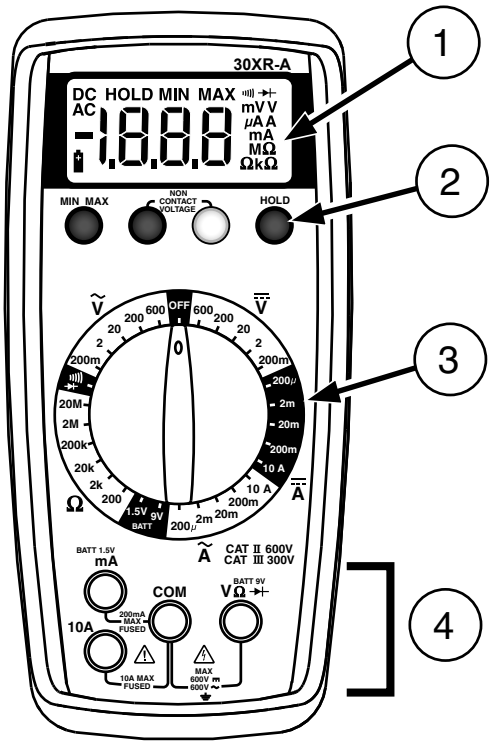
AMPROBE®

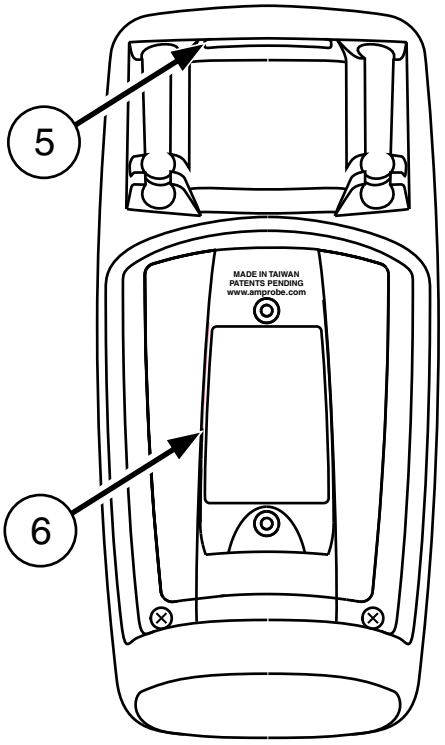
30XR-A

# Professional Digital Multimeter

## with Non-Contact Voltage Tester

## Users Manual




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

# 30XR-A

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## Professional Digital Multimeter

## Users Manual

## ⚠⚠Safety Information

**To Avoid possible electric shock, personal injury, damage to the meter or the equipment under test, adhere to the following practices:**

- Do not exceed the maximum overload limits per function (see specifications) nor the limits marked on the instrument itself. Never apply more than 600 VDC between the test lead and earth ground.
- Inspect 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 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.
- Do not change the position of the Function/Range Switch while the MIN MAX or the HOLD feature is enabled. Erroneous readings will result.
- Remove test leads before opening battery or case to change battery or fuses.

## Symbols Used in this Manual

| | | | |
|---|---|---|---|
| | Battery | ⚠ | Refer to the manual |
| ⧈ | Double insulated | ⚠ | Dangerous Voltage |
| ⎓ | Direct Current | ⏚ | Earth Ground |
| ~ | Alternating Current | ))) | Audible tone |
| CE | Complies with EU directives | | Underwriters Laboratories, Inc |
| ⊟ | Fuse | | |

## 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 you attempting to make a measurement.

### Correcting an Overload (OL) Indication ⚠

An OL or 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 OL indication is normal for some functions; for example, resistance, continuity, and diode test.

### Measuring DC Voltage See Figure -1-

1. Set the Range Switch to an appropriate $\overline{\tilde{V}}$ range.
   Select the highest range and work down if the voltage level is unknown.
2. Connect the Test Leads: Red to **VΩ⊣◀**, Black to **COM**.
3. Connect the Test Probes to the circuit test points.
4. Read the display, and, if necessary, fix any overload (OL) conditions.

### Measuring AC Voltage See Figure -2-

1. Set the Range Switch to an appropriate $\tilde{V}$ range.
   Select the highest range and work down if the voltage level is unknown.
2. Connect the Test Leads: Red to **VΩ⊣◀**, Black to **COM**.
3. Connect the Test Probes to the circuit test points.
4. Read the display, and, if necessary, fix any overload (OL) 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 10 amps.
- A warning tone sounds if you connect a test lead to a current input before you select a current range.
- Open circuit voltage at the measurement point must not exceed 600 V.
- Always measure current in series with the load. Never measure current across a voltage source.

## Measuring DC Current See Figure -3-

1. Set the Range Switch to an appropriate $\overline{\overline{A}}$ range.
   Select the highest range and work down if the current level is unknown.
2. Connect the Test Leads: Red to **mA** or **10 A**, Black to **COM**.
3. Turn off power to the circuit being measured.
4. Open the test circuit (—X—) to establish measurements points.
5. Connect the Test Probes in series with the load.
6. Turn on power to the circuit being measured.
7. Read the display, and, if necessary, fix any overload (OL) conditions.

## Measuring AC Current See Figure -4-

1. Set the Range Switch to an appropriate $\widetilde{A}$ range.
   Select the highest range and work down if the current level is unknown.
2. Connect the Test Leads: Red to **mA** or **10 A**, Black to **COM**
3. Turn off power to the circuit being measured.
4. Open the test circuit (—X—) to establish measurements points.
5. Connect the Test Probes in series with the load.
6. Turn on power to the circuit being measured.
7. Read the display, and, if necessary, fix any overload (OL) conditions.

## Measuring Resistance See Figure -5-

1. Set the Range Switch to an appropriate Ω range.
   Select the highest range and work down if the resistance level is unknown.
2. Connect the Test Leads: Red to **VΩ⇥|**, Black to **COM**.
3. Turn off power to the circuit being measured. Never measure resistance across a voltage source or on a powered circuit.
4. Discharge any capacitors that may influence the reading.
5. Connect the Test Probes across the resistance.
6. Read the display. If OL appears on the highest range, the resistance is too large to be measured.

## Measuring Continuity (<50 Ohms) See Figure -6-

1. Set the Range Switch to •))).
2. Connect the Test Leads: Red to **VΩ⇥|**, 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.
6. Listen for the tone that indicates continuity (< 50 Ohms).

## Checking Diodes See Figure -7-

1. Set the Range Switch to ⇥|.
2. Connect the Test Leads: Red to **VΩ⇥|**, 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 OL.

## Measuring NCV (Non-Contact Voltage) See Figure -8-

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 (sensor location) close to the conductor/circuit in question.
4. If a voltage of 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 (1.5 and 9 volt) See Figure -9-

1. Set the Range 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 V, and a good 9 volt battery should measure > 7.2 V.

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# Additional Features

## Input Lead Warning

The 30XR-A emits a continuous tone to indicate that the user has placed the unit in a potentially dangerous configuration. Specifically, a test lead is in a current connector and the Range Switch is set to measure some other function. If, in this configuration, the DMM is connected to a voltage source, very high and potentially dangerous current could result. The meter includes fast acting fuses as additional protection for all current ranges.

## MIN MAX Measurements

**⚠⚠WARNING**

**To avoid erronoeus readings, do not change the position of the Function/Range Switch while the MIN MAX function is enabled.**

The MIN MAX function works within the active measurement mode to capture and display the minimum or maximum reading associated with that measurement. Pressing the **MIN MAX** button for less than 1 second enables the function and shows **MIN** or **MAX** along with the appropriate minimum or maximum reading on the display. Each subsequent press toggles between the two modes. To exit the function, press the **MIN MAX** button for more than 1 second.

## HOLD Measurements

**⚠⚠WARNING**

**To avoid erronoeus readings, do not change the position of the Function/Range Switch while the HOLD function is enabled.**

The **HOLD** function is used to make a measurement and hold the reading after removing the leads from the test circuit. Pressing the **HOLD** button during a measurement will capture and hold the reading. Pressing the **HOLD** button again will release the display for subsequent measurements.

## Product Maintenance

### Cleaning

To clean the meter, use a soft cloth moistened with water. Using benzene, alcohol, acetone, ether, paint thinner, lacquer thinner, ketone or other solvents may deform or discolor the meter and its display.

### 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.

**⚠⚠WARNING**

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

### Battery and Fuse Replacement See Figure -10-

To access these parts, you must first remove the cover from the battery compartment. The battery cover is on the rear of the meter and is held in place with two screws. After removing these screws, you can easily remove and replace the battery. To replace the mA fuse, pry it from its clips using a small screwdriver. A spare mA fuse is located between the battery and the mA fuse.

**Battery:** 9 V NEDA **mA Fuse:** Fast Blow 250 mA/600 V (Amprobe® FP375)

To replace the 10 A fuse, remove the battery, remove the four rear-case screws, separate the case, remove the 10 A fuse cover, and remove and replace the 10 A fuse. Re-install the fuse cover.

**10 A Fuse:** Fast Blow 10 A/600 V, minimum interrupt rating 30 kA (10 x 38 mm) fuse (Amprobe® FP160) or equivalent.

## Repair

All test tools returned for warranty or non-warranty repair or for calibration should be accompanied by the following: your name, company's name, address, telephone number, and proof of purchase. Additionally, please include a brief description of the problem or the service requested and include the test leads with the meter. Non-warranty repair or replacement charges should be remitted in the form of a check, a money order, credit card with expiration date, or a purchase order made payable to Amprobe® Test Tools.

# Specifications

## General Specifications

**Display:** 3½ digit liquid crystal display (LCD) with a maximum reading of 1999.

**Polarity:** Automatic, positive implied, negative polarity indication.

**Overrange:** (OL) or (-OL) is displayed.

**Zero:** Automatic.

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

**Measurement rate:** 2.5 per second, nominal.

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

**Storage temperature:** -20 °C to 60 °C, 0 to 80 % R.H. with battery removed from meter.

**Temperature Coefficient:** 0.1 × (specified accuracy) per °C. (0 °C to 18 °C, 28 °C to 50 °C).

**Environment:** Indoor use, Altitude up to 2000 m

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

**Battery life:** 200 hours typical with carbon-zinc.

**Dimensions:** 196 x 92 x 60 mm ( 7.7" x 3.5" x 2.4").

**Weight:** Approx. 426 .( 0.94 lb.) without holster, including battery.

**Accessories:** One pair test leads (TL36), 9 V battery (installed), Magna Grip™ Holster, and Operating Instructions.

**Warranty:** One (1) Year

**Approvals:**

c UL us LISTED 950Z CE

Safety: Conforms to UL1244; EN61010-1: Cat II - 600V / Cat III - 300V; Class 2, Pollution degree II.

The 30XR-A is recommended for use with local level power distribution, appliances, portable equipment, etc, where only smaller transient overvoltages may occur, and not for primary supply lines, overhead lines and cable systems.

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.

## Electrical Specifications

(at 23 °C ± 5 °C, <75 % R.H. non-condensing)

**DC VOLTS**

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

Accuracy: All ranges, ± (1.0 % rdg + 1 dgt)

Resolution: 100 μV in 200 mV range

Input impedance: 10 MΩ

Overload protection: 200 mV range: 600 V dc or 600 V ac rms 15 seconds. Other ranges: 600 V dc or 600 V ac rms

**AC VOLTS** (45 Hz – 500 Hz)
Ranges: 200 m, 2 V, 20 V, 200 V, 600 V
Accuracy: All ranges, ± (1.5 % rdg + 4 dgts)
Resolution: 100 μV in 200 mV range
Input impedance: 10 MΩ
Overload protection: 200 mV range: 600 V dc or 600 ac rms 15 seconds. Other ranges: 600 V dc or 600 V ac rms

**DC CURRENT**
Ranges: 200 μA, 2 mA, 20 mA, 200 mA, 10 A
Accuracy:
200 μA to 200 mA ranges: ± (1.5 % rdg + 1 dgt)
10 A range: ± (2.0 % rdg + 3 dgts)
Resolution: 0.1 μA in 200 μA range
Burden voltage:

| | |
|---|---|
| 200 μA Range: | 1 mV/ 1 μA |
| 2 mA Range: | 100 mV/ 1 mA |
| 20 mA Range: | 13 mV/ 1 mA |
| 200 mA: | 4.6 mV / 1 mA |
| 10 A: | 40 mV / 1 A |

Overload Protection:
μA / mA input: F 0.25 A /600 V, Min. I.R. 30 kA, (6.3x32 mm)
10 A input: F 10 A / 600 V, Min. I.R. 100 kA, (10x38 mm) (10 A for 4 minutes maximum followed by a 12 minute cooling period)

**AC CURRENT** (45 Hz – 500 Hz)
Ranges: 200 μA, 2 mA, 20 mA, 200 mA,10 A
Accuracy:
200 μA to 200 mA ranges: ± (2.0 % rdg + 4 dgts)
10 A range: ± (2.5 % rdg + 4 dgts)
Resolution: 0.1 μA in 200 μA range
Burden voltage: See DC Current
Overload Protection:
μA / mA input: F 0.25 A /600 V, Min. I.R. 30 kA, (6.3x32 mm)
10 A input: F 10 A / 600 V, Min. I.R. 100 kA, (10x38 mm) (10 A for 4 minutes maximum followed by a 12 minute cooling period)

**RESISTANCE**
Ranges: 200 Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2 MΩ, 20 MΩ
Accuracy:
200 Ω to 200 kΩ ranges: ± (1.0 % rdg + 4 dgts)
2 MΩ ranges: ± (1.5 % rdg + 4 dgts)
20 MΩ range: ± (2.0 % rdg + 5 dgts)
Resolution: 100 mΩ in 200 Ω range
Open circuit volts:
200 Ω range: 3.0 V dc
Other ranges: 0.3 V dc typical
Overload protection: 600 V dc or 600 V ac rms

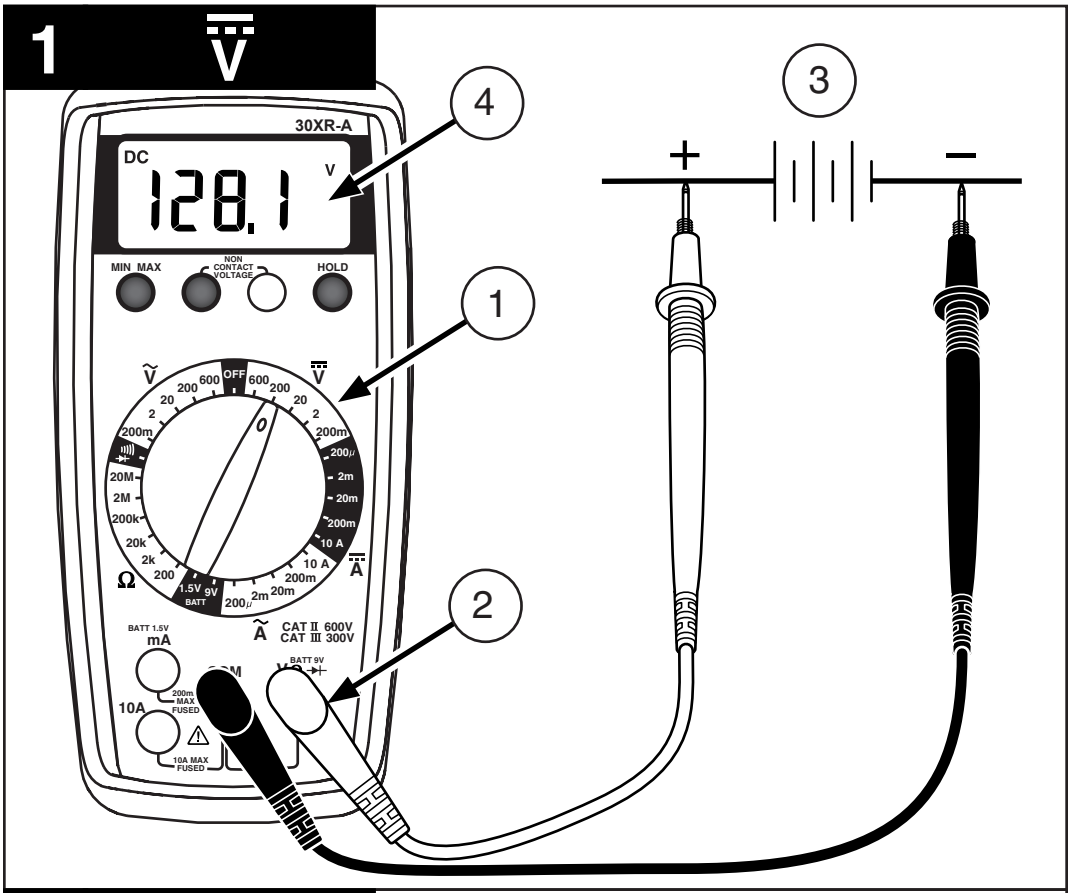
**CONTINUITY**
Audible indication: 75 Ω ± 25 Ω
Response time: 100 ms
Overload protection: 600 V dc or 600 V ac rms

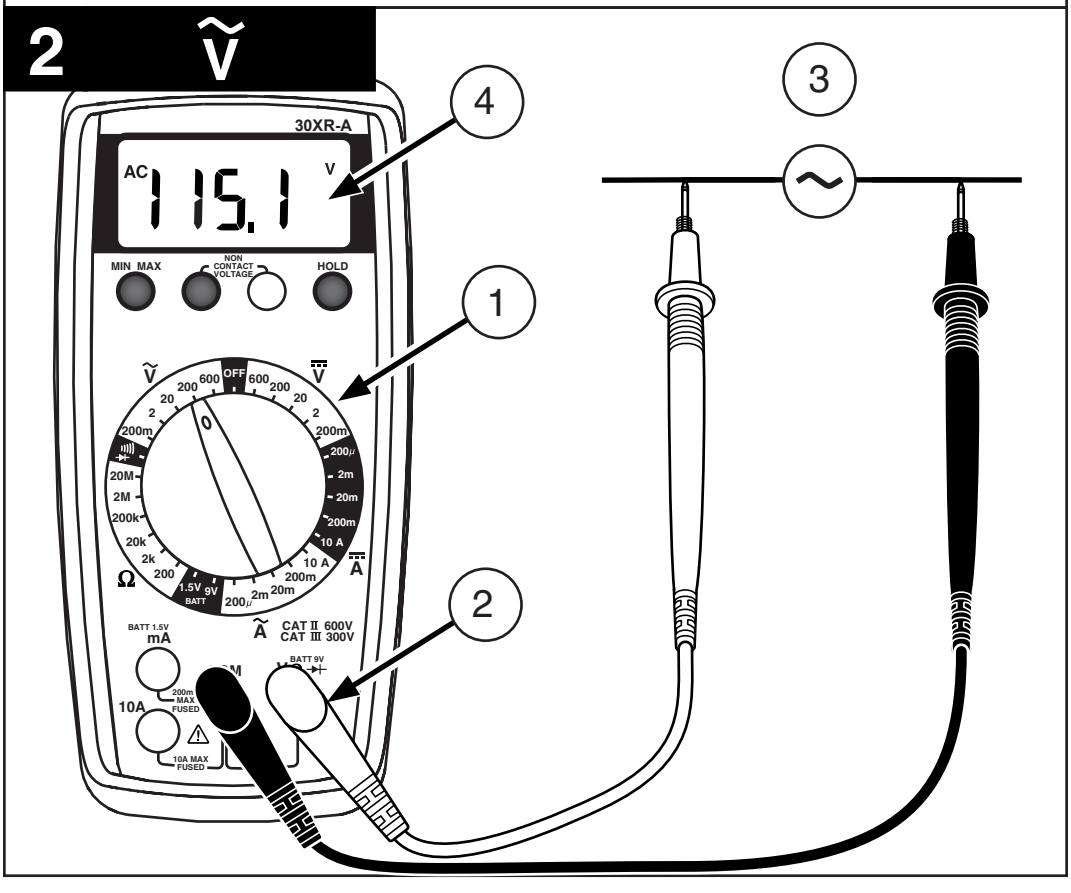
**DIODE TEST**
Test current: 1.0 mA (approximate)
Accuracy: ± (1.5 % rdg + 3 dgts)
Resolution: 0.001 V
Open circuit volts: 3.0 V dc typical
Overload protection: 600 V dc or 600 V ac rms

**BATTERY TEST**
Ranges: 1.5 V, 9 V
Accuracy: ± (3.5 % rdg + 2 dgts)
Resolution: 1 mV, 10 mV
Load Test current:
1.5 V range: 150 mA typical
9 V range: 5 mA typical
Overload protection: 600 V dc or 600 V ac rms

**NON-CONTACT VOLTAGE (NCV)**
AC Volts: 70 V to 600 V ac
Red LED and Audible Indicator

**REPLACEMENT PARTS**
TL36 – Test Lead Set w/ Alligator clips
FP375 - Fuse Pack 250 mA/600 V (4 each)
FP160 - Fuse Pack 10 A/600 V (2 each)


1
30XR-A
DC
128.1
V
MIN MAX
NON CONTACT VOLTAGE
HOLD
OFF
CAT II 600V
CAT III 300V
BATT 1.5V
mA
10A
BATT 9V
10A MAX FUSED
200m MAX FUSED
+
−
1
2
3
4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AC
115.1
V
MIN MAX
NON CONTACT VOLTAGE
HOLD
OFF
CAT II 600V
CAT III 300V
BATT 1.5V
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10A
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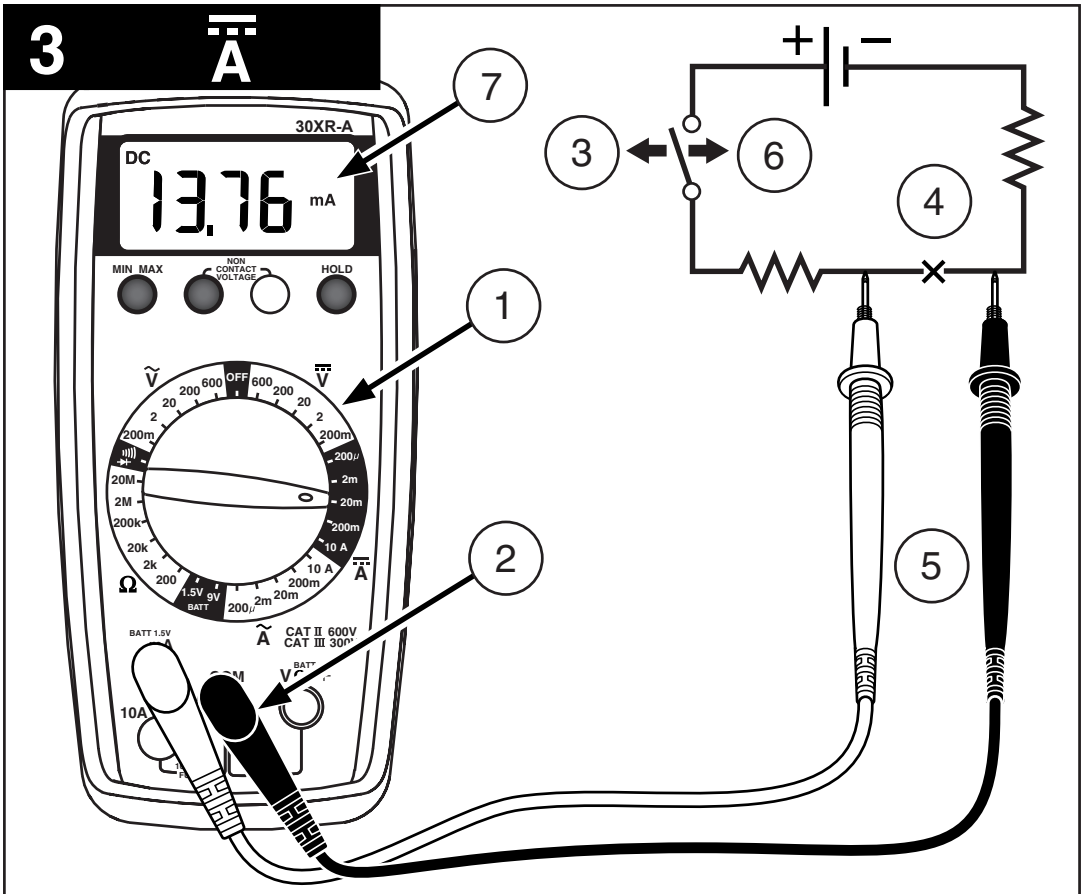
200m MAX FUSED
1
2
3
4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DC
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mA
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HOLD
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10A
CAT II 600V
CAT III 300V
7
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2
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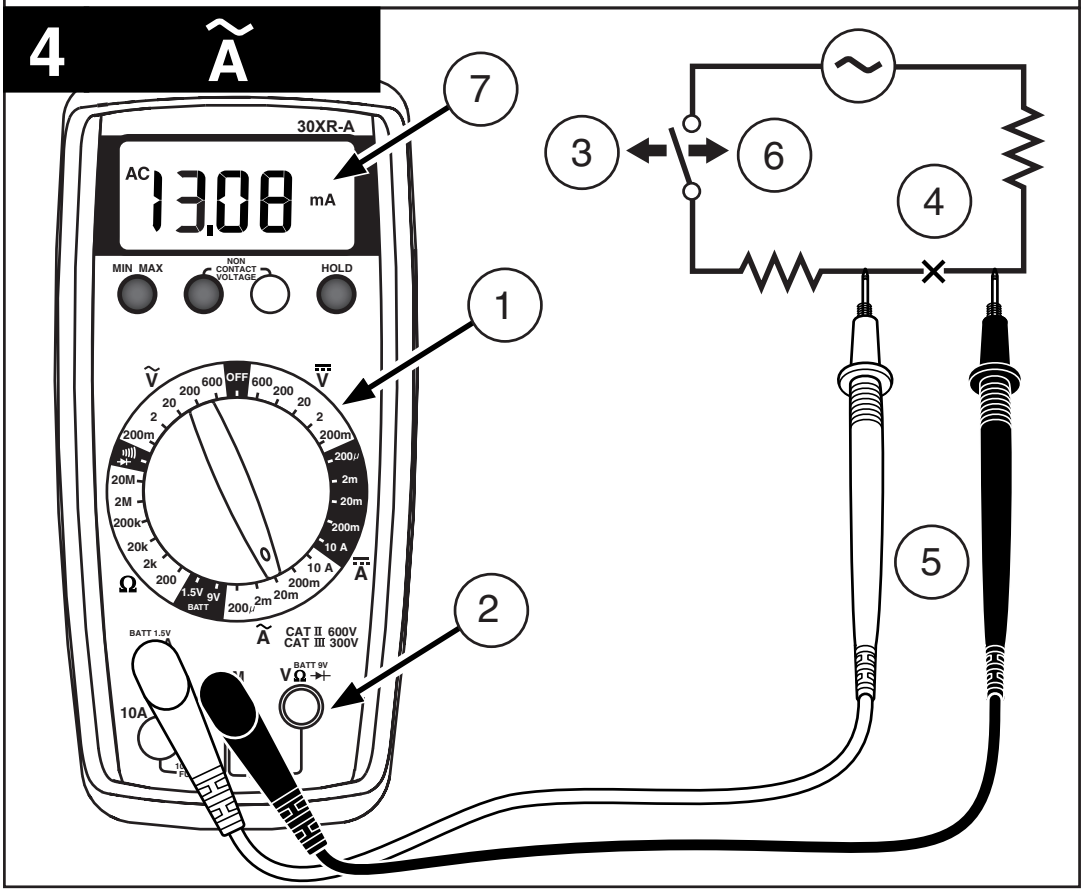
4
5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13.08
mA
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HOLD
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10A
CAT II 600V
CAT III 300V
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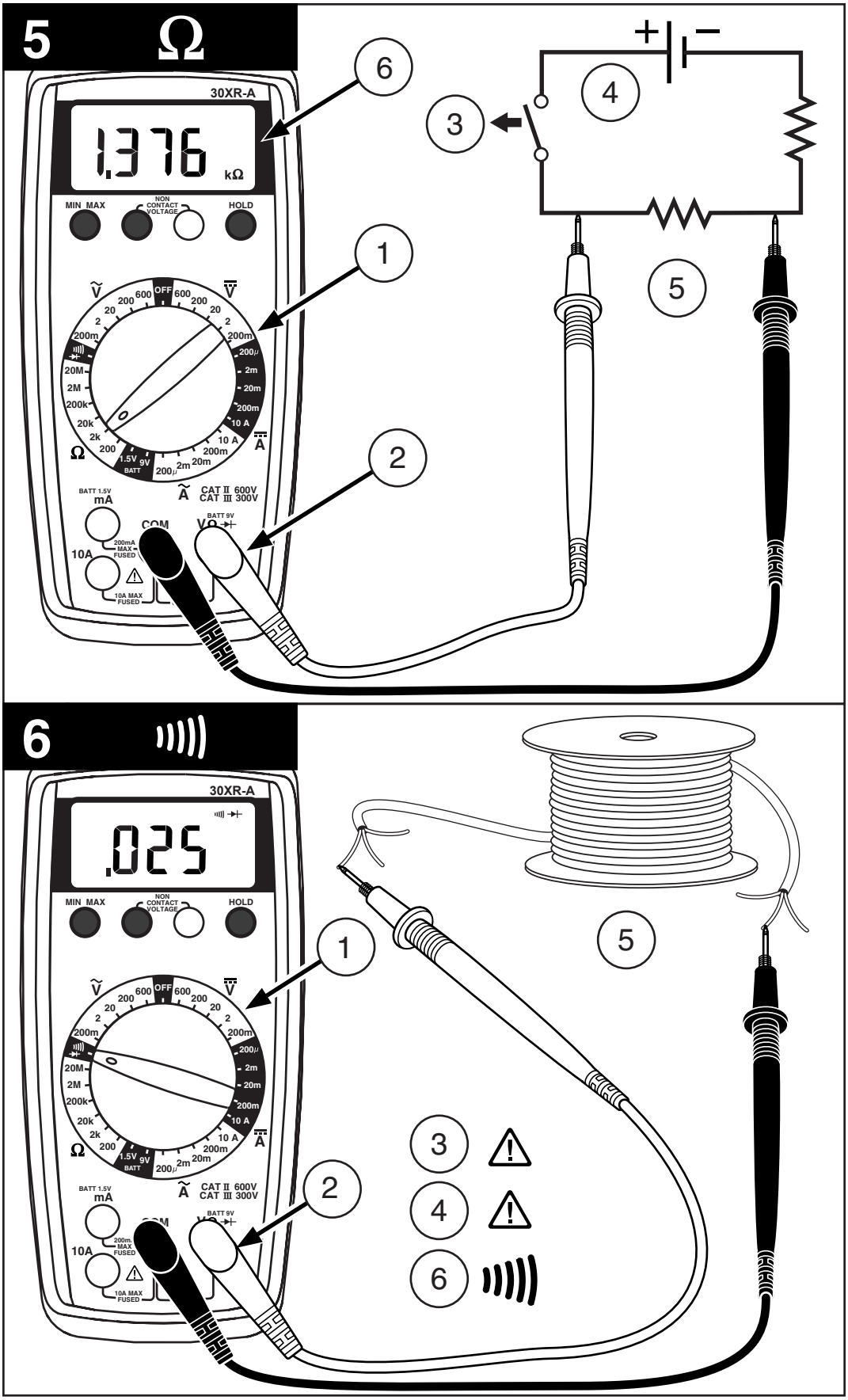
5


5 Ω
30XR-A
1.376 kΩ
MIN MAX
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OFF
CAT II 600V
CAT III 300V
BATT 1.5V
mA
10A
COM
BATT 9V
200mA MAX FUSED
10A MAX FUSED
1
2
3
4
5
6
6
30XR-A
.025
MIN MAX
NON CONTACT VOLTAGE
HOLD
OFF
CAT II 600V
CAT III 300V
BATT 1.5V
mA
10A
BATT 9V
200mA MAX FUSED
10A MAX FUSED
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4
5
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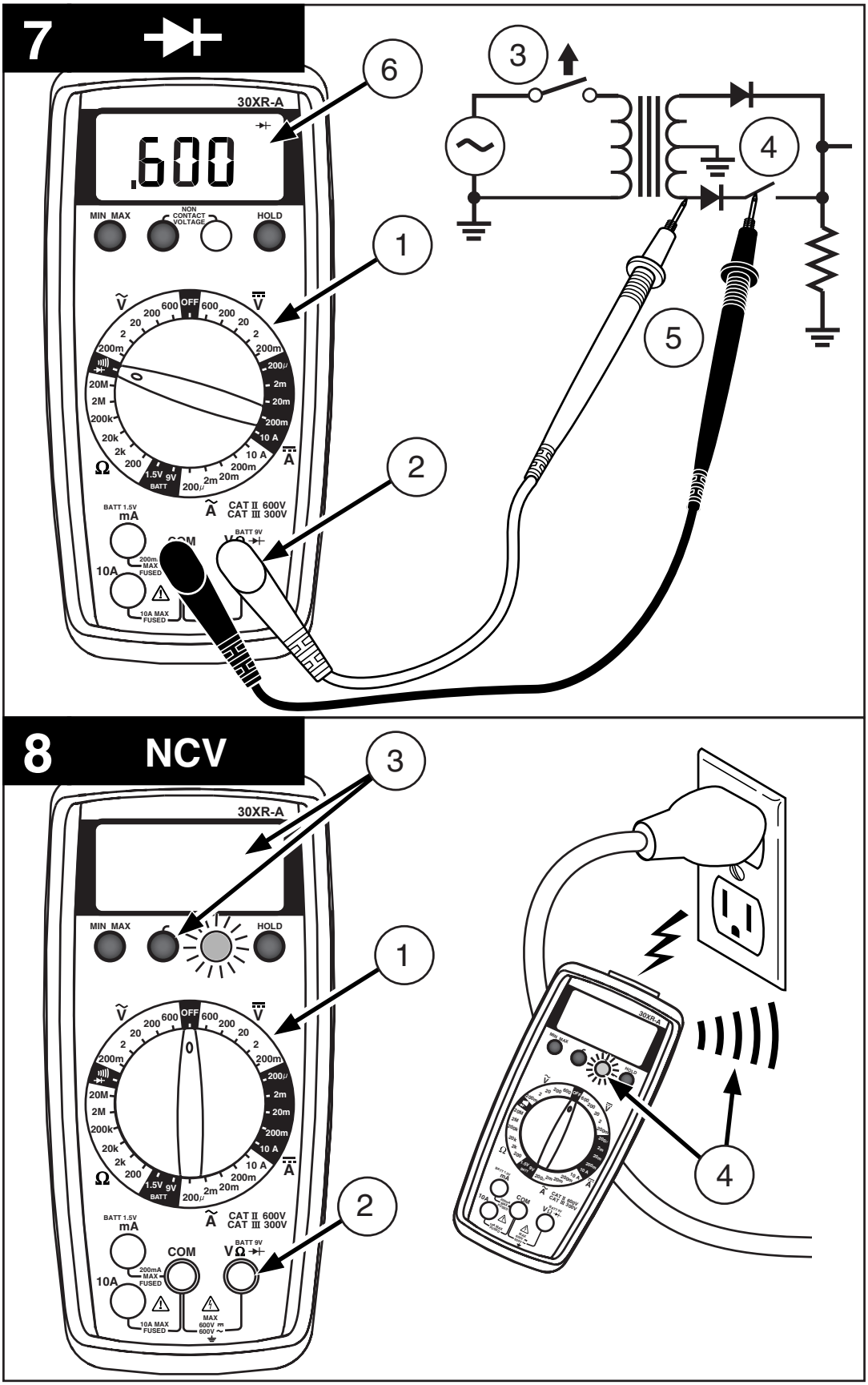
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COM
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CAT III 300V
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4
5
6
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CAT III 300V
1
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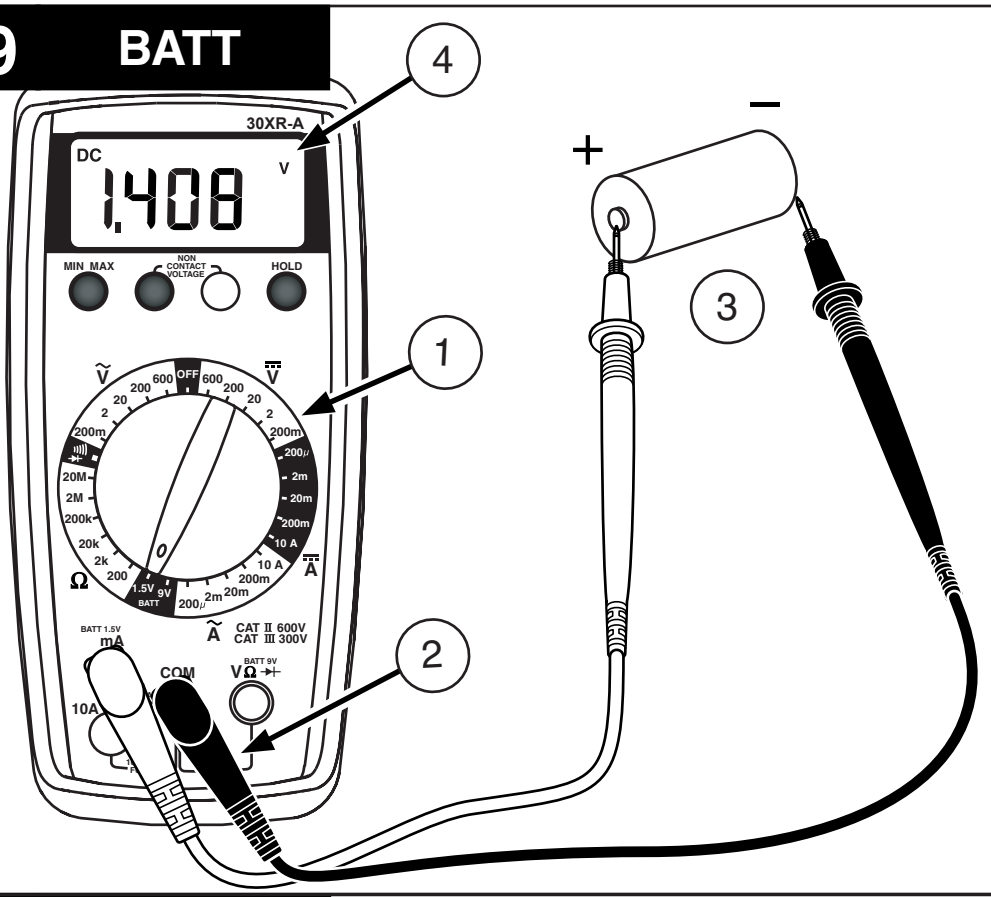
4

## 9 BATT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DC
V
1.408
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+
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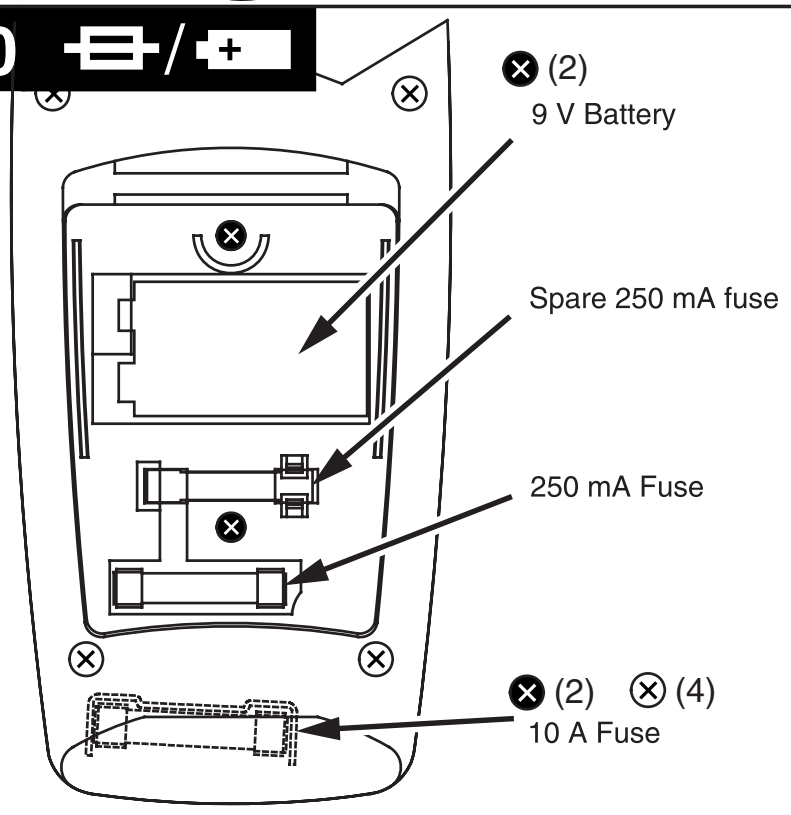
COM
10A
CAT II 600V
CAT III 300V

## 10


⊗ (2)
9 V Battery
Spare 250 mA fuse
250 mA Fuse
⊗ (2) ⊗ (4)
10 A Fuse