

FLUKE®

77/75/23/21


Series III Multimeter

Instruction Sheet

Read First: Safety Information

- Never use the meter if the meter or test leads look damaged.
- Be sure the test leads and switch are in the correct position for the desired measurement.
- Never measure resistance in a circuit when power is applied.
- Never touch the probes to a voltage source when the test leads are plugged into the 10 A or 300 mA input jack.
- Never apply more than the rated voltage between any input jack and earth ground.
- Be careful when working with voltages above 60 V dc or 30 V ac rms. Such voltages pose a shock hazard.
- Keep your fingers behind the finger guards on the test probes when making measurements.

Warning

To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator () appears.

Symbols



Read First: Safety Information



Dangerous Voltage May Be Present



Double Insulation

Overvoltage Installation Category per IEC 1010:

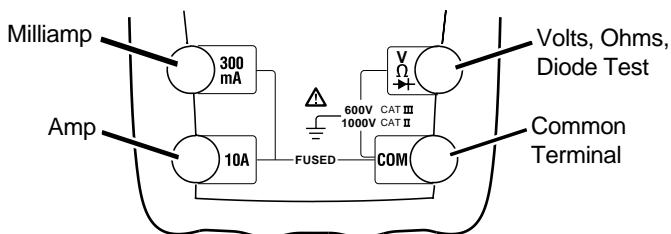
CAT II

Typical locations include; main wall outlets, local appliances, and portable equipment.

CAT III

Typical locations include switches in the fixed installation and equipment for industrial use permanently connected to the fixed installation.

Input Jacks



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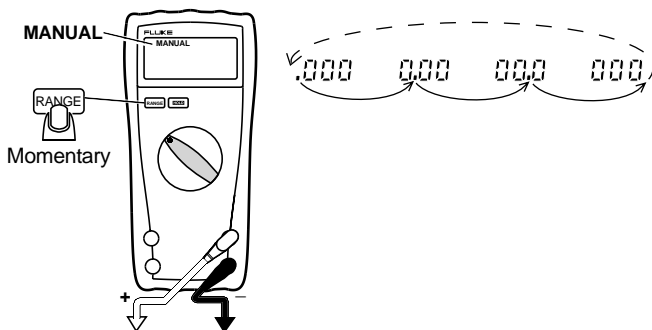
See Specifications for overload protection.

Autorange

The meter defaults to autorange when you turn on the meter.

Manual Range

Manual ranging is available in V ac, V dc, ohms, A ac, and A dc.



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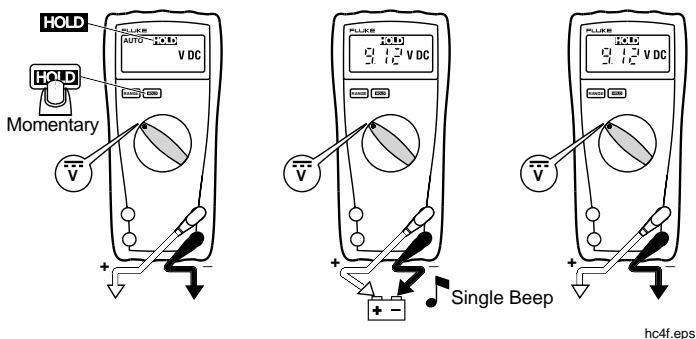
To return to autorange, press **RANGE** for 1 second or turn the rotary switch.

Automatic Touch Hold® Mode

⚠ Warning

To avoid electric shock, do not use the Touch Hold® mode to determine if a circuit with high voltage is dead. The Touch Hold® mode will not capture unstable or noisy readings.

The Touch Hold® mode automatically captures and displays stable readings for all functions.



When the meter captures new input, it beeps and a new reading is displayed.

Note

Stray voltages can produce a new reading.

To exit the Touch Hold® mode, press **HOLD** momentarily or turn the rotary switch.

Bar Graph

The bar graph shows readings relative to the full scale value of the displayed measurement range and indicates polarity.

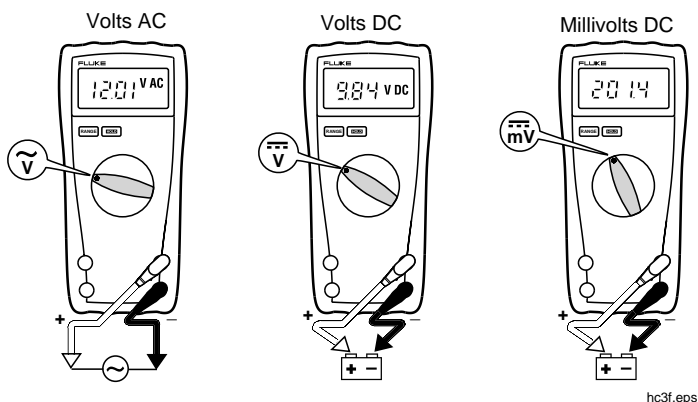


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Standby

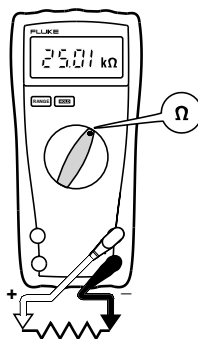
If the meter is on but is inactive for an hour (20 minutes in diode test), the display goes blank and displays four bar graph segments. To resume operation, turn the rotary switch or press a button.

AC and DC Voltage (\tilde{V} $\overline{\overline{V}}$ $m\overline{\overline{V}}$)

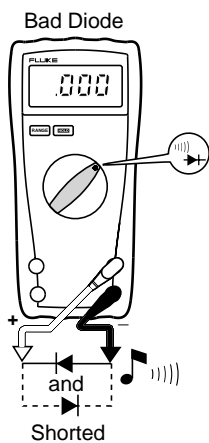
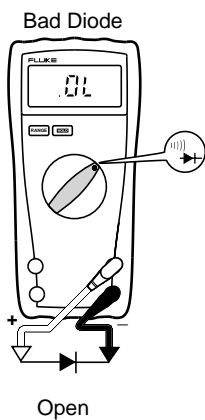
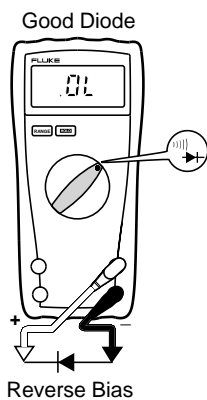
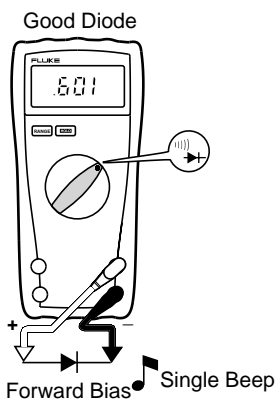


Resistance (Ω)

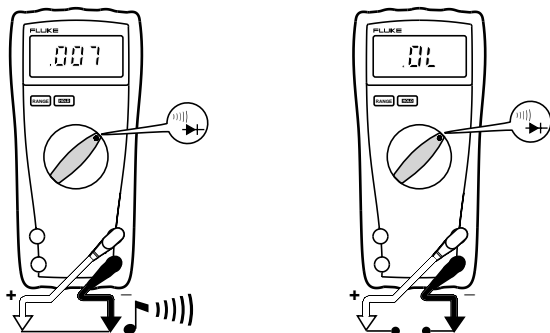
Turn off the power and discharge all capacitors. An external voltage across a component will give invalid resistance readings.



Diode Test (\rightarrow +))



Continuity Test ())))



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If continuity exists (resistance $< 210\ \Omega$ for Models 21/75 and $< 270\ \Omega$ for Models 23/77), the beeper sounds continuously. The meter beeps twice if it is in Touch Hold® mode.

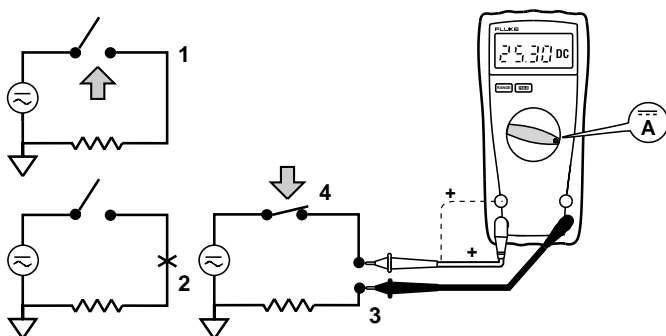
Current (\tilde{A} $\overline{\overline{A}}$)

Warning

To avoid injury, do not attempt a current measurement if the open circuit voltage exceeds the rated voltage of the meter.

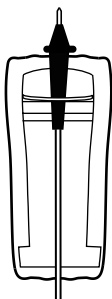
To avoid blowing an input fuse, use the 10 A jack until you are sure that the current is less than 300 mA.

Turn off power to the circuit. Break the circuit. (For circuits of more than 10 amps, use a current clamp.) Put the meter in series with the circuit as shown and turn power on.



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Probe Holder



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Maintenance

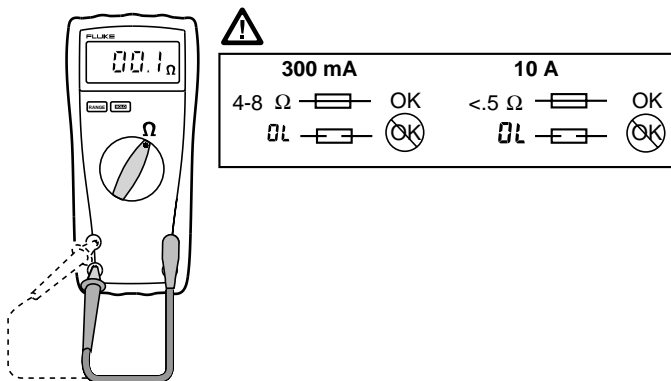
Warning

To avoid electric shock, remove the test leads before opening the case, and close the case before using the meter. To prevent fire and possible arc-flash, use fuses with ratings shown on the back of the meter.

Caution

To avoid contamination or static damage, do not touch the circuit board without proper static protection.

Internal Fuse Test

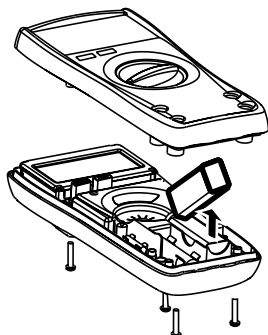


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Battery Replacement

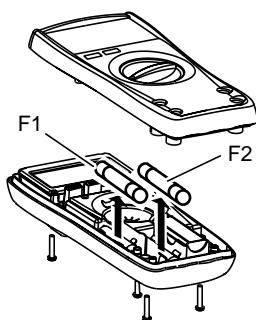
Note

Before opening the case, make sure the test leads are removed and the rotary switch is turned to OFF.

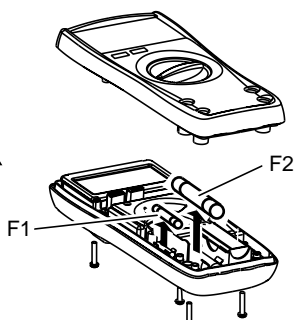


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Fuse Replacement



23/77



21/75

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Cleaning

To clean the meter, use a damp cloth and mild detergent; do not use abrasives or solvents on the meter.

Service and Parts

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

USA and Canada: 1-888-99-FLUKE (1-888-993-5853)

Europe: +31 402-678-200

Japan: +81-3-3434-0181

Singapore: +65-**-276-6196

Anywhere in the world: +1-425-356-5500

Or, visit Fluke's Web site at www.fluke.com.

Item	Description	Fluke PN	Quan.
BT1	Battery, 9 V, NEDA 1604/IEC 6F22, or NEDA 1604A/IEC 6LR61	696534 614487	1
	Models 21/75:		
F1*	Fuse, F630 mA, 250 V, Min Interrupt Rating 1500 A or IEC 127-1	740670	1
F2*	Fuse, F11 A, 1000 VAC/DC, Min Interrupt Rating 17 kA	943118	1
	Models 23/77:		
F1*	Fuse, F44/100 A, 1000 VAC/DC, Min Interrupt Rating 10 kA	943121	1
F2*	Fuse, F11 A, 1000 VAC/DC, Min Interrupt Rating 17 kA	943118	1
* For safety, use exact replacement			

Specifications

Accuracy is specified for a period of one year after calibration, at 18°C to 28°C (64°F to 82°F) with relative humidity to 90%. AC conversions are ac-coupled, average responding, and calibrated to the RMS value of a sine wave input.

Accuracy specifications are given as:

$\pm[(\% \text{ of reading}) + [\text{number of least significant digits}]]$

Maximum Voltage Between any Terminal and Earth Ground	Rated voltage
Display	Digital: 3,200 counts, updates 2.5/sec Analog: 31 segments, updates 25/sec
Response Time of Digital Display	V ac < 2 s V dc < 1 s Ω < 1 s to 320 k Ω , < 2 s to 3.2 M Ω , < 10 s to 32 M Ω
Operating Temperature	0°C to 50°C
Storage Temperature	-40°C to 60°C
Temperature Coefficient	0.1 x (specified accuracy)/°C (<18°C or >28°C)

Electromagnetic Compatibility In RF field of 3 V/m on all functions.	Total accuracy = Specified accuracy + 0.1% of range.
Relative Humidity except 32 MΩ range	0% to 90% (0°C to 35°C) 0% to 70% (35°C to 50°C)
32 MΩ range only	0% to 80% (0°C to 35°C) 0% to 70% (35°C to 50°C)
Altitude	Operating: 2000 meters Storage: 12,000 meters
Battery Type	9 V NEDA 1604 or 6F22 or 006P, or NEDA 1604A or 6LR61
Battery Life	2000 hrs typical with alkaline 1600 hrs typical with carbon zinc
Continuity Beeper	4096 Hz
Shock, Vibration	per MIL-T-PRF 28800F Class III, Sinusoidal, Non Operating
Size (H x W x L)	3.7 cm x 8.9 - 7.8 cm x 19 cm (1.5 in x 3.5 - 3.1 in x 7.49 in)
Weight	365 g (12.9 oz)
Safety	Models 21/75 Series III: 600 V CAT III, Models 23/77 Series III: 600 V CAT III and 1000 V CAT II per ANSI/ISA S82.01-1994, EN 61010-1: 1993, CSA C22.2 No 1010.1-92, UL 3111-1.
EMC Regulations	EN 61326-1 1997.
Certifications/Listings	



Function	Range	Accuracy
$\overline{\overline{V}}$	3.200 V, 32.00 V, 320.0 V 600 V (21/75), 1000 V (23/77)	$\pm(0.3\%+1)$ $\pm(0.4\%+1)$
$m\overline{\overline{V}}$	320.0 mV	$\pm(0.3\%+1)$
\tilde{V} (45 to 500 Hz, 3.2 V range. Other ranges 45 to 1 kHz)	3.200 V, 32.00 V, 320.0 V 600 V (21/75), 1000 V (23/77)	$\pm(2\%+2)$ $\pm(2\%+2)$
Ω	21/75: 320.0 Ω	$\pm(0.5\%+2)$
	3200 Ω , 32.00 k Ω ,	$\pm(0.5\%+1)$
	320.0 k Ω 3.200 M Ω	$\pm(0.5\%+1)$
	32.00 M Ω	$\pm(2\%+1)$
	23/77: 320.0 Ω	$\pm(0.5\%+3)$
	3200 Ω , 32.00 k Ω , 320.0 k Ω 3.200 M Ω 32.00 M Ω	$\pm(0.5\%+1)$ $\pm(0.5\%+1)$ $\pm(2\%+1)$
$\rightarrow \nabla \parallel \parallel \parallel$	2.0 V	$\pm(1\% \text{ typical})$

Function	Range	Accuracy	Burden Voltage (typical)
\tilde{A} (45 Hz to 1 kHz)	32.00 mA, 320.0 mA 10.00 A *	$\pm(2.5\%+2)$ $\pm(2.5\%+2)$	6 mV/mA 50 mV/A
$\overline{\overline{A}}$	32.00 mA, 320.0 mA 10.00 A *	$\pm(1.5\%+2)$ $\pm(1.5\%+2)$	6 mV/mA 50 mV/A
* 10 A continuous, 20 A for 30 seconds maximum.			

Overload protection for all functions and ranges: Rated voltage.

Function	Input Impedance (Nominal)		
$\bar{V}, m\bar{V}, \tilde{V}$	>10 M Ω , <50 pF		
	Common Mode Rejection Ratio (1 k Ω Unbalanced)	Normal Mode Rejection	
$\bar{V}, m\bar{V}$	>120 dB at dc, 50 Hz, or 60 Hz	>60 dB at 50 Hz or 60 Hz	
\tilde{V}	>60 dB dc to 60 Hz		
	Open Circuit Test Voltage	Full Scale Voltage To 3.2 M Ω 32 M Ω	
Ω	<3.1 V dc <2.8 V dc (typical)	<440 mV dc <420 mV dc (typical)	<1.4 V dc <1.3 V dc (typical)
	Open Circuit Test Voltage	Full Scale Voltage	
$\rightarrow \vdash \parallel \rangle$	<3.1 V dc	2.0 V dc	
	Short Circuit Current (typical)		
Ω	21/75: 400 μ A	23/77: 300 μ A	
$\rightarrow \vdash \parallel \rangle$	500 μ A	400 μ A	
$\rightarrow \vdash$	V _F	Current (typical)	
	0.0 V 0.6 V 1.2 V 2.0 V	21/75: 0.5 mA 0.4 mA 0.3 mA 0.1 mA	23/77: 0.4 mA 0.3 mA 0.2 mA 0.1 mA