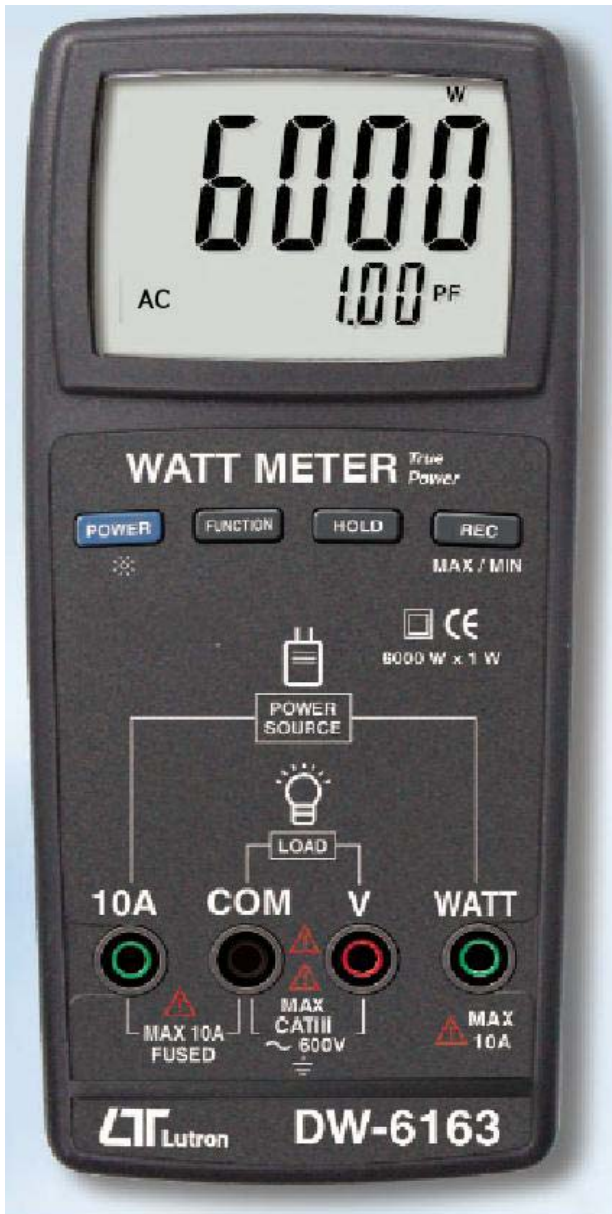


6000 W x 1 W, PF, ACV, ACA

WATT METER

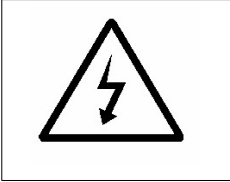
Model : DW-6163



Your purchase of this WATT METER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

Caution Symbol



Caution :

- * Risk of electric shock !



Caution :

- * Do not apply the overload voltage, current to the input terminal !
- * Remove test leads before open the battery cover !
- * Cleaning - Only use the dry cloth to clean the plastic case !

Environment Conditions

- * *Installation Categories III-600V.*
- * *Pollution Degree 2.*
- * *Altitude up to 2000 meters.*
- * *Indoor use.*
- * *Relative humidity 80% max.*

TABLE OF CONTENTS

1. FEATURES.....	1
2. SPECIFICATIONS.....	1
2-1 General specifications.....	1
2-2 Electrical specifications.....	2
3. FRONT PANEL DESCRIPTION.....	4
3-1 Display.....	4
3-2 POWER/Backlight button.....	4
3-3 FUNCTION button.....	4
3-4 HOLD button.....	4
3-5 RECORD button (MAX. / MIN.).....	4
3-6 LOAD terminal.....	4
3-7 POWER SOURCE terminal.....	4
3-8 RS-232 output terminal.....	4
3-9 DC 9V Power Adapter input socket.....	4
3-10 Battery Cover / Compartment.....	4
3-11 Stand.....	4
4. MEASUREING PROCEDURES.....	5
4-1 Power ON/OFF.....	5
4-2 ACV measurement procedure.....	5
4-3 ACA measurement procedure.....	5
4-4 Watt measurement procedure.....	6
4-5 Data Hold.....	6
4-6 Data Record (Max., Min. reading).....	6
4-7 Backlight ON/OFF.....	7
4-8 Auto power management.....	7
5. MAINTENANCE.....	8
6. RS232 PC SERIAL INTERFACE.....	8
7. BATTERY REPLACEMENT.....	10
8.THE ADDRESS OF AFTER SERVICE CENTER.....	10

1. FEATURES

- * Professional precision WATT meter with 1 W resolution digital display , battery operated.
- * LSI - circuit provides high reliability and durability.
- * Directly operation.
- * Measurement :
 WATT (AC) : 6000W x 1W.
 ACV : 600V x 0.1 V .
 ACA : 10 A x 10 m A .
 PF : 1.00 x 0.01
- * True Power and Wide range 0 W to 6000 Watt.
- * True RMS measurement of ACV / ACA.
- * Super large LCD , Dual display at same time.
- * Full function Auto range.
- * Memory Record (Max. , Min.) , Data Hold.
- * RS232 / USB Computer interface.
- * Built-in low battery indicator.
- * Built - in backlight easy to readout.
- * Power : DC 9V (006P) or AC to DC 9V adapter in.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.	
Display	Large LCD display max. reading 9999. Digit size : 21.8 x 8.5 mm. Dual value display with backlight	
Measurement Unit	ACV	0 to 600.0 V
	ACA	0.01 to 10.00 A
	WATT	0 to 6000 W
	PF	0.01 to 1.00
Over input	" ---- " mark indication .	
Zero	Automatic adjustment	
Sampling Time	Approx. 1 second .	

Data Hold	Freeze the display reading .
Memory Recall	Maximum & Minimum value .
Data output	RS232 / USB PC Computer interface. * Connect the optional RS232 cable UPCB - 02 will get the RS232 plug. * Connect the optional USB cable USB - 01 will get the USB plug.
Operation Temperature	0°C to 50°C (32°F to 122°F).
Operation Humidity	Less than 80% RH
Power Supply	Alkaline or Heavy duty type DC 9V battery 006P , MN1604 (PP3) or equivalent.
Power Consumption	Approx. DC 10 mA
Weight	398 g/0.88 LB
Dimension	190 x 88 x 40 mm (7.5 x 3.5 x 1.6 inch).
Accessories Included	Instruction manual..... 1 PC Test lead (Red & Black)..... 1 Pair
Optional Accessories	AC TO DC 9V adapter USB cable , USB - 01 RS232 cable , UPCB - 02 Data Acquisition software, SW-U801-WIN Excel Data Acquisition software, SW-E802

2-2 Electrical Specifications (23± 5 °C)

WATT (TRUE POWER)

<i>Range</i>	<i>Resolution</i>	<i>Accuracy</i>
6000 W	1 W	± (1%+ 5 W)
<p>* Auto range. * Measuring Signal come from the front LOAD plug terminals. * Accuracy is test under input signal is sine wave , 50 / 60 Hz. * ACV ACA frequency response is from 40 to 400 Hz. * Max. input value, AC voltage : 600V, AC current : 10 A. * Accuracy @ 23°C ± 5°C.</p>		

V/A (TRUE RMS)

<i>Range</i>	<i>Resolution</i>	<i>Accuracy</i>
ACV 600 V	0.1 V	$\pm (0.3 \% + 0.3 V)$
ACA 10 A	0.01 A	$\pm (0.3 \% + 0.03 A)$

* Auto range.
* ACV, ACA accuracy is test under input signal is sine wave, 50/ 60 Hz.
* ACV ACA frequency response is from 40 to 400 Hz.
* Max. input value, AC voltage : 600V, AC current : 10 A.
* Accuracy @ 23°C \pm 5°C

PF (Power factor)

<i>Range</i>	<i>Resolution</i>	<i>Accuracy</i>
1.00	0.01	$\pm (1 \% + 2d)$

* ACV, ACA accuracy is test under input signal is sine wave, 50/ 60 Hz
* ACV ACA frequency response is from 40 to 400 Hz.
* Max. input value, AC voltage : 600V, AC current : 10 A.
* Accuracy @ 23°C \pm 5°C

@ Above specification tests under the environment RF Field Strength less than 3 V/M & frequency less than 30 MHz only.

3. FRONT PANEL DESCRIPTION

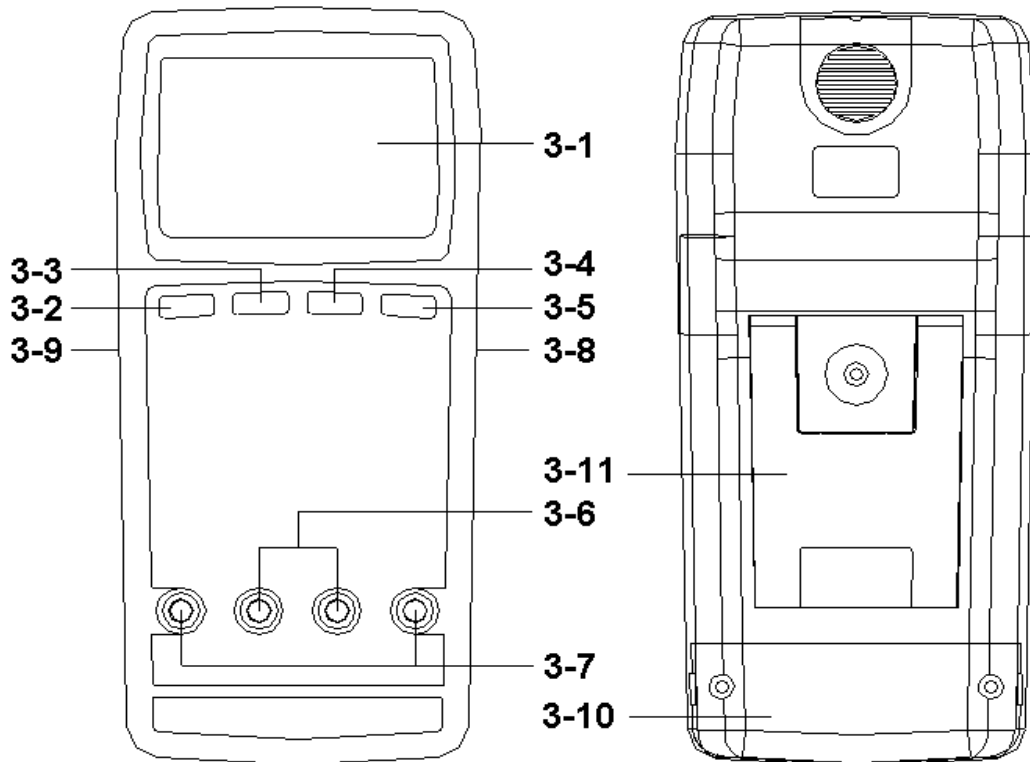


Fig. 1

- 3-1 Display
- 3-2 POWER / Backlight button
- 3-3 FUNCTION button
- 3-4 HOLD button
- 3-5 RECORD button (MAX. / MIN.)
- 3-6 LOAD terminal
- 3-7 POWER SOURCE terminal
- 3-8 RS-232 output terminal
- 3-9 DC 9V Power Adapter input socket
- 3-10 Battery Cover / Compartment
- 3-11 STAND

4. MEASURING PROCEDURE

4-1 Power ON/OFF

- 1) Press the POWER button (3-2, Fig. 1) more than 1.5 sec to Turn ON the meter.
- 2) Press the POWER button (3-2, Fig. 1) more than 1.5 sec to Turn OFF the meter.

4-2 ACV measurement procedure

- 1) Press the POWER button (3-2, Fig.1) more than 1.5 sec to Turn ON the meter.
- 2) Push the FUNCTION button (3-3, Fig. 1) once then change function for measuring ACV.
- 3) Connect Red test lead to the " V " input terminal and Black test lead to " COM " input terminal .
- 4) Then use the test lead measurement unknown AC voltage.
- 5) Read the up display . The value indicated corresponds to the position selected. If the Display shows " ---- " it indicates an Out-of-range measurement.

4-3 ACA measurement procedure

- 1) Press the POWER button (3-2, Fig.1) more than 1.5 sec to Turn ON the meter.
- 2) Push the FUNCTION button (3-3, Fig. 1) once then change function for measuring ACA
- 3) Connect red test lead to the " 10 A " input terminal and black test lead to "COM" input terminal .
- 4) Then use the test lead measurement unknown AC current.
- 5) Read the down display . The value indicated corresponds to the position selected. If the display shows "---- " it indicates an Out-of-range measurement.

4-4 Watt measurement procedure

- 1) Press the POWER button (3-2, Fig. 1) more than 1.5 sec to Turn ON the meter.
- 2) Make sure your equipment work voltage, such as 110 V or 220 V.
- 3) Turn off the POWER SOURCE.
- 4) Plug in the LOAD (equipment) to V terminal and COM terminal.
- 5) Plug in the power source to WATT terminal and 10A terminal.
- 6) Push the FUNCTION (3-3, Fig. 1) button once then change function for measuring ACV / ACA
- 7) Turn on the POWER SOURCE, then you can read out the WORK VOLTAGE from the top of the LCD display value.
- 8) Turn on the equipment power switch. Let it work, then you can read out the POWER CONSUMPTION from the bottom of the LCD display value
- 9) At the same time. Push the FUNCTION button (3-3, Fig. 1) once then change function for measuring WATT / PF
- 10) Now you can take the Active Power value and Power Factor value from the LCD display .

4-5 Data Hold

During the measurement, press the " Hold Button " (3-4, Fig. 1) once will hold the measured value & the LCD will display a " HOLD " symbol.

Press the " Hold Button " once again will release the data hold function.

4-6 Data Record (Max., Min. reading)

- 1) The data record function records the maximum and minimum readings. Press the " REC Button " (3-5, Fig. 1) once to start the Data Record function and there will be a " REC. " symbol on the display.

- 2) With the " REC. " symbol on the display :
- a) Press the " REC Button " (3-5, Fig. 1) once, the " REC. MAX. " symbol along with the maximum value will appear on the display.
If intend to delete the maximum value, just press the " Hold Button " (3-4, Fig. 1) once, then the display will show the " REC. " symbol only & execute the memory function continuously.
 - b) Press the " REC Button " (3-5, Fig. 1) again, the " REC. MIN. " symbol along with the minimum value will appear on the display.
If intend to delete the minimum value, just press the " Hold Button " (3-4, Fig. 1) once, then the display will show the " REC. " symbol only & execute the memory function continuously.
 - c) To exit the memory record function, just press the " REC " button for 2 seconds at least. The display will revert to the current reading.

4-7 Backlight ON/OFF

- 1) When use the instrument in a dark place or under the SUN .
You can turn ON the Backlight for easy readout.
- 2) If the instrument is working. Press the POWER button (3-2, Fig. 1) once, can turn ON the Backlight.
- 3) Press the button again will turn OFF the Backlight .

4-8 Auto power management

- 1) The instrument has built-in "Auto Power Shut-off" in order to prolong battery life. The meter will switch off automatically if none of the buttons are pressed within 10 min.
- 2) To de-activate this feature, Select the memory record function during measurement, by pressing the " Record button " (3-5, Fig. 1).

5. MAINTENANCE

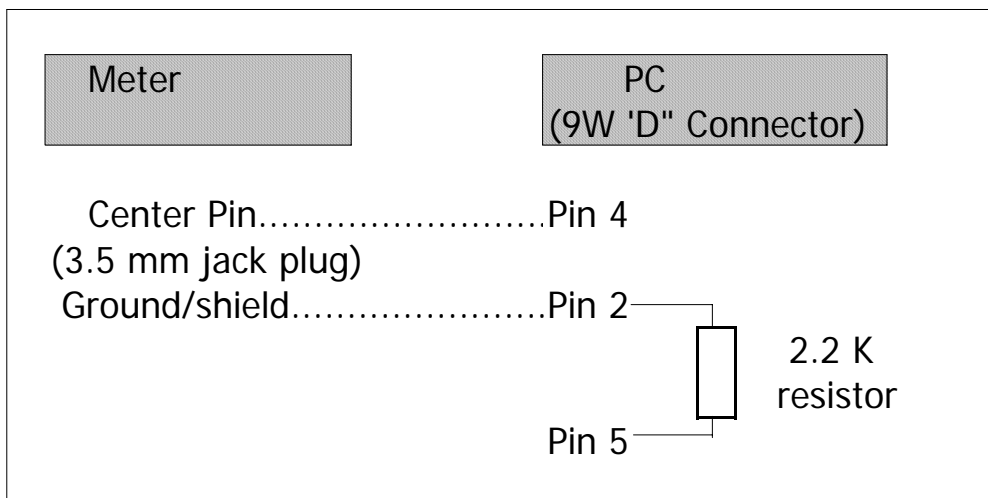
- 1) This WATT METER is intended for measuring the TRUE RMS POWER CONSUMPTION. At the same , It can let you know .how many effect from your equipment.
- 2) When measuring POWER CONSUMPTION. Equipment working voltage must be recheck again, before turn on the equipment power switch.
- 3) Instruments used in dusty environments should be stripped and cleaned periodically.
- 4) Do not leave the instrument exposed to direct heat from the sun for long periods.
- 5) Before removing the battery compartment cover, ensure that the instrument is disconnect from any circuit and the power switch is on the OFF position.

6. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-8, Fig. 1).

The data output is a 16 digit stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial port.



The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0


Each digit indicates the following status :

D0	End Word
D1 & D8	Display reading, D1 = LSD, D8 = MSD For example : If the display reading is 1234, then D8 to D1 is : 00001234
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP
D10	Polarity 0 = Positive 1 = Negative
D11 & D12	Annunciator for Display ACV = 50 W = 47 A = 52 PF = 54
D13	When send the upper display data = 1 When send the lower display data = 2
D14	4
D15	Start Word

RS232 FORMAT : 9600, N, 8, 1

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

7. BATTERY REPLACEMENT

- 1) When the Top of left corner on LCD display show "  , it is necessary to replace the battery , However in -spec. measurement may still be made for several hours after LOW BATTERY INDICATOR appears before the instrument become inaccurate.
- 2) Open the screw of " Battery Cover " by screwdriver, then move the battery.
- 3) Replace with 9V battery and reinstate the cover.

8. THE ADDRESS OF AFTER CENTER

