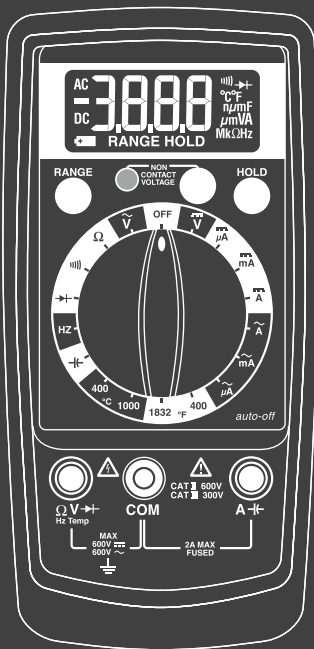


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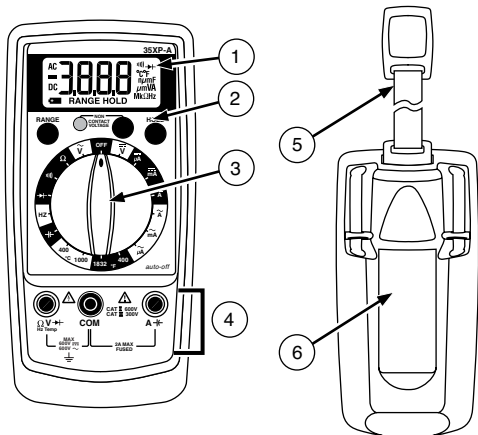
HARD AT WORK SINCE 1948.



5XP-A 15XP-B 35XP-A Compact Digital Multimeter

User Manual

Compact Digital Multimeters



- 1.) Display
- 2.) Feature Buttons
- 3.) Function/Range Switch
- 4.) Test Lead Connections
- 5.) Strap Clip
- 6.) Battery/Fuse Cover

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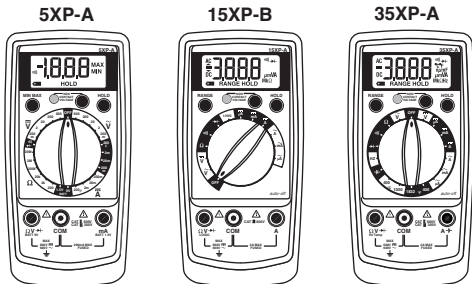
5XP-A

15XP-B

35XP-A

Compact Digital Multimeters

Users Manual



SAFETY INFORMATION

- The XP Series Digital Multimeters conform to EN61010-1:2010, EN61010-2-033:2012, CAT II 600 V, CAT III 300 V(5XP-A,35XP-A), CAT III 600 V(15XP-B), class 2 and pollution deg.2; CSA 22.2 -1010-1.













CAT II : Is for measurements performed on circuits directly connected to the lowvoltage installation.

CAT III : Is for measurements performed in the building installation.

- Do not exceed the maximum overload limits per function (see specifications) nor the limits marked on the instrument itself. Never apply more than 600 V dc/600 V ac rms between the test lead and earth ground.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Inspect the DMM, test leads and accessories before every use. Do not use any damaged part.
- Never ground yourself when taking measurements. Do not touch exposed circuit elements or test probe tips.
- Do not operate the instrument in an explosive atmosphere.

- Exercise extreme caution when: measuring voltage >20 V // current >10 mA // AC power line with inductive loads // AC power line during electrical storms // current, when the fuse blows in a circuit with open circuit voltage >600 V // servicing CRT equipment.
- Always measure current in series with the load – NEVER ACROSS a voltage source. Check fuse first. Never replace a fuse with one of a different rating.
- Remove test leads before opening the case.

SYMBOLS USED IN THIS MANUAL

	Battery		Refer to the manual
	Double insulated		Dangerous Voltage
	Direct Current		Earth Ground
	Alternating Current		Audible tone
	Fuse		Canadian Standards Association
	Complies with EU directives		Non-contact Voltage

MAKING MEASUREMENTS

Verify Instrument Operation

Before attempting to make a measurement, verify that the instrument is operational and the battery is good. If the instrument is not operational, have it repaired before attempting to make a measurement.

Range Selection

In addition to autoranging (Models 15XP-B and 35XP-A only) you can manually select and lock a range by pressing the **RANGE** button. **RANGE** appears on the display to indicate

that manual ranging is active and the range is locked. When appropriate, each subsequent press of the range button steps the meter to the next higher range. When the highest range is reached the next press returns the meter to the lowest range. To return to autoranging press the **RANGE** button. If **RANGE** still shows on the display, autoranging is not available for the selected function. Use autorange for all initial measurements. Then, when appropriate, use the **RANGE** button to select and lock a range.

Warning

To avoid electrical shock while manual ranging, use the display annunciators to identify the actual range selected.

Correcting an Overload ($\overline{\Omega}$ or $-\overline{\Omega}$)

Indication

An $\overline{\Omega}$ or $-\overline{\Omega}$ indication may appear on the display to indicate that an overload condition exists. For voltage and current measurements, an overload should be immediately corrected by selecting a higher range. If the highest range setting does not eliminate the overload, interrupt the measurement until the problem is identified and eliminated. The $\overline{\Omega}$ indication is normal for some functions; for example, resistance, continuity, and diode test.

Measuring DC Voltage (See Figure 1)

1. Set the Function Switch to \overline{V} .
2. Select the desired **RANGE**. The default DC voltage range is 2 V on the 15XP-B and 4 V on the 35XP-A.
3. Connect the test leads: Red to **V Ω \rightarrow** , Black to **COM**.
4. Connect the test probes to the circuit test points.
5. Read the display, and, if necessary, correct any overload ($\overline{\Omega}$) conditions.

Measuring DC Voltage (See Figure 2)

1. Set the Function Switch to \tilde{V} .
2. Select the desired **RANGE**. The default AC voltage range is 2 V on the 15XP-B and 4 V on the 35XP-A.
3. Connect the test leads: Red to $V \Omega \rightarrow$, Black to **COM**.
4. Connect the test probes to the circuit test points.
5. Read the display, and, if necessary, correct any overload (Ω) conditions.


Preparing for Current Measurements

- Turn off circuit power before connecting the test probes.
- Allow the meter to cool between measurements, if current measurements approach or exceeds 2 amps.
- A warning tone sounds if you connect a test lead to a current input while a current function is not selected.
- Open circuit voltage at the measurement point must not exceed 600V.
- Always measure current in series with the load. Never measure current across a voltage source.

Measuring DC Current (See Figure 3)

1. Set the Function Switch to a current function, μA , mA , or **A**.
2. Select the desired **RANGE** (5XP-A only).
3. Connect the test leads: Red to **mA** or **A**, Black to **COM**.
4. Turn off power to the circuit being measured.
5. Open the test circuit ($\text{---} \times \text{---}$) to establish measurement points.
6. Connect the test probes in series with the load (to the measurement points).
7. Turn on power to the circuit being measured.
8. Read the display, and, if necessary, correct any overload (Ω or $-\Omega$) conditions.

Measuring AC Current (See Figure 4)

1. Set the Function Switch to a current function and range, μA , mA , or A .
2. Select the desired **RANGE** (5XP-A only).
3. Connect the test leads: Red to **mA** or **A**, Black to **COM**.
4. Turn off power to the circuit being measured.
5. Open the test circuit () to establish measurement points.
6. Connect the test probes in series with the load (to the measurement points).
7. Turn on power to the circuit being measured.
8. Read the display, and, if necessary, correct any overload (OL) conditions.

Measuring Resistance (See Figure 5)

1. Set the Function Switch to Ω .
2. Select the desired **RANGE** (5XP-A, 15XP-B).
3. Connect the test leads: Red to **V Ω \rightarrow** , Black to **COM**.
4. Turn off power to the circuit being measured. Never measure resistance across a voltage source or on a powered circuit.
5. Discharge any capacitors that may influence the reading.
6. Connect the test probes across the resistance.
7. Read the display. If OL appears on the highest range, the resistance is too large to be measured or the circuit is an open circuit.
8. (15XP-B) The $2000\text{ M}\Omega$ range has a fixed 10-count offset in the reading. For example, when measuring $1100\text{ M}\Omega$, the display reads 1110. The 10 residual must be subtracted to obtain the actual value of $1100\text{ M}\Omega$.

Testing for Continuity (See Figure 6)

1. Set the Function Switch to Ω (with a diode symbol).
2. Connect the test leads: Red to $V \Omega \rightarrow$, Black to **COM**.
3. Turn off power to the circuit being measured.
4. Discharge any capacitors that may influence the reading.
5. Connect the test probes across the resistance or the two points of test.
6. Listen for the tone that indicates continuity.

Testing Diodes (See Figure 7)

1. Set the Function Switch to \rightarrow (with a diode symbol).
2. Connect the test leads: Red to $V \Omega \rightarrow$, Black to **COM**.
3. Turn off power to the circuit being measured.
4. Free at least one end of the diode from the circuit.
5. Connect the test probes across the diode.
6. Read the display. A good diode has a forward voltage drop of about 0.6 V. An open or reverse biased diode will read ∞ .

Measuring Capacitance (35XP-A only) (See Figure 8)

1. Set the Function Switch to the \overline{C} function.
2. Connect the test leads: Red to \overline{mA} , Black to **COM**.
3. Turn off power to the circuit being measured.
4. Discharge the capacitor using a 100 k Ω resistor.
5. Free at least one end of the capacitor from the circuit.
6. Connect the test probes across the capacitor.
7. Read the display.

Measuring Temperature (35XP-A only) (See Figure 9)

1. Set the function switch to appropriate °C or °F range.
2. Connect the K-type thermocouple to a TEMP adapter (XR-TA). Match the polarity of the adapter to the polarity of the thermocouple.
3. Connect the TEMP adapter to the **V Ω \rightarrow** and **COM** inputs.

***Note:** The 35XP-A is compatible with all K-type thermocouples. The K-type bead thermocouple supplied with the meter is not intended for contact with liquids or electrical circuits.*

4. Expose the thermocouple to the temperature to be measured.
5. Read the display.

Measuring Frequency (35XP-A only) (See Figure 10)

1. Set the Function Switch to **Hz**.
2. Connect the test leads: Red to **Hz**, Black to **COM**.
3. Connect the test probes to the signal source.
4. Read the display.

Measuring NCV (Non-Contact Voltage) (See Figure 11)

1. Range switch may be set to **OFF** or any function/range.
2. Test leads are not used for the **NCV** test.
3. Press the **NCV** button. The display goes blank, a tone sounds and the red **LED** next to the **NCV** button on the front panel lights up to verify that the instrument is operational. While pressing the button, hold the top-center of the meter $\text{V} \rightarrow$ (sensor location) close to the conductor/circuit in question.
4. If a voltage in the range of 70 to 600 V ac is present, a tone sounds and the red **LED** next to the **NCV** button on the front panel lights up.

Testing Battery Voltage (5XP-A only) (See Figure 12)

1. Set the Function Switch to the appropriate **BATT** setting, **1.5 V** or **9 V**.
2. Connect the test leads: Red to **BATT 1.5 V** or **BATT 9 V**, Black to **COM**.
3. Connect the test probes across the battery. The meter applies an appropriate load to the battery.
4. Read the display. A good 1.5 volt battery should measure $>1.2\text{ V}$, and a good 9 volt battery should measure $>7.2\text{ V}$.

Testing Logic Levels (15XP-B only) (See Figure 13)

The 15XP-B tests logic levels for TTL logic. The meter displays $\square L$ plus a \wedge for a high-level (true) condition. The meter beeps and displays an $\square L$ and a \vee for a low-level (false) condition. See Specifications for the logic 1 and logic 0 voltage limits. Out-of-limits indications are displayed as $\square L$ only, no \wedge , \vee or beep occur.

1. Set the Function Switch to **LOGIC**.
2. Connect the test leads: Red to **V $\Omega \rightarrow$** , Black to **COM**.
3. Connect the black lead to logic common.
4. Connect the red lead to the logic test point.
5. Read the display.

ADDITIONAL FEATURES

Input Test Lead Warning

The meter emits a continuous tone when a test lead is placed in the mA or A input jack and the Function/Range Switch is not set to a correct current position. (If the meter is connected to a voltage source with leads connected for current, very high current could result). All current ranges are protected by fast acting fuses.

MIN MAX Measurements (Model 5XP-A only)

The **MIN MAX** feature reads and updates the display to show the maximum or minimum value measured after you press the **MIN MAX** button. Pressing the **MIN MAX** button for less than 1 second will put the meter into a mode of displaying the maximum or minimum readings. Each time the button is pressed, the meter will cycle to the next display mode. Press the **MIN MAX** button for more than 1 second to disable this feature.

Auto Power Off (Models 15XP-B and 35XP-A only)

Auto Power Off is a battery saving feature that puts the meter into a sleep mode if the Function/Range Switch has not changed position in the last 10 minutes. To wake the meter turn the Function/Range Switch to another position. The Auto Power Off feature can be disabled to keep the meter from going to sleep. To disable the Auto Power Off feature use the following procedure:

1. Set the Function Switch to **OFF**.
2. Press and hold the **Range** button while turning the Function Switch from **OFF** to the desired function.
3. Release the **Range** button. The Auto Power Off feature will remain disabled until the meter is turned off and then on.

HOLD Measurements

The **HOLD** button causes the meter to capture and continuously display a measurement reading. To use the **HOLD** feature make a measurement, and then, after the reading has stabilized, momentarily press the **HOLD** button. You can remove the test leads and the reading will remain on the display. Pressing the **HOLD** button again releases the display.


PRODUCT MAINTENANCE

Cleaning

To clean the meter, use a soft cloth moistened with water. To avoid damage to the plastic components do not use benzene, alcohol, acetone, ether, paint thinner, lacquer thinner, ketone or other solvents to clean the meter.

Troubleshooting

If the meter appears to operate improperly, check the following items first.

1. Review the operating instructions to ensure the meter is being used properly.
2. Inspect and test the continuity of the test leads.
3. Make sure the battery is in good condition. The low battery symbol  appears when the battery falls below the level where accuracy is guaranteed. Replace a low-battery immediately.
4. Check the condition of the fuses if the current ranges operate incorrectly.

Battery and Fuse Replacement (See Figure 14)

Warning

To avoid electrical, shock remove the test leads from both the meter and the test circuit before accessing the battery or the fuses.

To replace the fuse:

1. Remove the 2 rear-case screws.
2. Separate the case.
3. Remove and replace the 2 A fuse (15XP-B or 35XP-A) or 0.315 fuse (5XP-A).
4. Reassemble the meter.

Fuse:

Fast Blow 2 A/1000 V, minimum interrupt rating 30 kA
(6 x 32 mm) (Amprobe® FP200).

Fast Blow 0.315 A/1000 V minimum interrupt rating 30 kA
(6.3 x 32 mm) (Amprobe® FP300)

SPECIFICATIONS

Display:

5XP-A and 15XP-B: 3 ½ digit liquid crystal display (LCD) with a maximum reading of 1999.

35XP-A: 3 ¾ digit liquid crystal display (LCD) with a maximum reading of 3999.

Polarity: Automatic, positive implied, negative polarity indication.

Overrange: $\overline{0}$ or $-\overline{0}$ is displayed.

Battery life: Approximately 200 hours typical with carbon-zinc battery. 400 hours with alkaline battery.

Low battery indication: The **+** symbol is displayed when the battery voltage drops below the operating level.

Operating environment: 0 °C to 50 °C at <70 % R.H.

Power: Single standard 9 V battery, NEDA 1604, JIS 006P, IEC 6F22.

Dimensions: 155 mm (H) x 72 mm (W) x 32 mm (D)

Weight: Approximately 210 g including battery.

Overload protection: 600 V dc or 600 V ac

Accessories: One pair test leads TL245, 9 V battery (installed), holster, magnet strap, Users Manual, Type K Bead Thermocouple (35XP-A only), and temperature adaptor (35XP-A only).

Altitude: 6561.7 Feet (2000 m)



Safety: Conforms to EN61010-1:2010, EN61010-2-033:2012, CAT II 600V, CAT III 300V(5XP-A,35XP-A), CAT III 600 V(15XP-B), class 2 and pollution deg. 2; CSA 22.2 -1010-1.

EMC: Conforms to EN61326-1. This product complies with requirements of the following European Community

Directives: 89/ 336/ EEC (Electromagnetic Compatibility) and 73/ 23/ EEC (Low Voltage) as amended by 93/ 68/EEC(CE Marking). However, electrical noise or intense electromagnetic fields in the vicinity of the equipment may disturb the measurement circuit. Measuring instruments will also respond to unwanted signals that may be present within the measurement circuit. Users should exercise care and take appropriate precautions to avoid misleading results when making measurements in the presence of electronic interference.

Non-Contact Voltage Indicator

Sense voltage 70 V to 600 VAC (50 Hz to 60 Hz) beeper chirps and bright red LED comes on, works when meter dial is on any range.

Detection Distance

115 V 60 Hz	22 mm (1 in)
230 V 50 Hz	75 mm (3 in)

Replacement Parts

TL36 Test Lead Set w/threaded alligator clips

TL245 Replacement Test Leads

FP200 Fuse – 2 A / 1000 V (15XP-B and 35XP-A)

FP300 Fuse – 0.315 A / 1000 V (5XP-A)

H-XP Magne-Grip® Holster, clip, magnet, and strap

XR-TA Input Adapter for K-type thermocouple (35XP-A)

TP255 K type thermocouple

See amprobe.com for detailed specifications of the Amprobe® XP digital multimeters.

5XP-A Electrical Specifications

(at 23°C ± 5°C, < 75 % R.H.)

DC VOLTS

Ranges: 200 mV, 2 V, 20 V, 200 V, 600 V

Accuracy: ± (1.0 % rdg + 1 dgt)

AC VOLTS (45 Hz to 500 Hz)

Ranges: 200 mV, 2 V, 20 V, 200 V, 600 V

Accuracy: ± (1.5 % rdg + 5 dgts)

DC CURRENT

Ranges: 200 µA, 2 mA, 20 mA, 200 mA,

± (1.5 % rdg + 1 dgt)

AC CURRENT (45 Hz to 500 Hz)

Ranges: 200 µA, 2 mA, 20 mA, 200 mA,

± (2.0 % rdg + 5 dgts)

RESISTANCE

Ranges: 200 Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2 MΩ, 20 MΩ

Accuracy: ± (1.0 % rdg + 4 dgts) on 200 to 200 kΩ

ranges: ± (1.5 % rdg + 4 dgts) on 2 MΩ range: ± (3.0 % rdg + 5 dgts) on 20 MΩ range

CONTINUITY

Audible indication: 75 ± 25 Ω

DIODE TEST

Test current: 1.0 mA (approximate)

Accuracy: ± (1.5 % rdg + 3 dgts)

Open circuit volts: 3.0 dc typical

BATTERY TEST

Ranges: 1.5 V, 9 V

Accuracy: ± (3.5 % rdg + 2 dgts)

OVERLOAD PROTECTION

Voltage, Resistance, Diode, Continuity:

600 VDC or 600 VAC rms

200 mV Range: 600 VDC / 600 VAC rms (3 minutes)

Current: 0.315 A / 1000 V fast blow ceramic fuse 6.3 × 32 mm
mA JACK: Input warning detects wrong switch/input jack configuration

AUXILIARY FEATURES

DATA HOLD: Freeze the latest reading on the display.

MIN/MAX: Record the maximum and minimum reading in a measurement.

15XP-B Electrical Specifications

(at 23°C ± 5°C, < 75 % R.H.)

DC VOLTS

Ranges: 200 mV, 2 V, 20 V, 200 V, 600 V

Accuracy: ±(0.5 % rdg + 1 dgt)

AC VOLTS (45 Hz to 500 Hz)

Ranges: 200 mV, 2 V, 20 V, 200 V, 600 V

Accuracy: ±(1.5 % rdg + 5 dgts) 45 Hz to 100 Hz on 200 mV

range: ±(1.5 % rdg + 5 dgts) on 2 V to 600 V ranges

DC CURRENT

Ranges: 200 μA, 2000 μA, 20 mA, 200 mA, 2 A

Accuracy: ±(1.0 % rdg + 2 dgts) on 200 μA to 200 mA ranges:
±(2.0 % rdg + 3 dgts) on 2 A range

AC CURRENT (45 Hz to 500 Hz)

Ranges: 200 μA, 2000 μA, 20 mA, 200 mA, 2 A

Accuracy: ±(1.5 % rdg + 5 dgts) on 200 μA to 200 mA ranges:
±(2.5 % rdg + 5 dgts) on 2 A range

RESISTANCE

Ranges: 200 Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2 MΩ, 20 MΩ, 2000 MΩ

Accuracy: ± (1.0 % rdg + 4 dgts) on 200 to 2 MΩ
ranges: ± (3.0 % rdg + 5 dgts) on 20 MΩ range
± {5.0 % (rdg - 10 dgt) + 20 dgt} on 2000 MΩ range

CONTINUITY

Audible indication: Less than 25 Ω

DIODE TEST

Test current: 1.2 mA (approximate)

Accuracy: $\pm(1.5\% \text{ rdg} + 3 \text{ dgts})$

Open circuit volts: 3.0 dc typical

LOGIC TEST

Thresholds Logic 1 (Hi): 2.8 V \pm 0.8 V

Thresholds Logic 0 (Lo): 0.8 V \pm 0.5 V

Test voltage: TTL 5 VDC

OVERLOAD PROTECTION

Voltage, Resistance, Diode, Continuity, Logic:

600 VDC or 600 VAC rms

Current: 2 A / 1000 V fast blow ceramic fuse 6.3 x 32 mm

mA JACK: Input warning detects wrong switch / input jack configuration

AUXILIARY FEATURES

DATA HOLD: Freeze the latest reading on the display.

RANGE: Execute manual range mode.

AUTO Power off: After auto power off, press (RANGE) button to restart the meter, and the last reading of measurement will be returned to the display.

35XP-A Electrical Specifications

(at 23°C \pm 5°C, < 75 % R.H.)

DC VOLTS

Ranges: 400 mV, 4 V, 40 V, 400 V, 600 V

Accuracy: $\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$

AC VOLTS (45 Hz to 500 Hz)

Ranges: 400 mV, 4 V, 40 V, 400 V, 600 V

Accuracy: $\pm(1.5\% \text{ rdg} + 5 \text{ dgts})$ 45 Hz to 100 Hz on 400 mV range: $\pm(1.5\% \text{ rdg} + 5 \text{ dgts})$ on 4 V to 600 V ranges

DC CURRENT

Ranges: 400 μ A, 4000 μ A, 40 mA, 400 mA, 2 A

Accuracy: $\pm(1.0\% \text{ rdg} + 2 \text{ dgts})$ on 400 μ A to 400 mA ranges: $\pm(2.0\% \text{ rdg} + 3 \text{ dgts})$ on 2 A range

AC CURRENT (45 Hz to 500 Hz)

Ranges: 400 μ A, 4000 μ A, 40 mA, 400 mA, 2A

Accuracy: \pm (1.5 % rdg + 5 dgts) on 400 μ A to 400 mA ranges:
 \pm (2.5 % rdg + 5 dgts) on 2 A range

RESISTANCE

Ranges: 400 Ω , 4 k Ω , 40 k Ω , 400 k Ω , 4 M Ω , 40 M Ω

Accuracy: \pm (1.0 % rdg + 4 dgts) on 400 to 4 M Ω
ranges: \pm (3.0 % rdg + 5 dgts) on 40 M Ω range

CONTINUITY

Audible indication: Less than 25 Ω

DIODE TEST

Test current: 1.2 mA (approximate)

Accuracy: \pm (1.5 % rdg + 3 dgts)

Open circuit volts: 3.0 dc typical

CAPACITANCE

Ranges: 4 nF, 40 nF, 400 nF, 4 μ F, 40 μ F, 400 μ F, 4 mF

Accuracy: \pm (5.0 % rdg + 30 dgts) on 4 nF range: \pm (5.0 % rdg + 5 dgts) on 40 nF and 400 μ F ranges: \pm (5.0 % rdg + 15 dgts) on 4 mF range

TEMPERATURE

Ranges: -20°C to 1000°C, -4°F to 1832°F

Accuracy: \pm (2.0 % rdg +4°C) -20°C to 10°C

\pm (1.0 % rdg + 3°C) 10°C to 200°C

\pm (3.0 % rdg + 2°C) 200°C to 1000°C

\pm (2.0 % rdg + 8°F) -4°F to 50°F

\pm (1.0 % rdg + 6°F) 50°F to 400°F

\pm (3.0 % rdg + 4°F) 400°F to 1832°F

FREQUENCY

Ranges: 4 k, 40 k, 400 k, 1 MHz

Accuracy: \pm (0.1 % rdg + 3 dgts)

Sensitivity: 10 Hz to 1 MHz: >2.5 V rms

OVERLOAD PROTECTION

Voltage, Resistance, Diode, Continuity, Frequency,

Temperature: 600 VDC or 600 VAC rms

Current, Capacitance: 2 A / 1000 V fast blow ceramic fuse 6.3
× 32 mm

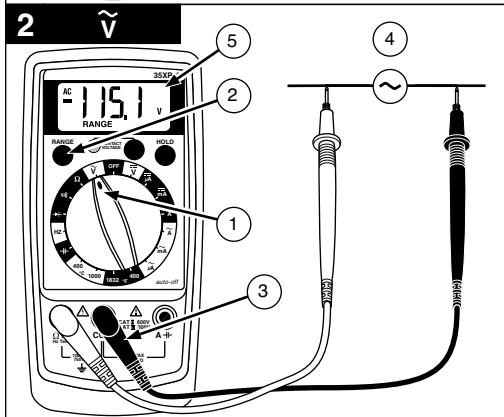
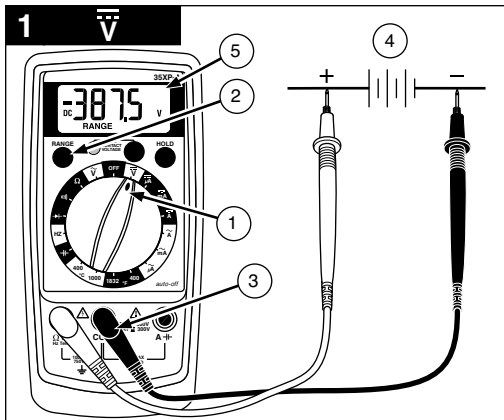
mA JACK: Input warning detects wrong switch/input jack
configuration

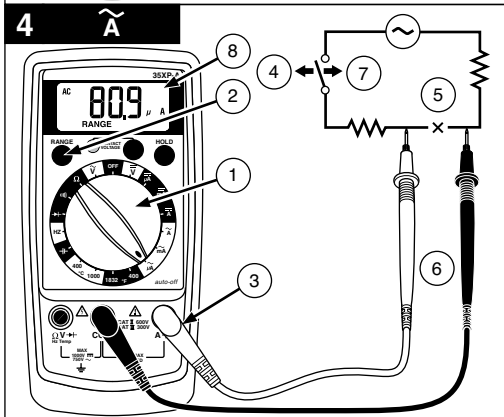
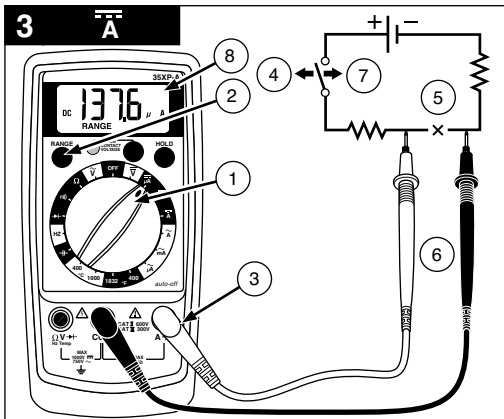
AUXILIARY FEATURES

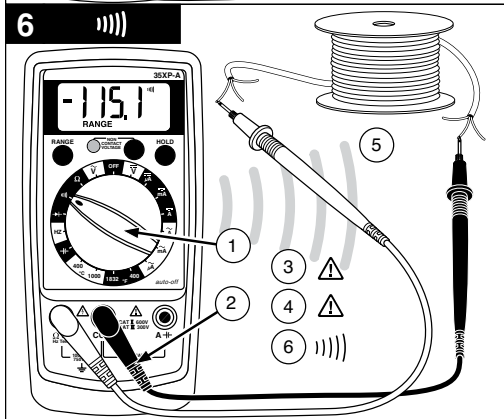
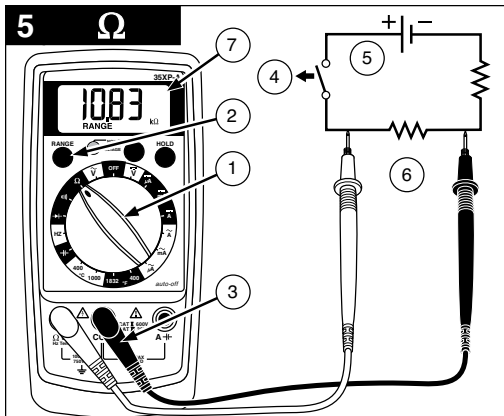
DATA HOLD: Freeze the latest reading on the display.

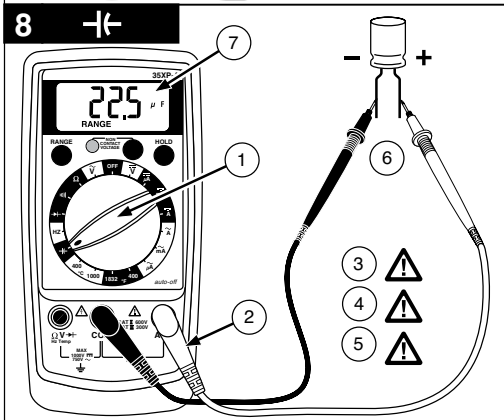
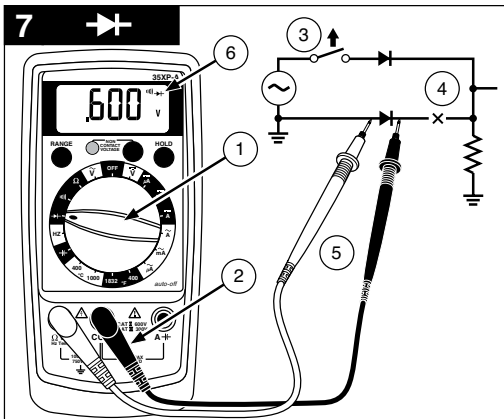
RANGE: Execute manual range mode.

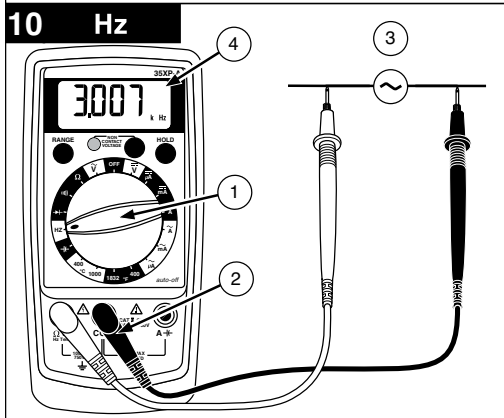
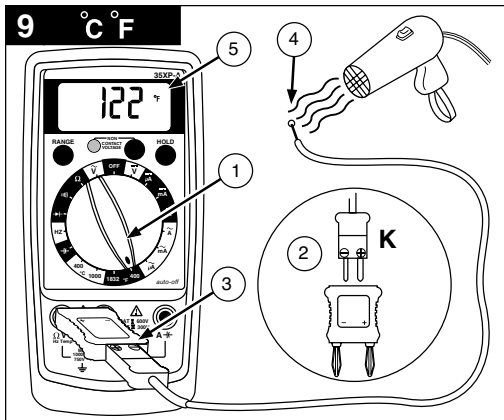
AUTO Power off: After auto power off, press (RANGE) button
to restart the meter, and the last reading of measurement
will be returned to the display.



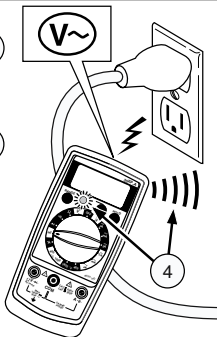
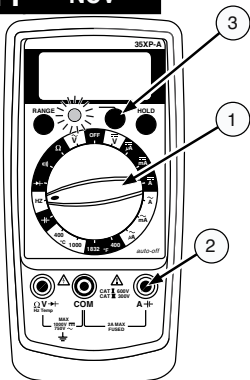




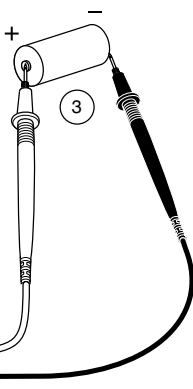
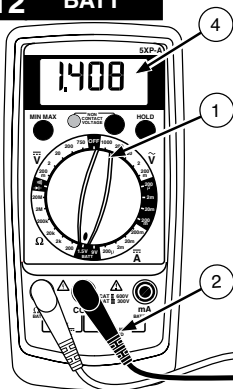




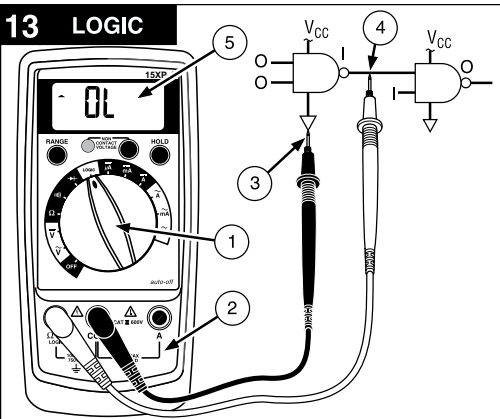
11 NCV



12 BATT



13 LOGIC



14 /

Fast Blow 2 A/1000 V Fuse (15XP-B/35XP-A)
0.315A/1000 V Fuse (5XP-A)

