

USER'S GUIDE

Programmable DC Power Supply

**Model IT6821/IT6822/IT6823/
IT6831/IT6832/IT6833/IT6834**



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Quick Reference

General information

The following safety precautions should be observed before using this product and any associated instrumentations. Although some instruments and accessories would be used with non-hazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to this manual for complete product specifications.

If the product is used in a manner not specified, the protection provided by the product may be impaired.

Before performing any maintenance, disconnect the line cord and all test cables.

Protection from electric shock

Operators of this instrument must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 volts, no conductive part of the circuit may be exposed.

Definition of users

Responsible body is the individual or group responsible for the use and maintenance of equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Service is only to be performed by qualified service personnel.

We do not accept responsibility for any direct or indirect financial damage or loss of profit that might occur when using the electronic load.

About your safety

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

Safety symbols and terms



Connect it to safety earth ground using the wire recommended in the user manual.



The symbol on an instrument indicates that the user should refer to the operating instructions located in the manual.



High voltage danger

Certification and Warranty

Certification

We certify that this product met its published specifications at time of shipment from the factory.

Warranty

This instrument product is warranted against defects in material and workmanship for a period of one year from date of delivery. During the warranty period we will, at its option, either repair or replace products which prove to be defective. For warranty service, with the exception of warranty options, this product must be returned to a service facility designated by us. Customer shall prepay shipping charges by (and shall pay all duty and taxes) for products returned to the supplier for warranty service. Except for products returned to customer from another country, supplier shall pay for return of products to customer.

Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the Customer, Customer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation and maintenance.

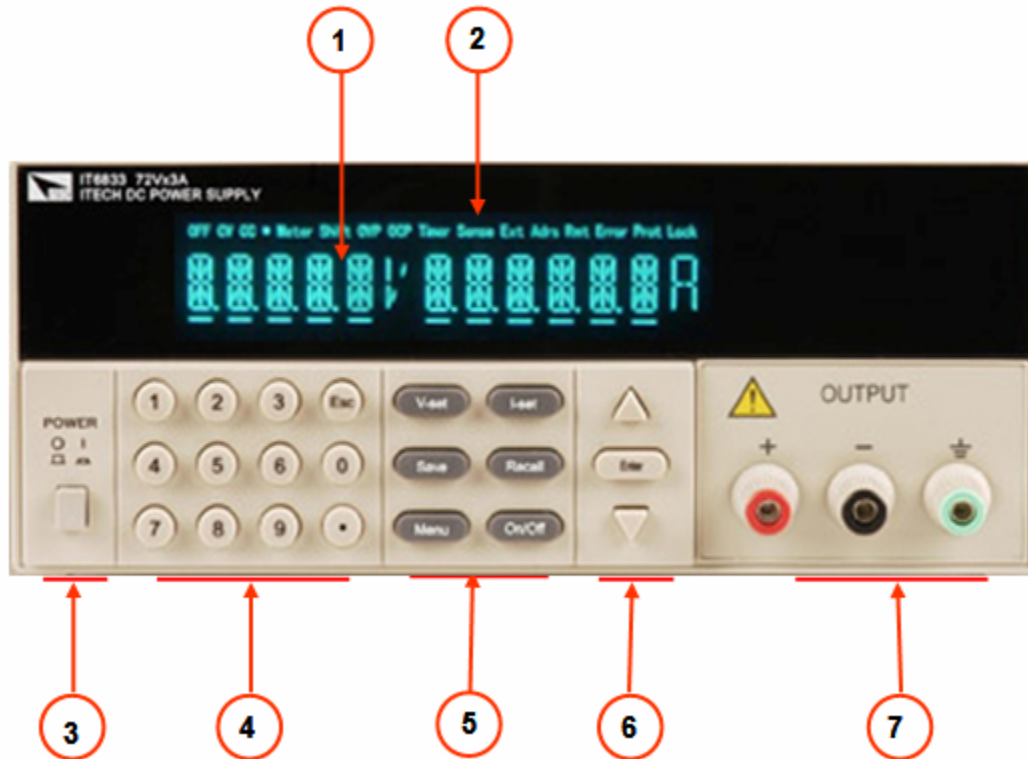
Introduction

IT6800 Series power supplies are high performance single-output programmable DC power supplies with communication interface. The combination of bench-top and system features in these power supplies provides versatile solutions for your design and test requirements.

Convenient bench-top features:







- Nice appearance, small-size and light weight
- VFD display
- Convenient leaning numeric keypad
- Adjustable & constant voltage outputs
- Adjustable & constant current outputs
- Output on/off
- High accuracy and high resolution
- Excellent load and line regulation
- Low ripple and noise
- Limit voltage protection
- Over current/temperature protection
- Sixteen operating states storage
- Optional communication cable
- Software calibration
- Free software for control and calibration
- May be used in series or parallel modes with additional power supplies

The Front Panel at a Glance



- ① 10 digits VFD display
- ② Status information for operating mode and working status
- ③ Power switch
- ④ Number keys
- ⑤ Function keys
- ⑥ UP、DOWN and ENTER key
- ⑦ Output terminals

Function keys description

	Set the output voltage value
	Set the output current value
	Save the present settings to a specified register location(1~16)
	Recall a saved settings from location “1”through “16”
	Menu function to set related parameters of the power supply
	Output ON/OFF, to enable/disable the output

Menu description

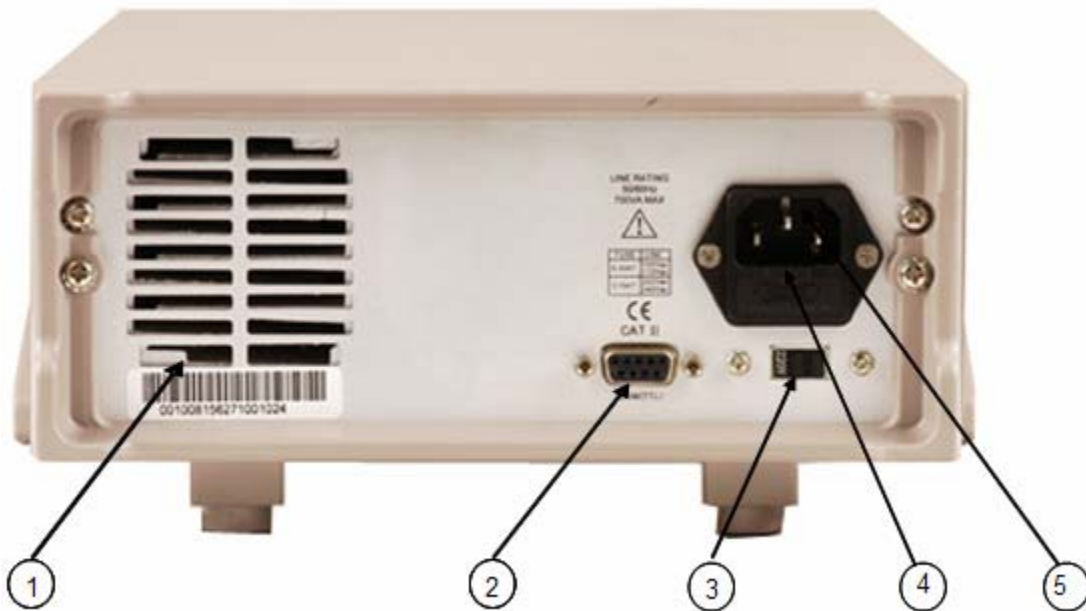
Menu		
▼	>MAX VOLT	Set the maximum output voltage value
▼	>INIT OUT	Initiate the output state to ON or not
▼	>INIT VOL	Initiate the output voltage to 0 volt or not
▼	>KEY SOUN	Switch On/Off the buzzer sound when you press any key
▼	>BAUD RATE	Set the communication baud rate
▼	>ADDR	Set the communication address
▼	>KEY LOCK	Set the password for function keys
▼	>EXIT	Exit

Display annunciators



OFF	The power supply's output is off	Timer	Not used
CV	Constant voltage mode	Sense	Not used
CC	Constant current mode	Ext	Not used
*	Not used	Adrs	The instrument is communicating with an IT-E131/IT-E132/IT-E133
Meter	Meter mode	Rmt	The instrument is in remote state. The only active key is the Local KEY.
Shift	Not used	Error	The instrument has error
OVP	Over voltage protect state	Prot	Not used
OCP	Over current protect state	Lock	The keyboard is locked by a password

The Rear Panel at a Glance



- ① Cooling window
- ② DB9 interface connector
- ③ 110V/220V selector
- ④ Fuse
- ⑤ Power socket

Chapter 1 Quick Start

One of the first things you will want to do with your power supply is to become acquainted with the front panel. The exercises in this chapter prepare the power supply for use and help you get familiar with some of its front-panel operations.

This chapter is intended for both the experienced and the inexperienced user because it calls attention to certain checks that should be made prior to operation.

1.1 Preliminary Checkout

The following steps help you verify that the power supply is ready for use.

1. Check the list of supplied items.

Verify that you have received the following items with your power supply. If anything is missing, contact your nearest Sales Office.

- One power cord for your location
- This User's Manual.
- Calibration Report
- CD-Rom
- Communication cable (optional)

2. Connect the power cord and turn on the power supply.

When you turn on the power supply, the front-panel display will light up briefly while the power supply performs its power-on self-test. All the VFD annunciators will light up at once. To review the display with all annunciators, you can check if there is any stroke loss on any annunciator. If there isn't any response when you power on the power supply, please see Section 1.5 on page 10 for some service information.

If the EEPROM was damaged or the latest operation data in EEPROM was lost, the VFD will display as follows:

ERR EEPROM

If the calibration data in EEPROM was lost, the VFD will display as follows:

ERROR CAL

If everything is OK, the VFD will display voltage and current as follows:

CV Meter
5.65V 0.00A



Warning: The power supply is shipped from the factory with a power-line cord that has a plug appropriate for your location. Your power supply is equipped with a 3-wire grounding type power cord; the third conductor being the ground. The power supply is grounded only when the power-line cord is plugged into an appropriate receptacle. Do not operate your power supply without adequate cabinet ground connection.

1.2 Output Checkout


The following procedures check to ensure that the power supply develops its rated outputs and properly responds to operation from the front panel.

1.2.1 Voltage Output Checkout

The following steps verify basic voltage functions without load.

1. Turn on the power supply.

2. Enable the outputs.

Press  key to turn off the OFF annunciator and turn on the CV annunciator.

Notice: if the voltage value flash, then the power supply is in *Set* mode, “Set mode” means that the VFD display shows the setting output voltage and current. Or the power supply is in *Meter* mode, “Meter mode” means that the VFD display shows the actual output voltage and current and the “Meter” annunciator is lit.

3. Check that the front-panel voltmeter properly responds to numeric keys

Set some different voltage values, then wait till the Meter mode to check if the VFD displayed voltage value is the same as the set voltage value, and to check if the VFD displayed current value is nearly zero.


4. Ensure that the voltage can be adjusted from zero to the full rated value.

1.2.2 Current Output Checkout

The following steps check basic current functions with a short across the power supply’s output.

1. Turn on the power supply.

2. Disable the output

Press  key to ensure that the output is disabled. The OFF annunciator is turned on.


3. Connect a short across (+) and (-) output terminals with an insulated test lead.

Use a wire size sufficient to handle the maximum current.



Warning: To satisfy safety requirements, load wires must be heavy enough not to overheat when carrying the maximum short-circuit output current of the power supply. If there is more than one load, then any pair of load wires must be capable of safety carrying the full-rated current of the power supply.

4. Enable the output.

Press  key to ensure that the output is enabled. The OFF annunciator is turned off.

5. Adjust the voltage value to 1.0 volt.

Adjust the voltage to 1.0 volt to ensure the power supply is in CC operation mode. The CC annunciator will turn on.

6. Adjust the current value.

Set some different voltage values, then wait till the Meter mode to check if the VFD displayed current value is the same as the set voltage value, and to check if the VFD displayed voltage value is nearly zero.

7. Ensure that the current can be adjusted from zero to the full rated value.

8. Turn off the power supply and remove the short wire from the output terminals.

1.3 If the Power Supply Does Not Turn On

Use the following steps to help solve problems you might encounter when turning on the instrument. If you need more help, refer to chapter 6 for instructions on returning the instrument to the supplier for service.

1. Verify that there is AC power to the power supply.

First, verify that the power cord is firmly plugged into the power receptacle on the rear panel of the power supply. You should also make sure that the power source you plugged the power supply into is energized. Then, verify that the power supply is turned on.

2. Verify the power-line voltage setting.

The line voltage is set to the proper value for your country (110VAC or 220VAC) when the power supply is shipped from the factory. Change the voltage setting if it's not correct.

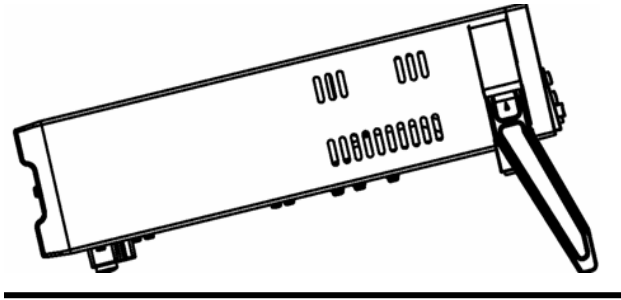
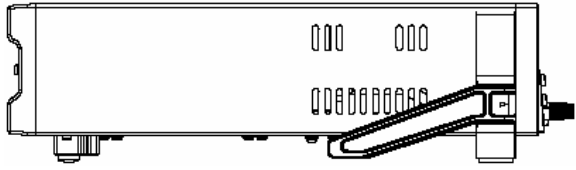
3. Verify that the correct power-line fuse is installed.

If the fuse was damaged, please see the table below to replace the fuse for your power supply.

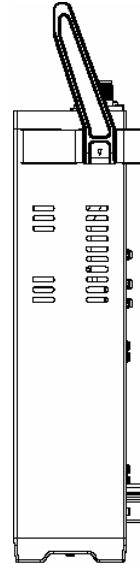
Model	Fuse Description
IT6821	Fuse 2.5A T 250V for 220VAC
IT6822	Fuse 5A T 250V for 110VAC
IT6823	
IT6831	Fuse 3.15A T250V for 220VAC
IT6832	Fuse 6.5A T250V for 110VAC
IT6833	
IT6834	

1.4 To Adjust the Carrying Handle

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



Bench-top viewing positions

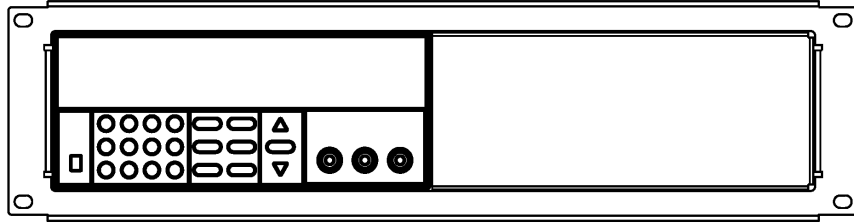


Carrying position

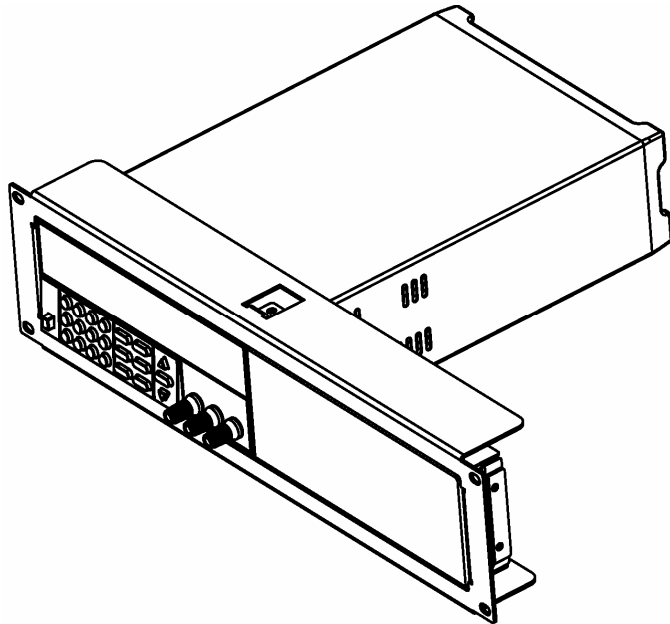
1.5 To Rack Mount the Instrument

You can mount the power supply in a standard 19-inch rack cabinet using the IT-E151 rack mount kit.

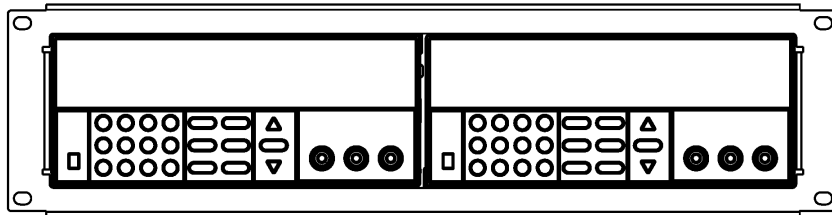
Note: Remove the carrying handle and the two plastic ears before rack-mounting the instrument. To remove the handle, grasp the handle by sides and pull outwards and rotate it to a special position to let the arrow on the handle and the arrow on the plastic ears be in opposite directions, then pull the handle outward. After removing the handle, you can use a screwdriver to remove the two plastic ears.



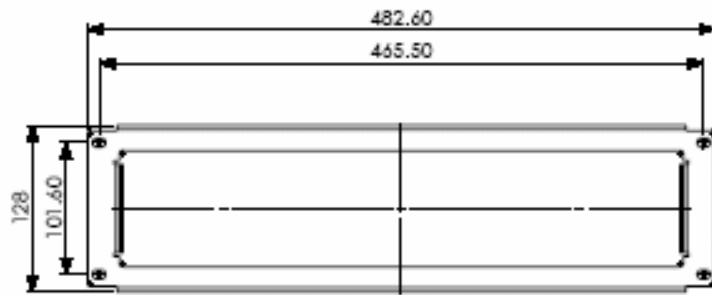
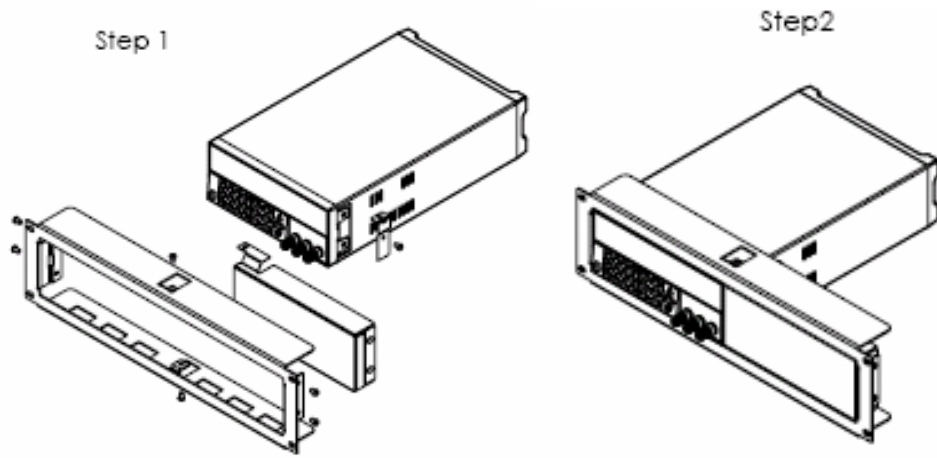
To rack mount a single instrument, order rack mount kit IT-E151



Side view of rack mounting a single instrument



To rack mount two instruments side-by-side, order rack mount kit IT-E151, you needn't to use the front cover panel.



Dimension

unit (mm)

Chapter 2 Specifications

2.1 Specifications

Parameter		IT6821	IT6822	IT6823	IT6831	IT6832	IT6833	IT6834
Output Rating (0 °C - 40 °C)	Voltage	0 ~ 18V	0 ~ 32V	0 ~ 72V	0~18V	0~32V	0~72V	0~150v
	Current	0 ~ 5A	0 ~ 3A	0 ~ 1.5A	0~10A	0~6A	0~3A	0~1.2A
	LVP	0 ~ 19V	0 ~ 33V	0 ~ 73V	0~19V	0~33V	0~73A	0~151V
Load Regulation	Voltage	(rated current≤3A) < 0.01%+3mV (rated current≤10A) < 0.02%+5mV						
	Current	< 0.01%+3mA						
Line Regulation	Voltage	< 0.01%+3mV						
	Current	< 0.1%+2mA						
Programming Resolution	Voltage	10mV						
	Current	10mA						
Readback Resolution	Voltage	10mV(<20V); 100mV(>20V)						
	Current	10mA						
Programming Accuracy (25 °C ± 5 °C)	Voltage	≤0.05%+10mV	≤0.05%+15mV	≤0.05%+10mV	≤0.05%+15mV	≤0.05%+15mV	≤0.1%+38mV	
	Current	0.2%+10mA						
Readback Accuracy (25 °C ± 5 °C)	Voltage	≤0.05%+15mV(<20V)	≤0.05%+20mV (<20V)	≤0.05%+15mV (<20V)	≤0.05%+20mV (<20V)	≤0.05%+20mV (<20V)	≤0.1%+38mV (<20V)	
		≤0.05%+120mV (≥20V)	≤0.05%+20mV (≥20V)	≤0.05%+120mV (≥20V)	≤0.05%+120mV (≥20V)	≤0.05%+120mV (≥20V)	≤0.1%+120mV (≥20V)	
	Current	< 0.1%+15mA						
Ripple (20Hz~20MHz)	Voltage	≤0.5mVrms/3mVp-p	≤0.5mVrms/4mVp-p	≤0.5mVrms/3mVp-p.	≤0.5mVrms/4mVp-p	≤0.5mVrms/4mVp-p	≤0.6mVrms/7mVp-p	
	Current	5 mArms						
Temperature Coefficient(0 °C ~ 40 °C)	Voltage	< 0.02%+5mV						
	Current	< 0.1%+5mA						
Readback Temperature Coefficient	Voltage	< 0.02%+10mV (<20V), <0.02%+100mV(≥20V)						
	Current	< 0.1%+15mA						

2.2 Supplemental Characteristics

State Storage Memory

Sixteen (16) user-configurable stored states

Recommended Calibration Interval

1 year

AC Input Ratings (selectable via switch on the rear panel)

Option OP1: 220VAC ± 10%, 47 to 63 Hz

Option OP2: 110 VAC ± 10%, 47 to 63 Hz

Cooling

Fan cooled

Operating Temperature

0 to 40 °C for full rated output

Storage Temperature

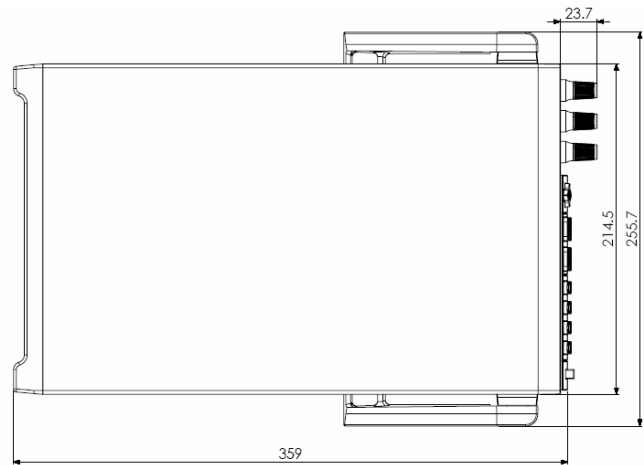
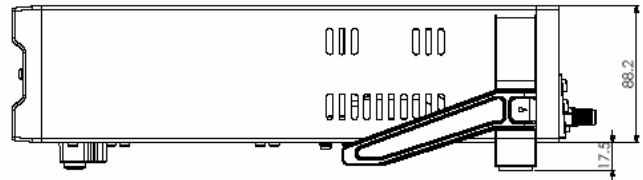
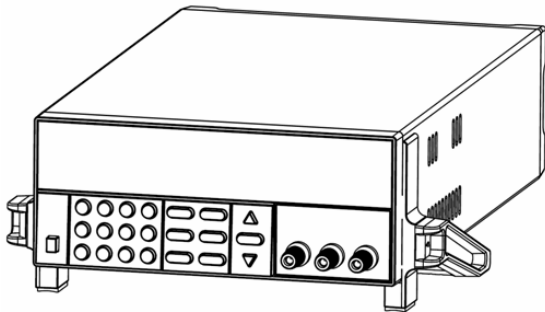
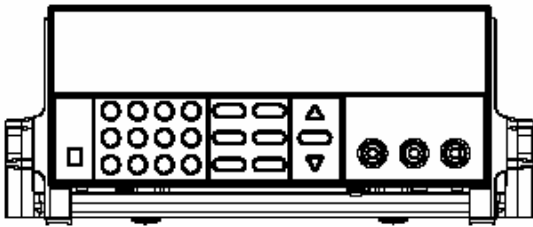
-20 to 70 °C for storage environment.

Environmental Conditions

Designed for indoor use in an installation category II, pollution degree 2 environment. Designed to operate at maximum relative humidity of 95% and at altitudes of up to 2000 meters.

Dimensions*

255.7mmW x 105.7mmH x 382.7mmD



(Unit: mm)

Chapter 3 Front-panel Operation


So far you have learned how to install your power supply and do quick start. During the quick start, you were briefly introduced to operating from the front panel as you learned how to check basic voltage and current functions. This chapter describes in detail the use of the front-panel keys and shows how they are used to accomplish power supply operation.

This chapter is divided into the following sections:

- Front-Panel Operation Overview, on page 14
- Constant Voltage Operation, on page 15
- Constant Current Operation, on page 15
- Storing and Recalling Operating States, on page 15
- MENU operation, starting on page 16

3.1 Front-panel Operation Overview

The following section describes an overview of the front-panel keys before operating your power supply.

1. The power supply is shipped from the factory configured in the front-panel operation mode. At power-on, the power supply is automatically set to operate in the front-panel operation mode. When in this mode, the front panel keys can be used.
2. When the power supply is in remote operation mode, you cannot use the front-panel. A change between front-panel and remote operation modes will not result in any change in the output parameters. You can change the front-panel and remote operation modes by computer.
3. The power supply is in *Meter* mode when it is powered on, and the VFD will display the actual voltage and current output value. And in this mode, if any non-functional key is pressed, the power supply will be changed to *Set* mode, and the VFD will display the adjusted voltage and current value. In *Set* mode, the set voltage value will flash, you can press ▲ and ▼ keys to adjust the voltage value. In *Set* mode, the power supply will turn back to *Meter* mode if there is no any key is pressed for 3 seconds.
4. The output of the power supply can be enabled or disabled from the front panel by pressing  key. When the output is on, the OFF annunciator will turn off.
5. The VFD display shows the present operating status of the power supply with annunciators. For example, the power supply is operating in CV mode, and then the CV annunciator will turn on. If, the power supply is remotely controlled, the Rmt annunciator will also turn on, See “Display Annunciators”.

3.2 Constant Voltage Operation

The constant voltage range is from 0V to the maximum voltage value of each model. It is very easy for you to set the constant voltage output. You have 2 solutions to set the constant voltage value.

Solution 1:

Step1. Power on the IT6800 series instrument

Step2. Press the ▲ and ▼ keys to change the value

Solution 2:

Step1. Power on the IT68xx instrument

Step2. Press  key.

Step3. Use the numeric keys **0** to **9** or **▲** and **▼** keys to change the voltage value.

Step4. Press **Enter** to confirm the value

3.3 Constant Current Operation

The constant current output range is from 0A to the maximum current value of each type. It is very easy for you to set the constant current output.

Step1. Power on the IT6800 series instrument

Step2. Press **I-Set** key

Step3. Use the numeric keys **0** to **9** or use **▲** and **▼** keys to change the current value

Step4. Press **Enter** key to confirm the value

3.4 Saving and Recalling Operation

You can store up to 16 different output states in storage register locations (1 to 16). Each output state includes Constant voltage value, Constant current value and Maximum output voltage value. When shipped from factory, storage locations "1" through "16" are empty. You can recall the saved settings by Recall function.

Step1. After you setting an output state (CV value, CC value and Maximum voltage), press **Save** key.

Step2. Use the numeric keys **0** to **9** or **▲** and **▼** keys to select the memory location (the range is 1 to 16) which you want to store in.

Step3. Press **Enter** to confirm the memory location.

Step4. Press **Recall** key.

Step5. Use numeric keys **0** to **9** or **▲** and **▼** keys to select the states which you want to recall.

Step6. Press **Enter** key to confirm. Then the saved settings will come on.

Note: 1. If the function keys were locked by password, you need to enter the correct password after you press function keys (V-set, I-set, Save, Recall and Menu), then you can do the settings.

2. If you want to cancel a function operation (V-set, I-set, Save, Recall or Menu), just press **Esc** key to exit.

3.5 Menu Operation



■ Set Maximum voltage(>MAX VOLT)

Please be well known that the Max voltage value should be in the range of each type of IT68xx Power supply.

Step1. Press  key.

Step2. Select >MAX VOLT by using ▲ and ▼ key.

Step3. Press  key.

Step4. Change the voltage value by using numeric keys  to  or ▲ and ▼ key.

Step5. Press  key.

Note: After you setting the maximum voltage value, the output voltage setup should be in the range from 0 volt to maximum voltage. The default maximum voltage is the full voltage range of its model.

■ Initiating the Output state(>INIT OUT)

This instruction can initiate the output state when the power supply is powered on. If you select ON, the power supply will initiate the output to OFF state when the power supply is powered on. If you select OFF, the output will remain the same state as last time you turned off the power supply

Note: Default selection is ON and the output state is always OFF state.

■ Initiating the Output Voltage (>INIT VOLT)

This instruction can set the initial output voltage. If you select ON, the power supply will initiate the output voltage to 0 Volt when the power supply is powered on. If you select OFF, the output voltage will remain as the same volts as the last time you turned off the power supply

Note: Default setting is ON and the output voltage is 0 volt.

■ Setting the Key Sound(>KEY SOUND)

This instruction can switch on/off the buzzing sound when you press any key, If you select ON, the buzzer will sound when any key was pressed. If you select OFF, the buzzer will not sound when the keys were pressed.

Note: Default setting is ON; the buzzer will sound when you press any key.

■ **Setting the Baud Rate(>BAUDRATE)**

This instruction can change the communication baud rate for the power supply, the baud rate range is 4800, 9600, 19200 or 38400. Before the communication, you must make sure that there is same baud rate between the power supply and the computer.

Note: Default baud rate is 4800.

■ **Setting Address (>ADDRESS)**

This instruction can set the communication address for each power supply. The address range is from 0 to 30. Before the communication, you must make sure that there is same address between the power supply and the computer.

Note: Default address is 0. When the power supply receives a frame instruction from computer, the LINK indicator will light on; it means that the power supply started to communicate with computer. If the power supply hasn't received the signal from computer for 3 seconds, the Adrs indicator will be turned off and it means that the power supply can not communicate with computer.

■ **Setting password for function keys(>KEY LOCK)**

This instruction can set a password (1 through 4 digits) to lock the function keys operation. After setting the password, all the function keys on the front panel will be locked except the **OUT on/off** key. You must enter the correct password to unlock them, then you can continue to do the function key operation. If you don't want to lock the function keys, please don't press any number key when you enter the >KEY LOCK instruction, just press **ENTER** key to unlock it.

Note: When shipped from factory, there is no password and function keys are unlocked. The start bit of your desired password shouldn't be 0.

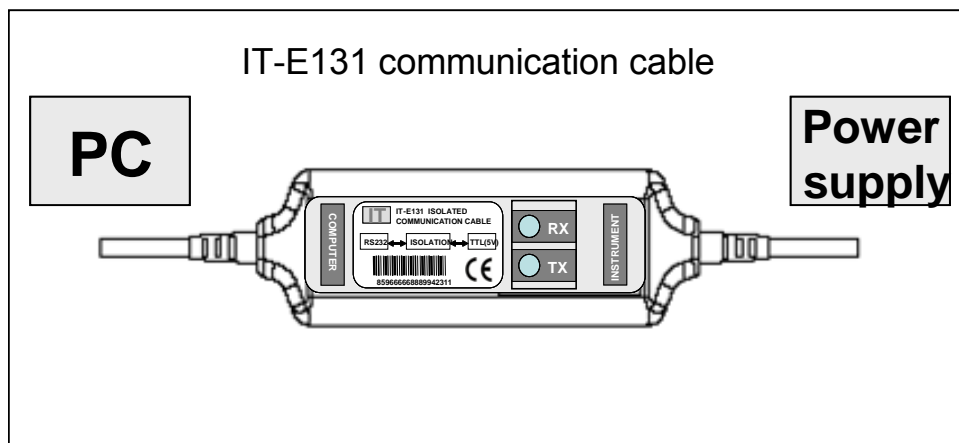
Chapter 4 Remote Operation Mode

The DB9 interface connector on the rear panel of the power supply can be transferred to RS-232 interface, the following information will tell you how to use the computer to control the output of the power supply.

4.1 Communication cable

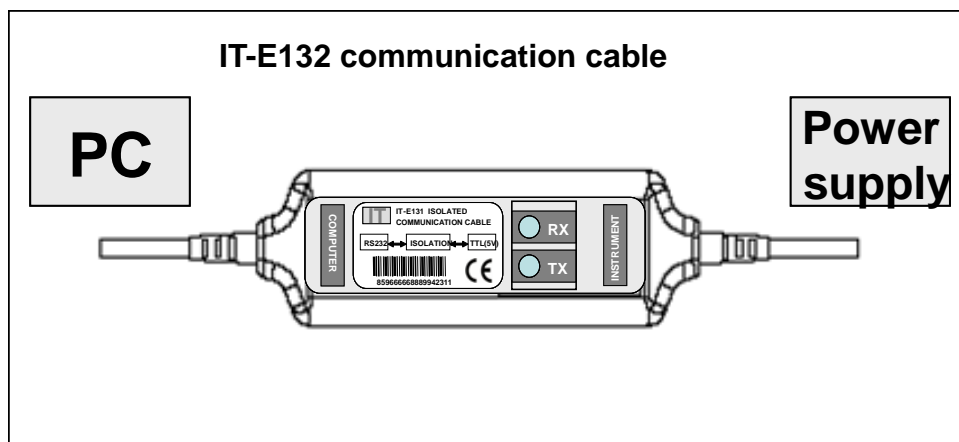
IT-E131 RS232 Communication cable

The DB9 interface connector on the rear panel of power supply is TTL voltage level; you can use the communication cable (IT-E131) to connect the DB9 interface connector of the power supply and the RS-232 interface connector of computer for the communication.



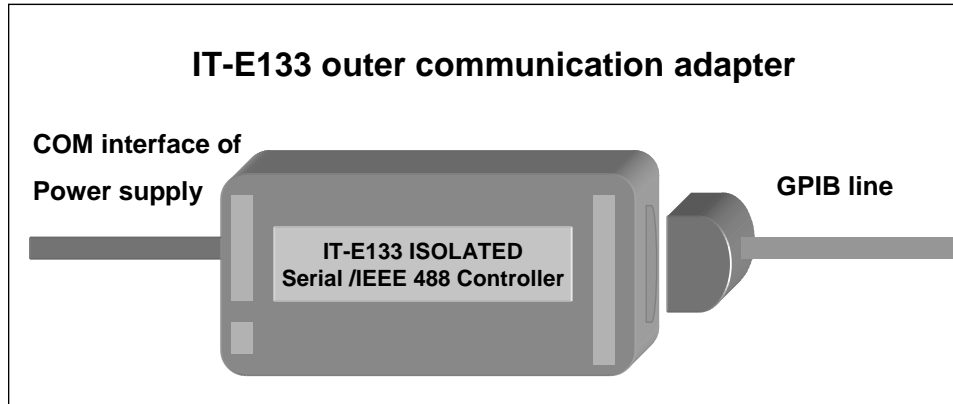
IT-E132 USB Communication cable

The DB9 interface connector on the rear panel of power supply is TTL voltage level; you can use the communication cable (IT-E132) to connect the DB9 interface connector of the power supply and the USB interface connector of computer for the communication.



IT-E133 GPIB Communication Cable

The DB9 interface connector on the rear panel of power supply is TTL voltage level; you can use the GPIB communication cable (IT-E133) to connect the DB9 interface connector of the power supply, and then connect the GPIB interface of the IT-E133 and computer with GPIB/IEEE 488 line for the communication.



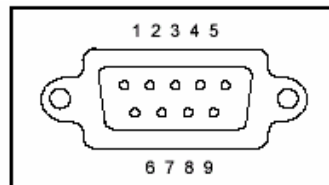
4.2 Communication between Power Supply and PC

Before using the remote operation mode, please make sure that the baud rate and communication address in power supply are the same as in the computer software, otherwise, the communication will fail, you can change the baud rate and communication address from the front panel or from computer.

1. Address: the range is from 0 to 254, default setting is 0
2. Baud rate: 4800,9600,19200 and 38400 are selectable, default setting is 4800
3. Data bit: 8 bit
4. Stop bit: 1
5. Parity: None

Parity=None	Start Bit	8 Data Bits	Stop Bit
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1. End of String is '\n'(0x0a)
2. DB9 Interface Details



DB9 in the rear panel of power supply is TTL level signal. It can be connecting with standard PC interface through the IT-E131 isolated communication cable.