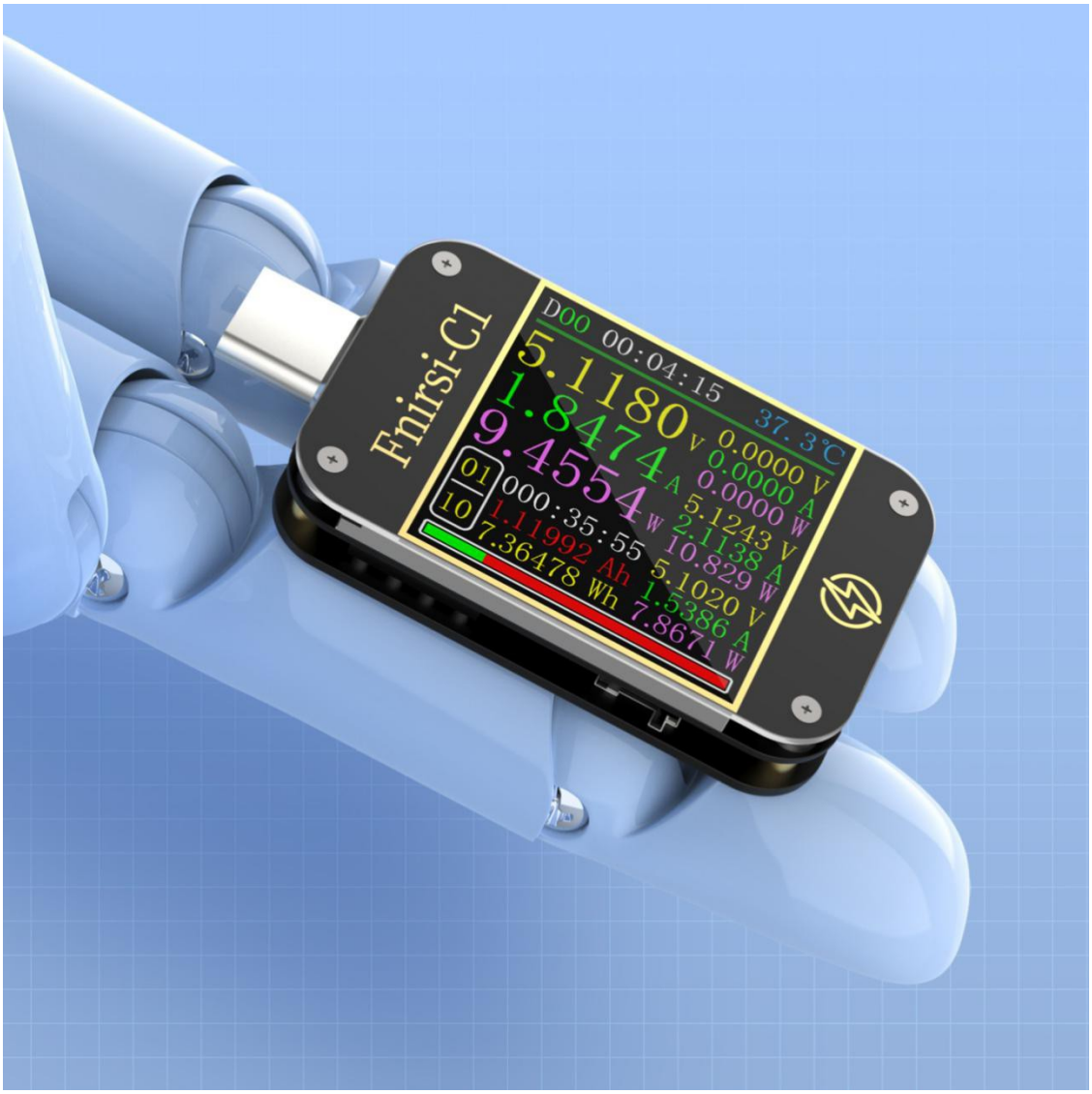
FNIRSI-C1 User Manual

(V0.1)


Fnirsi-C1
D00 00:04:15 37.3℃
5.1180 V 0.0000 V
1.8474 A 0.0000 A
9.4554 W 0.0000 W
01 000:35:55 5.1243 V
10 1.11992 Ah 2.1138 A
7.36478 Wh 10.829 W
5.1020 V
1.5386 A
7.8671 W

目录

0.0 version and updates

As the instrument has many functions and frequent software and hardware updates, the manual may be updated at any time, please be aware. Please get the latest update information on the official website.

1.0 Overiew

The C1 TYPE-C tester is a high-reliability, high-safety USB voltage and current detection meter and a mobile communication terminal fast charging trigger. It has a 1.3-inch TFT LCD display with 240x240 ultra-high pixels. Use external 16-bit ADC, PD protocol physical chip. It can be used to measure the power supply or power consumption of products such as USB interfaces, mobile phone chargers, U disks, etc.;It can be used to measure mobile phone charging power and mobile power input and output conditions; it can be used to test charger fast charging protocols.

This instruction manual includes relevant safety information, warning tips and solutions to common abnormal situations. Please read the relevant content carefully and strictly abide by all warnings and precautions.

2.0 pay attention to safety matters

1 Do not connect the monitoring interface to a power supply exceeding 24V;

2 Do not connect the PC connection port to a power source exceeding 16V;

3 When using the fast charge trigger module, please do not connect equipment that cannot withstand high voltage to any monitoring interface;

4 When working with high power, the temperature of the instrument rises, please be careful to prevent burns;

5 Please do not charge the phone after the fast charge is triggered. Therefore, the manufacturer is not responsible for damage to the phone.

3.0 Performance description

3.0.1 Interface

1 Input monitoring port: TYPE-C, 24-PIN male;

2 Output monitoring port: TYPE-C, 24-PIN female socket;

3 PC connection port: Micro-USB, 5-PIN female socket.

3.0.2 Human-computer interaction

1 1.3 inch TFT-LCD screen;

2 Press button x 3.

3.0.3 Voltage and current

1 The highest six-digit display of voltage, current and power, the highest resolution is 0.00001 (V/A/W);

2 Record of minimum, maximum and average values of voltage, current and power during operation;

3 10 groups of switchable capacity, power, and time statistics;

4 1 set of voltage and current curve records, maximum support 9 hours;

5 Support low-speed waveform (voltage, current, D+, D-) drawing, 2sps --> 100sps sampling rate;

6 Support high-speed ripple (voltage, AC coupling) drawing, 5Ksps --> 4Msps sampling rate.

3.0.4 Fast charge trigger

1 QC2.0, QC3.0 trigger;

2 Huawei FCP, SCP trigger;

3 Samsung AFC trigger;

4 PD2.0/3.0 trigger;

5 Except for the PD protocol, it supports automatic monitoring;

6 Supports a maximum of 24 hours for a limited time trigger, and automatically closes the trigger when the time is reached

3.0.5 Wire identification

1 The internal resistance measurement of the wire rod by the differential pressure method;

2 E-Marker cable chip reading.

3.0.5 Miscellaneous

1 Start-up running time record;

2 Onboard temperature measurement;

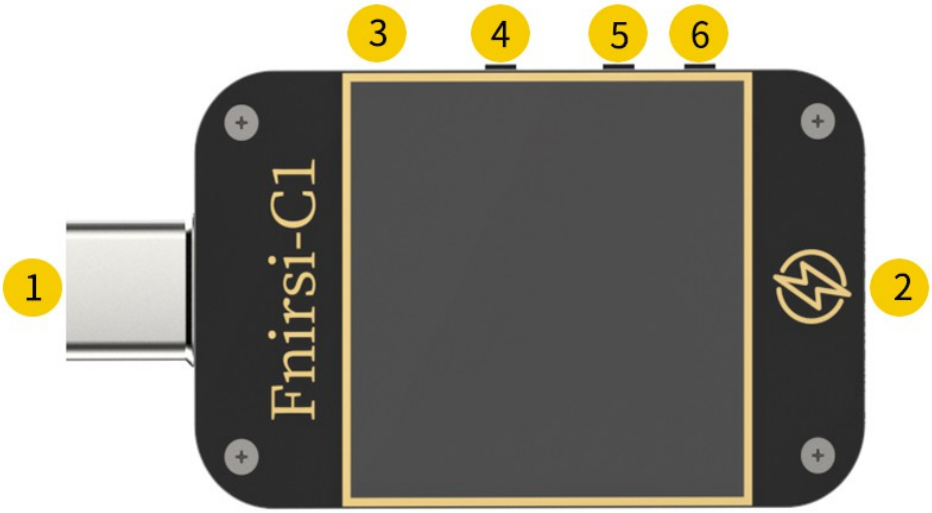
3 Gravity sensor, automatically switch the display direction, the whole interface supports 4 direction switching;

4 PD monitoring;

5 Apple 2.4A acceleration;

4.0 Appearance structure

1 Input monitoring port: TYPE-C, 24-PIN male;
2 Output monitoring port: TYPE-C, 24-PIN female socket;
3 PC connection port: Micro-USB, 5-PIN female socket;
4 OK key;
5 Left button;
6 Right click;



5.0 Technical Specifications

Accuracy: ±(a%(‰) reading + number of words)

Index	Range	Resolution	Accuracy
Monitorvoltage	4～24V	0.00001V	±(0.2‰+2)
Monitorcurrent	0～6.5A	0.00001A	±(0.5‰+2)
Monitor power	0～130W	0.00001W	±(0.5‰+2)
Loadequivalent internalresistance	0～9999.9Ω	0.0001Ω	±(0.5‰+2)
D+/D- voltage	0～3.3V	0.001V	±(1.0%+2)
Equipment temperature	℃	1℃	±(1.2%+3)
	℉	1℉	±(1.2%+4)
capacity	0～9999.99Ah	0.00001Ah	
energy used	0～9999.99Wh	0.00001Wh	
Cable internal resistance	0～9999.9Ω	0.0001Ω	
Equipment running time	99 days 23 hours 59 minutes 59 seconds	1second	
Record time	999 hours 59 minutes 59 seconds	1second	

6.0 Main Page

Except for special instructions, left and right buttons switch pages/menus, OK button and click to confirm, OK button and long press to cancel/return.

6.0.1 Concise Page

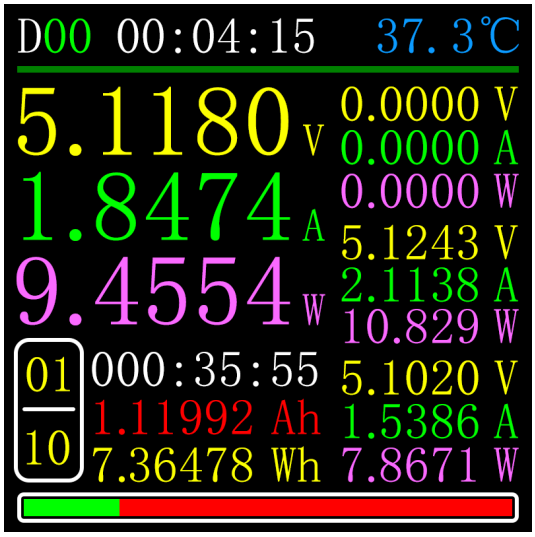
Description

Only 4 key parameters of voltage, current, power and load equivalent internal resistance are displayed, → indicates the direction of current. This page can change the display direction.

Instructions

(1) Long press the left button: enter the setting menu.
(2) Click the OK button: switch to 6-bit resolution.
(3) Long press the OK button: when the setting menu -> general -> gravity direction recognition is off, switch the screen direction.

6.0.2 Record page



Description

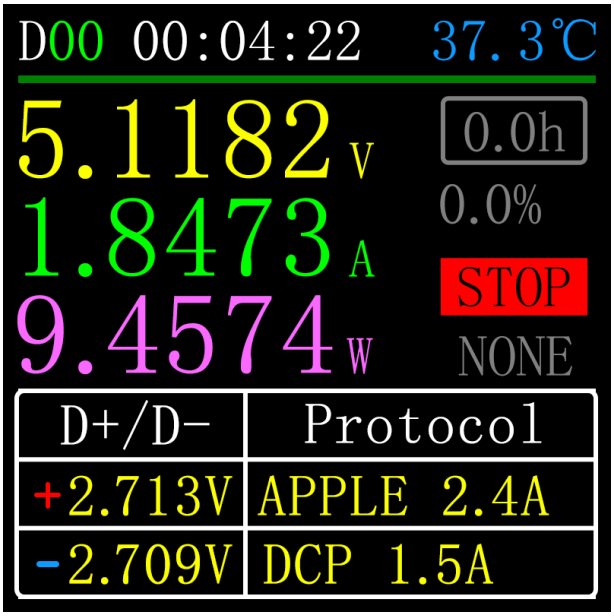
The top row of data from left to right is the boot record time and the onboard temperature respectively;
The uppercase data on the left is voltage, current, and power from top to bottom;
The curve and progress bar on the right are the remaining storage capacity of the voltage and current curves;
The groups in the lower left corner are the currently selected statistical group number, current group statistical time, capacity, and energy;
From top to bottom on the right are the minimum group, maximum group, and average group during the observation period. Can distinguish voltage, current, and power according to the unit;
There is a progress bar at the bottom, which is the remaining capacity of the offline curve. The color display indicates that it is recording, and the gray color indicates that it is not recording.

Instructions

(1) Long press the left button: switch to the capacity/power consumption list (please see the following instructions).
(2) Click the OK button: start/stop the voltage and current curve recording. It cannot be started when the recording time is 0.

(3) Long press the OK button: prompt to restart the calculation of the minimum, maximum, and average values of voltage, current, and power.
(4) Long press the right button: enter the offline curve observation page (please see the follow-up instructions).

6.0.3 Fast charge recognition page



Description

The top row of data from left to right is the boot record time and the onboard temperature respectively;

The uppercase data on the left is voltage, current, and power from top to bottom;

From top to bottom on the right are:

1. The trigger time limit is the setting menu->trigger->trigger time value.
2. The percentage of remaining trigger time.
3. Trigger status.
4. Trigger type

The trigger timing is the timing of the trigger time. When the timing reaches the trigger time limit, the meter will stop triggering.
It should be noted that the charger will restart after some protocols stop triggering.
The bottom table shows the D+/D- voltages and the identified possible ongoing agreements.

Instructions

(1) Long press the left button: prompt to enter the fast charge trigger module, if a certain protocol has been triggered, it will prompt to release

(2) Click the OK button: start/stop the trigger timing.

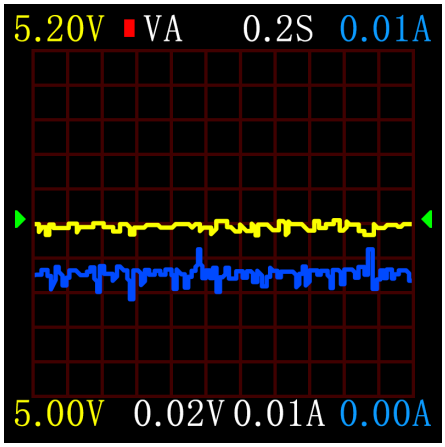
(3) Long press the middle button: prompt to clear and trigger timing.

(4) Long press the right button: enter the charging tool menu (please see the following instructions).

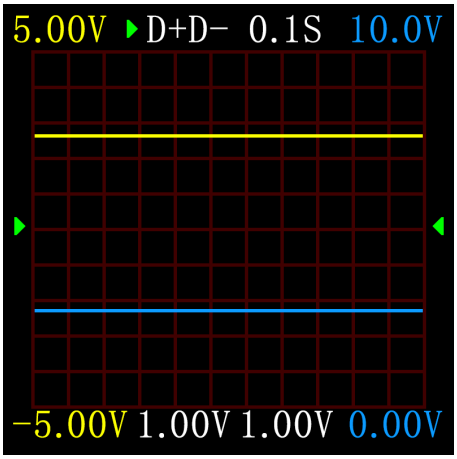
6.0.4 Curve display page

Description

Mode 1: Low-speed voltage and current curve (2sps -> 100sps)

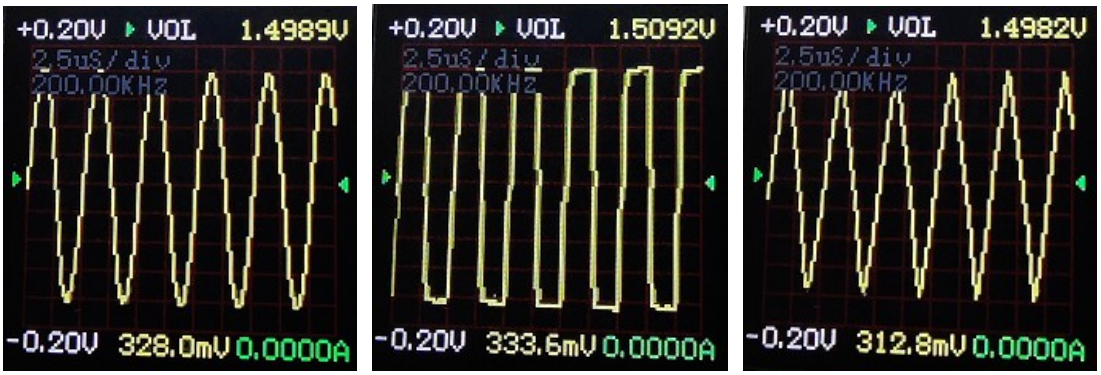


Mode 2: Low-speed D+D-curve (2sps -> 100sps)



Mode 3: High-speed voltage ripple (AC coupling) (5Ksps -> 4Msps)

The following picture shows the sine wave, square wave and triangle wave at 200KHz.

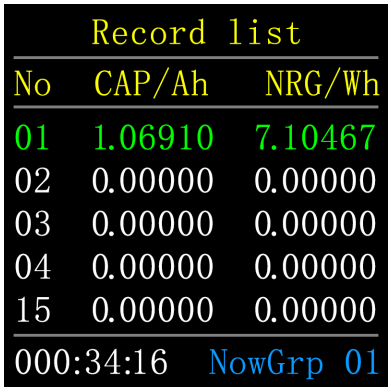


Instructions

(1) Long press the left button: time base subtraction.
(2) Click the OK button: start/pause drawing the curve. (Except in mode 3, it will prompt whether to clear the curve).
(3) Long press OK key: switch mode.
(4) Long press the right button: time base plus.

7.0 Expansion of recording function

7.0.1 Energy Statistics List



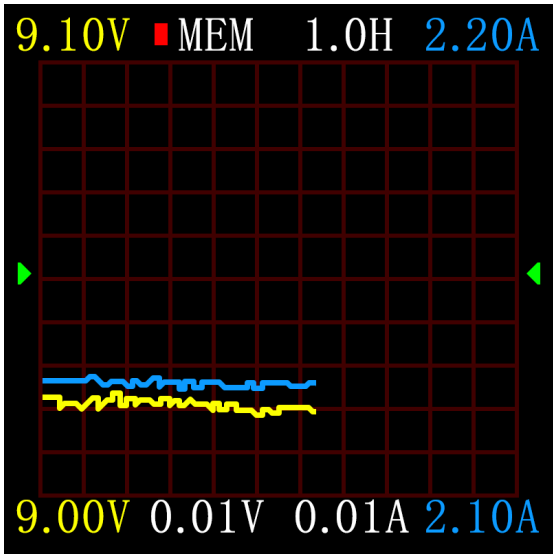
Description

In the record page (6.0.2) long press the left button to enter. Each row in the list represents a group of parameters, from left to right are the group number, capacity, and energy. The selected group is displayed in green, the lower left corner is the statistical time of the selected group, and the lower right corner is the group number of the currently statistical group.

Instructions

(1) Click the OK button: prompt to select or clear the selection group.\

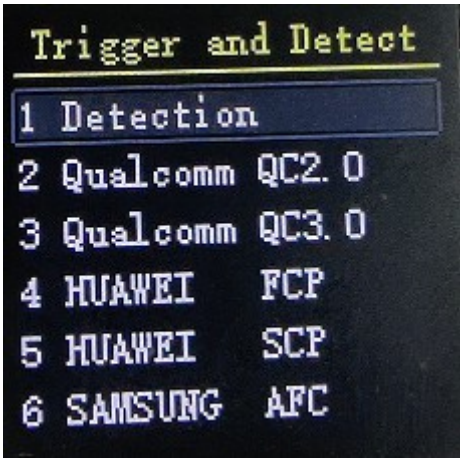
7.0.2 Offline curve observation page



Description

Click OK to prompt to clear the record curve.

8.0 Quick charge protocol trigger and detection menu



Description

On the (6.0.3) fast charge recognition page, long press the left button and confirm to enter.

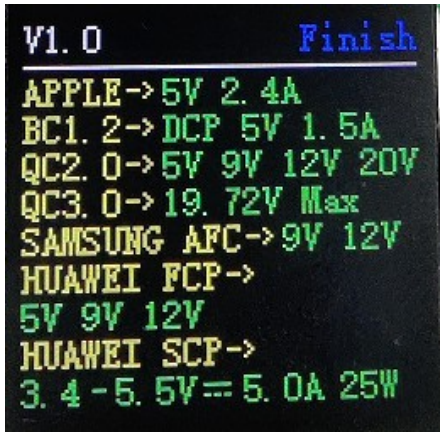
This meter supports QC2.0/QC3.0, HuaWei FCP/SCP, Samsung AFC trigger, PD2.0/3.0 trigger.

caveat

Once you have entered the quick charge trigger/detection interface, all operations

must be performed carefully, and it is forbidden to connect to equipment that cannot withstand high voltage. During the use of this function, the author will not be responsible for the loss caused by misoperation.

8.0.1 Automatic detection of fast charge protocol

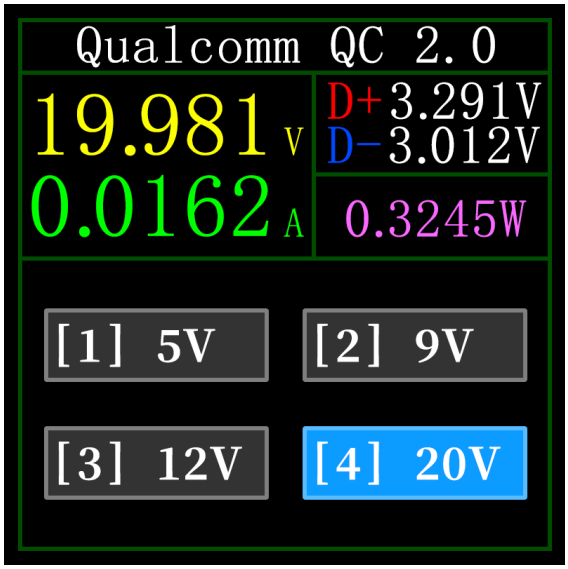


In this mode, the meter tries to trigger various protocols in turn, and displays the test results on the screen. Red means not supported, and green means supported. During the test, it is forbidden to connect to any equipment at the back end.

During the test, it does not respond to any key operations. If you want to exit during the test, please unplug the meter directly.

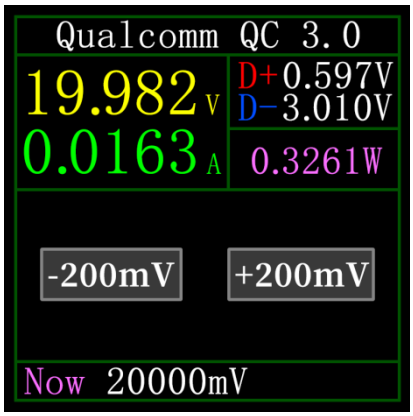
After the test is completed, click the OK button to start the test again; long press the OK button to return to the previous page.

8.0.2 QC2.0 trigger



In QC2.0 trigger mode, use the left and right keys to select the trigger voltage, and long press the OK key to return.

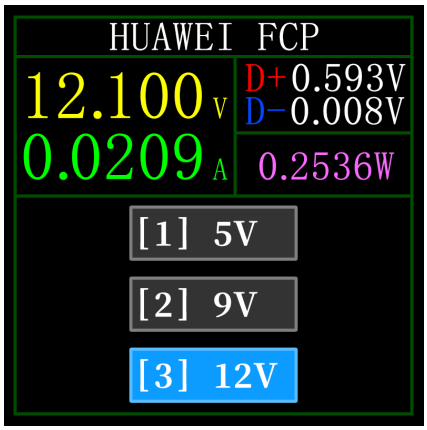
8.0.3 QC3.0 trigger



In QC3.0 trigger mode, use the left and right keys to decrease/increase the trigger voltage, and long press the OK key to return.

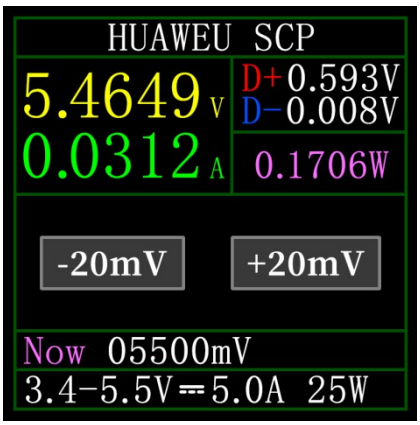
Press the left/right keys to quickly decrease/increase the voltage.

8.0.4 Huawei FCP trigger



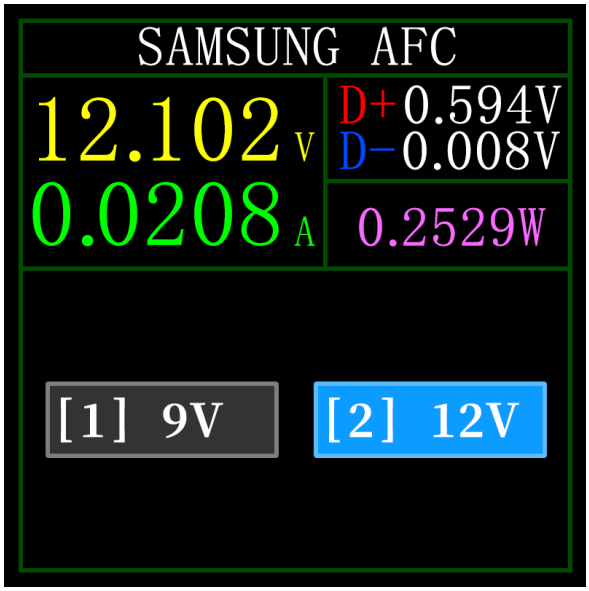
The operation mode is the same as QC2.0 trigger.

8.0.5 Huawei SCP trigger



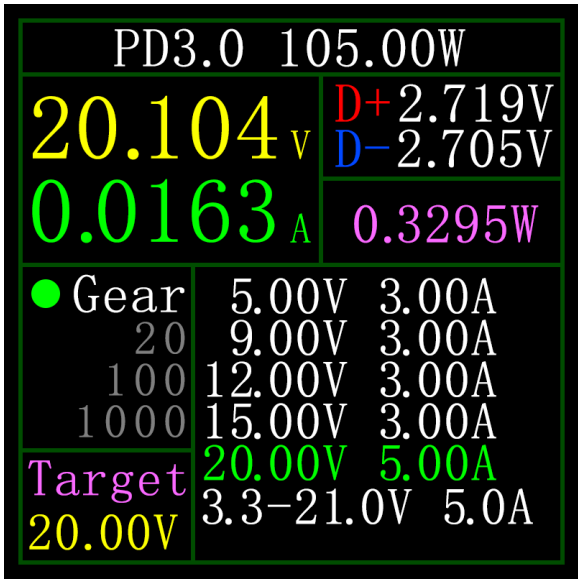
The operation mode is the same as QC3.0 trigger.

8.0.6 Samsung AFC Trigger



The operation mode is the same as QC2.0 trigger.

8.0.7 PD protocol trigger



Take the picture as an example. The picture shows a charger sending a message with a total of 6 gears, among which gears 1, 2, 3, 4, and 5 are fixed voltage gears, and gear 6 is adjustable voltage gear (PPS).

When the dot on the left is on Gear, you can switch the gear by pressing the left and right keys. When the gear is switched to the PPS gear, you can switch the step voltage by clicking the middle button. After selecting the step voltage, press the left

and right keys (left Decrease right plus), decrease/increase the voltage.

9.0 Charging tool

On the (6.0.3) fast charge recognition page, long-press the right button to enter the charging tool menu. The functions are:

1 PD listener.
2 Read the E-Marker cable.
3 wire resistance measurement.
4 Apple 2.4A acceleration.

9.0.1 PD Listener

When using a PD monitor, use a power supply not greater than 16V (usually 5V) and a Micro-USB cable to connect to the PC connection terminal, provide external power.

When the connection is normal and the PD protocol triggered by the PD consumer is captured, the page is shown as follows.

In the figure above, the charger is a 105W PD charging head. The current PD consumer selects the 5th gear and triggers the target voltage of 20V,the maximum current is 5A.

Click the middle button to switch to the "View Detailed Communication Process" page, as shown in the figure above.

In the left column, you can select the message to be viewed by the left/key, such as:

Now select the message with 0x1882 REQ <-. It is the message number. In this instrument, the larger the message number, the newer the message. 0x1882 is the message header. REQ is the message type, which means that this is a request (Request) message. The request message (Request) is used to apply to the charging head for the gear required for charging (for example, 6 gears in this example, request one of the gears)). <- Indicates the direction of data transmission, which means that this message is sent to the PD charging head by the PD consumer.

The right column 3304B12C (hexadecimal) contains information such as voltage and current when sending a request message.

In addition, in this interface, long press the left button to clear the data buffer. Long press the right button to quickly browse the messages.

Note:

1 Turn on the setting menu->trigger->mask PD CRC, you can turn off the monitoring of CRC.

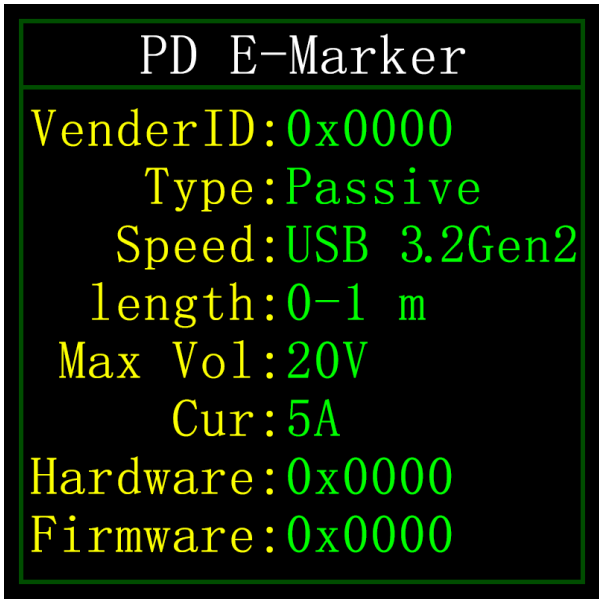
2 For the meaning of various messages in the PD protocol, please refer to the relevant information.

9.0.2 Read E-Marker cable

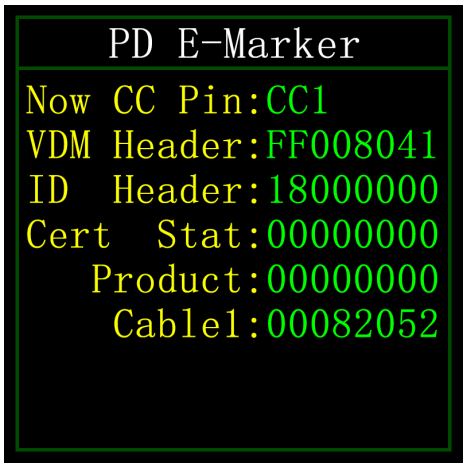
E-Marker cable refers to a cable with an E-Marker chip in the Type-C interface. If the interface does not contain an E-Marker chip, the packet from the PD charging head cannot exceed 3A current, and only the E-Marker cable can be used to trigger the PD According to the agreement, the current can exceed 3A.

When using the PD monitor, please use the PC communication port for power supply.

After entering this function, insert the cable from the Type-C female socket to read the message, as shown in the figure below.



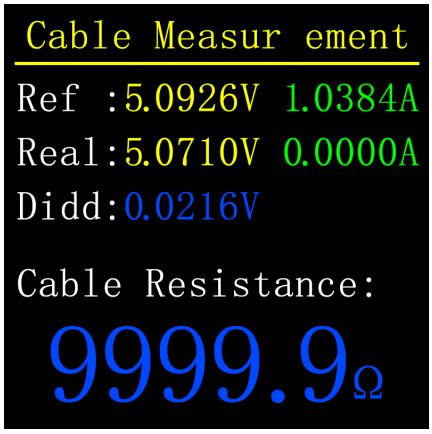
Click OK to switch to the figure below.



The above two pictures, one picture is the parsed data, and the second picture is the original data. Users can consult the PD protocol related materials and make

comparisons by themselves.

9.0.3 Wire resistance measurement page



Description

C1 uses the differential pressure method to measure the internal resistance of the cable, which needs to be used with a constant current load.

Instructions

Click the OK button: use the current voltage and current value as the reference value.

Measurement procedure

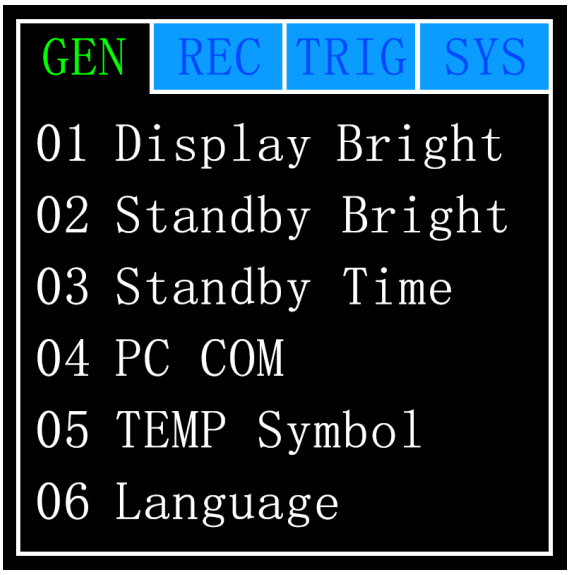
(1) Connection method: charger + C1 + constant current load (the current is adjusted to about 0.5-1A), and record the reference value.

(2) Connection method: charger + cable + C1 + constant current load (the current is adjusted to about 0.5-1A, and it needs to be followed
The current when recording the reference value is similar), the system automatically calculates the internal resistance of the cable.

9.0.4 Apple 2.4A acceleration

The Apple device can only charge at 5V-2.4A when it detects that the charging head D+ and D- are 2.7V. This function sets D+ and D- to 2.7V.

10.0 setting menu



Description

In the setting menu, left and right buttons can select menu options, click OK to enter/confirm the current options, long press OK to return/cancel/exit the current options/menu.

10.1 Settings menu -> General

Set up some general system configurations.

10.1.1 Setting menu -> General -> Display brightness

Set the screen brightness, the adjustable range is 1-20 levels.

10.1.2 Settings menu->General->Standby brightness

Set the brightness of the standby screen, the adjustable range is 0-20, when it is set to 0, the screen will be turned off directly after entering the standby state.

10.1.3 Settings menu->General->Standby time

Set the standby time, the last time you operate the button to start timing, reach the standby time, enter the standby state.

10.1.4 Settings menu->General->Data transmission

After closing, unable to connect to the computer through the PC port.

10.1.5 Setting menu->General->Temperature symbol

Optional on-board temperature display as ℃/℉.

10.1.6 Settings menu -> General -> System language

Currently only Chinese/English is supported. Due to the character size problem, English will be displayed in the Chinese system, which is a normal phenomenon.

10.1.7 Settings menu -> General -> Current change wake up

Set the wake-up current. When the current change exceeds the wake-up current, the meter changes from the standby state to the normal working state. When set to 0, the function is turned off。

10.1.8 Settings menu->General->Bluetooth switch

After closing, Bluetooth data transmission is not possible.

10.1.9 Settings menu -> General -> Gravity direction recognition

When opened, the page direction is automatically switched, after closing, the page reverse cannot be switched automatically, but you can switch the page direction by long pressing the OK button on the (6.0.1) concise page.

10.1.10 Settings menu->General->Startup page

Turn on/off the boot page.

10.1.11 Settings menu->General->Restore factory settings

Restore all settings except recorded data.

10.2 Settings menu -> record

Set the configuration required for logging data.

10.2.1 Setting menu->Record->Curve record time

Set the recording time of the voltage and current curve, the maximum is 9 hours, set to no time without recording. Each time you change the configuration, the curve will be cleared to 0.

10.2.2 Setting menu->Record->Statistical current threshold

When the current is greater than or equal to the threshold, the capacity, energy,

and time statistics are performed, and the setting range is 0-5A.

10.2.3 Settings menu->Record->Energy statistics time

When set to None, there is no time limit until the statistics reach the maximum value. After the time is set, the statistics will automatically stop when the statistics time reaches the set value.

10.2.7 Settings menu->Record->Clear all records

Clear all recorded data, including offline curves and energy statistics.

10.3 Settings menu -> trigger

Trigger related configuration.

10.3.1 Setting menu -> Trigger -> Trigger time

Set the trigger time.

10.3.2 Setting menu -> Trigger -> Block PD CRC

After it is enabled, CRC packets can be shielded when PD is monitoring, and it is disabled by default.

10.3.3 Settings menu -> Trigger -> Power on Apple 2.4A

Settings menu -> Trigger -> Power on Apple 2.4A.

10.4 Settings menu -> system

You can view information such as the running times of the instrument, SN serial number, software version, etc.

11.0 Upgrade firmware instructions

(NOTE： The previous FNB38 and FNB48 use the FNIRSI USB Meter upgrade tool.FNIRSI-C1 uses FNIRSI UsbMeter Computer Software to upgrade the firmware now.)

1 Open the FNIRSI UsbMeter Computer Software.

2 When the meter is off, press the "OK" button fisrt.Then connect the USB data cable to the "PC online port".And it will display the connected, device model, and device firmware version.

3 Click “System”, In the location of the file, import the firmware version you want to upgrade.

4 Click “Refresh icon”，START to start the firmware upgrade. After the upgrade is complete, the watch will automatically restart and enter the main interface.

12.0 Frequently Asked Questions

1 Q: Why is there no response when C1 is inserted into the PD charger?

A: The CC pull-down of C1 is off by default, and the PD charging head does not supply power when the CC pull-down is not detected. After you can connect to C1, press AND HOLD the right button，you can use the CC pull-down to open the way to make the charger work.

2 Q: Use the CC cable to connect to C1 from the TYPE-C female socket, and press the right button, why there is still no response?

A: The CC line has only one-sided CC, and the connector can be turned over and reconnected.

3 Q: How to trigger the PD protocol?

A: If you start by pressing the right button, after entering the PD trigger, no protocol information is displayed, you need to re-plug and enter.

3 Q: After triggering SCP or PD, and then triggering other protocols, will it restart?

A: This is the reason for the agreement, which is normal.

4 Q: After the SCP or PD is released, if another protocol is triggered, it will restart?

A: This is the reason for the agreement, which is normal.

5 Q: Enter the PD to monitor a black screen?

A: Entering the PD monitor will turn off the CC pull-down, so it is recommended to use an external power supply.

6 Q: PD monitoring fails and there is no data?

A: Switch to the page of "View detailed communication process", and then long press the left button to clear the data buffer area, and then trigger the monitoring.