



Dk2300 P、 L Temperature Process Control Instrument



High-precision measurement, Universal input with feed-in, control without overtone

- Double SV, SV1, SV2 switching function, ONE BACK one-key return function
- High precision 24-bit AD measurement with sensor feed
- 4 way alarm relay output control available
- Standard MODBUS RTU Communication
- With signal transfer function
- The dual output control can be realized by heating refrigeration(refrigeration uses relay, which has the function of delay start protection refrigeration compressor)
- Custom anti-interference chip design measurement circuit, can work in bad working environment
- Improved DK PID algorithm control, faster output, no overtone. Control speed 100MS
- Electrical alarm suppression and electrical deactivation function

DK2300P、L PID Intelligent Process Control Instrument Installation and Use Manual

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One、Installation and wiring



1 brief introduction

The DK2300P、L PID series controller is a single-loop process controller and display instrument based on microprocessor technology. It can control and display temperature, pressure, flow, and other process parameters. It is flexible, easy to configure, and simple to operate.

- ★ Universal input, heat resistance, thermocouple and DC signals, compatible with 23 industrial signal inputs
- ★ Modular design, output free configuration
- ★ 100-240V AC, 47 ~ 63hz
- ★ Multiple alarm mode
- ★ Alarm status indicator
- ★ ON / OFF PID Multiple control methods
- ★ Photoelectric isolation RS-485 communication interface

2 technical index

2.1 Key technical indicators

Input signal range: 23 common industrial standard signals

Basic error: 0.2 % FS $\pm$ 1 word

Measurement AD: 24 bits, 40Hz

Lost DA: 12, 100KSPS

Main control output: 1 road(optional heating cooling output, alarm 3 can be defined as refrigeration output)

Alarm output: When 4(2316 P、L is all the way alarm) is heated, the main control output is the lower limit control alarm.

Refrigeration, master output to do upper limit alarm.

Input impedance: $\geq 500\Omega$ at voltage, $\leq 200\Omega$ at current,

Thermal resistance ≤ 0.25 mA, thermocouple $\geq 500\text{K}$

Output impedance(with load capacity): current $\leq 500 \Omega$ (current has special requirements, can do 650 Ω , set Description of time of shipment), relay AC220V/2A, DC30V/1A

Display: Digital Pipe

Control output cycle: 10 Hz

Communication Protocol: MODBUS RTU(RS485 interface, two-wire system)

Drive distance: 1200 meters

Check method: No check, odd check, even check

Porter rate: 4800, 9600, 19200

Communication data format: one bit starting bit, eight bits of data bit, one stop bit

Supply voltage: 100-240V AC(47 ~ 63Hz)

Isolation voltage: input, output, power 3 isolation, 2300 VAC 1 minute

Working conditions: Temperature -20 $^{\circ}\text{C}$ ~ +50 $^{\circ}\text{C}$, humidity 10 % ~ 90 % RH

Storage conditions: temperature: -40 $^{\circ}\text{C}$ ~ +80 $^{\circ}\text{C}$; Humidity: 10 % to 90 % RH

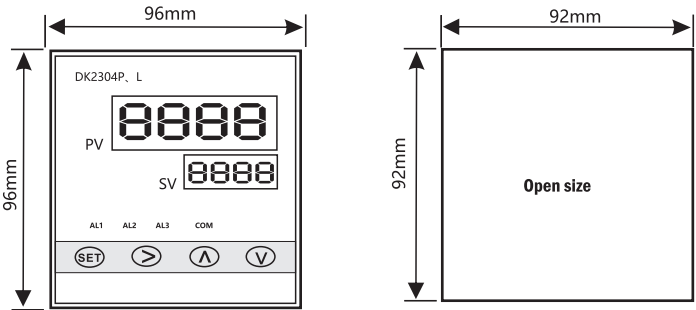
Instrument depth:

DK2300P :79mm

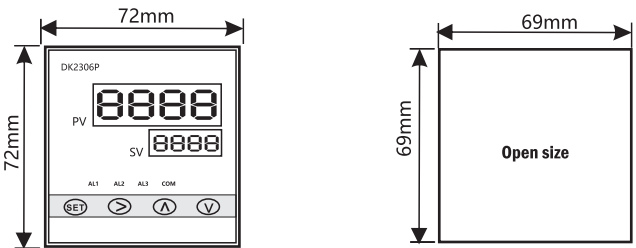
DK2300L:136.5mm

3 Shape Size

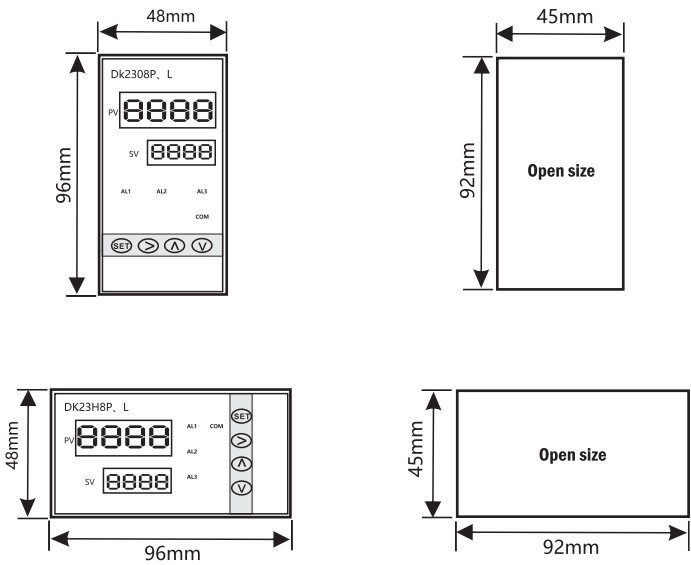
3.1 Diagram of DK2304 P、L Shape and Hole Size



3.2 Diagram of DK2306 P Shape and Hole Size



3.3 Diagram of DK2308P、L / 23H8P、L Shape and Open Size

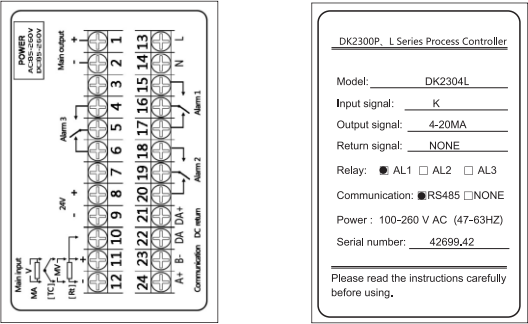


3.4 Diagram of DK2316 P、L Shape and Hole Size



4 Label Description

Taking DK2304 L as an example, one side of the instrument is the terminal wiring description, and the other side is the meter's parameter as shown in the figure below:



5.Installation and wiring

5.1 Open case inspection

1. Open the controller package and check the controller host and its accessories, which include installation fixture and shock-proof gasket. Please keep the packing for future use.
2. Check the controller and accessories for damage. If there is any damage, please notify the delivery person immediately.

5.2 Installation

Note: All installation needs to be done by trained and experienced staff.

5.3 Use of shielded cables

All analog signals must use shielded cables to minimize electromagnetic interference. Connect to do It is possible that the short cable should be grounded at one end, and the suitable ground position is close to the sensor and transmitter.

5.4 Measures to curb interference

Under normal circumstances, if the wiring is good, no other anti-interference measures are required. The disturbance is very serious. In the case, RC networks or diode networks can be considered to suppress interference.

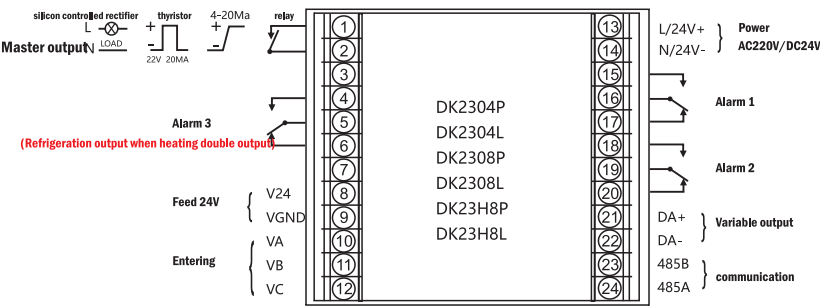
The anti-interference of electromagnetic coil -- the RC network and diode can be connected together to reduce the instantaneous interference of the inductor coil.

Contact arcs are generated when the contactor is cut off by reducing the contact with the RC network.

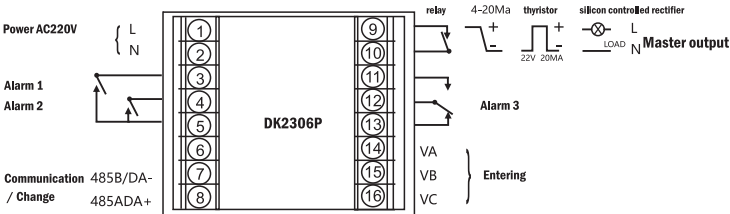
If the current is below 3A, use 470μm's

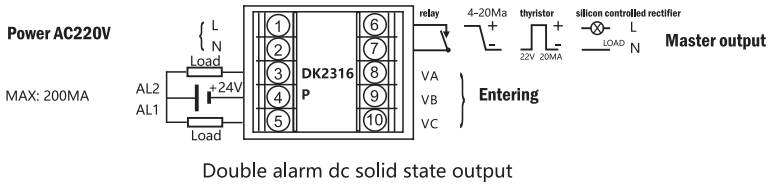
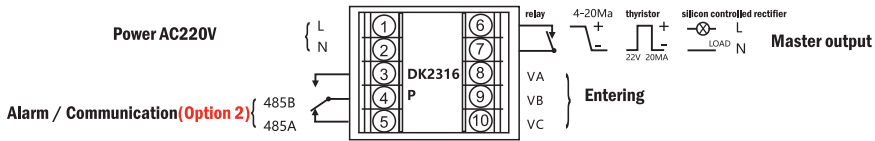
The resistor and 0.1 μF capacitance form a network. When the current is 3-5 A, it is connected in parallel with 2 RC networks.

5.5 Connections

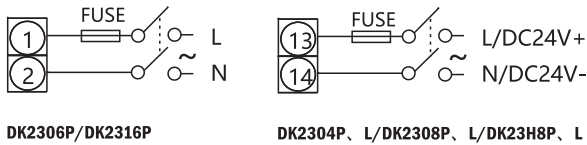


Only the DK2300L series has an optional 24V DC power supply.

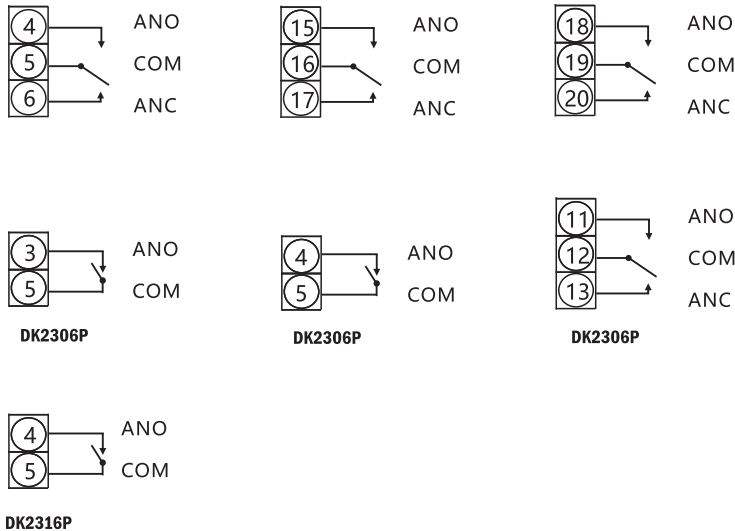




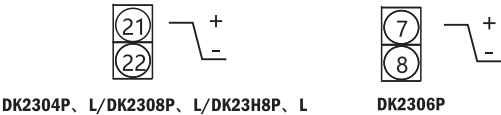
A.Power wiring : 100-240V AC :



B.Alarm output wiringDK2304P、L/DK2308P、L/DK23H8P、L



C.Variable output wiring :



7

8

+

-

DK2306P

D.Communication wiring :



7

8

485B

485A

DK2306P

4

5

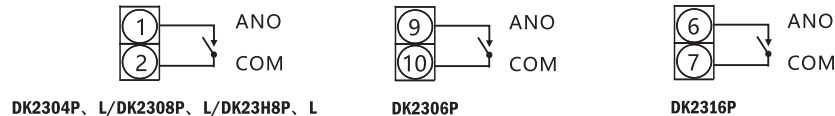
485B

485A

DK2316P

E.Master output wiring :

Electric relay :



9

10

ANO

COM

DK2306P

6

7

ANO

COM

DK2316P

4-20MA :



9

10

+

-

DK2306P

6

7

+

-

DK2316P

Transistor :



9

10

+

-

22V 20MA

DK2306P

6

7

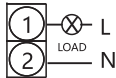
+

-

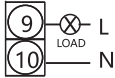
22V 20MA

DK2316P

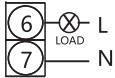
silicon controlled rectifier:



DK2304P、 L/DK2308P、 L/DK23H8P、 L



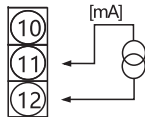
DK2306P



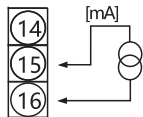
DK2316P

F. Different types of sensor input wiring:

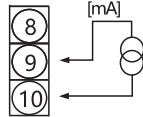
MA Enter:



DK2304P、 L/DK2308P、 L/DK23H8P、 L

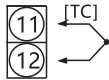


DK2306P

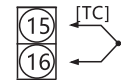


DK2316P

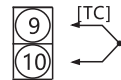
Thermocouple input:



DK2304P、 L/DK2308P、 L/DK23H8P、 L

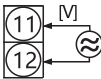


DK2306P

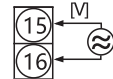


DK2316P

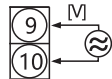
V Enter:



DK2304P、 L/DK2308P、 L/DK23H8P、 L

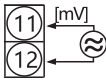


DK2306P

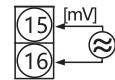


DK2316P

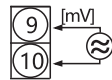
MV Enter:



DK2304P、 L/DK2308P、 L/DK23H8P、 L

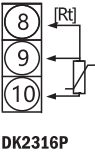
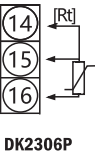
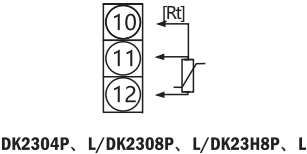


DK2306P

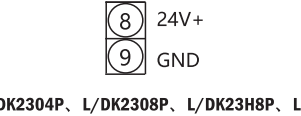


DK2316P

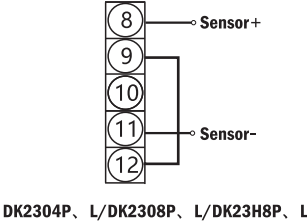
Thermal resistance input:



24V Feed :



Second line sensor connection:



6 Description of selection :

A. Supported 23 input type selection tables :

sequence number	Signal type	Instrument display	Selection code	Range of measurements	Measurement accuracy
0	K	K	K	-200~1300℃	0.1
1	S	S	S	0~1700℃	0.2
2	R	R	R	0~1700℃	0.2
3	T	T	T	-200~400℃	0.2
4	E	E	E	0~1000℃	0.2
5	J	J	J	0~1200℃	0.2
6	B	B	B	400~1800℃	0.2
7	N	N	N	0~1300℃	0.2
8	WRe3-WRe25	WRE3	WRE325	0~2300℃	0.2
9	WRe5-WRe26	WRE5	WRE526	0~2300℃	0.2
10	Cu50	CU50	CU50	-50.0~150.0℃	0.2
11	Pt100	PT100	PT100	-200.0~850.0℃	0.1
12	0~80Ω	0-80	0Ω80	0~80Ω	0.2
13	0~400Ω	0-400	0Ω400	0~400Ω	0.1
14	0~10mA	0-10	0MA10	0~10mA	0.1
15	0~20mA	0-20	0MA20	0~20mA	0.1
16	4~20mA	4-20	4MA20	4~20mA	0.1
17	0~20mV	0-20	0MV20	0~20mV	0.2
18	0~100mV	0-100	0MV100	0~100mV	0.1
19	0~1V	0-1	0V1	0~1V	0.1
20	0~2V	0-2	0V2	0~2V	0.1
21	0~5V	0-5	0V5	0~5V	0.1
22	1~5V	1-5	1V5	1~5V	0.1

B.Description of variant output selection code

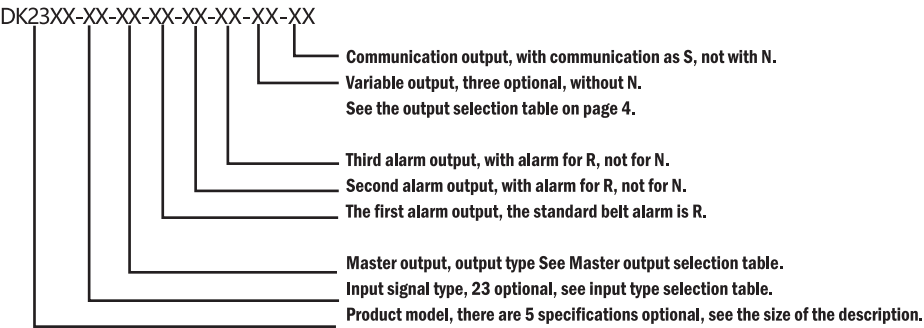
This instrument supports the following 3 kinds of variable output signals:

Selection code	0MA20	4MA20	0MA10
type	0-20mA	4-20mA	0-10mA
Instrument display	0-20	4-20	0-10

C. Master output selection table :

sequence number	type	Selection code	Instrument display
1	4-20MA	4MA20	LI nE
2	0-20MA	0MA20	LI nE
3	0-10MA	0MA10	LI nE
4	Relay output	R	RELY
5	Solid state transistor output	P	TRANS
6	Silicon Controlled Output	T	SC
7	No	N	

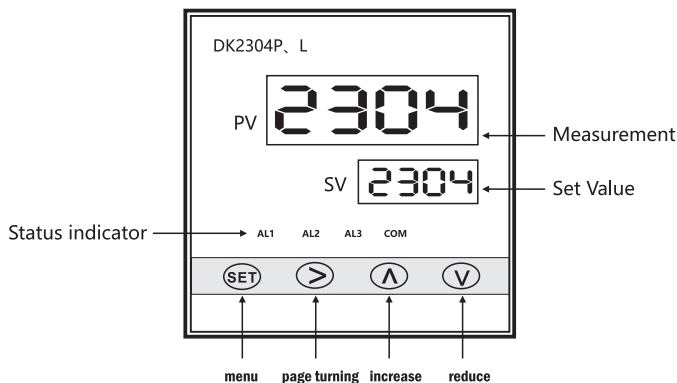
D. Examples of selection :



Example: The customer needs to measure and collect K-type thermocouple signals, with 2-way alarm output, with communication, master output 4-20MA signal,Open size 92 * 92mm required.
The selection code is:

DK2304L-K-4MA20-R-R-N-N-S

Two、Operational Application Guide



1 Panel Introduction

Pv display window: displays measurements or current parameters, etc..

SV display window: display settings or parameter values, etc..

Operation indicator: AL1 and AL2, AL3 have alarm often on.

The com lamp flickered as the module communicated.

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, flip the previous parameter

2 Operation Status Description

A. On the system: First, PV display window display instrument model, SV display window display program version number.

Then, the PV display window shows the input type, and the SV display window shows automatic manual instructions.

Enter the system: PV display window shows the measurement value, SV display window shows the setting value.

B. The initial interface length presses **SET** 3S to enter the system main menu, and the submenu is pressed **^**/**v** switched.

Press **>** to enter the password interface. Press **>** to select the bit, press **^**/**v** to enter the password, enter the password correctly, wait 2 seconds, display PASS, enter the menu. Password error. No action.

C. Press **>** to switch the current display status: S-SV, OUT, SV1, SV2.

S-SV: currently running SV1 or SV2, OUT: current of PID control output

SV1: Set value 1, SV2: Set value 2

Press **SET** to enter the S-SV interface. Press **^**/**v** to switch SV1 and SV2 (need to enable switching).

D. When automatic, press **^**/**v** to change the setting value SV.

When manually, press **^**/**v** to modify the output signal percentage.

E. At any interface, press **SET** to return the previous level menu.

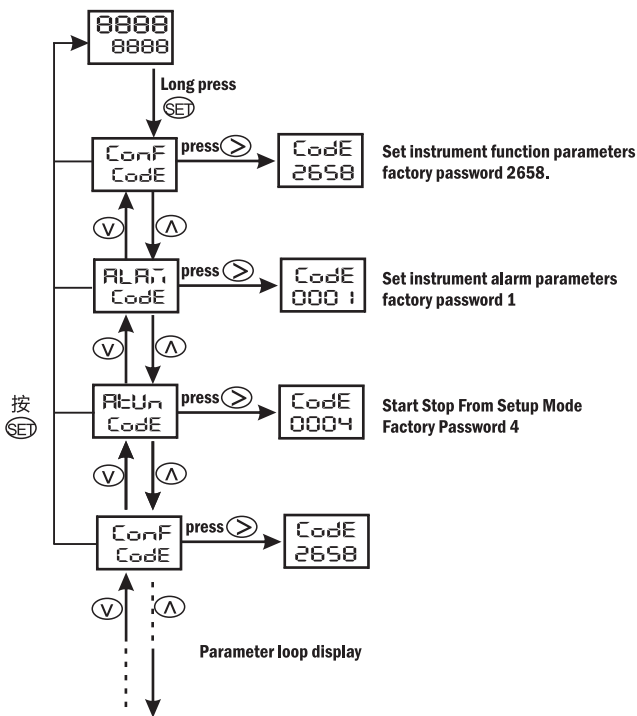
F. The parameter is modified and waits for 2 seconds. The parameter value is automatically saved by the interface flicker.

G. After the button has no operation 60S, the normal display interface is automatically returned.

3 Access Menu and Access Password

The meter has three access menus: Conf, ALAR, ALtUn.
Conf can view and configure all parameters of the instrument, enter the password 2658 into.
ALAR can view and set the alarm parameters of the instrument. Enter password 1 to enter.
ALtUn can customize the instrument, need to enter the password 4 access.
Note: Please do not configure the menu for password entry above.

Instrument main menu toggle operation flow diagram.



CONF Menu(ex-factory password 2658)

number	parameter	Show up row	Next Row Show	Signal type	instructions	accuracy	Default
1	Type of Input	1 ~ 19	P	K-type thermocouple	-200~1300℃	0.1	K
			S	S-type thermocouple	0 ~ 1700℃	0.2	
			R	R-type thermocouple	0 ~ 1700℃	0.2	
			T	T-type thermocouple	-200 ~ 400℃	0.2	
			E	E-type thermocouple	0 ~ 1000℃	0.2	
			J	J-type thermocouple	0 ~ 1200℃	0.2	
			b	B-type thermocouple	400 ~ 1800℃	0.2	
			n	N-type thermocouple	0 ~ 1300℃	0.2	
			WRE3	Wre3-25	0 ~ 2300℃	0.2	
			WRE5	Wre5-26	0 ~ 2300℃	0.2	
			CU50	Cu50	-50.0 ~ 150.0℃	0.2	
			Pt100	Pt100	-200.0 ~ 850.0℃	0.1	
			0~80	Resistance signal	0 ~ 80Ω	0.2	
			~400	Resistance signal	0 ~ 400Ω	0.1	
			0.1~10	Milliam signal	0 ~ 10mA	0.1	
			0.1~20	Milliam signal	0 ~ 20mA	0.1	
			4.1~20	Milliam signal	4 ~ 20mA	0.1	
			0~20	Milliam signal	0 ~ 20mV	0.2	
			0~100	Milliam signal	0 ~ 100mV	0.1	
			0~1	Volt signal	0 ~ 1V	0.1	
			0~2	Volt signal	0 ~ 2V	0.1	
			0~5	Volt signal	0 ~ 5V	0.1	
			1~5	Volt signal	1 ~ 5V	0.1	

(Note: After the input type changes, the SVvalue is automatically set to 0, and the Sv value needs to be reset according to the control requirements.)

number	parameter	Show up row	Next Row Show	instructions	Default
2	Show decimal place	dP	8888	0-No decimal places	0
			888.8	1-One decimal place	
			88.88	2-Two decimal places	
			8.888	3-3-digit decimal places	
3	Show range upper limit	l nHi	1300	Set when simulating linear signals, -1999 ~ 9999	1300
4	Show the lower limit of the range	l nLo	-200	Set when simulating linear signals, -1999 ~ 9999	-200
5	Translation correction	oFFS	0	Field correction input, range: -500 ~ 500	0
6	Digital filtering	FiLt	1.0	The larger the value, the more stable, the slower the response speed is, 0.1 ~ 100.0 s	1.0
7	Temperature Unit Switching	Uni t	C	0-Celsius	0
			F	1-Fahrenheit	
			P	2-Absolute Temperature	
8	Output Type	CoUt	Li nE	0-Linear output	0
			rELY	1-Relays	
			tRAs	2-Transistor	
			SC	3-Silicon Controlled	
9	Output linear signal type	CI tY	4.720	0-(4 ~ 20MA)	0
			0.710	1-(0 ~ 10MA)	
			0.720	2-(0 ~ 20MA)	
10	Output Action Mode	CtRL	rEAc	0-Heating reaction	0
			PACt	1-Refrigeration is active	
11	Proportional band	Pb-P	20	0 is the bit-type switch control. Range: 0 ~ 9999, the unit is the unit of quantity	20
12	Integral time	I	120	the integral time is zero and the integral is closed. Range: 0 ~ 3600s	120
13	Differentiation time	d	30.0	Differential time is zero, closing differential. Range: 0.0 ~ 99.9 s	30.0
14	Switching control cycle	Ct	2.0	Nonlinear output control cycle. Range: 0.1 ~ 200.0 s	2.0
15	ON / OFF control lag	CHY	1	The return value of the output action. Range: 0 ~ 2000 LSB	1
16	Output cap	o-Hi	100.0	Set the upper limit of output, range: 0.0 % ~ 100.0 %	100.0
17	Lower output limit	o-Lo	0.0	Set the lower output limit, range: 0.0 % ~ 100.0 %	0.0
18	Enter exception output preset value	Er-o	0.0	The output value of the PID when an exception is entered. Range: 0.0 % ~ 100.0 %	0.0
19	Sensor open circuit processing	boUt	PrEv	0-Transfer preset value	0
			KEEP	1-maintain open circuit output	

number	parameter	Show up row	Next Row Show	instructions	Default
20	Alarm type	AL AL1	none	0-None	0
			HI AL	1-Maximum alarm	
			LoAL	2-Lower Alarm	
			HdAL	3-Up bias alarm	
			LdAL	4-Deviation alarm	
			dEAL	5-Deviation with alarm	
21	Alarm type 2	AL AL2	none	0-None	0
			HI AL	1-Maximum alarm	
			LoAL	2-Lower Alarm	
			HdAL	3-Up bias alarm	
			LdAL	4-Deviation alarm	
			dEAL	5-Deviation with alarm	
22	Alarm type 3	AL AL3	none	0-None	0
			HI AL	1-Maximum alarm	
			LoAL	2-Lower Alarm	
			HdAL	3-Up bias alarm	
			LdAL	4-Deviation alarm	
			dEAL	5-Deviation with alarm	
			oUt2	6-Refrigeration Relay Output	
23	Correspondence address	Addr	1	Instrument address at time of communication: 1 ~ 247	1
24	Porter rate	bAUD	4800	0-4800	1
			9600	1-9600	
			19200	2-19200	
25	Verification Method	Prot	none	0-No check	2
			odd	1-odd check	
			Even	2-even check	
26	Communications delay	UAI t	0	Communication delay time setting, range: 0 ~ 60mS	0
27	Variable output range	rEEY	4~20	0-(4-20MA)	0
			0~10	1-(0-10MA)	
			0~20	2-(0-20MA)	

number	parameter	Show up row	Next Row Show	instructions	Default
28	Variation parameter selection	rESL	PV	0-Variable measurement	0
			SU	1-Variable settings	
			OUT	2-Variable output value	
			dESU	3-Variable bias value(PV-SV)	
29	Change upper limit	rEHl	5000	Maximum range of variable output, range: -1999 ~ 9999	5000
30	Change lower limit	rELo	0	The lower limit of the range of the variable output, range: -1999 ~ 9999	0
31	Heat the cooling zone.	noUt	1.0	1.0 ~ 20.0 %(reduce frequent actions when dual output)	1.0
32	Refrigeration protection delay time	o2dt	600	1 ~ 600s(set protection compressor when compressor control is used for system refrigeration Time of electricity)	600
33	Electrical alarm exemption	LACH	0	0-dl SA forbidden, 1-EnAb enabled	0
34	On slow start function	Stb	0	0-dl SA forbidden, 1-EnAb enabled	0
35	On slow start time	Stbt	0	Slow startup time 0 ~ 999, in seconds	0
36	Switch to SV2 Slope Rate	rPTE	0	Parameter range: 0-3000, 0-close, unit LSB / minute.	0

ALAr Menu(factory password 0001)

number	parameter	Show up row	Next Row Show	instructions	Default
1	Alarm 1 setting value / deviation value	AL 1	0	Upper and lower limit warning values and deviation warning values, range: -1999 ~ 9999	0
2	Alarm 1 action return	ALY 1	0	Go to jitter action return, range: 0 ~ 2000 LSB	0
3	Relay 1 Action Delay	r 1dt	0	Relay action delay time, range: 0 ~ 600s	0
4	Alarm 2 setting value / deviation value	AL 2	0	Upper and lower limit warning values and deviation warning values, range: -1999 ~ 9999	0
5	Alarm 2 action return	ALY2	0	Go to jitter action return, range: 0 ~ 2000 LSB	0
6	Relay 2 Action Delay	r 2dt	0	Relay action delay time, range: 0 ~ 600s	0
7	Alarm 3 setting value / deviation value	AL 3	0	Upper and lower limit warning values and deviation warning values, range: -1999 ~ 9999	0
8	Alarm 3 Action Retreat	ALY3	0	Go to jitter action return, range: 0 ~ 2000 LSB	0
9	Relay 3 Action Delay	r 3dt	0	Relay action delay time, range: 0 ~ 600s	0

RETURN Menu(factory password 0004)

number	parameter	Show up row	Next Row Show	instructions	Default
1	Self-tuning switch	REtUn	dI SA	0-Close from set	0
			REtEn	1-Start Self-tuning	
2	Automatic conversion by hand	S-MA	MANU	0-Manual.	1
			AUTO	1-Automatic	
3	Manual automatic output enable	MANEn	dI SA	0-No manual output	1
			EnAb	1-Allow manual output	
4	SV1 / SV2 Switch	S-SV	Su 1	0-SV1	0
			Su2	1-SV2	
5	SV1 / SV2 switching enabled	SuEn	dI SA	0-prohibits SV1 / SV2 switching	0
			EnAb	1-Allow SV1 / SV2 toggle	

4.Custom

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.

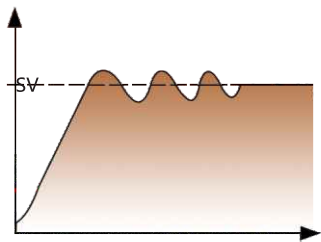
Self-tuning: The controller adopts the method of unit order adjustment to automatically calculate and set PID parameters.

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.



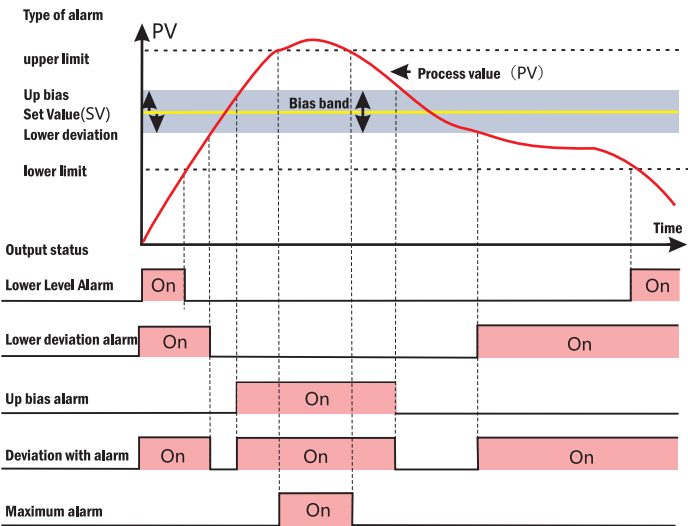
Usually, the output will be maximized after the start of the adjustment, and the output will be closed when the PV reaches the set value SV. This causes the process value to oscillate to calculate the control parameters.

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.

5. Give An Alarm

Alarm is used to alert and generate alarm signals when the process value exceeds a predetermined limit. Alarm on the meter panel during alarm. Indicators AL1 and AL2, AL3 lights Changliang. An output signal (usually an electrical output) can be generated at this time. External devices generate corresponding actions. Alarm can be divided into two main types. They are:
A. Simulated alarm-its role is to monitor an analog quantity (numerical quantity) to see if it exceeds the predetermined limit. The analog alarm is an alarm for PV values, output values, and other variables.

- Simulated alarm code and type:
- Hi AL : upper limit alarm, when the process value exceeds the predetermined limit
 - Lo AL : Lower alarm, when the process value is below the predetermined limit
 - Lo AL : Upward deviation alarm, when the process value is higher than the set value and exceeds the predetermined limit
 - Hi AL : Lower deviation alarm, when the process value is lower than the set value and exceeds the predetermined limit
 - Lo AL : Deviation alarm, alarm when the process value is higher or lower than the set value and exceeds the predetermined limit



Situation diagram of various analog alarm types when PV changes

III. Communications component

1 Communication connection

The product communication function is optional. If you choose the communication function when ordering, you can refer to the communication section of this chapter.

This instrument supports the standard Modbus RTU protocol. The two-wire RS485 connection can connect up to 32 meters on a single communication line at a distance of 1.2 Km. In order to ensure the reliability of the communication line(that is, not to interrupt the signal due to noise or line interference), the wiring between the instruments should be connected using twisted pairs.

Parameter Settings

The factory's default address is 01 and the baud rate is 9600 BPS. The address, the baud rate can be set by pressing the button, or it can be set by the communication protocol. When multiple modules are applied, the address can not be repeated, and the Potter rate must be the same.

Communications Statute

This instrument uses ModBus RTU communication protocol(ModBus is a registered trademark of Modicon)
Specifically as follows;

Data frame format:

A start bit
8 data bits, the smallest significant bit sent first
No check, odd check, even check
1 stop bit

2 Function Code Introduction

Code	Meaning	Operation
01	Bit register	Read output bit register
02	Bit register	Read output bit register
03	Batch data	Read single or multiple continuous register values within the current register range
04	Batch data	Read single or multiple continuous register values within the current register range
05	Bit register	Writes the value of the current registry bit
06	Write Single Register	Writes the set parameter value to a single register
16	Batch multiple registers	Writes set parameter values to multiple consecutive registers

Function code: 01H 05H(01H is the read switch quantity command, 05H is the switch quantity command)						
number	Relative Address	MODBUS address	Data type	Status Description	instructions	Value range
1	0	1	bit	0: off, 1: start self-tuning	Remote Start Custom	0
2	1	2	bit	0: Manual, 1: Automatic	Remote manual automatic switch	1
3	2	3	bit	0: Prohibition, 1: Enabling	Allow manual automatic switching	1
4	3	4	bit	0: SV1, 1: SV2	SV Switch	0
5	4	5	bit	0: Prohibition, 1: Enabling	Allow switching SV	0

Function code：02H						
number	Relative Address	MODBUS address	Data type	Status Description	instructions	
1	0	1	bit	0: Disconnect 1: Closed	Alarm 1 Action Status	
2	1	2	bit	0: Disconnect 1: Closed	Alarm 2 Action Status	
3	2	3	bit	0: Disconnect 1: Closed	Alarm 3 Action Status	
4	3	4	bit			
5	4	5	bit	0: Prohibition, 1: Enabling	Input sensor, open circuit alarm	
6	5	6	bit	0: Prohibition, 1: Enabling	Input sensor, open circuit alarm	

Function code：03H 06H 10H						
number	Relative Address	MODBUS address	Data type	instructions	Value range	
1	0	1	word	SV1-Set value, read and write	-1999~9999	
2	1	2	word	OP-Output value. When manual, the communication writes output. Auto invalid	-1999~9999	
3	2	3	word	SV2-Set value, read and write	0.0%~100.0%	
4	256	257	word	Alarm 1 setting value / deviation value	-1999~9999	
5	257	258	word	Alarm 1 action return	0~2000LSB	
6	258	259	word	Alarm 1 action delay time	0~600S	
7	259	260	word	Alarm 2 setting value / deviation value	-1999~9999	
8	260	261	word	Alarm 2 action return	0~2000LSB	
9	261	262	word	Alarm 2 action delay time	0~600S	
10	262	263	word	Alarm 3 setting value / deviation value	-1999~9999	
11	263	264	word	Alarm 3 Action Retreat	0~2000LSB	

Function Code : 03H 06H 10H					
number	Relative Address	MODBUS address	Data type	instructions	Value range
12	264	265	word	Alarm 3 Action Delay Time	0~600S
13	4096	4097	word	Input Type, Main Input Channel Sensor Type Settings	0~22
14	4097	4098	word	Decimal Location Settings	0~3
15	4098	4099	word	Sensor input range upper limit	-1999~9999
16	4099	4100	word	Lower limit of sensor input range	-1999~9999
17	4100	4101	word	Input Offset Correction	-500~500
18	4101	4102	word	Digital filter time constant in seconds	0.1~100.0
19	4102	4103	word	Temperature unit switching: 0-C, 1-F, 2-absolute temperature	0~2
20	4103	4104	word	System Retention	
21	4104	4105	word	Output Type	0~3
22	4105	4106	word	Output linear signal type	0~2
23	4106	4107	word	Output 1 Action Mode: 0-Heating Reaction, 1-Refrigeration Positive	0~1
24	4107	4108	word	Output 1 Scale Belt	0~9999
25	4108	4109	word	Integration	0~3600S
26	4109	4110	word	Differentiation time	0.0~999.9S
27	4110	4111	word	Switching control cycle	0.1~200.0S
28	4111	4112	word	ON / OFF control lag	0~2000LSB
29	4112	4113	word	Output cap	0.0%~100.0%
30	4113	4114	word	Lower output limit	0.0%~100.0%
31	4114	4115	word	Enter exception output preset value	0.0%~100.0%
32	4115	4116	word	0-transfer output preset value, 1-maintain open circuit pre-output	0~1
33	4116	4117	word	System Retention	
34	4117	4118	word	Alarm type	0~5
35	4118	4119	word	Alarm type 2	0~5
36	4119	4120	word	Alarm type 3	0~6
37	4120	4121	word	Correspondence address	1~247
38	4121	4122	word	Porter rate: 0-4800, 1-9600, 2-19200	0~2

Function code：03H 06H 10H					
number	Relative Address	MODBUS address	Data type	instructions	Value range
39	4122	4123	word	Verification method: 0-no verification, 1-odd verification, 2-even verification	0~2
40	4123	4124	word	Communications delay	0-60mS
41	4124	4125	word	Variable range	0~2
42	4125	4126	word	Variation parameter selection	0~3
43	4126	4127	word	Change upper limit	-1999~9999
44	4127	4128	word	Change lower limit	-1999~9999
45	4128	4129	word	Heat the cooling zone	1.0~20.0%
46	4129	4130	word	Refrigeration protection delay time	1~600s
47	4130	4131	word	Call the alarm, no function	0-1
48	4131	4132	word	Slow Start Function	0-1
49	4132	4133	word	Slow Start Time	0-999
50	4133	4134	word	Switch to SV2 Slope Rate in LSB / min 0-Close	0-3000
51	4134	4135	word	Enable from station, 0-disable,1-enable	0-1

Function code：04H					
number	Relative Address	MODBUS address	Data type	instructions	Value range
1	0	1	word	PV-Measurement	-1999~9999
2	1	2	word	OP-Output Value	0.0%~100.0%
3	2	3	word	SV-Current Settings	-1999~9999
4	3	4	word	SV1-Set Value	-1999~9999
5	4	5	word	SV2-Set Value	-1999~9999
6	5	6	word	Alarm 1 status: 0-nil, 1-upper alarm, 2-lower alarm, 3-upper deviation alarm, 4-lower deviation alarm, 5-deviation alarm	0~5
7	6	7	word	Alarm 1 status: 0-nil, 1-upper alarm, 2-lower alarm, 3-upper deviation alarm, 4-lower deviation alarm, 5-deviation alarm	0~5
8	7	8	word	Alarm 1 status: 0-nil, 1-upper alarm, 2-lower alarm, 3-upper deviation alarm, 4-lower deviation alarm, 5-deviation alarm	0~6
9	8	9	word		

Note: 1. Negative numbers in communication are represented by binary complement
2, the analog signal measurement value is the set range; In thermal resistance, 0.1 / LSB; Thermocouple time, 1/LSB.

IV. Technical support

Warning:

Modifications to the parameter status may cause unnecessary faults and losses. Non-engineering technicians should not take the initiative. Change the system parameters, to modify the parameters beyond the order specifications caused by unnecessary losses, not within the scope of warranty, the company does not assume any responsibilities and obligations, customers need to change their own parameters please call the consultation, the company will provide you with technical guidance.

The product is maintained free of charge for one year(except for man-made damage) and is maintained for life.

V Appendix-Technical Indicators

1. Universal input

1.1 Input of technical indicators

Sampling rate	40 Hz
Digital input filter	Time constant 0.1 ~ 100.0 s
resolution ratio	24 A/D
Input impedance	Thermal resistance ≤ 0.25 mA; Thermocouple $\geq 500\text{K}$; Linear current $\leq 200\Omega$; Voltage $\geq 500\text{K}\Omega$
isolation	Input-output isolation
Enter process value offset	$\pm 500\text{LSB}$

1.2 Thermocouple

Thermocouple Technical Indicators

standard	ITS-90
Fracture protection	Maximum detection time is 2s, open circuit according to parameter setting
precision	$0.1\% / \pm 0.2\%$
resolution ratio	Resolution $1\text{ }^{\circ}\text{C}$
Cold end compensation	In the test environment: the error is less than $\pm 0.1\text{ }^{\circ}\text{C}$; Working environment: The error is less than $\pm 1\text{ }^{\circ}\text{C}$;
Temperature stability	$0.01\% / ^{\circ}\text{C}$ of range
Power impact	Negligible
Relative Humidity Effect	Negligible
Sensor resistance effect	$100\text{ }\Omega$: & lt; 0.1% ; $1000\text{ }\Omega$: & lt; 0.5%

1.3 Thermal resistance(RTD)

Thermal resistance technical indicators

connection	3 Line PT100
standard	ITS-90
Wire compensation	Automatic compensation
RTD sensor current	250 μ A
Break Protection	Maximum detection time is 2s, open circuit according to parameter setting
precision	$\pm 0.2 \%$
resolution ratio	Resolution 0.1 $^{\circ}$ C
Temperature stability	PT100 error 0.1 %, CU 50 error 0.2 %
Power impact	Negligible
Relative Humidity Effect	Negligible
Wire resistance effect	10 Ω / line: & lt; 0.5 %

1.4 Linear DC

Linear DC input technical specifications

Range upper limit	-1999 ~ 9999 decimal places can be set
Lower Range	-1999 ~ 9999 decimal places can be set
Minimum range	1LSD
Break Protection	Maximum detection time is 2s, open circuit according to parameter setting For 4 ~ 20mA, 1 ~ 5V
precision	$\pm 0.1 \%$
Temperature stability	The range is 0.01 % / $^{\circ}$ C
Power impact	Negligible
Relative Humidity Effect	Negligible

2 Output

2.1 Types of output modules

Output 1 Type	Linear DC, transistor, Silicon controllable, relay
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2.2 Output of technical indicators

Linear DC input technical specifications

electric relay	type	SPDT
	rated current	2A 240V AC/3A 30V DC
	Alarm relay rated current	0.5 A 220V AC/ 1A 30V DC
	life	& GT; 500,000
	isolation	240V
transistor	Driving capability	22V, 20mA
	isolation	Input and output isolation
silicon controlled rectifier	Operating voltage range	20 ~ 280 Vrms(47 ~ 63Hz)
	Current range	0.01 ~ 6A(at 25 °C); 0.5 A(at 40 °C)
	Limit current(16.6 MS)	25A
	Minimum change in shutdown state at rated voltage	500V / μ s
	Minimum leakage current at rated voltage	1mAms
	Minimum pressure drop at work	1.5 V
	Voltage peak at shutdown state	600V
Linear DC	resolution ratio	12 people
	Update Rate	Each control cycle: 100MS
	Signal type	0 ~ 10mA, 0 ~ 20mA, 4-20mA
	With load capability	0 ~ 10mA: Max 1000 Ω
		0 ~ 20mA: Max 500 Ω
		4 ~ 20mA: Max 500 Ω
	Variable output precision	$\pm$ 0.2 %
	Control output precision	$\pm$ 0.2 %
	isolation	Isolation from other inputs and outputs

3 Control

Custom form	Expert revision
Proportional band	0(OFF): Full range 0 ~ 9999, in units of engineering quantity
Integral time	0(OFF): 0 ~ 3600s
Differentiation time	0.0(OFF): 0.0 ~ 999.9 s
ON / OFF action return	From 0 to 2000, the unit is the unit of engineering.
Automatic / Manual Control	Easy to switch automatically
Control cycle	0.1 ~ 200.0 s
Set Value Range	Set set upper limit ~ set lower limit
Set set upper limit	Less than the upper limit of the range
Set lower limit	Greater than the lower limit of the range

4 Police

Maximum number of alarms	3 soft alarm + loop alarm
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5 Digital communications

form	Serial communication
agreement	Modbus RTU
Model Form	Rs485
Address Range	1 ~ 247
Porter rate	4800bps, 9600bps, 19200bps
data structure	10 or 11.
Stop Bit	1
check	No check, no check, no check
isolation	2300 V AC input, output, power supply between

6 Test environment

ambient temperature	20 °C ± 2 °C
relative humidity	60 ~ 70 %
Power voltage	100 ~ 240V AC 50Hz
Thermocouple input impedance	<10 Ω
Wire resistance	<0.1 Ω / Interline Resistance Difference(PT100)

7 Working environment

Operating temperature	0 ~ 55 °C
Storage temperature	-20 ~ 80 °C
relative humidity	20 ~ 80 %
elevation	Up to 2000m
Power voltage	100 ~ 240V AC 50Hz
power dissipation	5W/7.5 VA
Signal source resistance	Maximum 1000 Ω(thermocouple)
PT100 wire resistance	Maximum 20 Ω / line(PT100)

8 Standards

authentication	CE
EMC standard	EN61326*
Safety standards	EN61010 and UL3121
Front panel protection level	IP66

