FLUKE®

15B & 17B
Multimeters

Users Manual

PN 4228256
July 2012

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year 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.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

Fluke Corporation
P.O. Box 9090
Everett, WA 98206-9090
U.S.A.

Fluke Europe B.V.
P.O. Box 1186
5602 BD Eindhoven
The Netherlands

Table of Contents

15B & 17B Multimeters

Introduction

⚠⚠Warning

To avoid electric shock or personal injury, read "Safety Information" and all Warnings before using the Meter.

The Fluke Model 15B and Model 17B Multimeters (hereafter referred to as "the Meter") are 4,000 count instruments.

This equipment is intended for use in business environments and is not to be used in homes. The Meter is battery powered with a digital display.

Except where noted, the descriptions and instructions in this Users Manual apply to both the Model 15B and Model 17B Multimeters.

Unless otherwise identified, all illustrations show the Model 17B.

Safety Information

The Fluke Model 15B and 17B comply with IEC 61010-1:2001 Second Edition CAT II 1000 V, CAT III 600 V overvoltage standards. See Specifications.

Use the Meter only as specified in this manual, otherwise the protection provided by the Meter may be impaired.

In this manual, a **Warning** identifies conditions and actions that pose hazards to the user.

A **Caution** identifies conditions and actions that may damage the Meter or the equipment under test.

International symbols used on the Meter and in this manual are explained in Table 1.

Safe Working Practices

Review the safety information and comply with the safe working practices on pages 2 and 3.

⚠⚠Warning

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

- **Read all safety Information before you use the Product.**
- **Carefully read all instructions.**
- **Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.**
- **Do not use and disable the Product if it is damaged.**
- **Do not use the Product if it operates incorrectly.**
- **Do not touch voltages > 30 V ac rms, 42 V ac peak, or 60 V dc.**
- **Limit operation to the specified measurement category, voltage, or amperage ratings.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **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.**
- **Do not apply more than the rated voltage, between the terminals or between each terminal and earth ground.**
- **Measure a known voltage first to make sure that the Product operates correctly.**
- **Use the correct terminals, function, and range for measurements.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **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.**

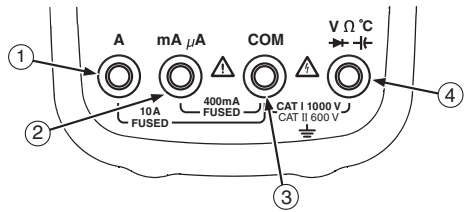
- **Use only current probes, test leads, and adapters supplied with the Product.**
- **Connect the common test lead before the live test lead and remove the live test lead before the common test lead.**
- **Keep fingers behind the finger guards on the probes.**
- **Only use probes, test leads, and accessories that have the same measurement category, voltage, and amperage ratings as the Product.**
- **Remove all probes, test leads, and accessories before the battery door is opened.**
- **Do not exceed the Measurement Category (CAT) rating of the lowest rated individual component of a Product, probe, or accessory.**

Table 1. International Electrical Symbols

~	AC (Alternating Current)	⏚	Earth Ground
⎓	DC (Direct Current)		Fuse
≅	AC or DC		Double Insulated
⚠	Safety Information	⚠	Shock Hazard
	Battery	CE	Complies with EU directives
	Diode		Capacitance
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. This part of the installation is expected to have a minimum of three levels of overcurrent protective devices between the transformer and the connecting points of the measuring circuit.	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. This part of the installation is expected to have a minimum of two levels of over-current protective devices between the transformer and possible connecting points.
	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.		Conforms to relevant South Korean EMC Standards

Instrument Overview

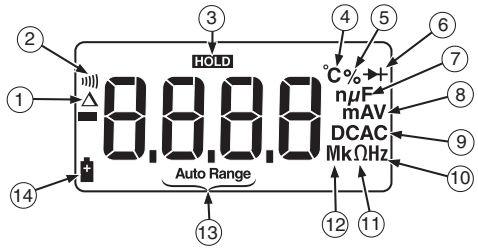
Terminals



apg1f.eps

Item	Description
1	Input terminal for AC and DC current measurements to 10A and frequency (17B only) measurements.
2	Input terminal for AC and DC microamp and milliamp measurements to 400 mA and frequency (17B only) measurements.
3	Common (return) terminal for all measurements.
4	Input terminal for voltage, resistance, continuity, diode, capacitance, frequency (17B only) and temperature (17B only) measurements.

Display



apg2f.eps

Item	Description
1	Relative mode is active
2	Continuity selected
3	Display Hold is enabled
4	Temperature is selected
5	Duty Cycle is selected
6	Diode test is selected
7	**F** – Farads for capacitance
8	**A, V** – amps or volts
9	**DC, AC** – dc or ac voltage or current
10	**Hz** – Frequency is selected
11	**Ω** – Ohms is selected
12	**m, M, k** – decimal prefix
13	Auto range selected
14	Battery is low and should be changed

Battery Saver

The Meter enters the “Sleep mode” and blanks the display if the Meter is not used and the input is inactive for 30 minutes. Press any button or turn the rotary switch to wake the Meter up. To disable the Sleep mode, hold down the YELLOW button while turning the Meter on.

Making Measurements

Manual Ranging and Auto Ranging

The Meter has both manual and auto range options. In the auto range mode, the Meter selects the best range for the input detected. This allows you to switch test points without having to reset the range. You can override auto ranging by selecting the range manually.

The Meter defaults to the auto range mode in measurement functions that have more than one range. When the Meter is in the auto range mode, **Auto Range** is displayed.

To enter and exit the manual range mode:

1. Press RANGE.

   Each press of RANGE increments the range. When the highest range is reached, the Meter wraps to the lowest range.

2. To exit the manual range mode, press and hold RANGE for two seconds.

Data Hold

⚠⚠ Warning

Dangerous voltages may be present at the input terminals and may not be displayed.

To hold the present reading, press HOLD. Press HOLD again to resume normal operation.

Relative Measurements (17B only)

The Meter will display relative measurements in all functions except frequency.

1. With the Meter in the desired function, touch the test leads to the circuit on which you want future measurements to be based.
2. Press REL to store the measured value as the reference value and activate the relative measurement mode. The difference between the reference value and subsequent reading is displayed.
3. Press REL for more than 2 seconds to return the Meter to normal operation.

Measuring AC and DC Voltage

To minimize improper reading of an unknown voltage containing either ac or ac + dc voltage components, first select the ac voltage function on the meter making particular note of the ac range required for a good measurement. Next manually select the dc function with the dc range that either matches or is higher than the previously noted ac range. Using this procedure minimizes

the effects of ac transients while making accurate dc measurements.

1. Choose ac or dc by turning the rotary switch to ṽ, v̄, or mv̄.
2. Connect the red test lead to the VΩC terminal and the black test lead to the **COM** terminal.
3. Measure the voltage by touching the probes to the desired test points of the circuit.
4. Read the measured voltage on the display.

Note

The only way to access the 400 mṽ range is by manual ranging.

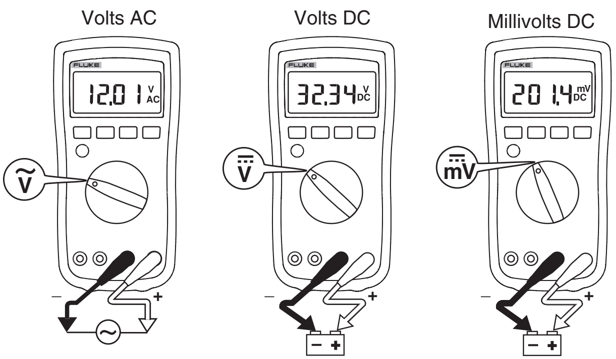


Figure 1. Measuring AC and DC Voltage

Measuring AC or DC Current

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, remove circuit power before you connect the Product in the circuit when you measure current. Connect the Product in series with the circuit.

1. Turn the rotary switch to A, mA, or µA.
2. Toggle between ac or dc current measurement by pressing the YELLOW button.
3. Connect the red test lead to either the **A**, or **mA µA** terminal based on the current to be measured and connect the black test lead to the **COM** terminal.
4. Break the circuit path to be measured. Then connect the test leads across the break and apply power.
5. Read the measured current on the display.

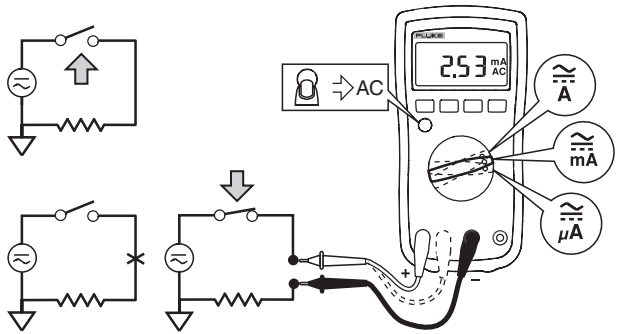


Figure 2. Measuring AC and DC Current

Measuring Resistance

⚠⚠ 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.

1. Turn the rotary switch to Ω. Make sure power is disconnected from the circuit to be measured.
2. Connect the red test lead to the VΩ terminal and the black test lead to the **COM** terminal.
3. Measure the resistance by touching the probes to the desired test points of the circuit.
4. Read the measured resistance on the display.

Testing for Continuity

With the resistance mode selected, press the YELLOW button twice to activate the continuity beeper. If the resistance is under 50 Ω, the beeper will sound continuously, designating a short circuit. If the meter reads OL, the circuit is open.

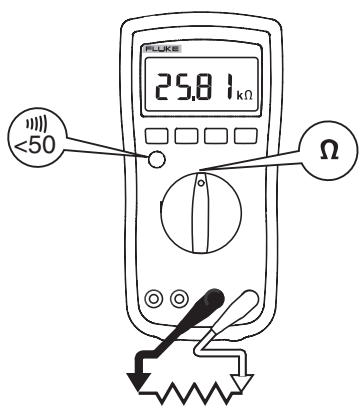


Figure 3. Measuring Resistance/Continuity

Testing Diodes

⚠⚠ 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.

1. Turn the rotary switch to Ω.
2. Press the YELLOW function button once to activate Diode Test.
3. Connect the red test lead to the VΩ°C terminal and the black test lead to the **COM** terminal.
4. Connect the red probe to the anode side and the black test lead to the cathode side of the diode being tested.
5. Read the forward bias voltage value on the display.
6. If the polarity of the test leads is reversed with diode polarity, the display reading shows OL. This can be used to distinguish the anode and cathode sides of a diode.

Measuring Capacitance

⚠⚠ 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.

1. Turn the rotary switch to ⊣⊢.
2. Connect the red test lead to the VΩ°C terminal and the black test lead to the **COM** terminal.
3. Touch the probes to the capacitor leads.
4. After allowing the reading to stabilize (up to 15 seconds), read the capacitance value on the display.

Measuring Temperature (17B only)

1. Turn the rotary switch to °C.
2. Plug the thermocouple into the Meter's VΩ°C and **COM** terminals, insuring the thermocouple plug marked with a + symbol is inserted into the VΩ°C terminal on the Meter.
3. Read the temperature in degrees centigrade on the display.

Measuring Frequency and Duty Cycle (17B only)

The Meter can measure Frequency or Duty Cycle while making either an AC Voltage or AC Current measurement. Pressing the Hz % button will switch the meter to manual range. Select appropriate range before measuring frequency or duty cycle.

1. With the Meter in the desired function (AC Voltage or AC Current), press the Hz % button.
2. Read the frequency of the AC signal on the display.
3. To make a duty cycle measurement, press the Hz % button again.
4. Read the percent of duty cycle on the display.

Maintenance

Beyond replacing batteries and fuses, do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service instructions. The recommended calibration cycle is 12 months.

⚠⚠ Warning

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

- **Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.**
- **Remove the input signals before you clean the Product.**
- **Use only specified replacement parts. Have an approved technician repair the Product.**
- **Remove all probes, test leads, and accessories before the battery door is opened.**

General Maintenance

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.

Dirt or moisture in the terminals can affect readings.

To clean the terminals

1. Turn the Meter **OFF** and remove the test leads.
2. Shake out any dirt that may be in the terminals.

3. Soak a new swab with isopropyl alcohol and work around the inside of each input terminal.
4. Use a new swab to apply a light coat of fine machine oil to the inside of each terminal.

Testing the Fuses

1. Turn the rotary switch to  .
2. Plug a test lead into the  terminal and touch the probe to the **A** or **mA** μ**A** terminal.

- A good **A** terminal fuse is indicated by a reading between 000.0 Ω and 000.1 Ω. A good **mA** μ**A** terminal fuse is indicated by a reading between 0.990 kΩ and 1.010 kΩ.
- If the display reads OL, replace the fuse and test again.
- If the display shows any other value, have the Meter serviced. See “Service and Parts” later in this manual.

Replacing the Batteries and Fuses

⚠⚠ Warning

For safe operation and maintenance of the product, remove batteries to prevent battery leakage and damage to the Product if it is not used for an extended period.

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

- **Replace a blown fuse with exact replacement only for continued protection against arc flash.**
- **Use only specified replacement fuses.**
- **Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**

Service and Parts

If the Meter fails, first check the batteries and fuses, then review this manual to make sure that you are operating the Meter correctly.

To contact Fluke call:

+86-10-65123435 ext 15 in China
+91-11-450-94781/98200 29770 in India
+81-3-3434-0181 in Japan
+85-276-6196 in Singapore
+1-425-446-5500 anywhere in the world

Visit Fluke’s Web site at www.fluke.com

General Specifications

Maximum Voltage between any Terminal and Earth Ground:	1000 V
Display:	Digital: 4000 count updates 3/sec
Temperature:	Operating: 0 °C to 40 °C, Storage: -30 °C to 60 °C indefinitely (to -40 °C for 100 hours)
Operating Altitude:	0 to 2000 meters
Temperature Coefficient:	0.1 X (specified accuracy)/ °C (<18 °C or >28 °C)
Electromagnetic Compatibility:	Complies with FCC Part 15, Class B, EN 61326-1:2006, 3 V/m, performance criterion A Class A Equipment (Industrial Broadcasting & Communication Equipment) [1] [1] 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 is not to be used in homes.
Rated Transient Overvoltage:	6 kV (1.2 x 50 µs) Peak for measurement Categories II and III.
Relative Humidity:	Noncondensing < 10 °C 90 % from 10 °C to 30 °C; 75 % from 30 °C to 40 °C
Relative Humidity, 40 MΩ Range:	80 % from 10 °C to 30 °C; 70 % from 30 °C to 40 °C
Battery Type:	2 X AA, NEDA 15A, IEC LR6
Battery Life:	Alkaline: 500 Hours
Size (H x W x L):	180 mm x 89 mm x 51.5 mm (with holster)
Weight:	425 grams
Certifications:	CMC, CE, KC (KCC-REM-FLK-012002002)
Safety Compliances:	Complies with ANSI/ISA 82.02.01 (61010-1) 2004, CAN/CSA-C22.2 No 61010-1-04, UL 61010-1 (2004) and IEC/EN 61010-1 2nd Edition to 1000 V CAT II and 600 V CAT III, Pollution Degree 2.

Overvoltage installation categories per IEC 61010-1, 2000:

The Meter is designed to protect against transients in these categories:

CAT II From equipment supplied from the fixed installation, e.g., TVs, PCs, portable tools and household appliances.

CAT III From equipment in fixed equipment installations, e.g., installation panels, feeders and short branch circuits, and lighting systems in large buildings.

Accuracy Specifications

Accuracy is specified for 1 year after calibration, at operating temperatures of 18 °C to 28 °C, relative humidity at 0 % to 75 %. Accuracy specifications take the form of: ±([% of Reading] + [Number of Least Significant Digits])

Function	Range	Resolution	Accuracy	
			Model 15B	Model 17B
AC Volts (40 to 500 Hz) $\tilde{V}$	400.0 mV [1]	0.1 mV	3.0 % + 3	3.0 % + 3
	4.000 V 40.00 V 400.0 V 1000 V	0.001 V 0.01 V 0.1 V 1 V	1.0 % + 3	1.0 % + 3
DC Millivolts $\overline{mV}$	400.0 mV	0.1 mV	1.0 % + 10	1.0 % + 10
DC Volts $\overline{V}$	4.000 V 40.00 V 400.0 V 1000 V	0.001 V 0.01 V 0.1 V 1 V	0.5 % + 3	0.5 % + 3
Diode Test [2]	1.000 V	0.001 V	10 %	
Temperature [3] °C (K-type thermocouple)	50 °C to 400 °C 0 °C to 50 °C -55 °C to 0 °C	0.1 °C	NA	2 % + 1 °C ± 2 °C 9 % + 2 °C

[1] Manual Range only.

[2] Diode test open circuit test voltage is 1.1 V to 1.6 V and short circuit current is < 0.6 mA (typical).

[3] Temperature specifications do not include thermocouple errors. After inserting the thermocouple plug into the meter, allow several minutes for thermal stabilization. The thermocouple supplied with this unit covers a temperature range of -40 °C to +260 °C. For probes that provide coverage outside this range, see the Fluke Accessories Brochure.

Function	Range	Resolution	Accuracy	
			Model 15B	**Model 17B**
Resistance (Ohms) Ω	400.0 Ω	0.1 Ω	0.5 % + 3	0.5 % + 3
	4.000 kΩ	0.001 kΩ	0.5 % + 2	0.5 % + 2
	40.00 kΩ	0.01 kΩ	0.5 % + 2	0.5 % + 2
	400.0 kΩ	0.1 kΩ	0.5 % + 2	0.5 % + 2
	4.000 MΩ	0.001 MΩ	0.5 % + 2	0.5 % + 2
	40.00 MΩ	0.01 MΩ	1.5% + 3	1.5% + 3
Capacitance [1]	50.00 nF	0.01 nF	2 % + 5	2 % + 5
	500.0 nF	0.1 nF	2 % + 5	2 % + 5
	5.000 µF	0.001 µF	5 % + 5	5 % + 5
	50.00 µF	0.01 µF	5 % + 5	5 % + 5
	100.0 µF	0.1 µF	5 % + 5	5 % + 5
Frequency **Hz** (10 Hz – 100 kHz)	50.00 Hz	0.01 Hz	NA	0.1 % + 3
	500.0 Hz	0.1 Hz		
	5.000 kHz	0.001 kHz		
	50.00 kHz	0.01 kHz		
	100.0 kHz	0.1 kHz		
Duty Cycle	0.1 % to 99.9 %	0.1 %	NA	1 % typical [2]

[1] Specifications do not include errors due to test lead capacitance and capacitance floor (may be up to 1.5 nF in the 50 nF range). For the 17B, errors can be reduced by using the relative feature.

[2] For values between 10 % and 90 % duty cycle at 50 Hz.

Function	Range	Resolution	Accuracy	
			Model 15B	**Model 17B**
AC Current (40 to 200 Hz) ≂ µA	400.0 µA 4000 µA	0.1 µA 1 µA	1.5 % + 3	1.5 % + 3
AC Current (40 to 200 Hz) ≂ mA	40.00 mA 400.0 mA	0.01 mA 0.1 mA	1.5 % + 3	1.5 % + 3
AC Current (40 to 200 Hz) ~ A	4.000 A [1] 10.00 A	0.01 A 0.01 A	1.5 % + 3	1.5 % + 3
DC Current ⎓ µA	400.0 µA 4000 µA	0.1 µA 1 µA	1.5 % + 3	1.5 % + 3
DC Current ⎓ mA	40.00 mA 400.0 mA	0.01 mA 0.1 mA	1.5 % + 3	1.5 % + 3
DC Current ⎓ A	4.000 A [1] 10.00 A	0.01 A 0.01 A	1.5 % + 3	1.5 % + 3

[1] When in the 4A range, display will show 4000 counts, please ignore the last digit.

Function	Overload Protection	Input Impedance (Nominal)	Common Mode Rejection Ratio	Normal Mode Rejection
AC Volts	1000 V [1]	>10 MΩ <100 pF	>60 dB at dc, 50 or 60 Hz	_
DC Volts	1000 V [1]	>10 MΩ <100 pF	>100 dB at dc, 50 or 60 Hz	>45 dB at 50 or 60 Hz

[1] 10^6 V Hz Max