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REMOTE METER

For Photonic Universe dual battery solar charge controllers DB1024 (10A) and DB2024 (20A) series

Remote meter model: PUDB-RM

INSTRUCTION MANUAL

----- Application: motorhomes, caravans, RVs, campervans, boats, and other solar systems with one or two 12V/24V batteries -----

For use with Photonic Universe dual battery solar charge controllers only

Dear Customer,

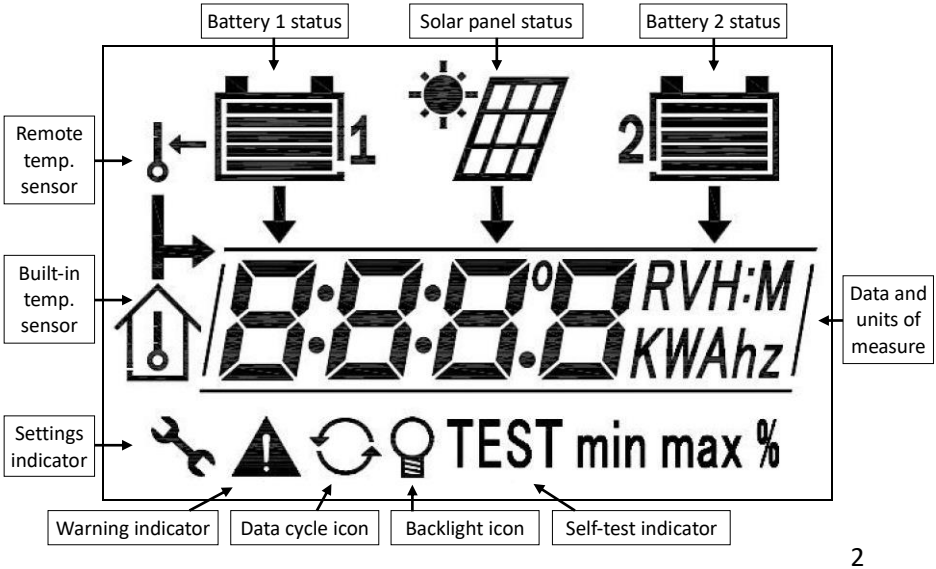
Thank you very much for choosing our product. This manual contains important information about the installation and operation of the remote meter. Please read this manual carefully before installing the product.
Note: working with electricity and batteries can be dangerous. Ensure that any work follows all appropriate safety standards and precautions.

Overview

This remote LCD meter can be used with 10A or 20A Photonic Universe dual battery solar charge controllers / regulators (series DB1024 / DB2024) in 12V or 24V solar systems with 2 batteries. This meter allows you to check the current state of your solar system by displaying various charging parameters: voltage, current, battery state of charge etc. The meter can also record accumulated battery capacity (accumulated charge) and min/max voltage for each of the 2 batteries for a certain period of time. The meter is supplied with a 10m connection cable (plugs into dual battery solar charge controller).

Information on LCD display

The LCD display of the remote meter can show the following information:

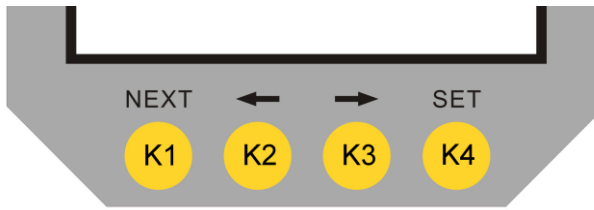


The main status is shown by two LEDs above the display:

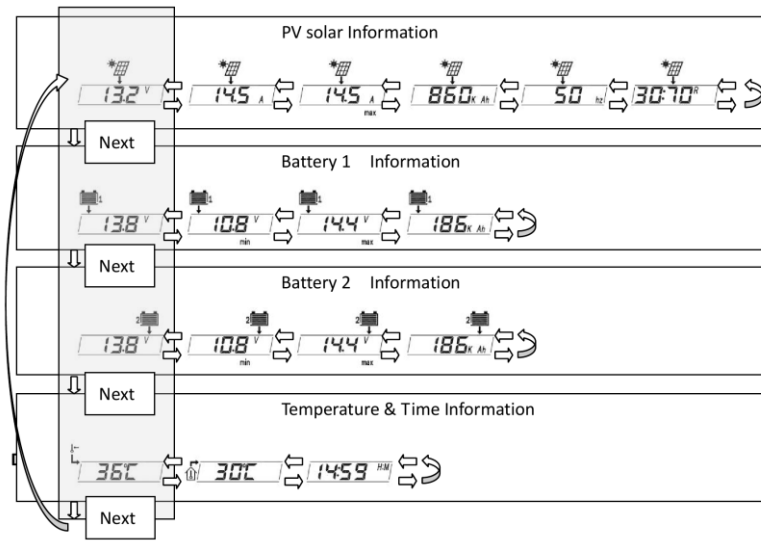
- The green “Charging” LED is on whenever charging is switched on
- The red “Warning” LED is on if one of the protection functions has been triggered or if an error has occurred (see below for more information)

Switching between different display modes and parameters

For the purposes of the diagrams and settings below we will use the following key names throughout this document (from left to right: K1, K2, K3, K4), or “NEXT”, “LEFT”, “RIGHT”, “SET”.



The overall sequence of the information and displayed parameters is shown on the diagram below.



Displayed data is grouped into four data sets:

1) Solar panel information
2) Battery 1 information
3) Battery 2 information
4) Temperature and time information.

Use keys K1, K2 and K3 (“NEXT”, “LEFT” and “RIGHT”) to change individual values in each data set and switch between sets.

Below you can find a description of the data values in each set:
Solar panel: voltage – current (amperage) – maximum recorded current – accumulated energy (energy counter) – charging frequency (frequency of charging pulses) – split of charge ratio for two batteries
Battery 1: voltage – minimum recorded voltage – maximum recorded voltage – energy received by the battery
Battery 2: voltage – minimum recorded voltage – maximum recorded voltage – energy received by the battery
Temperature and time: temperature measured by external sensor (if installed) – temperature measured by sensor built into the front panel of the controller – time

Settings

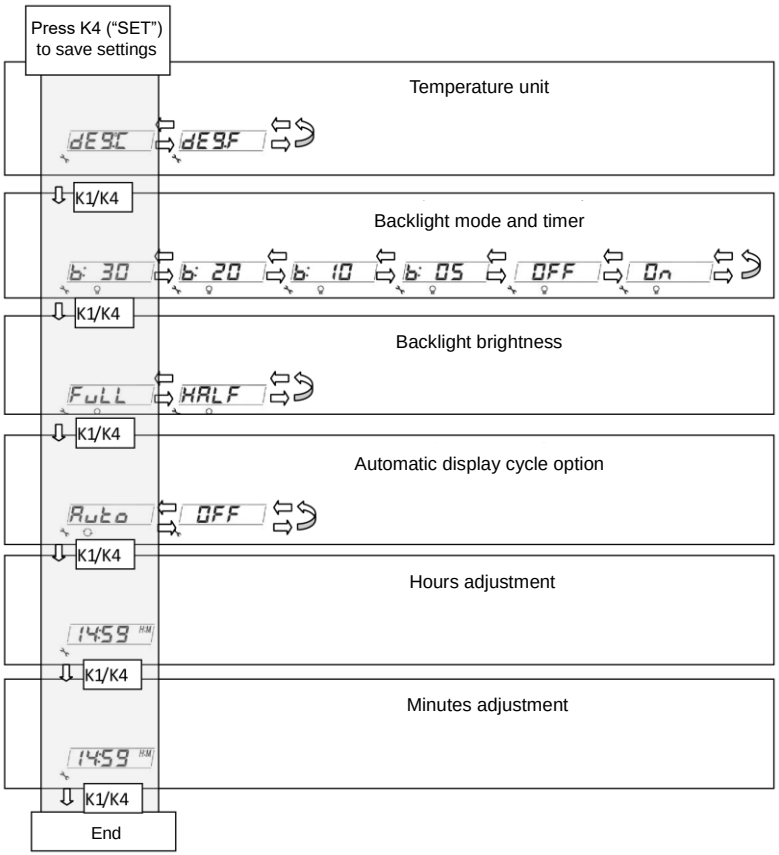
The following settings of the remote meter can be adjusted:

1) Temperature unit:
   - **C**, Celsius scale
   - **F**, Fahrenheit scale
2) Backlight mode and timer
   - **B:30**, backlight is on for 30 seconds
   - **B:20**, backlight is on for 20 seconds
   - **B:10**, backlight is on for 10 seconds
   - **B:05**, backlight is on for 5 seconds
   - **OFF**, backlight is off all the time
   - **ON**, backlight is on all the time
3) Backlight brightness
   - **FULL**, high backlight brightness
   - **HALF**, low backlight brightness (helps to save battery and solar power)
4) Automatic display cycle option
   - **Auto**, the meter will cycle through all data sets / parameters stopping for 3 seconds on each of them (K1 or “NEXT” can be pressed for next data set, or K2 and K3 / “LEFT” and “RIGHT” between individual parameters)

- **OFF**, the meter will not automatically cycle through data, though keys K1, K2 and K3 (“NEXT”, “LEFT” and “RIGHT”) will still switch between different data sets and values.

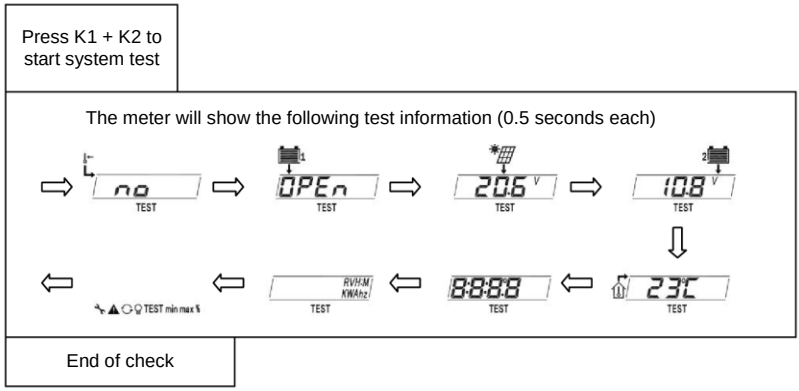
5) Time setting: hour adjustment
   - When hours start flashing, press K2 / K3 (“LEFT” / “RIGHT”) to adjust the value, and then K4 (“SET”) to save it
6) Time setting: minute adjustment
   - When minutes start flashing, press K2 / K3 (“LEFT” / “RIGHT”) to adjust the value, and then K4 (“SET”) to save it

The overall settings diagram is provided below:



System test

You can perform a system test at any time by pressing keys K1 + K2 ("NEXT" + "LEFT") simultaneously. If "no" is displayed, it means there is no connection (e.g. remote temperature sensor). If "OPEn" is displayed, it means that the battery is not connected or battery overvoltage has been detected.



Troubleshooting

The most common cause of the LED light / symbol  to be displayedis that one of the batteries is disconnected (or if the dual battery solar charge controller is being used as a single battery charging system). By default the LCD meter expects both batteries to be connected, so it will give a warning if information for the second battery cannot be displayed.

Another cause of the warning light/symbol could be that the external temperature sensor is not connected to the dual battery solar charge controller. In such case, the remote meter will only show information from the built-in temperature sensor (and this sensor will also be used for charging voltage compensation).
However there may be a more serious reason for the warning to be displayed – in such case, in addition to the warning LED light on the remote meter, the controller LED lights will also indicate a problem (e.g. no charging). These reasons include:

- Battery overvoltage has been detected and the battery was automatically disconnected
- Overcharge current has been detected

- Solar PV short circuit has been detected

These problems require immediate attention – please disconnect the system (disconnect the solar panel from the controller, then each battery from the controller) and contact your electrician / installer to discover the cause of the problem.

The warning LED light / symbol  will disappear automatically once the problem is rectified.

Four dashes on the screen. If the communication with dual battery solar charge controller is interrupted when the meter is switched on, it will display four "_". The display will resume automatically once the communication channel is on. If the meter remains in this condition, please check the cable. In some cases, long cables (especially extended) and interference from other appliances / radio emitting devices may be the cause of such problem.

"Oily stain" on the screen. Sometimes when the transparent film of the front sticker gets stuck to the glass LCD screen underneath, it creates an oily stain effect in the middle of the screen. Fix a small piece of sticky tape to the centre of the screen and pull the sticker film away gently from the meter to recrify this problem easily.

Special note about battery capacity

Please note that the battery icons displaying 5 bars are only an approximate representation of battery capacity based on the battery voltage - they do not measure actual remaining capacity. Each bar equals roughly 20% of the battery capacity, and the meter automatically calculates remaining capacity based on measured battery voltage: fully charged battery voltage is taken at 100% capacity, and over discharged voltage is 0%.

Energy counters which record accumulated capacity (Ah) will be updated frequently (each minute will contribute). 1 Ah roughly means 1 hour of charging at 1 Amp, or 0.5 hour of charging at 2 Amps, or 15 min charging at 4 Amps etc. Please note that energy counters are not very accurate when the charging current is small.

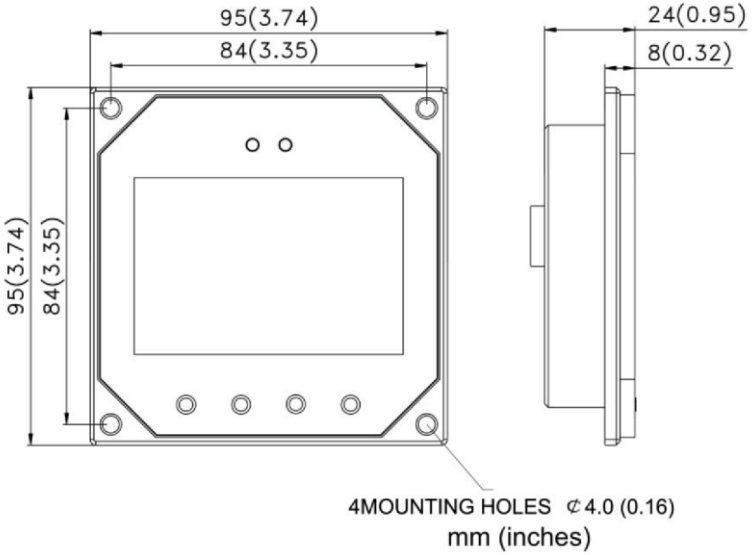
Specifications

Rated voltage: 12V nominal, minium (suggested): 8.0V
Current self-consumption:

- with backlight on, full brightness: < 23mA
- with backlight on, half brightness: < 20mA
- with backlight and LED indicators off: <17mA

Operation temperature: -10C to 40C
Humidity: 0 – 100%
Tolerance: 5%
Communication cable: RJ45 (8 PIN), 10 meters

Mounting dimensions



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