Consumption/Standby Power Meter

Manual

Product Name : Wattman (HPM-100A)

AD Power Co., Ltd

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1. Product Introduction

Wattman (HPM-100A)isaconsumption/standby power analyzer and a practical and economical handheld-type wattmeter. It enables the measurement of the power consumption of home appliances and business equipment with not greater than a 9mW~3.75kW power consumption, in a Plug & Play way, thus allowing easy and simple operation by any user. It also enables the easy conversion of electric power usage data into electric charge and amount of CO2 emission values.

⦿ Characteristics

- It displays the voltage, current, power, and frequency at the same time. It can also display the power factor, electric energy, electric charge, and amount of CO2 emission based on the amount of electric energy used.
- There is no need for batteries and adaptors as no additional power operation is needed.
- Superior precision, with a base error range of ±0.4%.
- Equipped with universal and convenient multiplug sockets.
- Its front buttons enable the selection of the unit to be used for the electric charge and the amount of CO2 emission.
- Equipped with a time setting function (00.hr: unlimited; 1~24 hr).
- Comes with a free copy of the GUI PC program.
- With free portable bags.
- Cable supply for data communication use (with charge).

Warning

- Extreme caution against high voltage should be taken whenusingthisproduct.
- The inappropriate use of this product may cause casualties or electric shock.
- Observe all the safety guidelines stated in the accompanying manual.
- Do not repair your own unit unless you have the necessary skills.

⦿ Safety Instructions

This equipment was designed in accordance with the CE CAT II & FCC safety standards. The users, however, must have a thorough knowledge of the following guidelines and must use the product with full attention to ensure safe operation.

- Do not attempt to operate the product if you cannot close its back cover.

Input Value Limit	
Function	Maximum Input and Time

Voltage	AC 90V ~ 260V
Current	Within an AC 10~15A range, there should be at-least-10-minute intervals and each measurement should be done within 30 seconds. With a less-than-10A current, the measurements can be conducted for a longer time.

※ When measuring a continuous 10A or higher current, thebuilt-infuse can be disconnected. The measurement should thus be accomplished within a maximum of 30 seconds.

※ Also, make sure that the supply voltage (source voltage) and the voltage rating of the equipment to be measured are identical.

⊙ General Characteristics

- It is easy to analyze the voltage, electric current, and frequency values obtained as they are displayed at the same time.
- ±0.4% electric power accuracy.
- ±0.3% voltage and electric current accuracy.
- Voltage measurement range: AC 90~260V (±0.3%, ±3 digit)
- Electric current measurement range: AC 100μA~15A (±0.3%, ±3 digit)
- Electric power measurement range: 9mW~3.75kW (±0.4%, ±3 digit)
- Power factor measurement range: ±0.001~1.000 (±0.5%, ±3 digit)
- Frequency measurement range: 50~1000Hz (±0.3%, ±3 digit)
- Operating temperature: 0~50°C
- Storing temperature: -20~60°C; humidity: 0~80%
- Temperature coefficient: 0.1 * (stated accuracy) / 1°C (not greater than 18°C, or 28°C or above)
- Altitude: 2000 m (6,561.7 feet)
- Size: 115 mm(W) x 200 mm(H) x 45 mm(D)
- Weight: 650 g

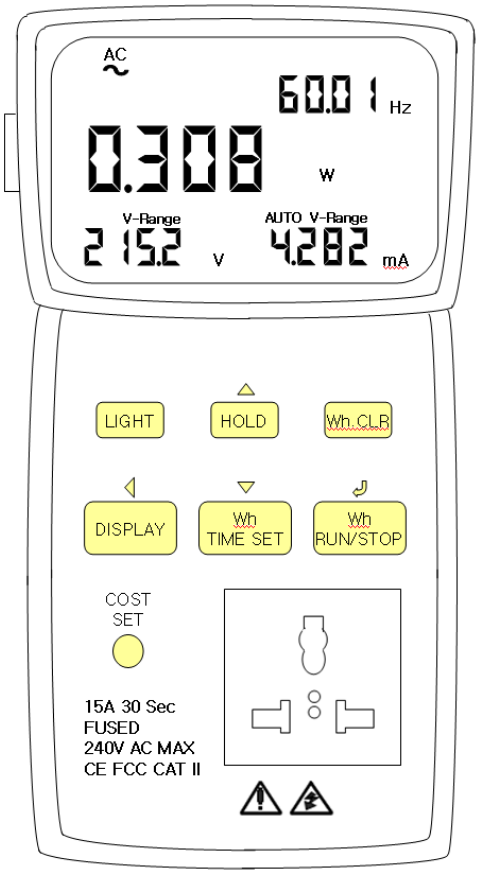


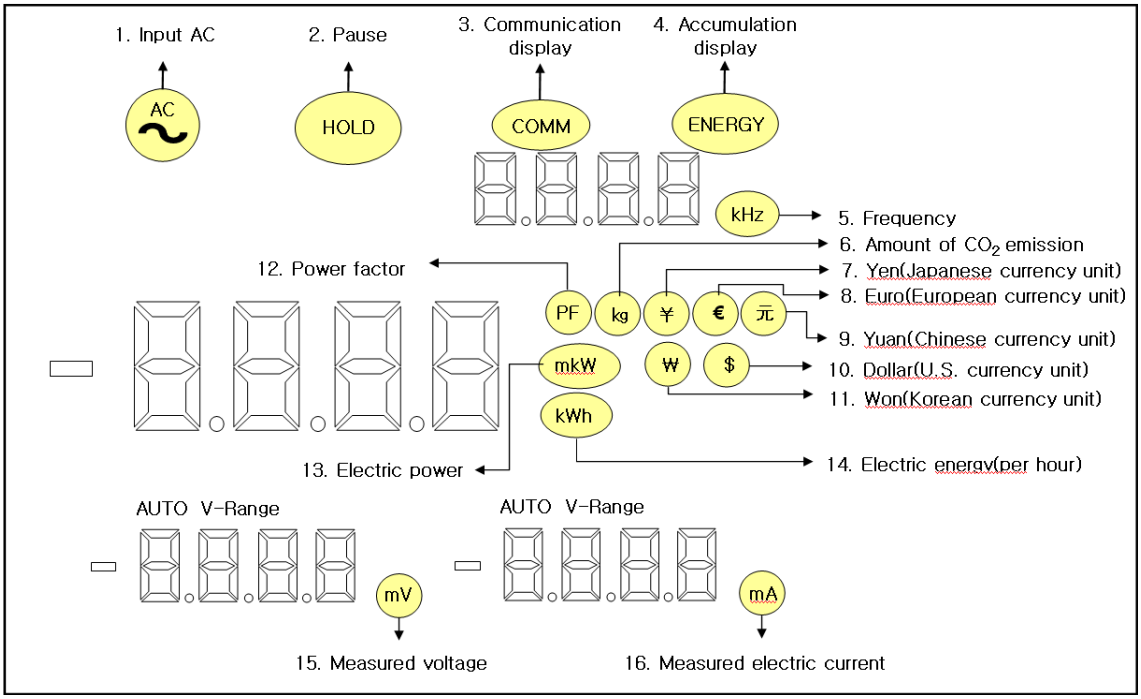
Figure 1. Front view and button of HPM-100A

⦿ **Function of the Push Buttons**

Push Button	Function
LIGHT	LCD backlight on/off
HOLD	Temporarily pauses the measurement value
Wh.CLR	In the accumulative electric energy mode (Wh), with no accumulation being operated, press this button for 3 seconds and it will be reset when you hear the beeping sound. It is used to delete the electric energy value previously obtained and to conduct a new measurement.
DISPLAY	Voltage (W), accumulative electric energy (Wh), power factor (PF), amount of CO2 emission(kg), and electric charge mode conversion button.
Wh TIME SET	Time setting for electric energy (Wh) accumulation (00.hr: unlimited, 1~24 hr)
Wh RUN/STOP	Start/stop accumulation setting in the accumulative electric energy mode (At the start of the accumulation, “ENERGY” will be displayed on the LCD screen.)
COST SET	Unit setting of the electric charge and the amount of CO_2 emission

※ **Warning: All the electric-energy-related buttons (Wh CLR, Wh TIME SET, Wh RUN/STOP, COST SET) can be operated in the accumulated electric energy mode (Wh).**

⊙ **LCD Display**



1. **Input AC : Wattman is for AC use only.**
2. **Temporary Pause : Use when pausing the measurement value.**
3. **Communication Display : "On" when using RS-232C communication.**
4. **Accumulation Display : "On" when accumulating electric energy.**
5. **Frequency : Frequency measurement unit.**
6. **Amount of Co2 Emission : Display the amount of Co2 emission per kWh.**
7. **Yen(Japanese currency unit) : For Japan's use.**
8. **Euro(European currency unit) : For European Union member's use.**
9. **Yuan(Chinese currency unit) : For Chinese's use.**
10. **Dollar(U.S. currency unit) : For American's use.**
11. **Won(Korean currency unit) : For Korean's use.**
12. **Power Factor : Displays the power factor of the equipment to be measured**
13. **Electric Power : Displays the electric power consumption of the equipment to be measured.**
14. **Electric Energy(per hour) : Displays the electric energy of the equipment to be measured.**
15. **Measured Voltage : Displays the service voltage of the equipment to be measured.**
16. **Measured Electric Current : Displays the working voltage of the equipment to be measured.**

Initial (Default) Settings

The initial settings are 0.000V, 00.00mA, 0.000W, and 00.00Hz, with AUTO Range on display.

2. Electric Power Measurement

First, make sure that the supply voltage (source voltage) and the voltage rating of the equipment to be measured are identical.

Wattman enables the simultaneous measurement of the voltage, electric current, electric power, and frequency values.

It basically enables the measurement of a 9mW~3.75kW range (consumption and standby power measurement).

1. When the power is on, the voltage, electric current, electric power, and frequency values will be displayed on the LCD screen.
2. When measuring, connect the measurement load to the front plug socket of Wattman.
3. When the [DISPLAY] button is pressed, conversion will be accomplished in the following order: electric power → electric energy → power factor → amount of CO2emission→electric charge.
4. When measuring for a long time (more than 1 hour), set at a maximum of 10A.

3. Electric Energy Measurement

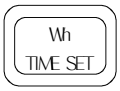
Electric energy measurement will be conducted up to 2000 kWh.
Ex) For the instantaneous power of 1 KW, it is 2000 hours.

1. [DISPLAY] Press the button to set the accumulative electric energy mode
2. Press the [Wh TIME SET] and buttons to set the desired accumulation time (1~24 hr). If the time does not change, [Wh.CLR] reset after the initialization.
3. Press the [Wh RUN/STOP] button and “ENERGY” will be displayed on the screen and the accumulation will start.
4. Other measurement values can be checked during the accumulation.
5. When the accumulation stops, press the [Wh RUN/STOP] button.
6. When deleting the previously accumulated electric energy value, press the [Wh.CLR] button for 3 seconds. It will be reset after the light of “Clr” is on.

⊙ Time Setting: 1~24 hr

Wattman enables measurement after setting the time for electric energy value accumulation (00.hr: unlimited, 1~24 hr).

1. When setting the time, the previously accumulated value will be reset. Press the [DISPLAY] button to convert to the accumulative electric energy mode, then press [Wh.CLR] for 3 seconds to reset it.

2. Press the 

button for accumulation time setting from 1 hr up to 24 hr (00.hr: unlimited accumulation).

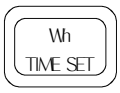
3. Press the 

button and the accumulation will be conducted for the duration of the set time.

4. While accumulation is in progress, pressing the 

button will stop the accumulation process. When the same button is pressed again, the accumulation will continue.

5. While accumulation is in progress, the remaining time will be displayed on the screen, with a countdown from the set time.

6. To check the set time, press the 

button and the set time will be briefly displayed.

⊙ Electric Charge and CO_2 Emission Amount Setting

Wattman enables the accumulated electric energy to be converted into its corresponding electric charge and CO2 emission amount values, and to be displayed on the screen.
The electric charge and CO2emissionamountperkWhappliedcanbemodified,ifnecessary.

① Electric Charge Measurement

Please note that the average electric charge of an average household (with an electric power usage rate of 300 kWh/month) is KRW168/kWh.

Ex. Electric charge (KRW ₩) = 1 kWh × 168 (₩)

*** The electric charge unit can be modified using the "Setting" key.**

② CO_2 Emission Amount Measurement

The allowable amount of fossil fuel (petroleum, coal) CO_2 emission for 1kWh power generation is 0.424kg (according to the 2005 research data obtained by Korea Institute of Energy).

Ex. Amount of CO2emission(Kg) = 1 kWh × 0.424 kg

※ As the bases of the CO2 emission amounts are different, modification can be done using the "Setting" key.

③ How to Set

1. When ◯ "COST SET" is pressed, the previously set value will be displayed with a unit on the screen.
2. The up (▲), down (▼), left (◀), and enter (↲) buttons can be used for the corresponding functions.
3. The value can be modified using the up (▲), down (▼), or left (◀) buttons.
4. Press "Enter (↲)" to save the setting. The unit setting can be modified in the same way.
   When all the modifications have been done, press ◯ "COST SET" to finalize the changes made.

4. PC Communication Method

1. HPM-100A is compatible with RS-232C communication.
2. The GUI PC program will be provided free of charge. It can also be downloaded from the homepage.
3. The basic transmission protocol is as follows: (Transmission protocols can be confirmed from a hyper terminal.)
   - Cable supply for data communication (with charge)

(1) Communication Port: Connect to a created port in the case of a serial communication port or a USB cable.
(2) Transmission Speed: 9600
(3) Parity: none
(4) Stop Bit: 1
(5) Flow Control: none
(6) When the English capital letter "S" is transmitted from a PC or Micom, or when "RS-232" is pressed, data will be consecutively received and "COMM" will be displayed on the product's screen. When the English capital letter "E" is transmitted, the communication will be cancelled.
"S" on the communication screen means the start of a set of data, while "E" means the end.

※ Warning: When collecting data through the HPM-100A GUI program, the accumulated Wh value on HPM-100A will be reset.

*** Received data (□ : indicates a decimal point)**

Ex) Data obtained: 220.0V, 100.0mA, 22.00W, 120.3Wh, 1.000PF, 60.00Hz

① Press the "S" transmission on the PC, or the "RS232" button.

② The data obtained will be consecutively received in the format shown below.

③ When the English capital letter "E" is transmitted, the communication will be cancelled

S 22003Vo 10003Am 22002Wa 10001Pf 60001Hz 11kg 53711Wo E

UNIT(data at the decimal point)

	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7
Volt	0.000 V	00.00 V	000.0 V	-	-	-	-
Ampere	0.000 mA	00.00 mA	000.0mA	0.000A	00.00A	000.0A	-
Watt	0.000 W	00.00 W	000.0 W	0.000 kW	00.00 kW	000.0 kW	
Wh	0.000 Wh	00.00 Wh	000.0 Wh	0.000 kWh	00.00 kWh	000.0 kWh	0000 kWh
PF	0.000 PF	-	-	-	-	-	-
VAR	0.000 Var	-	-	-	-	-	-
Hz	00.00 Hz	000.0 Hz	0.000 kHz	-	-	-	-
₩	0.000 ₩	00.00 ₩	000.0 ₩	0000 ₩	-	-	-
$	0.000 $	00.00 $	000.0 $	0000 $	-	-	-
¥	0.000 ¥	00.00 ¥	000.0 ¥	0000 ¥	-	-	-
€	0.000 €	00.00 €	000.0 €	0000 €	-	-	-
元	0.000 元	00.00 元	000.0 元	0000 元	-	-	-
kg	0.000 kg	00.00 kg	000.0 kg	0000 kg	-	-	-

5. Functions of “Hold” and the Backlight

Press “HOLD” to temporarily pause the displayed value. All actions will be suspended until “HOLD” is pressed again.

To operate the LCD backlight, press [LIGHT] .

* The power consumption of the backlight is not included in the measured value.

6. Others

Maintenance

Warning

To prevent electric shock or damage, take note of the following:

1. Do not separate the equipment from its case when the power source is applied.
2. Use an identical voltage rating (250V, 15A) when replacing a fuse damaged due to overload.
3. Close the case only after ensuring that the fuse has been properly replaced and that the wiring is properly arranged.
4. Do not open the case except when replacing a fuse.
5. When other maintenance is required, consult with the company’s A/S service team.
   The company shall not be liable for any damage incurred by the product due to the repairs conducted by the users themselves or by non-company personnel, other than replacing a fuse.

When a problem arises:

1. Please refer to the manual.
2. When a measurement load is connected to the plug socket of the product, the product can malfunction due to the external power surge. In this case, remove the power plug of the measuring equipment, then resupply power after 3 seconds.
3. Services will be provided free of charge within a year from the date of purchase of the product. However, when product failure occurs even during the warranty period due to the customer's negligence or due to a natural disaster, extra charges will be applied for the services rendered by the company's A/S service team.
4. It is much safer to have the product repaired by the company's service personnel even beyond the warranty period. (A/S Service Center Contact No.:82-32-234-3794)

Accessories: Manual for users, portable bag, cable supply for data communication use (with charge)

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