

SunKeeper
Field Testing Document
Morningstar Corporation
rev 1.0.0

Quick Check

Verify correct SunKeeper operation by following these few short steps. The SunKeeper should be wired to a solar panel(s) and battery per the installation instructions prior to this test. A voltmeter will be required for this test.

Measurements:

1. If the SunKeeper is mounted to a panel j-box, remove j-box cover to expose wiring.
2. Measure the voltage across SOLAR+(yellow lead) and COMMON(black lead) leads at the SunKeeper.
3. Measure the voltage across BATTERY+(red lead) and COMMON(black lead) leads at the SunKeeper.

Results:

1. If the SOLAR voltage is **EQUAL TO BATTERY** voltage:
 - a. The SunKeeper is recharging the battery
 - b. The *Status LED* on the SunKeeper should be solid green (with a flicker heartbeat every 5 seconds)
2. If the SOLAR voltage is **GREATER THAN BATTERY** voltage:
 - a. BATTERY voltage should be at full charge, either in Absorption stage (14.1V) or Float stage (13.7V)**
 - b. The *Status LED* should be blinking green, indicating regulation charging.
3. If the SOLAR voltage is **LESS THAN BATTERY** voltage:
 - a. The solar panel(s) are not exposed to full sun (or indoors)
 - b. The Status LED should be off (with a quick blink heartbeat every 5 seconds)

Notes:

1. Disconnecting the battery with a panel(s) connected and measuring the voltage output from the SunKeeper is not a valid test.
2. The Status LED should always turn off at night
3. If the SunKeeper indicates a fault condition (Red LED, flashing or solid), or does not seem to be working, refer to the troubleshooting flow diagram at the end of this document.

**** Temperature compensation will skew Absorption and Float voltage**

FAQ

Q: The SunKeeper seems to be working but my battery does not recharge (or recharges very slowly). Why?

A: The recharge time depends on several factors:

1. **Amount of current produced by the solar panel(s) –vs- the amount of power drained from the battery daily** - If more power is drained from the battery by system loads than can be replaced by the solar panel, the battery will be at a constant state of discharge.
2. **Size of the battery bank** – If the capacity of the battery bank is large compared to the amount of current produced by the solar panel(s), charging time will be slow. Your solar system designer/installer should properly “size” the PV system.
3. **Health and age of the battery bank**- If the battery is old or has been abused, it may not accept or hold a charge.

Q: Why is the SunKeeper under-charging or over-charging my battery?

A: If the SunKeeper is not indicating a red flashing or solid red fault, the most likely reason is temperature compensation. If a Remote Temperature Sensor or the internal temperature sensor is being used for temperature compensation (see manual), then the regulation voltage will be higher in cooler ambient temperatures and lower in warmer ambient temperatures. The SunKeeper adjusts the regulation voltage to compensate for changes in battery chemistry which varies with temperature. Also, double-check the system wiring. Be sure that the Solar + and Battery + lines are not inadvertently wired together.

Q: Should I use a Remote Temperature Sensor?

A: The Remote Temperature Sensor allows precise temperature measurement at the battery so that the SunKeeper can more accurately adjust regulation voltage with temperature. If the battery is stored in significantly different ambient temperature than the SunKeeper, the Remote Temperature Sensor may be required.

