

Anti-reverse Protection Unit IT-E165A User Manual

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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 instrument 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.



Note

Visit <https://www.itechate.com/en/support/register.html> to complete product registration by filling out the necessary information to extend the warranty to two (2) years.











- 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	-	-

Regulatory Markings

	The CE tag shows that the product complies with the provisions of all relevant European laws (if the year is shown, it indicates that the year when the design is approved).
	The UKCA tag shows that the product complies with the provisions of all relevant United Kingdom laws (if the year is shown, it indicates that the year when the design is approved).
	This instrument complies with the WEEE directive (2002/96/EC) tag requirements. This attached product tag shows that the electrical/electronic product cannot be discarded in household waste.
	This symbol indicates that no danger will happen or toxic substances will not leak or cause damage in normal use within the specified period. The service life of the product is 10 years. The product can be used safely within the environmental protection period; otherwise, the product should be put into the recycling system.

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 ¹²³

Reference Standards

CISPR 11:2015+A1:2016 Ed 6.1

IEC 61000-3-2: 2018 RLV

IEC 61000-3-3: 2013+A1:2017

IEC 61000-4-2:2008

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

IEC 61000-4-4:2012

IEC 61000-4-5:2014+A1:2017

IEC 61000-4-6:2013+cor1:2015

IEC 61000-4-11:2004+A1:2017

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+A1:2016

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Chapter 1 IT-E165A Introduction

Our company's power supply products, such as the **IT6000 series** (including **IT6000B, IT6000C, IT6000D, IT8000**), **IT6500C/D series**, **IT-M3900 series** (including **IT-M3900B, IT-M3900C, IT-M3900D, IT-M3800**), and **IT6600 series** (including **IT6600C, IT6600D**), all support the optional **IT-E165A module**.

The **IT-E165A** is a **reverse polarity protection module** designed to **prevent reverse connection** when testing battery-related DUTs. Additionally, it can be used with **DC electronic loads that do not allow reverse connection** to prevent damage caused by the DUT being connected in reverse.

It is necessary to consider that the voltage / current of the DUT is within the rated voltage / current range of IT-E165A.

For the IT6600 series dual-channel models, when using both channels simultaneously, two IT-E165A units need to be selected. Additionally, the voltage and current range of both IT-E165A units must meet the output requirements of their respective channels.

The following models are available:

Model	Voltage	Current
IT-E165A-250	750V	250A
IT-E165A-400	750V	400A
IT-E165A-500	900V	400A
IT-E165A-750	1500V	750A
IT-E165A-1000	1500V	1000A

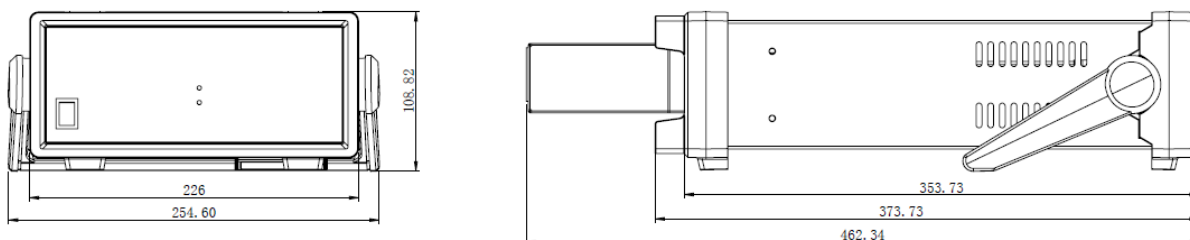
The main functions achieved are as follows, which represent typical applications:

- **Effectively Preventing Reverse Connection of the DUT (Battery Products):** The IT-E165A has a built-in detection circuit that determines whether there is a voltage difference to detect reverse connection. If a reverse connection is detected, the test circuit is disconnected to ensure the safety of both the DUT and the operator.
- **Protecting Electronic Loads from Damage:** When using a **DC load** to test a **DC power supply** or **DC-DC converter**, most **DC electronic loads strictly prohibit reverse connection** of the DUT. If the DUT is **connected in reverse** or if a **high voltage spike exceeding the rated voltage range** of the load occurs, the electronic load may be damaged. To prevent such issues, the **IT-E165A** can be used as an optional accessory. With its built-in **pre-charge** and **reverse polarity protection** functions, the **IT-E165A** effectively reduces such risks and

ensures the safety of the electronic load testing equipment (such as the **IT8900A/E** or **IT8900G/L** series).

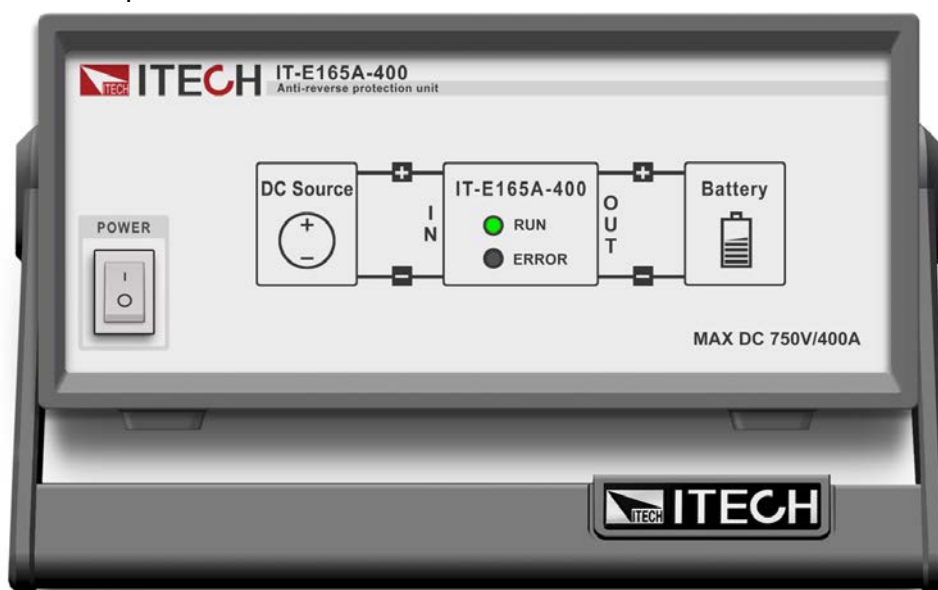
1.1 Introduction

- The dimensions of IT-E165A-250, IT-E165A-400, and IT-E165A-500 are shown below. Unit: mm



The **IT-E165A-250**, **IT-E165A-400**, and **IT-E165A-500** can be installed in standard 19-inch wide racks. ITECH offers optional installation kits—**IT-E151** (resulting in a 3U height after installation) or **IT-E151A** (resulting in a 2U height)—for this purpose. Users can refer to the **IT-E151** or **IT-E151A** user manual for rack installation instructions.

The front panel is shown below.

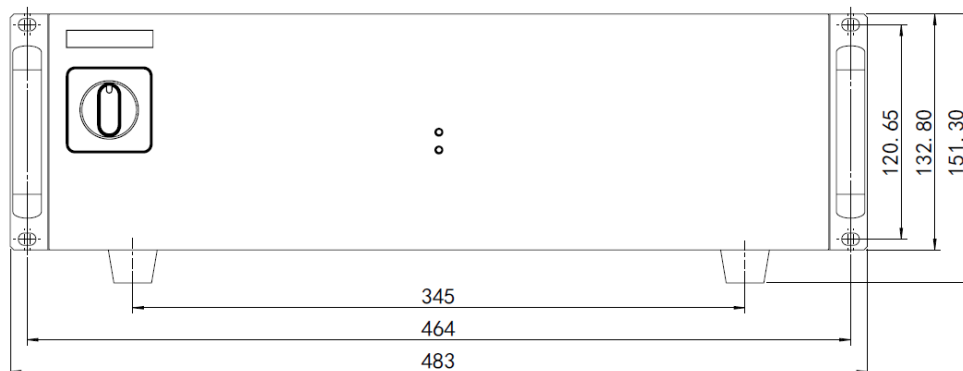


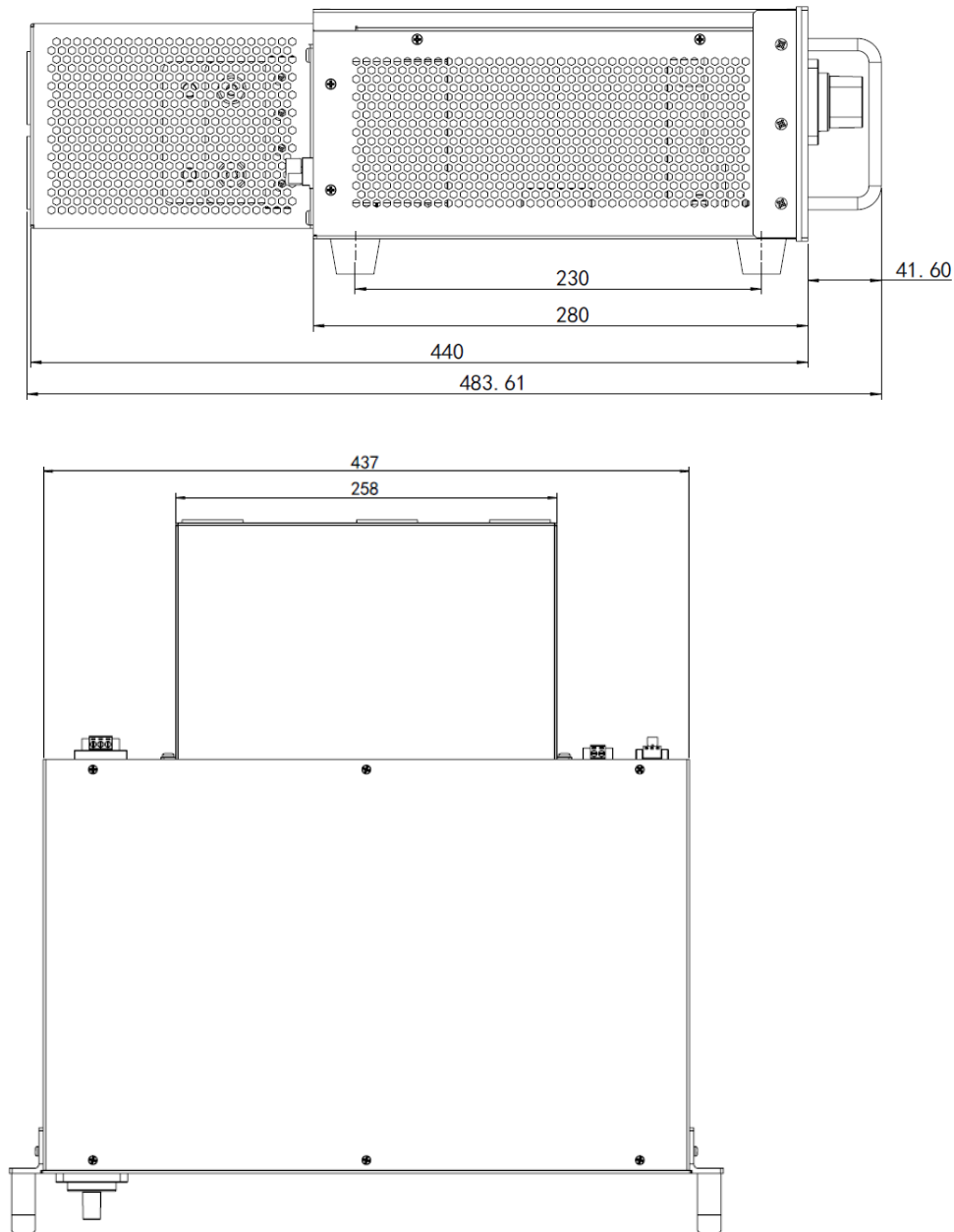
The rear panel is shown below.



- AC input: 88~264VAC, 50/60Hz, 1.3A max.
 - DC terminals: OUT DC+ DC-; IN DC- DC+
 - Sense: reserved terminals, no connection required
 - IO: When leaving the factory, the pin IN is shorted to GND by default, and the instrument can work normally; if the short-circuit piece is removed, the instrument will not work. When the instrument is running, there is a low level of 0V between OUT and GND, and a high level of 5V in the non-RUN state.
- The dimensions of IT-E165A-750 and IT-E165A-1000 are as shown in the figure below. Unit: mm

The **IT-E165A-750** and **IT-E165A-1000** come with front mounting handles that allow the instrument to be installed into a standard 19-inch wide rack. However, the rack must be equipped with load-bearing components such as side brackets, rails, or trays to support the weight of the instrument.





The rear panel is shown below.



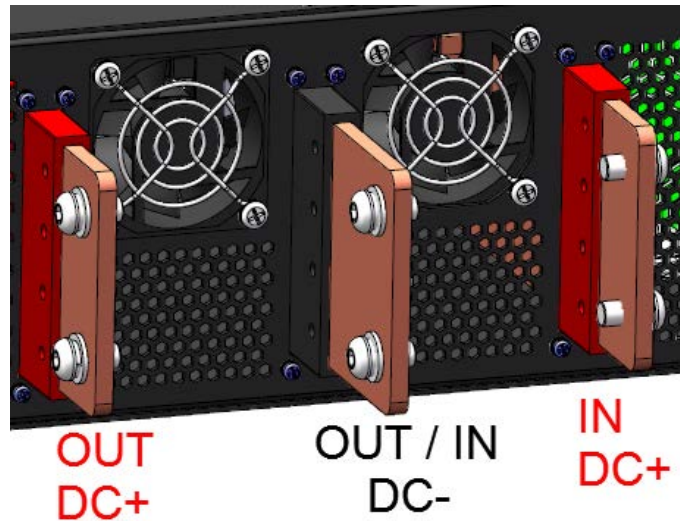
1. AC input terminals L, N, PE

AC input voltage range: 180~550VAC

AC input frequency range: 47~63Hz

AC input inrush current: 50A (cold start)

2. DC terminals



Note: The maximum current of the positive and negative terminals of IN and OUT on the rear panel is 1000A.

3. Normally open contact

5A at 250VAC, 24VDC

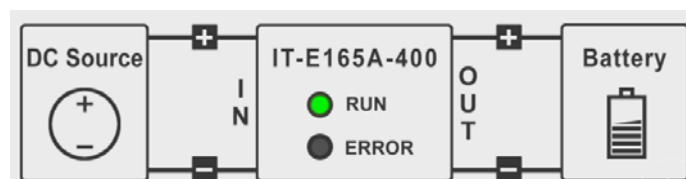
4. Digital IO terminals

When leaving the factory, the pin IN is shorted to GND by default, and the instrument can work normally; if the short-circuit piece is removed, the instrument will not work. When the instrument is running, there is a low level of 0V between OUT and GND, and a high level of 5V in the non-RUN state.

1.2 How to Use

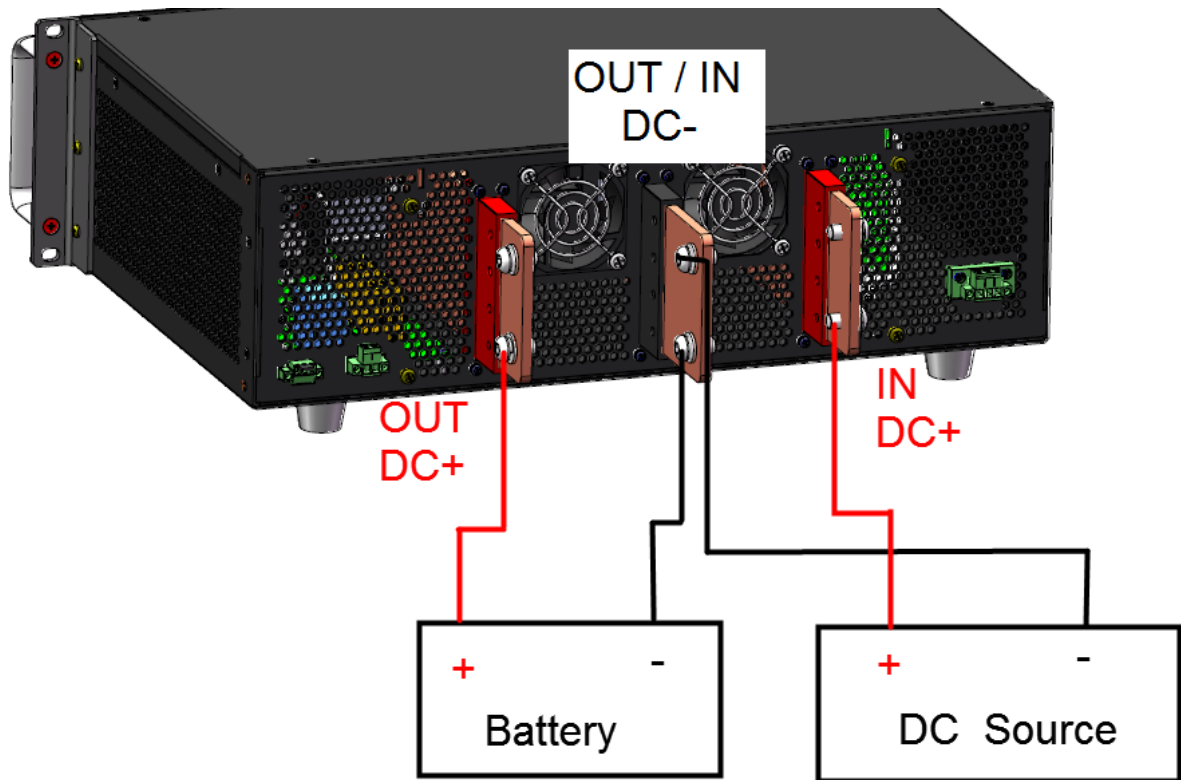
For battery testing applications, refer to the following steps.

1. Make sure that the power of the battery, IT-E165A, and IT6000 is turned off.
2. Refer to the following diagram to connect the IT6000 series instrument and the DUT (battery).
 - IT-E165A-250, IT-E165A-400, IT-E165A-500



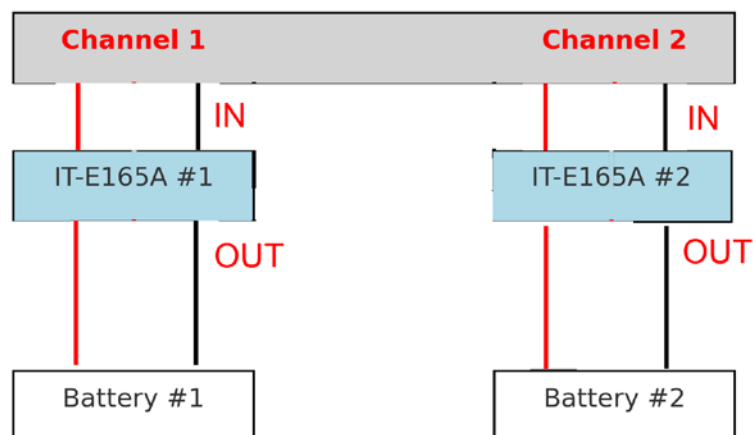
Note: The green terminals Sense and IO on the rear panel are reserved terminals and do not need to be connected.

- IT-E165A-750, IT-E165A-1000



- When using both channels of the IT6600 series simultaneously, connect two IT-E165A units.

Dual-Channel DC Power Supply



3. Connect the power cord of IT-E165A.
4. Start the battery and turn on the IT6000 power switch.
5. Turn on the Power switch of the IT-E165A.

If two IT-E165A units are connected, turn on the power switches of the IT-E165A units sequentially.

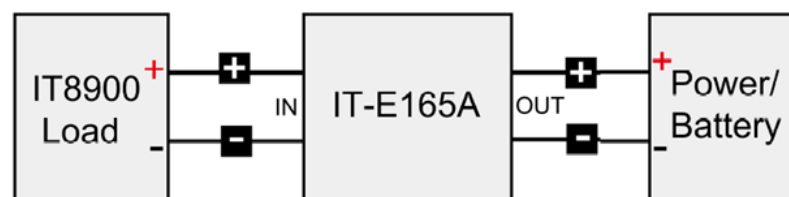
If IT6000 (IN) and DUT (OUT) are not reversed, and the voltage difference between IT6000 (IN) and DUT (OUT) is less than 3V, the indicator will display RUN (green light);

If there is a reverse connection between IT6000 (IN) and DUT (OUT), or the voltage difference between IT6000 (IN) and DUT (OUT) is greater than 3V, the indicator will display ERROR (red light). Please recheck whether IT6000 (IN) and DUT (OUT) are reversely connected, and make sure that the voltage difference between IT6000 (IN) and DUT (OUT) is less than 3V.

Note: The IT-E165A pre-charge process takes some time, please be patient and wait.

For **DC-DC Converter** testing applications, using the **IT8900A/E series electronic load** as an example, refer to the following steps.

1. Ensure that the power supplies of the **DUT, IT-E165A, and IT8900A/E** are turned off.
2. Connect the IT8900 series instrument and the DUT according to the following schematic diagram.



3. Connect the power cable of the IT-E165A.
4. Turn on the DUT, then switch on the IT8900 power.
5. Turn on the **IT-E165A** power switch.

The **IT-E165A** detects whether there is a reverse connection.

- If no reverse connection is detected, the **IT-E165A** will perform a pre-charge operation, charging the IT8900 electronic load (a passive device) port **IN**.

- When the voltage difference between **IN and OUT** is **less than 3V**, the indicator light will show **RUN (green light)**, and the test circuit will be connected.
 - If the voltage difference remains too high, the indicator light will display **ERROR (red light)**, and the test circuit will remain disconnected.
6. After the **IT-E165A** operates normally (**test circuit is connected**), set the **load operating mode and load value**, then turn on the load **[On/Off]**.

Contact US

Thank you for purchasing ITECH products. If you have any doubt about this product, please contact us as follows.

1. Visit ITECH website www.itechate.com.
2. Select the most convenient contact for further consultation.