KUSAM-MECO®
An ISO 9001:2015 Company

Operation Manual Of Solar Energy Tester

MODEL - KM 828-SI

1. WARNINGS

• Read understand and follow safety rules and operating instructions in the manual before using this tester.
• The detection function of the tester may not be able to solve the user's needs if not used in accordance with the manufacturer's instructions.
• Do not use if the tester appears damaged or if it is not operating properly. If in doubt, replace the tester.
• Comply with all applicable safety codes.
• Do not expose tester to extremes in temperature or high humidity.
•When using the compass function to measure the orientation, please do not put the mobile phone and other electronic devices that have a great impact on the magnetic field close to the tester, so as not to cause excessive error of the measured value.
•When the magnetic field in the measuring environment is too large, please recalibrate the tester.
• If the tester has not been used for a long time, or the environment has changed significantly, please recalibrate the tester.

2.International Safety Symbols

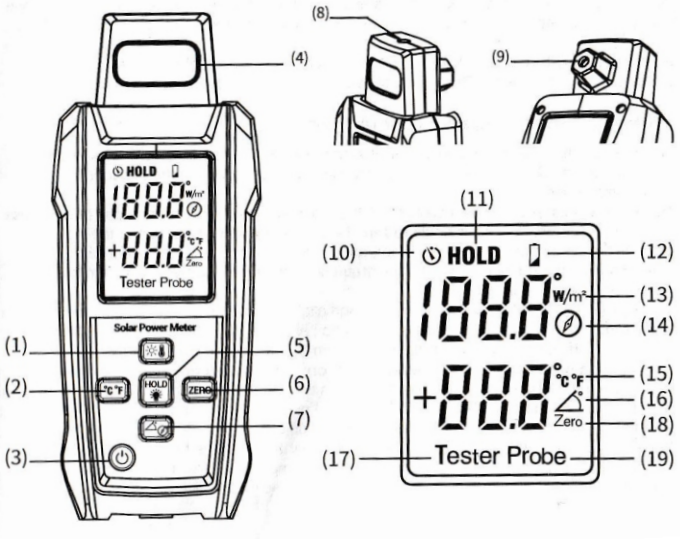
Potential danger. Indicates the user must refer to the manual for important safety information.
Equipment is protected by double or reinforced insulation.

3.General Specifications

Irradiance	
Measuring range	50 to 1400 W/m²
Resolution	1 W/m²
Measuring Accuracy	±(5% + 5 Digit)
Temperature Measurement	
Measuring range	tester : -10℃ to 50℃ (14℉ to 122℉) Probe : -30℃ to 100℃ (-22℉ to 212℉)
Resolution	0.1℃ (0.2℉ / 1℉@>100℉)
Measuring Accuracy	±1.5℃(±2.7℉) @-10℃ to 75℃ (14℉ to 167℉)
	±2℃(±3.6℉) @-30℃ to -10℃ (-22℉ to 14℉)
	±2.5℃(±4.5℉) @75℃ to 100℃ (167℉ to 212℉)
Inclination Angle	
Measuring range	-90°to +90°
Resolution	0.1°
Measuring Accuracy	±3°
Compass	
Measuring range	0°to 360°
Resolution	1°
The measured value can be used as a reference for the actual situation	

4.Tester Introduction

(1)	Function keys for irradiance and temperature measurement	(10)	Auto power off symbol
(2)	Celsius and Fahrenheit Switch Button	(11)	Hold indicator
(3)	On/Off Button	(12)	Battery Level Indicator
(4)	Photovoltaic Irradiance Sensor	(13)	Irradiance Units and Function Indicator
(5)	LCD backlight key and HOLD key (Press and hold for three seconds to turn the backlight on or off)	(14)	Compass Function Indicator
(6)	Angle Reset Button	(15)	Temperature Unit Indicator (Celsius / Fahrenheit)
(7)	Function keys for compass and angle measurement	(16)	Angle Function Indicator
(8)	External Temperature Probe Slot	(17)	Integrated Temperature Sensor Indicator
(9)	Integrated Temperature Sensor For Solar Panel Surface Measurement	(18)	Angle Reset Indicator
		(19)	External Temperature Probe Indicator



5. Operation

5-1. Turning The Tester ON/OFF

Briefly press the switch button of the tester, and the tester will first display all the elements on the screen, and then enter the interface of light irradiance measurement and temperature measurement. At this time, the user can use the instrument normally. If you press and hold the switch button of the tester and do not release it, all elements will be displayed on the screen all the time, and the tester cannot work normally. Briefly press the switch button of the tester again in the power on state, and the tester will enter the shutdown state, which cannot be measured in this state.

5-2. Light Irradiance and Temperature Measurement

Adjust the tester to the temperature and illumination measurement mode, and directly place the tester on the photovoltaic panel to measure the temperature and illumination. The internal embedded temperature sensor on the back of the tester will obtain the temperature reading,the light irradiance sensor on the surface of the tester will obtain the light intensity.
Obtain temperature through external temperature probe. After the external temperature probe is connected to the tester, the icon at the bottom of the screen will change from "Tester" to "Probe", indicating that the external temperature probe has been successfully connected. At this time, the displayed temperature is the temperature obtained by the probe, not the temperature sensor on the back of the tester. At this time, the user can place the tester above or beside the photovoltaic panel and place the suction cup at the bottom of the photovoltaic panel.
Switch temperature units. You can switch between Celsius and Fahrenheit by briefly pressing the " ℃℉ " button. The default temperature unit is Celsius.

5-3. Measure The Tilt Angle and Basic Direction

Briefly press the " " button once to switch the tester to the inclination and compass measurement mode. The inclination angle can be obtained by placing the tester on the photovoltaic panel.
Note: we suggest placing the tester flat on the ground before measurement, and briefly press the "ZERO" button to adjust the angle to zero. Due to the influence of terrain or the inclination of some house surfaces is not 0 °, this operation can reduce the error of measured values.
The compass measurement needs to pay attention to the following two points to obtain the accurate basic direction:
1. Place the tester on the photovoltaic panel and align it, and perform illumination, temperature and inclination measurement. When the inclination exceeds 20 °, the compass function will display "OL". **If the inclination angle is less than 20 °, it will be affected by the surrounding metal objects, so the display of any compass degree is inaccurate.**
2. Perform the compass measurement away from the PV panel by holding the meter or placing meter on a horizontal surface (0 to 20 degrees tilt) pointing the tip of the meter in the direction that the PV panel faces.Keep away from any metal objects.
Note: the compass will point out the geomagnetic north pole. If the tester is placed above or near objects containing metal (including solar panels, metal roofs, reinforced concrete surfaces, electronic equipment, etc.), the compass degree is not reliable.

5-4. Hold and Backlight

Short press the "hold" button once, the screen will maintain the current test value and will not update the new measurement value. Short press the "hold" button again to exit the current mode and display the obtained measured value in real time.
Long press the " " button, and the screen backlight can be turned on or off after about three seconds. The default backlight is off.

5-5. Low battery indicator

• If the power supply voltage is between 4.8V and 5.2v, the battery icon at the top right of the screen will continue to flash slowly, and the instrument will enter the low voltage mode.
• When the battery power of the tester is lower than 4.8V and cannot work reliably, the tester will enter the shutdown state.
• Replace the battery to resume operation.

5-6. Auto Power Off

•In order to extend battery life, after turning on the automatic shutdown function, the tester will automatically shut down after about 30 minutes of inactivity. After turning off the automatic shutdown function, the tester will continue to standby.
•When turned on, long press the power button to switch the automatic shutdown function on or off. When turned on, the automatic shutdown flag will light up, otherwise it will go out.
•When the power is turned off, there is no display on the screen and testing cannot be performed. If testing is required, please restart the tester.

6.Changing Battery

1. Carefully unscrew the battery cover screw on the back of the tester and open the battery cover.
2. Use 4* AA 1.5V alkaline batteries.
3. Close the battery cover carefully.
4. Tighten the screws on the battery cover until they feel tight. Don't use too much force.
Note: when inserting the battery for the first time, please remove the white rectangular safety strip before installing the battery.

7.Compass Calibration Instructions

If the tester has not been used for a long time, or the environment has changed significantly, please recalibrate the tester.The calibration method is as follows:
1. Restart the tester once, long press the " " button, release the button when the screen displays "444444", and then short press the " " button once, and the screen will continue to display "444444", indicating that the compass calibration mode has been entered at this time.
2. Put the tester on a horizontal plane, or hold the tester horizontally, and rotate the tester slowly and at a uniform speed as far as possible. The number of turns should be greater than 6, and the duration of rotation should be at least 1 minute.
3. Briefly press the " " button once to complete the calibration of the compass. At this time, the compass function can be used normally.
Note: if the steps are wrong or the calibration fails, please repeat the above steps 1-3 for calibration.

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