

Quick charger controller IT-E255A/M User Manual



Model: IT-E255A/M
Version: V1.1/05,2019

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Manual Part Number



402225

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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 series 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.

- The product returned to ITECH for warranty service must be shipped PRE-PAID. 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 in case of the following:

- Damage caused by circuit installed by customer or using customer own products or accessories;
- Modified or repaired by customer without authorization;
- Damage caused by circuit installed by customer or not operating our products under designated environment;
- 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 instrument is provided with a power cord during delivery and should be connected to a socket with a protective earth terminal, a junction box or a three-phase distribution box. Before operation, be sure that the instrument is well grounded.
 - Please always use the provided cable to connect the instrument.
 - Check all marks on the instrument before connecting the instrument to power supply.
 - 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.
-

WARNING

- **SHOCK HAZARD Ground the Instrument.** This product is provided with a protective earth terminal. To minimize shock hazard, the instrument must be connected to the AC mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet or distribution box. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in injury or death.
- Before applying power, verify that all safety precautions are taken. All connections must be made with the instrument turned off, and must be performed by qualified personnel who are aware of the hazards involved. Improper actions can cause fatal injury as well as equipment damage.
- **SHOCK HAZARD, LETHAL VOLTAGES** This product can output input the dangerous voltage that can cause personal injury, and the operator must always be protected from electric shock. Ensure that the output input electrodes are either insulated or covered using the safety covers provided, so that no accidental contact with lethal voltages can occur.
- Never touch cables or connections immediately after turning off the instrument. Verify that there is no dangerous voltage on the electrodes or sense terminals before touching them.

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.

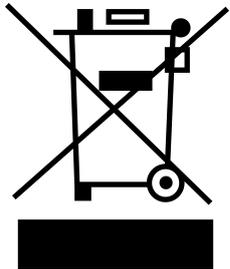
Environmental Conditions	Requirements
Operating temperature	0°C ~ 40°C
Operating humidity	20% ~ 80% (non-condensation)
Storage temperature	-10°C ~ 70 °C

Environmental Conditions	Requirements
Altitude	Operating up to 2,000 meters
Installation category	II
Pollution degree	Pollution degree 2

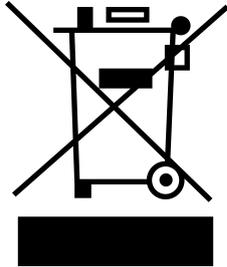

Note

In order to ensure the accuracy of measurement, it is recommended to operate the instrument half an hour after start-up.

Regulation Tag

	<p>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).</p>
	<p>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.</p>
	<p>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.</p>

Waste Electrical and Electronic Equipment (WEEE) Directive



Waste electrical and electronic equipment (WEEE) directive, 2002/96/EC

The product complies with tag requirements of the WEEE directive (2002/96/EC). This tag indicates that the electronic equipment cannot be disposed of as ordinary household waste. Product Category

According to the equipment classification in Annex I of the WEEE directive, this instrument belongs to the "Monitoring" product.

If you want to return the unnecessary instrument, please contact the nearest sales office of ITECH.

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 11:2009+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

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1 Brief Introduction

- ◆ [Verifying the Shipment](#)
- ◆ [Instrument Size Introduction](#)
- ◆ [Brief Introduction](#)
- ◆ [Front Panel Introduction](#)
- ◆ [Rear Panel Introduction](#)

1.1 Verifying the Shipment

Unpack the box and check the contents before operating the instrument. If wrong items have been delivered, if items are missing, or if there is a defect with the appearance of the items, contact the dealer from which you purchased the instrument immediately.

Table 1–1 The package contents include:

Item	Qty.	Model	Remarks
Quick charger controller	x1	IT-E255 series	IT-E255 series include IT-E255A and IT-E255M
Power cord	x1	-	USB Adapter (5V/1A charger) and MicroUSB to Type A cable (5V/1A power cord)
USB cable (supply for IT-E255A)	x1	-	This accessory is selected when the USB interface is used for starting up remote operation.
DB9 cable (supply for IT-E255A)	x1	-	The user can use the TTL interface to connect the IT8500+ series load.
CD	x1	-	It contains power supply User's Manual, Programming Guide and other user documentations.
Ex-factory Test Report	x1	-	It is the test report of the instrument before delivery.



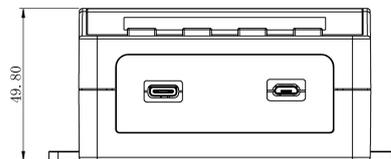
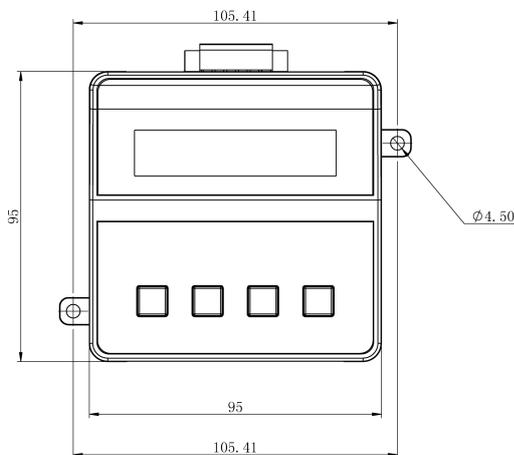
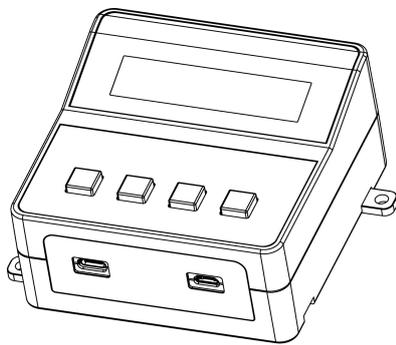
Note

Upon verification of the shipment, keep the package and relevant contents thereof in a safe place. When returning the instrument for warranty service or repair, the specified packing requirements shall be met.

1.2 Instrument Size Introduction

The instrument should be installed at well-ventilated and rational-sized space. Please select appropriate space for installation based on the instrument size.

Detailed size of the IT-E255A/M quick charger controller is shown as below.



1.3 Brief Introduction

ITECH IT255A/M quick charger controller provides QC2.0, QC3.0, PE+, PE2.0+, USB PD2.0 and USB PD3.0/USB PPS 6 types of protocols for automatically or manually quick charger loading test. It can simulate the fast charge control signal of smartphone, tablet and notebook, which is suitable for the test of

smartphone/tablet charger, AC-DC adapter, mobile power bank, car charger and wall charger.

IT-E255M is manual version, which can support IT8500+, IT8800, IT8700 electronic loads connection and simulate the loading of quick charger.

IT-E255A is automatic version, which can support automatic test of the host computer and manual test. Under different operation modes, the supported load models are different:

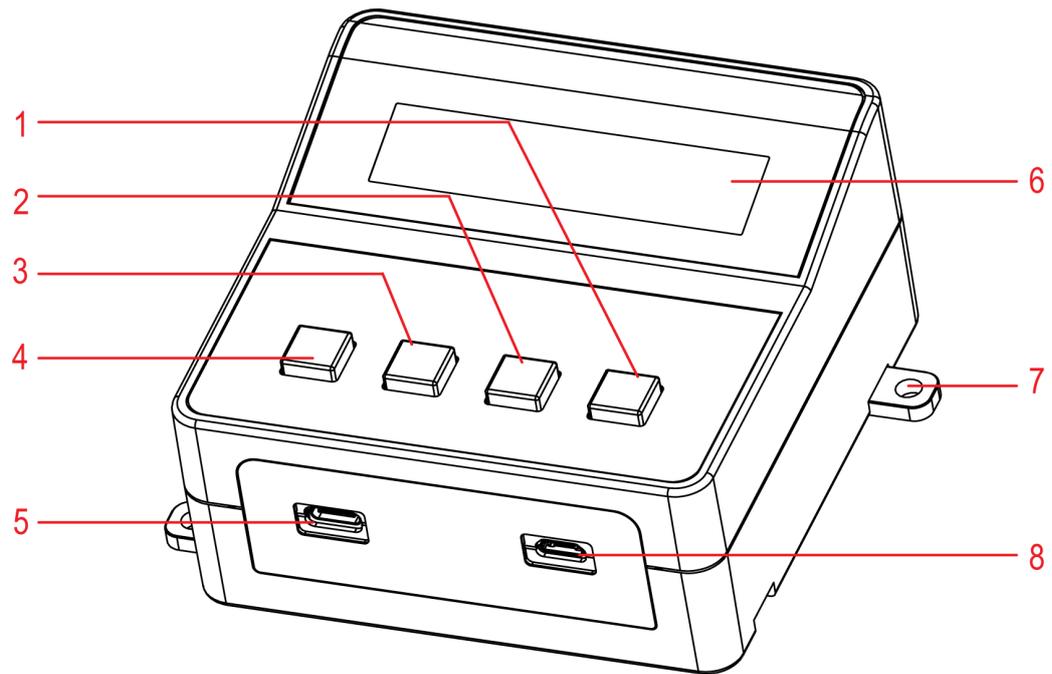
- Under manual operation mode, it has the same function as the IT-E255M and can support manual test of List file.
- Under automatic operation mode, it can only support IT8500+ DC electronic load to simulate the loading test of charger load. It can support the interconnection between TTL interface and IT8500+ DC electronic load and realize the software control load setting.

IT-E255A/M quick charger controller are featured with:

- Large-screen LCM liquid crystal display
- Provides QC2.0, QC3.0, PE+, PE2.0+, USB PD2.0 and USB PD3.0/USB PPS 6 types of protocols
- Provide a Micro USB and a USB Type C hardware interface for DUT connection.
- Standard Micro USB power cord (5V, 1A)
- Support the USB Charger Software of host computer (only for IT-E255A)
- Support the communication with PC through USB VCP and USBTMC communication method (only for IT-E255A)
- Support SCPI communication format (only for IT-E255A)
- The Software Interface can display USB D+ and USB D- voltage (only for IT-E255A)
- Support List operation mode. The user can download the host computer program to the quick charger controller for manual test (only for IT-E255A).

1.4 Front Panel Introduction

The front panels of IT-E255A and IT-E255M quick charger controllers are the same. Detailed button and appearance are described as below.

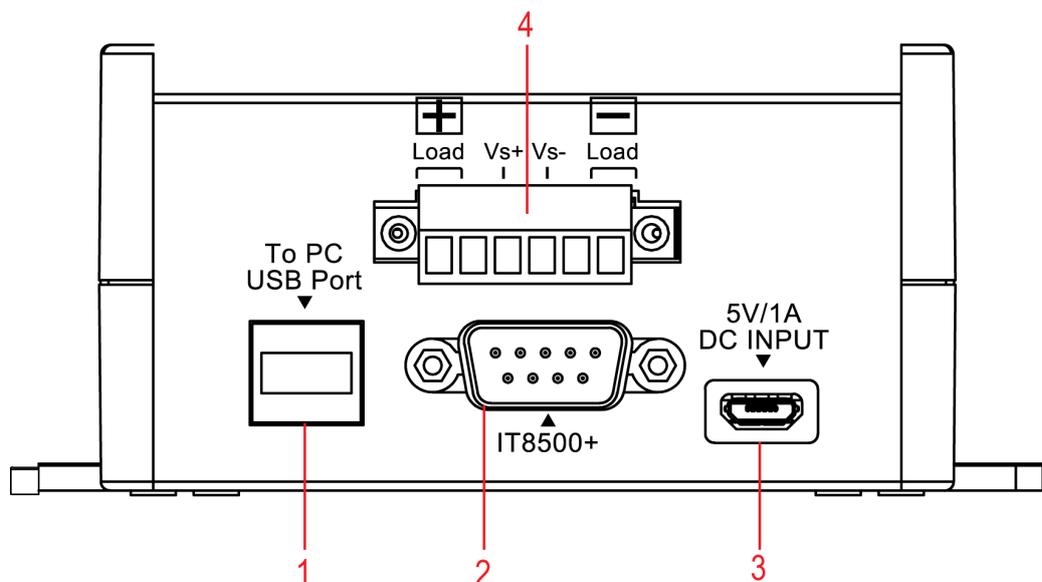


No.	Description	Function description
1	START	<ul style="list-style-type: none"> • Short press: Start to change the output voltage based on setting value. • Long press for 3 seconds: Start to change the output voltage based on setting value, and save the mode states selected by MODE and current duration under PE mode. After saving, “saved” will be displayed. In the next starting, the quick charger controller will automatically load the setting value, and the user needs not to set it again.
2	DOWN	Decrease the setting voltage value. Under QC3.0, PE+2.0 and PD3.0 modes, there are short press and long press; by pressing and holding the DOWN button, the user can quickly decrease the voltage value or current value (only in PPS).
3	UP	Increase the setting voltage value. Under QC3.0, PE+2.0 and PD3.0 modes, there are short press and long press; by pressing and holding the UP button, the user can quickly increase the voltage value or current value (only in PPS).
4	MODE	The user can select the protocol supported by the quick charger controller in order. Select the fast

No.	Description	Function description
		<p>charging protocol the same as the adapter to be tested so as to execute control.</p> <ul style="list-style-type: none"> IT-E255M: QC 2.0 -> QC 3.0 -> PE+ -> PE+ 2.0 -> USBPD 2.0/USBPD 3.0 IT-E255A: QC 2.0 -> QC 3.0 -> PE+ -> PE+ 2.0 -> USBPD 2.0/USBPD 3.0-> List Mode.
		<p> Note</p> <p>Under PPS mode, the user can switch the setting state of voltage and current.</p>
5	USB Type-C	It is the USB Type-C port for connecting the DUT.
6	LCD screen	Display existing mode as well as voltage and other parameters.
7	Fixing hole	It is used to fix the quick charger controller.
8	Micro USB	It is the Micro USB port for connecting the DUT.

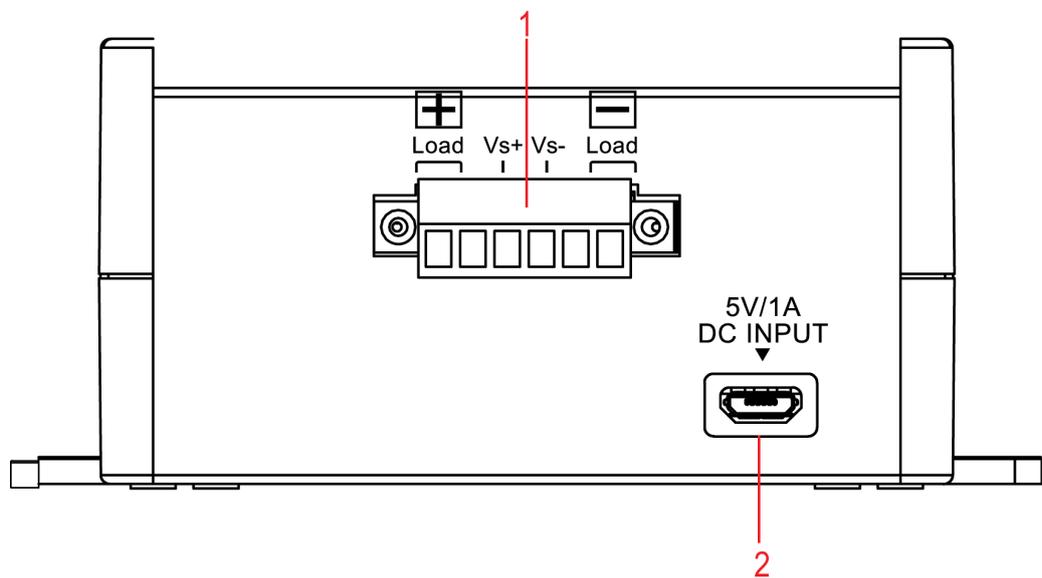
1.5 Rear Panel Introduction

The rear panel of the IT-E255A quick charger controller is described as below.



No.	Description	Function description
1	USB Interface	Interconnect to the PC host computer.
2	TTL Interface	Interconnect to the COM (TTL) Interface on the rear panel of IT8500+.
3	Power Input Interface	It is the input power interface of the IT-E255A quick charger controller.
4	Terminal Block	Connect to the load input terminal and the remote measurement terminal of the load.

The rear panel of IT-E255M quick charger controller is described as below.



No.	Name	Description
1	Terminal Block	Connect to the load input terminal and the remote measurement terminal of the load.
2	Power Input Interface	It is the input power interface of the IT-E255M quick charger controller.

2 Function and Features

This chapter describes in detail the use of the front-panel keys and shows how they are used to accomplish instrument operation. This chapter is divided into the following sections:

- ◆ [Connecting the Device Under Test](#)
- ◆ [Manual testing](#)
- ◆ [Automatic Test \(only for IT-E255A\)](#)

2.1 Connecting the Device Under Test

Precautions

To prevent electric shock and damage to the instrument, observe the following precautions.

WARNING

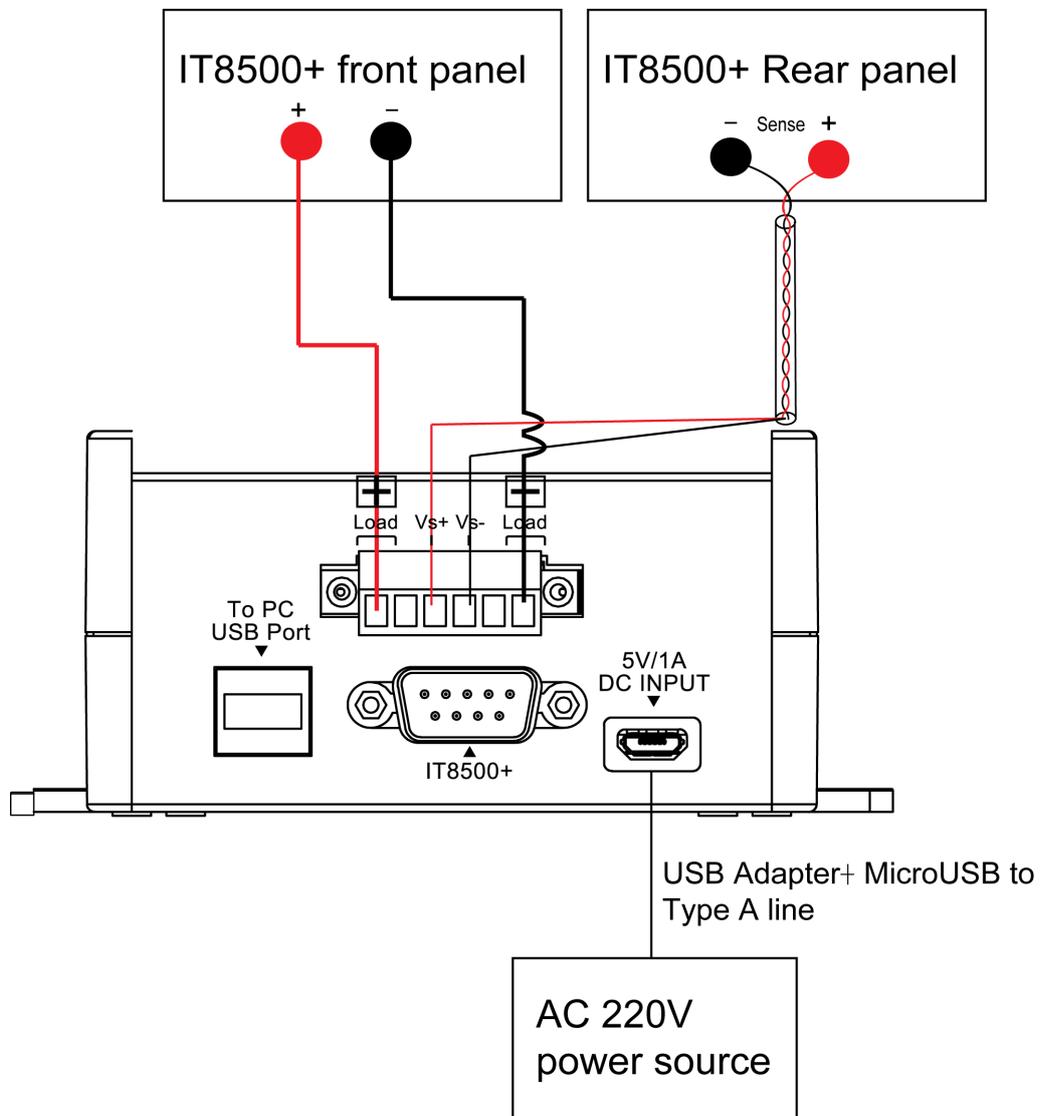
- To avoid electrical shock, before testing, please make sure the rating values of the testing lines, and do not measure the current that higher than the rating value. All test lines shall be capable of withstanding the maximum short circuit output current of the power supply without causing overheat.
 - The quick charger controller is provided with a standard power cord. If the user needs to replace other power cords, please note the input specifications of the quick charger controller. This will avoid damage to the instrument.
 - During wiring, check that the anode and cathode of the test lines are properly and tightly connected.
-

Specification

Test cables are not standard accessories for the instrument. Please select optional red and black test cables for individual sales based on the maximum current value. For specifications of test cables and maximum current values, refer to the [A.1 Specifications of Red and Black Test Cables](#) in chapter [A Appendix](#) for more information.

Wiring Method for Manual Test

The IT-E255M/IT-E255A can be directly connected to such DC electronic loads as IT8500+, IT8800 and IT8700 to manually simulate the loading test of charger load. The chapter below describes the wiring method for manual test by taking the connection of IT-E255A to IT8500+ as an example.



Note

The rear panel of IT-E255M is slightly different from that of IT-E255A, but the wiring terminal and method are the same. For details, refer to specific instrument marks.

1. Use red and black test cables to connect the Load+ and Load- of the quick charger controller to the anode and cathode of the load's front panel.
2. Use the twisted-pair cables to connect the Vs+ and Vs- of the quick charger controller to the Sense+ and Sense- of the load's rear panel.

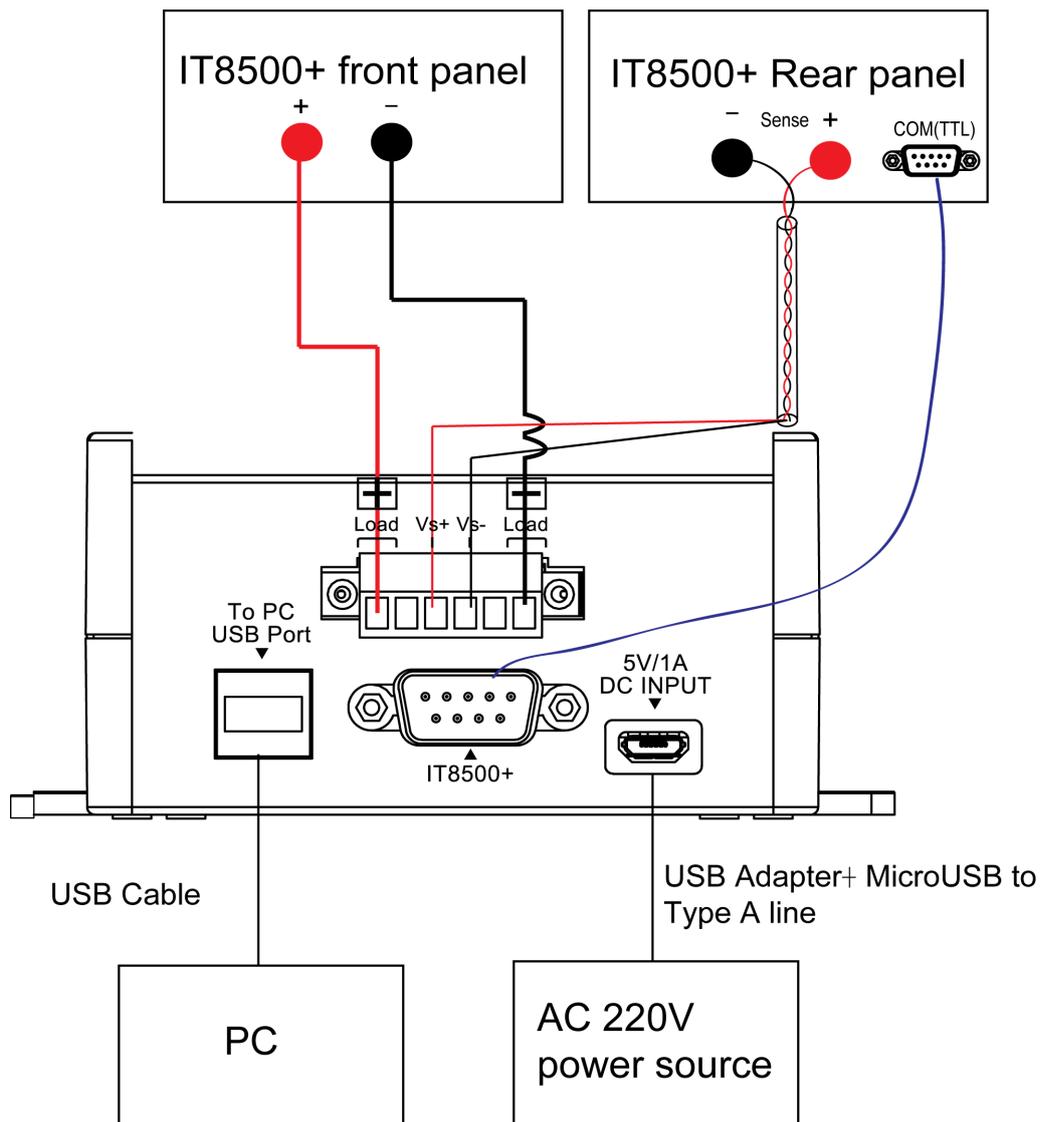
3. The quick charger controller is provided with a standard power cord. Please directly insert the USB Adapter terminal of the power cable to the 220V socket.
4. Insert the Micro USB terminal of the power cord to the DC input terminal of the quick charger controller's rear panel.


Note

To ensure the stability of the system, use armored twisted-pair cables between the remote sense terminals and the equipment under test.

Wiring Method for Automatic Test

The IT-E255A can realize interconnection to the PC host computer, which uses software at the PC terminal for automatic test. The chapter below describes the wiring method for automatic test by taking the connection of IT-E255A to IT8500+ as an example.



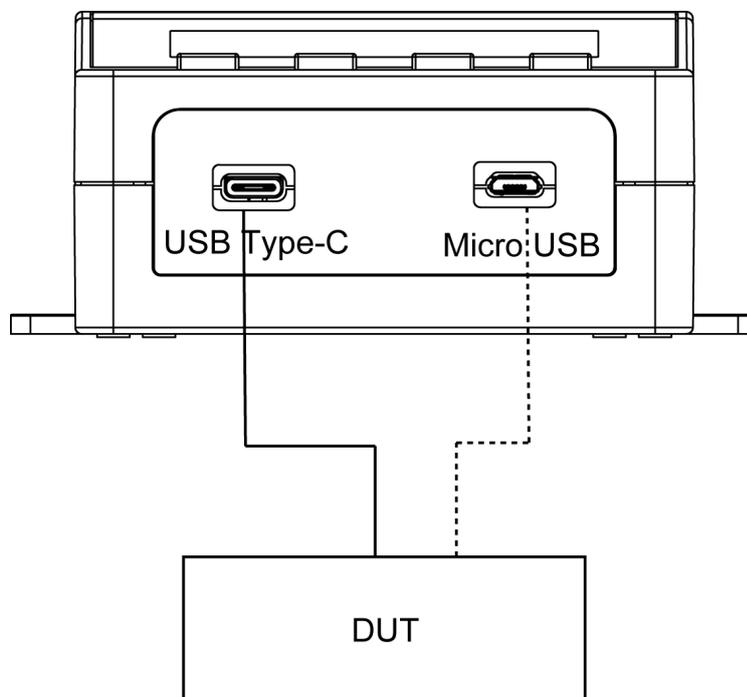
1. Use red and black test cables to connect the Load+ and Load- of the quick charger controller to the anode and cathode of the load's front panel.
2. Use the twisted-pair cables to connect the Vs+ and Vs- of the quick charger controller to the Sense+ and Sense- of the load's rear panel.
3. Use USB communication cable to connect the quick charger controller and the PC host computer.
4. Use DB9 cable to connect the quick charger controller and the IT8500+ TTL interface.
5. The quick charger controller is provided with a standard power cord. Please directly insert the USB Adapter terminal of the power cord to the 220V AC socket.
6. Insert the Micro USB port of the power cord to the DC input interface of the quick charger controller's rear panel.


Note

To ensure the stability of the system, use armored twisted-pair cables between the remote sense terminals and the equipment under test.

Connecting the Device Under Test

The IT-E255A and IT-E255M quick charger controllers have the same interfaces to connect to the DUT, which provide two kinds of interfaces, namely, USB Type-C and Micro-USB to connect different types of interfaces. Select either solid-line connection or dotted-line connection as shown below based on the interface type.



2.2 Manual testing

The IT-E255M quick charger controller is manual version. During test, the user needs to manually conduct test. The IT-E255A also supports manual test. Taking IT-E255A model as an example, the operation method is described below.

Different devices under test support different charging protocols. This series of quick charger controller provides 6 types of protocols including QC2.0, QC3.0, PE+, PE+2.0, USB PD2.0 and USB PD3.0/USB PPS. Please select corresponding mode for test based on the protocol supported by actual DUT. The operation methods below are described in detail taking QC2.0, PE+ 2.0 and USB PD3.0/USB PPS as an example. The operation methods of other protocols are similar.

The voltage range reference and adjustment method of different protocol modes are as shown below:

Mode		QC 2.0	QC 3.0	PE+	PE+ 2.0	USB P-D2.0	USB PD3.0
UP	Click	5V→9V→12V→20V	The voltage range is 3.6V-20V, increasing by 0.2V each time.	5V→7V→9V→12V	The voltage range is 5V-20V, increasing by 0.5V each time.	POS 1~7	POS 1~7 Under PPS mode: The voltage increases by 0.02V each time, and the current increases by 0.05A each time.
	Hold	-	The voltage range is 3.6V-20V, increasing by 0.2V per 0.1Sec.	-	The voltage range is 5V-20V, increasing by 0.5V per 0.1Sec.	-	Under PPS mode: The voltage increases by 0.02V per 0.1Sec, and the current increases by 0.05A per 0.1Sec.
DOWN	Click	5V←9V←12V←20V	The voltage range is 3.6V-20V, decreasing by 0.2V each time.	5V←7V←9V←12V	The voltage range is 5V-20V, decreasing by 0.5V each time.	POS 1~7	POS 1~7 Under PPS mode: The voltage decreases by 0.02V each time, and the current decreases by 0.05A each time.
	Hold	-	The voltage range is 3.6V-	-	The voltage range is 5V-20V,	-	Under PPS mode: The voltage decreases by 0.02V per 0.1Sec, and

			20V, decreasing by 0.2V per 0.1Sec.		decreasing by 0.5V per 0.1Sec.		the current decreases by 0.05A per 0.1Sec.
UP+ DOWN	Click	-	-	The interval increases/decreases by 0.2s.		-	PPS returns to PD3.0
	Hold	-	-	The interval continually increases/decreases by 0.1s.		-	-
START	Click	Start to change voltage.	Start to change voltage.	Start to change voltage or determine the interval time setting.		Start to change voltage.	Start to change voltage.
	Hold	Start to change voltage, and save existing mode, setting value and current duration under PE mode.					

2.2.1 Test under QC2.0 Mode

Preparation before Test

At first, the user connects the test lines. For detailed connection method, please refer to Chapter [2.1 Connecting the Device Under Test](#).

Operation Method

1. Power on the electronic load, and set the electronic load mode and voltage and current parameters. For load function, refer to the user manual of related electronic load.



Note

Please set the load voltage or current based on the DUT specifications. This will prevent overlarge loading current from damaging the DUT.

2. When the IT-E255A is supplied with power, the display is shown as below.

Q	C		2	.	0										
V	s	e	t	:	5	.	0	0							

First row: Display the protocol mode of the existing test.

Second row: Display the voltage setting value under the existing protocol mode.



Note

If the existing mode is not QC 2.0, the user can press **MODE** button for selection.

3. Press **UP** or **DOWN** to select the voltage setting position.

Under QC 2.0 protocol test, there are four voltage positions: **5V**, **9V**, **12V** and **20V**

4. Press **START** button to change the output voltage based on the setting voltage.
5. Turn on the **On/Off** button of load input control.

2.2.2 Test under PE+ 2.0 Mode

Preparation before Test

At first, the user connects the test lines. For detailed connection method, please refer to Chapter [2.1 Connecting the Device Under Test](#).

Operation Method

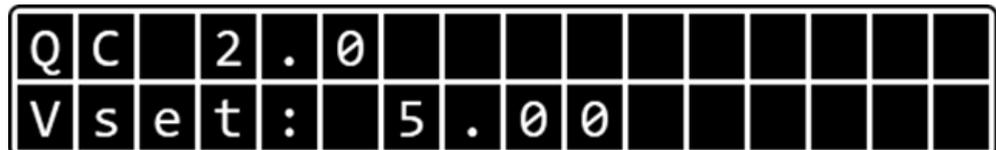
1. Power on the electronic load, and set the electronic load mode and voltage and current parameters. Under the PE mode, the load's loading current needs to be more than 0.3A. Otherwise, the voltage setting of the quick charger controller will automatically recover to 5V. For load functions, refer to the user manual of related electronic load.



Note

Please set the load voltage or current based on the DUT specifications. This will prevent overlarge loading current from damaging the DUT.

2. When the IT-E255A is supplied with power, the display is shown as below.



First row: Display the protocol mode of the existing test.

Second row: Display the voltage setting value under the existing protocol mode.

3. Press **MODE**, and select PE+ 2.0 mode.
4. Press **UP** or **DOWN** to set voltage.

The voltage adjustment step under PE+ 2.0 protocol test is 0.5V. Click **UP** or **DOWN**, and the voltage will increase/decrease by 0.5V each time. Click and hold **UP** or **DOWN**, and the voltage will be quickly adjusted to the setting voltage value by increasing/decreasing 0.5V per 0.1Sec.


Note

To set voltage value under PE+ or PE+ 2.0 mode, the user needs to switch off the load input control.

5. Press **UP** and **DOWN** buttons simultaneously to switch to the setting interface of current duration.
6. Click **UP** or **DOWN**, and the time will increase/decrease by 0.2Sec each time. Click and hold **UP** or **DOWN**, and current duration will be adjusted to the setting value by increasing/decreasing 0.2S per 0.1Sec. The setting range is 0~10.0 Sec.

When the test loop current is lower than 0.3A, the voltage setting will automatically recover to 5V after the current is output for 300ms under PE+ and PE+ 2.0 modes. If the user fails to timely press ON button of the electronic load to start loading test after changing output voltage, the output voltage will automatically recover to +5V. To avoid this circumstance, the PE+ mode and PE+ 2.0 mode of the IT-E255A/M are provided with the current duration setting. This function facilitates the user to press the ON button of the electronic load within 0~10s after changing output voltage to start loading.

7. After the setting of current duration, press **START** to confirm and exit.
8. Press **START** button to change the output voltage based on the setting voltage.
9. Within the set current duration, turn on the **On/Off** button of load input control.

2.2.3 Test under USB PD 3.0/PPS Mode

Programmable Power Supply (PPS) is a type of power supply which allows the adjustment of voltage and current through USB PD protocol with voltage adjustment amplitude of 20mV. It can simulate and verify the loading capacity for different currents under different voltage grades by the USB PD 2.0/3.0 quick charger, thus finishing complex test with simple operations.

Preparation before Test

- At first, the user connects the test lines. For detailed connection method, please refer to Chapter 2.1 [Connecting the Device Under Test](#).
- The DUT shall be USB Type-C type.

Operation Method

1. Power on the electronic load, and set the electronic load mode and voltage and current parameters. For load function, refer to the user manual of related electronic load.



Note

Please set the load voltage or current based on the DUT specifications. This will prevent overlarge loading current from damaging the DUT.

2. When the IT-E255A is supplied with power, the display is shown as below.

Q	C		2	.	0									
V	s	e	t	:		5	.	0	0					

First row: Display the protocol mode of the existing test.

Second row: Display the voltage setting value under the existing protocol mode.

3. Press **MODE** button, and select USBPD Mode.

U	S	B		P	D		3	.	0		P	O	S		1	
F	i	x				5	.	0	0	V		5	.	0	0	A

First row: Display the protocol mode of the existing test and selected Position mark.

Second row: Display the voltage setting value and current setting value under the existing protocol mode.

4. Press **UP** or **DOWN** to select PPS mode.

U	S	B		P	D		3	.	0		P	O	S		4		
P	P	S				3	.	3	-	1	1	.	0	,	2	.	4

First row: Display the protocol mode of the existing test and selected Position mark.

Second row: Display the voltage setting range and maximum current value under the PPS mode.



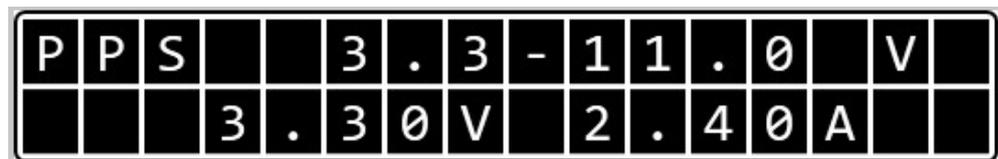
Note

Press **UP** and **DOWN** buttons simultaneously to exit existing PPS mode.

5. Press **START** to enter PPS mode, and display the existing voltage and current setting values.

When the existing voltage value flicks, it represents that the voltage value is in to-be-set state. Press **UP** or **DOWN** to adjust the output voltage value. The adjustment step of voltage value is 0.02V.

- Press **UP** or **DOWN**: The voltage increases/decreases by 0.02V each time.
- Press and hold **UP** or **DOWN**: The voltage increases/decreases by 0.02V per 0.1Sec.



6. Press **MODE** button to switch existing setting parameter to current. Press this button again to switch the setting parameter between voltage and current.
7. When the current flicks, it represents that the current value is in to-be-set state. Press **UP** or **DOWN** to adjust the output current value. The adjustment step of current value is 0.05A.
 - Press **UP** or **DOWN**: The current increases/decreases by 0.05A each time.
 - Press and hold **UP** or **DOWN**: The current increases/decreases by 0.05A per 0.1Sec.
8. Press **START** button to change the output voltage and current based on the setting voltage and current.
9. Turn on the **On/Off** button of load input control.

2.2.4 Test under List Mode (only for IT-E255A)

Only IT-E255A has test function under List mode. The List file can only be edited in the host computer software. The user needs to use the host computer software to edit the List file, and save the edited List file into the quick charger

controller before manual test. The List file can support the edit of 1~99 steps, and select to judge Pass or Fail based on the judgment conditions set for each step.

This Chapter describes the manual test under List mode in the IT-E255A quick charger controller.

Preparation before Test

- At first, the user connects the test lines. For detailed connection method, please refer to Chapter [2.1 Connecting the Device Under Test](#).
- The List file has been edited in the host computer software and saved in the IT-E255A quick charger controller. For detailed editing method of List file, refer to [2.3.2.3 Test under List Mode](#).

Operation Method

1. Power on the electronic load.



The List file has defined related parameters of the load, and the user needs not to manually set the load.

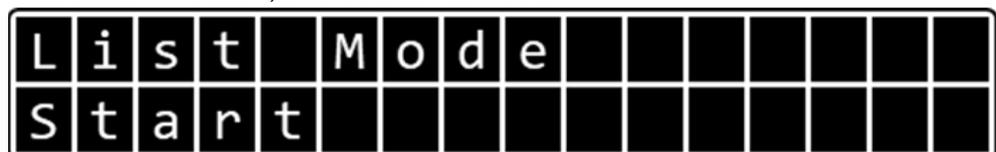
2. When the IT-E255A is supplied with power, the display is shown as below.



First row: Display the protocol mode of the existing test.

Second row: Display the voltage setting value under the existing protocol mode.

3. Press **MODE** button, and select List Mode.



If the instrument does not save the edited List file, the instrument interface displays "Empty". Please use the host computer software for editing again and save the file.

4. Press **START** button to run List test.



Sequentially run the test based on the List steps. If a step is set with judgment conditions and such conditions are met, the test will stop and display “Fail” for this step.

5. After the execution, the interface will remain at the last step and prompt “Pass” for the test.



2.3 Automatic Test (only for IT-E255A)

Only IT-E255A quick charger controller can support the connection of PC host computer. The user can use the host computer control software for automatic test. This chapter describes in detail the operation of the host computer control software - USB Charger Software. Through the host computer control software, the user can run all functions of the quick charger controller and set load states. When use the host computer control software for automatic test, the selected IT8500+ series electronic load version needs to be 1.46 or above. For detailed query methods, refer to the corresponding User Manual.



Note

IT-E255M is manual version and does not support the host computer control software - USB Charger Software.

2.3.1 Preparation before Test

Connecting the Device

Before automatic test, please connect the instrument and the DUT in accordance with the automatic test wiring method and DUT wiring method in [Chapter 2.1 Connecting the Device Under Test](#).

Setting the Load

When the IT-E255A quick charger controller is used to connect the RS-232 communication interface, the default Baud rate of the RS-232 communication interface is 38,400. Therefore, when the load is communicated with the quick

charger controller, the used Baud rate needs to be consistent. The user needs to manually set the communication parameters of the electronic load and protocol.

- For detailed setting methods, refer to the corresponding User Manual of IT8500+ electronic load. Select the corresponding Baud rate of the RS-232 interface as 38,400.
- The host computer control software communicate with IT8500+ through SCPI protocol, therefore, the IT8500+ load present protocol must set to SCPI.

Installing the Driver

To communicate the PC host computer with the quick charger controller, the user can select the USB interface or the RS-232 for communication. When the RS-232 communication is used, the driver program of ITECH vcp Driver Installer needs to be installed. Please get the driver program from the soft installation disk.

Installing the Software

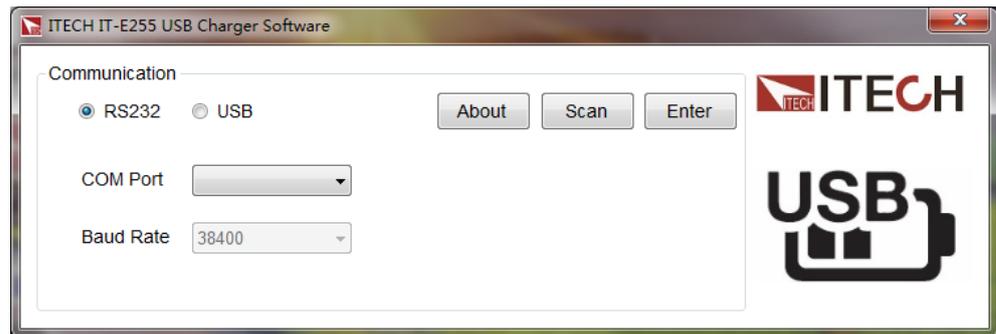
1. Get the installation software from the soft installation disk.
2. Decompress the installation file of USB Charger Software to the local folder.
3. Double click the exe installation file, and install it to the specified path in accordance with the installation instructions.

2.3.2 Software Function Introduction

In this series of quick charger controller, only IT-E255A supports the connection of host computer software of USB Charger Software and the execution of automatic test. Please refer to the model of purchased quick charger controller.

2.3.2.1 Interface Introduction

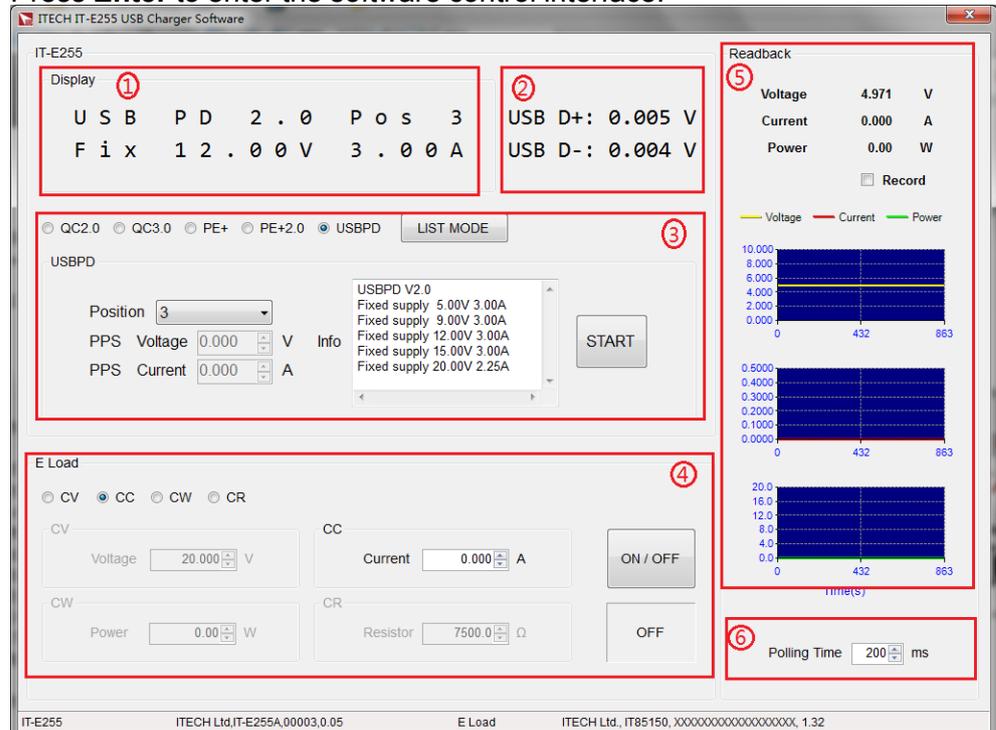
1. Double click the USB Charger Software to run the program. The interface displays is shown below:



Description of interface parameters:

- RS232: select the RS232 communication method.
- USB: Select the USB communication method.
- About: View such information as software version.
- Scan: Execute automatic scanning when the communication interface cannot be identified.
- Enter: Enter the software control interface.
- COM Port: When the RS232 communication is selected, the user needs to select specific COM port.
- Baud Rate: This is the Baud rate for RS232 communication, which requires no user configuration and is default to 38,400.

2. Select the communication method and specific communication address.
3. Press **Enter** to enter the software control interface.



Interface Introduction

- 1: It is consistent with the display on the quick charger controller, which facilitates the user to directly observe existing setting on the software interface.
- 2: It shows USB D+ and D- voltage read under the QC mode. This value is invalid under other modes.
- 3: Select the test mode and set voltage/current/current duration under corresponding mode, and press START to start test.


Note

The figure above takes the USPPD protocol as an example for description. The displayed parameters vary based on different modes selected. Please be subject to the specific display. Click **LIST MODE** to enter the List Edit and List Run interfaces.

- 4: Set parameters under the electronic load mode and corresponding mode. The user can also press **ON/OFF** to control the input state of electronic load. The bottom displays existing load input state.
- 5: This is consistent with the readback value of the electronic load, and is displayed in the form of waveform.

In this area, the user can check **Record** to save existing test data to the Report folder under the software installation directory in txt format. The data file is named after the time of file creation.

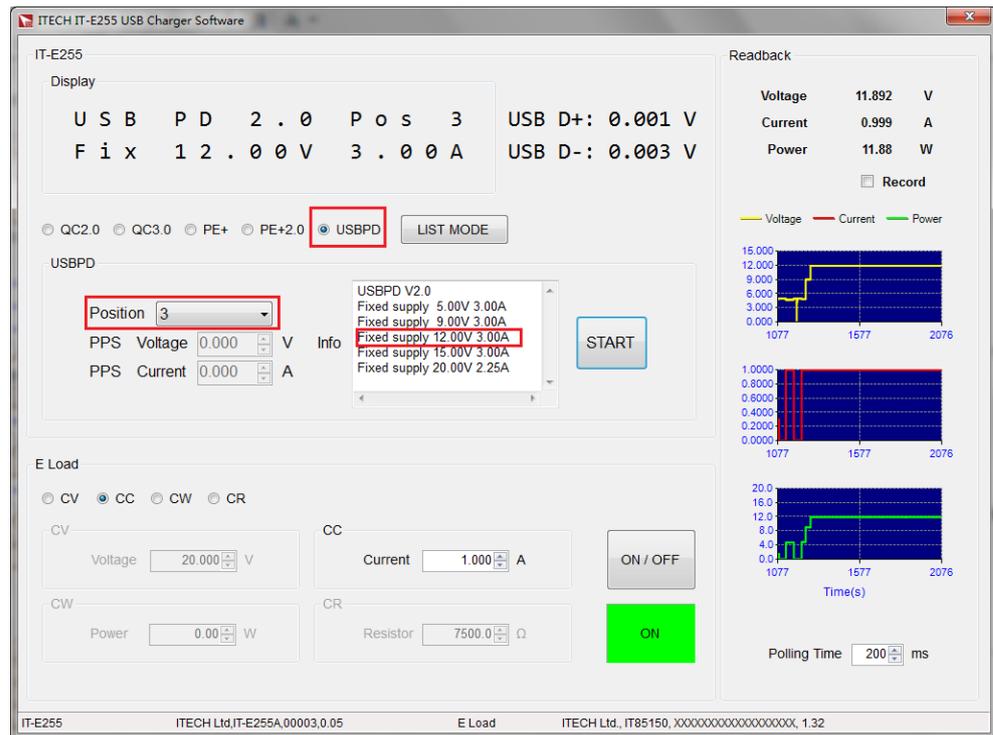
- 6: It is the data refresh time, ranging from 200ms to 1,000ms.

2.3.2.2 Operation Method

The user can run all manual test functions of the IT-E255A quick charger controller through software control.

1. Double click the USB Charger Software to run the program.
2. Select the communication method and specific communication address.
3. Press **Enter** to enter the software control interface.
4. The user selects existing test mode based on the protocol supported by the DUT.

Taking the USBPD protocol as an example, the interface is shown as below:



If the DUT supports this protocol, the voltage position of the existing DUT will be displayed at the bottom of the USBPD protocol. The position selected in the left **Position** corresponds to the voltage and current positions in the right Info box. For example, Position 3 corresponds to 12.00V/3.00A.

Under different modes, both the voltage positions and voltage setting methods are different. Other protocol modes are described below:

- Under QC 2.0 mode, there are four voltage positions: **5V**, **9V**, **12V** and **20V**. The user can directly select the voltage position on the interface.
- Under QC 3.0 mode, the voltage range is 3.6V-20V. The user can click Set button to increase or decrease the voltage value with an adjustment step of 0.2V. Or, the user can press and hold Set button for fast adjustment or directly input a voltage value.
- Under PE+ mode, there are four voltage positions: **5V**, **7V**, **9V** and **12V**. The user can directly select the voltage position on the interface.

Under PE+ mode, the user also needs to set the current duration. When the test loop current is lower than 0.3A, the voltage setting will automatically recover to 5V after the current is output for 300ms under PE+ mode. If the user fails to timely press ON/OFF button of the electronic load to start loading test after changing output voltage, the output voltage will automatically recover to +5V. To avoid this circumstance, the PE+ mode is provided with the current duration setting. This function facilitates the user to press the ON/OFF button of the electronic load within 0~10s after changing output voltage to start loading.

- Under PE+ 2.0 mode, the voltage range is 5V-20V. The user can click Set button to increase or decrease the voltage value with an adjustment step of 0.5V. Or, the user can press and hold Set button for fast adjustment or directly input a voltage value.

Under PE+ 2.0 mode, the user also needs to set the current duration. This function is the same as that under the PE+ mode.

- Under USB PD mode, the software will distinguish USB PD2.0 or USB PD3.0 based on the protocol supported by the DUT. The user can define the **Position** value to select the voltage and current position.

The USB PD3.0 has PPS specifications. When defining the **Position** value and selecting **PPS** mode, the user can customize the voltage and current value. This function can meet more test needs of the user.

5. Set the load mode and corresponding parameter value. For load mode and related description, please refer to corresponding user manual.



Note

When the test mode is PE+ or PE+ 2.0, the loading current of the load cannot be less than 0.3A. Otherwise, the voltage setting will automatically recover to 5V.

6. Click **START**, and change the output voltage based on setting.
7. Click **ON/OFF** to start load input control. When the load input state light turns green and displays ON, start loading test.



Note

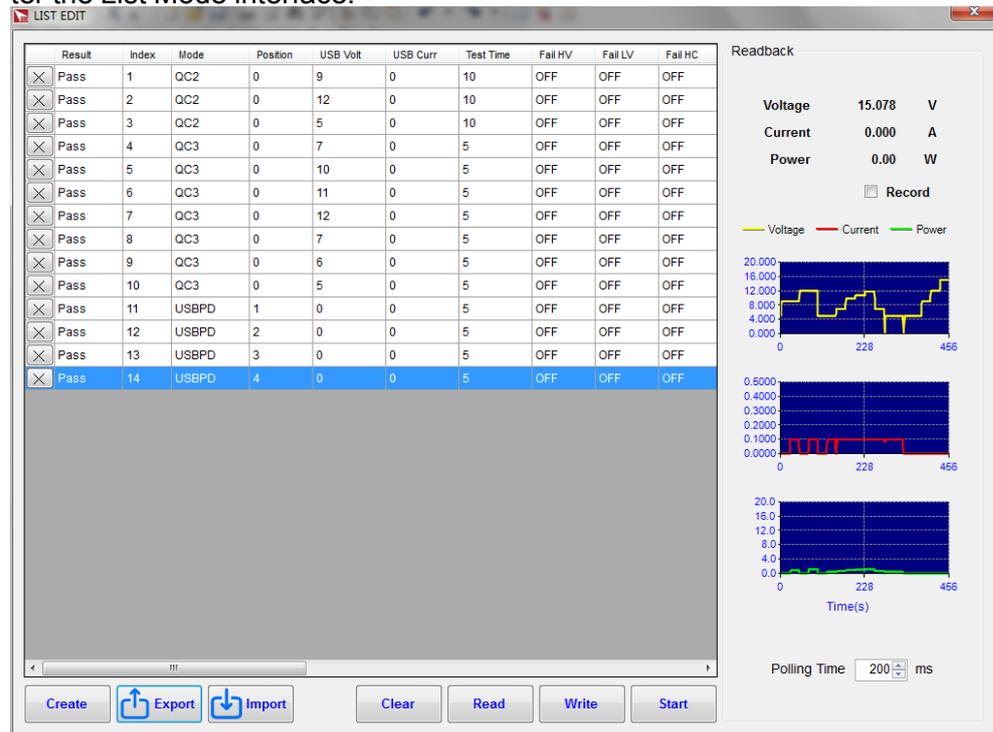
When the existing mode is PE+ or PE+ 2.0, press **START** to change the output voltage, and then turn on the load input control.

8. Observe the **Readback** value at the right side. If you want to save data, check **Record** to record test data.

2.3.2.3 Test under List Mode

The user can edit 1~99 steps of list file in the software for automatic execution of continuous tests.

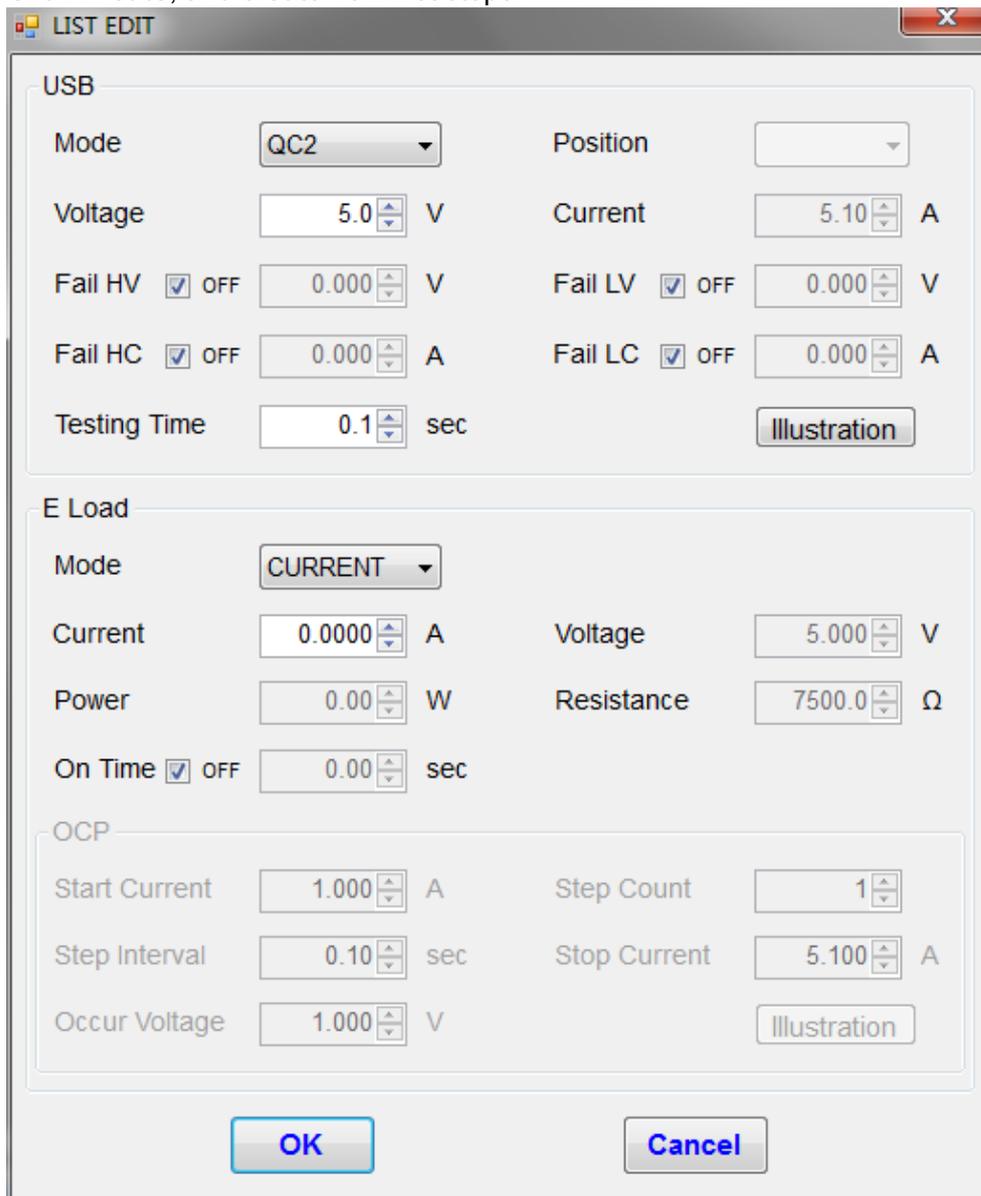
1. On the main interface of the USB Charger Software, click **LIST MODE** to enter the List Mode interface.



Description of interface parameters:

- Create: Create List steps.
- Export: Export the existing List file to the excel file.
- Import: Import List file from the excel file.
- Clear: Clear all existing List steps.
- Read: Read List file from IT-E255A.
- Write: Write existing List file into IT-E255A.
- Start: Execute the List file.

2. Click **Create**, and create new List steps.



The screenshot shows the 'LIST EDIT' dialog box with the following settings:

- USB Section:**
 - Mode: QC2
 - Position: (empty)
 - Voltage: 5.0 V
 - Current: 5.10 A
 - Fail HV: OFF, 0.000 V
 - Fail LV: OFF, 0.000 V
 - Fail HC: OFF, 0.000 A
 - Fail LC: OFF, 0.000 A
 - Testing Time: 0.1 sec
 - Illustration button
- E Load Section:**
 - Mode: CURRENT
 - Current: 0.0000 A
 - Voltage: 5.000 V
 - Power: 0.00 W
 - Resistance: 7500.0 Ω
 - On Time: OFF, 0.00 sec
- OCP Section:**
 - Start Current: 1.000 A
 - Step Count: 1
 - Step Interval: 0.10 sec
 - Stop Current: 5.100 A
 - Occur Voltage: 1.000 V
 - Illustration button

Buttons: OK, Cancel

Description of interface parameters:

Parameters	Descriptions
USB	
Mode	The test modes of this step include: QC2, QC3, PE+, PE +2.0, USBPD and USBPPS
Position	It is the defined voltage position when the mode is USB PD or USB PPS. When the mode is USB PPS, the parameter configuration starts from 2. Otherwise, the USB PPS mode test cannot be executed.
Voltage	It is the voltage value set in this step. For voltage setting range, please refer to Chapter 2.2 Manual testing .

Parameters	Descriptions
Current	It is the current value set in this step when the mode is USB PPS. The setting range is 0A~5.1A.
Fail HV	It is the judgment condition of highest voltage in this step. If voltage is higher than this setting value, the test fails. When OFF is checked, no judgment is made. Setting range: 0V~21.000V
Fail LV	It is the judgment condition of lowest voltage in this step. If voltage is lower than this setting value, the test fails. When OFF is checked, no judgment is made. Setting range: 0V~21.000V
Fail HC	It is the judgment condition of highest current in this step. If current is higher than this setting value, the test fails. When OFF is checked, no judgment is made. Setting range: 0A~5.100A
Fail LC	It is the judgment condition of lowest current in this step. If current is lower than this setting value, the test fails. When OFF is checked, no judgment is made. Setting range: 0A~5.100A
Testing Time	It is the running time for this step.
Illustration	View the curve graph of this step.
E Load	
Mode	Running mode of the electronic load: VOLTAGE, CURRENT, POWER, RESISTANCE, SHORT, OCP
Current	It is the current setting value with setting range of 0~5.100A.
Voltage	It is the voltage setting value with setting range of 0~21.000V.
Power	It is the power setting value with setting range of 0~150.00W.
Resistance	It is the resistance setting value with setting range of 0~7,500.0Ω.
On Time	It is the loading time. When OFF is checked, the loading time will not be calculated. The setting range is 0~1,000.00S. This setting time should be less than the setting time in Testing Time.

Parameters	Descriptions
	OCP: It is valid when the Running Mode of the electronic load is set to OCP.
Start Current	It is the setting value of start current.
Step Count	It is the total steps.
Step Interval	It is the time interval of each step.
Stop Current	It is the setting value of stop current.
Occur Voltage	It is the OCP voltage value.
Illustration	View the curve graph of this step.
OK	Confirm to add the existing setting as a single step of the List file.
Cancel	Cancel the step adding operation.

- Fill in corresponding parameters on the **LIST EDIT** interface, and click **OK**. The interface displays List steps.

Result	Index	Mode	Position	USB Volt	USB Curr	Test Time	Fail HV	Fail LV	Fail HC
<input type="checkbox"/>	1	QC2	0	5	0	3.0	5.2	4.8	3.5
<input type="checkbox"/>	2	QC3	0	5	0	3.0	5.2	4.8	3.5
<input type="checkbox"/>	3	PE+	0	5	0	3.0	5.2	4.8	3.5
<input type="checkbox"/>	4	PE+	0	5	0	3.0	5.2	4.8	3.5
<input type="checkbox"/>	5	PE+2	0	5	0	3.0	5.2	4.8	3.5

- Click button at the front of the step to delete existing step.
 - Double click the step parameters to edit this List step.
- After editing the List step, click **Write** to write the existing List file to the quick charger controller. Then, the quick charger controller will run test based on this List.
 - Click **Start** to run test.

Note

When the List is running, the **Start** button is changed to **Stop**. To stop test, click **Stop**.

- Click **Export** to export the List file, and save the List file in the computer in Excel form.

The user can also edit a List file in Excel format, and click **Import** to import the List file. For file format, refer to the exported List file.

3 Technical specifications

This chapter describes in detail the specifications of the input voltage, communication interface and I/O interface of the quick charger controller.

◆ [Main technical parameters](#)

3.1 Main technical parameters

3.1.1 IT-E255A

IT-E255A Specification V1.0	
I/O Interfaces	
Micro USB USB Type C	20V 5A/max
OUT Terminal	20V 5A/max
Communication Interface	
TTL (connect to IT8500+ series)	
USB Type A Interface (USB Virtual Com Port, USBTMC)	
Power source (with USB 5V 1A wall charger)	
Input Voltage	5V/1A max
Dimension (mm)	95(W)*95(D)*47.8(H) mm
Net Weight	0.6Kg max

3.1.2 IT-E255M

IT-E255A Specification V1.0	
I/O Interfaces	
Micro USB USB Type C	20V/5A max
OUT Terminal	20V/5A max
Power source (with USB 5V 1A wall charger)	
Input Voltage	5V/1A max

Dimension (mm)	95(W)*95(D)*47.8(H) mm
Net Weight (net)	0.6Kg max

A Appendix

A.1 Specifications of Red and Black Test Cables

ITECH provides you with optional red and black test cables, which are sold individually and you can select for test. For specifications of ITECH test cables and maximum current values, refer to the table below.

Model	Specification	Length	Description
IT-E30110-AB	10A	1m	A pair of red and black test cables with an alligator clip at one end and a banana plug at the other end
IT-E30110-BB	10A	1m	A pair of red and black test cables with banana plugs at both ends
IT-E30110-BY	10A	1m	A pair of red and black test cables with a banana plug at one end and a Y-terminal at the other end
IT-E30312-YY	30A	1.2m	A pair of red and black test cables with Y-terminals at both ends
IT-E30320-YY	30A	2m	A pair of red and black test cables with Y-terminals at both ends
IT-E30615-OO	60A	1.5m	A pair of red and black test cables with round terminals at both ends
IT-E31220-OO	120A	2m	A pair of red and black test cables with round terminals at both ends
IT-E32410-OO	240A	1m	A pair of red and black test cables with round terminals at both ends

Model	Specifica- tion	Length	Description
IT-E32420-OO	240A	2m	A pair of red and black test ca- bles with round terminals at both ends
IT-E33620-OO	360A	2m	A pair of red and black test ca- bles with round terminals at both ends

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

AWG	10	12	14	16	18	20	22	24	26	28
The Maxi- mum Cur- rent 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.

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1. Refer to accompanying data disk and relevant manual.
2. Visit ITECH website: www.itechate.com.
3. Select the most convenient contact method, for further information.