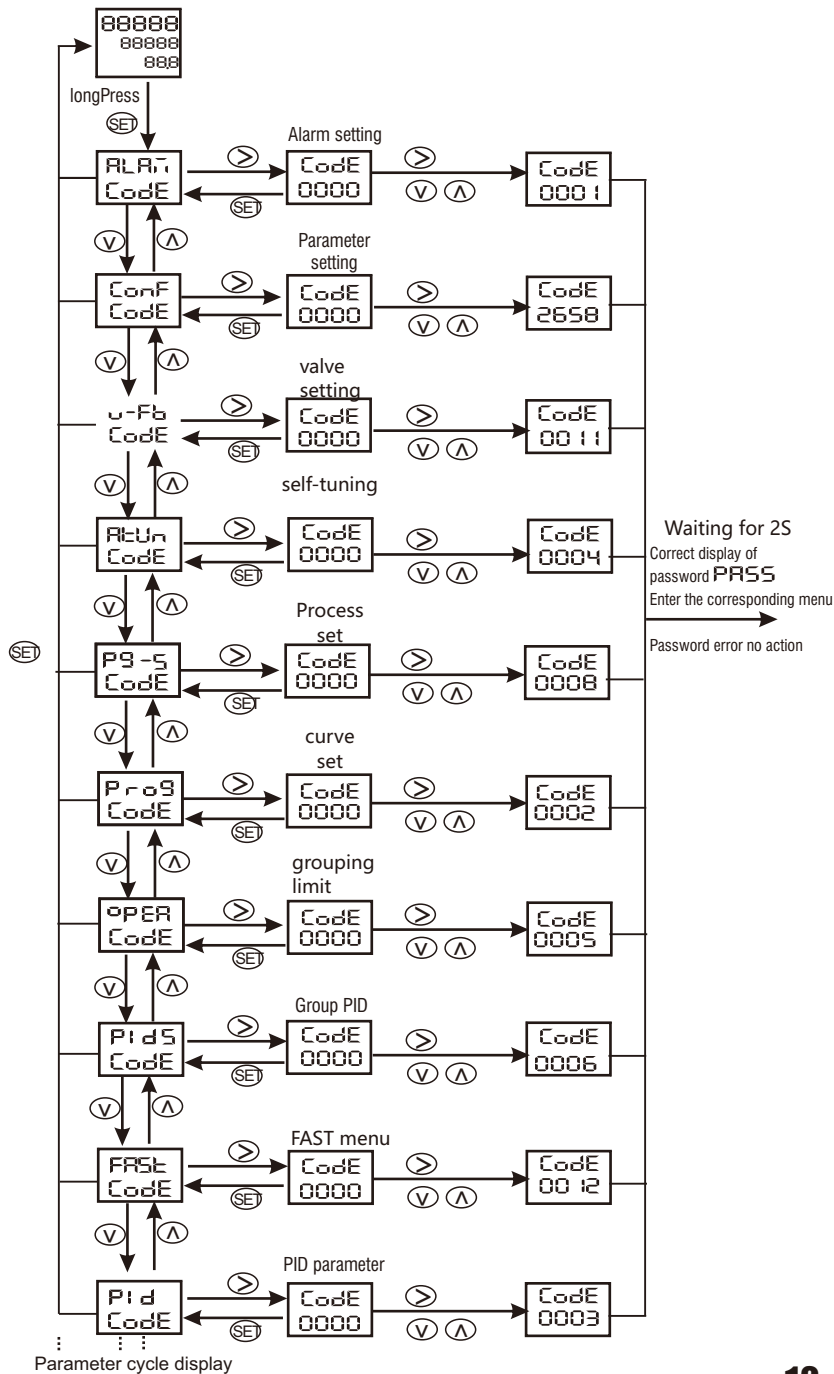
2.3 Menu and access code

The instrument has 9 groups of access menus **CONF**, and **PROG**, **PG-S**, **ALAR**, **ALUN**, **PI d**, **PI dS**, **OPER**, **u-Fb**, **u-CP** etc.

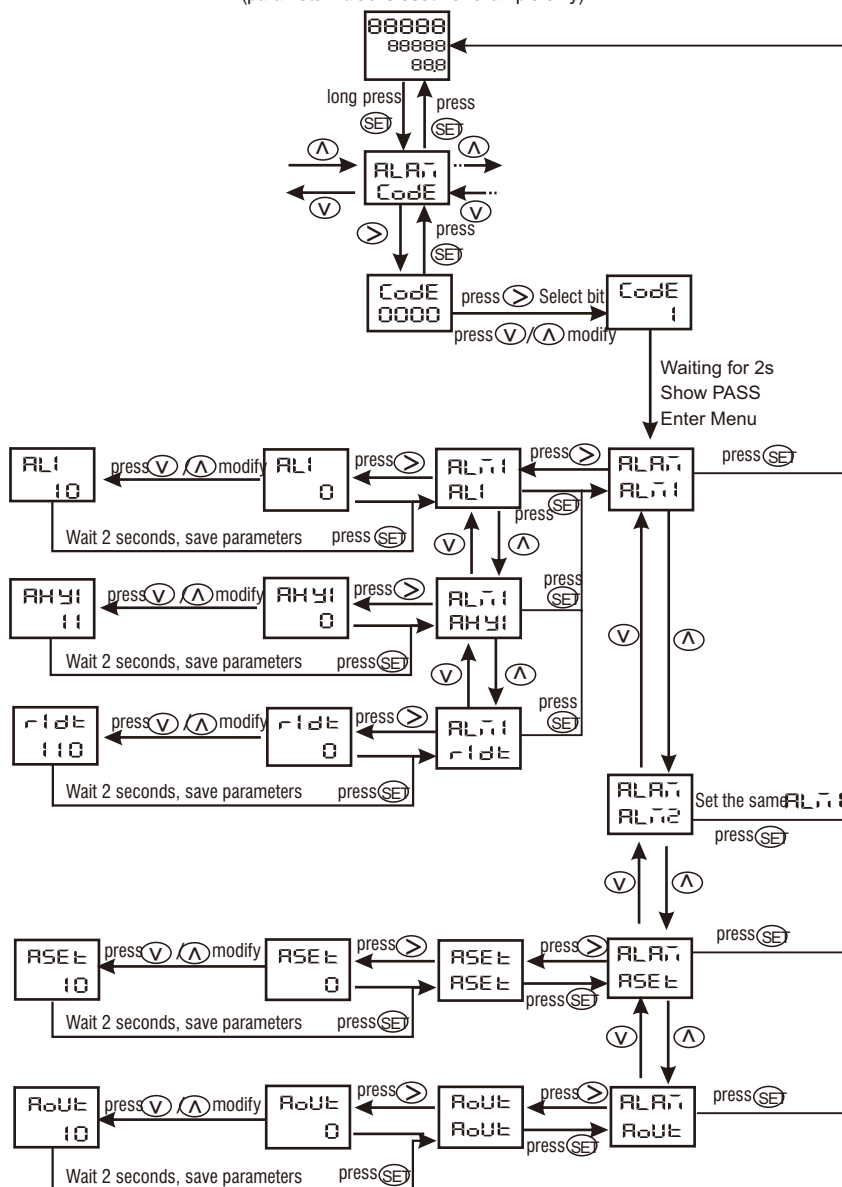
Note: For the above menus that require a password to enter, the factory password cannot be modified. Non-professional engineers should not configure it.

(After the **CONF** menu parameters are modified, it is best to re-power on to run the new parameters)

Diagram showing the operation flow of switching the main menu of the instrument.



Instrument parameter modification operation flow diagram, take the **A1.A.7.** menu as an example (parameter value is used for example only).



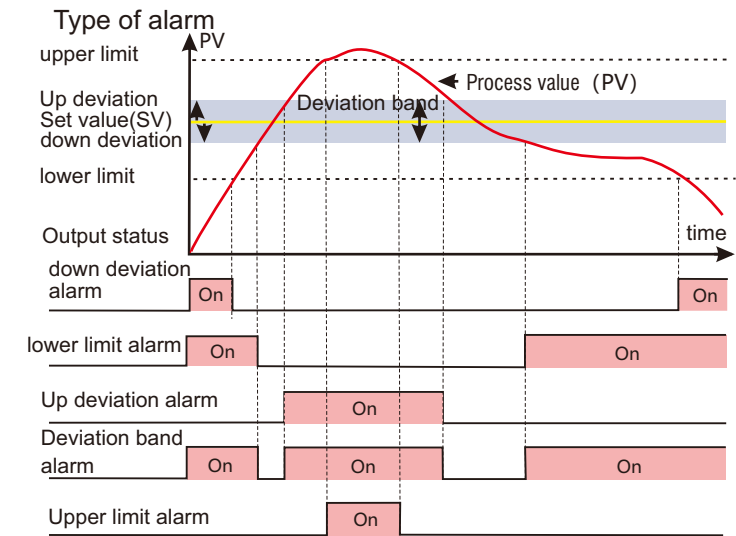
Chapter 3 Alarm

The alarm is used to prompt and generate an alarm signal when the process value exceeds a predetermined limit. When an alarm occurs, the alarm indicator lights AL1 and AL2 on the instrument panel will always be on. At this time, an output signal (usually a relay output) can be generated to make the external device produce corresponding actions.

Analog alarm-its function is to monitor an analog quantity (numerical value) to see if it exceeds a predetermined limit. Analog alarm is to alarm variables such as PV value and output value.

Simulated alarm code and type:

- H₁ AL** : upper limit alarm, when the process value exceeds the predetermined limit
- L₀ AL** : Lower alarm, when the process value is below the predetermined limit
- H_d AL** : Upward deviation alarm, when the process value is higher than the set value and exceeds the predetermined limit
- L_d AL** : Lower deviation alarm, when the process value is lower than the set value and exceeds the predetermined limit
- d_E AL** : Deviation alarm, alarm when the process value is higher or lower than the set value and exceeds the predetermined limit
- b₁ RP** : Sensor open, alarm when the sensor is damaged or disconnected
- b₂ -2** : Second auxiliary input open circuit alarm, alarm when the second auxiliary input channel input signal is disconnected
- b₃ AL** : heater breakwire alarm, when the heater breakwire condition is reached, the heater breakwire alarm is generated



Circumstantial Diagram of Various Simulated Alarm Types in PV Change

Menu AL AL (Access Password 1)

number	Parameter name	Upper row display	Bottom row display	Numerical range	Default value
1	Alarm 1 Settings value/ Deviations value	AL1 1	AL 1	-10000~30000	0
2	Alarm 1 Action Backlash		ALY1	0~2000LSB	0
3	Alarm 1 action delay		r1dt	0~600S	0
4	Alarm 2 Settings value/ Deviations value	AL1 2	AL 2	-10000~30000	0
5	Alarm 2 Action Backlash		ALY2	0~2000LSB	0
6	Alarm 2 action delay		r2dt	0~600S	0
7	Alarm value of heater disconnection	ASEt	ASEt	-10000~30000	0
8	Output value judgement by heater disconnection	RoUt	RoUt	0.0%~100.0%	0.0

The set value of the alarm indicates the alarm value when the upper and lower limit alarm is used; the deviation value is the deviation value relative to the SV value when the deviation alarm occurs, and the SV value ± deviation value is the alarm value.

In order to prevent the system alarm relay from working too frequently and sensitively in some occasions, the alarm return difference can be appropriately added.

In order to prevent the system alarm relay from working too frequently and sensitively in some occasions, the alarm action delay time can be set.

Heater disconnection alarm description:

The condition for the heater disconnection alarm is that the signal when PV2 is used as the disconnection alarm function input is less than the heater disconnection alarm value, and the main control output value is greater than the heater disconnection judgment output value to trigger the heater disconnection alarm.

For example: the heater disconnection alarm value is 100A, and the heater disconnection judgment output value is 25%. When the input signal of PV2 is less than 100A and the main control output value is greater than 25%, the heater disconnection alarm is triggered, and the corresponding alarm The relay is closed.

Chapter 4 Self-tuning

Tuning: Set the control parameters(PID parameters) that match the system characteristics to achieve better control results.

Good control effect:

Stable, the process value is stable at the set point, and there is no fluctuation in a straight line.

There's no rush.

Can quickly recover when external disturbances cause deviations.

Self-tuning: The controller adopts the method of unit order adjustment to automatically calculate and set PID parameters.

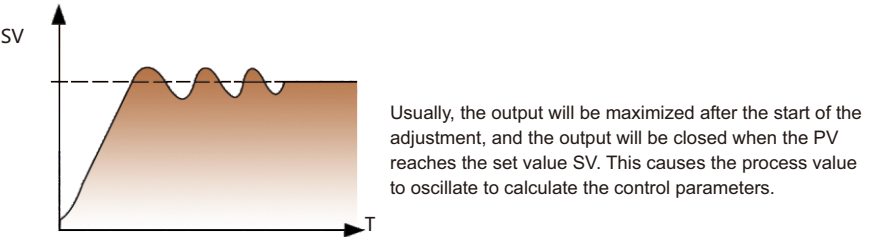
The unit order is fixed: by making the output full open and full off, the process value fluctuates. Control parameters are calculated based on amplitude and oscillation period.

If the system does not allow full power heating or cooling, it can be limited by the output limit.

Of course, it is also necessary to ensure that the process value can have a certain range of oscillations to calculate the control parameters.

Self-tuning can be done at any time, but usually only once at the initial debugging.

It is best to self-adjust when the process value is room temperature and the set value is normal working value. This makes the control more accurate and stable.



Note: Pay attention to the integral and differential time parameter settings before setting, and the time constant is 0 to turn off the corresponding function. For example, if you want to implement PI control, set the differential time to 0 to close the differential effect. Self-tuning control methods are divided into four modes: P, PI, PD, and PID.

Self-tuning menu **REUN** parameter table (access password 4)

number	Parameter name	Upper row display	Bottom row display	Explain	Default value
1	Starting master Self tuning	REUN	RE I	0- d!5R turn off self-tuning, 1- EnAb start self-tuning	0

Chapter 5 System PID Parameters

P: Proportional band

The proportional band P represents the proportional relationship between the output control quantity and the deviation. The larger the set value of the instrument proportional band parameter P, the lower the control sensitivity. The smaller the setting value of P, the higher the sensitivity.

I: Integration time

The purpose of the integral operation is to eliminate the static difference. As long as the deviation exists, the integral effect will move the control vector in the direction of eliminating the deviation. The integral time is the unit that represents the integral strength. The shorter the integral time set by the instrument, the stronger the integral effect of the instrument. (For example, the integral time of the instrument is set to 200s, which means that for the current fixed deviation, the output of the integral effect is the same as the proportional effect output to use 200s time)

D: Differentiation of time

The proportional effect and the integral effect are corrections to the control result. The action response speed is slow. The differential effect is to eliminate its shortcomings. The differential effect corrects the output according to the speed of the deviation. The control process is returned to the original control state as soon as possible. The differential time is the unit of differential strength. The longer the differential time set by the instrument, the stronger the differential effect of the instrument on the control amount.

From the above, it can be seen that the combination of the three advantages of the rapidity of the proportional action, the thoroughness of the integral action, and the leading of the differential action constitutes an ideal PID regulator.

Most systems can set the best parameters of the system by self-tuning the system, but experienced engineers can directly enter the PID parameters of the system to achieve accurate control.

In some cases, since the PID control parameters obtained by self-adjustment are not necessarily the best values, the control effect of the instrument after self-adjustment is not necessarily the most ideal, such as the accuracy requirements of the control system can not be met. The system can achieve satisfactory control effect by manually setting and fine-tuning the values of these parameters.

1. Selection of proportional band P. Since the size of P directly affects the system's overshoot, transition time, and steady state error, the selection of P is particularly important. The proportional band P is reduced, the system is sensitive and the speed is accelerated; However, it is small, the overregulation increases, the number of oscillations increases, and the adjustment time is too long; P increases, and the system tends to be stable; If P is too large, the system will slow down. The size of P is inversely related to the steady state error. Reducing the proportional effect can reduce the steady-state error and improve the control accuracy.
2. Selection of integral time I. The integral action aims to eliminate the steady-state error. The strength of the integral time I and the integral action are inversely proportional. I is too small. Too strong an integral effect will make the system unstable, have more oscillations, and I is too large, and the impact on the system performance is weakened. So that steady state error can not be eliminated.
3. Selection of differential time D. Differential control can predict deviation and produce forward correction, which can improve dynamic characteristics. However, when D is large or small, the overshoot and adjustment time will increase. D should be as small as possible when controlling the amount of basically no lag, such as pressure, speed, etc..

From the above analysis, it can be seen that the selection of the three parameters influences and restricts each other, and is also restricted by various actual factors. A compromise choice must be made according to specific operating conditions and control requirements.

PID control menu (access code 3)

number	Parameter name	Upper row display	Bottom row display	Numerical range	Default value
1	Proportional band	P I d 1	P b	0~10000	20
2	integral		i	0~3600	120
3	differential		d	0.0~360.0	10.0
4	Control backlash		CHY	0~2000LSB	1
5	Switch control cycle		C t	0.1~200.0S	2.0
6	Proportional band	P I d 2	P b	0~10000	20
7	integral		i	0~3600	120
8	differential		d	0.0~360.0	10.0
9	Control backlash		CHY	0~2000LSB	1
10	Switch control cycle		C t	0.1~200.0S	2.0
11	Cooling dead zone		dbd	0~1000LSB	0
12	Differential filtering coefficient	P I d	d - - F	1~10	1
13	Retain				
14	Retain				
15	Suppression of up-overshoot parameters		C b L S	1.0~4.0	1
16	Suppression Overshock Parameters		C b H S	1.0~4.0	1

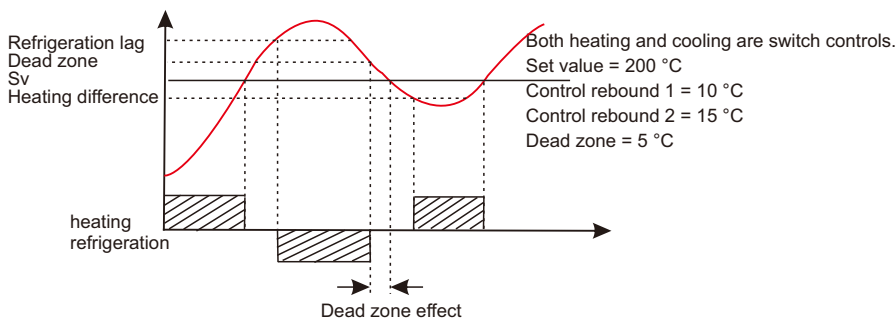
Note: The differential effect decreases with the increase of the differential filtering coefficient.

Double PID Switch Settings: 0-Master PID, 1-5 packet PID

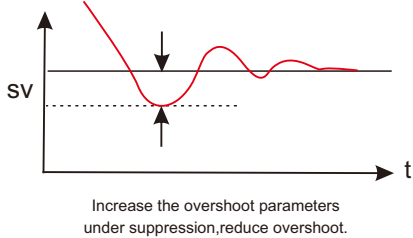
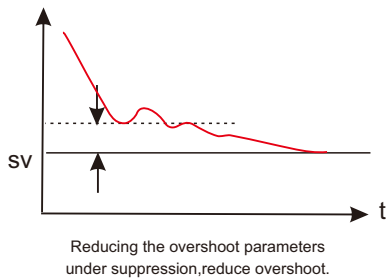
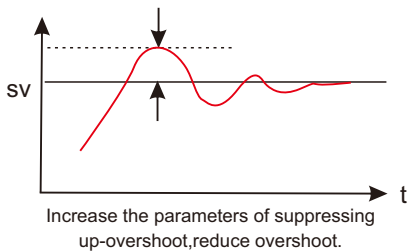
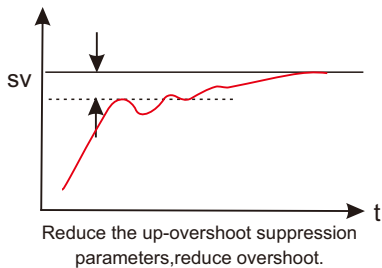
The control lag parameter CHY represents the difference setting for Bitwise control.

Switching control period C t indicates the space occupancy ratio setting time for solid state relay output and Silicon controllable output.

Double PID Usage Note: When PV is lower than P-PV, the system uses a system PID, which is higher than P-PV, and uses a 1-5 set PID.



Suppression of upstream or downstream overshoot parameters: that is to say, the proportional band with lower or higher than SV (1.0-4.0) starts PID control.



Chapter 6 Instrument configuration parameter setting

Instrument configuration menu function introduction, enter this level CONF menu, access password 2658, must be configured by experienced engineers.

6.1 Instrument Function Selection Menu

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	Inst	LoCP	Panel Key Locking Function	0- d!sA prohibition, 1- EnAb enablement	0
2		AREn	Panel Manual/ Automatic Enablation	0- d!sA prohibition, 1- EnAb enablement	1
3		PGEn	SV1/PROG handover	0- d!sA prohibition, 1- EnAb enablement	0
4		SuEn	SV1/SV2 handover	0- d!sA prohibition, 1- EnAb enablement	0
5		PrGE	Program enable	0- d!sA fixed-point PID control (SV1/SV2) switching 1- EnAb allows SV1/PROG mode switching	0
6		Unit	Temperature Unit Conversion	0 - C degrees Celsius, 1 - F degrees Fahrenheit, 2 - P absolute temperature	0
7		FiLt	Digital filtering time	0.1~100.0	1.0
8		Ctrl	control mode	0- SoUt Single Output, 1- doUt Double Output(Heating Refrigeration) 2- uPoS No feedback valve control, 3- uPFb with feedback valve control, 4- ddo2 Large and small fire control (second output relay, output value greater than or equal to 3.0 %)	0
9		Pi dC	PID mode	0 to 2(0- P! d classic PID; 1- d! P! differentiates PV; 2- P - P! without overtone algorithm;)	0
10		SuHi	Sv can set upper limit	-10000~30000	1000
11		SuLo	Sv can set lower limit	-10000~30000	0

In the control mode:
Main control output 1 can only be used for main control output.
In heating and cooling, main control output 1 is used for heating output control, and main control output 2 is used for cooling control output.
Panel key lock:
After opening the function, you need to enter the password 2400 to unlock. No operation restores the locked state. Need to set this menu to completely unlock.

6.2 Main input channel configuration.

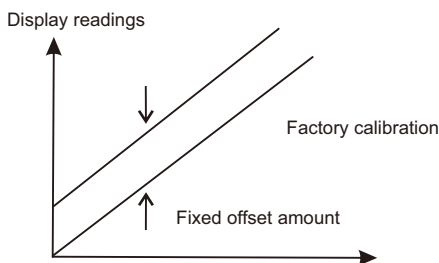
number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	PUI	INtY	Type of input	0-31:32 signal types, see input type table	0
2		INHi	Show upper limit	-10000~30000	1300
3		INLo	Show lower limit	-10000~30000	-200
4		dPoS	Number of decimal places	0 ~ 4 decimal places, corresponding to: 10000、1000.0、100.00、10.000、1.0000	0
5		Err-o	Enter exception handling	0- PREU turn output preset value 1- PEEP Maintain open front output	0
6		boUt	Enter an exception preset value	0.0~100.0	0.0
7		oFFS	Offset	-500 ~ 500	0
8		CEC	Cold end compensation type	0- INtE, 1- 0, 2-45, 3-50	0
9		S-i n	Custom Nonlinear Enabling Energy	0- dISR banned, 1-EnRB enabled	0

6.2.1 Err-o Fault Strategy:

Sensor input anomaly handling is a fault strategy processing method when sensor input error occurs, and it is an important guarantee for control system.

6.2.2 oFFS offset:

All ranges of meters have been strictly calibrated before they leave the factory. There is no need to recalibrate even if the input type is changed. But you can still set an offset to correct the sensor error. ThePV migration is to add a fixed offset to the whole range.



6.2.3 CEC cold end compensation type:

The principle of temperature measurement by thermocouple is to measure the temperature difference potential between the measuring end and the reference end of thermocouple. Therefore, the temperature of the reference end must be known to calculate the temperature of the measurement end. There are two ways: one is to fix the reference end in a given temperature environment. Another method is to measure the temperature of the reference end directly by the instrument.

6.2.3.1 Internal Compensation

The controller is equipped with a temperature detection element to measure the temperature of the thermocouple reference end and compensate the calculation. To achieve high compensation accuracy and adapt to a variety of thermocouples. The instrument is equipped with high precision temperature measurement compensation elements as default compensation configuration.

6.2.3.2 freezing point

The ice bottle uses basic physics principles. The ice bottle is filled with a pure ice water mixture and its temperature is 0 °C at normal pressure. The electronic ice bottle is cooled by a semiconductor refrigerator and measured and controlled by a high-precision temperature sensor to stabilize the temperature at 0 °C.

The reference end of the thermocouple is placed in an ice bottle and connected to the controller with a copper wire. What the controller gets is a measurement signal with a reference point of 0 °C.

6.2.3.3 Thermostat.

The same principle as the ice bottle, the reference point can also be a higher temperature. As long as the temperature is stable.

The thermostat is the opposite of an electronic ice bottle. It uses heating to stabilize the temperature at a certain value. This controller allows the use of a thermostat at 45 °C or 50 °C as the reference potential of the thermocouple.

6.2.3.4 Compensatory wires

Since the internal compensation of the instrument is only to measure the temperature of the instrument terminal, the length of the thermocouple itself is not enough to connect to the instrument terminal. If you connect with ordinary wires, the cold end of the thermocouple will be different from the cold end of the instrument, which will result in measurement errors. The most common method is to connect the cold end of the thermocouple to the meter with a compensation wire corresponding to the thermocouple. Since the compensation line has the same characteristics as a thermocouple, this is equivalent to extending the thermocouple. So there's no error.

6.3 Second input channel parameters:

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	Pu2	FuNC	Auxiliary Channel Function	0- d1SA forbidden, 1- b7AL heating breakline alarm, 2- Pofb valve bit feedback, 3- r - Su remote SV, 4- d - S' double input high and low temperature switch, 5- d - Pu Dual sensor redundancy 6- Pu 1-2 PV1 and PV2 difference alarm	0
2		I nEtY	Input type	32 signal types, see input type table	26
3		I nHi	Upper limit of display	-10000~30000	1000
4		I nLo	Lower limit of display	-10000~30000	0
5		dPos	Decimal digit Eight	0~4 decimal places, corresponding to: 10000, 1000.0, 100.00, 10.000, 1.0000	0
6		E r - o	Input exception handling	0~1: 0- PrEu, 1- PEEP	0
7		boUt	Input exception prefabricated values	0.1~100.0	0.0
8		oFFS	deviation amount	-500~500	0

Auxiliary channel function description:

- 1. The heater disconnection detection uses sensor signal input, and the heater disconnection open circuit protection is judged by the set alarm value.
- 2. The input signal of remote control setting value is enabled. Set the process control setting value through the change of the input signal. It is only valid in single-point SV mode.
- 3. When the system uses two high and low temperature measurement sensors, the auxiliary input is used as the input source of the high temperature switch sensor.
- 4. When remote control SV and high and low temperature switch function, input type resolution description:
 - A. When the input type of the main input channel is thermocouple, thermal resistance:
The temperature units "Celsius" and "Kelvin" have a resolution of 0.1 degrees, and the temperature unit "Fahrenheit" has a resolution of 1 degree.

That is, when the main input type is thermocouple thermal resistance, and the temperature unit is Celsius or Kelvin, the decimal point of the auxiliary input channel is set to 1 decimal. When the temperature unit is Fahrenheit, the decimal point is set to 0 decimal places.

- B. When the input type of the main input channel is analog signal:

Set the resolution according to the decimal point, and the two channels must have the same resolution.

That is, the main input and auxiliary input maintain the same number of decimal places.

- 5. Double sensor redundancy description:

This controller can adopt dual-sensor redundant switching function. When the first sensor is open, the current measurement is automatically transferred to the measured value of input 2 for control. The sensor type must be the same to use this function. At the same time, set the output preset value when input 2 is open.

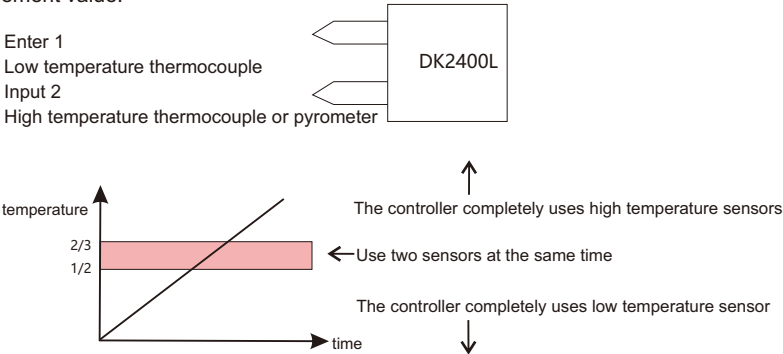
6.4 Dual sensor switching

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	d-i n	S'wHi	Upper limit switching point	-10000~30000	1200
2		S'wLo	Lower limit switching point	-10000 ~ 30000	1000

This is often used in temperature control applications with a wide temperature range. For example, use a thermocouple when the temperature is low, and use an infrared pyrometer when the temperature is high. Two different thermocouples can also be used.

The chart below shows the switching of the two sensors. The high switching point (2 to 3) is the working high point of the first sensor, which is determined by the 'SwHi' parameter. The low switching point (1 to 2) is the low point at which the second sensor works and is determined by the 'SwLo' parameter. The controller performs smoothing calculations between these two points.

The judgment of the high and low temperature switching point is based on the auxiliary input measurement value.



6.5 External Switch Input Function Configuration

number	Submenu	Molecular menu	Numerical range	Default value
1	DI	DI 1	0-14: 0- None, 1- M-A Manual Automatic(closed manual, disconnect automatic), 2- R-S Remote Settings (closed remote control given, disconnect local given), 3- R-C Custom, 4- R-A As a key, 5- dEC as a subkey, 6- R-U operation program, 7- H-L program suspension, 8- S-E-P program stop, 9- S-H-P program run jump to the next paragraph(in order to prevent misoperation, press the interval must not be less than 3 seconds, Only one action in 3 seconds), 10- S-E-B slow start(closed standby state, disconnect slow start), 11- S-V switch SV(closed SV2, disconnect SV1), 12- P-R-S process curve selection(click +1), 13- S-E-B standby(closed standby), 14- L-O-C panel button lock(closed lock), 15- F-O-O-S program runs 5 times, 16- F-O-I-O program runs 10 times, 17- F-O-Z-O program runs 20 times, 18- F-O-B-O program runs 30 times	0
2		DI 2	0-8 (with DI 1)	0
3		S-E-B-E	Slow start time, range 0 ~ 999, in seconds	0

Fast forward function of current segment:

5X, 10X, 20X, 30X double speed current segment fast forward function. When DI is closed, the current target temperature is automatically fast forwarded.

6.6 Main control output 1 functional configuration

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	OP 1	C-E-Y-P	Output 1 function	0- L-I-N-E linear current, 1- R-E-L-Y relay, 2- S-S-S solid state relay, 3- S-C Silicon controllable	0
2		C-E-R-L	Output function	0- R-E-R-C Counteraction, 1- P-R-A-C-E Positive effect	0
3		L-I-N-E	Output 1 signal type	0- 4-20mA, 1- 0-5V, 2- 0-10V	0
4		O-H-I	Upper limit of output	0.0~100.0	100.0
5		O-L-O	Lower limit of output	0.0~100.0	0.0

6.6 Main control output 2 functional configuration

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	OP2	TYPE	Output 2 function	0- LINE linear current, 1- RELY relay, 2- SSR solid state relay, 3- SC Silicon controllable	0
2		CTRL	Output function	0- REFC Counteraction, 1- PRCE Positive effect	0
3		LINE	Output 2 signal type	0- 4~20 , 1- 0~10 , 2- 0~20	0
4		UHI	Upper limit of output	0.0~100.0	100.0
5		ULO	Lower limit of output	0.0~100.0	0.0

Heating and cooling dual output mode, output 1 is automatically configured as reverse action, and output 2 is automatically configured as positive action

6.8 Transmit function configuration

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	TRAN	LINE	Transmit signal type	0- 4~20 , 1- 0~10 , 2- 0~20	0
2		UHI	Upper limit of transfer	-10000~30000	1000
3		ULO	Lower limit of transfer	-10000~30000	0
4		ESL	Selection of Transmitting Parameters	0- P _U transmits the measured value, 1- S _U transmission setting value, 2- O _U transmits the output value, 3- dEP _{S_U} transmission deviation value (PV-SV) 4- dEP _{S_P} transmission deviation value (SV-PV) 5- dEP _{i2} transmits PV difference (PV1-PV2), 6- dEP ₂₁ transmits PV difference (PV2-PV1), 7- AbP _{i2} Transmits PV difference (absolute value of PV1-PV2)	0

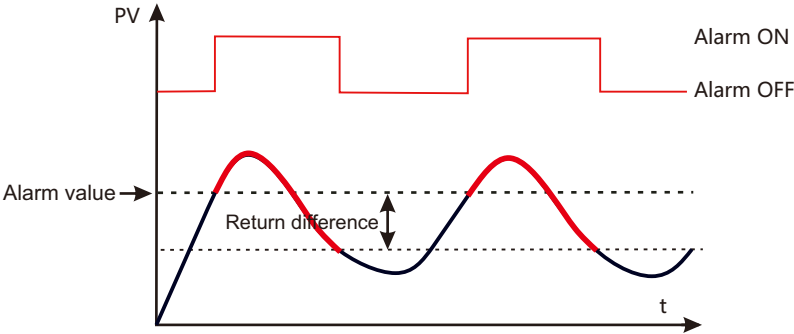
6.9 Communication Function Configuration

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	COMM	BAUD	baud rate	0- 4800, 1- 9600, 2- 19.2K	1
2		Prot	School inspection method	0- none no-check, 1- oddodd check, 2- Even even check	2
3		Addr	Postal address	0~247, 0-master station, one network one master	1
4		TIME	Communication delay	0~60mS	0

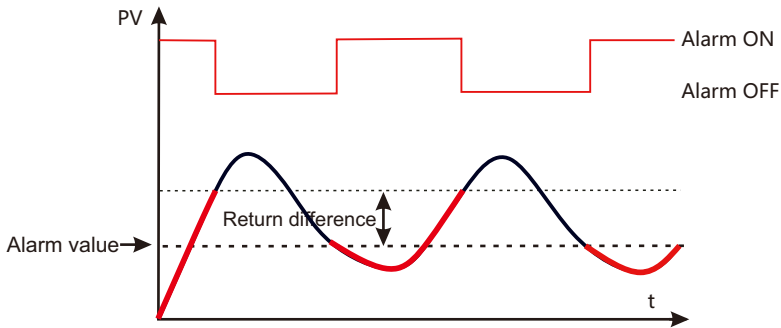
6.A Alarm Function Configuration

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	AL1	AL1.1	Alarm 1 Type Setting	0- none nothing, 1- Hi AL Upper limit alarm, 2- LoAL Lower limit alarm, 3- HdAL Upper deviation alarm, 4- LdAL Lower deviation alarm, 5- dEAL Deviation band alarm, 6- HbAL heater disconnection alarm, 7- SbAL sensor failure alarm, 8- ProgS program segment running status, 9- dEP12PV1 minus PV2 difference alarm, 10- dEP21PV2 minus PV1 difference alarm, 11- AbP12PV1 minus PV2 difference absolute value alarm	0
2		AL1.2	Alarm 2 Type Setting	with AL1.1	0
3		LACH	Power-on alarm exemption function	0- d! SA prohibit, 1- EnABEnable	0
4		nRoL	Alarm relay in normal condition	0- OFF disconnect, 1- onclosure	0

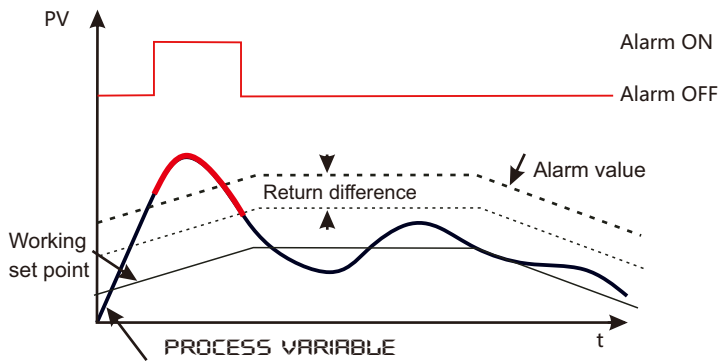
A. Upper limit alarm, when the process variable PV exceeds the set upper limit. Hysteresis is the difference between the alarm opening process value and the shutdown process value, which is used to prevent frequent relay actions



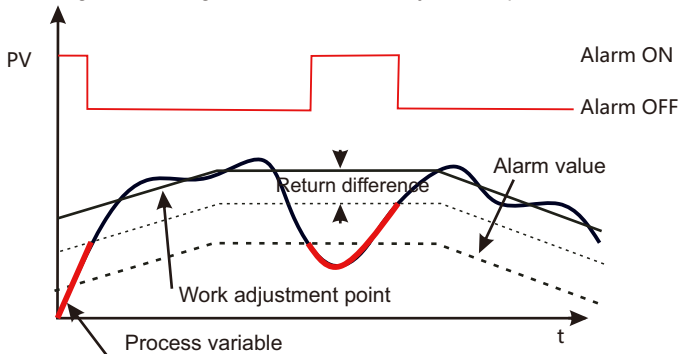
B. Lower limit alarm, when the process variable PV exceeds the set lower limit.



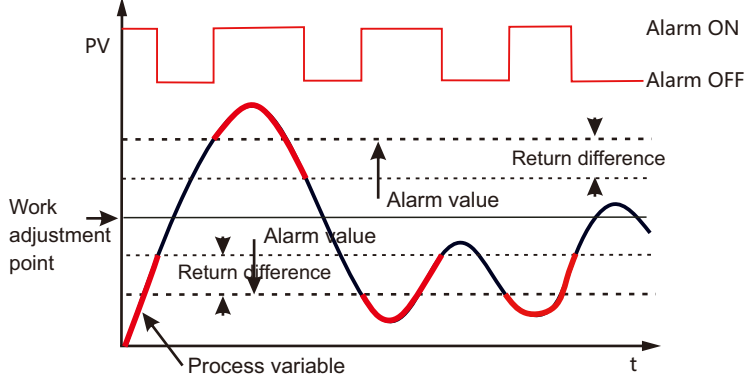
C. Deviation upper limit alarm, when the difference between the process variable and the set value is positive and higher than the alarm adjustment point, the alarm is triggered.



D. Lower deviation alarm, when the difference between the process variable and the set value is negative and higher than the alarm adjustment point, the alarm is triggered.

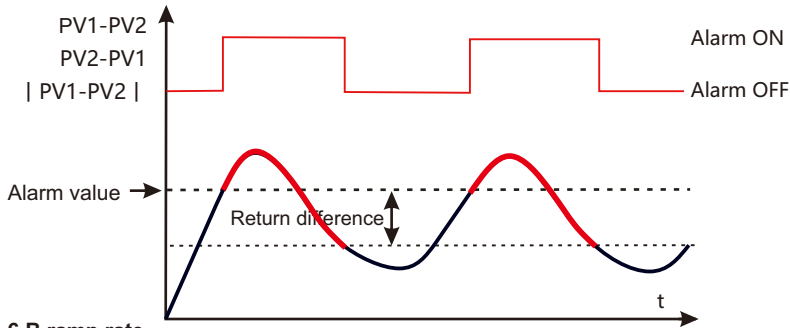


E. Deviation zone alarm, alarm when the difference between PV and SV exceeds the deviation zone.



Deviation band alarms are used to monitor process variables and operating adjustment points, and constantly compare their deviations with alarm set points. If the deviation is higher than the alarm setting value in the positive direction, or lower than the alarm setting value in the negative direction, the alarm state will be activated.

F. PV1 and PV2 difference alarm

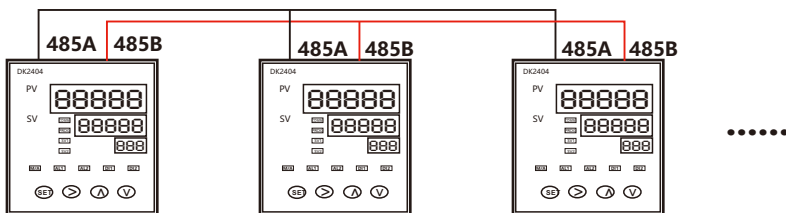


6.B ramp rate

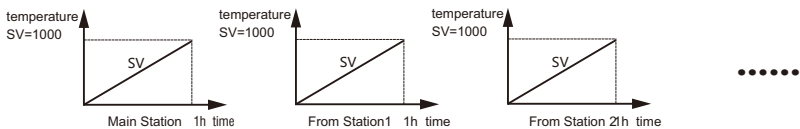
number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	S-S	r-RtE	SV1 switching to SV2 ramp rate, unit LSB/min, 0-off	0 ~ 3000	0
2		C Add	Master-slave mode, slave station SV address (when master-slave controller communicates online, write to slave station SV MODBUS RTU register address)	1-128	3
3	Spare				
4	Spare				

Application examples of controller with master-slave control

When using the master-slave control function, the master-slave station realizes synchronous control through 485 communication. Communication address 0 is only valid in master-slave mode. When communicating with computer, PLC, DCS, there can be no address that is 0 Please refer to the figure below for specific usage.

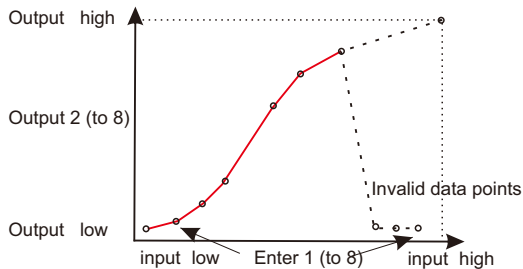


Set address $ADDR = 0$ master station



6. C main input 8-point linearization processing

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	SSSE	Unit 1	Voltage/ current	0 ~ 20000	0
2		Set 1	Display value	-10000 ~ 30000	0
.....					
15		Unit 8	Voltage/ current	0 ~ 20000	0
16		Set 8	Display value	-10000 ~ 30000	0



The function is to linearize the input value by linearizing the input value through the 8 point linearization table to produce the output value. (Voltage current value must be rising) The input value using this function must be rising(the display value can not be).

Description:

The input types supported by custom nonlinear input are:

20mV, 100mV; (LSB: 0.01mV)

0-10mA, 0-20mA, 4-20mA; (LSB: 0.001mA)

0-1V, 0-2V, 0-5V, 1-5V, 0-10V, 2-10V. (LSB: 1mV)

6.D Valve control

number	Submenu	Molecular menu	Explain	Numerical range	Default value
1	VCTE	E-F	Valve full travel time, unit: second	0.1-300.0	30
2		E-TP	Minimum valve action time, unit: second, 0-auto	0.0-100.0	2.0
3		br-o	Sensor open circuit processing method. 0-OFF fully closed 1-on fully open, 3-PEEP no action	0-2	0
4		Pdb	Valve action dead zone, output percentage	0.1-10.0	2.0
5		System reservation			
6		System reservation			

6.F Ethernet configuration

parameter name	Upper row display	Bottom row display	Description	Defaults
TCP enable	TCPE	TCPE	0-Disallowed, 1-Enabled	0
IP address		IP-1	0~255	192
IP address		IP-2	0~255	168
IP address		IP-3	0~255	1
IP address		IP-4	0~255	200
Subnet mask		SUB1	0~255	255
Subnet mask		SUB2	0~255	255
Subnet mask		SUB3	0~255	255
Subnet mask		SUB4	0~255	0
Gateway		GA1	0~255	192
Gateway		GA2	0~255	168
Gateway		GA3	0~255	1
Gateway		GA4	0~255	1

Chapter 7 Group PID function

Pi d5 Menu (access code 6)

number	Submenu	Molecular menu	Numerical range	Default value	Explain
1	P -- 1	Pb-P	0~10000	50	The first set of proportional band 1
2		I--P	0~3600	120	The first set of integration time 1
3		d--P	0.0~360.0	20.0	First set of differential time 1
4		Pb-S	0~10000	50	The first set of proportional band 2
5		I--S	0~3600	120	The first set of integration time 2
6		d--S	0.0~360.0	20.0	First set of differential time 2
.....					
115	P -- 20	Pb-P	0 ~ 10000	50	The twentieth group of proportional band 1
116		I--P	0 ~ 3600	120	The twentieth group of integration time 1
117		d--P	0.0 ~ 360.0	20.0	The twentieth group of differential time 1
118		Pb-S	0 ~ 10000	50	The twentieth group of proportional band 2
119		I--S	0 ~ 3600	120	The twentieth group of integration time 2
120		d--S	0.0 ~ 360.0	20.0	The twentieth group of differential time 2

The instrument can set 20 groups of PID calling functions.

In the program curve mode, different PID group parameters can be called according to the curve segment setting value. In order to meet the control accuracy of the controlled object in different control states (high temperature\low temperature\constant temperature\up\down).

PID parameter description:

1. When the system does not enable group PID, the auto-tuning results are saved in the system default PID parameters.
2. When the system enables group PID, after the system starts auto-tuning, the auto-tuning result is automatically saved under the current group PID.
3. Auto-tuning can also be enabled in the execution curve (if the production process permits).

Chapter 8 Group output limiting function

Group output limit menu α PER(factory password 5)

Number	Upper row display	Lower row display	parameter	Description	Default value
1	α PER	α PER	Enable group output	0- α I: SA is off, 1- P is switched according to PV 2- S switch according to SV	0
2	α P01	S01	Stage first temperature	-10000~30000	3000
3		α H1	Upper limit of paragraph first	1~100	100
4		α L1	Lower limit of paragraph first	0~100	0
5		C01	The first segment calls PID	0- CFG system configuration PID, 1~5: P -- 1 ~ P -- S group PID	0
.....					
78	α P20	S020	Stage twentieth temperature	-10000~30000	3000
79		α H20	Upper limit of paragraph twentieth	1~100	100
80		α L20	Lower limit of paragraph twentieth	0~100	0
81		C020	The twentieth segment calls PID	0- CFG system configuration PID, 1~5: P -- 1 ~ P -- S group PID	0

For example: silicon molybdenum rod load, because the cold resistance is small, the starting current is too large, the first group temperature can be set to 150 degrees as needed,

The output limit of the first group is 15%, so that after the system heats up, the resistance becomes larger and the output can be unrestricted.

Then: α PER =1

S01 =150

α H1 =15

α L1 =0

Chapter 9 Program Curve Function
Curve setting parameters P r o g (access code 2)

Number	parameter	Upper row display	Lower row display	Description	Default value
1	Program waiting type	P C F 9	H L d t	0- d i S R none, 1- L o w lower deviation is valid, 2- H i g H Upper deviation is valid, 3- b a n d Upper deviation is valid.	0
2	The program waits for the deviation value		H L d	0~100LSB	0
3	Curve time unit		t i m e	0- H o u r time , 1- m i n Minute , 2- S E C second	1
4	Number of blocks		P n o	1~24	1
5	Number of program cycles		C y c l e	0~100 (0-Infinite cycle)	1
6	Power failure handling		P o n P	0- E o n t ,continue before power failure1- S t o p , poweron to stop state2- r u n i ,Stop before power failure or runthe program from the first stage. 3- d R S t ,After power-on,no deviation alarm will continue, if any, stop.4- H t d ,stop before power failure or enter suspension state	0
7	Initial setting value		S u - S	0- P u , 1- S u	0
8	End of program function		E n d	0- o u t 0 output is 0, 1- P - S u end SV continue control	0
9	Cycle times		C - n o	0~99,0-Prohibited Cycling Function	0
10	Loop start segment		C - S P	1~24	1
11	End of loop		C - E P	1~24	1
12	The third line shows the parameters		P d i S	0-current segment number, 1-current segment remaining time	0
13	Segment 1 setting value	P i	S u	S u t o ~ S u H i	0
14	Segment 1 execution time		t i m e	0~999	0
15	Segment 1 relay status		d o	0- o f f OFF, 1- o n ON	0
16	Segment 1 PID selection		P i d S	0- C F 9 default, 1~5- P -- i n P -- S This section callable grouping PID	0
17	Segment 1 group limiting		o u t S	0-none, 1-20 corresponding limit group	0
18	Alarm cancel function		n o a R L	0- d i S A disable, 1- E n A b enable	0
.....					

Number	parameter	Upper row display	Lower row display	Description	Default value
149	Segment 24 setting value	P24	SU	SuLo ~ SuHi	0
150	Segment 24 execution time		ti TE	0~999	0
151	Segment 24 relay status		do	0-OFF OFF, 1-ON ON	0
152	Segment 24 PID selection		Pi dS	0-CFG default, 1~5-P -- 1~ P -- S	0
153	Segment 24 group limiting		oUtS	0-none, 1-20 corresponding limit group	0
154	Segment 24 alarm cancel		noAL	0- d! SA disable, 1- EnAb enable	0

Procedure Curve Selection **P9-5** (Access Code 8)

number	parameter name	Upper row display	Bottom row display	instructions	Default values
1	Programming curve setting	P9-5	P9-5	Selection of 0-8 Curves	0

9.1 Menu functionality

Program Waiting Type

When the process value is lower or higher than the set value because it can not keep up with the changes in the set value, the "waiting" function allows the program to automatically follow the process value such as the suspended state. It is determined by two parameters: method and value. When the "waiting" function is valid, if the deviation value is greater than the waiting value, the program automatically pauses the waiting process value to follow, and the program automatically continues when the deviation is less than or equal to the waiting value.

Waiting type is as follows

- " d! SA " - invalid, not used
- " L o' " - deviation is valid when the process value is lower than the set value
- " Hi SH " - deviation is valid when the process value is higher than the set value
- " bAnd " - The bias band is valid when the process value is higher or lower than the set value

9.11 Procedure Waiting Deviation Value

When the difference between the process value and the set value is greater than the waiting deviation value, the program enters the waiting state and temporarily stops the update of SV.

9.12 Period unit

The time unit can be set to time, minutes, and seconds, and the time unit and segment execution time parameter value together determine the execution time of the segment.

9.13 Number of procedural segments

The program segment number setter consists of several programs, ranging from 1-24, and up to 24 programs can be set up.

9.14 Number of procedural cycles

Set the number of cycles for the program segment mode to run, 0-100, 0 times for the infinite loop mode, and 1-100 for the specific number of cycles. For example, if the number of cycles is set to 5, the program will enter the end state after 5 runs.

9.15 Electricity operation mode

- " EoNE " - After the meter is electrified, continue to perform in the state before the last power outage
- " StOP " - Stopped after the meter is charged
- " rUn! " - Continue to stop before power off, otherwise the program will automatically start from the first paragraph after the call
- " dRSt " - If there is no deviation alarm after power, the program continues to execute, and if there is deviation alarm, it stops running.

" HL d " – The meter is out of power during operation. No matter what happens after the call, the instrument is suspended. But if the meter stops
Before the power is stopped, the state of stop is still maintained after the call.

9.16 Starting value setting

The starting value of the program segment mode setting value can be set as PV, that is, the current measurement value, as the starting value, or SV as the starting value. The starting value and the first paragraph target setting value constitute the first paragraph of the program.

9.2 Curve segment settings

9.21 Setting value

End Point Target for Program Segment

9.22 Time of implementation

The execution time of this paragraph is determined together with the time unit to determine the execution time of this paragraph.

9.23 Relay Status

You can set the alarm type to a program segment running status indicator, and when the program runs to this paragraph, the set relay closes to indicate that the current program is running to this segment.

9.24 PID Selection

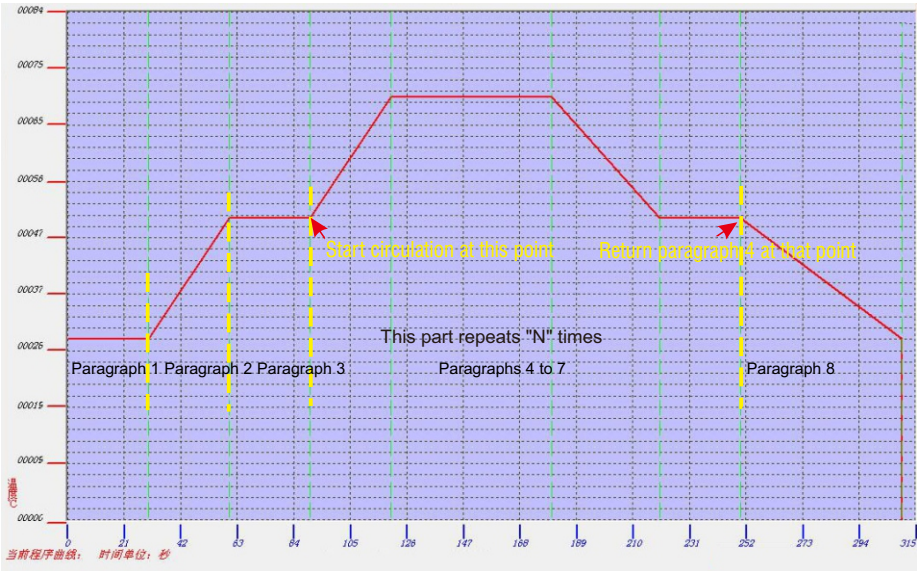
Select the parameters used to calculate PID-controlled when the program executes to this paragraph. The numerical range 0-5 ,0 is the default main PID parameter for the program and 1-5 is the set parameter for the packet PID.

9.25 Internal loop of segments

The internal loop of the program allows a part of the program to repeat the execution of a continuous segment. The equivalent of calling a subroutine.

The internal loop of the program segment can reduce the number of program segments stored in the controller and simplify the settings. Just set, program start segment, program end segment, program loop times to achieve program internal loop.

The following figure shows a simple example:



Paragraph 4 is the beginning of the cycle , paragraph 7 is the end of the cycle.

9.3 Procedural Status

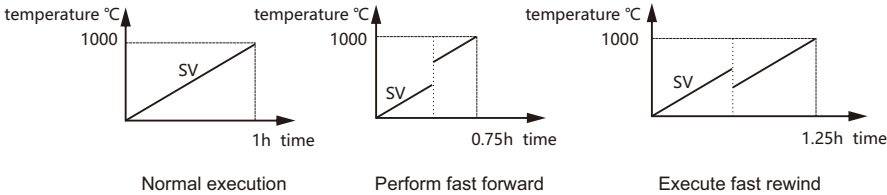
The program includes: stop, run, wait, pause, and end five states.

state	describe	Second row
stop	Close output	Current setting, $STOP$ flashing alternately
run	Program to change settings according to setting parameters	Current settings, indicator lights PROG and SV1 Changliang
wait	Set value unchanged, wait for process value to follow	Current setting, $WAIT$ flashing alternately
suspend	Set value unchanged	Current setting, $HOLD$ flashing alternately
end	End of program, close output	Current setting, END flashing alternately

9.4 Press the FAST function menu $FAST$
(fast forward and fast reverse function of the current segment) password 12

number	parameter name	Upper row display	Bottom row display	instructions	Default values
1	Button FAST function	$FAST$	Numerical value	Range: the lower limit of the current temperature setting value ~ the upper limit	0

In some process curve control occasions, the temperature and time of the current segment are required to realize fast forward and fast rewind according to the process setting curve in this segment in order to meet the process requirements. It can be set through the FAST menu. After entering the menu, the second row displays the current target temperature. You can press the V / A key to quickly reach the required setting value, wait for 3 seconds and then flash once and automatically save, the process curve is Press the new target temperature to start execution, and then press the SET key to return to the normal display interface.



- Note: A. Under fixed SV mode control, the FAST function is invalid
- B. FAST function can only be executed in the state of process curve running and pause.
- C. The panel button FAST can fast forward and rewind, which can only be realized in the current segment. If it exceeds this segment, please select the skip function and then execute the fast forward and rewind functions.
- D. The fast forward and fast rewind functions cannot be enabled in the heat preservation section, and the SV process target value can only be changed by skipping sections.
- E. In the case that the initial setting value of the first segment is the measured value PV, the meter will automatically save the current PV value after power-off, and keep the fast-forward and fast-rewind functions at the same slope as the power-off value.

Chapter 10 Valve position feedback upper and lower limit setting

```
u-Fb menu(Access Password 11)
```

number	Submenu	Molecular menu	Description	Value range	Defaults
1	└─Fb	H: 9H	Start upper limit setting	0~1,0-d: 5A disable, 1-ErAb enable	0
2		Lo'L	Start lower limit setting	0~1,0-d: 5A disable, 1-ErAb enable	0
3		└─ H:	Upper limit setting result	Percentage of full scale	0.00
4		└─ Lo	Lower limit setting result	Percentage of full scale	0.00
5		System reservation			
6		System reservation			
7		System reservation			
8		System reservation			

Note: When the valve feedback is adjusted, the input 2 function must be set to valve feedback, and the upper and lower limits of the input 2 range are automatically set to 0-10000. After the valve is fully opened, the enable upper limit will be saved after 10 seconds; after the valve is fully closed, the enable lower limit will be saved after 10 seconds.