

## 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 minimize measurement errors, instruments 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 AND RANGE Switch

This control is located at the center 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

3 1/2 digit, 7 segment, 0.5" high LCD

#### 3. Common Jack

Plug in connection for black (negative) test lead.

#### 4. "V . $\Omega$ . mA." Jack

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

#### 5. "10A" Jack

Plug in connection for red (positive) test lead for 10A measurements.

#### 6. hFE Socket

## SPECIFICATIONS

### GENERAL

DISPLAY: 3 1/2 digit LCD. 0.5" height, with polarity.  
 OVERRANGE INDICATION: 3 least significant digits blanked  
 MAXIMUM COMMON MODE VOLTAGE: 500V peak.  
 OPERATING ENVIRONMENT: 0 to 50°C, less than 80% relative humidity up to 35°C, less than 70% relative humidity from 35°C to 50°C.  
 STORAGE ENVIRONMENT: -15°C. to 50°C.  
 TEMPERATURE COEFFICIENT: (0 to 18°C and 28 to 50), Less than 0.1 x applicable accuracy specification per C.  
 POWER: 9V alkaline or carbon-zinc battery (NEDA 1604).  
 BATTERY LIFE: 100 hours typical with carbon-zinc cells, 200 hours with alkaline cells.  
 DIMENSIONS WEIGHT: 126mm long x 70mm wide x 24mm thick. (4.96" x 2.76" x 0.94") Net weight 170g (6 oz).

### DC VOLTAGE

| RANGE  | RESOLUTION | ACCURACY(1YEAR) 18 to 28°C |
|--------|------------|----------------------------|
| 200mV  | 100uV      | ±1% + 2dig                 |
| 2000mV | 1mV        |                            |
| 20V    | 10mV       |                            |
| 200V   | 100mV      |                            |
| 1000V  | 1V         |                            |

MAXIMUM ALLOWABLE INPUT 1000V DC or peak AC.  
 NORMAL MODE REJECTION RATIO Greater than 46dB at 50 Hz. 60Hz (1k unbalance)

### DC CURRENT

| RANGE  | RESOLUTION | ACCURACY(1YR) 18 to 28°C | MAXIMUM FULL SCALE VOLTAGE DROP |
|--------|------------|--------------------------|---------------------------------|
| 200uA  | 100 nA     | ±1.2%+2dig               | 0.25V                           |
| 2000uA | 1uA        |                          | 0.25V                           |
| 20mA   | 10uA       |                          | 0.25V                           |
| 200mA  | 100uA      |                          | 0.25V                           |
| 10A    | 10mA       |                          | ±2% of rdg±2D                   |

OVERLOAD PROTECTION: mA input 0.8A 250V FUSE

### AC VOLTAGE

| RANGE | RESOLUTION | ACCURACY (1YR) 18 to 28°C | FREQUENCY RANGE |
|-------|------------|---------------------------|-----------------|
| 200V  | 100mV      | ±1.2% of rdg±10D          | 45Hz-450Hz      |
| 750V  | 1V         |                           |                 |

MAXIMUM ALLOWABLE INPUT: 750V rms.  
 RESPONSE: Average responding, calibrated in rms of a sine wave.

### RESISTANCE

| RANGE         | RESOLUTION | ACCURACY (1 YR) 18 to 28°C |
|---------------|------------|----------------------------|
| 200 $\Omega$  | 100 m ohm  | ±1.2%+2dig                 |
| 2000 $\Omega$ | 1 ohm      |                            |
| 20K           | 10 ohm     |                            |
| 200K          | 100 ohm    |                            |
| 2000K         | 1K ohm     |                            |

MAXIMUM OPEN CIRCUIT VOLTAGE: 2.8V.

### DIODE TEST

Measures forward resistance of a semiconductor junction in K $\Omega$ , a test current of 1.5mA MAX.

### hFE TEST

Measures transistor hFE.

## OPERATING INSTRUCTIONS

### GENERAL

The METER is completely portable pocket-sized digit multimeter designed for use by the engineer and hobbyist.

Equipped with FIVE functions and 19 ranges, each test position is quickly and easily selected with a simple turn of the single selector switch.

## WARNINGS

1. To avoid electrical shock hazard and/or damage to the instrument, do not measure Voltages that might exceed 500V above earth ground.
2. Before the use of instrument, inspect test leads, connectors and prods for cracks, breaks, or crazes in the insulation.

## DC VOLTAGE MEASUREMENT

1. Connect red test lead to "V.  $\Omega$ . mA." input connector and black to "COM."
2. Set RANGE switch to desired DC V position if magnitude of value not only for this function but any measurement factor is not known, set switch to highest range and reduce until satisfactory reading is obtained.
3. Connect test leads to device or circuit being measured.
4. Turn on power to device or circuit being measured. Voltage value will appear on Digital Display along with the voltage polarity.

## DC CURRENT MEASUREMENT

1. Red lead to "V.  $\Omega$ . mA" jack, for measurements up to 200 mAmps. Black lead to "COM" jack.

### NOTE

For measurements between 200mA and 10 Amps connect red lead to "10A" jack with fully depressed.

2. RANGE switch to desired DCA position.
3. Open the circuit to be measured, and connect test leads IN SERIES with the load in which current is to be measured.
4. Read current value on Digital Display.

## AC VOLTAGE MEASUREMENTS

1. Red lead to "V.  $\Omega$ . mA.", Black lead to "COM".
2. RANGE switch to desired ACA position.
3. Connect test leads to device or circuit being tested.
4. Read voltage value on Digital Display.

## RESISTANCE MEASUREMENTS

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

## BATTERY FUSE REPLACEMENT

### CAUTION

BEFORE ATTEMPTING BATTERY REMOVAL OR REPLACEMENT, DISCONNECT TEST LEADS FROM ANY ENERGIZED CIRCUITS TO AVOID SHOCK HAZARD.

Fuse rarely need replacement and blow almost always as a result of operator error.

To replace battery & Fuse (0.8A/250V) remove the 2 screws in the bottom of the case. Simply remove the old, and replace with a new battery being careful to observe polarity.

## hFE measurement

1. Insert E, B, C pins of a transistor to the corresponding slot of hFE socket with special attention to its type: NPN or PNP.
2. Read hFE value on Digital Display.

## CALIBRATION PROCEDURE

Recalibration should not be necessary for long intervals. In no event should adjustments be made without highly accurate voltage standards (better than 0.1% accuracy).

Remove the 2 Phillipshead screws. Carefully remove the plastic back cover.

With the instrument operating and set to the 200mV DC range, apply 190mV DC from an accurate source. With a small screwdriver inserted into the semi fixed resistor (SVR1) carefully turn the variable into the reading until the reading reads 190mV.

## SAFETY SYMBOLS

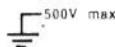


This marking adjacent to another marking or a terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid damage to the equipment and/or to avoid personal injury.

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



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 terminal(s) 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.



### WARNING

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