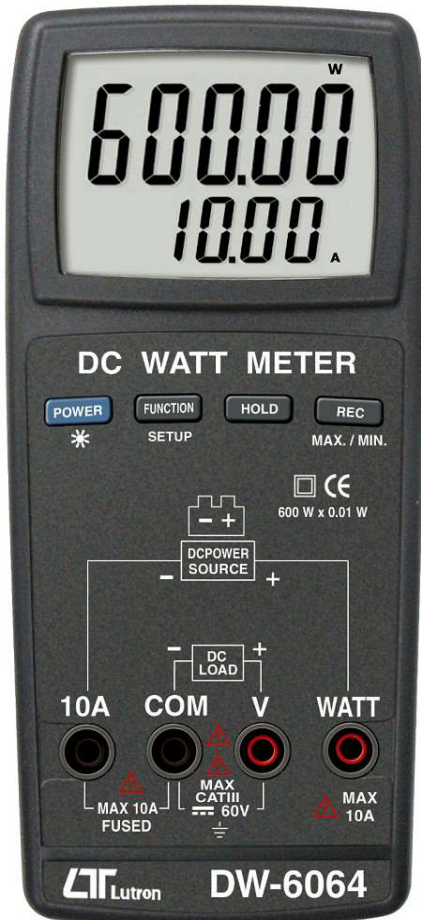


fast data logger with 50 mS sampling time

DC WATT METER

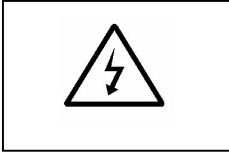
Model : DW-6064



Your purchase of this DC 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-60V.***
- * ***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.....	3
3. FRONT PANEL DESCRIPTION.....	4
3-1 Display.....	4
3-2 POWER/Backlight button.....	4
3-3 FUNCTION/SETUP 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. MEASURING PROCEDURES.....	5
4-1 Power ON / OFF.....	5
4-2 DCV measurement procedure.....	5
4-3 DCA measurement procedure.....	5
4-4 DC WATT measurement procedure.....	5
4-5 Fast data logger measurement procedure.....	6
4-6 Data Hold.....	7
4-7 Data Record (Max. , Min. reading).....	7
4-8 LCD Backlight ON/OFF.....	8
5. ADVANCED SETTING.....	8
5-1 Auto Power Off Default Setting.....	8
5-2 Set beeper sound ON / OFF.....	9
6. MAINTENANCE.....	10
7. RS232 PC SERIAL INTERFACE.....	10
8. BATTERY REPLACEMENT.....	12
9. THE ADDRESS OF AFTER SERVICE CENTER.....	12

1. FEATURES

- * Professional precision DC WATT meter with 0.001W resolution special digital display , battery operated .
- * LSI - circuit provides high reliability and durability .
- * Directly operation.
- * DCV input impedance : 10M Ω .
- * Measurement
WATT (DC) : 600 W x 0.01 W/60.000 W x 0.001 W .
DCV : 60V x 0.01 V .
DCA : 10 A x 10 m A/2 A x 1 m A.
- * Low Watt measurement , 60.000 W x 0.001W .
- * Fast data logger with 50mS sampling time.
- * Data hold , Record (Max. , Min.) .
- * Super large LCD , Dual display at same time .
- * Full function Auto range .
- * 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 input.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.	
Display	Large LCD display max. reading 60000. Digit size : 21.8 x 8.5 mm. Dual value display with backlight	
Measurement Unit	DCV	0.02 V - 60.00 V
	DCA	1 mA to 10.00 A.
	WATT	0.002 W to 600 W

Over input	" ---- " mark indication .
Zero	Automatic adjustment
Display Sampling Time	Approx. 0.5 second.
Data Hold	Freeze the display reading .
Memory Recall	Maximum & Minimum value . * <i>Just for DC Watt and DC Ampere function only.</i>
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.
	* DC 9V adapter (adapter is optional).
Power Consumption	Approx. DC 8.5 mA * <i>If the LCD backlight on, the power consumption will increase approx. 2 mA.</i>
Weight	364 g / 0.80 LB * <i>Meter only.</i>
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 Data transfer software, DL-2005 Excel data transfer software, SW-E2005

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

DC WATT

Range	Resolution	Accuracy
600 W	0.01 W	± (0.6% reading+ 10d)
60 W	0.001 W	
* Auto range. * Measuring signal come from the front LOAD plug terminals. * Max. input value, DC voltage : 60V, DC current : 10 A. * Accuracy @ 23°C ±5°C.		

V/A

Range	Resolution	Accuracy
DCV 60 V	0.01 V	±(0.3 % reading+ 5d)
DCA 2 A	0.001 A	
DCA 10 A	0.01 A	
* Auto range. * Max. input value : DC voltage : 60V , DC current : 10 A . * Accuracy @ 23°C ±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

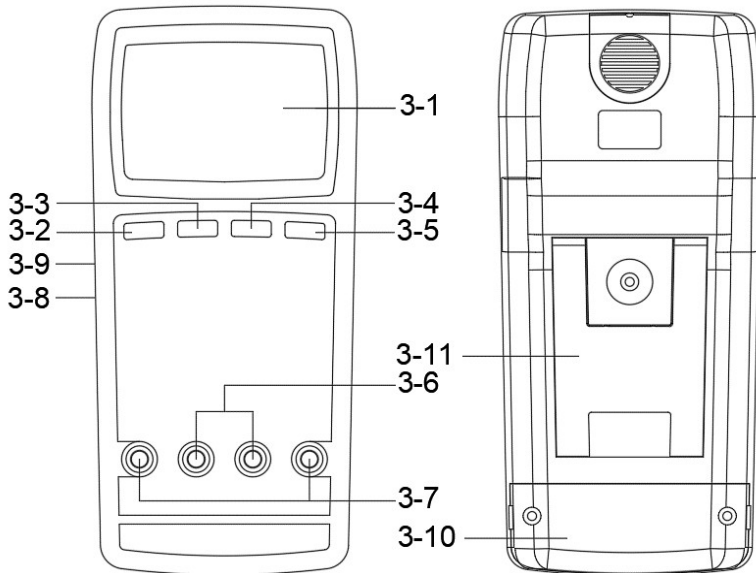


Fig. 1

- 3-1 Display
- 3-2 POWER / Backlight button
- 3-3 FUNCTION / SETUP 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 seconds to Turn ON the meter.
- 2) Press the " POWER button " (3-2, Fig. 1) more than 1.5 seconds to Turn OFF the meter.

4-2 DCV measurement procedure

- 1) Press the " POWER button " (3-2, Fig.1) more than 1.5 seconds to Turn ON the meter.
- 2) Connect Red test lead to the " V " input terminal and Black test lead to " COM " input terminal .
- 3) Then use the test lead measurement unknown DC voltage.
- 4) Read the value from top display. The value indicated corresponds to the position selected. If the LCD show " ---- ", it indicates an Out-of-range measurement.
- 5) If the LCD show in " dcv Error " , and the beeper is continuously turn on, please change voltage polarity .

4-3 DCA measurement procedure

- 1) Press the " POWER button " (3-2 , Fig.1) more than 1.5 seconds to Turn ON the meter.
- 2) Connect red test lead to the " COM " input terminal and black test lead to " 10A " input terminal .
- 3) Then use the test lead measurement unknown DC current.
- 4) Read the value from bottom display . The value indicated corresponds to the position selected. If the display shows " ---- " it indicates an Out-of-range measurement.

4-4 DC WATT measurement procedure

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

- 3) Plug in the DC POWER SOURCE to " WATT " terminal and " 10A " terminal (3-7 , Fig.1).
Turn ON the DC POWER SOURCE.
- 4) Read the value from top display. The value indicated what voltage to test.
Then turn OFF the DC POWER SOURCE.
- 5) Make sure your unknown elements or equipment working voltage and voltage polarity .
- 6) Press the " FUNCTION button " (3-3 , Fig.1) once then change function for measuring DC WATT.
- 7) Plug in the LOAD (element or equipment) to " V " terminal and " COM " terminal (3-6 , Fig.1).
- 8) Turn ON the DC POWER SOURCE. (Turn ON the equipment power switch, let it work.)
- 9) Then you can read out the POWER value from the top of the LCD display .
- 10) Then you can read out the CURRENT CONSUMPTION from the bottom of the LCD display .
- 11) At the same time push the " FUNCTION button " (3-3 , Fig.1) once then change function for measuring DCV/ DCA.

4-5 Fast data logger measurement procedure

- 1) Press the " POWER button " (3-2 , Fig.1) more than 1.5 seconds to Turn ON the meter.
- 2) Press the " FUNCTION button " (3-3 , Fig.1) and " HOLD button " (3-4 , Fig.1) at the same time more than 3 seconds, will into Fast data logger mode and LCD will show in " FAST " at the top of display, on the bottom side of LCD will show in " DATALOGGER " .
- 3) On the bottom side will show in " 2.000 A ", means maximum work current are 2 A, you can press " HOLD button " (3-4, Fig. 1) once to change for maximum current 10 A, and LCD will show in " 10.00 A " .
- 4) Now you can turn on the equipment power switch or turn on the DC POWER SOURCE .

- 5) Then press " REC button " (3-5, Fig. 1) to execute data logger function, and LCD will show in " REC " at the top of display.
- 6) When finish data logger function " REC " symbol will disappear, " SET " symbol will show on LCD left side.
- 7) If you press " FUNCTION button " (3-3, Fig. 1) , meter will send data from " RS-232 output terminal" (3-8, Fig. 1). through RS232 cable (UPCB - 02) or USB cable (USB - 01) into the computer and recording to the software SW-E2005 (optional) or DL-2005 (optional).
- 8) When finish data transmit , " EMPTY " symbol will show on LCD on left side automatically.
- 9) If you intend to exit Data logger function. press the " FUNCTION button " (3-3 , Fig.1) and " HOLD button " (3-4 , Fig.1) at the same time again more than 3 seconds , will leave Fast data logger mode.
- 10) The record numbers of Data logger is 300 records. The duration time of Data logger is 5 seconds.

4-6 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 " (3-4, Fig. 1) once again will release the data hold function.

4-7 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 " (3-5, Fig. 1)for 2 seconds at least.
The display will revert to the current reading.

4-8 LCD 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 .

5. ADVANCED SETTING

5-1 Auto Power Off Default Setting

- 1) Press the " POWER button " (3-2 , Fig.1) more than 1.5 seconds to Turn ON the meter.
- 2) Press the " FUNCTION button " (3-3, Fig. 1) for 3 seconds at least, will into ADVANCED SETTING.

- 3) LCD will show in " Auto " & " yes " , means ensure Auto Power Off function, you can press " HOLD button " (3-4, Fig. 1) once to change state to " no " , means Auto Power Off function is turn OFF.
- 4) If the state is correct, you can press the " FUNCTION button " (3-3, Fig. 1) for 3 seconds at least to save your setting and return to measurement.
- 5) If none of the buttons are pressed within 5 seconds, meter will return to measurement without change anything.

5-2 Set beeper sound ON/OFF

- 1) Press the " POWER button " (3-2 , Fig.1) more than 1.5 seconds to Turn ON the meter.
- 2) Press the " FUNCTION button " (3-3, Fig. 1) for 3 seconds at least, will into ADVANCED SETTING.
- 3) LCD will show in " Auto " & " yes " , press the " FUNCTION button " (3-3, Fig. 1) once again. LCD will show in " bEEP " & " yes " , means ensure Beeper function, you can press " HOLD button " (3-4, Fig. 1) once to change state to " no " , means Beeper function is turn OFF.
- 4) If the state is correct, you can press the " FUNCTION button " (3-3, Fig. 1) for 3 seconds at least to save your setting and return to measurement.
- 5) if none of the buttons are pressed within 5 seconds, meter will return to measurement without change anything.

6. MAINTENANCE

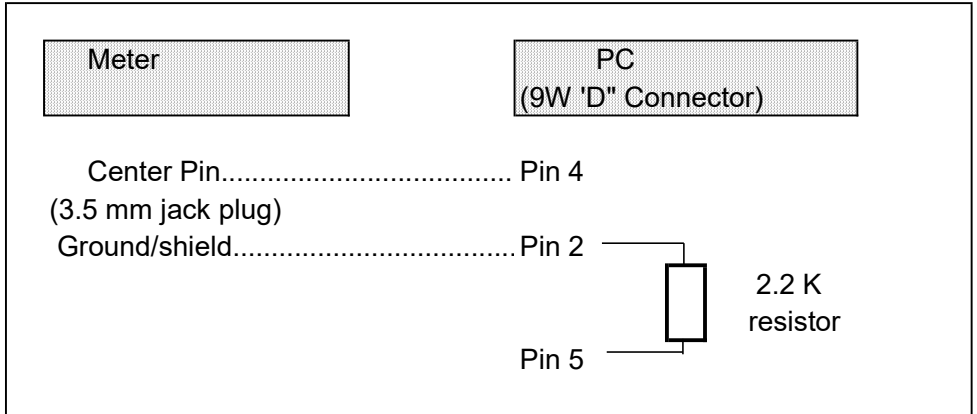
- 1) This WATT METER is intended for measuring the DC POWER CONSUMPTION. At the same , It can let you know .how many effect from your equipment.
- 2) When measuring DC POWER CONSUMPTION. Element or Equipment working voltage and correct polarity must be recheck again, before turn on the POWER SOURCE or 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.

7. 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 :

D15	Start Word, 02		
D14	4		
D13	When send the " V " display data = 1 When send the " I " display data = 2 When send the "W " display data = 3		
D12 & D11	Annunciator for Display		
	DCV = 34	DCA = 36	DCW = 47
D10	Polarity 0 = Positive 1 = Negative		
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D8 to D1	Display reading, D1 = LSD, D8 = MSD For example : If the display reading is 1234, then D8 to D1 is : 00001234		
D0	End Word, 0D		

RS232 FORMAT : 9600, N, 8, 1

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

8. 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 " (3-10, Fig. 1) by screwdriver then move the battery.
- 3) Replace with 9V battery and reinstate the cover.

9. THE ADDRESS OF AFTER SERVICE CENTER

