

Fluke 83V and 87V Digital Multimeters Detailed Specifications

For all detailed specifications:

Accuracy is given as $\pm([\% \text{ of reading}] + [\text{number of least significant digits}])$ at 18 °C to 28 °C, with relative humidity up to 90 %, for a period of one year after calibration.

For Model 87 in the 4½-digit mode, multiply the number of least significant digits (counts) by 10. AC conversions are ac-coupled and valid from 3 % to 100 % of range. Model 87 is true-rms responding. AC crest factor can be up to 3 at full scale, 6 at half scale. For non-sinusoidal wave forms add $-(2 \% \text{ Rdg} + 2 \% \text{ full scale})$ typical, for a crest factor up to 3.



Fluke 87V ac voltage function specifications (true-rms)

Function	Range	Resolution	Accuracy					
			45 - 65 Hz	30 - 200 Hz	200 - 440 Hz	440 Hz - 1 kHz	1 - 5 kHz	5 - 20 kHz ¹
\tilde{V} ^{2,4}	600.0 mV	0.1 mV	$\pm (0.7 \% + 4)$		$\pm (1.0 \% + 4)$		$\pm (2.0 \% + 4)$	$\pm (2.0 \% + 20)$
	6.000 V	0.001 V						
	60.00 V	0.01 V	$\pm (0.7 \% + 2)$			$\pm (2.0 \% + 4)^3$	unspecified	
	600.0 V	0.1 V						
	1000 V	1 V					unspecified	unspecified
	Using low pass filter		$\pm (0.7 \% + 2)$	$\pm (1.0 \% + 4)$	$+ 1 \% + 4$ $-6 \% - 4^5$	unspecified	unspecified	unspecified

¹ Below 10 % of range, add 6 counts.

² The Fluke 87V is a true-rms responding meter. When the input leads are shorted together in the ac functions, the meter may display a residual reading between 1 and 30 counts. A 30-count residual reading will cause only a 2-digit change for readings over 3 % of range. Using REL to offset this reading may produce a much larger constant error in later measurements.

³ Frequency range: 1 kHz to 2.5 kHz.

⁴ A residual reading of up to 13 digits with leads shorted, will not affect stated accuracy above 3 % of range.

⁵ Specification increases from -1 % at 200 Hz to -6 % at 440 Hz when filter is in use.

Fluke 83V ac voltage function specifications (average responding rms indicating)

Function	Range	Resolution	Accuracy		
			50 Hz - 60 Hz	30 Hz - 1 kHz	1 kHz - 5 kHz
\tilde{V} ¹	600.0 mV	0.1 mV	$\pm (0.5 \% + 4)$	$\pm (1.0 \% + 4)$	$\pm (2.0 \% + 4)$
	6.000 V	0.001 V	$\pm (0.5 \% + 2)$	$\pm (1.0 \% + 4)$	$\pm (2.0 \% + 4)$
	60.00 V	0.01 V	$\pm (0.5 \% + 2)$	$\pm (1.0 \% + 4)$	$\pm (2.0 \% + 4)$
	600.0 V	0.1 V	$\pm (0.5 \% + 2)$	$\pm (1.0 \% + 4)$	$\pm (2.0 \% + 4)^2$
	1000 V	1 V	$\pm (0.5 \% + 2)$	$\pm (1.0 \% + 4)$	unspecified

¹ Below a reading of 200 counts, add 10 counts

² Frequency range: 1 kHz to 2.5 kHz

Fluke 83V and 87V Detailed Specifications cont.

DC voltage, resistance, and conductance function specifications

Function	Range	Resolution	Accuracy	
			Fluke 83V	Fluke 87V
$\overline{\text{V}}$	6.000 V	0.001 V	$\pm (0.1 \% + 1)$	$\pm (0.05 \% + 1)$
	60.00 V	0.01 V	$\pm (0.1 \% + 1)$	$\pm (0.05 \% + 1)$
	600.0 V	0.1 V	$\pm (0.1 \% + 1)$	$\pm (0.05 \% + 1)$
	1000 V	1 V	$\pm (0.1 \% + 1)$	$\pm (0.05 \% + 1)$
$\overline{\text{mV}}$	600.0 mV	0.1 mV	$\pm (0.3 \% + 1)$	$\pm (0.1 \% + 1)$
Ω	600.0 Ω	0.1 Ω	$\pm (0.4 \% + 2)^1$	$\pm (0.2 \% + 2)^1$
	6.000 k Ω	0.001 k Ω	$\pm (0.4 \% + 1)$	$\pm (0.2 \% + 1)$
	60.00 k Ω	0.01 k Ω	$\pm (0.4 \% + 1)$	$\pm (0.2 \% + 1)$
	600.0 k Ω	0.1 k Ω	$\pm (0.7 \% + 1)$	$\pm (0.6 \% + 1)$
	6.000 M Ω	0.001 M Ω	$\pm (0.7 \% + 1)$	$\pm (0.6 \% + 1)$
	50.00 M Ω	0.01 M Ω	$\pm (1.0 \% + 3)^2$	$\pm (1.0 \% + 3)^2$
nS	50.00 nS	0.01 nS	$\pm (1.0 \% + 10)^1$	$\pm (1.0 \% + 10)^1$
	60.00 nS	0.01 nS	$\pm (1.0 \% + 10)^1$	$\pm (1.0 \% + 10)^1$

¹ When using the REL Δ function to compensate for offsets

² Add 0.5 % of reading when measuring above 30 M Ω in the 50 M Ω range and 20 counts below 33 nS in the 60 nS range

Temperature specifications (87V only)

Temperature	Resolution	Accuracy ^{1, 2}
-200 °C to +1090 °C	0.1 °C	1 % + 10
-328 °F to +1994 °F	0.1 °F	1 % + 18

¹ Does not include error of the thermocouple probe.

² Accuracy specification assumes ambient temperature stable to ± 1 °C. For ambient temperature changes of ± 5 °C, rated accuracy applies after 1 hour.

Current function specifications

Function	Range	Resolution	Accuracy		Burden Voltage (typical)
			Model 83 ¹	Model 87 ^{2, 3}	
mA $\text{A} \sim$ (45 Hz to 2 kHz)	60.00 mA	0.01 mA	$\pm (1.2 \% + 2)^5$	$\pm (1.0 \% + 2)$	1.8 mV/mA
	400.0 mA ⁶	0.1 mA	$\pm (1.2 \% + 2)^5$	$\pm (1.0 \% + 2)$	1.8 mV/mA
	6.000 A	0.001 A	$\pm (1.2 \% + 2)^5$	$\pm (1.0 \% + 2)$	0.03 V/A
	10.00 A ⁴	0.01 A	$\pm (1.2 \% + 2)^5$	$\pm (1.0 \% + 2)$	0.03 V/A
mA $\text{A} \overline{\text{---}}$	60.00 mA	0.01 mA	$\pm (0.4 \% + 4)$	$\pm (0.2 \% + 4)$	1.8 mV/mA
	400.0 mA ⁶	0.1 mA	$\pm (0.4 \% + 2)$	$\pm (0.2 \% + 2)$	1.8 mV/mA
	6.000 A	0.001 A	$\pm (0.4 \% + 4)$	$\pm (0.2 \% + 4)$	0.03 V/A
	10.00 A ⁴	0.01 A	$\pm (0.4 \% + 2)$	$\pm (0.2 \% + 2)$	0.03 V/A
$\mu\text{A} \sim$ (45 Hz to 2 kHz)	600.0 μA	0.1 μA	$\pm (1.2 \% + 2)^5$	$\pm (1.0 \% + 2)$	100 $\mu\text{V}/\mu\text{A}$
	6000 μA	1 μA	$\pm (1.2 \% + 2)^5$	$\pm (1.0 \% + 2)$	100 $\mu\text{V}/\mu\text{A}$
$\mu\text{A} \overline{\text{---}}$	600.0 μA	0.1 μA	$\pm (0.4 \% + 4)$	$\pm (0.2 \% + 4)$	100 $\mu\text{V}/\mu\text{A}$
	6000 μA	1 μA	$\pm (0.4 \% + 2)$	$\pm (0.2 \% + 2)$	100 $\mu\text{V}/\mu\text{A}$

¹ AC conversion for Model 83 is ac coupled and calibrated to the rms value of a sine wave input.

² AC conversions for Model 87 are ac coupled, true rms responding, and valid from 3 % to 100 % of range.

³ Model 87 is a true rms responding meter. When the input leads are shorted together in the ac functions, the Meter may display a residual reading between 1 and 30 counts. A 30 count residual reading will cause only a 2 digit change for readings over 3 % of range. Using REL to offset this reading may produce a much larger constant error in later measurements.

⁴ Δ 10 A continuous up to 35 °C; < 20 minutes on, 5 minutes off at 35 °C to 55 °C. 20 A for 30 seconds maximum; > 10 A unspecified.

⁵ Below a reading of 200 counts, add 10 counts.

⁶ 400 mA continuous; 600 mA for 18 hours maximum.

Capacitance and diode function specifications

Function	Range	Resolution	Accuracy
$\overline{\text{C}}$	10.00 nF	0.01 nF	$\pm (1 \% + 2)^1$
	100.0 nF	0.1 nF	$\pm (1 \% + 2)^1$
	1.000 μF	0.001 μF	$\pm (1 \% + 2)$
	10.00 μF	0.01 μF	$\pm (1 \% + 2)$
	100.0 μF	0.1 μF	$\pm (1 \% + 2)$
	9999 μF	1 μF	$\pm (1 \% + 2)$
$\overrightarrow{\text{D}}$	3.000 V	0.001 V	$\pm (2 \% + 1)$

¹ With a film capacitor or better, using Relative mode to zero residual.

Frequency counter specifications

Function	Range	Resolution	Accuracy
Frequency (0.5 Hz to 200 kHz, pulse width > 2 µs)	199.99	0.01 Hz	± (0.005 % + 1)
	1999.9	0.1 Hz	± (0.005 % + 1)
	19.999 kHz	0.001 kHz	± (0.005 % + 1)
	199.99 kHz	0.01 kHz	± (0.005 % + 1)
	> 200 kHz	0.1 kHz	unspecified

Frequency counter sensitivity and trigger levels

Input Range ¹	Minimum Sensitivity (RMS Sine wave)		Approximate Trigger Level (DC Voltage Function)
	5 Hz - 20 kHz	0.5 Hz - 200 kHz	
600 mV dc	70 mV (to 400 Hz)	70 mV (to 400 Hz)	40 mV
600 mV ac	150 mV	150 mV	–
6 V	0.3 V	0.7 V	1.7 V
60 V	3 V	7 V (≤ 140 kHz)	4 V
600 V	30 V	70 V (≤ 14.0 kHz)	40 V
1000 V	100 V	700 V (≤ 1.4 kHz)	100 V
Duty Cycle Range	Accuracy		
0.0 to 99.9 %	Within ± (0.2 % per kHz + 0.1 %) for risetimes < 1 µs		

¹ Maximum input for specified accuracy = 10X Range or 1000 V.

Electrical characteristics of the terminals

Function	Overload Protection ¹	Input Impedance (nominal)	Common Mode Rejection Ratio (1 kΩ unbalance)	Normal Mode Rejection						
\bar{V}	1000 V rms	10 MΩ < 100 pF	> 120 dB at dc, 50 Hz or 60 Hz	> 60 dB at 50 Hz or 60 Hz						
\overline{mV}	1000 V rms	10 MΩ < 100 pF	> 120 dB at dc, 50 Hz or 60 Hz	> 60 dB at 50 Hz or 60 Hz						
\tilde{V}	1000 V rms	10 MΩ < 100 pF (ac-coupled)	> 60 dB, dc to 60 Hz	Full Scale Voltage			Typical Short Circuit Current			
				Open Circuit Test Voltage	To 6.0 MΩ	50 MΩ or 60 nS	600 Ω	6 k	60 k	600 k
Ω	1000 V rms	< 7.3 V dc	< 4.1 V dc	< 4.5 V dc	1 mA	100 µA	10 µA	1 µA	1 µA	0.5 µA
$\rightarrow +$	1000 V rms	< 3.9 V dc	3.000 V dc			0.6 mA typical				

¹ 10⁶ V Hz maximum

MIN MAX recording specifications

Model	Nominal Response	Accuracy
83V	100 ms to 80 %	Specified accuracy ± 12 counts for changes > 200 ms in duration (± 40 counts in ac with beeper on)
87V	100 ms to 80 % (dc functions)	Specified accuracy ± 12 counts for changes > 200 ms in duration > 25 % of range
	120 ms to 80 % (ac functions)	Specified accuracy ± 40 counts for changes > 350 ms and inputs
	250 µs (peak) (Model 87 only) ¹	Specified accuracy ± 100 counts for changes > 250 µs in duration (add ± 100 counts for readings over 6000 counts) (add ± 100 counts for readings in Low Pass mode)

¹ For repetitive peaks: 1 ms for single events.

Fluke 83V and 87V General Specifications

Maximum voltage between any terminal and earth ground: 1000 V rms

Fuse protection for mA or μ A inputs: 44/100 A, 1000 V FAST Fuse

Fuse protection for A input: 11 A, 1000 V FAST Fuse

Display:

Digital: 6000 counts updates 4/sec; (Model 87V also has 19,999 counts in high-resolution mode)

Analog: 33 segments, updates 40/sec.

Frequency: 19,999 counts, updates 3/sec at > 10 Hz

Temperature: Operating: -20 °C to +55 °C; Storage: -40 °C to +60 °C

Altitude:

Operating: 2000 m

Storage: 10,000 m

Temperature coefficient: 0.05 x (specified accuracy)/ °C (< 18 °C or > 28 °C)

Electromagnetic compatibility: In an RF field of 3 V/m total accuracy = specified accuracy

Relative humidity: 0 % to 90 % (0 °C to 35 °C); 0 % to 7 0% (35 °C to 55 °C)

Battery type: 9 V zinc, NEDA 1604 or 6F22 or 006P

Battery life: 400 hours typical with alkaline (with backlight off)

Vibration: Per MIL-PRF-28800 for a Class 2 instrument

Shock: 1 Meter drop per IEC 61010-1:2001

Size (HxWxL): 1.25 in x 3.41 in x 7.35 in (3.1 cm x 8.6 cm x 18.6 cm)

Size with holster and flex-stand: 2.06 in x 3.86 in x 7.93 in (5.2 cm x 9.8 cm x 20.1 cm)

Weight: 12.5 oz (355 g)

Weight with holster and flex-stand: 22.0 oz (624 g)

Safety: Complies with ANSI/ISA S82.01-2004, CSA 22.2 No. 1010.1:2004 to 1000 V Overvoltage Category III, IEC 664 to 600 V Overvoltage Category IV. UL listed to UL3111-1. Licensed by TÜV to EN61010-1.

Fluke. *Keeping your world up and running.*

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Printed in U.S.A. 4/2005 2161164 D-US-N Rev B

TECHNICAL DATA

Fluke PRV240 Proving Unit



REDUCES RISK

Reduces the risk of shock and arc flash risk hazard

BATTERY LIFE

5,000 tests per set of four AA batteries

SIMPLE TO USE

Single LED indicates functionality

SAFETY RATING

IEC61010-1, IEC61010-2-030

WARRANTY

One-year

Unique, compact, convenient

The Fluke PRV240 Proving Unit is a portable, pocket-sized, battery-powered voltage source. It is unique in that it sources stable ac and dc voltages for both LoZ and HiZ instruments.

Designed for safety and compliance

The Fluke PRV240 provides a safe method to verify that your electrical test tool is operating properly before you conduct any live tests. The concept of “Test Before Touch” (TBT) involves testing your meter against a known live source before and after the actual measurement. This sequence verifies that your test tool is operating properly during the actual measurement.

Verify your test tool without unnecessary exposure to shock and arc flash. Using the PRV240 reduces the need for personal protective equipment (PPE) when a known voltage source is not available for verification of your tester or multimeter before test before TBT are performed. PPE is still needed for absence of voltage testing when appropriate.

Key benefits

- Using the PRV240 reduces the risk of shock and arc flash by validating the functionality of test tools without placing yourself in a potentially hazardous electrical environment
- Sources both ac and dc steady-state voltage—supplies 240 V dc/ac
- A single LED indicates functionality, making this unit a simple-to-use solution for complying with TBT verification of your test tool
- Compatible with both high impedance or low impedance multimeters, clamp meters or two pole testers
- Voltage is sourced through recessed contacts that are activated when tested probes are inserted to avoid accidental contact
- Includes TPAK magnetic hanging strap
- Long battery life—5,000 tests per set of four AA batteries



Specifications

Output voltage	240 V ac rms or dc LoZ >3 kΩ load	± 10% ≥ 1 MΩ 60 V ac typical 50 V ac rms minimum
LED power indicator	Turns on when output voltage is present	
Battery	4 AA Alkaline batteries NEDA	24 A IEC LR03
Battery life	5000 (5-second duration) test cycles with >1 MΩ load, 300 tests minimum with >3 kΩ load	
Operating temperature	-10 °C to +50 °C	
Operating humidity	0% to 90% (0 °C to 35 °C)	0% to 70% (35 °C to 55 °C)
Operating altitude	2000 m	
Dimensions	11.7 cm x 7.4 cm x 2.8 cm (4.6 in x 2.9 in x 1.1 in), Pollution Degree 2	
Weight	0.23 kg (8 oz) includes batteries	
Safety	IEC61010-1, IEC61010-2-030	
Warranty	One-year	
Electromagnetic Compatibility (EMC)	IEC 61326-1 US (FCC) Korea (KCC)	Portable EM environment; CISPR 11, Group 1, Class A 47 CFR 15 subpart B, this product is considered an exempt device per clause 15.103 Class A Equipment (Industrial Broadcasting & Communication Equipment)
	This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.	

Ordering information

PRV240 Proving Unit

Included

TPAK hanging strap, four AA batteries, instruction sheet

Kits

FLK-3000FC/PRV240 3000FC DMM
+ PRV240 Proving Unit Kit
FLUKE-87V/PRV240 FLUKE-87V DMM
+ PRV240 Proving Unit Kit
FLUKE-117/PRV240 FLUKE-117 DMM
+ PRV240 Proving Unit Kit
FLUKE-376/PRV240 FLUKE-376 CLAMP
+ PRV240 Proving Unit Kit
FLUKE-T5-1K/PRV240 FLUKE-T5-1000
+ PRV240 Proving Unit Kit
FLUKE-T150/PRV240 FLUKE-T150
+ PRV240 Proving Unit Kit

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Printed in U.S.A. 4/2015 6005026b-en

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