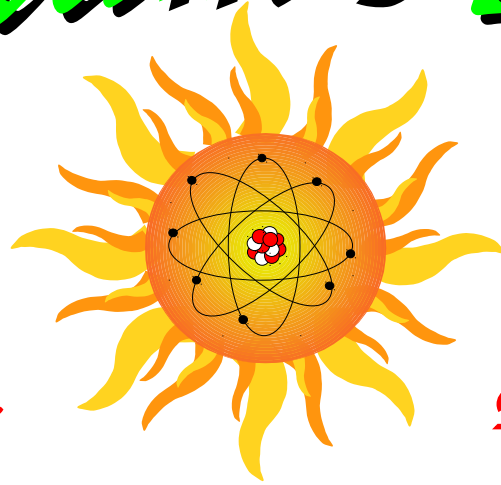


Quantum Harvest[®]

*Faraday
Enclosures*



*Portable Solar
Power Stations*

Owner's Manual

Quantum Harvest Model 3000-60 TSW



Introduction

Congratulations on your purchase of a Quantum Harvest EMP protected* portable solar power station! These units have been carefully designed and hand-crafted to provide many years of trouble-free operation. In the unlikely event of malfunction, we offer a 1 year warranty on the batteries (if provided by us.); 3 years on the inverter and charge controllers; 5 years on everything else. For warranty details, see page 34.

To obtain maximum performance and long life from your new power station, it is important to gain a basic understanding of how such units operate and their limitations. The heart of the unit, and it's main component, is the battery bank. This is where the energy from the solar panels or the included 120 volt AC battery charger is stored for later use. The particular batteries I have selected are state of the art deep-cycle Absorbed Glass Mat (AGM) medical-grade batteries. These batteries are maintenance free and can be stored and used in any position. Since they do not give off gases as they charge, there is no danger of fire and they never need to have water added.

To obtain maximum life from these, or any other batteries, it is important to try to avoid deep cycling, that is, drawing them down flat before allowing them to recharge. Sometimes this cannot be avoided, but if at all possible, strive to avoid doing so.

Another important component is the inverter. This is the device that converts the low voltage DC current from the batteries into the high voltage AC current that we are familiar with. (All Quantum Harvest power stations also have 12 volt DC receptacles and USB charging sockets for the appropriate devices, in addition to standard 120 volt AC house current.) The inverter is protected internally from overheating and low battery voltage, and externally from over-current draw by a 400 ampere ANL type fuse. The Model 3000 will sustain a continuous 3000 watts of current, and will briefly provide up to 6000 surge watts, to start motors and other inductive loads. The inverter relies on air flow around and through the unit to cool it, therefore it is imperative that the inverter not be used with the enclosure door closed.

Another important part is the solar panels. We currently offer a choice of a 100 watt single-panel mobile assembly, as well as a 200 watt dual-panel mobile assembly, and a 300 watt, three panel assembly. All our models of power stations can also be purchased without solar panels, allowing the client to supply their own panels, if they so desire. We recommend an absolute minimum of 100 watts rated panel capacity, and 200 or even 300 watts would be better. If unsure, email us at support@quantumharvest.net with the specifications of the proposed panels and we can quickly look them up and confirm whether or not they will work.

**A quick note on EMP*

*An EMP, or **E**lectro-**M**agnetic **P**ulse is a devastating phenomenon that, while harmless to living things, absolutely destroys anything electronic. It consists of extremely powerful electromagnetic fields building and collapsing hundreds of thousands of times per second. This induces potentially huge electric currents in anything that conducts electricity, causing components connected to said conductor to burn out. An EMP can be caused by either a deliberate, high-altitude nuclear warhead detonation, or can be caused naturally by a solar event called a Coronal Mass Ejection, or CME.*

All Quantum Harvest power units are built into a specially designed enclosure, more properly called a Faraday Cage, named after Michael Faraday, an early pioneer in electromagnetic research. The purpose of a Faraday cage is to intercept and divert electromagnetic energy away from the box's interior, thus protecting the contents.

The principles involved are fairly simple, but the proper execution is critical. In order for the enclosure to be useful, it must have a door, but any opening larger than a square centimeter or so allows too much energy to penetrate the interior, thus defeating the purpose of the Faraday cage.

The solution to this conundrum is to gasket the door with a special type of conductive gasket, mated to a copper or silver strip that is electrically bonded to the main box. The key is to have very low electrical resistance between the door and the enclosure, with no gaps. This is not as easy as it sounds, and requires special materials designed specifically for this application.

My experience with Faraday apparatus comes from 8 years experience with very powerful industrial machines called RF welders. These machines use extremely powerful and focused bursts of electromagnetic energy to weld and form plastic parts. These machines basically create a local EMP every time they fire, and it is critical that stray energy be confined and dissipated safely to avoid damage to other sensitive electrical machinery.

Table of Contents

Specifications.....	Page 4
Note on Batteries.....	Page 5
Section 1.....Capacities and recommended usages.....	Page 6-7
Section 2.....Controls/Circuit Protection Devices.....	Page 8-10
Section 3.....External Ports and Connectors.....	Page 11-13
Section 4A.....General Operation and Routine Maintenance.....	Page 14
Section 4B.....Using the 220 volt sub-system.....	Page 15
Section 4C..Using the Solar Panel Assembly(s) and AC charger....	Page 16-19
Section 5.....Using Booster Cables.....	Page 20-22
Section 6A.....Power Board Removal, Re-installation.....	Page 23-25
Section 6B.....Battery Removal, Re-installation.....	Page 26-28
Section 6C.....Soft-start Module Removal, Re-installation.....	Page 29
Section 6D.....Control Panel Removal, Re-installation.....	Page 30-32
Troubleshooting.....	Page 33
Contact Information.....	Page 33
Warranty Information.....	Page 34
Addendum A....Replacement of Solar Panel Diodes.....	Page 35-36
Addendum B....Bypassing the Soft-start Module.....	Page 37

Base Unit Specifications

Assembled Dimensions:	30.5”H x 47.5”O.A.L x 19.5”W
Assembled Weight:	430 lbs.
Inverter:	Samlex America 3000 watt true sine-wave
Battery Bank:	4 AGM Deep-Cycle Batteries, 110 amp/hrs each.
Battery Bank Capacity:	440 Amp/hours, 5,280 Watt/hours
AC Charger:	20 Amp Smart Battery Charger
Solar Charger/Controller:	Instapark 60 Amp MPPT Solar Power Charge Controller.

Solar Panel Assembly Specifications (300 Watt Model)

Assembled and folded Dimensions:	50.75”H x 8”D x 25.5”W
Unfolded Dimensions:	47.75”H x 60”W
Assembled Weight:	68.2 lbs.
Rated Output (Nominal)	Optimum Operating Voltage (Vmp): 18.9V Optimum Operating Current (Imp): 15.87 A Open - Circuit Voltage (Voc): 22.5 V Short- Circuit Current (Isc): 17.25 A Maximum Power at STC: 300 W Operating Module Temperature: -40°C to + 90°C

In this manual, the following symbols are used to highlight important facts:



Denotes circumstances where failure to follow the procedures outlined in the manual may result in property damage.



Denotes circumstances where failure to follow the procedures outlined in the manual may result in personal injury or death.

Always remember that electricity is utterly devoid of mercy and never grants second chances!

Note on Batteries

This Quantum Harvest power station is designed to use AGM batteries that measure 12.91” Long, by 6.77” Wide by 9.29” High. The particular battery model we use is the UB121100 110AH model. Other models of similar dimensions and specifications will also work.



Caution Although the low voltage at the battery terminals means that electrical shock or electrocution is impossible, nonetheless, batteries store an enormous amount of potential energy, that if accidentally released by a short-circuit, can melt metal tools, start fires and cause personal injury. Eye protection **MUST BE WORN** whenever working with batteries of this size, and extreme care must be exercised at all times. Anything electrical is unforgiving of mistakes.



!Warning! Note that although the voltage at the battery terminals is insufficient to shock a person, the current coming from the inverter receptacles is 120 volt house current, and that is indeed capable of inflicting a severe, potentially fatal shock. Always be sure that extension cords are not frayed or worn, and that all equipment plugged into the inverter is in a safe condition.

Section 1: Capacities and recommended usages

This 3,000 watt model is the next-to-largest true sine-wave unit we currently produce, and with it's premium, industrial-grade Samlex inverter with proven soft-start technology, will reliably start and power anything within it's capability, even fussy items that will not run with cheaper, modified sine-wave inverters. It will run full-size refrigerators and freezers, table saws and chop saws, as well as any hand-held tools, such as drills, grinders and circular saws, etc. It will also, of course, power smaller items such as TVs, cell phones, laptops, tablets, etc.

This Model is available with an optional transformer and proprietary soft-start mechanism to augment the built-in system in the inverter, which allows it to reliably start and power up to to a 1 hp submersible well pump. It is NOT recommended to power large resistive loads like central air-conditioners, water heaters and electric space heaters, as well as large electric motors, such as industrial air compressors, etc.

Used within it's limits, this unit will provide many years of trouble-free service, and be a joy to own and use. But like most things, if you push it beyond it's limits, you will be plagued by expensive repairs and poor performance.

This machine contains a battery bank of four, 110 amp/hour batteries, for a total capacity of 440 amp/hrs. How much real power is that? If we multiply the 440 amp/hours by the nominal voltage (12 volts), we get a capacity of 5,280 watt/hours (watts = volts times amps). This machine will run a full-sized refrigerator or freezer for several days, even without the solar panels hooked up.

On the next page is a partial list of common electrical appliances and their approximate loads, provided in part by the good folks at: <http://www.energy.gov>

Appliance	Watts used	Load type		Quantum Harvest Model			
		R= Resistive					
		I= Inductive	Notes	1500	2500/2505	3000	
Aquarium	50-1210	R	1	X	X	X	X
Clock radio	10	R	2	X	X	X	X
Coffee maker	900-1200	R	2	X	X	X	X
Clothes washer	350-500	I		X	X	X	X
Clothes dryer	1800-5000	R					
Dishwasher	1200-2400	R					X
Dehumidifier	785	I		X	X	X	X
Electric blanket (Single/Double)	60-100	R		X	X	X	X
Fans:							
Ceiling	65-175	R		X	X	X	X
Window	55-250	R		X	X	X	X
Furnace	750	R		X	X	X	X
Hair dryer	1200-1875	R	3		X	X	X
Heater (portable)	750-1500	R	3		X	X	X
Clothes iron	1000-1800	R	3		X	X	X
Microwave oven	750-1100	R	2	X	X	X	X
Personal computer (desktop w/LCD monitor)	150	R		X	X	X	X
Radio (stereo)	70-400	R		X	X	X	X
Refrigerator (frost-free, 16 cubic feet)	725	I		X	X	X	X
Televisions-CRT (color)							
19"	65-110	R		X	X	X	X
27"	113	R		X	X	X	X
36"	133	R		X	X	X	X
53" - 61" Projection	170	R		X	X	X	X
Flat screen	120	R		X	X	X	X
Toaster	800-1400	R		X	X	X	X
Toaster oven	1225	R	3	X	X	X	X
VCR/DVD	17-21 / 20-25	R		X	X	X	X
Vacuum cleaner	1000-1440	R	3	X	X	X	X
Water heater (40 gallon)	4500-5500	R		NR	NR	NR	NR
Water pump, 1/3 to 1/2 hp (120 volt)	500-1100	I	4		X		X
Water pump 1/2 to 1 hp (220 volt)	1000-3000	I	4				X
Water bed (with heater, no cover)	120-380	R		X	X		X

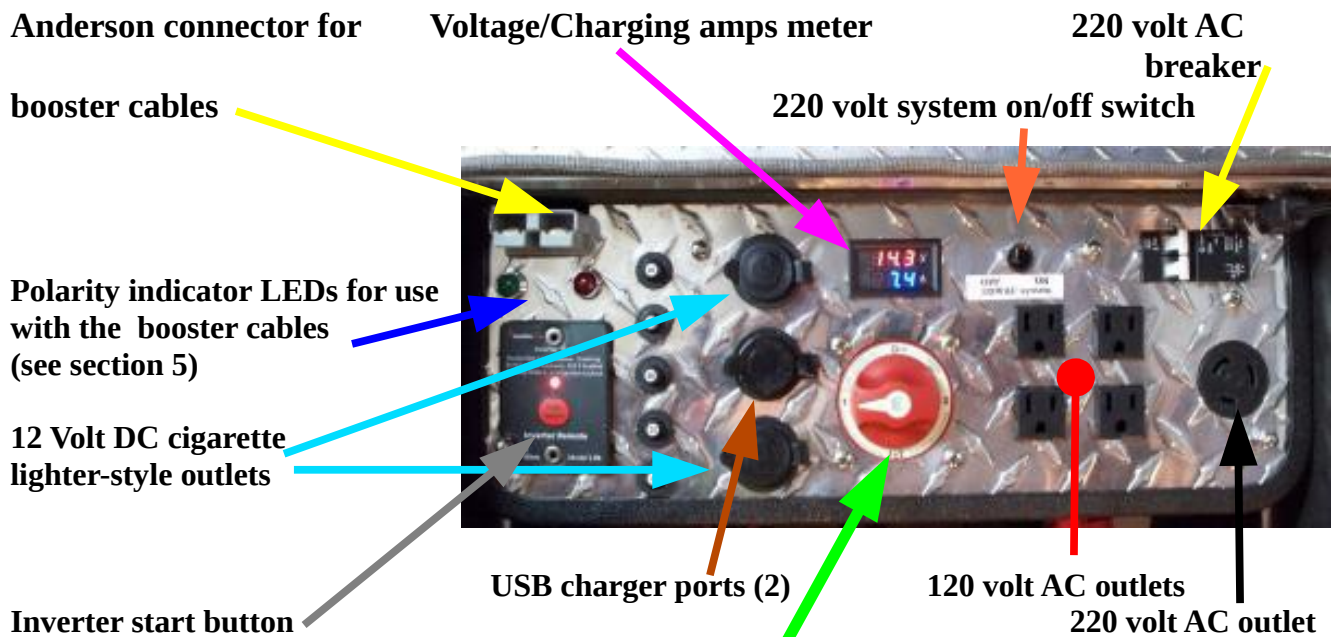
Notes: 1=Higher wattage indicates use of an aquarium heater. 2= May have difficulty with Modified sine-wave inverters
3= High power usage, but usually short duration. 4= High surge requirement for starting.

Section 2: Controls/Circuit Protection Devices

There is one main fuse, a 400 ampere ANL type fuse, shown to the right, located beside the inverter. There is one spare fuse included in the spare parts kit. To replace the fuse, first, be sure the main switch is turned off, then, using a 9/16" wrench, remove the two nuts. Lift the fuse out and place the new one over the studs; reapply the nuts, being careful to not over-tighten.



Detail of Main Control Panel



Main Switch; 4 positions available.

Off position isolates the inverter and control panel from the batteries.

Position #1 is the normal use position in which the unit draws from the internal battery bank.

Position #1&2 is the position used when using the booster cables, and allows the unit to run from both the internal battery bank and the vehicle's charging system.

Position #2 is not normally used, and allows the load to be run directly from an automobile's charging system, bypassing the internal battery bank.

Detail of Main Panel Circuit Breakers

40 amp for AC charger

30 amp for right-most
120volt outlets

30 amp for left-most 120volt
outlets

20 amp for 12 volt DC outlets

5 amp for USB charger,
and soft-start module
control system



20 amp, 220 volt AC breaker

Detail of AC Charger

Battery voltage selector

Battery type selector

Max. charge current
selector

Initiate charging sequence button



Display toggle between % charge and
battery voltage button

Detail of Solar Charger/Controller and related circuit-breakers

The solar charge controller is completely automatic, and requires no user intervention or maintenance.

Steady red light indicates batteries are being charged, blinking red light indicates full charge.

Yellow light indicates connection to battery bank.

Green light in the middle may be ignored in this application.



Right; The solar charge controller is protected by 2, 70-amp circuit-breakers. It is recommended that they be kept in the disconnected position (shown) until the solar panels are plugged in; then push the red levers down to latch, turning the breakers on. To shut off, depress the red button to the left of the levers. These breakers both must be engaged to charge the batteries from the solar panels.



Section 3: External Ports and Connectors

The external ports/connectors for attaching the power cord for the AC charger and the solar panels are located on the latch side of the unit.

External Connector Location



AC Charger port



Insert the plug into the socket with the silver tab on top, and turned slightly to the left. Push it in fully and gently twist it clockwise until it latches. To remove, use your thumb to pull the silver tab toward you, then twist the plug counter-clockwise and pull it out of the socket.

Solar Panel Connector Port

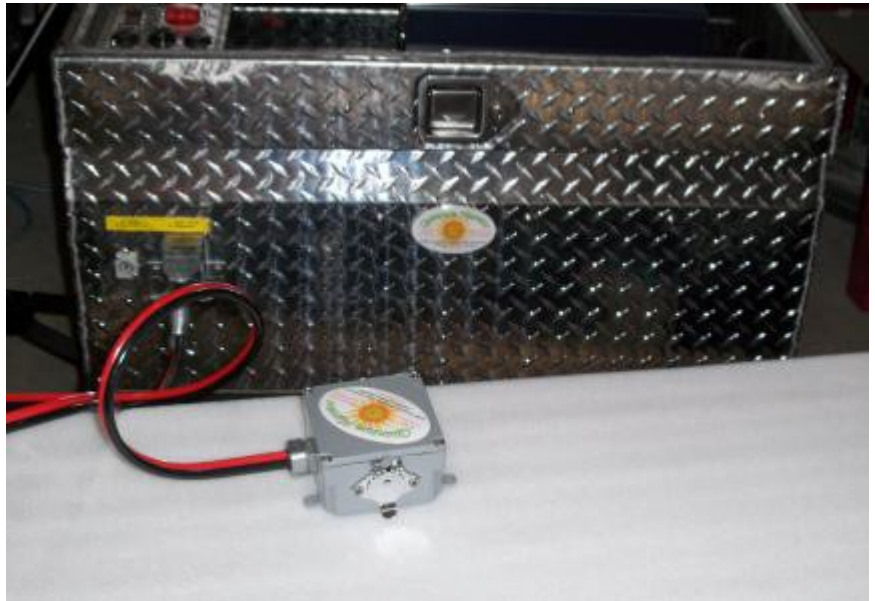
Due to the large amount of amperage the solar charge controller is able to handle, this model uses a heavy-duty 2 pin intermediary connector to handle multiple solar panels. To connect, lift the cover, and oriented as shown with the boss on top, slide the connector into the socket. Please note that the cover has a latch-pawl to prevent the jack from creeping out. To remove, lift the cover slightly to disengage the latch, and remove the jack.



(Although both connectors are shown connected in the upper photo for illustration purposes, it is not recommended that both the AC charger and the solar charger operate at the same time.)



Right; The intermediary solar panel cable plugged into the base unit.



The solar panel assemblies simply plug into the intermediary cable junction box



Section 4A: General Operation and Maintenance

WARNING! The base unit is NOT water-proof, and must be stored and used in a dry location. Wind-driven rain will ruin the inverter, and worse, set up conditions where people or pets may be electrocuted. The solar panel assemblies may, however be safely used outdoors in any weather, so long as care is taken to prevent wind and falling objects like tree limbs, etc. from causing damage.



Also, please take note that in addition to the above very real danger, the warranty does not cover water or other weather-related damage to any of the components!

To use the unit, unplug the AC charger cord if it is connected, then wheel the unit to a convenient location. Open the cabinet door and turn the main switch clockwise to position #1 and then press the inverter start button to initialize the inverter. Connect any loads to the appropriate receptacles. Be sure to keep the door open so as to allow adequate airflow for inverter cooling.

Note that it is not necessary to have the solar panels connected in order to use the power station, but if they are not connected (and in direct sunlight), you will only have what power is in the batteries. There is no easy way to tell exactly how much charge remains in the batteries, so the best measure we have is to watch the battery bank voltage, which is shown on the control panel's digital display.

Battery voltage gradients change over time as the batteries age, but a good rule of thumb is that 12.8 to 14 volts is a reading for a battery pretty much fully charged. When the voltage drops to 12.1 to 12.3 volts, the batteries are usually about one half to two-thirds discharged. Voltage of 11.0 to 11.9 mean that the battery is pretty much exhausted, and voltages below about 10.5 will cause the inverter to shut off. These numbers are only approximate, experience is still the best teacher!

Please note that the voltage readings, to be accurate, must be read under a no-load condition. The voltage will be much lower when the batteries are under load.

Section 4B: Using the 220 volt system

The Model 3000 is the only one of our systems that features an on-demand 220 volt system with a specially designed soft-start system to power common deep-well submersible pumps up to 1 hp. Since the transformer bleeds off about 20 watts of power even when unused, it is recommended to leave it powered down when not in use to conserve battery power.

There is a switch on the upper right of the control panel that when in the “on” position, supplies power to the transformer; turn it on, (there should be a faint humming sound beneath the control panel when the transformer is energized.), and plug in the power cord for the pump. Be sure the 20 amp double circuit-breaker in the upper right-most corner is also in the “on” position. Everything else is fully automatic.

Transformer power on/off switch

220 volt, 20 amp circuit-breaker



220 volt twist-lock receptacle

The 220 volt system includes our proprietary soft-start module, pictured on the right. Its purpose is to reduce the amount of current required to start the pump motor; this allows a smaller load to be passed to the inverter, allowing any given sized inverter to start and run a disproportionately large motor.

It accomplishes this by sensing when the pressure switch turns the pump on, and activating a mechanism that starts the load at a smaller voltage, and ramping up the voltage to normal line-level over a period of several seconds. When the pressure switch on the pump is satisfied and switches off, the soft-starter switches off and resets for the next cycle.



The soft-starter has 2 LEDs that are visible by looking down on the left (hinge) side by the end of the control panel. Under normal operation, the green LED comes on when the module senses the pump has started, and a few seconds later, the yellow LED lights to indicate the soft-start cycle is complete, and the voltage going to the pump is at normal line-level.



In the event of a failure of the module, it may be bypassed. Instructions are on page 37.

Section 4C: Using the solar panel assembly(s), and AC Charger

To use the mobile solar panel assembly, wheel it to a location with a good Southern exposure to the sun, and if using the 200 or 300 watt multiple panel models, retract the wheel assemblies as shown in the pictures below, release the latch and unfold the panels, then loosen the knobs and position the support struts such that the panels face the sun at approximately a 45 degree angle, and re-tighten the knobs. Uncoil as much cable as needed to reach the connector box, and plug it in. Be sure both solar charge controller circuit-breakers are switched on. Procedure is the same for the 100 watt single-panel model except that the wheels must be locked with the brake knobs to prevent rolling.



The solar panel assembly has been built to be as sturdy as possible, but remember that the panels themselves are made of a low-iron glass, that while quite robust, is nonetheless glass, and WILL BREAK if the panels are dropped or fall onto a hard surface or object. The warranty DOES NOT cover broken solar panels!! Take care in setting up the panels so that the wind will not blow them over, and that they do not tip over. It is recommended that they be guyed in place in potentially windy situations.

On the multi-panel models; it is vital that the wheel assemblies be retracted to allow the panels to sit directly on the ground/floor when the panels are being used and also when they are being stored, otherwise the wheels will allow the unit to roll forward and collapse, falling onto the backs of the panels, possibly resulting in breakage! The single-panel model must likewise have the wheels locked in the same situations for the same reasons. The only time the wheels are lowered/unlocked is when the units are being moved!

300 watt Solar Panel Assembly Use Instructions

Right; This is the panel assembly in the parked position. Note that the wheel struts are unlocked, allowing the assembly to rest on the rubber bumpers on the bottom, and the brace is folded out to provide support.



Right; This shows the wheel strut locked in the transport position. To unlock, pull the gold colored knob out and twist it 90 degrees either way to lock it in the retracted position. Note that the wheel struts will only be in this position when the assembly is being wheeled around.



Right; Detail of the wheel strut in the unlocked position. They must be in this position whenever the assembly is being used, or is parked.



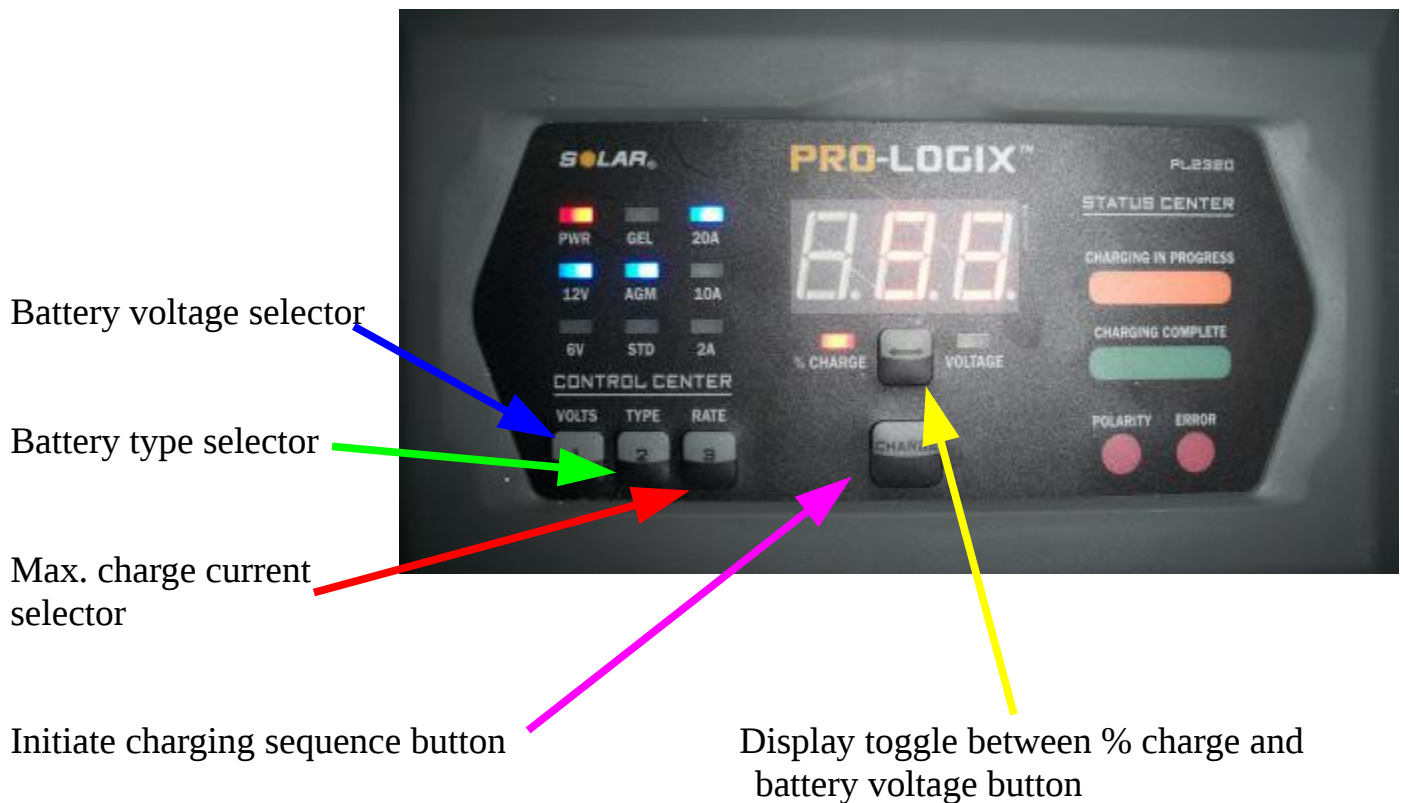


Above; To use the assembly, wheel it to the desired location, unlock and raise the wheel struts, release the rubber latch on top, and unfold as shown. Be careful to not pinch your fingers between the panels! (Been there, done that!)

Below; The top support gusset is velcroed to the back of the middle panel. Detach it and slip it over the pins on top of the assembly to provide structural rigidity.



When you are finished with the unit, unplug the solar panel assembly, coil the cable on the brackets and stow the assembly in a safe place. Switch off the inverter, then turn the main switch to the off position. Wheel the unit to a safe, indoor location, and plug the AC charger cord into a wall socket and plug the other end into the appropriate socket on the side of the base unit. Verify that the AC charger is on, and that the left-most LEDs indicate 12 volts and AGM setting. Select the charge rate (20 amps recommended) and press the “Charge” button. Close and latch the cabinet door. Note that the main switch should be OFF. The AC charger will automatically maintain the batteries at the optimum voltage as long as it is plugged in. There is no need for further intervention.



Please note that the AC charger will charge the batteries even if the main switch is off, but in order to use the inverter or other power outlets, the main switch MUST be switched to position #1!

The only other maintenance needed besides keeping the batteries charged is to keep the faces of the solar panels clean to improve their efficiency.

Section 5 : Using the Included Booster Cables

Imagine: It's dark, the power has been out for 2 days and the meat in the freezer is thawing fast....the wife is freaking out, the sun hasn't been seen in 3 days, and the power station has been running the fridge and furnace, and is at less than 25% charge. What do you do now.....?

All of the Quantum Harvest solar power stations greater than 800 watts allow the user to use an automobile's electrical system to recharge the power station's batteries in an emergency. I realize that idling a 100+ horsepower engine solely to run the alternator is not very fuel efficient, but compared to losing the contents of a full freezer, or having the pipes freeze for lack of heat, a few gallons of gasoline seems a pretty small price!

Models 1500, 2500, 2505, and 3000, due to the size of the battery bank, and the fact that the batteries are behind a panel, are furnished with a set of cables that conveniently mate with a corresponding terminal on the control panel. These models also have a unique system to help prevent crossed polarity, which, again, due to the size of the battery bank, may result in damage to the vehicle's charging system. Below, you will see the steps necessary to use these features.



Failure to strictly adhere to the following steps may result in the vehicle's battery exploding, potentially causing severe injuries to the skin and eyes, and could also result in very costly damage to your vehicle's electrical system. Eye and hand protection is mandatory. As I have stated before, batteries, even relatively flat ones, store enormous amounts of energy that can melt tools, cause fires, and cause grave personal injuries. Don't be a statistic!



This is why I designed a polarity check system! A classic example of the "mystery battery syndrome"! Which is positive? Which is negative? Not to worry; see below.....



Step1: Be sure the main switch is either in the off or #1 position! The Polarity Check system is defeated if the main switch is in either the 1&2 or the #2 position!!





!WARNING! Every year, people die needlessly from carbon monoxide poisoning by running engines or heaters or such inside their homes.



Don't be a statistic! DO NOT run the vehicle's engine inside a garage with the doors closed!



Step 2: Position the power station a comfortable distance from the vehicle, then, first, plug the cables into the power station, then affix the clamps to the vehicles battery.

Step 3: Check for correct cable to battery polarity by looking at the LEDs on the control panel; See below.



Green LED lit indicates polarity is correct. Turn main switch to position "1 & 2" and charge batteries. (Note that the vehicle's engine must be running to actually charge batteries!)



Red LED lit indicates polarity is INCORRECT! DO NOT MOVE THE MAIN SWITCH! Reverse the clamps positions on the battery.

Step 4: After confirming the green LED is illuminated, thus ensuring the correct cable to battery polarity, turn the main switch to position “1 & 2”, and allow the batteries to charge. It is very important to be sure the vehicle's engine remains running, otherwise you will just end up with a flat battery in your car, and very, very, slightly charged batteries in the power station!



Be absolutely sure that the green LED is lit before moving the main switch to the top #1&2 position! If the switch is moved to this or the #2 position when the red LED is lit, there will be a dead short between the power station and the car's electrical system. This will almost certainly do a great deal of very dramatic and costly damage to both the car and the power station!



It is perfectly OK to run the inverter to power other loads while the car is charging the batteries, although it will slow the charging process. It will probably be necessary to use an extension cord from the power station, so be sure the cord is of heavy enough construction to carry the load, is not frayed, and is placed to minimize the tripping hazard.

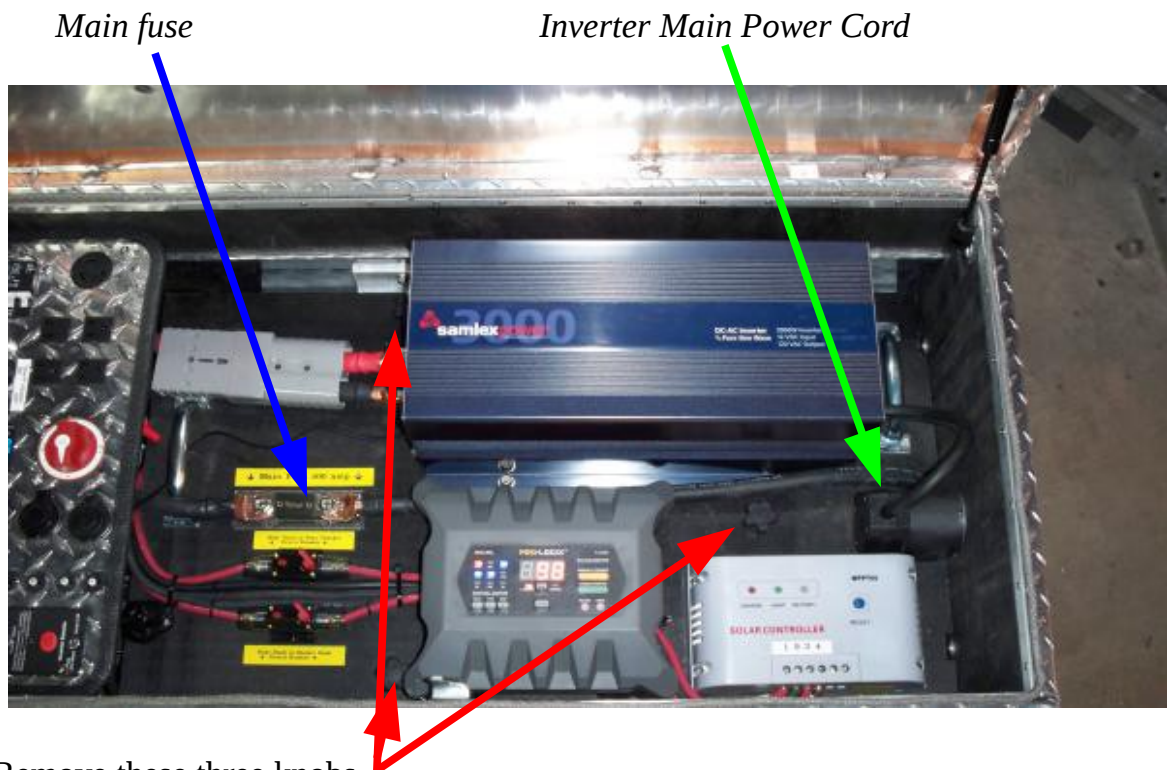
Section 6A: Power Board Assembly Removal and Re-installation

All Quantum Harvest power stations feature a modular construction that allows faulty components to be easily removed and returned to us for repair, without the necessity of having to crate up the entire heavy unit and paying the costly shipping charges for a 200+ lb. machine.

This model power station consists of, in addition to the casing and batteries, two such removable modules; the power assembly, which contains the the inverter, chargers and related components, and the control panel.

Removal of the power assembly.

Tools Required: 9/16" socket or wrench



Step 1: Remove these three knobs.

Step 2: Remove the main fuse, then unplug the inverter main power cord by pulling it toward the control panel. Lay the heavy black cable up and over the back of the unit to get it out of the way.



It is absolutely imperative that the main fuse be removed BEFORE unplugging the main inverter power cord to preclude any possibility of the prongs being energized while unplugged



Step 3: Using the handles provided, pick the entire unit up slightly, move it toward the control panel slightly to clear the inverter power socket, and pull the rear up to clear the back of the cabinet, and let it rest there at an angle as shown below to allow you to disconnect the 6 cables that tie the power assembly to the main unit.

350 amp Anderson
Connector



Step 4: Above, Disconnect the large gray 350 amp connector by pulling it apart as shown. (Due to it's robust design, it takes a fair amount of effort to disconnect it. It helps to rock one segment from side to side while pulling it apart.)

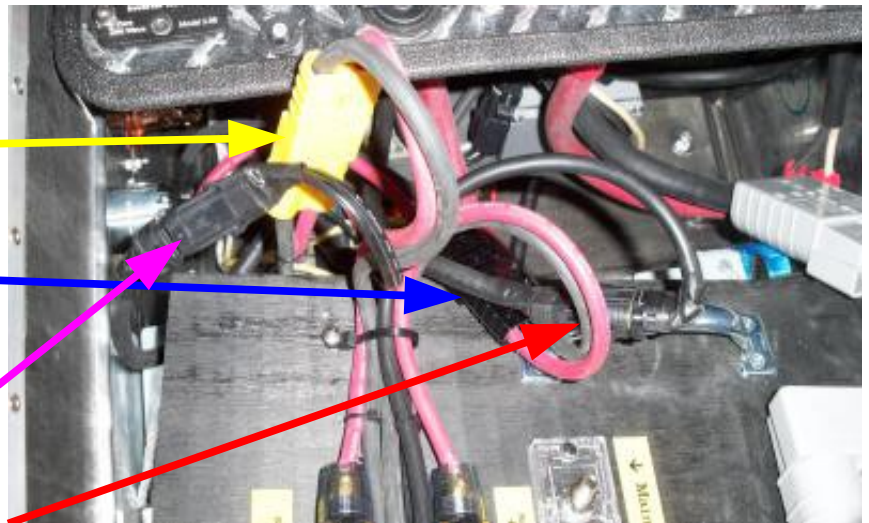
Step 5: Below, Disconnect the 4 connectors detailed below.

Charge Controller to Battery Bank
Connector (yellow)

Solar Panel to Charge Controller
Connector (black)

AC Charger to Battery Bank Connector
(2-pin)

AC Charger to Input Jack Connector (3-
pin)

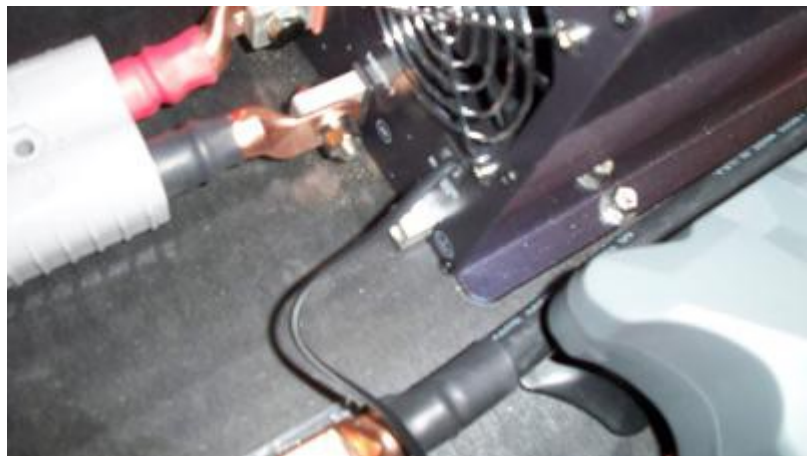


It is important to note that the yellow connectors go together, and the black solar panel to charge controller connectors go together. Be advised that it is possible to cross these, and doing so may damage the solar charge controller!

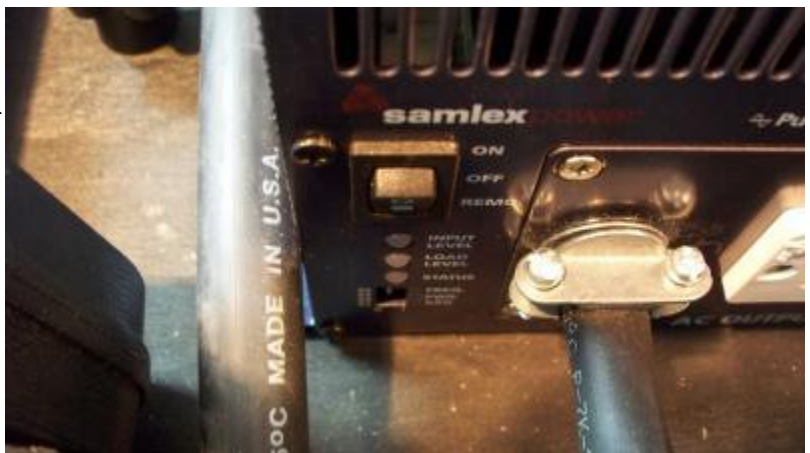
Right; Detail of weather-pak connector. To disconnect, gently pull up on the tab to release the catch, and pull the connector apart. To reconnect, just push the 2 halves together until you hear a click.



Step 4: Right: Disconnect the inverter control cable. (It works the same as a phone-jack.)



Right, After installation, be sure the selector switch on the back of the inverter is in the “remote” position to allow the inverter to be switched on and off from the control panel.



**The power board may now be removed;
Reverse the above steps to re-install.**

Section 6B: Battery Removal/Re-installation

Tools Required: 11 mm or 7/16" socket or wrench, #2 Phillips screwdriver



Caution Although the low voltage at the battery terminals means that electrical shock or electrocution is impossible, nonetheless, batteries store an enormous amount of potential energy, that if accidentally released by a short-circuit, can melt metal tools, start fires and cause personal injury. Eye protection **MUST BE WORN** whenever working with batteries of this size, and extreme care must be exercised at all times. Anything electrical is unforgiving of mistakes.

Step 1: Remove power assembly.
(Pages 18-19)

Step 2: *Right;* Remove the 6 bolts (3 to a side) from the shelf support assembly.



Step 3: *Right;* Fold the shelf support as shown and remove. Be careful that it does not touch the battery terminals and cause a short-circuit.

(NOTE: When reinstalling. The shelf support, the slat with the single hole goes toward the rear of the cabinet)



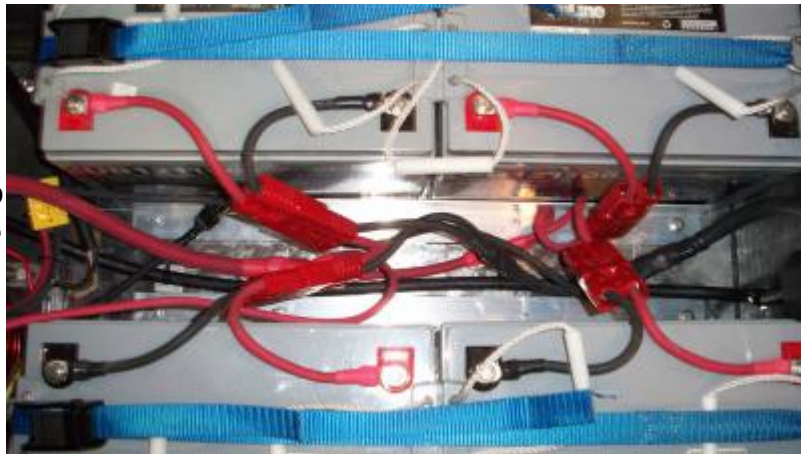
Step 4: *Right;* Press the release on the blue battery retention straps, pull up enough slack to unhook the strap end from the ring on the front of the battery compartment.

Buckle release lever

Attachment ring location



Step 5: *Right;* Disconnect the red connectors by pulling the two halves straight apart. Remove the batteries



Battery Installation Instructions



Caution Although the low voltage at the battery terminals means that electrical shock or electrocution is impossible, nonetheless, batteries store an enormous amount of potential energy, that if accidentally released by a short-circuit, can melt metal tools, start fires and cause personal injury. Eye protection **MUST BE WORN** whenever working with batteries of this size, and extreme care must be exercised at all times. Anything electrical is unforgiving of mistakes.

Things to note before starting:

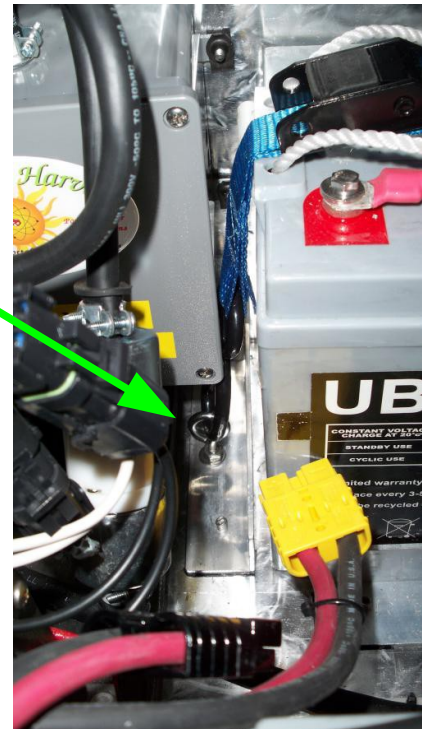
Be careful with any metal tools that you do not inadvertently short between terminals. Remove any metal jewelry from your hands and avoid loose metal necklaces or such that may droop down and short between adjacent terminals. Work slowly and carefully, and wear eye protection at all times.

Be wary of applying excessive force; things should slide in and together smoothly. If something seems to go hard, it is most likely caught up on something or started crooked.

Battery re-installation is the reverse of removal, except that the first battery must be slid in under the inverter main power socket, then the remaining 3 batteries may be placed in the cabinet.



Right; The attachment point for the hinge-side battery strap is partially concealed by the soft-start module.



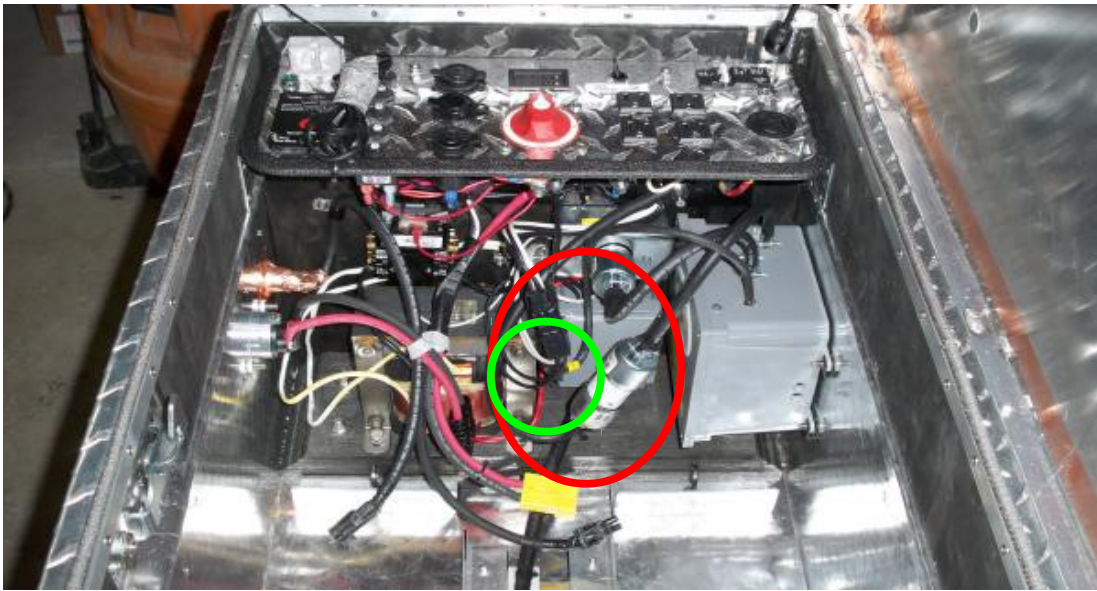
Section 6C: Soft-start Module removal/replacement

Tools needed: #2 Phillips screwdriver

Step 1: Remove the power board. (Pages 21-22)

Step 2: Remove the batteries. (Pages 23-24)

Step 3: *Below*, Disconnect the 2 cords (red circle), and the 2-pin connector, (green circle).



Step 3: *Right*, Remove the 4 screws on the hinge-side of the cabinet, and remove the soft-start module.



Reverse the above steps to re-install.

Section 6D: Control Panel Removal/Replacement

The only reason this assembly would have to be removed is for repair.

Tools needed: 11/16" socket or wrench; 9/16" socket or wrench; 3/8" wrench; #2 Phillips screwdriver

Step 1: Remove the power board. (Pages 21-22)

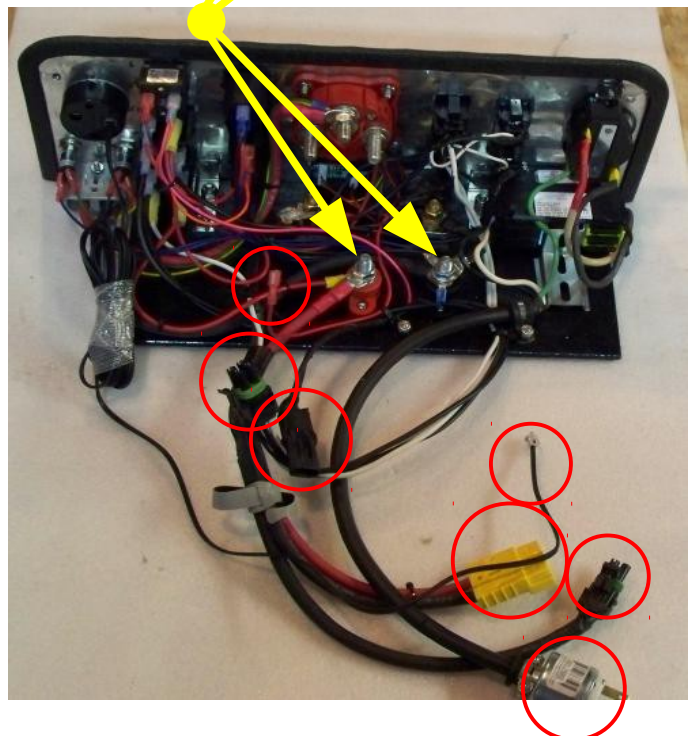
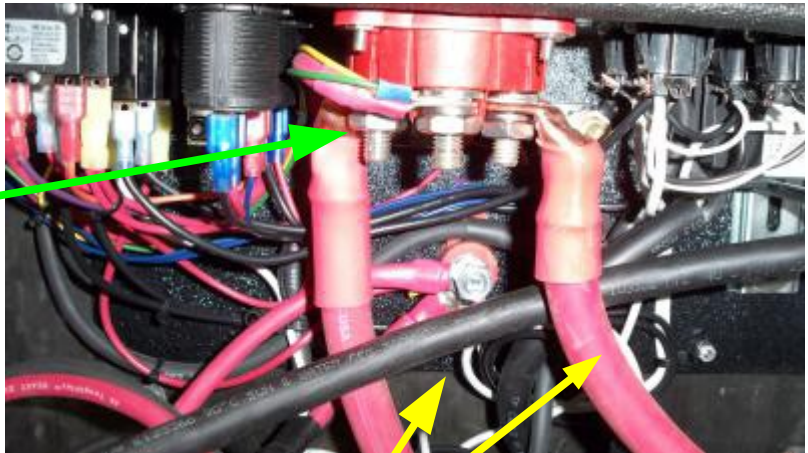
Step 2: Remove the batteries. (Pages 23-24)

Step 3: *Right;* Using an 11/16" socket or wrench, remove the nut indicated, and remove the left cable.

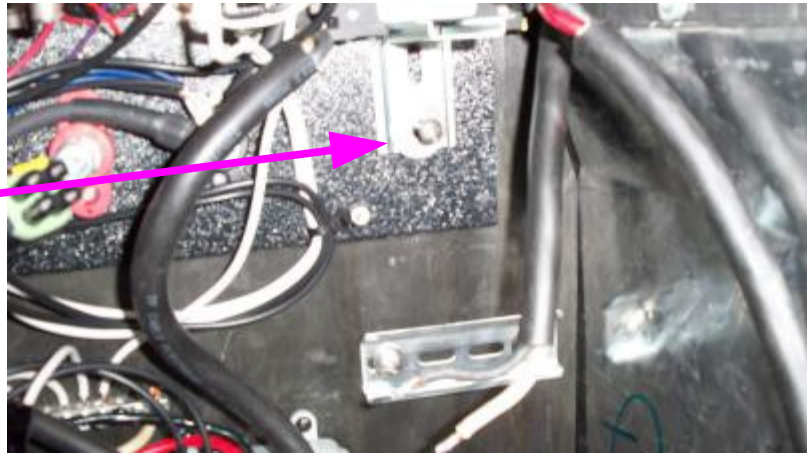
Step 4: *Right and below right;* Remove the nuts from the red and black terminals indicated, and remove the battery wiring harness.

View below shows more detail for the terminals location

Note that there are a total of 7 connections to the control panel in addition to the 3 battery cables detailed above in steps 3 and 4. (Highlighted by the red circles)



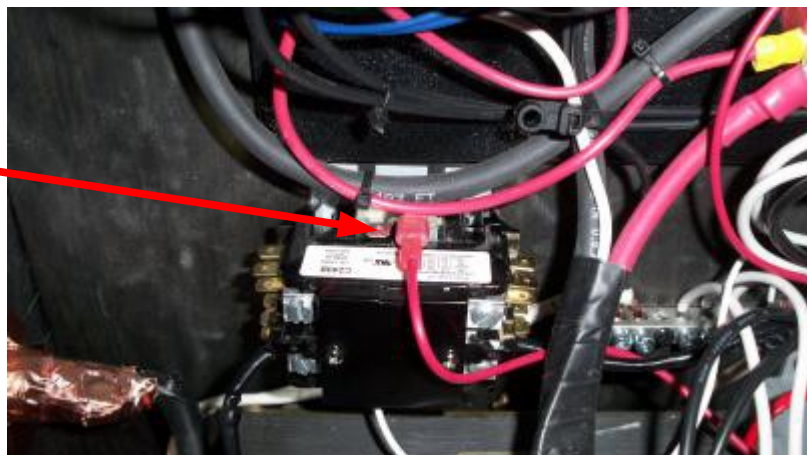
Step 5: *Right;* Remove the screw indicated.



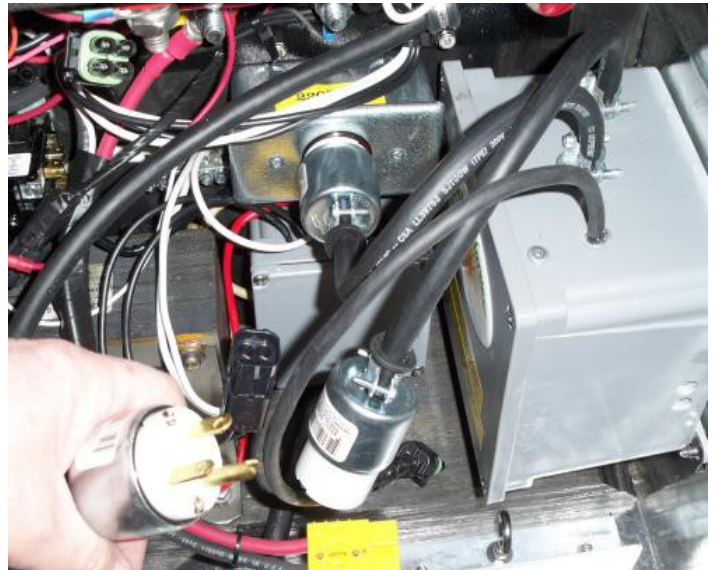
Step 6: *Right;* Disconnect the 120 volt connector shown here.



Step 7: *Right;* Disconnect the power wire from the 220 volt transformer feed contactor.



Step 8: *Right, and Below;* Disconnect the DC supply connector for the soft-start module and the cord that connects the soft-starter to the control panel 220 volt outlet.



Do not remove these 2 nuts.



Step 9: *Above;* Remove only the 2 acorn nuts indicated, lift the control panel up off the studs and remove it from the case.

Reverse the above steps to re-install.

Troubleshooting

Problem	Possible Solution
Inverter will not start, main switch is on and meter indicates 10.5 volts or less.	Batteries are flat and must be recharged.
Inverter will not start, main switch is on and meter reads greater than 11 volts.	Is selector switch on back of inverter switched to the “remote” position? (Page 23)
Main switch is on, but nothing works; meter has no reading.	Main fuse blown. (Page 7)
Solar panels are connected, in sunlight, but meter indicates 0 charging amps. No LEDs lit on solar charge controller.	Are both circuit-breakers for the solar charge controller in the “on” position? (Page 9)
Water pump does not run; main switch is on, meter reads more than 11 volts and inverter LEDs are green.	Can you hear a faint hum under the control panel? If not, is the 220 volt system toggle switch on? If the switch is on and you can hear the transformer humming, then is the 220 volt circuit breaker on the control panel switched on? If so, the soft-start module may be at fault. Bypass it using the instructions on page 37.

Contact Information

Quantum Harvest, LLC
89 Chapman Ridge Rd.
Athens, ME 04912

Email: support@quantumharvest.net

Warranty Information

All Quantum Harvest power station base units and mobile solar panel units are warranted to be free of defects in materials and workmanship for:

Batteries, if provided by us.....1 year
Inverters, AC chargers and solar charger/controllers.....3 years
Everything else, including solar panels.....5 years

To obtain warranty service, contact us at: support@quantumharvest.net for instructions. We will assist in diagnosing the affected component(s), and furnish an RMA. Shipping both ways is on us. You won't pay a cent for warranty service.

In addition to the above warranty, we are so confident of our products, we will never, as long as you own it, charge you labor for repairs. Even after the warranty period, if a component fails or gets damaged, just contact us at the above email address, and we will assist in diagnosing the problem and either arrange to send you the part at cost, or have you ship us the affected module, where we will diagnose the problem and contact you with the cost of the replacement part(s). You will pay what we pay, no more.

What is NOT COVERED under the warranty:

Physical damage to the solar panels, including, but not limited to; broken glass or broken or bent parts. If this unit falls out of a truck at 65 mph and goes bouncing down the road, one can hardly expect the manufacturer to fix it for free!

Physical damage to the power station itself. It weighs over 200 lbs.! If it gets dropped off a tailgate, it is going to be damaged.

Water damage to the internal components of the power station.

Damage caused by improper use of the booster cables. If someone turns on the inverter with the cables connected improperly to the vehicle, it will blow the main capacitors. (Believe me, I will know what happened when I see the inverter!) Obviously, if this happens, we won't fix the car, either!

Addendum A

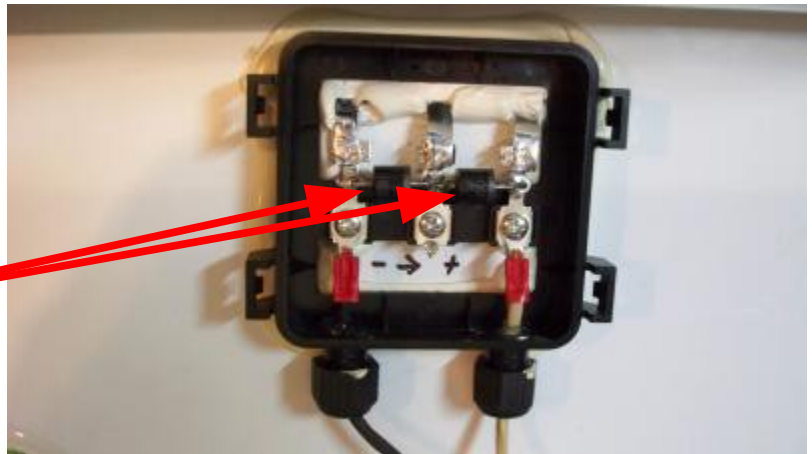
Solar Panel Diode Replacement

Note that each panel has a diode junction box, thus, the 300 watt triple panel assembly has 3 boxes and 6 diodes in total.

To gain access to the blocking diodes, remove the cover by inserting a thin-bladed screwdriver into the slot and gently prying inward to release the catch. Repeat for all 4 latches.



Diodes (2 per panel)



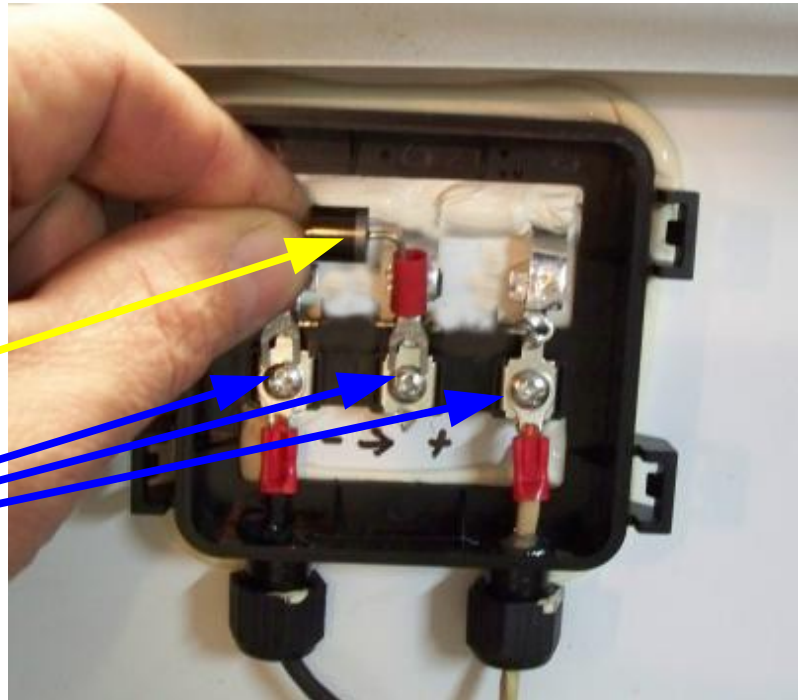
Using a pair of wire-cutters, carefully clip the diode leads to free the old diodes, and discard.



Loosen the 3 screws, and slip the replacement diodes in as shown. It is VERY IMPORTANT to orient the diodes properly. The silver stripe goes in the direction of the arrow. Snug the screws back up, being very careful not to strip the threads. Replace the cover and snap it into place

Silver stripe

Screws



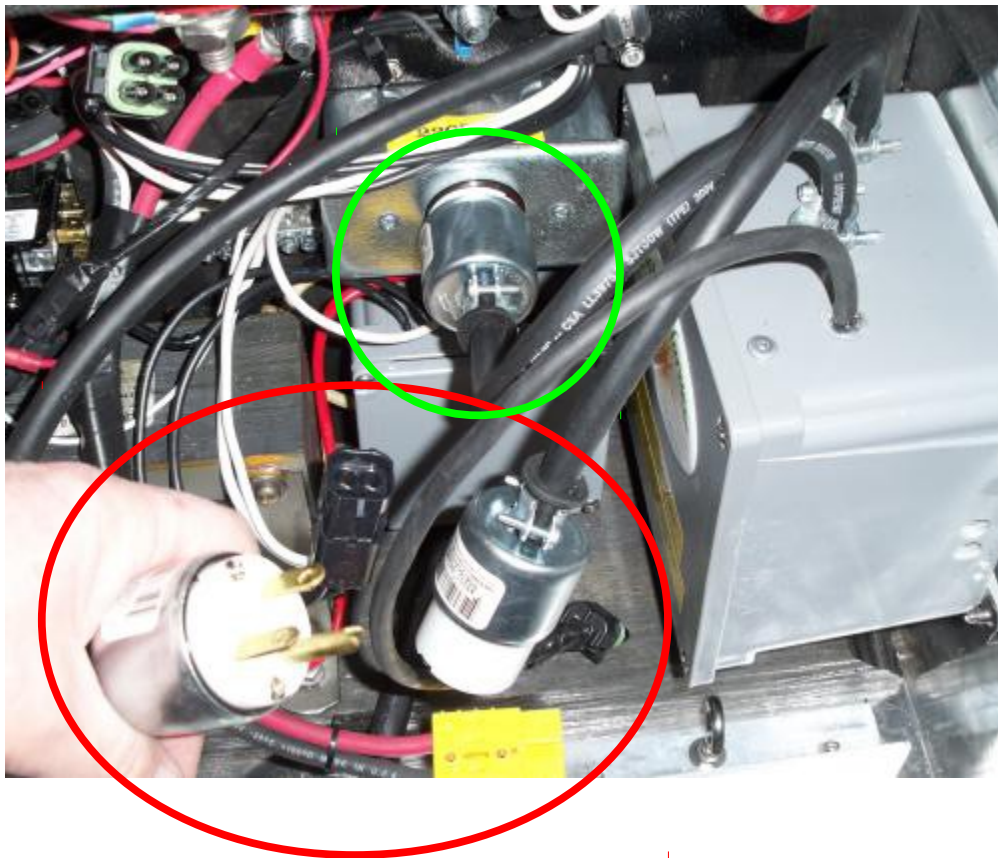
Addendum B

Bypassing a malfunctioning Soft-start Module.

In the event that the soft-start module fails, it may be bypassed by plugging the cord for the 220 volt receptacle on the control panel directly into the 220 feed from the transformer. Procedure is outlined below.

Step 1; Remove the main fuse and place the heavy black cable over the back of the cabinet out of the way. Disconnect the inverter main power cable.

Step 2; Pick up the power board and lay it partially out of the cabinet as shown on the top photo on page 24. This allows access to the 220 volt system power cords.



Step 3; Disconnect the power feed line from the control panel's 220 volt outlet from the socket from the soft-start module. (Red circle) Disconnect the cord from the 220 volt supply box. (Green circle), now, connect the cord from the control panel directly into the 220 volt supply box. Replace the power board and main fuse.