OWON HDS241

OWON HDS241 Single-Channel Handheld Oscilloscope Instruction Manual

Your comprehensive guide to operating the HDS241 3-in-1 device.

1. Introduction

The OWON HDS241 is a versatile 3-in-1 handheld device that integrates a single-channel oscilloscope, a 24,000-count digital multimeter, and a 100KHz signal generator. Designed for portability and efficiency, it is suitable for various electrical testing and measurement applications. This manual provides detailed instructions for safe and effective use of your device.

Safety Precautions: Always observe general safety rules when operating electrical equipment. Ensure proper connections and use appropriate probes for the measurement task. Do not exceed the maximum input ratings of the device.

2. Product Overview

The HDS241 combines three essential functions into one compact unit:

- **Oscilloscope:** Features a 40 MHz bandwidth, 250 MSa/s real-time sampling rate, and a waveform refresh rate of up to 10,000 wfms/s. It supports auto-setup, multiple measurement functions, cursor measurement, and a slow sweep mode for long-term signal monitoring.
- **Digital Multimeter:** A 4½-digit True RMS multimeter with 24,000 counts. It can measure AC/DC voltage, AC/DC current, resistance, diode, capacitance, and perform continuity tests. Maximum input voltage is AC 750V and DC 1000V.
- **Signal Generator:** A single-channel generator with a frequency range of up to 100 kHz. It supports sine, square, ramp, and pulse waveform outputs with a maximum amplitude of 2.5 Vpp.

The device features a 3.5-inch high-definition color LCD screen for clear display of waveforms and measurement data. Its robust design includes a rubber coating for durability and improved grip.

Figure 2.1: The OWON HDS241 device, showcasing its 3-in-1 functionality as an oscilloscope, multimeter, and signal generator. Key specifications for each mode are listed alongside the device.

Especificaciones del osciloscopio	
Ancho de banda	40 MHz
Canal	1
Frecuencia de muestreo	250MSa/s
Modelo de adquisición	Muestra, detección de picos
Longitud de grabación	Máx. 8K
Visualización	LCD de 3,5 pulgadas
Frecuencia de actualización de la forma de onda	10.000wfms/s
Acoplamiento de entrada	CC, CA, Tierra
Impedancia de entrada (acoplamiento CC)	1 MΩ±2%, en paralelo con 16 pF±10 pF
Atenuación de la sonda	1x,10x,100X,1000X,10000X
Máx. Tensión de entrada	400V (CC+AC, PK-PK)
Sensibilidad Resolución	10mV/div~10V/div
Resolución Vertical	8 bit
Escala horizontal	5ns/div-1000s/div, Paso a paso 1-2-5
Tipo de disparo	Borde
Modelo de disparo	Auto, Normal, Simple
Medición automática	Periodo, Frecuencia, Media, PK-PK, Max, Min, Amplitud, RMS
Medición del cursor	△V, △T

Figure 2.2: A comprehensive diagram illustrating the various buttons, ports, and display areas of the OWON HDS241, including the viewing area, multi-function keys, channel key, mode change key, system configuration, save button, power button, multimeter input port, horizontal adjustment, measurement range switch, arrow keys, auto range key, hold/run key, signal input connector, probe compensation output, and USB charge/communication interface.

3. Setup

3.1 Battery Installation and Charging

The HDS241 is powered by a high-capacity 2000 mAh lithium battery. The device features a low-power consumption design for extended operation.

- **Charging:** Connect the device to a power source using the standard USB Type-C port. You can use a compatible adapter or a power bank.
- **Battery Life:** The battery provides long-lasting performance. Actual usage time may vary based on operating conditions.

Figure 3.1: This image shows the internal battery compartment of the OWON HDS241, revealing two 18650 lithium batteries, and highlights the USB Type-C port for charging and PC connection.

3.2 Connecting Probes

For oscilloscope measurements, connect the probe to the BNC connector. For multimeter functions, use the provided test leads with the multimeter input ports.

- **BNC Connector:** The BNC connector features an external rubber coating to enhance safety and prevent external interference. It supports high-voltage probes for accurate and reliable signal capture.

Figure 3.2: This image highlights the BNC connector with external rubber coating for safety and interference prevention. It also illustrates the difference between conventional measurement (accurate only for sine waves) and True RMS measurement (accurately measures all current waveforms).

3.3 Powering On/Off

Press and hold the power button (refer to Figure 2.2 for location) to turn the device on or off.

4. Operating Instructions

4.1 Oscilloscope Mode

To enter Oscilloscope mode, press the 'Mode' button until the oscilloscope interface is displayed.

- **Basic Waveform Display:** Connect the probe to the signal source. The waveform will be displayed on the screen.
- **Auto-Setup:** Press the 'Auto' button for automatic adjustment of vertical, horizontal, and trigger settings to quickly display a stable waveform.
- **Measurement Functions:** The HDS241 offers various measurement capabilities:

- **Automatic Measurements:** Includes Period, Frequency, Mean, PK-PK, Max, Min, Amplitude, and RMS.
- **Cursor Measurement:** Use the cursor function to measure voltage difference (ΔV) and time difference (ΔT) between two points on the waveform.

- **Saving Data:** Connect the device to a computer via the USB Type-C port. The included PC software allows you to save waveform images and data for further analysis.

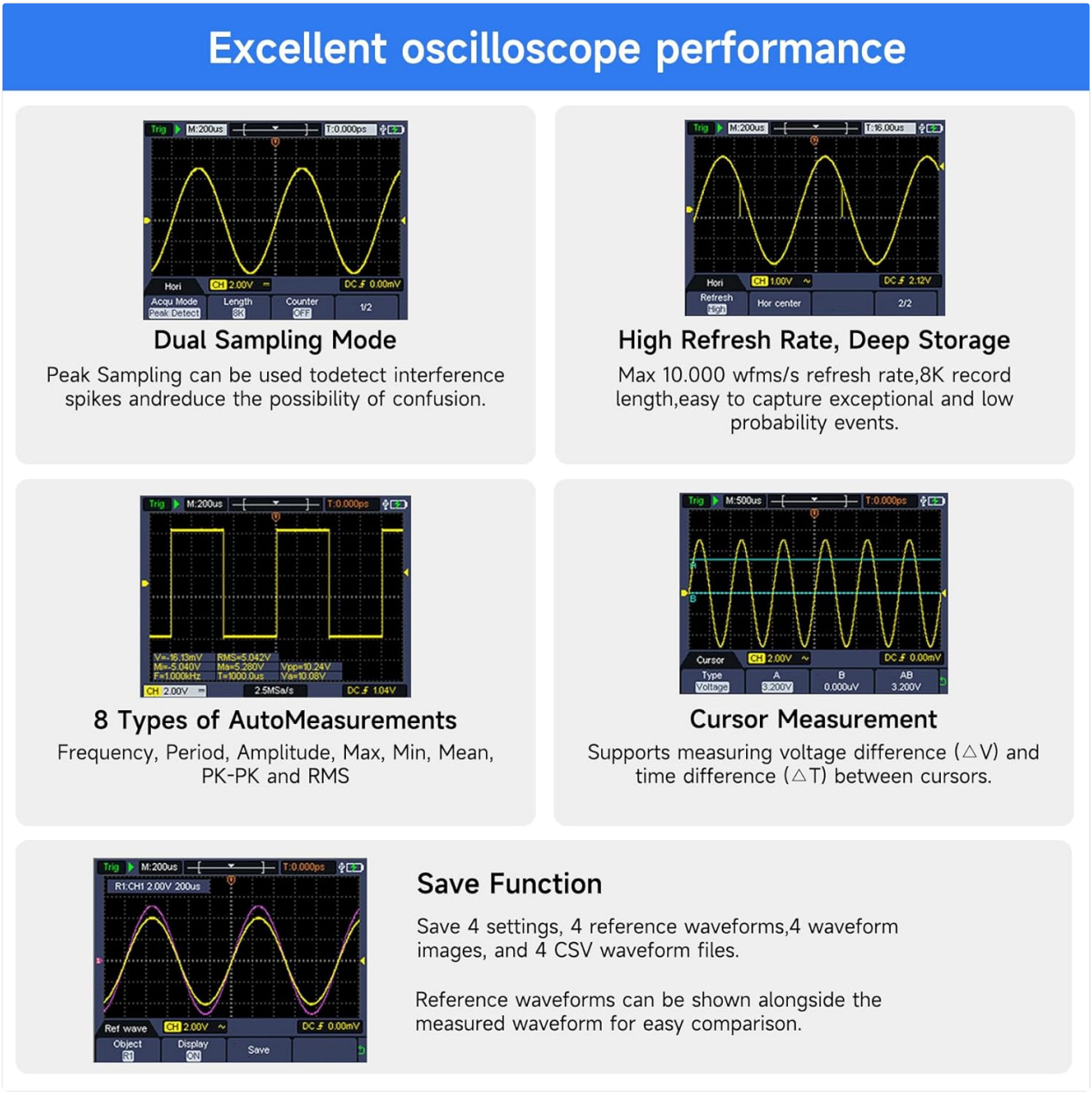

Figure 4.1: This image details the oscilloscope's advanced features, including Dual Sampling Mode for interference detection, High Refresh Rate (10,000 wfms/s) and Deep Storage (8K record length), 8 Types of AutoMeasurements (Frequency, Period, Amplitude, Max, Min, Mean, PK-PK, RMS), and Cursor Measurement for ΔV and ΔT. It also shows the Save Function for reference waveforms.

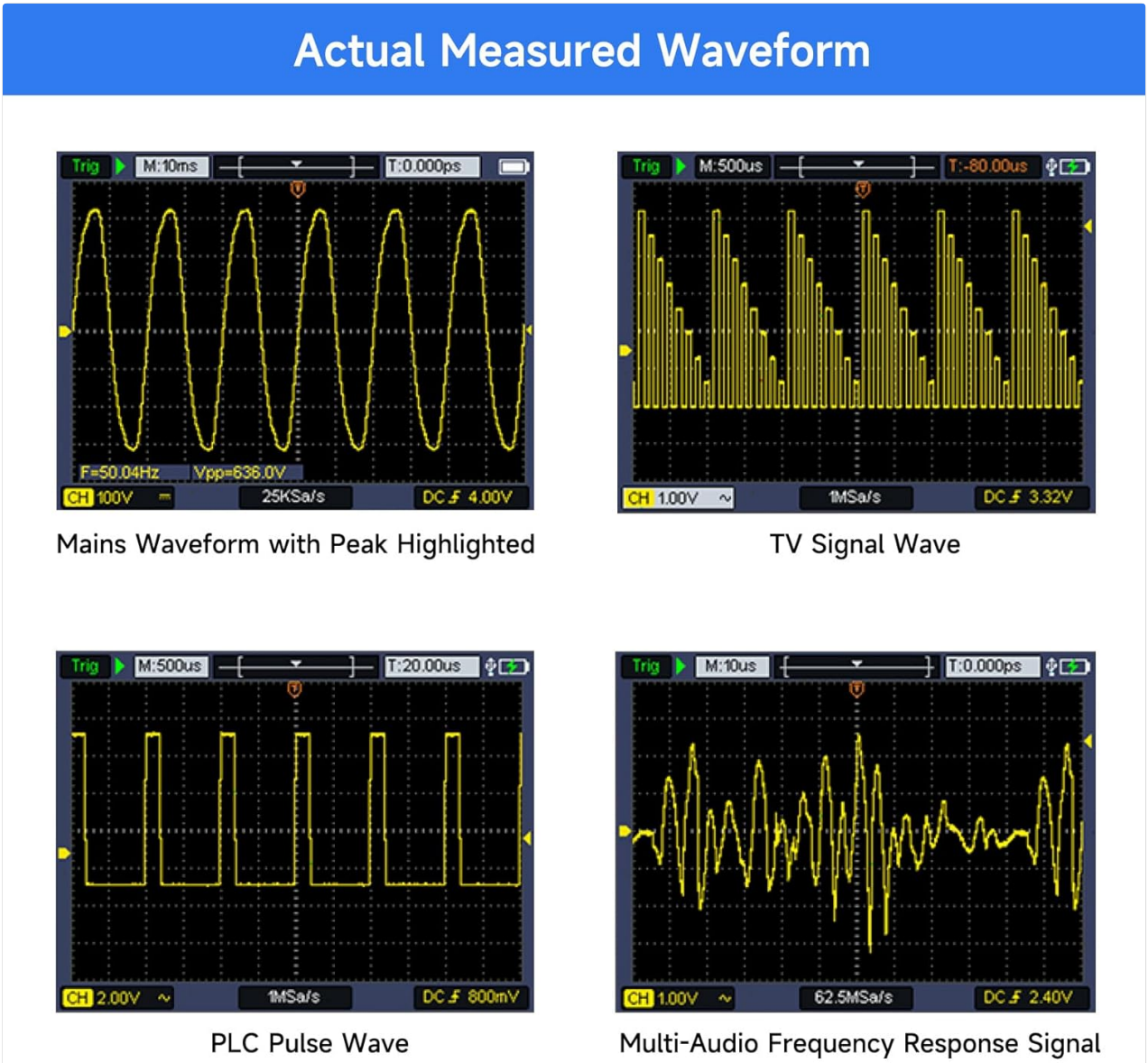

Figure 4.2: This image displays four examples of waveforms captured by the OWON HDS241: a Mains Waveform with peak highlighted, a TV Signal Wave, a PLC Pulse Wave, and a Multi-Audio Frequency Response Signal, demonstrating its versatility in signal analysis.

Figure 4.3: The OWON HDS241 is shown connected to a laptop via a USB cable, demonstrating its capability to save waveform images and data for further analysis on a computer.

4.2 Multimeter Mode

To enter Multimeter mode, press the 'Mode' button until the multimeter interface is displayed.

- **Measurements:** The multimeter supports measuring AC/DC voltage, AC/DC current, resistance, diode, capacitance, and continuity. Select the desired measurement function using the appropriate buttons.
- **True RMS:** The HDS241 features True RMS measurement, which is essential for accurately measuring non-sinusoidal AC waveforms.
- **Auto Range:** The device automatically selects the appropriate measurement range for convenience.

Figure 4.4: The OWON HDS241 is depicted in an outdoor setting, connected to a car battery with multimeter probes, illustrating its practical application for electrical measurements.

4.3 Signal Generator Mode

To enter Signal Generator mode, press the 'Mode' button until the signal generator interface is displayed.

- **Waveform Selection:** Choose from sine, square, ramp, or pulse waveforms.
- **Frequency and Amplitude:** Adjust the output frequency (up to 100 kHz) and amplitude (up to 2.5 Vpp) as required for your testing needs.

5. Maintenance

- **Cleaning:** Use a soft, dry cloth to clean the device. Do not use abrasive cleaners or solvents.
- **Battery Care:** To prolong battery life, avoid fully discharging the battery frequently. Charge the device regularly, especially if it will be stored for an extended period.
- **Storage:** Store the device in a cool, dry place away from direct sunlight and extreme temperatures.

6. Troubleshooting

If you encounter issues with your OWON HDS241, consider the following basic troubleshooting steps:

- **Device not powering on:** Ensure the battery is charged. Connect the device to a power source using the USB Type-C cable and try again.
- **No waveform displayed:** Check that the probe is correctly connected to both the device and the signal source. Verify the signal source is active. Try using the 'Auto' button to adjust settings.
- **Incorrect multimeter readings:** Ensure the test leads are properly inserted into the correct input jacks for the measurement type (e.g., voltage, current, resistance). Check the integrity of the test leads.
- **Unstable readings:** Ensure connections are secure and there is no external interference.

For further assistance, please contact OWON customer support.

7. Specifications

Especificaciones del multímetro digital		
Lectura a fondo de escala	4½ dígitos (máx. 24000 cuentas)	
Modos de prueba	Tensión, corriente, resistencia, capacitancia, diodo, continuidad	
Tensión de entrada máxima	AC 750V， DC 1000V	
Corriente máxima de entrada	AC 10A， DC 10A	
Rango automático	√	
RMS verdadero	√	
Especificación del generador de forma de onda		
Frecuencia de salida	Seno	10Hz~100KHz
	Cuadrado	10Hz~100KHz
	Rampa	10Hz~100KHz
	Pulso	10Hz~10KHz
Amplitud	2Vpp~2.5Vpp	

Figure 7.1: This image presents a detailed table of technical specifications for the OWON HDS241, covering its oscilloscope, digital multimeter, and waveform generator functions.

7.1 Oscilloscope Specifications

Feature	Specification
Bandwidth	40 MHz
Channel	1
Sampling Frequency	250 MSa/s
Acquisition Model	Sample, Peak detection
Record Length	Max. 8K
Display	3.5 inch LCD
Waveform Refresh Rate	10,000 wfms/s
Input Coupling	DC, AC, Ground
Input Impedance	1 MΩ±2%, in parallel with 16 pF±10 pF
Probe Attenuation	1x, 10x, 100x, 1000x
Max. Input Voltage	400V (DC+AC, PK-PK)
Sensitivity Resolution	10mV/div-10V/div
Vertical Resolution	8 bit
Horizontal Scale	5ns/div-1000s/div, Step 1-2-5
Trigger Type	Edge
Trigger Mode	Auto, Normal, Single
Automatic Measurement	Period, Frequency, Mean, PK-PK, Max, Min, Amplitude, RMS

Feature	Specification
Cursor Measurement	ΔV, ΔT

7.2 Digital Multimeter Specifications

Feature	Specification
Full Scale Reading	4½ digits (max. 24000 counts)
Test Modes	Voltage, current, resistance, capacitance, diode, continuity
Max Input Voltage	AC 750V, DC 1000V
Max Input Current	AC 10A, DC 10A
Auto Range	Yes
True RMS	Yes

7.3 Waveform Generator Specifications

Waveform Type	Output Frequency
Sine	10Hz-100KHz
Square	10Hz-100KHz
Ramp	10Hz-100KHz
Pulse	10Hz-10KHz
Amplitude	2Vpp-2.5Vpp

7.4 General Specifications

- **Dimensions:** 9.6 x 3.8 x 19.8 cm
- **Weight:** 1.2 kg
- **Battery:** 2000 mAh Lithium Battery
- **Charging Interface:** USB Type-C

8. Warranty and Support

For warranty information, technical support, or service inquiries, please refer to the warranty card included with your product or contact OWON customer service directly. Keep your purchase receipt as proof of purchase.