

# HS5x2 Oscilloscopes

## User's Guide

# Notices

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## Edition

First edition, October 2024  
Current edition, January 2025

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### CAUTION

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# HScope HS5x2 Oscilloscopes - At a Glance



HS502



HS512 MAX

	HS 502 (2024 Edition)	HS 512 Max
<b>Indicated for</b>	Low level signals (standard vehicles, sensors, mV measures)	Wider input range (standard and heavy duty vehicles)
<b>No Input Channels</b>	2	
<b>Min Input Range</b>	± 500mV	±100mV
<b>Max Input Range</b>	±16V	±80V
<b>Max Supported Voltage</b> (protection limit)	50Vp	230V (for 30 seconds) Protected against high input voltages spikes
<b>Input Ranges</b>	5 steps	12 steps
<b>Input Coupling</b>	AC / DC	
<b>Input Impedance</b>	1 Mohm (1.010 kOhm)	1 Mohm (1.030 kOhm)
<b>ADC bits</b>	<b>8 - 12</b> (depending on rate) 300KSa/s - 4.8MSa/s (12 bit) 7 - 13MSa/s (8 bit)	
<b>Sampling Rate</b>	1kSa/s - 13MSa/s	
<b>Real-time Rates</b>	1KSa – 300KSa (2 channels) 1KSa – 600KSa (1 channel)	
<b>BW</b>	<b>1.6 MHz</b> (2Vpp signal @5MSa/s) <b>3 MHz</b> (2Vpp signal @13MSa/s)	
<b>Memory Buffer</b>	32k samples @ 12-16bit (half when enable both channels) 64k samples @ 8bit (7-13MSa/s, half when enable both channels)	
<b>Trigger</b>	Hardware, real-time, position within first 500 samples	Hardware, real-time, variable position

The HScope HS5x2 oscilloscopes deliver these features:

- Operate with almost all Android devices (check requirements).
- High refresh rate.
- All operation with Android touch screen and gesture.
- Many built-in measurements.
- Waveforms filtering function (low-pass, high-pass, band-pass)
- Advanced Math: dynamic frequency, duty-cycle.
- Long continuous recording with Automotive Module, up to 600Ksa/s with single channel.
- Long recording in paging mode for top rates.
- Serial decode with optional Digital Module for: UART/RS232, CAN, LIN.
- Low USB power consumption for long use.
- Easy data saving and sharing. Open file format.

For more information about HScope oscilloscopes, see:

[www.Martinloren.com/hscope](http://www.Martinloren.com/hscope)

# 1 Getting Started

This chapter describes the steps you take when using the oscilloscope for the first time.

- Inspect the Package Contents
- Power-On the Oscilloscope
- Connect Probes to the Oscilloscope
- Input a Waveform
- Use Autoscale & Basic Gesture
- Compensate Passive Probes / Attenuators

## Inspect the Package Contents

Inspect the shipping container for damage.

If your shipping container appears to be damaged, keep the shipping container or cushioning material until you have inspected the contents of the shipment for completeness and have checked the oscilloscope mechanically and electrically.

Verify that you received the following items and any optional accessories you may have ordered:

- HScope HS5x2 oscilloscope.
- USB OTG Cable (it may include micro-usb adapter).
- Oscilloscope probes (one for each analog input channel) are not included in the basic offer.

## Power-On the Oscilloscope

- |                             |  |
|-----------------------------|--|
| Android Device Requirements | <ul style="list-style-type: none"> <li>• <b>OS version:</b> Android 7+, best with Android 9+</li> <li>• <b>RAM:</b> 512KB, best with 4GB+</li> <li>• <b>Flash:</b> at least 1GB free (for waveform saving).</li> </ul> |
|-----------------------------|--|

App Installation	You may install <b>HScope app</b> from Google Play Store or Huawei App Store. In the app store just search for "HScope".
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- |                              |  |
|------------------------------|--|
| To power-on the oscilloscope | <ol style="list-style-type: none"> <li><b>1</b> Connect the USB cable to the rear of the oscilloscope, then to your Android device. Route the power cord so that there is no pressure on the USB connectors.</li> <li><b>2</b> Check that the oscilloscope red LED is on.</li> </ol> |
|------------------------------|--|

**Always use a grounded power cord. Do not defeat the power cord ground.**

## Connect Probes to the Oscilloscope

- 1 Connect the oscilloscope probe to an oscilloscope channel BNC connector.
- 2 Connect the probe's retractable hook tip to the point of interest on the circuit or device under test. Be sure to connect the probe ground lead to a ground point on the circuit.

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**CAUTION**

⚠ Maximum input voltage at analog inputs

- 50Vpk for **HS502**
- 230Vrms for 30s for **HS512 MAX**

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**CAUTION**

⚠ Do not float the probes ground

Defeating the ground connection and "floating" the probes ground will probably result in inaccurate measurements and may also cause equipment damage. If you need to measure between two live points, use a differential probe with sufficient dynamic range.

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**WARNING**

**Do not negate the protective action of the ground connection to the oscilloscope. The oscilloscope must remain grounded through the probe ground. Defeating the ground may create an electric shock hazard through the oscilloscope case or the Android device in user's hands.**

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## Input a Waveform

The Probe Comp signal is used for compensating probes.

- 1 Connect an oscilloscope probe from channel 1 to the Probe Ref terminal on the back panel.

**WARNING**

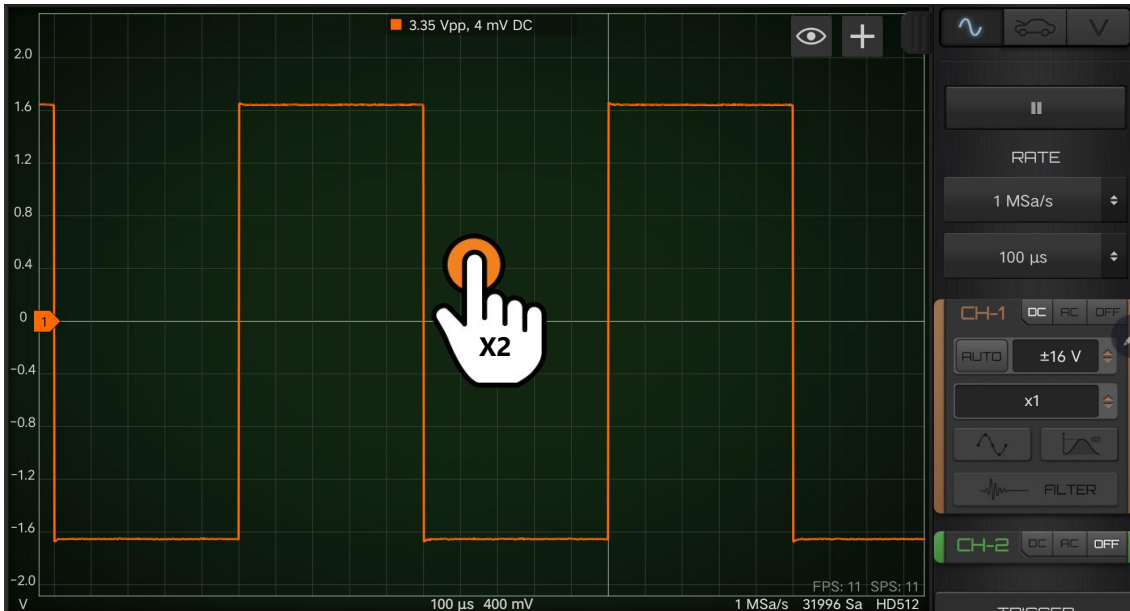
A voltage source should never be connected to the ground terminal of this instrument. If, for any reason, the Protective Conductor Terminal is disconnected or not functioning properly and a voltage source is connected to the equipment's ground terminals, the entire chassis and Android device will bear the voltage potential of the voltage source, and the operator or bystanders could receive an electric shock.



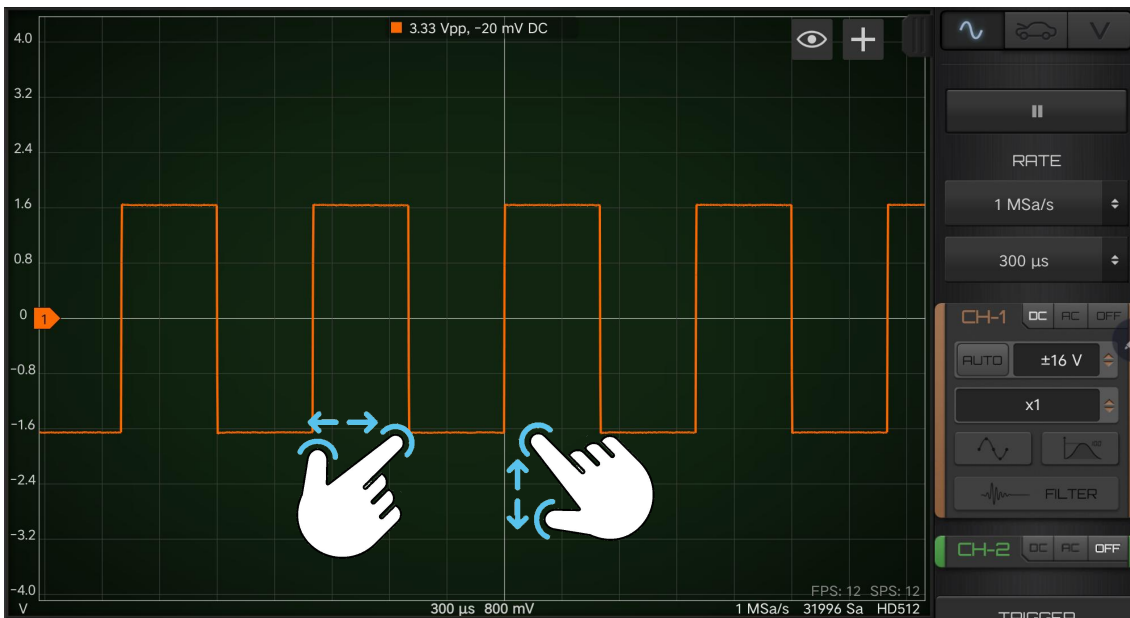
## Use Autoscale & Basic Gesture

Autoscale automatically configure the screen to best display the input signals vertically.

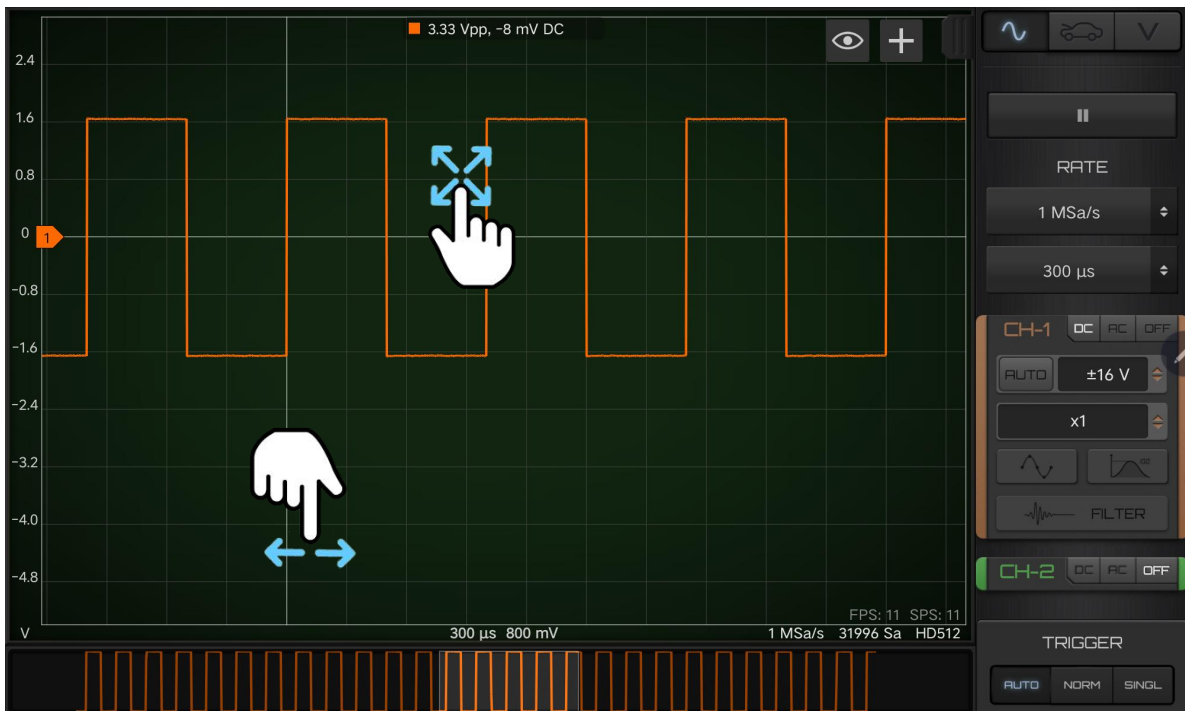
- 1 Double tap on the center of the screen.  
You should see a waveform on the oscilloscope's display similar to this:



- 2 Pitch and zoom with 2 fingers to change vertical zoom or horizontal zoom (time scale) or both.



- Use one finger to scroll or move the view up and down. Or move the finger on the bottom bar to scroll just left and right.



If you see the waveform, but the square wave is not shaped correctly as shown above, perform the procedure under "[Compensate Passive Probes](#)".

If you do not see the waveform, make sure the probe is connected securely to the front panel channel input BNC and to the Probe Ref terminal.

## Compensate Passive Probes / Attenuators

Each oscilloscope passive probe must be compensated to match the input characteristics of the oscilloscope channel to which it is connected. A poorly compensated probe can introduce significant measurement errors.

**NOTE**

If your probe has a configurable attenuation setting (like the P6100 probes do), the 10:1 setting must be used for probe compensation.

- 1 Enable the channel to which the probe is connected (CH-1 or CH-2).
- 2 Input the Probe Ref signal.
- 3 Perform the autoscale
- 4 If necessary, use a nonmetallic tool (supplied with the probe) to adjust the trimmer capacitor on the probe / attenuator for the flattest pulse possible.

Perfectly compensated



Over compensated



Under compensated



- 5 Repeat the procedure for each probe.