Commercial Electric™

Questions, problems, missing parts? Before returning to the store,
call Commercial Electric Customer Service
8 a.m. - 7 p.m., EST, Monday - Friday, 9 a.m. - 6 p.m., EST, Saturday

1-877-527-0313
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Retain this manual for future use.

Document #: IM032524

Commercial Electric™

Item #1011 112 443
Model #DMM-8301S

USE AND CARE GUIDE

TRUE RMS AUTO-RANGING MULTIMETER



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THANK YOU

We appreciate the trust and confidence you have placed in Commercial Electric through the purchase of this digital multimeter. We strive to continually create quality products designed to enhance your home. Visit us online to see our full line of products available for your home improvement needs. Thank you for choosing Commercial Electric!

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Safety Information

Please read this manual carefully and pay attention to related safe working standards before using this meter. Protection provided by the instrument will be impaired if used in a manner not specified by the manufacturer.

SAFETY SYMBOLS

Symbol	Definition
	Indicates important safety information.
	Caution! Indicates a potentially hazardous situation.
	Caution, possibility of electric shock.
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION.
	Read instruction before use.
	Protective conductor terminal.
	The fuse must be replaced with the rating specified in this manual.
 Intertek 5023835	Conforms to UL STD. 61010-1, 61010-2-033. Certified to CSA STD. C22.2 NO. 61010-1, 61010-2-033.
CAT II	(Measurement Category II) is applicable to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.
CAT III	(Measurement Category III) is applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

Safety Information (continued)

PRECAUTIONS

WARNING: Measure known voltage with the meter to verify that the meter is working properly. If the meter is working abnormally, stop using it immediately. A protective device may be damaged. If there is any doubt, have the meter inspected by a qualified technician.

WARNING: Do not use the meter or test leads if they look damaged. Check to see if the test wire has insulation damage or bare metal. Check test wire continuity. If the wire is damaged, replace it with a new one before using the meter.

WARNING: When testing voltage that exceeds 30V AC voltage RMS or 60V DC, be particularly careful to avoid electric shock.

WARNING: Before measuring current, check the meter's fuse and turn off power to the circuit before connecting the meter to the circuit.

WARNING: Do not operate the meter with the case (or any part of case) removed or damaged.

WARNING: When the battery low voltage indicator illuminates, replace the battery immediately. A low battery will cause meter reading errors and may result in electric shock or personal injury.

WARNING: Do not operate the meter around explosive gas, vapor, or dust.

WARNING: When measuring, use the correct jack, and select the proper function and measuring range.

WARNING: When making connections, connect the common test lead before connecting the live test lead. When disconnecting, disconnect the live test lead before disconnecting the common test lead.

WARNING: Do not use under direct sunlight or high temperatures.

WARNING: Do not measure voltages exceeding the rated voltage marked on the meter.

WARNING: Disconnect power to the circuits and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.

WARNING: Before changing functions, disconnect the test leads from the circuit under test.

WARNING: For all DC functions, including manual or auto ranging, avoid the risk of shock due to a possible inaccurate reading by verifying the presence of any AC voltages. Firstly, use the AC function and then select DC voltage range equal to or greater than the AC range.

WARNING: Use only with CAT III and CAT IV rated test leads.

Safety Information (continued)

WARNING: Do not attempt to measure resistance or continuity on a live circuit.

CAUTION: To avoid damage to the meter, do not exceed the maximum limits of the input values shown in the specification tables.

CAUTION: When the range of the value to be measured is unknown, check that the range initially set on the meter is the highest possible setting or, wherever possible, choose the auto-ranging mode.

CAUTION: When maintaining the meter, use replacement parts specified by the manufacturer.

CAUTION: If the current under measurement is higher than the selected value for a long period, overheating may take place, compromising the safety and operation of the inner circuits.

NOTE: The hazardous voltage indicator " ϟ " will appear for AC voltages >30V rms or DC voltages >30V.

CAUTION: Pay attention to the battery polarity when changing the battery.

CAUTION: When maintaining the meter, use replacement parts specified by the factory.

CAUTION: When repairing televisions or carrying out measurements on power-switching circuits, remember that high-amplitude voltage pulse at the test points can damage the meter. Use of a TV filter will attenuate any such pulse.

CAUTION: Check the batteries before use. Replace the batteries if the low battery symbol appears on the LCD display.

CAUTION: Before you take a measurement, turn the function/ range switch to the desired range.

NOTE: Keep your fingers behind the protection guards while measuring.

Safety Information (continued)

FCC COMPLIANCE STATEMENT

WARNING: This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
The Home Depot, Inc.
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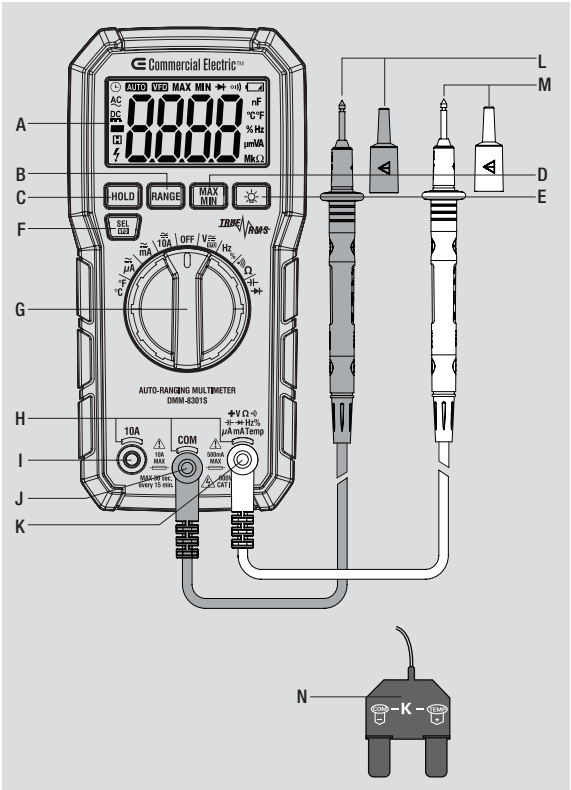
Warranty

WARRANTY: 12 months
For one year from the date of purchase, this product is warranted against any defects in material or workmanship. This warranty is void if this product is ever used while providing commercial services or if rented to another person.

Contact the Customer Service Team at 1-877-527-0313 or visit www.homedepot.com.

Pre-Operation

PRODUCT DESCRIPTION



Pre-Operation (continued)

Part	Name	Description
A	LCD display	Display the measured readings.
B	RANGE button	For measurement situations requiring that a range be manually selected, perform the following steps: 1. Press the RANGE button, the "AUTO" auto-ranging indicator will disappear. 2. Press the RANGE button to step through the available ranges until you select the range you want. 3. Press and hold the RANGE button for 2 seconds to exit the manual-ranging mode and return to auto-ranging mode.
C	Data hold button	Press to hold the current reading on the display. Press again to exit the hold mode.
D	MAX/ MIN button	Press to select MAX or MIN function.
E	Backlight button	Press to turn on/off the LCD backlight.
F	SEL/ VFD button	Press to switch function in the multi-function setting. In the ACV setting, press and hold this button for 2 seconds to enter the VFD mode. Press and hold this button for 2 seconds again to exit the VFD mode.
G	Rotary switch	Rotate to select a measurement mode.
H	Leads alert LED indicators	Indicate the right jack for leads input.
I	10A jack	Connect to the red test lead to measure 10A current.
J	COM jack	Connect to the black test lead.
K	Positive input jack	Connect to the red test lead to measure voltage, µA/mA current, resistance, capacitance, continuity, diode, VFD, frequency and duty cycle.
L	Black test lead with removable cap	Connect to COM jack.
M	Red test lead with removable cap	Connect to positive input jack or 10A positive input jack.
N	K-type thermocouple	Connect to COM jack and positive input jack for temperature measurement.

Pre-Operation (continued)

LCD DISPLAY DEFINITIONS



Part	Symbol	Description
AA		Active auto power off indicator
BB	AC	Alternating current indicator
CC	DC	Direct current indicator
DD		Numerical value polarity indicator (negative sign)
EE		Data hold indicator
FF		High voltage warning symbol (> 30V AC RMS or 30V DC)
GG	AUTO	Automatic measuring range indicator
HH	VFD	Variable frequency drive indicator
II	MAX	Maximum measuring indicator
JJ	8888	Measurement display value
KK	MIN	Minimum measuring indicator
LL		Diode measurement function indicator
MM		Continuity measurement indicator
NN		Low battery indicator
OO	n	Nano (value x 10^{-9})
OO	F	Farads (Capacitance)
PP	°C	Degree Celsius (Temperature)
PP	°F	Degree Fahrenheit (Temperature)
QQ	%	Duty cycle
QQ	Hz	Hertz (Frequency)
RR	µ	Micro (value x 10^{-6})
RR	m	Mili (value X 10^{-3})
RR	V	Volts (Voltage)
RR	A	Amps (Current)
SS	M	Mega (value X 10^{6})
SS	k	Kilo (value X 10^{3})
SS	Ω	Ohms (Resistance)

Pre-Operation (continued)

PRODUCT SPECIFICATIONS

Component	Specification
LCD display	4000 counts
Sampling frequency	3 samples per second
Fuse protection	F: 10A/ 600V, 6 X 32 mm (Rated breaking capacity: 10kA) F: 500mA/ 600V, 5 X 20 mm (Rated breaking capacity: 1kA)
Battery	2 X AAA 1.5V batteries
Accuracy	Accuracy is specified for a period of one year after calibration and at 18°C to 28°C (64°F to 82°F) with relative humidity up to 80%. Accuracy specifications take the form of: ±(% of reading + number of least significant digits).
AC response	True RMS
Low battery indication	on the display
Over-range indication	LCD displays"OL"
Polarity indication	"-"displayed for negative polarity
Operating altitude	< 6560 ft. (2000 m)
Operation environment	32°F to 122°F (0°C to 50°C), < 70% relative humidity, indoor use only.
Storage temperature	14°F to 142°F (-10°C to 60°C), < 80% relative humidity, battery removed.
Pollute degree	2
Safety rating	CAT III 600V, Class 2, Double insulation.
Size	6.44 X 3.19 X 1.82 in (163.5 X 81 X 46.4 mm)
Weight	Approx. 12.69 oz (360 g), battery included.

DC VOLTAGE SPECIFICATIONS

Measuring Range	Resolution	Accuracy
400.0mV	0.1mV	±(0.5% of reading + 5 digits)
4.000V	0.001V	
40.00V	0.01V	
400.0V	0.1 V	±(0.8% of reading + 3 digits)
600V	1V	±(1.0% of reading + 3 digits)

☐ Input Impedance: 10MΩ

☐ Maximum Input Voltage: 600V DC

Pre-Operation (continued)

AC VOLTAGE SPECIFICATIONS

Measuring Range	Resolution	Accuracy
4.000V	0.001V	±(1.0% of reading + 3 digits)
40.00V	0.01V	
400.0V	0.1V	
600V	1V	±(1.2% of reading + 5 digits)

- ☐ Input Impedance: 10MΩ
- ☐ Maximum Input Voltage: 600V AC RMS
- ☐ Frequency Range: 50 to 60Hz; All AC Voltage ranges are specified from 5% of range to 100% of range.

VFD SPECIFICATIONS

Measuring Range	Resolution	Accuracy
600V	1V	±(4% of reading + 3 digits)

DC CURRENT SPECIFICATIONS

Measuring Range	Resolution	Accuracy
400.0µA	0.1µA	±(1.0% of reading + 5 digits)
4000µA	1µA	
40.00mA	0.01mA	
400.0mA	0.1mA	
4.000A	0.001A	±(2.0% of reading + 5 digits)
10.00A	0.01A	

- ☐ Overload Protection: F: 10A/ 600V, F: 500mA/ 600V.
- ☐ Maximum Input: µA/mA setting: 400mA DC
  10A setting: 10A DC (30 sec. max with reduced accuracy)
- ☐ When measured current is greater than 2A, the continuous measurement time cannot be more than 2 minutes. Disconnect the current and wait 10 minutes before you take another measurement.

Pre-Operation (continued)

AC CURRENT SPECIFICATIONS

Measuring Range	Resolution	Accuracy
400.0µA	0.1µA	±(1.0% of reading + 5 digits)
4000µA	1µA	
40.00mA	0.01mA	
400.0mA	0.1mA	
4.000A	0.001A	±(2.0% of reading + 10 digits)
10.00A	0.01A	

- ☐ Overload Protection: F: 10A / 600V, F: 500mA / 600V
- ☐ Maximum Input: µA/mA setting: 400mA AC RMS
  10A setting: 10A AC RMS (30 sec max with reduced accuracy)
- ☐ Frequency Range: 50 to 60Hz. All AC current ranges are specified from 5% of range to 100% of range.
- ☐ For measurements greater than 2A, the continuous measurement time cannot be more than 2 minutes. Disconnect the current and wait 10 minutes before making another measurement.

RESISTANCE SPECIFICATIONS

Measuring Range	Resolution	Accuracy
400.0Ω	0.1Ω	±(1.2% of reading + 5 digits)
4.000kΩ	0.001kΩ	
40.00kΩ	0.01kΩ	
400.0kΩ	0.1kΩ	
4.000MΩ	0.001MΩ	
40.00MΩ	0.01MΩ	±(2.0% of reading + 10 digits)
50.00MΩ	0.1MΩ	±(2.8% of reading + 10 digits)

- ☐ Overload Protection: 250V AC RMS or 250V DC

AUDIBLE CONTINUITY SPECIFICATIONS

Measuring Range	Resolution
)))	When the on-resistance is smaller than 50Ω, the built-in buzzer sounds. The open circuit voltage is approximately 1V.

- ☐ Overload Protection: 250V AC RMS or 250V DC

Pre-Operation (continued)

DIODE SPECIFICATIONS

Measuring Range	Resolution	Accuracy
3.3V	0.001V	Display forward voltage drop of diode

☐ Overload Protection: 250V AC RMS or 250V DC

CAPACITANCE SPECIFICATIONS

Measuring Range	Resolution	Accuracy
40.00nF	0.01nF	±(3.5% of reading + 10 digits)
400.0nF	0.1nF	±(3.0% of reading + 5 digits)
4.000µF	0.001µF	
40.00µF	0.01µF	
400.0µF	0.1µF	±(3.5% of reading + 5 digits)
4.000mF	0.001mF	

☐ Overload Protection: 250V AC RMS or 250V DC

FREQUENCY SPECIFICATIONS - THROUGH GRADE HZ/DUTY CYCLE

Measuring Range	Resolution	Accuracy
9.999Hz	0.001Hz	±(1.0% of reading + 5 digits)
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	
50.00KHz	0.01kHz	

☐ Overload Protection: 250V AC RMS

☐ Input Voltage Range: > 2V AC RMS (Input voltage increases when the frequency to be measured increases)

Pre-Operation (continued)

DUTY CYCLE SPECIFICATIONS

Measuring Range	Resolution	Accuracy
0.1% - 99.9%	0.1%	±(1.2% of reading + 2 digits)

THROUGH GRADE HZ/DUTY:

☐ Frequency Response: 5 to 10.0kHz

☐ Input Voltage Range: > 2V AC RMS (Input voltage increases when the frequency to be measured increases)

☐ Maximum Input Voltage: 250V AC RMS

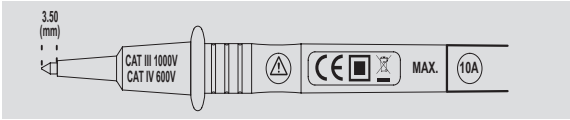
TEMPERATURE SPECIFICATIONS

Measuring Range	Resolution	Accuracy
-40°F to 10°F	1°F	±(1.2% of reading + 7 digits)
11°F to 1832°F	1°F	±(1.2% of reading + 6 digits)
-40°C to -12°C	1°C	±(1.2% of reading + 4 digits)
-11°C to 1000°C	1°C	±(1.2% of reading + 3 digits)

☐ Overload Protection: 250V DC or 250 V AC RMS

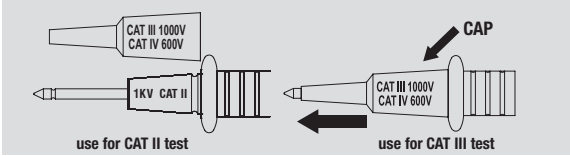
TESTING IN CAT III / CAT IV MEASUREMENT LOCATIONS

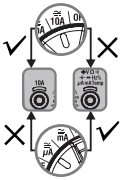
Ensure the test leads shield is pressed firmly in place. Failure to use the CAT III / CAT IV shield increases arc-flash risk.



TESTING IN CAT II MEASUREMENT LOCATIONS

CAT III/ CAT IV shields may be removed for CAT II locations. This will allow testing on recessed conductors such as standard wall outlets. Take care not to lose the shields.

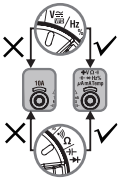




WARNING:

- ☐ 10A range measurements: must insert RED test lead to left probe **10A** socket ONLY.
- ☐ mA range measurements: must insert RED test lead to right probe **mA** socket and do not use these ranges to measure HIGH VOLTAGE.

MISUSE CAN RESULT IN BLOWN FUSE!



WARNING:

- ☐ All other measurements: must insert RED test leads to the right socket.
- ☐ Do not use these ranges to measure HIGH VOLTAGE.

MISUSE CAN RESULT IN UNIT DEFECT OR BLOWN FUSE!

DATA HOLD BUTTON

Data hold mode causes the meter to stop updating the data on the LCD display (A). To enter and exit data hold mode:

- ☐ Press data hold button (C) to freeze the current measurement on the LCD display (A) and the "H" icon appears.
- ☐ Press again to release the display and return to live measurement and the "H" icon disappears.

RANGE BUTTON

For measurement situations requiring that a range be manually selected, perform the following steps:

- ☐ Press the RANGE button (B), the auto-ranging indicator AUTO will disappear.
- ☐ Press the RANGE button (B) to step through the available ranges until you select the range you want.
- ☐ Press and hold the RANGE button (B) for 2 seconds to exit the manual-ranging mode and return to auto-ranging mode.

MAX/MIN BUTTON

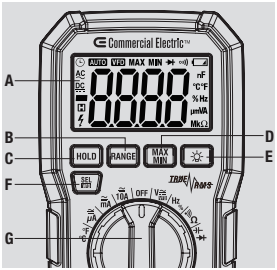
- ☐ Press MAX/MIN button (D) to select MAX or MIN mode to record the maximum or minimum during measurement.

BACKLIGHT BUTTON

- ☐ Press backlight button (E) to active the backlight.
- ☐ Press again to turn off the backlight.

SEL/ VFD BUTTON

- ☐ Press SEL/ VFD button (F) to switch function in the multi-function settings.
- ☐ Rotate the rotary switch (G) ACV setting, press and hold this button for 2 seconds to enter the VFD mode. Press and hold this button for 2 seconds again to exit the VFD mode.



LEAD ALERT LEDs

- ☐ When the rotary switch (G) is rotated to a measurement setting, the lead alert LED indicators (H) will illuminate green to indicate that the test leads should be inserted into the appropriate jacks. The lights will automatically turn off after 2 minutes. To disable the lead alert LED indicators (H), power the meter ON while holding the backlight button (E) .

NOTE: Lead alert function will reactivate by default when the meter powers OFF or when the rotary switch is rotated.

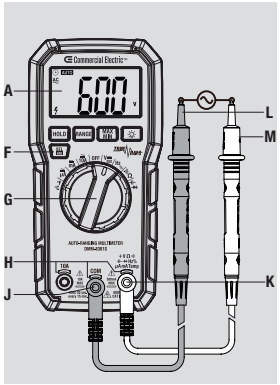
AUTO POWER OFF

- ☐ By default, the meter automatically enters a sleep state after 5 minutes inactivity. Press any button to active the working mode.
- ☐ To disable the auto power off function, rotate the rotary switch (G) to OFF position, hold the SEL/ VFD button (F), and rotate the rotary switch to any working position. The beeper will sound, the auto power off icon "⏲" will disappear, indicating that the auto power off function is successfully turned off.

Operation

1 AC or DC Voltage Measurement

CAUTION: To avoid electrical shock and/or damage to the meter, do not attempt to take any voltage measurement that might exceed 600V DC or AC rms.



- ☐ Rotate the rotary switch (G) to the V AC/DC ( ) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).
- ☐ Press SEL/ VFD button (F) to select AC or DC voltage mode. The AC or DC icon will show on the LCD display (A) to indicate which mode is selected.
- ☐ Apply test leads (L and M) to the circuit to be tested to measure voltage. The meter will auto-range to display the voltage measurement in the most appropriate range.
- ☐ Read the data on the LCD display (A).

NOTE: If "−" appears on the LCD display, the test leads are being applied to the circuit in reverse polarity. Swap the position of the leads to correct one.

NOTE: When in a voltage setting and the test leads are open, readings of order mV may appear on the display. This is noise and is normal. By touching the test leads together to close the circuit, the meter will measure zero volt.

Operation (continued)

2 AC or DC Current Measurement

CAUTION: To avoid damage to the meter, check the meter's fuse before proceeding. Use the proper terminals, function, and range for your measurement. Never place the test leads in parallel with a circuit or component when the leads are plugged into the current terminals.

WARNING: Do not attempt to measure more than 10A.

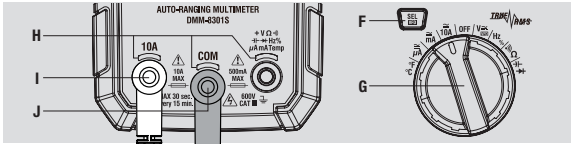
WARNING: To avoid damage to the meter or injury if the fuse blows, do not take current measurements if the voltage exceeds 600V.

WARNING: When measuring current greater than 5A, a measurement time of 30 seconds followed by 15 minutes of recovery time is recommended.

- ☐ Rotate the rotary switch (G) to the appropriate AC/DC current ( ) setting. Press SEL/ VFD button (F) to select AC or DC current mode. The AC or DC icon will show on the LCD display (A) to indicate which mode is selected.

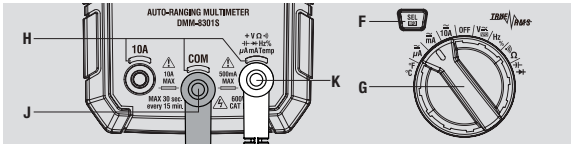
AC/DC Current > 400mA and < 10A:

- ☐ Rotate the rotary switch (G) to the 10A AC/DC current ( ) setting. Insert the RED test lead (M) into 10A jack (I) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).



mA AC/DC current < 400mA:

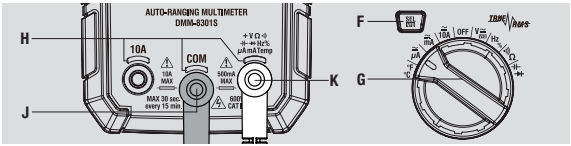
- ☐ Rotate the rotary switch (G) to the mA AC/DC current ( ) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).



Operation (continued)

µA AC/DC currents < 400µA:

☐ Rotate the rotary switch (G) to the µA AC/DC (⎓mA) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).



☐ Remove power from circuit.

☐ Apply test leads (L and M) to the circuit to be tested to measure current. The meter will auto-range to display the current measurement in the most appropriate range.

☐ Read the data on the LCD display (A).

3 Continuity Check

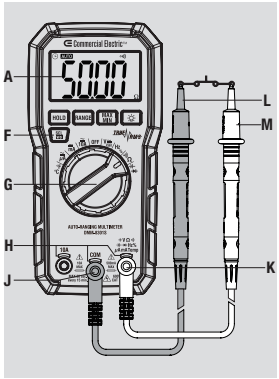
WARNING: Do not attempt to measure continuity with live circuit.

☐ Rotate the rotary switch (G) to the continuity (•))) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).

☐ The meter defaults to continuity measurement in this settings. Ensure that the continuity icon •)) is showed on the LCD display (A). If not, press the SEL/ VFD button (F) to select continuity mode.

☐ Remove power from circuit.

☐ Test for continuity by connecting conductor or circuit with test leads (L and M). If resistance is measured less than 50Ω, an audible signal will sound and display will show a resistance value. If circuit is open, display will show “OL”.



Operation (continued)

4 Resistance Measurement

WARNING: Do not attempt to measure resistance on a live circuit.

CAUTION: To avoid electrical shock and/or damage to the meter, disconnect the circuit power and discharge all high-voltage capacitors before you measure resistance.

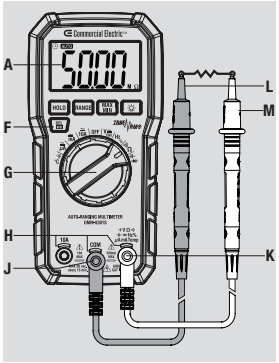
☐ Rotate the rotary switch (G) to the resistance (Ω) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).

☐ The meter defaults to continuity measurement in this setting. Press the SEL/ VFD button (F) to select resistance mode, the display will show "OL. MΩ" with test leads open to indicate that the resistance mode is selected.

☐ Remove power from circuit.

☐ Measure resistance by connecting test leads to circuit. The meter will auto-range display the measurement in the most appropriate range.

☐ Read the data on the LCD display (A).



Some tips for measuring resistance:

☐ The measured value of a resistor in a circuit is often different from the resistor's rated value. This is because the meter's test current flows through all possible paths between the test lead tips.

☐ In order to ensure the best accuracy for a low resistance measurement, shorten the test leads before measurement and remember the test probe resistance. This is necessary in order to subtract for the resistance of the test leads.

☐ When there is no input (for example, an open circuit), the display shows "OL". This means that the measured value is out of range.

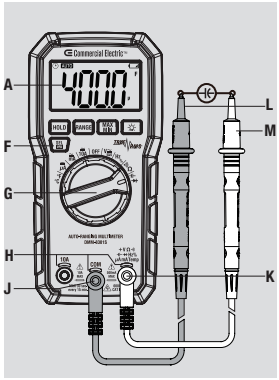
NOTE: When in a resistance mode and the test leads are open (not connected across a resistor or objects), or when a failed resistor is under test, the display will indicate OL. This is normal.

Operation (continued)

5 Capacitance Measurement

CAUTION: To avoid electrical shock and/ or damage to the meter, disconnect the circuit power and discharge all high-voltage capacitors before measuring capacitance.

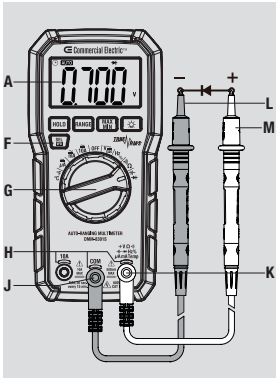
- ☐ Rotate the rotary switch (G) to the capacitance (⊣⊢) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).
- ☐ The meter defaults to capacitance measurement in this settings. Ensure that the LCD display (A) reads "0.00 nF" with test leads open. If not, press the SEL/ VFD button (F) to select capacitance mode.
- ☐ Remove power from circuit.
- ☐ Measure capacitance by connecting test leads (L and M) across the capacitor. The meter will auto-range display the measurement in the most appropriate range.
- ☐ Read the data on the LCD display (A).



Operation (continued)

6 Diode Test

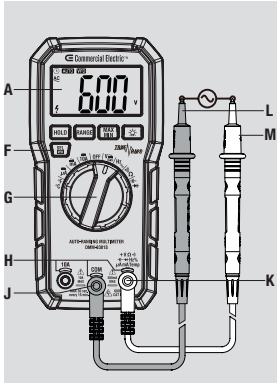
- ☐ Rotate the rotary switch (G) to the diode (⇥) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).
- ☐ The meter defaults to capacitance measurement in this mode. Press SEL/ VFD button (F) to select diode mode. The diode icon ⇥ will show on the LCD display (A) to indicate the diode mode is selected.
- ☐ Connect the BLACK test lead (L) and the RED test lead (M) to the negative pole and positive pole of the measured diode.
- ☐ The LCD display (A) shows the forward bias value of the measured diode. If the poles of the test leads are connected inversely, the meter displays "OL".



7 VFD Measurement

CAUTION: To avoid electrical shock and/or damage to the meter, do not attempt to take any voltage measurement that might exceed 600V DC or AC rms.

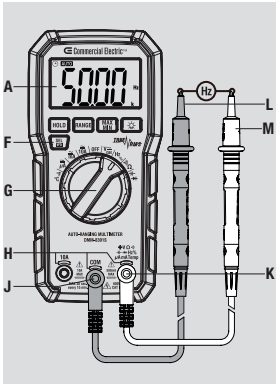
- ☐ Rotate the rotary switch (G) to the V AC/ DC (V⎓) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert LED indicators (H).
- ☐ Press SEL/ VFD button (F) select AC voltage mode. The AC icon AC will show on the LCD display (A) to indicate the AC mode is selected. Press and hold SEL/ VFD button (F) for 2 seconds to enter VFD mode. The VFD icon **VFD** will show on the LCD display (A) to indicate VFD mode is selected.
- ☐ Apply the BLACK test lead (L) to the neutral side of the circuit and the RED test lead (M) to the hot side of the circuit.
- ☐ Read the data on the LCD display (A).



8 Frequency/ Duty Cycle Measurement

CAUTION: To prevent electric shock or meter damage, do not input the voltage higher than 60V DC or 30V AC in the frequency/ duty ratio measurement position.

- ☐ Rotate the rotary switch (G) to the frequency/ duty cycle (Hz%) setting. Insert the RED test lead (M) into positive input jack (K) and BLACK test lead (L) in COM jack (J) according to leads alert indicators (H).
- ☐ The meter defaults to frequency testing in this mode. Press SEL/ VFD button (F) to select frequency or duty cycle mode. Ensure that the appropriate frequency icon **Hz** or duty cycle icon **%** appears on the display (A).
- ☐ Apply the test leads (L and M) across the circuit to be measured.
- ☐ Read the data on the LCD display (A).



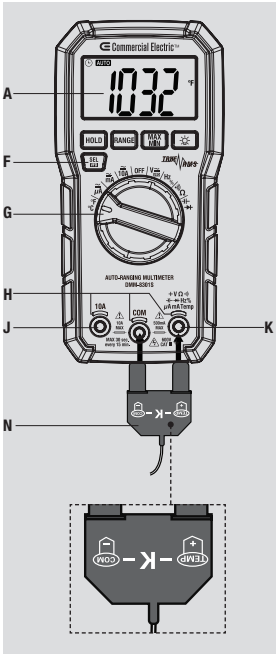
Operation (continued)

9 Temperature Measurement

CAUTION: To prevent electric shock or meter damage, do not input the voltage higher than 30V in the temperature measurement position.

CAUTION: Remove thermocouple before switching meter to other measurement functions.

- ☐ Rotate the rotary switch (G) to temperature (°C/°F) setting. Insert K-type thermocouple (N) into positive input jack (K) and COM jack (J) according to leads alert LED indicators (H), note the polarity.
- ☐ Place the tip of K-type thermocouple (N) to the object or environment to be measured.
- ☐ Read the data on the LCD display (A).



Maintenance

WARNING: Before you open the meter, always disconnect it from all sources of electrical current and make sure you are not charged with static electricity, which may destroy the internal components.

WARNING: To avoid injury or damage to the meter, do not wet the inner parts of the meter. Before opening the case or battery cover, remove the connecting cable between the test probe and input signal.

WARNING: Any adjustment, maintenance, or repair work carried out on the meter while it is live should be carried out by a qualified electrician.

WARNING: To avoid risk of electric shock, disconnect leads from any voltage source before accessing fuses.

WARNING: Only use the specified batteries and fuses for replacement. See the Product Specifications section of this manual for more information.

WARNING: When you open the meter, remember that some internal capacitors can retain a dangerous voltage level even after the instrument is switched off.

WARNING: To prevent electrical hazard or shock, turn off the meter and disconnect the test leads and any input signals before removing the battery cover.

WARNING: Do not use this meter until the rear cover is placed back on the meter and the screws are tightened.

WARNING: Change the battery when the battery symbol appears on the LCD in order to avoid incorrect data, which could lead to electric shock or personal injury.

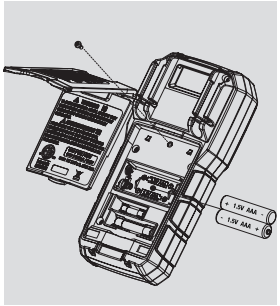
CAUTION: Do not mix old and new batteries. Do not mix alkaline, standard (carbon-zinc), or rechargeable (ni-cad, ni-mh, etc) batteries.

CAUTION: If the meter is not going to be used for a long time, take out the battery and do not store the meter in high temperature or high humidity environment.

Maintenance (continued)

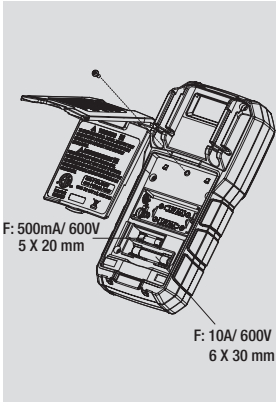
BATTERY REPLACEMENT

- ☐ Once indicator is displayed on the LCD display (A), batteries must be replaced.
- ☐ Turn the meter off by rotating the rotary switch (G) to the OFF position.
- ☐ Disconnect the RED test lead (M) and BLACK test lead (L) and any connectors from the terminals on the meter.
- ☐ Remove one screw from battery door.
- ☐ Replace with two fresh 1.5V AAA batteries in the battery slot (note proper polarity).
- ☐ Assemble battery cover and fasten securely with screw.



FUSE REPLACEMENT

- ☐ Fuse may blow if more than 400mA is applied to the positive input jack (K) or more than 10A is applied to the 10A jack (I), or voltage has applied to function with current setting. To access fuses:
- ☐ Turn the meter off by rotating the rotary switch (G) to the OFF position.
- ☐ Disconnect the RED test lead (M) and BLACK test lead (L) and any connectors from the terminals on the meter.
- ☐ Remove one screw from battery door.
- ☐ Replace blown fuse(s) with:
  VΩ(μA/mA) input jack: 500mA/ 600V, 5 X 20mm.
  10A input jack: 10A/ 600V, 6 X 30mm.
- ☐ Assemble battery cover and fasten securely with screw.



Maintenance (continued)

TEST LEAD REPLACEMENT

If the insulation on the leads is damaged, replace the test leads. Replacement test leads must meet the manufacturer's specifications (EN 61010-031 standard, 1000V CAT III/ 600V CAT IV 10A, or better).

Care and Cleaning

- ☐ Keep the meter dry. If it gets wet, wipe it off.
- ☐ Keep the meter clean. Wipe off dirt with a soft cloth dampened with water. Do not use chemicals, cleaning solvents, or detergents.
- ☐ Use and store the meter within normal temperature ranges. Extreme temperatures can reduce the life of the electronic parts and cause distortion or melting of plastic parts.
- ☐ Handle the meter gently and carefully. Dropping it can damage the electronic parts or the case.
- ☐ Use only fresh batteries of the recommended size and type. Ensure batteries are inserted with the correct polarity. Remove old or weak batteries so they do not leak and damage the unit.
- ☐ Do not mix old and new batteries. Do not mix different types of batteries such as alkaline, carbon-zinc, or rechargeable batteries. Non-rechargeable batteries are not to be recharged.
- ☐ If the meter is to be stored for an extend period, remove the batteries to prevent damage to the unit. Periodically wipe the case with a damp cloth and mild detergent.
- ☐ Repairs or service are not covered in this manual and should only be carried out by a qualified trained technician.