

## MAINTENANCE

### CAUTION

The Model 245 Multimeter is covered by a one-year warranty and should be referred to the factory for maintenance within the warranty period. Attempts to make any extensive repairs within the warranty period may invalidate the warranty. If repairs are needed after the warranty period, only qualified technicians should attempt to effect such repairs and should use test instruments and standards calibrated within the accuracy and tolerances of the specifications.

Limited maintenance may be performed on the Model 245 DMM in the field: the battery module may be recharged or replaced; the probe-installed protective fuse may be replaced; and ---if suitably accurate test standards and test conditions are available --- then the unit may be recalibrated. If the procedures suggested below are not successful in clearing the difficulty, then refer to the Instruction Manual for further maintenance information.

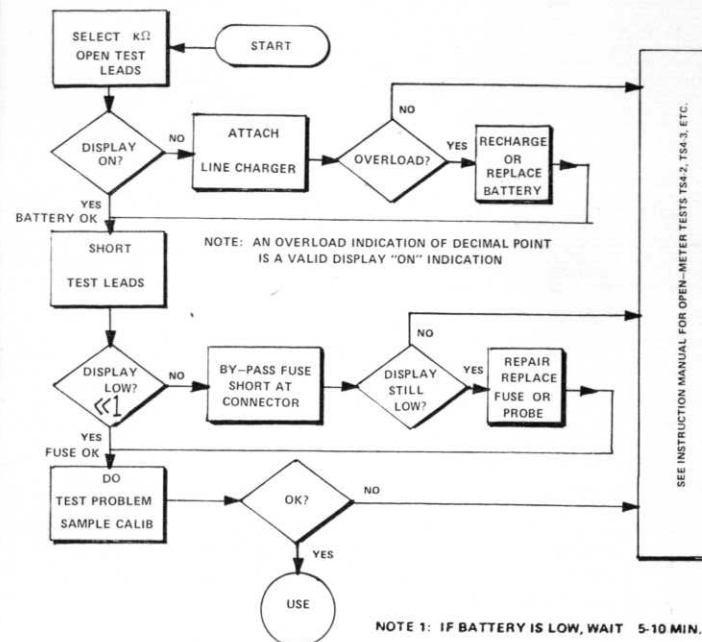
### TROUBLE-SHOOTING PROCEDURE TS4-1

Flow chart TS4-1 defines a step-by-step procedure to be followed with the meter fully assembled. It is intended to isolate the cause of difficulty to either a low battery voltage, or to a burned out fuse. In Procedure TS4-1 below, the first test checks for low battery voltage; the second checks for blown fuse; and the third checks for calibration drifts (after a minimum of 6 months). Refer to the CALIBRATION section for information of the calibration problem test referred to in TS4-1.

### REPLACEMENTS

A spare fuse is furnished in the plastic bag of accessories.  
See the list of accessories for part number of spare battery module.

### TROUBLE-SHOOTING PROCEDURE TS4-1



### ACCESSORIES

Model B40 Accessory Bench Stand . . . . .	\$ 15.00
Additional Battery Module, Model C50P. . . . .	\$ 19.50
Additional Test Leads, Per Pair, Model T4. . . . .	\$ 7.50
Additional Line-Cord/Charger	
(115V) Model L15 . . . . .	\$ 25.00
(230V) Model L30 . . . . .	\$ 25.00
Adapter to charge separate battery module	
Model B24 . . . . .	\$ 15.00
High Voltage Probe, Model V-30 . . . . .	\$ 25.00

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# MINIATURE TRI-PHASIC™ DIGITAL MULTIMETER

## MODEL 245

## OPERATOR'S MANUAL

**DATA PRECISION**  
... years ahead

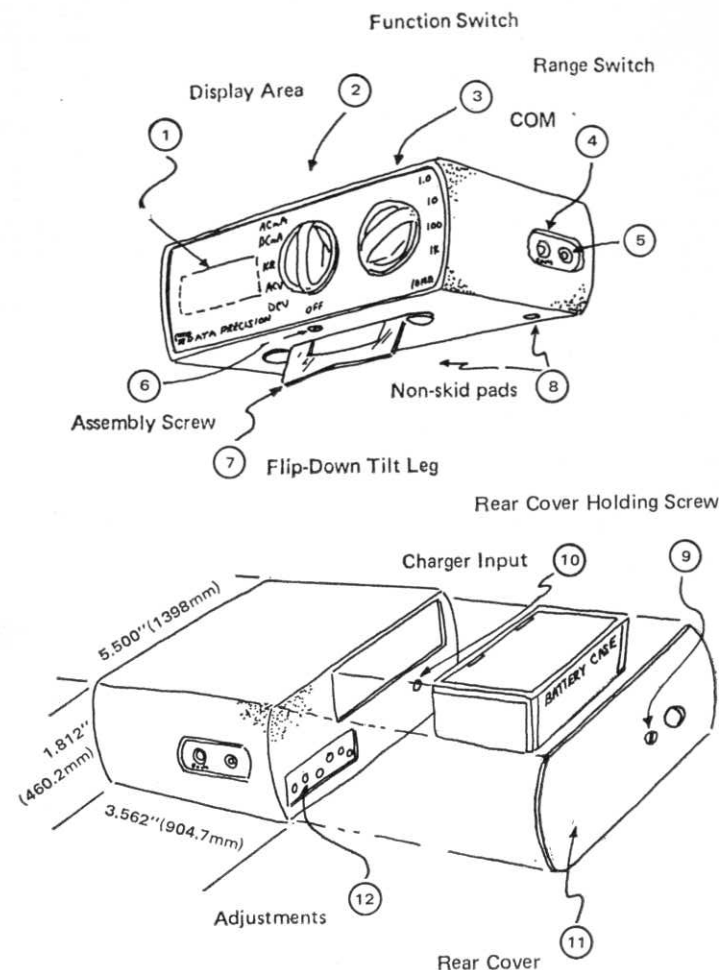


Figure 1. Key Features of Your Model 245 DMM

## OPERATION

1. If AC line power is to be used, connect charger to AC source, and attach cord to Charger Input (Figure 1 - Item 10). Battery power is automatic when the Function MODE switch is operated to select a particular measuring mode.
2. Select appropriate measuring function mode (Figure 1 - Item 2).
3. Select appropriate full scale range (Figure 1 - Item 3).
4. Connect probes (Figure 1 - Items 4 and 5). Make measurement.
5. Read display (Figure 1 - Item 1).
6. If OVERLOAD is displayed (polarity sign and decimal point are lighted, digits are blanked), change to higher range scale.

The maximum in-range value that will be displayed, and the value of the least significant digit count for each range and each measuring function are shown in the table below.

**NOTE** A blue flash in the display is a normal indication.

		FUNCTION SELECT				
		DCV	ACV RMS	DCmA	ACmA	K $\Omega$
RANGE SELECT	1.0	1.9999V 100 $\mu$ V	1.9999V 100 $\mu$ V	1.999mA 1 $\mu$ A	1.999mA 1 $\mu$ A	1.9999K $\Omega$ 100m $\Omega$
	10	19.999V 1mV	19.999V 1mV	19.99mA 1mA	19.99mA 1mA	19.999K $\Omega$ 1 $\Omega$
	100	199.99V 10mV	199.99V 10mV	199.9mA 10mA	199.99mA 10mA	199.99K $\Omega$ 10 $\Omega$
	1K	1000.0V 100mV	500.0V* 100mV	1999.9mA 100mA	1999.9mA 100mA	1999.9K $\Omega$ 100 $\Omega$
	10M $\Omega$	—	—	—	—	19.999M $\Omega$ 1K $\Omega$

\*Up to 10 KHz. Max = 200VAC RMS at 50 KHz.

In each block, the upper number is the maximum value displayed for the range scale selected; the lower number is the value of one count of the least significant (right hand) digit in the display.

## HINTS & KINKS IN OPERATING YOUR MODEL 245 DMM

Keep probe contacts clean and make firm contact with measured points.

Twist probe leads to minimize pickup from environmental electric fields.

On 1.0 scale for K $\Omega$  resistance measurement, short probes at measuring point to obtain value of probe lead resistance. Subtract this quantity (a few counts) representing the probe lead resistance from measurements displayed when using the 1.0 scale in resistance measurements.

Common mode signals may be reduced by operating the Model 245 DMM on its internal battery (automatically accomplished by removing the charger input). Battery operation eliminates common mode signals reactively coupled from the power source, or developed by differences in potential between signal and AC power ground references.

## CALIBRATION

Perform the adjustments in the sequence defined in the table below. Apply test amplitude and frequency as close as possible to those listed. Adjust the designated control adjustment until the display indicates the exact value of the test input applied. If the only test standard available does not provide the full scale values shown in the table, then the closest value to the specified input should be used, and the control adjusted for that display value. It is desirable to use input signals at least 50% of full scale.

MODE	RANGE	TEST INPUT	ADJUST
DCV	1.0	+1.0000 VDC	R10
ACV	1.0	100Hz, 1.0000 V RMS	R4
ACV	1000	20 KHz, 200.00 V RMS	C7
ACV	100	20 KHz, 100.00 V RMS	C3
ACV	10	20 KHz, 10.000 V RMS	C2
ACV	1.0	20 KHz, 1.0000 V RMS	C1

CALIBRATION adjustments (Fig. 1 - Item 12) are accessible behind the plastic cover (Fig 1 - Item 11).