

Solar Panel Addendum



2003 Panther

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SOLAR PANEL

The motorhome is equipped with a solar-powered battery charging system. The system consists of one solar panel with mounts, a Combiner box (this allows additional panels to be wired to the system) and a charge controller that can handle up to six 100 watt solar panels.

Solar Panel:

The solar panel is a laser-grooved, buried-grid panel that is capable of delivering about five amps of charge per hour, per panel, in full sunlight (usually between 9:30 a.m. and 2:30 p.m.). Extensive testing has shown that one 100 watt solar panel delivers enough power to offset the normal day-to-day drain on batteries caused by various parasitic electrical loads. These parasitic loads are usually associated with transmission memories, alarm systems, natural self-discharge of batteries and other like items. This means that the first solar panel is only intended to cover these parasitic loads. Adding a second, third or more solar panels (depending upon needs and electrical consumption) can replace what is drawn out of the batteries from the operation of lights, water pumps, inverters, etc., while dry camping.



WARNING: The solar panel needs to be cleaned monthly. The solar panel may need to be cleaned more frequently depending on weather conditions.

Fuses::

30amp- Goes to the house batteries located in the battery compartment. 5amp- Goes to the chassis batteries located in the engine compartment. 1amp- The 1amp fuses are used to protect the wire that sends the signal from the house batteries and the solar panel to the VCM. The 1amp fuse are located behind the washer/dryer in the bed room closet of the motorhome.



NOTE: When looking at the readings on the VCM screen, and it reads (XXXXX) the fuses need to be checked, and if they are blown replace the fuse with the same style and current rating.

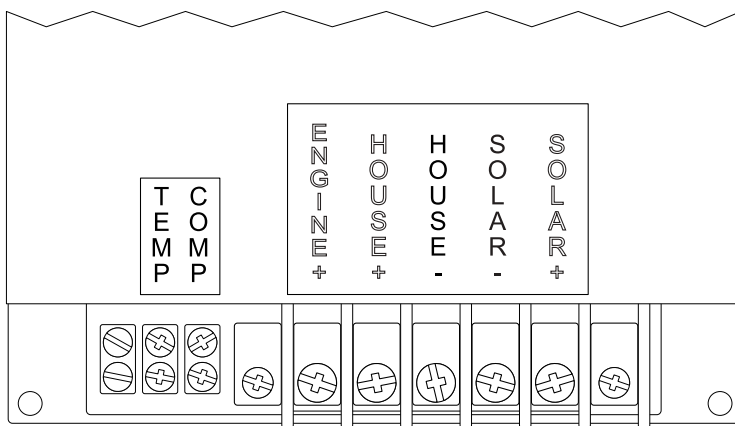
Combiner Box:

The Combiner Box is located on the side of the refrigerator vent on the roof. It has four standard "knock outs" to allow extra solar panels to be added to meet dry-camping needs.

Charge Controller:

The Charge Controller was built specifically to meet the needs of a motorhome. It can be set to accommodate either Flooded Lead-Acid batteries or Absorb Glass Mat (AGM) batteries. The Charge Controller is located behind the Washer-Dryer.

Status of the charge controller is viewed through the VCM electrical status display. The controller is used as a heat sink for the electronics attached to it. It is normal for the controller to become warm to the touch especially when it is processing higher amperage. This is normal and there is no reason to be concerned. The charge controller will automatically enter Thermal Shutdown if it gets too warm.

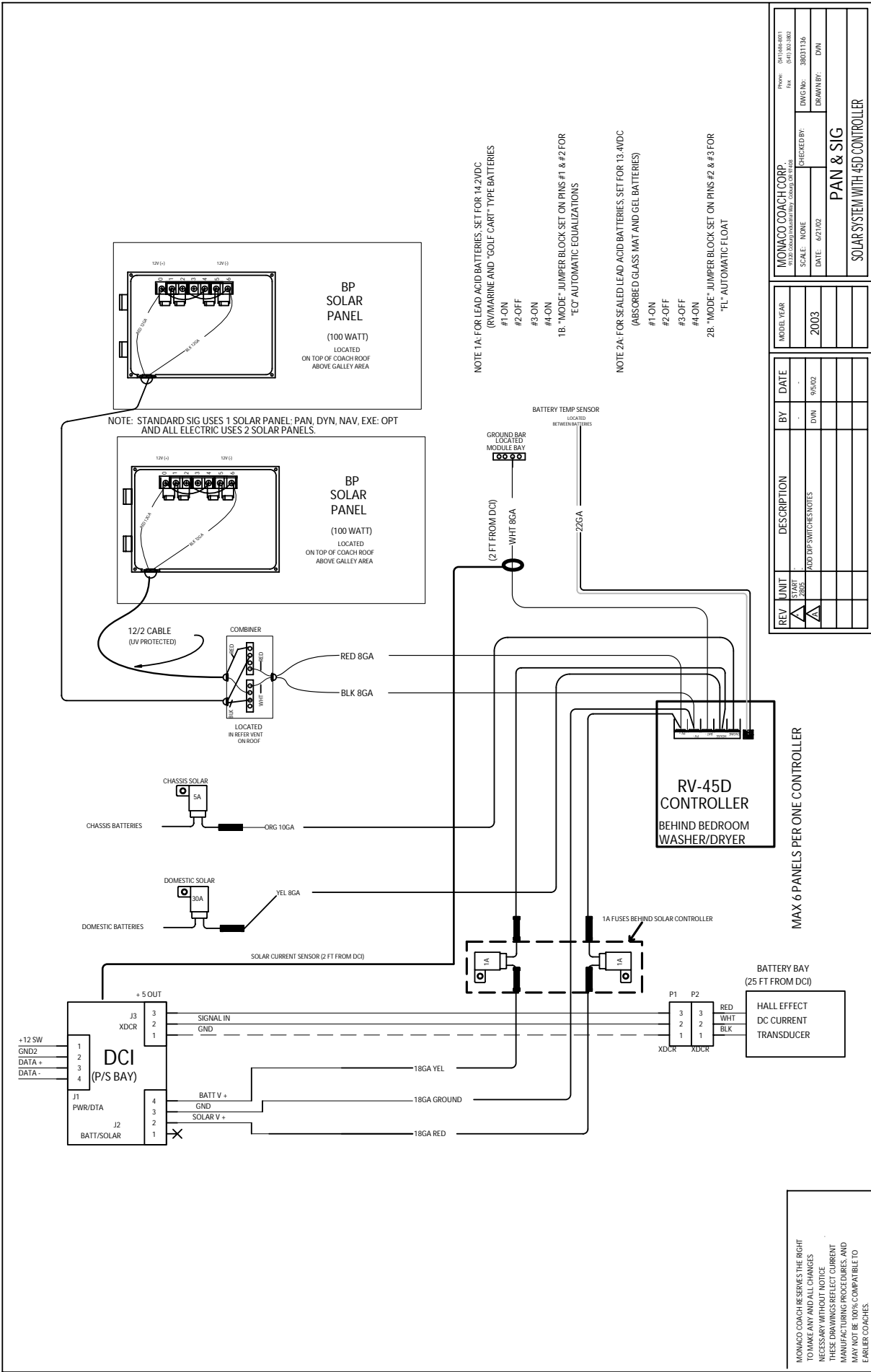


080418

| COACH ELECTRICAL STATUS | | |
|-------------------------|--------|--------|
| BATTERY | VOLTS | XXXXXX |
| | AMPS | XXXXXX |
| SOLAR | VOLTS | XXXXXX |
| | AMPS | XXXXXX |
| BASEMENT | TEMP F | XXXXXX |
| OUTSIDE | TEMP F | XXXXXX |

VCM Screen

020198b



| | | |
|----------------------------------|--------------|------------------|
| PROJ: 017168-001 | REV: 1 | DATE: 01/10/03 |
| MONACO COACH CORP | | |
| SCALE: NONE | CHECKED BY: | DWG NO: 38021136 |
| DATE: 6/21/02 | DESIGNED BY: | DRAWN BY: DYN |
| PAN & SIG | | |
| SOLAR SYSTEM WITH 4SD CONTROLLER | | |

| REV | UNIT | START | DATE | BY | DESCRIPTION |
|-----|------|-------|--------|-----|------------------------|
| 1 | 2801 | | 9/5/02 | DYN | ADD DIP SWITCHES NOTES |

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The RV-45D Charge Controller has many unique features.

- 1. Dual Battery Bank Charging** - Parasitic loads affect both the House and Engine batteries. The controller automatically charges both the House and Engine batteries at the same time to deal with this issue.
- 2. Pulse Width Modulation** - This charging strategy has been found by the Sandia National Laboratories to maintain the highest state of charge with the least amount of water consumption by the batteries. In effect, it delivers all the available charging amperage until the batteries reach their set point voltage (this stage is called bulk charging) and then it begins to taper off amperage (absorption stage) until it is reduced to all that is needed to simply hold the batteries at their set point voltage (Float Stage).
- 3. Temperature Compensation** - The gassing threshold of the batteries is reached at around 14.1 to 14.4 Volts at room temperature (25° C). If the temperature of the batteries is hotter than 25° C, the gassing threshold is reached at a lower voltage. If the temperature of the batteries is colder than 25° C, the gassing threshold is reached at a higher voltage. This feature protects the batteries from excess water loss and/or plate sulfating by automatically compensating for these temperature changes and adjusting the charging voltage accordingly.
- 4. Automatic Equalization (Only when set to Flooded Lead-Acid Batteries)** - This feature is activated once per day to extend the life of the batteries by allowing the weaker cells a chance to catch up with the stronger cells. This assures that all cells will be at an equal state of charge. The first time the house batteries reach 14.2 Volts during the day, a delay timer is activated that allows a short duration period (20 to 30 minutes) at a slightly higher voltage (14.5 to 15.0 Volts) and then falls back to the 14.2 Volt setting for the remainder of the day.

5. Automatic Float (Only when set to Absorbed Glass Mat

Batteries) - This feature resets the charge parameters to work with AGM batteries. It removes the equalization cycle (AGM batteries are sealed and don't like the higher voltage reached during equalization), and changes the Float setting from 14.2 to 13.4 Volts, which is what the AGM battery manufacturer recommends.

A critical part of maintaining the solar electric battery charging system is to keep the panels clean. The amount of power that a panel will produce is directly related to the intensity of sunlight that reaches it. A dirty panel will allow less light to reach the panel resulting in less power produced. A single layer of dust or road grime can reduce the power output by 15 to 25%. Leaves and debris that can cover two or three of the 36 individual cells can reduce output power by 50 to 75%.

Use of the basic maintenance tips, regular inspections and regular cleaning will assure maximum charging from the solar charging system. To clean the panels, use a non-abrasive cleaner and paper towels. The surrounding environment and the amount of road dust encountered determines how frequently the panels should be cleaned. One to two times a month is preferred.

Tips to Follow:

1. The panels should be cleaned if a film or a layer of dust is on the windshield.
2. On a bright sunny day, the charging amps should be 3.5 to 5 Amps for each panel.
3. High winds blow dust and debris around causing dirt build up. Frequently inspect the panels and clean as necessary.



CAUTION: Avoid damage to the solar panel controller. Cover the solar panel with a blanket when replacing the batteries or performing battery cable maintenance.

Solar Panel Care



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