

Automotive Oscilloscope VATO2004

- 4 analog channels
- 200MHz bandwidth
- 1GSa/s sampling rate
- 50Mpts memory depth
- 7500mAh Li-ion battery
- Various communication tests: Ignition, CAN...
- Camshaft sensors, cooling fans actuators and more...
- Easy to use on any Android devices (Smartphone, Tablet, PC)



Test any electronic system on any vehicle

Product description

VATO2004 is a portable affordable split-type automotive diagnostic oscilloscope, most compact design with a built-in battery. It features 200MHz bandwidth, 4 channels, 1GSa/s sampling rate, up to 50Mpts memory depth.

It can be connected to any Android device, such as tablets, smartphones, and PC computers. With a user-friendly UI design, a wide range of measurement options, and built-in professional automotive software packages, it allows for one-click test configuration and provides a new automotive diagnostic operation experience.

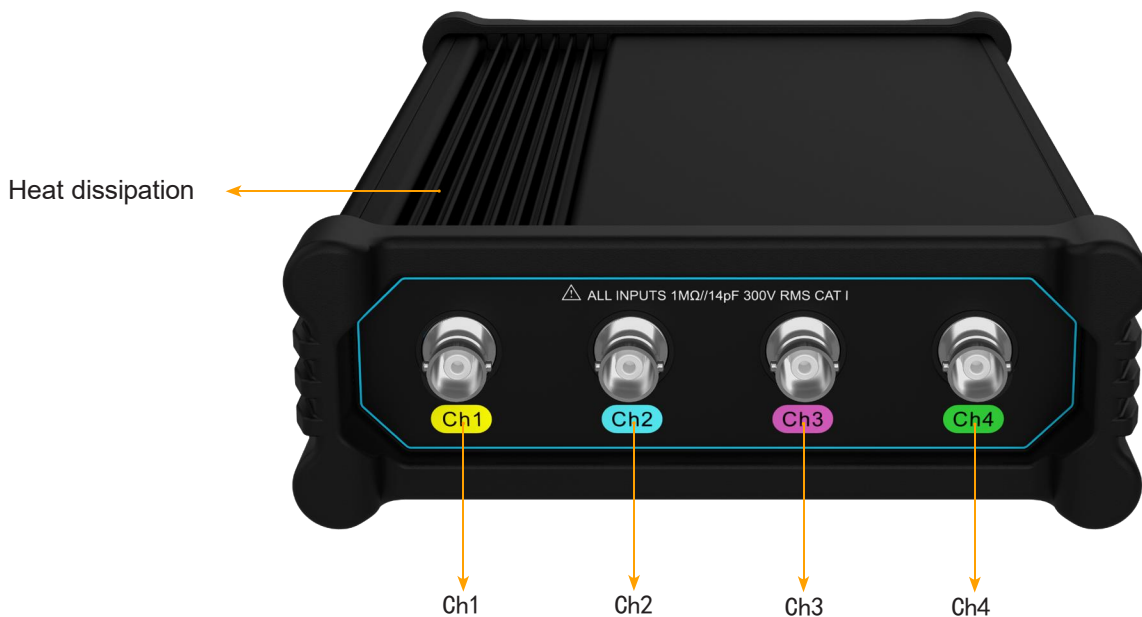
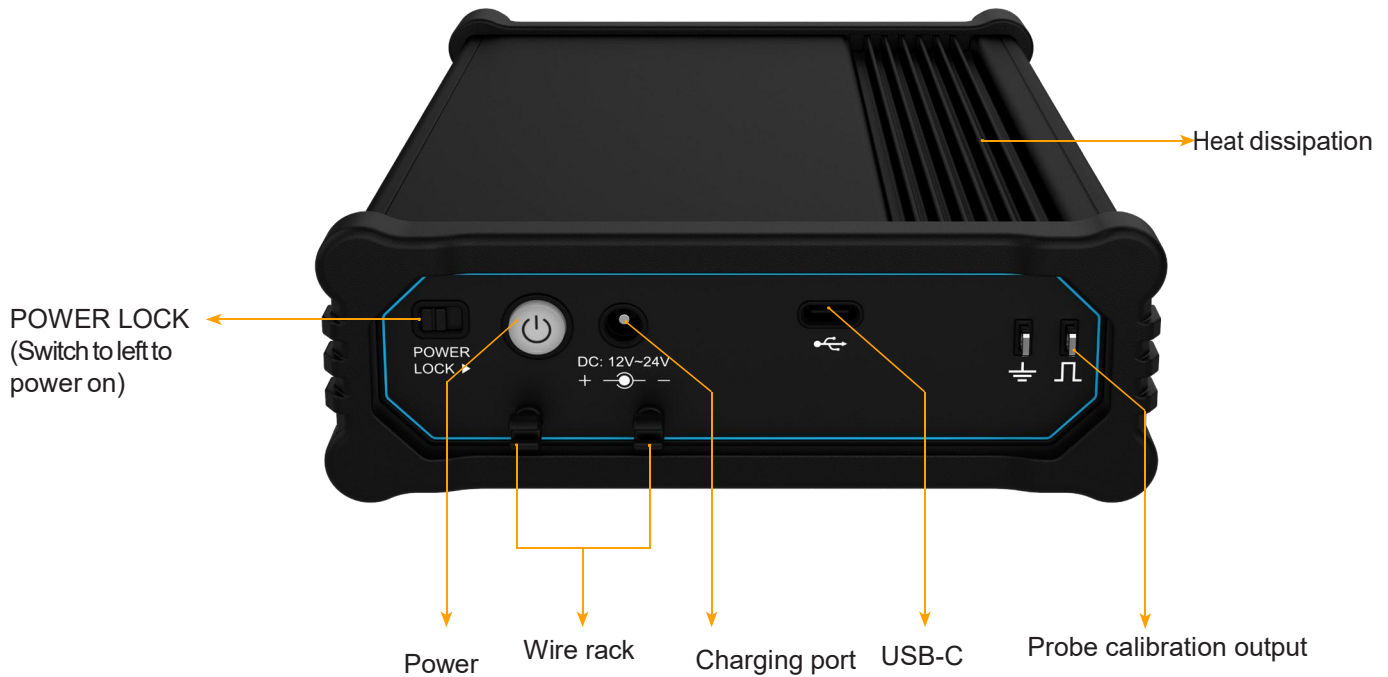


- ▶ One step to diagnose, easy to test
- ▶ Small size, light weight, perfect for outdoor test
- ▶ 7500mAh Li-ion battery for day-long use
- ▶ Deep memory depth, capture all signal details
- ▶ Multiple serial bus protocol triggering and decoding
- ▶ 31 automated measurements, one click to select

Key specifications

| Model | VATO2004 |
|--------------------|-----------------------------|
| Max bandwidth | 200MHz |
| Analog channels | 4 |
| Rise time | ≤ 1.8ns |
| Max. sampling rate | 1GSa/s |
| Memory depth | 50Mpts |
| DC gain accuracy | ≤ 2% |
| Input impedance | 1MΩ±1% 14pF |
| Interfaces | USB Type-C, DC power |
| Battery (optional) | 7.4V、7500mAh Li-ion battery |
| Dimension | 140*215*52mm |
| Net weight | 640g |

Appearance & Interfaces



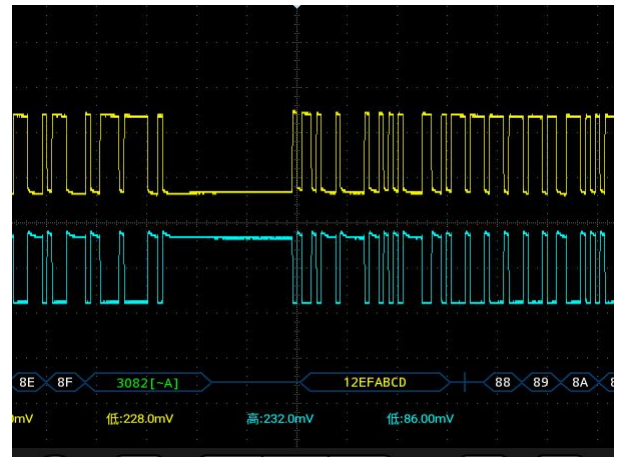
Automotive Diagnostic Presets:

- **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, FlexRay, K line
- **Combination Tests:** Crankshaft + Camshaft, Camshaft + Primary Ignition, Primary ignition + Injector Vol, Crankshaft + Camshaft + Injector Vol. + Secondary Ignition



One click to test

Select the respective test item, follow the description to connect wires, click OK and the oscilloscope will automatically configure the corresponding tests, easily solving most common issues encountered by automotive engineers.



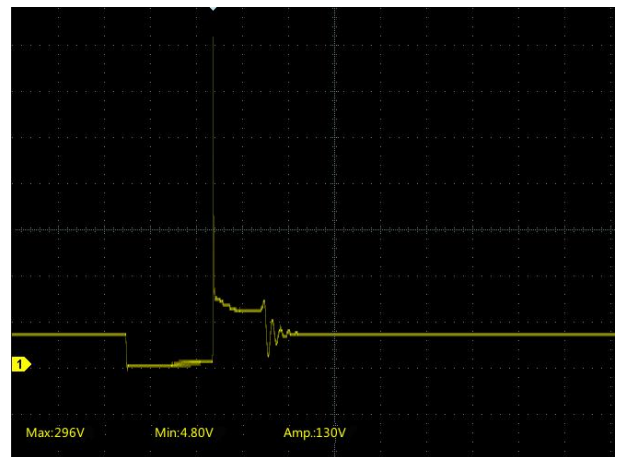
CAN bus

The application of Controller Area Network (CAN) in automotive simplifies wiring, reduces costs, and enables simpler and faster communication between electronic control units. It also reduces the number of sensors required and facilitates the sharing of information resources.



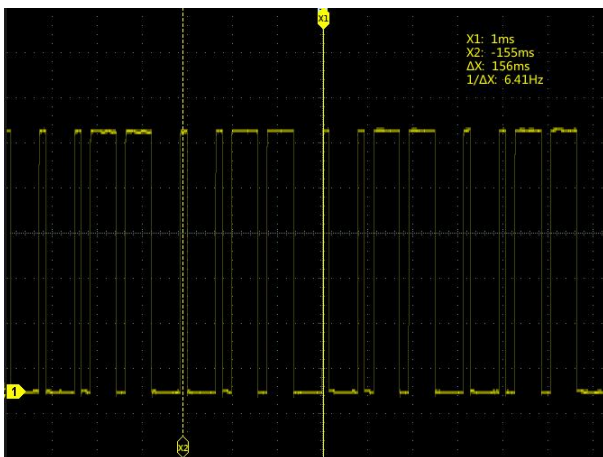
Carbon canister solenoid valve

The carbon canister is typically installed in the engine compartment and connected to the fuel tank via a pipeline. Its purpose is to collect the evaporated fuel vapors from the fuel tank to prevent emission into the air, thus reducing pollution.



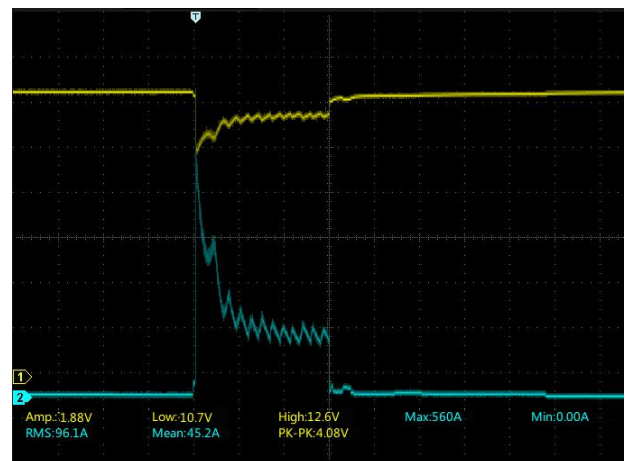
Primary ignition voltage

The ignition system of a gasoline car typically consists of primary coils, secondary coils, and spark plugs. There are traditional ignition systems and electronic ignition systems. Currently, most car models use electronic ignition systems. The primary circuit has evolved from basic contact-point and capacitor types to the commonly used distributor-less and one-coil-per-cylinder systems today.



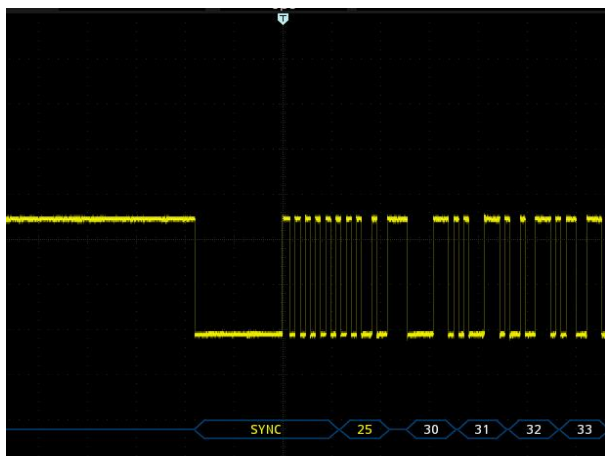
Camshaft

The camshaft position sensor is generally used for timing and is often tested in conjunction with the crankshaft sensor to determine the vehicle's timing. Common vehicle models have one or two camshaft position sensors, while it is less common to have four. Common types of camshaft position sensors include Hall-effect, inductive, and AC reluctance sensors.



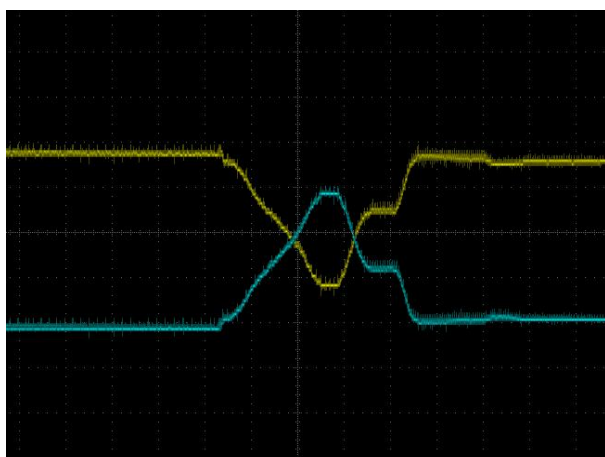
Startup current

Use VATO with a current probe to conduct current testing during the starting process of a vehicle (both gasoline and diesel vehicles), able to observe whether the current waveform is normal or not.



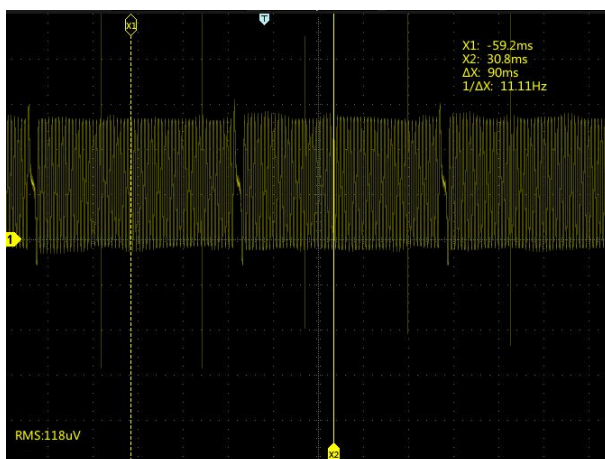
LIN bus

The LIN bus communication is widely used in automobiles, with low speed and the ability to connect multiple control devices on a single network. It can control non-safety-critical components of the vehicle at low speeds, such as wipers, windows, mirrors, air conditioning, and electronic seats.



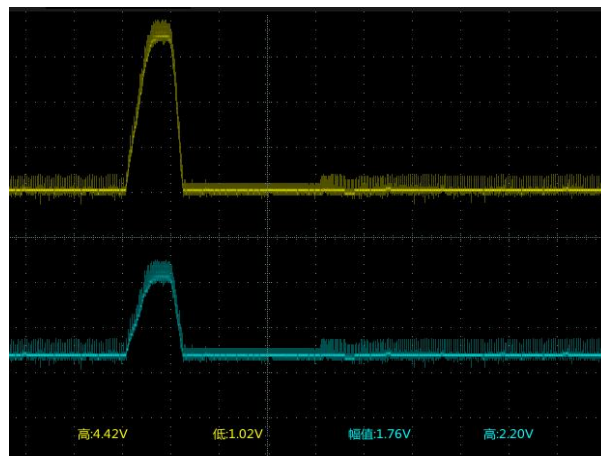
Throttle position

The throttle position sensor is installed on the throttle body drive shaft to sense the opening of the throttle. It provides the ECM with information for intake judgment. There are two types of outputs: analog output and throttle position switch output.



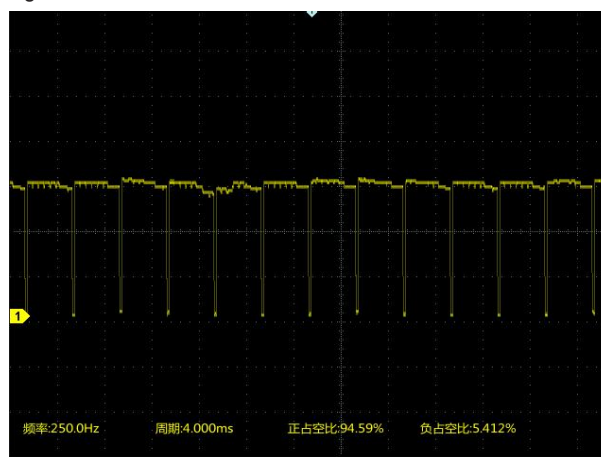
Crankshaft sensor

The crankshaft position sensor can be installed in various locations, such as near the front crank pulley or on the rear flywheel. The ECM uses its output signal to determine the precise position of the engine's crankshaft. Typically, there are two types: inductive and Hall-effect sensors.



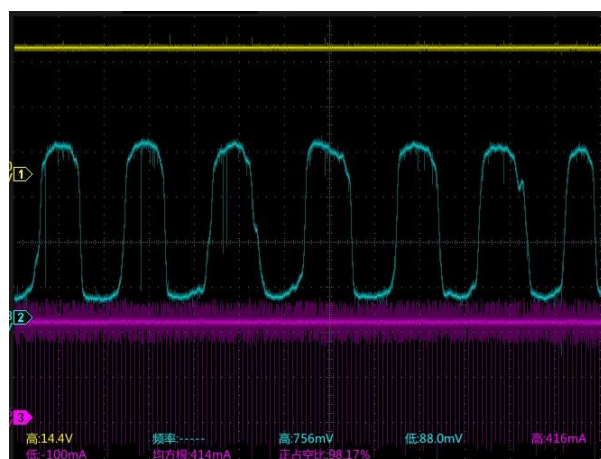
Accelerator pedal

The accelerator pedal is the signal from accelerator. Generally, there are two sets, each with 3 wires: power, signal, and ground. They can be classified as analog/analog or analog/digital signals. Analog/analog signals consist of 2 analog signals, typically in two modes: a divergent signal and a convergent signal.



Variable valve timing

Variable valve timing is achieved by adjusting the camshaft phase of the engine, allowing the intake air volume to change with the engine speed. This helps achieve optimal combustion efficiency and improve fuel economy.



Oxygen Sensor

The oxygen sensor is typically installed on the exhaust pipe, in front of the catalytic converter. It is used to sense the oxygen content in the exhaust gases. This allows the ECM to determine the combustion conditions in the combustion chamber and adjust the fuel delivery accordingly.



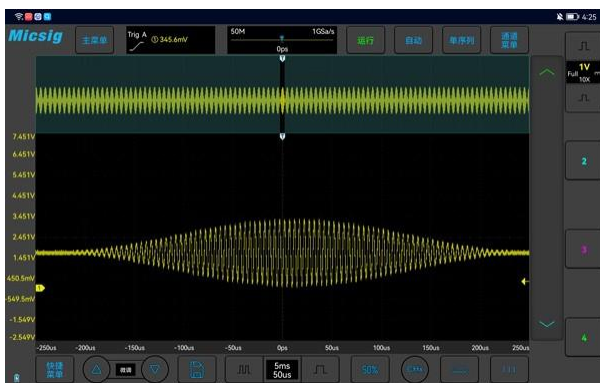
Super convenient

With the USB type-c interface, it can be used with any Android platform or device. Such as smartphones, tablet devices or Android-based computers.



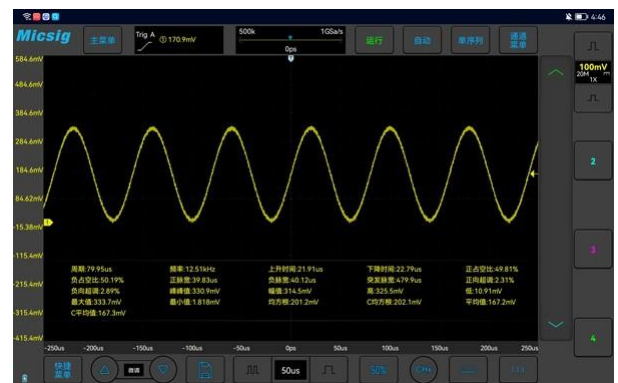
Large capacity battery

An optional 7500mAh lithium battery, support 24 hours field work. Power lock makes it safer to carry and transport.



Ultra memory depth

Memory depth up to 50Mpts, with Zoom technology, both the overall picture and details can be perfectly displayed.



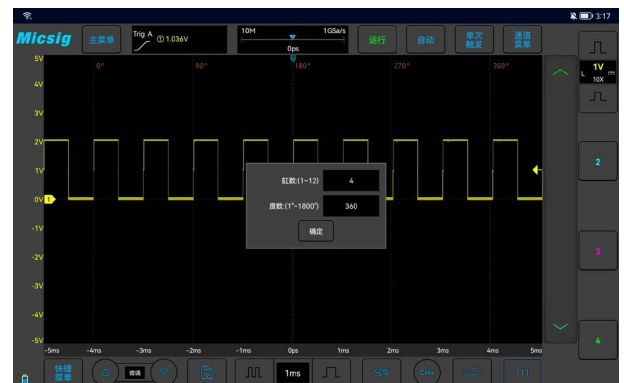
Convenient auto measurements

31 types of automated measurements, all can be selected and cleared with one click.



Hardware digital filter

Support hardware digital filtering to filter out interference and noise.



Phase scale

Helps measure the timing of the cyclic waveform. Set the cylinders number and angle, with the phase start and end points indicated by solid lines. Two phase scales can be dragged to appropriate positions to mark the start and end points of the cycle.

Specifications

| Vertical system | |
|---------------------------------------|--|
| Bandwidth Filter | Full bandwidth, High pass & Low pass (30KHz~Max bandwidth) |
| Input Coupling | DC, AC, GND |
| Input Impedance | 1MΩ±1% 14pF±3pF |
| Vertical Resolution | 8 bit |
| DC Gain Accuracy (Amplitude accuracy) | <±2% (1MΩ input) |
| Input Sensitivity Range | 5mV/div~10V/div (1MΩ input) |
| Noise | ≤ 1.3mVpp (5mV/div,1MΩ) |
| Ch-to-Ch Isolation | ≥ 40dB (100:1) (DC to Max bandwidth) |
| Maximum Input Voltage | CAT I 300Vrms (1MΩ) |

| Horizontal System | |
|-----------------------------------|-----------------|
| Time Base | 5ns/div~1ks/div |
| Time base delay time range | 10 div ~10ks |
| Clock Drift | ≤ ±5ppm/ year |
| Time Base Accuracy | ±20ppm |

| Trigger System | |
|------------------------------|---|
| Trigger Mode | Auto, Normal, Single |
| Trigger Coupling | DC, noise suppression |
| Trigger Holdoff Range | 200ns~10s |
| Trigger Types | |
| Edge | Positive slope, negative slope, or any slope on any channel. Coupling includes DC and noise suppression |
| Pulse Width | Trigger on positive pulse width, negative pulse width >, <, =, ≠ or within the time range of 8ns~10s |
| Bus decoding | LIN、CAN |

| Waveform Measurements | |
|-----------------------------------|---|
| Cursors | Horizontal, Vertical, Cross |
| Automated Measurements | 31 types. Including: Period, Frequency, Rise Time, Fall Time, Delay, Positive Duty , Cycle, Negative Duty Cycle, Positive Pulse Width, Negative Pulse Width, Burst Width, Positive Overshoot, Negative Overshoot, Phase, Peak-to-Peak, Amplitude, High, Low, Maximum, Minimum, RMS, Cycle RMS, Mean, Cycle Mean |
| Waveform Math | |
| Dual Waveform | +、-、*、/, analog channel |
| FFT | Points: max. 100K; Source: Analog channel; Window: Rectangular, Hamming, Blackman, Hanning |
| Storage | |
| Storage Format | WAV、CSV |
| Store Waveform Quantity | Unlimited |
| Stored Waveform Rename | Support |
| Reference Waveform Display | 4 |
| Quick Screenshot | Support |
| User Setting Storage | 8 |
| User Settings Rename | Support |
| System | |
| Self-calibration | Support |
| Language | English, Chinese |
| System | Android 7 or above |
| Warranty | The main unit has one-year warranty. 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) |
| Interface | |
| USB Type-C | One, read and edit |
| DC power port | 1 |
| Probe calibration signal | 1kHz、2Vpk-pk |

| Power Source | |
|--------------------------|------------------------------|
| Power Voltage Range | 100~240V AC, 50/60Hz |
| Power Consumption | < 60W |
| Adapter Output | 12V DC, 4A |
| Battery (optional) | 7.4V, 7500mAh Li-ion battery |
| Enviroment | |
| 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 | |
| Dimension | 140*215*52mm |
| Net weight | 640g |

Standard Accessories

| Model | Accessories |
|----------|---------------------------|
| VATO2004 | Passive BNC probes*2 |
| | BNC to banana cable * 4 |
| | Alligator clips *4 |
| | Pin needle*4 |
| | Power cable*1 |
| | Power adapter * 1 |
| | Battery*1(Built-in) |
| | Type-c cable *1 |
| | Calibration certificate*1 |
| | Quick Operation Guide *1 |

Recommend Instruments

Suitcase & handbag

| | |
|-----------------|--|
| Handbag | Black nylon , suitable for all Micsig oscilloscopes |
| Suitcase | Anti-fall, anti-seismic, anti-pressure, dust-proof, moisture-proof, customized for Micsig oscilloscope |

Current Probe

| | |
|--|--|
| High Frequency AC/DC Current Probe CP Series | Bandwidth:DC~100MHz, Accuracy: $\pm 1\%$, BNC |
| Low Frequency AC/DC Current Probe CP2100 Series | Bandwidth: DC~2.5MHz, Range: 10A/100A, BNC |
| Rogowski AC Current Probe | Bandwidth: 15~30MHz, Current range: 200mA _{pk} -12000A _{pk} , Accuracy: 2% |
| AC Current Probe ACP1000 | Bandwidth: 10Hz~100kHz, Current range: 0.1A _{pk} ~1000A _{pk} |

High Voltage Differential Probe

| | |
|------------------|--|
| DP series | Bandwidth: 100MHz ~ 300MHz, Differential Voltage(DC+AC PK): 700V - 7000V, Accuracy: $\pm 2\%$, BNC interface |
|------------------|--|

SigOFIT Optical-fiber Isolated Probe

| | |
|--------------------|--|
| MOIP series | Bandwidth: 100MHz ~ 1GHz, DC Gain Accuracy: 1%, Common Mode Voltage Range: 85kV _{pk} , CMRR: Up to 180dB |
|--------------------|--|

