FLUKE®

16

Multimeter with Temperature

Instruction Sheet

⚠ *Read First: Safety Information*

To ensure that the meter is used safely, follow these instructions:

- Do not use the meter if the meter or test leads appear damaged, or if you suspect that the meter is not operating properly.
- Disconnect the live test lead before disconnecting the common test lead.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Do not use the V•Check mode to measure voltages in circuits that could be damaged by this mode's low input impedance (≅2 kΩ).
- Turn off power to the circuit under test before cutting, desoldering, or breaking the circuit. Small amounts of current can be dangerous.
- Do not apply more than 600V rms between a meter terminal and earth ground.
- Use caution when working with voltages above 60V dc or 30V ac rms. Such voltages pose a shock hazard.

PN 2063513 December 2002

Symbols

RANGE — Press button.

SELECT — Press button to switch between modes.

Double insulation.

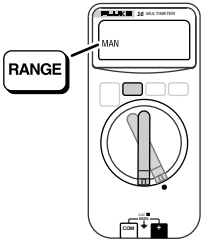
MAN — Manual ranging mode.

ip14i.eps

Automatic Range Selection

The meter defaults to autoranging when you turn it on. The 4000 mV range can be entered only with manual range selection.

Manual Range Selection



0.000 00.00 000.0 0.000 .0000

RANGE

To return to autoranging, press RANGE for 2 seconds, or change the measurement mode.

ip15i.eps

Battery Saver™

If the meter is ON but inactive and not connected to voltage for more than 45 minutes, the display goes blank to preserve battery life. To resume operation, press any button.

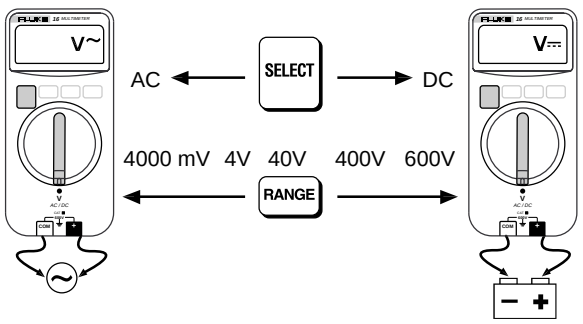
Battery Saver™ is disabled in MIN/MAX record mode.

AC and DC Voltage

Also refer to V•Check.

Volts AC
Input Impedance ≅5 MΩ
50 Hz to 400 Hz

Volts DC
Input Impedance ≅10 MΩ



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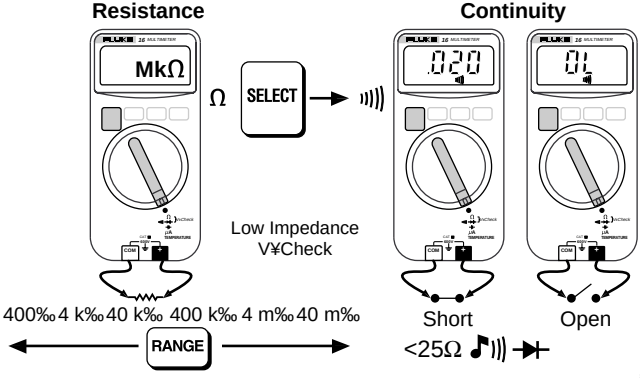
Resistance and Continuity Ω)))

Turn off circuit power before testing. Also refer to V•Check.

Resistance

Continuity



ip02i.eps

Detects shorts and opens ≥250 µS.

⚠ *V•Check*

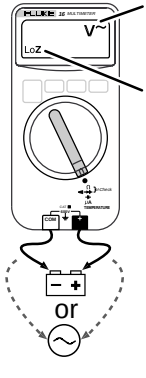
If a dc or ac voltage greater than about 4.5V is present across the inputs when the meter is set to))), ⊣⊢, or Ω, the meter switches automatically to dc or ac voltage mode (V•Check mode).

⚠ Warning

Repetitive transients on a dc bus will cause V•Check to select ac volts, even though a hazardous dc voltage may be present. To avoid a misleading display and possible electric shock, manually select the proper volts function for measurements on these circuits.

When V•Check is activated, the meter has low input impedance (Lo**Z**) ≅2 kΩ. This load can alter the voltages in electronic control circuits. Do not use V•Check to measure voltage in circuits that could be damaged by a 2 kΩ load.

Hint: V•Check can be effectively used to eliminate “ghost” voltages.



If AC detected
If DC detected

Meter puts ≅ 2 kΩ load on circuit.

Disable and re-enable V•Check

RANGE For))), ⊣⊢ and Ω, Disables V•Check and locks meter in selected mode.

RANGE 2 sec
or
SELECT
or

Re-enables V•Check

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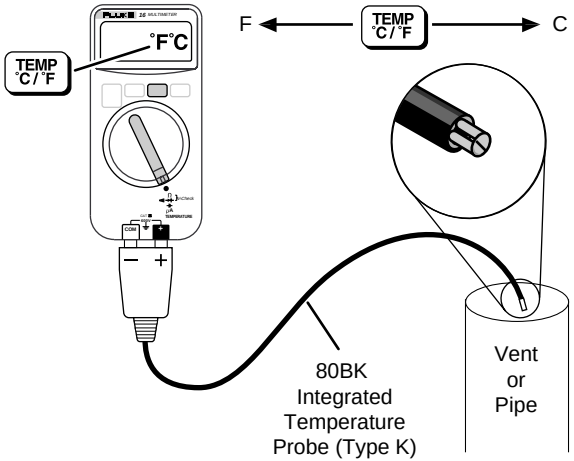
Temperature



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Note correct connector polarity.

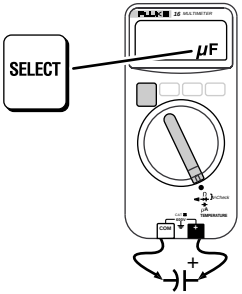
To meet stated accuracy, the 80BK temperature adapter must be at the same temperature as the meter.

Warning

To avoid possible electric shock, DO NOT apply thermocouple tip to any conductor that is greater than 30V AC, 42.4V pk, or 60V DC to earth.

Capacitance ⊣⊢

Turn off circuit power; then disconnect and discharge the capacitor before measuring capacitance.



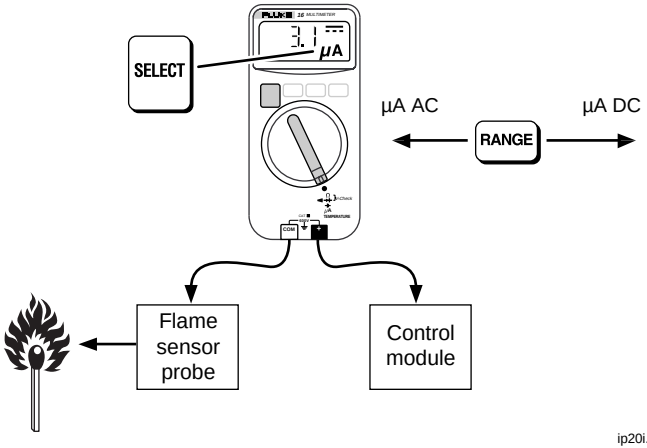
If the capacitor requires more discharging, **diSC** is displayed while the capacitor discharges**.**

ip05i.eps

Note correct probe polarity for polarized capacitors.

Microamps µA

Range 0 to 200 µA



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Example: Flame rectification circuit.

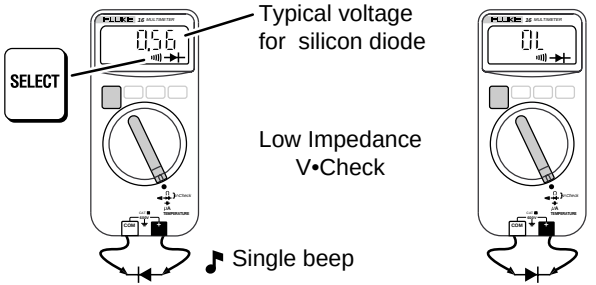
To measure flame rectification circuits:

1. Turn function switch to far right position.
2. Push select button 3 times to select µA.
3. Connect meter between flame sensor probe and control module.
4. Turn heating unit on and record µA measurement.

Diode Test ⇥|

Turn off circuit power before testing. For best results diodes should be measured out of circuit.
Also refer to V•Check.

Good Diode



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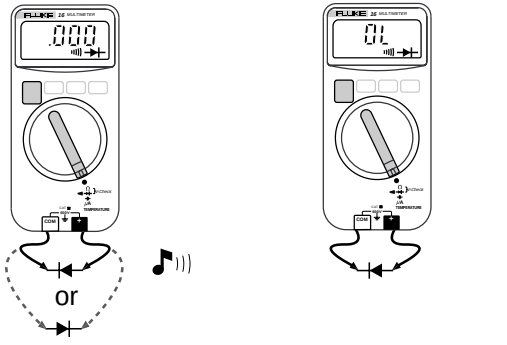
Forward Bias

Reverse Bias

Bad Diode



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Shorted

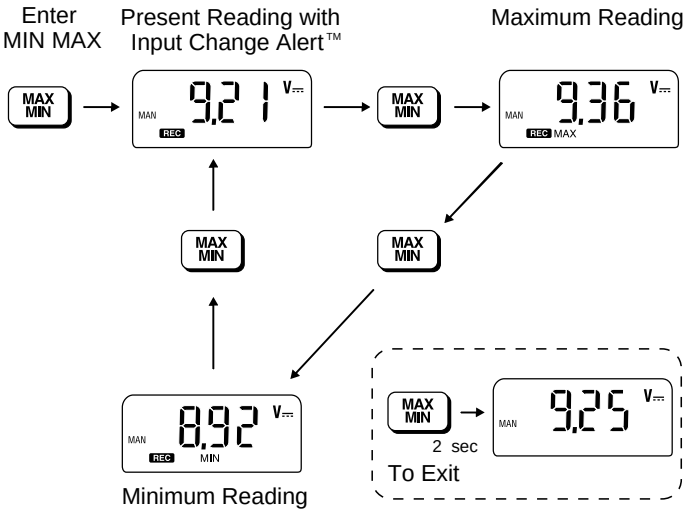
Open

MIN MAX (µF)

(Records the lowest and highest measurements)

V•Check, autoranging, and Battery Saver™ are disabled. Put the meter in the proper range before entering MIN MAX.

When the reading changes more than about 50 digits, the meter gives a short beep. When a new minimum or maximum is recorded, the meter gives a long beep.



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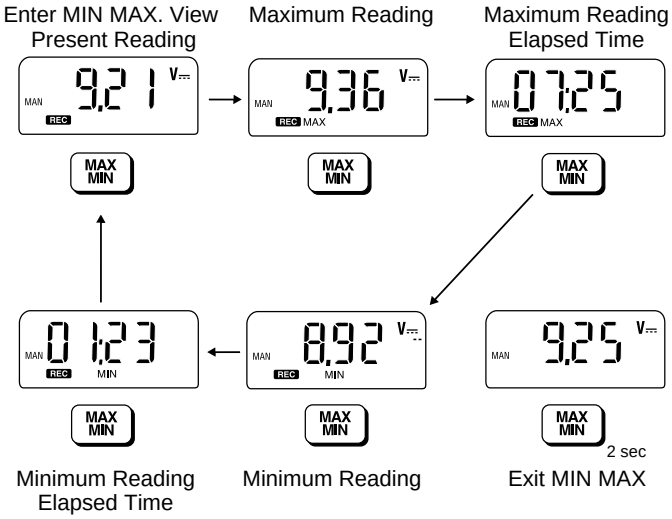
MIN MAX with Elapsed Time

Records the hours and minutes between when MIN MAX was entered and the last high and low was recorded. OL is displayed for times longer than 99:59.

To enable the MIN MAX timer, hold down [MIN MAX] while turning the rotary switch from OFF to either measurement mode.



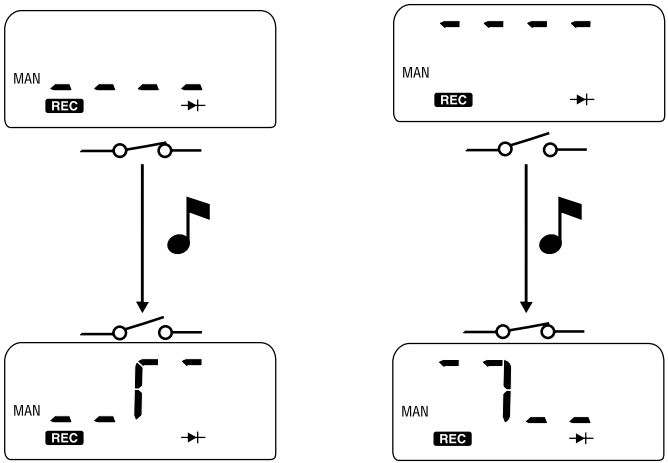
ip11i.eps

Disabling the Beeper

To disable the beeper for all modes, hold down [RANGE] for 2 seconds while turning the meter on.

Continuity Capture™

To set up the meter to capture intermittent shorts and opens, turn the switch to ⊣)))), connect the leads to the circuit; then press [MIN MAX].



ip12i.eps

Captures transitions longer than 250 µs (1/4000th of a second).

Transitions after the first transition cause the meter to beep, but the display does not change.

To reset the display to the current condition, press [MIN MAX].

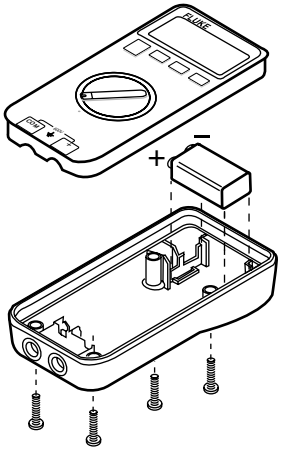
To exit, press [MIN MAX] for 2 seconds, or change the measurement mode.

Maintenance

Clean the case with a damp cloth and detergent. Do not use abrasives or solvents.

Battery Replacement

Remove the test leads before disassembling the case.



ip13i.eps

Replacement Parts

Fluke TL-75 (Double-insulated leads)	PN 855705
80BK (Integrated Temperature Probe)	PN 1273124

Service and Parts

This meter should be serviced only by a qualified service technician. To locate an authorized service center, call:

USA: 1-888-99-FLUKE (1-888-993-5853)
Canada: 1-800-36-FLUKE (1-800-363-5853)
Europe: +31 402-675-200
Japan: +81-3-3434-0181
Singapore: +65-738-5655
Anywhere in the world: +1-425-446-5500

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

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 follows:

±([% of reading] + [number of least significant digits])

Function	Range	Resolution	Accuracy
Temperature	-10°C to 400°C 14°F to 752°F	0.1°C or 0.2°F	±(1.0% + 0.8°C) typical ±(1.0% + 1.5°F) typical
(Type K Thermocouple)	-40°C to -10°C -40°F to 14°F	0.1°C or 0.2°F	±(5.0% + 1.5°C) typical ±(5.0% + 3.3°F) typical
Error does not include Type K Thermocouple errors.			

Function	Range	Resolution	Accuracy
V~ (50 to 400 Hz)	4000 mV[1]	1 mV	±(1.9% + 3)
	4.000V	0.001V	±(1.9% + 3)
	40.00V	00.01V	±(1.9% + 3)
	400.0V	000.1V	±(1.9% + 3)
	600V	1V	±(1.9% + 3)
V⎓	4000 mV[1]	1 mV	±(0.9% + 2)
	4.000V	0.001V	±(0.9% + 2)
	40.00V	00.01V	±(0.9% + 1)
	400.0V	000.1V	±(0.9% + 1)
	600V	1V	±(0.9% + 1)
Ω	400.0Ω	0.1Ω	±(0.9% + 2)
	4.000 kΩ	0.001 kΩ	±(0.9% + 1)
	40.00 kΩ	0.01 kΩ	±(0.9% + 1)
	400.0 kΩ	0.1 kΩ	±(0.9% + 1)
	4.000 MΩ	0.001 MΩ	±(0.9% + 1)
	40.00 MΩ	0.01 MΩ	±(1.5% + 3)
⊣⊢	1.000 µF	0.001 µF	±(1.9% + 2)
	10.00 µF	0.01 µF	±(1.9% + 2)
	100.0 µF	0.1 µF	±(1.9% + 2)
	10000 µF	1 µF	≤1000 µF ±(1.9% + 2) >1000 µF ±(10% + 90) typical
))) —▶⊢	2.000V	0.001V	±(1.9% + 2)[2]

1. The 4000 mV range can be entered only in manual range mode. Use the 4000 mV range with accessories.
2. The beeper is guaranteed to come on at <25Ω and turn off at >250Ω. The meter detects opens or shorts ≥250 µs.

Function	Range	Resolution	Accuracy	Burden Voltage
μA (50 Hz to 400 Hz)	0 to 200 μA	0.1 μA	±(2% + 3 counts)	<5 mV/μA
μA	0 to 200 μA	0.1 μA	±(1% + 2 counts)	<5 mV/μA

Function	Overload Protection[1]	Input Impedance (Nominal)		
V~	600V rms	>5 MΩ <100 pF V•Check and Lo**Z** = >2 kΩ <200 pF (ac coupled)[2]		
V⎓	600V rms	>10MΩ <100 pF V•Check and Lo**Z** = >2 kΩ <200 pF[2]		
		Common Mode Rejection Ratio (1 kΩ Unbalanced)	**Normal Mode Rejection**	
V~	600V rms	>60 dB at dc 50 or 60 Hz		
V⎓	600V rms	>100 dB at dc, 50 or 60 Hz	>50 dB at 50 Hz or 60 Hz	
		Open Circuit Test Voltage	**Full Scale Voltage To 4.0 MΩ**	**40 MΩ**
Ω	600V rms	<1.5V dc	<450 mV dc	<1.5V dc
→|←	600V rms	2.4-3.0V dc	2.400V dc	
		Short Circuit Current		
Ω	600V rms	<500 μA		
→|←	600V rms	0.95 mA (typical)		

1. 3×10^6 V Hz maximum
2. ≅2 kΩ input impedance up to 50V. Impedance increases with input voltage to >300 kΩ at 600V.

MIN MAX Recording Accuracy and Response Time

Specified accuracy of the measurement function ±12 digits in dc for changes >200 ms in duration (±40 digits in ac). Typical 100 ms response to 80%.

Example 1: This would mean ±1.2° when recording temperature.

Example 2: This would mean ±12 μA when recording μA or ±12A if used with a dc amp probe (with a mV input).

MIN MAX Recording with Elapsed Time

Elapsed Time	Resolution	Accuracy
0 to 100 hours (99:59)	1 minute	0.3% typical

Maximum Voltage Between any Terminal and Earth Ground:	600V rms
Display:	3 3/4-digits, 4000 counts, updates 4/sec
Operating Temperature:	-10°C to 50°C (14°F to 122°F)
Storage Temperature:	-30°C to 60°C (-22°F to 140°F) indefinitely (to -40°C (-40°F) for 100 hrs)
Temperature Coefficient:	(.1 x specified accuracy)/°C (<18°C or >28°C)
Relative Humidity:	0% to 90% (-10°C to 35°C; 14°F to 95°F) 0% to 70% (35°C to 50°C; 95°F to 122°F)
Battery Type:	9V, NEDA 1604 or IEC 6F22
Battery Life:	650 continuous hours with alkaline 450 continuous hours with carbon-zinc
Shock, Vibration:	3 meter drops.
Size (H x W x L):	3.46 cm x 7.05 cm x 14.23 cm (1.35 in x 2.75 in x 5.55 in)
Weight:	286g (10 oz)
Safety:	Designed to Protection Class II requirement of UL3111, ANSI/ISA-S82, CSA C22.2 No 231, and VDE 0411, and IEC 1010 overvoltage Category III (CAT III, 600 Volts).
EMI Regulations:	Complies with FCC Part 15, Class B, and VDE 0871B. Trademark of TÜV Product Services. Complies with EN 61010-1: 1993.
Certifications:	 TUV, UL and VDE

LIMITED WARRANTY & LIMITATION OF LIABILITY

Each Fluke product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is three years and begins on the date of shipment. Parts, product repairs and services are warranted for 90 days. This warranty extends only to the original buyer or end-user customer of a Fluke authorized reseller, and does not apply to fuses, disposable batteries or to any product which, in Fluke's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling. Fluke warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on non-defective media. Fluke does not warrant that software will be error free or operate without interruption.

Fluke authorized resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Fluke. Warranty support is available if product is purchased through a Fluke authorized sales outlet or Buyer has paid the applicable international price. Fluke reserves the right to invoice Buyer for importation costs of repair/replacement parts when product purchased in one country is submitted for repair in another country.

Fluke's warranty obligation is limited, at Fluke's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to a Fluke authorized service center within the warranty period.

To obtain warranty service, contact your nearest Fluke authorized service center or send the product, with a description of the difficulty, postage and insurance prepaid (FOB Destination), to the nearest Fluke authorized service center. Fluke assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation prepaid (FOB Destination). If Fluke determines that the failure was caused by misuse, alteration, accident or abnormal condition of operation or handling, Fluke will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. FLUKE SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, WHETHER ARISING FROM BREACH OF WARRANTY OR BASED ON CONTRACT, TORT, RELIANCE OR ANY OTHER THEORY.

Since some countries or states do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any provision of this Warranty is held invalid or unenforceable by a court of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision.

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Everett WA	5602 B.D. Eindhoven
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5/94

330 Series/902 Clamp Meters

FLUKE®

Fluke 337

Fluke 336

Fluke 335

Fluke 334

Fluke 333

Fluke 902

600V CAT III

LISTED UL CSA TÜV PRODUCT SERVICE GS True RMS

Expanded capabilities for current measurement

The Fluke 330 Series Clamp Meters offer all the features you need to fit the way you work. The small body and jaws fit perfectly in your hand and into tight places. Meter controls are positioned so that current measurements can be down with one hand. A large backlit display (on most models) is easy to see and a handy Display Hold keeps measurements on the display. Measuring starting current for motors, lighting, etc. is easy with the in-rush current function (on most models).

The Fluke 902 adds temperature and capacitance measurement capabilities to the line, ideal for heating, ventilation and air conditioning system inspections.

Features

Functions	333	334	335	336	337	902
True-RMS			●	●	●	●
Display backlight		●	●	●	●	●
Auto shut-off	●	●	●	●	●	●
Display Hold	●	●	●	●	●	●
Motor start-up current		●	●	●	●	
Low battery indication	●	●	●	●	●	●
Large jaw				●	●	
Min/Max					●	●
Current AC/DC				●	●	●*
Temperature						●

* DC A: 0-200 µA direct measurement

Specifications

Functions	Range	333	334	335	336	337	902
Current AC	0-400.0A	2% ± 5 counts					
	0-600.0A		2% ± 5 counts	2% ± 5 counts	2% ± 5 counts		1% ± 5 counts
	0-999.9A					2% ± 5 counts	
Crest Factor	0-600.0A			2.4 @ 500A	3 @ 500A		2.4 @ 500A
				2.0 @ 600A	2.5 @ 600A		2.0 @ 600A
	0-999.9A					3 @ 500A	
						2.5 @ 600A	
						1.42@ 1000A	
Current DC	0-200 µA						1% ± 5 counts
	0-600.0A				2% ± 5 counts		
	0-999.9A					2% ± 5 counts	
In-rush Current	Integration time		100mS	100mS	100mS	100mS	
Voltage AC	0-600.0V	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts
Voltage DC	0-600.0V	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts	1% ± 5 counts
Resistance	0-600.0Ω	1.5% ± 5 counts	1.5% ± 5 counts	1.5% ± 5 counts	1.5% ± 5 counts	1.5% ± 5 counts	
	0-6000Ω		1.5% ± 5 counts	1.5% ± 5 counts	1.5% ± 5 counts	1.5% ± 5 counts	
	0-9999Ω						1.5% ± 5 counts
Continuity		≤ 30Ω	≤ 30Ω	≤ 30Ω	≤ 30Ω	≤ 30Ω	≤ 30Ω
Frequency	5-400Hz					0.5% ± 5 counts	0.5% ± 5 counts
Temperature	-10° to 400°C						1% ± 0.8°C
Capacitance	1µF to 1000µF						1.9% ± 2 counts

Battery Life: Alkaline, 150 hours
Size (HxWxD):
238 mm x 79 mm x 41mm (333, 334, 335 and 902)
251 mm x 79 mm x 41 mm (336 and 337)

Jaw Opening: 30 mm (333, 334, 335 and 902)
42 mm (336, 337)
Weight: 0.312 kg
Three Year Warranty

Recommended Accessories


H3


TL223


L215

Included Accessories

C33 Soft case, TL75 test leads, 80BK Integrated DMM temperature probe (902),
2 AA alkaline batteries, instruction card and safety information sheet.

Ordering Information

Fluke 333	Clamp Meter
Fluke 334	Clamp Meter
Fluke 335	True-RMS Clamp Meter
Fluke 336	True-RMS Clamp Meter
Fluke 337	True-RMS Clamp Meter
Fluke 902	True-RMS Clamp Meter (HVAC)

10457-eng Rev. 08