User’s Guide

Programmable DC Power Supply

2025/05

Introduction

According to output, three types power supply could be classified:

	CH1&CH2	CH3
Type 1	0-32V 0-3.2A	1.8V/2.5V/3.3V/5V switchable, 3.2A (Max. output)
Type 2	0-32V 0-5.1A	1.8V/2.5V/3.3V/5V switchable, 3.2A (Max. output)
Type 3	0-50V 0-3.2A	1.8V/2.5V/3.3V/5V switchable, 3.2A (Max. output)

Type 1/2/3 as a new generation of programmable DC power supply promoted by our company has the following advantages: with USB (TMC Protocol), LAN(option) and RS232 (option) programmable interface and can timely output arbitrary voltage and current value within the specified range, using LED to display the working status of power supply, with large scale integrated circuit, providing three channels voltage output in which the first and second channel's step value of voltage stabilization and current stabilization can be adjusted, and the two working status of voltage stabilization and current stabilization can be automatically converted with the change of load. The first and second outputs can be connected in series, parallel and independently operated, while the third output has four output voltages: 1.8V, 2.5V, 3.3V and 5V, and overload protection; small size, reliable operation, easy to use.

This series programmable power supply can be widely applied in scientific research, universities and colleges, laboratory of industrial and mining enterprises, and also in the areas of computer automatically measuring and control system's DC power supply.

Main function characteristics

- All digital control, low drift, can trace output in series, can output in parallel
- LED digital tube to display voltage, current and power
- digital knob control, easy to set, intuitive output
- timing output function
- overvoltage protection function
- keyboard lock to prevent misoperation
- 5V 1A USB charging output interface
- USB programmable interface (TMC Protocol), LAN (option), RS232 (option)

Packing List

- Programmable Power Supply 1
- three core Power Cord 1
- CD (User's Guide) 1

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Chapter 1 Preparation before using

1.1 Check the instrument and accessory

Check whether the instrument and the accessory are complete and ready according to the packing list. If the package carton is badly damaged, please keep it until the instrument passes the performance test.

1.2 Connect the power supply to instrument

Instrument can be powered on in the following conditions:

Supply Voltage: AC220(1±10%)V

Supply Frequency: 50/60 (1±5%) Hz

Using environment: only indoors

Working temperature: 0-40℃

Storage temperature: -40-60℃

Relative humidity: 20% ~ 90%RH (40℃)

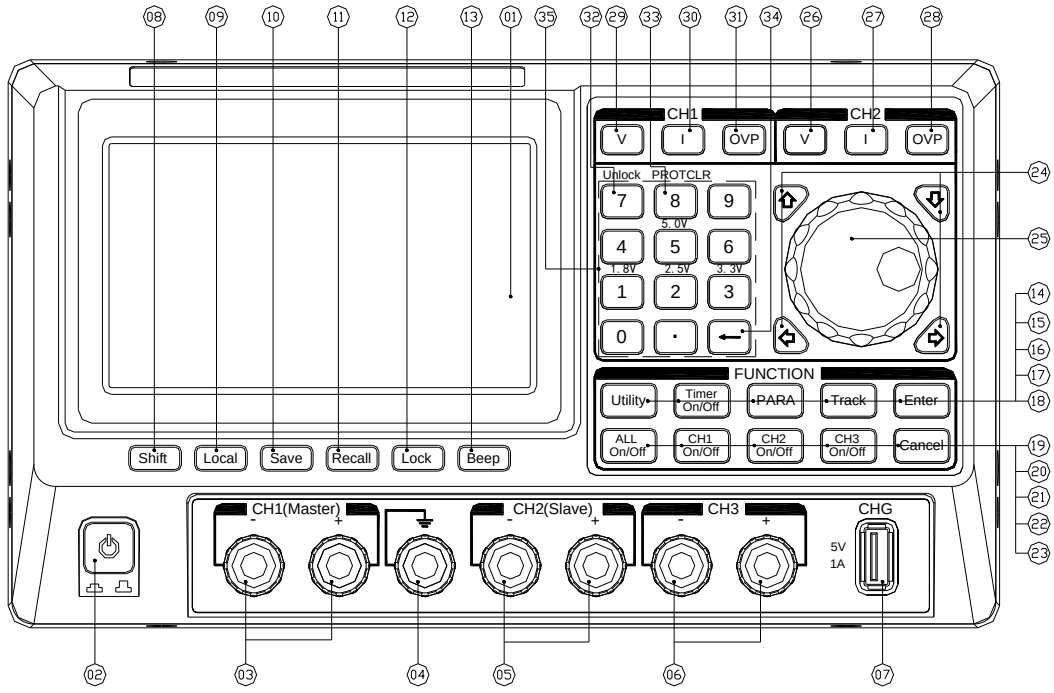
Before connecting the power supply to the instrument, please check whether the power supply's voltage accords with connected power grid firstly, and then insert the power plug to power socket with grounding wire. Press the ON/OFF in front panel, the instrument will be powered on and begin to initialize and then go to the normal working state.

Warning: In order to ensure the security of the operator, use triple- core power socket with ground wire.

Chapter 2 Operation Instruction

Users will get detail learning about functions and usage of the power supply through this chapter and easily solve the problem in practical application using this instrument.

2.1 Front panel overview



2.2 Front panel Instruction

(1) Display screen: Display the working state and voltage and current, etc.

(2) Power ON/OFF: control the instrument's power on/off.

(3) CH1 Output: voltage range: 0-32V (Type 1/2) /0-50V (Type 3), current range: 0-3.2A (Type 1/3) / 0-5.1A(Type 2).

(4) ⏚ : grounding wire, connect the shell to the ground.

(5) CH2 Output: voltage range: 0-32V (Type 1/2)/0-50V(Type 3), current range: 0-3.2A (Type 1/3) / 0-5.1A(Type 2).

(6) CH3 Output: You can choose 1.8V/2.5V/3.3V/5.0V for voltage; maximum current 3.2A

(7) USB CHARGE OUTPUT: Mobile power supply charging or power supplied by development board

(8)【Shift】: Shift key, to enable the second function of keys

(9)【Local】: Press the key of 【Local】 to cancel the remote control if LOCAL display is in status bar.

(10)【Save】: Press it to save current setting parameters for current, voltage, etc.

(11) 【Recall】: Press the key to recall the set parameter in storage to replace the present voltage and current parameters.

(12) 【Lock】: Press the key to lock all the keys in panel except of 【Shift】key.

(13) 【Beep】: turn on/off beep

(14) 【Utility】: Press the key to enter the system auxiliary function setting interface, then user can set network port parameter, system calibration, check the sensor temperature, self-check, etc.

(15) 【Timer On/Off】: turn on/off Timer function

(16) 【PARA】: Parallel output mode controller.

(17) 【Track】: Serial output mode controller.

(18) 【Enter】: Enter key. The input parameters will be executed or saved.

(19)【ALL On/Off】: All channel output On/Off control keys

(20)【CH1 On/Off】: Turn on or off CH1.

(21)【CH2 On/Off】: Turn on or off CH2

(22)【CH3 On/Off】: Turn on or off CH3

(23)【Cancel】: Cancel key, press it and return to the main interface. The current incomplete operation will be terminated and the input value will be discarded.

(24) Direction Keys: four directions keys are used to select parameters when setting.

(25)【Knob】used to modify voltage, current parameters and switch timer set.

(26)【V】:CH2 Voltage setting key

(27)【I】: CH2 Current setting key

(28)【OVP】: CH2 Overvoltage protection setting key

(29)【V】: CH1 Voltage setting key

(30)【I】: CH1 Current setting key

(31)【OVP】: CH1 Overvoltage protection setting key

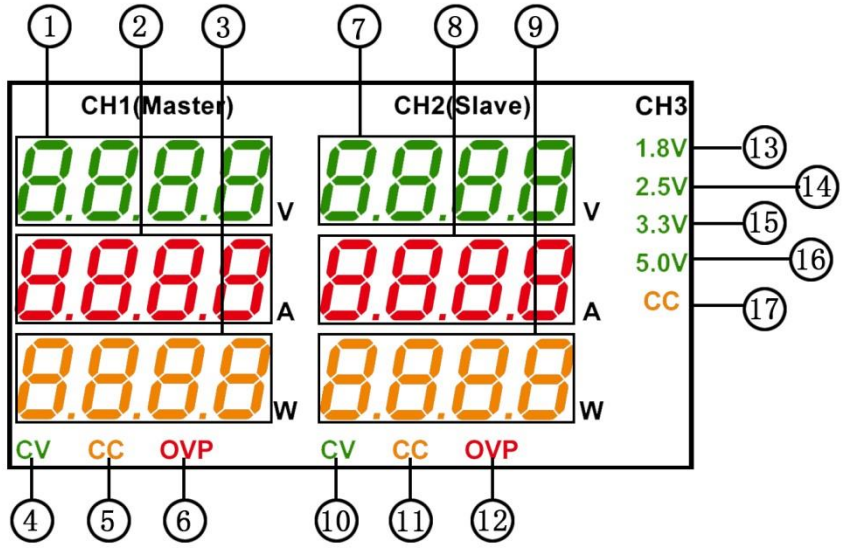
(32)【7】(Unlock): Number key 7, second function: unlock the keyboard.

(33)【8】(PROTCLR): Number key 8, second function: clear the protection state.

(34)【Back】: Backspace key, 1 bit number will be cleared for every press.

(35) Number Keys: to input number, no second function.

2.3 Display Screen Overview



2.4 Display Screen Instruction

(1) CH1 voltage displaying area: display the set voltage value or measured value in CH1 outputs.

(2) CH1 current displaying area: display the set current value or measured value in CH1 outputs.

(3) CH1 power displaying area: display the power measured value in CH1 outputs.

(4) CH1 indicator light for constant voltage: when CH1 is connected and on the constant voltage state, it will be light on.

(5) CH1 indicator light for constant current: when CH1 is connected and on the constant current state, it will be light on.

(6) CH1 indicator light for Over Voltage Protection: When over voltage is happening in CH1, it will enter the Over Voltage Protection state, output will be closed and the indicator light will be light on. Now you can't connect the CH1 until you have cleared the

over voltage protection state.

(7) CH2 voltage displaying area.

(8) CH2 current displaying area.

(9) CH2 power displaying area.

(10) CH2 indicator light for constant voltage: when CH2 is connected and on the constant voltage state, it will be light on.

(11) CH2 indicator light for constant current: when CH2 is connected and on the constant current state, it will be light on.

(12) CH2 indicator light for Over Voltage Protection: When over voltage is happening in CH2, it will enter the Over Voltage Protection state, output will be closed and the indicator light will be light on. Now you can't connect the CH2 until you have cleared the over voltage protection state.

(13) CH3 1.8V indicator light: It will be light on when CH3's output is 1.8V.

(14) CH3 2.5V indicator light: It will be light on when CH3's output is 2.5V.

(15) CH3 3.3V indicator light: It will be light on when CH3's output is 3.3V.

(16) CH3 5.0V indicator light: It will be light on when CH3's output is 5.0V.

(17) CH3 indicator light for output overload: It will be light on when CH3's output is overloaded.

2.5 Basic operation

2.5.1 Output introductions

The programmable DC power supply provides 3 independent channels output, in which CH1andCH2 can be continuously adjusted, with10mV/1mA resolution and output voltage range 0-32V (Type1/2)/0-50V (Type3), output current range 0-3.2A

(Type1/3)/0-5.1A(Type2); CH3 has four output voltages which are 1.8V, 2.5V, 3.3V and 5V and has overload protection. The CV and CC will be changed automatically according to the load current. When actual output current value is less than setting value, the power supply will switch to CV mode automatically and power supply will offer stable load voltage through adjusting output current, at this time output voltage is equal to the setting value and CV indicator light turns on. When actual output current exceeds the setting value, the power supply will switch to CC mode automatically and power supply will offer stable load current through decreasing output voltage, at this time output current is equal to the setting value and CC indicator light turns on.

2.5.2 Voltage Setting

Press [V] of the corresponding channel to set the output voltage value. There are two methods to set the voltage.

Method one: Set with the numeric keypad. Press [V], [Cancel] and [Enter] key lights turn on, and then type the voltage value through the number keys on the panel. Press [Enter] key to confirm the setting, or press [Cancel] to cancel this setting. If the input value is not within the channel output range, or if the input is incorrect, an error (buzzer noise) will be reported and the setting will be cancelled.

For example: set the voltage to 30.12V.

Press [V] [3] [0] [.] [1] [2] [Enter] successively.

Method two: Set with a knob. Press [V], [Cancel] and [Enter] key light turns on. After selecting the place to be set through the left and right direction key, rotate the knob to change corresponding parameters, press [Enter] to complete the setting, or press [Cancel] to cancel the setting.

2.5.3 Current setting

Method one: press [I] key, [Cancel] and [Enter] key lights turn on, and then type the current value through the number keys on the panel, press [Enter] to confirm the setting, or press [Cancel] to cancel the setting. If the input value is not within the channel output range, or if the input is incorrect, an error (buzzer noise) will be reported and the setting will be cancelled.

For example: set the voltage to 1.000A

Press【I】【1】【.】【0】【0】【0】【Enter】successively.

Method two: Set with a knob. Press [I], [Cancel] and [Enter] key lights turn on and enter the setting mode of the knob. After selecting the place to be set through the left and right direction key, rotate the knob to change corresponding parameters, press [Enter] to complete this setting, or press [Cancel] to cancel this setting.

2.5.4 CH3 output Settings

Select 1.8V / 2.5V/ 3.3V/5.0V of CH3 by pressing [Shift] + [1] / [2] / [3] / [5], at the same time, the CH3's corresponding voltage indicator will light on at the right side of display.

2.5.5 Output On/Off

Press [CH1 On/Off] / [CH2 On/Off] / [CH3 On/Off] to open or close the output of the corresponding channel, while press [ALL On/Off] to open or close all channel' output. Key indicator light and output indicator light in display screen turning on or turning off indicates On/Off status. In the output state, the Nixie tube in corresponding channel will display the measured value of output voltage, current and power, and the indicator light indicates the working mode (CV and CC) of the channel.

2.5.6 Set the overvoltage protection value

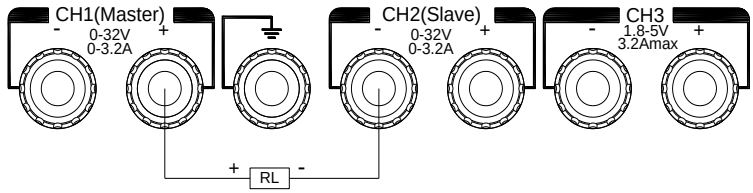
Press [OVP], [Cancel] and [Enter] key light will light up and enter the overvoltage setting mode. At this time, the corresponding channel voltage display area shows the current overvoltage protection setting value. Use numeric keyboard to input overvoltage protection value, and press [Enter] to confirm this setting or press [Cancel] to cancel this setting. If the input value is not within the channel protection value range, or the input is incorrect, an error (buzzer noise) will be reported and this setting will be cancelled.

2.5.7 Overvoltage protection reset

When the output voltage's measured value exceeds the set value of overvoltage protection (OVP), power supply will automatically turn off the output to reduce the possibility of damage to the load. At this time, the power supply will alarm by lighting up the overvoltage protection (OVP) indicator of the corresponding channel. Press [Shift] + [8] (PROTCLR) keys successively to clear the protection state, otherwise the corresponding channel output cannot be opened through [CH1 On/Off] / [CH2 On/Off] / [ALL On/Off] key.

2.5.8 Serial output mode

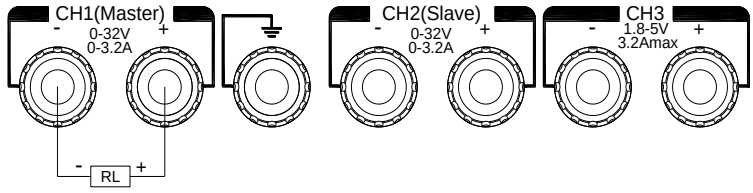
In series mode, the output voltage is twice of the single channel, CH1 and CH2 are internally connected in series, and CH1 is the control channel.



In the independent output mode and CH1 and CH2 is in the closed state, press [Track] to

enter or exit the serial output mode. Key indicating light will be turned on or off to indicate series status. When in the serial output mode, CH2's voltage setting, current setting, overvoltage protection setting and output On/Off state will automatically track the CH1. In this mode, the CH2 can't be selected and set, and the output can only be adjusted by adjusting CH1's voltage and current.

2.5.9 Parallel output mode



In parallel mode, the output current is twice of the single channel, CH1 and CH2 are internally connected in parallel, and CH1 is the control channel.

In the independent output mode and CH1 and CH2 is in the closed state, press the [PARA] to enter or exit the parallel output mode. Key indicating light will be turned on or off to indicate parallel status. When in the parallel output mode, CH2's voltage setting, current setting, overvoltage protection setting and output On/Off state will automatically track CH1. In this mode, the CH2 can't be selected and set, and the output can be only adjusted by adjusting CH1's voltage and current value.

2.5.10 Save and Recall

5 sets of setting parameters can be saved locally, and the saving content is CH1's and CH2's setting voltage, setting current and overvoltage protection values.

Save settings:

1. Set the state to be saved

2. Press [Save] to enter the Save interface
3. Input the group number (1-5) through the numeric keys.
4. Press [Enter] to finish saving, and [Cancel] to cancel saving

Recall Settings：

1. Press the [Recall] to enter the recall interface
2. Input the group number (1-5) through the numeric keys to confirm which set of parameters to recall
3. Press [Enter] to complete the call out and [Cancel] to cancel the call out

2.5.11 Key lock and unlock

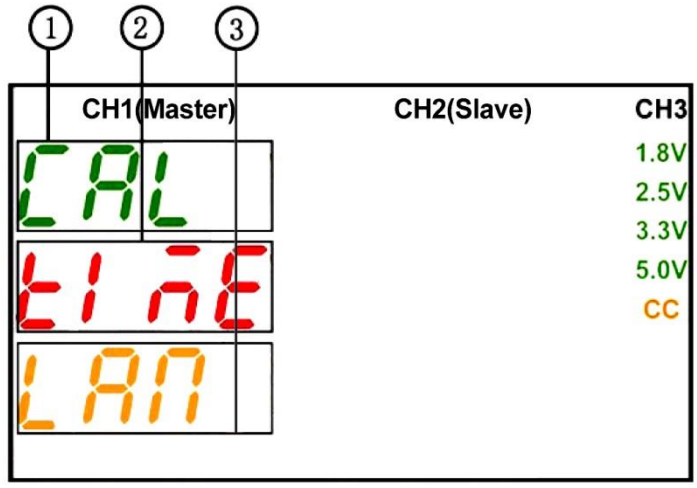
Press the [lock] key to lock the keyboard, at this time other keys don't work except for the [Shift] + [7] (Unlock) combination key operation. You can unlock the keyboard by pressing [Shift] + [7](Unlock).

2.5.12 Remote control mode On/Off

After the power supply successfully receives any programmable command, instrument will enter program control mode automatically. In this mode, except [Local] and [Beep] keys, other keys will not work. Press [Local] to exit the remote control mode.

2.6 System auxiliary function

Press 【Utility】 to show the following interface, and select the function by pressing up and down direction keys. Press 【Enter】or【Utility】key to enter or exit.



1) software calibration

2) timer

3) LAN interface setting (option)

2.6.1 Software calibration

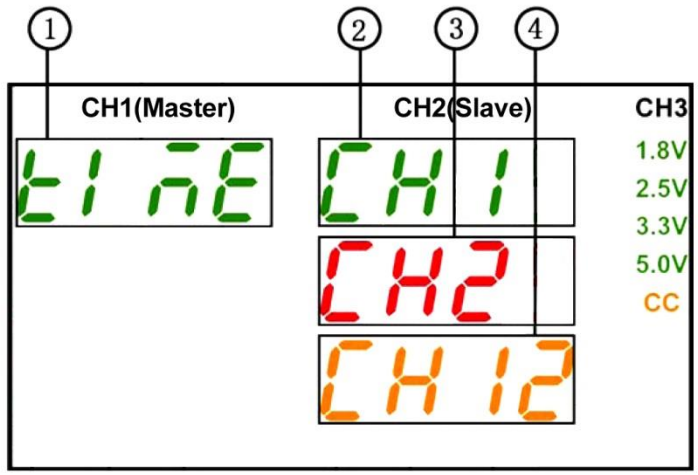
The software calibration has been completed before out of the factory, and the user's self-calibration may cause serious deviation of the output. If you need self-calibration, please contact us.

2.6.2 Timer

This power supply provides timer function. The timer can work in independent mode, series mode and parallel mode, and each channel can save ten sets of timing Settings, and each set is independent from each other. You can set arbitrary voltage and current values within the parameter range according to the needs. The timer can output continuously, and the maximum timing time of each group is 9999s, and the maximum number of cycles is 100.

Enter the timer interface

Press [Utility], select the "time" option through the up and down direction keys, and then press [Enter] to enter the timer channel selection interface as follows:



（1） Timer function (TIME)

（2） CH1, set and check CH1's timer parameters

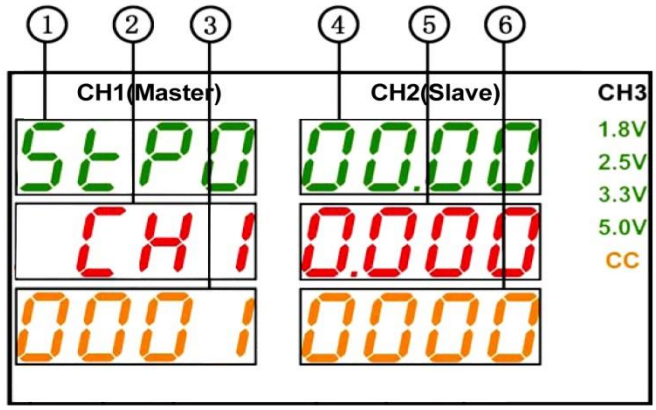
（3） CH2, set and check CH2's timer parameters

（4） CH1 and CH2 , check CH1's and CH2's timer parameters

Set timer parameters

1. After entering the timer interface, select CH1 or CH2 through the up and down direction keys, and then press [Enter] to enter the timer parameter setting interface as follows.
2. Adjust the timer group to be set through the knob, and select the item to be set by the up and down direction keys.
3. Input the corresponding parameter value through the numeric keys, and press the [Enter] key to save it.

4. Press [Cancel] to exit the timer parameter setting interface.



(1) Timer group 0-9

(2) CH1

(3) Timer cycle times

(4) setting voltage

(5) setting current

(6) setting duration time (It is remaining time when timer runs.)

In Serial or Parallel mode, timer can only choose CH1.

After selecting CH12, you can only check CH1 and CH2 timer's setting voltage, setting current and setting timer's time but can't modify them.

Timer on

1. After entering the timer channel selection interface, select the channel to open the timer and press [Timer On/Off] to start the Timer.

2. When the Timer is on, press the [Timer On/Off] again to end the timer.

Timer output in series and parallel mode

If you need to use timed output in series or parallel mode, you need to open the series or parallel output mode before entering the timer channel selection interface, and can only

choose CH1 as the timer channel.

2.6.3 To set LAN port (option)

LAN port as option is supported by this device and user need to set it before using.

Select 'LAN' through pressing up and down direction keys, then press 【Enter】to set LAN, or press【Cancel】key to cancel the setting.

To set IP. Select the IP address needed to be set through pressing right and left direction keys, then use number keys to input setting value. Press 【Enter】to finish setting or 【Cancel】key to cancel the setting.

To set subnet mask. Rotate knob clockwise to switch to 'MASK' option, then select the needed setting address through pressing right and left direction keys and input address value by number keys. Press 【Enter】to finish setting or 【Cancel】key to cancel the setting.

To set default gateway. Rotate knob clockwise to switch to 'GW' option, then select the needed setting address through pressing right and left direction keys and input address value by number keys. Press 【Enter】to finish setting or 【Cancel】key to cancel the setting.

Enable or disable DHCP. Rotate knob clockwise to switch to 'DHCP' option, turn on or off DHCP through pressing up and down direction keys (OFF=turn off, ON= turn on). Press 【Enter】to finish setting or 【Cancel】key to cancel the setting.

To check MAC. Rotate knob clockwise to switch to 'MAC' option.

To apply this setting. Rotate knob clockwise to switch to 'APPLY', select whether apply this setting though press up and down direction keys. Select 'YES', press 【Enter】to apply this setting and exit.

*Please inquiry administrator when set IP so as to avoid IP conflict or wrong setting.

* Please make sure to apply this setting after finishing setting, otherwise the setting is invalid.

* In the condition of without changing setting, press 【Utility】to exit setting.

Chapter 3 Programmable Interface

The instrument will enter programmable control mode automatically as soon as receiving any programmable command. In this mode, other keys don't work except for 【Local】 and【Beep】.

3.1 Establish a remote connection

Any interface of USB (TMC Protocol), LAN (option) and RS232 (option) could be chosen to establish the remote control between PC and power supply.

3.1.1 USB (TMC Protocol) connection

Use a cable to connect PC and programmable power supply's USB interface in rear panel. Remote control the power supply by using the software supporting USB-TMC protocol. After successfully connection, information such as manufacturer, instrument model, serial number, firmware version, etc. will be shown.

3.1.2 LAN connection (option)

Please make sure that your PC is connected into local area network.

Make sure that LAN support DHCP mode. If not available, available network interface parameter such as IP address, subnet mask and default gateway should be got.

Connect LAN interface in rear panel of device into local area network by a piece of LAN cable.

Press 【Utility】to select LAN menu to configure device IP address, subnet mask and default gateway, meantime please make sure that PC and power supply are both in same Subnet.

Programmable Power Supply's TCP (used for programmable controlling) port: 5025

3.1.3 RS232 connection (option)

Use a RS232 cable to connect PC and programmable power supply's RS232 interface in rear panel.

Set serial port baud rate: 115200, Verification: no parity check, Character length: 8, Stop bit: 1

Note:

Command terminator "\r\n" must be added during sending command.

3.2 Programmable Commands

SCPI (Standard Commands for Programmable Instruments) is an instrument command language based on ASCII which is widely used for test and measurement instrument. This section introduces SCPI command's format, symbol, and abbreviation rules.

3.2.1 SCPI command symbol introduction

The command symbol is used for auxiliarily explaining a command and can't be sent with the command.

In {} there are several parameter options for the given command string, one of which must be selected when the command is sent.

For example: SYSTem:BEEPer {ON|OFF}

| separates the several parameter options for the given command string. For example: SYSTem:BEEPer {ON|OFF}

< > indicates that you must specify a valid value for the parameter within the brackets.

For example: VOLTage{CH1|CH2|CH3,}<volt>

[] indicates that the parameters are selectable and can be omitted. If no value is specified for the parameter, the instrument will select the default value.

3.2.2 SCPI Command abbreviation rules

Most commands and some parameters are presented by mixing capital and small letters, but neither command is sensitive to capital or small letter. Capital letter means the command abbreviation. If you want to write it easily, you can send abbreviation type command. If you want better readability, you can send complete spelling command.

For example: SYST, SYSTEM, syst, system are all acceptable formats. You can use either capital or small letters.

3.2.3 Command List

1. *IDN?
2. *SAV
3. *RCL
4. MEASure:ALL[{CH1|CH2 }]?
5. MEASure:VOLTage {CH1|CH2|CH3}?
6. MEASure:CURRent {CH1|CH2 }?
7. MEASure:POWEr {CH1|CH2 }?
8. MEASure:OVP {CH1|CH2}?
9. VOLTage {CH1|CH2|CH3}?
10. CURRent {CH1|CH2}?
11. OVP {CH1|CH2}?
12. VOLTage {CH1|CH2|CH3,}<volt>
13. VOLTage CH3{,1.8|2.5|3.3|5.0}
14. CURRent {CH1|CH2,}<curr>
15. OVP {CH1|CH2,}<ovp>

16. OUTPut {CH1|CH2|CH3}?
17. OUTPut {CH1|CH2|CH3, }{ON|OFF}
18. OUTPut:TRACKMode?
19. OUTPut:TRACK {INDE|SERI|PARA}
20. OUTPut:CVCC {CH1|CH2|CH3}?
21. OUTPut:OVP:CLEAR
22. TIMEr:PARAmeter? {CH1|CH2} <secnum>
23. TIMEr:CIRCLe? {CH1|CH2}
24. TIMEr:STATE? {CH1|CH2|CH12}
25. TIMEr:PARAmeter {CH1|CH2} <secnum>,<volt>,<curr>,<time>
26. TIMEr:CIRCle {CH1|CH2} <circle>
27. TIMEr:STATE {CH1|CH2|CH12} {ON|OFF}
28. SYSTem:LOCK?
29. SYSTem:LOCK {ON|OFF}
30. SYSTem:LOCal
31. SYSTem:REMote
32. SYSTem:BEEPer?
33. SYSTem:BEEPer {ON|OFF}
34. SYSTem:BEEPer:IMMediate
35. SYSTem:COMMunicate:LAN:DHCP?
36. SYSTem:COMMunicate:LAN:DHCP {ON|OFF}
37. SYSTem:COMMunicate:LAN:MAC?

38. SYSTem:COMMunicate:LAN:IPADdress?
39. SYSTem:COMMunicate:LAN:IPADdress <ip>
40. SYSTem:COMMunicate:LAN:GATEway?
41. SYSTem:COMMunicate:LAN:GATEway <gateway>
42. SYSTem:COMMunicate:LAN:SMASK?
43. SYSTem:COMMunicate:LAN:SMASK <smask>
44. SYSTem:COMMunicate:LAN:APPLy

3.2.4 Command introduction

***IDN?**

Command format：***IDN?**

Function description: to inquire instrument ID character string.

Return format: to return instrument ID character string, which includes four parts and they are manufacturer's name, product model, instrument serial number, hardware version number.

***RST**

Command format：***RST**

Function description: restore the power supply to factory default state which includes each channel's voltage, current, OVP setting value, timing output setting value, recording values stored in group 1 to 5.

***SAV**

Command format：***SAV{1|2|3|4|5}**

Function description: to store each channel's setting values of to group 1 to 5)

For example: *sav 3 means to save each channel's setting value to group 3.

***RCL**

Command format：***RCL {1|2|3|4|5}**

Function description: to recall the data stored in group 1 to 5.

For example: *RCL2 means to recall the data stored in group 2 and make it as each channel's setting value.

MEAsure

Command format：**MEASure:ALL[{CH1|CH2}]?**

Function description: to inquire voltage, current, power and status of all channels or each single channel.

For example: MEAS:ALL?

Return information: 0.00,0.000,0.00,0x00;0.00,0.003,0.00,0x00;1.8 (CH1 voltage, CH1 current, CH1 power, CH1 state value （bit2:cv bit1:cc bit0:ov(overvoltage); CH2 voltage, CH2 current, CH2 power, CH2 state value; CH3 setting voltage)

For example: **MEAS:ALL CH1?** (inquire CH1's voltage, current, power value)

Return information: 0.000,0.000, 0.00 (CH1 voltage, current and power are 0V, 0.000A and 0W respectively)

Command format：**MEASure:VOLTage {CH1|CH2|CH3}?**

Function description: to query voltage value tested in the specified channel's output terminal.

For example: MEAS:VOLT CH1? (means to query CH1's voltage value)

Return information: 1.00

Command format：**MEASure:CURRent {CH1|CH2 }?**

Function description: to query current value of specified channel's output terminal

For example: MEAS:CURR CH1? (means to query CH1's current value)

Return information: 1.000

Command format：**MEASure:POWEr {CH1|CH2 }?**

Function description: to query power value of specified channel's output terminal

For example: MEAS:POWE CH1? (means to query CH1's power value)

Return information: 0.15

Command format: **MEASure:OVP {CH1|CH2}?**

Function description: to query OVP value of specified channel's output terminal

For example: MEAS:OVP CH1?(means to query CH1's OVP value)

Return information: 35.000

VOLTage

Command format:VOLTage {CH1|CH2|CH3}?

Function description: to query voltage value of specified channel.

Command format: **VOLTage {CH1|CH2,}<volt >**

Function description: to set voltage value of present operation or specified channel.

For example: VOLT CH2,30.00 (means to set CH2's voltage value to be 30.000V)

CURRENT

Command format: Current {CH1|CH2}?

Function description: query current value of specified channel.

Command format: **Current {CH1|CH2,}<curr>**

Function description: Set current value of present operation or specified channel.

For example: CURR CH1,2.000 (means to set CH1's current value to be 2.000A)

OVP

Command format: OVP {CH1|CH2|CH3}?

Function description: to query OVP value of specified channel.

Command format: **OVP {CH1|CH2|CH3,}<ovp>**

Function description: to set OVP value of present operation or specified channel.

For example: OVP CH1,35.00 (means to set CH1's OVP value to be 35.00V)

OUTPUT

Command format：**OUTPut {CH1|CH2|CH3}?**

Function description: to query whether specified channel's output is on or off.

For example: OUTP CH1?

Return information: OFF or ON

Command format：**OUTPut [CH1|CH2|CH3,]{ON|OFF}**

Function description: to turn on or off present operation or specified channel' output

For example: OUTP CH2,ON

Command format：**OUTPut:TRACKMode?**

Function description: to query whether the power supply's track function is on or off.

For example: OUTP:TRACKM?

Return information: INDE or SERI or PARA

Command format：**OUTPut:TRACK {INDE|SERI|PARA }**

Function description: to control the power supply's output mode

For example: OUTPut:TRACK SERI

Command format：**OUTPut:CVCC {CH1|CH2|CH3}?**

Function description: to query the output mode of present operation or specified channel

For example: OUTP:CVCC CH1? (to enquiry CH1's output mode)

Return information: one of CV, CC, OFF. When output is off, return OFF..

Command format：**OUTPut:OVP:CLEAR**

Function description: to clear the occurred OVP

For example: OUTPut:OVP:CLEAR

TIMER

Command format：**TIMEr:PARAmeter? {CH1|CH2} <secnum>**

Function description: to query the voltage, current and output time of timing output specified group

For example: TIME: PARA? CH1 1

Return information: 5.00,2.000,100 (step0's setting voltage, current and duration time for CH1 timer group are separately is 5V, 2A and 100S)

Command format：**TIMEr:CIRCLe? {CH1|CH2}**

Function description: to query CH1 or CH2 timing output's cycle times.

For example: TIMEr:CIRCLe? CH1

Return information: 1 (the present output's cycle number is 1)

Command format: **TIMEr:STATE? {CH1|CH2|CH12}**

Function description: to query whether timing output function is on or off.

For example: TIME:STATE? CH1

Return information: ON or OFF

Command format: **TIMEr:STATE {CH1|CH2|CH12} {ON|OFF}**

Function description: to turn on or off timing output function

For example: TIMEr:STATe CH12 ON(to turn on both CH1 and CH2 timing output simultaneously)

Commandformat: **TIMEr:PARAmeter{CH1|CH2}<secnum>,<volt>,<curr>,<time>**

Function description: to set the value of voltage, current and duration time of CH1 or CH2 timer group

For example: TIMEr:para CH1 0,10,1,30（to set CH1 timer output group 0's voltage, current, duration time to 10V, 1A, 30S）

Command format: **TIMEr:CIRCle {CH1|CH2} circle>**

Function description: to set the CH1 or CH2 timing output cycle times

For example: TIMEr:CIRCle CH1 3 (to set the CH1 timing output cycle to 3 times)

Command format: **SYSTem:LOCK?**

Function description: to query whether the power supply's front panel is locked or not.

For example: SYST:LOCK?

Return information: ON or OFF

Command format: **SYSTem:LOCK {ON|OFF}**

Function description: to lock or unlock front panel

For example: SYST:LOCK ON

Command format: **SYSTem:LOCal**

Function description: to switch the power supply from remote control mode to local mode.

For example: SYST:LOC

Command format: **SYSTem: REMote**

Function description: to switch the power supply from local mode to remote control mode.

For example: SYST:REM

Command format: **SYSTem: BEEPer?**

Function description: to query whether beeper is on or off.

For example: SYST:BEEP?

Return information: ON or OFF

Command format: **SYSTem:BEEPer {ON|OFF}**

Function description: to turn on or off beeper

For example: SYSTem:BEEP ON (to turn on beeper)

Command format: **SYSTem:BEEPer:IMMediate**

Function description: to make the beeper buzz immediately

For example: SYST:BEEP:IMM

Command format: **SYSTem:COMMunicate:LAN:DHCP?**

Function description: query whether DHCP is on or off.

For example: SYST:COMM:LAN:DHCP?

Return information: ON or OFF

Command format: **SYSTem:COMMunicate:LAN:DHCP {ON|OFF}**

Function description: Turn on or off DHCP mode.

For example: SYST:COMM:LAN:DHCP ON (turn on DHCP mode)

Command format: **SYSTem:COMMunicate:LAN:MAC?**

Function description: query MAC address of power supply.

For example: SYST:COMM:LAN:MAC?

Return information: MAC:XX-XX-XX-XX-XX-XX (MAC address has 6 byte and represented by HEX, 'XX' means a byte)

Command format: **SYSTem:COMMunicate:LAN:IPADdress?**

Function description: query current IP address of power supply

For example: SYST:COMM:LAN:IPAD?

Return information: current IP address of device, such as 192.168.99.101

Command format: **SYSTem:COMMunicate:LAN:IPADdress <ip>**

Function description: to set IP address of power supply

For example: SYST:COMM:LAN:IPAD 192.168.99.120 (to set IP of power supply to be 192.168.99.120)

Command format: **SYSTem:COMMunicate:LAN:GATEway?**

Function description: query current default gateway of power supply

For example: SYST:COMM:LAN:GATE ?

Return: current default gateway of power supply, such as GATEWAY:192.168.99.1

Command format: **SYSTem:COMMunicate:LAN:GATEway<gateway>**

Function description: to set default gateway of power supply

For example: SYST:COMM:LAN:GATE 192.168.88.1 (to set gateway address to be 192.168.88.1)

Command format: **SYSTem:COMMunicate:LAN:SMASK?**

Function description: query subnet mask of power supply

For example: SYST:COMM:LAN:SMASK?

Return: current subnet mask of power supply, such as SMASK:255.255.255.0

Command format: **SYSTem:COMMunicate:LAN:SMASK<smask>**

Function description: set subnet mask of power supply

For example: SYST:COMM:LAN:SMASK 255.255.255.1 (set subnet mask of power supply to be 255.255.255.1)

Command format: **SYSTem:COMMunicate:LAN:APPLy**

Function description: make configuration to LAN valid. As soon as perform this command, the new configuration to LAN will be valid.

For example: SYST:COMM:LAN:APPL

Chapter 4 Maintenance and Repair

4.1 Cleaning

In the case of disconnecting the power supply, use soft cloth with neutral washing liquid and clear water to wash the instrument. It is forbidden to spray washing liquid directly on the instrument to prevent the instrument from being damaged by washing liquid leaking to it..

4.2 Fuse changing

For safety, the following instructions are only for professional technicians.

If the fuse is burnt out and instrument can't work, pls first find the reason and correct it, and then replace the fuse with the original model. It is forbidden to use a temporary fuse or to short connect the fuse tube.

***When the instrument is breakdown and needs to repair, pls disconnect the power supply with the instrument.**

***Please do not adjust the potentiometers inside the instrument randomly.**

Warning：To insure the effective protection，only specific model fuse with the rating voltage of 250V can be replaced. Before replacing, the power supply must be cut and the power wire must also be taken off.

Chapter 5 Service and support

Warranty

We will give one year's warranty to maintaining or replacing since consignment for the verified quality problem of the product.

Except for this explanation and the description in the warranty card, the company has no other warranty, in proclamation or in implication. Under no circumstances, the company won't be responsible for the direct, indirect or other secondary loss.

Chapter 6 Technical Specifications

6.1 Adjusting range:

CH1 & CH2: 0~32V step value: 10mV (Type 1/2)

0-50V step value: 10mV (Type 3)

0~3.2A step value: 1mA (Type 1/3)

0~5.1A step value: 1mA (Type 2)

CH3: 1.8V/2.5V/3.3V/5V is switchable

maximum current output3.2A

6.2 Source effect：

CH1&CH2:

$CV \leq 1 \times 10^{-4} + 2mV$

$CC \leq 1 \times 10^{-4} + 2mA$

CH3: $CV \leq 1 \times 10^{-4} + 3mV$

6.3 Load effect：

CH1&CH2: $CV \leq 1 \times 10^{-4} + 3mV$(Type 1/3)

$CV \leq 1 \times 10^{-4} + 8mV$(Type 2)

CH3: $CV \leq 1 \times 10^{-4} + 3mV$

CH1&CH2: $CC \leq 1 \times 10^{-4} + 2mA$

6.4 Period and random deflection (PARD)(rms)：

CH1&CH2: CV≤1mV(Type 1/2)

CV≤1.5mV(Type3)

CH3: CV≤1mV

CH1&CH2: CC≤3mA(Type 1/3)

CC≤5mA(Type2)

6.5 Display resolution：

CH1&CH2: 10mV 1mA

6.6 Voltage accuracy:

CH1&CH2: ≤±(0.5%+30mV) (Type 1/2)

≤±(0.5%+60mV) (Type 3)

CH3: ≤±7%

Current accuracy:

CH1&CH2: ≤±(0.5%+30mA) (Type 1/3)

≤±(1%+60mA) (Type 2)

CH3: ≥3.2A

Note: if output is less than rated 5%, 5 digits can be added to Type1's accuracy, 10 digits can be added to Type 2 and Type3's accuracy.

6.7 Two sets of synchronism deviation

CV≤±（0.4%+300mV）（Type 1）

CV≤±（0.8%+600mV）（Type 2）

CV≤±（0.4%+600mV）（Type 3）

6.8 General specifications

Rated Voltage：AC220（1±10%）V

Rated Power: 500W 670VA (Type 1)

600W 800VA (Type 2/3)

Rated Frequency: 50/60（1±5%）Hz

Working Environment: Indoors

Working temperature: 0~40℃

Storage temperature: -40～60℃

Relative humidity: 20 ~90%RH (40℃)

Warm-up time: ≤15min

6.9 Interface

USB charging interface: 5V 1A

Programmable interface: USB (TMC Protocol), LAN (option), RS232 (option)

6.10 DC outputs, Dimensions and Weight

Model	Channel	Independent	In Series	In Parallel	Weight (kg)	Dimension (mm3)
Type 1	3	0-32V/0-3.2A×2 1.8-5V/3.2Amax×1	0-64V 0-3A	0-32V 0-6A	8.0	226*140*303
Type 3	3	0-50V/0-3.2A×2 1.8-5V/3.2Amax×1	0-100V 0-3A	0-50V 0-6A	9.0	226*140*333
Type 2	3	0-32V/0-5.1A×2 1.8-5V/3.2A max×1	0-64V 0-5A	0-32V 0-10A	9.0	226*140*333