RIGOL

DHO900 Series

Digital Oscilloscope

Data Sheet

DSA37101-1110

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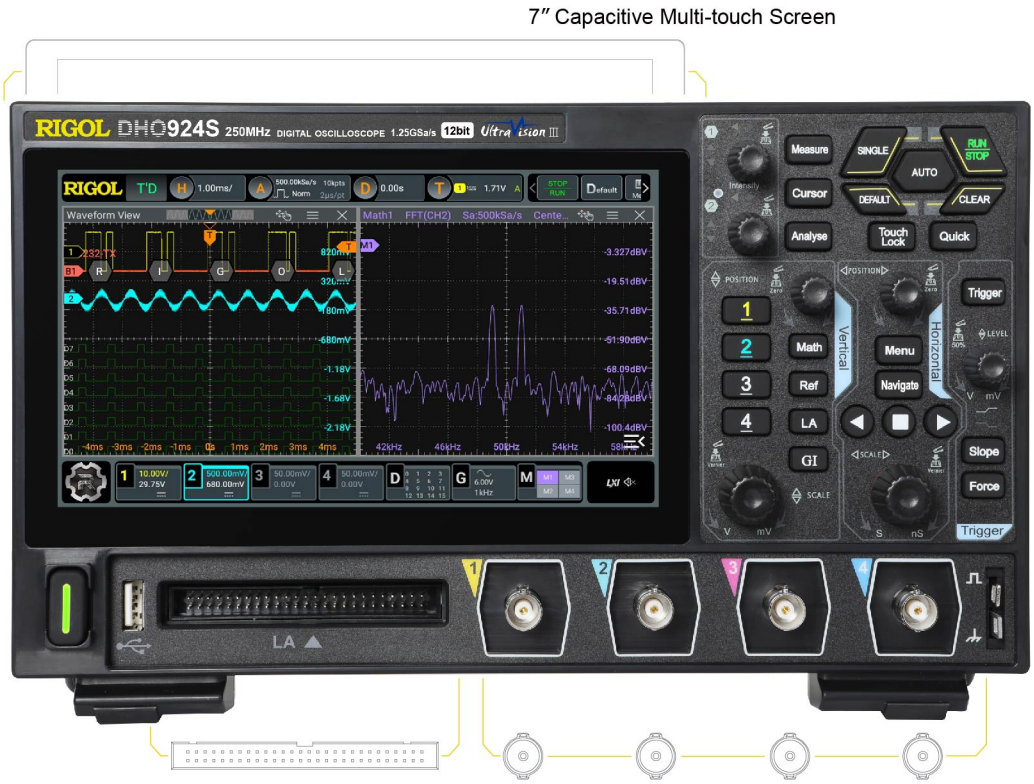
DHO900 Series
Digital Oscilloscope

Compact Size, Various Functions



265.35 mm (W) × 161.75 mm (H) ×77.38 mm (D)

Application Scenarios

It is compact and portable, easy to be used on the workbench, in the classroom, on the test site, and in other application scenarios.
You can put it on the workbench, with supporting legs folded or unfolded; put it flat on the workbench; or fix its rear panel to the desktop clamp-on stand to save room.

N-in-1 Integrated Digital Oscilloscope

Digital Oscilloscope

Capture rate up to 1,000,000 wfms/s (in UltraAcquire Mode), 50 Mpts memory depth, and 12-bit high resolution

Logic Analyzer

16 digital channels (std.), 25 Mpts memory depth for the waveforms of all the digital channels, max. sample rate 625 MSa/s
Support analog/digital channel triggers and decodes, convenient digital channel operation

Arbitrary Function Generator (AFG)

Single-channel AFG output (std.), support 6 standard waveforms and user-defined waveforms, with the max. frequency 25 MHz
Sample rate up to 156 MSa/s, support modulation

Protocol Analyzer

Support RS232/UART, I2C, SPI, CAN, and LIN serial bus decodings that can help engineers make an in-depth waveform analysis; widely used in the auto electronics and other fields.

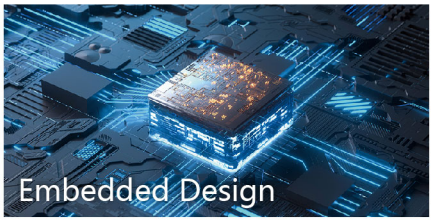
Bode Plot (Standard for DHO914S and DHO924S)

The DHO900 series can generate the sweep signal of the specified range by controlling the built-in signal generator module and output the signal to the switching power supply to carry out loop analysis test. The bode plot can display the gain and phase variations of the system under different frequencies, helping engineers analyze the phase margin (PM) and gain margin (GM) to quickly judge whether the system is stable.

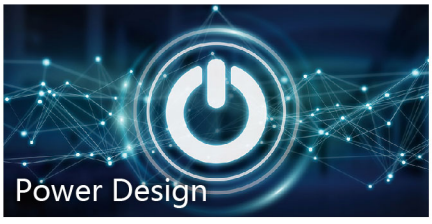
Type-C Interface

Provides power with the mobile power supply via this interface, making the on-site test more flexible.

Application



With a standard configuration of embedded decodes, the DHO900 series supports digital signal analysis, efficiently analyzing the analog and digital signals in the embedded system.



The 12-bit resolution delivers 4096 vertical digitizing levels, capable of capturing the signal details of the high-precision power supply. The S model is equipped with a standard configuration of built-in signal generator and Bode plot loop analysis function, making it easy to do the switching power supply test.

The DHO series offers standard CAN and LIN auto bus decodes, capable of addressing the decoding demands of the automobile communication system.

Product Features

Product Features

- Ultra-low noise floor, purer signal, never miss the small signals
- Up to 12 bits resolution for all the models of this series
- Max. analog bandwidth of 250 MHz, 4 analog channels
- 16 digital channels (std.), logic probe required to be purchased if needed
- Max. real-time sample rate of 1.25 GSa/s
- Max. memory depth of 50 Mpts
- Vertical sensitivity range: 200 μV/div to 10 V/div
- Max. capture rate of 1,000,000 wfms/s (in UltraAcquire mode)
- Digital phosphor display with real-time 256-level intensity grading
- Integrates the AFG function, bode plot analysis, histogram, digital signal analysis, and etc
- Waveform search and navigation function allows you to debug the signal anomalies faster
- 7" (1024x600) capacitive multi-touch screen
- Brand new Flex Knob brings user-friendly experience
- USB Device & Host, LAN, and HDMI interfaces (std.) for all the models of this series
- Novel and delicate industrial design, easy to operate
- Unique online upgrade

The DHO900 series is RIGOL's new launched high-performance economical digital oscilloscope. Though compact in design, it has superior performance. It features a capture rate up to 1,000,000 wfms/s (in UltraAcquire Mode), 50 Mpts memory depth, 12 bits resolution, and low noise.

The DHO900 series supports 16 digital channels. One instrument can make an analysis on both the analog and digital signals to meet the embedded design and test scenarios. With an affordable price equivalent to purchasing an entry-level instrument, you can access the auto serial and parallel bus analysis, bode plot analysis, and other functions to meet the test demands in the R&D, education, and scientific research fields.

RIGOL Probes and Accessories Supported

Model	Type	Description
Passive High-impedance Probe		
 PVP2150	Passive High-impedance Probe	• Attenuation: 10:1/1:1 • 1X BW: DC to 35 MHz • 10X BW: DC to 150 MHz • Compatibility: All models of RIGOL's digital oscilloscopes
 PVP2350	Passive High-impedance Probe	• Attenuation: 10:1/1:1 • 1X BW: DC to 35 MHz • 10X BW: DC to 350 MHz • Compatibility: All models of RIGOL's digital oscilloscopes
 PVP3150	Passive High-impedance Probe	• Attenuation: 10:1/1:1 • 1X BW: DC to 20 MHz • 10X BW: DC to 150 MHz • Compatibility: All models of RIGOL's digital oscilloscopes
High-voltage Single-ended Probe		
 RP1010H	High-voltage Probe	• Attenuation: 1000:1 • BW: DC to 40 MHz • DC: 0 to 10 kV DC • AC: pulse ≤20 kVp-p • AC: sine ≤7 kV_{rms} • Compatibility: All models of RIGOL's digital oscilloscopes
 RP1018H	High-voltage Probe	• Attenuation: 1000:1 • BW: DC to 150 MHz • $DC+AC_{peak}$: 18 kV CAT II • AC_{rms}: 12 kV CAT II • Compatibility: All models of RIGOL's digital oscilloscopes

Model	Type	Description
 RP1300H	High-voltage Probe	• Attenuation: 100:1 • BW: DC to 300 MHz • CAT I 2000 V (DC+AC) • CAT II 1500 V (DC+AC) • Compatibility: All models of RIGOL's digital oscilloscopes
High-voltage Differential Probe		
 PHA0150	High-voltage Differential Probe	• BW: DC to 70 MHz • Max. voltage ≤ 1500 Vpp • Compatibility: All models of RIGOL's digital oscilloscopes
 PHA1150	High-voltage Differential Probe	• BW: DC to 100 MHz • Max. voltage ≤ 1500 Vpp • Compatibility: All models of RIGOL's digital oscilloscopes
 PHA2150	High-voltage Differential Probe	• 50X BW: DC to 160 MHz • 500X BW: DC to 200 MHz • Max. voltage ≤ 1500 Vpp • Compatibility: All models of RIGOL's digital oscilloscopes
 RP1025D	High-voltage Differential Probe	• BW: DC to 25 MHz • Max. voltage ≤ 1400 Vpp (DC + AC P-P) • Compatibility: All models of RIGOL's digital oscilloscopes
 RP1050D	High-voltage Differential Probe	• BW: DC to 50 MHz • Max. voltage ≤ 7000 Vpp (DC + AC P-P) • Compatibility: All models of RIGOL's digital oscilloscopes
 RP1100D	High-voltage Differential Probe	• BW: DC to 100 MHz • Max. voltage ≤ 7000 Vpp (DC + AC P-P) • Compatibility: All models of RIGOL's digital oscilloscopes

Model	Type	Description
Current Probe		
 RP1001C	Current Probe	• BW: DC to 300 kHz • Maximum Input AC: ±100 A AC P-P: 200 A AC RMS: 70 A • Compatibility: All models of RIGOL's digital oscilloscopes
 RP1002C	Current Probe	• BW: DC to 1 MHz • Maximum Input AC: ±70 A AC P-P: 140 A AC RMS: 50 A • Compatibility: All models of RIGOL's digital oscilloscopes
 RP1003C	Current Probe	• BW: DC to 50 MHz • Maximum Input AC P-P: 50 A (non-continuous) AC RMS: 30 A • Compatibility: All models of RIGOL's digital oscilloscopes • Required to order RP1000P power supply.
 RP1004C	Current Probe	• BW: DC to 100 MHz • Maximum Input AC P-P: 50 A (non-continuous) AC RMS: 30 A • Compatibility: All models of RIGOL's digital oscilloscopes • Required to order RP1000P power supply.
 RP1005C	Current Probe	• BW: DC to 10 MHz • Maximum Input AC P-P: 300 A (non-continuous), 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
 RP1006C	Current Probe	• BW: DC to 2 MHz • Maximum Input AC P-P: 700 A peaks, non-continuous AC RMS: 500 A • Compatibility: All models of RIGOL's digital oscilloscopes • Required to order RP1000P power supply.
 RP1000P	4CH Power Supply	Power supply for RP1003C, RP1004C, RP1005C, and RP1006C; supporting 4 channels.
Logic Analyzer Probe		
 PLA2216	Logic Analyzer Probe	• Logic analyzer probe dedicated for MSO5000 and DHO900 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 DHO900 Series Technical Specifications

Overview of the DHO900 Series Technical Specifications				
Model	DHO914	DHO914S	DHO924	DHO924S
Analog Bandwidth (-3 dB)	125 MHz		250 MHz	
Rise Time (10% to 90%, typical)	≤2.8 ns		≤1.4 ns	
No. of Input/Output Channels	4 input analog channels 16 input digital channels (required to purchase the PLA2216 logic analyzer probe) single-channel arbitrary function generator (AFG) output (only available for the S model)			
Sampling Mode	Real-time Sampling			
Max. Sample Rate of Analog Channel	1.25 GSa/s (single-channel[1]), 625 MSa/s (dual-channel[2]), 312.5 MSa/s (full-channel[3])			
Max. Memory Depth	50 Mpts (single-channel[1]), 25 Mpts (dual-channel[2]), 10 Mpts (full-channel[3])			
Max. Waveform Capture Rate	30,000 wfms/s (Vector Mode) 1,000,000 wfms/s (UltraAcquire Mode)			
Vertical Resolution	12 bits			
Hardware Real-time Waveform Recording and Playing	Max. 500,000 frames			
Peak Detection	Capture 1.6 ns glitches			
LCD Size and Type	7'' capacitive multi-touch screen			
Display Resolution	1024x600			

Vertical System Analog Channel

Vertical System Analog Channel		
Input Coupling		DC, AC, or GND
Input Impedance		1 MΩ ± 1%
Input Capacitance		15 pF ± 3 pF
Probe Attenuation Coefficient		0.001X, 0.002X, 0.005X, 0.01X, 0.02X, 0.05X, 0.1X, 0.2X, 0.5X, 1X, 2X, 5X, 10X, 15X, 20X, 50X, 100X, 150X, 200X, 500X, 1000X, 1500X, 2000X, 5000X, 10000X, 15000X, 20000X, and 50000X
Maximum Input Voltage		CAT I 300 V_{rms}, 400 V_{pk} (DC + V_{peak})
	Remarks	Whether the probe is used or not, the transient overvoltage is not allowed to occur. Please use the instrument dedicated for the specified measurement category (not applicable to CAT II, III, and IV)
Vertical Resolution		12 bits
Vertical Sensitivity Range[4]		200 μV/div to 10 V/div
Offset Range		±0.5 V (<500 μV/div) ±1 V (≥500 μV/div, ≤65 mV/div) ±8 V (>65 mV/div, ≤270 mV/div) ±20 V (>270 mV/div, ≤2.75 V/div) ±100 V (>2.75 V/div, ≤10 V/div)
Dynamic Range		±4 div (12 bits)
Bandwidth Limit (Typical)		20 MHz, FULL; selectable for each channel
DC Gain Accuracy[4]		± 1% (>5mV/div, FullScale) ± 2% (≤5mV/div, FullScale)
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		≥100:1
ESD Tolerance		±8 kV (on input BNCs)

Vertical System Digital Channel

Vertical System Digital Channel	
Number of Channels	16 input channels (D0 to D15) (D0 to D7, D8 to D15)
Threshold Range	±15.0 V, in 10 mV step
Threshold Accuracy	±(100.00 mV + 3% of threshold setting)
Threshold Selection	TTL(1.4 V), CMOS5.0(2.5 V), CMOS3.3(1.65 V), CMOS2.5(1.25 V), CMOS1.8(0.9 V), ECL(-1.3 V), PECL(3.7 V), LVDS(1.2 V), 0.0V User (threshold adjustable for a single channel)
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	about 8 pF
Vertical Resolution	1 bits

Horizontal System--Analog Channel

Horizontal System--Analog Channel		
Range of Time Base		2 ns/div to 500 s/div
		Fine
Time Base Resolution		100 ps
Time Base Accuracy		±25 ppm ± 5 ppm/year
Time Base Delay Range	Pre-trigger	-5 div
	Post-trigger	1 s or 100 div, whichever is greater
Delta Time Accuracy		±(Time Base Accuracy x Readout) ± (0.001 x Screen Width) ± 20 ps
Channel-to-Channel Skew Correction		±100 ns, Accuracy ± 1 ps
Analog Channel-to-Channel Delay (Typical)[5]		≤2 ns

Horizontal System--Analog Channel		
Horizontal Mode	YT	Default
	XY	Channel 1/2/3/4
	SCAN	Time base ≥200 ms/div
	ROLL	Time base ≥50 ms/div, available to enter or exit the ROLL mode by adjusting the horizontal timebase 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)
Channel-to-Channel Skew (Typical)[6]	±5 ns

Acquisition System

Acquisition System		
Max. Sample Rate of Analog Channel	1.25 GSa/s (single-channel[1]), 625 MSa/s (dual-channel[2]), 312.5 MSa/s (full-channel[3])	
Max. Memory Depth of Analog Channel	50 Mpts (single-channel[1]), 25 Mpts (dual-channel[2]), 10 Mpts (full-channel[3])	
Acquisition Mode	Normal	Default
	Peak Detection	Capture 1.6 ns glitches
	Average Type	2, 4, 8, 16...65536 are available for you to choose
	UltraAcquire	Waveform capture rate up to 1,000,000 wfms/s

Trigger System

Trigger System		
Trigger Source		Analog channel (CH1 to CH4), digital channel (D0 to D15)
Trigger Mode		Auto, Normal, Single
Trigger Coupling	DC	DC coupling trigger
	AC	AC coupling trigger
	High Frequency Rejection	Cut-off frequency to 120 kHz (internal trigger only)
	Low Frequency Rejection	Cut-off frequency to 120 kHz (internal trigger only)
Noise Rejection		Increases delay for the trigger circuit (internal trigger only), On/Off
Holdoff Range		8 ns to 10 s
Trigger Bandwidth		Internal trigger: analog bandwidth of the oscilloscope
Trigger Sensitivity		Internal trigger: 0.5 div, ≥50 mV/div; 0.7 div (with noise rejection enabled)
Trigger Level Range		Internal trigger: ±4.5 div from the center of the screen

Trigger Type

Trigger Type	
Trigger Type	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, RS232/UART, I2C, SPI, CAN, and LIN
Edge	Triggers on the threshold of the specified edge of the input signal. The edge types can be Rising, Falling, or Either. Source channel: CH1 to CH4, D0 to D15
Pulse	Triggers 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 to CH4, D0 to D15

Trigger Type	
Slope	Triggers on the positive or negative slope of the specified time. The slew time is greater or smaller than a certain value or within a certain time range. Source channel: CH1 to CH4
Video	Triggers on all lines, specified line, odd field, or even field that conforms to the video standards. The supported video standards include NTSC, PAL/SECAM, 480p/60Hz, 576p/50Hz, 720p/60Hz, 720p/50Hz, 720p/30Hz, 720p/25Hz, 720p/24Hz, 1080p/60Hz, 1080p/50Hz, 1080p/30Hz, 1080p/25Hz, 1080p/24Hz, 1080i/60Hz, and 1080i/50Hz. Source channel: CH1 to CH4
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 to CH4, D0 to D15
Duration	Triggers 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, and 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 to CH4, D0 to D15
Timeout	Triggers when duration of a certain event exceeds the specified time. The event can be specified as Rising, Falling, or Either. Source channel: CH1 to CH4, D0 to D15
Runt	Triggers when the pulses pass through one threshold but fail to pass through another threshold. Source channel: CH1 to CH4
Window	Triggers 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 to CH4
Delay	Triggers 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 to CH4, D0 to 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. Source channel: CH1 to CH4, D0 to D15
Nth Edge	Triggers on the Nth edge that appears after the specified idle time. The edge can be specified as Rising or Falling. Source channel: CH1 to CH4, D0 to D15

Trigger Type	
RS232/UART	Triggers on the Start, Error, Check Error, or Data frame of the RS232/UART bus (up to 20 Mb/s). Source channel: CH1 to CH4, D0 to D15
I2C	Triggers 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 to CH4, D0 to D15
SPI	Triggers on the specified pattern of the specified data width (4 to 32) of SPI bus. CS and Timeout are supported. Source channel: CH1 to CH4, D0 to D15
CAN	Triggers on the start of a frame, end of a frame, Remote ID, Overload, Frame ID, Frame Data, Data&ID, Frame Error, Answer Error, Check Error, Format Error, Bit Fill, 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 to CH4, D0 to D15
LIN	Triggers 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 to CH4, D0 to D15

Search&Navigation

Search&Navigation	
Type	Edge, Pulse
Source	Analog channel
Copy	Copies the search settings from or to the trigger settings mutually, including threshold setting and search condition settings
Result Display	Displays in event table form; can be exported to the external or internal memory
Navigation	Time navigation: navigates to the acquired waveforms in time order.
	Event navigation: uses the navigation keys to scroll through the event search results and navigates to the specified event.
	Frame navigation: navigates to the specified frame segment in UltraAcquire mode.

Waveform Measurement

Waveform Measurement		
Cursor	Number of Cursors	2 pairs of XY cursors
	Manual Mode	Voltage deviation between cursors (ΔY) Time deviation between cursors (ΔX) Reciprocal of ΔX (Hz) (1/ΔX)
	Track Mode	Fixes Y-axis to track X-axis waveform point's voltage and time values Fixes X-axis to track Y-axis waveform point's voltage and time values
	Auto Measurement	Allows to display cursors during auto measurement
	XY Mode	Measures 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 to CH4, D0 to D15, Math1 to Math4
	Measurement Range (Region)	Main, Zoom
	All Measurement	Displays 33 measurement items (vertical and horizontal) for the current measurement channel; the measurement results are updated continuously.
	Vertical	Vmax, Vmin, Vpp, Vtop, Vbase, Vamp, Vupper, Vmid, Vlower, Vavg, VRMS, Per. VRMS, Overshoot, Preshoot, Area, and Period Area.
	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↓)

Waveform Calculation

Waveform Calculation		
No. of Math Functions		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
Color Grade		Supports FFT
FFT	Record Length	Max. 1 Mpts (The max. number of the points to be analyzed for the FFT operation is 1 Mpts.)
	Window Type	Rectangular, Blackman-Harris, Hanning (default), Hamming, Flattop, and Triangle.
	Peak Search	A maximum of 15 peaks, determined by the user-defined threshold and offset threshold

Waveform Analysis

Waveform Analysis		
Waveform Recording		Stores the signal under test in segments according to the trigger events, that is, saves all the sampled waveform data as a segment to the RAM for each trigger event. The maximum number of the sampled segments reaches 500,000.
	Source	All enabled analog channels
	Analysis	Support playing frame by frame or continuous playing; capable of calculating, measuring, and decoding the played waveforms
PassFail		Compares 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

Waveform Analysis		
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, auto measurement item
	Type	Horizontal, vertical, and measure
	Measure	Statistics: Sum, Peaks, Max, Min, Pk_Pk Histogram: Mean, Median, Mode, Bin width, Sigma, and XScale
	Sampling Mode	Supports all modes, except the Zoom, XY, and ROLL modes
Color Grade		Provides a dimensional view for waveform intensity, color grade >16, 256-level color scale display
	Source	Any analog channel
	Color Theme	Temperature and intensity
	Sampling Mode	Supports all modes

Serial Decoding

Serial Decoding	
Number of Decodings	4 protocol types can be decoded and enabled at the same time
Decoding Type	Standard: Parallel, RS232/UART, I2C, SPI, LIN, and CAN
Parallel	Up to 4 bits of Parallel decoding, supporting any analog channel Support user-defined clock and auto clock settings. Source channel: CH1 to CH4, D0 to D15
RS232/UART	Decodes 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 to CH4, D0 to D15
I2C	Decodes the address (with or without the R/W bit) of the I2C bus, data, and ACK. Source channel: CH1 to CH4, D0 to D15

Serial Decoding	
SPI	Decodes the MISO/MOSI data (4-32 bits) of the SPI bus. The available mode includes "Timeout" and "CS". Source channel: CH1 to CH4, D0 to D15
CAN	Decodes 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 to CH4, D0 to D15
LIN	Decodes 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 to CH4, D0 to D15

Bode Plot[7]

Bode Plot	
Start Freq	10 Hz to 24.99 MHz
Stop Freq[8]	100 Hz to 25 MHz
Number of Points per Octave	10 to 300
Output Amplitude	20 mV to 5 V

Arbitrary Function Generator (AFG)[7]

AFG (technical specifications are typical values)	
Number of Channels	1
Output Mode	Normal (Single-channel output)
Sample Rate	156 MSa/s
Vertical Resolution	14 bits
Max. Frequency	25 MHz
Output Waveform	Standard Waveform: Sine, Square, Ramp, DC, Noise User-defined waveform: supported

AFG (technical specifications are typical values)		
Sine	Frequency Range	2 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	Frequency Range	2 mHz to 15 MHz
	Rise/Fall Time	<15 ns
	Overshoot	<5%
	Duty	1% to 99%, adjustable
	Jitter	500 ps
Ramp	Frequency Range	2 mHz to 150 kHz
	Linearity	1%
	Symmetry	0 to 100%
Noise	Frequency Range	25 MHz analog bandwidth
Arbitrary Waveform	Frequency Range	2 mHz to 10 MHz
	Waveform Length	2 pts to 16 kpts
	Supports loading the stored waveforms	
Frequency	Accuracy	100 ppm
	Resolution	0.1 Hz or 4 bits (whichever is greater)
Amplitude	Output Range	2 mV to 10 V (frequency ≤ 10 MHz) 2 mV to 5 V (frequency > 10 MHz)
	Resolution	100 µV or 3 bits (whichever is greater)
	Accuracy	±(2% of setting + 1 mV) (Frequency = 1 kHz)

AFG (technical specifications are typical values)		
DC Offset	Range	-5 V to 5 V
	Resolution	100 µV or 3 bits (whichever is greater)
	Accuracy	±(2% of offset setting + 5 mV + 0.5% of amplitude)
Modulation	AM	Modulating Waveform: Sine, Square, Triangle, Up Ramp, Down Ramp, and Noise. Carrier Waveform: Sine, Square, Ramp Modulation Source: Internal Modulation Depth: 0% to 120% Modulation Frequency: 2 mHz to 1 MHz
	FM	Modulating Waveform: Sine, Square, Triangle, Up Ramp, Down Ramp, and Noise. Carrier Waveform: Sine, Square, Ramp Modulation Source: Internal Frequency Deviation: 2 mHz to set carrier frequency (limited by the carrier frequency setting; the sum of the frequency deviation and carrier frequency shall not exceed the upper limit of the carrier frequency) Modulation Frequency: 2 mHz to 1 MHz
	PM	Modulating Waveform: Sine, Square, Triangle, Up Ramp, Down Ramp, and Noise. Carrier Waveform: Sine, Square, Ramp Modulation Source: Internal Phase Deviation: 0° to 360°, default 90° Modulation Frequency: 2 mHz to 1 MHz

Auto

Auto	
AutoScale	Min voltage > 10 mVpp, duty cycle > 1%, frequency > 35 Hz

Digital Voltmeter

Digital Voltmeter	
Source	Any analog channel
Function	DC, AC+DC_{rms}, AC_{rms}

Digital Voltmeter	
Resolution	ACV/DCV: 3 digits
Limits Beeper	Sounds an alarm when the voltage value is within or outside of the limit range

High-precision Frequency Counter

High-precision Frequency Counter		
Source		Any analog channel
Measure		Frequency, period, totalizer
Counter	Resolution	3-6 digits, user-defined
	Max. Frequency	Max. analog bandwidth
Totalizer		48-bit totalizer
		Counts the number of the rising edges
Time Reference		Internal reference

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	7-inch capacitive multi-touch screen, gesture enabled operation
Resolution	1024×600 (Screen Region) 16:9
Graticule	10 horizontal divisions x 8 vertical divisions
Persistence	Off, Infinite, variable persistence (100 ms to 10 s)
Brightness	256 intensity levels (LCD, HDMI)

Processor System

Processor System	
Processor	Cortex-A72 up to 1.8 GHz, 6-core processor
System Memory	4 GB RAM
Operating System	Android
Internal Non-volatile Memory	8 GB

I/O

I/O		
USB2.0 Host		1 on the front panel
USB2.0 Device		1 on the rear panel
LAN		1 on the rear panel, 10/100 Base-T, supporting LXI-C
Web Remote Control		Supports Web Control interface (input the IP address of the oscilloscope into the Web browser to display the operation interface of the oscilloscope)
AFG OUT[7]	Waveform Output	1 on the rear panel, BNC connector
AUX OUT	Output Interface	1 on the rear panel, BNC connector 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	Outputs 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 to 10 ms)
HDMI	Video Output	1 on the rear panel, HDMI 1.4, A plug. It is used to connect to an external monitor or projector
Probe Compensation Output		1 kHz, 3 V_{pp} square waveform

Power Supply

Power Supply	
Power Supply Interface	Type-C
Power Voltage	DC 12 V, 4 A
Power	Max. 48 W (when connected to various interfaces, USB storage device, active probes)

Environment

Environment		
Temperature Range	Operating	0℃ to 50℃
	Non-operating	-30℃ to +60℃
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 60℃: ≤90% RH (without condensation)
Altitude	Operating	below 3,000 m
	Non-operating	Below 15,000 m

Warranty and Calibration Interval

Warranty and Calibration Interval	
Warranty	Three years for the mainframe, excluding the probes and accessories.
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	EN 61010-1:2019 EN 61010-031:2015 IEC 61010-1:2016 IEC 61010-2-030:2017 UL 61010-1:2012 R7 UL 61010-2-31:2017 R2 CAN/CSA-22.2 No. 61010-1-12:2017 CAN/CSA-22.2 No. 61010-2-30:2018 CAN/CSA-22.2 No. 61010-031-07:201	
Vibration	Meets GB/T 6587; class 2 random Meets MIL-PRF-28800F and IEC60068-2-6; class 3 random	

Regulations	
Shock	Meets GB/T 6587-2012; class 2 random Meets MIL-PRF-28800F and IEC 60068-2-27; class 3 random In non-operating conditions: 30 g, half-sine wave, 11 ms duration, 3 shocks along the main axis, total of 18 shocks

Mechanical Characteristics

Mechanical Characteristics	
Dimensions	265.35 mm (W) x 161.75 mm (H) x 77.38 mm (D)
Weight[9]	Package excluded: 1.78 kg
	Package included: 2.78 kg

Non-volatile Memory

Non-volatile Memory		
Data/File Storage	Setup/Image	setup (*.stp), image (*.png, *.bmp, *.jpg)
	Waveform Data	CSV waveform data (*.csv), binary waveform data (*.bin,), list data (*.csv), and reference waveform data (*.ref, *.csv, *.bin)
Internal Capacity		8 GB
Reference Waveform		Displays 10 internal waveforms
Setting		Storage is limited by the capacity
USB Capacity		Supports the USB storage device that conforms to the industry standard

Note:

[1]: Single-channel mode: If any one of the channels is enabled, it is called single-channel mode.

[2]: Dual-channel mode: if any two of the channels are enabled, it is called dual-channel mode.

[3]: Full-channel mode: if any three channels or all of the four channels are enabled, it is called full-channel mode.

[4]: 200 μV/div and 500 μV/div is a magnification of 1 mV/div setting. For vertical accuracy calculations, use full scale of 8 mV.

[5]: For any channel, under the same input impedance with DC-coupled, the Volts/div setting is the same for 100 mV/div and 200 mV/div.

[6]: Channel-to-Channel skew is ±5 ns when the sample rate on the digital channel is 625 MSa/s and the period is 1.6 ns.

[7]: Only DHO914S and DHO924S models are equipped with the Bode plot and AFG function.

[8]: The stop frequency shall be greater than the start frequency.

[9]: Standard configuration.

Order Information and Warranty Period

Order Information

Order Information	Order No.
Model	
250 MHz, 1.25 GSa/s, 50 Mpts, 4CH	DHO924S
250 MHz, 1.25 GSa/s, 50 Mpts, 4CH	DHO924
125 MHz, 1.25 GSa/s, 50 Mpts, 4CH	DHO914S
125 MHz, 1.25 GSa/s, 50 Mpts, 4CH	DHO914
Standard Accessories	
Power Adaptor Conforming to the Standard of the Destination Country	— —
Banana-Plug Ground Connecting Cable	— —
DHO924/DHO924S: Passive Probe x4 (350 MHz)	PVP2350
DHO914/DHO914S: Passive Probe x4 (150 MHz)	PVP3150
Recommended Accessories	
16-channel Logic Analyzer Probe	PLA2216

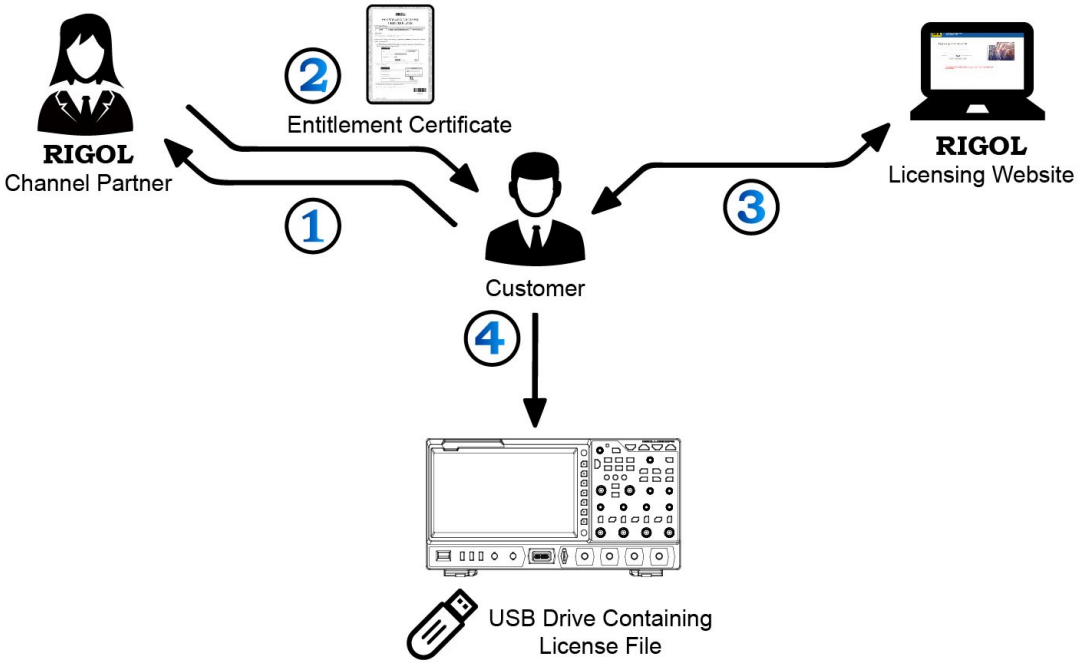
NOTE:

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.

Option Ordering and Installation Process



1. According to the usage requirements, please purchase the specified function options from **RIGOL Sales Personnel**, and provide the serial number of the instrument that needs to install the option.
2. After receiving the option order, the **RIGOL** factory will mail the paper software product entitlement certificate to the address provided in the order.
3. Log in to **RIGOL** official website for registration. Use the software key and instruments serial number provided in the entitlement certificate to obtain the option license code and the option license file.
4. Download the option license file to the root directory of the USB storage device, and connect the USB storage device to the instrument properly. After the USB storage device is successfully recognized, the **Option install** menu is activated. Press this menu key to start installing the option.

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