

*1310*

***DIGITAL WATT AMMETER  
OPERATION MANUAL***

# ***1310 DIGITAL WATT AMMETER***

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## **Safety Instruction**

- Before operating this product, please check the voltage requirements and specifications as described in this operation manual.
- Proper grounding refers to the proper connection from the grounding point of the power source to the grounding terminal of this product.

### **Warning**

- Any grounding terminal or earth terminal can generate electrical conductivity that may harm or endanger the user.
- When operating this product, please place it in a well-ventilated environment.
- Do not place this product in an area that is directly exposed to sunlight or under high humidity.
- When you need to clean the outer surface of the product, use a clean and dry cloth.

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## **1. Overview**

Toward Model **1310** Digital Watt-Ammeter was designed as an accurate, low-cost instrument to aid engineering, production test and quality assurance departments in the determination of product power consumption from AC power lines.

### **1.1 Introduction**

The **1310** features dual independent digital displays. One provides a continuous display of the AC line voltage. The other is switch selectable to display true watts (  $\text{Elcos } \Phi$  ) or true rms current.

This instrument provides a fast and convenient method of determining product efficiency, power factor and true rms current while continuously monitoring the AC line voltage. Phase angle relationships may be accurately calculated through utilization of the display digital data.

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## **1.2 Unpacking and Checking**

Your **1310** is packed in polyfoam to protect it during shipment. you should keep this material and the shipping box, in case the unit must be moved or shipped again.

This box should contains the following items:

Model **1310** Digital Watt-Ammeter

Removable AC power cord

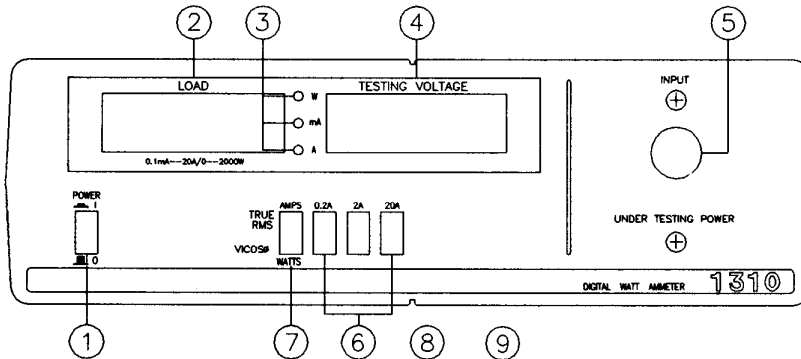
Operation manual

Please check to see that all of the above items are included. You should contact local distributor if anything missing.

## **2. Front and Rear Panels**

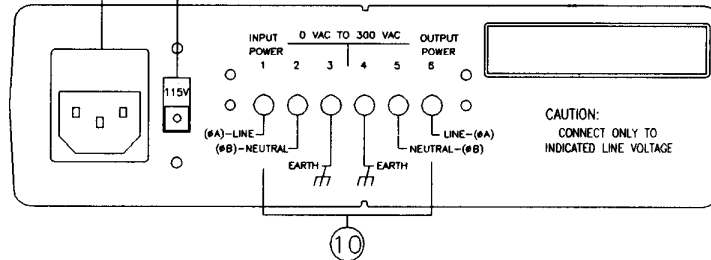
The following is an explanation of the function of each of the front and rear panel controls and connectors. You should refer to Figure 1 and Figure 2 for location of each control/ connector.

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**Figure 1**  
**Front Panel**

**Figure 2**  
**Rear Panel**



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## **1. POWER**

This is the main power switch of Model 1310.

## **2. LOAD Display**

This 3-1/2 digital display indicates either the true watt or true rms current.

## **3. W/ mA/ A Indicator**

3 LEDs indicate which mode of this instrument being used.

## **4. TESTING VOLTAGE Display**

This display shows the voltage which is applied to the UUT (Unit-Under-Test).

## **5. UNDER TESTING POWER**

A 20 ampere circuit breaker acts as a power switch and protector for your UUT.

## **6. 200mA/ 2A/ 20A Range Switch**

Three current ranges can be selected for current measurement.

## **7. AMPS/ WATTS Select Switch**

This switch selects the display mode for LOAD display.

## **8. AC socket with fuse holder**

There are two fuses in fuse holder including spare fuse.

## **9. AC input voltage setting switch**

There are two input voltages 115V and 230V can be selected. Before applying power to your 1310, make sure that this switch is correctly set for your power source.

## **10. INPUT/ OUTPUT POWER**

A six-pins terminal block for connecting the input and output power that are applied for Unit-Under-Test.



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## **3. Operation**

### **3.1 Voltmeter**

The **TESTING VOLTAGE display(04)** shows the AC voltage applying on the **INPUT/ OUTPUT POWER(10)** terminal block at all time with 0.1 volt resolution regardless of the mode of **LOAD display(02)**. The Model **1310** measures the AC voltage from 0 to 299.9 Volt.

### **3.2 Ammeter**

To operate the Model **1310** in the AMPS mode, place the **AMPS/ WATTS select switch(07)** in the AMPS position. The 3-1/2 digit **LOAD display(02)** will indicates the current flowing through the Unit-Under-Test that is connected on the **INPUT/ OUTPUT POWER(10)** terminal block. There are three current ranges, 200mA, 2A, and 20A. Be sure to select a proper range to get an accurate measurement.

### **3.3 Wattmeter**

To operate the Model **1310** in the WATTS mode, the **AMPS/ WATTS select switch(07)** is placed in the WATTS position. The LED indicator adjacent to the WATTS legend will illuminate to indicate the **1310** is operating in the WATTS mode. The **LOAD display(02)** will then indicates the power, in watts, being delivered to the Unit-Under-Test. This is a true **Elcos $\Phi$**  indication irrespective of the voltage or current waveforms. The Model **1310** measures power consumption from 0 to 2000 watts in three

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ranges, 20watt, 200watt, 2000watt, which are selected by the **current range switch(06)** 200mA, 2A, 20A, respectively.

## 3.4 Wiring Diagram

Please refer to Figure 3 to make sure your wiring is correct before turning on the **UNDER TESTING POWER(05)**.

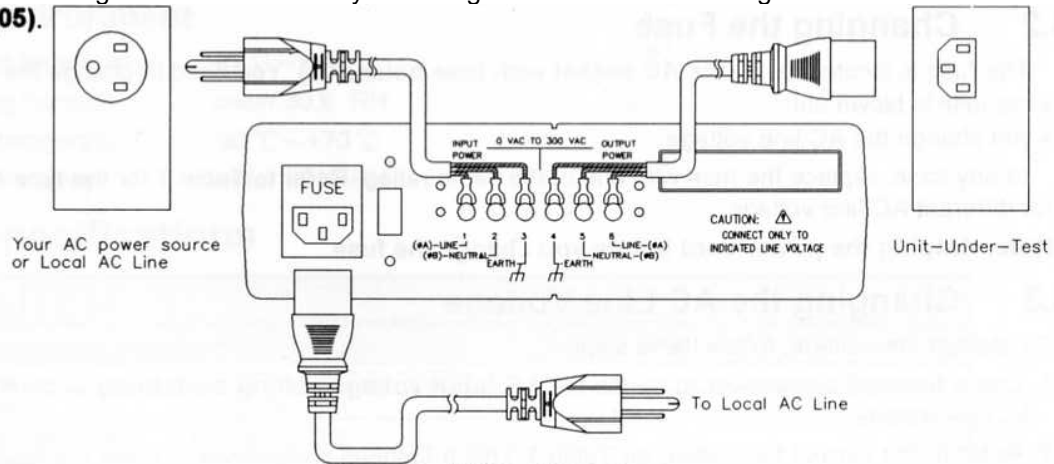


Figure 3 Wiring Diagram

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## **4. Maintenance**

### **4.1 Cleanness**

Please clean outer surface with dry cloth and do not open the case except maintenance staffs.

### **4.2 Changing the Fuse**

The fuse is located inside the **AC socket with fuse holder(08)**, You need to change the fuse when:

- the fuse is blown out.
- you change the AC line voltage.

In any case, replace the fuse with one of the same rating. Refer to Table 1 for the type of fuse used for different AC line voltage.

**Note: Unplug the power cord before you change the fuse.**

### **4.3 Changing the AC Line Voltage**

To change the voltage, follow these steps:

1. Use a flathead screwdriver to switch the **AC input voltage setting switch(09)** to meet the correct AC line voltage
2. Refer to the correct fuse rating on Table 1. Use a flathead screwdriver to open the fuse holder and change fuse.

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Model	Fuse type: Slow Blow 5x20mm	
	115V	230V
1310	T125mA/250V	T80mA/250V

Table 1 Fuse Specification

## 4.4 Environment

- Operating temperature : +5°C ~ +40°C  
Operating humidity : under 80% RH  
Storage temperature : -20°C ~ +70°C  
Storage humidity : under 80% RH

## 5. Specifications

ITEM	1310
<b>WATT MEASUREMENT</b>	
<b>Range</b>	19.99W, 199.9W, 1999W
<b>Accuracy</b>	±(0.3% + 3d)
<b>FREQ. Response</b>	40Hz ~ 200Hz
<b>MAX. Voltage</b>	299.9V
<b>MAX. Current</b>	200mA for 19.99W, 2A for 199.9W, 20A for 1999W

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<b>Power Factor</b>	0~1, Leading or Lagging
<b>Shunt Resistance</b>	0.01 $\Omega$
<b>AC VOLTAGE MEASUREMENT</b>	
<b>Range</b>	0~299.9V
<b>Accuracy</b>	$\pm(0.25\% + 2d)$
<b>FREQ. Response</b>	40Hz~4KHz for 0~19V, 40Hz~10KHz for 19~299.9V
<b>Protection</b>	700V
<b>Impedance</b>	1000K $\Omega$
<b>AC CURRENT MEASUREMENT</b>	
<b>Range</b>	199.9mA, 1.999A, 19.99A
<b>Accuracy</b>	$\pm(0.3\% \pm 2d)$
<b>FREQ. Response</b>	40Hz~200Hz for 199.9mA, 40Hz~1KHz for 1.999~19.99A
<b>Shunt Resistance</b>	0.01 $\Omega$
<b>Crest Factor</b>	MIN 60:1, Linear Decreasing to 3:1
<b>GENERAL</b>	
<b>MIN. Input</b>	10% of Range for All True RMS Converters
<b>Power Source</b>	ACV 115V/ 230V, $\pm 10\%$ , 60Hz/ 50Hz
<b>Machine (mm)</b>	262(W)x85(H)x260(D)
<b>Package(mm)</b>	387(W)x192(H)x347(D)
<b>Gross Weight</b>	2.35Kg
<b>Net Weight</b>	1.5Kg

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