MT-1 Tracer Meter

RENOGY MT-1 Tracer Meter for Duo Battery Charge Controller
# Table of Contents

⚠️ Important Safety Instructions ⚠️ .......................................................... 3

General Information ............................................................................... 3

Identification of Display ....................................................................... 3

Installation .......................................................................................... 5

Operation ............................................................................................ 5
  - Power On: Test Mode ................................................................... 5
  - Menu Display ............................................................................. 5
  - User Parameter Setting ............................................................... 6

System Status Icons and Considerations ............................................. 8
  - Test Mode ................................................................................ 8
  - Error Indicator ........................................................................ 8
  - Telecommunication Port .......................................................... 8
  - Battery Level Flashing ............................................................... 9
  - Battery capacity AH ................................................................. 9

Troubleshooting .................................................................................. 9

Technical Specifications ...................................................................... 10
  - Electrical Parameters ............................................................... 10
  - Mechanical Parameters ........................................................... 10
  - Temperature Parameters ........................................................... 10
  - CAD Dimensions .................................................................... 10
Important Safety Instructions

This manual contains important safety, installation, and operating instructions for the charge controller. The following symbols are used throughout the manual to indicate potentially dangerous conditions or important safety information.

⚠️ WARNING: Indicates a potentially dangerous condition. Use extreme caution when performing this task.

⚠️ CAUTION: Indicates a critical procedure for safe and proper operation of the controller

NOTE: Indicates a procedure or function that is important to the safe and proper operation of the controller.

General Safety Information
- Read all instructions, cautions, and notes in the manual before starting the installation.
- There are no serviceable parts inside the MT-1. Do not disassemble or attempt to repair the meter electronics.
- Do not allow water to enter the MT-1.

General Information

The Renogy MT-1 Tracer meter is the remote digital display used for the 10Amp or 20Amp Duo Battery Charge Controllers. It is a self-diagnostics meter ideal for monitoring and displaying the current solar system status information and any error indications the system might be experiencing. The information is displayed on a backlit LCD display and is easily navigated using the large buttons on the meter. The MT-1 Tracer meter could also be flush mounted on a wall or flat surface using the mounting frame provided. The MT-1 Tracer is supplied with a 10 meter long cable and is connected using the RJ45 port.

Key Features
- Displays both solar voltage and battery voltage
- Displays charging current and load current
- Displays Amp-Hour and Watt-Hour accumulation
- 2 different brightness levels for the LCD display

Included Components
- Wall Mounting Frame
- 10 meter cable

Components NOT included
- Screws → ø 4mm (0.16in)

Identification of Display

1

2
1. **Solar Icon**
   - **Battery Icon(s)**—icon is present if the battery is connected otherwise it will remain flashing. It will demonstrate the battery level in which each bar represents 20% of the battery capacity.

2. **Remote Temperature Sensor Icon (optional)**—if the charge controller has the Remote Temperature Sensor connected (separate purchase required), the meter will display this icon.

3. **Local Temperature Sensor Icon**—indicates the current temperature of the room.

4. **Setting Icon**—icon is present when the user is modifying parameters of the controller such as brightness, clock, temperature units, or screen cycling.

5. **Error Indicator**—indicates improper connection, tracer error, or short circuiting of the battery or solar panels.

6. **Data Repeat Icon**—the meter will automatically cycle through the different screens.

7. **Backlight on Icon**—indicates backlight is on.

8. **Self-Test Indicator**—when the tracer is powered on, it will “TEST” through all screens and make sure everything is running appropriately.

9. **Data Units**
**Installation**

**CAUTION:** Before installing the MT-1 Tracer, apply power and make sure the meter is working properly. Resolve any issues before installing the meter and the meter cable.

The MT-1 can be mounted in two ways: Frame Mount or in a Wall Mount. A plastic mounting frame has been included for the purpose of Frame Mounting. If Wall Mounting then the MT-1 faceplate sits flush with the mounting surface and the body of the meter would be able to rest comfortably in a hole cut-out on the mounting surface.

**NOTE:** The screws are NOT included for installation purposes.

**Operation**

The following keys are used to cycle through the screens or adjust the parameters on the tracer:

(K1) **NEXT**, (K2) (←), (K3) (→), (K4) **SET**

**NOTE:** Both batteries must be connected to the charge controller, otherwise there will be a default error.

**Power On: Test Mode**

Once powered on, the meter will have both Charge and Error LED’s on as well as display all the icons for approximately 5 seconds. Once completed, it will begin **TEST** mode by which it will cycle through each of the following indicators:

1. Remote Temperature Sensor reading (optional)
2. Battery 1 Voltage
3. Solar Panel Reading
4. Battery 2 Voltage
5. Local Temperature reading
6. Time
7. Units
8. Setting Icon
9. Error Indicator
10. Data Repeat Icon
11. Backlit indicator
12. Min, max, percentage

**NOTE:** Test mode can be manually activated by pressing **NEXT + (←)**

**Menu Display**

After **TEST** mode, the user can use the **NEXT** key to cycle through four menus: PV Solar Information, Battery 1 Information, Battery 2 Information, and Temperature/Time Information.
The user can also use the (K2) (←), (K3) (→) keys to cycle within the four menus and display more information.

**Data Screens**

<table>
<thead>
<tr>
<th>PV Solar</th>
<th>Battery 1 and Battery 2</th>
<th>Temperature / Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Solar Panel Amps (A)</td>
<td>2. Max Battery Voltage (V_{MAX})</td>
<td>2. Time</td>
</tr>
<tr>
<td>3. Max Solar Panel Amps (A_{MAX})</td>
<td>3. Min Battery Voltage (V_{MIN})</td>
<td>3. Local Temperature Reading</td>
</tr>
<tr>
<td>4. Generated Amp-Hours (Ah)</td>
<td>4. Battery Amp-Hours (Ah)</td>
<td></td>
</tr>
<tr>
<td>5. PWN Charge Frequency (Hz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Charge Priority Percentage (R)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**User Parameter Setting**

By pressing the SET button, the user is able to modify some parameters of the meter. They include: Temperature Units, Backlight Timer, Backlight Brightness, Data Repeat Option, and clock. The user uses the (K2) (←) and (K3) (→) to adjust the parameter, and then press (K4) SET again to save the setting.
The icon will be displayed when the user is in the **SET** function. It will disappear once the user is in the reading menu.

<table>
<thead>
<tr>
<th>Function</th>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>dEg</td>
<td>Changes Temperature Units ((C°) \text{ to } (F°))</td>
</tr>
<tr>
<td>Backlight</td>
<td>B:</td>
<td>Sets a backlight timer after last button push</td>
</tr>
<tr>
<td>Brightness</td>
<td>Full:</td>
<td><strong>Full</strong>: high brightness (\text{Half}: \text{low brightness})</td>
</tr>
</tbody>
</table>
| Data Repeat | Auto | **Auto:** Each Menu and submenu repeats every 3 seconds
| Time        | 00:00  | **Off:** No data will repeat unless the user presses the arrow keys.

### System Status Icons and Considerations

#### Test Mode

At any time the user can press the **NEXT + (←)** to activate test mode. Test mode checks and displays the related data automatically. The user might experience the following display when undergoing test mode:

- **“NO”**—there is no connection. Connect a battery if applicable. In the default reading screen the battery icon will be flashing.
- **“OPEN”**—indicates that there is no battery connection, or the battery is over voltage. Check manufacturer specifications and ensure system is appropriate.

![Graphical Symbols](image)

#### Error Indicator

The red LED on the tracer is on or the “⚠️” symbol is visible in the digital display. Possible reasons for the Error Indicator include:

1. One battery could be disconnected, over voltage, or open circuit. Check connections. Disconnect and reconnect.
2. The remote temperature sensor probe is malfunctioning. Check the sensor probe. Disconnect and reconnect.
3. The system is experiencing overcharging current. Check connections, disconnect and reconnect.

**NOTE:** Both batteries must be connected to the charge controller, otherwise there will be a default error.

#### Telecommunication Port

When the meter running on individual power or the communication is cut off, the MT-1 will display graphical symbols abnormally. Press any key to stop the display and resume normal
activity. If problem persists, disconnect the port and connect it again. Normal behavior is when the meter updates every 20 seconds.

**NOTE:** Errors could occur in the telecommunication port if the connection is not properly secured. Also, too long of a cable may cause some inconsistencies.

**Battery Level Flashing**

Each strip equals to 20% of battery capacity. The bar that is flashing indicates that the battery is within the next increment of 20% of the battery capacity. For example: when the first bar is flashing, the battery is at 1-19% of capacity. Similarly, when the second bar of the battery is flashing, then the capacity is at 21-39%.

**NOTE:** The meter measures battery capacity by the voltage it is experiencing. When batteries are charging, they will not necessarily match the accurate battery capacity.

**Battery capacity AH**

AH is the accumulation of charging, each one minute will count. The data is not accurate while the charge current is too small. The min. is 1AH, means 1 amps charging for 1 hour, Ah comes to show.

**Troubleshooting**

**MT-1 has no display**
- Verify that the duo battery charge controller is powered on and that it is connected to the MT-1. The MT-1 is powered by the duo battery charge controller.

**LCD display is dim**
- Make sure that the MT-1 is not in half-brightness mode.
- Check the system battery voltage. The MT-1 needs a minimum of 8 V to operate.
- Verify that the temperature is within range of the LCD operating parameters.

**MT-1 turns on, but shows no data**
- MT-1 is potentially damaged or the cable is damaged. Replace the cable by contacting the manufacturer.

**MT-1 display does not match product manual**
- Our products undergo manual revisions from time to time. Please check our website at Renogy-store.com > downloads for latest documentation.

**Buttons do not work**
- Disconnect the MT-1 and clean the faceplate to remove any potential build-up of residue
- Reconnect MT-1
# Technical Specifications

## Electrical Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>12V</td>
</tr>
<tr>
<td>Minimum Voltage Suggested</td>
<td>8V</td>
</tr>
<tr>
<td>Strong backlight on</td>
<td>&lt; 23mA</td>
</tr>
<tr>
<td>Low Backlight on</td>
<td>&lt; 20mA</td>
</tr>
<tr>
<td>Backlight and LED indicator off</td>
<td>&lt; 17mA</td>
</tr>
</tbody>
</table>

## Mechanical Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Cable</td>
<td>RJ45 (8 pin)</td>
</tr>
<tr>
<td>Cable Length</td>
<td>10 meters</td>
</tr>
<tr>
<td>Faceplate Dimensions</td>
<td>95 x 95mm (3.74 x 3.74in)</td>
</tr>
<tr>
<td>Wall Frame Dimensions</td>
<td>110 x 110mm (4.33 x 4.33in)</td>
</tr>
</tbody>
</table>

## Temperature Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Temperature</td>
<td>-40°F to 140°F</td>
</tr>
<tr>
<td>LCD Operation Temperature</td>
<td>-14°F to 104°F</td>
</tr>
<tr>
<td>Humidity</td>
<td>0-100%</td>
</tr>
</tbody>
</table>

## CAD Dimensions

**NOTE:** Dimensions are in millimeters (inches)