## SPECIFICATIONS

### DC VOLTAGE

<table>
<thead>
<tr>
<th>RANGE</th>
<th>MAXIMUM READING</th>
<th>ACCURACY (12 months)</th>
<th>MAXIMUM ALLOWABLE INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2V</td>
<td>1.9999</td>
<td>±0.04% + 1d</td>
<td>1200V momentary</td>
</tr>
<tr>
<td>20V</td>
<td>19.999</td>
<td>±0.04% + 1d</td>
<td>1200V</td>
</tr>
<tr>
<td>200V</td>
<td>199.99</td>
<td>±0.04% + 1d</td>
<td>1200V</td>
</tr>
<tr>
<td>1200V</td>
<td>1200.0</td>
<td>±0.04% + 1d</td>
<td>1200V</td>
</tr>
</tbody>
</table>

Temperature Coefficient (0°-18° and 28°-55°C): +0.006% + 0.2 digit/°C
Input Resistance: 10 MΩ ±0.1%
Settling Time: 1 second to within 1 digit of final reading.

### AC VOLTAGE

<table>
<thead>
<tr>
<th>RANGE</th>
<th>MAXIMUM READING</th>
<th>ACCURACY (12 months)</th>
<th>TEMPERATURE COEFFICIENT (above 2000 counts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2V</td>
<td>1.9999</td>
<td>±0.4% + 15d</td>
<td>±(% rdg + digits)/°C</td>
</tr>
<tr>
<td>20V</td>
<td>19.999</td>
<td>±0.3% + 15d</td>
<td>±(0.5% + 15 digits)</td>
</tr>
<tr>
<td>200V</td>
<td>199.99</td>
<td>±0.3% + 15d</td>
<td>±(1.0% + 15 digits)</td>
</tr>
<tr>
<td>1000V</td>
<td>1000.0</td>
<td>±0.3% + 15d</td>
<td>±(0.5% + 15 digits)</td>
</tr>
</tbody>
</table>

Extended Frequency Accuracy:
(45Hz-100Hz) ±(0.5% + 15 digits)
(10kHz-20kHz) ±(1.0% + 15 digits)
Response: Average responding calibrated in rms of a sinewave.
Settling Time: 2.5 seconds to within 10 digits of final reading.

Input Impedance: 1MΩ + 1% shunted by less than 75pF.
Maximum Allowable Input Voltage:
1000 V rms, 1400 V peak, 10V Hz maximum.
Common Mode Rejection Ratio (1kΩ unbalance):
60dB at DC, 50Hz and 60Hz.

### RESISTANCE

<table>
<thead>
<tr>
<th>RANGE</th>
<th>MAXIMUM READING</th>
<th>ACCURACY (12 months)</th>
<th>TEMPERATURE COEFFICIENT</th>
<th>NOMINAL APPLIED CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 kΩ</td>
<td>1.9999</td>
<td>±0.04% + 2d</td>
<td>±(0.003% + 0.2d)</td>
<td>1mA</td>
</tr>
<tr>
<td>20 kΩ</td>
<td>19.999</td>
<td>±0.04% + 1d</td>
<td>±(0.003% + 0.2d)</td>
<td>100 μA</td>
</tr>
<tr>
<td>200 kΩ</td>
<td>199.99</td>
<td>±0.04% + 1d</td>
<td>±(0.003% + 0.2d)</td>
<td>1 μA</td>
</tr>
<tr>
<td>2000 kΩ</td>
<td>1999.9</td>
<td>±0.04% + 1d</td>
<td>±(0.003% + 0.2d)</td>
<td>10 μA</td>
</tr>
<tr>
<td>20 MΩ</td>
<td>19.999</td>
<td>±0.10% + 1d</td>
<td>±(0.02% + 0.2d)</td>
<td>0.1 μA</td>
</tr>
</tbody>
</table>

Maximum Allowable Input: 250 V rms sine, 350 V peak.
Maximum Voltage Across Unknown: 2V within range, 5 V open circuit.
Settling Time: 1 second to within 1 digit of final reading except 2 seconds on the 20 MΩ range.

### GENERAL

DISPLAY: Five 0.5" LED digits, appropriate decimal position and polarity indication.
CONVERSION PERIOD: 400 milliseconds.
ENVIRONMENT: Operating: 0° to 55°C;
0% to 80% relative humidity up to 40°C.
Storage: -25°C to +65°C.
POWER: 105-125 or 210-250 volts (switch selected), 90-110V available. 50-60 Hz, 7 watts.
Optional 6 hour battery pack, Model 1788.
DIMENSIONS, WEIGHT: 85mm high x 235mm wide x 275mm deep (3-1/2 in. x 9-1/4 in. x 10-3/4 in.). Net weight: 1.7 kg (3 lbs., 13 oz).
OVERRANGE INDICATION: Display blinks all zeros above 19999 counts.
MAXIMUM COMMON MODE VOLTAGE: 1400 V peak.
2-7. OPERATING INSTRUCTIONS. Refer to Figure 2-3 and operate the DMM as follows:

a. Turn on the power by depressing the ON/OFF pushbutton.

b. Select the function with the DCV, ACV or Ω pushbutton.

c. Select the range by depressing the appropriate pushbutton. For ac and dc voltage measurements there are four ranges available. For resistance measurements there are five ranges. The pushbuttons are interlocked to avoid improper settings.

d. Connect the source to the INPUT terminals.

MAXIMUM RATINGS:

DCV: (2V): 450V rms continuous; 1200V peak, for 8 seconds per minute.

   (20-1200V): 1200V peak.

ACV: (All Ranges): 1000V rms; 10⁷V·Hz.

Ω: (All Ranges): 250V rms sine wave or 350V peak.
2.8 DC VOLTAGE MEASUREMENT. Use the Model 178 DMM to measure dc volts as follows:
   a. Turn on power and depress the DCV pushbutton.
   b. Select the desired range from the four ranges available. The maximum reading is
      19999. Overrange is indicated by a flashing 0000 except on the 1000-volt range.
      
      CAUTION
      ! Do not exceed the maximum ratings. Instrument damage may occur.
      c. Negative polarity is displayed automatically. Positive polarity is implied when
         the minus (-) display is off.
      d. Zero the instrument as described in Paragraph 2-11 before the first use, whenever
         the instrument is used outside the temperature range of 18° to 28°C, and approximately
         weekly, during normal use.
   
2.9 AC VOLTAGE MEASUREMENT. Use the Model 178 DMM to measure ac volts as follows:
   a. Turn on power and depress the ACV pushbutton.
      
      CAUTION
      ! Do not exceed the maximum ratings. Instrument damage may occur.
   b. Select the desired range from the four ranges available. The maximum reading is
      19999. Overrange is indicated by a flashing 0000 except on the 1000-volt range. The
      instrument reads the root mean square value of a sine wave with a frequency of 45 to 20
      kHz.
   c. The Model 1682 RF Probe (see Paragraph 2-12e) should be used to measure ac voltages
      with a frequency of 20 kHz to 100 MHz.
   
2.10 RESISTANCE (R) MEASUREMENT. Use the 178 DMM to measure resistance as follows:
   a. Turn on power and depress the Ω pushbutton.
      
      CAUTION
      ! Do not exceed the maximum ratings. Instrument damage may occur.
   b. Select the desired range from the five ranges available. The maximum reading is
      19999. Overrange is indicated by a flashing 0000. The letter k refers to kilohms, and
      M refers to megohms.
   c. The HI input terminal is positive and causes forward conduction of semiconductor
      junctions.
   d. Two volts is applied at full range with 5 volts maximum under open circuit conditions.
   e. Zero the instrument as described in Paragraph 2-11 before the first use whenever
      the instrument is used outside the temperature range of 18° to 28°C, and approximately
      weekly, during normal use.
   
2.11 ZERO ADJUSTMENT. The zero adjustment nulls input offset on the 20, 200 and 1200
   volt ranges and on all resistance ranges. Typically, this adjustment need not be per-
   formed more often than once a week unless the instrument is operated at ambient
   temperatures outside the range of 18° to 28°C, and approximately weekly during normal use.
   
   a. Turn on the power and select DCV and the 20 range.
   b. Plug in test leads and short them. Adjust the zero adjust (pot R132) from the
      front panel with a small screwdriver to obtain a reading of 0000 or -0000.
   
2.12 ACCESSORIES. A wide range of accessories is available to facilitate use of the
   Model 178 DMM, extend its range and adapt it for additional uses.