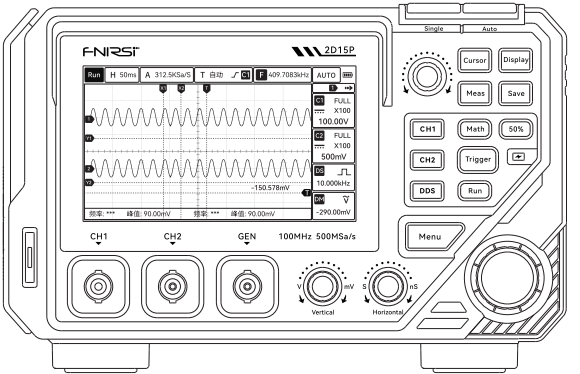
FNIRSI

DSO2D15P

V1.2

3-IN-1 2CH 100 MHZ PHOSPHOR SCOPEMETER USER MANUAL



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

CONTENTS

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.

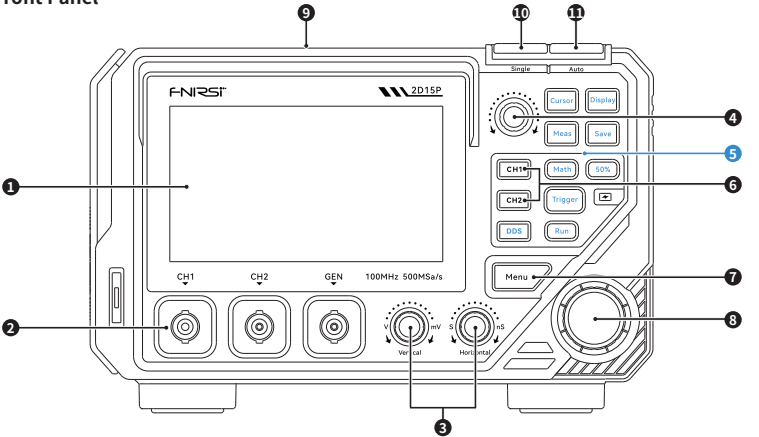
2.PRODUCT OVERVIEW

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.

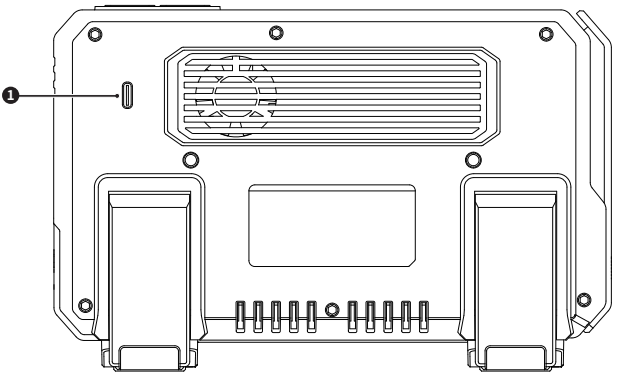
⑧ **Trigger control knob:** Adjusts trigger level and trigger delay time to ensure stable display of the waveform at the trigger point.

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

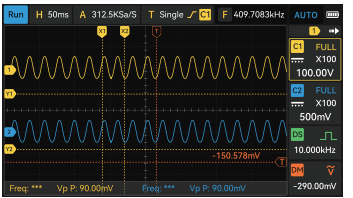


① **Power port:** Power interface, supports Type-C input with fast charging protocol, rated at 12V, **1A.**

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.

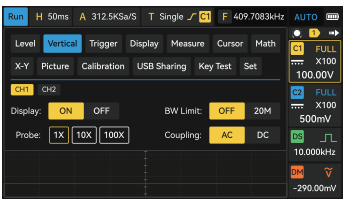
⑧ **Signal source settings:** Used to output various types of waveform signals. Users can adjust parameters such as frequency and waveform type to generate the desired test signal.

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.

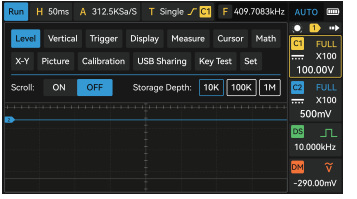
⑥ **Bandwidth limit adjustment:**

- 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.



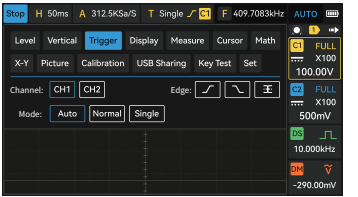
① **Adjust Roll:** Toggle roll function On and Off. When roll is On, the waveform continuously scrolls on the screen, making it easier to observe long-term signal changes.

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.

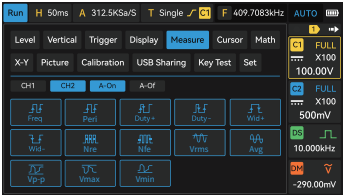
- Auto: Refresh waveform no matter if trigger or not.
- Normal: Refresh waveform only when a trigger event occurs.
- Single: Captures a single waveform at trigger and then stops.

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.

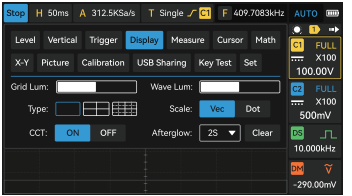
⑬ **Average:** Arithmetic average value over the entire waveform or gated area.

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.

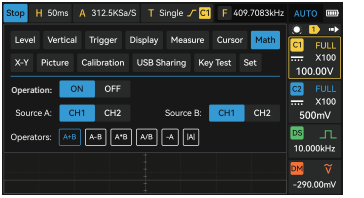
⑤ **Select Display Type:** Set the waveform display mode to either "Vector" or "Dot."

- 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.

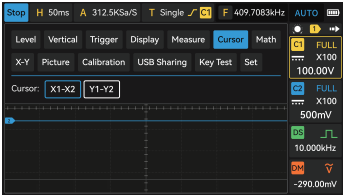
▶3.1.8 Cursor

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

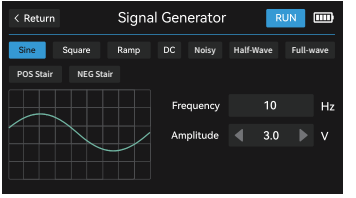
Channel	Dual Channel
Sample Rate	500MSa/s
Analog Bandwidth	100MHz
Memory Depth	10K, 100K, 1M
Input Impedance	1MΩ

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.

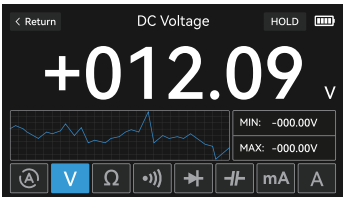
▶3.2.2 Signal Generator Specifications

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

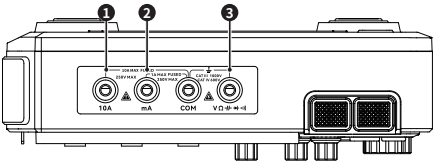
③ Display of measurement values

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, temperature, diode/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.

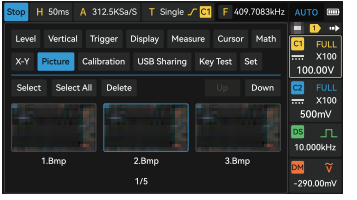
▶3.3.3 Multimeter Specifications

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



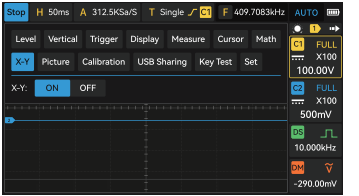
① Press the save button on the panel to save a screenshot of the current display only.

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

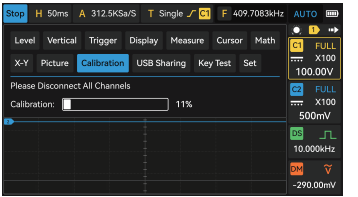
After selecting XY mode, Channel 1 is the X-axis, Channel 2 is the Y-axis. Another waveform amplitude: horizontal axis shows Channel 1, vertical axis shows Channel 2. This function plots the relationship curve between the two channel waveforms.



▶3.4.3 Self-Calibration

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

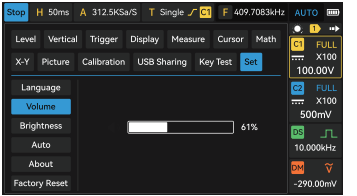
②Self-calibration quickly brings the oscilloscope to optimal status for accurate measurements. It can be performed anytime, but must be done if ambient temperature changes by 5°C or more.



▶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

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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.