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.
Symbols

- Press button.
- Press button to switch between modes.
- Double insulation.
- Manual ranging mode.

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

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

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

---

**Resistance and Continuity Ω|||**

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

Resistance

Continuity

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 \( \text{mV} \), \( R \), or \( \Omega \), 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 (LoZ) \( \cong 2 \, \text{k}\Omega \). 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 k\Omega load.

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

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.

Note correct probe polarity for polarized capacitors.
**Microamps μA**

Range 0 to 200 μA

---

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**

![Typical voltage for silicon diode](ip03i.eps)

- **Forward Bias**
  - Single beep
- **Reverse Bias**
  - Low Impedance V Check

**Bad Diode**

![Shorted](ip04i.eps)

- **Shorted**
- **Open**
MIN MAX
(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.
**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.

![Diagram of MIN MAX with Elapsed Time](ip114eps)
Disabling the Beeper

To disable the beeper for all modes, hold down \textit{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 \textit{GR}, connect the leads to the circuit; then press \textit{Max}.

Captures transitions longer than \(250 \mu s\) (\(1/4000^{th}\) 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 \textit{Max}.

To exit, press \textit{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.

**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](http://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:
\[ \pm \left( \% \text{ of reading} + \text{[number of least significant digits]} \right) \]

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (Type K Thermocouple)</td>
<td>-40°C to -10°C</td>
<td>0.1°C or 0.2°F</td>
<td>±(1.0% + 1.5°C)typical</td>
</tr>
<tr>
<td></td>
<td>-10°C to 400°C</td>
<td>14°F to 752°F</td>
<td>±(1.0% + 0.8°C)typical</td>
</tr>
<tr>
<td></td>
<td>-10°C to 0°C</td>
<td>0.1°C or 0.2°F</td>
<td>±(5.0% + 3.3°F)typical</td>
</tr>
<tr>
<td>Error does not include Type K Thermocouple errors.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>V~ (50 to 400 Hz)</td>
<td>400 mV</td>
<td>1 mV</td>
<td>±(1.9% + 3)</td>
</tr>
<tr>
<td></td>
<td>4.000V</td>
<td>0.001V</td>
<td>±(1.9% + 3)</td>
</tr>
<tr>
<td></td>
<td>40.00V</td>
<td>0.01V</td>
<td>±(1.9% + 3)</td>
</tr>
<tr>
<td></td>
<td>400.0V</td>
<td>1V</td>
<td>±(1.9% + 3)</td>
</tr>
</tbody>
</table>

| V~       | 4000 mV    | 1 mV     | ±(0.9% + 2) |
|          | 4000 kΩ    | 0.1 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) |

| \(\Omega\) | 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     | ±(1.9% + 2) |
|            |          |          | >1000 μF ±(10% + 90)typical |

| \(\Omega\) | 2.000V    | 0.001V   | ±(1.9% + 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 >2500Ω. The
test detects opens or shorts ≥250μs.
### Function Range Resolution Accuracy Burden Voltage

<table>
<thead>
<tr>
<th>Function</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Burden Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\mu\text{A}$ (50 Hz to 400 Hz)</td>
<td>0 to 200 $\mu\text{A}$</td>
<td>0.1 $\mu\text{A}$</td>
<td>±(2% + 3 counts)</td>
<td>&lt;5 mV/$\mu\text{A}$</td>
</tr>
<tr>
<td>$\mu\text{A}$</td>
<td>0 to 200 $\mu\text{A}$</td>
<td>0.1 $\mu\text{A}$</td>
<td>±(1% + 2 counts)</td>
<td>&lt;5 mV/$\mu\text{A}$</td>
</tr>
</tbody>
</table>

### Function Overload Protection

- $V_-$: 600V rms >5 MΩ <100 pF
  - V=Check and LoZ = >2 kΩ <200 pF (ac coupled)
- $V_+$: 600V rms >10MΩ <100 pF
  - V=Check and LoZ = >2 kΩ <200 pF

### Input Impedance (Nominal)

- Common Mode Rejection Ratio (1 kΩ Unbalanced): >60 dB at dc 50 or 60 Hz
- Normal Mode Rejection: >100 dB at dc, 50 or 60 Hz

### Open Circuit Test Voltage

<table>
<thead>
<tr>
<th>Type</th>
<th>Test Voltage</th>
<th>Full Scale Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ω</td>
<td>600V rms</td>
<td>40 MΩ</td>
</tr>
<tr>
<td></td>
<td>&lt;1.5V dc</td>
<td>&lt;450 mV dc</td>
</tr>
<tr>
<td></td>
<td>600V rms</td>
<td>4.0 MΩ</td>
</tr>
<tr>
<td></td>
<td>2.4-3.0V dc</td>
<td>2.400V dc</td>
</tr>
</tbody>
</table>

### Short Circuit Current

<table>
<thead>
<tr>
<th>Type</th>
<th>Test Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ω</td>
<td>600V rms</td>
<td>&lt;500 $\mu\text{A}$</td>
</tr>
<tr>
<td></td>
<td>600V rms</td>
<td>0.95 mA (typical)</td>
</tr>
</tbody>
</table>

1. $3 \times 10^7$ 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 ±1.2 $\mu\text{A}$ when recording $\mu\text{A}$ or ±12A if used with a dc amp probe (with a mV input).
### MIN MAX Recording with Elapsed Time

<table>
<thead>
<tr>
<th>Elapsed Time</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 100 hours (99:59)</td>
<td>1 minute</td>
<td>0.3% typical</td>
</tr>
</tbody>
</table>

**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:** $(0.1 \times \text{specified accuracy})/°C$ (<18°C or >28°C)

**Relative Humidity:** 0% to 90% (-10°C to 35°C; 14°F to 95°F)

**Battery Type:** 0% to 70% (35°C to 50°C; 95°F to 122°F)

**Battery Life:** 9V, NEDA 1604 or IEC 6F22

**Battery Life:** 650 continuous hours with alkaline

**Battery Life:** 450 continuous hours with carbon-zinc

**Shock:** 1 meter drop 6 sides.

**Vibration:** Class II vibration MIL-PRF-28800F

**Size (H x W x L):** 3.46 cm x 7.05 cm x 14.23 cm

**Size (H x W x L):** (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).


**Certifications:** TÜV, 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.

Fluke Corporation
P.O. Box 9090
Everett WA 98206-9090

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

5/94