

High-resolution Oscilloscope

MHO1 Series

100MHz/200MHz 12bit 1% DC Accuracy 4% multimeter



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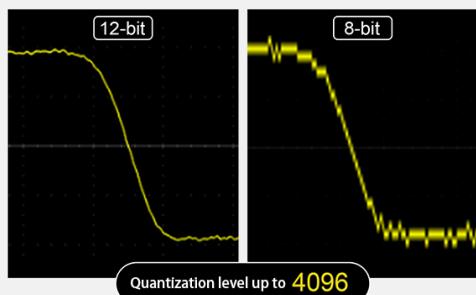
Product Overview

Micsig MHO1 series is an ultra-portable professional-grade high-resolution oscilloscope, equipped with a 12-bit high-precision ADC, featuring a bandwidth of up to 200MHz, 4 analog channels, a real-time sampling rate of 1GSa/s, and a storage depth of 110Mpts. These high-performance parameters ensure that every measurement is accurate and provides a solid foundation for in-depth signal analysis. With a body thickness of only 3.1 cm, it can be easily placed in a backpack for efficient testing anytime, anywhere. It is equipped with an 8-inch high-definition anti-glare touch screen with a resolution of up to 1280*800, offering a delicate and clear picture and responsive touch, bringing users an ultimate operating experience.



Product Features

- ▶ 12-bit vertical resolution
- ▶ Optional 100MHz, 200MHz bandwidth
- ▶ DC gain accuracy $\leq 1\%$
- ▶ Segmented storage function
- ▶ Advanced math and FFT function
- ▶ Simultaneous data saving on multi-channel
- ▶ Only 3.1cm thickness, small and compact
- ▶ Supports power lock for safer carrying
- ▶ Supports 6-digit hardware frequency counter
- ▶ Integrated 4½-digit multimeter function (Optional)
- ▶ 8" TFT LCD capacitive touch screen, 1280*800 pixels
- ▶ Large-capacity battery 16000mAh
- ▶ Support charging with power bank
- ▶ Mobile APP, PC remote control, SCPI commands
- ▶ 32G internal storage to save big data
- ▶ Standard decodes: RS-232/422/485/UART, CAN, CAN FD, LIN, SPI, I²C, ARINC-429, MIL-STD-1553B
- ▶ Built-in electronic tools, electronic calculator, WPS office, ES file explorer, and other apps

12-bit vertical resolution

► MHO 1 series has 12 bit high-resolution 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

► MHO 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

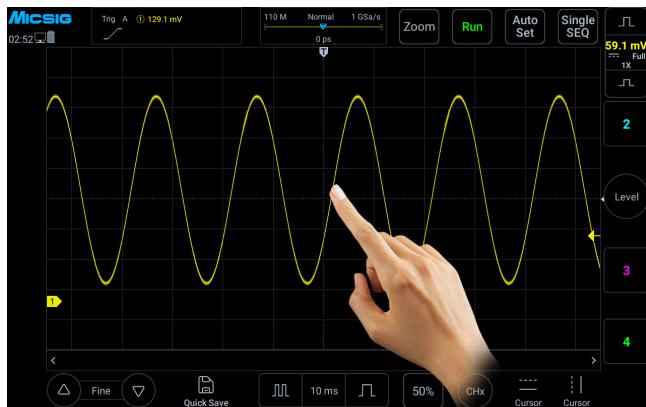
► MHO1 series features a soft rubber protective casing that not only offers a comfortable grip but also excellent protective capabilities. Equipped with 16000mAh high-capacity, long-life lithium-ion battery, it can withstand over 1000 charge-discharge cycles.

Key Specifications

| Model | MHO14-100 | MHO14-200 | MHO14-100N | MHO14-200N |
|-------------------------------|--|---|------------|------------|
| Bandwidth | 100MHz | 200MHz | 100MHz | 200MHz |
| Rise Time | ≤ 3.5ns | ≤ 1.75ns | ≤ 3.5ns | ≤ 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 | | |
| 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 | 4 ⁵ /6 Digits | | / | |
| Dimension / Net Weight | 265*174*31mm (Width x Height x Thickness) / 1.73kg | 265*174*31mm (Width x Height x Thickness) / 1.685kg | | |

Multimeter is not included in the model with the "N" symbol.

Product Features



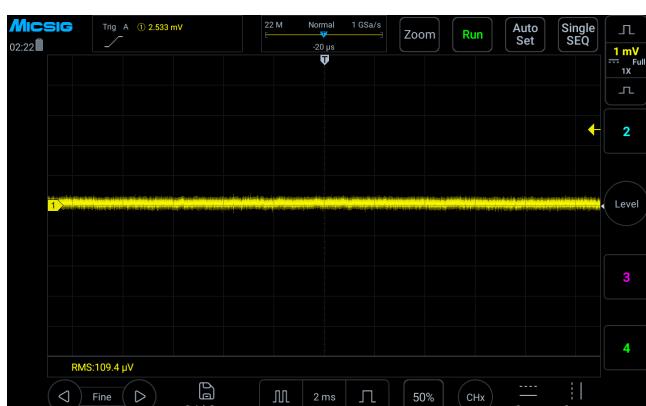
Smooth touch control

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



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.



Low noise

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



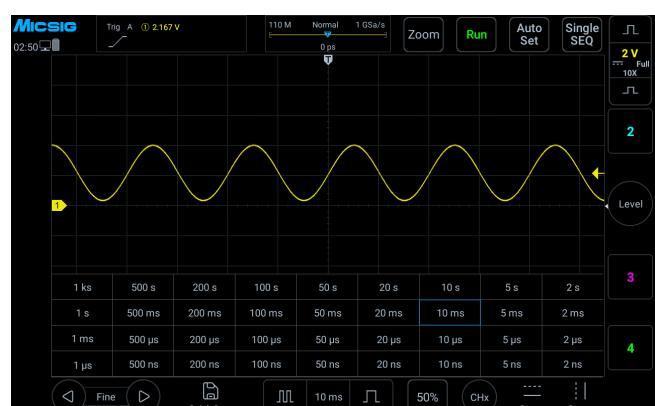
Integrated Multimeter Function (Optional)

It integrates the function of a 4½-digit multimeter, supporting various parameters such as voltage, current, resistance, continuity test, diode detection and capacitance measurement.



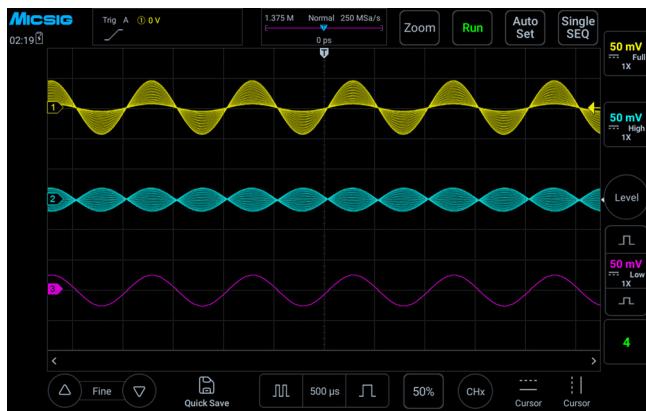
Segmented storage acquisition

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.



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 MHO 1 series also has a time base matrix, allows user to select any time base in one click.



Full bandwidth High pass Low pass

Hardware digital filtering

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



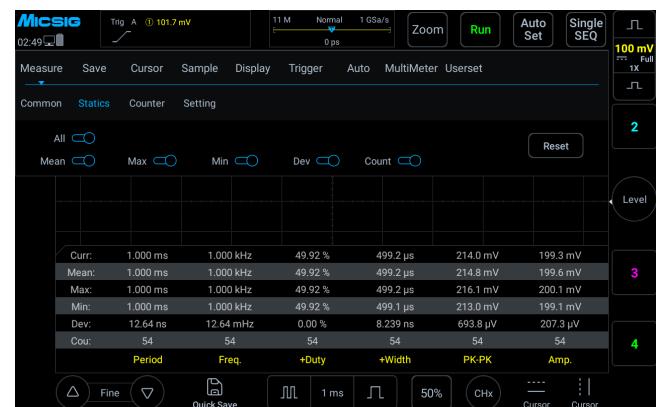
Serial bus decoding and analysis

The MHO 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.



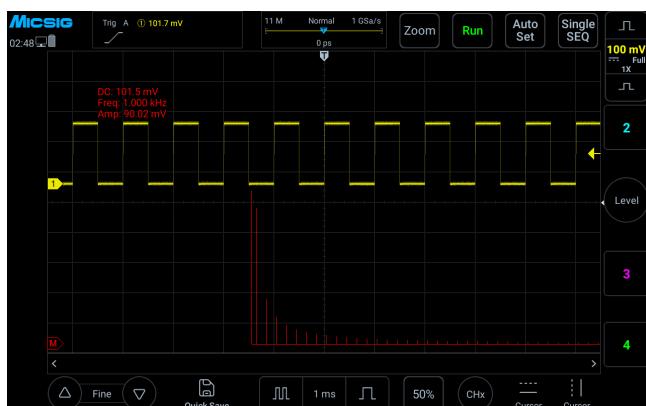
Multiple Trigger Functions

The MHO 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

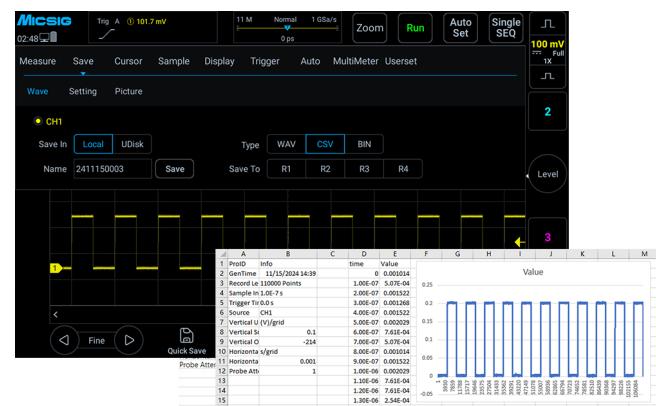
Simultaneously calculate the average, maximum, minimum, and root mean square of 10 measurement items, with a max count of up to 10,000, every waveform data is accurately recorded, provide more accurate and comprehensive readings.



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 | $\leq 1\%$ |
| Bandwidth filter | 20MHz、High Pass / Low Pass |
| Coupling | DC、AC、GND |
| Input impedance and accuracy | $1M\Omega \pm 1\%$ |
| Vertical resolution | 12 Bit |
| Vertical divisons | 10div |
| Vertical scale factor | 1mV/div~10V/div |
| Max. input voltage | CAT I 300Vrms 400Vpk |
| Channel isolation | > 40dB ($\leq 100MHz$) , > 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 | $\pm 5div$ 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 (Optional) | | |
|--------------------------------------|---|-----------------------------|
| 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 60MΩ | ± (0.1%+5d) ± (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.

※ Multimeter is not included in the model with the "N" symbol.

| 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 |
| ROM storage | 32G |
| 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. <small>* Please refer to the data sheet of each probe and accessory for the respective warranty terms. (contact us for extended warranty)</small> |

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/iOS 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 (with multimeter), 1.685kg (without multimeter) |

Standard Accessories

| Model | Standard Accessories |
|-------------------|---|
| | Main unit *1 |
| | Passive Probe *4 |
| MHO14-100 | Multimeter pen * 1 pair (Multimeter is not included in the model with the "N" symbol) |
| MHO14-200 | Power adapter *1 |
| MHO14-100N | Power cord *1 |
| MHO14-200N | Quick Guide *1 |
| | Calibration Certificate *1 |
| | Battery *1 |

Professional Hand Carry Bag/ Hard Case Set

| | |
|----------------------------|---|
| Micsig Handbag set | Black, Nylon, Customized |
| Micsig Suitcase set | Impact, Vibration, Crush resistant, Dustproof, Moisture-proof, Customized |

Optional Instruments

| | |
|----------|--|
| DP700 | High Voltage Differential Probe: 100MHz, 70V (20X) / 700V (200X), Accuracy: ±2% (Customizable 1% accuracy) |
| DP702 | High Voltage Differential Probe: 200MHz, 70V (20X) / 700V (200X), Accuracy: ±2% (Customizable 1% accuracy) |
| DP1500 | High Voltage Differential Probe: 100MHz, 150V (50X) / 1500V (500X), Accuracy: ±2% (Customizable 1% accuracy) |
| DP1502 | High Voltage Differential Probe: 200MHz, 150V (50X) / 1500V (500X), Accuracy: ±2% (Customizable 1% accuracy) |
| DP3000 | High Voltage Differential Probe: 100MHz, 300V (100X) / 3000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| DP3002 | High Voltage Differential Probe: 200MHz, 300V (100X) / 3000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| DP7000 | High Voltage Differential Probe: 100MHz, 700V (100X) / 7000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| DP7002 | High Voltage Differential Probe: 200MHz, 700V (100X) / 7000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| CP3008 | High Frequency AC / DC Current Probe: DC-8MHz, 300Arms, 500Apk, Output Sensitivity: 1V/10A, 1V/100A |
| CP3005 | High Frequency AC / DC Current Probe: DC-5MHz, 300Arms, 500Apk, Output Sensitivity: 1V/10A, 1V/100A |
| CP1510 | High Frequency AC / DC Current Probe: DC-10MHz, 150Arms, 300Apk, Output Sensitivity: 1V/10A, 1V/100A |
| CP1003B | High Frequency AC / DC Current Probe: DC-100MHz, 30Arms, 50Apk, Output Sensitivity: 1V/1A, 1V/10A |
| CP503B | High Frequency AC / DC Current Probe: DC-50MHz, 30Arms, 50Apk, Output Sensitivity: 1V/1A, 1V/10A |
| MOIP200P | SigOFIT Optical-fiber Isolated Probe: DC-200MHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |
| MOIP350P | SigOFIT Optical-fiber Isolated Probe: DC-350MHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |

Optional Instruments (Continued from above)

| | |
|---------------|--|
| MOIP500P | SigOFIT Optical-fiber Isolated Probe: DC-500MHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |
| MOIP1000P | SigOFIT Optical-fiber Isolated Probe: DC-1GHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |
| RCP-XS Series | Rogowski AC Current Probe: Peak current 12000Apk, coil cross-section ϕ 1.6mm, coil circumference 80mm/200mm The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| RCP-S Series | Rogowski AC Current Probe: Peak current 12000Apk, coil cross-section ϕ 3.0mm, coil circumference 200mm/700mm The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| RCP-M Series | Rogowski AC Current Probe: Peak current 12000Apk, coil cross-section ϕ 4.5mm, coil circumference 200mm/700mm The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| RCP-L Series | Rogowski AC Current Probe: Peak current 12000Apk, coil cross-section ϕ 8.0mm, coil circumference 700mm The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| CP2100A | Low Frequency AC/DC Current Probe: DC-800kHz, Peak current 100Apk, Max. conductor diameter 13mm |
| CP2100B | Low Frequency AC/DC Current Probe: DC-2.5MHz, Peak current 100Apk, Max. conductor diameter 13mm |



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*The final interpretation of this content is vested in Shenzhen Micsig Technologies Co., Ltd. For any updates to relevant information, please follow the official Micsig website (www.micsig.com).