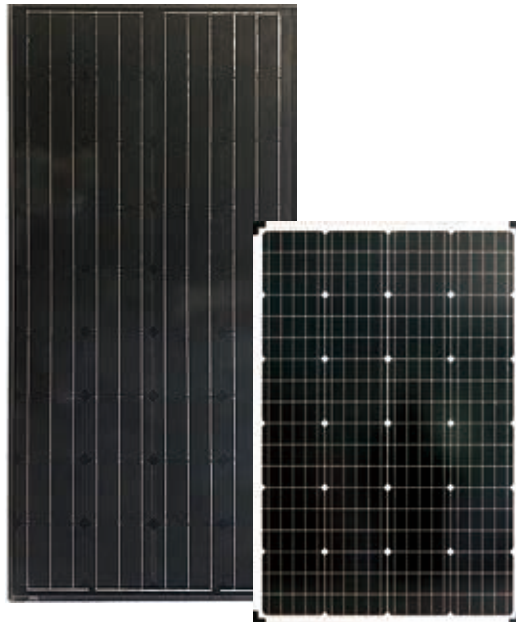




Crystalline Solar Panel and Charging Kit

User Manual



*Actual product appearance can vary depending on solar cells and materials used



WARNING: Read carefully and understand all assembly and operation instructions before operating. Failure to follow the safety rules and other basic safety precautions may result in serious personal injury.

90 Watt 100 Watt 110 Watt 165 Watt 180 Watt 200 Watt 215 Watt

SAVE THESE INSTRUCTIONS

Important Safety Information

Thank you for choosing a Nature Power Product.

Save the receipt and these instructions. It is important that you read the entire manual to become familiar with this product before you begin using it.

This product is designed for certain applications only. The distributor cannot be responsible for issues arising from modification. We strongly recommend this product not be modified and/or used for any application other than that for which it was designed. If you have any question relative to a particular application, Do not use the product until you have first contacted the distributor to determine if it can or should be performed on the product.

For technical question please call 1800-588-0590

WARNING

- Read and understand all instructions. Failure to follow all instructions may result in serious injury or property damage.
- The warnings, cautions, and instructions in this manual cannot cover all possible conditions or situations that could occur. Exercise common sense and caution when using this tool. Always be aware of the environment and ensure that the tool is used in a safe and responsible manner.
- Do not allow persons to operate or assemble the product until they have read this manual and have developed a thorough understanding of how it works.
- Do not modify this product in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the product. There are specific applications for which the product was designed.
- Use the right tool for the job. DO NOT attempt to force small equipment to do the work of larger industrial equipment. There are certain applications for which this equipment was designed. It will be a safer experience and do the job better at the capacity for which it was intended. DO NOT use this equipment for a purpose for which it was not intended.
- Industrial or commercial applications must follow OSHA requirements.



WARNING

This product can expose you to chemicals, including Di (2-ethylhexyl) phthalate (DEHP) which is known to the State of California to cause cancer, birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov



ADVERTENCIA

Este producto puede exponerlo a productos químicos, incluidos Di (2-etilhexil) ftalato (DEHP) que el estado de California sabe que causa cáncer, defectos de nacimiento u otros daños reproductivos. Para obtener más información, vaya a www.p65warnings.ca.gov

Cautions

- Never touch the end of output cables with your bare hands when the modules are irradiated. Handle wires with rubber-gloved hands to avoid electric shock.
- Do not wear metallic jewelry when working on electrical equipment.
- Product should be installed and maintained by qualified personnel.
- Do not drop tool or other item on the glass of the solar module.
- Do not scratch the back film of the solar panel.
- Avoid exposing solar panels to partial sunlight or shadows. Partial sunlight can cause hot spots on the panel.
- Do not pour chemicals on module when cleaning.
- Keep module away from children.

Precautions when working with batteries

- Never smoke or allow a spark or flame near the batteries.
- Batteries generate hydrogen and oxygen during charging resulting in evolution of explosive gas mixture. Care should be taken to ventilate the battery area and follow the battery manufacturer's recommendations.
- Batteries contain very corrosive diluted sulphuric acid as electrolyte. Precautions should be taken to prevent contact with skin, eyes or clothing.
- Use caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and could cause an explosion.
- Remove metal items like rings, bracelets and watches when working with batteries. The batteries can produce a short circuit current high enough to weld a ring or the like to metal and thus cause a severe burn.
- If you need to remove a battery, always remove the ground terminal from the battery first. make sure that all the accessories are off so that you do not cause a spark.
- Use properly insulated tools only when making battery connections.

Precautions when working with solar panels

With the incidence of sunlight or other light sources on all solar panels, a voltage appears at the output terminals of the solar panel turning it into a source of electricity. To avoid a shock hazard make sure the solar panel is covered with an opaque (dark) material such as paper/cloth during the installation. Do not make contact with the terminals when the panel is exposed to sunlight or other light sources.

Precautions when working with Charge Controllers

If two or more solar panels are connected in series/parallel make sure that the sum of the short circuit current ratings of all panel strings does not exceed 80% of the charge controller's current rating.

Parts List

| Parts Description | Quantity | | | | | | |
|-----------------------------|----------|------|------|------|------|------|------|
| | 90W | 100W | 110W | 165W | 180W | 200W | 215W |
| Solar panel | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SAE to bare end cable | 1 | - | 1 | 1 | 1 | 1 | 1 |
| SAE to battery clamp cable* | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Z bracket / set | 1 | - | 1 | 1 | 1 | 1 | 1 |
| Manual | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Charge controller | Optional | | | | | | |
| Power Inverter | Optional | | | | | | |

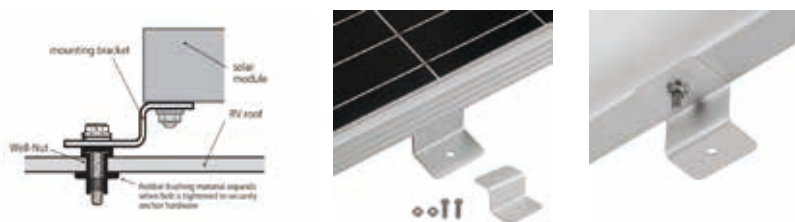
* This cable can be "Battery clamp to Bare end" in some model.

Specification

| Property | 90W | 100W | 110W | 165W | 180W | 200W | 200W | 215W |
|------------------------------|-------------|--------|---------|---------|---------|---------|-----------|---------|
| Solar Cells | Crystalline | | | | | | | |
| | | | | | | | Indonesia | Vietnam |
| Maximum Power(Pmax) | 90 W | 100 W | 110 W | 165 W | 180 W | 200 W | 200 W | 215 W |
| Current at Pmax(Imp) | 5.12 A | 5.65 A | 5.81 A | 8.72 A | 9.51 A | 9.85 A | 9.62 A | 9.85 A |
| Voltage at Pmax(Vmp) | 17.64 V | 18.0 V | 18.90 V | 18.94 V | 18.94 V | 20.31 V | 20.75 V | 21.8V |
| Short Circuit Current(Isc) | 5.49 A | 5.74 A | 6.27 A | 9.41 A | 10.34 A | 10.33 A | 9.96 A | 10.24 A |
| Voltage at open circuit(Voc) | 22.12 A | 21.6 V | 22.31 V | 22.31 V | 22.31 A | 24.35 V | 24.75 V | 25.33 V |

Mounting the Solar Panel

Mounting the solar panels that is free from shade and located in an area that receives maximum sunlight daily. In the Northern Hemisphere, The best direction to face solar panels is south. However, using your judgment in figuring out which location gets the most sun, would be helpful. For maximum solar power absorption through out the day, a tilt-mounting is recommended.



The solar panels can be permanently installed level using the Z-brackets.

Measure the distance between the mounting site and the battery location. The charge controller should be mounted in close proximity to the battery bank (within 5 feet). Refer to the DC electrical wire guide to choose an appropriate gauge wire for the length of the wire.

If you choose to mount your Solar Panel on your RV, be sure you solidly mount your panels to the roof. If you have a rubber roof over thin plywood you may want to use molly fasteners to get a better grip. If you have a fiberglass roof, drill some pilot holes through the fiberglass to reach plywood below. This will prevent cracking or damaging the fiberglass. If your RV is equipped with a metal roof you must mount the solar panel to the joists supporting the roof.

Installing Instructions

Selecting the correct charge controller

Charge Controllers are sold separately and are required for installations of solar systems arrays that are rated 12 Watts and higher. Nature Power Products offers charge controllers from 8Amp-32Amp. One Charge Controller can regulate multiple solar panels.

Selecting the correct battery

Nature Power does not offer batteries. However, please choose a 12 Volt rechargeable battery. Do not attempt to recharge non-rechargeable batteries. 6 Volt battery configurations may also be used if connected in series (Negative to Positive). You may choose a Sealed Lead Acid battery, a Gel-Cell or a Deep Cycle 12 Volt battery. Batteries come in all different sizes, please converse with your battery dealer for more information on which type of battery you should use for your system. Note your solar panel amperage rating when selecting your battery size.

Location of solar module

Please locate your solar module in a position where it can absorb direct sunlight on the solar panel, and generally free from cover and shade. To capture the most sunlight in a day Solar Modules should be facing 20 degrees South if you are in the Northern hemisphere and 20 degrees North if you are in the Southern hemisphere. The Solar Module can become very hot, please keep out of reach of children. Do not place heavy objects on Solar Module.

Out put power testing

You may use a voltage meter or a digital multi-meter to measure the voltage of your Solar Module before connecting to the battery. Voltage can range between 15-22 volts; Testing will ensure correct charging operation. Testing equipment not included.

Electrical installation

Please refer to the charge controller section.

Connecting power inverter

Please refer to the power inverter Manual.

*Power inverter is optional and may not be included.

Charge Controller

Intended Use

Any solar panel that is rated 12 watts or higher requires the use of a charge controller , The Charge controller is designed to protect your 12 Volt batteries from being overcharge and prevents discharging of the battery overnight. Never deeply discharge your battery; never let your battery voltage pass below 11.0 volts. It will cause permanent damage to the battery. Use a DMM Digital Multi-Meter to measure your battery's voltage.

Safety Instructions

- Make sure your battery has enough voltage for the controller to recognize the battery type before first installation.
- The battery cable should be as short as possible to minimize loss.
- The regulator is only suitable for lead acid batteries: AGM, GEL. it is not suited for nickel metal hydride, lithium ions or other batteries.
- The charge regulator is only suitable for regulating solar modules. Never connect another charging source to the charge regulator.

Operating Instructions

- Observe manufacturer's safety procedures when working around batteries and other electrical equipment.
- Always connect charge controller to the battery first and remove last.
- This product is designed to be used on 12 volt configurations in parallel,
*Optional 2x6 volt in series.
*Optional 24 volt while using controller with LCD display as shown in this manual.
- This product is designed to receive charges from 12 Volt Solar Panels.
- This product should be placed in a well ventilated dry area, free from flammable gases, weather, and moisture. Charge controller is NOT weatherproof.
- Charge controller should not be installed further than 2 to 5 ft. way from the battery. Solar Panel distance must not reach further than 20 ft way from battery or loss of current may occur.

Charge Controller With Indicate Light

Specification

| Model | 60011 | 60012 |
|--------------------------|----------|-------|
| Battery Voltage | 12V Only | |
| Cut-in Voltage | 13V | |
| Cut-out Voltage | 14.2V | |
| Max Input Charge Current | 11A | 12A |



LED light indicates a full battery charge "green" at 14.2 Volts, at this time the charge controller will cut out to prevent overcharging.

LED light indicates battery charging "yellow" when battery reaches below 13 Volts, charge controller will cut in and allow solar panel to being charging.

Electrical Installation

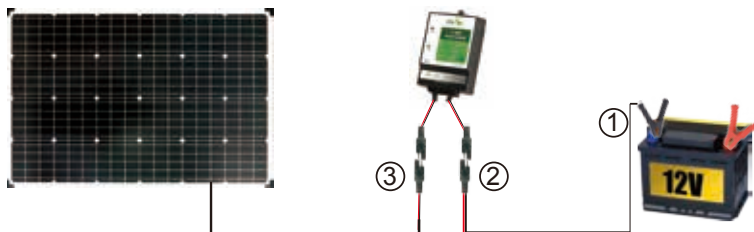
Please confirm that you have all parts to your system before starting installation.

*** Charge controller is optional and may not be included. below image just showing how to connect the solar panel to charge your battery. Reverse below steps to uninstall.**

Step1 Connect the battery with SAE-battery clamp cable, Always connecting the positive to positive, negative to negative.

Step2 Connect the SAE connector to charge controller (battery side of charge controller)

Step3 Connect the solar panel to charge controller (solar panel side of charge controller)



Charge Controller With LCD Display

Features

1. Build-in industrial micro controller.
2. Big LCD display. all adjustable parameter.
3. Fully 4-stage PWM charge management.
4. Build-in short-circuit protection, open-circuit protection, reverse protection, over-load protection.
5. Dual mosfet Reverse current protection, low heat production.



Specification (For charge controller with LCD display)

| MODEL | | NPCC11 | NPCC13 | NPCC20 |
|------------------------------|------------|-----------------------------|--------|--------|
| Battery Voltage | | 12V/24V Auto | | |
| Max Input Charge Current | | 11A | 13A | 20A |
| Max Discharge Current | | 11A | 13A | 20A |
| Max Solar Input | | <50V | | |
| Equalization* | B01 Sealed | 14.4V | | |
| | B02 Gel | 14.2V | | |
| | B03 Flood | 14.6V | | |
| Float Charge Voltage* | | 13.7V (Default, Adjustable) | | |
| LVD(Low Voltage Disconnect)* | | 10.7V (Default, Adjustable) | | |
| LVR(Low Voltage Recovery)* | | 12.6V (Default, Adjustable) | | |
| USB Output | | 5V/3A | | |
| Self-Consumes | | <10mA | | |
| Operation Temperature | | -35~+60 C | | |
| Size / Weight | | 150*78*35mm / 150g | | |

*Value x2 while using in 24V system

Electrical Installation

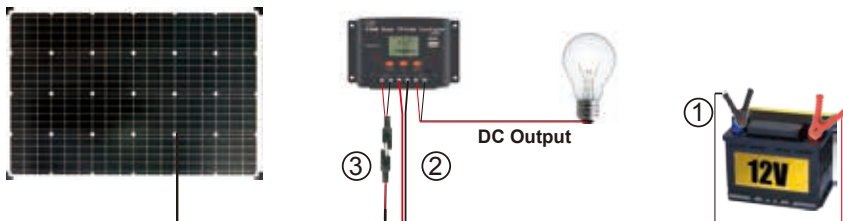
Please confirm that you have all parts to your system before starting installation.

*** Charge controller is optional and may not be included. below image just showing how to connect the solar panel to charge your battery. Reverse below steps to uninstall.**

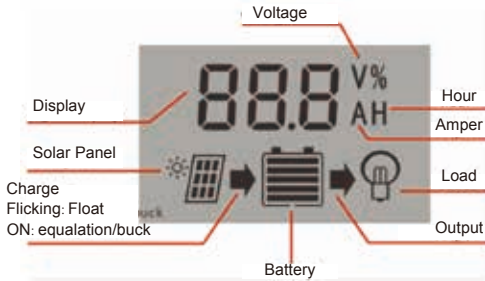
Step1 Connect the battery with Bare end-battery clamp cable, Always connecting the positive to positive, negative to negative.

Step2 Connect the bare end to charge controller (battery side of charge controller)

Step3 Connect the SAE-bare end cable to charge controller (solar panel side of charge controller), and use the SAE connector to connecting solar panel.



LCD Display / Setting

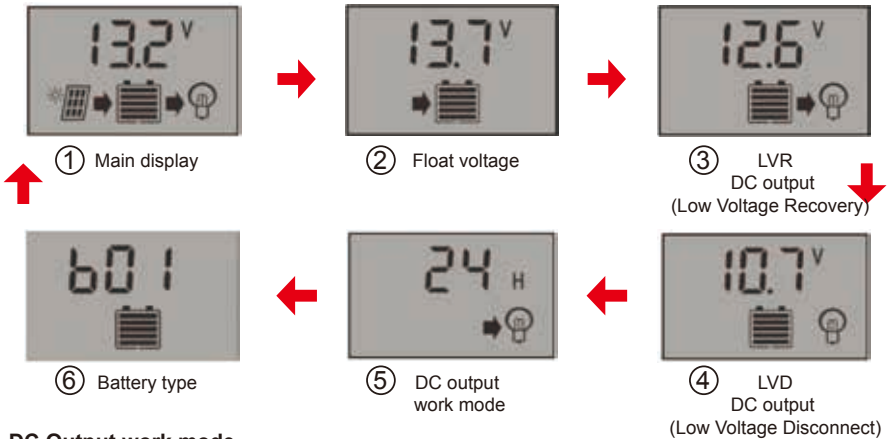


| | | |
|--|-----------------|--|
| | MENU | Switching display, or to enter/exit setting by long Press. |
| | UP | Press to increase value |
| | DOWN/ ON/OFF | Press to increase value |

Press MENU to browse different interface.

In interface 2-5, long press MENU to enter setting, and using [UP] [DOWN] to set the parameter, long press MENU again to exit.

long press [DOWN] to restore parameter.



DC Output work mode

1. Press the [Down] button to ON/OFF load manually at main display.

2. Selecting work mode as below:

(24H) load output 24 hours

(1-23H) load on after sunset and closed after setting hours

(0H) Dusk to dawn

Trouble shooting

| Situation | Probable cause | Solution |
|-------------------------------|--|---------------------|
| Charge Icon Not On When Sunny | Solar panel opened or reversed connect | Reconnect |
| Load Icon Off | Mode setting wrong | Adjust setting |
| | Battery low | Charge battery |
| Load Icon Flashing | Over load | Reduce load power |
| | Short circuit protection | Auto reconnect |
| Power Off | Battery low | Check battery |
| | Reverse connection | Check and reconnect |

Trouble Shooting

Battery are not charging.

- Check your controller and battery first of all , make sure it's a workable 12V battery (or 24V while with the charge controller model NPCC11 / NPCC13 / NPCC20). battery voltage should not lower than 11V(12V battery) / 22V(24V battery).
- Faulty connections
The wires should always be water tight and insulated. Poor wiring may cause loose connections, corrosion and oxidation of the wires. Voltage levels at various parts of your connection can be checked by a multimeter to help you find out the points at which low voltage problems start. Do not connect the solar power to the controller during the solar power voltage check.
- Solar panel faults
This condition is not common as most of the solar panels are able to sustain harsh weather conditions and last for a long period of time. Checking on your solar panels is also advised as the last resort. The main defects a solar panel may experience are: Delamination, junction box faults (increased resistance in the junction boxes due to exposure to moisture).

Low power output from Solar panel / Battery charging slow.

- Shading
Shading should always be avoided at all times. Shading causes massive loss of power output and solar panels need high exposure to sun light so as to produce high power outputs. One should always make sure that there are no tree branches blocking the solar panels from direct sunlight. Dust and debris also causes shading. Solar panels should always be cleaned to prevent dust and debris particles from causing shading on the solar panels.

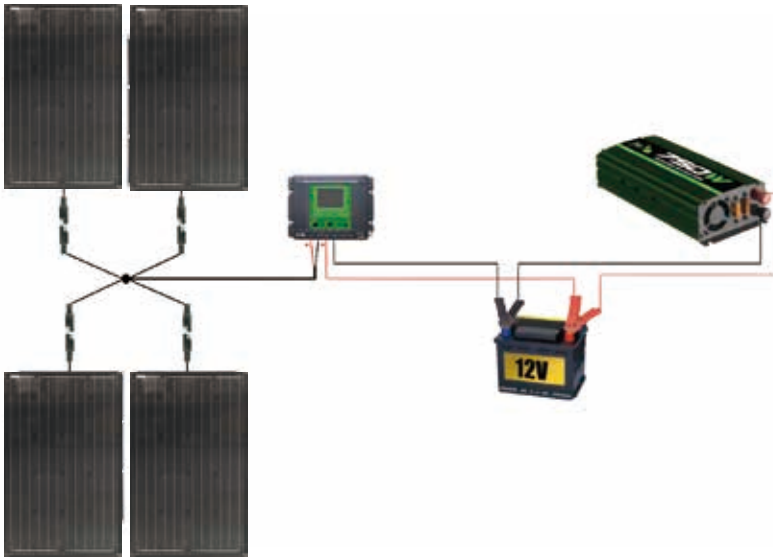
Solar Panels Weekly Power Chart

Please noted all run times/ratings are estimates only and may vary depending on your location, time of day, time of year and are based on 7 Hours of full sunlight per day.

| Solar panel Rated Hourly (Maximum output) | 90W | 100W | 110W | 165W | 180W | 200W |
|--|------------|-------------|-------------|-------------|-------------|-------------|
| Weekly Output | 4.4KW·h | 4.9KW·h | 5.39KW·h | 8.08KW·h | 8.82 KW·h | 9.8 KW·h |
| Weekly Power Run Time | | | | | | |
| Fluorescent Light 40 watts | 110 hr | 122 hr | 134 hr | 202 hr | 220 hr | 244 hr |
| Laptop 20-50 watts | 88 hr | 98 hr | 107 hr | 161 hr | 176 hr | 196 hr |
| Fan 80 watts | 55 hr | 61 hr | 67 hr | 101 hr | 110 hr | 122 hr |
| PC 80-150 watts | 29 hr | 32 hr | 36 hr | 54 hr | 58 hr | 64 hr |
| 40" Television/ Projector 200 watts | 22 hr | 24 hr | 28 hr | 40 hr | 44 hr | 48 hr |
| Coffee Maker 1000 Watts | 4.4 hr | 4.9 hr | 5 hr | 8 hr | 8 hr | 9.8 hr |

Connecting Additional Solar Panels

Go to www.naturepowerproducts.com
for a larger selection of renewable energy products and accessories,
*400 watt solar system with 30 Amp charge controller and DC to AC power inverter.
(Not included, sample display only!)



FAQ

- **Will this solar panel work with a 24V battery?**

This solar panel can use with 24V battery while the charge controller are suitable for 24V system. Please call Nature Power Customer Service for more 24V system configuration.
- **How do solar system work?**

The panel's photovoltaic cells convert the energy in sunlight to electricity, the electricity is then stored in the battery and an inverter will allow you to plug in appliances. there is 4 major components needed to set up your solar off grid system. Solar panels, charge controller to control the charge to the battery bank, a battery for power storage and an inverter to transfer DC power from the battery to an AC power.
- **Do I need a battery to store Power?**

Yes, a battery is needed to store the power from the solar panel, the inverter will also connect to the battery.
- **What size battery can I use?**

The amount of battery storage you need is based on your energy usage. Energy usage is measured in Watts or kilowatt hours over a period of time. You can use any size battery, best used with Deep Cycle batteries.
- **Can you connect this to the breaker box in the house?**

No, this is an off grid only solar kit, you can not connect to the breaker box.
- **How to use a charge controller?**

Charge controllers are required for installations of solar systems arrays that are rated 12 Watts and higher. Charge Controllers help to protect the battery(s) and solar panel(s) from harmful reverse currents, battery over charging and high wattage surges, addition protections are found on larger charge controllers. Nature Power Products offers charge controllers from 8Amp-32Amp. One Charge Controller can regulate multiple solar panels.
- **How should my solar panels be positioned in order to produce the most power?**

In the Northern Hemisphere, The best direction to face solar panels is south. However, using your judgment in figuring out which location gets the most sun, would be helpful.
- **Does the panels need to be in direct sun to work?**

No, although solar panels produce the highest wattage output in direct sunlight, they will still produce power on cloudy days.
- **Will I need solar maintenance?**

Solar panels generally require very little maintenance. They are very durable but should always be cleaned to prevent dust and debris particles from causing shading on the solar panels. batteries might need to be changed every few years.
- **How long does installation take?**

This is a very basic setup plug and play, however, installing the panel to a flat surface might require able bodies with a little bit of know how's.
- **On what roof materials can solar be installed?**

Solar panels can be installed on any roof material that can take the weight of the panel. properly mounted solar panel system is essential, as a an improperly mounted solar panel can cause leaks or other roof issues.

Limited Warranty

Nature Power warrants our products to the original purchaser that this product is free from defects in materials and workmanship for the period of 1 year from date of purchase, 25 year warranted to generate up to 80% of rated power from date of purchase. In the case of product defect, contact Nature Power customer service to receive trouble shooting. If defective part or unit should be returned, a Return Authorization Number must be issued by Nature Power and the defective part or unit should be returned to the authorized location at the purchasers' expense. A dated proof of purchase is required to receive warranty service. Once received at authorized location and defect proves to be the result of defective material and workmanship, the defective part or unit will be replaced at warrantors' option and returned to the original purchaser at warrantors' expense. No refunds will be granted by the warrantor, in the event of buyer's remorse please contact your point of purchase within and in adherence to their return policy. Refunds are granted at the retailers' discretions.



Please contact Nature Power Products to acquire more information:

1-800-588-0590

info@naturepowerproducts.com

www.naturepowerproducts.com