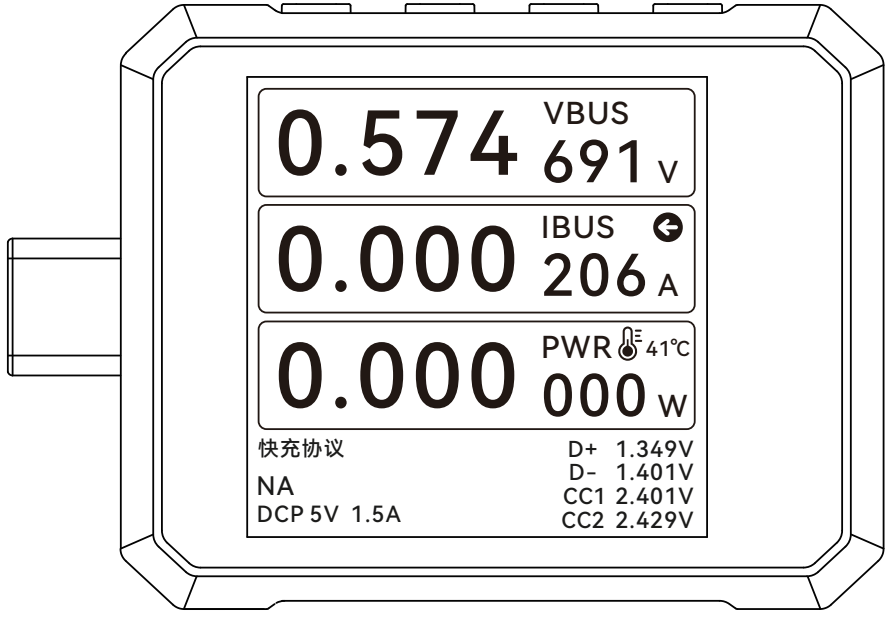
FNIRSi 菲尼瑞斯

FNB-C2

USB检测仪说明书 V1.1

USB Tester User Manual



※使用产品前请仔细阅读本说明书，并妥善保管。

※Please read this instruction manual carefully before using the product and keep it properly.

目 录

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一、版本与更新

由于仪表功能极多且软硬件更新频繁，说明书随时可能更新，请知悉。请在官网上获取最新的更新信息。

二、产品概览

本使用说明书包括有关的安全信息、警告提示以及常见的异常状况解决方案，请仔细阅读有关内容并严格遵守所有的警告和注意事项。

2.1 产品简介

FNB-C2 TYPE-C测试仪是一款高可靠性、高安全性的USB电压电流检测表及移动通信终端快充触发仪。具有1.54寸TFTLCD显示屏，240x240超高像素。使用外置20位高精度ADC，PD协议采用外部物理芯片通信，安全可靠，支持PD3.1协议，设备可用于测量USB接口、手机充电器、U盘等产品的供电或耗电情况；可用于测量手机充电功率、移动电源输入输出状况；可用于充电器快充协议测试，充电头输出电源纹波观测等，可对type-c的线缆进行检测是否存在emarker芯片，以及线缆的承载能力等参数，可对PD协议进行抓包监听等。

三、注意安全事项

- 监控接口请勿接入超过 50V 的电源；
- PC 联机端口请勿接入超过 16V 的电源；
- 在使用快充触发模块时，请勿在任何监控接口接入不能承受高压的设备；

- 当大功率工作时，仪表温度升高，请小心谨慎，预防烫伤；
- 请勿在快充触发后给手机充电，因此造成手机损坏，厂商概不负责。

四、性能描述

4.1 接口

- 输入监控口：TYPE-C, 24-PIN 公头
- 输出监控口：TYPE-C, 24-PIN 母座
- PC联机端口：TYPE-C, 24-PIN 母座

4.2 人机交互

- 1.54寸TFT-LCD屏幕
- 按键X 4

4.3 电压电流类

- 电压、电流、功率最高七位显示，最高分辨率达 0.000001(V/A/W)
- 10 组可切换的容量、电量、时间统计
- 1 组电压、电流曲线记录，最大支持 9 小时
- 支持低速波形(电压、电流、D+ 、D-)绘制, 2sps --> 1Ksps 采样率

- 支持高速纹波(电压,交流耦合)绘制，20Ksps-->2MspS 采样率

4.4 快充触发类

- QC2.0,QC3.0 触发
- 华为 FCP,SCP 触发
- 三星 AFC 触发
- PD2.0/3.0 触发
- UFCS触发
- OPPO(VOOC、SVOOC1.0、SVOOC2.0)触发
- VIVO (VFCP) 触发
- 协议均支持自动监测

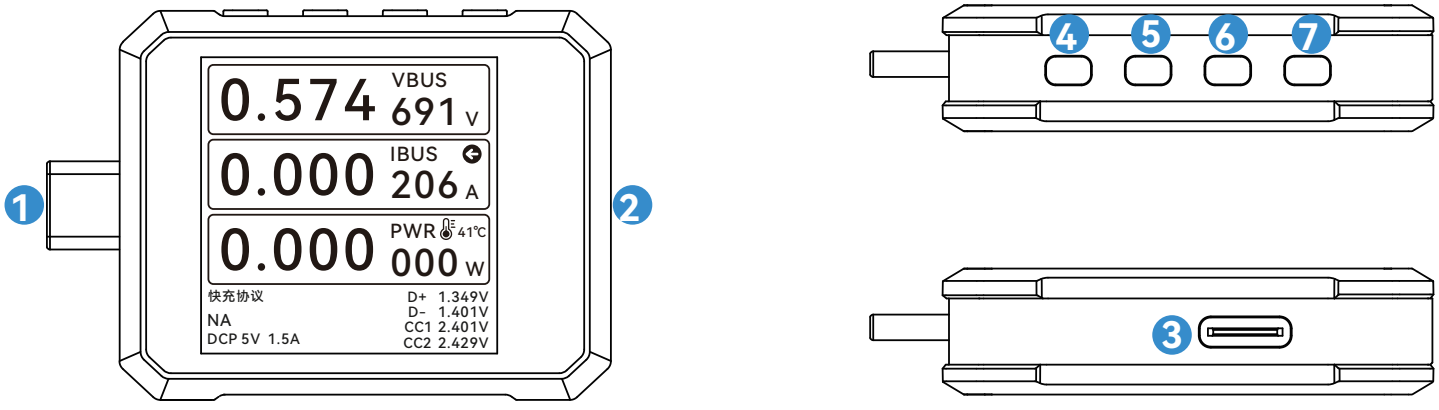
4.5 线材鉴别类

- E-Marker 线缆芯片读取

4.6 杂类

- 板载温度测量
- 重力感应，自动切换显示方向,全界面支持 4 个方向切换
- PD 监听
- QC协议向PD协议的转换

五、外观结构



序号	名称	描述
①	USB-C 公头	标准的TYPE-C 公头，保持完整的USB 4 Gen3 特性，支持双向电流，不分正反方向。
②	USB-C 母座	标准的TYPE-C 母座，保持完整的USB 4 Gen3 特性，支持双向电流，不分正反方向。
③	HID	联机接口，免驱动文件，支持Window / Mac OS平台，用来扩展仪表功能，升级固件，快充协议触发等。
④	返回键	返回操作
⑤	左键	在主界面下用来切换4个基本的显示窗口，在设置菜单下，主要用来修改参数值。
⑥	菜单键/确认键	多功能菜单键，对应的主界面下所反馈的功能不同，支持长按短按；关机状态下按住再通电，可以进入固件升级模式。
⑦	右键	在主界面下用来切换4个基本的显示窗口，在设置菜单下，主要用来修改参数值。

六、技术指标

准确度，±(a%(‰)读数+字数)

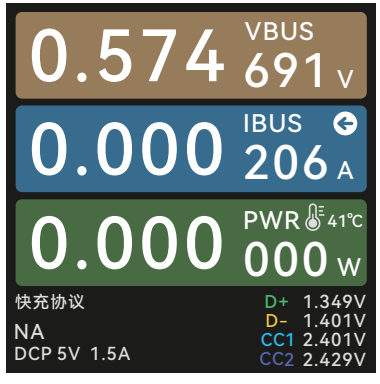
指标	量程	分辨率	准确度
监控电压	4 ~ 50V	0.000001V	±(0.2‰+2)
监控电流	0 ~ 6.5A	0.000001A	±(0.5‰+2)
监控功率	0 ~ 240W	0.000001W	±(0.5‰+2)
D+/D-电压	0 ~ 3.3V	0.001V	±(1.0%+2)
CC1/CC2电压	0 ~ 3.3V	0.001V	±(1.0%+2)
设备温度	℃	1℃	±(1.2%+3)
容量	0 ~ 9999.99Ah	0.00001Ah	/
用电量	0 ~ 9999.99Wh	0.00001Wh	/
记录时间	9 时 0 分0 秒	1 秒	/

七、主页面

除特殊说明，【左键】【右键】在界面单击切换页面，OK 键单击确认，返回 键单击返回。

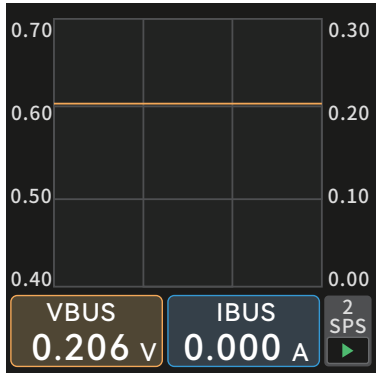
7.1 仪表盘界面

- 在此界面长按【OK键】可以切换采样率，按顺序循环切换：2SPS→10SPS→50SPS→1KSPS。
- 橙色表示被测线路上的电压，标记为VBUS;
- 蓝色表示被测线路上的电流，标记为IBUS;
- 绿色表示被测线路上的功率，标记为PWR;
- 黑色表示被检测到的快充协议，同时显示一些辅助电压。



7.2 实时曲线界面

- 在界面按下【返回键】可切换D+_D-/CC1_CC2/VBUS_IBUS;
- 长按【OK键】可以切换采样速度，按顺序循环切换：2SPS→10SPS→50SPS→1KSPS;
- 短按【OK键】可启动/暂停绘制曲线。



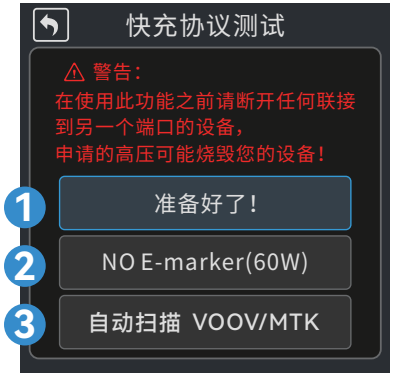
7.3 离线数据界面

用来记录从电源端流入到设备上的电量，也可以理解为直流电表，单位（mAH）、（mWH）。

- 在界面按【OK键】，界面会弹出‘新建一条记录’/‘结束记录’;
- 短按/长按【返回】键可选择"清除本组数据"/"清除所有组数据"。

7.4 应用界面

▶7.4.1 快充协议



在使用这个功能请做好以下准备工作:

- 请在HID接口提供可持续供电的电源;
- 测试PD电源时请使用USB 公头插入充电器;
- 准备好后设置对应Emarker线材模拟等功能;
- 切忌无关的设备插入另一个接口，请求的高压会立即烧毁你的设备。

①快充协议测试

自动测试:应用界面>快充协议>准备好了>自动检测
可自动检测的协议包含：UFCS/PD2.0、PD3.0/QC2.0/QC3.0/QC4、QC5/FCP/SCP/AFC/VFCP/VOOC/SVOOC1.0/SVOOC2.0/APPLE/BC12/MTK

单一快充协议测试：应用界面>快充协议测试>Power Delivery
可触发的协议包含PD2.0、PD3.0、PPS、EPR/QC2.0/QC3.0 /AFC/FCP/SCP/VFCP/UFCS/VOOC /SVOOC1.0/SVOOC2.0
不支持的快充协议MTK PE / SFCP

②线缆模拟测试

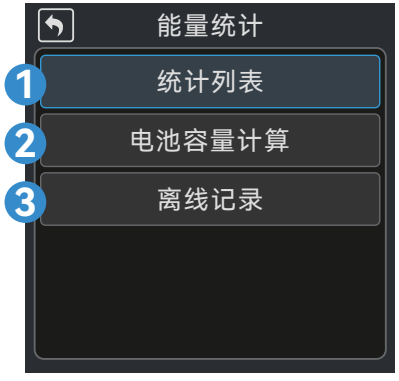
线缆模拟测试功能允许用户模拟不同的线缆配置，以测试和验证设备在不同电流和电压条件下的充电性能。用户可以根据需要选择不同的线缆配置，系统将根据选择输出相应的线缆信息给充电器。

③VOOC/MTK协议自动扫描

- VOOC/MTK协议自动扫描功能允许系统自动识别和测试设备支持的VOOC和MTK快充协议；
- 开启后:协议自动检测时，会检测【VOOC】、【SVOOC1.0】、【SVOOC2.0】、【MTK】协议；未开启，自动检测时，则会跳过【VOOC】、【SVOOC1.0】、【SVOOC2.0】、【MTK】协议。

▶7.4.2 能量统计

①	1.显示每组记录的数据信息。 2.短按【OK】键可选择数据的继续记录或清除。
②	1.显示每组记录的数据信息 2.选择对应组号，对其中电池电压、转换效率这两个参数进行设置和计算。 电池电压：可调节范围：3.0-5.0V 转换效率：可调节范围：80-100
③	1.显示设定时间内记录的数据信息。 2.短按【OK】键可选择数据的开始离线记录/清除离线记录/设置记录时间。



▶7.4.3 小工具

在应用界面选择小工具功能，短按【OK】键，进入小工具菜单，功能有：

- **USB-C eMarker(电子标签)**

  可读取到普通3A/5A/50V/EPR/TBT3/TBT4数据线的信息：类型、方案、供电、线长、速率、版本。

- **PD 监听**

  实时监听 USB Power Delivery（PD）协议的通信过程。在充电设备与受电设备依据 PD 协议进行电压、电流等参数协商时，该功能可捕获相关通信数据并展示，便于用户了解 PD 协议运行状态，排查充电异常时的兼容性问题。

- **QC转PD**

  实现高通 Quick Charge（QC）协议到 USB Power Delivery（PD）协议的转换。当设备仅支持 QC 协议，而充电器主要支持 PD 协议时，使用该功能可促成两者适配，让设备能利用充电器的 PD 功能充电，提升设备在不同快充协议环境下的兼容性。

- **VBUS 波形图**

  实时显示 VBUS（USB 电源总线）上的电压波形。通过可视化波形，用户可直观判断电源稳定性，检测是否存在电压波动、纹波异常等情况。

  该功能可对频率功能进行档位调节：20.0KHz→50.0KHz→100.0KHz→200.0KHz→500.0KHz→1.0MHz→2.0MHz。

▶7.4.4 设置

- **设置>显示**

  设置>显示>屏幕亮度：设置屏幕亮度，可调范围10~100。

  设置>显示>自动低亮度：设置待机屏幕亮度,可调范围10~100,默认值50。

  设置>显示>开机界面：开/关开机页面。

  设置>显示>主题:主题可切换背景颜色。

  设置>显示>自动旋转屏幕：支持重力感应调整屏幕方向。

- **设置>存储器**

  设置>存储器>保存间隔：可设置1~120秒间隔记录一次数据。

  设置>存储器>开始规则：默认关闭的，设置一个合适的值可自动触发记录仪开始工作。

设置>存储器>结束规格：设置一个合适的值可自动结束记录，监测手机设备充电曲线非常合适。

设置>存储器>能量统计：设置“离线数据”界面中记录的时长，记录到达设定的时间后，结束记录。

设置>存储器>离线记录：设置“能量统计”中“离线记录”的记录时间。

- **设置>语言**

  可根据需求切换界面显示的语言。

- **设置>关于**

  查看设备详细信息，固件版本等。

- **设置>重置所有设置**

  重置所有设置参数为出厂值。

7.5 升级固件说明

- 关机状态下，按住【OK】键，再接入电源进入固件升级页面;
- 使用USB Type-c数据线接入设备和电脑;
- 电脑将会自动识别U盘，将固件拖入U盘即可;
- 固件升级完成将会自动重启。

八、生产信息

产品名称：USB检测仪

品牌/型号：FNB-C2

生产商：深圳市菲尼瑞斯科技有限公司

地址：广东省深圳市龙华区大浪街道伟华达工业园C栋西侧8楼

服务热线：0755-28020752

服务邮箱： support@fnirsi.com

商务邮箱： business@fnirsi.com

官方网站：www.fnirsi.cn

执行标准：GB/T12116-2012

九、保修说明

※ 此页为保修卡基本凭证，请妥善保管

感谢您选择本公司产品，本产品自销售之日起计保修期。在产品保修期内，凡按照产品使用，说明书安装使用。于正常环境、条件使用之下，因原物料及加工过程中之瑕疵而导致故障，可依据本保修条款的内容享受无偿维修服务，本保修卡请用户妥善保存，以作保修凭证，丢失恕不补发。

以下情况将实施有偿维修服务:

- 不能出示有效保修卡原件;
- 产品安装不符合产品要求、标准和相关规范造成 的损坏;
- 产品安装环境中相关配件不符合产品要求、标准和相关规范造成的损坏;
- 用户对产品使用不当、保管不妥或擅自拆机、私自维修等原因造成的损坏;
- 超过保修期。

1.Version & Updates

Due to the extensive functionality of the device and frequent software and hardware updates, this manual may be updated at any time. Please refer to the official website for the latest information and updates.

2.Product Overview

This user manual includes important safety information, warning notices, and common troubleshooting guidelines.Please read it carefully and follow all warnings and precautions strictly.

2.1 Product Overview

FNB-C2 USB-C tester is a high-reliability, high-safety USB voltage and current tester and a fast-charging protocol trigger for mobile devices. It features a 1.54-inch TFT LCD display with 240×240 ultra-high resolution and adopts an external 20-bit high-precision ADC. The PD protocol uses an external physical communication chip for secure and stable operation, with full support for PD3.1. The device can be used to measure the power supply or consumption of USB interfaces, phone chargers, and flash drives; to test smartphone charging performance and monitor the input/output status of power banks; to carry out fast-charging protocol tests and observe charger output ripple; to check whether Type-C cables contain eMarker chips and identify their current-carrying capacity; and to perform PD protocol packet capture and monitoring.

3.Safety Instructions

- Do not connect power sources exceeding 50V to the monitoring interface.
- Do not apply more than 16V to the PC connection port.
- When using the fast-charging trigger module, do not connect any device to the monitoring interface that cannot withstand high voltage.
- During high-power operation, the device may heat up. Handle with care to avoid burns.
- Do not charge your phone after triggering fast charge. The manufacturer will not be held responsible for any damage caused to your device as a result.

4.Performance Description

4.1 Interfaces

- Input Monitoring Port: USB Type-C, 24-pin Male Connector
- Output Monitoring Port: USB Type-C, 24-pin Female Connector
- PC Connection Port: USB Type-C, 24-pin Female Connector

4.2 Human-Machine Interface (HMI)

- 1.54-inch TFT-LCD display
- 4 physical buttons

4.3 Voltage & Current Measurement

- Voltage, current, and power display up to 7 digits with a maximum resolution of 0.000001 (V/A/W)
- 10 switchable sets for capacity, energy, and time statistics
- 1 set of voltage/current curve recording, supporting up to 9 hours
- Supports low-speed waveform drawing (Voltage, Current, D+, D−), with sampling rates from 2 sps to 1 ksps
- Supports high-speed ripple waveform (AC-coupled voltage) with sampling rates from 20 ksps to 2 Msps

4.4 Fast-Charging Trigger

- Supports QC2.0 and QC3.0 triggering
- Supports Huawei FCP and SCP triggering
- Supports Samsung AFC triggering
- Supports PD2.0 / PD3.0 triggering
- Supports UFCS triggering
- Supports OPPO (VOOC, SVOOC 1.0, SVOOC 2.0) triggering
- Supports VIVO (VFCP) triggering
- All protocols support automatic detection

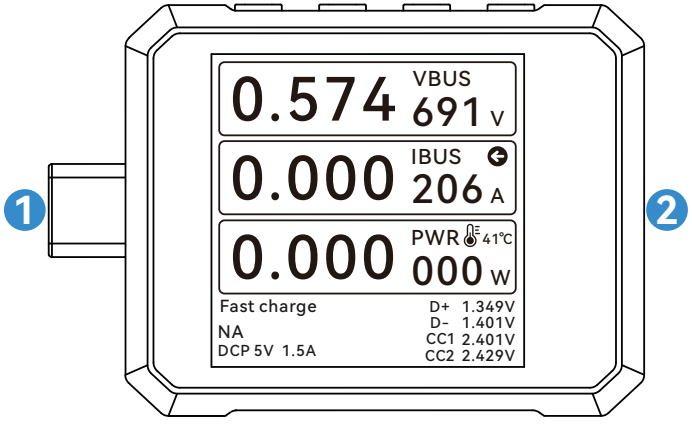
4.5 Cable Identification

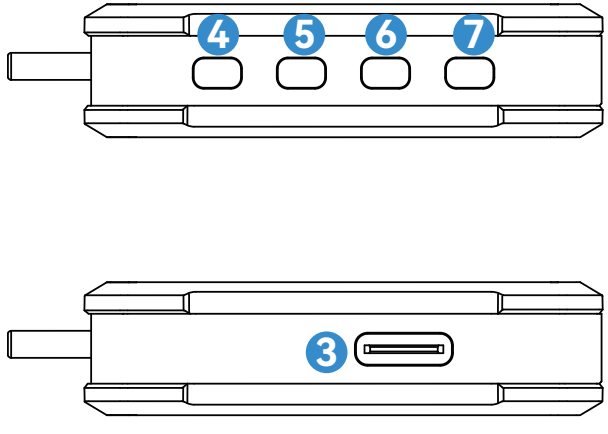
- E-Marker chip detection and reading

4.6 Miscellaneous Features

- Onboard temperature measurement
- PD protocol monitoring
- Gravity sensor for automatic screen rotation; all interfaces support four-directional display
- QC-to-PD protocol conversion

5.Appearance & Structure





No.	Name	Description
①	USB-C Male Connector	Standard USB Type-C male plug with full USB 4 Gen3 support. Allows bidirectional current and reversible insertion.
②	USB-C Female Port	Standard USB Type-C female socket with full USB 4 Gen3 support. Allows bidirectional current and reversible insertion.
③	HID	Connection port supporting plug-and-play (no driver required). Compatible with Windows and Mac OS platforms. Used for feature extension, firmware upgrades, and fast-charging protocol triggering.
④	Back Button	Return operation
⑤	Left Button	On the main interface: cycles through four primary display windows. In settings menu: used to adjust parameter values.
⑥	Menu/Confirm Button	Multi-function Menu Button:The function varies depending on the main interface context. Supports both short press and long press. When the device is powered off, hold this button while powering on to enter firmware upgrade mode."
⑦	Right Button	On the main interface, used to switch among four primary display screens;in the settings menu, primarily used to adjust parameter values.

6.Technical Specifications

Accuracy: ±(a%(‰) of reading + N digits)

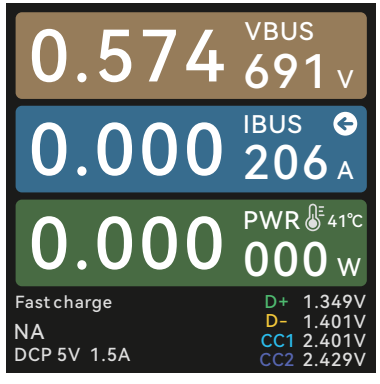
Parameter	Range	Resolution	Accuracy
Monitoring Voltage	4 ~ 50V	0.000001V	±(0.2‰+2)
Monitoring Current	0 ~ 6.5A	0.000001A	±(0.5‰+2)
Monitoring Power	0 ~ 240W	0.000001W	±(0.5‰+2)
D+/D− Voltage	0 ~ 3.3V	0.001V	±(1.0%+2)
CC1/CC2 Voltage	0 ~ 3.3V	0.001V	±(1.0%+2)
Device Temperature	℃	1℃	±(1.2%+3)
Capacity	0 ~ 9999.99Ah	0.00001Ah	/
Energy Consumption	0 ~ 9999.99Wh	0.00001Wh	/
Recording Time	9 h 0 m 0 s	1 s	/

7.Main Interface

Unless otherwise specified, press 【Left】or【Right】to switch pages, 【OK】to confirm, and【Back】to return.

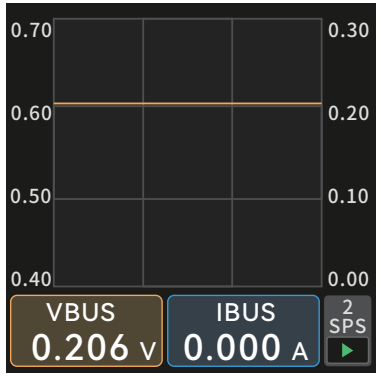
7.1 Dashboard Interface

- Long-press the【OK】button on this interface to switch the sampling rate in the following cycle: 2 SPS → 10 SPS → 50 SPS → 1 kSPS
- Orange indicates the measured voltage on the line, labeled as VBUS
- Blue indicates the measured current on the line, labeled as IBUS
- Green indicates the measured power on the line, labeled as PWR
- Black indicates the detected fast-charging protocol, along with auxiliary voltage information



7.2 Real-Time Waveform Interface

- Press the【Back】button to switch between D+_D− / CC1_CC2 / VBUS_IBUS views
- Long-press the【OK】button to change the sampling rate in the following cycle: 2 SPS → 10 SPS → 50 SPS → 1 kSPS
- Short-press the【OK】button to start or pause waveform drawing



7.3 Offline Data Interface

This interface is used to record the amount of energy delivered from the power source to the device. It can be regarded as a DC energy meter, with units in mAh and mWh.

- Press the【OK】button to bring up the option: “Start a new record” / “End record”
- Short-press or long-press the【Back】button to select “Clear current group data” / “Clear all group data”

7.4 Application Interface

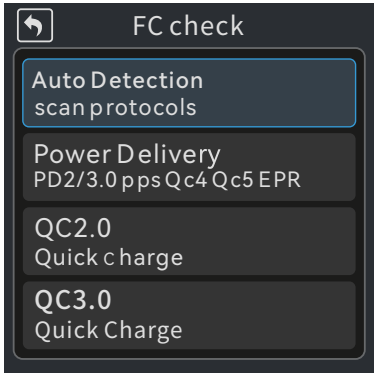
▶7.4.1 Fast-Charging Protocol

Before using this function, please ensure the following preparations:

- A power source capable of continuous supply should be connected to the HID interface
- When testing PD chargers, insert the USB male connector into the charger
- After preparation, set up the corresponding Emarker cable simulation and related features
- Do not insert unrelated devices into other ports — a high-voltage request may instantly damage your device

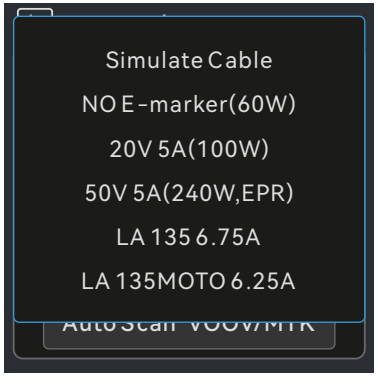
① Fast-Charging Protocol Test

Automatic Test Path: Application Interface > Fast-Charging Protocol > Ready > Auto Detect
Supported protocols include: UFCS/PD2.0、PD3.0/QC2.0/QC3.0/QC4、QC5/FCP/SCP/AFC/VFCP/VOOC/SVOOC1.0/SVOOC2.0/APPLE/BC12/MTK
Single Fast-Charge Protocol Test: Application Interface > Fast-Charge Protocol Test > Power Delivery
Supported protocols include: PD2.0, PD3.0, PPS, EPR, QC2.0, QC3.0, AFC, FCP, SCP, VFCP, UFCS, VOOC, SVOOC1.0, SVOOC2.0
Unsupported protocols: MTK PE, SFCP



② Cable Simulation Test

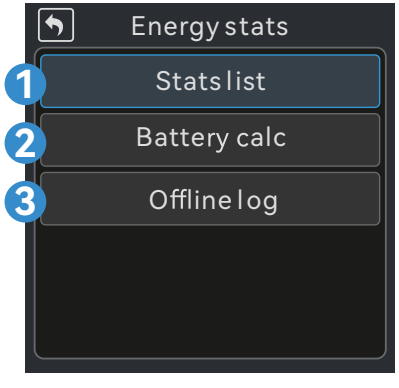
The cable simulation test allows users to emulate various cable configurations in order to test and validate device charging performance under different current and voltage conditions. Users can select different cable types as needed, and the system will output corresponding cable information to the charger based on the selected configuration.



③ VOOC/MTK Protocol Auto Scan

- The VOOC/MTK protocol auto scan function allows the system to automatically identify and test the VOOC and MTK fast charging protocols supported by the device.
- When enabled, the auto detection will include the following protocols:【VOOC】,【SVOOC1.0】,【SVOOC2.0】, and【MTK】. When disabled, these protocols will be skipped during automatic detection.

▶7.4.2 Energy Statistics



①	1. Displays the data information of each recorded group. 2. Short press the 【OK】 key to choose whether to continue recording or to clear the data.

②	1. Displays the data information of each recorded group. 2. Select a group number to configure and calculate two parameters: battery voltage and conversion efficiency. Battery Voltage: Adjustable range: 3.0–5.0V Conversion Efficiency: Adjustable range: 80–100
③	1. Displays the recorded data within a specified time period. 2. Short press the 【OK】 key to choose: start offline recording / clear offline records / set recording duration.

▶7.4.3 Utilities

In the application interface, select the Utilities function and short-press the 【OK】to enter the utilities menu. Available functions include:

- **USB-C eMarker**

  Allows reading information from standard USB-C cables (3A/5A/50V/EPR/TBT3/TBT4), including: type, solution, power, length, speed, version

- **PD Monitor**

  Real-time monitoring of USB Power Delivery (PD) protocol communication. This function captures and displays data exchanged between a charging device and a powered device during PD negotiation of voltage, current, etc., helping users understand protocol operation status and troubleshoot charging compatibility issues.

- **QC to PD Converter**

  Enables conversion from Qualcomm Quick Charge (QC) to USB Power Delivery (PD). When a device only supports QC and the charger primarily supports PD, this function bridges the two protocols, allowing the device to charge via PD and improving compatibility across fast-charging environments.

- **VBUS Waveform**

  Displays real-time voltage waveform of the USB power bus (VBUS). The visual waveform helps users assess power supply stability and detect voltage fluctuations, ripple noise, or anomalies. The visual waveform helps users assess power supply stability and detect voltage fluctuations, ripple noise, or anomalies.

  Frequency range adjustable by level: 20.0kHz → 50.0kHz → 100.0kHz → 200.0kHz → 500.0kHz → 1.0MHz → 2.0MHz.

▶7.4.4 Settings

- **Settings > Display**

  Settings > Display > Screen Brightness: Adjust screen brightness, range 10–100.

  Settings > Display > Auto Dim: Set standby screen brightness, range 10–100, default is 50.

  Settings > Display > Startup Screen: Enable or disable the startup page.

  Settings > Display > Theme: Switch background color themes.

  Settings > Display > Auto Screen Rotation: Enable gravity sensor to adjust screen orientation automatically.

- **Settings > Storage**

  Settings > Storage > Save Interval: Set the interval to record data, from 1 to 120 seconds.

  Settings > Storage > Start Condition: Disabled by default. Set an appropriate value to automatically trigger recording start.

  Settings > Storage > Stop Condition: Set a suitable value to automatically stop recording; ideal for monitoring charging curves of mobile devices.

  Settings > Storage > Energy Statistics: Set the recording duration in the “Offline Data” interface. Recording will stop when the set time is reached.

  Settings > Storage > Offline Recording: Set the recording time for “Offline Records” under Energy Statistics.
- **Settings > Language**

  Switch the interface display language as needed.
- **Settings > About**

  View detailed device information, firmware version, etc.
- **Reset All Settings**

  Restore all settings to factory defaults.

7.5 Firmware Upgrade Instructions

- While the device is powered off, press and hold the【OK】 button, then connect the power to enter the firmware upgrade screen;

- Connect the device to a computer using a USB Type-C data cable;
- The computer will automatically recognize the device as a USB drive—simply drag the firmware file into the drive;
- The device will reboot automatically once the upgrade is complete.

8.Contact Us

Product Name: USB Tester

Model: FNB-C2

Manufacturer: Shenzhen FNIRSI Technology Co., Ltd.

Address: 8th Floor, West Side, Building C, Weihua Da Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong, China

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Service Email: support@fnirsi.com

Business Email: business@fnirsi.com

Website: www.fnirsi.com

Standard Implemented: GB/T12116-2012

http://www.fnirsi.com/

9. Warranty Information

※This page is the basic warranty card. Please keep it.

Thank you for choosing our company's products. The warranty period of this product starts from the date of sale. During the product warranty period, if the product is installed and used in accordance with the product manual and used in normal environment and conditions, and the fault is caused by defects in the original materials and processing, you can enjoy free repair services according to the content of this warranty clause. Please keep this warranty card properly as a warranty certificate. No reissue will be issued if it is lost.

The following situations will incur paid repair services:

- Failure to present a valid original warranty card;
- Damage caused by improper installation not complying with product requirements, standards, or related regulations;
- Damage caused by accessories in the installation environment that do not meet product requirements, standards, or related regulations;
- Damage caused by improper use, poor maintenance, unauthorized disassembly, or unauthorized repairs;
- Warranty period has expired.

保修卡

产品型号	FNB-C2	**数量**	
渠道商名称 （购买商店）		**联系方式**	
渠道商地址		**发票号** （订单号）	
购买时间	**年　　月　　日**		
客户姓名:		**地址:**	
联系方式:		**故障说明:**	

Warranty Card

Product Model	FNB-C2	**Qty.**	
Distributor Name (where to buy)		**Contact**	
Address		**Invoice Number** (Order Number)	
Purchase Date (as per invoice)	**Year** **Month** **Day**		
User Name:		**Address:**	
Contact:		**Fault Description:**	

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