S-S Type

Digital integrated power regulator

Operation Instruction

Thank you for purchasing S-S digital integrated power regulator. This instruction manual mainly explains some necessary precautions during installation and wiring. Before operation, please read this manual to fully understand the operation procedure of this product, please bring the manual for reference at any time.

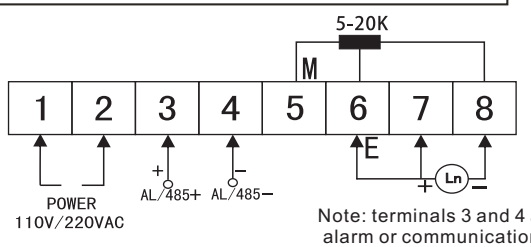
1.Attention

1. Please do not use this product in places full of explosive and combustible gases.
2. Before connecting the power supply, please confirm whether the voltage is within the rated range and whether the wiring terminals are correct, or the controller may be seriously damaged after the power supply.
3. Please follow the screw size confirm the terminals maximum torque.
4. It is strictly forbidden to decompose, modify or repair the product.
5. Please do not use in the following circumstances:
   - ● where the temperature changes dramatically.
   - ● places where humidity is too high and water is produced .
   - ● a place where the vibration or impact is very strong Where corrosive gases or dust are present.
   - ● splash of water, oil and chemicals.
6. Wiring should be kept away from high-voltage, high-current power lines to avoid interference.
7. Please note that the outer shell of the body is eroded by organic solutions, strong acids, strong alkalis.

2. Functions and Performance

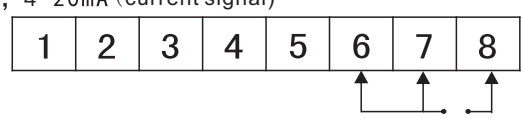
Power voltage :① Control board: AC220V. 50/60Hz
② Main circuit :AC110, 220, 380,480V (please use according to the actual specifications)
Ambient temperature :-10-50℃ Ambient humidity: 0-85%RH
Display error:±0.5%FS Type of input signal: (4-20mA. 1-5V, VRSK)
S-S digital integrated power regulator has the following main characteristics:
(1) Configure MODBUS communication
(2) The maximum phase shift Angle can be 0°-180°
(3) Equipped with intuitive output reading display
(4) Voltage regulation (phase shift), power regulation (zero), can be switched by parameter
(5) The delay time can be adjusted

3.Connection instruction sample

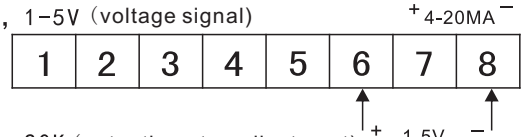


Note: terminals 3 and 4 are either alarm or communication.
The alarm is - lack of phase alarm of power supply

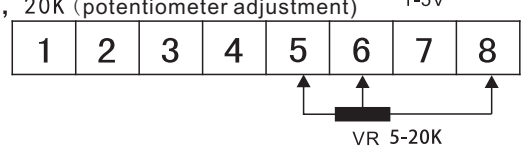
①, 4-20mA (current signal)



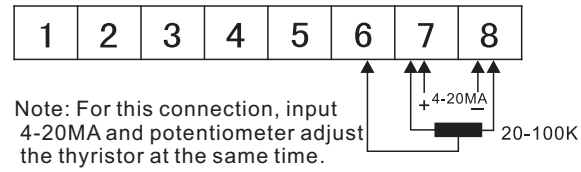
②, 1-5V (voltage signal)



③, 20K (potentiometer adjustment)

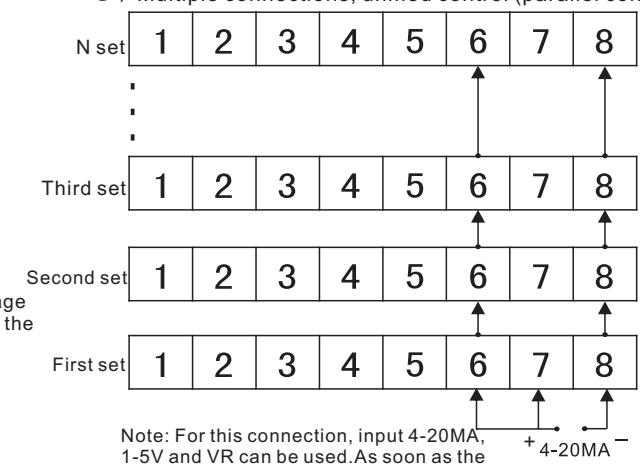


④, Automatic input (manually adjust the maximum output)



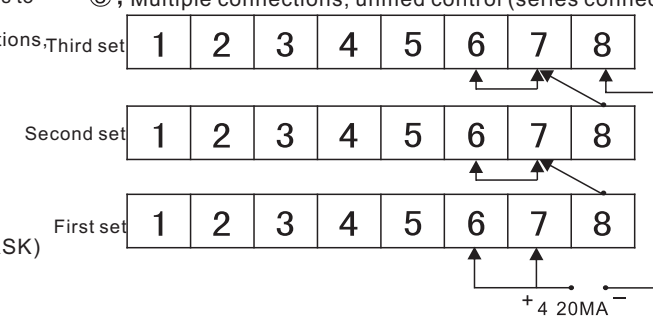
Note: For this connection, input 4-20MA and potentiometer adjust the thyristor at the same time.

⑤, Multiple connections, unified control (parallel connection)



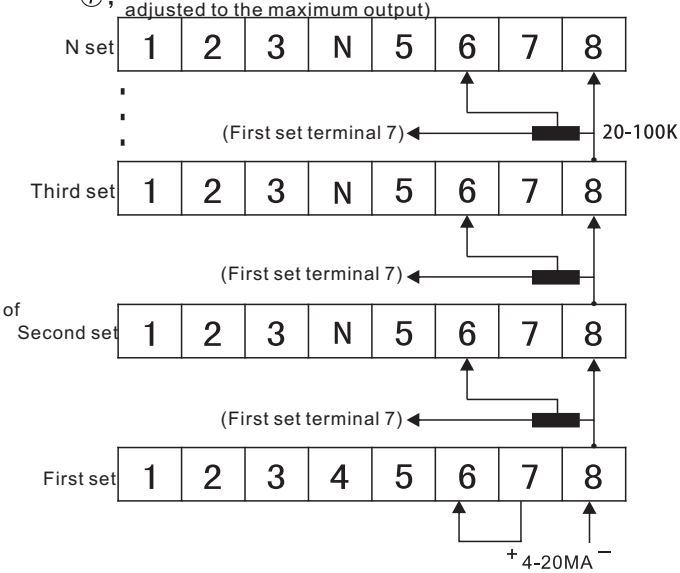
Note: For this connection, input 4-20MA, 1-5V and VR can be used.As soon as the first one clicks on the signal, the next one' both connect to terminals 6 and 8. (Preferably no more than 5)

⑥, Multiple connections, unified control (series connection)



Note: For this connection, input 4-20MA,Can only connect 3 sets (more than that, the impedance is too high),our company 4-20mA instrument impedance <900, can string 3 sets, other 4-20MA meter impedance is mostly <600 ohm, can only string 2 sets.

⑦, Multiple sets connected (each set can be manually adjusted to the maximum output)



Note: This connection, the key point is that the second SCR must be the other end of the potentiometer, and the first SCR 7 terminal connected. Because of the number of thyristor terminal itself, so connect the wire to 4 terminals (in fact, any hanging terminal will do)
Note: for more than one terminal connected, it is recommended that the potentiometer be more than 100K.

4. Signal modification

Our company's normal delivery of SCR signal input is 4-20mA, the following methods are to other signal input:

1. Switch 1-5V:
According to the wiring instructions example 2,voltage input wiring,no need tochange the parameters, hardware.

2. Switch 2-10V:
Switch the short-circuit block to the 10V voltage position, and then connect the voltage input according to the wiring instruction example 2.You don't need to change the parameters.

3. Switch 0-20mA:
Short-circuit the input terminal 6,7.8, and press SET+ up key to find the ANL parameter: press left key 2, the tube starts flashing, then press ENT to confirm,and exit the parameter layer.In accordance with wiring instructions example 1, the current input wiring can be.

4.Switch 0-5V:
Short-circuit the input terminals (6,7,8), press SET+ up key at the same time,find ANL parameter, press left button 2 times, the digital tube starts to flash, and then press ENT to confirm, exit the parameter layer, and connect the voltage input according to the wiring instructions example 2.

5.Switch 0-10V:
Short-circuit input terminals 6,7,8.At the same time, press SET+ up key to find ANL parameter, press left key 2 times, digital tube to start flashing, and then press ENT key to confirm, then exit the parameter layer, switch the short-circuit block to 10V input position.In accordance with wiring instructions example 2, voltage input wiring can be.

Note: When changing, only ANL parameter should be changed, ANH parameter should not be moved, otherwise the input signal will be wrong.
（Detailed process description is provided on the operation process page.）

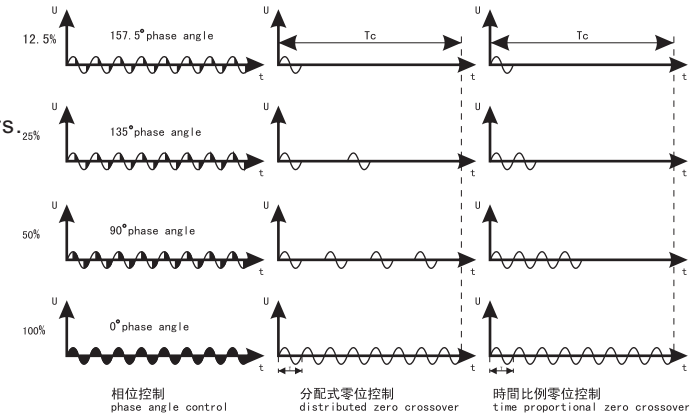
5. Installation and dimension description

Heat is generated inside the SCR power controller when it is used. Please install it according to the installation direction, that is, the text direction on t he controller peripherals is upward.Generally more than 50A we add fan cooling, fan in the lower end of the controller.Do not install in high temperature or poorly ventilated place.

Ampere	Appearance of size	Installation dimensions	Note
30A	165*110*165	130*105	without fan
40A	200*110*165	130*105	
50A	230*110*165	130*105	with fan
60A、80A、100A、125A	255*140*180	162*133	
130A、160A、200A	380*200*235	427*152	
250A、300A、400A	380*270*235	427*200	
500A、600A	450*410*265	427*356	
800A、1000A	450*410*290	427*356	

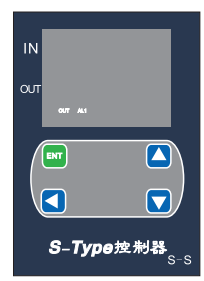
6. Control mode introduction,selection

Comparison of control modes:
Throughout the domestic and foreign SCR power controller products, the control mode is no more than two: phase control (voltage regulation) and zero control (power regulation). See the chart below for a comparison



The SCR division, in the zero control, made a distribution zero control mode This method, compared with the normal zero control, the impact on the power grid is much reduced, and the defect of zero control is greatly avoided..

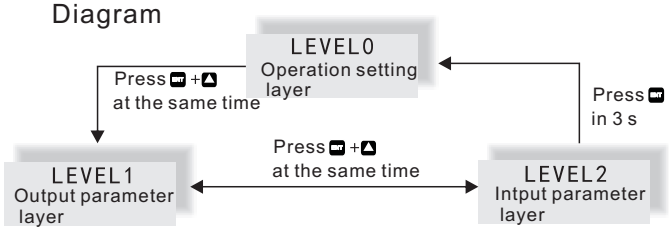
7.Panel function instruction



NO	Panel text	Content description
1	IN	Input signal display/mode display
2	OUT	Output percentage display (analog/real)
3	OUT1	Control output indicator light
4	AL1	Missing phase alarm indicator light
5	MAN	Manual output indicator light
6	▲	Increase key
7	▼	Reduce key
8	◀	The displacement of the key
9	ENT	Loop/confirm key

8.Operation process

Diagram



LEVEL0 Operation setting layer(site operator set)

Power on

Self-checking → Self-checking light on

5s

InP 4-20 → Display input signal type

5s

P-- / --- → PV: display input value (one decimal point)
MV: output percentage
:OFF(not running)
:Any value(output percentage)

ENT

rUN 0 → Running status (with memory function)
0:Stop
1:Running

Press ENT+▲ at the same time

LEVEL1

LEVEL1 Output parameter layer (field engineers set)

dLY 0-10 → Power-on slow start setting
This parameter is valid only for the first power-on output
The larger the set value, the longer the slow start time (maximum 20 seconds or so)

dLYI 0-10 → Output buffer setting
In the process of connecting, the rise/fall has the effect of slow output. The larger the set value, the longer the slow start time (the longest is about 20 seconds).

CC 0-2 → Output mode setting
0: phase shift 1: indicates the zero of allocation
2: time proportion is zero

OUtL 0 → Output percentage lower limit

OUtH 100 → Output percentage upper limit

zERO 0-10 → Zero offset adjustment
For example, the factory 4mA is the low point, but the field meter minimum output is 4.1mA.At this point, the ZERO parameter can be set to 1, that is, the low point becomes 4.16mA

SPAN 0-10 → High point offset adjustment
If the high point of the factory is 20mA but the maximum output of the field instrument is 19.9mA, the SPAN parameter can be set to 1, that is, the high point becomes 19.84mA.

Add 0-255 → Communication Address (0-255)
When the value is 0, the communication is closed

bAd 9600 → Baud rate MODBUS
9600/19200

MAN 0-1 → Whether the manual state is open
0: manual open
1: Manual prohibit

LoCt 000-111 → DATALCK Data lock
LCK=001
except the RUN all the parameters lock

Press ENT+▲ at the same time

LEVEL0

LEVEL2 Input parameter layer (Set by manufacturer engineer)

InP 4-20 → index number

AnL 0.0 → Input signal, low point correction
To modify this parameter, perform Step 4

AnH 100.0 → Input signal, high correction
To modify this parameter, need to have a source

LSP 4.0 → Range lower limit setting

USP 20.0 → Range upper limit setting

Z0 6.0 → Minimum conduction angle

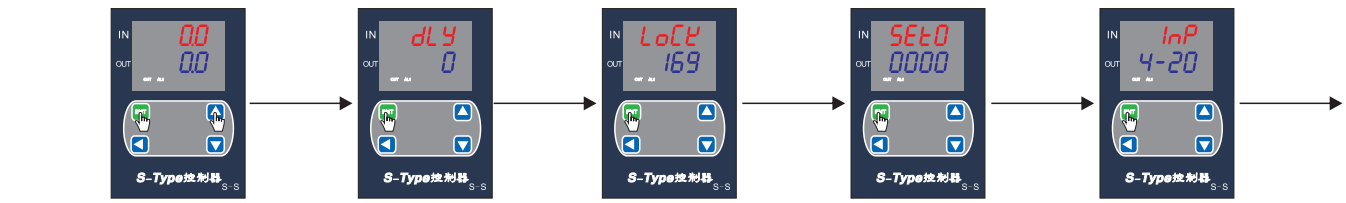
PCA 178.0 → Maximum conduction angle

Press ENT in 3 s

LEVEL0

Note: Change LCK parameter to 169 and press ENT for 3 seconds. To enter the shielding layer,change the shielding layer SET0 parameter to 0000.Before entering LEVEL2. At LEVEL2, calibrate the input signal low ANL. However, do not change other parameters. For details, see step 4- Signal modification. After the input signal calibration is completed, pay attention to change the shielding bit back to 1111.

Attached: signal input modification process



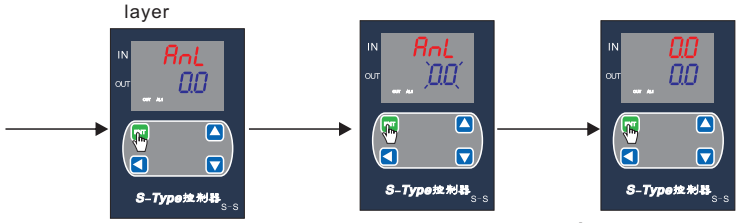
1、Press ENT+▲ at the same time enter the LEVEL1 layer

2、Press ENT to find the LOCK parameter, change to 169. Confirm

3、Press ENT on the screen for 5 seconds to shied layer

4、Change SET1 to 0000

5、Press ENT+▲ at the same time enter the LEVEL2 layer



6、Press ENT to find the ANL parameter

7、Press the left button, OUT column of digital tube flashing press the key once and then press ENT to confirm.

8、Press ENT for 5 seconds to exit to the main interface

9. Communication protocol

9.1 Protocol Overview

1. Selection: Pan-Globe S-Type (S-S) series intelligent thyristor.
2. Work realization: S-Type (S-S) series intelligent SCR and upper computer exchange data.
3. Transmission interface and mode: RS485, MODBUS RTU.
4. Communication medium: shielded twisted pair.
5. Communication stack number :1-255,(the number of mounts is limited)
6. implement the function: read hold register (03) write hold register (06)
7. Data length: Each complete and valid packet contains at most 16 bytes of data (8 parameters)
8. data format: signed 16-bit binary complement: read is magnified 10 times after the data. (Write data 10 times)
9. Serial port parameters:
   1) baud rate: 9600,19200
   2) Communication format: N81
10. Frame check method: Cyclic redundancy check (CRC16)
11. Packet format (N=2 here):

Address	Function code	Data	CRCcheck
8bits	8bits	Nx8bits	16bits

9.2 Example

1.Function code 03(read output percentage MV=100)

Request		Response	
Field name	Hexadecimal	Field name	Hexadecimal
Stack	01	Stack	01
Function code	03	Function code	03
Start address Hi	00	Byte count	02
Start address Lo	02	Register value Hi	03
Register number Hi	00	Register value Lo	E8
Register number Lo	01	CRCLo	B8
CRCLo	25	CRCHi	FA
CRCHi	CA		

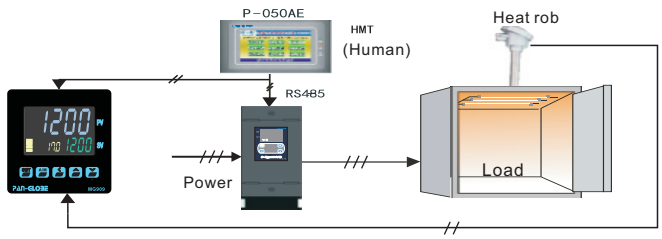
2. function code 06(write set point OUH=100)

Request		Response	
Field name	Hexadecimal	Field name	Hexadecimal
Stack	01	Stack	01
Function code	06	Function code	06
Start address Hi	00	Start address Hi	00
Start address Lo	0E	Start address Lo	0E
Register number Hi	03	Register number Hi	03
Register number Lo	E8	Register number Lo	E8
CRCLo	E8	CRCLo	E8
CRCHi	B7	CRCHi	B7

9.3 Parameter Address assignment table

Parameter name	Address		Read / write	Ratio	Range
	Hexadecimal	Decimal			
PV (IN)	00H	0	R	10	
MV (OUT)	02H	2	R/W	10	0~100. 0
RUN	04H	4	R/W	1	0~1
DLY	06H	6	R/W	1	0~10
DLY1	08H	8	R/W	1	0~10
LSP	0AH	10	R/W	10	0~999.9
USP	0CH	12	R/W	10	0~999.9
OUH	0EH	14	R/W	10	0~100
OUL	10H	16	R/W	10	0~100
AM	12H	18	R/W	1	0~1
CC	14H	20	R/W	1	0~2
K0	16H	22	R/W	1	3~10
PMA	18H	24	R/W	1	0~180

10.Application Example



10.1 Calculation of current (S-S phase control mode)

Engineering example: there is one electric furnace.The temperature in the furnace should be maintained at 800 degrees, and the heating wire should be made of gold complex (pure resistive load) star connection.Power 95KW, rated voltage for three-phase 380V power supply.A simple temperature control system is built with three - phase S-S power regulator.

Selection method: Firstly, the size of power supply voltage and current of S-S power regulator should be determined.

Current calculation formula : ▲Current $= \frac{\text{single-phase power}}{\text{Phase voltage}} = \frac{\frac{\text{Total power}}{3}}{\frac{\text{Line voltage}}{\sqrt{3}}}$

The heating wire adopts the star connection method, the line voltage is 380V, and the total load is 95Kw. The calculated current is about 144A, so we choose the SCR controller of 160A (with a safety factor of 1.1-1.3), and there is no need to do the feedback fixed current. Therefore, the S-S power regulator we choose for this project is:

S-SX3010-3PC160A-10AX

11.Selection

S-SX [A] [B] [C] [D] -3 [E] [F] [G] A-10

A—— Signal input
- 3: 4-20MA
- 4: Other linear models

B—— Communication
- 0: none
- 3: MODBUS RTU communication

C—— Alarm
- 0: none
- 1: Missing phase alarm

D—— Control power supply
- 0: AC 220V
- 1: Other

E—— Power supply type
- 3: Three-phase

F—— Control mode
- P: Phase control
- D: Distributed zero position control

G—— Current

According to your own needs, refer to the fifth point, choose how much A.