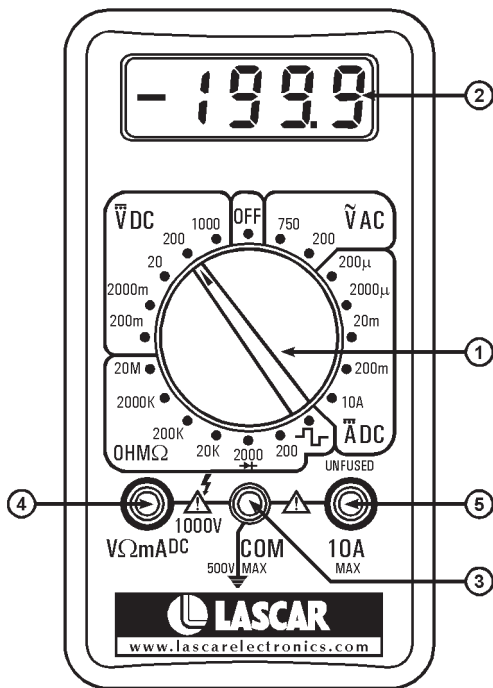




## MINI DIGITAL MULTIMETER - DMM 350 OPERATOR'S INSTRUCTION MANUAL



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## WARNING

READ AND UNDERSTAND THIS MANUAL BEFORE USING THE INSTRUMENT. Failure to understand or comply with the WARNINGS and operating instructions can result in serious or fatal injuries and/or property damage.

## GENERAL

Before attempting to operate the instrument, become familiar with each control. A thorough understanding of how the instrument operates will avoid undue mistakes and minimise measurement errors, instrument damage and the possibility of personal injury.

## FRONT PANEL DESCRIPTION

This section, consisting of the Figure, will describe the proper function of the instrument.

### 1. FUNCTION/RANGE Switch

This control is located in the centre of the front panel and it combines the operations of selecting the function and desired range, as well as having an "OFF" position. To extend the life of the battery, the switch should be in this "OFF" position when the instrument is not in use.

### 2. Display

3½ digit LCD, 7-segment, 0.5" digit height.

### 3. COMMON Socket

Plug-in connection for Black (negative) test lead.

### 4. "V Ω mA" Socket

Plug-in connection for Red (positive) test lead for all voltage and resistance and DC current (except 10A) measurements.

### 5. "10A" Socket (for 10 seconds only)

Plug-in connection for Red (positive) test lead for DC 10A measurements.

## SPECIFICATIONS

### GENERAL

Display:	3½ digit LCD, 0.5" digit height, with auto polarity
Overrange indication:	3 least significant digits blanked
Temperature for specified accuracy:	23 °C ± 5 °C RH < 75%
Temperature ranges:	Operating: 0 °C to 40 °C (32 °F to 104 °F)
	Storage: -10 °C to 50 °C (14 °F to 122 °F)
Power:	9V alkaline or carbon-zinc battery
Low battery indication:	BAT on left of LCD display
Dimensions (H x W x D):	128 x 70 x 28mm (5" x 2.75" x 1.2")
Net weight:	210g. (8oz)

## DC VOLTAGE (DCV)

Range	Resolution	Accuracy
200mV	100 $\mu$ V	$\pm(1\% \text{ reading} + 6 \text{ counts})$
2000mV	1mV	
20V	10mV	
200V	100mV	
1000V	1mV	$\pm(1.5\% \text{ reading} + 8 \text{ counts})$

Maximum allowable input: 1000V DC or peak AC.

## DC CURRENT (DCA)

Range	Resolution	Accuracy
200 $\mu$ A	100nA	$\pm(1.2\% \text{ reading} + 8 \text{ counts})$
2000 $\mu$ A	1 $\mu$ A	
20mA	10 $\mu$ A	
200mA	100 $\mu$ A	
10A	10mA	$\pm(1.2\% \text{ reading} + 10 \text{ counts})$

Overload Protection: mA input 2A/250V fuse.

## AC VOLTAGE (ACV)

Range	Resolution	Accuracy
200V	100mV	$\pm(1.2\% \text{ reading} + 20 \text{ counts})$
750V	1V	

Frequency Range: 45Hz - 450Hz

Maximum Allowable Input: 750Vrms

Response: Average responding. Calibrated in rms of a sine wave.

## RESISTANCE

Range	Resolution	Accuracy
200 $\Omega$	100m $\Omega$	$\pm(1.2\% \text{ reading} + 8 \text{ counts})$
2000 $\Omega$	1 $\Omega$	
20k $\Omega$	10 $\Omega$	
200k $\Omega$	100 $\Omega$	
2000k $\Omega$	1k $\Omega$	
20M $\Omega$	10k $\Omega$	$\pm(2\% \text{ reading} + 10 \text{ counts})$

Maximum Open Circuit Voltage: 2.8V

## DIODE TEST (→→)

Measures forward voltage drop of a semiconductor junction in mV, test current of 1.5mA maximum.

## SIGNAL INJECTOR (↺↺)

Outputs a square wave signal (30-40Hz) for audio check.

# OPERATING INSTRUCTIONS

## GENERAL

The meter is a digital multimeter designed for engineers and hobbyists. Equipped with 5 functions and 19 ranges, each test position is quickly and easily selected with a simple turn of the FUNCTION/RANGE selector rotary switch.

## WARNINGS

1. To avoid electrical shock hazard and/or damage to the instrument, do not measure voltages that might exceed 1000V DC or 750V AC peak above earth ground.
2. Before using the instrument, inspect the test leads, connectors and probes for cracks, breaks or creases in the insulation.

## DC VOLTAGE MEASUREMENT (DCV)

1. Connect the Red test lead to the “V  $\Omega$  mA” socket and the black test lead to the “COM” socket.
2. Set the FUNCTION/RANGE switch to the desired DCV position. If the magnitude of the Voltage is not known, then set the switch to the highest range and reduce it until a satisfactory reading is obtained.
3. Connect the test leads to the device or circuit under test.
4. Turn on power to the device or circuit under test. The voltage value will appear on the LCD Display along with the voltage polarity.

## DC CURRENT MEASUREMENT (DCA)

1. Connect the Red lead to the “V  $\Omega$  mA” socket for measurements up to 200mA and connect the black lead to the “COM” socket.  
**NOTE:** For measurements between 200mA and 10A, connect the Red lead to the 10A socket (for 10 seconds only).
2. Set the FUNCTION RANGE switch to the desired DCA position.
3. Open the circuit to be measured, and connect the test leads IN SERIES with the load in which the current is to be measured.
4. Read the current value on the LCD display.

## AC VOLTAGE MEASUREMENT (ACV)

1. Connect the Red lead to the “V  $\Omega$  mA” socket and the Black lead to the “COM” socket.
2. Set the FUNCTION/RANGE switch to the desired ACV position.
3. Connect the test leads to the device or circuit under test.
4. Read the voltage value on the LCD Display.

## RESISTANCE MEASUREMENT ( $\Omega$ )

1. Connect the Red lead to the “V  $\Omega$  mA” socket and the Black lead to the “COM” socket.
2. Set the FUNCTION RANGE switch to the desired  $\Omega$  position.
3. If the resistance being measured is connected to a circuit, turn off the power and discharge all capacitors before applying the test leads.
4. Connect the test leads to the circuit being measured.
5. Read the resistance value on the LCD Display.

## DIODE TEST (→|←)

1. Connect the Red lead to the “V  $\Omega$  mA” socket and the Black lead to the “COM” socket.
2. Set the FUNCTION RANGE switch to the →|← diode (2000 $\Omega$ ) position.
3. Connect the Red lead to the anode of the diode and the black lead to the cathode.
4. Read the forward voltage drop in mV on the LCD Display. If the polarity is reversed, “1” will be displayed.

## SIGNAL INJECTOR (—|—)

1. Connect the Red lead to the “V  $\Omega$  mA” socket and the Black lead to the “COM” socket.
2. Set the FUNCTION RANGE switch to the (square wave) position.
3. A test signal (30-40Hz) will appear between the “V  $\Omega$  mA” and “COM” sockets with a certain DC component. An additional coupling capacitor should be used.

## FUSE AND BATTERY REPLACEMENTS

### CAUTION

BEFORE ATTEMPTING BATTERY REPLACEMENT, DISCONNECT THE TEST LEADS FROM ANY ENERGISED CIRCUITS TO AVOID SHOCK HAZARD.

In all cases first remove meter from its protective holster.

Fuses rarely need replacement and always blow as a result of operator error. To replace the fuse, remove the 2 back cover fixing screws, carefully remove the back cover and replace the blown fuse with one with the same rating, replace the back cover and fixing screws.

To replace the battery, remove the battery door screw and battery door, replace with a new battery of the same type and refit the battery door and retaining screw.

## CALIBRATION PROCEDURE

Recalibration should not be necessary for long intervals in any event. Calibration must be carried out with a highly accurate voltage standard (better than 0.1% accuracy).

1. Remove the 2 back cover fixing screws. Carefully remove the back cover.
2. With the instrument operating and set to the 200mV DC range, apply 190mV DC from an accurate source.
3. With a small screwdriver inserted into the semi-fixed resistor (SVR-1), carefully turn it until the reading reads 190.0mV.
4. Refit the back cover and retaining screws.

Replace multimeter into protective holster when calibration or battery/fuse replacement is complete.

## SAFETY SYMBOLS



This marking adjacent to another marking or a terminal or operating device indicates that the operator must refer to an explanation in the operating instructions to avoid damage to the equipment and/or to avoid personal injury.

**CAUTION**

This WARNING sign notes a hazard. It calls attention to a procedure, practice or the like which, if not correctly performed or adhered to, could result in permanent injury.

**WARNING**

This CAUTION sign denotes a hazard. It calls attention to a procedure, practice or the like which, if not correctly adhered to, could result in damage to or destruction of part of the instrument.



This marking advises the user that the terminals so marked must not be connected to a circuit point at which the voltage, with respect to earth ground, exceeds (in this case) 500 volts.



This symbol adjacent to one or more terminals identifies them as being associated with ranges that may in normal use be subjected to particularly hazardous voltages. For maximum safety, the instrument and its test leads should not be handled when these terminals are energized.