Specifications apply from +10°C to +28°C at relative humidity up to 75% unless otherwise noted.

**DC VOLTS Manual ranging.**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 mV</td>
<td>10 µV</td>
<td>± (0.05% rdg + 1 digit)</td>
</tr>
<tr>
<td>2 V</td>
<td>100 µV</td>
<td>± (0.05% rdg + 3 digits)</td>
</tr>
<tr>
<td>20 V</td>
<td>1 mV</td>
<td>± (0.05% rdg + 10 digits)</td>
</tr>
<tr>
<td>200 V</td>
<td>10 mV</td>
<td>± (0.05% rdg + 100 digits)</td>
</tr>
<tr>
<td>1000 V</td>
<td>100 mV</td>
<td>± (0.05% rdg + 1000 digits)</td>
</tr>
</tbody>
</table>

Input Impedance: 10 MΩ

Normal Mode Rejection: Greater than 50 dB (50kHz)

Common Mode Rejection: Greater than 100 dB (50kHz)

**AC VOLTS Manual ranging. True RMS. AC Coupled**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 mV</td>
<td>10 µV</td>
<td>± (1.0% rdg + 10 digits)</td>
</tr>
<tr>
<td>2 V</td>
<td>100 µV</td>
<td>± (2.0% rdg + 20 digits)</td>
</tr>
<tr>
<td>20 V</td>
<td>1 mV</td>
<td>± (4.0% rdg + 50 digits)</td>
</tr>
<tr>
<td>200 V</td>
<td>10 mV</td>
<td>± (4.0% rdg + 100 digits)</td>
</tr>
<tr>
<td>750 V</td>
<td>100 mV</td>
<td>± (4.0% rdg + 400 digits)</td>
</tr>
</tbody>
</table>

Input Impedance: 10 MΩ + less than 110 pF

Crest Factor: 3

**DC CURRENT Manual ranging.**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 µA</td>
<td>10 nA</td>
<td>± (0.5% rdg + 1 digit)</td>
</tr>
<tr>
<td>2 mA</td>
<td>100 nA</td>
<td>± (0.5% rdg + 2 digits)</td>
</tr>
<tr>
<td>20 mA</td>
<td>1 µA</td>
<td>± (0.5% rdg + 4 digits)</td>
</tr>
<tr>
<td>200 mA</td>
<td>10 µA</td>
<td>± (0.5% rdg + 10 digits)</td>
</tr>
<tr>
<td>20 A</td>
<td>1 mA</td>
<td>± (0.5% rdg + 100 digits)</td>
</tr>
</tbody>
</table>

Overload Protection: 0.5 A (600 V) fast blow ceramic fuse on mA input
20 A (600 V) fast blow ceramic fuse on 20 A input.

20 A Range Maximum Current: 10 A continuous; 20 A for 60 sec. max.

**AC CURRENT Manual ranging. True RMS. AC Coupled.**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 µA</td>
<td>10 nA</td>
<td>± (0.5% rdg + 1 digit)</td>
</tr>
<tr>
<td>2 mA</td>
<td>100 nA</td>
<td>± (0.5% rdg + 2 digits)</td>
</tr>
<tr>
<td>20 mA</td>
<td>1 µA</td>
<td>± (0.5% rdg + 4 digits)</td>
</tr>
<tr>
<td>200 mA</td>
<td>10 µA</td>
<td>± (0.5% rdg + 10 digits)</td>
</tr>
<tr>
<td>20 A</td>
<td>1 mA</td>
<td>± (1.5% rdg + 20 digits)</td>
</tr>
</tbody>
</table>

Overload Protection: 0.5 A (600 V) fast blow ceramic fuse on mA input
20 A (600 V) fast blow ceramic fuse on 20 A input.

20 A Range Maximum Current: 10 A continuous; 20 A for 60 sec. max.

**FEATURES**

- True RMS reading.
- 4 1/2 digit LCD display with large 0.7" digits.
- Basic accuracy: DCV ± 0.05%.
- Resolution of 10 µV, 10 mV, 0.01 Ω.
- Single function and range control.
- Auto power off prolongs battery life.
- Five dc voltage ranges: 200 mV to 1000 V.
- Five ac voltage ranges: 200 mV to 750 V.
- Five dc current ranges: 20 µA to 20 A.
- Five ac current ranges: 20 µA to 20 A.
- Six resistance ranges: 200 Ω to 20 MΩ.
- Logic probe functions: indicate logic high or low.
- Diode test function: measures forward voltage drop.
- Visual and audible continuity tester.
- Data hold function freezes value on display.
- Auto polarity, auto zero.
- Overrange indication on all ranges.
- High energy fuses.
- Fusible 20 A range.
- Safety type test leads.
- Shock resistant case in holder withstands 10 foot drop.
- Tilt stand, Hanger strap.

**RESISTANCE Manual ranging.**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 Ω</td>
<td>10 mΩ</td>
<td>± (0.2% rdg + 10 digits)</td>
</tr>
<tr>
<td>2 kΩ</td>
<td>100 mΩ</td>
<td>± (0.2% rdg + 10 digits)</td>
</tr>
<tr>
<td>20 kΩ</td>
<td>1 kΩ</td>
<td>± (0.2% rdg + 10 digits)</td>
</tr>
<tr>
<td>200 kΩ</td>
<td>10 Ω</td>
<td>± (0.2% rdg + 10 digits)</td>
</tr>
<tr>
<td>2 MΩ</td>
<td>100 Ω</td>
<td>± (0.25% rdg + 10 digits)</td>
</tr>
<tr>
<td>20 MΩ</td>
<td>1 kΩ</td>
<td>± (0.0% rdg + 30 digits)</td>
</tr>
</tbody>
</table>

Overload Protection: 500 VDC or peak AC

**FREQUENCY COUNTER Manual ranging.**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 kHz</td>
<td>0.1 Hz</td>
<td>± (0.5% rdg + 3 digits)</td>
</tr>
<tr>
<td>20 kHz</td>
<td>1 Hz</td>
<td>± (0.5% rdg + 3 digits)</td>
</tr>
<tr>
<td>200 kHz</td>
<td>10 Hz</td>
<td>± (0.5% rdg + 3 digits)</td>
</tr>
</tbody>
</table>

Sensitivity at 30% and 70% duty cycle: 400 mV rms

**DUTY CYCLE**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Pulse Width</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 40%</td>
<td>0.1%</td>
<td>&gt; 10 µs</td>
<td>± (0.5% rdg + 30 digits)</td>
</tr>
</tbody>
</table>
SYMBOLS

See instruction manual for further precautionary information.

High voltage terminal; up to 1000 volts may be present if connected to high voltage.

COM
Common input terminal.

Diode test.

Connect to earth ground at point not more than 500 volts from earth ground.

1000 V MAX
Maximum input rating of V-O terminal with respect to COM input terminal.

Continuity test.

V AC
ACV.

V DC
DCV.

A AC
ACA.

A DC
DCA.

OPTIONAL ACCESSORIES

Clamp-on AC current probe
Model CP-1

10 amp test leads
Model FP-10

Demodulator probe
Model PR-23

High voltage probe (40 kVDC)
Model PR-28

High voltage probe (6 kVDC)
Model HV-6

Replacement test leads
Model FP-30

Temperature Adapter, semiconductor type
Model TP-28

Temperature Adapter, Type K thermocouple
Model TP-30

OPERATING INSTRUCTIONS

CURRENT MEASUREMENTS

WARNING

For current measurements, the meter must be connected in series with the load. If incorrectly connected in parallel with the load, the meter presents a very low impedance (almost a short), which may blow the fuse or damage the equipment under test.

1. To measure dc current, set the function switch to the desired A~ range.

2. To measure ac current, set the function switch to the desired A- range.

3. For current measurements under 200 mA, connect the red test lead to the mA/JK/A jack and the black test lead to the COM jack.

4. For current measurements above 200 mA, connect the red test lead to the 20 A jack and the black test lead to the COM jack (set the Function/Range switch to the 20 A position). For current measurements greater than 3 A, high current test leads are recommended.

5. Remove power from the circuit under test and open the normal circuit path where the measurement is to be taken. Connect the meter in series with the circuit.

6. Apply power and read the value from the display.

LOGIC MEASUREMENTS

1. Set the function switch to LOGIC position.

2. Connect red test lead to GND VDZ Hz jack.

3. Connect black test lead to COM jack.

4. Connect black test lead to circuit ground.

5. Connect red test lead to point of logic test.

6. A ▲ arrow (Hi) indicates high logic level. A ▼ arrow (LO) indicates low logic level. A high logic level will also have an audio tone. When both indicators are on, the point of measurement is toggling between HI and LO.

FREQUENCY OR DUTY CYCLE MEASUREMENTS

1. Set the Function/Range switch to the desired Hz frequency range for frequency measurements or DUTY % for duty cycle measurement.

2. Connect the red test lead to the GND VDZ Hz jack and the black test lead to the COM jack.

3. Connect the test leads to the point of measurement and read the frequency or duty cycle % from the display.

DATA HOLD

Data hold can be used when making voltage, current, or frequency measurements. When switched to the ON position, the display will freeze. The test leads can then be disconnected without affecting the data display.

LEAD STORAGE

The solder provides means of storing the test leads when not in use. See Figure 1 and proceed as follows:

1. Press the probe end of the test leads into the storage slots with the end of the probe pointing toward the top of the unit.

2. Press the leads into the lead slots to prevent the leads from resembling.
MAINTENANCE

WARNING
Remove test leads before changing battery or fuse or performing any servicing.

BATTERY REPLACEMENT
A low battery is indicated when the symbol in the upper right hand corner is on. The low battery indication first appears when the battery is about 90% depleted. The meter may be operated a few more hours but the battery should be replaced soon thereafter.

1. Remove rubber holster.
2. Remove two screws from back of unit securing the tilt stand assembly.
3. Remove tilt stand assembly.
4. Remove two screws securing case back, then carefully lift back off to gain access to battery.
5. Replace the dead battery with a fresh 9 volt " transistor" battery. Use alkaline batteries such as the NEDA 1604 or equivalent for longer life. To prolong battery life set the Function/Range switch to the OFF position when not making measurements.
6. Reinstall back cover, tilt stand assembly and holster.

FUSE REPLACEMENT
If no current measurements are possible, check for a blown overload protection fuse. There are two fuses, F1 for the mA / µA input and F2 for the 20A input. For access to fuses, remove the case back as described for battery replacement, then lift off the case front. Replace F1 with the new fuse 0.5A, 600V, fast acting ceramic fuse (B-K Precision Part No. 194-045-9-001). Replace F2 only with the original type 20A, 600V, fast acting ceramic fuse (B-K Precision Part No. 194-043-9-001). When reassembling the case, make sure the rotary knob on the case front properly aligns with the switch mechanism on the circuit board assembly.

TEST LEADS
Use only safety type leads, like those supplied. Periodically examine the test leads to ensure that the conductors are not intermittent or broken. Also make sure that good contact pressure exist at the test receptacles and fuseholder, and keep these areas free from dirt and corrosion.

DIODE CHECK

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Max Test Current</th>
<th>Max Open Circuit Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>🍖</td>
<td>0.1 mV</td>
<td>±0.5% H.D.</td>
<td>10 mA</td>
<td>3.3 VDC</td>
</tr>
</tbody>
</table>

Overload Protection ............... 500 V DC or peak AC

CONTINUITY TEST

<table>
<thead>
<tr>
<th>Range</th>
<th>Response Time</th>
<th>Description</th>
<th>Max Open Circuit Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎯</td>
<td>Approx. 100 ms</td>
<td>buzzer sounds below approx. 150 Ω</td>
<td>3.3 VDC</td>
</tr>
</tbody>
</table>

Overload Protection ............... 500 V DC or peak AC

LOGIC LEVEL
LCD Displays Number "1" when selected

Test voltage ............... 5 V DC
Detector ............... AC coupled
Logic Threshold
Logic 1 (high) ............... 2.8 V ±0.8 V
Logic 0 (low) ............... 0.8 V ±0.5 V
Duty Cycle ............... >20% and <80%
Indications ............... 40 ms beep at logic high
Pulse Width ............... 25 µs min.
Pulse Rate ............... 1 Mpps max.
Pulse Rise Time ............... 10 µs max.
Input Impedance ............... 120 kΩ or 100 pF
Input Overvoltage Protection ............... 500 V DC or peak AC

GENERAL SPECIFICATIONS
Display: 4-1/2 digit liquid crystal display (LCD) with a maximum reading of 19999.
Polarity: Automatic (+) or negative polarity indication.
Overrange Indication: "1" or "-1".
Low Battery Indication: displayed.
Sampling rate: 2.5 measurements per second, nominal, 1 time per second for frequency measurements.
Temperature,
Full Operation ............... 0 to +50°C, <70% R.H.
Power: Single standard 9V battery, NEDA 1604.
Battery life: 500 hours typical (alkaline).
Auto Power off: Meter automatically shuts down after approx. 45 minutes of inactivity.
Dimensions (H x W x D): 7.5" x 3.4" x 1.5" (189 mm x 87 mm x 37 mm).
Weight: 12.9 oz. (370 g) including battery.
Supplied Accessories: Test leads (pair), battery, instruction manual.