Triple Output Programmable DC Power Supply

IT6300 Series User Manual

Model: IT6322A/IT6332A/IT6333A
IT6322B/IT6332B/IT6333B
IT6322C/IT6332C/IT6333C

Version: V2.2

Notices

Manual Part Number

IT6300-402204

Revision

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Itech Electronic, Co., Ltd.

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Safety Notices

CAUTION

A CAUTION sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

WARNING

A WARNING sign denotes a hazard. It calls attention to an operating procedure or practice that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

NOTE

A NOTE sign denotes important hint. It calls attention to tips or supplementary information that is essential for users to refer to.

Quality Certification and Assurance

We certify that IT6300 series power supply meets all the published specifications at time of shipment from the factory.

Warranty

ITECH warrants that the product will be free from defects in material and workmanship under normal use for a period of one (1) year from the date of delivery (except those described in the Limitation of Warranty below).

For warranty service or repair, the product must be returned to a service center designated by ITECH.

- The product returned to ITECH for warranty service must be shipped PREPAID. And ITECH will pay for return of the product to customer.
- If the product is returned to ITECH for warranty service from overseas, all the freights, duties and other taxes shall be on the account of customer.

Limitation of Warranty

This Warranty will be rendered invalid if the product is:

- Damaged resulting from customer-wired circuits or customer-supplied parts or accessories;
- Modified or repaired by customer without authorization;
- Damaged resulting from customer-wired circuits or use in an environment not designated by us;
- The product model or serial number is altered, deleted, removed or made illegible by customer;
- Damaged as a result of accidents, including but not limited to lightning, moisture, fire, improper use or negligence.

Safety Symbols

⎓	Direct current	|	ON (power)
∼	Alternating current	○	OFF (power)
⎓ ∼	Both direct and alternating current	⎍	Power-on state
⏚	Chassis (earth ground) symbol.	⎎	Power-off state
⏚	Earth (ground) terminal	⊣	Reference terminal

	Caution	+	Positive terminal
	Warning (refer to this manual for specific Warning or Caution information)	—	Negative terminal
	A chassis terminal	-	-

Safety Precautions

The following safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or specific warnings elsewhere in this manual will constitute a default under safety standards of design, manufacture and intended use of the instrument. ITECH assumes no liability for the customer's failure to comply with these precautions.

WARNING

- Do not use the instrument if it is damaged. Before operation, check the casing to see whether it cracks. Do not operate the instrument in the presence of inflammable gasses, vapors or dusts.
- The power supply is provided with a three-core power line during delivery and should be connected to a three-core junction box. Before operation, be sure that the power supply is well grounded. Make sure to use the power cord supplied by ITECH.
- Check all marks on the instrument before connecting the instrument to power supply.
- Use electric wires of appropriate load. All loading wires should be capable of bearing maximum short-circuit of electronic load without overheating. If there are multiple loads, each pair of the load power cord must be carry out the full rated short-circuit output current of the power securely.
- Ensure the voltage fluctuation of mains supply is less than 10% of the working voltage range in order to reduce risks of fire and electric shock.
- Do not install alternative parts on the instrument or perform any unauthorized modification.
- Do not use the instrument if the detachable cover is removed or loosen.
- To prevent the possibility of accidental injuries, be sure to use the power adapter supplied by the manufacturer only.
- We do not accept responsibility for any direct or indirect financial damage or loss of profit that might occur when using the instrument.
- This instrument is used for industrial purposes. Do not apply this product to IT power supply system.
- Never use the instrument with a life-support system or any other equipment subject to safety requirements.

CAUTION

- Failure to use the instrument as directed by the manufacturer may render its protective features void.
- Always clean the casing with a dry cloth. Do not clean the internals.
- Make sure the vent hole is always unblocked.

Environmental Conditions

The instrument is designed for indoor use and an area with low condensation. The table below shows the general environmental requirements for the instrument.

Environmental Conditions	Requirements
Operating temperature	0°C to 40°C
Operating humidity	20%-80% (non-condensation)
Storage temperature	-20°C to 70 °C
Altitude	Operating up to 2,000 meters
Installation category	II
Pollution degree	Pollution degree 2

Note

To make accurate measurements, allow the instrument to warm up for 30 min.

Regulatory Markings

CE	The CE mark indicates that the product complies with all the relevant European legal directives. The specific year (if any) affixed refers to the year when the design was approved.
	The instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affix product label indicates that you must not discard the electrical/electronic product in domestic household waste.
	This symbol indicates the time period during which no hazardous or toxic substances are expected to leak or deteriorate during normal use. The expected useful life of the product is 10 years. The product can be used safely during the 10-year Environment Friendly Use Period (EFUP). Upon expiration of the EFUP, the product must be immediately recycled.

Waste Electrical and Electronic Equipment (WEEE) Directive

2002/96/EC Waste Electrical and Electronic Equipment (WEEE) Directive

This product complies with the WEEE Directive (2002/96/EC) marking requirement. This affix product label indicates that you must not discard the electrical/electronic product in domestic household waste.

Product Category

With reference to the equipment classifications described in the Annex 1 of the WEEE Directive, this instrument is classified as a “Monitoring and Control Instrument”.

To return this unwanted instrument, contact your nearest ITECH office.

Compliance Information

Complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low-Voltage Directive (Safety) 2014/35/EU

Conforms with the following product standards:

EMC Standard

IEC 61326-1:2012/ EN 61326-1:2013 [1][2][3]

Reference Standards

CISPR 11:2009+A1:2010/ EN 55011:2009+A1:2010 (Group 1, Class A)

IEC 61000-4-2:2008/ EN 61000-4-2:2009

IEC 61000-4-3:2006+A1:2007+A2:2010/ EN 61000-4-3:2006+A1:2008+A2:2010

IEC 61000-4-4:2004+A1:2010/ EN 61000-4-4:2004+A1:2010

IEC 61000-4-5:2005/ EN 61000-4-5:2006

IEC 61000-4-6:2008/ EN 61000-4-6:2009

IEC 61000-4-11:2004/ EN 61000-4-11:2004

1. The product is intended for use in non-residential/non-domestic environments. Use of the product in residential/domestic environments may cause electromagnetic interference.
2. Connection of the instrument to a test object may produce radiations beyond the specified limit.
3. Use high-performance shielded interface cable to ensure conformity with the EMC standards listed above.

Safety Standard

IEC 61010-1:2010/ EN 61010-1:2010

Contents

Chapter1 Acceptance and Installation

Power supply is a high level safety equipment, there is a protected ground terminal. Before Installation or operation, please read the safety signs and instructions in this manual.

1.1 Confirm package contents

Open the package and check the articles within package box before operation. In case of any non-conformity, missing or appearance wearing, please contact ITECH immediately.

The package box should comprise:

Device name	Quantity	Model	Remarks
Power supply	x1	IT6300 series	IT6300 series include: IT6322A/IT6332A/IT6333A/ IT6322B/IT6332B/IT6333B/ IT6322C/IT6332C/IT6333C
Power Cord	x1	IT-E171/IT -E172/ IT-E173/IT -E174	The User may select different power cords based on local outlet specification. For detailed specifications, refer to 1.5 Connecting the Power Cord.
USB communication cable	x1	-	-
Ex-factory Test Report	x1	-	It is the test report of the instrument before delivery.

NOTE

After confirming that package contents are consistent and correct, please appropriately keep package box and related contents. The package requirements should be met when the instrument is returned to factory for repair.

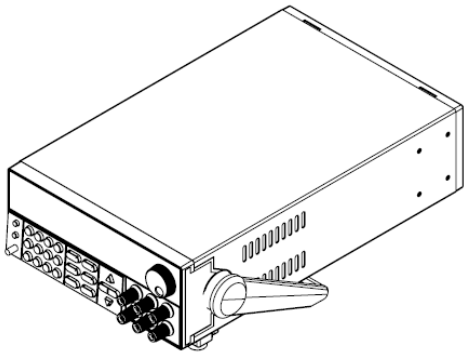
The IT6300 series power supply has the following optional accessories sold separately:

Equipment Name	Model	Description
Rack Mount Kit	IT-E151/ IT-E151A	Select this accessory when you need to install the instrument on a dedicated stand. IT-E151A is only available for IT6322A/IT6322B/IT6322C.

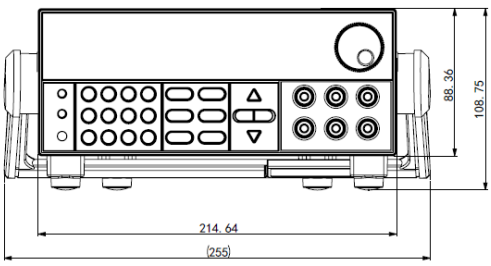
1.2 Installation Position

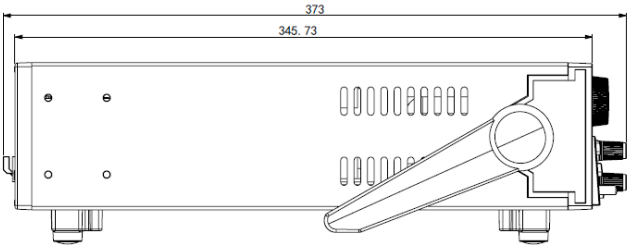
The instrument should be installed at well-ventilated and rational-sized space. Please select appropriate space for installation based on the power supply size. Unit: millimeter (mm)

IT6322A/IT6322B/IT6322C Models

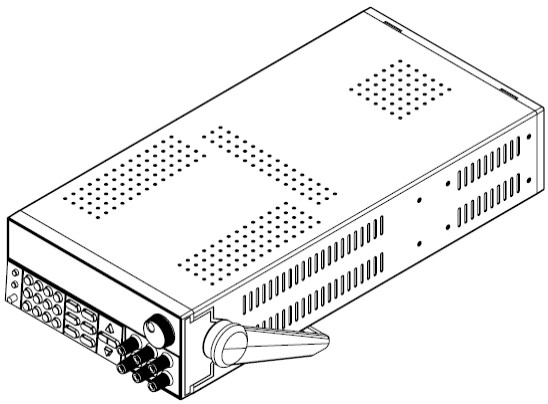


Detailed Dimension Drawing

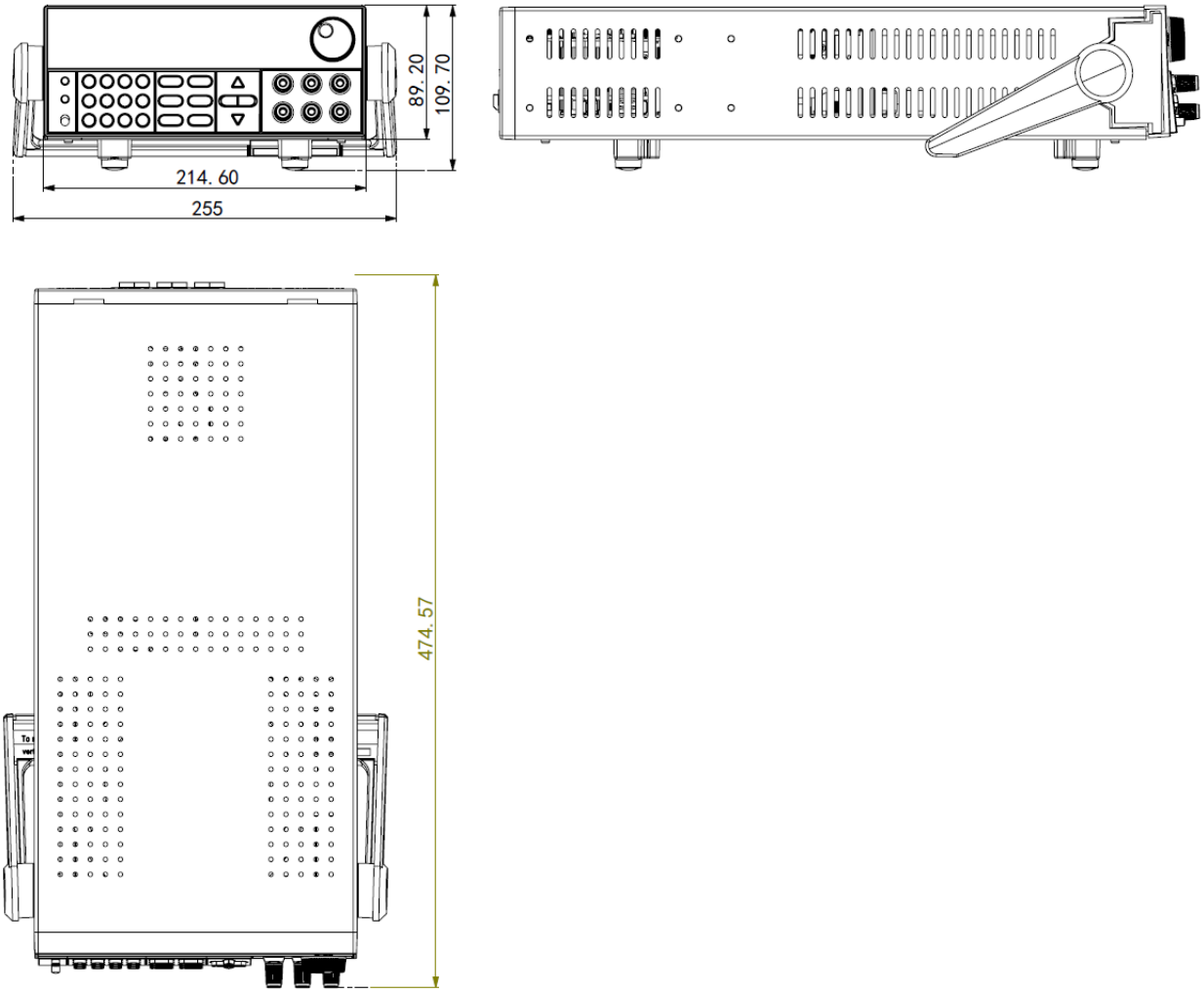




IT6332A/IT6333A/IT6332B/IT6333B/IT6332C/IT6333C Models

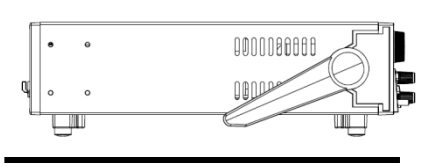


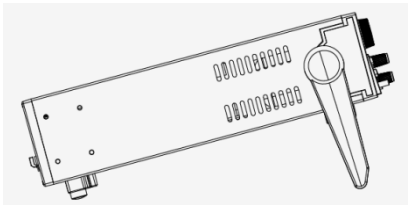
Detailed Dimension Drawing



1.3 Adjustment of Power Handle

To adjust the position, grasp the handle by the sides and pull outward. Then rotate the handle to the desired position.





Bench operation

Handle

Note

Do not use excessive force when installing or removing the handle to prevent pinching.

1.4 Installation of Support

The IT6300 Series power supplies can be installed on a standard 19-inch support. IT-E151/ IT-E151A is an accessory prepared for user. The user can select the corresponding manual according to the purchased support model to install.

1.5 Connecting the Power Cord

Connect power cord of standard accessories and ensure that the power is under normal power supply.

AC power input level

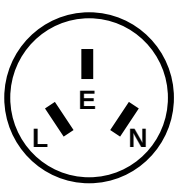
Working voltage of IT6300 series includes 110V and 220V (which can be selected by the switch at the bottom of power supply).

AC power input level:

- Option Opt.01: 220VAC ± 10%, 47 to 63 Hz
- Option Opt.02: 110 VAC ± 10%, 47 to 63 Hz

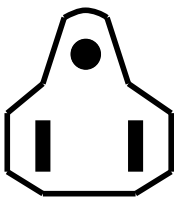
Categories of power cords

Select from the flowing schedule of power cord specifications an appropriate power cord that matches the voltage for the area in which you use the instrument. If the power cord included in the instrument you purchased does not match the voltage, contact the dealer or manufacturer for change.



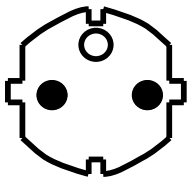
China

IT-E171



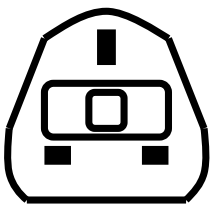
United States & Canada & Japan

IT-E172



Europe

IT-E173



England

IT-E174

Chapter2 Quick Start

This chapter introduces the front panel, the rear panel, key functions and VFD display function of the power supply, make sure that you can quickly know the appearance, instruction and the key function before you operate the power supply, help you make better use of this series of power supply.

2.1 Brief Introduction

IT6300 series triple output programmable DC power supply, the output voltage or current of each channel can be set from 0 to max rated value.

The triple output power supply provides you with high-resolution, high accuracy and high stability, and supports over voltage, over temperature protection; Provides a serial or parallel mode, used to extend the voltage or current output capacity. Resolution reaches up to 1mV/1mA that it can meet the needs of a variety of applications, and is a great choice for University or R & D department and the manufacturer. The main features and advantages are as follows:

- Triple output voltage, all are adjustable.
- CH1 and CH2 can set to serial/parallel/track mode.
- The voltage and current for the three channels can be displayed at the same time.
- Small size of 1/2 2U
- VFD display
- Function keys with LED light
- Remote measurement function, compensation online pressure drop.
- High accuracy, resolution and stability.
- Switch to control the output status.
- Limited voltage and over heat protection.
- Intelligent fan control, energy conservation, noise reduction.
- IT6300A series instruments have built-in USB/RS232 communication interface; IT6300B series instruments have built-in USB/GPIB/RS232 communication interface; IT6300C series instruments have built-in LAN/USB communication interface;
- Low ripple and low noise
- Shut off memory function
- Can be monitored by computer software.
- Can calibrate through software.
- Memory capacity of 36 groups, for save and recall.
- Can adjust the voltage or current by knob.
- Can adjust the stepping by Left/right arrow button.
- Output timer function (0.1 ~ 99999.9 seconds)

Model Selection Table for IT6300 Series:

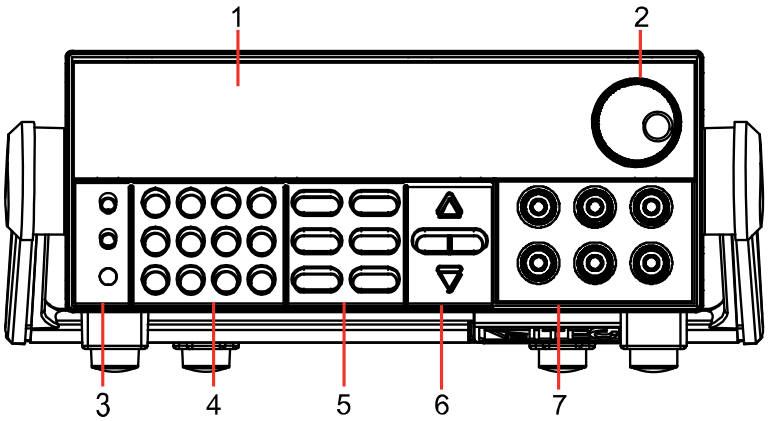
Model	Channel	Voltage	Current
IT6322A	CH1	30V	3A

	CH2	30V	3A
	CH3	5V	3A
IT6332A	CH1	30V	6A
	CH2	30V	6A
	CH3	5V	3A
IT6333A	CH1	60V	3A
	CH2	60V	3A
	CH3	5V	3A
IT6322B	CH1	30V	3A
	CH2	30V	3A
	CH3	5V	3A
IT6332B	CH1	30V	6A
	CH2	30V	6A
	CH3	5V	3A
IT6333B	CH1	60V	3A
	CH2	60V	3A
	CH3	5V	3A
IT6322C/ IT6322C(G)	CH1	30V	3A
	CH2	30V	3A
	CH3	5V	3A
IT6332C/ IT6332C(G)	CH1	30V	6A
	CH2	30V	6A
	CH3	5V	3A
IT6333C/ IT6333C(G)	CH1	60V	3A
	CH2	60V	3A
	CH3	5V	3A

*IT6300C(G) is the model with built-in GPIB, the function is the same as standard model, please check with ITECH for availability.

2.2 Introduction to the Front Panel

The front panel of IT6300 series is shown in the next figure.

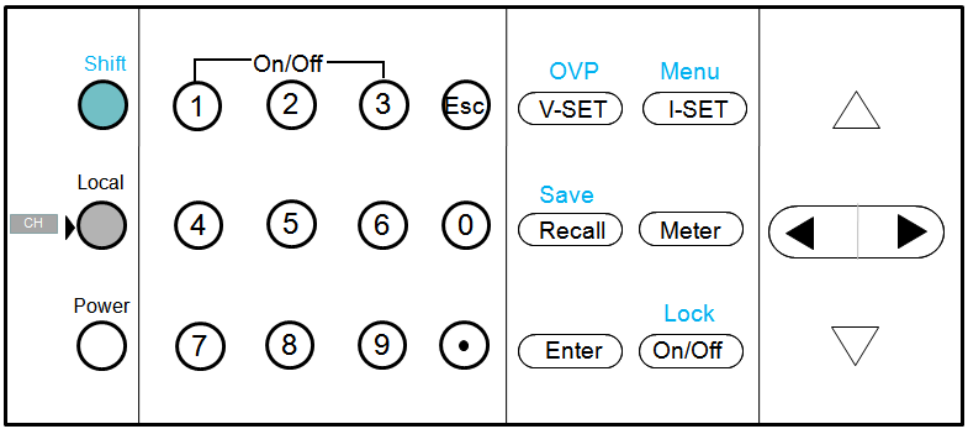


1. VFD display

2. Rotary knob
3. Power switch, Local and Shift key
4. Numeric keys and ESC escape key
5. Function keys
6. Up/Down/Left/Right keys
7. Output terminals

2.3 Introduction of the Keypad

The keypad of IT6300 series is shown in the next figure.



Key Symbol	Name & Function
0 to 9	Numeric keys. Use keys 1 to 3 to control the output state of the 3 channels which should coordinate with Shift key. Note: In key lock mode, Shift key is not needed.
Esc	Escape from the current setting or menu item.
·	Decimal point
(Shift)	Compound key.
(Local)	Used to switch to local operation mode. / Channel switch function.
(Power)	Used to power on/off the DC source.
V-set /OVP	Used to set the voltage or shift+V-set to set OVP value.
I-set /Menu	Used to set the current or shift+I-set to enter the menu operation.
Recall /Save	Save or recall different operating parameters in memory locations.
Meter	Switch the display between setting value and actual value.

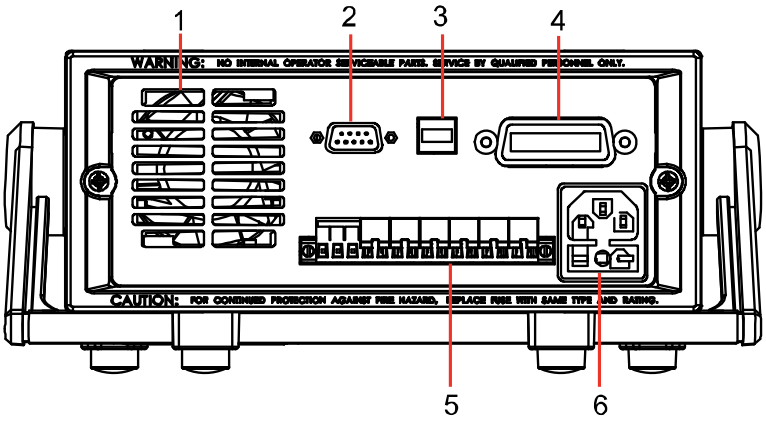
Enter	Enter button to confirm the selection.
On/Off /Lock	Used to control the output state of all channels or Shift+On/Off to lock the front keys.
	Right/Left key, use to move the cursor or scroll through the menu items.
	Up/down key, used to increase or decrease the setting value.
(Shift)+1, (Shift)+2, (Shift)+3	Used to turn on the output of corresponding channel no matter in menu operation or Meter state.

2.4 Introduction of Indicators on the Screen

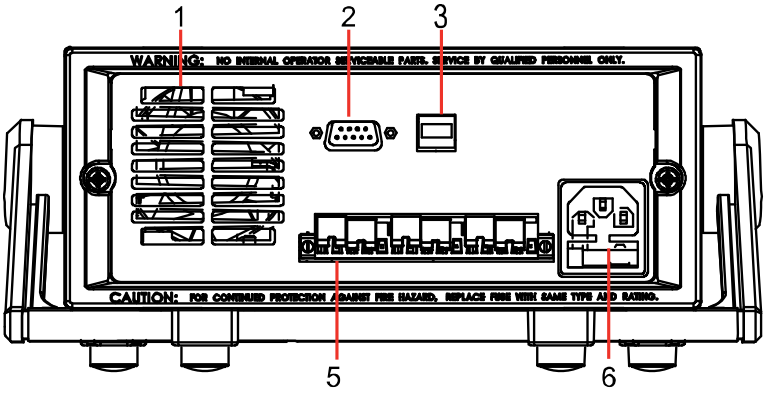
C	In constant current mode.
V	In constant voltage mode.
	Keyboard operation for the lock mode.
	Open the remote sense function.
	Indicates the shift button is pressed.
	Indicates the channel currently selected.
T	Enable tracking mode.

2.5 Introduction to the Rear Panel

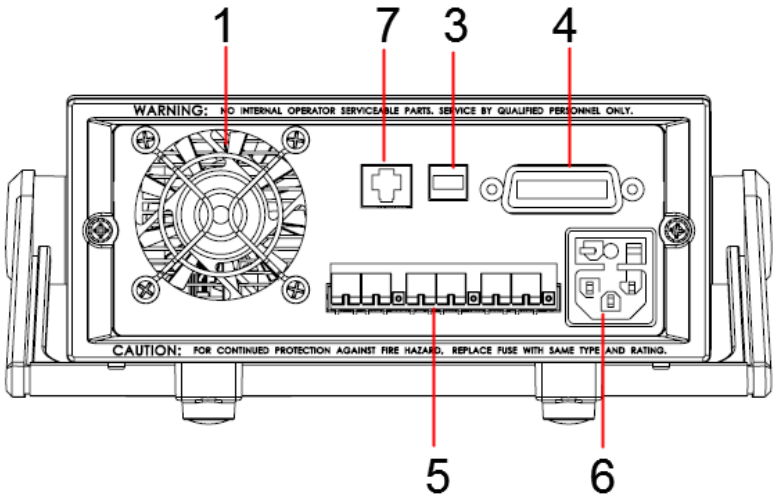
The rear panel of IT6322B/IT6332B/IT6333B is shown in the next figure.



The rear panel of IT6322A/IT6332A/IT6333A is shown in the next figure.



The rear panel of IT6322C/IT6332C/IT6333C is shown in the next figure.



1. Cooling window
2. RS232 communication interface
3. USB communication interface
4. GPIB communication interface (Only IT6300B, IT6300C(G) series are available)
5. Remote measurement terminals and output terminals
6. AC power input socket and fuse
7. LAN communication interface

Note

The 110V/220V power switch is at the bottom of the instrument. Please check the switch position before powering on to avoid burning the instrument.

2.6 Power-on Selftest

A successful selftest indicates that the purchased power product meets delivery standards and is available for normal usage.

Before operation, please confirm that you have fully understood the safety instructions.

WARNING

- To avoid burning out, be sure to confirm that power voltage matches with

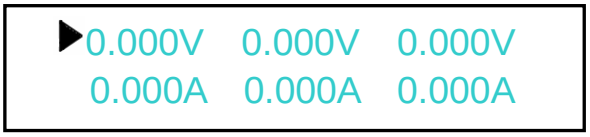
supply voltage.

- Be sure to connect the main power socket to the power outlet of protective grounding. Do not use terminal board without protective grounding. Before operation, be sure that the power supply is well grounded.
- To avoid burning out, pay attention to marks of positive and negative polarities before wiring.

Selftest steps

Normal selftest procedures:

1. Correctly connect the power cord. Press **Power** key to start up.
2. After selftest, VFD display information as follows:



Error Information References

The following error information may occur when an error occurs during Power On self-test:

- If the EEPROM was damaged, the VFD will display “EEPROM Fail”.
- If the latest operation state of the power supply was lost, then the VFD will display “System Lost”.
- If send channel data, the channel response failure, the VFD display the tooltip information “Model Fail”.
- If calibration data read failure, the VFD display the tooltip information “Cal Lost”.
- If the channel to send data loss, channel initialization failed, the VFD display the tooltip information “Model Lost”.
- If the factory calibration data in EEPROM is lost, and then the VFD will display “FACT LOST”.

Exception handling

If the power supply cannot start normally, please check and take measures by reference to steps below.

1. Check whether the power cord is correctly connected and confirm whether the power supply is powered.

   Correct wiring of power cord => 2

   Incorrect wiring of power cord => Re-connect the power cord and check whether the exception is removed.

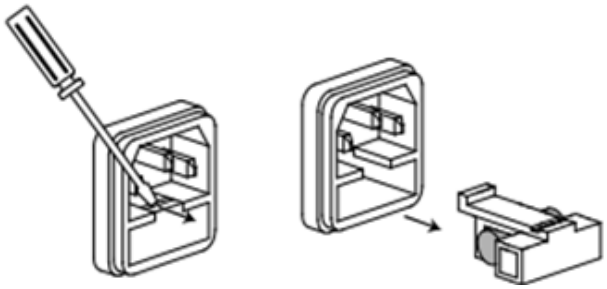
2. Check whether the power in On. Power key is under “|” On status.

   Yes => 3

   No => Please check the Power key to start power and check whether the exception is removed.

3. Check whether the fuse of power supply is burned out.
   If yes, change fuse. Detailed steps:

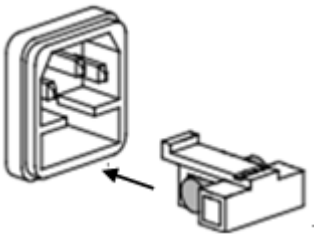
- Pull out power line and take out the fuse box at power line jack with a small screw driver. (The fuse position is described in section 2.5.)
  As shown below.



See the table blow for matching information of fuse and machine model.

Products	Specification (220VAC)	Specification (110VAC)
IT6322A/IT6322B/IT6322C	3.15A T250V	6.30A T250V
IT6332A/IT6332B/IT6332C	5A T250V	10A T250V
IT6333A/IT6333B/IT6333C	5A T250V	10A T250V

- After replacement, install the fuse box back to original position, as shown below.



2.7 Output Verification

The following procedure verify that the power supply outputs the correct voltage and current levels and properly responds to entries from the front panel.

Voltage Output Check

The following steps verify basic voltage function without load.

1. Press Power key to turn on the power supply.
2. Set the current value (≥0.1A).
3. Press On/Off key to enable the output.
   The ON/OFF button light is on, and the CV status indicator on the VFD display lights up.
4. Set the voltage value.

Adjust the voltage, then press Meter to lit the key (indicates it is in the METER mode), make sure that the set value and output value are same, and if the current displayed on the VFD is nearly 0A.

5. Make sure the voltage can be adjusted from zero to the maximum rated value.
6. Check the other two channels by the same method.

Note

When Meter key is gray, the power supply is in SET mode, then the VFD displays the set voltage and current; when the key is lit, then the power supply is in METER mode, the actual voltage and current display on the VFD.

Current output Check

The following steps check the basic current functionality by shorting the power supply's output.

1. Press Power key to turn on the power supply.
2. Press On/Off to disable the output, ensure the output is OFF.
3. Connect a short across (+) and (-) output terminals with an insulated test lead, use a wire sufficient to handle the maximum current.
4. Adjust the voltage value to 1V.
5. Press On/Off to enable the output.
6. Adjust the current.

   Set some different current values, in METER mode, check whether the voltage value on VFD is near 0v, and the current on it is close to the value you set.
7. Make sure that the current can be adjusted from 0 to full rated value.
8. Disable the output and then remove the short wire.
9. Check the other two channels by the same method.

Chapter3 Function and Features

This chapter will describe in detail how to use the buttons to complete the basic operation of the IT6300 series power supply. Will be divided into the following sections:

- Front panel operation introduction
- Switch local/remote operations
- Channel switching operation
- OUT ON/OFF output setting
- Timer operation
- Voltage setting operation
- Current setting operation
- Data save/recall settings
- Overvoltage operation
- Keypad lock function
- Overheat protection
- Menu function
- Rear panel terminals function

3.1 Front-panel Operation Overview

- The power supply is shipped from the factory ready for front-panel operation mode. At power-on, the power supply will automatically enter the front-panel operation mode and the instrument can be controlled via the front panel keys and knob.
- The output of power supply can be enabled/disabled from the front panel by pressing the On/Off button. When turn on the output, the VFD will display the state and voltage/current of each channel. ”C” represents constant current mode. ”V” represents constant voltage mode. When output is in OFF mode, VFD will have no any indicators of **C** or **V**.
- The VFD also displays operation states or error information. “ ”means the power supply is in remote mode. When front-panel keys are locked, “ ” means the power supply keyboard locked .For more details, please refer to chapter of “Descriptions about VFD marks”.
- If the power supply is in set mode, you can modify parameters using the knob. If the power supply is in menu operation, the knob is used for menu selection.
- When V-set, I-set, Recall, Meter or On/Off buttons are lit, means they are under corresponding state now. If pressing (Shift)+ Recall(Save), Recall button will keeping flickering and waiting for a number to be entered to specify the memory location.

Details about key buttons’ state:

V-set	When button is lit, means you can set voltage.
I-set	When button is lit, means in current setting mode.
Recall	When button is lit, means in recall mode. When button keeps flickering, means in save mode and waiting for a number to be entered to specify the memory location.
Meter	When button is lit, means current VFD displays actual voltage and current.
On/Off	When button is lit, means at least one channel output is on. Or all channels are in OFF mode.

NOTE

V-set, I-set, Recall buttons will not be lit at the same time.

3.2 Local/Remote Operation Switching

The power supply provides two modes of operation, local operation and remote operation. The two operating modes can be switched between communication commands. The initialization mode is the local operation mode.

- Local operation mode: In the local operation mode, all the buttons can be used. Use the buttons on the front panel to perform related operations.
- Remote operation mode: The power supply is connected to the PC, and the related operation is performed on the PC. When in the remote operation mode, the other buttons on the panel do not work except the Meter and Local buttons. You can switch to the local operating mode by pressing the Local button. When the operating mode is changed, the output parameters of the power supply are not affected.

3.3 Channel Operation

When V-set or I-set button is lit, press (Local) key can switch between the three channels.

3.4 OUT ON/OFF

Pressing On/Off button toggles the output state of all 3 channes of the power supply. If the output state is ON, press it, to turn the output state to OFF. While the output state is OFF, press On/Off and the power supply output will turn ON.

To control channels individually, press (Shift)+ 1, (Shift)+ 2, (Shift)+ 3 corresponding to each channel. (Shift)+ 1 controls the output state of the first channel, (Shift)+2 controls the output state of the second channel, (Shift)+3 controls the output state of the third channel.

When the power supply is in remote mode, you can set the output state by sending SCPI command (OUTPut: ON | OFF). The output state operation does not affect any other parameter.

The output switch does not affect the present set value, and the serial/parallel setting affects the operation of the output switch.

NOTE

The On/Off key controls the output state of all 3 channels simultaneously. If you want to control the output state of individual channels, use the number keys 1 to 3 with shift button. When the output is turned on, there will be a **V** or **C** display at the current display position.

3.5 Timer Operation

If the “Out timer” is enabled for any channel in the menu, after the time set, the specified channel of the power supply will automatically switch to output off state. Please refer to Out Timer of section 3.12.

3.6 Set Voltage

- **Solution 1**: press (Local) to select channel, press V-set then enter a numerical value followed by Enter.
- **Solution 2**: press V-set, then press ▶ ◀ to move the cursor position and adjust the voltage value using the knob. Press Enter to confirm.
- **Solution 3**: press V-set, then press ▶ ◀ to move the cursor position and adjust the voltage value using △ ▽. Press Enter to confirm.

  NOTE

  When output in OFF mode and Meter button light on, rotary knob and up/down keys cannot be used to adjust voltage and current. If rotary knob is enabled, then adjusting it will real-time change the current output setup without pressing Enter to confirm.

3.7 Set Current

- **Solution 1**: press (Local) to select channel, press I-set then enter a numerical value followed by Enter.
- **Solution 2**: press I-set, then press ▶ ◀ to move the cursor position and adjust the current value using the knob. Press Enter to confirm.
- **Solution 3**: press I-set, then press ▶ ◀ to move the cursor position and adjust the current value using △ ▽. Press Enter to confirm.

3.8 Save and Recall Operation

You can store up to 36 different operating states in memory locations 1 through 36. They are divided to four groups, and each group includes nine different setups. These setups include voltage upper limit (MaxVolt), overvoltage value (OVP Set), voltage setpoint, and current setpoint.

Press (Shift) + Recall(Save) followed by a number key to save the current operating state to nonvolatile memory.

Press Recall +number 1 to 9 to recall operating state assigned to this location.

You can also use the SCPI command(*SAV, *RCL) to save and recall.

NOTE

When Save or Recall operation is done, there will be a corresponding information to indicate the successful or failed operation. The power supply does not support Save/Recall operation when in serial/parallel or tracking mode.

3.9 Overvoltage Operation

Select the channel, and press (Shift)+ V-set (OVP), then select “ON” to set the OVP value. Select OFF to cancel the operation. After set successfully, when the actual voltage is higher than OVP value, then VFD will display “OVER VOLT”. The three channels can be set separately.

3.10 Key Lock Set

Press (Shift) + On/Off (Lock) can lock the front panel keys and label “ ” will be lit on the lower left corner

In key lock mode, all keys are disabled, except 1, 2, 3, On/Off, Meter , (Local) and . (Shift)+ keys.

3.11 Over Temperature Protection

The power supply temperature is protected when the internal power device of the power supply exceeds 80 °C. At this time, the output is OFF, the buzzer sounds, and the VFD displays the following information.

Over Temperature…

3.12 Menu Description

Press (Shift)+ I-set (Menu) to enter the menu. View the menu on the VFD, and use the right/left key to change the setup, and up/down key to scroll

through the complete menu items. Press Enter to enter the selected menu function. Press Esc to return to the previous menu. When the item keeps filickering indicates it is selected currently.

Config	Configuration Menu			
	Configuration Menu…		Configuration Menu	
	Out State	Power Out State Set	Power supply power on output state Settings	
		Off	All along OFF	
		Keep	Keep the last time state before the shutdown	
	Out Param	Power Out Param Set	Set up the related parameters when power on	
		Reset	default	
		Keep	Restore the last time parameters	
	Knob	Knob Function Set	Pulsating knob function Settings	
		Unlock	Pulsating knob function open	
		Lock	Pulsating knob function closed	
	Buzzer	Key Beeper Set	Key sound establishment	
		Off	Key sound closed	
		On	Key sound open	
	Communication	Communication Select	Communication interface choice	
		RS232 (For IT6300A/ IT6300B series only)	Choose RS232 communication interface	
			4800, 8, N, 1,Single	
			9600 O Mux	
			19200 E	
			38400	
			57600	
			115200	
		GPIB (Only IT6300B, IT6300C(G) series are available)	Choose GPIB communication interface	
			Communication Address	GPIB communications address
			Address=15 (1~30)	
		USB	Choose USB communication interface And, the IT6300C series supports USBTMC and USBVCP options.	
		LAN (For IT6300C series only)	Choose LAN communication interface	

			Info	Display LAN interface information Lan Status: LAN interface status Lan IP Mode: IP mode status (Auto, manual) Lan IP: IP address, default value 0.0.0.0 Lan SubNet: Subnet mask, default value 0.0.0.0 Lan Gateway: Gateway, default value 0.0.0.0 Lan MAC: 8C: C8: F4: 40:01: E1 Lan HostName: Host name Lan HostDesc: Host description string Lan Socket Port: Port number, default value 30000
			Config	**IP Mode (Configure IP related parameters. After the modification, you need to restart the instrument to take effect.)** DHCP: Automatically set IP related parameters. Manual: Manually set IP related parameters. IP: IP address IP Mask: subnet mask Gate: Gateway Address Socket port: Port number
			Restore	Select whether to reset the LAN to the default settings or not. And the settings take effect after restart.
	Ext Port	Ext Port settings…	External interface Settings	
		None	None	
	Memory Group	Select Memory Group	Memory group set	
		Grp1	Group 1	
		Grp2	Group 2	
		Grp3	Group 3	
		Grp4	Group 4	
	Command	SCPI Version Select…	SCPI version select	
		ITECH	ITECH SCPI command	
		EXT1	Extended SCPI command 1	
		EXT2	Extended SCPI command 2	
	Return Meter	Auto Return to Meter State	Auto Return to Meter State	
		Off	Function close	
		Wait 5 Sec	The front panel display will change from setting to meter	

			state automatically after 5s.		
	Reset	Reset Menu Default	restore the factory setting		
		No	Cancel		
		Yes	Enter		
	Exit	Exit the configuration menu			
System	System Menu				
	Channel Select …	Channel Select			
	CH1	System Menu…	First channel system menu		
		Max volt	Max voltage Set	Maximum voltage setting	
			Max Volt=31.000V		
		Out timer	Out Timer State Set	Output timer status setting	
			Disable	Turn off the timer function.	
			Enable	Turn on the timer function.	
		Exit	Exit the first channel system menu		
	CH2	System Menu…	Second channel system menu		
		Max Volt	Max Voltage Set	Maximum voltage setting	
			Max Volt=31.000V		
		Out Timer	Out Timer State Set	Output timer status setting	
			Disable	Turn off the timer function.	
			Enable	Turn on the timer function.	
		Exit	Exit the second channel system menu		
	CH3	System Menu…	Third channel system menu		
		Max Volt	Max Voltage Set	Maximum	

				voltage setting
			Max Volt=6.000v	
		Out timer	Out Timer State Set	Output timer status setting
			Disable	Turn off the timer function.
			Enable	Turn on the timer function.
		Exit	Exit the third channel system menu	
Comb	Power Combine Set…	Power channel combination status selection		
	Off	Cancel the current string/parallel status.		
	Series	Series Choose…	Select serial connect mode	
		CH1+CH2	Connect CH1 and CH2 in serial	
	Parallel	Parallel Choose…	Select parallel connect mode	
		CH1+CH2	Connect CH1 and CH2 in parallel	
		CH2+CH3	Connect CH2 and CH3 in parallel	
		ALL	Connect three channels in parallel	
	Track	Track Choose…	Enable tracking function	
		CH1+CH2	Connect CH1 and CH2 in track	
		CH2+CH3	Connect CH2 and CH3 in track	
		ALL	Connect three channels in track	
Exit	Exit the system menu			

OutState

This parameter sets the output On/Off state at power up. If you select **Keep**, the power supply will save the output state prior to power down and revert to that state at power up. If you select **Off**, the output state is always **OFF** when the power supply is turned on. The recommend setting is **OFF**.

OutParam

This menu item is used for set up power whether save the last output parameters. If you select **Keep**, the power save the last time before the shutdown of the output parameters. The next time after startup power output

parameter is still the last output parameters. If you select **Reset**, the power output for factory default output parameters.

Knob

This menu item is used to set whether the knob is available. Set to UnLock to enable this feature, otherwise the Knob function is disabled.

Buzzer

This menu item is used to set whether there is sound when the button is pressed. Set to ON to have a sound, otherwise it will be muted when pressed.

Communication

This item set the communication mode, optional communication interfaces are RS232, GPIB, USB.

- **RS232 Communication Set**

  This item configures the baud rate for serial communication. Possible values are 4800, 9600, 19200, 38400, 57600, 115200. When operating the power supply in remote mode, make sure that you configure identical baud rate settings for the power supply and the computer.

  Optional settings of parity bit for serial communication are NONE, ODD and EVEN. Default setting is NONE.

- **GPIB**

  (Only IT6300B, IT6300C(G) series are available) This item set the communication address for GPIB interface. Available range is 1-30.

- **USB**

  Select communication mode via USB interface.

- **LAN**

  Select communication mode via LAN interface. Before using the power supply to communicate with the host computer, you must set the relevant parameters to ensure that the power supply configuration is consistent with the configuration of the host computer.

Memory Group

You can store up to 36 different operating states in a nonvolatile memory space. All saved parameters are divided into four groups. They are Grp1, Grp2, Grp3 and Grp4. Each group can save 9 different operating states (1~9).

Command

This item set the communication protocol. Possible settings are SCPI, EXT1 and EXT2. Default setting is SCPI.

Return Meter

This item enable(“Wait5Sec”) or disable(OFF) the function to turn back to meter state automatically. When select “Wait5Sec”, the display on front panel will automatically change to meter state under the condition of no operation within 5S.

Reset

If you enter this menu and select “YES”, all parameters will be set to their default values. The default configuration menu setting is as follows:

Out State	OFF
Out Param	Keep
Knob	UnLock
Buzzer	ON
Communication	RS232
Ext Port	None
Memory Group	Grp1
Command	ITECH
Return Meter	Wait5Sec

System

This item set the max voltage and out timer of each channel. Choose one channel and set the parameters.

Max Volt

The max voltage you set should be within the range of 0V to the maximum rated voltage. You can edit this value using the △, ▽ keys or via numerical key pad followed by Enter. The default setting is the maximum rated voltage for each channel.

Out Timer

This item sets the output timer for each channel. The range is 0.1~99999.9S. If you enable this function, and the output state of all channels is on, the timer will start counting down immediately. If you do not need this feature, set it to Disable.

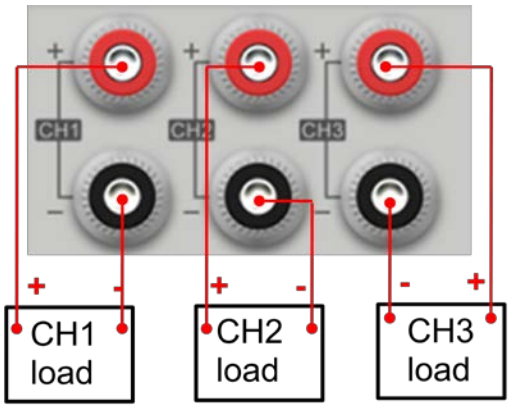
Comb

This item configures the instrument connection mode. The options are Off, Series, Para, Track. Data save and recall operations are not supported in Series/Para/Track mode.

- **Off**

  Off means that each channel operates independently. When set successfully, front panel will display “Remove success!”

  Wiring in OFF state



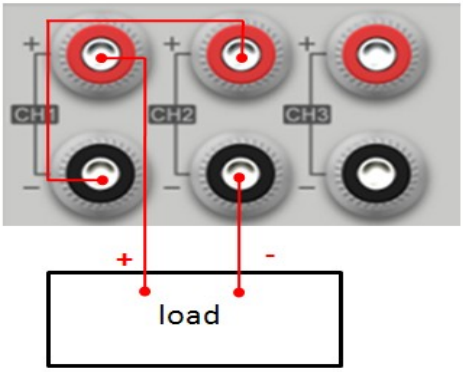
- **Series (Series mode)**

  This function configures the instrument for series operation of CH1 and CH2. Press Enter button to confirm your set. And press Esc to quit the operation.

  When enable series connection mode, the front panel will indicate “Series success!” and escape this screen after 2S.

  Front display as follows in condition of output off and meter state.

Wiring in serial mode:

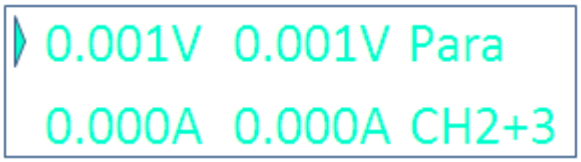


- **Parallel (Parallel mode)**

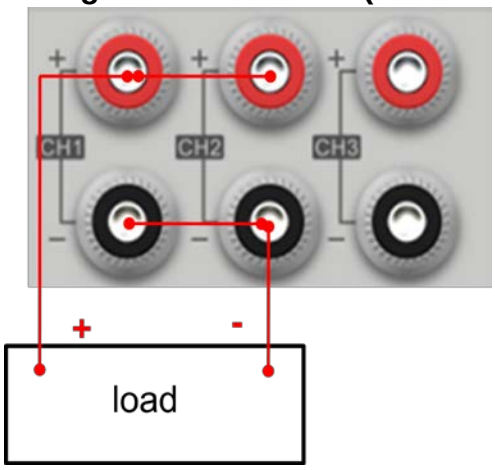
  This function configures the instrument for parallel operations of three channels. Possible combination mode is CH1+CH2, CH2+CH3, ALL. Press Enter button to confirm your set. And press Esc to quit the operation.

  Take **CH2+CH3** as an example, press (Shift) + I-set (Menu) and select **Comb** and then press Enter to confirm. Select **CH2+CH3** item and press Enter to confirm. The front panel will indicate “Parallel Success!” and escape this screen after 2S.

Front display as follows in condition of output off and meter state.



Wiring in Parallel mode (CH1+CH2)



- **Track (sync output setting)**

  This function configures the instrument for tracking operations of three channels. Possible combination mode is CH1+CH2, CH2+CH3, ALL. Press Enter button to confirm your set. And press Esc to quit the operation.

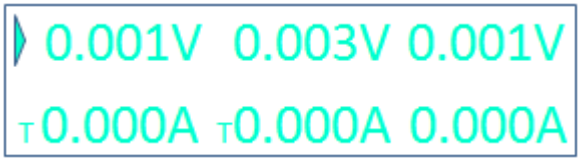
  Before setting the track mode, you need to set the voltage and current of the selected channel. In tracking mode, once the parameters of any one channel are changed, other channels will change proportionally.

  For example, set voltage and current of CH1 and CH2 as follows, CH1: 4V, 1A; CH2: 8V, 2A. Press (Shift) + I-set (Menu) into Menu, and press ▶ to select Comb, VFD will display as follows:

  CH1+CH2 CH2+CH3 ALL

  Select CH1+CH2 and press Enter to confirm. The VFD will display "Track Set Success!" and escape this screen after 2S.

  Front display as follows in condition of output off and meter state.



  For example: In setting status, if voltage of CH1 is set as 2V, voltage of CH2 will automatically change to 4V proportionally.

NOTE

Tacking function is disabled to the channel with 0V or 0A setting. In the former example, if CH2 setting is 0V or 0A, then when CH1 voltage is adjusted to 2V, CH2 will remain unchanged.

Parameters in Serial, Parallel or Tracking mode

The maximum voltage values in serial, parallel or tracking mode are as follows, taking IT6322B as an example.

Operate “CH1+CH2” in series, the max voltage is 62V the sum of the max voltage of CH1 and CH2.

Operate “CH1+CH2” in parallel, the max voltage is the smallest max voltage of the two channels. It is 31V.

Operate “CH2+CH3” in parallel, the max voltage is the smallest max voltage of the two channels, it is 6V.

Operate “CH1+CH2+CH3” in parallel, the max voltage is the smallest max voltage of the three channels. It is 6V.

In tracking mode, the max voltage is 31V.

In serial, parallel and tracking mode, the out timer function will be disabled.

In serial, parallel and tracking mode, the Save/Recall function will be disabled.

NOTE

When changed to serial, parallel or tracking mode, all channels will be OFF and voltage will be reset to 0V. The channels configured to serial, parallel or tracking mode will be add a label of “[ ]” in the display.

Power Information

Press (Shift) +, VFD will display power information, the information includes the following parts:

Power Model

Display the model of power supply: IT63XX

Soft Version

Firmware version of power supply: Ver: 1.XX-1.XX

Power SN

Display the serial number of the power supply: SN:XXXXXXXXXXXXXXXXXX

Calibration information

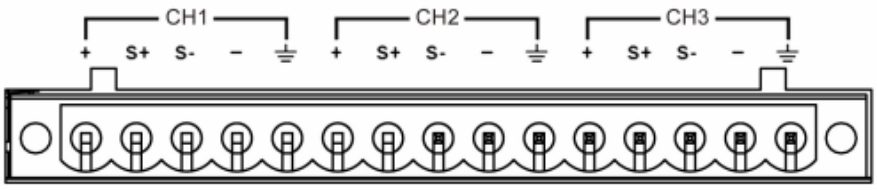
Display calibration information: 2005-8-26 17:46:13

Error Information

If error, press (Shift) +, VFD will display error information, press any key to display the next error message, if not, then continue to display information on above (model, the software version, serial number, etc.) Error message will be cleared in the display, but fault still exist.

3.13 Rear Panel Terminals Function

Remote voltage sensing is used to maintain good regulation at the load and reduce the degradation of regulation that would occur due to the voltage drop in the leads between the power supply and the load. By connecting the supply for remote voltage sensing, voltage is sensed at the load rather than at the supply's output terminals. This will allow the supply to automatically compensate for the voltage drop in the load leads and improve regulation.



+, -: Output terminals, the same as front pane output terminals.

S+, S-: Remote sensing terminals.

Disable remote sense function:

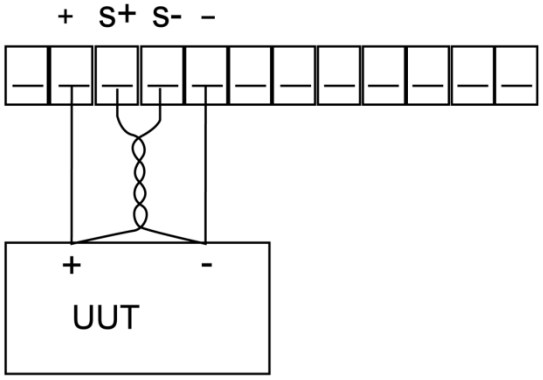
1. Use the standard shorting clip which has been installed before leave the factory. Or you can also use wires to short "S+" and "+", "S-" and "-".
2. Connect the output "+" and "-" terminals of the corresponding channel on the front panel to the device under test.

Enable remote sense function:

1. Remove the shorting clip between "S+" and "+", "S-" and "-".
2. Connect "S+" and "S-" to the device under test.
3. Connect "+" and "-" to the device under test.

NOTE

To ensure the system stability, please use twisted-pair cables between sense terminal and load.



Chapter4 Technical Specifications

4.1 Major technical parameters

IT6322A				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0~30V	0~30V	0~5V
	Voltage limiting	0~31V	0~31V	0~6V
	Current	0~3A	0~3A	0~3A
	Power	90W	90W	15W
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV		
	Current	≤0.1%+3mA		
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV		
	Current	≤0.1%+3mA		
Setup resolution	Voltage	1mV		
	Current	1mA		
Read-back resolution	Voltage	1mV		
	Current	1mA		
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Read-back accuracy (25 °C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Ripple and noise (20Hz-20MHz)	Voltage (Vp-p)	≤3mVp-p		
	Voltage (rms)	≤1mVrms		
	Current (rms)	≤3mArms		
Output Temp. coefficient (0 °C ~ 40 °C) (%of output + offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Read-back Temp. coefficient (%of output + offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Parallel setup accuracy	Voltage	≤0.02%+5mV		
	Current	≤0.1%+20mA		
Memory	Save/recall	36 groups		
Timer	Function	Output timer		
	Time set	0.1~99999.9 second		
	Resolution	0.1 second		
Working temperature		0-40**°C**		

Overall Dimension (mm)	W×H×D	255mm×108.7mm×365.3mm

IT6332A				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0-30V	0-30V	0-5V
	Voltage limiting	31V	31V	6V
	Current	0-6A	0-6A	0-3A
	Power	180W	180W	15W
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Setup resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Read-back resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+8mA	≤0.1%+8mA	≤0.1%+5mA
Read-back accuracy (25 °C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+8mA	≤0.1%+8mA	≤0.1%+5mA
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p)	≤4mVp-p	≤4mVp-p	≤3mVp-p
	Voltage(rms)	≤1mVrms	≤1mVrms	≤1mVrms
	Current (rms)	≤5mArms	≤5mArms	≤4mArms
Output Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)/	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Series setup resolution	Voltage	1mV		
	Current	1mA		

Series Read-back resolution	Voltage	1mV		
	Current	1mA		
Parallel setup resolution	Voltage	1mV		
	Current	0 - 9.999A - 1mA		
		10 - 12A - 10mA		
Parallel Read-back resolution	Voltage	1mV		
	Current	0 - 9.999A - 1mA		
		10 - 12A - 10mA		
Parallel setup accuracy	Voltage	≤0.02%+5mV		-
	Current	≤0.1%+30mA		-
Voltage waveform rise time 10%-90% change time	Typical value	< 100 ms	< 100 ms	< 100 ms
Voltage waveform fall time 10%-90% change time	Typical value	< 500 ms	< 500 ms	< 100 ms
Voltage dynamic response time, Load change 50%-100%	Restore to 50 mV	< 75 us		
Memory	Save/recall	36 groups		
Timer	Function	Output timer		
	Time set	0.1 second-99999.9 second		
	Resolution	0.1 second		
Working temperature		0-40**°C**		
Dimension (Bare metal, mounted to the cabinet)	W×H×D	214.5mm×88.2mm×451.6mm		
Dimension (Overall)	W×H×D	255.3mm×108.7mm×471mm		
Weight		15Kg		

IT6333A				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0-60V	0-60V	0-5V
	Voltage limiting	61V	61V	6V
	Current	0-3A	0-3A	0-3A
	Power	180W	180W	15W

Load regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Setup resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Read-back resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back accuracy (25 °C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p) (10°C - 40°C)	≤4mVp-p	≤4mVp-p	≤3mVp-p
	Voltage(Vp-p) (0°C - 10°C)	≤4.5mVp-p	≤4.5mVp-p	≤4.5mVp-p
	Voltage(rms)	≤1mVrms	≤1mVrms	≤1mVrms
	Current (rms)	≤4mArms	≤4mArms	≤4mArms
Output Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back Temp. coefficient (%of output+offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Series setup resolution	Voltage	0-99V --- 1mV		--
		100-120V --- 10mV		
	Current	1mA		--
Series Read-back resolution	Voltage	0-99V --- 1mV		--
		100-120V --- 10mV		
	Current	1mA		--
Parallel setup resolution	Voltage	1mV		
	Current	1mA		

Parallel Read-back resolution	Voltage	1mV		
	Current	1mA		
Parallel setup accuracy	Voltage	≤0.02%+10mV		
	Current	≤0.1%+30mA		
Voltage waveform rise time 10%-90% change time	Typical value	< 100 ms	< 100 ms	< 100 ms
Voltage waveform fall time 10%-90% change time	Typical value	< 1.5 s	< 1.5 s	< 100 ms
Voltage dynamic response time, Load change 1.5A(0.5 ms)-3A(0.5 ms)	Restore to 75 mV	< 50 us		
Memory	Save/recall	36 groups		
Timer	Function	Output timer		
	Time set	0.1 second-99999.9 second		
	Resolution	0.1 second		
Working temperature		0-40**°C**		
Dimension (Bare metal, mounted to the cabinet)	W×H×D	214.5mm×88.2mm×451.6mm		
Dimension (Overall)	W×H×D	255.3mm×108.7mm×471mm		
Weight		15Kg		

IT6322B				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0~30V	0~30V	0~5V
	Voltage limiting	0~31V	0~31V	0~6V
	Current	0~3A	0~3A	0~3A
	Power	90W	90W	15W
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV		
	Current	≤0.1%+3mA		
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV		
	Current	≤0.1%+3mA		
Setup resolution	Voltage	1mV		

	Current	1mA
Read-back resolution	Voltage	1mV
	Current	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA
Read-back accuracy (25 °C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA
Ripple and noise (20Hz-20MHz)	Voltage (Vp-p)	≤3mVp-p
	Voltage (rms)	≤1mVrms
	Current (rms)	≤3mArms
Output Temp. coefficient (0 °C ~ 40 °C) (%of output + offset)	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA
Read-back Temp. coefficient (%of output + offset)	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA
Parallel setup accuracy	Voltage	≤0.02%+5mV
	Current	≤0.1%+20mA
Memory	Save/recall	36 groups
Timer	Function	Output timer
	Time set	0.1~99999.9 second
	Resolution	0.1 second
Working temperature		0-40**°C**
Overall Dimension (mm)	W×H×D	255mm×108.7mm×366mm

IT6332B				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0-30V	0-30V	0-5V
	Voltage limiting	31V	31V	6V
	Current	0-6A	0-6A	0-3A
	Power	180W	180W	15W
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Setup resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA

Read-back resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+8mA	≤0.1%+8mA	≤0.1%+5mA
Read-back accuracy (25 °C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+8mA	≤0.1%+8mA	≤0.1%+5mA
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p)	≤4mVp-p	≤4mVp-p	≤3mVp-p
	Voltage(rms)	≤1mVrms	≤1mVrms	≤1mVrms
	Current (rms)	≤5mArms	≤5mArms	≤4mArms
Output Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)/	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Series setup resolution	Voltage	1mV		
	Current	1mA		
Series Read-back resolution	Voltage	1mV		
	Current	1mA		
Parallel setup resolution	Voltage	1mV		
	Current	0 - 9.999A - 1mA		
		10 - 12A - 10mA		
Parallel Read-back resolution	Voltage	1mV		
	Current	0 - 9.999A - 1mA		
		10 - 12A - 10mA		
Parallel setup accuracy	Voltage	≤0.02%+5mV		-
	Current	≤0.1%+30mA		-
Voltage waveform rise time 10%-90% change time	Typical value	< 100 ms	< 100 ms	< 100 ms

Voltage waveform fall time 10%-90% change time	Typical value	< 500 ms	< 500 ms	< 100 ms
Voltage dynamic response time, Load change 50%-100%	Restore to 50 mV	< 75 us		
Memory	Save/recall	36 groups		
Timer	Function	Output timer		
	Time set	0.1 second-99999.9 second		
	Resolution	0.1 second		
Working temperature		0-40**°C**		
Dimension (Bare metal, mounted to the cabinet)	W×H×D	214.5mm×88.2mm×451.6mm		
Dimension (Overall)	W×H×D	255.3mm×108.7mm×471mm		
Weight		15Kg		

IT6333B				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0-60V	0-60V	0-5V
	Voltage limiting	61V	61V	6V
	Current	0-3A	0-3A	0-3A
	Power	180W	180W	15W
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Setup resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Read-back resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV

accuracy (25 °C ± 5 °C) (%of output + offset)	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p) (10°C - 40°C)	≤4mVp-p	≤4mVp-p	≤3mVp-p
	Voltage(Vp-p) (0°C - 10°C)	≤4.5mVp-p	≤4.5mVp-p	≤4.5mVp-p
	Voltage(rms)	≤1mVrms	≤1mVrms	≤1mVrms
	Current (rms)	≤4mArms	≤4mArms	≤4mArms
Output Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back Temp. coefficient (%of output+offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Series setup resolution	Voltage	0-99V --- 1mV		--
		100-120V --- 10mV		
	Current	1mA		--
Series Read-back resolution	Voltage	0-99V --- 1mV		--
		100-120V --- 10mV		
	Current	1mA		--
Parallel setup resolution	Voltage	1mV		
	Current	1mA		
Parallel Read-back resolution	Voltage	1mV		
	Current	1mA		
Parallel setup accuracy	Voltage	≤0.02%+10mV		
	Current	≤0.1%+30mA		
Voltage waveform rise time 10%-90% change time	Typical value	< 100 ms	< 100 ms	< 100 ms
Voltage waveform fall time 10%-90% change time	Typical value	< 1.5 s	< 1.5 s	< 100 ms
Voltage dynamic response time, Load change	Restore to 75 mV	< 50 us		

1.5A(0.5 ms)-3A(0.5 ms)		
Memory	Save/recall	36 groups
Timer	Function	Output timer
	Time set	0.1 second-99999.9 second
	Resolution	0.1 second
Working temperature		0-40**°C**
Dimension (Bare metal, mounted to the cabinet)	W×H×D	214.5mm×88.2mm×451.6mm
Dimension (Overall)	W×H×D	255.3mm×108.7mm×471mm
Weight		15Kg

Parameters		**IT6322C**
Rated values (0 °C - 40 °C)	Voltage	0~30V×2，0~5V×1
	Current	0~3A×2，0~3A×1
	Voltage limiting	0~31V×2，0~6V×1
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV
	Current	≤0.1%+3mA
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV
	Current	≤0.1%+3mA
Setup resolution	Voltage	1mV
	Current	1mA
Read-back resolution	Voltage	1mV
	Current	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA
Read-back accuracy (25 °C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA
Ripple and noise	Voltage	≤1mVrms/3mVp-p
	Current	≤3mArms
Output Temp. coefficient (0 °C ~ 40 °C) ±(%of output+offset)	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA
Read-back Temp. coefficient	Voltage	≤0.03%+10mV
	Current	≤0.1%+5mA

±(%of output+offset)		
Series setup resolution	Voltage	1mV
	Current	1mA
Series readback resolution	Voltage	1mV
	Current	1mA
Parallel setup resolution	Voltage	1mV
	Current	1mA
Parallel readback resolution	Voltage	1mV
	Current	1mA
Parallel setup accuracy	Voltage	≤0.02%+5mV
	Current	≤0.1%+20mA
Voltage waveform rise time	10%-90%	≤150ms
Voltage waveform fall time	90%-10%	CH1/CH2≤2.5s, CH3≤0.2s
Dynamic response time Restore to 50mV	50%-100% Freq=1k	100us (Typical value)
Memory	Save/recall	36 groups
Timer	Time set	0.1~99999.9 second
	Resolution	0.1 second
	Function	Output timer

IT6332C				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0-30V	0-30V	0-5V
	Voltage limiting	31V	31V	6V
	Current	0-6A	0-6A	0-3A
	Power	180W	180W	15W
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA

Setup resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Read-back resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+8mA	≤0.1%+8mA	≤0.1%+5mA
Read-back accuracy (25 °C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+8mA	≤0.1%+8mA	≤0.1%+5mA
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p)	≤4mVp-p	≤4mVp-p	≤3mVp-p
	Voltage(rms)	≤1mVrms	≤1mVrms	≤1mVrms
	Current (rms)	≤5mArms	≤5mArms	≤4mArms
Output Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)/	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Series setup resolution	Voltage	1mV		
	Current	1mA		
Series Read-back resolution	Voltage	1mV		
	Current	1mA		
Parallel setup resolution	Voltage	1mV		
	Current	0 - 9.999A - 1mA		
		10 - 12A - 10mA		
Parallel Read-back resolution	Voltage	1mV		
	Current	0 - 9.999A - 1mA		
		10 - 12A - 10mA		
Parallel setup accuracy	Voltage	≤0.02%+5mV		-
	Current	≤0.1%+30mA		-
Voltage waveform rise time 10%-90% change time	Typical value	< 100 ms	< 100 ms	< 100 ms

Voltage waveform fall time 10%-90% change time	Typical value	< 500 ms	< 500 ms	< 100 ms
Voltage dynamic response time, Load change 50%-100%	Restore to 50 mV	< 75 us		
Memory	Save/recall	36 groups		
Timer	Function	Output timer		
	Time set	0.1 second-99999.9 second		
	Resolution	0.1 second		
Working temperature		0-40℃		
Dimension (Bare metal, mounted to the cabinet)	W×H×D	214.5mm×88.2mm×451.6mm		
Dimension (Overall)	W×H×D	255.3mm×108.7mm×471mm		
Weight		15Kg		

IT6333C				
Parameters		CH1	CH2	CH3
Rated values (0 °C - 40 °C)	Voltage	0-60V	0-60V	0-5V
	Voltage limiting	61V	61V	6V
	Current	0-3A	0-3A	0-3A
	Power	180W	180W	15W
Load regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Line regulation (%of output + offset)	Voltage	≤0.01%+3mV	≤0.01%+3mV	≤0.01%+3mV
	Current	≤0.01%+3mA	≤0.01%+3mA	≤0.01%+3mA
Setup resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Read-back resolution	Voltage	1mV	1mV	1mV
	Current	1mA	1mA	1mA
Setup accuracy (Within 12 months) (25°C ± 5 °C) (%of output + offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV

accuracy (25 °C ± 5 °C) (%of output + offset)	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Ripple and noise (20Hz-20MHz)	Voltage(Vp-p) (10°C - 40°C)	≤4mVp-p	≤4mVp-p	≤3mVp-p
	Voltage(Vp-p) (0°C - 10°C)	≤4.5mVp-p	≤4.5mVp-p	≤4.5mVp-p
	Voltage(rms)	≤1mVrms	≤1mVrms	≤1mVrms
	Current (rms)	≤4mArms	≤4mArms	≤4mArms
Output Temp. coefficient (0 °C ~ 40 °C) (%of output+offset)	Voltage	≤0.03%+10mV	≤0.03%+10mV	≤0.03%+10mV
	Current	≤0.1%+5mA	≤0.1%+5mA	≤0.1%+5mA
Read-back Temp. coefficient (%of output+offset)	Voltage	≤0.03%+10mV		
	Current	≤0.1%+5mA		
Series setup resolution	Voltage	0-99V --- 1mV		--
		100-120V --- 10mV		
	Current	1mA		--
Series Read-back resolution	Voltage	0-99V --- 1mV		--
		100-120V --- 10mV		
	Current	1mA		--
Parallel setup resolution	Voltage	1mV		
	Current	1mA		
Parallel Read-back resolution	Voltage	1mV		
	Current	1mA		
Parallel setup accuracy	Voltage	≤0.02%+10mV		
	Current	≤0.1%+30mA		
Voltage waveform rise time 10%-90% change time	Typical value	< 100 ms	< 100 ms	< 100 ms
Voltage waveform fall time 10%-90% change time	Typical value	< 1.5 s	< 1.5 s	< 100 ms
Voltage dynamic response time, Load change 50%-100%	Restore to 50 mV	< 50 us		

Memory	Save/recall	36 groups
Timer	Function	Output timer
	Time set	0.1 second-99999.9 second
	Resolution	0.1 second
Working temperature		0-40℃
Dimension (Bare metal, mounted to the cabinet)	W×H×D	214.5mm×88.2mm×451.6mm
Dimension (Overall)	W×H×D	255.3mm×108.7mm×471mm
Weight		15Kg

*The above specifications may be subject to change without prior notice.

4.2 Supplemental Characteristics

Recommended calibration frequency: once a year

Maximum input power:

Model	IT6322A/IT6322B/IT6322C	IT6332A/IT6332B/IT6332C	IT6333A/IT6333B/IT6333C
Power	750VA	1000VA	1000VA

Cooling style: fans

Chapter5 Communication with PC

IT6322B/IT6332B/IT6333B Standard configuration have three communication interface: RS232, USB and GPIB. IT6322A/IT6332A/IT6333A Standard configuration have two communication interface: RS232 and USB. The IT6300C series power supply comes standard with communication interfaces: LAN, USB (including TMC and VCP). The user can choose any one to realize the communication with the computer. The following content can help you understanding how to through the computer control power supply output.

5.1 RS232 interface

The power rear panel has a DB9 needle mouth. Using both for the COM (DB9) cable connect computer. Press (Shift) + I-set (Menu), setting menu of configuration the same as the computer configuration before Activation connection. RS-232 interface can use all of the SCPI command to programming.

NOTE

In the procedure, the RS-232 must be set consistently with the front panel Config menu set. If you want to change, please press (Shift)+ I-set (Menu) and access to menu to change.

RS-232 data format

RS-232 data is a start bit and a stop bit 10 words. Start bit and the number of stop bits cannot be edit. However, press (Shift)+ I-set (Menu) and you can choose the following parity item. Parity options are stored in nonvolatile memory.

Baud rate

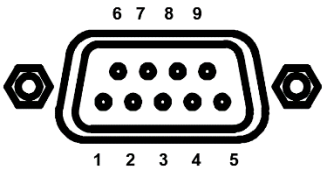
Press (Shift)+ I-set (Menu), under the Config menu, you can select a baud rate which is stored in nonvolatile memory:

4800/9600/19200/38400/57600/115200

RS-232 connection

RS-232 serial port can connect with controller serial port by using a piece of RS-232 cable with DB-9 interface (such as PC). The following table shows the plug of the pin.

If your computer connects with RS-232 interface with DB-25 plug, you need a cable and an adapter which one aspect of the matter is DB-25 plug the other end is DB-9 plug.



RS232 Pins of Plug

Base pin number	Description
1	No conjunction
2	TXD, data transmission
3	RXD, data receiving
4	No conjunction
5	GND, grounding
6	No conjunction
7	CTS, clear to send
8	RTS, request to send
9	No conjunction

RS-232 troubleshooting

If you are having trouble communicating over the RS-232 interface, check the following:

- The computer and the power supply must be configured for the same baud rate, parity, number of data bits, and flow control options. Note that the power supply is configured for 1 start bit and 1 stop bit (these values are fixed).
- The correct interface cables or adapters must be used, as described under RS-232 Connector. Note that even if the cable has the proper connectors for your system, the internal wiring may be incorrect.
- The interface cable must be connected to the correct serial port on your computer (COM1, COM2, etc.).

Communication settings

Before communication, you should first make the following parameters of power supply and PC matches.

Baud Rate: 9600 (4800/9600/19200/38400/57600/115200). You can enter the system menu from the front panel, and then set the baud rate.

Data bits: 8

Stop bit: 1

Parity: (none, even, odd)

EVEN Eight data bits have even check

ODD Eight data bits have odd check

NONE Eight data bits have no check

The machine address: (0 ~ 31, the factory a value of 0)

Start Bit	8 Data Bits	Parity=None	Stop Bit

5.2 USB interface

You can connect the power and computer by using a USB cable with an A

type port and a B type port. All the power function can program through the USB.

Note

For the IT6300C series models, USBTMC and USBVCP options are supported, and USBVCP is a virtual serial port (fixed to 9600/8/N/1). Before starting communication with the PC, you need to install VCP related drivers. Please contact ITECH Technical Support for the driver.

The power supply USB488 interface functions are described as follows:

- Interface is 488.2 USB488 interface.
- Interface receive the request of REN_CONTROL, GO_TO_LOCAL, and LOCAL_LOCKOUT.
- Interface receive command information about MsgID = TRIGGER USBTMC and pass on TRIGGER order to function layer.

The power USB488 device function are described as follows:

- Equipment can read all the forced SCPI command.
- Equipment is SR1 enabled.
- Equipment is RL1 enabled.
- Equipment is DT1 enabled.

5.3 GPIB interface (Only IT6300B, IT6300C(G) series are available)

First of all, you should make power supply GPIB port connecting to computer GPIB card through the IEEE488 bus. Make sure the connect is firmly and then set the address, power supply address range is: 1 to 30.You can Enter the system menu functions by pressing (Shift)+ I-set (Menu). You can find GPIB address settings through pressing ▶ and Input address, then press Enter to confirm. GPIB address is stored in nonvolatile line storage.

5.4 LAN interface

The LAN interface is assembled in the rear panel of the IT6300C series power supply. When connect PC, user can use one crossover cable to connect PC directly. Another way is using one direct-attached network cable to connected the router (in this case, the computer is also connected to the router).

Note

- When using one crossover cable to connect PC directly, the gateway address should be consistent with that of the PC, and the IP address should be at the same network segment with the PC's IP address.
- When the instrument and computer are connected to the router, an independent IP address must be assigned for the instrument.

The user can view the related information of LAN interface or configure the communication parameters in configuration menu (Config).

View LAN Interface Information

The operation steps to view the LAN interface information are as follows.

1. Press **[Shift]+[I-set]** (Menu) to enter into the menu setting interface.
2. Use left/right key or rotate the knob to select **Config > Communication** and press **[Enter]** to confirm.
3. Use left/right key or rotate the knob to select **LAN** and press **[Enter]** to confirm.

   The first displayed menu item **Info** is to view the LAN interface information.
4. Press **[Enter]** to confirm.
5. Use the left/right key or rotate the knob to view the LAN interface information. For details, see the information in the Config menu table of the User Manual.
6. After the setting is completed, press **[Esc]** to exit.

Configure LAN Interface Information

The configurable parameters are described as follows.

The instrument address

IP: This value is the Internet Protocol (IP) address of the instrument. An IP address is required for all IP and TCP/IP communications with the instrument. An IP Address consists of 4 decimal numbers separated by periods. Each decimal number ranges from 0 through 255 with no leading zeros (for example, 169.254.2.20).

IP Mask: This value is used to enable the instrument to determine if a client IP address is on the same local subnet. The same numbering notation applies as for the IP Address. When a client IP address is on a different subnet, all packets must be sent to the Default Gateway.

Gate: This value is the IP Address of the default gateway that allows the instrument to communicate with systems that are not on the local subnet, as determined by the subnet mask setting. The same numbering notation applies as for the IP Address. A value of 0.0.0.0 indicates that no default gateway is defined.

Socket Port: This value indicates the port number corresponding to the Raw-socket service.

The operation steps to configure are as follows.

This configures the instrument address (IP Mode).

1. Press **[Shift]+[I-set]** (Menu) to enter into the menu setting interface.
2. Use left/right key or rotate the knob to select **Config > Communication** and press **[Enter]** to confirm.
3. Use left/right key or rotate the knob to select **LAN** and press **[Enter]** to confirm.
4. Use left/right key or rotate the knob to select **Config** and press **[Enter]**

to confirm.

The first displayed menu item **IP Mode** is to configure the instrument address.

5. Press **[Enter]** to confirm.
   - DHCP: automatically configure the addressing of the instrument;
   - Manual: manually configure the addressing of the instrument.
6. After the setting is completed, press **[Esc]** to exit.
7. Restart the instrument and the modified configuration item will take effect.

Reset the LAN to the Default Settings

The operation steps to reset the LAN to the default settings are as follows.

1. Press **[Shift]+[I-set]** (Menu) to enter into the menu setting interface.
2. Use left/right key or rotate the knob to select **Config > Communication** and press **[Enter]** to confirm.
3. Use left/right key or rotate the knob to select **LAN** and press **[Enter]** to confirm.
4. Use left/right key or rotate the knob to select **Restore** and press **[Enter]** to confirm.
   - NO: indicates refuse to reset the LAN to the default settings.
   - YES: indicates reset the LAN to the default settings.
5. After the setting is completed, press **[Esc]** to exit.
6. Restart the instrument and the modified configuration item will take effect.

Appendix

Specifications of Red and Black Test Lines

ITECH provides you with optional red and black test lines, which individual sales and you can select for test. For specifications of ITECH test lines and maximum current values, refer to the table below.

Model	Specification	Cross section	Length
IT-E301/30A	30A	6mm^2	1.2m
IT-E301/30A	30A	6mm^2	2m
IT-E301/60A	60A	20mm^2	1.5m
IT-E301/120A	120A	50mm^2	2m
IT-E301/240A	240A	70mm^2	1m
IT-E301/240A	240A	70mm^2	2m
IT-E301/360A	360A	95mm^2	2m

For maximum current of AWG copper wire, refer to table blow.

AWG	10	12	14	16	18	20	22	24	26	28
The Maximum current value(A)	40	25	20	13	10	7	5	3.5	2.5	1.7

Note: AWG (American Wire Gage), it means X wire (marked on the wire). The table above lists current capacity of single wire at working temperature of 30°C. For reference only.

Contact Us

Thanks for purchasing ITECH products. In case of any doubts, please contact us as follows:

1. Visit ITECH website:www.itechate.com
2. Select the most convenient contact method, for further information.