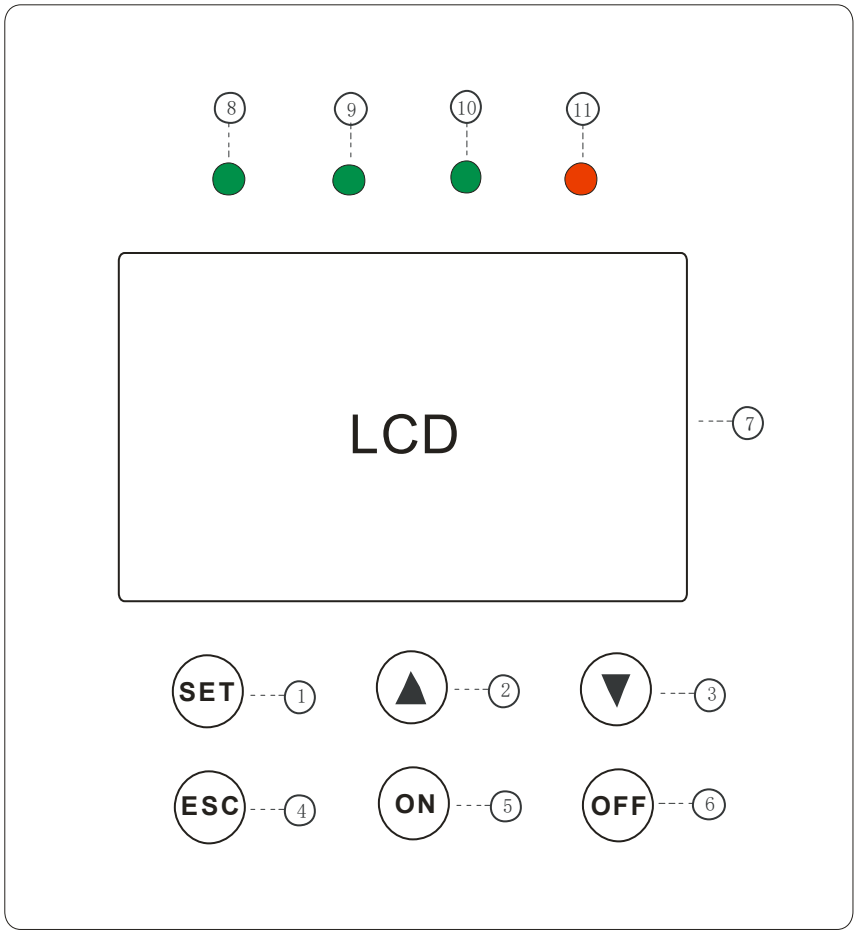
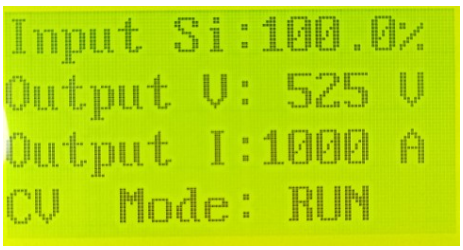
LCD panel operating instructions (i.e. the hand-held device):



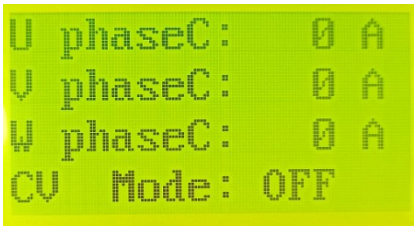
Parts	Function
SET	Setting button, used as parameter confirm button under the setting mode
▲	To increase the parameter value when modify.
▼	To decrease the parameter value when modify.
ESC	Return button
ON	The start button on the panel
OFF	The stop button on the panel
LCD Display Screen	To display the load mode and parameters.
A Mode indicator (Green)	When it lights, means the control board is in constant voltage adjustment mode; When both A & B are not in lit, then the control board is in open loop voltage adjustment mode.
B Mode Indicator (Green)	When it lights, means the control board is in constant current adjustment mode.
C Mode indicator (Red)	Running indicator
D Mode indicator (Red)	Alarm indicator

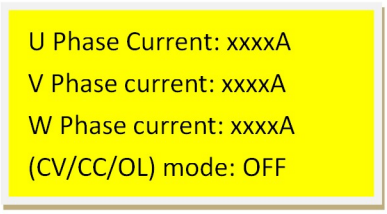
I. LCD Interfaces



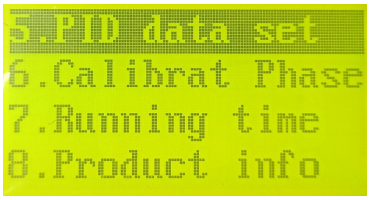
* Input Si: input signal (0~100%)
* Output V: Output voltage (0~525V default)
* Output I: Output current (0-1000A default)
* CV/CC/OL mode: Load running condition, CV means constant voltage mode, CC mode means constant current mode, OL mode means open loop mode; Press ON to RUN the boards.

Short press ESC change into the AC side current value query under the standby and no fault mode. Short press ESC again or no operation in 10 seconds it will back into standby mode, display format as below:





* Primary menu as below



After short pressing the SET button in standby mode, it will remind you to enter the password: ------ (factory password: ▲▲▲▼▼▼). Press the SET again after entering the correct password to enter the first level menu, the interface is as below.

*Basic data set: Basic parameter setting

Basic parameters, set according to users' needs.

*Protection data set: Protection function parameter setting

Protection functions and parameter setting.

*Comm data set: Communication parameter setting

When users uses the version with RS485 communication function, need to enter this menu and set accordingly.

*PID data set: PID parameter setting

When users uses different loads, different dynamic parameters can be adjusted according to the characteristics of the load to achieve the optimal or stable operation adjustment state.

*Reset default: to restore all the parameters to its default version, all the parameters set by user will be cleared.

Password: ▲▲▼▼▲▲, and then press SET + ESC at the same time, after the password is verified, the factory recovery operation will be performed automatically, and the control system will be restarted after completion.

*Calibrat Phase: Phase parameter calibration

When users changes the main loop voltage, or connect the transformer at the primary side, or connect a synchronization transformer to the synchronization signal terminal, then users need to enter here for phase parameter calibration.

In the phase calibration mode, it is recommended that the user access the 1K~10KW resistive dummy load to test. The system defaults to the output voltage of 50% of the main loop, and presses the start button to run the work.

At this time, when the output voltage is adjusted by pressing the ▲ (up) or ▼ (down) key to half of the main loop voltage, the calibration work is completed. The default parameters are with AC380V, users do not need to calibrate if the main circuit voltage is AC380V.

* The output is about DC256V when main circuit is AC380V, and about DC150V when is AC220V

* The phase calibration value of AC380V without synchronous transformer: 0

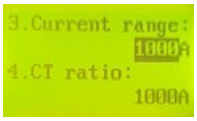
* Phase calibration value when AC380V, 660V, 1140V connect with synchronous transformer: -250

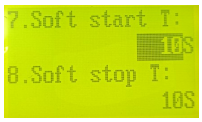
* Running time: Current running time and in total running time. User can know how long that the boards has been running.

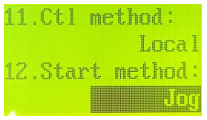
* Product information: Manufacturer information.

*Curr balance: current balance parameter setting (ST33/33C don't have this parameter, only in ST36/36C)

i. Basic data set







1. Running mode:

The working loop mode, user can choose from CC (constant voltage), CV constant current) and OL (open loop).

If you are new to our control boards, during your first testing, pls use OL mode, means just connect the wires of Input power supply, potentiometer, LCD, triggering terminals and synchronous signal terminals. After this wiring, press ON, and see if your voltmeter going up slowly, if YES, then your wiring is correct and boards working normally, and then we can go on next step testing.

2. Voltage range:

Set according to the rectified DC output voltage of the silicon/thyristor controlled rectifier, the actual load maximum voltage or the full range of the voltage sensor corresponds to the voltage feedback terminal VF5V, constant voltage value, over voltage value, under voltage and the pressure value are all set based on this parameter.

3. Current range:

Set according to the rectified DC output voltage of the silicon/thyristor controlled rectifier, the actual load maximum voltage or the full range of the voltage sensor corresponds to the voltage feedback terminal VF5V, constant voltage value, over current value, under current and the pressure value are all set based on this parameter.

4. CT ratio: users can set the CT ratio according to their needs.

Set according to the current transformer transformation ratio of the primary AC terminal, CT1-3 is connected to a transformer with secondary side current of 1A, with over current protection or three-phase current imbalance protection of the primary side AC measurement. Don't need to connect if not in need.

5. Voltage limit:

To prevent the load from damaging of over high output voltage, it has the highest running voltage limitation, to limit the actual output voltage.

6. Current limit:

To prevent the load from damaging of over high output current, it has the highest running current limitation, to limit the actual output current.

7. Soft Start T

The soft start time adjust range is 1~200 seconds.

8. Soft Stop T

The soft off time is form 0 to 200 seconds, if the soft time is set to "0", then the soft off function is close.

9. Phase/p limit

Phase limitation setting.

To limit the thyristor output phase change angle, there is no limitation when it is 0 degree, and output the highest voltage; it is half of the rectified output voltage when the degree is 60.

10. Host/S shift

Master-slave offset setting

In normal circumstance, the setting range is -30°～ +30. When there is a transformer in the main circuit, such as△/Y transformer, there would be a phase difference between the primary and secondary of the transformer, then the parameter need to be adjusted. △/Y transformer set as +30, Y/△ transformer set as -30.

11. Ctl method:

Control method setting

The control methods setting has “local” and “communication” modes, users can select according to their own needs, the out of factory default is “local”. “Local” mode is controlled by the external signal of the potentiometer, “Communication” mode is remote controlled by the host computer (to remote control the on and off and analog quantity), the external control signal will be invalid.

12. Start method

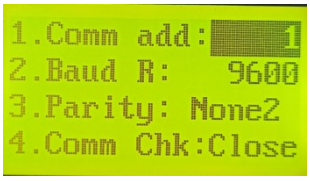
Start methods selection

The start methods setting has jog and self-locking two modes, for the specific usage please refer to part V, users can select according to their own needs, the out factory default is jog.

ii. Protection set

1. Overvoltage: Press ▲ or ▼ to set the range, can be set from 1~6000V, must be lower than the set max voltage range. VF voltage signal feedback terminal, when output voltage over than this value and after the set overvoltage time, it will be in overvoltage protection. Default overvoltage protection function is closed.
2. Overvoltage T: Press ▲ or ▼ to set, the over voltage protection action time, default is 10 seconds.
3. Undervoltage: Press ▲ or ▼ to set the range, can be set from 1~6000V, must be lower than the set max voltage range. VF voltage signal feedback terminal, when output voltage lower than this value and after the set under voltage time, it will be in under voltage protection. Default under voltage protection function is closed.
4. Undervol T: Press ▲ or ▼ to set, the under voltage protection action time, default is 10 seconds.
   IF overload: IF current signal feedback terminal, when the load current higher than this value and after the set over load time, it will be in over load protection mode. Default over load protection function is closed.
5. IF overload T: Press ▲ or ▼ to set, the over load protection action time, default is 10 seconds.
6. CT Overload: Current tansducer over load. Transducer signal input detection function, when the load current is higher than the set value and after the set CT over load time, it will be in over current protection, default is closed.
7. CT Overload T: The transducer over load protection act time, can be set from 0-200 seconds, default is 10s.
8. Phase loss: When one of a certain phase disappears, it will enter the phase loss proteection mode. The phase loss protection function can be chosen. Default is open (ON)
9. I imblance: Three phase current balance protection.
   This function is used to detect the balance state of the three-phase current during the operation of the load. It represents the percentage value of the current difference between two phases and the maximum value. The adjustable range is 10% to 60%. Default is closed (OFF).

iii. Comm data set:



Communication data set: for specific pls refer to the communication protocol.

iv. PID set:

According to the load features to set different dynamic parameters in order to achieve the best or stable operation adjustment state, users need to set the PID parameter at this moment

Function Parameter	Parameter Value	Default	Remark
PID parameter setting	Refer to the Remark	Medium Speed (M/S)	PID setting has F/S-fast speed (Suitable for resistive load, constant voltage and constant current), M/S-medium speed, S/S-slow speed (Suitable for inductive and conductive load, constant voltage and constant current) and user-defined PID regulation. Under the user-defined mode, users can set the P and I parameters all by themselves, but parameters under other three kind of mode cannot be adjust.
P parameter setting	1～128	--	
I parameter setting	1～128	--	
D parameter setting	Not adjustable	--	

v. Phase calibration

Calibtrat Phase: Phase calibration
Output Vol 50%: Output voltage will be 50% of the main circuit loop.
Parameter: this parameter don't need to be changed if your main circuit loop is AC380V.

When users changes the main loop voltage, or connect the transformer at the primary side, or connect a synchronization transformer to the synchronization signal terminal, then users need to enter here for phase parameter calibration.
In the phase calibration mode, it is recommended that the user access the 1K~10KW resistive dummy load to test. The system defaults to the output voltage of 50% of the main loop, and presses the start button to run the work.
At this time, when the output voltage is adjusted by pressing the ▲ (up) or ▼ (down) key to half of the main loop voltage, the calibration work is completed. The default parameters are with AC380V, users do not need to calibrate if the main circuit voltage is AC380V.
* The output is about DC256V when main circuit is AC380V, and about DC150V when is AC220V
* The phase calibration value of AC380V without synchronous transformer: 0
* Phase calibration value when AC380V, 660V, 1140V connect with synchronous transformer: -250

vi. Current balance: Curr balance, only when the version is ST36, the board will have this function.

Due to the two sets of secondary output of the transformer, that is, the star or angle connection is connected to the twelve pulse wave control, the current imbalance phenomenon will occur. At this time, the user needs to enter the current balance manually adjust mode.
In the trickle charge adjustment mode, users can directly adjust the parameters in the shutdown state and then test; for example, in the operation adjustment, the system default output voltage is 50% of the main loop rectified voltage, Press the start (ON) key to run, and adjust the output by pressing the ▲ (up) or ▼ (down) key. At this time, the manual adjustment realizes the increase or decrease of the two groups of currents.

Constant current constant voltage external switch method(If users need external switch, pls express in advance, the default is internal menu setting switch）

Tips in menu setting:

1、Press ESC return to the last menu.

2、It will back to standby mode if no operation in ten seconds under the setting mode.

3、The menu setting can only entered in standby or fault mode, can't enter after start.

4、It cannot be start in the setting menu, only out of the menu can it be start.

II. LCD Basic parameter setting option and default

Parameter	Setting Option	Default
1. Running mode	CV, CV, OL	CV
2. Voltage range	10~6000V	525V
3. Current range	10~6000A	1000A
4. CT ratio	10~6000A	1000A
5. Voltage limit	10~6000V, setting value is "CLOSE" when over 6000V	CLOSE
6. Current limit	10~6000A, setting value is "CLOSE" when over 6000A	CLOSE
7. Soft start T	1~200S	10S
8. Soft stop T	0~200S	10S
9. Phase position limitation	0~180 degree	0
10. Master-slave Offset	-60~60 degree	0
11. Control method	Local、remote communication	Local
12. Start method	Jog、Self-locking	Jog

Protection parameter setting.

Parameter	Setting range	Default
1. Over voltage protection range	Close, 1～6000V	CLose
2. Over voltage protection time	0～200 seconds	10 seconds
3. Under voltage protection range	Close, 1～6000V	Close
4. Under voltage protection time	0～200 seconds	10 seconds
5. IF over load protection option	Close, 1～6000A	Close
6. IF over load protection time	0~200 seconds	10 Seconds
7. CT over load protection option	Close, 1～6000A	Close
8. CT over load protection time	0~200 seconds	10 Seconds
9. Phase missing protection option	Close, open	Open
10. Three phase imbalance protection	Close, 10～60%	Close

Communication parameter (For specific communication protocol please ask for communication protocol attachment instruction)

Parameter	Setting range	Default
1.Communication address	1～247	1
2.Baud rate	2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200	9600
3.Parity bit	None, odd, even	None
4.Communication detection	Close, open	Close

Fault display and dealing methods

When a fault occurs, the fault relay output a signal, the running relay and the load output are disconnected, and the text on the lower right of the LCD screen is the fault display. If you need to query the fault, **press the ESC key to enter the fault display mode. At this time the fault is displayed in the middle of the screen.** We provide the following troubleshooting methods for the possible failures:

※ Overvoltage fault: Check the voltage protection level and overvoltage protection selection setting. If the parameters are normal, then check if the power supply voltage exceeds the set value.

※ Undervoltage fault: Check the voltage protection level and undervoltage protection selection setting. If the parameters are normal, then check if the power supply voltage is lower than the set value.

※ Phase loss protection: The protection circuit operates when any phase of the main circuit power supply is disconnected.

Maintenance method: Check if the main circuit input is disconnected or the load is too light. If the load current is too small, then the transformer needs to be replaced.

※ Overcurrent protection: The protection circuit operates instantaneously when any phase current exceeds 8 times the rated current.

Maintenance method: Check if there is a short circuit in the main circuit or the overload protection parameter setting is too low.

※ Overload protection: Uses overload reverse time protection.

Maintenance method: Reduce the load.

※ Three-phase unbalance protection: When two of the phase current values differ bigger than the set value, the protection take action after three seconds.

Maintenance method: Check if there is any abnormality in the power supply or in the load.

※ Overheat protection: Protection acts when the thyristor is over temperature.

Maintenance method: Check if the radiator is too small or the load current is too large.

※ Feedback fault: There is no signal input to the VF or IF feedback terminal from voltage sensor or current sensor during the constant voltage or constant current.

Maintenance method: Check if the voltage sensor or current sensor didn't output feedback signal, or if it is damaged or the line is disconnected.

Analysis and elimination of common problems：

Number	Fault	Possible Reason	Solution
1	No display on the display screen	1.No AC input power	1.Check if the power is on, or if the fuse is burned
		2.AC power voltage is too low	2.Check input voltage of the control power
		3.Display screen interface is broken	3.Return to factory for replacement
2	No output from the control board	1.Control wire on the trigger port is connected wrong	1.Follow the wiring diagram, check the wiring of the control wire
		2.The thyristor is damaged	2.Replace the thyristor
		3.There is an indicator light (six red lights) not lit on the trigger port	3.The related indicator of certain road is not lit, check if the thyristor on this road is connected right

		4.There is an indicator light (six green lights) not lit on the trigger port	4.Return to factory for replacement
3	The output voltage is unstable	1.Open load	1.Check if the load is wired
		2.Power of the load is low	2.Change for a high power load, please take >1000W for experiment
		3.One of the thyristor is not conductive	3.Replace the thyristor
		4.PID parameter is wrong	4.Reset the PID parameters according to the feature of the load
4	The differ ratio between the input signal value and the actual output voltage is too big.	1.Constant current or constant voltage does not match with feedback signal	1.Check if the feedback signal is DC0-5V
5	Output voltage can't adjust to the rated value.	1. Feedback signal of constant current or constant voltage does not match.	1.Check if the feedback signal is DC0-5V
		2.The settled value of limit voltage or limit current is too low	2.Reset the value of limit voltage or limit current
		3.The main circuit is not with 380V or synchronous transformer	3.Re-phase calibration, adjust parameters