RIGOL

MSO5000-E Series Digital Oscilloscope

- Analog bandwidth: 150 MHz
- 2 analog channels, 1 EXT channel, and a standard configuration of 16 digital channels (required to purchase the probe)
- Up to 4 GSa/s real–time sample rate
- Up to 100 Mpts memory depth (option)
- High waveform capture rate (over 300,000 wfm/s)
- Auto measurement of 41 waveform parameters; full–memory hardware measurement function
- A variety of serial protocol triggers and decodes
- Up to 450,000 frames of hardware real–time and ceaseless waveforms recording and playback functions
- Independent search, navigation keys, and event table
- Built–in advanced power analysis software (option)
- Bode plot for loop test analysis
- Integrates 7 independent instruments into 1, including a digital oscilloscope, a logic analyzer, a spectrum analyzer, an arbitrary waveform generator, a digital voltmeter, a frequency counter and totalizer, and a protocol analyzer
- 9–inch capacitive multi–touch screen, 256–level intensity grading display, with color persistence
- Multiple interfaces available: USB HOST&DEVICE, LAN(LXI), HDMI, TRIG OUT, and USB–GPIB
- Web Control remote command
- Unique online version upgrade
- Novel and delicate industrial design, easy to operate

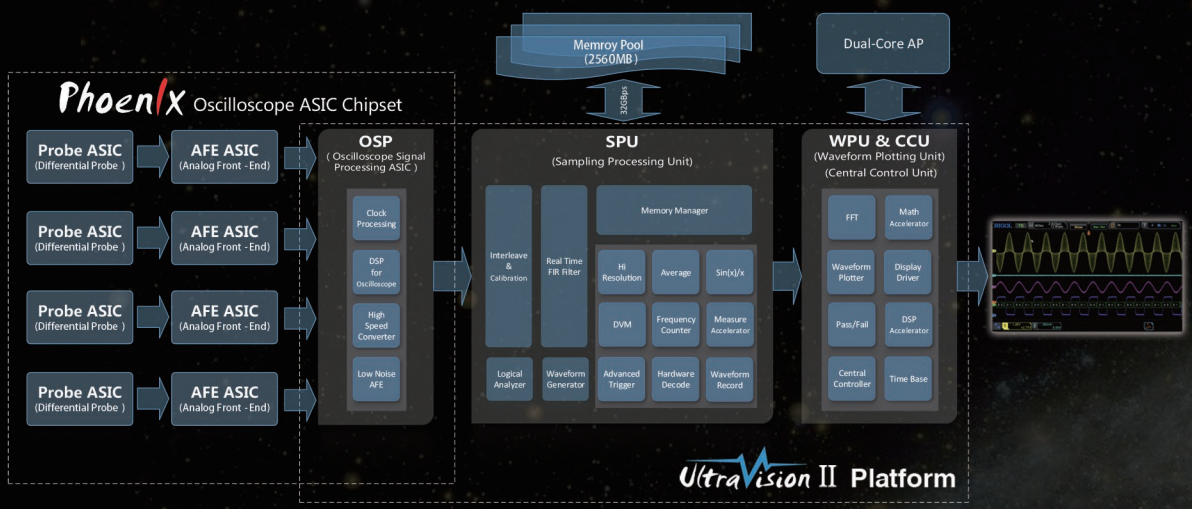
MSO5000-E series digital oscilloscope is a high-performance oscilloscope model designed based on RIGOL UltraVision II technology. With a 9-inch capacitive multi-touch screen, the MSO5000-E series integrates 7 independent instruments into one, delivering super sample bandwidth ratio, extremely high memory depth, and other excellent specifications. It is compact and portable in design, and all of the MSO5000-E series products support the upgrade of the analysis software. As it integrates many functions of multiple instruments, different user groups can have more choices in selecting their desired product based on their needs, helping them save their budget to a large extent while enjoying the superior test support and user experience.

MSO5000-E Series Digital Oscilloscope

UltraVision II Technology Platform Brings Excellent Specifications

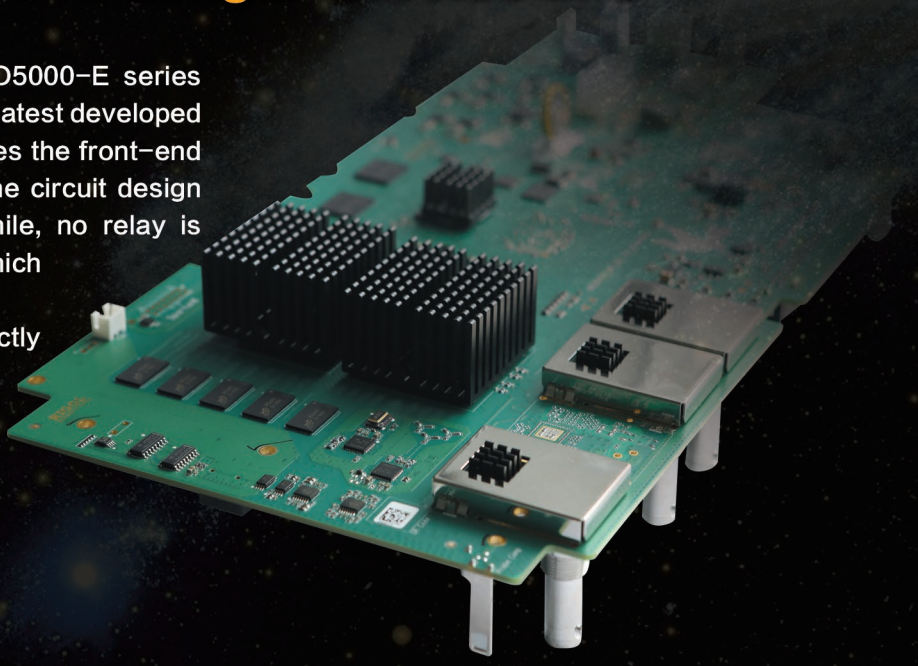
The UltraVision II platform integrates RIGOL's latest research achievements in the digital oscilloscope's signal processing, data analysis, and waveform visualization, with higher waveform capture rate, full digital trigger technology, and full memory hardware measurement technology. The MSO5000-E series digital oscilloscope is equipped with the UltraVison II technical platform, and also integrates 7 general instruments in the electronics measurement industry, offering extraordinary user experience at an unprecedented price point.

- High sample rate (maximum sample rate: 4 GSa/s)
- High memory depth (maximum memory depth of 100 Mpts, optional)
- High waveform capture rate (over 300,000 waveforms per second)
- Real-time waveform recording and playback functions (up to 450,000 frames)
- Full memory hardware measurement technology
- Full digital trigger technology



Higher Reliability and Longer Service Life

The main board circuit of the MSO5000-E series digital oscilloscope adopts RIGOL's latest developed dedicated ASIC chipset, which makes the front-end circuit enjoy a higher integration, the circuit design more simple and reliable. Meanwhile, no relay is added to the MSO5000-E series, which has prolonged the service life of the oscilloscope to a large extent, indirectly reducing the usage cost for users and further highlighting its cost-effective advantage.



Available for Software Upgrade with Options According to User's Demands

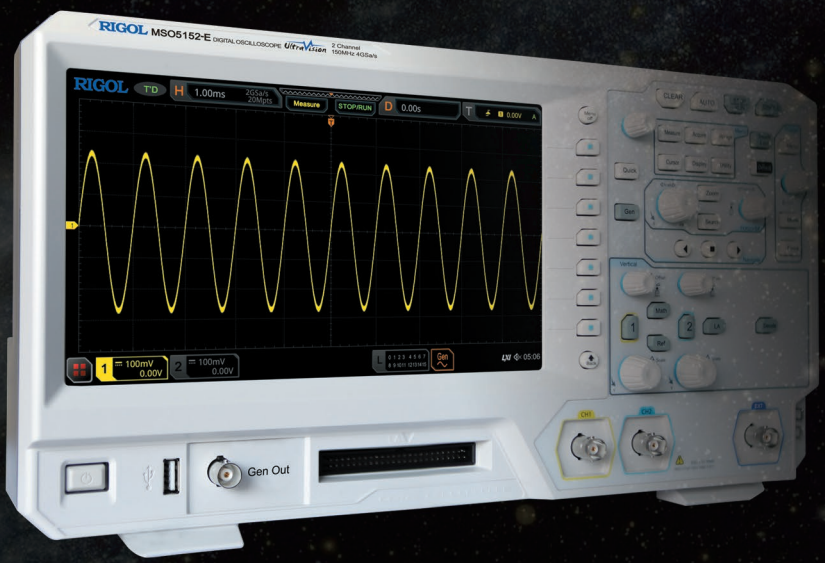
Want more functions within your limited budget? The MSO5000-E series suffices! It has been fully configured with 2 analog channels, 16-channel logic analyzer and AWG hardware circuit before leaving the factory. When purchasing the product, select one with a proper configuration based on your current test demand, without worrying about the future demand. If you have more demands in the future, purchase the desired option for expansion through relevant channels. Only a license code is enough. So easy!

- **LA interface available as a standard configuration for hardware**

  Any MSO5000-E series model has a standard configuration of 16-channel logic analyzer interface and function software. If you need, purchase a probe PLA2216.

- **AWG output port available as a standard configuration for hardware**

  Any MSO5000-E series model has a standard configuration of AWG output port. If you need, purchase the AWG option.

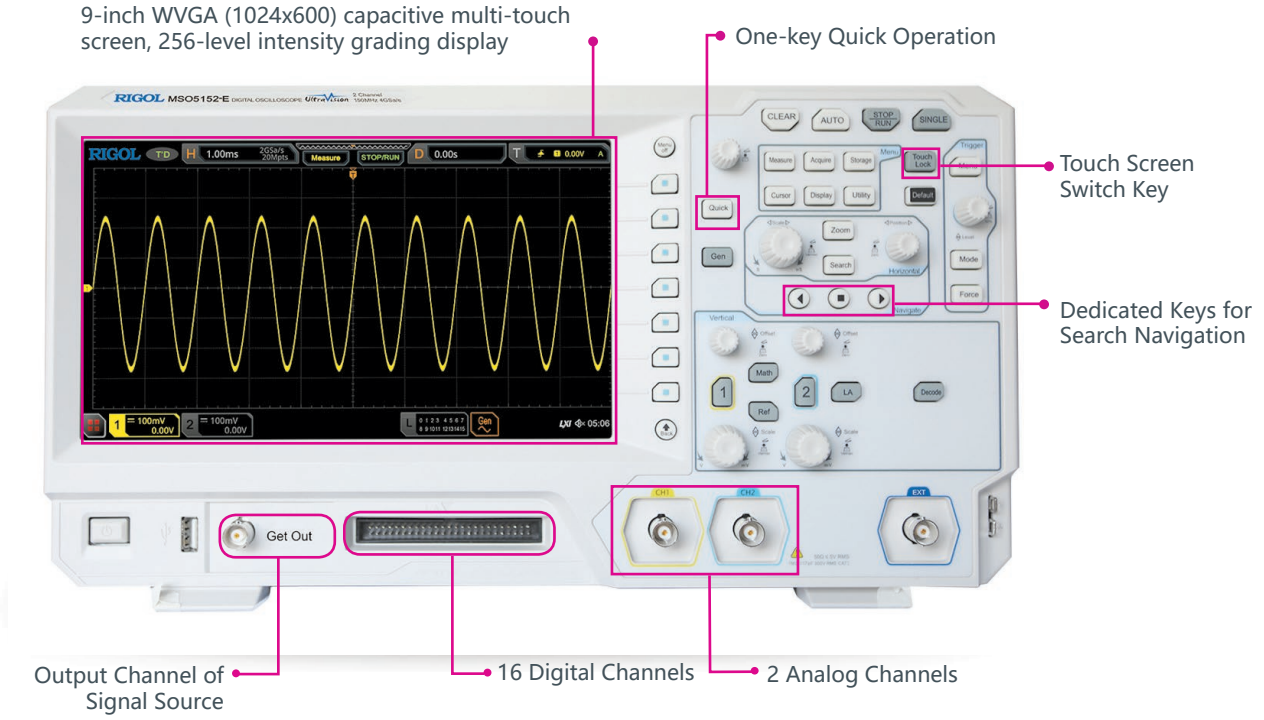


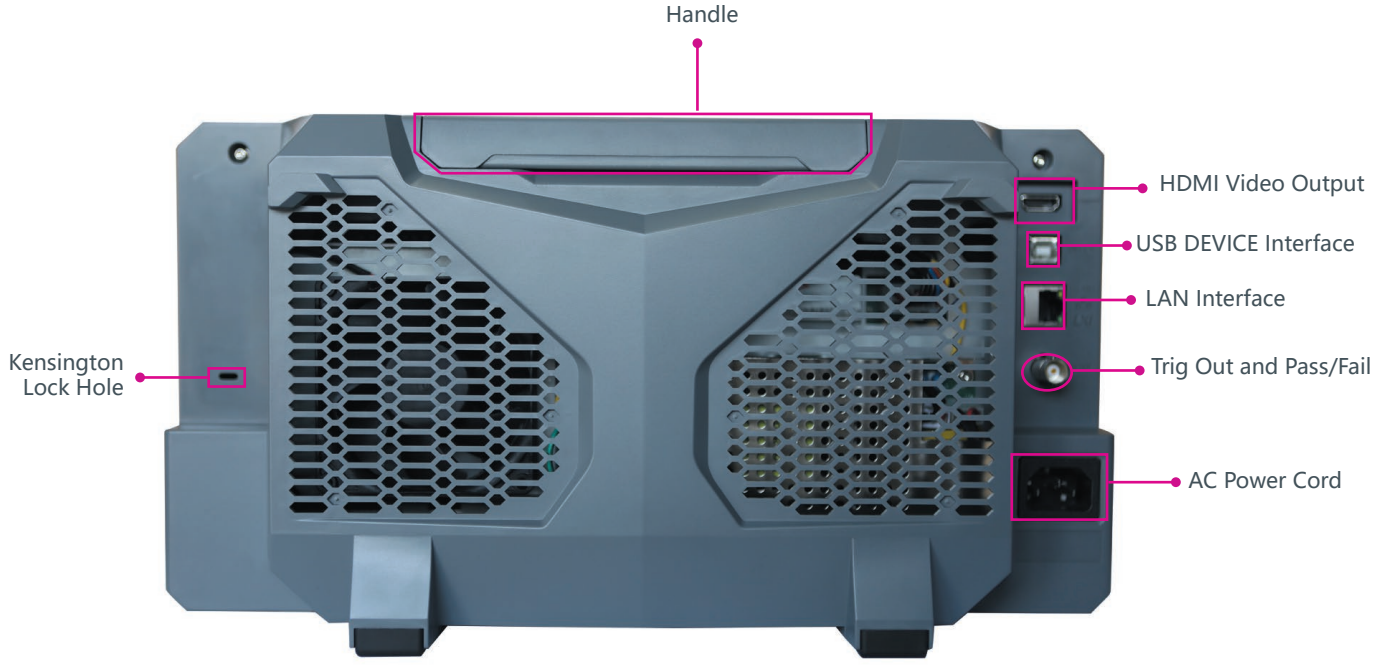
Mainstream Touch Screen Design Offers You Supreme User-friendly Experience

The 9-inch capacitive multi-touch screen supports various touch gestures, making it always keep up with the mainstream development trend for screen operation. Various multi-touch gestures such as Tap, Drag, Pinch & Stretch, and Rectangle Drawing are supported, making the measurement actions more smooth, convenient, and easy for users to operate. Meanwhile, the MSO5000-E series digital oscilloscope still keeps the knob and key operation as what RIGOL traditional digital oscilloscopes have, optimizing the user-friendly interactive experience to a large extent.

▶Small Body, Big Use

The innovative physical appearance of the instrument and the thin design in both sides of the instrument not only make its LCD display prominent but also keeps its shape delicate, making it portable and easy to operate.



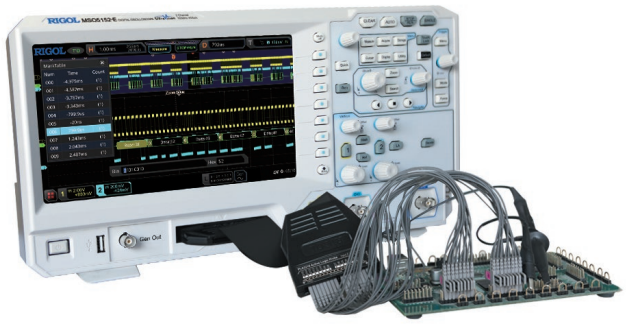


▶Overview of RIGOL's Medium-end Series Products

	MSO/DS2000A	MSO/DS4000	MSO5000	MSO5000–E	DS6000	MSO/DS7000
Analog Channel+Digital Channel	2+16	4+16	2/4+16	2+16	4	4+16
Analog Bandwidth	70 MHz to 300 MHz	100 MHz to 500 MHz	70 MHz to 350 MHz	150MHz	600 MHz to 1 GHz	100 MHz to 500 MHz
Max. Sample Rate	2 GSa/s	4 GSa/s	8 GSa/s	4 GSa/s	5 GSa/s	10 GSa/s
Max. Memory Depth	56 Mpts (optional)	140 Mpts	200 Mpts (optional)	100 Mpts (optional)	140 Mpts	500 Mpts (optional)
Waveform Capture Rate	> 52,000 wfms/s	> 110,000 wfms/s	>500,000 wfms/s	>300,000 wfms/s	> 180,000 wfms/s	> 600,000 wfms/s
Max. Frames of Waveform Recording	65,000	200,000	450,000	450,000	200,000	450,000
LCD	8''	9''	9'' capacitive multi–touch screen	9'' capacitive multi–touch screen	10.1''	10.1'' capacitive multi–touch screen
Hardware Mask Test	Standard	Standard	Standard	Standard	Standard	Standard
Built–in Arbitrary Waveform Generator	2 CH, 25 MHz (optional)	None	2 CH, 25 MHz (optional)	25 MHz (optional)	None	2 CH, 25 MHz (optional)
Built–in Digital Voltmeter	None	None	Standard	Standard	None	Standard
Built–in Hardware Counter	6–digit frequency counter	6–digit frequency counter	6–digit frequency counter + totalizer	6–digit frequency counter + totalizer	6–digit frequency counter	6–digit frequency counter + totalizer
Search and Navigation	None	None	Standard, supporting table display	Standard, supporting table display	None	Standard, supporting table display
Power Analysis	PC (optional)	PC (optional)	Built–in UPA (optional)	Built–in UPA (optional)	PC (optional)	Built–in UPA (optional)
Serial Protocol Analysis	RS232/UART, I2C, SPI, CAN, and USB	RS232/UART, I2C, SPI, CAN, FlexRay, and MIL–STD–1553	RS232/UART, I2C, SPI, CAN, LIN, FlexRay, I2S, and MIL–STD–1553	RS232/UART, I2C, SPI, CAN, LIN, FlexRay, I2S, and MIL–STD–1553	RS232/UART, I2C, SPI, CAN, and FlexRay	RS232/UART, I2C, SPI, CAN, LIN, FlexRay, I2S, and MIL–STD–1553
Waveform Color Persistence	None	None	Standard	Standard	None	Standard
Histogram	None	None	Standard	Standard	None	Standard
FFT	Standard	Standard	Enhanced FFT, Standard	Enhanced FFT, Standard	Standard	Enhanced FFT, Standard
MATH	Displays 1 function at the same time	Displays 1 function at the same time	Displays 4 functions at the same time	Displays 4 functions at the same time	Displays 1 functions at the same time	Displays 4 functions at the same time
Connectivity	standard: USB, LAN, and VGA option: USB–GPIB	standard: USB, LAN, and VGA option: USB–GPIB	standard: USB, LAN, and HDMI option: USB–GPIB	standard: USB, LAN, and HDMI option: USB–GPIB	standard: USB, VGA, and LAN option: USB–GPIB	standard: USB, LAN, and HDMI option: USB–GPIB

Design Features

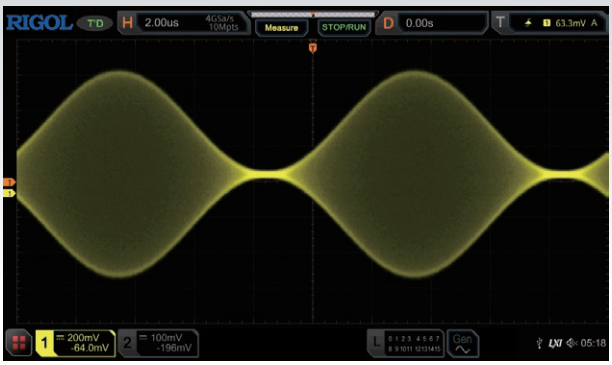
▶7-into-1 Integrated Digital Oscilloscope



In today's integrated design field, a highly integrated comprehensive digital oscilloscope has become a useful tool for design engineers. The MSO5000-E series digital oscilloscope launched by RIGOL this time integrates 7 independent instruments into 1, including one digital oscilloscope, one 16-channel logic analyzer, one spectrum analyzer, one arbitrary waveform generator, one digital voltmeter, one high-precision frequency counter and totalizer, and one protocol analyzer. The MSO5000-E series offers you a flexible and economical solution to address your actual needs.

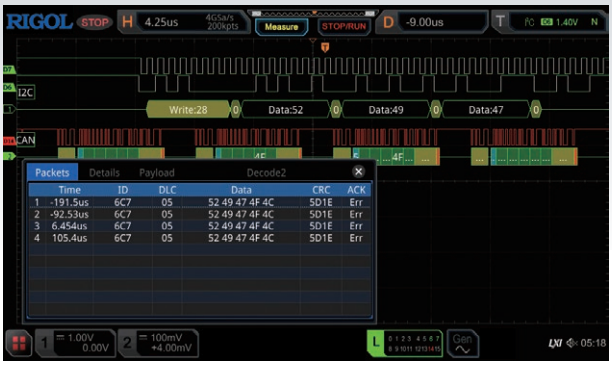
1. Digital Oscilloscope

- 150 MHz bandwidth model
- Up to 4 GSa/s real-time sample rate
- 2 analog channels , 16 digital channels (standard)
- Up to 100 Mpts memory depth (option)
- Maximum waveform capture rate of 300,000 wfms/s
- 350 MHz passive voltage probe for each channel (standard)



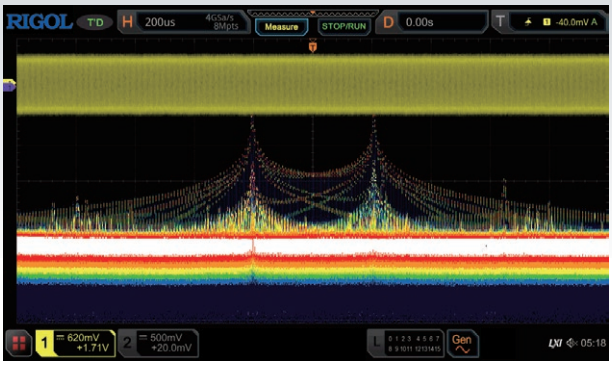
2. Logic Analyzer

- Standard 16 digital channels, just buy a PLA2216 active logic probe
- 25 Mpts memory depth for the waveforms of all the digital channels
- Up to 1 GSa/s sample rate
- Hardware real-time waveform recording and playback functions supported
- Mixed (analog channel and digital channel) trigger and decode supported
- Convenient digital channel grouping and group operation



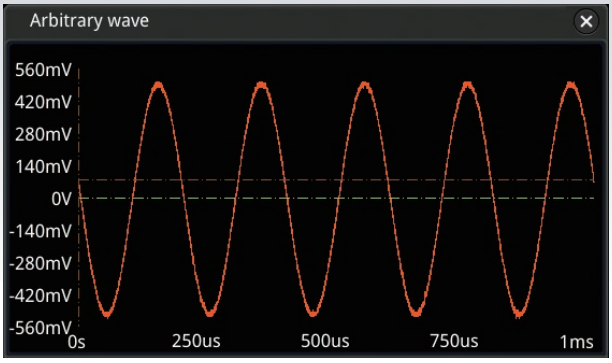
3. Spectrum Analyzer

- Standard configuration of enhanced FFT, real-time operation for max. 1 Mpts waveform data
- Max. frequency range: oscilloscope analog bandwidth
- Up to 4 groups of operations can be displayed at the same time
- Independent FFT color persistence view supported
- Up to 15 peaks available for the peak search function; event table available to be exported



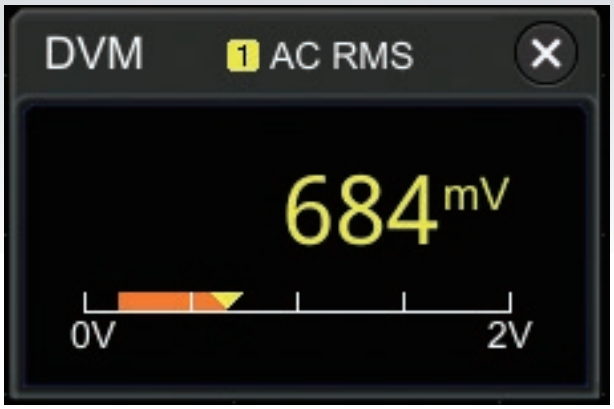
4. Arbitrary Waveform Generator (Option)

- Standard configuration of one waveforms output channels for the hardware, and only AWG option is required to be ordered
- 13 pre-defined waveforms
- Up to 25 MHz frequency
- Up to 200 MSa/s sample rate
- Advanced modulation, sweep, and burst signal output supported



5. Digital Voltmeter

- 3-digit DC/AC, RMS/AC+DC RMS voltage measurement
- Sound an alarm for reaching or exceeding the limits
- Display the latest measurement results in the form of a diagram, and display the extrema over the last 3 seconds

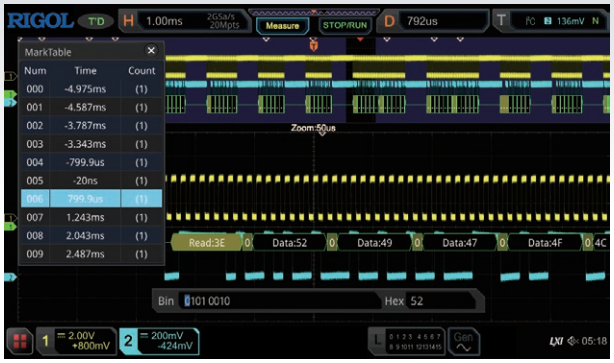


6. High-precision Frequency Counter and Totalizer

- 3 to 6-digit (selectable) high-precision frequency counter
- Support the statistics on the maximum and minimum values of the frequency
- 48-bit totalizer (standard)

7. Protocol Analyzer (Option)

- Support RS232/UART, I2C, SPI, CAN, LIN, I2S, FlexRay, and MIL-STD-1553 serial bus



▶Excellent Sample Bandwidth Ratio

Bandwidth and the sample rate are two key technical specifications that engineers take priority in choosing the digital oscilloscope. Bandwidth determines the maximum frequency that the oscilloscope can acquire. The higher the bandwidth of the oscilloscope, the better the oscilloscope can keep the steep, fast, abundant harmonics components and energies of the signal under test. Whereas the sample rate determines the time interval of the sample points, that is, determines the refinement of the outlined waveforms. The MSO5000–E series provides a maximum of 4 GSa/s real–time sample rate and 26X sample rate/bandwidth ratio for 150 MHz bandwidth, which makes itself far ahead of the same level products.

With up to 100 M memory depth, you can capture 12.5 ms of waveforms while maintaining a sample rate of 4 G, without causing the waveforms to be distorted.

While maintaining the super high sample rate of 4 GSa/s, the MSO5000–E series also has a maximum of 100 Mpts memory depth, enabling itself to capture more events in one acquisition. This provides sufficient time for users to observe while retaining the waveform details to a large extent. Thus, users can not only get the detailed information about the waveforms, but also can take an overview of the waveforms.

▶300,000 wfms/s Capture Rate

Engineers often have to spend a lot of time and efforts in locating the problem in design and debugging. Therefore, a proper debugging tool will help engineers to work more efficiently. MSO5000–E series digital oscilloscope can provide the waveform capture rate of up to 300,000 wfms/s, so that the glitches and infrequent events in waveforms can be quickly identified, greatly improving the debugging efficiency for the engineers.

256–level intensity grading display can reflect the occurrence frequencies of the infrequent events. Its newly added color persistence function can highlight the signal of different probabilities with a different color grading. You can set the persistence time to control the duration time for the waveforms to be displayed on the screen, so that the display capability of the infrequent events can be further enhanced.

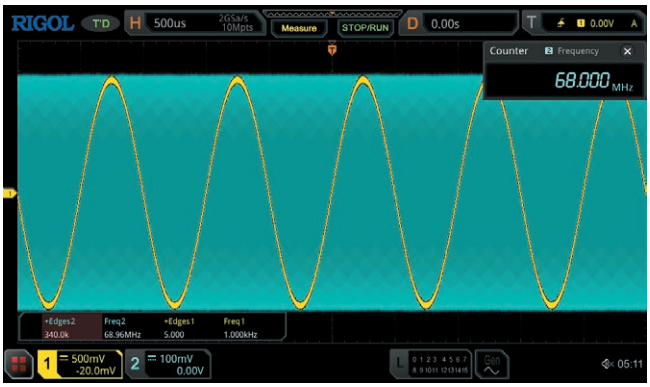
Capture occasional exceptional signals in a highly refresh mode.

Changes of each frame of waveforms of the sweep signal can be clearly observed in the highly refresh mode.

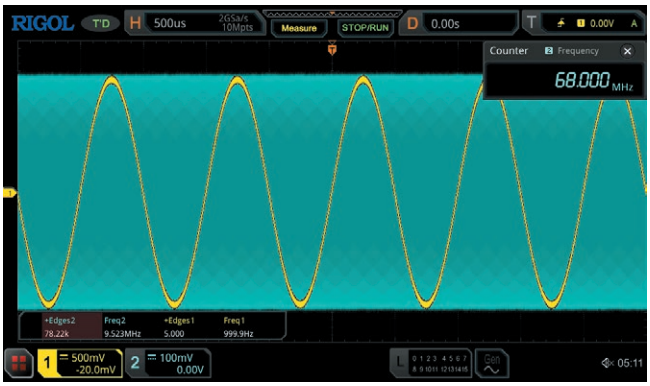
▶Hardware Full Memory Auto Measurement

The auto measurement is the basic tool for engineers to make a rapid analysis of the signals, and it requires more efficient measurement process and accurate measurement results. MSO5000–E supports hardware full memory auto measurement, provides measurements of 41 waveform parameters, supports displaying the statistics and analysis of the measurement results for 10 items. In addition, the auto measurement function also supports auto cursor indicator and measurement range selection. You can also set the threshold for each measurement source independently, making the waveform measurement more flexible. To get a quick view about how to make measurements, we provide you with detailed help documents and diagrams to better illustrate the measurement methods for each item.

Based on the different data sources, auto measurement consists of two modes: Normal and Precision. In Normal mode, the data volume increases from 1 k to 1 M, realizing the optimization of the basic measurement function. In Precision mode, the oscilloscope provides hardware full–memory auto measurement, greatly improving the precision of the waveform measurement.



Observe and accurately measure two signals with great frequency deviations. The full–memory hardware measurement can measure accurate frequency value of the waveforms with 340k rising edges.



The ordinary 1 Mpts software measurement can no longer measure the accurate frequency of the high–frequency signal.

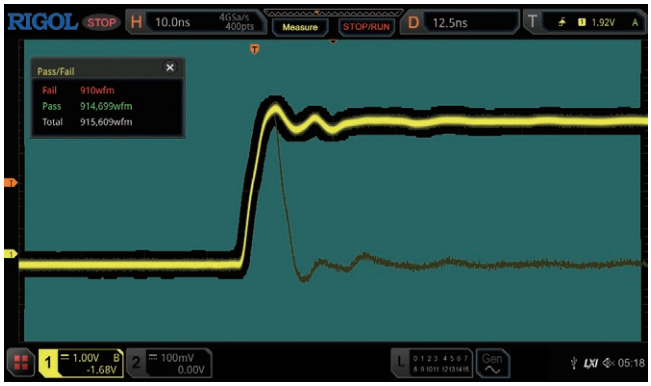
▶Hardware Waveform Recording and Playback

The memory depth is one of the key specifications of the oscilloscope. However, whatever high the memory depth, it cannot be guaranteed that all the signals that users are concerned about can be captured in one time. This is especially true for the occurrence of the infrequent signals during debugging design or locating specific events from the long captured complicated signals. In addition, the long memory depth will be bound to reduce the response time for the oscilloscope. The hardware waveform recording and playback function can address this issue.

The MSO5000–E series provides ceaseless recording and playback for a maximum of 450,000 frames of hardware real–time waveforms. This specification is second to none in the industry. The hardware waveform recording function adopts the segmented storage technology. With the technology, you can set the trigger conditions to make a selective choice in capturing and saving the signals that you are interested in, then mark the time on the signal. This has not only ensured the high capture efficiency, but also prolonged the overall observation time for the waveforms. The hardware waveform playback function enables you to have sufficient time to take a careful view and analysis of the recorded segment of the waveforms.

▶Hardware Pass/Fail Test

The MSO5000–E series is equipped with hardware pass/fail test function as the standard configuration, which can be used in signal monitoring for a long time, signal monitoring during design, and signal test in the production line. You can set the test mask based on the known "standard" waveform, and then compare the signal under test with the "standard" waveform to display the statistics on the test results. When a successful or failed test is detected by the oscilloscope, you can choose to immediately stop monitoring, enable the beeper to sound an alarm, or save the current screen image. Also, you can choose to continue monitoring.



The Pass/Fail test function can quickly make a statistics on the occurrence probability of the signal exceptions.

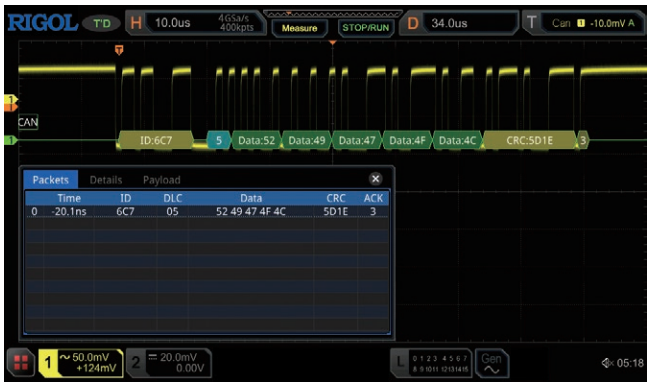
▶Enhanced FFT Analysis

The MSO5000–E series can analyze 1 Mpts of FFT, which improves the frequency resolution to a large extent, convenient for you to better analyze the disturbance noise in the circuit under test. To adjust the spectrum waveforms to be observed, set the center frequency and the span; or set the start frequency and the stop frequency. The MSO5000–E series also provides the peak search function, which can auto mark up to 15 peaks and display their frequencies and amplitudes in the form of a list. Such information and the non–peak section in the frequency–domain cursor measurement can greatly improve the working efficiency of the engineers.

With the near–field probe, you can easily observe the spectrum peak in the frequency domain when the probe approaches to the radiation leakage point.

▶A Variety of Triggers and Protocol Decodings

MSO5000–E series digital oscilloscope provides powerful trigger functions, including Edge trigger, Pulse trigger, Slope trigger, Video trigger, Pattern trigger, Duration trigger, Timeout trigger, Runt trigger, Window trigger, Delay trigger, Setup/Hold trigger, Nth Edge trigger, and serial protocol trigger. These triggers can help engineers accurately and quickly capture and identify the signals of great interest.



The optional serial protocol decoding is capable of decoding 4 serial buses simultaneously. The full memory data analysis and the decoding event table display can help engineers quickly find out the system failure and locate the symbol error waveforms, greatly improving the debugging efficiency of the overall system signals. The MSO5000–E series also provides optional decodings such as RS232/UART, I2C, SPI, CAN, LIN, I2S, FlexRay, and MIL–STD–1553. These serial bus decodings can help engineers make a deep analysis on the waveforms, and they are widely applied to the auto electronics, aerospace, and other fields. Besides, the oscilloscope has a standard parallel bus decoding, which is capable of performing the debugging test for the mixed signals of up to 18 channels (analog channel and digital channel) simultaneously.

▶Zone Trigger

In face of the complex and variable circuit signal in the circuit debugging, it is easy for us to find the transient occasional exception signals on the oscilloscope with a high waveform capture rate. However, it is not easy to isolate the exceptional signal from the complex circuit signals and trigger them stably. You have to spend more time on the usage of some advanced trigger types, and sometimes even the powerful advanced trigger is unable to make it. The MSO5000–E series is specially equipped with touch screen–based zone trigger function, which can help users accelerate the signal isolation process. The zone trigger function is easy to operate. You only need to use the specified rectangle drawing gesture to draw one or two rectangular zones on the corresponding signal section, then you can quickly isolate the signal for observation.

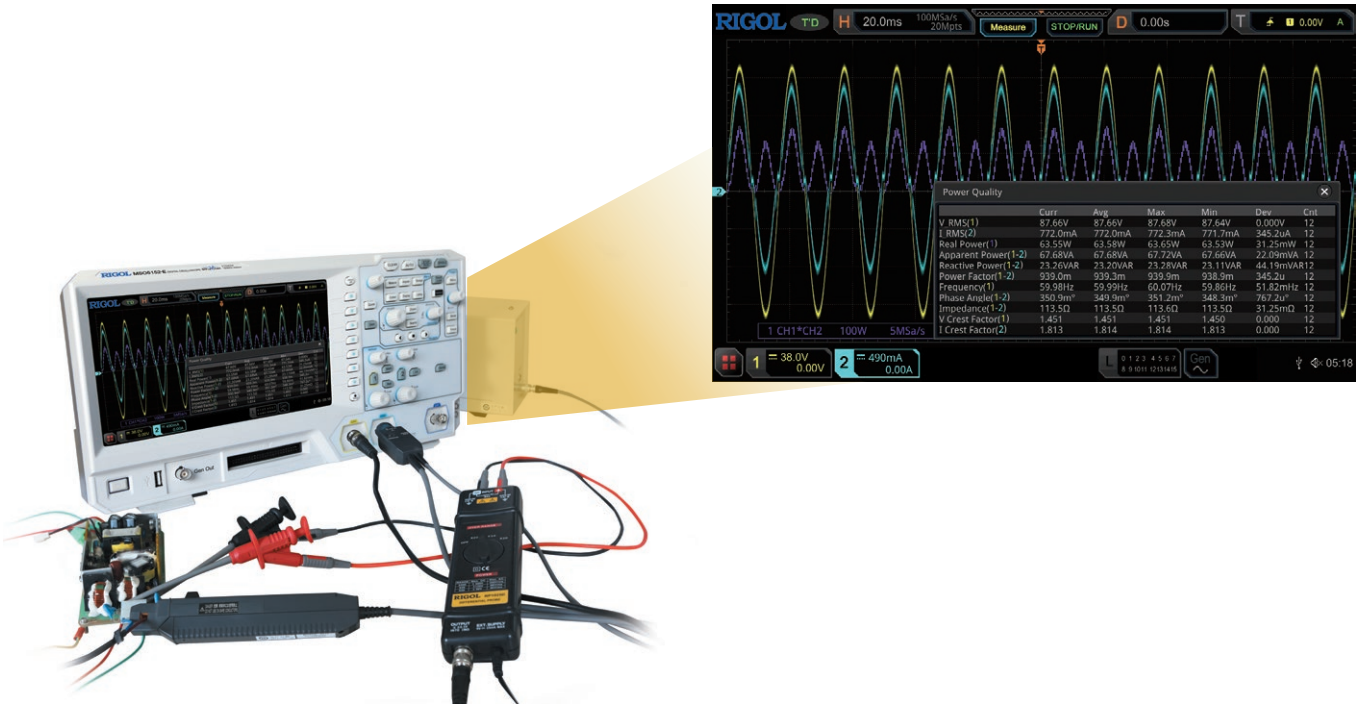
The zone trigger can work with other 20 trigger types, and it also supports the decoding, waveform recording, and pass/fail test functions. This is conducive to the debugging of the complex signals.

Draw a rectangle on the transient exception signal and select Trigger zone B.

Quickly isolate the exceptional signal with Edge trigger and Zone trigger.

▶ Power Analysis (Option)

To cater to the increasing test demand for the switch power supply and the power component, we configure the MSO5000–E series with the optional built–in power analysis software. The current power analysis software can complete the power quality analysis and ripple analysis. The power analysis software can help engineers analyze the commonly used power parameters rapidly and accurately, without needing to make tedious configurations manually or do complicated formula calculation.



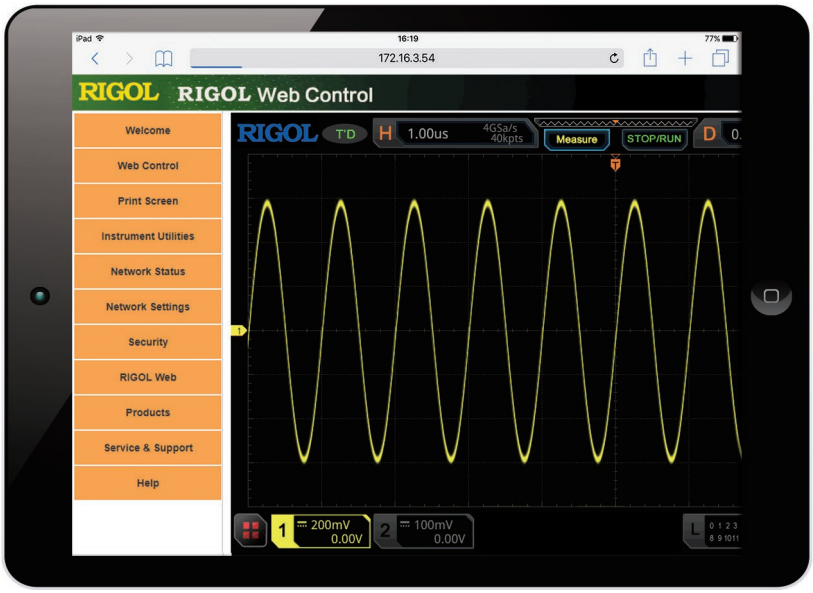
▶ Bode Plot

The stability of the switch power supply affects the reliability of the whole system. MSO5000–E series can generate the sweep signal of the specified range by controlling the built–in signal generator module and output the signal to the switch power supply to carry out loop analysis test. The bode plot generated from the test can display the gain and phase variations of the system under different frequencies, enabling engineers to get a clear view about data from the bode plot. By analyzing the phase margin (PM), gain margin (GM), and other parameters, they can judge whether the system is stable.

Remote Control Software

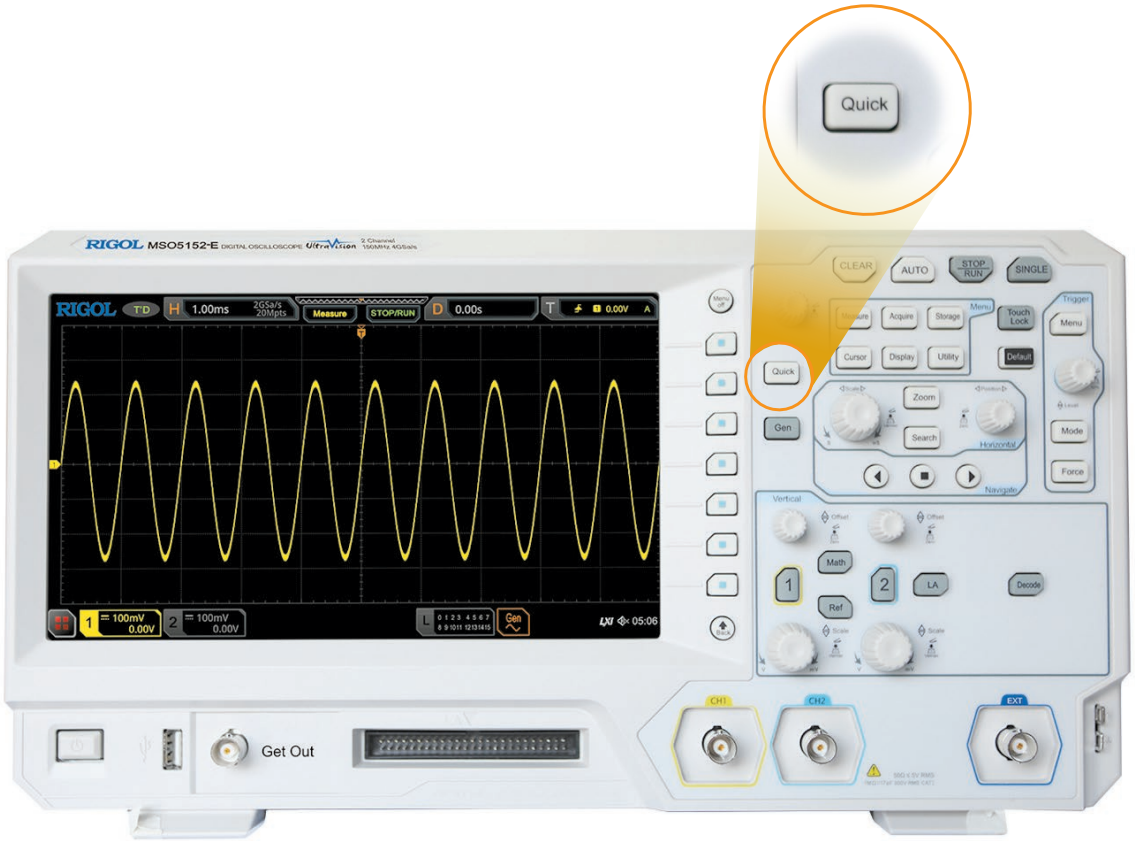
The Web Control software is a standard configuration for the MSO5000–E series. You can use the software to migrate the instrument control and waveform analysis to the PC, and then click the mouse to operate easily.

You only need to input the IP address of the oscilloscope into the address bar of the Web browser to open the Web Control software. The display of the waveform interface and instrument control in the software are consistent with that in the MSO5000–E series. You can use the mouse to tap the keys or knobs in the Web Control interface to complete the waveform control, measurement, and analysis. In the Web Control interface, the basic information of the instrument is displayed, and you can also upload or download the files of the oscilloscope, control with the SCPI commands, set or modify the network status.



▶User-defined One-key Quick Operation

There is a dedicated Quick key on the front panel of the MSO5000-E series, enabling you to customize the function of the key and complete the commonly used operation quickly. With the customized setting of the Quick key, you can quickly capture the screen image, realize waveform saving, setup saving, all measurement, reset measurement statistics, reset pass/fail test statistics, printing, email sending, waveform recording, group saving, and etc.



RIGOL Probes and Accessories Supported by the MSO5000-E Series

· RIGOL Passive Probes

Model	Type	Description
 PVP2150	High-impedance Probe	1X: DC ~ 35 MHz 10X: DC ~ 150 MHz Compatibility: All models of **RIGOL**'s digital oscilloscopes
 PVP2350	High-impedance Probe	1X: DC ~ 35 MHz 10X: DC ~ 350 MHz Compatibility: All models of **RIGOL**'s digital oscilloscopes
 RP3500A	High-impedance Probe	DC ~ 500 MHz Compatibility: All models of **RIGOL**'s digital oscilloscopes
 RP1300H	High-voltage Probe	DC ~ 300 MHz CAT I 2000 V (DC+AC) CAT II 1500 V (DC+AC) Compatibility: All models of **RIGOL**'s digital oscilloscopes

Model	Type	Description
 RP1010H	High-voltage Probe	DC ~ 40 MHz DC: 0 ~ 10 kV DC AC: pulse ⩽20 kVp-p AC: sine wave⩽7 kVrms Compatibility: All models of **RIGOL**'s digital oscilloscopes
 RP1018H	High-voltage Probe	DC ~ 150 MHz DC+AC Peak: 18 kV CAT II AC RMS: 12 kV CAT II Compatibility: All models of **RIGOL**'s digital oscilloscopes

· RIGOL Active and Current Probes

Model	Type	Description
 RP1001C	Current Probe	BW: DC ~ 300 kHz Maximum Input DC: ± 100 A AC P–P: 200 A AC RMS: 70 A Compatibility: All models of **RIGOL**'s digital oscilloscopes
 RP1002C	Current Probe	BW: DC ~ 1 MHz Maximum Input DC: ± 70 A AC P–P: 140 A AC RMS: 50 A Compatibility: All models of **RIGOL**'s digital oscilloscopes
 RP1003C	Current Probe	BW: DC ~ 50 MHz Maximum Input AC P–P: 50 A (noncontinuous) AC RMS: 30 A Compatibility: All models of **RIGOL**'s digital oscilloscopes Required to order RP1000P power supply.
 RP1004C	Current Probe	BW: DC ~ 100 MHz Maximum Input AC P–P: 50 A (noncontinuous) AC RMS: 30 A Compatibility: All models of **RIGOL**'s digital oscilloscopes Required to order RP1000P power supply.
 RP1005C	Current Probe	BW: DC ~ 10 MHz Maximum Input AC P–P: 300 A (noncontinuous), 500 A (@pulse width ⩽ 30 us) AC RMS: 150 A Compatibility: All models of **RIGOL**'s digital oscilloscopes Required to order RP1000P power supply.

Model	Type	Description
 RP1000P	Power Supply	Power supply for RP1003C, RP1004C, and RP1005C; supporting 4 channels.
 RP1025D	High–voltage Differential Probe	BW: 25 MHz Max. voltage ⩽ 1400 Vpp Compatibility: All models of **RIGOL**'s digital oscilloscopes
 RP1050D	High–voltage Differential Probe	BW: 50 MHz Max. voltage ⩽ 7000 Vpp Compatibility: All models of **RIGOL**'s digital oscilloscopes
 RP1100D	High–voltage Differential Probe	BW: 100 MHz Max. voltage ⩽ 7000 Vpp Compatibility: All models of **RIGOL**'s digital oscilloscopes
 PLA2216	Active Logic Probe	Active logic probe (available for MSO5000/ MSO5000–E series)

Specifications

All the specifications are guaranteed except the parameters marked with "Typical" and the oscilloscope needs to operate for more than 30 minutes under the specified operation temperature.

Overview of the MSO5000-E Series Technical Specifications

Model		MSO5152-E
Analog Bandwidth		150 MHz
Rising Time (typical)		≤2.33 ns
No. of Input/Output Channels		2
		16 input digital channels (PLA2216 probe option is required to be ordered)
		Single-channel arbitrary waveform generator output (required to install the MSO5000-E-AWG option to activate the software function)
Sampling Mode		Real-time sampling
Max. Sample Rate of Analog Channel		MSO5152-E: 4 GSa/s (single-channel), 2 GSa/s (all channels)
Max. Memory Depth	1RL(option)	Analog channel: 100 Mpts (single-channel), 50 Mpts (all channels)
		Digital channel: 25 Mpts
Max. Waveform Capture Rate[1]		≥300,000 wfms/s
Hardware Real-time Waveform Recording and Playing		≥450,000 wfms (single-channel)
Peak Detection		Under all the time base settings, capture 500 ps glitches
LCD Size and Type		9-inch capacitive multi-touch screen/gesture enabled operation
Display Resolution		1024 × 600

Vertical System Analog Channel

Vertical System Analog Channel	
Input Coupling	DC, AC or GND
Input Impedance	1 MΩ ± 1%
Input Capacitance	17 pF ± 3 pF
Probe Attenuation Coefficient	0.0001X, 0.0002X, 0.0005X, 0.001X, 0.002X, 0.005X, 0.01X, 0.02X, 0.05X, 0.1X, 0.2X, 0.5X, 1X, 2X, 5X, 10X, 20X, 50X, 100X, 200X, 500X, 1000X, 2000X, 5000X, 10000X, 20000X, and 50000X
Maximum Input Voltage	CAT I 300 Vrms, 400 Vpk, Transient Overvoltage 1600 Vpk
Vertical Resolution	8 bits
Vertical Sensitivity Range[2]	500 μV/div~10 V/div
Offset Range	± 1 V (500 μV/div~50 mV/div) ± 30 V (51 mV/div~260 mV/div) ± 100 V (265 mV/div~10 V/div)
Dynamic Range	± 5 div (8 bits)
Bandwidth Limit (Typical)	20 MHz, selectable for each channel
DC Gain Accuracy[1]	± 3% of full scale
DC Offset Accuracy	<200 mV/div (± 0.1 div ± 2 mV ± 1.5% of offset value)
	>200 mV/div (± 0.1 div ± 2 mV ± 1.0% of offset value)
Channel-to-Channel Isolation	40 dB, from DC to maximum rated bandwidth of each model
ESD Tolerance	± 8 kV (on input BNCs)

Vertical System Digital Channel

Vertical System Digital Channel	
Number of Channels	16 input channels (D0~D15) (D0~D7, D8~D15)
Threshold Range	± 15.0 V, in 10 mV step
Threshold Accuracy	± (100 mV + 3% of the threshold setting)
Threshold Selection	TTL(1.4 V), COMS5.0(2.5 V), COMS3.3(1.65 V), COMS2.5(1.25 V), COMS1.8(0.9 V), ECL(-1.3 V), PECL(3.7 V), LVDS(1.2 V), 0.0 V User (adjustable threshold for 8 channels in a group)
Max. Input Voltage	± 40 V peak CAT I; transient overvoltage 800 Vpk
Max. Input Dynamic Range	± 10 V + threshold
Minimum Voltage Swing	500 mVpp
Input Impedance	About 101 kΩ
Probe Load	≈8 pF
Vertical Resolution	1 bit

Horizontal System--Analog Channel

Horizontal System--Analog Channel		
Range of Time Base		150 MHz
		2 ns/div~1 ks/div
		Support fine adjustment
Time Base Resolution		10 ps
Time Base Accuracy		± 10 ppm ± 10 ppm/year
Time Base Delay Range	before triggering	⩾1/2 screen width
	after triggering	1 s or 100 div, whichever is greater
Time Interval (△T) Measurement		± (1 sample interval) ± (2 ppm × readout) ± 50 ps
Inter–channel Offset Correction Range		± 100 ns
Horizontal Mode	YT	Default
	XY	X = Channel 1, Y = Channel 2
	SCAN	Time base ⩾200 ms/div, available to enter or exit the SCAN mode by rotating the Horizontal SCALE knob
	ROLL	Time base ⩾200 ms/div, available to enter or exit the ROLL mode[3] by rotating the Horizontal SCALE knob

Horizontal System--Digital Channel

Horizontal System--Digital Channel	
Min. Detectable Pulse Width	5 ns
Maximum Input Frequency	200 MHz (accurately copied as the sine wave of the maximum frequency of the logic square wave; input amplitude is the minimum swing; the shortest the ground cable is required for the logic probe)
Inter–channel Time Delay	2 ns (typical), 5 ns (maximum)

Acquisition System

Acquisition System		
Max. Sample Rate of Analog Channel		MSO5152–E: 4 GSa/s (single–channel), 2 GSa/s (all channels)
Max. Memory Depth of Analog Channel	Standard	50 Mpts (single–channel), 25 Mpts (all channels)
	1RL(option)	100 Mpts (single–channel), 50 Mpts (all channels)
Max. Sample Rate of Digital Channel		1 GSa/s (all channels)
Max. Memory Depth of Digital Channel		25 Mpts (all channels)
Acquisition Mode	Normal	Default
	Peak Detection	Capture 500 ps glitches
	Average Mode	2, 4, 8, 16…65536 are available for you to choose, averaging point by point
	High Resolution	12 bit (max .)

Trigger System

Trigger System		
Trigger Source		Analog channel (1~2), digital channel (D0~D15), EXT, EXT/5 and AC Line
Trigger Mode		Auto, Normal, Single
Trigger Coupling	DC	DC coupling trigger
	AC	AC coupling trigger
	High Frequency Rejection	High frequency rejection, cut–off frequency~55 kHz (internal only)
	Low Frequency Rejection	Low frequency rejection, cut–off frequency~55 kHz (internal only)
Noise Rejection		Increase delay for the trigger circuit (internal only), On/Off
Holdoff Range		8 ns to 10 s
Trigger Bandwidth	Internal	Analog bandwidth
	External	200 MHz
Trigger Sensitivity (Internal)		1 div or 5 mVpp, whichever is larger, <10mV/div 0.5 div, ⩾10mV/div Enable the noise rejection, with trigger sensitivity reducing half
Trigger Sensitivity (External)	EXT	200 mVpp, DC~200 MHz
	EXT/5	1 Vpp, DC~200 MHz

Trigger Level Range	Internal:	± 5 div from the center of the screen
	EXT	± 1V
	EXT/5	± 5V
	AC Line	Fixed 50%

Trigger Type

Trigger Type	
Zone Trigger	Trigger in the rectangle area drawn manually, supporting trigger zone A and trigger zone B. The trigger conditions can be "Intersect" or "Not intersect" Source channel: CH1~CH2; only one analog channel is triggered each time
Trigger Type	Standard: Edge trigger, Pulse trigger, Slope trigger, Video trigger, Pattern trigger, Duration trigger, Timeout trigger, Runt trigger, Window trigger, Delay trigger, Setup/Hold trigger, and Nth Edge trigger
	Option: RS232, UART, I2C, SPI, CAN, FlexRay, LIN, I2S, and MIL–STD–1553
Edge	Trigger on the threshold of the specified edge of the input signal. The edge types can be Rising, Falling, or Either. Source channel: CH1~CH2, EXT, EXT/5, D0~D15, or AC Line
Pulse	Trigger on the positive or negative pulse with a specified width. The pulse width is greater or smaller than a certain value or within a certain time range. Source channel: CH1~CH2, D0~D15
Slope	Trigger on the positive or negative slope of the specified time (800 ps~10 s). The slew time is greater or smaller than a certain value or within a certain time range. Source channel: CH1~CH2
Video	Trigger on all lines, specified line, add field, or even field that conforms to the video standards. The supported video standards include NTSC, PAL/SECAM, 480P, 576P, 720P, 1080P, and 1080i. Source channel: CH1~CH2
Pattern	Identifies a trigger condition by searching for a specified pattern. The pattern is a combination of multiple selected channel sources. The logic pattern of each channel is H, L, X, Rising, or Falling. Source channel: CH1~CH2, D0~D15
Duration	Trigger when the specified pattern meets the specified duration condition. The pattern is a combination of multiple selected channel sources. The logic pattern of each channel is H, L, X. The duration is greater or smaller than a certain value, or within a certain time range, or outside a certain time range. Source channel: CH1~CH2, D0~D15
Timeout	Trigger when duration of a certain event exceeds the specified time (16 ns~10 s). The event can be specified as Rising, Falling, or Either. Source channel: CH1~CH2, D0~D15
Runt	Trigger when the pulses pass through one threshold but fail to pass through another threshold. The channel only supports analog channels Source channel: CH1~CH2
Window	Trigger in a specified window state when the rising edge of the signal crosses the upper threshold or the falling edge crosses the lower threshold. The window state can be Enter, Exit, or Time. Source channel: CH1~CH2
Delay	Trigger when the time difference between the specified edges of Source A and Source B meets the preset time. The duration is greater or smaller than a certain value, or within a certain time range, or outside a certain time range. Source channel: CH1~CH2, D0~D15
Setup/Hold	When the setup time or hold time between the input clock signal and the data signal is smaller than the specified time (8 ns~1 s). Source channel: CH1~CH2, D0~D15
Nth Edge	Trigger on the Nth edge that appears after the specified idle time. The edge can be specified as Rising or Falling. Source channel: CH1~CH2, D0~D15
RS232/UART (Option)	MSO5000–COMP option Trigger on the Start, Error, Check Error, or Data frame of the RS232/UART bus (up to 20 Mb/s). Source channel: CH1~CH2, D0~D15
I2C (Option)	MSO5000–EMBD option Trigger on the Start, Stop, Restart, MissedACK, Address (7 bits, 8 bits, or 10 bits), Data, or Address Data of the I2C bus. Source channel: CH1~CH2, D0~D15
SPI (Option)	MSO5000–EMBD option Trigger on the specified pattern of the specified data width (4~32) of SPI bus. CS and Timeout are supported. Source channel: CH1~CH2, D0~D15
CAN (Option)	MSO5000–AUTO option Trigger on the start of a frame, end of a frame, Remote ID, Overload, Frame ID, Frame Data, Data&ID, Frame Errorr, Bit Fill, Answer Error, Check Error, Format Error, and Random of the CAN signal (up to 5Mb/s). The supported CAN bus signal types include CAN_H, CAN_L, TX/RX, and DIFF. Source channel: CH1~CH2, D0~D15
FlexRay (Option)	MSO5000–FLEX option Trigger on the specified position (TSS End, FSS_BSS End, FES End, DTS End), frame (null, Syn, Start, All), symbol (CAS/MTS and WUS), error (Head CRC Err, Tail CRC Err, Decode Err, and Random Err) of the FlexRay signal (up to 10 Mb/s). Source channel: CH1~CH2, D0~D15

LIN (Option)	MSO5000–AUTO option Trigger on the Sync, ID, Data (length settable), Data&ID, Wakeup, Sleep, and Error of the LIN bus signal (up to 20 Mb/s). Source channel: CH1~CH2, D0~D15
I2S (Option)	MSO5000–AUDIO option Trigger on 2's complement data of audio left channel, right channel, or either channel (=, ≠, >, <, < >, > <). The available alignment modes include I2S, LJ, and RJ. Source channel: CH1~CH2, D0~D15
MIL–STD–1553 (Option)	MSO5000–AERO option Trigger on the Sync (Data Sync, Cmd/Status Sync, and All Sync) field, Data, RTA, RTA+11Bit, and Error (Sync Error and Check Error) of the MIL–STD–1553 bus. Source channel: CH1~CH2

Search&Navigation

Search, Navigation, and Table	
Type	Edge, Pulse, Runt, Slope, RS232, I2C, and SPI
Source	Any analog channel
Copy	Copy the search settings to the trigger settings, and copy from the trigger settings
Result Display	Event table or navigation. Go to the specific event through the event table index
Navigation	Memory playing: view the memory waveforms with the navigation keys by scrolling through stored waveform data, supporting viewing at three speeds.
	ZOOM playing: view the details of waveforms with the navigation keys by panning the ZOOM window automatically, supporting viewing at three speeds.
	Recording playback: play back the recorded waveforms with the navigation keys.
	Event navigation: use the navigation keys to scroll through the event search results.

Waveform Measurement

Waveform Measurement		
Cursor	Number of Cursors	2 pairs of XY cursors
	Manual Mode	Voltage deviation between cursors (△Y) Time deviation between cursors (△X) Reciprocal of △X (Hz) (1/△X)
	Track Mode	Fix Y–axis to track X–axis waveform point's voltage and time values Fix X–axis to track Y–axis waveform point's voltage and time values
	Auto Measurement	Allow to display cursors during auto measurement
	XY Mode	Measure the voltage parameters of the corresponding channel waveforms in XY time base mode. X = Channel 1, Y = Channel 2
Auto Measurement	Number of Measurements	41 auto measurements; and up to 10 measurements can be displayed at a time.
	Measurement Source	CH1~CH2, Math1~Math4, and D0~D15
	Measurement Mode	Normal and Precision (full–memory hardware measurement)
	Measurement Range	Main, Zoom, and Cursor
	All Measurement	Display 33 measurement items for the current measurement channel; the measurement results are updated continuously; you can switch the measurement channel.
	Vertical	Vmax, Vmin, Vpp, Vtop, Vbase, Vamp, Vupper, Vmid, Vlower, Vavg, VRMS, Per.VRMS, Overshoot, Preshoot, Area, Per.Area, and Std Dev.
	Horizontal	Period, Frequency, Rise Time, Fall Time, +Width, –Width, +Duty, –Duty, Positive Pulse Count, Negative Pulse Count, Rising Edge Count, Falling Edge Count, Tvmax, Tvmin, +Slew Rate, and –Slew Rate
	Others	Delay(A ↑ –B ↑), Delay(A ↑ –B ↓), Delay(A ↓ –B ↑), Delay(A ↓ –B ↓), Phase(A ↑ –B ↑), Phase(A ↑ –B ↓), Phase(A ↓ –B ↑), and Phase(A ↓ –B ↓)
	Analysis	Counter, DVM, Bode, and UPA
	Statistics	Current, Average, Max, Min, Standard Deviation, Count Statistical times settable

Waveform Calculation

Waveform Calculation	
No. of Math Functions	4; 4 math functions available to be displayed at a time
Operation	A+B, A–B, A × B, A/B, FFT, A&&B, A||B, A^B, !A, Intg, Diff, Sqrt, Lg, Ln, Exp, Abs, AX+B, LowPass, HighPass, BandPass, and BandStop

Source		CH1~CH2, D0~D15 (only available for A&&B, A||B, !A, and A^B), Math1~Math4, and Ref1~Ref10
Color Grade		Support Math and FFT
Enhanced FFT	Record Length	Max. 1 Mpts
	Window Type	Rectangular, Blackman–Harris, Hanning (default), Hamming, Flattop, and Triangle.
	Pane	Full
	Peak Search	A maximum of 15 peaks, confirmed by the settable threshold and offset threshold set by users

Waveform Analysis

Waveform Analysis		
Waveform Recording		Store the signal under test in segments according to the trigger events, i.g. save all the sampled waveform data as a segment to the RAM for each trigger event. The maximum number of the sampled segments reaches 450,000.
	Source	All enabled analog channels and digital channels
	Analysis	Support playing frame by frame or continuous playing; capable of calculating, measuring, and decoding the played waveforms
Pass/Fail Test		Compare the signal under test with the user–defined mask to provide the test results: the number of successful tests, failed tests, and the total number of tests. The pass/fail event can enable immediate stop, beeper, and the screenshot.
	Source	Any analog channel
Histogram		The waveform histogram provides a group of data, showing the number of times a waveform hits within the defined region range on the screen. The waveform histogram not only shows the distribution of hits, but also the ordinary measurement statistics.
	Source	Any analog channel or auto measurement item
	Type	Horizontal, Vertical, or Measure
	Measure	Sum, Peaks, Max, Min, Pk_Pk, Mean, Median, Mode, Bin width, Sigma, and XScale
	Mode	Support all modes, except the Zoom, XY, and ROLL modes
Color Grade		Provide a dimensional view for color grade waveforms
	Source	Any analog channel
	Color Theme	Temperature and intensity
	Mode	Support all modes

Serial Decoding

Serial Decoding	
Number of Decodings	4, four protocol types can be supported at the same time
Decoding Type	Standard: Parallel
	Option: RS232, UART, I2C, SPI, LIN, CAN, FlexRay, I2S, and MIL–STD–1553
Parallel	Up to 18 bits of Parallel decoding, supporting the combination of any analog channel and digital channel. Support user–defined clock and auto clock settings. Source channel: CH1~CH2, D0~D15
RS232/UART	MSO5000–COMP option Decode the RS232/UART (up to 20 Mb/s) bus's TX/RX data (5–9 bits), parity (Odd, Even, or None), and stop bits (1–2 bits) Source channel: CH1~CH2, D0~D15
I2C	MSO5000–EMBD option Decode the address (with or without the R/W bit) of the I2C bus, data, and ACK. Source channel: CH1~CH2, D0~D15
SPI	MSO5000–EMBD option Decode the MISO/MOSI data (4–32 bits) of the SPI bus. The available mode includes "Timeout" and "CS". Source channel: CH1~CH2, D0~D15
LIN	MSO5000–AUTO option Decode the protocol version (1.X or 2.X) of the LIN bus (up to 20 Mb/s). The decoding displays sync, ID, data, and check sum. Source channel: CH1~CH2, D0~D15
CAN	MSO5000–AUTO option Decode the remote frame (ID, byte number, CRC), overload frame, and data frame (standard/extended ID, control domain, data domain, CRC, and ACK) of the CAN bus (up to 5 Mb/s). The supported CAN bus signal types include CAN_H, CAN_L, TX/RX, and DIFF. Source channel: CH1~CH2, D0~D15
FlexRay	MSO5000–FLEX option Decode the frame ID, PL (payload), Header CRC, Cycle Count, Data, Tail CRC, and DTS of the FlexRay bus (up to 10 Mb/s). The supported signal types include BP, BM, and RX/TX. Source channel: CH1~CH2, D0~D15

I2S	MSO5000–AUDIO option Decode I2S audio bus left channel data and right channel data, supporting 4–32 bits. The alignment modes include I2S, LJ, and RJ. Source channel: CH1~CH2, D0~D15
MIL–STD–1553	MSO5000–AERO option Decode the MIL–STD–1553 bus signal's data word, command word, and status word (address+last 11 bits). Source channel: CH1~CH2

Auto

Auto	
AutoScale	Min voltage greater than 5 mVpp, duty cycle greater than 1%, frequency over 35 Hz

Arbitrary Waveform Generator

Arbitrary Waveform Generator (technical specifications are typical values) (option)		
Number of Channels	1	
Output Mode	Normal (2–channel output)	
Sample Rate	200 MSa/s	
Vertical Resolution	14 bits	
Max. Frequency	25 MHz	
Standard Waveform	Sine, Square, Ramp, Pulse, DC, Noise	
Built–in Waveform	Sinc, Exp.Rise, Exp.Fall, ECG, Gauss, Lorentz, Haversine	
Sine	Frequency Range	100 mHz to 25 MHz
	Flatness	±0.5 dB (relative to 1 kHz)
	Harmonic Distortion	–40 dBc
	Spurious (non–harmonics)	–40 dBc
	Total Harmonic Distortion	1%
	S/N Ratio	40 dB
Square/Pulse	Frequency Range	Square: 100 mHz to 15 MHz
		Pulse: 100 mHz to 1 MHz
	Rise/Fall Time	<15 ns
	Overshoot	<5%
	Duty	Square: always be 50%
		Pulse: 10% to 90%, adjustable
	Duty Cycle Resolution	1% or 10 ns (whichever is greater)
	Min. Pulse Width	20 ns
	Pulse Width Resolution	10 ns or 5 bits (whichever is greater)
	Jitter	5 ns
Ramp	Frequency Range	100 mHz to 100 kHz
	Linearity	1%
	Symmetry	1% to 100%
Noise	Bandwidth	>25 MHz
Built–in Waveform	Frequency Range	100 mHz to 1 MHz
Arbitrary Waveform	Frequency Range	100 mHz to 10 MHz
	Waveform Length	2~16 kpts
	Support loading channel waveforms (screen range and cursor range) and stored waveforms	
Frequency	Accuracy	100 ppm (<10 kHz), 50 ppm (>10 kHz)
	Resolution	100 mHz or 4 bits (whichever is greater)
Amplitude	Output Range	20 mVpp~5 Vpp (HighZ), 10 mVpp~2.5 Vpp (50 Ω)
	Resolution	100 uV or 3 bits (whichever is greater)
	Accuracy	±(2% of setting+1 mV) (Frequency=1 kHz)
DC Offset	Range	±2.5 V (HighZ), ±1.25 V (50 Ω)
	Resolution	100 uV or 3 bits (whichever is greater)
	Accuracy	±(2% of offset setting+5 mV+0.5% of amplitude)

Modulation	AM, FM, FSK	
	AM	Modulating Waveforms: Sine, Square, Triangle, and Noise.
		Modulation Frequency: 1 Hz to 50 kHz
		Modulation Depth: 0% to 120%
	FM	Modulating Waveforms: Sine, Square, Triangle, and Noise.
		Modulation Frequency: 1 Hz to 50 kHz
		Modulation Offset: 1 Hz to carrier frequency
	FSK	Modulating Waveforms: 50% duty cycle square
		Modulation Frequency: 1 Hz to 50 kHz
		Hopping Frequency: 100 mHz to max. carrier frequency
Sweep	Linear, Log, and Step	
	Sweep Time	1 ms to 500 s
	Start Frequency and End Frequency	Any frequencies within the waveform range
Burst	N Cycle, Infinite	
	Cycle Count	1 to 1000000
	Burst Period	1 μs to 500 s
	Burst Delay	0 s to 500 s
	Trigger Source	Internal, Manual

Digital Voltmeter

Digital Voltmeter (technical specifications are typical values)	
Source	Any analog channel
Function	DC, AC+DC RMS, and AC RMS
Resolution	ACV/DCV: 3 bits
Limits Beeper	Sound an alarm when the voltage value is within or outside of the limit range.
Range Measurement	Display the latest measurement results in the form of a diagram, and display the extrema over the last 3 seconds

High-precision Frequency Counter

High–precision Frequency Counter		
Source		Any analog channel and digital channel
Measure		Frequency, period, totalizer
Counter	Resolution	Max. 6 bits, user–defined
	Max. Frequency	Max. bandwidth of the analog channel
Totalizer		48–bit totalizer
	Edge	Count the number of the rising edges
Time Reference		Internal Reference

Customization for Quick Key

Customization for Quick Key	
Quick Screenshot	Quickly save the screen image to the specified path based on the current image storage menu settings.
Quick Waveform Save	Quickly save the screen or memory waveforms to the specified path based on the current waveform storage menu settings.
Quick Save Settings	Quickly save the setup file to the specified path based on the current setup storage menu settings.
Quick All Measurement	Display all the prompt message windows for all the measurement of the waveforms.
Quick Reset of Statistics	Quickly reset all the measurement statistics data and measurement counts.
	Quickly reset all the statistics information in PassFail function.
Quick Waveform Recording	Quickly start or stop the waveform recording.
Quick Email Sending	Quickly send the Email based on the set email address.
Quick Print	Quickly perform the print operation based on the current printer settings.
Quick Group Saving	Quickly perform the group saving function based on the currently selected item for saving.

Command Set

Command Set	
Common Commands Support	IEEE488.2 Standard
Error Message Definition	Error messages
Support Status Report Mechanism	Status reporting
Support Syn Mechanism	Synchronization

Display

Display	
LCD	9–inch capacitive multi–touch screen/gesture enabled operation
Resolution	1024 × 600 (Screen Region)
Graticule	(10 vertical divisions) x (8 horizontal divisions)
Persistence	Off, Infinite, variable persistence (100 ms to 10 s)
Brightness	256 intensity levels (LCD,HDMI)

I/O

I/O		
USB 2.0 Hi–speed Host Port	1 on the front panel	
USB 2.0 Hi–speed Device Port	1 on the rear panel, compatible with USB Test and Measurement Class (USBTMC)	
LAN	1 on the rear panel, 10/100/1000–port, supporting LXI–C	
GPIB	GPIB–USB adapter (option)	
Web Remote Control	Support VNC Web interface (input the IP address of the oscilloscope into the Web browser to display the operation interface of the oscilloscope)	
Aux Out	BNC output on the rear panel. Vo (H)≥2.5 V open circuit, ≥1.0 V 50 Ω to GND Vo (L)≤0.7 V to load ≤4 mA; ≤0.25 V 50 Ω to GND	
	Trigger Output	Output a pulse signal when the oscilloscope is triggered.
	Pass/Fail	Output a pulse signal when a pass/fail event occurs. Supports user–defined pulse polarity and pulse time (100 ns~10 ms).
HDMI video output	1 on the rear panel, HDMI 1.4b, A plug. used to connect to an external monitor or projector	
Probe Compensation Output	1 kHz, 3 Vpp square waveform	

Power

Power Supply	
Power Voltage	100 V–240 V, 45 Hz–440 Hz
Power	Max. 75 W (connect to various interfaces, USB)
Fuse	4 A, T degree, 250 V

Bode

Bode	
Start Frequency	10 Hz to 25 MHz
Stop Frequency	100 Hz to 25 MHz
Points/Decade	10 to 300
Output Amplitude	HighZ: 20 mV to 5 V; 50Ω: 10 mV to 2.5 V

Environment

Environmental Stress		
Temperature Range	Operating	0℃~+50℃
	Non–operating	–30℃~+70℃
Humidity Range	Operating	Below +30℃: ≤90% RH (without condensation)
		+30℃ to +40℃, ≤75% RH (without condensation)
		+40℃ to +50℃, ≤45% RH (without condensation)
	Non–operating	Below 65℃: ≤90% RH (without condensation)
Altitude	Operating	Below 3,000
	Non–operating	Below 15,000

Warranty and Calibration Interval

Warranty and Calibration Interval	
Warranty	3 years
Recommended Calibration Interval	18 months

Regulations

Regulations		
Electromagnetic Compatibility	Compliant with EMC DIRECTIVE 2014/30/EU, compliant with or higher than the standards specified in IEC 61326–1:2013/EN 61326–1:2013 Group 1 Class A	
	CISPR 11/EN 55011	
	IEC 61000–4–2:2008/EN 61000–4–2	± 4.0 kV (contact discharge), ± 8.0 kV (air discharge)
	IEC 61000–4–3:2002/EN 61000–4–3	3 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz)
	IEC 61000–4–4:2004/EN 61000–4–4	1 kV power line
	IEC 61000–4–5:2001/EN 61000–4–5	0.5 kV (phase–to–neutral voltage); 1 kV (phase–to–earth voltage); 1 kV (neutral–to–earth voltage)
	IEC 61000–4–6:2003/EN 61000–4–6	3 V, 0.15–80 MHz
	IEC 61000–4–11:2004/EN 61000–4–11	voltage dip: 0% UT during half cycle; 0% UT during 1 cycle; 70% UT during 25 cycles short interruption: 0% UT during 250 cycles
Safety	IEC 61010–1:2010 (Third Edition)/EN 61010–1:2010, UL 61010–1:2012 R4.16 and CAN/CSA–C22.2 NO. 61010–1–12+ GI1+ GI2	
Vibration	Meet GB/T 6587; class 2 random Meets MIL–PRF–28800F and IEC60068–2–6; class 3 random	
Shock	Meet GB/T 6587–2012; class 2 random Meet MIL–PRF–28800F and IEC60068–2–27; class 3 random (in non–operating conditions: 30 g, half sine, 11 ms duration, 3 vibrations along the main axis, a total of 18 vibrations)	

Mechanical Characteristics

Mechanical Characteristics		
Dimensions[4]	367 mm (W) × 200 mm (H) × 130 mm (D)	
Weight[5]	Package Excluded	<3.5 kg
	Package Included	<5.8 kg
Rack Mount Kit	5U	

Non-volatile Memory

Non–volatile Memory		
Data/File Storage	Setup/Image	setup (*.stp), image (*.png, *.bmp, *.tif, *.jpg)
	Waveform Data	CSV waveform data (*.csv), binary waveform data (*.bin, *.wfm), list data (*.csv), reference waveform data (*.ref, *.csv, *.bin), and arbitrary waveform data (*.arb)
Reference Waveform	Display 10 internal waveforms, and its storage is limited by the capacity	
Setting	Storage is limited by the capacity	
USB Capacity	Support the USB storage device that conforms to the industry standard	

Note[1]: Maximum value. single–channel, 20 ns horizontal time base, input amplitude 4 div, sine wave signal with 10 MHz frequency. Others are default settings.
Note[2]: 1 mV/div and 2 mV/div are a magnification of 4 mV/div setting. For vertical accuracy calculations, use full scale of 32 mV for 1 mV/div and 2 mV/div sensitivity setting.
Note[3]: You need to press Acquire → More → Auto ROLL to enable the ROLL mode.
Note[4]: Supporting legs and handle folded, knob height included, front protective cover excluded.
Note[5]: Standard configuration.

Order Information

Order Information	Order No.
Model	
MSO5152–E (150 MHz, 4 GSa/s, 50 Mpts, 2+16 CH MSO)	MSO5152–E
Standard Accessories	
Power cord conforming to the standard of the destination country	–
USB cable	CB–USBA–USBB–FF–150
2 passive probes (350 MHz)	PVP2350
Quick guide (hard copy)	–
Optional Accessories	
16 digital channels active logic probe (available for MSO5000/MSO5000–E series)	PLA2216
Front panel cover	MSO5000–E–FPC
Rack mount kit	MSO5000–RM
USB–GPIB interface converter	USB–GPIB
Near–field probe	NFP–3
Power analysis phase difference correction jig	RPA246
Digital oscilloscope demonstration plate	DK–DS6000
Memory Depth Option	
Maximum memory depth up to 100 Mpts	MSO5000–E–1RL
Bundle Option	
Function and application bundle option, including MSO5000–COMP, MSO5000–EMBD, MSO5000–AUTO, MSO5000–FLEX, MSO5000–AUDIO, MSO5000–AERO, MSO5000–E–AWG, and MSO5000–PWR	MSO5000–E–BND
Serial Protocol Analysis Option	
PC serial bus trigger and analysis (RS232/UART)	MSO5000–COMP
Embedded serial bus trigger and analysis (I2C and SPI)	MSO5000–EMBD
Auto serial bus trigger and analysis (CAN and LIN)	MSO5000–AUTO
FlexRay serial bus trigger and analysis (FlexRay)	MSO5000–FLEX
Audio serial bus trigger and analysis (I2S)	MSO5000–AUDIO
MIL–STD–1553 serial bus trigger and analysis (MIL–STD–1553)	MSO5000–AERO
Measurement Application Option	
25 MHz arbitrary waveform generator	MSO5000–E–AWG
Built–in Power Analysis	MSO5000–PWR

Note: For all the mainframes, accessories and options, please contact the local office of **RIGOL**.

Warranty Period

Three years for the mainframe, excluding the probes and accessories

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