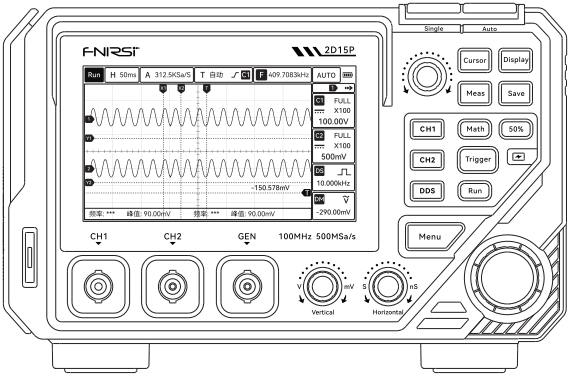
FNIRSI 菲尼瑞斯

2D15P

100M双通道荧光示波器万用表说明书 V1.3

3-IN-1 2CH 100 MHZ PHOSPHOR SCOPEMETER 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、安全信息

1.1 安全术语和符号

以下术语可能出现在本手册中:

警告:警告性声明,指出可能会危害生命安全的条件和行为

注意:注意性声明,可能导致此产品或其它财产损坏的条件和行为

以下术语可能出现在产品上:

危险:表示如果进行此操作可能会造成伤害

警告:表示如果进行此操作可能会有危险

注意:表示如果进行此操作可能会对本产品或连接到本产品的其他设备造成损坏

1.2 一般安全概要

本产品严格遵循GB4793电子测量仪器安全要求以及IEC61010-1安全标准进行设计和生产。符合绝缘过电压标准CATI300V和污染等级1的安全标准。请阅读下列安全性预防措施:

- 为防止触电或失火,请使用本产品专用并在使用国家(地区)核准的电源线及电源适配器。
- 本产品通过电源线内的保护接地线接地。

- 为防止电击，使用前请检查电源插座是否与大地相连接。
- 在连接除电源线外的输入或输出端之前，确认保护接地端与电源接地端有可靠的连接为避免人身伤害、防止设备损坏，只有受过专业培训的人员才能对设备进行维修。
- 为了防止火灾或电击危险，请注意产品额定工作范围及产品标记。
- 禁止在额定值范围外工作。
- 使用前，请检查附件是否有机械损伤，如发现损伤，请勿使用并及时更换。
- 仅使用本产品配置的附件。
- 禁止将金属物体插入本产品的输入、输出端。
- 如怀疑本产品有损坏，需专业维修人员进行检查。
- 禁止在仪器机箱开启状态下运行本产品。
- 请勿在潮湿的环境下操作。
- 保持产品表面清洁和干燥。

1.3 一般性检测

当您得到一台新的仪器时，建议您按以下步骤对仪器进行检查。

- **检查是否存在因运输造成的损坏**

  如果发现包装纸箱或泡沫塑料保护垫严重破损，请先保留，直到整机和附件通过电性和机械性测试。

- **检查附件**

  关于提供的附件明细，在本说明书“附录A：附件”已经进行了说明。您可以参照此说明检查附件是否有缺失。如果发现附件缺少或损坏，请和负责此业务的本公司经销商或本公司的当地办事处联系。

- **检查整机**

  如果发现仪器外观破损，仪器工作不正常，或未能通过性能测试，请和负责此业务的本公司经销商或本公司的当地办事处联系。如果因运输造成仪器的损坏，请注意保留包装。通知运输部门和负责此业务的本公司经销商。本公司会安排维修或更换。

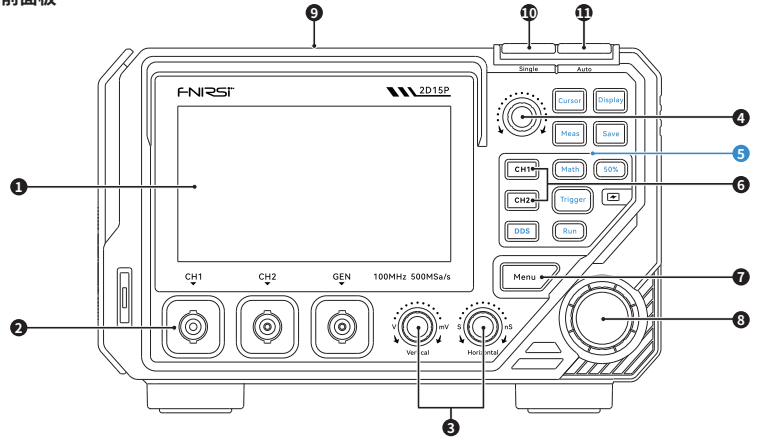
二、产品概览

2.1 主要特点

本产品采用实体按键+4.3寸电容触摸屏的操作方式让用户更好的使用该款示波器，具有500MSa/s的采样率，模拟带宽为100M（单通道100M，双通道同时打开时只有50M），10K、100K、1M的储存深度；具备128级灰度显示，配合余晖、色温做到更好的波形浏览；最高约1200帧的波形捕获率，异常波形也能有效捕获；6种（加减乘除等）运算波形实时分析采集信号的时域、频域特性；13种参数测量帮助用户更好的分析信号的各项参数；另外，该款产品搭载了10M波形发生器，能够输出9种常见波形，且幅值、占空比可调；万用表功能为4位半20000点真有效值，支持交直流电压电流测量，电容、电阻、二极管、通断等测量功能。内置5000mAh可充电锂电池，以小巧的体积给用户提供更多、更强的实用功能，同时具有很好的便携性。

2.2 面板和按键介绍

▶2.2.1 前面板



①显示区域，支持触摸

②通道信号输入端口/信号源输出端口

③垂直/水平档位旋钮

- 垂直：调整波形高度以及电压档位。
- 水平：调整波形宽度以及时基档位。

④功能旋钮

- 当【光标】开启时，通过旋钮左右移动光标在波形上的位置，利用光标可以精确测量波形上任意两点之间的电压差值、时间差值等参数。再次点击切换上下移动光标。
- 【光标】关闭时，该旋钮可用于调整通道电压偏置。

⑤功能按键

- 光标：按下此按键后，可在屏幕上激活光标功能，通过操作相关旋钮，能够移动光标在波形上的位置，利用光标可以精确测量波形上任意两点之间的电压差值、时间差值等参数。
- 显示：按下此按键后，示波器会出现显示设置界面，调整示波器波形的亮度、色温、余晖、网格类型、显示模式(点、矢量)
- 测量：按下此按键后，示波器会出现测量设置界面，可从中选择需要测量的参数，如频率、幅值、占空比等13种测量类型。
- 保存：按下此按键后，示波器仅提供当前显示内容的截图保存功能。

- 运算：按下此按键后，示波器会出现运算设置界面，可从中开启或关闭波形计算功能，共有6种运算方式。
- 50%：按下此按键后，示波器可以快速将触发电平和通道偏置电压、运算偏置电压调置中间位置，还有触发延时时间调整中间位置。
- Trigger：按下此按键后，示波器会出现触发设置界面，可从中设置通道、模式、触发沿等触发相关参数。
- 运行：按下此键可启动或停止示波器对信号的实时采集与显示，当运行时，指示灯为绿色；当停止时，指示灯为红色。
- DDS：按下此按键后，示波器会进入信号发生器功能设置界面，支持输出如正弦波、方波、三角波等信号。在该界面中，您可以设置输出信号的频率、幅值、波形类型等参数。

⑥**CH1/CH2通道切换键：**快速切换在屏幕上显示的当前通道，快速波形显示。

⑦**菜单按键：**按下此按键后，示波器会出现菜单界面，可从中选择需要的功能设置与调整。

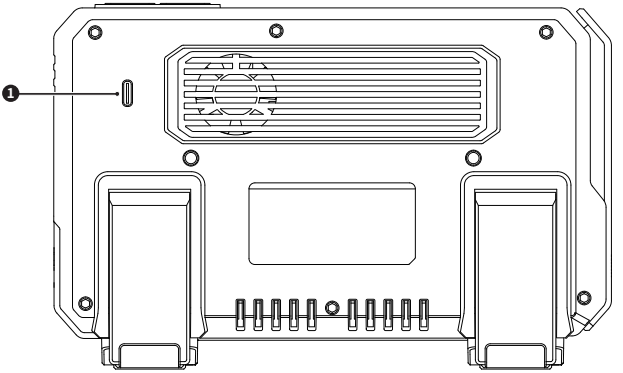
⑧**触发控制旋钮：**调整触发电平和触发延时时间，确保波形在触发点稳定显示。

⑨**万用表接口：**10A、mA、COM

⑩**单次触发：**按下此按键后，可以使示波器捕获并显示一次特定的触发事件。

⑪**自动触发：**按下此按键后，可以使示波器能够自动调整触发条件，以便在没有手动干预的情况下稳定地显示波形。

▶2.2.2 后面板

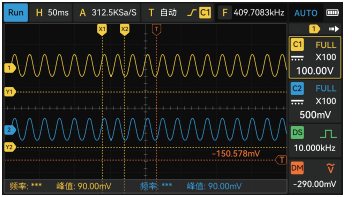


①**电源接口：**电源接口，支持Type-C输入快充协议，规格为12V，1A。

三、功能介绍

3.1 示波器

▶3.1.1 用户界面



①**运行状态显示：**当状态显示为RUN并且为绿色时，示波器处于运行状态，实时采集并更新显示输入信号的波形。当状态显示为STOP并且为红色时，示波器停止实时采集。

②**水平时基显示：**表示屏幕水平轴上每格所代表的时间长度。使用水平档位旋钮可以修改该参数，可设置范围5ns/div ~ 50s/div。

③**采样率/存储深度显示：**显示示波器当前使用的采样率及存储深度，调整水平档位旋钮对该采样率/存储深度影响。

④**触发设置：**可对通道CH1/CH2进行触发设置修改，可设置触摸模式（自动、正常、单次）、触发沿。

⑤**频率计显示：**显示测量信号的频率值。

⑥**触发状态显示：**状态包括：Trig’ d(已触发)、wait、ROLL（滚动）、Auto、Stop、Ready

⑦**通道设置：**可对通道CH1/CH2进行更多功能设置，如开启或关闭显示、探头衰减比例、电压档位设置、设置通道耦合方式（交流耦合、直流耦合）、带宽限制等。

⑧**信号源设置：**可设置输出不同类型的波形信号，用户根据需要调整信号的频率、波形类型等，以生成所需的测试信号。

⑨**万用表设置：**可切换电压、电流、电阻等测量类型，支持自动 / 手动量程，直接显示测量数值，辅助分析信号电气特性。

▶3.1.2 垂直系统

垂直系统是示波器中用于控制和调整信号显示的关键组成部分。对于双通道示波器每个通道都有独立的设置，用户可以通过点击屏幕上的相关功能按钮或使用CH1/CH2按键来进行调整。

①**选择通道：**按下CH1或CH2按键或点击屏幕上的通道设置，选择要调整的通道。

②**调整显示：**可以开启或关闭对应通道的波形显示。

③调整探头倍率：可以选择探头的衰减比例（1X，10X，100X），以适应不同幅度的信号测量。

④调整档位：可以使用垂直档位旋钮或屏幕菜单调整垂直刻度的档位，以适应不同电压范围的信号。根据不对的探头倍率对应的档位也不同。

1X	10mV，20mV，50mV，100mV，200mV，500mV，1V，2V，5V，10V
10X	100mV，200mV，500mV，1V，2V，5V，10V，20V，50V，100V
100X	1V，2V，5V，10V，20V，50V，100V，200V，500V，1000V

⑤调整耦合：可以选择信号的耦合方式：交流（AC）、直流（DC），用于滤除不需要的信号成分。

⑥调整带宽限制：

- 可以设置带宽限制，以减少高频噪声对测量的影响，可根据需要选择合适的限值。
- 关闭：被测信号含有的高频分量可以通过。
- 20M：带宽被限制为 20MHz，被测信号含有的大于 20MHz 的高频分量被阻隔。

▶3.1.3 水平系统

水平系统是示波器中用于控制和调整时间基准显示的重要部分。

①**调整滚动：**设置滚动功能“开启”和“关闭”之间切换。开启滚动功能时，波形将在屏幕上连续滚动显示，便于观察长时间信号变化。

②**设置储存深度：**影响示波器在连续采集模式下能够显示的波形长度，可以根据需要选择10K、100K或1M的存储深度，以适应不同复杂度的信号分析需求。

▶3.1.4 触发设置

触发方式包括自动触发方式、正常触发方式和单次触发方式。当示波器运行时，触发方式指示示波器在没有触发时要进行的操作。

①**进入触发设置界面：**选择面板上的“Trigger”按键，或者通过通道设置按键进行操作，操作后示波器便会进入触发设置界面。

②**选择通道：**选择要调整的通道进行触发设置。

③**触发模式：**影响示波器在连续采集模式下能够显示的波形长度，可以根据需要选择自动、正常或单次的触发模式，以适应不同复杂度的信号分析需求。

- 自动：示波器不管有无触发，都会进行波形刷新。
- 正常：示波器只有信号触发到时才会有波形刷新。
- 单次：示波器在下一次触发事件后停止数据采集，用于捕获瞬态事件。

④**触发沿：**

- 上升沿：示波器在检测到信号从低到高的变化时触发。
- 下降沿：示波器在检测到信号从高到低的变化时触发。
- 双向沿：示波器在检测到信号的上升沿或下降沿时触发。

▶3.1.5 测量

示波器的测量功能可对输入信号的多种参数进行精确测定，为信号分析提供关键数据。以下是对图中测量功能的详细介绍：

示波器的测量功能可对输入信号的多种参数进行精确测定，为信号分析提供关键数据。以下是对图中测量功能的详细介绍：

①**进入测量设置界面：**选择面板上的“测量”按键，或者通过通道设置按键进行操作，操作后示波器便会进入测量设置界面。

②**选择通道：**选择要调整的通道进行测量设置。

③**全开/全关：**

- 全开：点击全开按钮，会在主界面显示所有的测量参数。
- 全关：点击全关按钮，会在主界面关闭所有的测量参数。

④**频率：**信号每秒周期变化次数。

⑤**周期：**信号完成一次周期变化的时长。

⑥**正占空比：**信号高电平时间与周期的比值。

⑦**负占空比：**信号低电平时间与周期的比值。

⑧**正脉宽：**在一个周期内，高电平持续时长。

⑨**负脉宽：**在一个周期内，低电平持续时长。

⑩**上升沿个数：**信号上升沿的数量。

⑪**下降沿个数：**信号下降沿的数量。

⑫**有效值：**信号的有效值（RMS）。

⑬**平均值：**整个波形或选通区域上的算术平均值。

⑭**峰峰值：**信号最高点与最低点之间的电压差。

⑮**最大值：**信号的最大电压值。

⑯**最小值：**信号的最小电压值。

▶3.1.6 显示

示波器的测量功能可对输入信号的多种参数进行精确测定，为信号分析提供关键数据。以下是对图中测量功能的详细介绍：

①**设置屏幕网格：**选择面板上的“显示”按键，可设置屏幕显示的网格类型。以下为3种可选的网格类型，可根据实际需要选择所需网格类型。

- 无网格
- 轻网格
- 全网格

②**调节网格亮度：**使用网格亮度滑块，通过手指滑动自行调节网格线的亮度，以适应不同的观察需求。

③**调节波形亮度：**使用波形亮度滑块，通过手指滑动自行调节波形的亮度，以获得最佳的视觉效果。

④**设置色温显示：**色温功能采用颜色的变化来体现波形出现频率的大小。波形出现的频率越大，颜色越暖。出现的频率越小，颜色越冷。

⑤**选择显示类型：**设置波形的显示方式为“矢量”或“点”。

- 矢量：采样点之间通过连线的方式显示。该模式在大多情况下提供较好的观看。可方便查看波形（例如方波）的陡边沿。
- 点：直接显示采样点，可以直观的看到每个采样点。

⑥**设置余晖：**用户可对余晖时间进行配置。

▶3.1.7 运算

示波器的运算功能可对输入信号进行多样化处理，帮助用户从不同角度深入剖析信号特性。以下是对图中运算功能的详细介绍：

①**进入运算设置界面：**选择面板上的“运算”按键，操作后示波器便会进入运算设置界面。

②**运算开启与关闭：**通过点击“开启 / 关闭”按钮来控制运算功能的启用与停用。当选择“开启”时，示波器将按照后续设置

对信号执行相应运算操作;若选择“关闭”,则停止运算功能,屏幕关闭运算信号波形。

③**信号源选择:**默认情况下,信源 A 对应通道 1 的信号,信源 B 对应通道 2 的信号。用户可以根据实际需求,选择不同通道的信号作为运算的输入源,灵活组合进行各种运算操作。

④**运算符:**示波器配备包括加、减、乘、除等在内的 6 种运算符,可对波形进行计算分析。

▶3.1.8 光标

显示波形上用于测量的光标线,用户可以通过光标精确定位波形上的特定点。

①**进入光标显示界面:**选择面板上的“光标”按键,操作后示波器便会进入光标显示界面。

②**移动光标:**当光标功能开启时,使用旋钮可以移动光标在波形上的位置。

- 首先,按下旋钮以控制光标1(X1)左右移动。
- 再次按下旋钮以控制光标2(X2)左右移动。
- 然后,按下旋钮以控制光标1(Y1)上下移动。
- 最后,按下旋钮以控制光标2(Y2)上下移动。

③**认识光标:**

- X 光标:X 光标是指用于测量水平时间的垂直虚线。包括:

X1— 屏幕右侧（默认）垂直虚线。可手动移动到屏幕中任意垂直位置。

X2— 屏幕左侧（默认）垂直虚线。可手动移动到屏幕中任意垂直位置。

X1-X2表示 X轴的差值，显示在屏幕左上角区域框中,可通过旋钮左右移动。

- Y 光标：Y 光标是指用于测量垂直电压或安培（配合电流探头）的水平虚线。

Y1— 屏幕下方（默认）水平虚线。可手动移动到屏幕中任意水平位置。

Y2— 屏幕上方（默认）水平虚线。可手动移动到屏幕中任意水平位置。

Y1-Y2 表示 两个Y轴的差值，显示在屏幕左上角信息区域" 框中。

- 1/d|X|：1/d|X|表示时间差值的倒数，显示在屏幕左上角信息区域框中。

▶3.1.9 参数

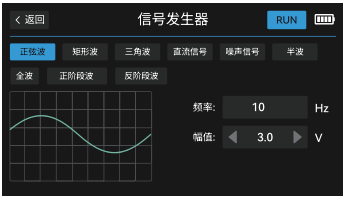
通道	双通道
采样率	500MSa/s
模拟带宽	100M
存储深度	10K、100K、1M

输入阻抗	1MΩ
时基范围	5ns~50s
垂直灵敏度	10mv ~10v/div
最大测量电压	800V（X10档位）
触发模式	自动、正常、单次
触发类型	上升沿、下降沿、双向沿
显示模式	点、矢量、色温
耦合	交流/直流
余晖	min/2s/5s/10s/20s/50s/∞
运算	6种基础运算

波形截图保存	支持
导出波形图形	支持
光标测量	支持

3.2 信号发生器

▶3.2.1 用户界面



进入信号发生器功能设置界面：选择面板上的“DDS”按键，或者通过点击屏幕上的“DDS”按键进行操作，操作后示波器便会进入信号发生器功能设置界面。

①输出波形选择，共9种：正弦波、矩形波、三角波、直流信号、噪声信号、半波、全波、正阶梯波、反阶梯波。用户可根据实际测试需求，点击相应选项进行波形切换。

②波形调节的参数设置：选择需要调节的参数，点击后会出现一个输入界面，用户可以输入所需的参数值进行设置。

③波形示意图：以图形化方式展示当前所选波形的形态，当功能处于开启状态时，按键背光灯高亮显示；若图形呈现灰色，则代表该功能处于关闭状态，此时按键背光灯熄灭。

▶3.2.2 参数

通道	单通道
频率	0-2MHz(正弦波为10MHz)
幅值	0.1-3.0Vpp
占空比	0-100%

3.3 万用表

▶3.3.1 用户界面

进入万用表功能设置界面：按下面板上的“菜单”按键，在弹出选项中选择万用表功能，选择操作后示波器便会进入万用表功能设置界面。

①具体测量的档位显示

②数据保持

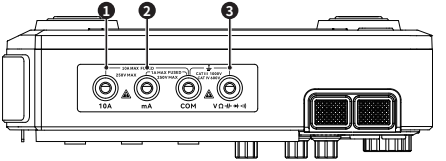
③测量的数值显示

④测量的当前档位的数值中的最大值与最小值

⑤曲线示意图：以图形化方式直观展示当前测量数据的变化形态

⑥点击按钮，可使示波器退出当前万用表功能界面，返回到上一级菜单或之前的操作界面。

▶3.3.2 表笔接口介绍



①大电流测量：红笔接10A，黑笔接COM

注意：被测电流大于10A会烧坏保险丝，测量前请初步评估电流。

②小电流测量：小电流最大测量199.99mA，红笔接mA，黑笔接COM。

③电压、电阻、电容、二极管/通断测量：红笔接 VΩ⊣⊢⊣•))) ，黑笔接 COM，测量时请根据需要测量的参数切换相应功能档位。

④自动挡：只能自动识别电压、电阻两个档位，测量电压时，会自动识别交流电压/直流电压。

▶3.3.3 参数

直流电压	1.9999V/19.999V/199.99V/1000V
交流电压	1.9999V/19.999V/199.99V/750.0V
直流电流	19.999mA/199.99mA/1.9999A/9.999A
交流电流	19.999mA/199.99mA/1.9999A/9.999A
电阻	19.999MΩ/1.9999MΩ/199.99KΩ/19.999KΩ
	1.9999KΩ/199.99Ω
电容	999.9uF/99.99uF/9.999uF/999.9nF/99.99nF/9.999nF
	9.999mF/99.99mF

二极管	√
通断	√

3.4 系统辅助功能

▶3.4.1 图片查看

①按下面板上的保存按键后，示波器仅提供当前显示内容的截图保存功能。

②在菜单中选择“图片”选项，可以查看已保存的波形图片。用户可以通过单选、多选或删除按钮来选择一个或多个图片进行查看/删除。

③通过USB共享按钮，可以将波形图片导出到USB存储设备。在操作此步骤时，其他功能将被禁用以防止误操作。

▶3.4.2 X-Y模式设置

选择XY模式后，通道1是XY的横坐标，通道2是XY的纵坐标。另一个波形幅度，水平轴显示通道1，垂直轴上显示通道2。该功能绘制出两通道波形的关系曲线。

▶3.4.3 自校正

①在菜单中选择“校正”选项，示波器会弹出校正窗口，点击开始就可执行。

②自校正操作可迅速使示波器达到最佳状态，以取得最精确的测量值。您可在任何时候执行自校正操作，但如果环境温度变化范围达到或超过 5°C 时，必须执行自校正操作。

▶3.4.4 系统设置

①设置单项选择：

- 语言
- 音量
- 屏幕亮度
- 自动关机
- 关于
- 出厂设置

②具体设置详情：

- 语言：中文、English
- 音量/屏幕亮度：0%-100%
- 自动关机：OFF、15min、30min、1hour
- 关于：显示设备基本信息以及制造商
- 出厂设置：恢复出厂默认配置

四、故障处理

下面列举仪器在使用过程中可能出现的故障及排查方法，请按照相应的步骤进行处理，如不能处理，请与经销商或当地办事处联系，同时请提供机器的设备信息（获取方法：依次按 菜单→关于）。

●如果按下电源键示波器仍黑屏，无任何显示：

①检查电源接头是否接好。

②检查电源开关是否按实。

③做完上述检查后，请重新启动示波器。

④如果仍无法正常启动本产品，请与经销商或当地办事处联系。

●采集信号后，画面中并未出现相应波形：

①检查探头是否正确连接在信号连接线上。

②检查信号连接线是否正确连接在 BNC（通道连接器）上。

③检查探头是否与待测物正常连接。

④检查待测物是否有信号产生。

⑤重新采集一次信号。

●测量的电压幅值比实际值大或者小（注意：此种情况一般在使用探头时才出现）：

①检查通道衰减系数是否与探头实际使用的衰减比例相符。

●波形显示呈阶梯状：

①水平时基档位可能过低，增大水平时基以提高水平分辨率，可以改善显示。

②若显示类型为矢量，采样点间以直线连接，可能造成波形阶梯状显示。将显示类型设置为“点”显示方式，即可解决。

五、维护修养

5.1 保养

存放或放置仪器时，请勿使液晶显示器长时间受阳光直射。

注意：为避免损坏仪器或探头，请勿将其置于雾气、液体或溶剂中。

5.2 清洁

请根据使用情况经常对仪器和探头进行清洁。方法如下：

①使用质地柔软的抹布擦拭仪器和探头外部的浮尘。清洁液晶显示屏时，注意不要划伤透明的塑料保护屏。

②使用一块用水浸湿的软布清洁仪器，请注意断开电源。如要更彻底地清洁，可使用 75%异丙醇的水溶剂。

注意：

①为避免损坏仪器或探头的表面，请勿使用任何磨蚀性试剂或化学清洁试剂。

②在重新通电使用前，请确认仪器已干透，避免因水分造成电气短路甚至人身伤害。

六、生产信息

产品名称：100M双通道荧光示波器万用表

品牌/型号：2D15P

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/T 32194-2015

七、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:

1.不能出示有效保修卡原件;

2.产品安装不符合产品要求、标准和相关规范造成的损坏;

3.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;

4.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;

5.超过保修期。

附录A、配件清单

型号	2D15P
标配	P6100*2
	表笔*1
	USB-A转TYPE-C线*1
	BNC 转鳄鱼夹电缆*1
	产品说明书*1

1.SAFETY INFORMATION

1.1 Safety Terms and Symbols

The following terms may appear in this manual:

Warning: Indicates conditions or actions that could result in serious injury or death.

Caution: Indicates conditions or actions that could result in damage to the product or other property.

The following terms may appear on the product:

Danger: Indicates that performing the action could cause personal injury.

Warning: Indicates that performing the action may be hazardous.

Caution: Indicates that performing the action may cause damage to this product or to devices connected to it.

1.2 General Safety Summary

This product is designed and manufactured in strict accordance with the safety requirements of GB4793 for electronic measuring instruments and the international standard IEC 61010-1. It complies with CATI 300V overvoltage insulation standard and Pollution Degree 1. Please read the following safety precautions carefully:

- To prevent electric shock or fire, only use the dedicated power cord and adapter approved for use in your country or region.
- This product is grounded through the protective earth conductor in the power cord.
- To avoid electric shock, ensure the power outlet is properly grounded before use.
- Before connecting any input or output terminals other than the power cord, ensure that the protective ground terminal is reliably connected to the power ground. To avoid personal injury and prevent equipment damage, only qualified personnel should service the device.
- To prevent fire or electric shock hazards, always follow the rated operating range and product markings.
- Operation outside the rated limits is strictly prohibited.
- Before use, inspect all accessories for mechanical damage. Do not use damaged accessories and replace them promptly.
- Only use accessories supplied with this product.
- Do not insert metallic objects into input or output terminals.
- If the product is suspected to be damaged, have it inspected by qualified service personnel.
- Do not operate the product with the case open.
- Do not operate in a humid environment.
- Keep the product surface clean and dry.

1.3 General Inspection

When you receive a new instrument, it is recommended that you perform the following checks:

- **Check for shipping damage**

  If the shipping carton or foam cushioning is found to be severely damaged, please retain it until the instrument and accessories have passed both electrical and mechanical testing.

- **Check the accessories**

  A detailed list of standard accessories is provided in Appendix A: Accessories of this manual. Please refer to it to verify that all accessories are present and undamaged. If any items are missing or damaged, contact your local distributor or our regional office responsible for this product.

- **Check the instrument**

  If you find any external damage, malfunction, or failure during performance tests, please contact your distributor or our regional office. If the instrument has been damaged due to transportation, be sure to retain all packaging materials and notify both the carrier and the responsible distributor. Arrangements will be made for repair or replacement.

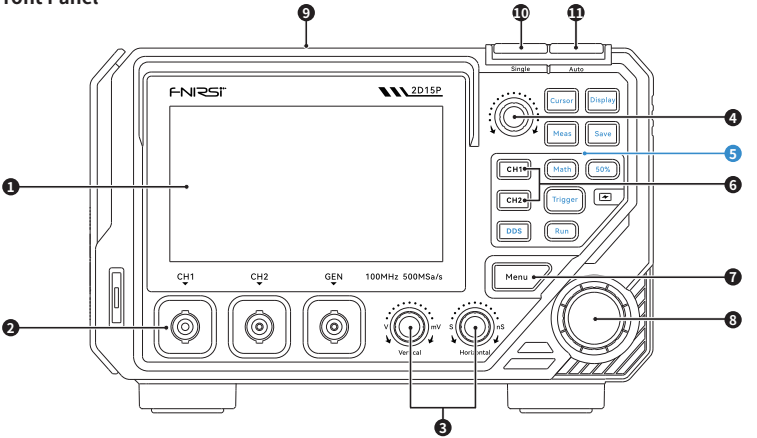
2.PRODUCT OVERVIEW

2.1 Key Features

"This product adopts a combination of physical buttons and a 4.3-inch capacitive touchscreen to enhance user interaction and usability. It features a sampling rate of 500 MSa/s and an analog bandwidth of 100 MHz (100 MHz for single-channel operation; 50 MHz per channel when both channels are active). It supports memory depths of 10K, 100K, and 1M. With 128-level grayscale display and support for persistence and color temperature visualization, the oscilloscope provides a clearer view of waveform details. The waveform capture rate reaches up to approximately 1,200 frames per second, allowing effective capture of abnormal signals. The unit includes 6 types of math operations (such as addition, subtraction, multiplication, and division) for real-time time-domain and frequency-domain analysis. It also offers 13 parameter measurements to assist users in analyzing various signal parameters efficiently. Additionally, the device integrates a 10 MHz waveform generator, capable of outputting 9 common waveforms with adjustable amplitude and duty cycle. The built-in 4.5-digit (20,000 counts) True RMS digital multimeter supports AC/DC voltage and current measurement, as well as capacitance, resistance, diode, and continuity testing."

2.2 Panel and Button Description

▶2.2.1 Front Panel



① Display area, supports touch operation

② Channel signal input port / signal generator output port

③ Vertical/Horizontal knobs

- Vertical: Adjusts waveform height and voltage range
- Horizontal: Adjusts waveform width and time base

④ Function knob

- When【Cursor】is enabled, rotate the knob to move the cursor left or right on the waveform. The cursor can be used to accurately measure voltage difference, time difference, and other parameters between any two points on the waveform. Press again to switch to moving the cursor up or down.
- When【Cursor】is disabled, the knob is used to adjust the channel voltage offset.

⑤ Function buttons

- Cursor: Press this button to activate the cursor function. Use the corresponding knob to move the cursor on the waveform. The cursor can be used to accurately measure voltage difference, time difference, and other parameters between any two points on the waveform.
- Display: Press this button to open the display settings interface. You can adjust waveform brightness, color temperature, persistence, grid type, and display mode (dots or vectors).
- Measure: Press this button to open the measurement settings interface. You can select from 13

measurement types such as frequency, amplitude, duty cycle, etc.

- Save: Press this button to save a screenshot of the current display only.
- Math: Press this button to open the math settings interface. You can enable or disable waveform math functions, with 6 operation types available.
- 50%: Press this button to quickly set the trigger level, channel offset voltage, and math offset voltage to the middle position. Also sets the trigger delay time to the middle position.
- Trigger: Press this button to open the trigger settings interface. You can set parameters such as channel, mode, trigger edge, etc.
- Run: Press this button to start or stop real-time signal acquisition and display. When running, the indicator is green; when stopped, the indicator is red.
- DDS: Press this button to enter the signal generator settings interface. It supports output of sine, square, triangle and other waveforms. In this interface, you can set frequency, amplitude, waveform type, etc.

⑥ **CH1/CH2 channel switch button:** Quickly switch the currently displayed channel on the screen for fast waveform viewing.

⑦ **Menu button：**Press this button to open the menu interface. You can select and adjust the required functions.

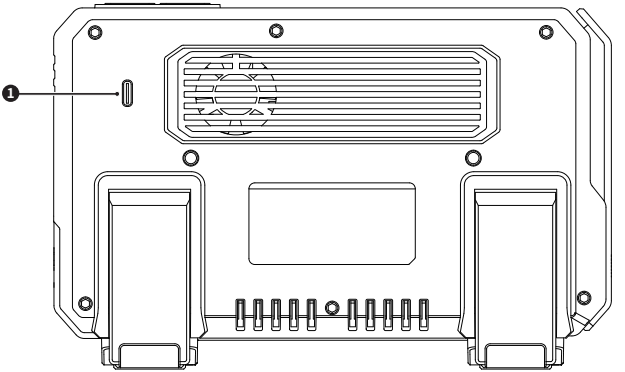
⑧ **Trigger control knob:** Adjusts trigger level and trigger delay time to ensure stable display of the waveform at the trigger point.

⑨ **Multimeter interface：**10A、mA、COM

⑩ **Single trigger:** Press this button to capture and display a single specific trigger event.

⑪ **Auto trigger:** Press this button to enable automatic trigger adjustment so the waveform can be displayed stably without manual operation.

▶2.2.2 Rear Panel

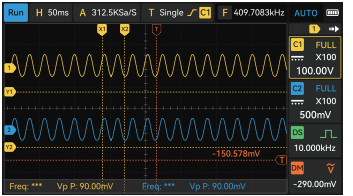


① **Power port:** Power interface, supports Type-C input with fast charging protocol, rated at 12V, **1A.**

3.FUNCTION OVERVIEW

3.1 Oscilloscope

▶ 3.1.1 User Interface



① **Run status display:** When the status shows “RUN” and is green, the oscilloscope is in running mode, continuously acquiring and updating the input signal waveform in real time. When it shows “STOP” and is red, the oscilloscope has stopped real-time acquisition.

② **Horizontal time base display:** Indicates the time per division on the horizontal axis. This value can be adjusted using the horizontal knob. The adjustable range is 5 ns/div to 50 s/div.

③ **Sampling rate / memory depth display:** Shows the current sampling rate and memory depth.Adjusting the horizontal knob affects this parameter.

④ **Trigger settings:** Allows configuration of trigger settings for CH1/CH2, including trigger mode (Auto, Normal, Single) and edge selection.

⑤**Frequency counter display:** Displays the frequency of the measured signal.

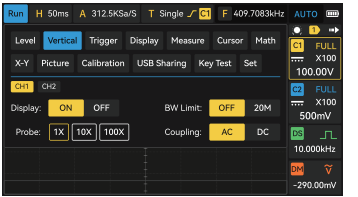
⑥ **Trigger status display:** Status includes Trig' d, Wait, ROLL, Auto, Stop, and Ready.

⑦ **Channel settings:** Allows additional configuration for CH1/CH2, such as enabling/disabling display, probe attenuation ratio, voltage range, coupling mode (AC/DC), bandwidth limit, etc.

⑧ **Signal source settings:** Used to output various types of waveform signals. Users can adjust parameters such as frequency and waveform type to generate the desired test signal.

⑨ **Multimeter Settings:** Supports switching between voltage, current, and resistance measurement modes. supports automatic measurement. Measurement values are displayed directly, assisting in the analysis of signal electrical characteristics.

▶ 3.1.2 Vertical System



The vertical system is a key component of the oscilloscope used to control and adjust signal display.

For a dual-channel oscilloscope, each channel has independent settings. Users can make adjustments by tapping the corresponding function buttons on the screen or by using the CH1/CH2 keys.

① **Select channel:** Press the CH1 or CH2 button, or tap the channel settings on the screen to select the channel to be adjusted.

② **Display adjustment:** You can enable or disable the waveform display for the corresponding channel.

③ **Probe attenuation adjustment:** You can select the probe attenuation ratio (1X, 10X, 100X) to match different signal amplitude measurements.

④ **Vertical scale adjustment:** Use the vertical knob or on-screen menu to adjust the vertical scale to fit different voltage ranges. The scale varies depending on the selected probe attenuation.

1X	10mV, 20mV, 50mV, 100mV, 200mV , 500mV, 1V, 2V, 5V, 10V
10X	100mV, 200mV, 500mV, 1V, 2V, 5V, 10V, 20V, 50V, 100V
100X	1V, 2V , 5V , 10V , 20V , 50V, 100V, 200V, 500V, 1000V

⑤ **Coupling selection:** Choose the signal coupling mode—AC or DC—to filter out unwanted signal components.

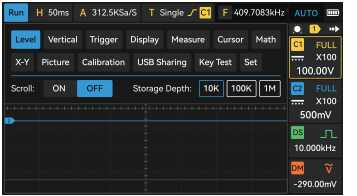
⑥ **Bandwidth limit adjustment:**

- You can set a bandwidth limit to reduce the impact of high-frequency noise on measurements. Select the appropriate limit as needed.

- Off: High-frequency components of the measured signal are allowed to pass.
- 20M: Bandwidth is limited to 20MHz; components above 20MHz are filtered out.

▶ 3.1.3 Horizontal System

The horizontal system is an important part of the oscilloscope used to control and adjust the time base display.



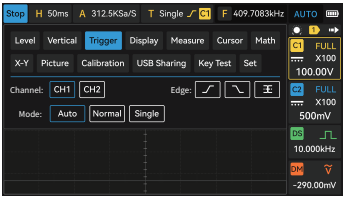
① **Adjust Roll:** Toggle roll function On and Off. When roll is On, the waveform continuously scrolls on the screen, making it easier to observe long-term signal changes.

② **Adjust Time Base:** Use the horizontal knob to adjust the time base. The setting range typically spans from a few nanoseconds per division to several seconds per division, accommodating signal analysis at different time scales. Adjustment range: 5 ns/div to 50 s/div.

③**Memory Depth settings:** Select 10K, 100K, or 1M points depending on signal duration and complexity. This selection determines the amount of waveform data that can be stored during continuous acquisition.

▶ 3.1.4 Trigger Settings

Trigger modes include Auto, Normal, and Single trigger modes.When the oscilloscope is running, the trigger mode defines what action the oscilloscope takes if no trigger occurs.



① **Enter Trigger Settings:** Press the "Trigger" button on the panel or access it via the channel settings button to enter the trigger settings menu.

② **Select Channel:** Choose the channel to adjust trigger settings.

③**Select Trigger Mode:** Choose Auto, Normal, or Single mode depending on measurement needs.

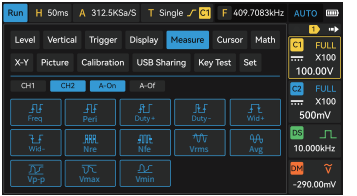
- Auto: Refresh waveform no matter if trigger or not.
- Normal: Refresh waveform only when a trigger event occurs.
- Single: Captures a single waveform at trigger and then stops.

④**Trigger Edge:**

- Rising Edge: The oscilloscope triggers when detecting a signal transition from low to high.
- Falling Edge: The oscilloscope triggers when detecting a signal transition from high to low.
- Both Edges: The oscilloscope triggers on either rising or falling edge of the signal.

▶ 3.1.5 Measurement

The oscilloscope's measurement function can accurately determine various parameters of the input signal, providing key data for signal analysis. Below is a detailed introduction to the measurement features shown on the screen:



① **Enter Measurement Menu:** Press the "Measurement" button on the panel or access it via the channel settings button to enter the measurement settings menu.

② **Select Channel:** Choose the channel to configure measurement settings.

③ **Show All / Hide All**

- All On: Clicking the All On button will display all measurement parameters on the main screen.
- All Off: Clicking the All On button will close all measurement parameters on the main screen.

④ **Frequency:** Number of signal cycles per second.

⑤ **Period:** Duration of one complete signal cycle.

⑥ **+Duty :** Ratio of high-level time to the total period.

⑦ **-Duty :** Ratio of low-level time to the total period.

⑧ **+Width :** Duration of high-level signal within one cycle.

⑨ **-Width :** Duration of low-level signal within one cycle.

⑩ **Rising Edge Count:** Number of rising edges in the signal.

⑪ **Falling Edge Count:** Number of falling edges in the signal.

⑫ **RMS:** Root mean square value of the signal.

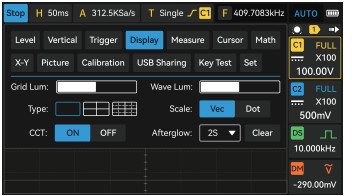
⑬ **Average:** Arithmetic average value over the entire waveform or gated area.

⑭ **Vpp:** Voltage difference between the highest and lowest points of the signal.

⑮ **Max.:** Max voltage value of the signal.

⑯ **Min.:** Min voltage value of the signal.

▶ 3.1.6 Display



The oscilloscope' s measurement functions provide precise determination of multiple parameters of the input signal, offering key data for signal analysis. The detailed explanation of the measurement functions shown in the image is as follows:

① **Set Screen Grid:** Press the "Display" button on the panel to set the type of screen grid. Three grid types are available to choose from based on actual needs:

- No Grid
- Light Grid
- Full Grid

② **Adjust Grid Brightness:** Use the grid brightness slider to adjust the brightness of the grid lines by sliding with your finger, adapting to different observation needs.

③ **Adjust Waveform Brightness:** Use the waveform brightness slider to adjust the brightness of the waveform by sliding with your finger, achieving the best visual effect.

④ **Set Color Temperature Display:** The color temperature function uses color changes to reflect the frequency of waveform occurrences. The higher the frequency, the warmer the color; the lower the frequency, the cooler the color.

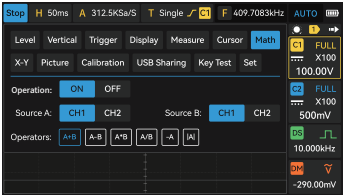
⑤ **Select Display Type:** Set the waveform display mode to either "Vector" or "Dot."

- Vector: Displays sample points connected by lines. This mode generally offers better viewing and makes it easier to observe waveform edges (e.g., square wave).
- Dot: Displays only the sample points, allowing intuitive visualization of each sample.

⑥ **Set Persistence:** Users can configure the persistence time.

▶ 3.1.7 Math

The oscilloscope' s math functions allow diversified processing of input signals, helping users analyze signal characteristics from different perspectives. Below is a detailed explanation of the math functions shown in the image:



①**Enter the Math Settings Interface:** Press the "Math" button on the panel to enter the math settings interface.

②**Enable or Disable Math:** Tap the "On/Off" button to control whether the math function is enabled or disabled. When "On" is selected, the oscilloscope will perform signal operations based on subsequent settings. When "Off" is selected, math processing stops and the math waveform will no longer be displayed.

③**Signal Source Selection:** By default, Source A corresponds to Channel 1, and Source B to Channel 2.

④**Math Operators:** The oscilloscope includes 6 math operators such as addition, subtraction, multiplication, division, which can be applied for waveform analysis.

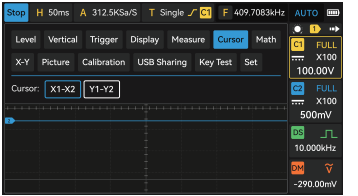
▶3.1.8 Cursor

The oscilloscope displays cursor lines on the waveform for measurement. Users can precisely locate specific points on the waveform using cursors.

①**Enter Cursor Display Interface:** Press the "Cursor" button on the panel to enter the cursor display interface.

② **Move Cursors:** When the cursor function is enabled, use the knob to move the cursor position on the waveform.

- First, press the knob to control Cursor 1 (X1) moving left/right.
- Press the knob again to control Cursor 2 (X2) moving left/right.
- Then, press the knob to control Cursor 1 (Y1) moving up/down.
- Finally, press the knob to control Cursor 2 (Y2) moving up/down.



③ **Understanding Cursors:**

- X Cursors: The X cursors are vertical dashed lines used to measure horizontal time, including:

X1 — Vertical dashed line at the right side of the screen (default). Can be manually moved anywhere vertically on the screen.

X2 — Vertical dashed line at the left side of the screen (default). Can be manually moved anywhere vertically on the screen.

X1-X2 indicates the difference on the X axis, displayed in the upper left information box, adjustable by turning the knob left/right.

- Y Cursors: The Y cursors are horizontal dashed lines used to measure vertical voltage or current (with current probe).

  Y1 — Horizontal dashed line at the bottom of the screen (default). Can be manually moved anywhere horizontally on the screen.

  Y2 — Horizontal dashed line at the top of the screen (default). Can be manually moved anywhere horizontally on the screen.

  Y1-Y2 indicates the difference between two Y axes, displayed in the upper left information box.
- 1/d|X|: Represents the reciprocal of the time difference, displayed in the upper left information box.

▶3.1.9 Oscilloscope Specifications

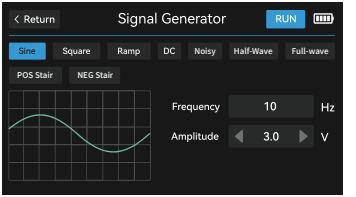
Channel	Dual Channel
Sample Rate	500MSa/s
Analog Bandwidth	100MHz
Memory Depth	10K, 100K, 1M
Input Impedance	1MΩ

Timebase Range	5ns~50s
Vertical Sensitivity	10mV~10V/div
Max Input Voltage	800V (×10 Probe)
Trigger Mode	Auto, Normal, Single
Trigger Type	Rising, Falling, Both Edges
Display Mode	Dot, Vector, Color Temp
Coupling	AC/DC
Persistence	min/2s/5s/10s/20s/50s/∞
Math Operations	6 Basic Ops
Waveform Capture	√
Waveform Export	√

Cursor Measurement	√

3.2 Signal Generator

▶3.2.1 User Interface



Enter the signal generator setting interface by pressing the "DDS" button on the panel or tapping the "DDS" button on the screen. The oscilloscope will enter the signal generator settings.

① **Waveform Selection (9 types):** Sine, Square, Triangle, DC, Noise, Half-wave, Full-wave, Positive Staircase, Negative Staircase. Users can tap the corresponding option to switch waveforms based on testing needs.

② **Waveform Parameter Adjustment:** Select the parameter to be adjusted. After tapping, an input interface will appear, allowing the user to enter the desired parameter value for setting.

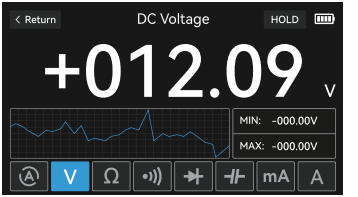
③ **Waveform Display:** Graphically shows the current selected waveform shape. When enabled, the button backlight is on; when disabled, the waveform icon is grayed out and the backlight is off.

▶3.2.2 Signal Generator Specifications

Channel	1CH
Frequency	0-10 MHz(the sine wave is 10MHz)
Amplitude	0.1-3.0 Vpp
Duty Cycle	0-100%

3.3 Multimeter

▶3.3.1 User Interface



Enter the multimeter setting interface: Press the "Menu" button on the panel, then select the multimeter function from the pop-up options. After selection, the oscilloscope will enter the multimeter setting interface.

① Display of measurement range

② HOLD

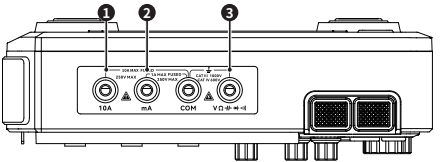
③ Display of measurement values

④ Max/Min values of the current measurement range

⑤ Curve Diagram: Graphically displays the variation trend of the current measurement data.

⑥Press the button to exit the current multimeter function and return to the previous menu or operation interface.

▶3.3.2 Test Lead Interface Description



① **High current measurement:** Red lead to 10A, black lead to COM

Note: Measuring current over 10A will damage the fuse. Please estimate before testing.

② **Low current measurement:** Max 199.99mA. Red lead to mA, black lead to COM.

③ **Voltage, resistance, capacitance, iode/continuity measurement:** Red lead to VΩ⊣⊢→|•))) , black lead to COM . Select corresponding function range based on measurement type.

④ **Auto mode:** Only supports automatic identification of voltage and resistance. AC/DC voltage is auto-detected during voltage measurement.

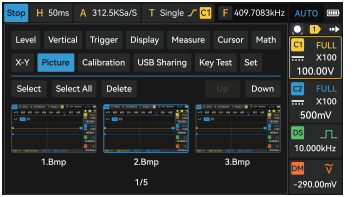
▶3.3.3 Multimeter Specifications

DC Voltage	1.9999V/19.999V/199.99V/1000V
AC Voltage	1.9999V/19.999V/199.99V/750.0V
DC Current	19.999mA/199.99mA/1.9999A/9.999A
AC Current	19.999mA/199.99mA/1.9999A/9.999A
Resistance	19.999MΩ/1.9999MΩ/199.99KΩ/19.999KΩ
	1.9999KΩ/199.99Ω
Capacitance	999.9uF/99.99uF/9.999uF/999.9nF/99.99nF/9.999nF
	9.999mF/99.99mF

Diode	√
Continuity	√

3.4 System Auxiliary Functions

▶3.4.1 Image Viewing



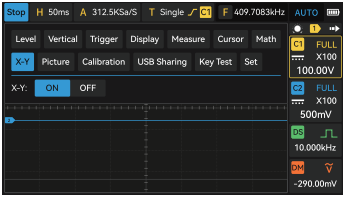
① Press the save button on the panel to save a screenshot of the current display only.

② In the menu, select the “Images” option to view saved waveform pictures. Users can select one or multiple images via single or multiple selection and delete buttons to view or delete.

③ Using the USB share button, waveform images can be exported to a USB storage device. During this operation, other functions are disabled to prevent accidental operation.

▶3.4.2 XY Mode Setup

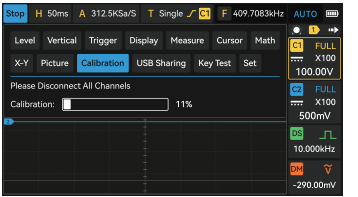
After selecting XY mode, Channel 1 is the X-axis, Channel 2 is the Y-axis. Another waveform amplitude: horizontal axis shows Channel 1, vertical axis shows Channel 2. This function plots the relationship curve between the two channel waveforms.



▶3.4.3 Self-Calibration

①In the menu, select “Calibration” to open the calibration window, then click Start to execute.

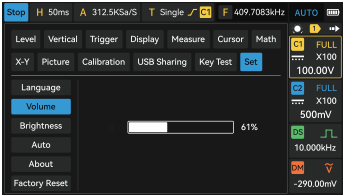
②Self-calibration quickly brings the oscilloscope to optimal status for accurate measurements. It can be performed anytime, but must be done if ambient temperature changes by 5°C or more.



▶3.4.4 System Settings

① Setting Single Select:

- Language
- Volume
- Brightness
- Auto
- About
- Factory Reset



② Setting Details:

- Language: Chinese, English
- Volume/Brightness: 0%-100%
- Auto: OFF, 15min, 30min, 1hour
- About: Provides basic information about the device and the manufacturer.
- Factory Reset: Restore default factory settings

4.TROUBLESHOOTING

Troubleshooting tips for common issues during instrument use. Please follow the steps below. If unresolved, contact your dealer or local service center and provide device info (Menu → About).

● Power button pressed but oscilloscope screen stays black with no display:

① Check if the power cable is properly connected.

② Check if the power switch is fully pressed.

③ After checking, restart the oscilloscope.

④ If still fails to start, contact your dealer or local service center.

● No waveform displayed after signal acquisition:

① Check probe connection to signal cable.

② Check signal cable connection to BNC (channel connector).

③ Check probe connection to device under test.

④ Confirm device under test is generating signal.

⑤ Re-acquire the signal.

● Measured voltage amplitude differs from actual (common with probe use):

① Verify channel attenuation matches probe attenuation ratio.

● Waveform appears stepped:

① Horizontal time base may be too low; increase to improve resolution.

② If display type is Vector (lines between samples), switch to Point mode to remove stepped effect.

5.MAINTENANCE

5.1 Maintenance

When storing or placing the instrument, avoid exposing the LCD screen to direct sunlight for extended periods.

Note: To prevent damage to the instrument or probes, do not place them in mist, liquids, or solvents.

5.2 Cleaning

Clean the instrument and probes regularly depending on usage. The method is as follows:

① Use a soft cloth to wipe dust from the instrument and probe exteriors. When cleaning the LCD screen, be careful not to scratch the transparent plastic protective cover.

② Use a soft cloth dampened with water to clean the instrument. Make sure to disconnect the power. For more thorough cleaning, 75% isopropyl alcohol solution can be used.

Note:

① To avoid damage to the instrument or probes' surfaces, do not use any abrasive agents or chemical cleaners.

② Before reconnecting power, ensure the instrument is completely dry to prevent electrical short circuits or personal injury.

6.CONTACT US

Product Name: 3-in-1 2CH 100 MHz Phosphor ScopeMeter

Brand / Model: 2D15P

Manufacturer: Shenzhen FNIRSI Technology Co., Ltd.

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

Service Hotline: +86-755-28020752

Service Email: support@fnirsi.com

Business Email: business@fnirsi.com

Official Website: https://www.fnirsi.com/

Compliance Standard: GB/T 32194-2015

http://www.fnirsi.com/

7.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:

- Unable to present the original valid warranty card.
- Damage caused by improper installation not meeting product requirements, standards, or relevant specifications.
- Damage caused by accessories in the installation environment not meeting product requirements, standards, or relevant specifications.
- Damage caused by improper use, improper storage, unauthorized disassembly, or unauthorized repairs by the user.
- Expiration of the warranty period.

APPENDIX A: ACCESSORIES LIST

Model	2D15P
Standard accessories	P6100*2
	Test pen*1
	USB-A to TYPE-C cable*1
	BNC to alligator clip cable*1
	User manual*1

保修卡

产品型号	2D15P	**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	2D15P	**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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