

UEI  
8030 SW Nimbus Bldg #7  
Beaverton OR 97008

# INSTRUCTION MANUAL



**UEI**®

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## INTRODUCTION

This meter is a handheld, battery powered instrument designed and tested in accordance with the standards set forth in UL-1244, IEC publication 1010-1 (EN61010-1), the EMC directive and other safety standards (see "Specifications").

## FEATURES

- 3-3/4 digit, 4000 count display
- Auto ranging with manual ranging override
- Fused 400 milliamp and 10 amp ranges
- Basic DC voltage accuracy of 0.5%
- 400 millivolt AC range for 45 Hz to 100 Hz
- MAX/MIN recording function
- Data hold
- Audible continuity indicator
- Diode test function
- 600 volt input protection in the ohms function
- Surge voltage protection
- Water resistant
- Hold and low-battery annunciators
- Auto polarity
- Rubber boot
- Large LCD display (2" wide X 7/8" tall)

## SAFETY RULES









Before using this meter, read all safety information carefully. In this manual, the word "WARNING" is used to indicate conditions or actions that may pose physical hazards to the user. The word "CAUTION" is used to indicate conditions or actions that may damage this instrument.



### WARNING!

Higher voltages and currents require greater awareness of physical safety hazards. Before connecting the test leads; turn off power to the circuit under test; set the meter to the desired function and range; connect the test leads to the meter first, then to the circuit under test. Reapply power. If an erroneous reading is observed, disconnect power immediately and recheck all settings and connections.

## INTERNATIONAL SYMBOLS

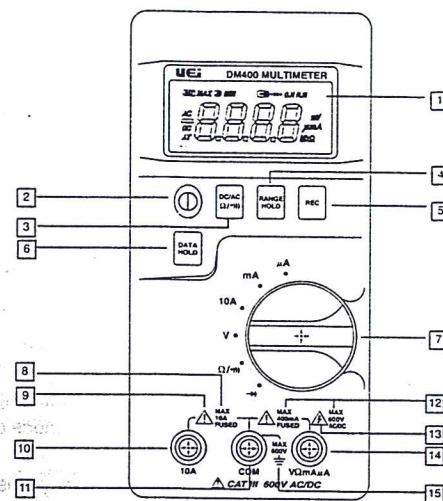
 Dangerous Voltage	 Ground
 AC- Alternating Current	 See Explanation
 DC-Direct Current	 Double Insulation (Protection Class II)
 Either DC or AC	 Fuse


## SAFETY TIPS

This meter was designed for use by professionals who know the hazards associated with their trade. Exceeding the specified limits of this meter is dangerous and can expose the user to serious or possibly fatal injury. To ensure safe and appropriate use, please observe the following safety guidelines:



- Do not attempt to measure any voltage that exceeds 600 volts DC or AC-RMS
- Voltages above 60 volts DC or 25 volts AC may constitute a serious shock hazard
- Do not attempt to use this meter if either the meter or the test leads have been damaged. Turn it in for repair at a qualified repair facility
- Always turn off power to a circuit (or assembly) under test before cutting, unsoldering or breaking the current path. Even small amounts of current can be dangerous
- Always disconnect the live test lead before disconnecting the common test lead from a circuit
- Keep your fingers away from the test lead's metal probe contacts when making measurements. Always grip the leads behind the finger guards molded into the probes
- Use a current clamp adapter when measuring current that may exceed 10 amps. See the back of this manual for available UEI accessories
- In the event of electrical shock, ALWAYS bring the victim to the emergency room for evaluation, regardless of the victim's apparent recovery. Electrical shock can cause an unstable heart rhythm that may need medical attention

## EXPLANATION OF CONTROLS AND INDICATORS



1. **Digital Display:** Readings are displayed on a digital, 4000 count display, which includes the appropriate polarity indication, range and function annunciators, and automatically positions the decimal point appropriate to the selected range. When this meter is turned on, all display segments and symbols appear briefly during a selftest. The display updates three times per second.
2. **Power Switch:** Used to turn the power to the meter on or off. 


## EXPLANATION OF CONTROLS AND INDICATORS (CONT.)

3. **Function Switch:** Switches between DC and AC when measuring amperes or volts.  When DC is selected, the symbol "DC" is displayed, and when AC is selected, the symbol "AC" is displayed. It also switches between resistance and continuity when that function is selected on the dial.
4. **Range Hold Switch:** Selects the "Manual Ranging" mode of operation. The symbol  "R.H" is displayed when the button is pressed. Each subsequent press of this button changes the range as indicated by the annunciators and the decimal point placement. An audible "beep" is heard whenever the range changes. To return to the autoranging mode of operation, press and hold this button for two seconds, or change the rotary dial to any other measurement function. "R.H" will disappear from the top of the display, and "AT" will appear on the lower left of the display.
5. **Record Switch:** After selecting the mode and range, this function allows the meter to store the highest and lowest readings obtained. Pressing "REC" locks the meter in the range it is in at that moment, and begins the recording process. Each time a new high or low value is recorded, an audible beep sounds. When the "REC" button is pressed a second time, the annunciator "MAX" appears at the top of the display, while the maximum recorded value is displayed. When the "REC" button is pressed a third time, the "MIN" annunciator

## EXPLANATION OF CONTROLS AND INDICATORS (CONT.)







appears at the top of the display, while the minimum recorded value is displayed. While you are viewing the "MAX" or "MIN" values, a newly recorded high or low value will be displayed. Pressing the button again will return you to monitoring real-time readings. Cycling through these modes will not affect the values in memory. To exit the record mode, press and hold the "REC" button for two seconds. The meter will return to the autoranging mode, unless the meter is in the 400 mV (DC or AC) range.

*See the note under the table in the "Autorange Control" section of this manual.*





6. **Data Hold Switch:** Freezes the reading presently on the digital display, and displays the annunciator "D.H". To cancel data hold, press the data hold button again, or select any other measurement function. 
7. **Rotary Switch:** Allows you to switch between any of the functions indicated by the annunciators printed around the rotary switch.

μA	Microamperes DC/AC
mA	Milliamperes DC/AC
A	Amperes DC/AC
V	Volts DC/AC
Ω •))	Resistance or continuity
→+	Diode test

## EXPLANATION OF CONTROLS AND INDICATORS (CONT.)

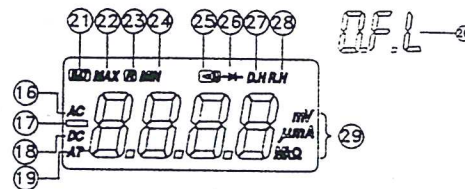
8. **10 ampere maximum, fused, meter lead terminal:**  Use this input port when measuring amperages greater than 400 mA, but less than 10 amps AC or DC. This instrument is protected by a fast acting fuse on this terminal.
9. **Caution symbol:** Reminds the user to follow provided instructions. See "Caution" in the international symbol section of this manual. 
10. **A (ampere input terminal):** The red test lead is plugged into this terminal when measuring current (AC or DC) in the 400 mA to 10 amp range. 
11. **COM Common Terminal:** The black test lead is plugged into this terminal and supplies the ground or "low" reference for all measurements. 
12. **Multifunction terminal information:** Indicates the maximum input values, and indicates the terminal is fused.  

## EXPLANATION OF CONTROLS AND INDICATORS (CONT.)

13. **Warning:** Potentially dangerous voltages may be present. Be extremely careful when making high-voltage measurements. In the event of a malfunction that produces smoke, flame, arcing or noise associated with high voltage arcing. DO NOT PULL THE METER LEADS FROM YOUR METER! SHUT OFF POWER TO THE CIRCUIT BEFORE ATTEMPTING TO REMOVE ANY LEAD OR CIRCUIT CONTACT! Damage could occur to the meter or meter leads resulting in degraded protection if this warning is ignored. 
14. **Multifunction** (volts, ohms, milliamps, microamps, and diode test) **Input Terminal:** Use the red test lead in this terminal for any of these test functions. Use caution when selecting amperage measurements on the rotary dial. Remember amperage measurements are made in series with your circuit. 
15. **Maximum voltage potential to be applied at this terminal:** DO NOT CONNECT TO MORE THAN 600 V WITH RESPECT TO EARTH GROUND.  

## EXPLANATION OF CONTROLS AND INDICATORS (CONT.)

### DISPLAY ANNUNCIATORS



16. **AC** Indicates the meter is reading AC voltage or current.
17. **—** Indicates a negative polarity measurement.
18. **DC** Indicates the meter is reading DC voltage or current.
19. **AT** Indicates the meter is in the auto-ranging mode.
20. **O.F.L.** Indicates the value measured exceeds the limits of the selected range or exceeds the over-all limits of the meter.
21. **BAT** Indicates the battery is low and must be changed immediately.
22. **MAX** Indicates the meter is displaying the maximum value recorded in the "Record" mode.
23. **R** Indicates the meter is in the "record" mode.
24. **MIN** Indicates the meter is displaying the minimum value recorded in the "Record" mode.
25. **•))** Indicates the audible continuity mode has been selected.

## EXPLANATION OF CONTROLS AND INDICATORS (CONT.)

### DISPLAY ANNUNCIATORS (CONT.)

26. **→+** Indicates diode testing has been selected.
27. **D.H.** Indicates data hold has been selected and the display is no longer updating.
28. **R.H.** Indicates the meter's range is being manually selected (range hold).
29. The following symbols represent the type and value of measurement being made.

V	Volts
mV	Millivolts
A	Amps
mA	Milliamps
μA	Microamps
Ω	Resistance (measured in ohms)
kΩ	Kilohms (thousands of ohms)
MΩ	Megohms (millions of ohms)

## AUTORANGE CONTROL

In the autorange mode, the meter automatically selects the range that gives you the best resolution of the value measured. For example, if you were measuring a 9 volt battery that actually put out 9.6 volts, the meter would automatically display "09.60", although it has the ability to display "0009" or "009.6" for the same battery. The far left, or most significant digit, can only display "0" through "3", so "9.600" could not be displayed, instead the symbol "0.FL" would appear on the display indicating the measured value exceeded the range selected. The meter automatically enters the autoranging mode when it is first turned on, and whenever a new function is selected using the rotary dial. In the autoranging mode, the symbol "AT" appears on the display and, in the absence of a terminal input, the range is automatically set to the following:

Function	Display	Range
DC or AC Volts	0.000 V	4 V
$\mu$ A (Either AC or DC)	000.0 $\mu$ A	400 $\mu$ A
mA (Either AC or DC)	00.00 mA	40 mA
10 A (Either AC or DC)	0.000 A	4 A
Resistance	0.FL M $\Omega$	40 M $\Omega$
Continuity	0FL $\Omega$	400 $\Omega$
Diode Test	.0FL V	3 VDC out

**NOTE:** The 400 mV (DC or AC) range must be selected manually. The meter will not seek this range in the autorange mode.

For current measurements above 400 mA and less than 10 amps, plug the red test lead into the "10A MAX" terminal. For current measurements of 400 mA or less, plug the red test lead into the V/ $\Omega$ /mA/ $\mu$ A terminal.

## MANUAL RANGE CONTROL

Although the autoranging mode is easy to use, you may occasionally prefer the manual ranging mode. For example, suppose you are measuring a series of connectors you knew had either 24 or 120 volts AC. If your goal is to find which terminal had what voltage applied, the task is faster and easier if you set the meter to hold the 400 volt range. To select manual range control, press the "Range Hold" button. As you release the button, the annunciator "R.H" appears at the top of the display, and an audible tone sounds to alert you the meter has changed ranges or modes. Each subsequent time the range hold button is pressed, the range increases one step and a tone sounds until it reaches its highest range. The next press of the range hold button returns the meter to its lowest range.

## USING THE TEST LEADS

Use only the same type test leads as those supplied with this meter. These test leads are rated for 1200 volts. Although the test leads are rated for use at up to 1200 volts, the meter is not. Do not attempt to measure any voltage greater than the meter's specified rating. This meter is rated to handle up to 600 volts DC or AC.

**NOTE:** In the 400 mV (DC or AC) range, without an input signal (including ground), the display might show fluctuating readings. This fluctuation is normal. The high input sensitivity produces a wandering effect. When the meter leads touch the measurement points of a circuit, that circuit's value will be displayed.



## USING THE PROTECTIVE BOOT AND STAND

The meter comes with a protective boot that absorbs shock and helps protect the meter from the rigors of daily use by trade professionals. A stand is built into the back of the boot to allow for easier viewing and "hands free" operation.

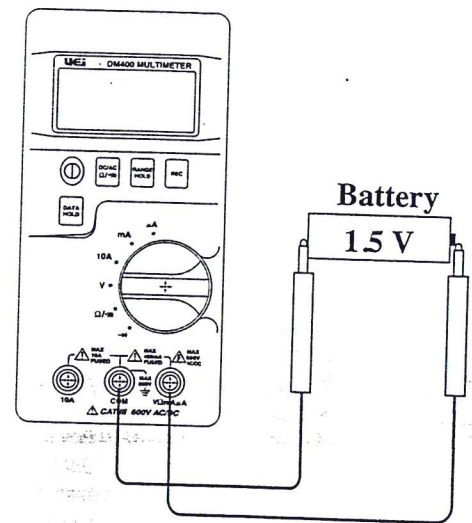
## MEASURING VOLTAGE



**TO AVOID THE RISK OF ELECTRICAL SHOCK AND INSTRUMENT DAMAGE, INPUT VOLTAGES MUST NOT EXCEED 600 VOLTS DC OR AC (RMS). DO NOT ATTEMPT TO TAKE ANY UNKNOWN VOLTAGE MEASUREMENTS THAT MAY BE IN EXCESS OF THESE VALUES.**

**THIS METER IS DESIGNED FOR MEASURING VOLTAGES IN RESIDENTIAL, HOUSEHOLD APPLIANCE AND LIGHT COMMERCIAL APPLICATIONS. INDUSTRIAL APPLICATIONS OFTEN EXCEED THE LIMITATIONS OF THIS METER. DANGEROUS POWER SURGES ARE LIKELY TO OCCUR ON INDUSTRIAL POWER LINES. IF THE MAXIMUM MEASUREMENT VALUE IS UNKNOWN OR IS LIKELY TO EXCEED THE METER'S RATED LIMIT, DO NOT ATTEMPT TO MAKE THAT MEASUREMENT WITH THIS METER. CONSIDER USING CURRENT CLAMPS IN HIGH POWER SITUATIONS WHENEVER PRACTICAL.**

## MEASURING DC OR AC VOLTS



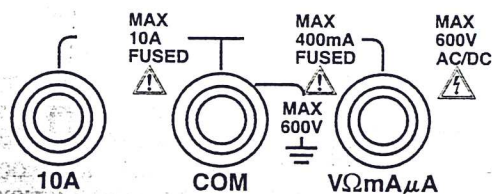
**NOTE:** When taking voltage measurements your meter must be connected in parallel to the circuit or circuit element, under test.

To improve the accuracy of DC voltage measurements taken in the presence of AC voltages, (such as measuring the DC offset voltage of an amplifier in the presence of an AC signal), measure the AC voltage first. Note the AC voltage range and select a DC voltage range that is the same or higher than the AC voltage range. This method improves the DC voltage accuracy by preventing the input protection circuits from being activated.

## MEASURING DC OR AC VOLTS (CONT.)

Follow these steps to measure DC or AC volts.

1. Set the selector switch to "V". Select "AC" or "DC" by pressing the "DC/AC" button. The meter will select the appropriate range.
2. Plug the red lead into the V/ $\Omega$ /mA/ $\mu$ A terminal, and the black lead into the "COM" input terminal of the meter.



3. Disconnect the power from the circuit to be tested.
4. Connect the test leads to the circuit to be tested.
5. Reapply power to the circuit. The measured voltage will be displayed.
6. For DC measurements, when the input to the V/ $\Omega$ /mA/ $\mu$ A terminal is lower (more negative) than the "COM" (or low) input terminal, a minus polarity sign will appear on the left of the display.
7. Disconnect power to the circuit before removing the test leads from the circuit.

## MEASURING DC OR AC VOLTS (CONT.)

 **WARNING!**

### Measuring Three-Phase AC Volts

When measuring three phase power systems, remember there are some important steps to ensure safe multimeter use.

When measuring three phase circuits line to line, the voltage in a *Wye* system is 1.73 times higher *phase to phase* than it is *phase to ground*.

**DO NOT EXCEED THE MAXIMUM VOLTAGE RATING OF THE METER**

If you connect the meter to a three phase system with a 480 VAC phase to ground rating, the voltage from *phase to phase* is over 831 VAC. This exceeds the maximum rating of this meter and may result in personal injury or instrument damage.

**KNOW THE TYPE OF POWER SUPPLY SYSTEM YOU ARE TESTING BEFORE MAKING MEASUREMENTS WITH YOUR MULTIMETER.**

## MEASURING RESISTANCE

### CAUTION!

Turn off the power, and discharge all the capacitors on the circuit to be tested before attempting "in circuit" resistance measurements. Failure to do so may result in unit-under-test or instrument damage.

The resistance measuring circuit applies a small, known value of constant current through the unknown resistance. It then uses the voltage developed across the measured circuit to calculate resistance. It is critical to both the welfare of the meter and the accuracy of the measurement that you remove all power to the circuit under test when making resistance measurements. If any voltage is present in the test circuit, whether from a conventional power supply or energy stored in a capacitor, an erroneous reading will result. This meter may be damaged if voltage in excess of 600 volts is present while measuring ohms or continuity.

**NOTE:** *When measuring critically low ohm values, touch test lead tips together and record the reading. Subtract this value from the total circuit resistance to obtain the most accurate value.*

## MEASURING RESISTANCE (CONT.)

When measuring large resistance values, the reading may be unstable due to environmentally induced electrical noise. If this occurs, connect the resistor directly to the meter input terminals in place of the test leads. It may also be possible to use an electrical shield on the resistor connected to the same ground plane as the "COM" input terminal to obtain a stable reading.

For resistance measurements above one megohm the display might take a few seconds to stabilize. This is normal for high resistance readings.

The meter has a circuit to protect the resistance ranges from voltages of up to 600 volts AC. However, to prevent accidentally exceeding the protection circuit rating and to ensure a correct measurement, **NEVER CONNECT THE TEST LEADS TO A SOURCE OF VOLTAGE** when the rotary switch is set to ohms, continuity or diode test functions.

## MEASURING RESISTANCE (CONT.)

The current applied during resistance measurements could damage some devices. The table below lists the test voltages and currents induced at each resistance range. (All values are typical.)

Range	Open Circuit Voltage(A)	Full Scale Voltage (B)	Short Circuit Current (C)
400 $\Omega$	2.99 V	315 mV	760 $\mu$ A
4k $\Omega$	0.83 V	560 mV	409 $\mu$ A
40k $\Omega$	0.55 V	435 mV	50.4 $\mu$ A
400k $\Omega$	0.55 V	440 mV	5.6 $\mu$ A
4M $\Omega$	0.51 V	414 mV	0.7 $\mu$ A

- NOTE:** (A) *The open circuit test voltage at the input terminals, measured in volts.*  
(B) *The voltage drop across a resistance equal to full scale value.*  
(C) *The current through a short circuit at the input terminals.*

## MEASURING RESISTANCE (CONT.)

When measuring resistance, be sure you have good contact between the test leads and the circuit. Dirt, oil, solder flux, or other foreign matter alters the reading value.

To measure resistance, follow these steps:

1. Insert the test leads into the meter, and turn off the power to the circuit under test. Voltage, from any source, across the circuit will cause an erroneous reading.
2. Set the rotary switch to the resistance/continuity function, then turn on the power to the meter. The meter defaults to the resistance measurement mode.
3. Touch the test probes to the test points, and read the display. The meter beeps as it seeks the correct range to measure the circuit resistance.

**NOTE:**

- During continuity or resistance checks, polarity does not matter
- It may be preferable to use the manual range mode to test circuits that are susceptible to damage at low voltages/currents. See the table on page 20 to determine which range is best suited to your circuit.

## CONTINUITY TEST MODE

Use this mode to make quick checks for continuity of electrical circuits, such as wiring, speaker cables, connections, switches or relays. In the continuity mode, an audible tone sounds when the value measured is approximately  $50\Omega$  or less.

To test for continuity, follow these steps:

1. Set the rotary switch to the ohms/continuity function.
2. Press the  $\Omega$  button to bring the symbol up on the top of the display, indicating that the continuity mode has been selected. The range is preset to the  $400\Omega$  scale and can not be changed.
3. Place one probe to each side of the circuit to be tested. If approximately  $50\Omega$  or less resistance is in the circuit, the meter sounds a continuous tone.

## DIODE TEST MODE

The diode test function allows you to check diodes, transistors and other semi-conductor devices for opens, shorts and normal operation.



**Never connect the test leads to a source of voltage when the diode test function is selected.**

Diodes and other P/N junction devices, easily allow current flow in one direction and prevent current flow in the other direction. When a diode is forward biased, it allows current to flow. When it's reverse biased it prevents current flow.

Your meter is designed to apply enough voltage in the forward biased direction to allow current flow. All diodes use up or "drop" a small amount of the supplied voltage when they are forward biased, and drop nearly all of the supplied voltage when they are reverse biased. The voltage drop of the diode under test is displayed on the meter when it is forward biased. This is normally around 0.4 V for germanium diodes and 0.6 V for silicon diodes. When the diode is reverse biased, the meter should indicate (.0FL).

## DIODE TEST MODE (CONT.)

Determine the condition of semiconductor devices as follows:

1. Select the diode test function on your rotary dial.
2. Connect the red test lead to the anode side of the diode, and the black to the other. A black band is normally printed around the end of the anode side of a diode.
3. Note the displayed value.
4. Reverse the red and black test leads and again note the displayed value.
5. If the digital reading in the first (forward biased) direction indicates some measurable value, and the reading in the reversed direction shows an overload (.OFL), the diode is good.
6. If the displayed value is low or measurable in both directions, the diode is probably shorted.
7. If the display indicated an overload (.OFL) in both directions, the diode is probably open. Some diodes require a higher biasing voltage than this meter supplies. See UEI's catalog (L144) to purchase an economical, high-power diode test lead adapter set if necessary.

## MEASURING CURRENT (AMPS)

### CAUTION!

The current functions are protected by 250 volt rated fuses. To avoid damage to the instrument, do not measure current sources with open circuit voltages greater than 250 volts DC or AC.

**NOTE:** When taking current measurements, this meter must be connected in **SERIES** with the circuit (or circuit element) under test. **NEVER CONNECT THE TEST LEADS ACROSS A VOLTAGE SOURCE** while the rotary switch is set to amps. This can cause damage to the circuit under test or this meter.

### CAUTION!

**The low amperage measurement functions share the test probe port with the volt and ohm measurement.**

**DO NOT TURN THE FUNCTION SELECT KNOB TO THE mA OR  $\mu$ A POSITION UNTIL THE CIRCUIT IS PREPARED FOR CURRENT MEASUREMENTS AS DESCRIBED ON THE FOLLOWING PAGE.**

## MEASURING CURRENT (AMPS) (CONT.)

To measure current, you must break the circuit under test and make the meter part of the circuit. Two connection points are created when a circuit is broken. On one side is the power source and the other is the load. Connect the two test leads in the circuit at the points created by this break.

When measuring alternating current, any waveform other than a sinusoidal wave will have inherent measurement error.

For a meter to measure current, it must pass the current flow through internal shunt resistors to develop a measurable voltage drop. This voltage drop is known as a burden voltage and may effect high precision circuits or measurements.

If DC current is being measured and flows opposite the connection polarity, a minus sign will be displayed.

## MEASURING CURRENT (AMPS) (CONT.)

### TO MEASURE AC OR DC CURRENT FLOW, (IN AMPS), FOLLOW THESE STEPS:

1. Ensure power is off to the circuit to be tested.
2. Insert the black lead in the "COM" terminal.
3. Determine whether the current measurement you are about to make may potentially exceed 400mA.
4. If not, insert the red test lead into the V/ $\Omega$ /mA/ $\mu$ A terminal. If the amperage may exceed 400mA (but won't exceed 10A), insert the red lead in the meter's far left "A" terminal. If you are not sure of the amperage (so long as it's below 10 amps), start out by using the 10 amp terminal, then move it to a lower scale if necessary.
5. Set the rotary switch to the appropriate amperage measurement setting.
6. Turn on the meter. The meter will default to the DC current setting. If you have an AC current source, press the AC/DC button to switch to AC. The meter indicates which mode you have selected at the far left of the display.
7. Either manually select your preferred meter range, or leave it in the autoranging mode.
8. Break the circuit as described earlier, and connect the meter leads to the appropriate points.
9. Apply power to the circuit.

Note your measurement value, and disconnect power to the circuit. Do not remove the leads from the circuit until power is disconnected.

## GENERAL MAINTENANCE



### WARNING!

Repair and service of this instrument is to be performed by qualified personnel only. Improper repair or service could result in physical degradation of the meter. This misuse could alter the protection from electrical shock and personal injury this meter provides. Perform only those maintenance tasks that you are qualified to do.

These guidelines will help you attain long and reliable service from your meter.

- Calibrate the meter annually to ensure it meets the original performance specifications
- Keep the meter dry. If it gets wet, wipe it dry immediately. Liquids often contain minerals that can corrode electronic circuits
- Whenever practical, keep the meter away from dust and dirt, which can cause premature wear.
- Even though the meter is built to withstand the rigors of daily use by industry professionals, it can be damaged by severe impacts. Use reasonable caution when using and storing the meter
- Periodically clean your meter's case with a damp cloth. Do not use abrasives, cleaning solvents or strong detergents as they may damage the finish or effect the reliability of the structural components
- Always use fresh replacement batteries of the specified size and type. Immediately remove old or weak batteries from the meter and dispose of them in accordance with your local disposal regulations. They can leak chemicals that corrode electronic circuits

## BATTERY REPLACEMENT

The meter requires two (2) 1.5 V, size AA batteries for power.



### WARNING!

To avoid electric shock, be sure to turn off the meter's power and disconnect both test leads from any equipment before you remove or install the batteries.

To install new batteries follow these procedures:

1. Remove the three screws from the battery/fuse compartment cover on the back of the meter, and lift the cover.
2. Remove and discard the old batteries if needed. Always dispose of old batteries promptly in a manner consistent with local disposal regulations.



### WARNING!

**Under no circumstances should you expose batteries to extreme heat or fire as they may explode and cause injury.**

3. Place two fresh AA batteries in the compartment. Always replace the batteries as a set to ensure the battery auto-check circuitry in the meter can accurately assess the batteries' condition. An old battery may leak before the over-all voltage level drops to an unacceptable level, if they are replaced separately. If you do not plan to use the meter for a month or more, remove the batteries and store them in a safe area that won't be damaged by leaking batteries.
4. Reattach the battery compartment cover to the meter and reinstall the screws.



## FUSE REPLACEMENT

All 400mA and below ranges are routed through the meter's far right terminal, labeled "V/ $\Omega$ /mA/ $\mu$ A." These ranges are protected by a 0.5A fuse. The 10A range is routed to the far left terminal, labeled "A." These ranges are protected with a 12A fuse. When either of these fuses blow, the meter will freeze with zeros (example-00.00mA) displayed in the ranges serviced by that fuse.

### WARNING!

To avoid the potential of electric shock or personal injury, disconnect the test probes from any potential power source before removing the fuse(s). Replace the blown fuse with the fuse specified for this meter ONLY!

To replace a blown fuse, perform the following procedures:

1. Turn off power to the circuit under test.
2. Turn off the meter.
3. Disconnect the test leads from the circuit or component under test.
4. Open the battery/fuse compartment cover. The two fuses are visible in the bottom of the compartment.
5. If needed, temporarily remove the batteries for easier access to the fuses.
6. Pull the defective fuse(s) from its fuse holder.
7. Insert the new fuse(s).
8. Replace the batteries, if they were previously removed, and reattach the battery compartment cover.

## GENERAL SPECIFICATION

Digital Display (LCD)	Counts - 4000 Updates 3 times/sec.
Storage Temperature	-4° to 140°F -20° to 60°C
Operating Temperature	32° to 122°F 0° to 50°C
Relative Humidity	0% to 80% @ 32° to 122°F
Temperature Coefficient	0.10 x (Specified Accuracy)/°C when <18°C or > 28°C (<64°F or > 82°F)
Battery Type	1.5 V X 2, AAM or R6
Battery Life (alkaline)	1000 hrs. typical
Size (H x W x D)	
Meter Only	155 x 76 x 40.5 (mm)
With Holster	168 x 85 x 50 (mm)
Weight	
Meter Only	0.269 (kg)
With Holster	0.466 (kg)
Vibration and Shock	Designed to MIL-T-28800 for a Class II instrument
Pollution Degree	2
IP Code	IP67
Safety Standards	Designed to both IEC 1010-1 (Class II) and the EMC Directive. UL3111, CSA C22.2 No. 231 and ISA-DS 82

## SPECIFICATIONS AT A GLANCE

FUNCTION	RANGE	RESOLUTION	ACCURACY	IMPEDANCE	
DC Volts	400 mV	0.1 mV	±0.5% rdg + 3 digits	> 100 MΩ	
	4 V	1 mV		10 MΩ	
	40 V	10 mV		10 MΩ	
	400V	100 mV		10 MΩ	
	600 V	1 V		10 MΩ	
AC Volts	400 mV	0.1 mV	±1.5% rdg + 5 digits	> 100 MΩ	
	4 V	1 mV		10 MΩ	
	40 V	10 mV		10 MΩ	
	400 V	10 mV		10 MΩ	
	600 V	1 V		10 MΩ	
DC Amps	400 μA	0.1 μA	±1.2% rdg + 3 digits	100 Ω	
	4000 μA	1 μA		100 Ω	
	40 mA	10 μA		1 Ω	
	400.0mA	100 μA		1 Ω	
	4 A	1 mA		0.01 Ω	
	10 A	10 mA		0.01 Ω	
AC Amps	400 μA	0.1 μA	±5% rdg + 5 digits	100 Ω	
	4000 μA	1 μA		100 Ω	
	40 mA	10 μA		1 Ω	
	400 mA	0.1mA		1 Ω	
	4 A	0.001A		0.01 Ω	
10 A	0.01A	0.01 Ω			
FUNCTION	RANGE	RESOLUTION	ACCURACY	MEASUREMENT	
Ohms	400 Ω	0.1 Ω	±0.75% rdg + 3 digits	V <sub>ohm</sub> / 1.2mA or less	
	4 kΩ	1 Ω		±0.75% rdg + 3 digits	0.7V / 0.7mA or less
	40 kΩ	10 Ω		±0.75% rdg + 3 digits	0.47V / 0.7mA or less
	400 kΩ	100 Ω		±0.75% rdg + 3 digits	
	4 MΩ	1 kΩ		±1.0% rdg + 3 digits	
40 MΩ	10 kΩ	±1.2% rdg + 3 digits			
* V <sub>ohm</sub> = dc 3 V					
Continuity Open circuit test voltage: <3 V Threshold: approx. <50 Ω					
Diode Check Open circuit test voltage: <2.5 V MAX. test current: 3.1 μA					

For any current measured in the 10 ampere mode, limit the measurement duty cycle to five minutes. After continuous use for five minutes, disconnect the current input from the 10 ampere mode for a least five additional minutes before making a second measurement.

## MAXIMUM INPUTS

FUNCTION	INPUT TERMINALS		
	RED LEAD	BLACK LEAD	MAXIMUM INPUT
DC V	V Ω mA μA	COM	600 V
AC V	V Ω mA μA	COM	600 V
Ω (Ω))	V Ω mA μA	COM	600 V
→	V Ω mA μA	COM	600 V
A ~	A	COM	10 A/250 V
mA ~	V Ω mA μA	COM	400mA/250 V
μA ~	V Ω mA μA	COM	400mA/250 V

## WARRANTY

The DM400 is warranted to be free from defects in materials and workmanship for a period of three years from the date of purchase. If within the warranty period your meter should become inoperative from such defects, the unit will be repaired or replaced at UEI's option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. A purchase receipt or other proof of original purchase date will be required before warranty repairs will be rendered. Instruments out of warranty will be repaired for a service charge. Return the unit postage paid and insured to:

**UEI Service Department**  
5500 SW Arctic Drive, Beaverton, OR 97005  
(503) 644-8723

This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

## ACCESSORIES

*NOTE: When servicing the meter, use only the replaceable parts specified.*

AB20	Batteries, two (2) 1.5 V, AA
AF150	Fuse 12A, 250 V RMS
AF145	Fuse 0.5A, 250 V RMS
ATL55	Test Lead Set
AH400	Rubber Boot (Grey)