High-resolution Automotive Oscilloscope

AHO1 Series

12bit

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Product Overview

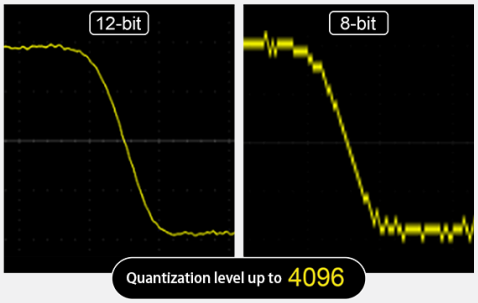
Micsig AHO1 Series is a professional high-resolution automotive oscilloscope built for vehicle diagnostics, equipped with a 12-bit high-precision ADC, featuring a bandwidth of 200MHz, 4 analog channels, a real-time sampling rate of 1GSa/s, and a storage depth of 110Mpts. Its 3.1 cm ultra-slim portable design, built-in large-capacity Li-ion battery, and USB Type-C charging make it ideal for mobile and outdoor repair work.

With an innovative general/ automotive dual-software architecture and dedicated test modes for engines, sensors, and EV systems, it supports both ICE and new energy vehicle diagnostics, helping technicians troubleshoot faster and improve service efficiency.

Product Features

- 12-bit vertical resolution
- 200MHz bandwidth
- DC gain accuracy ≤ 1%
- Integrated 4⅝ -digit multimeter function
- Simultaneous data saving on multi-channel
- Only 3.1cm thickness，small and compact
- 8" LCD capacitive touch screen, 1280*800 pixels
- Supports 6-digit hardware frequency counter
- Support HDMI direct connection to displays
- Support charging with USB Type-C
- Professional automotive diagnostic tests
- Automotive/General oscilloscope function
- Built-in large Li-ion battery
- Various Sensors / Actuators / CAN / LIN / Flexray / Ignitions
- Supports images, videos, waveform data, etc
- Standard decodes: RS-232/422/485/UART, CAN, CAN FD, LIN, SPI, I^2C, ARINC-429, MIL-STD-1553B
- Built-in electronic tools，electronic calculator

12-bit vertical resolution



▸ AHO 1 series has 12 bit ADC with a quantization level of up to 4096, it's 16 times that of traditional 8-bit ADC, present unmatched waveform details.

Remote control

▸ AHO 1 series support PC and smartphone remote control, also have HDMI port for demonstration purpose. Support SCPI programming commands control, helping engineers achieve automated measurements more flexibly and efficiently.

Excellent display

▸ 8-inch touch-integrated screen, 1280*800 resolution, providing a delicate and clear visual experience. Ultra-thin body, only 3.1cm thick, portable and beautiful, making each operation enjoyable.

Complete connectivity

▸ Standard USB 3.0 Host, Type-C, LAN, HDMI, calibration square wave output interface, Trigger out meet diverse connection needs, enhancing flexibility and convenience of test work. It also supports power lock for safer carrying.

Built-in Battery for Ultimate Portability

▸ AHO1 series features a soft rubber protective casing that not only offers a comfortable grip but also excellent protective capabilities. Equipped with a high-capacity, long-life lithium-ion battery, it can withstand over 1000 charge-discharge cycles.

Automotive/General Oscilloscope Function

▸ With dedicated automotive and general-purpose oscilloscope software, it meets both professional vehicle diagnostic and general electronic measurement.

Automotive Diagnostic

▸ Dedicated software for auto repair engineers, covering most of the auto repair tests.

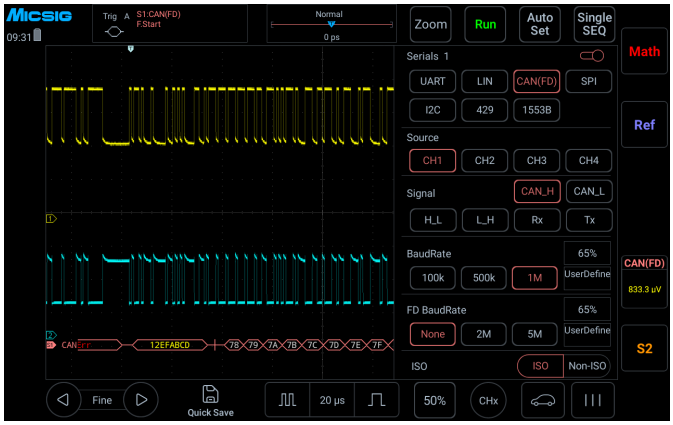
Auto-diagnostic Presets:

Charging/Start Circuit: 12V&24V charging, Alternator AC Ripple, Ford smart Alternator, 12V&24V Start, Cranking Current
Sensor: ABS, Accelerator Pedal, Air Flow Meter, Camshaft, Coolant Temperature, Crankshaft, Distributor, Fuel pressure, Knock, Lamda, MAP, Road Speed, Throttle Position
Actuators: Carbon Canister Solenoid Valve, Diesel Glow Plugs, EGR Solenoid Valve, Fuel Pump, Idle Speed Control Valve (IAC), Injector (Petrol), Injector (Diesel), Pressure Regulator, Quantity Control Valve, Throttle Servomotor, Variable-speed cooling fan, Variable Valve Timing
Ignition: Primary, Secondary, Primary + Secondary
Networks: CAN High & CAN Low, CAN FD, FlexRay, K line
Combination Tests: Crankshaft + Camshaft, Camshaft + Primary Ignition, Primary ignition + Injector Vol, Crankshaft + Camshaft + Injector Vol.+ Secondary Ignition
Pressure Tests: Intake Manifold, Exhaust Tailpipe, In-Cylinder, In-Crankcase

Key Specifications

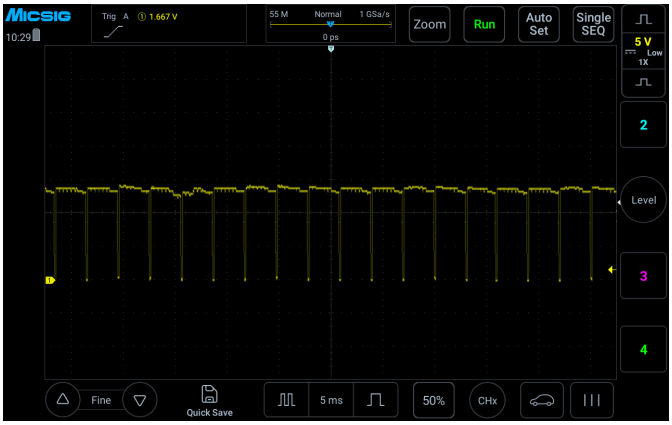
Model	AHO14-200
Bandwidth	200MHz
Rise Time	≤ 1.75ns
Analog channels	4
Sampling rate	1GSa/s
Memory Depth	110Mpts
Maximum waveform capture rate	50,000 wfms/s
Vertical Resolution	12bit
Interfaces	USB 3.0 Host、USB Type-C、LAN、HDMI、Trigger out
Support test	Charging/Start Circuits, Sensors, Actuators, Ignition, Networks (CAN L/H, CAN FD, LIN, Flexray, K line), Combination Tests
Display	8" TFT LCD capacitive touch screen, 1280*800 pixels
Battery（optional）	3.7 V、16000mAh Lithium-ion battery
Charging	Standard DC 12V adapter, supports Type-C charging
Multifunction Meter Accuracy	4⅝ Digits
Dimension / Net Weight	265*174*31mm (Width x Height x Thickness) / 1.73kg

Product Features



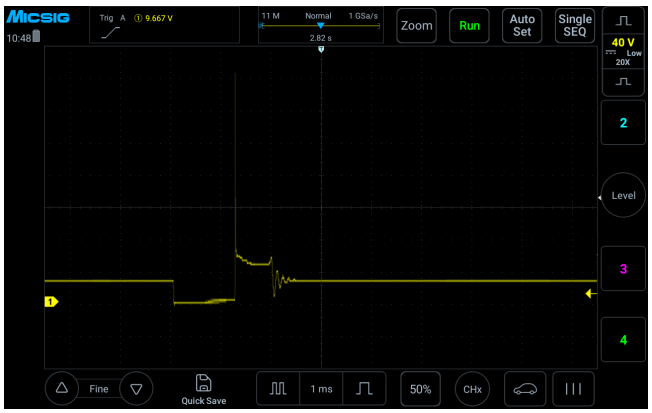
CAN Bus

CAN, a multiplex communication technology used in vehicles, simplifies wiring harness design, lowers system cost, and enables fast communication between ECUs. With fewer sensors required, it supports efficient data sharing and coordinated control across the entire vehicle.



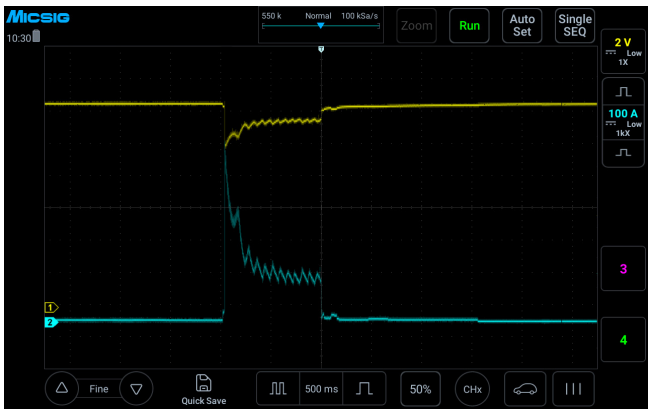
VVT

Variable valve timing (VVT) optimizes the camshaft phase according to engine speed, allowing the intake airflow to vary dynamically for optimal combustion efficiency and improved fuel economy.



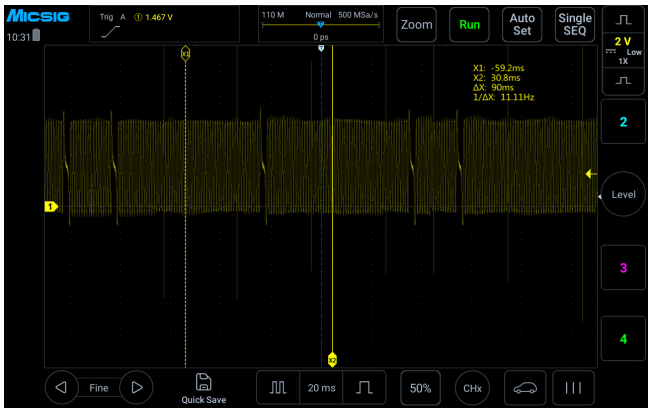
Primary Ignition

The ignition system in gasoline vehicles typically consists of a primary coil, a secondary coil, and spark plugs. Most modern vehicles now use electronic ignition systems.



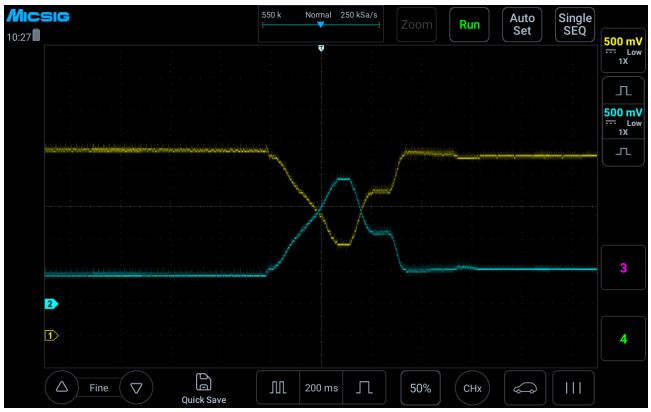
Start/Charging Current

AHO 1 series oscilloscope, together with a current probe, can be used to measure the starting current of vehicles (both gasoline and diesel). By observing the current waveform, you can determine whether the startup current is normal.



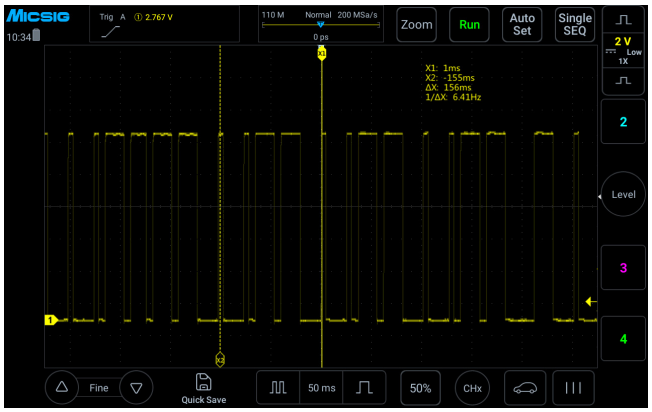
Crankshaft

The ECM uses its output signal to determine the engine's precise position. The most common types are inductive and Hall-effect sensors.



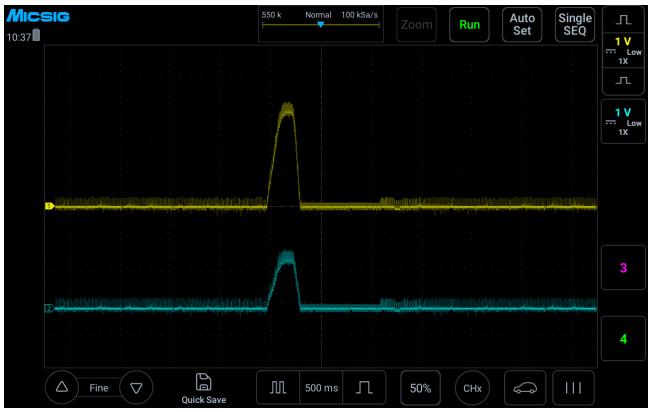
Throttle Position

The throttle position sensor (TPS) is mounted on the throttle butterfly shaft to detect the throttle opening and provide the ECM with a basis for intake-air control.



Camshaft

The camshaft sensor is generally used for timing and is often tested together with the crankshaft sensor to verify engine timing.

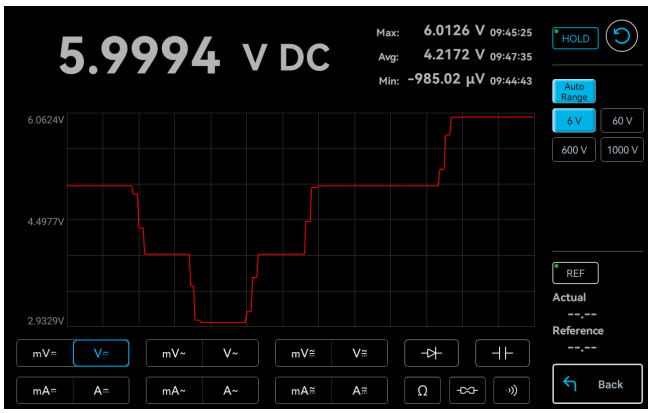


Accelerator Pedal

The accelerator pedal provides the vehicle's throttle input signal. It usually has two signal groups, with three wires per group: power, signal, and ground.

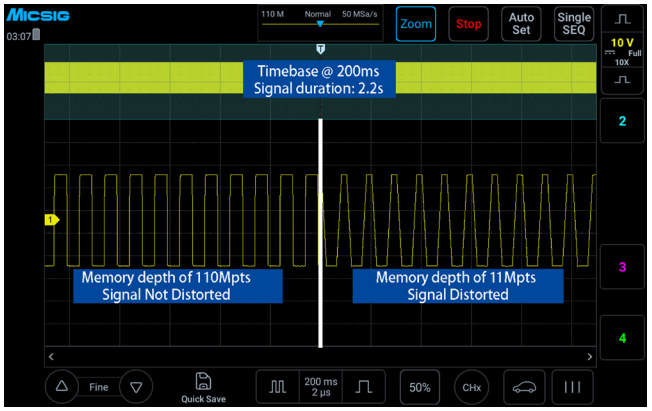
Smooth Touch Control

8" full-touch integrated display, all operations can be completed by touch, more intuitive and efficient than ever before.



Integrated Multimeter Function

It integrates the function of a $4^5/_6$-digit multimeter, supporting various parameters such as voltage, current, resistance, continuity test, diode detection and capacitance measurement.

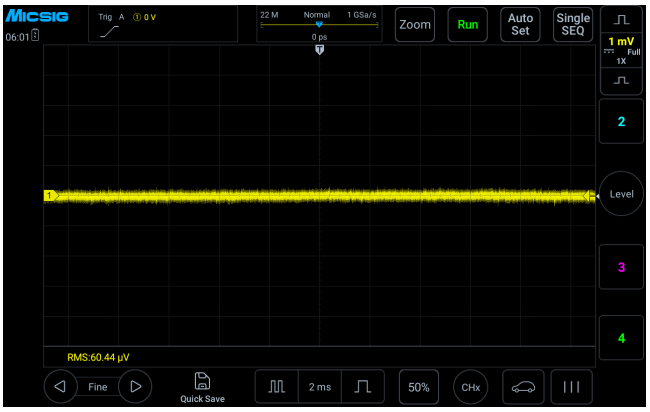


Deep Memory

Insufficient memory depth often leads to distortion when long timebase signals were expanded. With memory depth of up to 110Mpts, there is no reduction in performance even with two channels opened at the same time. The signals will still maintain excellent fidelity even at long period of time.

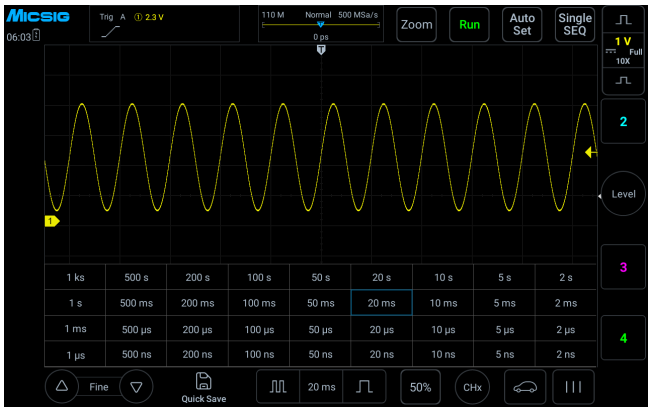
Segmented Storage Acquisition

Traditional Single acquisitions can only capture signals continuously,wasted storage depth when testing intermittent signals like laser pulses or serial buses, also difficult to trace back captured events. While the segmented storage acquisition can capture the target signal and allows to play back captured ones, effectively captures target signals multiple times over a long period of time.



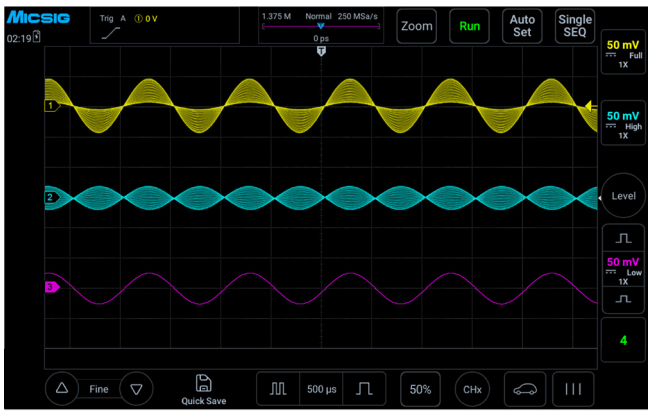
Low Noise

Even at its full bandwidth, the noise floor of the AHO 1 series still low, allow engineers accurately capture weak but important signals during daily circuit debugging and signal analysis.



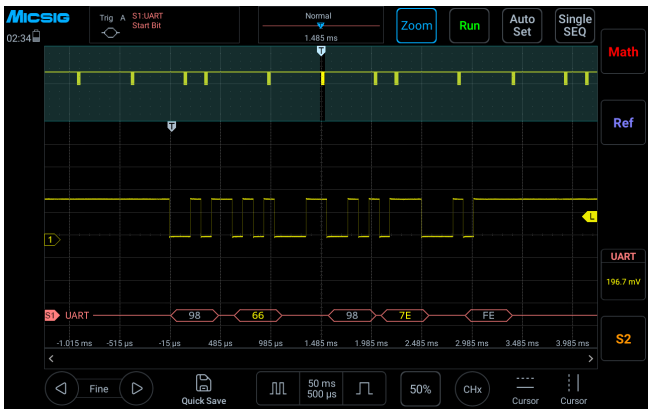
Faster Time Base Adjustment

Traditional oscilloscopes need to step in a sequential manner when adjusting the time base. In addition to traditional sequential steps, the AHO 1 series also has a time base matrix, allows user to select any time base in one click.



Hardware Digital Filtering

Digital filtering can selectively allow or block signal components within specific frequency ranges.

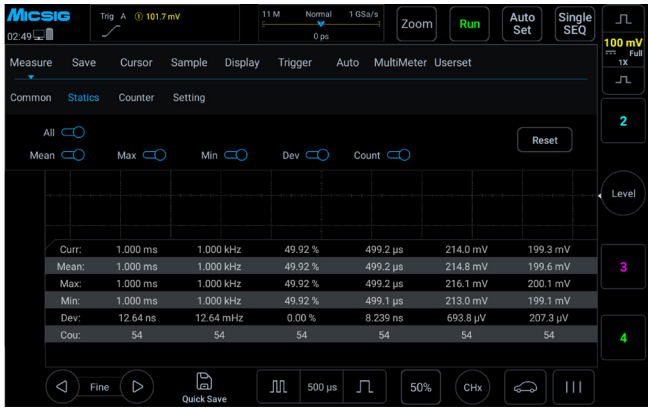


Serial Bus Decoding and Analysis

The AHO 1 series standard with 8 serial bus decodes: RS-232/422/485/ UART, CAN, LIN, CAN FD, SPI, I2C, ARINC-429, 1553B. With the TXT decoding text mode, the data can be transferred to CSV format.

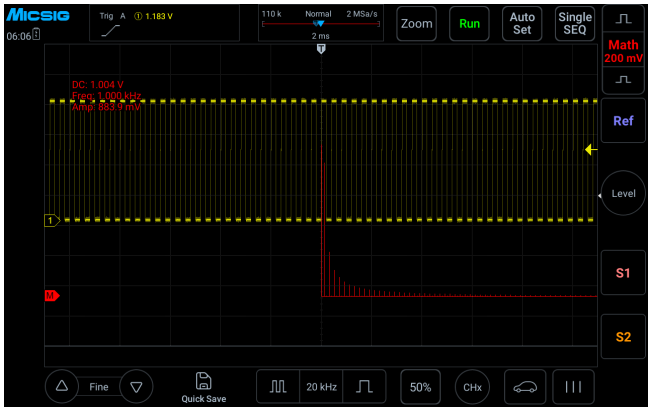
Multiple Trigger Functions

The AHO 1 series provide multiple triggers, including edge, pulse width, logic, Nth edge, Runt, slope, bus decoding, etc. Whether you need to capture specific edge transitions, or observe duration and frequency of the target signal, it meets your requirement at ease.



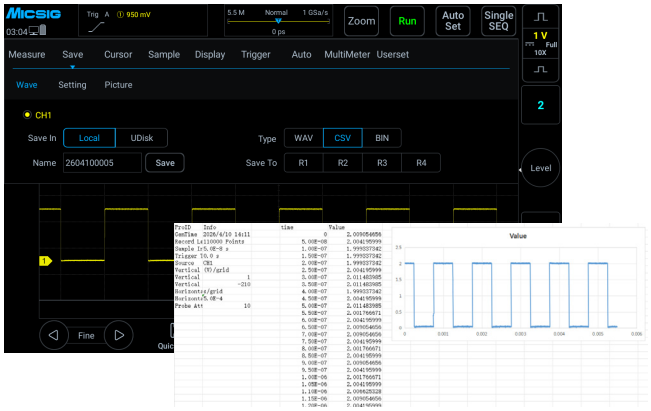
Statistics Measurement

Simultaneously calculate the average, maximum, minimum, and root mean square of 10 measurement items, with a max count of up to 10,000, every waveform data is accurately recorded, provide more accurate and comprehensive readings.



Advanced Math functions

Support various mathematical calculations: addition, subtraction, multiplication, division, integration, differentiation, etc.
Support custom function formula for advanced signal analysis. Also support FFT (Fast Fourier Transform) for real-time spectral analysis of collected waveform signals.



Diverse File Saving

Users can save waveforms and measurement results as binary (BIN) or CSV format files for data analysis using Matlab or Excel.
Also support saved as WAV format, direct open & analysis inside the oscilloscope. Additionally, user can save waveforms as images or record videos.

Product specifications

Vertical system	
DC gain accuracy	⩽ 1%
Bandwidth filter	20MHz、High Pass / Low Pass
Coupling	DC、AC、GND
Input impedance and accuracy	1MΩ±1%
Vertical resolution	12 Bit
Vertical divisons	10div
Vertical scale factor	1mV/div~10V/div
Max. input voltage	CAT I 300Vrms 400Vpk
Channel isolation	＞40dB（⩽ 100MHz），＞35dB（＞ 100MHz）
Vertical expansion reference	Screen center, channel zero point
Probe Attenuation Ratio	1mX~10kX, 1-2-5 sequence, support customization

Horizontal system	
Horizontal scale	2ns/div~1ks/div
Roll mode range	100ms/div~1ks/div
Time base accuracy	20ppm
Horizontal divisions	11div
Time base delay time range	-11div ~ 11ks, resolution: 1 pixel

Trigger System	
Trigger mode	Auto, Normal, Single
Trigger level range	±5div from screen center, analog channel
Hold off range	200ns~10s
Trigger Types	Edge, Pulse Width, Logic, N Edge, Runt Pulse (Runt), Slope, Time Out, Video, Serial
Bus decoding	RS-232/422/485/UART、CAN、CAN FD、LIN、SPI、I2C、ARINC429、1553B

Sampling System	
Real-time sampling rate(Max.)	1GSa/s (single channel); 500MSa/s (half channel); 250MSa/s (Full channel)
Memory depth (Max.)	110Mpts (single channel); 55Mpts (half channel); 27.5Mpts (Full channel)
Segmented storage function	Support up to 10,000 segments
Average times	2,4,8,16,32,64,128,256
Envelope times	2,4,8,16,32,64,128,256, ∞

Measurements	
Auto measurements	Period, frequency, rise time, fall time, delay, positive duty cycle, negative duty cycle, positive pulse width, negative pulse width, burst pulse width, positive overshoot, negative overshoot, phase, peak-to-peak, Amplitude, High, Low, Maximum, Minimum, RMS, C RMS, Average, C Average, AC RMS, Positive Slope, Negative Slope *C represents the first period, indicating a certain value in the first period of the waveform
Hardware frequency counter	Support each analog channel, 6bit, 2Hz~max. bandwidth, pk-pk > 0.8div
Cursor	Horizontal, Vertical, Cross
Cursor resolution	1 pixel
Math	
Dual waveform	+, -, *, /, Analog channel
FFT	Points: max. 360k; Source: Analog channel; Window: Rectangular, Hamming, Blackman, Hanning
AX+B	A: ±1k, Min. Resolution 1p or 4it B: ±1k, Resolution 1p or 5bit X: Analog channel
Advanced math	Advanced input, including +、-、*、/、<、>、≤、≥、==、!=、&&、||、（、）、!(、sqrt、abs、deg、rad、exp、diff、ln、sin、cos、tan、intg、lg、asin、acos、atan

Multimeter Specifications		
Function	Range	Accuracy
DC Voltage (+25° C) DCV Bit	1000V/600V/60V/6V	± (0.03%+5d)
DC Voltage (+25° C) DCmV Bit	600mV	± (0.03%+5d)
AC Voltage (+25° C) ACV Bit	1000V/600V/60V/6V	± (0.3%+15d)
AC Voltage (+25° C) ACmV Bit	600mV	± (0.3%+15d)
DC Current (+25° C) DCA Bit	10A/6A	± (0.2%+5d)
DC Current (+25° C) DCmA Bit	600mA/60mA	± (0.15%+5d)
AC Voltage (+25° C) ACV Bit	1000V/600V/60V/6V	± (0.3%+15d)
AC Voltage (+25° C) ACmV Bit	600mV	± (0.3%+15d)
Resistance (+25° C)	6MΩ/600kΩ/60kΩ/6kΩ/600Ω/60Ω	± (0.1%+5d)
	60MΩ	± (0.2%+10d)
Capacitance (+28° C)	1mF/100uF/10uF/100nF/10nF	± (3%+30d)
Continuity	Buzzer when < 50Ω; Displays "OL" (Overload) when > 200Ω	
Diode Test	0.0000V~3.0000V, Displays "OL" when > 3.0V	
Measurement Display	Max / Avg / Min values (all with timestamp recording)	

※ Note: "d" refers to the last digit of the reading.

Display	
Display	8" TFT LCD capacitive touch screen, 1280*800 pixels, 11*10 Divisions
Persistence	Auto, 10ms~10s, ∞
Time base mode	YT、XY、Roll、Zoom
Expand base	center, trigger position
Waveform Display	Dot, line, adjustable brightness
Maximum waveform capture rate	50,000 wfms/s

Storage	
Storage media	Local , USB drive
Storage format	WAV, CSV, BIN
Quantity of stored waveforms	No limit
Stored waveform rename	Chinese, English
REF waveforms display	4
Quick screenshot	Support
Quantity of user setting	10
User setting rename	Support
Flash memory	Industry standard
Screenshot, video recording	Support

System	
Self-calibration	Support
Languages	Support Chinese, English, Spanish, Portuguese, Russian, Turkish, Japanese, Korean, French, Arabic, etc.
Operating System	Android
Built-in app	App Store, Browser, Oscilloscope, Calendar, Clock, Gallery, Calculator, User Guide, Electronic Tools, File Manager
Warranty	Three-year for mainframe. Probes and accessories are not covered. * Please refer to the data sheet of each probe and accessory for the respective warranty terms. (contact us for extended warranty)

Interfaces	
USB3.0	1, read and edit
USB Type-C	1, read and edit, support charging with power bank
LAN	1
DC power socket	1
Probe calibration signal	1kHz、2Vpk-pk
HDMI	HDMI 1.4
PC software	Support
Android remote control APP	Support
SCPI	Support

Power supply	
Adapter input	100~240V AC, 50/60Hz
Power consumption	60W
Adapter output	12V DC, 5A
Power cord	Local

Environment	
Temperature	
Operating	0°C ~ 45°C
Non-operating	-40°C ~ 60°C
Humidity	
Operating	5% ~ 85%, 25°C
Non-operating	5% ~ 90%, 25°C
Altitude	
Operating	< 3000m
Non-operating	< 12000m

Physical Characteristics	
Dimensions	265*174*31mm（Width x Height x Thickness）
Net Weight	1.73kg

Accessories

Standard Kit


2 x passive probe


4 BNC-Banana cable


power cord


2 x Alligator clips/pair


2 x soft pin probe/pair


power adapter


1 x Multimeter pen/pair


Battery (built-in)

Master Kit


2 x passive probe


4 BNC-Banana cable


secondary ignition probe


2 x Alligator clips/pair


2 x soft pin probe/pair


Multimeter probe


power cord


power adapter


Suitcase


1 x Multimeter pen/pair


Battery (built-in)

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