Sinometer CQ5010C

Sinometer CQ5010C 10 MHz Single Channel Oscilloscope Instruction Manual

Model: CQ5010C

1. Introduction

This instruction manual provides essential information for the safe and effective operation of the Sinometer CQ5010C 10 MHz Single Channel Oscilloscope. The CQ5010C is designed for measuring and observing electrical signals, featuring a 10 MHz single channel, high stability, TV synchronizing capabilities, X-Y operating mode, and high sensitivity. Please read this manual thoroughly before using the instrument.

2. Safety Information

WARNING: To avoid electric shock, the protective grounding connector in the power cord must be connected to ground. Disconnect input power before replacing the fuse. For continued fire protection, use only the manual-specified type and rating fuse. Please read this manual for safety instructions.

- Always connect the instrument to a properly grounded power outlet.
- Do not operate the oscilloscope in wet or damp conditions.
- Ensure the correct voltage selection (110V or 220V) is made before connecting to power.
- Do not attempt to service the instrument yourself. Refer all servicing to qualified personnel.
- Use only probes and accessories specified for this instrument.

3. Product Overview

The Sinometer CQ5010C oscilloscope features a user-friendly layout with clearly labeled controls for various functions. Familiarize yourself with the front and rear panels before operation.

3.1 Front Panel

Figure 1: Front panel of the CQ5010C oscilloscope. This image displays the front panel of the CQ5010C oscilloscope, featuring the CRT display, input connectors, and various control knobs for vertical, horizontal, and trigger settings.

The front panel includes the Cathode Ray Tube (CRT) display, input terminals, and controls for vertical deflection (VOLTS/DIV, POSITION), horizontal deflection (TIME/DIV, POSITION), and trigger settings (LEVEL, MODE, SOURCE).

3.2 Rear Panel

Figure 2: Rear panel of the CQ5010C oscilloscope. The rear panel of the CQ5010C oscilloscope includes the AC power input, fuse holder, and a voltage selection switch (110V/220V). Important safety warnings regarding grounding and fuse replacement are also visible. The serial number for this unit is S52201200326.

The rear panel houses the AC power input, fuse holder, and a voltage selection switch to adapt the unit to local power supplies (110V or 220V). Ensure this switch is set correctly before connecting power.

4. Setup

1. **Unpacking and Inspection:** Carefully remove the oscilloscope from its packaging. Inspect the unit for any signs of physical damage. Report any damage to your supplier immediately.
2. **Power Connection:**
   - Verify the voltage selection switch on the rear panel matches your local power supply (110V or 220V). Adjust if necessary.
   - Connect the provided power cord to the AC input on the rear panel and then to a grounded power outlet.
3. **Probe Connection:** Connect the oscilloscope probe to the input BNC connector on the front panel. Ensure a secure connection.

5. Operating Instructions

5.1 Basic Operation

1. **Power On:** Press the power switch to turn on the oscilloscope. Allow a few moments for the display to stabilize.

2. **Intensity and Focus:** Adjust the **INTEN** (Intensity) and **FOCUS** knobs to achieve a clear, bright trace on the CRT screen.
3. **Vertical System (Y-Axis):**
    - **VOLTS/DIV:** Selects the vertical sensitivity, determining the voltage represented by each major division on the screen.
    - **POSITION:** Moves the trace vertically on the screen.
    - **VAR (Variable):** Provides fine adjustment of the vertical sensitivity. For calibrated measurements, this knob should be in the CAL position.
    - **INPUT COUPLING (AC/DC/GND):** Selects how the input signal is coupled to the vertical amplifier. **DC** for all signal components, **AC** for AC components only (blocking DC), and **GND** to display a ground reference level.
4. **Horizontal System (X-Axis):**
    - **TIME/DIV:** Selects the horizontal sweep speed, determining the time represented by each major division on the screen.
    - **POSITION:** Moves the trace horizontally on the screen.
    - **X-Y Operation:** For X-Y mode, set the TIME/DIV switch to X-Y. The input signal to the CH1 (Y-axis) and EXT (X-axis) inputs will be displayed as a Lissajous figure.
5. **Trigger System:**
    - **LEVEL:** Adjusts the trigger point on the input waveform.
    - **MODE (AUTO/NORM/TV):** Selects the trigger mode. **AUTO** provides a free-running sweep if no trigger is present. **NORM** requires a trigger for a stable display. **TV** is for synchronizing with video signals.
    - **SOURCE (INT/LINE/EXT):** Selects the trigger source. **INT** uses the input signal itself. **LINE** uses the AC line frequency. **EXT** uses an external signal applied to the EXT TRIG input.
    - **SLOPE (+/-):** Selects whether the trigger occurs on the rising (+) or falling (-) edge of the waveform.

5.2 Measurements

To perform accurate measurements, ensure the VAR (Variable) knob for VOLTS/DIV and the fine adjustment for TIME/DIV are in their calibrated positions. Count the number of divisions and multiply by the respective VOLTS/DIV or TIME/DIV setting.

6. Maintenance

1. **Cleaning:** Clean the exterior of the oscilloscope with a soft, damp cloth. Do not use abrasive cleaners or solvents. Ensure no liquid enters the instrument.
2. **Fuse Replacement:** If the oscilloscope does not power on, check the fuse located on the rear panel. **WARNING: Disconnect the power cord before replacing the fuse.** Replace with a fuse of the same type and rating as specified in the technical data (e.g., F1A(250V) for 110V, F0.5A(250V) for 220V).
3. **Storage:** Store the oscilloscope in a clean, dry environment away from direct sunlight and extreme temperatures.

7. Troubleshooting

If you encounter issues with your CQ5010C oscilloscope, refer to the following common problems and solutions:

- **No Display/Power:**
  - Check if the power cord is securely connected.
  - Verify the power outlet is functional.
  - Inspect and replace the fuse if blown (refer to Section 6.2).
  - Ensure the voltage selection switch on the rear panel is set correctly.
- **No Trace on Screen:**
  - Adjust the INTEN (Intensity) and FOCUS knobs.
  - Adjust the vertical and horizontal POSITION knobs to bring the trace into view.
  - Check the input signal and probe connection.
  - Ensure the input coupling is not set to GND if you expect a signal.
- **Unstable Waveform:**
  - Adjust the TRIGGER LEVEL knob.
  - Change the TRIGGER MODE (try AUTO or NORM).
  - Verify the TRIGGER SOURCE is appropriate for your signal.
  - Check the probe compensation.

If problems persist, contact qualified service personnel.

8. Specifications

The following table details the technical specifications for the Sinometer CQ5010C oscilloscope:

Figure 3: Technical Data for CQ5010C/CQ5010D. This table provides detailed technical specifications for the CQ5010C oscilloscope, including parameters for the CRT, vertical system, horizontal system, trigger system, X-Y operation, calibration power source, dimensions, weight, and included accessories.

Category	Type	Specification (CQ5010C)
CRT	Type	3" round
	Display area	8 x 10DIV (1DIV=6mm)
	Potential	1.3kV
Vertical System	Sensitivity	5mV/DIV ~ 5V/DIV ±3%
	Bandwidth (-3dB)	DC: 0~10MHz AC: 10Hz~10MHz
	Input impedance	1MΩ ±3%, 20pF ±3pF
	Input coupling	DC, GND, AC
	Max. input voltage	400V (DC+ACpeak)
	Trimming ratio	2.5 : 1
	Rise time	35ns
	Sweep time	0.1μs/DIV ~ 0.1s/DIV ±3%

Category	Type	Specification (CQ5010C)
Horizontal System		
	Trimming ratio	2.5 : 1
Trigger System	Mode	AUTO, NORM, TV
	Source	INT, LINE, EXT
	Polarity	"+" or "-"
	Trigger sensitivity	INT: 1DIV EXT: 0.3V, TV: 2DIV
	External trigger input	Input impedance: 1MΩ ±3%, 25pF ±5pF Max. input voltage: 160V (DC+ACpeak)
X-Y Operation	Sensitivity	X: 0.5V/DIV Y: 5mV/DIV ~ 5V/DIV
	Bandwidth (-3dB)	DC: 0~1MHz AC: 10Hz~1MHz
	Phase difference	≤3° (DC ~ 50kHz)
Calibration	Source	1kHz±2%, 0.5Vp-p±2% square wave
Power Source		110-127 VAC±10%, 220-240VAC±10%, 50Hz±2Hz, 60Hz±2Hz
Dimension (W x H x D)		225 x 91 x 280mm, 140 x 195 x 280mm
Weight		3kg
Accessories		One operation manual, one fuse, one power cable, one probe

9. Warranty and Support

For warranty information, please refer to the terms and conditions provided at the point of purchase or contact your vendor. For technical support or service inquiries, please reach out to your authorized Sinometer distributor or visit the official Sinometer website.

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