



Solar Controller / Battery Charger

Input: DC12/ 24 Volt Solar Panel (Max. 50V)

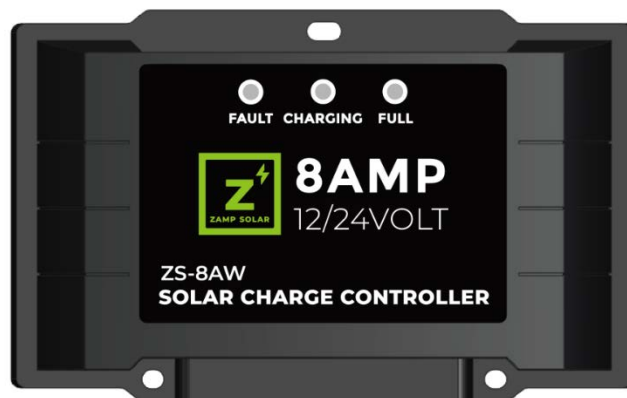
Output: DC 12/ 24V 8A

Model Number: ZS-8AW

User's Manual

FEATURES

- 12 Volt or 24 Volt system compatible, auto-detecting.
- Advanced MCU-controlled pulse width modulated (PWM) technology for high efficiency operation.
- Functions with Gel, AGM, Conventional lead-acid (WET) or LiFePO₄ (LFP) Batteries, user selected via DIP switch.
- Built-in regulator to prevents battery from being overcharged or undercharged. Overcharging occurs when the charge voltage is unregulated. This can result in premature battery failure.
- The unit provides an automatic equalization feature for a deeply drained conventional lead-acid battery.
- 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 the 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 to the solar panel.
- Colored LED’s indicate charging status, battery condition and system fault
- Multi-charging protections against reverse polarity, short circuit, over temperature, over voltage, etc.
- Conformal-coating circuit boards and plated terminals protect from hostile environments.
- Waterproof with IP67 rating.



For use with 12V or 24V solar panels up to 270 Watts

WARNING -- IMPORTANT PLEASE READ

- This charger is designed for indoor or outdoor use.
- Do not disassemble the controller. Contact Zamp Solar Tech Support if the unit requires repair.
- 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 will generate energy even when they are disconnected. Cover the panels with cloth or cardboard to 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.
- Accidental 'shorting' of the terminals or wiring can result in sparks causing personal injury or a fire hazard.
- Always install a 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 on a flat surface using the three plastic spacers and self-tapping screws supplied.

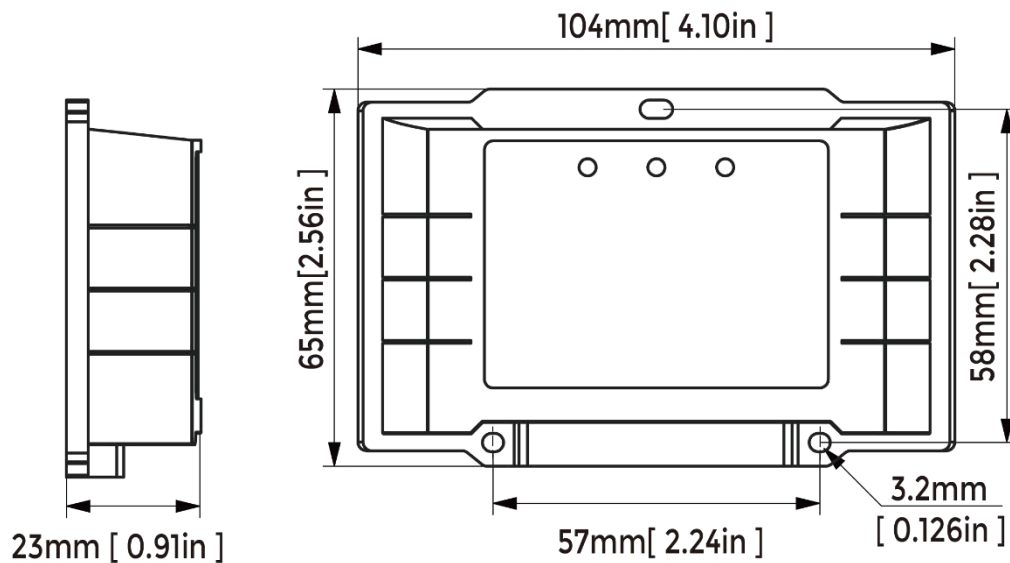


Figure 1.1

WIRING CONNECTIONS

To protect the Battery and the Solar Panel, we strongly recommend that you place a 15A inline fuse on the positive wire on both the “Solar” and “Battery” Circuits. (As close to the battery/ panel as possible). Cover up the panel(s) with cloth or cardboard to block all incoming light during the installation.

The Solar Controller has 4 terminals which are clearly marked ‘Solar’ and ‘Battery’. There is a (12/ 24V) and earth (GND) terminal for each circuit. Refer to the wiring diagram below.

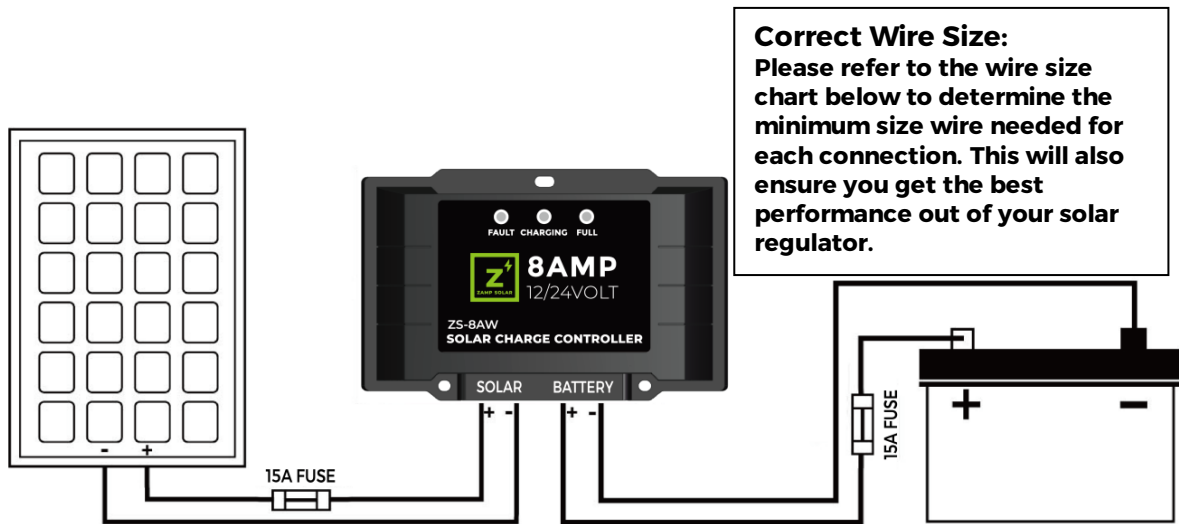


Figure 2.1

	Battery Connection		Solar Array Connection		
Length of Wire	5ft	10ft	10ft	15ft	20ft
Size (AWG)	14	12	14	12	12

1. Insert the positive (+) and negative (-) wires from the solar panel to the “Solar” terminal on the back of the controller and tighten screws firmly.
2. Insert the positive (+) and negative (-) wires from the battery to the “Battery” terminal on the back of the controller and tighten screws firmly.
3. Double check the positive (+) and negative (-) wiring orientation before uncovering the solar panel.

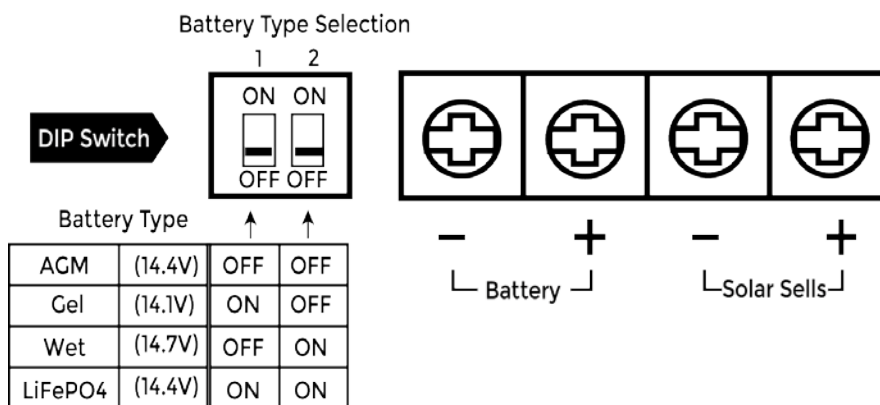
When the connections are completed, the Solar Controller will start working automatically.

BATTERY TYPE SETTING - via DIP switch

Please check your battery manufacturer's specifications to select the correct battery type. The unit provides for 4 battery types: Gel, AGM, WET (conventional lead acid), and LiFePO4.

There is a DIP switch at the back of the solar charge controller, this Dip switch is used for presetting your battery type. Please refer to Figure 3.1 to make DIP switch setting for the proper battery chemical; the factory default setting is AGM battery type.

Note: Once the Dip switch setting is finished, do not change the DIP switch unless disconnected from the battery; otherwise it may damage your battery.



The unit has a 5-stage charging algorithm.

Soft Charge (Level 1) - Bulk Charge (Level 2) - Absorption charge (Level 3) - Equalizing Charge* (Level 4) - Float Mode (Level 5)

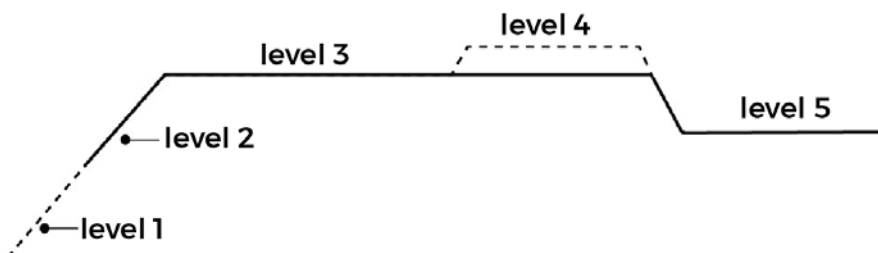


Figure 4.1

- Soft Charge** When a battery suffers an over-discharge, the controller will softly ramp the battery voltage up to 10V.
 - Bulk Charge** Maximum current charging until the battery rises to the Absorption level.
 - Absorption Charge** Constant voltage charge when the battery is over 85%
 - Equalization Charge*** Only for WET battery, when the battery is deeply drained below 11.5V, it will automatically run this stage to bring the internal cells to an equal state to reduce any loss of capacity.
 - Float Charge** Battery is fully charged and maintained at a safe level
- Voltage values are for 12V system, x 2 for 24V system

OPERATION - L.E.D. INDICATION

The 3 LED's indicate the charging status and Fault connection	Fault	Charge	Full
	Red	Blue	Green
Solar Power Present- No battery connected	ON	Slow flash	Slow flash
Battery reversed	ON	Fast flash	Fast flash
Solar panel reversed	OFF	OFF	OFF
Soft start charging	OFF	Slow flash	OFF
Bulk, Absorption, Equalization charging	OFF	ON	OFF
Float charging	OFF	OFF	ON
Solar panel weak	Slow flash	OFF	OFF
At night, no charge	OFF	OFF	OFF

Slow flash = 1Hz flash; Fast flash = 3 Hz flash

SPECIFICATIONS

1	Electrical Parameters			
1-1	Rated solar panel amps	8	Max.	AMP
1-2	Normal input Solar cell array voltage	15-22		VDC
1-3	Max. solar cell array voltage (output has no load)	25	Max.	VDC
1-4	The controller lowest operating voltage (at solar or battery side)	9V	Min	VDC
1-5	Standby current consumption at night	2	Max	mA
1-6	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 4		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
	-- LiFePO4 type battery	14.4	+/- 0.2	VDC
2-6	Absorption transits to Equalizing or Float condition:			
	-- Charging current drops to	0.8	+/- 0.1	AMP
	-- or Absorption charging timer timed out	4		Hour
2-7	Equalization charging active (Only for WET)			
	-- Battery voltage discharged to less than	11.5	+/- 0.2	VDC
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			
	-- for GEL, AGM and WET battery	13.6	+/- 0.2	VDC
	-- for LiFePO4 battery	13.4	+/- 0.2	VDC
2-11	Battery temperature compensation coefficient	-24		mV/°C
2-12	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
4	Electrical parts			
4-1	Input output terminal	M4 terminals		
4-2	Temperature sensor port or DIP switch			
5	Physical Parameters			
5-1	Controller material	Plastic, Standard ABS		
5-2	Power terminal maximum stranded wire size	#12AWG stranded-3 mm ²		
5-3	Mounting	Vertical wall mounting		
5-4	IP grade	IP67,		
5-5	Net weight	Approx. 0.2kg / 0.44lb		
6	Environmental characteristics			
6-1	Operating temperature	-25 ~ 50°C / -13~122°F		
6-2	Storage temperature	-40 ~ 85°C / -40~185°F		
6-3	Operating Humidity range	100%no condensation		

Voltage values are for 12V system, x 2 for 24V system