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FLUKE®

CNX 3000

Wireless Multimeter

Users Manual

August 2012

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for three years from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

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Table of Contents

List of Tables

List of Figures

Introduction

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, read all safety information before you use the Product.

The CNX 3000 Wireless Multimeter (the Product) is a True-rms Digital Multimeter.

How to Contact Fluke

To contact Fluke, call one of the following telephone numbers:

- Technical Support USA: 1-800-44-FLUKE (1-800-443-5853)
- Calibration/Repair USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-6714-3114
- Singapore: +65-6799-5566
- Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at www.fluke.com.

To register your product, visit http://register.fluke.com.

To view, print, or download the latest manual supplement, visit http://us.fluke.com/usen/support/manuals.

Safety Information

The Product complies with:

- ANSI/ISA-82.02.01
- CAN/CSA-C22.2 No. 61010-1-12: 3rd Edition
- UL 61010-1: 3rd Edition
- IEC/EN 61010-1:2010
- FCC Part 15 Subpart C Section 15.207, 15.209, 15.249 FCCID: T68-FWCS
- IC:6627A-FWCS
- Measurement Category III, 1000V, Pollution Degree 2
- Measurement Category IV, 600V, Pollution Degree 2

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

A list of symbols used on the Product and in this manual is in Table 1.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury:

- **Carefully read all instructions.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Limit operation to the specified measurement category, voltage, or amperage ratings.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **Do not touch voltages > 30 V ac rms, 42 V ac peak, or 60 V dc.**
- **Do not exceed the Measurement Category (CAT) rating of the lowest rated individual component of a Product, probe, or accessory.**
- **Measure a known voltage first to make sure that the Product operates correctly.**
- **Do not use, and disable the Product if it is damaged.**
- **Do not work alone.**
- **Comply with local and national safety codes. Use personal protective equipment (approved rubber gloves, face protection, and flame-resistant clothes) to prevent shock and arc blast injury where hazardous live conductors are exposed.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **The battery door must be closed and locked before you operate the Product.**

- **Do not use the Product if it operates incorrectly.**
- **Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.**
- **Use only correct measurement category (CAT), voltage, and amperage rated probes, test leads, and adapters for the measurement.**
- **Do not use test leads if they are damaged. Examine the test leads for damaged insulation, exposed metal, or if the wear indicator shows. Check test lead continuity.**
- **Keep fingers behind the finger guards on the probes.**
- **Do not touch the probes to a voltage source when the test leads are connected to the current terminals.**
- **Connect the common test lead before the live test lead and remove the live test lead before the common test lead.**
- **Remove all probes, test leads, and accessories that are not necessary for the measurement.**

Table 1. Symbols

Symbol	Description	Symbol	Description
⚠	Risk of Danger. Important information. See Manual.	⚠	Hazardous voltage.
CE	Conforms to European Union directives.	N10140	Conforms to relevant Australian EMC requirements.
C SP US	Conforms to relevant North American Safety Standards.	▭	Fuse
▬	Battery	⧈	Double insulation.
CAT III	Measurement Category III is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.	CAT IV	Measurement Category IV is applicable to test and measuring circuits connected at the source of the building's low-voltage MAINS installation.
CAT II	Measurement Category II is applicable to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.		

Table 1. Symbols (cont.)

Symbol	Description
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.

Hazardous Voltage

The display shows ϟ and the hazardous voltage indicator illuminates red when a hazardous voltage (≥30 V) is present on the input of the Product

Test Lead Alert

The display shows LEAD for a second when you turn the function switch to or from the mA position to remind you to make sure the test leads are in the correct terminals.

Battery Saver

The Product goes into "Sleep mode" and turns off the display if there is no function change or button pushed for 20 minutes. To turn off the sleep mode, push  while you turn on the Product. The sleep mode is always turned off for a MIN MAX AVG record session and when remote modules are shown in the display.

MIN MAX AVG Record Mode

The MIN MAX AVG record mode records the minimum and maximum input values, and calculates a running average of all measurements. The Product beeps when a new high or low is sensed.

Note

For dc functions, accuracy is the specified accuracy of the measurement function, ±12 counts for changes longer than 250 ms in duration.

For ac functions, accuracy is the specified accuracy of the measurement function ±40 counts for changes longer than 900 ms in duration.

To start a MIN MAX AVG record session:

1. Make sure the Product is set to the correct measurement function and on the correct range. Autorange is disabled while in a MIN MAX AVG record session.
2. Push MINMAX. **Min Max** and Max show at the top of the display. The measurement in the display is the maximum value measured. It will change only when a new maximum value is sensed.
3. To pause MIN MAX AVG record, push HOLD. **HOLD** shows in the display while record is paused. Recorded values are not deleted. To continue record session, push HOLD.
4. To exit and erase the MIN, MAX, and AVG values, push MINMAX for 1 second or turn the rotary switch.
5. To see the other recorded values (minimum and average), push MINMAX. Each push of the button shows a different recorded value. The value shown in the display is identified with Max, Min, or Avg to the right of the MIN MAX icon.

Note

Battery save or sleep mode is turned off in MIN MAX AVG record mode.

Display Hold

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.

In the display hold mode, the Product holds the DMM measurement in the display. All wireless module measurements continue to update. To hold a measurement in the display, push HOLD. The display shows **HOLD** when display hold is turned on.

Push HOLD again to stop hold mode and show measurements in the display.

Yellow Button

Push the YELLOW button (▭) to set the Product to a different measurement function. The different functions are shown in yellow around the rotary switch. Frequency, mV ac, capacitance, diode test, and mA dc are functions of the Product set with the yellow button.

Display Backlight

Push ☼ to turn on and turn off the backlight. The backlight automatically turns off after 2 minutes.

Manual and Auto Range

The Product can be set to manual or auto range. In autorange, the Product sets the range so the input is shown with the best resolution. Manual range lets you set the range.

When you turn on the Product, it is set to autorange and **Auto** shows in the display. To set the Product to manual range, push RANGE.

Note

You cannot change range when the Product is in the MIN MAX AVG record mode or in display hold mode. If you push RANGE in one of these modes, the Product will beep twice to alert you to an invalid operation.

Power-Up Options

To set a power-up option, hold down the button shown in Table 2 while you turn on the Product.

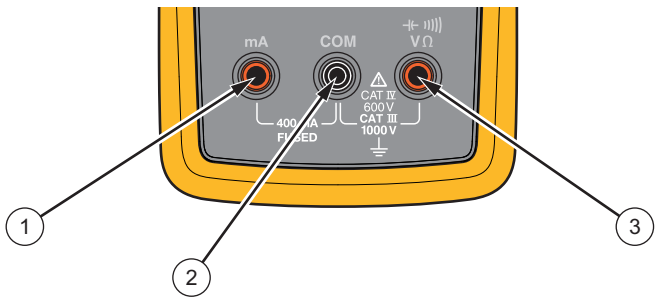
Table 2. Power-Up Options

Button	Power-Up Option
MINMAX	Turns off the beeper.
(YELLOW)	Turns off battery save (“Sleep mode”). **POFF** shows in the display for a second.
	Turns off 2 minute backlight timeout. **LOFF** shows in the display for a second.
	Sets the Product to the module mode. See the “How to Set the Product to Module Mode.”

Features

Tables 3 through 5 are lists of Product features with descriptions.

Table 3. Inputs



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Terminal	Description
①	mA - Input for 3.00 mA to 400.0 mA current measurements and current frequency.
②	COM - Return terminal for all measurements.
③	VΩ - Input for voltage, resistance, diode, capacitance, and voltage frequency.

Table 4. Rotary Switch Positions

Switch Position	Function
Hz V	DC voltage from 1 mV to 1000 V. Push [yellow] to measure frequency from 2 Hz to 99.99 kHz
Hz ~ V	AC voltage measurement from 60.0 mV to 1000 V. Push [yellow] to measure frequency from 2 Hz to 99.99 kHz. Push [yellow] again to measure Volts/Hertz.
~ mV	DC voltage measurements from 1 mV to 600 mV. Push [yellow] to measure ac voltage from 6 mV to 600 mV. [1]
Ω	Resistance measurements from 0.1 Ω to 50 MΩ. Push [yellow] to measure capacitance from 1 nF to 9999 µF.
)))))	Continuity. Beeper turns on at <25 Ω and turns off at >250 Ω. Push [yellow] for diode test. Shows OL above 2.0 V.
~ mA Hz	AC current measurements from 3.00 mA to 400 mA. Push [yellow] to measure dc current from 3.00 mA to 400 mA. [1] Push [yellow] again to measure frequency from 2 Hz to 9.99 kHz.

[1] This function will stay in ac or dc when the function switch is moved to another position and back to this function. Even when turned to off and back to this function.

Table 5. Pushbuttons

Button	Switch Position	Function
	Hz ~ V	Selects frequency.
	Hz ⎓ V	Selects frequency.
	~ ⎓ mV	Selects ac millivolts. [1]
	⊣⊢ Ω	Selects capacitance.
	⊣▸)))	Selects diode test.
	⎓ ~ mA Hz	Push once to select dc milliamps. Push twice to select ac frequency. [1]
RANGE	All positions	Sets the Product to manual range and scrolls through each range. Push for 1 second to set the Product to autorange.
HOLD	All positions	Freezes the display

Table 5. Pushbuttons (cont.)

Button	Switch Position	Function
	Not related to switch position	Push once to turn on the backlight and push again to turn off the backlight. The backlight turns off automatically after 2 minutes.
	All positions	Starts the MIN MAX record function. Steps the display through MAX, MIN, AVG (average), and input signal measurement. Push for 1 second to stop MIN MAX record.
	Not related to switch position	Selects/deselects the highlighted wireless module in the display. Hold for 1 second to bind all selected modules to the Product and stop the discovery procedure. [2]
	Not related to switch position	Moves the highlight in the display to the next wireless module shown in the display. [2]
	Not related to switch position	Turns on the radio and starts the module discovery procedure. (( )) shows in the display when the radio is on. Turns off the radio when the radio is on. [2]

[1] This function will stay in ac or dc when the function switch is moved to another position and back to this function. Even when turned to off and back to this function.

[2] This button is used when the Product connects with a wireless module. See the “Discovery of Modules” section to learn more.

AC Zero Input Behavior of True-rms Meters

Average responding meters can accurately measure only pure sinewaves. A True-rms meter can accurately measure distorted waveform signals. A minimum input voltage is necessary for Calculating True-rms converters to make a measurement. Because of this minimum input, true-rms meter specifications are only good for 1 % to 100 % of range. Non-zero digits that are shown on a true-rms meter when the test leads are open or are shorted are possible. This has no effect on the ac measurement accuracy of signals that are more than 1 % of range.

Unspecified input levels on the lowest ranges are:

AC voltage less than 1 % of 600 mV ac or 6 mV ac.

AC current less than 5 % of 60 mA ac or 3 mA ac.

Basic Measurements

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, disconnect power and discharge all high-voltage capacitors before you measure resistance, continuity, capacitance, or a diode junction.

The figures that follow show how to make basic measurements with the Product.

When you connect the test leads to the circuit or device, connect the common (COM) test lead before the live lead. When you remove the test leads, remove the live lead before the common test lead.

AC and DC Voltage Measurements

The voltage ranges are 600.0 mV, 6.000 V, 60.00 V, 600.0 V, and 1000 V. To set the 600.0 mV dc or ac range, turn the function switch to ≂ mV. Push  to toggle the Product between millivolts dc and millivolts ac. Refer to Figure 1 to measure ac or dc voltage.

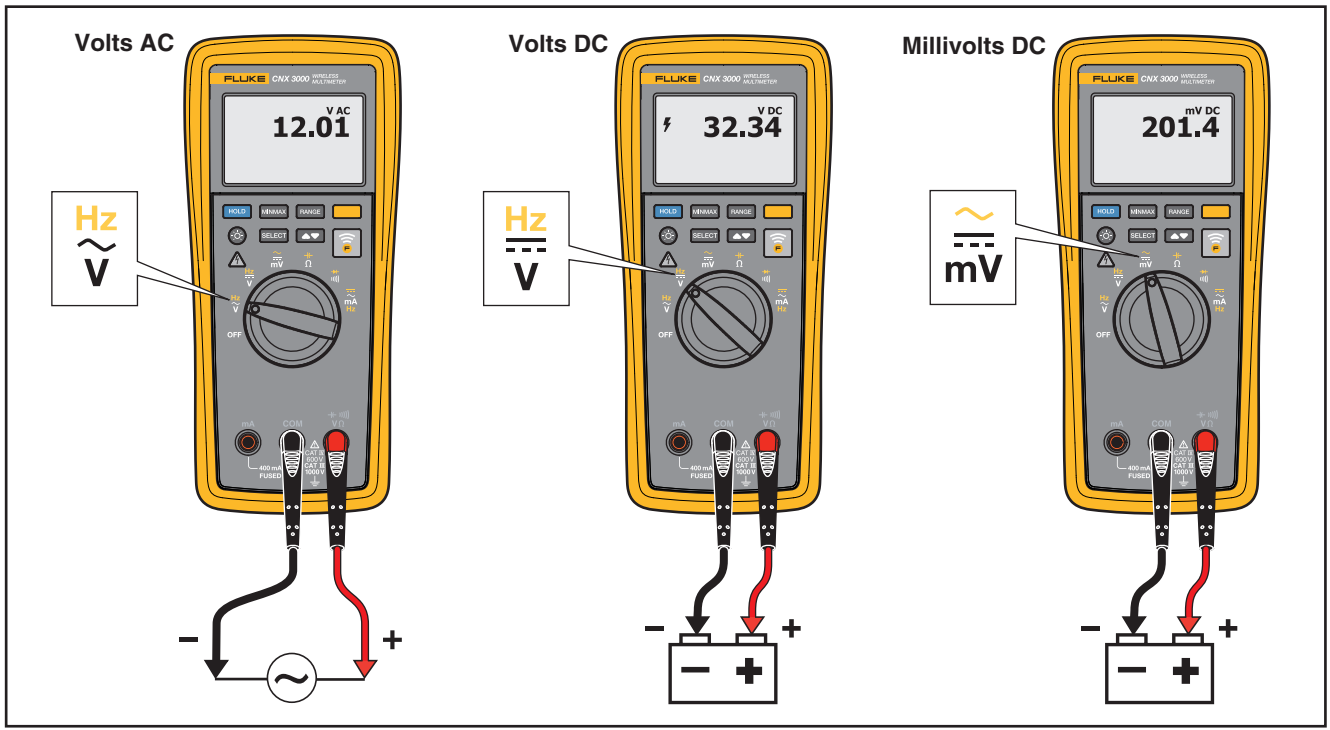

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Figure 1. AC and DC Voltage Measurements

Volts/Hertz Ratio

The Product can show the ratio of volts to frequency of an ac signal. Set the Product as shown in Figure 2 to show Volts/Hertz ratio.

When the Product is set to the Volts/Hz function, the voltage range is set to manual. If the voltage increases to a value larger than the range, the Product shows **OL** in the display. If the voltage drops to less than 5 % of the range, the value shown in the display can be invalid. Set the Product as shown in Figure 2 to measure volts/Hz.

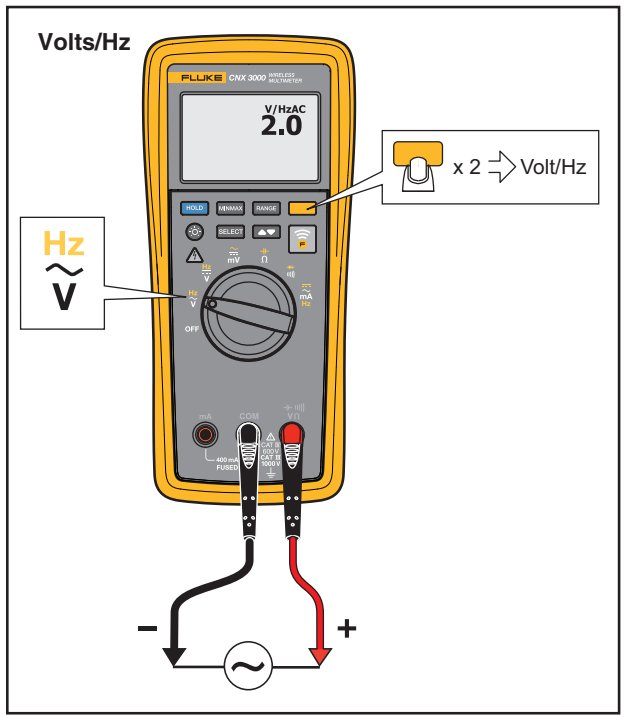

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Figure 2. Volt/Hertz Ratio

Resistance Measurements

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, disconnect power and discharge all high-voltage capacitors before you measure resistance, continuity, capacitance, or a diode junction.

The Product sends a small current through the circuit for resistance measurements. Because the current flows through all possible paths between the probes, the resistance measured is the total resistance of all paths between the probes.

The resistance ranges are 600.0 Ω, 6.000 kΩ, 60.00 kΩ, 600.0 kΩ, 6.000 MΩ, and 50.00 MΩ. Set the Product as show in Figure 3 to measure resistance.

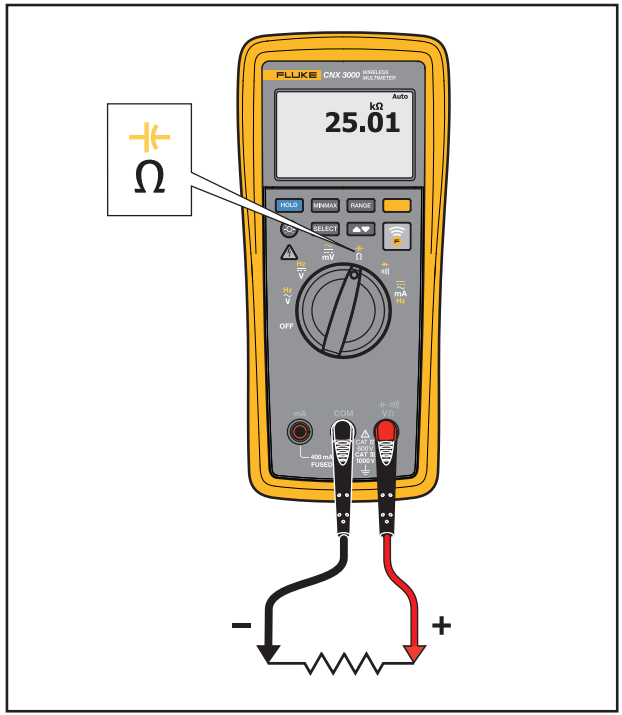

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Figure 3. Resistance Measurements

Capacitance Measurements

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, disconnect power and discharge all high-voltage capacitors before you measure resistance, continuity, capacitance, or a diode junction.

Capacitance ranges are 1,000 nF, 10.00 µF, 100.0 µF, and 9999 µF. To measure capacitance, set up the Product as shown in Figure 4.

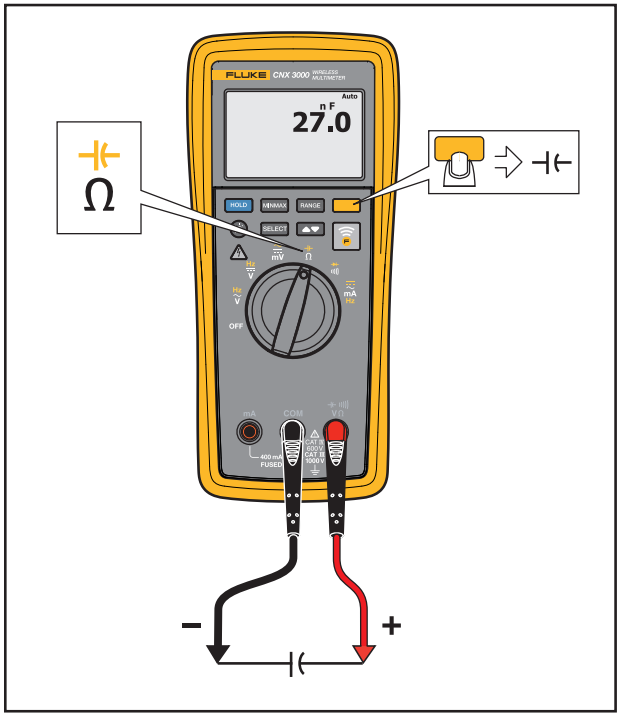

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Figure 4. Capacitance Measurements