

GREEN POWER 4 in 1 METER

Model : LM-8020G



Your purchase of this GREEN 4 in 1 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 developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

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1. FEATURES

- * Hybrid power, power supply from green power (handy generator) or battery. If power source come from "Green power", battery is no need. Wind-up the generator 20 seconds will offer several minutes energy typically.
- * 4 in 1 professional measuring instrument: Anemometer, Hygrometer, Thermometer, and Light meter.
- * Anemometer use low-friction ball bearing mounted wheel design provides high accuracy at high and low air velocity.
- * Anemometer use the separate probe, convenient for measurement.
- * Light meter use exclusive photo diode and color correction filter light sensor, spectrum meets C.I.E. photopic.
- * High precision humidity sensor with fast response time.
- * Standard type K (NiCr-NiAl) thermocouple input jack suitable for all kinds of type K probe.
- * Concise and compact buttons arrangement, easy operation.
- * Memorize the maximum and minimum value with recall.
- * °C/°F detection by pressing button on the front panel.
- * Lux/Feet-candle selection by pressing button on the front panel.
- * Air velocity measuring units selection by pressing button on the front panel for five kinds of units.
- * Multi channel display for relative humidity and temperature measured values or air velocity and temperature measured values at the same time.
- * Zero button design makes light meter calibration.
- * Hold function to freeze the current reading value.
- * Microprocessor circuit assures high accuracy and reliable performance.
- * Large LCD, dual function display.
- * Auto power shut off to battery life or manual power off.
- * Using the durable, long-lasting components and a strong lightweight ABS-plastic housing case.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.
Display	40 mm x 32 mm LCD (Liquid crystal display).
Measurement Data Hold	Anemometer, Humidity, Temperature. Light Freeze the display reading.
Memory Recall	Maximum and Minimum reading values can be saved and retrieved by record function.
Power off	Auto shut off saves battery life or manual off by push button.
Overload indication	"- - -" symbol on the display.
Operating Temperature	0 °C to 50 °C (32 °F to 122 °F).
Operating Humidity	Max. 80% RH.
Sampling Time	Approx. 1 second.
Power Supply	Green power : * <i>Hybrid power</i> Power from the handy generator, battery is no need. Battery power : DC 9V battery, 006P, MN1604 (PP3) or equivalent. * <i>Alkaline or heavy duty type.</i>
Power Consumption	Battery power : Approx. DC 10 mA.
Weight	432 g/0.95 LB (w/o battery).
Dimension	<i>Meter :</i> 170 x 70 x 39 mm (6.7 x 2.8 x 1.1.5 inch). <i>Anemometer probe head :</i> Round, 72 mm Dia.
Standard Accessories	Instruction manual..... 1 PC Hard carrying case..... 1 PC
Optional Accessories	Temperature probe (Please refer to page 12).

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

Measurement		Range	Resolution
Air velocity	m/s	0.4 - 25.0 m/s	0.1 m/s
	km/h	1.4 - 90.0 km/h	0.1 km/h
	MPH	0.9 - 55.9 mile/h	0.1 MPH
	knots	0.8 - 48.6 knots	0.1 knots
	ft/min	80 - 4930 ft/min	1 ft/min
	Temperature (Semiconductor)	32 to 122 °F 0 to 50 °C	0.1 °F 0.1 °C

Measurement		Range	Resolution
Humidity	% RH	10 to 95 %RH	0.1 %RH
	Temperature (Semiconductor)	32 to 122 °F 0 to 50 °C	0.1 °F 0.1 °C
Light	Lux	0 to 2,200 Lux	1 Lux
		1,800 to 20,000 Lux	10 Lux
* auto range	Ft-cd	0 to 204.0 Fc	0.1 Ft-cd
		170 to 1,860 Fc	1 Ft-cd
Temperature (Type K)		-148 to 2372 °F	0.1 °F
		-100 to 1300 °C	0.1 °C

Measurement	Range	Accuracy
Air velocity	0.4 - 25.0 m/s	$\leq 20 \text{ m/s} : \pm 3\% \text{ F.S.}$ $> 20 \text{ m/s} : \pm 4\% \text{ F.S.}$
	1.4 - 90.0 km/h	
	0.9 - 55.9 mile/h	
	0.8 - 48.6 knots	
	80 - 4930 ft/min	
	32 to 122 °F	± 2.5 °F
	0 to 50 °C	± 1.2 °C
Humidity	10 to 95 %RH	$< 70\% \text{ RH} :$ $\pm 4\% \text{ RH}$ $\geq 70\% \text{ RH} :$ $: \pm (4\% \text{rdg} + 1.2\% \text{RH})$
	32 to 122 °F	± 2.5 °F
	0 to 50 °C	± 1.2 °C
Light	0 to 20,000 Lux	± 5% rdg ± 8 dgt
	0 to 1,860 Fc	
Temperature (Type K)	-148 to 2372 °F	± (1% rdg + 2°F)
	-100 to 1300 °C	± (1% rdg + 1°C)

Remark :

ft/min : feet per minute

m/s : meters per second

km/h : kilometers per hour

MPH : miles per hour

knots : nautical miles per hour

Ft-cd : feet candle

3. FRONT PANEL DESCRIPTION

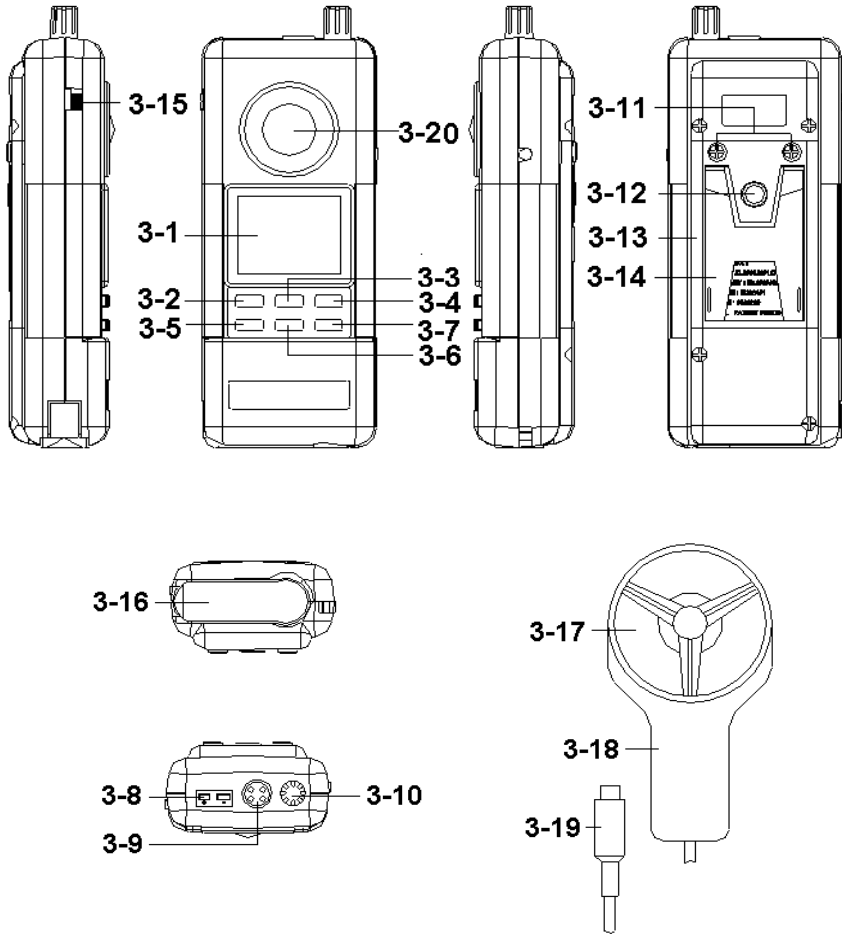


Fig. 1

- 3-1 Display
- 3-2 Power Button
- 3-3 Hold Button
- 3-4 Max/Min Button (REC Button)
- 3-5 Unit/Zero Button
- 3-6 °C/°F, Lux/Ft-cd Button
- 3-7 Function Button
- 3-8 Type K Temp. Socket
- 3-9 Anemometer Socket
- 3-10 Humidity Sensor
- 3-11 Screws for battery cover
- 3-12 Tripod Fix Nut
- 3-13 Battery compartment / Cover
- 3-14 Stand
- 3-15 Power type switch
- 3-16 Power generator's handle
- 3-17 Anemometer Probe head
- 3-18 Probe handle
- 3-19 Anemometer Probe Plug
- 3-20 Light Sensor

4. MEASURING PROCEDURE

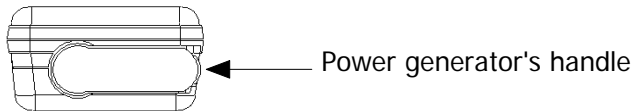
4-1 Power type selection

Green power (No battery) supply

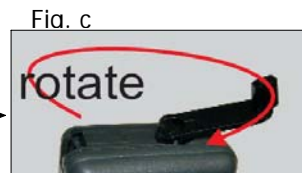
If power supply will come from green power (handy generator), the procedures are following :

Slide the " Power type switch " (3-15, Fig. 1) to the " G " position, the meter will offer the power source from the Handy generator (Green power), battery is no need.

- 1) There is a " Power generator's handle " (3-16, Fig. 1) on the bottom of the housing case.



- 2) a. Power off the meter.
b. Lift and extend the " Power generator's handle " and rotate the handle in clockwise direction will generate the power energy into the meter, refer Fig. a. b. c.



- c. Wind-up the generator 20 seconds will offer several minutes energy for the meter typically. If operate the generator more time will save more power into the meter.

Battery supply

If intend use the battery power, the procedures are following :

Install the DC 9V battery into the " Battery compartment " (3-13, Fig. 1)

Slide the " Power type switch " (3-15, Fig. 1) to the " B " position, the meter will offer the power source from the battery.

4-2 Air Velocity Measurement

- 1) Install the " Anemometer Probe Plug " (3-19, Fig. 1) into the " Anemometer Socket " (3-9, Fig. 1).
- 2) Power on the instrument by pressing the " Power Button " (3-2, Fig. 1).
- 3) Select the Anemometer function by pressing " Function Button " (3-7, Fig. 1).
- 4) Press the " Unit Button " (3-5, Fig. 1) to select the measuring unit (m/S, Ft/min, Km/h, Knots, MPH), then face the " Anemometer Probe Head " (3-17, Fig. 1) to the source of wind.
- 5) Hold the " Probe Handle " (3-18, Fig. 1) by hand, let the " Anemometer Probe Head " (3-17, Fig. 1) face against the measuring air flow source, Display (3-1, Fig. 1) will show air velocity directly. At the same time, the display will show the air temperature value.

Measuring Consideration :

- * The yellow dot mark on the sensor head indicates the direction that " need to face against the air flow.***
- * Allow time for the reading to become stable and note the value indicated. From a practical point of view the velocity may fluctuate.***

***4-3 Temperature Measurement
(Thermocouple)***

- 1) Power on the instrument by pressing the " Power Button " (3-2, Fig. 1)..
- 2) Plug a type K thermocouple probe in the " Type K Temp. Socket " (3-8, Fig. 1).
- 3) Select the Temperature function by pressing " Function Button " (3-7, Fig. 1)
- 4) Contact the Thermocouple Sensor Head with measuring object and the reading value will be displayed on the LCD display.

***Measuring Consideration of Temperature
Measurement (Thermocouple)***

- * Please make sure the polarity is correct when you plug a thermocouple probe in the Temp. input socket.***
- * The temperature difference between thermocouple probe and thermometer will cause an inaccurate measuring result. Therefore, for the best measuring and accuracy performance, whenever change a probe or plug a new probe, thermal equivalent between probe plug and meter's input socket is a necessary condition. Thermal equivalent procedure may take few minutes and apply only when the probe has been exposed to an ambient temperature different from the meter.***

4-4 Humidity & Ambient Temperature Measurement

- 1) Power on the instrument by pressing the " Power Button " (3-2, Fig. 1).
- 2) Select the Humidity function by pressing " Function Button " (3-7, Fig. 1).
- 3) Display will show humidity and temperature value that sensing from the " Humidity Sensor " (3-10, Fig. 1).
 - * *When the meter is applied in a new environment, a few minutes are required to reach a stable condition.*

4-5 Light Measurement

- 1) Power on the instrument by pressing the " Power Button " (3-2, Fig. 1).
- 2) Select the Light Measurement function by pressing the " Function Button " (3-7, Fig. 1) until the light value is displayed.
- 3) Display will show the light value that sensing from the " Light Sensor " (3-20, Fig. 1).
- 4) Press the " Lux/Ft-cd Button " (3-6, Fig. 1) to select measuring unit " Lux " or " Ft-cd ".

Zero Offset Adjustment of Light Function :

- * For best results zero the light sensor prior to use in a dark environment. Placing the light sensor end of the meter under a desktop or flat surface so as to block any light can accomplish this. Then press the " Unit/Zero Button " (3-5, fig. 1) to set the meter indication to zero.
- * Zero point can drift due to environment temperature and battery power change as well as for other reasons. It is recommended that the zero be checked frequently using the above procedure.

4-6 Change °C, °F

During the temperature measurement, if intend to change the temperature unit from " °C " to " °F " or " °F " to " °C " , then just press the " °C/°F Button " (3-6, Fig. 1) once.

5. OTHER FUNCTIONS

5-1 Hold Function

Whenever press the "Hold Button " (3-3, Fig. 1) will freeze the current reading value with a " HOLD " symbol on the display.

5-2 Data Record Function


- 1) The Data Record function records & displays the maximum and minimum reading values. Start the Data Record function by pressing the " Max./Min. Button " (3-4, Fig. 1) once. There will be a " REC " symbol on the display.
- 2) With the REC symbol on the display :
 - (a) Press the " Max./Min. Button " (3-4, Fig. 1) once and the " Max " symbol along with the maximum value will appear on the display.
 - (b) Press the " Max./Min. Button " again, the " Min " symbol along with the minimum value will appear on the display.
 - (c) To exit the memory record function, press the " Max./Min. Button " continuously for at least 2 seconds. The display will revert to the current reading.
 - (d) Clear the Max./Min. value recorded by pressing the " Hold Button " (3-3, Fig. 1) once. Previous recorded Max./Min. value will be given up and then revert to the REC. function keep on recording.

5-3 Auto Power Off Disable

In order to prolong the battery life, the instrument has "Auto Power Off " function. The meter will switch off automatically if no buttons are pressed for around 10 minutes.

To de-activate this feature, Select the memory record function during measurement, by pressing the " Max/Min Button " (3-4, Fig. 1).

6. BATTERY REPLACEMENT

When the left top corner of LCD display show " , it indicate the power supply is under low power condition.

If the meter is used the " Battery power supply " , it is necessary to replace the battery. However within specification measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.

Loose the " Screws for battery cover " (3-11, Fig. 1) and open the " Battery Cover " (3-13, Fig. 1) away from the instrument and remove the battery.

Install a 9 V battery (Alkaline or Heavy duty type) and replace the cover.

7. OPTIONAL TEMPERATURE PROBE AND OTHER ACCESSORIES

Thermocouple Probe (Type K) TP-01	<ul style="list-style-type: none"> * Measuring Range : -40 to 250 °C (-40 to 482 °F) * Max. short-term operating Temp. : * It's an ultra fast response naked-bead thermocouple suitable for many general purpose application.
Thermocouple Probe (Type K) TP-02A	<ul style="list-style-type: none"> * Measuring Range : -50 to 900 °C (-50 to 1650 °F) * Dimension: 10 cm tube, 3.2 mm Dia.
Thermocouple Probe (Type K) TP-03	<ul style="list-style-type: none"> * Measuring Range : -50 to 1200 °C (-50 to 2200 °F) * Dimension: 10 cm tube, 8 mm Dia.
Thermocouple Probe (Type K) TP-04 * <i>surface Temp. probe.</i>	<ul style="list-style-type: none"> * Measuring Range : -50 to 400 °C (-50 to 752 °F) * Size : Temp. sensing head - 15 mm Dia. Probe length - 12 mm.