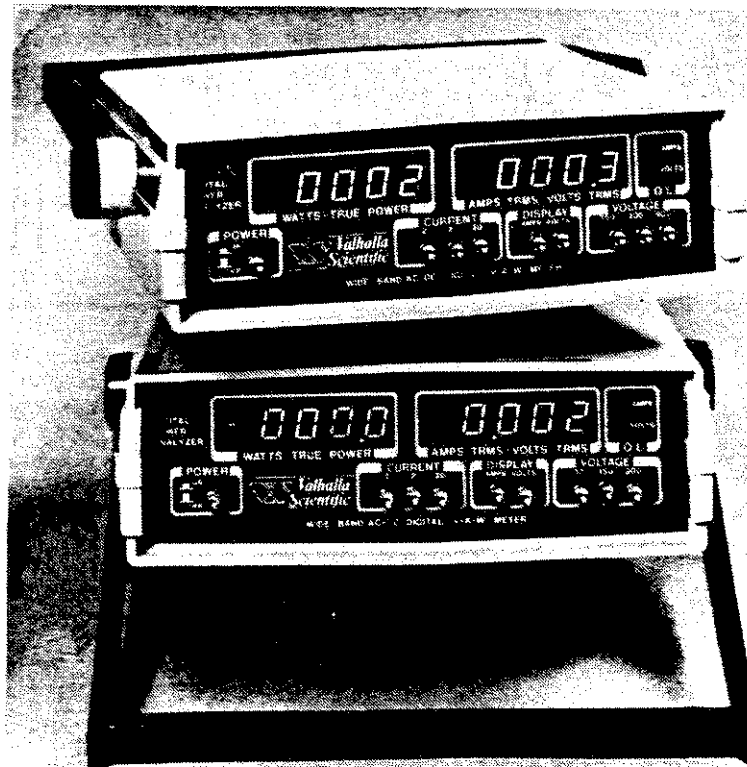


Valhalla Scientific, Inc.

2100/2101
Digital Power Analyzer
Operation and Maintenance
Manual



 VALHALLA
SCIENTIFIC

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Revised: 03/25/88

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SPECIFICATIONS (Cont'd)

DISPLAYS:	Large, high intensity LED's.
MINIMUM INPUT:	5% of range for all true RMS responding converters.
OPERATING TEMPERATURE RANGE:	0°C to 50°C.
TEMPERATURE COEFFICIENT:	± 0.025% of range per °C from 0°C to 20°C and 30°C to 50°C.
CONVERSION RATE:	One conversion in approximately 300 milliseconds.
LOAD CONNECTION:	Four-terminal, heavy duty input jacks.
POWER REQUIRED:	115/230 VAC ± 10%, 50-60 Hz, 5 watts.
SIZE:	23.5 cm L x 21.6 cm W x 6.4 cm H (9.25" x 8.25" x 2.5").
WEIGHT:	2.3 kg (5 lbs) NET, 4.5 kg (10 lbs) shipping.

Specifications subject to change without notice.

SECTION I — GENERAL INFORMATION

1-1 DESCRIPTION

1-2 Valhalla Scientific Models 2100 and 2101 Digital Wattmeters are accurate, low-cost instruments to aid engineering, production test and quality assurance departments in the determination of product power consumption from DC and AC power lines. The instruments feature dual, independent digital displays. One display provides a continuous indication of True Power in Watts. The other display is switch selectable between Amperes (True RMS) and Volts (True RMS).

1-3 The Model 2100 and Model 2101 provide a fast and convenient method of determining product efficiency, power factor and true RMS current. Phase angle relationships may be calculated through utilization of the displayed digital data.

1-4 The Digital Wattmeters use a unique four-quadrant complex waveform analog multiplier to derive a DC signal equivalent to the integrated product of the instantaneous value of line voltage and current. The resultant wattage value is converted for presentation on a 4-1/2 digit display. Power ranging provides maximum resolution from 10 milliwatts to 12000 watts on the Model 2100 and from 1 milliwatt to 6000 watts on the Model 2101. True RMS current from 100 microamperes (max resolution) through 19.99 amperes with a crest factor of 2.5:1 may be monitored by selecting the current display with the front panel switch. True RMS voltage from 7.5 volts to 600 volts may be monitored on the Model 2100 by selecting the

voltage display. On the 2101, the range is from 1.5 volts to 300 volts. Four binding posts on the rear panel provide convenient means of making the measured line and load connections.

1-5 The Digital Wattmeters are designed to operate from selectable 115/230V AC power. The loads may be operated from power sources up to 600 volts on the Model 2100 and up to 300 volts on the Model 2101. These sources may be independent of instrument power and may be DC, or AC from 40 Hz to 20 KHz. Peak voltage limitation is 1500 volts for the Model 2100 and 750 volts for the Model 2101. There are three selectable current display ranges identified on the front panel as .2, 2 and 20 amperes. DC current may be displayed up to 0.5000, 5.000 and 20.00 amperes. AC sinewave current may be displayed up to 0.3500, 3.500 and 20.00 amperes. Voltage display ranges are also selectable in three steps; 150.00, 300.0 and 600.0 on the Model 2100 and 30.00, 150.00 and 600.0 on the Model 2101

1-6 ACCESSORIES

1-7 The Digital Wattmeters are shipped from the factory with a detachable power cord and an instruction manual.

1-8 RACK MOUNT- OPTION 'R'

1-9 The Model 2100 or Model 2101 may be purchased with an Option 'R' rack mount adapter for use in rack mount applications.

SECTION II — INSTALLATION

2-1 INTRODUCTION

2-2 This section of the manual contains information for receiving inspection and installation of the Model 2100 and Model 2101 Digital Wattmeters.

2-3 INITIAL INSPECTION

2-4 If the external shipping container shows evidence of in-transit damage, such damage should be immediately brought to the attention of the carrier and such damage noted on the bill of lading.

2-5 Unpack the instrument and retain the shipping container until the instrument has been inspected for possible damage in shipment. If in-shipment damage is observed, notify the carrier and obtain his authorization for repairs before returning the instrument to the factory. Where the external shipping container has shown evidence of damage in transit, but the instrument shows no external damage, it may be advisable to check the performance of the unit using the adjustment procedure of Section V as a guide to determine that the instrument has not incurred hidden damage.

2-6 POWER REQUIREMENTS

2-7 The instrument is shipped from the factory for operation from 115 or 230 volts AC 50/60 Hz. The internal operating input voltage range is selectable with a rear panel switch. When 115V is selected, the unit will operate at line voltages of 103 to 130 volts. When 230V is selected, the unit will operate at line voltages of 206 to 260 volts.

2-8 INSTALLATION

2-9 If the Model 2100 or Model 2101 is to be used in the bench top configuration, installation requires only that the line cord be connected to the wall receptacle and its other end inserted in the rear panel connector. A rear panel mounted fuse provides protection for the internal circuits.

2-10 If the unit is to be installed in a rack, assemble the Wattmeter into the rack mount adapter using the instructions included with the option. Then it is only necessary to locate the unit in the rack, install the screws that attach it and make the power source and load connections. The unit should be operated only in areas where the ambient temperature does not exceed 50°C. If the internal temperature of the rack mount, in which the unit is installed, will exceed this temperature limit, forced air cooling should be employed to maintain the ambient air at or below the 50°C limit.

SECTION III — OPERATION

3-1 INTRODUCTION

3-2 This section of the manual contains complete operating instructions for the Model 2100 and Model 2101 Digital Wattmeters.

3-3 FRONT PANEL CONTROLS AND INDICATORS

3-4 There are nine push-button controls on the front panel. Their functions are detailed in the following paragraphs.

3-5 POWER PUSH BUTTON

3-6 Power is applied to the unit by pressing the POWER push button. Application of power is indicated by lighting of the power and voltage/current digital displays. The first depression locks the push button in its ON position and applies power to the unit. When it is depressed a second time, it returns to its outer position and disconnects power from the unit.

3-7 AMPS/VOLTS DISPLAY SELECTORS

3-8 Display of amperes or volts on the righthand display is selected by depressing either the AMPS or VOLTS push button. The button remains in its depressed position until released by depressing the other button.

3-9 CURRENT RANGE SELECTORS

3-10 There are three current range selections that are made with the CURRENT push buttons. The push buttons are labeled .2, 2 and 20. The maximum current reading that may be displayed in each range is approximately .3500, 3.500 and 20.00, respectively. The selected push button remains locked in its depressed position until released by depressing another button in the CURRENT group.

3-11 VOLTAGE RANGE SELECTORS

3-12 There are three voltage range selections that are made with the VOLTAGE push buttons. The push buttons on the Model 2100 are labeled 150, 300 and 600. Those of the Model 2101 are labeled 30, 150 and 300. The maximum voltage that

may be displayed in each range of the Model 2100 is 199.99, approximately 500.0 and 600.0, respectively. On the Model 2101 the voltages are approximately 50.00, 199.99 and 300.0. The selected push button remains locked in its depressed position until released by depressing another button in the VOLTAGE group.

3-13 PEAK- AMP OVERLOAD INDICATOR

3-14 If the peak or steady-state current to the measured load is greater than 250% of the range selected with the CURRENT push button, the PEAK AMP O/L indicator will be illuminated. Selecting the proper range or reducing the current to the load will extinguish the indicator. Do not rely on current or power indications if the indicator is illuminated.

3-15 PEAK- VOLT OVERLOAD INDICATOR

3-16 If the peak or steady-state voltage applied to the rear panel connectors is greater than 250% of the range selected with the VOLTAGE push button, the PEAK VOLT O/L indicator will be illuminated. Selecting the proper range or reducing the voltage will extinguish the LED. Do not rely on voltage and power indications if the indicator is illuminated.

3-17 VOLTS/AMPS DISPLAY

3-18 When VOLTS is selected, the righthand digital display will show the voltage applied to the rear panel connectors. Resolution is 0.01 volts when the 30 volt range (Model 2101 only) or 150 volt range is selected and the 0.1 volt resolution when the 300 volt range or 600 volt range (Model 2100 only) is selected. When AMPS is selected, the current supplied to the load will be displayed with resolution of 0.0001 ampere when the .2 ampere range is selected, 0.001 ampere when the 2 ampere range is selected and 0.01 ampere when the 20 ampere range is selected. The display will blink if the voltage or current is greater than that required for a display of 19999 (decimal omitted).

3-19 WATTMETER

3-20 The power dissipated in the load is indicated on the lefthand display. To obtain a valid

