

IMPORTANT! - YOU'RE SOLAR READY

ZAMP SOLAR[®]
power to explore!

SOLAR POWER - THE NEW WAY TO RV!

Your RV is PRE-WIRED for SOLAR POWER!



Zamp Solar Portable Solar Kit

Benefits of Solar

- Maximize Battery Life
- Electrical Independence
- Green, Clean & Quiet
- Safe & Reliable
- Virtually Maintenance Free
- Reduce Generator Use & Hook-Up fees

CONGRATULATIONS!

Thank you for purchasing your NEW Forest River RV.

We are constantly looking for ways to create a better product for you, our customer. That's why we went the extra mile and pre-wired your RV with a Zamp Solar pre-wired solar port. Solar is a great way to keep batteries fully charged and cut the cord giving you freedom to explore.

Zamp Solar - POWER to EXPLORE!

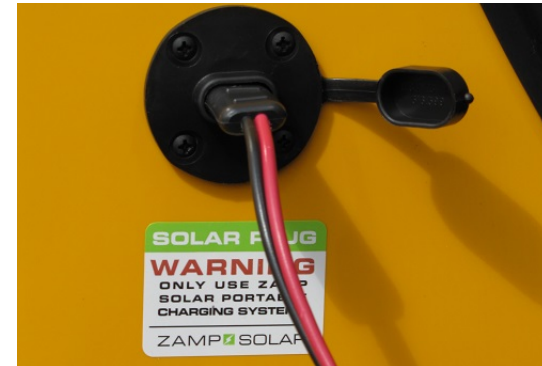
If you have questions regarding solar and the best solar system for your requirements contact your nearest Zamp Solar Dealer or Zamp Solar directly.

WARNING

You will love SOLAR!

**Green, Clean and Quiet
Electrical Independence
Safe & Reliable**

www.zampsolar.com



Have one of these? You're ready for solar!



www.zampsolar.com

1 In Mobile Solar Solutions

CONGRATULATIONS!

On The Purchase Of Your New R-Pod

**This Recreational Vehicle
Has Been Prewired For
A Zamp Solar Charging
System**



I M P O R T A N T

Contact Your Selling Dealer or Call Us

1-855-567-8031

We Can Help You!

Thank you for purchasing your new R-Pod Recreational Vehicle. If you have any questions concerning The Zamp Solar Prewire Kit, service or component compatibility, please call Zamp Solar at our toll-free number listed above. Or you may email us on the internet at: support @ zampsolar.com. Our office hours are Mon-Fri 8:00am-5:00pm (PST). We value our customers and are pleased to address any questions or concerns.





Zamp Solar is the expert in the recreational vehicle solar battery charging industry. Zamp Solar is leading the charge in RV solar charging technology. They have created some of the best and most innovated products available today exclusively for the RV owner, some of which are the portable charging systems pictured below.

Made of the same durable and dependable roof mounted solar panels, Zamp Portable Charging Systems will give your customer the ability to charge their batteries easily, affordably, and portably.

Complete and ready to use! Zamp folding solar kits feature A+ Monocrystalline solar panel technology, are ground mounted, have adjustable tilt legs for optimum reflection angle, comes standard with a built in charge controller, equipped with 16ft lead wire with battery clips for easy hook up, can be folded up and stored safely in a ballistic nylon padded carrying case. When your customer arrives at their destination, the set up process takes less than 5 minutes. Unpack the bag, unfold the panels, adjust the tilt legs, set on the ground in a sunny location pointing south and simply connect the optional quick battery plug (Part# ZS-BDC-C) to the Zamp Solar battery Charging Port on the side of the RV.



Available through your manufacturer in 40 & 80 watt versions (larger units are available). These units are compact and easy to store. Increase your dealerships profitability, with this new and exciting option. Factory direct savings will allow your parts, sales and service departments to increase the deal gross as well as increase your aftermarket sales with past customers.

Contact your factory sales rep for more information regarding this program.





Solar Controller / Battery Charger

Input: DC12V Solar panel (Max. 25V)

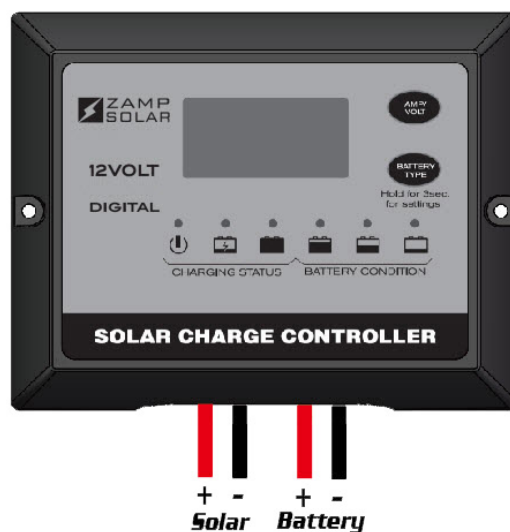
Output: DC12V 10A / DC12V 15A

Model Number: ZS-10A / ZS-15A

User's Manual

FEATURE

- Advanced MCU control pulse width modulated (PWM) technology, high efficiency operation.
- Target for Gel, AGM, Conventional lead-acid (WET) and Calcium Batteries.
- Built in regulator to prevent your battery from being overcharged. Overcharging occurs when the charge voltage is unregulated. This can result in premature battery failure.
- Come with regulator to prevent your battery from being under charged, in the solar energy field, battery undercharge always occurs, especially on some Conventional lead –acid or Calcium batteries; The unit provides an automatic Equalization feature for deeply drained Conventional lead acid battery or Calcium battery, as well as provides a cycling automatic Equalizing feature every 28 days.
- Can be connected to the battery permanently to keep the battery fully charged by using a process called “floating”. This means the controller will stop charging when the battery is full and will automatically start charging the battery as required. This process will also reduce water loss and help prevent the battery from ‘drying out’.
- Protects your battery from discharge at night. Under low light or no light conditions the solar panel voltage could be less than the battery voltage. The unit contains a special circuit which prevents current flowing back from the battery and into the solar panel.
- Colored LED’s to easily indicate the operational status and battery conditions.
- Digital LCD to directly display battery voltage, charging current, charging capacity (Amp hour), battery types, full charge and faulty codes.
- Provides external battery temperature sensor (Optional).
- Multi charging protections against reverse polarity, short circuit, over temperature, over voltage, etc.
- Surface Mount or Flush Panel Mount options.
- Conformal-coating circuit boards and plated terminals apply to hostile environments.
- Waterproof and non-waterproof selectable.



For use with 12Volt Solar Panel Only
Suitable for Solar panels up to 170 / 255 Watts for ZS-10A / ZS-15A

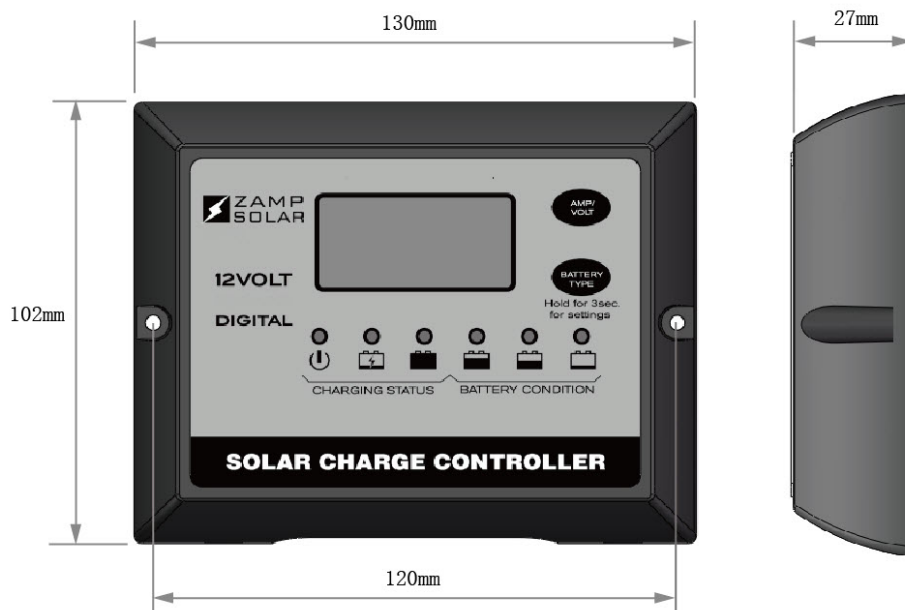
WARNING – IMPORTANT PLEASE READ

- This charger is designed for indoor use (non-waterproof type) or outdoor Use (waterproof type).
- Do not disassemble the controller. Take to a qualified person if the unit requires repairing.
- Lead acid batteries can be dangerous. Ensure no sparks or flames are present when working near batteries.
- Eye protection should always be used. Never short circuit the battery
- Given sufficient light solar panels always generate energy even when they are disconnected.
- Accidental 'shorting' of the terminals or wiring can result in sparks causing personal injury or a fire hazard. We recommend that you cover up the panel(s) with some sort of soft cloth so you can block all incoming light during the installation. This will ensure that no damage is caused to the Solar Panel or Battery if the wires are accidentally short circuited.
- Always install a battery fuse on each circuit including the solar controller
- Do not reverse connect the wires to the solar panel or battery

MOUNTING THE DEVICE

The Solar Controller is mounted as below

The quickest and easiest way to mount the unit is to use the two plastic spacers and self tapping screws supplied and mount the unit to a flat surface,



WIRING CONNECTIONS

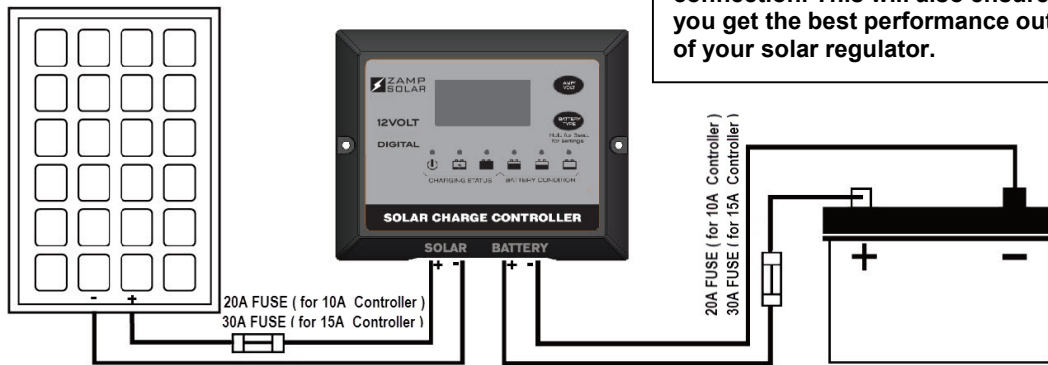
To protect the Battery and the Solar Panel, we strongly recommend that you place a inline fuse on the positive wire on both the “Solar” and “Battery” Circuits. 20A fuse for ZS-10A, 30A fuse for ZS-15A (As close to the Battery /Panel as possible)

The Solar Controller has 4 terminals which are clearly marked ‘Solar’ and ‘Battery’. There is a (12V) and earth (GND) terminal for each circuit.

Refer to the wiring diagram below.

Correct Wire Size:

Please refer to the wire size chart below to determine the minimum size wire needed for each connection. This will also ensure you get the best performance out of your solar regulator.



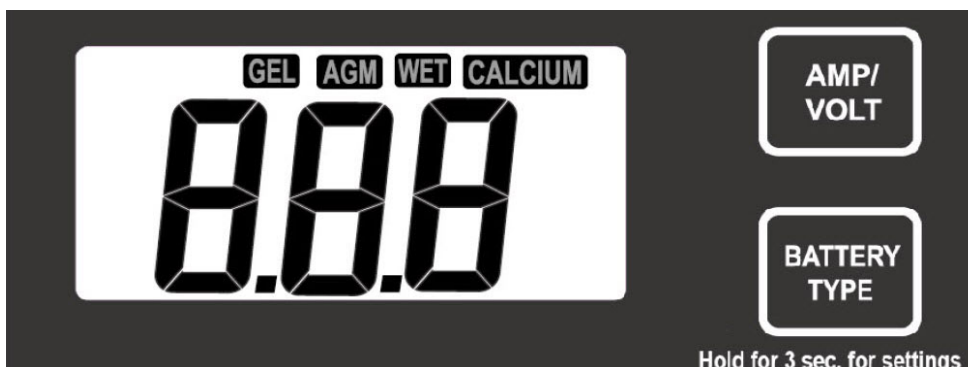
| Length of Wire | Battery Connection | Solar Array Connection | | |
|----------------|--------------------|------------------------|----|-----|
| | < 0.9m | 6m | 9m | 12m |
| Size (AWG) | 18 or 16 | 14 | 12 | 12 |

- Using the stranded wires, screw tightly the wires to the “Solar” terminal on the back of controller and connect to the Solar Panel like shown.
- Using the stranded wires, screw tightly the wires to the “Battery” terminal on the back of controller and connect to the Battery like shown.

When the connections are completed, the Solar Controller will start working automatically.

OPERATION - LCD DISPLAY


Please check your battery manufacturer’s specifications to select correct battery type. The unit provides 4 battery types for selections: Gel, AGM, WET (conventional lead acid), and Calcium.



Press **BATTERY TYPE button** and hold for 3 seconds to go into your battery type selection mode, the battery type you select will be shown on the LCD meter, the default setting is AGM Battery; the controller will automatically memorize your battery type setting.

Caution: Incorrect battery type setting may damage your battery.

When the controller powers on, the unit will run self-qualify mode and automatically show below items on LCD before going into charging process

 Self-test starts, digital meter segments test

 Software version test

 Rated voltage and current test

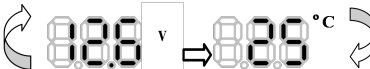
 External battery temperature sensor test (if connected)

After going into charging process, the LCD displays the charging statuses as below:
Press **VOLT / AMP button** in sequence, the LCD will display in turn with Battery Voltage, Charging Current, Charged capacity (Amp-hour) and Battery Temperature (if external temperature sensor connected)

Display in the day time-

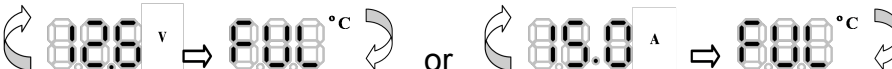


Display during the night-



Display when battery fully charged

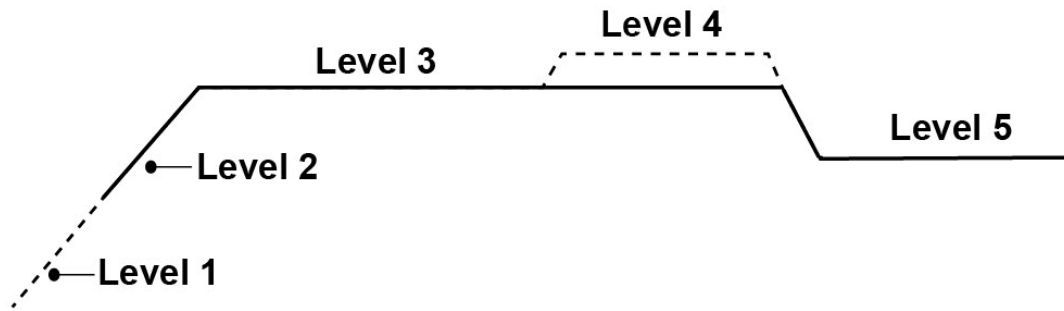
Press **VOLT / AMP button** in sequence, the LCD will display in turn with Battery Voltage, Charging Current, if you do not press the button, the LCD will alternatively display the FUL and VOLT or FUL and AMP every 2 seconds



CHARGING STAGES

The **VOLT / AMP button** can be changed at any time during charging process.

The LCD also can be treated as an independent voltage meter or thermometer.
A voltage less than 11.5V Volts indicates that the battery is discharged and needs re-charging.



Soft Charge- When batteries suffer an over-discharge, the controller will softly ramps the battery voltage up to 10V.

Bulk Charge-Maximum current charging until batteries rise to Absorption level

Absorption Charge-Constant voltage charging and battery is over 85%.






Equalization Charge*-Only for WET battery or Calcium battery type, when the battery is deeply drained below 10V, it will automatically run this stage to bring the internal cells as an equal states and fully complement the loss of capacity.(Gel and AGM battery do not run Equalization charge)





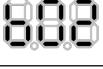







Float Charge-Battery is fully charged and maintained at a safe level.
A fully charged battery has a voltage of more than 13.6 Volts.


OPERATION - L.E.D. INDICATION

| The 6 LED's indicate the charging status and the battery condition | | | | | | |
|--|-------|-------|-------|----------------------------|--------|-------|
| | Red | Blue | Green | Green | Yellow | Red |
| Solar Power Present-No battery connected | ON | OFF | OFF | OFF | OFF | Flash |
| Soft charging | ON | Flash | OFF | OFF | OFF | ON |
| Bulk charging | ON | ON | OFF | Subject to battery voltage | | |
| Absorption charging | ON | ON | OFF | ON | OFF | OFF |
| Equalization charging | ON | ON | OFF | ON | OFF | OFF |
| Float charging | ON | OFF | ON | OFF | OFF | OFF |
| Solar panel weak | Flash | OFF | OFF | Subject to battery voltage | | |
| At night no charge | OFF | OFF | OFF | Subject to battery voltage | | |
| Battery Voltage below 11.5V (+/-0.2V) | ON | ON | OFF | OFF | OFF | ON |
| Battery Voltage between 11.5V - 12.5V(+/-0.2V) | ON | ON | OFF | OFF | ON | OFF |
| Battery Voltage above 12.5V (+/-0.2V) | ON | ON | OFF | ON | OFF | OFF |

ABNORMAL OPERATION MODE

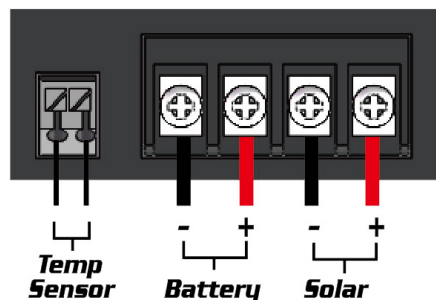
| Solar panel abnormal mode | LCD display | LED indication | LCD backlight |
|------------------------------------|---|--|---------------|
| Solar panel weak | |  Flash | ON |
| Solar panel reverse connection |  |  Flash | Flash |
| Solar panel over voltage (> 26.5V) |  |  Flash | Flash |

| Battery abnormal mode | LCD display | LED indication | LCD backlight |
|--|--|--|---------------|
| Battery disconnected or less than 3.0V |  |  Flash  Flash  Flash | Flash |
| Battery reverse connection |  |  Flash | Flash |
| Battery over voltage than > 17.5V |  |  Flash | Flash |
| Battery temperature over 65C |  |  Flash  Flash  Flash | Flash |

| The solar controller abnormal mode | LCD display | LED indication | LCD backlight |
|--|---|----------------|---------------|
| The controller over temperature protection |  | | Flash |

OPTIONAL EXTERNAL DEVICE

The controller provides an optional devices (excludes in the packaging box).



Optional external Battery temperature sensor:

As an option, the unit provides a port to connect the external battery temperature sensor; If the external battery temperature sensor is connected, the unit will optimize the charging performance subjected to the battery temperature detected and also provide the battery over temperature protection, in some case, if battery over temperature occurs, the controller will automatically stop charging.

SPECIFICATIONS

| | | | | |
|----------|---|------------------------------------|--------|-------|
| 1 | Electrical Parameters | | | |
| 1-1 | Rated solar panel amps for ZS-15A | 15 | Max. | AMP |
| 1-2 | Rated solar panel amps for ZS-10A | 10 | Max. | AMP |
| 1-3 | Normal input Solar cell array voltage | 15-22 | | VDC |
| 1-4 | Max. solar cell array voltage (output has no load) | 25 | Max. | VDC |
| 1-5 | The controller lowest operating voltage (at solar or battery side) | 8V | Min | VDC |
| 1-6 | Standby current consumption at night | 5 | Max | mA |
| 1-7 | Maximum voltage drop-Solar panel to battery | 0.25 | Max. | VDC |
| 2 | Charging characteristics | | | |
| 2-1 | Minimum battery start charging voltage | 3 | Min | VDC |
| 2-2 | Soft start charging voltage | 3-10 | +/-0.2 | VDC |
| 2-3 | Soft start charging current (50% PWM duty) | Up to 15 | | AMP |
| 2-4 | Bulk charge voltage | 10-14.0 | +/-0.2 | VDC |
| 2-5 | Absorption charging voltage at 25°C | | | |
| | --Gel type battery | 14.1 | +/-0.2 | VDC |
| | --AGM type battery (default setting) | 14.4 | +/-0.2 | VDC |
| | --WET type battery | 14.7 | +/-0.2 | VDC |
| | --Calcium type battery | 14.9 | +/-0.2 | VDC |
| 2-6 | Absorption transits to Equalizing or Float condition: | | | |
| | --Charging current drops to | 0.5 | +/-0.1 | AMP |
| | -- or Absorption charging timer timed out | 4 | | Hour |
| 2-7 | Equalization charging active | | | |
| | --Only for WET or Calcium battery | | | |
| | --Battery voltage discharged to less than | 10 | +/-0.2 | VDC |
| | --Automatic equalizing charging periodical | 28 | | Day |
| 2-8 | Equalization charging voltage at 25°C | 15.5 | +/-0.2 | VDC |
| 2-9 | Equalization charging timer timed out | 2 | | Hour |
| 2-10 | Float charging voltage at 25°C | 13.6 | +/-0.2 | VDC |
| 2-11 | Voltage control accuracy | +/- 1% | | |
| 2-12 | Battery temperature compensation coefficient | -24 | | mV/°C |
| 2-13 | Temperature compensation range | -20 ~ +50 | | °C |
| 3 | Protection | | | |
| 3-1 | Against reverse polarity or short circuit at panel side | | | |
| 3-2 | Against reverse polarity or short circuit at battery side | | | |
| 3-3 | No reverse current from battery to solar at night | | | |
| 3-4 | Over temperature protection during charging | 65 | | °C |
| 3-5 | Transient over voltage protection with TVS or varistor | | | |
| 4 | Electrical parts | | | |
| 4-1 | Input output terminal | M4 terminals | | |
| 4-2 | Temperature sensor port (Press and Release type) | DA 250-350 2P | | |
| 5 | Physical Parameters | | | |
| 5-1 | Controller material | Plastic, Standard ABS | | |
| 5-2 | Power terminal maximum stranded wire size | #12 AWG stranded-3 mm ² | | |
| 5-3 | Mounting | Vertical wall mounting | | |
| 5-4 | IP grade | IP22 or IP66, | | |
| 5-5 | Net weight | Approx. 250g | | |
| 6 | Environmental characteristics | | | |
| 6-1 | Operating temperature | -25 ~ 50°C | | |
| 6-2 | Storage temperature | -40 ~ 85°C | | |
| 6-3 | Operating Humidity range | 100% no condensation | | |