FNIRSi 菲尼瑞斯

DSO-TC4

多功能晶体管示波器 V1.6

MULTIFUNCTION TRANSISTOR OSCILLOSCOPE 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.

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一、安全要求

1.1 环境要求

注意事项

●避免高温、明火、腐蚀性气体、潮湿或多尘环境，以防设备故障。

●安装晶体管于设备上，应注意晶体管插座是否良好，避免接触不良。

●未给电容放电直接测量在插入锁紧瞬间机器会给电容放电产生火花。该功能只是起到防止忘记放电保护作用，正确使用还是建议先给电容手动放电在测试。

●在非测量过程中，123锁紧接口属于导通状态，禁止电池直接插入。

●测量元器件参数不在测试范围测试结果可能会出现非正确元器件类型。

远离以下物品

●加热器：避免过热或火灾风险。

●水源、化学品：溶剂：泄漏可能损坏设备或引发火灾。

●强磁性设备：防止磁场干扰设备正常运行。

请勿随生活垃圾丢弃废旧电池或设备，应按国家或当地法规处理。

二、产品概览

2.1 产品简介

DSO-TC4是一款由 FNIRSI 推出的功能全面、实用性强的多功能晶体管示波器，专为维修和研发行业设计。它集示波器、信号发生器、晶体管于一体。

产品主要特点有：

示波器功能：

- 采样率：48MSa/s
- 模拟带宽：10MHz
- 电压保护：±400V
- 波形存储：支持截图保存与查看，便于数据分析

信号发生器功能：

- 支持 13 种波形输出，频率范围 0-50KHz，输出电压可调3v
- 输出参数（频率、幅值、占空比）可调，灵活适配多种需求

晶体管功能：

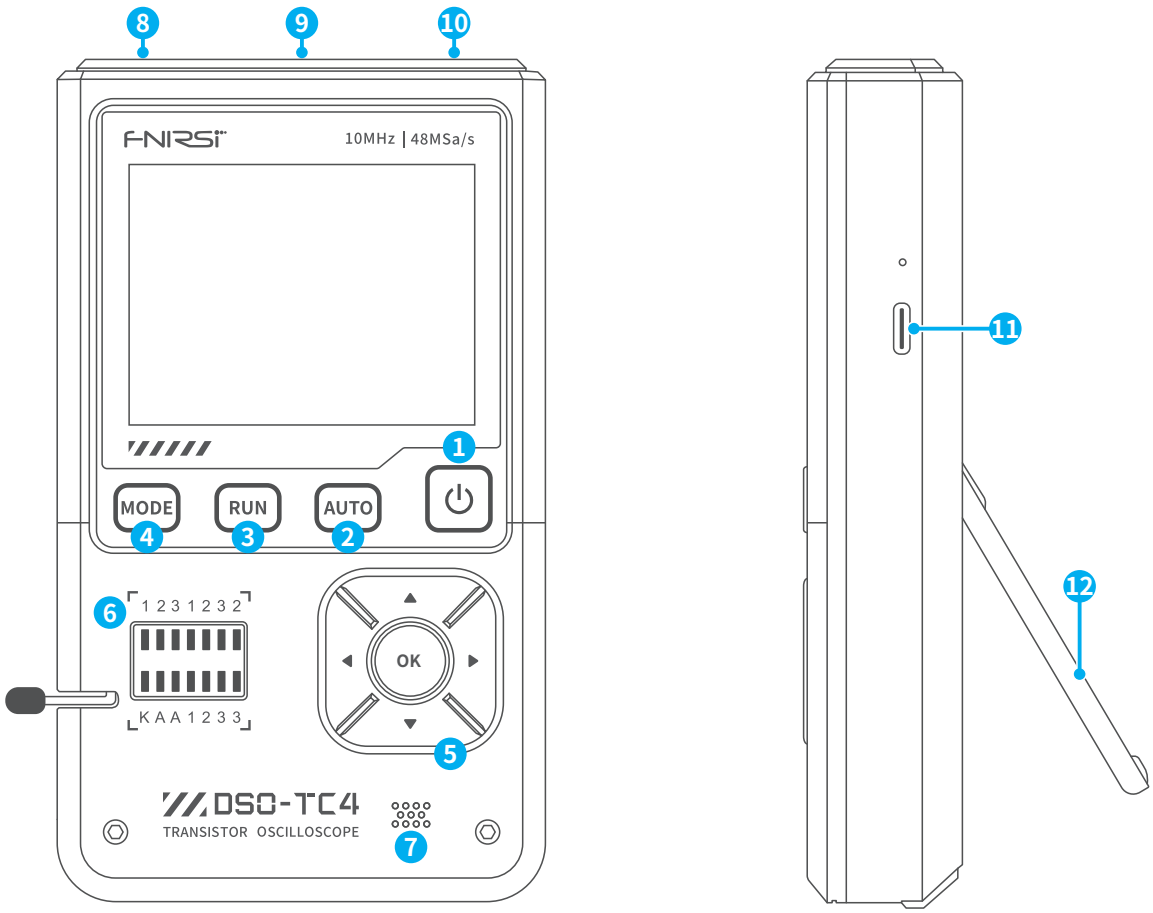
- 高效率：自动识别被测元件的类 型及引脚排列，简化操作流程，提高测试效率
- 类别多样：检测和分析晶体管、二极管、三极管、场效应（FET）等半导体元件的性能和特性

便携设计：

- 配备 2.8英寸 TFT彩屏，画面清晰直观
- 内置高容量可充电锂电池（1500mAh），支持长时间待机（4小时）
- 小巧轻便，适合移动使用。

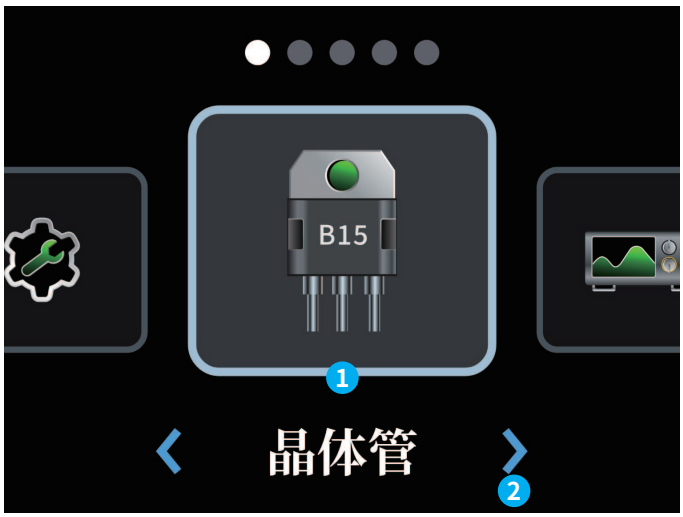
FNIRSI-DSO-TC4 致力于为用户提供强大、灵活的功能与便携的操作体验，是维修、研发工作的理想工具。

2.2 产品说明



①电源开关键(返回键)　②自动测量按键　③运行/暂停按键
④模式切换按键　⑤按键选择区　⑥晶体管插座
⑦红外检测口　⑧电压接口　⑨信号发生器输出口
⑩示波器通道接口　⑪充电接口Type-c　⑫支架

2.3 主页面示意图



①**功能名称:**此区域显示此刻选择的功能名称，共5个板块：晶体管、示波器、信号发生器、工具箱、设置。

②**模式切换:**点击左右键或者上下键，实现功能选择。

按键	操作	功能
⏻	短按	返回主菜单
	长按	切换开机/关机
◀ ▶	短按	在主菜单切换功能
▲ ▼	短按	在主菜单切换功能
OK	短按	进入此刻选择的功能

2.4 示波器页面示意图

①**电量显示:**此区域显示电量剩余。

②**模式切换:**短按**OK**确认键,可切换水平垂直单位、水平触发移动、通道波形上下移动、触发电平上下移动。

③**运行/暂停指示:**短按运行/暂停按键,RUN为运行,STOP为停止。

④**系统时基:**指水平方向一大格代表时间长度,由采样速率决定。

⑤**函数信号发生器指示:**蓝色代表开启函数信号发生器,红色代表未开启,展示的图形代表设置的波形类别。

⑥**触发电压指示图标:**即触发阈值。

⑦**触发X位置指示箭头:**指此处为触发点。

⑧**通道波形:**通道采集的波形信号。

⑨**测量数据:**可长按**MODE**键在菜单设置中开启/关闭测量参数显示。

⑩**触发设置:**可长按**MODE**键设置触发设置及通道设置。

⑪**垂直灵敏度:**指垂直方向一大格代表电压长度。

按键	操作	功能
⏻	短按	退出键，返回上一步操作/退出模式
	长按	关闭电源，关机
MODE	短按	切换到其他模式
	长按	打开示波器设置菜单，可设置波形、参数、余辉、图片等。再次长按，关闭菜单。
AUTO	短按	自动测量
	长按	自动校准
OK	短按	可切换水平垂直单位、水平触发移动、通道波形移动、触发电平移动。若在菜单设置中，短按为确认设置。
	长按	50%
RUN	短按	单击暂停，再次单击运行
	长按	保存图片

2.5 信号发生器页面示意图

①**电量显示:**此区域显示电量剩余。

②**状态显示:**此区域显示信号发生器开启状态,绿色(ON)开启,红色(OFF)关闭。

③**波形类别:**短按左右键选择波形类别,共13种波形可选择。

④**频率设置:**单击**OK**确认键,进入频率/占空比/幅值选择,单击**OK**键选择频率进入三级导航,设置频率值。

⑤**占空比设置:**单击**OK**确认键,进入频率/占空比/幅值选择,单击**OK**键选择占空比进入三级导航,设置占空比。

⑥**幅值设置:**单击OK确认键,进入频率/占空比/幅值选择,单击OK键选择幅值进入三级导航,设置幅值。

按键	操作	功能
⏻	短按	退出键,返回上一步操作/退出模式
	长按	关闭电源,关机
MODE	短按	切换到其他模式
OK	短按	确认,进入频率/占空比/幅值选择, 配合 ◀ / ▶ 设置对应值。
RUN	短按	单击开启/关闭,再次单击开启/关闭

2.6 晶体管页面示意图

①**电量显示:**此区域显示电量剩余。

②**状态显示:**此区域显示晶体管识别类别/晶体管状态。

③**返回图标:**短按电源键，退出晶体管模式。

④**晶体管指示:**在此区域显示识别出的晶体管类别，并展示对应符号。未识别则显示问号。

⑤**管脚指示:**在此区域显示晶体管插入识别插座的状态，并用不同颜色进行区分，方便调整对应管脚状态，以达到良好识别状态

按键	操作	功能
⏻	短按	退出键，退出模式
	长按	关闭电源，关机
MODE	短按	切换到其他模式
AUTO	短按	进行自动测量

2.7 工具箱页面示意图

①**电量显示:**此区域显示电量剩余。

②**状态显示:**此区域显示为模式工具箱。

③**电压测试:**插入电压测量接口测量其电压,测量电压范围0~40V。

④**通断测试:**测试晶体管电路通断状态/.OLΩ。

⑤**稳压二极管测试:**直接将稳压二极管两个引脚插入晶体管插座不同脚位,自动测量。

⑥**DS18B20:**单线数字温度传感器测量。

⑦**DHT11:**数字温湿度传感器测量,注意将124脚插入不同孔位。

⑧**红外解码:**自动解析NEC协议红外码,对准红外接收器发送红外信号,机器会自动进行解码,解码完成后显示地址码和用户码以及波形。

⑨**自动校准:**单击**OK**确认键自动进行校准调整。

按键	操作	功能
⏻	短按	退出键,退出模式
	长按	关闭电源,关机
MODE	短按	切换到其他模式
OK	短按	确定功能,确定执行

2.8 系统设置页面示意图

①**电量显示:**此区域显示电量剩余。

②**状态显示:**此区域显示为模式系统设置。

③**语言设置:**共有中文、English、Deutsch、Português、にほんご、Español、한국인、Русский，8种语言可切换。

④**音量设置:**单击**OK**进入音量设置，左右键调节音量，可设置为静音。

⑤**屏幕亮度:**单击**OK**进入亮度设置，左右键调节亮度。

⑥**开机启动:**共3种功能模式可选择开机默认进入，也可以都不选择。

⑦**自动关机设置:**可设置自动关机时间15min、30min、1hour，在不进行操作时间待机设置时间，自动关机。

⑧**USB共享:**开启后将进入USB共享界面，连接电脑后有U盘弹出，可【Screenshot file】文件夹获取截图图片。以及可在【LOGO】文件夹中放置“LOGODSO-TC4.jpg”(自定义开机LOGO)。

⑨**关于:**显示品牌信息与当前版本号，点击确定可选择是否进行恢复出厂设置。

三、技术规格

3.1 机型参数

参数	规格
产品型号	DSO-TC4
屏幕材质	2.8英寸 TFT彩屏
背光	背光亮度可调
供电电源	TYPE-C（5V/1A）
电池	3.7V/1500mAh
语言	中文、English、Deutsch、Português、 にほんご、Español、한국인、Русский
产品尺寸	≈90x142x27.5mm
裸机重量	≈186g

3.2 示波器参数

参数	规格	备注
实时采样率	48MSa/s	
模拟带宽	10MHz	
输入阻抗	1MΩ	
耦合方式	AC/DC	
测试电压范围	1:1探头：80Vpp(+40V) 10:1探头：800Vpp(+400V)	示波器置于X1 示波器置于X10
垂直灵敏度	10mV/div~10V/div（X1档）	
垂直位移	可调，并带有指示	
水平时基范围	50ns~20s	
触发模式	自动、常规和单次（Auto/Normal/Single）	
触发种类	上升沿、下降沿	
触发电平	可调，并带有指示	
波形冻结	有（HOLD功能）	
自动测量	最大值、最小值、平均值、有效值、 峰峰值、频率、周期、占空比	

3.3 晶体管参数

类别	范围	说明
三极管	*	放大倍数hfe，基极发射极电压Ube，Ic/Ie,集电极-发射极反向截止电流Iceo，Ices，保护二极管正向压降Uf
二极管	正向压降<5V	正向压降，结电容，反向漏电流
稳压二极管	0.01-32V	(K-A-A测试区)反向击穿电压
场效应管	JFET	栅极电容Cg，Vgs下的漏极电流Id，保护二极管正向压降Uf
	IGBT	Vgs下的漏极电流Id，保护二极管正向压降Uf
	MIOSTET	开启电压Vt,栅极电容Cg，漏源电阻Rds，保护二极管正向压降Uf
单向可控硅	开启电压<5V，门级	门级电压
双向可控硅	触发电流6<mA	
电容	25pF~100mF	电容值，损耗系数Vloss
电阻	0.01Ω~50MΩ	电阻值
电感	10uH~1000uH	电感值，直流电阻
DS18B20	-	温度传感器，引脚：GND、DQ、VDD
DHT11	-	温湿度传感器，引脚：VDD、DATA、GND

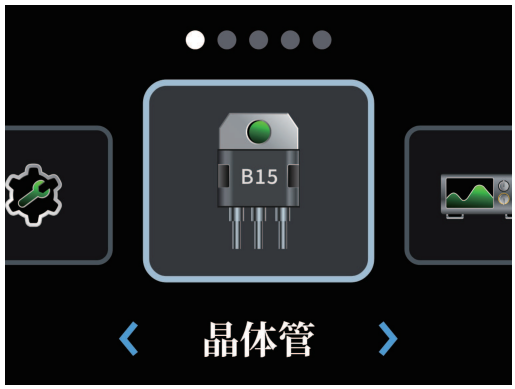
3.4 信号发生器参数

参数	规格
输出波形	支持13种波形输出
波形频率	0-50KHz
方波占空比	0-100%
波形幅值	0.1V-3.0V

四、操作指南

4.1 开机

长按 ⏻ 开机，等待系统加载，
进入系统设置默认界面。



默认界面

4.2 语言设置

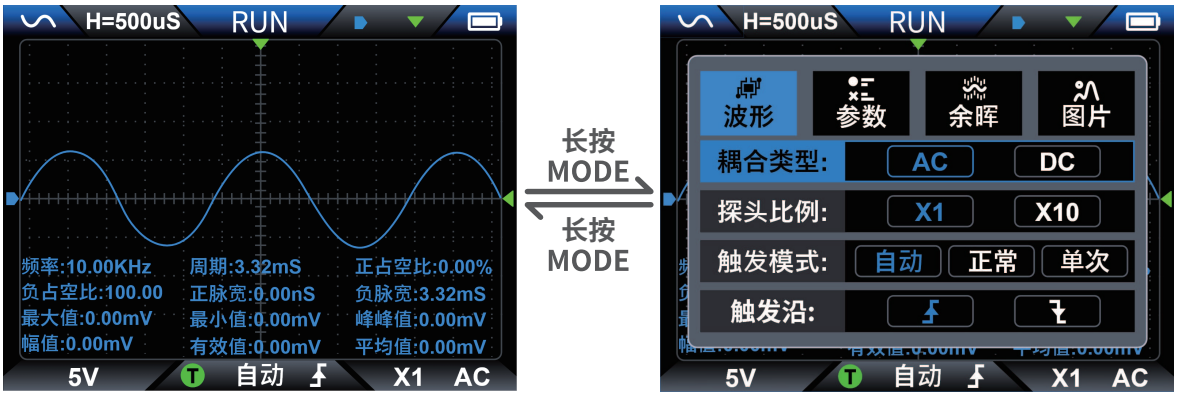
在默认界面，短按 ◀ / ▶ 选择系统设置，短按**OK**确认键进入系统设置，通过 ▲▼ 键选择语言设置，然后短按**OK**确认键进入语言设置，上下键选择需要设置的语言，**OK**确认键确认选择。

4.3 调整示波器参数

示波器调节

•在默认界面，短按左右键选择功能模块示波器，单击**OK**确认键进入示波器。长按模式切换键（**MODE**）进入示波器参数设置，可以通过按键选择区选择设置波形、参数、余辉、图片等参数。再次长按模式切换键（**MODE**）可关闭示波器参数设置。

•其中示波器参数设置中图片删除与选择需要进入图片参数设置界面，这个时候，单击切换键（**MODE**）是选择图片，单击运行/暂停键(**RUN**)全选图片，单击自动测量按键(**AUTO**)可选择是否删除图片，上下键选择图片，单击**OK**键确认勾选当前选择的图片，再次单击则取消勾选。在不选择图片的情况下，单击**OK**直接查看完整图片。



示波器功能界面　　示波器参数设置界面

4.4 亮度调节

在默认界面，短按 ◀ / ▶ 选择系统设置，短按**OK**确认键进入系统设置，通过 ▲▼ 选择屏幕亮度，然后短按**OK**确认键进入亮度设置，通过 ◀ / ▶ 实时调整亮度，单击⏻进行保存。

系统设置其他功能调节

对应功能选择与开启同以上操作导航大致相同，省略步骤描述。

五、快速入门

5.1 快速测量

1、开启多功能晶体管示波器，等待系统加载，可选择模式：示波器、信号发生器、晶体管等，举例选择信号发生器。

2、首先将接口连接好，进入信号发生器，选择需要输出的波形。点击确认键，确认设置频率、占空比、幅值等。

3、当设置好对应参数，点击运行/暂停键开启信号发生器即可。

4、点击模式切换按键，即可进行其他功能。

5.2 固件升级

●设备关机,同时按住MODE键和电源键，此时设备会弹出Firmware Upgrade界面,插入USB Type-c数据线连接电脑,进入Firmware Upgrad界面进行固件升级。

●把固件文件拷贝到Upgrade file文件夹，后按RUN按键进行升级

●拉取固件文件到U盘指定文件夹下后，按RUN按键进行升级，如果固件升级完成，会显示关机充电界面。

※**注意：**固件升级只支持在电脑Windows10及以上系统使用。

六、故障排查

6.1 设备无法开机

可能原因：

•电池电量耗尽　　•电池连接松动或损坏

解决方法：

①检查电池电量，若电量不足请充电。

②如果电池无法充电或设备依然无法开机，尝试重新安装电池，或更换电池。

③如果设备仍无法开机，请联系技术支持。

6.2 屏幕无法显示

可能原因：

•显示屏硬件故障　　•系统软件异常

解决方法：

①按照手册检查并调节背光亮度设置。

②尝试重启设备，确保系统恢复正常。

③如果屏幕仍无法正常显示，可能需要维修或更换显示屏。

七、维护保养

清洁设备外部

●**频率：**每月清洁一次，具体取决于使用环境。

●**方法：**使用柔软的布轻轻擦拭设备表面。避免使用化学清洁剂，特别是含有酒精或强酸、强碱的清洁剂，以免损坏外壳或屏幕。

●**注意事项：**

•定期清理设备和按钮周围的灰尘，以保持设备良好状态。

•确保设备无任何液体、灰尘或杂物进入设备接口。

检查电池与电源

●**电池保养：**对于内置电池的仪器，定期检查电池的健康状态。避免电池完全放电，建议定期充电并避免长时间不使用设备。

●**充电规范：**使用官方提供的充电器进行充电，避免过充或过放，确保电池处于适宜的工作电压范围。

●**电池更换：**若电池表现出过度衰减（如无法正常充电或极快放电），应及时更换。

存放与携带

●存放环境：仪器应存放在干燥、通风的环境中，避免高温、高湿或剧烈的温度变化。避免将其放置在阳光直射的地方。

●携带：使用时应小心避免摔落，尤其是在携带过程中。推荐使用保护套或专用包进行携带。

软件更新

●定期检查设备是否有新的固件更新。最新的固件可以修复已知的BUG并提升设备性能。

●更新时确保操作步骤正确，使用官方发布的固件文件，并避免断电或其他干扰。

恢复出厂设置

●若设备出现异常或无法正常工作，可尝试恢复出厂设置。恢复设置后，设备将清除所有自定义配置，恢复到初始状态。

●恢复出厂设置的方法可以参考用户手册或联系厂商客服。

八、生产信息

产品名称:多功能晶体管示波器

品牌/型号:FNIRSI / DSO-TC4

服务电话:0755-28020752

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达工业园C栋西边8楼

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/T 15289-2013

九、保修说明

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. SAFETY REQUIREMENTS

1.1 Environmental Requirements

Precautions

- Avoid high temperatures, open flames, corrosive gases, humid or dusty environments to prevent equipment failure.
- When installing transistors on equipment, pay attention to whether the transistor socket is in good condition to avoid poor contact.
- If you measure directly without discharging the capacitor, the machine will discharge the capacitor and produce sparks at the moment of insertion and locking. This function only serves as a protection when you forget to discharge. If used correctly, it is recommended to manually discharge the capacitor before testing.
- During non-measurement, the 123 locking interface is in the on state, and direct insertion of the battery is prohibited.
- If the measured component parameters are not within the test range, the test results may show incorrect component types.

Keep away from the following items

- Heaters: Avoid overheating or fire risks.
- Water, chemicals: Solvents: Leakage may damage the device or cause a fire.
- Strong magnetic devices: Prevent magnetic fields from interfering with the normal operation of the device.

Do not discard used batteries or devices with household waste. Dispose of in accordance with national or local regulations.

2.PRODUCT OVERVIEW

2.1 Product Introduction

DSO-TC4 is a multifunctional transistor oscilloscope launched by FNIRSI, which is comprehensive and practical, and is designed for the maintenance and R&D industries. It integrates an oscilloscope, a signal generator, and a transistor.

The main features of the product are:

Oscilloscope functions:

- Sampling rate: 48MSa/s
- Analog bandwidth: 10MHz
- Voltage protection: ±400V
- Waveform storage: supports screenshot saving and viewing, which is convenient for data analysis

Signal generator function:

• Supports 13 waveform outputs, frequency range 0-50KHz, output voltage adjustable 0-3v.

• Output parameters (frequency, amplitude, duty cycle) are adjustable, flexible to meet various needs

Transistor function:

• High efficiency: Automatically identify the type and pin arrangement of the tested component, simplify the operation process, and improve test efficiency

• Diverse categories: Detect and analyze the performance and characteristics of semiconductor components such as transistors, diodes, triodes, field effect (FET), etc.

Portable design:

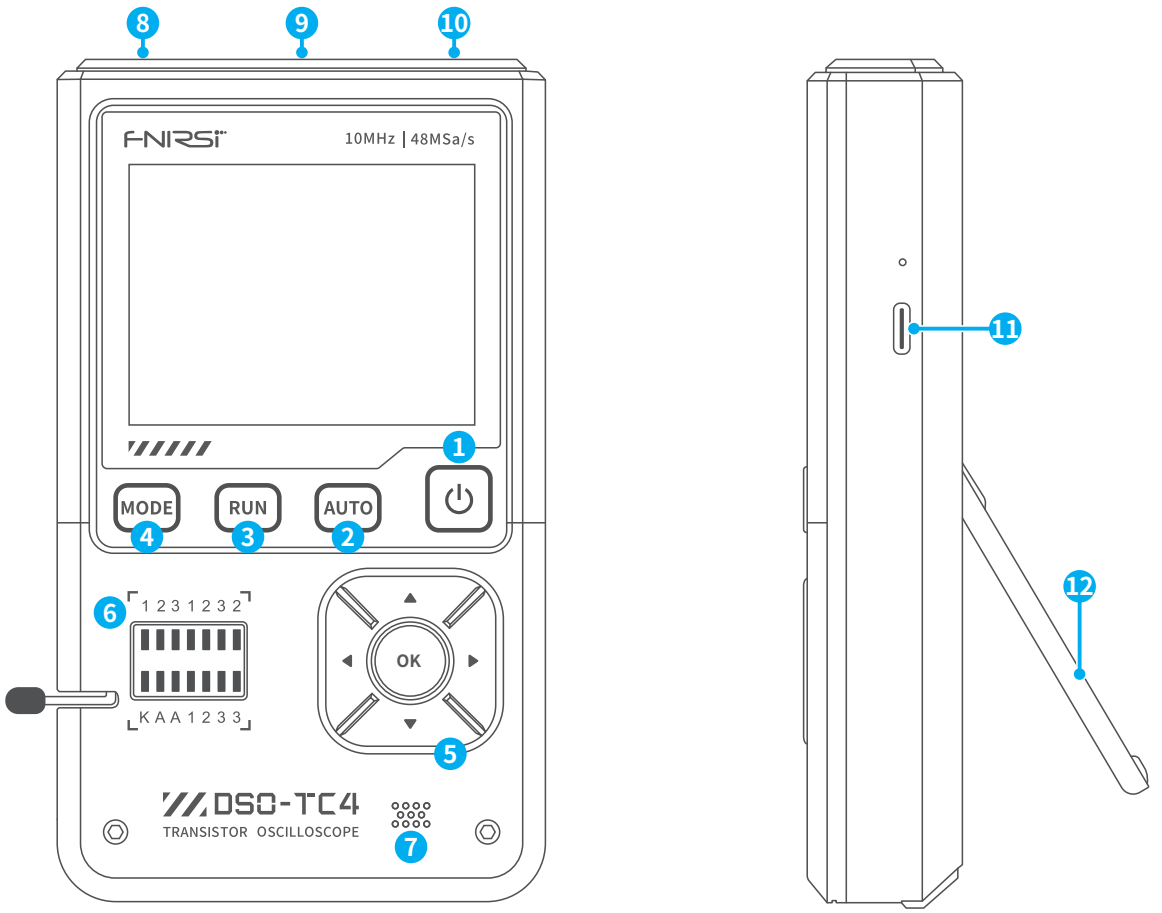
• Equipped with a 2.8-inch TFT color screen, the picture is clear and intuitive

• Built-in high-capacity rechargeable lithium battery (1500mAh), standby time 4 hours

• Small and light, suitable for mobile use.

FNIRSI-DSO-TC4 is committed to providing users with powerful, flexible functions and portable operation experience, and is an ideal tool for maintenance and R&D work.

2.2 Product Introduction



①Power switch (return button)

②Automatic measurement button

③Run/pause button

④Mode switch button

⑤button selection area

⑥Transistor socket

⑦Infrared detection port

⑧Voltage interface

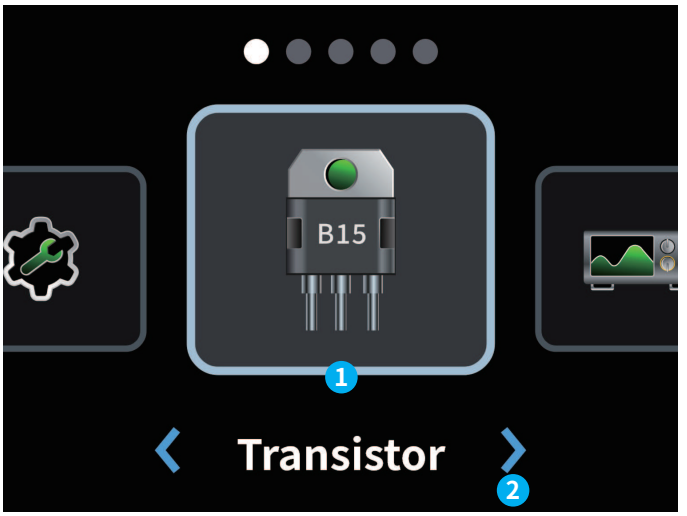
⑨Signal generator output port

⑩Oscilloscope channel interface

⑪Charging interface Type-c

⑫Support Stand

2.3 Main page

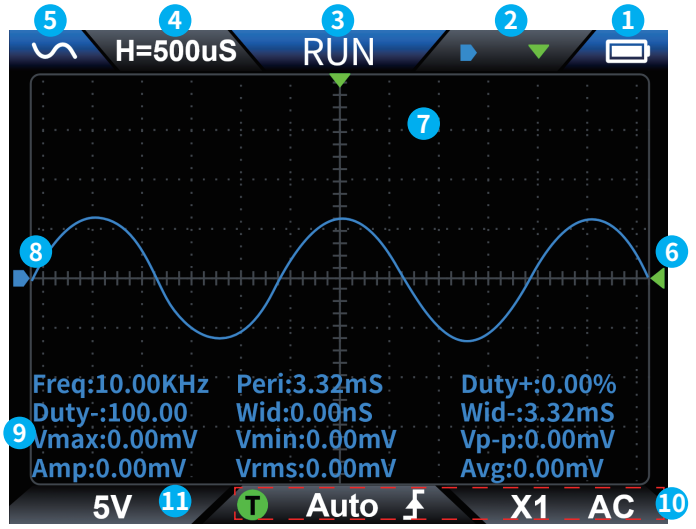


①**Function name:**This area displays the function name selected at the moment, with a total of 5 sections: transistor, oscilloscope, signal generator, toolbox, and settings.vv

②**Mode switch:**Click the left and right buttons or the up and down buttons to select the function.

button	Operation	Function
⏻	Short Press	Return to the main menu
	Long Press	Switch on/off
◀ ▶	Short Press	Switch functions in the main menu
▲ ▼	Short Press	Switch functions in the main menu
OK	Short Press	Enter the currently selected function

2.4 Oscilloscope



①**Battery display:** This area displays the remaining battery.

②**Mode switch:** Short press the **OK** confirmation button to switch horizontal and vertical units, horizontal trigger movement, channel waveform up and down movement, trigger level up and down movement.

③ **Run/pause indication:** Short press the run/pause button, RUN for running, STOP for stopping.

④**Time base:** refers to a large horizontal grid representing the length of time, which is determined by the sampling rate.

⑤**Function signal generator indication:** blue means the function signal generator is turned on, red means it is not turned on, and the displayed graph represents the set waveform category.

⑥**Trigger voltage indicator icon:** trigger threshold.

⑦**Trigger X position indicator arrow:** indicates that this is the trigger point.

⑧**Channel waveform:** waveform signal collected by the channel.

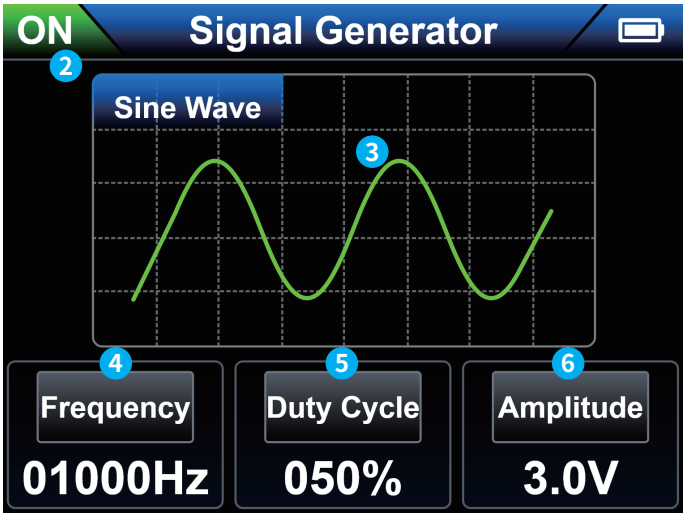
⑨**Measurement data:** You can long press the **MODE** button to turn on/off the measurement parameter display in the menu settings.

⑩**Trigger settings:** You can long press the **MODE** button to set the trigger settings and channel settings.

⑪ **Vertical sensitivity:** A large vertical grid represents the voltage length.

button	Operation	Function
⏻	Short Press	Exit button, return to the previous operation/exit mode
	Long Press	Turn off the power, Power off
MODE	Short Press	Switch to other modes
	Long Press	Open the oscilloscope setting menu, you can set the waveform, parameters, afterglow, pictures, etc. Long press again to close the menu
AUTO	Short Press	Automatic measurement
	Long Press	Automatic calibration
OK	Short Press	You can switch horizontal and vertical units, horizontal trigger movement, channel waveform movement, trigger level movement. If in the menu setting, short press to confirm the setting.
	Long Press	50%
RUN	Short Press	Click to pause, click again to run
	Long Press	Save picture

2.5 Signal generator



①**Battery display:** This area displays the remaining battery.

②**Status display:** This area displays the signal generator on-state, green (ON) is on, red (OFF) is off.

③**Waveform category:** Short press the left and right buttons to select the waveform category, a total of 13 waveforms are available.

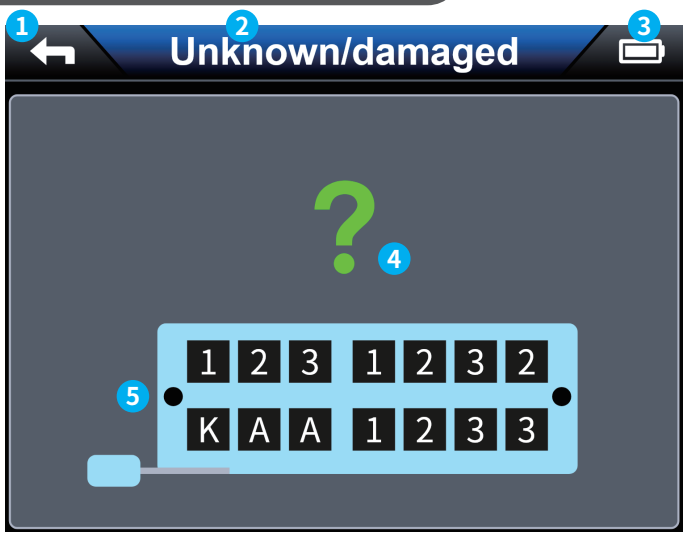
④**Frequency setting:** Click **OK** to enter the frequency/duty cycle/amplitude selection, click **OK** to select the frequency and enter the third-level navigation to set the frequency value.

⑤**Duty cycle setting:** Click **OK** to enter the frequency/duty cycle/amplitude selection, click **OK** to select the duty cycle and enter the third-level navigation to set the duty cycle.

⑥**Amplitude setting:** Click OK to enter the frequency/duty cycle/amplitude selection, click OK to select the amplitude and enter the third-level navigation to set the amplitude.

button	Operation	Function
⏻	Short Press	Exit button, return to the previous operation/exit mode
	Long Press	Turn off the power, Power off
MODE	Short Press	Switch to other modes
OK	Short Press	Confirm, enter the freguency/duty cycle/amplitude selection, adjust by ◀ / ▶ to set the corresponding value.
RUN	Short Press	Click on/off, and click on/off again

2.6 Transistor



①**Battery display:** This area displays the remaining battery.

②**Status display:** This area displays the transistor identification category/transistor status.

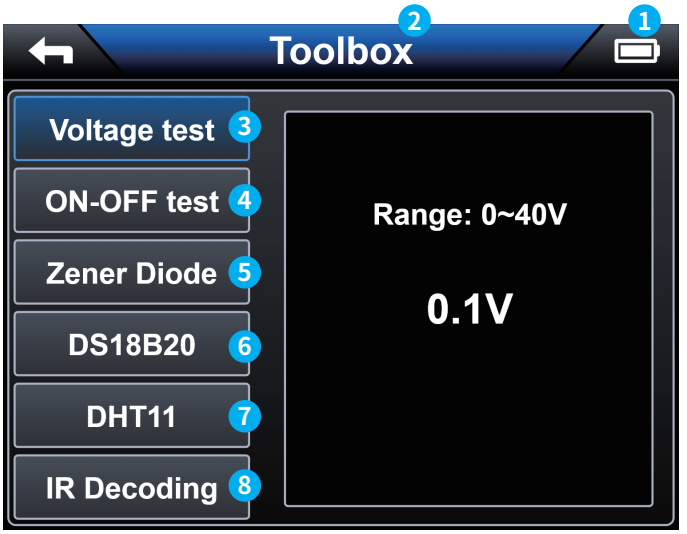
③**Return icon:** Short press the power button to exit the transistor mode.

④**Transistor indication:** This area displays the identified transistor category and displays the corresponding symbol. If it is not identified, a question mark is displayed.

⑤ **Pin indication:** This area displays the status of the transistor inserted into the identification socket, and uses different colors to distinguish, so as to facilitate the adjustment of the corresponding pin status to achieve a good identification state

button	Operation	Function
⏻	Short Press	Exit button, exit mode
	Long Press	Turn off the power, shut down
MODE	Short Press	Switch to other modes
AUTO	Short Press	Perform automatic measurement

2.7 Toolbox



①**Battery display:** This area displays the remaining battery.

②**Status display:** This area displays the mode toolbox.

③**Voltage test:** Insert the voltage measurement interface to measure its voltage, the measurement voltage range is 0-40V.

④**On-off test:** Test the on-off status of the transistor circuit/.OLΩ.

⑤**Zener diode test:** Directly insert the two pins of the Zener diode into different pins of the transistor socket for automatic measurement.

⑥**DS18B20:** Single-wire digital temperature sensor measurement.

⑦**DHT11:** Digital temperature and humidity sensor measurement, pay attention to insert pins 124 into different holes.

④**On-off test:** Test the on-off status of the transistor circuit/.OLΩ.

⑧**Infrared decoding:** Automatically parse the NEC protocol infrared code, aim at the infrared receiver to send the infrared signal, the machine will automatically decode, and after decoding, the address code, user code and waveform will be displayed.

⑨**Automatic calibration:** Click the OK confirmation button to automatically calibrate and adjust.

button	Operation	Function
⏻	Short Press	Exit button, exit mode
	Long Press	Turn off the power, shut down
MODE	Short Press	Switch to other modes
OK	Short Press	Confirm functionality, confirm execution

2.8 System settings

① Battery display: This area displays the remaining battery.

② Status display: This area displays the mode system settings.

③ Language settings: There are 8 languages to switch between: Chinese, English, Deutsch, Português, にほんご, Español, 한국인, and Русский.

④ Volume settings: Click OK to enter the volume settings, use the left and right buttons to adjust the volume, and can be set to mute.

⑤ Screen brightness: Click OK to enter the brightness settings, use the left and right buttons to adjust the brightness.

⑥ Power on: There are 3 function modes to choose to enter by default when the power is turned on, or you can choose none of them.

⑦ Automatic shutdown settings: You can set the automatic shutdown time to 15min, 30min, 1hour, and standby when there is no operation. Set the time and automatically shut down.

⑧USB sharing: After turning it on, you will enter the USB sharing interface. After connecting to the computer, a USB flash drive will pop up, and you can get the screenshot image in the [Screenshot file] folder. You can also put "LOGODSO-TC4.jpg" (custom startup LOGO) in the [LOGO] folder.

⑨About: Display brand information and current version number. Click OK to choose whether to restore factory settings.

3.TECHNICAL SPECIFICATIONS

3.1 Main Parameters

Parameter	Specification
Model	DSO-TC4
Screen	2.8-inch TFT Color Screen
Backlight	Brightness Adjustable
Power Supply	TYPE-C (5V/1A)
Battery	3.7V/1500mAh
Languages	中文、English、Deutsch、Português、 にほんご、Español、한국인、Русский
Size	≈90x142x27.5mm
Product Weight	≈186g

3.2 Oscilloscope

Parameter	Specification	Remark
Real-Time Sampling Rate	48MSa/s	
Analog Bandwidth	10MHz	
Input Impedance	1MΩ	
Coupling Mode	AC/DC	
Test Voltage Range	1:1 Probe: 80Vpp (+40V) 10:1 Probe: 800Vpp (+400V)	Oscilloscope in X1 Oscilloscope in X10
Vertical Sensitivity	10mV/div~10V/div (X1 range)	
Vertical Displacement	Adjustable with indication	
Time Base Range	50ns~20s	
Trigger Mode	Auto/Normal/Single	
Trigger Type	Rising edge, Falling edge	
Trigger Level	Adjustable with indication	
Waveform Freeze	Yes (HOLD function)	
Automatic Measurement	Max, Min, Avg, RMS, Vpp, Frequency, Cycle, Duty Cycle	

3.3 Component Testing

Category	Range	Description
Transistor	*	Amplification factor “hfe”; Base-Emitter voltage“ Ube”, Ic/Ie, Collector-Emitter reverse leakage current “Iceo”, Ices, Forward voltage drop of protection diode“ Uf"
Diode	Forward voltage drop <5V	Forward voltage drop, Junction capacitance, Reverse leakage current
Zener Diode	0.01~32V	Reverse Breakdown Voltage (K-A-A Test Area)
Field-Effect Transistor (FET)	JFET	Gate capacitance “Cg”, Drain current Id under“ Vgs”, Forward voltage drop of protection diode “Uf”
	IGBT	Drain current Id under Vgs, Forward voltage drop of protection diode Uf
	MIOSTET	Threshold voltage “Vt”, Gate capacitance “ Cg”, Drain-Source resistance “Rds”, Forward voltage drop of protection diode “Uf”
Unidirectional SCR	Trigger voltage <5V, Gate level	Gate voltage
Bidirectional SCR	Trigger current <6mA	
Capacitor	25pF~100mF	Capacitance value, Loss factor “Vloss”
Resistor	0.01Ω~50MΩ	Resistance value
Inductor	10μH~1000μH	Inductance value, DC resistance
DS18B20	-	Temperature sensor, Pins: GND, DQ, VDD
DHT11	-	Temperature and humidity sensor, Pins: VDD, DATA, GND

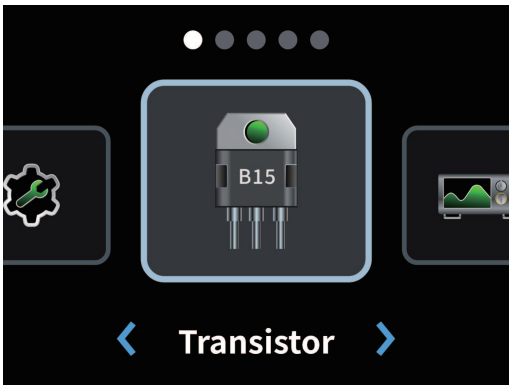
3.4 Signal Generator

Parameter	Specification
Output Waveform	Supports 13 waveform outputs
Waveform Frequency	0-50KHz
Square Wave Duty Cycle	0-100%
Waveform Amplitude	0.1V-3.0V

4.OPERATION GUIDE

4.1 Power on

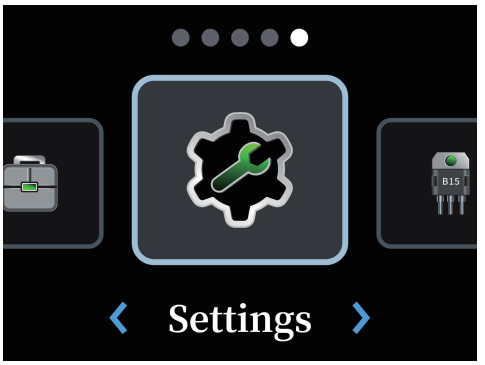
Long press ⏻ power on, wait for the system to load, and enter the default interface of system settings.



Default Interface

4.2 Language settings

In the default interface, short press ◀ / ▶ to select system settings, short press the OK button to enter system settings, select language settings by pressing ▲▼, and then short press the **OK** button to enter language settings, select the language to be set using the up/down buttons, and confirm the selection with the **OK** button.



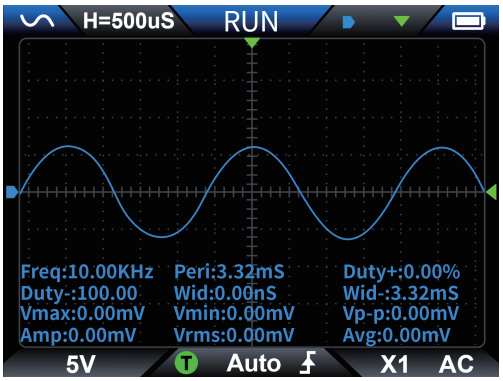
Short Press OK ⏻

4.3 Adjust oscilloscope parameters

Oscilloscope adjustment

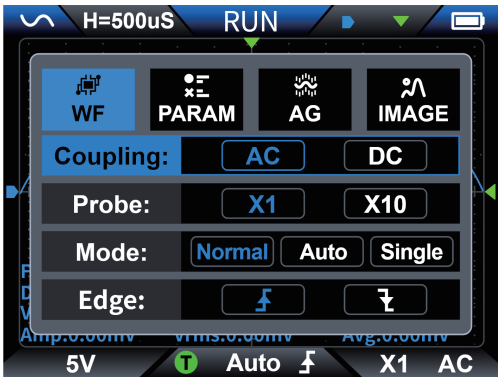
•In the default interface, short press the left and right buttons to select the function module oscilloscope, and click the **OK** confirmation button to enter the oscilloscope. Long press the mode switch button **(MODE)** to enter the oscilloscope parameter setting. You can select and set parameters such as waveform, parameters, persistence, and pictures through the button selection area. Long press the mode switch button **(MODE)** again to close the oscilloscope parameter setting.

•In the oscilloscope parameter setting, picture deletion and selection require entering the picture parameter setting interface. At this time, click the switch button **(MODE)** to select the picture, click the run/pause button **(RUN)** to select all pictures, click the automatic measurement button **(AUTO)** to select whether to delete the picture, use the up and down buttons to select the picture, click the **OK** button to confirm the check of the currently selected picture, and click again to uncheck it. Without selecting a picture, click **OK** to view the complete picture directly.



Oscilloscope Function Interface

Long Press MODE



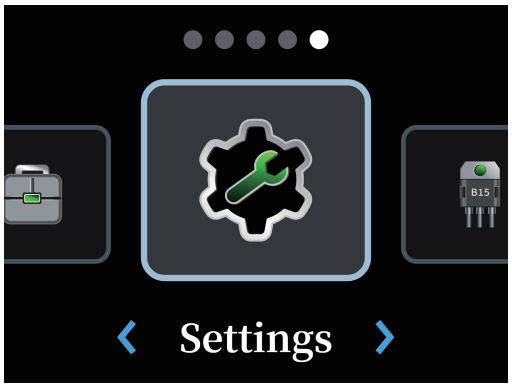
Oscilloscope Parameter Settings Interface

4.4 Brightness adjustment

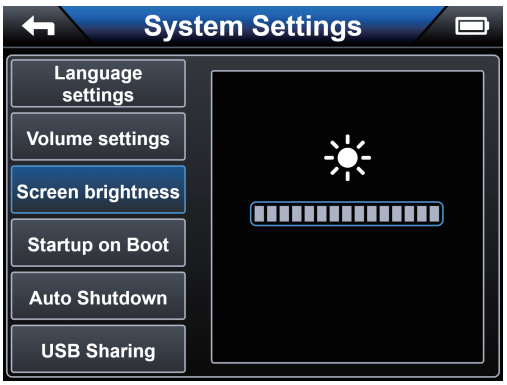
In the default interface, short press ◀ / ▶ to select system settings, short press the **OK** button to enter system settings, select screen brightness using ▲▼, and then short press the **OK** button to enter brightness settings. Use the ◀ / ▶ to adjust the brightness in real time, and click ⏻ to save.

Adjust other functions of system settings

The corresponding function selection and activation are roughly the same as the above operation navigation, and the step description is omitted.



Short Press OK



5.QUICK START

5.1 Quick Measurement

1. Turn on the multi-function transistor oscilloscope, wait for the system to load, and select the mode: oscilloscope, signal generator, transistor, etc. For example: select signal generator.
2. First connect the interface, enter the signal generator, and select the waveform to be output. Click the confirmation button to confirm the setting of frequency, duty cycle, amplitude, etc.
3. When the corresponding parameters are set, click the run/pause button to start the signal generator.
4. Click the mode switch button to perform other functions.

5.2 Firmware Upgrade

- Turn off the device, long press the MODE button and the power button at the same time, the device will pop up the Firmware Upgrade interface, insert the USB Type-c data cable to connect the computer, enter the Firmware Upgrade interface to upgrade the firmware.
- Copy the firmware file to the Upgrade file folder, then press the RUN button to upgrade.
- After pulling the firmware file to the specified folder of the U disk, press the RUN button to upgrade. If the firmware upgrade is completed, the shutdown charging interface will be displayed.

※**Note:** Firmware upgrade is only supported on computers with Windows 10 and above.

6.TROUBLESHOOTING

6.1 Unable to boot

Possible causes:

· Battery exhausted. · Loose or damaged battery connection

Solution:

①Check battery charge and charge if low

②If battery fails to charge or device still does not power on, try reinstalling or replacing the battery.

③If the device still does not power on, please Contact Technical Support.

6.2 Screen does not display

Possible causes:

· Display hardware malfunction. · System software abnormality

Solution:

①Check and adjust the backlight brightness settings according to the manual.

②Try restarting the device to ensure the system returns to normal.

③If the screen still does not display properly, the display may need to be repaired or replaced.

7. MAINTENANCE

Cleaning the outside of the device

●**Frequency:** Clean once a month, depending on the usage environment.

●**Method:** Use a soft cloth to gently wipe the surface of the device. Avoid using chemical cleaners, especially those containing alcohol or strong acids or alkalis, to avoid damaging the casing or screen.

●**Note:**

- Clean the dust around the machine and buttons regularly to keep the device well ventilated and cooled.
- Ensure that no liquid, dust or debris enters the device interface.

Check the battery and power

●**Battery maintenance:** For instruments with built-in batteries, check the health of the battery regularly. Avoid complete battery discharge. It is recommended to charge regularly and avoid not using the device for a long time.

●**Charging specifications:** Use the official charger to charge, avoid overcharging or over-discharging, and ensure that the battery is in the appropriate operating voltage range.

●**Battery replacement:** If the battery shows excessive attenuation (such as failure to charge normally or extremely fast discharge), it should be replaced in time.

Storage and Carrying:

●**Storage environment:** The device should be stored in a dry and ventilated environment, avoiding high temperature, high humidity or drastic temperature changes. Avoid placing it in direct sunlight.

●**Carrying:** Be careful to avoid falling when using, especially when carrying. It is recommended to use a protective case or a special bag for carrying.

Software Update

●Regularly check whether the device has new firmware to update. The latest firmware can fix known bugs and improve device performance.

●When updating, make sure the operation steps are correct, use the officially released firmware files, and avoid power outages or other interference.

Restore factory settings

●If the device is abnormal or does not work properly, try to restore the factory settings. After restoring the settings, the device will clear all custom configurations and return to the initial state.

●For methods to restore factory settings, please refer to the user manual or contact the manufacturer's customer service

8.CONTACT US

Any FNIRSI users who contact us with questions will receive our promise of a satisfactory solution, plus an extra 6-month warranty as a token of our appreciation for your support! By the way, we have created an exciting community, and we welcome you to contact FNIRSI staff to join.

SHENZHEN FNIRSI TECHNOLOGY CO.,LTD

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Tel: 0755-28020752

Web:www.fnirsi.com

E-mail:business@fnirsi.com (Business)

E-mail:service@fnirsi.com(Equipment Service)

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

1.Unable to present the original valid warranty card.

2.Damage caused by improper installation not meeting product requirements, standards, or relevant specifications.

3.Damage caused by accessories in the installation environment not meeting product requirements, standards, or relevant specifications.

4.Damage caused by improper use, improper storage, unauthorized disassembly, or unauthorized repairs by the user.

5.Expiration of the warranty period.

保修卡

产品型号	DSO-TC4	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	**DSO-TC4**	**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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