

# FNB38 manual

(V1.2)



**Tips:** The **FNB38 user manual (V1.2)** is applicable to firmware **V1.3** and above.

#### Firmware version description

**2019.12.24: v1.00**

Original firmware.

**2020.02.29: v1.10**

Fix some known issues.

**2020.03.20: v1.20**

Fix restart issue when PD protocol is triggered.

**2020.05.29: v1.30**

- 1、Add the setting to close the startup screen;
- 2、Add the setting to turn off the CC pulldown;
- 3、Changed the judgment logic during fast charge identification;
- 4、In v1.20 version, some testers D+ and D- are displayed as 0V, this version is corrected;
- 5、During fast charge detection, it supports displaying the power of PD protocol and the number of PDOs, and increases the detection of BC1.2 and APPLE2.1A/2.4A;
- 6、Add PD monitoring function;
- 7、Add PD E-Marker function;
- 8、Add QC2.0→PD protocol conversion function.

## table of Contents

<b>一、 Overview</b> .....	<b>4</b>
<b>二、 Pay attention to safety matters</b> .....	<b>4</b>
<b>三、 Appearance structure diagram</b> .....	<b>4</b>
<b>四、 Technical index</b> .....	<b>5</b>
<b>五、 Function page operation instructions</b> .....	<b>6</b>
1、 Features page.....	6
2、 Capacity / Power consumption observation page.....	6
3、 Capacity / power consumption list.....	8
4、 Fast charge identification page.....	9
5、 Curve display page.....	10
6、 Cable measurement page.....	10
7、 Fast charge detection and trigger page.....	11
7.1 Fast charge protocol detection.....	11
7.2 QC2.0 trigger.....	12
7.3 QC3.0 trigger.....	13
7.4 Huawei FCP trigger.....	13
7.5 Huawei SCP trigger.....	14
7.6 Samsung AFC trigger.....	14
7.7 PD protocol trigger.....	15
7.8 PD protocol monitoring.....	16
7.9 PD E-Marker.....	17
7.10 PD protocol conversion.....	18
8、 System information and settings page.....	19
<b>六、 Upgrade firmware instructions</b> .....	<b>23</b>

## 一、 Overview

FNB38 USB tester is a high-reliability, high-security USB voltage and current detection meter and mobile communication terminal fast charge trigger. With a 1.44-inch TFT LCD display and integrated USB-A, Micro-USB, Type-C interfaces. Use an 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 the charging power of mobile phones, the input and output of mobile power;

This instruction manual includes relevant safety information, warning tips and solutions to common abnormal conditions. Please read the contents carefully and strictly observe all warnings and precautions.

## 二、 Pay attention to safety matters

1. Do not connect a power supply exceeding 24V to the tester.
- 2.The USB-A input port of FNB38 supports high-power input (such as  $20V * 5A = 100W$ ). The USB-A output port can withstand 5A current for a short time. The Micro-USB input port does not support large current and high power. More than 2.5A. When using high current and high power, it is recommended to use Type-C interface output.
- 3.HID-USB interface is only used for data transmission.
- 4.When using high voltage and high power work, the temperature of the tester rises. Please be careful to prevent burns.

## 三、 Appearance and structure diagram (see Figure 1)

- 1.USB-A input
- 2.Type-C input
- 3.Micro-USB input
- 4.Type-C Output
- 5.USB-A Output
6. >> button, page / select button
- 7.<< button, page / select button

8.OK key, function key

9.HID-USB data transmission

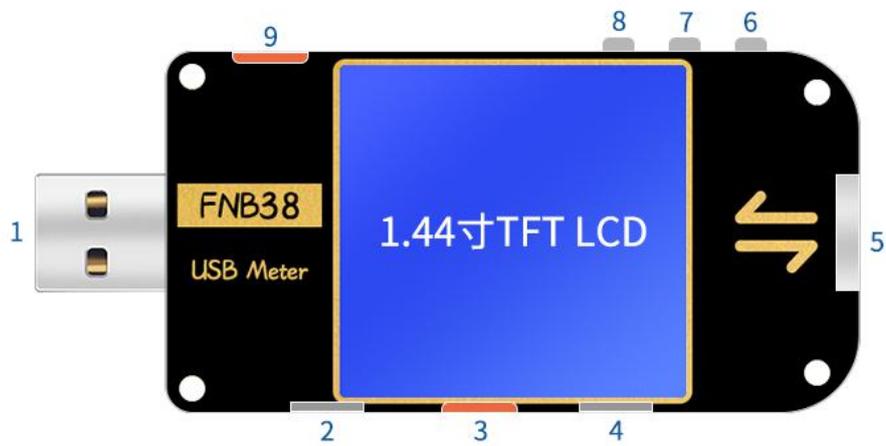


figure 1

#### 四、 Technical index

Accuracy:  $\pm (a\% (\text{‰}) \text{ reading} + \text{word count})$

index	Range	Resolution	Accuracy
Input voltage	4~24V	0.1mV	$\pm(0.2\text{‰}+2)$
Input Current	0~5A	0.1mA	$\pm(0.5\text{‰}+2)$
input power	0~120W	0.1mW	$\pm(0.5\text{‰}+2)$
Load Equivalent Internal Resistance	0~9999.9 $\Omega$	0.1m $\Omega$	$\pm(0.5\text{‰}+2)$
D + / D- voltage	0~3.3V	0.01V	$\pm(1.0\%+2)$
Equipment temperature	$^{\circ}\text{C}$	1 $^{\circ}\text{C}$	$\pm(1.2\%+3)$
	$^{\circ}\text{F}$	1 $^{\circ}\text{F}$	$\pm(1.2\%+4)$
capacity	0~99999mAh	0.0001mAh	for reference
energy used	0~9999.99Wh	0.00001Wh	for reference
Cable internal resistance	0~9999.9 $\Omega$	0.0001 $\Omega$	for reference
Equipment runtime	999 hours 59 minutes 59 seconds	1 second	5 seconds / hour
Record time	999 hours 59 minutes 59 seconds	1 second	5 seconds / hour

## 五、 Function page operation instructions

### 1、 Close-up page (see Figure 2)



Figure 2

#### description

Only the three key parameters of voltage, current and power are displayed. → indicates the current direction. This page changes the display orientation.

#### Instructions

(1) <<>> key

Short press: Turn the page.

(2) OK key

Long press: Switch the screen display direction.

### 2、 Capacity / power consumption observation page (see Figure 3)



Figure 3

#### description

FNB38 supports 5 sets of capacity / power consumption records, and offline voltage and current curve records.

**Run:XXX:XX:XX** Represents the tester's startup time, without saving, restarts the timer after restart.

**Rec:XXX:XX:XX** It indicates the valid time of the tester's recording capacity / power consumption. It is saved offline and will not be lost after power failure.

**Time** It shows the voltage and current offline curve recording time. This time can be set by Cap / Ele Limit, and **Rec:XXX:XX:XX**Record validity time for association or disassociation:

When Cap / Ele Limit is ON, the effective time of recording is limited by the time of offline curve recording. For example, Time is set to 1h. After recording for 1h, offline curve recording is completed, and the capacity / power consumption is no longer recorded. It is OFF. After the offline curve recording is completed, the capacity / power consumption continues to be recorded. Cap / Ele Limit is OFF by default and can be set by the user.

**Thres** Indicates the recording current threshold. When the Auto Rec Switch is ON, Auto is displayed. This value is meaningful, that is, when the current is greater than Thres, the capacity / power consumption / offline curve is automatically recorded; if the current is less than Thres, no recording is made.

When Auto Rec Switch is OFF, Manual is displayed, and the Thres value is meaningless. Recording on / off is determined by the OK key. After recording is turned on, all records are recorded regardless of the current.

**Memor** Indicates the remaining recording capacity of the offline curve. When it is 0%, the recording is completed.

**Grp:1/5** Indicates the record group.

**ON/OFF** Indicates the current recording status on / off.

## Instructions

(1) << key

Short press: page turning;

(2) Long press: switch to capacity / power consumption list (see Figure 4) (see the following description).

(3) >> key

Short press: page turning;

(4) Long press: switch record group.

(5) OK key

Short press: When set to manual recording, recording can be paused / started, and it is invalid when set to automatic recording;

Long press: Clear the current group record data, including capacity, power consumption, and record valid time.

### 3. Capacity / power consumption list (see Figure 4)



No	Cap/mAh	Ele/Wh
1	0.0000	0.00000
2	0.0000	0.00000
3	0.0000	0.00000
4	0.0000	0.00000
5	0.0000	0.00000

Rce:000:00:00 OFF

Figure 4

#### description

To facilitate the comparative analysis of multiple sets of capacity / power consumption data, you can switch to the capacity / power consumption list (Figure 4).

#### Instructions

(1) << key

(2) Long press: Switch to the capacity / power consumption observation page (see Figure 3).

(3) >> key

Short press: switch observation group.

(4) OK key

Short press: When set to manual recording, recording can be paused / started, and it is invalid when set to automatic recording;

Long press: Clear the current group record data, including capacity, power consumption, and record valid time.

#### Method for clearing recorded data: (note)

(1) Press the OK button on the pages of Figure 3 and Figure 4 to clear the capacity, power consumption, and recording time of each group.

(2) Offline record curve page (as shown in Figure 8), click OK, pop-up clear confirmation window, you can clear the offline record curve separately.

(3) Select Clear all Records in the settings to clear all records (5 sets of capacity / power consumption / recording time and voltage and current offline recording curves). (Enter the follow-up instructions of the setting method)

#### 4. Fast charge identification page (see Figure 5)



Figure 5

#### description

This page is used to observe the current charging protocol, D + / D- voltage.

**Wake** Indicates automatic wake-up current, current change  $\geq$  When Wake, exit from standby.

**Bright** Represents the current screen brightness.

#### Instructions

(1) << >> key

Short press: page turning;

(2) OK key

Short press: release D + / D-. When the fast charge trigger state (except the PD protocol), D + / D- can be released to return to the non-trigger state.

#### 5. Curve display page (as shown in Figures 6, 7, 8)

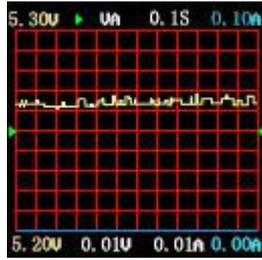


Figure 6

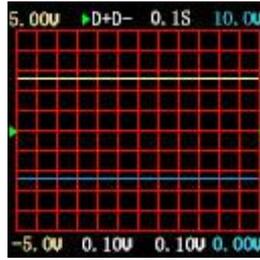


Figure 7

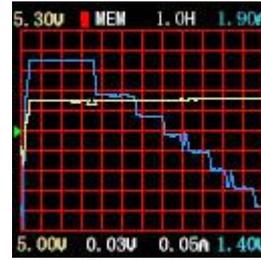


Figure 8

## description

Figure 6 is the real-time curve of voltage and current.

Figure 7 shows the data D + and D- real-time curves.

Figure 8 shows the offline recording curve of voltage and current.

## Instructions

(1) << >>key

Short press: page turning;

(2) Long press: Decrease / increase time base. (Only pages in Figures 6 and 7).

(3) OK key

Short press: screenshot curve; (Figures 6 and 7 are valid);

The curve clear window pops up; (Figure 8 is valid);

Long press: switch display curve.

## 6.Cable measurement page (see Figure 9)

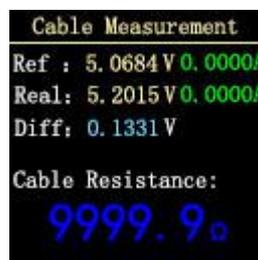


Figure 9

## description

FNB38 uses the voltage drop method to measure the internal resistance of the cable. It needs to be used with a constant current load.

## Instructions

- (1) << >>key
- (2) Short press: page turning;
- (3) OK key

Short press: Record the reference value. Long press: switch display curve.

## Measurement steps

- (1) Connection method: charger + FNB38 + constant current load (current adjusted to about 1A), record the reference value.
- (2) Connection method: charger + cable + FNB38 + constant current load (current adjusted to about 1A), the system automatically calculates the cable internal resistance.

## 7. Fast charge detection and trigger page (see Figure 10)

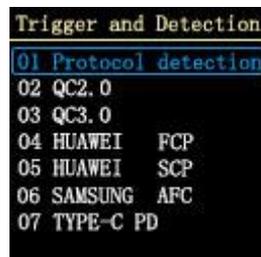


Figure 10

### description

Fast charge detection, fast charge trigger, short press OK to enter selection.

### 7.1 Fast charge protocol detection

After selecting Protocol detection protocol, short press OK to enter the state of automatic detection of fast charging protocol.

After the test is completed, short press OK to exit the test interface.

**Explanation:** PD protocol detection, because some PD chargers will only send a complete PDO after requesting the first voltage, and one-click detection will not make a voltage request, so the

number of PDOs may be small. Complete PDO please trigger with PD Time shall prevail. If this problem is solved, the firmware will be updated in the future.(For easier operation, **DANGEROUS** will not be prompted after this version!!!)

**Note: Do not connect any electrical appliances during the testing process, otherwise the high voltage triggered during the testing process may burn the electrical appliances!**

**Note: Do not connect any electrical appliances during the testing process, otherwise the high voltage triggered during the testing process may burn the electrical appliances!**



Figure11 One-click detection page

## 7.2 QC2.0 trigger

Select QC2.0, press OK shortly to enter the QC2.0 trigger page (as shown in Figure 12), Trigger Failure will display **Trigger Failure!**



Figure 12

### Instructions

(1) << >>key

Short press: Switch the QC2.0 trigger voltage.

(2) OK key

Long press: Exit the current page. (Still triggering).

### 7.3 QC3.0 trigger

Select QC3.0, press OK shortly to enter the QC3.0 trigger page (as shown in Figure 13), Failure will display **Trigger Failure!**



Figure 13

#### Instructions

(1) << >>key

Short press: Decrease / increase QC3.0 trigger voltage.

(2) OK key

Long press: Exit the current page. (Still triggering).

### 7.4 Huawei FCP trigger

Select Huawei FCP and press OK to enter the Huawei FCP trigger page (see Figure 14). If the entry fails, **Trigger Failure!** Will be displayed.



Figure 14

#### Instructions

(1) << >>key

Short press: Switch the FCP trigger voltage.

(2) OK key

Long press: Exit the current page. (Still triggering).

## 7.5 Huawei SCP trigger

Select Huawei SCP and press OK key to enter the Huawei SCP trigger page (as shown in Figure 15). Trigger Failure will display **Trigger Failure!**



Figure 15

### Instructions

(1) << >>key

Short press: Decrease / increase SCP trigger voltage.

(2) OK key

Long press: Exit the current page. (At the same time exit the SCP trigger state).

## 7.6 Samsung AFC trigger

Select Samsung AFC, press OK shortly to enter the Samsung AFC trigger page (as shown in Figure 16), Fail Failure will display **Trigger Failure!**



Figure 16

### Instructions

(1) << >>key

Short press: switch AFC trigger voltage. (When the charger does not support trigger voltage,

the voltage will return to 5V)

(2) OK key

Long press: Exit the current page. (Still triggering).

## 7.7 PD protocol trigger (requires connection to Type-C interface)

Select PD trigger, short press OK to enter the PD protocol trigger page (as shown in Figure 17). When entering, it will detect whether PD detects the CC pull-up. If not, return to the selection page. If there is a CC pull-up but no Caps are received, the voltage option will not be displayed.

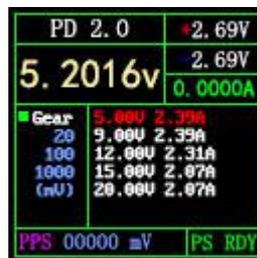


Figure 17

### PD2.0 Instructions

(1) << >>key

Short press: Select PD trigger voltage.

(2) OK key

Long press: Exit the current page.

### PD3.0 Instructions

(1) << >>key

Short press: Select trigger voltage. When the PPS is triggered, the voltage is lowered / raised.

OK button

(2) OK key

Short press: When the PPS trigger is selected, the step voltage unit is changed.

Long press: Exit the current page.

Note: PPS trigger requires continuous communication to maintain, so the charger will restart for a period of time after exiting the interface.

## 7.8 PD protocol monitoring

On the hardware, you need to use two CC lines, the connection method is:  
PD charger-CC line-FNB38-CC line-PD electrical appliances

In order to avoid losing data, you can use the HID interface to provide power.  
When connecting, first connect the charger, FNB38 will automatically judge the communication CC line and switch to the corresponding interface to monitor.

On the software, select PD monitor and short press OK button. If CC line is not detected, it will return to the selection page; if CC line is detected, enter PD monitor page 1 (see Figure 18).

Tip: PD monitoring only judges and switches to the corresponding CC line when entering. If it has been entered successfully and then HID power supply is removed, then the CC line connected to the charger is unplugged and inserted reversely. Because the communication CC line is different, it cannot be monitored. Flip the CC line, or exit the monitor and re-enter. When the monitoring function is not normal, you can also go to page 2 to reset the monitoring information.

Because the CC line usually only has a single-sided CC, the two CC lines need to be communicated with the CC line pair to monitor successfully.

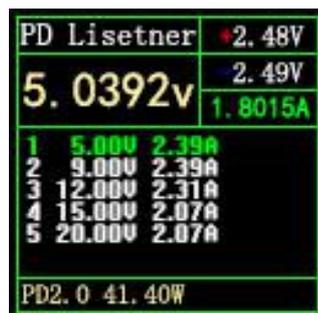


Figure 18



Figure 19

### PD monitoring Instructions

(1) << key

(2) Only valid on monitoring page 2 (Figure 19), short press: switch to view detailed information of the message package; long press: reset monitoring information.

(3) >> key

Only valid on the monitoring page 2 (Figure 19), short press: switch to view the detailed information of the message package; long press to hold to quickly browse down the information.

(4) OK key

Short press: You can switch between page 1 (Figure 18) and page 2 (Figure 19).

Long press: exit the current page.

## 7.9 PD E-Marker

This function can read the information of the CC line **with the chip**, use the **HID interface** or **5V ordinary power supply (non-Type-C interface power supply)**, enter PD E-Marker page 1 (Figure 20), this page shows some parsed CC lines Information, such as supplier ID, maximum voltage, maximum current, length, etc. Short press >> button to switch to page 2 (Figure 21), this page displays the unparsed original packet information, users can parse the packet according to the manual to see if it matches the data on page 1.

When **Auto** is green in the upper right corner, it means that the CC line is automatically detected. At this time, no operation is required when plugging and unplugging. The cable information will be automatically read. If you click OK to make **Auto** gray, you will switch to manual mode. Information will not change. In manual mode, you can click the << key to obtain the wire information.

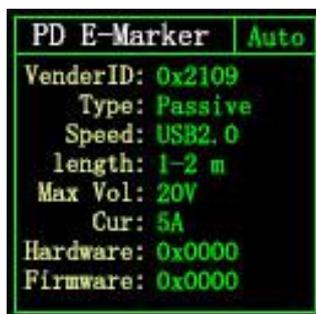


Figure 20

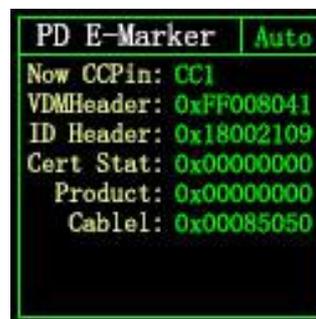


Figure 21

## 7.10 PD protocol conversion

This function can convert QC2.0 charging head to PD2.0 charging head for PD electrical appliances. When entering the page, the system detects whether the charging head supports QC2.0, if it does not support, it cannot enter.

This function automatically finds power-using equipment and supports 2-60W broadcasting. You only need to change the power as needed. **Be careful not to exceed the power of the charger to avoid unnecessary damage.**

Click the OK button to enter/confirm the power change. You can use the <</>> button to change the power. After the power is changed, the broadcast will be resent. The new power protocol is not triggered successfully. Please try to unplug and replug.

It is always 5V when no device is connected, to avoid high-voltage damage to mobile phones that do not support high-voltage when plugged in.

**QC2.0 only has a Class B charger that supports 20V triggering, so when PD appliances request 20V voltage, the tester will detect whether the charger successfully triggers QC2.0-20V. If it does not reach 20V, the tester will cancel the 20V gear. And resend Caps broadcast.**

In addition, some PD appliances will change the D+, D+ voltage during charging, resulting in an abnormal QC2.0 trigger, and this type of charger cannot be charged by this function.

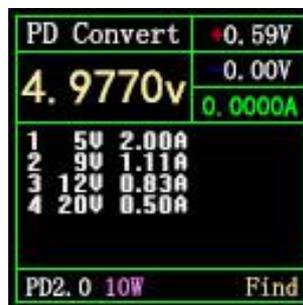


Figure 22 PDChange page

Status description in the lower right corner:

**Find:** Looking for PD electrical appliances;

**Send:** Send Caps broadcast;

**Wait:** Waiting for voltage request;

**Ready:** The agreement is complete.

## 8. System information and setting page (see Figure 18)



Figure 18

### description

Press and hold << to power on, FNB38 enters the system information and settings page.

VX.X Indicates the current firmware version.

SN:XXXXXXX Indicates the unique serial number of the device.

Run:XXXXXXX Represents the number of device runs.

### Instructions

(1) << >>key

Short press: switch setting items.

(2) OK key

Short press: The setting window pops up.

Long press: Exit the setting page, and the device starts from the LOGO page.

### Setting item description

	<p>The screen displays brightness settings, ranging from 1-20 levels.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p>
---	---

	<p>&lt;&lt; &gt;&gt; key: short press: when the green dot is at the maximum grid (20Level, not explained later), change the parameter.</p>
	<p>Standby screen display brightness setting, the range is 0-20 level, when it is 0, the backlight is turned off.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
	<p>Standby time, ranging from 0-30 minutes. Does not stand by when <b>OFF</b>.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>

	<p>Automatic recording switch:</p> <p>ON: recording when the current exceeds the threshold;</p> <p>OFF: The current threshold is invalid, and recording is started and stopped by pressing the button.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
	<p>Current threshold: effective when the automatic recording switch is ON, current <math>\geq</math> this value, recording voltage and current equivalent.</p> <p>OK key: short press: switch green dot position. Where is the green</p>

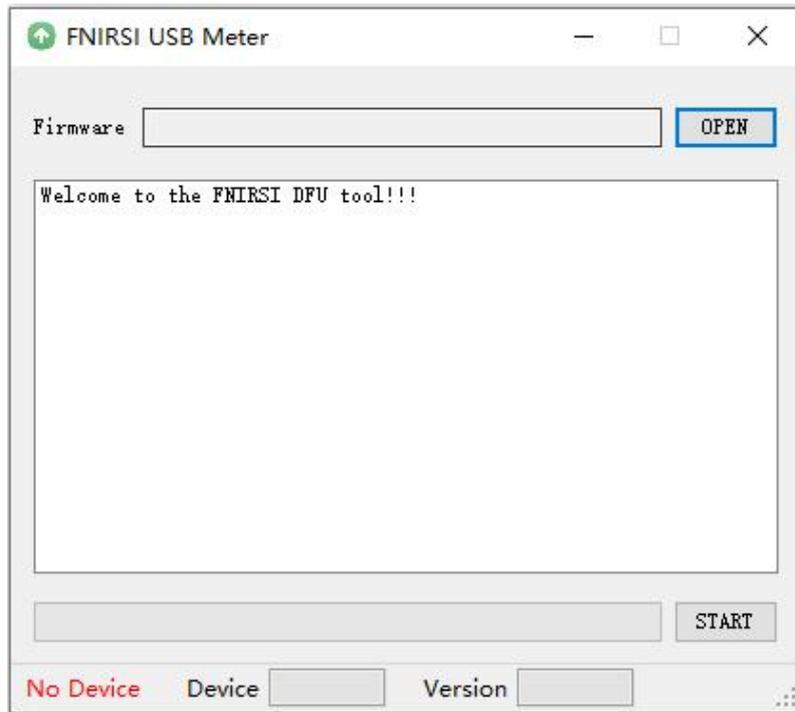
 <p>SYSTEM V1.3 SN:001863 Run:000026 01 Display Bright 02 0.05 03 A 04 05 ● NO YES 06 Recording Time 07 Cap/Ele Limit</p>	<p>dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
 <p>SYSTEM V1.3 SN:001863 Run:000026 01 Display Bright 02 1.0h 03 10 s/point 04 05 ● NO YES 06 Recording Time 07 Cap/Ele Limit</p>	<p>Recording time: curve recording time, no recording when NO, range is 0-9 hours, recording time interval is calculated automatically. (Such as one hour, one point every 10 seconds)</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
 <p>SYSTEM V1.3 SN:001863 Run:000026 01 Display Bright 02 OFF 03 ON 04 05 ● NO YES 06 Recording Time 07 Cap/Ele Limit</p>	<p>Capacity / power consumption record limit: When <b>OFF</b>, the capacity / power consumption is not limited by the recording time;</p> <p>When <b>ON</b>, the recording time is up and the capacity / power consumption is no longer recorded.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
 <p>SYSTEM V1.3 SN:001863 Run:000026 04 Auto Rec Switch 05 ON 06 OFF 07 08 ● NO YES 09 Temperature Symbol 10 System Language</p>	<p>Data transfer switch.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>

	<p>Temperature display symbol: ° C / ° F.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
	<p>System language: Chinese / English.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
	<p>Automatic wake-up current: When the current changes <math>\geq</math> this value, it exits the standby state.</p> <p>OK key: short press: switch green dot position. Where is the green dot, which corresponds to which operational block.</p> <p>Long press: Effective when the green dots are NO / YES.</p> <p>&lt;&lt; &gt;&gt; key: short press: when the green dot is on the largest grid, change the parameter.</p>
	<p>Turn on/off software CC pull-down.</p> <p>OK key: Short press: switch the green dot position. Where is the green dot, which corresponds to which operable block.</p> <p>Long press: Valid when the green dots are NO/YES.</p> <p>&lt;&lt; &gt;&gt; key: Short press: change the parameter.</p>

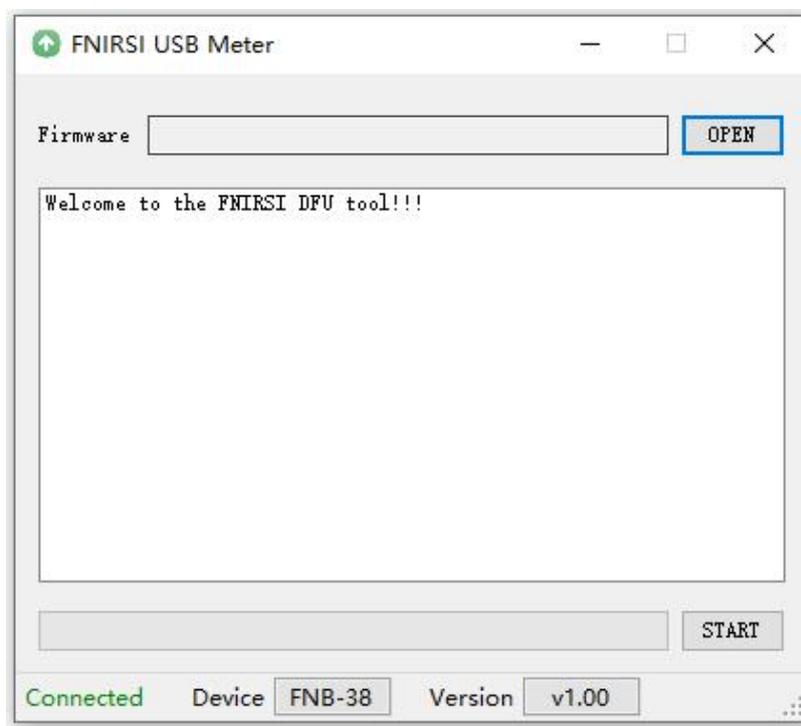
 <p>SYSTEM V1.3 SN:001863 Run:000026 07 Cap/Ele Limit 08 ON 09 OFF 10 11 ● NO YES 12 CC Pull Down 13 Start Page</p>	<p>Turn on/off the startup page</p> <p>OK key: Short press: switch the green dot position. Where is the green dot, which corresponds to which operable block.</p> <p>Long press: Valid when the green dots are NO/YES.</p> <p>&lt;&lt; &gt;&gt; key: Short press: change the parameter.</p>
 <p>SYSTEM V1.3 SN:001863 Run:000026 08 Data Transmission 09 Clear 10 11 12 ● NO YES 13 Start Page 14 Clear all Records</p>	<p>Clear all records: including voltage and current curve, 5 sets of capacity/power consumption record value.</p> <p>OK key: Short press: switch the green dot position. Where is the green dot, which corresponds to which operable block.</p> <p>Long press: Valid when the green dots are NO/YES.</p>
 <p>SYSTEM V1.3 SN:001863 Run:000026 09 Temperature Symbol 10 Reset 11 12 13 ● NO YES 14 Clear all Records 15 Factory Reset</p>	<p>Restore factory settings: This setting does not clear the recorded values.</p> <p>OK key: Short press: switch the green dot position. Where is the green dot, which corresponds to which operable block.</p> <p>Long press: Valid when the green dots are NO/YES.</p>

## 六、 Upgrade firmware instructions

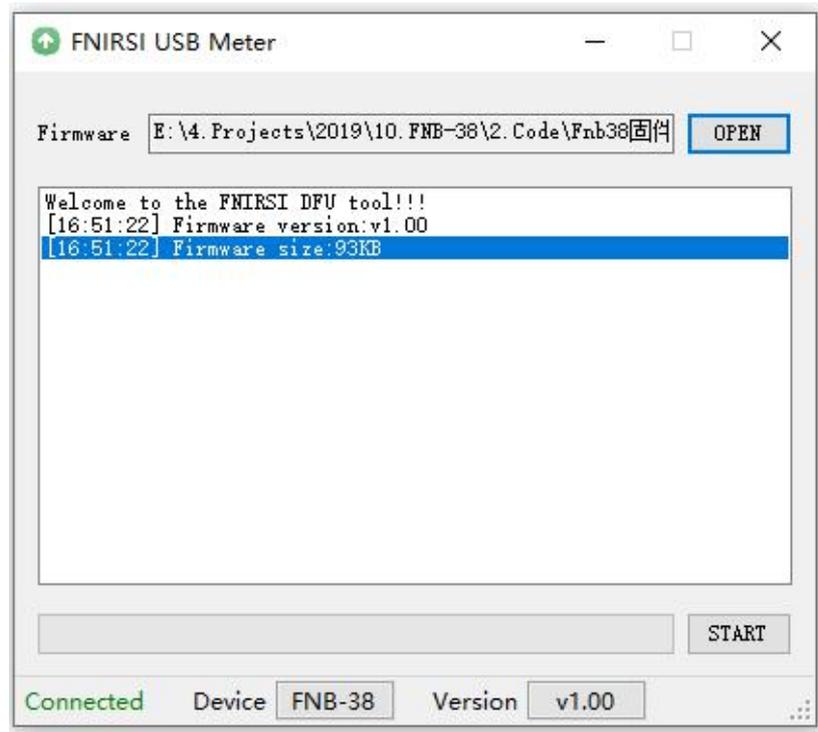
- 1、 Open the FNIRSI USB Meter upgrade tool.



2. When FNB38 is off, press and hold the OK key to access the HID-USB interface.  
Shows connected, device model, device firmware version.



3. Click OPEN and select Upgrade Firmware.



4. Click START to start upgrading the firmware. After the upgrade is completed, FNB38 will restart automatically.

## Common problem analysis

### **1. Why can't the power reach the maximum power of the charger?**

答: The PD protocol has a feature, if the current needs to exceed 3A.

First: The charger needs to support protocols exceeding 3A;

Second: The CC line connected to the charger needs to support a current of more than 3A. This CC line usually has an e-marker chip;

Third: The mobile phone also needs to support the agreement.

So how do you know that the mobile phone has indeed triggered a PD protocol exceeding 3A? You can use the PD monitoring function of the tester. If the monitoring result is that a higher power is triggered but the actual power is far from being reached, it is because the dual CC lines bring higher line impedance, resulting in the mobile phone receiving voltage lower than the ideal state. Too much, the mobile phone gets less current.

### **2. No agreement can be detected using two CC lines**

Answer: Because the CC lines on the market are single-sided CC (the signal line used for communication is called CC), when two CC lines are used, the signal line needs to be paired to communicate correctly. If it can't be triggered, please try to flip one side.

### **3. Use the tester to trigger fast charge, it cannot be charged, nor can it be charged without the tester**

Answer: Many people use the tester to trigger the quick charge to charge the mobile phone. This is not recommended. It is easy to break the phone without knowing the performance of the phone. Moreover, if the mobile phone supports fast charging, the mobile phone itself will trigger fast charging, and there is no need for additional triggering by the tester. For the function of charging the mobile phone, FNB38 has a function called PD protocol conversion, which can convert the QC protocol to the PD protocol to charge the PD device. Once again, do not directly trigger the charging of the mobile phone, it is unsafe! ! ! Tester triggering is generally used to charge other devices, such as 12V routers.

### **4. Why does the PD protocol trigger, when selecting the voltage, it restarts before it is selected?**

Answer: If the electric equipment can trigger the fast charge, there is no need for additional triggering by the tester, otherwise it will interfere.

### **5. Why does it keep restarting after entering the PD E-Marker tester?**

Answer: Because the tester is in E-Marker mode, the tester does not have

CC pull-down, so the PD charger will not supply power. After the power is not supplied, the physical chip of the PD is pulled down by default, and it is powered again, and it does not supply power after it is turned on. . Therefore, connecting the PD charger to the TYPE-C interface for power supply will cause the tester to restart. Please use the USB port and the micro interface for power supply.

## **6. Why is the capacity displayed on the tester different from the battery capacity?**

Answer: To measure the capacity of the battery, you need a formula to convert it out:

formula:

1. = mAh x output voltage/ battery voltage \* efficiency

2. = mWh/ battery voltage\* efficiency

(The battery voltage is generally 3.7V, and the efficiency is about 85-90%)

## **7. The tester automatically restarts when the fast charging protocol is automatically detected**

Answer: Some charging heads will restart when switching trigger protocol, please connect HID power supply.

## **8. Why does the fast charge protocol automatically detect and display all red?**

Answer: During the test, please do not connect the load. If possible, test several charging heads. If all the charging heads are all red, and confirm that these charging heads support fast charging (QC2.0/QC3.0/FCP/SCP/ Any protocol in AFC/PD), then it is suspected to be a PCB circuit problem, please check whether the D+D- part is short-circuited, soldered, etc.