JHM6000HD Series

High-Resolution Oscilloscope

Data Sheet

Product Introduction

The JHM6000HD Series High-Resolution Oscilloscope features a maximum bandwidth of 2 GHz and a sampling rate of up to 10 GSa/s. It is equipped with 4 analog channels, 1 EXT channel, and 1 signal source output, with a maximum memory depth of 1 Gpts. Adopting ultra-fast acquisition technology, it achieves a waveform capture rate of 1,500,000 wfms/s. The innovative digital trigger system offers high trigger sensitivity and low trigger jitter. It supports a rich set of advanced triggering, serial bus triggering and decoding functions. Additionally, it supports spectrum analysis, power analysis, histogram, waveform recording, Enhanced Resolution (ERES), hardware-accelerated template testing, Search and Navigate advanced acquisition and analysis modes. It is also equipped with comprehensive measurement functions and mathematical operation capabilities..

Characteristics and Advantages

- Analog channel bandwidth: 2GHz/1GHz
- Maximum Real-time Sampling Rate of Analog Channels: 10 GSa/s.
- 12-bit Vertical Resolution, up to 4096 Quantization Levels, for Clear Waveform Details
- 4 Analog Channels + EXT + Gen, Maximum Memory Depth: 1 Gpts
- Maximum Waveform Capture Rate: 800,000 wfms/s (Sequential Mode: 1,500,000 wfms/s)
- 8-in-1 Integrated Measurement Functions: Digital Oscilloscope, Function/Arbitrary Waveform Generator, Spectrum Analyzer, Digital Voltmeter, Frequency Counter, Protocol Analyzer, Bode Plot Analyzer, Power Analyzer
- Built-in 50 MHz Function/Arbitrary Waveform Generator, supporting real-time loading of oscilloscope screen data to arbitrary waveform output, with multiple built-in arbitrary waveforms
- Supports Bode Plot Loop Test and Analysis Function for System Stability Evaluation
- Supports Bus Timing Analysis: I²C, SPI, CAN
- Adds Bar Charts and Line Charts for Parameter Measurement Statistics Display
- Supports Hardware Real-time Waveform Uninterrupted Recording & Analysis up to 400,000 Frames, exportable to USB Storage Devices
- Maximum 4 M-point Enhanced FFT, with Spectrum Analyzer Functions including Frequency Setting, Waterfall Display, Detection Settings and Markers
- Enhanced resolution support, up to 4-bit
- Supports up to 54 Parameter Measurements
- Multi-Windows supports multi-window display
- Multi-channel Independent 7-digit Hardware Frequency Counter, with Adjustable Refresh Time and Effective Digits
- DVM multi-channel independent true RMS measurement, supporting DC, ACRMS, and DC+ACRMS
- Rich Trigger Types: Edge, Pulse Width, Video, Slope, Runt Pulse, Overshoot Pulse, Delay, Timeout, Duration, Setup & Hold, Nth Edge and Pattern Trigger
- Protocol Trigger & Decoding Functions: RS232/UART, I²C, SPI, CAN, CAN-FD, LIN, FlexRay, Audio, MIL-STD-1553B, Manchester, SENT, ARINC429, 1-WIRE, CAN-XL, I3C
- Practical Zone Trigger Function for Capturing Sporadic Signals and Observing Complex Signals
- Super Phosphor Display Effect, supporting up to 256 Grayscale Levels
- Extensive Peripheral Interfaces: USB Host, USB Device, LAN, EXT Trig, AUX Out (Trig Out, Pass/Fail, DVM) Output, Signal Source Output Interface (Gen), HDMI, 10 MHz Ref out and 10 MHz Ref in
- Supports SCPI Standard Commands for Programmable Instruments
- Built-in WebServer, enabling browser-based access and control of the instrument, supporting both PC and mobile operation modes for seamless cross-platform access.
- Support online upgrade

Design Features

High Resolution

Equipped with 12-bit high-resolution ADC sampling, it features up to 4096 quantization levels ── 16 times that of conventional 8-bit ADCs ── enabling more accurate reproduction of waveform details..

8─bit

12-bit

Excellent Background Noise Performance

With background noise below 100 μVrms at 1 GHz bandwidth, it facilitates the 12-bit ADC to fully exert its performance.

Application Scope

High Cost-Performance Multi-in-One Integrated Oscilloscope

The JHM6000HD Series High-Resolution Oscilloscope integrates 8 independent instruments into one, including a digital oscilloscope, function/arbitrary waveform generator, spectrum analyzer, digital voltmeter, high-precision frequency counter, protocol analyzer, Bode Plot analyzer, and power analyzer. This all-in-one solution provides users with highly flexible and cost-effective options tailored to their practical needs..

Digital Oscilloscope

- 2 GHz/1 GHz Bandwidth Options
- Maximum Real-time Sampling Rate: 10 GSa/s
- Maximum Memory Depth: 1 Gpts
- 4 Analog Channels + 1 External Trigger Channel
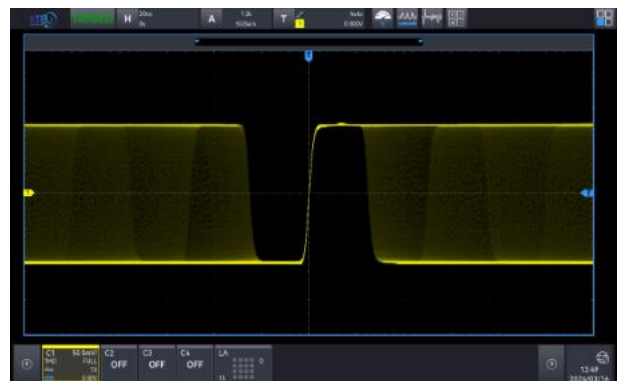

Function/Arbitrary Waveform Generator (Optional)

- 50 MHz Dual-channel Output
- Sampling rate 312.5MSa/s
- 16-bit vertical resolution
- Built-in multiple standard waveforms: sine wave, square wave, pulse wave,
  Sloped wave, arbitrary wave, noise, DC
- Supports AM, FM, ASK, FSK, and sweep frequency output
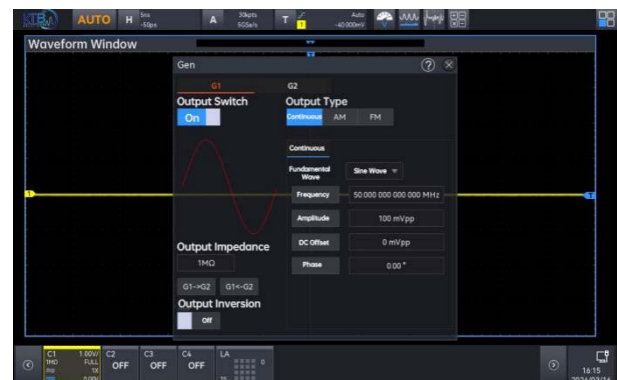
Spectrum Analyzer

- Standard Enhanced FFT with up to 4MptsX4 channel analyse
- Frequency measurement range: 0 to 2.5GHz
- Waterfall Display Supported
- 4 types of tracery + 4 types of detector
- Mark types include automatic, manual, and threshold
- Marker Point List Display Supported
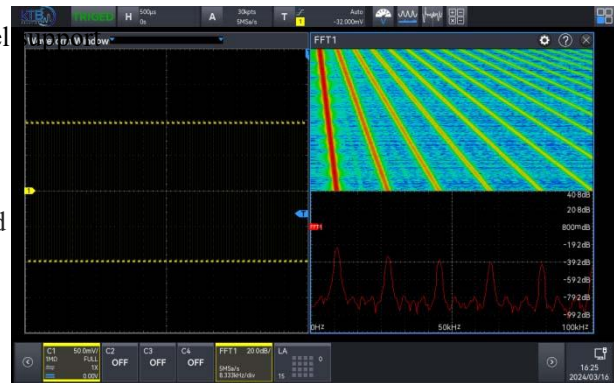
Digital Voltmeter

- 4-digit Digital Display
- Supports Independent Measurement in 3 Modes: DC, AC RMS, AC+DC RMS measurement
- Equipped with Overrange Alarm Function

High-Precision Frequency Counter

- 7-digit Hardware Frequency Counter
- Supports Adjustable Refresh Time and Effective Digi
- Equipped with Accumulative Counter Function
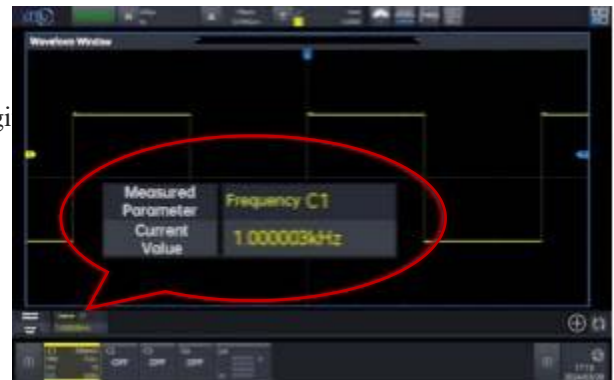
Bode Plot Analyzer (Optional)

- Bode Plot Analyzer (Optional)
- frequency response analysis
- loop stability analysis
- filter analysis
- Amplifier analysis, etc.

Protocol Analyzer

- 15 types of triggering protocols and decoding, covering computers and embedded systems Automotive, avionics, audio and other fields
- Support decoding while paused or recording
- Support event list display and search

Option Name	Description	Option Model	Standard Configuration
Computer Serial Bus Trigger & Decode	RS-232/422/485/UART	JHM6000HD-EMB	Optional
Embedded Serial Bus Trigger & Decode	I²C, SPI	JHM6000HD-COM	Optional
Automotive Serial Bus Trigger & Decode	CAN	JHM6000HD-CAN	Optional
Automotive Serial Bus Trigger & Decode	LIN	JHM6000HD-LIN	Optional
Automotive Serial Bus Trigger & Decode	CAN-FD	JHM6000HD-CANFD	Optional
Automotive Serial Bus Trigger & Decode	CAN-XL	JHM6000HD-CANXL	Optional
Automotive Serial Bus Trigger & Decode	FlexRay	JHM6000HD-FLEX	Optional
Automotive Sensor Bus Trigger & Decode	SENT	JHM6000HD-SENT	Optional
Audio Serial Bus Trigger & Decode	Audio	JHM6000HD-AUDIO	Optional
Aerospace Serial Bus Trigger & Decode	MIL-STD-1553, ARINC 429	JHM6000HD-AREO	Optional
Wireless Communication Serial Bus Trigger & Decode	Manchester	JHM6000HD-MANCH	Optional
Sensor Bus Trigger & Decode	1-WIRE	JHM6000HD-1WIRE	Optional
Mobile Phone Smart Serial Bus Trigger & Decode	I3C	JHM6000HD-I3C	Optional

Power analyzer (optional)

With the advancement of chip manufacturing processes, requirements for power supply systems have become increasingly stringent. Currently, the "low-voltage, high-current" trend prevails in power delivery networks (PDNs), especially for chip-level or precision component-based PDNs. These networks not only require reliable power supply and effective noise suppression for each circuit segment but also demand complete signal transmission between chips ─ presenting greater challenges for power supply testing. Designers focus more on power efficiency and response speed to ensure stable output and cleanliness of the power supply.In this context, power integrity (PI) testing is crucial: PI directly affects signal integrity (SI); conversely, signal quality also reflects power supply quality. More importantly, poor power supply quality may even trigger a series of

electromagnetic interference (EMI) issues, which are undoubtedly a major pain point for designers. Therefore, equipping an oscilloscope with power analysis capabilities is undoubtedly your optimal choice.

The JHM6000HD Series Oscilloscope provides comprehensive power analysis tools and evaluation results. Simply select the appropriate analysis type, connect the voltage and current probes to the power system test points or dedicated test fixtures as illustrated, connect to the desired observation channel, and make appropriate fine adjustments to obtain the required test results.

- ■ Power quality
- ■ harmonic analysis
- ■ switching loss
- ■ surge current
- ■ Rds(on)
- ■ slew rate
- ■ Safe Operating Area (SOA)
- ■ modulation analysis
- ■ ripple analysis

*Under continuous update. Power analysis support is subject to the latest firmware on the official website.

Timing Analyzer

Smart devices such as mobile phones, smart wearables, home appliances, multimedia audio-visual systems, and automotive electronic components have strict requirements for timing consistency in internal bus communications. The JHM6000HD's innovative timing analysis function can analyze parameters (including pulse width, amplitude, edge, setup time, and hold time) of signals such as I²C, SPI, and CAN, and supports exporting timing consistency test reports.

Ultrafast Acquisition Technology

Waveform capture rate is critical when locating and troubleshooting sporadic or intermittent signal anomalies. It refers to the number of waveforms an oscilloscope can capture per unit time, a parameter that directly reflects the oscilloscope's signal processing and analysis speed.

The JHM6000HD Series adopts an advanced hardware and software architecture, delivering a 5–10x leap in data processing performance compared to previous-generation models. Equipped with upgraded ultrafast acquisition technology, it supports 8-channel parallel graphics mapping with a processing rate of up to 20 Gbps and a waveform capture rate of 800,000 wfms/s. In sequential mode, it can capture 1.5 million fast-edge signals with a 750 ps edge rate, ensuring that no sporadic signals go undetected.

New Fast Autoset Strategy

Fuzzy control is an intelligent control method based on fuzzy set theory, fuzzy linguistic variables and fuzzy logic reasoning. The algorithm features fewer iterations, faster speed and strong anti-interference capability.

Traditional oscilloscopes execute the Autoset function to automatically identify appropriate signal amplitude and frequency for optimal display. However, disparate implementation schemes among manufacturers often lead

to drastically different response speeds of oscilloscopes, which even impairs user experience significantly. KTB redefines the execution logic of Autoset by adopting an analog signal-based fast fuzzy algorithm + multi-channel parallel processing technology, combined with a hardware 7-bit high-precision frequency counter. This enables the oscilloscope to quickly identify and process the amplitude and frequency parameters of unknown signals during Autoset execution. The full-channel Autoset completes within $\leq$ 1.5 s, while single-channel Autoset finishes within $\leq$ 1 s.

For users who need frequent switching of test objects or pursue efficient testing, this feature greatly improves work efficiency and reduces the risk of misoperation.

Rich Parameter Measurement

Parameter measurement functionality is essential for engineers using oscilloscopes. The JHM6000HD Series supports up to 54 measurement parameters, with 27 parameters displayable simultaneously. The measurement statistics interface adopts a page-based display mode, with 9 parameters presented per page. For each parameter, it supports statistical display of measured values, histograms, and trend graphs: histograms provide an intuitive view of parameter probability distribution, while trend graphs reflect parameter variation trends over time.

The parameter snapshot function can display 39 measurement parameters for a single channel, including voltage-related and time-related parameters, with measurement results updated in real time during device operation.

The JHM6000HD Series adds new amplitude calculation strategies, top-value strategies, and bottom-value strategies, making parameter measurement more flexible for engineers. Additionally, it introduces a burst setting function that displays burst-related parameters, helping engineers obtain timely and accurate access to measurement data of each channel.

Mathematical Operations

The JHM6000HD is equipped with a comprehensive algorithm suite for complex waveform operations, allowing you to perform in-depth analysis of waveforms and display the calculation results directly on the oscilloscope screen.

- Basic operations: +, -, *, ÷
- Digital Filtering: High-pass, Low-pass, Band-pass, Band-stop Filters
- Custom Function Operations: Supports analog channel participation in operations
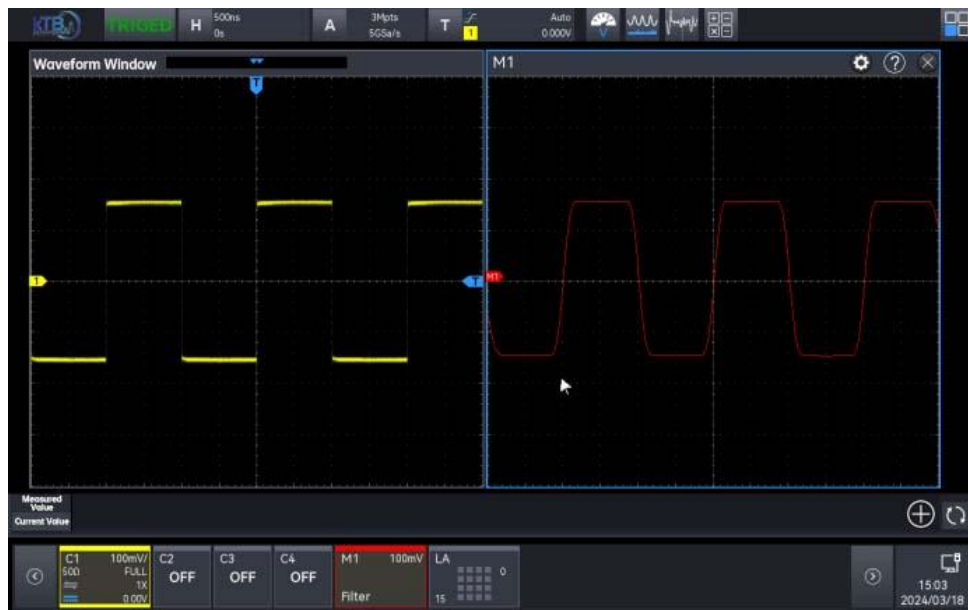
Navigation and Search

The JHM6000HD oscilloscope features an upgraded maximum memory depth of 1 Gpts. With this high storage capacity, it can capture tens of thousands of waveform cycles in a single acquisition. Previously, engineers had to spend considerable time manually locating specific waveforms from the large dataset. Now, the oscilloscope's intelligent search function automatically scans the acquired signals based on user-defined search criteria, and the navigation function enables quick location of waveforms of interest.

Combined with the oscilloscope's analysis capabilities, users can perform detailed analysis on target events, eliminating the time-consuming and cumbersome process of manual searching. The navigation system supports not only navigation for search events, but also navigation for the time axis and marker points.

Hardware-Accelerated Template Testing

Enabling the hardware-accelerated template testing function allows waveform testing compliant with specific standards to be completed within seconds
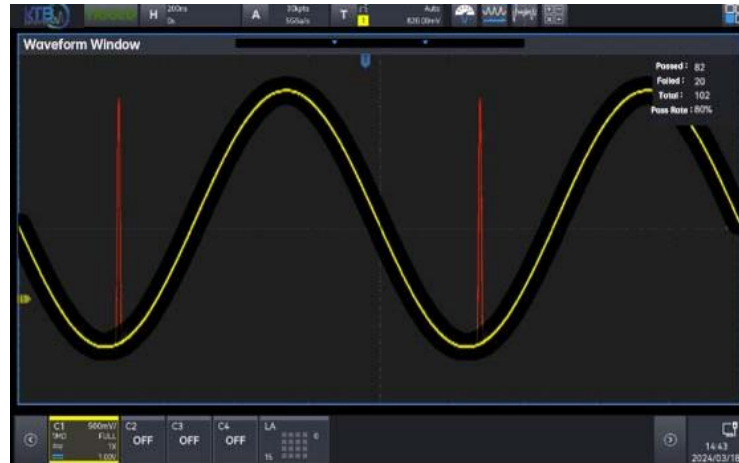
Region Trigger

Region triggering serves two core purposes: first, accurately isolating sporadic abnormal signals; second, achieving stable waveform display. Stable waveform display can only be guaranteed by stable triggering.

Therefore, when debugging complex and variable signals, engineers can enable the oscilloscope's region trigger function to capture and stabilize such sporadic signals. This feature has a low operational threshold and requires no time to learn complicated advanced triggering functions. By simply drawing a rectangular area on the screen via gesture operation, engineers can quickly isolate the signals they intend to observe. Even if the waveform is not fully stabilized, the region trigger function can still capture qualified waveforms and achieve stable display.
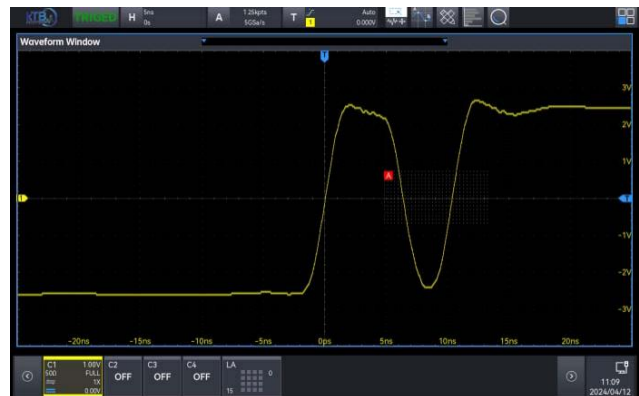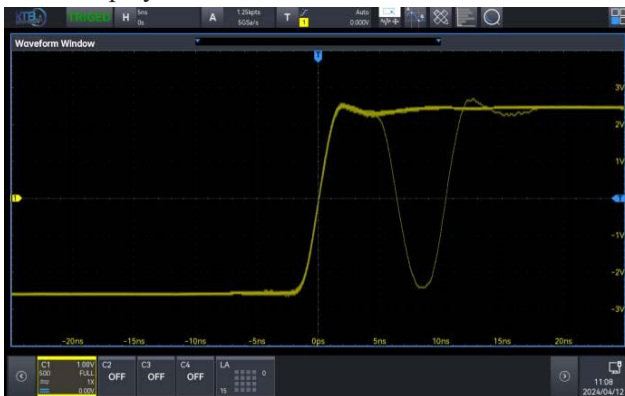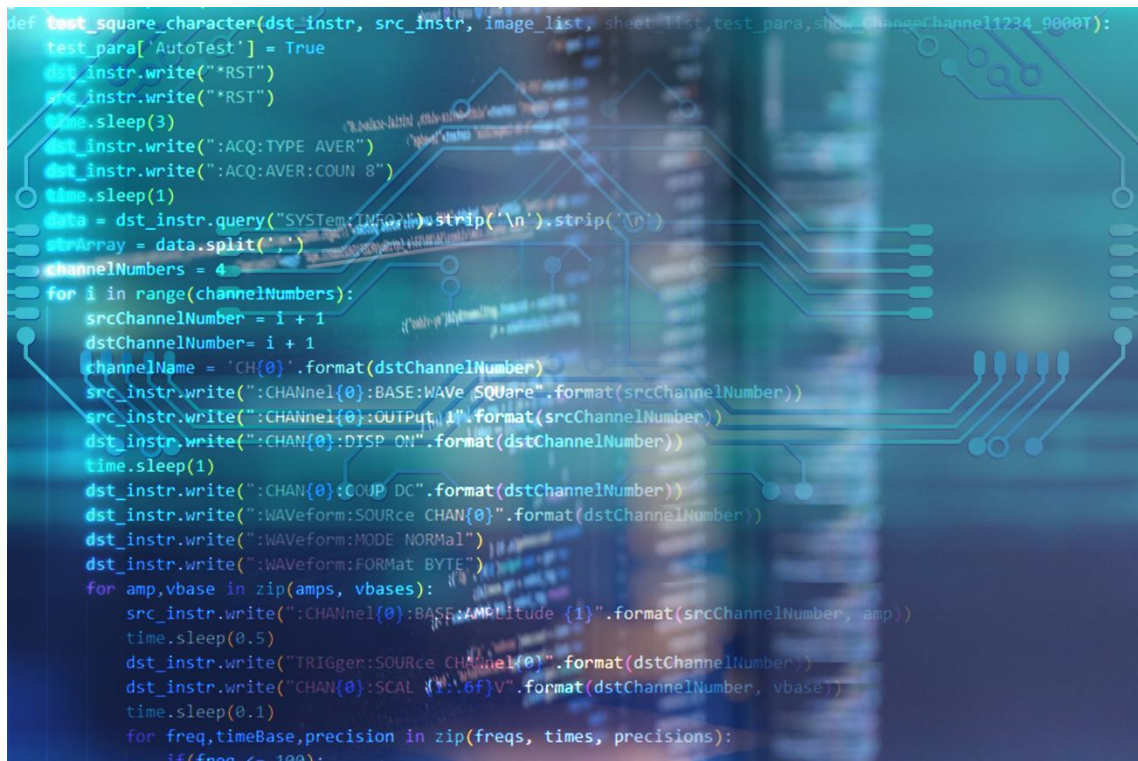
Multiple Interfaces

The JHM6000HD Series is equipped with a rich variety of connectivity interfaces, delivering unparalleled flexibility and operational convenience for users

Diverse Control Methods

Supports instrument control or secondary development via an instruction set compliant with SCPI standards

Support for Control via KTB's Free Instrument Management Software

The device can be controlled via LAN or USB Device interfaces by installing the instrument management software on a PC

Remote Control via WebServer

Supports SCPI remote control for remote viewing and operation
Supports waveform file export and online access to the product user manual
Compatible with both PC and mobile device access

Technical Specifications

All specifications are guaranteed, except those marked as "Typical".

Unless otherwise specified, all technical specifications apply to probes with the attenuation switch set to 10 × and the JHM6000HD Series High-Resolution Oscilloscopes. To meet these specifications, the oscilloscope must first satisfy the following two conditions:

- The instrument must operate continuously for more than 30 minutes at the specified operating temperature.
- If the operating temperature variation range reaches or exceeds 5°C, the self-calibration function must be performed.

model	JHM6204HD	JHM6104HD
Analog Bandwidth (50Ω, ≥10mV/div, -3dB)	2GHz	1GHz
Analog Bandwidth (50Ω, <10mV/div, -3dB)	500MHz	500MHz
Analog Bandwidth (1 MΩ, -3dB)	500MHz	500MHz
rise time	210ps	420ps
Input/output channel count	Analog Channels: 4	
	EXT Input Channel: 1	
	Signal Source Output Channel: 1	
Sampling Method	real-time sampling	
Acquisition Mode	Sampling, peak detection, high resolution, average, enhanced resolution	
Enhanced Resolution	Enhanced bits: 1, 1.5, 2, 2.5, 3, 4 (12 to 16 bits)	
real-time sampling rate	10 GSa/s (Interlaced mode, with only channels 1 or 2, 3 or 4 enabled) 5G Sa/s (non-interleaved mode, all 4 channels on)	
Average Count	When all channels reach N samples simultaneously, the value of N can be selected from 2, 4, 8, 16,32,64,128,256,512,1024,2048,4096, or 8192.	
Memory Depth	At full 4-channel operation, each channel delivers 500Mbps; at 2-channel operation, each channel provides 1Gbps.	
waveform capture rate	800,000wfms/s	
	1,500,000wfms/s (sequential mode)	
sequential acquisition	Maximum 400,000 frames, minimum trigger interval <700 ns	
Hardware real-time waveform recording and playback	400,000 frames	
display screen	12-inch 1280x800 HD capacitive touch full-lamination display	
vertical system (analog channels)		
input coupling	DC, AC, Ground	
Input Impedance	(1MΩ±1%) ‖ (16pF±2pF) ; (50Ω±1%)	
probe attenuation coefficient	Voltage probe ratio: 0.001X,0.01X,0.1X,1X,10X,100X,1000X, custom Current probe sensitivity: 5mV/A, 10mV/A, 50mV/A, 100mV/A, 200mV/A, 500mV/A, 1V/A, and customizable	
maximum input	1MΩ：400V(DC+AC Vpk) 135VRMS	

voltage	50Ω：5Vrms Max
vertical resolution	12-bit (full bandwidth, highest sampling rate)
Vertical Range	500μV/div to 10V/div (1 MΩ)
	500μV/div to 1V/div (50Ω)
Offset Range	500 μV/div to 100 mV/div：±2 V（50 Ω and 1 MΩ）
	101 mV/div to 1 V/div：±5 V（50 Ω）
	101 mV/div to 1 V/div：±20 V（1 MΩ）
	1.01V/div to 10 V/div：±200 V（1 MΩ）
	Display vertical shift reading V
bandwidth limit	50Ω：20 MHz , 500MHz, Full
	1MΩ：20 MHz , Full
Low-Frequency Response	(AC coupling, -3dB)；≤5 Hz (on BNC)
DC Gain Accuracy	<5mV: ±2% full scale, ≥5mV: ±1.5% full scale
DC Offset Accuracy	±（2%+0.1div+2mV）
unit	W, A, V and U; Default: V
channel isolation	DC to maximum bandwidth:>40 dB (100:1)
Horizontal System (Analog Channels)	
Time Base Range	200 ps/div ~ 1 ks/div
	Supports time base fine-tuning (displaying current sampling rate and storage depth simultaneously)
time base accuracy	Initial accuracy：±1ppm; First-year aging rate：±1ppm; Ten-year aging rate：±3.5ppm
Delay range	Pre-trigger (negative delay)：≥1 screen width
	Post-trigger (Positive Delay): 1 s ~ 5 ks
Inter-channel Delay	<100ps
time base mode	Y-T (Default)
	X-Y
	Roll, with a time base of ≥50 ms/div. The horizontal time base knob allows automatic entry or exit from Roll mode.
	Scan mode, time base ≥50ms/div. Users can choose between Roll or Scan mode.
Trigger	
Trigger Sensitivity	CH1～CH4 (DC~ maximum bandwidth):
	≤ 10mV/div, 1div or 5mVpp of the larger value
	> 10mV/div，0.5div
	EXT：
	400mVpp， DC～10MHz
	800 mVpp, 10MHz to 250 MHz for external trigger bandwidth
	Turn on noise suppression to reduce trigger sensitivity by half
trigger level range	Inside：±5 div from the screen center
	EXT：±5V

trigger mode	Automatic, Normal, Single
Holdoff Range	8ns to 10s
Trigger Coupling (Typical Value)	DC: Pass all components of the signal
	AC: DC component blocking input signal
	High-Frequency Rejection: Suppresses high-frequency components above 40 kHz in the signal
	Low-Frequency Rejection: Suppresses low-frequency components below 40 kHz in the signal
Noise Rejection	Suppresses high-frequency noise in the signal and reduces the probability of false triggering of the oscilloscope
trigger jitter	Typical value: <100psRMS (extreme value: <200ps) In Normal sampling mode, edge triggering occurs with the trigger level positioned near 50% of the EXT input signal.

Region Trigger	
Regions	Up to 2 zones available; Source: CH1 ~ CH4; Attribute: Intersect, Non-intersect

Edge Trigger	
Edge type	Rising edge, falling edge, or any edge
Source	CH1 ~ CH4, Mains, EXT

Glitch Trigger (Undershoot)	
pulse width condition	Greater Than, Less Than, Within Range, Irrelevant
polarity	Positive polarity, negative polarity
pulse width range	3.2 ns to 10s
Source	CH1 ~ CH4

Overshoot Pulse Trigger	
Overshoot Type	Rising edge, falling edge, or any edge
Trigger Position	Overshoot Entry, Overshoot Exit, Overshoot Duration
Overshoot Duration	3.2 ns to 10s
Source	CH1 ~ CH4

Nth Edge Trigger	
Edge type	rising edge, falling edge
Idle Time	3.2 ns to 10s
Number of Edges	1 to 65535
Source	CH1 ~ CH4

Delay Trigger	
Edge type	rising edge, falling edge
Delay type	Greater Than, Less Than, Within Range, Out of Range
delay time	3.2 ns to 10s
Source	CH1 ~ CH4

Timeout Trigger	

Edge type	Rising edge, falling edge, or any edge
Timeout Duration	3.2 ns to 10s
Source	CH1 ~ CH4
Duration Trigger	
Pattern Setting	H、L、X
Trigger condition	Greater Than, Less Than, Within Range
duration	3.2 ns to 10s
Source	CH1 ~ CH4
Setup and Hold Trigger	
Edge type	rising edge, falling edge
data type	H、L
Setup Time	3.2 ns to 10s
Hold Time	3.2 ns to 10s
Source	CH1 ~ CH4
Pulse Width Trigger	
pulse condition	Positive polarity (greater than, less than, within specified range) Negative polarity (greater than, less than, within specified range)
pulse length	0.8 ns to 4s
Source	CH1 ~ CH4, mains power, EXT
slope trigger	
slope condition	Positive slope (greater than, less than, within specified range) Negative slope (greater than, less than, or within a specified range)
Time setting	3.2 ns to 1s
Source	CH1 ~ CH4
Video trigger	
Trigger Capability	Triggers on all rows, specified rows, odd fields, or even fields that meet the video standard. Supported video standards include PAL, NTSC, SECAM, 525p/60,625p/50,720p/24,720p/25,720p/30,720p/50,720p/60,1080i/25,1080i/30,1080p/24,1080p/25,1080p/30, and 1080pfs/24.
Source	CH1 ~ CH4
Pattern Trigger	
Pattern Setting	H, L, X, rising edge, falling edge
Source	CH1 ~ CH4
RS232/UART trigger (optional)	
Trigger condition	Frame start, error frame, parity error, data
Baud rate	2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, Custom
data bit width	5, 6, 7, 8
Source	CH1 ~ CH4
I²C Trigger (Optional)	

Trigger condition	Start, Restart, Stop, Acknowledge Loss, Address, Data, Address + Data
address bit width	7-bit, 10-bit
Address range	0 to 7F,0 to 3FF
Byte length	1 to 5
data qualifier	Equal, greater than, less than
Source	CH1 ~ CH4

SPI Trigger (Optional)	
pattern	Time slot selection
Trigger condition	Start, Data
Timeout	100 ns to 1s
Data Bit Width	4-bit to 32-bit
Clock edge	rising edge, falling edge
Source	CH1 ~ CH4

CAN trigger (optional)	
Signal type	CAN_H、CAN_L
Trigger condition	Frame header, data frame, remote frame, error frame, overload frame, identifier, data, ID and data, frame footer, lost acknowledgment, bit stuffing error, CRC error, all errors
signal rate	10kbps, 19.2kbps, 20kbps, 33.3kbps, 38.4kbps, 50kbps, 57.6kbps, 62.5kbps, 83.3kbps, 100kbps, 115.2kbps, 125kbps, 230.4kbps, 250kbps, 490.8kbps, 500kbps, 800kbps, 921.6kbps, 1Mbps, 2Mbps, 3Mbps, 4Mbps, 5Mbps, custom
Source	CH1 ~ CH4

CAN-FD trigger (optional)	
Signal type	CAN_H、CAN_L
Trigger condition	Frame header, data frame, remote frame, error frame, overload frame, identifier, data, ID and data, frame footer, lost acknowledgment, bit stuffing error, CRC error, all errors
signal rate	10kbps, 19.2kbps, 20kbps, 33.3kbps, 38.4kbps, 50kbps, 57.6kbps, 62.5kbps, 83.3kbps, 100kbps, 115.2kbps, 125kbps, 230.4kbps, 250kbps, 490.8kbps, 500kbps, 800kbps, 921.6kbps, 1Mbps, 2Mbps, 3Mbps, 4Mbps, 5Mbps, custom
FD bit rate	250kbps, 500kbps, 800kbps, 1Mbps, 1.5Mbps, 2Mbps, 4Mbps, 6Mbps, 8Mbps, and custom
Source	CH1 ~ CH4

LIN trigger (optional)	
Trigger condition	Sync, identifier, data, ID, and data, wake-up frame, sleep frame, error
signal speed	V1, V2, Any
bit rate	1.2kbps, 2.4kbps, 4.8kbps, 9.6kbps, 10.417kbps, 19.2kbps, 20kbps, Custom
DL	1 ~ 8
Source	CH1 ~ CH4

FlexRay Trigger (Optional)	
Trigger condition	Frame header, indicator, identifier, loop count, header fields, data, ID and data, frame footer, error
polarity	BM, BDiff, or BP

bit rate	2.5Mbps, 5Mbps, 10Mbps, Custom
Source	CH1 ~ CH4

Audio Trigger (Optional)	
Trigger condition	Character trigger, left channel, right channel, or any channel data
Format	Standard, Left-Aligned, Right-Aligned, TDM
Source	CH1~CH4

MIL-STD-1553B trigger (optional)	
Trigger condition	Sync, command, status, data, error
polarity	normal polarity, inversion
polarity	normal polarity, inversion
Source	CH1~CH4

SENT Trigger (Optional)	
Trigger condition	Fast mode: synchronization, status, data, CRC, status+data, status+data+CRC, fast CRC error, continuous pulse error Slow mode: synchronous, short ID, short data, short CRC, short ID+data, enhanced ID, enhanced data, enhanced CRC, enhanced ID+data, slow channel CRC error
Source	CH1~CH4

Manchester Trigger (Optional)	
Trigger condition	Trigger at the frame header, header segment, data segment, tail segment, and error
Baud rate	500bps ~ 10Mbps
Source	CH1~CH4

ARINC 429 trigger (optional)	
Trigger condition	Start bit, End bit, Label, SDI, Data, SSM, Label+bit count, Check bit error, Bit error, Space error, All errors
Source	CH1~CH4

Decode (optional)	
Decode Channel Count	4
Decoding type	Standard: RS232/UART, I2C, SPI
	Optional: CAN, CAN-FD, LIN, FlexRay, Audio, MIL-5TD-1553B, SENT, ARINC 429, Manchester
Parallel Decode	Supports up to 18-bit parallel bus decoding and analog channels. Custom clock settings are available.
Source	CH1 ~ CH4

Search navigation	
type	Edge, Pulse Width, Slope, Undershoot, Overshoot, Delay, Timeout, Duration, Setup & Hold, Nth Edge, Pattern
Source	Any Analog Channel
amplitude	Copy from Trigger, Copy to Trigger
result display	Event List or Navigation; Jump to specific events via event list entries
navigation	Search Events, Time, Markers

waveform recording	
source	All Open Analog Channels
Analysis	Supports frame-by-frame or continuous playback; Enables waveform calculation and measurement.

Pass/Fail Test	
source	Any Analog Channel
Test Action	Pass/fail events can trigger immediate stop, buzzer alert and screenshot capture.

histogram	
source	Any Analog Channel
type	Horizontal, vertical
Measurements	Sampling point, peak, maximum, minimum, peak-to-peak, average, median, mode, Bin Width, standard deviation
Applicable Modes	Supports all modes except Roll Mode

Measurement	
Cursor Measurement	Voltage difference between cursors ($\triangle Y$)
	Time difference between cursors ($\triangle X$)
	The reciprocal of $\triangle X$ (Hz) (1/$\triangle X$)
	Voltage and time values of waveform points
	Cursor display enabled during automatic measurement
automatic measurement	**analog channels** ： 56 measurement parameters: maximum value, minimum value, peak value, bottom value, middle value, peak-to-peak, amplitude, average value, period average, root mean square, period root mean square, AC root mean square, area, period area, positive area, negative area, period positive area, period negative area, positive overshoot, negative overshoot, positive pre-charge, negative pre-charge, frequency, period, rise time, fall time, positive pulse width, negative pulse width, positive duty cycle, negative duty cycle, rise delay, fall delay, phase, proportion, period proportion, setup time, hold time, setup-to-hold ratio, FRFR, FRFF, FFFR, FFFF, FRLF, FRLR, FFLR, FFFL, positive pulse count, negative pulse count, rising edge count, falling edge count, burst width, burst interval, burst period, burst period count, phase (r-r), phase (f-f), delay (r-r), delay (f-f).
Measurement Mode	Standard measurement and precision measurement (full-memory hardware measurement)
Measurement Capacity	Display 27 measurements simultaneously
Measurement Range	Main Time Base, Extended Time Base, Cursor Area
Measurement statistics	Mean, maximum, minimum, standard deviation, number of measurements, line chart, and bar chart
XY Measurement	Supports Time, Cartesian Coordinates, Polar Coordinates, Product and Ratio Display
measuring source	C1~C4、M1~M4
Analysis Functions	Frequency meter, DVM, test capability, waveform recording, baud rate diagram, power analysis

Power analysis (optional)	
Analysis items	Power quality, harmonic analysis, surge current, Rds(on), switching loss, switching speed, safe operating area, modulation analysis, ripple analysis, startup/shutdown time, transient response, efficiency

histogram	
source	CH1~CH4
type	Horizontal, vertical

Mathematical Operations	
waveform calculation	A+B, A-B, A×B, A÷B, advanced operations, digital filtering
digital filtering	Low-pass, High-pass, Band-pass, Band-stop
Advanced Operations	0,1,2,3,4,5,6,7,8,9,(,+,-,*,/,^,>,<,&&,||,==,!=,)
mathematical function	Sin, Cos, Sinc, Tan, Sqrt, Exp, Lg, ln, Floor, ABS, Acos, Asin, Atan, Sinh, Tanh, Ceil, Cosh, Fabs, intg, diff, sign

FFT Analysis	
Channels	4
FFT window types	Hanning, Hamming, Rectangular, Blackman
Maximum FFT Points	4 Mpts
Vertical Scale	Vrms、dB
FFT	Waterfall Plot: On, Off
	Spectrum range settings: start frequency, end frequency, center frequency, sweep width
	Trace Display Modes: Normal, Average, Max Hold, Min Hold
	Markers: Marker Type, Marker Count, Marker List

Storage Functions	
Settings	Instrument Configuration (.set)
Waveforms	Waveform data (*.dat), comma-separated values (*.csv), arbitrary waveform (*.bsv)
Waveforms	Save Formats - *.bmp, *.png, *.jpg
reports	Decode event list formats (*.csv), (*.html), (*.pdf)

Signal source Gen (optional)	
Channels	2
sampling rate	312.5MSa/s
vertical resolution	16-bit
Maximum Output Frequency	50 MHz
standard waveforms	Sine, Square, Pulse, Ramp (Triangle), Noise, DC, Arbitrary Waveform
built-in waveform	200 types including Sinc, Exponential Rise, Exponential Fall, ECG, Gaussian, Lorentz, Half-Sine
sinusoidal wave	Frequency range: 1 μHz to 50 MHz
	Flatness: ±0.5 dB (relative to 1 kHz)
	Harmonic distortion: -40 dBc
	Spurious (Non-harmonic): -40 dBc
	Total harmonic distortion: 1% (DC to 20kHz, 1Vpp)

	Signal-to-noise ratio: 40 dB
Square wave/pulse	Frequency range: Square wave: 1 μHz to 15 MHz; Pulse: 1 μHz to 15 MHz
	Rise and fall time: <13 ns (typical value 1kHz, 1Vpp, 50Ω)
	Overshoot: Typical value 2% (1kHz, 1Vpp, 50Ω)
	Duty cycle: Square wave: 1% to 99%, adjustable; Pulse: 1% to 99%, adjustable
	Duty Cycle Resolution: 1% or 10 ns (whichever is greater)
	Minimum pulse width: 20 ns
	Pulse width resolution: 10 ns
	Jitter: 2ns
sawtooth wave	Frequency range: 1 μHz to 400 kHz
	Linearity: 1%
	Symmetry: 0.1% -99.9%
noise	Bandwidth: 50 MHz (typical)
Arbitrary Waveform	Frequency range: 1 μHz to 5MHz
	Waveform length: 16k
	Internal storage location: 200
frequency	Accuracy: ±1ppm initial accuracy; ±1ppm aging rate in the first year; ±3.5ppm aging rate after 10 years
	Resolution: 1μHz
Amplitude	Output range: 20 mVpp to 6 Vpp (high resistance); 10 mVpp to 3 Vpp (50 Ω)
	Resolution: 1mV
	Accuracy (Typical value: 1kHz sine wave, 0V offset): ±(5% of the set value + 2mVpp)
DC offset	Range: ±3 V (high resistance); ±1.5 V (50 Ω)
	Resolution: 1mV
	Accuracy: ±(5% of the offset setting value + 2mV)

AM Modulation	
Carrier Waveforms	Sine, Square Wave, Sine Wave, and Any Wave
source	interior
Modulation Waveforms	Sine, Square, Rising Ramp, Falling Ramp, Noise, Arbitrary Waveform
Modulation Frequency	2mHz～50kHz
Modulation Depth	0%～120%

FM Modulation	
Carrier Waveforms	Sine, Square, Ramp, Arbitrary Waveform
source	Internal
Modulation Waveforms	Sine, Square, Rising Ramp, Falling Ramp, Noise, Arbitrary Waveform

Modulation Frequency	2mHz ~ 50kHz
frequency deviation	12.5MHz (Maximum)

ASK Modulation

Carrier Waveforms	Sine, Square, Ramp, Arbitrary Waveform
modulation waveform	50% duty cycle square wave
Modulation Frequency	2mHz ~ 50kHz

FSK Modulation

Carrier Waveforms	Sine, Square, Ramp, Arbitrary Waveform
modulation waveform	50% duty cycle square wave
Modulation Frequency	2mHz ~ 50kHz
Hop Frequency	Any frequency within the carrier signal range

Frequency Sweep

Sweep Mode	Linear, logarithmic
Sweep Time	1ms ~ 500s
Start/Stop Frequency	Any frequency within the waveform output range

Display

Persistence Time	Auto, 50ms, 100ms, 200ms, 500ms, 1s,5s,10s,20s, Unlimited, Off
display type	Point, Vector
real-time clock	Time and date (adjustable by user)
waveform brightness	1% to 100% (default 50%)
Grid brightness	0%~100% (default 50%)
backlight brightness	1% to 100% (default 50%)
Window transparency	0%~100% (default 50%)

Bode Plot (Optional)

Mode	Bode Plot, Power Supply Rejection Ratio (PSRR)
Start Frequency	50 Hz ~ 50 MHz
Stop frequency	60 Hz ~ 50 MHz
Number of Points	1 ~ 1000
output amplitude	High Impedance: 20 mVpp to 6 Vpp 50Ω:10 mVpp to 3 Vpp

Digital Voltmeter (DVM) (All Values Typical)

Source	any channel
functions	DC、AC+DC RMS、AC RMS
Resolution	4-digit

Limit Alarm	Issue a warning when the value meets or exceeds the specified limit range
range measurement	Vertical range
Measurement Window	100ms

High-Precision Frequency Counter

Source	Any Analog Channel and Trigger Channel
Measurements	Frequency, Period, and Accumulation
counter	Maximum valid bits: 7. Refresh time and valid bits are adjustable.
maximum measurement frequency	maximum analog channel bandwidth
Time reference	Internal reference: initial accuracy of ±1 ppm; aging rate of ±1ppm in the first year; aging rate of ±3.5 ppm after 10 years

Interfaces

USB-Host 3.0	2 ports (Front Panel), 2 ports (Rear Panel)
USB-Device 3.0	1 port (Rear Panel)
LAN	LAN(VXI11)，10/100/1000 Base-T，RJ-45
AUX Out	Trig Out，Pass/Fail，DVM
Gen output	1 port (Rear Panel)
10MHz reference input	50 Ω, amplitude 400 mVpp to 4.5 Vpp(-3.979dBm,17.044dBm), frequency 10 MHz ± 10 ppm
10MHz reference output	50Ω,1.65 Vpp square wave
HDMI1	1, connects to an external monitor, projector, or touchscreen, supports resolution 1920*1080

outline specification

Probe compensator output

output voltage	3 Vpp
frequency	10Hz, 100Hz, 1kHz (default), 10kHz

Power Supply

supply voltage	100V to 240VAC (±10% fluctuation), 50Hz/60Hz 100V ~ 120VAC (fluctuation: ±10%), 400Hz
power	240W Max
fuse	3A, F class, 250V

environment

temperature range	Operation: 0℃ ~ +50℃
	Non-operational: -20℃ to +70℃
Cooling Method	forced cooling by fan
Humidity range	Working conditions: below +10℃, any relative humidity; +10℃ ~ +30℃ 5% ~ 95% relative humidity;

	+30℃ ~ +40℃ 5% ~ 75% relative humidity;
	+40℃ ~ +50℃ 5% ~ 45% relative humidity.
	Non-operation: 5% ~ 95% relative humidity.
Altitude	Operation: ≤ 4600 m; Non-operation: ≤ 15,000 m
Pollution Degree	2
Operating Environment	Indoor Use Only

Mechanical Specifications

Dimensions (W × H×D)	4-channel model: 365mm × 264mm × 115mm
weight	10kg;

Calibration Interval

Recommended calibration interval	1 year

Regulatory standards

electromagnetic compatibility	Complies with EMC Directive (2014/30/EU), complies with IEC 61326-1:2021/EN61326-1:2021, IEC 61326-2-1:2021/EN61326-2-1:2021, GB/T 18268.1-2020		
	Conducted Emission	CISPR 11/EN 55011	CLASS B group 1, 150kHz-30MHz
		GB4824	CLASS A group 1, 150kHz-30MHz
	Radiated Emission	CISPR 11/EN 55011	CLASS B group 1, 30MHz-1GHz
		GB4824	CLASS A group 1, 30MHz-1GHz
	electrostatic discharge	IEC 61000-4-2/ EN 61000-4-2/ GB/T 17626.2	4.0 kV (contact), 8.0 kV (air)
	Radio frequency electromagnetic field immunity	IEC 61000-4-3/ EN 61000-4-3/ GB/T 17626.6	3V/m (80 MHz to 1 GHz); 3V/m (1.4 GHz to 2 GHz); 1V/m (2.0 GHz to 2.7GHz)
	electric fast transient pulse train	IEC 61000-4-4/ EN 61000-4-4/	2kV (AC input port)
		GB/T 17626.4	1kV (AC input port)
	surge	IEC 61000-4-5/ EN 61000-4-5/ GB/T 17626.5	1kV (hot wire to neutral wire) 2kV (hot/neutral to ground)
	Radio frequency continuous conduction immunity	IEC 61000-4-6/ EN 61000-4-6/ GB/T 17626.6	3V, 0.15-80MHz
	Voltage Sags and Short Term Outages	IEC 61000-4-11/ EN 61000-4-11/ GB/T 17626.11	Voltage sag: 0% UT during 1/2-1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles Short interruption: 0% UT during 250/300 cycles
Safety	EN 61010-1:2010+A1:2019 EN IEC61010-2-030:2021+A11:2021 UL61010-1:2012 Ed.3+ R:19 Jul2019 UL61010-2-030:2018 Ed.2 CSA C22.2#61010-1:2012 Ed.3+U1:U2:A1 CSA C22.2#61010-2-030:2018 Ed.2		

GB 4793.1/GB/T 42125.1

Note:

    1: Only standard HDMI interfaces are supported; adapter connections of other types are not supported..

Order information and warranty period

Order Information

	description	number of order
model	High-resolution oscilloscope with 2GHz sampling rate and 4 analog channels	JHM6204HD
	High-resolution oscilloscope with 1GHz resolution and 4 analog channels	JHM6104HD
Standard Accessories	Power cord compliant with local standards (1 unit)	
	USB 3.0 cable (1)	UT-D30
	BNC-BNC straight-through line (1)	UT-L45
	Passive probe (500MHz) (1 per channel)	UT-P07A
Optional Accessories	Upgrade from 1GHz to 2GHz bandwidth	JHM6000HD-BW1T2G
	All Serial Bus Trigger & Decode Options	JHM6000HD-BND
	Automotive Serial Bus Trigger & Decode Option (Includes CAN, CAN-FD, LIN, FlexRay)	JHM6000HD-AUTO
	CAN Trigger/Decode Option	JHM6000HD-CAN
	CAN-FD Trigger/Decode Option	JHM6000HD-CANFD
	LIN Trigger/Decoder Option	JHM6000HD-LIN
	FlexRay Trigger/Decode Option	JHM6000HD-FLEX
	SENT Trigger/Decode Option	JHM6000HD-SENT
	Audio Trigger/Decode Options	JHM6000HD-AUDIO
	MIL-STD-1553 Trigger/Decode Option	JHM6000HD-MIL1553
	ARINC429 trigger/decoder option	JHM6000HD-ARINC429
	MANCHESTER Trigger/Decode Option	JHM6000HD-MANCH
	Function/Arbitrary Waveform Generator Option (includes Gen and Portals)	JHM6000HD-AWG
	Power Analysis Option	JHM6000HD-PWR
	Delay Calibration Fixture	UT-DF01
	isolation transformer	UT-ISOT
	High-Voltage Probe	UT-V23/UT-P21/UT-P20
	High-Voltage Differential Probe	UT-P30/UT-P31/UT-P32/UT-P33/UT-P35/UT-P36
	active single-ended probe	UT-PA2000
	current probe	UT-P40/UT-P41/UT-P42/UT-P43/UT-P44/UT-P4030D/UT-P4150/UT-P4500/P4100A/P4100B

Note: All main units, accessories, and optional items shall be ordered from your local KYB authorized dealer.

Warranty Period

The main unit is covered by a 1-year warranty, excluding probes and accessories.