

DWM1

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### 1. GENERAL

1-1 This DIGITAL WATT METER give a direct reading of WATT value on 3 1/2 digits LCD display. Five range and Functions give precision reading to the ACV, ACA, DCV, DCA and WATT. Then to NEW type of performance that make them ideal for many applications including industry, labs, service shop and schools. It can be requiring to accurate current, voltage, and true power measurement.

#### 1-2 FEATURES

- (1) Digital display, easy and correct read-out.
- (2) Reads true power, not apparent power.
- (3) Use with single-phase power source.
- (4) 9-Volt battery operated.
- (5) In build Low battery indicator.
- (6) LCD display provides low power consumption.
- (7) LCD display allow clear read-out even in bright ambient light condition.
- (8) Compact, light-weight, and excellent operativeness.
- (9) It is easy for one hand operation by pushing button.
- (10) Color-coded panel assures easy operation.

## 2. SPECIFICATIONS

### 2-1 GENERAL SPECIFICATIONS

- (1) Display : 0.5" LCD (Liquid Crystal Display) Max. Indication 1999 to -1999.
- (2) Measurement : DCV/ACV, DCA/ACA, WATTS.
- (3) Polarity : Bi-polar by a automatic switching, "-" indicates reverse polarity.
- (4) Zero Adjust : External adjustment for zero of the display is only for watt ranges, this is limited to +30 to -30 digits (ACV/DCV, ACA/DCA: Automatic adjustment).
- (5) Over-input : Indication of "1" or "-1".
- (6) Operating Temp : 0°C to 50°C (32°F to 122°F).
- (7) Operating Humidity : Less than 80% RH.
- (8) Power Supply : 006 DC 9V battery (heavy duty or alkaline battery).
- (9) Power Consumption : About 6 mA.
- (10) Weight : 500g (including battery).
- (11) Standard Accessories:  
 Instruction manual... 1 pcs.  
 Test Lead TL-01.... 1 pair.

### 2-2 ELECTRICAL SPECIFICATIONS

WATT (true power)		
Range	Accuracy	Resolution
2000W	± (1.5%+1d)	1W
6000W	± (1.5%+1d)	10W

\* Remark:  
 Input voltage: 0 to 600V AC (Overload protection 1000V)  
 Input current: 0 to 10 ACA.  
 Frequency characteristic: 45HZ to 65HZ.  
 Accuracy Spec.: Tested on input voltage over 60V ACV (60 HZ).

AC VOLTAGE				
Range	Accuracy	Resolution	Input Impedance	Overload circuit protection
200V	±(0.8%+1d)	0.1V	1M Ω	AC 1000V
750V	±(0.8%+1d)	1V	1M Ω	AC ±1100V

\* Remark:  
 Frequency characteristic: 45 HZ to 65HZ.  
 Converter Response: Average responding, calibrated to display RMS value of sine Wave.



### 3. FRONT PANEL DESCRIPTION

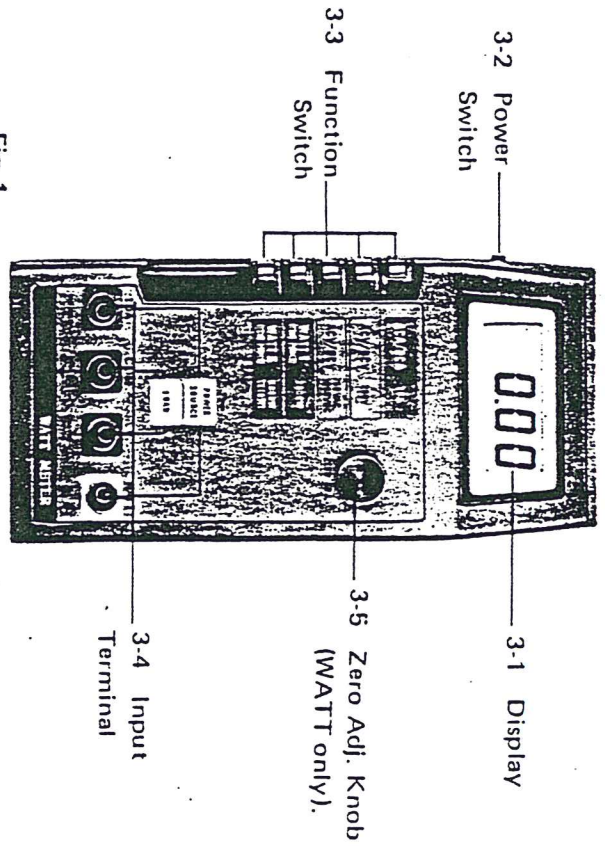


Fig. 1

### 4. PRECAUTIONS AND PREPARATIONS FOR MEASUREMENTS

- (1) Ensure that 9V battery is connected correctly to its snap terminal and placed in the battery compartment.
- (2) Depress the correct Function and range PUSH buttons before marking measurements.
- (3) Place the Test Lead into the proper Input terminal before marking measurements.
- (4) Select the proper measurement range by starting at the highest anticipated value.
- (5) Remove either of the test leads from the circuit under test while changing the measurement range.

AC CURRENT			
Range	Accuracy	Resolution	Voltage drop (IN CASE OF FS)
10A	±(1%+1d)	10mA	200mV AC

\*Remark:  
 Frequency characteristic : 45 HZ to 65 HZ.  
 Converter Response : Average responding  
 Calibrated to display value of sine wave.

DC VOLTAGE			
Range	Accuracy	Resolution	Input Impedance
200V	±(0.8%+1d)	0.1V	1M Ω
1000V	±(0.8%+1d)	1V	1M Ω

DC CURRENT			
Range	Accuracy	Resolution	Voltage drop (IN CASE OF FS)
10A	±(1% + 1d)	10mA	200mV DC

OPTIONAL ACCESSORIES.	
* CARRY CASE, CA-03 : Dimension : 185 x 90 x 60mm (7.3 x 3.5 x 2.4 inch) Weight : 70g (0.15 lb).	
* TEST LEAD, TL-02 : High quality and better performan test lead with silicon rubber wire.	
* Alligator clips AL-03 : Test wire with alligator clip pair.	

- (6) Operate the instrument only in the ambient temperature range of 32°F—122°F (0°C—50°C) and less than 80% Relative humidity.
- (7) Do not exceed the maximum rated voltage and current of each range and input terminal.
- (8) Always switch the power to its "OFF" position when the instrument is not in use. Remove the battery if the instrument is not to be used for a long period of time.

**5. MEASURING PROCEDURE**

**5-1. AC WATT MEASUREMENT**

- (1) Slide power switch to "ON" position.
- (2) Adjust the "WATT Zero Adjust Knob" until the display show "0".
- (3) Determine the highest anticipated WATT (2000W, 6000W) on the function scale and press the corresponding pushbutton.
- (4) Make the wire connection and connect the test leads into terminal as the fig. 2

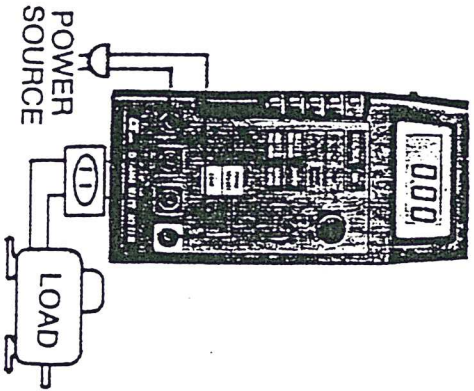


Fig 2

- (5) Connect the LOAD into the "LOAD" terminal
- (6) During make the above AC WATT measurement procedure, if you need to measure the AC voltage or AC current for the load. Please engage Function pushbutton to "ACA" or "ACV".

$$As VxAXCos\theta=WATTS$$

so if wants to measure POWER FACTOR can according the formula:

$$cos\theta (POWER FACTOR)= \frac{WATTS}{Vx A}$$

- (7) When make the "WATT" or "AC/DC current" measurement, as to prevent any external large surge current from network to defect the internal circuit of the instrument. To equip the FUSE (10 Amp) series with the "LOAD" is recommend.

**5-2 DC VOLTAGE, AC VOLTAGE MEASUREMENT.**

- (1) Connect BLACK test lead into "COM" terminal.
- (2) Connect RED test lead into "V" terminal.
- (3) If DC voltage or AC voltage is measured to engage Function pushbutton "ACV/DCV" on the function scale.
- (4) Determine highest anticipated DC voltage (200V, 1000V DC) or AC voltage (200V, 750V AC) on the function scale and press corresponding pushbutton.
- (5) Slide power switch to "ON" position.
- (6) Connect test lead into circuit under test.

**5-3 DC CURRENT, AC CURRENT MEASUREMENT**

- (1) Connect BLACK test lead into "COM" terminal.
- (2) Connect RED test lead into "10A" terminal.



- (3) Engage function pushbutton ACA/DCA on the function scale.
- (4) Slide power switch to "ON" position.
- (5) Series the test lead probes into the circuit under test.

## 6. MAINTENANCE & RECALIBRATING

### 6-1 Battery Replacement

- (1) When the left corner of LCD display show "LO BAT", it is necessary to replace the battery. However in-spec. measurements may still be made for several hours after the "LO BAT" appears before the instrument becomes inaccurate.
- (2) Slide the battery cover (fig. 3), away from the instrument and remove the battery.
- (3) Replace with 9 V battery (006V DC 9V) and reinstall the cover.

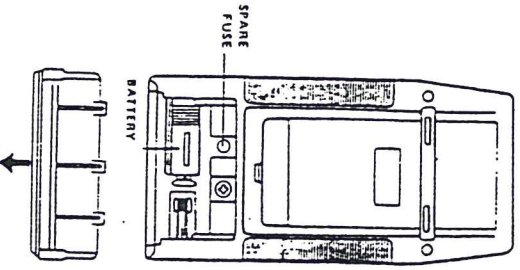


Fig. 3

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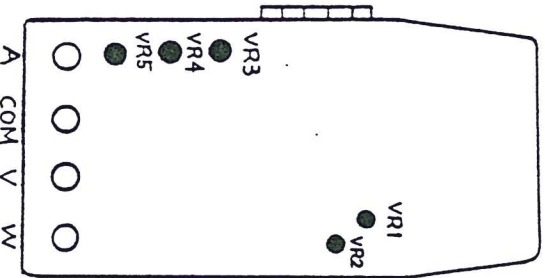


Fig. 4

### 6-2 Recalibrating (ref. fig. 4)

#### A. DC Voltage and AC Voltage.

- (1) Engage the FUNCTION pushbutton "ACV/DCV 200 V" on function scale.
- (2) Adjust the VR3 until the display value equal to "0".
- (3) Connect a standard DC voltage whose value is near full scale (199.9 DCV) and is known within  $\pm 0.5\%$ .
- (4) Calibration adjustment VR 1 is at the right top of main P.C. Board.
- (5) Adjust calibration VR 1 for a display equal to the known above DC voltage.
- (6) Remove the standard DC voltage.
- (7) Connect a standard AC voltage whose value is near full scale (199.9 ACV) and is known within  $\pm 0.5\%$ .
- (8) Calibration adjustment VR 4 is at the left bottom of main P.C. Board.
- (9) Adjust calibration VR 4 for a display equal to the known above AC voltage.

#### B. DC Current and AC Current

- (1) Engage the FUNCTION pushbutton "ACA/DCA 10A" on function scale.
- (2) Connect a standard DC or AC current whose value is near full scale (9.99A) and is known to within  $\pm 0.5\%$  accuracy.
- (3) Calibration adjustment VR 5 is at the left bottom of the main P.C. Board.
- (4) Adjust Calibration VR 5 for a display equal to the known above DC or AC current.
- (5) Remove the standard DC or AC current.

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## C. WATT

- (1) Engage the FUNCTION pushbutton "WATT II 6000W" on function scale.
- (2) Adjust the "WATT ZERO ADJUST KNOB" until the the display show "0".
- (3) Connect a standard power source and add a load, as Fig. 2 whose value is near full scale (600V, 10A) and is known to within  $\pm 0.5\%$  accuracy
- (4) Calibration adjustment VR 2 is at the right top bottom of the main P.C Board.
- (5) Adjust calibration VR 2 for a display equal to the known above WATT.
- (6) Remove the standard power source and and load.