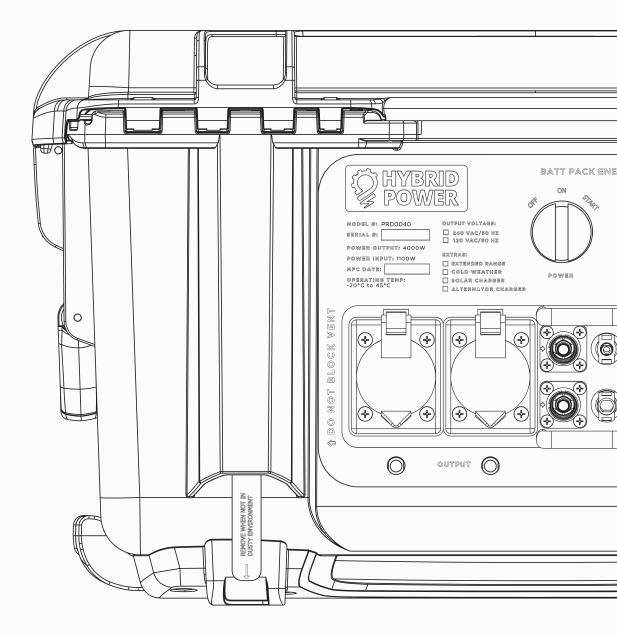
HYBRID POWER SOLUTIONS







SHOCK HAZARD:

Possible shock or death if used improperly, when damaged or used by untrained personnel.



FLAMMABLE HAZARD:

Lithium ion batteries contain flammable liquid electrolyte that may vent, ignite and produce sparks when subjected to high temperatures (> 150 °C (302 °F)), when damaged or abused (e.g., mechanical damage or electrical overcharge). Burning cells can ignite other batteries in close proximity.

Vapors or mists from a ruptured battery may cause respiratory irritation.

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1.1. Product Description

Thank you for choosing this portable power supply from Hybrid Power Solutions (HPS). We hope you enjoy and use the Batt Pack to its full potential.

Please unpack your Batt Pack Energy carefully and check the delivery for completeness and obvious damage. In case of damage inform us immediately.

The Batt Pack Energy is delivered to you in a ready to use state with 30% energy (+/-5%). However, please make sure you read through this user manual carefully. If you have further questions regarding the Batt Pack, please contact HPS.

1.2. Contact Details

Hybrid Power Solutions Inc.

Customer Service/ Technical Support 288 Judson St Unit #5, Toronto, ON M8Z 5T6 Canada

Phone: +1 (647) 347-6000 E-Mail: Info@hybridps.ca Website: hybridps.ca

SEMPTION TO SERVICE AND THE SE

2.1. General Safety Instructions

Before operating the Batt Pack Energy, carefully read and fully understand the instructions including all the cautions and safety notices shown on the second page of this manual. Following all instructions for proper operation and troubleshooting will reduce the risk of personal injury, death and/or property damage.

These instructions are not intended as a complete list of all details for operating and troubleshooting, although reading and following them will aim to keep you safe. If you have any questions or concerns about procedures or safety that are not covered by these instructions, do not hesitate to contact HPS.

2.2. Operator Responsibility

Treat the Batt Pack Energy system with general care, by closing the output plugs and input plugs and turning the system off when not in use.

If an unfamiliar sound or smell is noted to come from the unit, please turn off the unit and notify HPS immediately. Leave in a well-ventilated area, away from flammable sources.

WARNING: Do not put fingers and/or any other object into the units plugs.

Never open the unit case.

Do not expose to temperatures outside the range of -20°C to 45°C.

To minimize any adverse effects on battery performance it is recommended that the system be kept at room temperature (25°C +/- 5°C). Low or elevated temperatures can result in shortened cell life. Keep out of reach of children.

GFCI WARNING: Although the Batt Pack Energy does have circuit interruption built into the design, we highly recommend the use of a GFCI adapter in certain situations. This adapter can be supplied by HPS or other reputable suppliers. We do not include a GFCI as the Batt Pack Energy may be used in various scenarios that either do, or do not require this device. The following is a general outline from the National Electrical Code (NEC). Please review the entire NEC documentation pertaining to this matter to help with your decision-making process.

Commercial GFCI Requirements (NEC 2014 Excerpt)

- All 125-volt, single-phase, 15- and 20-ampere receptacles installed in bathrooms, kitchens, rooftops and outdoors, 6' from a sink, indoor wet locations, locker rooms, garages, service bays, and similar areas.
- All vending machines.
- All pool motors, spas, and pumps.
- All electric drinking fountains.
- Exceptions:
 - In industrial laboratories, receptacles used to supply equipment where removal of power would introduce a greater hazard shall be permitted to be installed without GFCI protection.
 - For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B)(1), GFCI protection shall not be required.
 - Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.
 - In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power is interrupted or having a design that is not compatible with GFCI protection.

2.3. Condition of Use

If system is in abnormal physical condition, do not use.

Critical Errors

If power button is pushed on but the state of charge gauge/fuel gauge back-light remains off, this is a sign of error, HPS technical support should be called immediately.

If internal components are heard/believed to be loose inside/rattling, please call HPS technical support.

3.1. Overview

The Batt Pack Energy is an industrial, high performance, weather resistant lithium ion battery pack that is designed to be safe and easy to operate.

Designed to deliver the full potential of batteries by delivering 4000W of power. With an average life cycle of 5 to 10 years (depending on usage).

3.2. Technical Specifications Batt Pack Energy - Standard

BATTERY VOLTAGE	25.6 Vdc
OUTPUT VOLTAGE	120Vac North American or 240Vac International
MAXIMUM AMPERAGE PER PLUG	20A (limited to combined 4000W)
CONT. POWER OUTPUT	4000 W (4 kW)
MAX POWER OUTPUT (0.2SEC)	8000 W (8kW)
MIN./MAX. VOLTAGE	18.3 V/ 29.2 V
APPROXIMATE WEIGHT	110 lbs (50.27 kg)
USABLE ENERGY	2.5 kWh (@1C & 25°C)
FULL CHARGE TIME	3-3.5h
CHARGER INPUT POWER	1100 W
DISCHARGE TEMP.	-20° to 45 °C
CHARGE TEMP.	-5° to 45 °C* (-20°C with cold weather package)
DIMENSIONS	L22.8in x W18.3in x H11.7in (L579mm x W465mm x H297mm)
MAXIMUM IP RATING (CLOSED PLUGS)	54
RELATIVE HUMIDITY	5 - 95 % (non-condensing)

^{*}An optional cold weather package is also available at the time of purchase and is recommended for sustained conditions under -5°C.

3.3. Technical Specifications Batt Pack Energy – Extended Range Model

BATTERY VOLTAGE	25.6 Vdc
OUTPUT VOLTAGE	120Vac North American or 240Vac International
MAXIMUM AMPERAGE PER PLUG	20A (limited to combined 4000W)
CONT. POWER OUTPUT	4000 W (4 kW)
MAX POWER OUTPUT (0.2 SEC)	8000 W (8kW)
MIN./MAX. VOLTAGE	18.3 V/ 29.2 V
APPROXIMATE WEIGHT	123 lbs (55.80 kg)
USABLE ENERGY	3.6 kWh (@1C & 25°C)
FULL CHARGE TIME	5-6h
CHARGER INPUT POWER	1100 W (0.7 kW)
DISCHARGE TEMP.	-20° to 45 °C
CHARGE TEMP.	-5° to 45 °C* (-20°C with cold weather package)
DIMENSIONS	L22.8in x W18.3in x H11.7in (L579mm x W465mm x H297mm)
MAXIMUM IP RATING (CLOSED PLUGS)	54
RELATIVE HUMIDITY	5 - 95 % (non-condensing)

^{*}An optional cold weather package is also available at the time of purchase and is recommended for sustained conditions under -5°C.

3.4. Technical Specifications Batt Pack Energy – XP BOOST MODEL

BATTERY VOLTAGE	25.6 Vdc
OUTPUT VOLTAGE	120Vac North American or 240Vac International
MAXIMUM AMPERAGE PER PLUG	20A (limited to combined 4000W)
CONT. POWER OUTPUT	4000 W (4 kW)
1 MIN POWER OUTPUT	4600 W (4.6 kW)
MAX POWER OUTPUT (1 SEC)	8000 W (8kW)
MIN./MAX. VOLTAGE	18.3 V/ 29.2 V
APPROXIMATE WEIGHT	130 lbs (59 kg)
USABLE ENERGY	3.6 kWh (@1C & 25°C)
FULL CHARGE TIME	5-6h
CHARGER INPUT POWER	1100 W (0.7 kW)
DISCHARGE TEMP.	-20° to 45 °C
CHARGE TEMP.	-5° to 45 °C* (-20°C with cold weather package)
DIMENSIONS	L22.8in x W18.3in x H11.7in (L579mm x W465mm x H297mm)
MAXIMUM IP RATING (CLOSED PLUGS)	54
RELATIVE HUMIDITY	5 - 95 % (non-condensing)

^{*}An optional cold weather package is also available at the time of purchase and is recommended for sustained conditions under -5 °C.

OPERAIION SECTIONATION

4.1. Component Identification and General Operation



^{*}image may defer from actual unit based on product version and is subject to change at any time.

The plug cover should always be used to protect the plug from corrosion and other environmental factors.

The system should always be left in the OFF position when not in use. In the ON position, very little power is consumed but will slowly deplete the battery. HPS recommends always turning off the Batt Pack when not in use.

When using the system in cold temperatures (below 0°C), discharge power may be limited and run time can be affected by up to 40%. The product will naturally warm itself with usage and improve performance. For maximum capacity and performance, ensure the Batt Pack is stored at room temperature (25°C) then brought out into colder climates. A cold weather package can be purchased at when ordering and is recommended when charging and discharging in sustained temperatures lower than -5°C.

The Batt Pack energy will not allow a discharge to occur after being fully depleted until the system has been charged passed 10%.

Batt Pack Energy – XP Boost: The XP model has a 10 second delay upon start-up

Battery Depletion – If the unit is left in the ON position, standby power will be drawn and slowly deplete the unit. This is especially dangerous when the pack has been fully depleted. Please ensure that the unit is charged after having been depleted.

The unit should be charged at a minimum interval of 3 months. Please note that the gauge will not show any reduction in energy level, even though a minor discharge did occur.

A monthly self discharge of 5-10% will occur and may damage a unit that has bee left stored after being depleted.

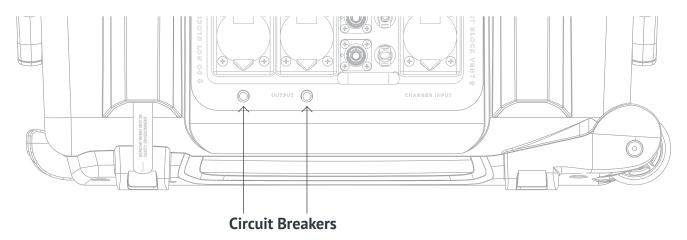
Just as a car battery will be depleted and need to be replaced after prolonged storage with no charging, the Batt Pack energy will do the same. Always ensure that you charge the product after use and turn the unit off. A battery stored fully discharged may permanently damage the product. **HPS is not responsible for batteries left depleted and these will not qualify for a warranty replacement.**

WARNING: Do not plug in tools requiring in excess of 20A into the plug. This can cause; damage, shock, injury and/or death. Please use caution when operating tools in wet conditions as this may lead to electrical shock, injury and/or death. HPS is not responsible for damaged or faulty equipment that has been plugged into the Batt Pack Energy and has caused an incident.

Using the Batt Pack as a UPS (uninterruptable power source): Always ensure the power button is left in the ON position and the charging port is connected to a main power source (15A circuit minimum). Plug all loads into the output port. This will ensure that if the power from the mains is interrupted, your devices will not be affected. Note that this does use the equivalent of 5-20 battery cycles per month.

WARNING: Always use appropriately sized extension cords and power bars that meet the requirements of your specific application.

Circuit Breakers: Located on the front of the Batt Pack are two (2) circuit breakers rated at 20A. These breakers will protect users and equipment from short circuits and power draws over 20A. To reset these, press in firmly.



4.2. Break in Period

WARNING: Although the battery system is delivered balanced, below advertised performance may be present during the first 5 cycles (charge and discharge). As the cells in the battery module equalize to within +/- 0.01V. This is completely normal and is the nature of Lithium ion batteries. Use the unit as normal but do acknowledge this break in period.

Ideally during this break in period, HPS recommends the unit be charged to 100%, then left on the charger for +2 hours afterwards. This will give the cells a chance to balance in order to achieve optimal performance. We also recommend not to discharge past 25%. This recommended break in habit is to insure optimal performance as quickly as possible.

Not following this break in recommendation will not damage the system but may lead to the gauge backlight turning off (indicating an error). As the system will acknowledge the imbalance. It may also delay achieving peak performance.

4.3. Recharging Guide and Storage

Charge using a regular single ended extension cord rated for 15A minimum. Always charge the unit on a dedicated electrical circuit. HPS recommends a minimum 12AWG extension cord. Do not use adapters for charging purposes and do not run the extension cord off of a power bar.

After the break in period concludes, charge and discharge as desired.

Charge Batt Pack within 72 hours of complete discharge with power button off.

Charge a minimum of once a month in order to ensure the energy level does not fall to damaging levels.

It is safe to leave the Batt Pack plugged into the charger for extended periods of times as long as the power button has been turned OFF.

The battery can be charged with the power button either ON or OFF. We recommend keeping the system in the OFF position when not being discharged, as an energy saving practice.

4.4. Transporting and Shipping

If shipping units is required, please ensure to list the Batt Pack with your shipper as a hazardous goods and follow all required precautions and regulations. The Batt Pack is a UN38.3 certified, class UN3481 (lithium ion battery in equipment). It is the shipper's responsibility to ensure all paperwork and required packaging is in order. HPS can help guide you through the process.

4.5. Maintenance & Cleaning

WARNING: HPS does not recommend using a pressure washer to clean the unit as this may damage the internal components and void the warranty. Always make sure to turn OFF the unit when not in use and to keep the unit in a charged state

Always make sure to turn OFF unit when not in use and to keep the unit in charged state.

No user maintenance is required. Periodic system checks can be performed by an authorized HPS representative.

4.6. Extreme Temperatures & Fan Operation

WARNING: Using the product in extreme temperatures, above 45°C and below -20 °C may reduce the total life cycles of the product. **The warranty does not cover such usage.**

We always recommend charging the Batt Pack Energy in temperatures above 0°C. Charging below this may reduce cycle life.

Note that performance may be affected in temperatures under 0°C. Run time can be reduced as well as available power.

To improve performance in cold weather scenarios, HPS suggests storing and charging the system at room temperature before exposing to cold temperatures. An optional cold weather package is also available at the time of purchase and is recommended for sustained conditions under -5°C.

Fans operate when the internal temperature of the system is higher than 29°C. This generally occurs in warmer climates and when the battery is being charged or is being discharged at a high-power output.

4.7. Starting Motors

Please exercise caution when powering motors with the Batt Pack Energy. Most motors require 2-3 times their continuous operating amperage at start-up. Certain motors may require more amperage than can be produced. Note that the surge power of 8000W is only sustained for 20ms and may not be long enough for some motors. Motors with a soft start feature may help to reduce this inrush current.

Hybrid Power Solutions also supplies an XP version of the Batt Pack Energy that will handle longer and higher surge ratings.

Please note that Hybrid Power Solutions Inc. is not responsible for damaged tools, equipment or electronics.

4.8. Dusty Environment

In dusty environment, please use additional filters that can be ordered via Hybrid Power Solutions' products on our website, hybridpowersolutions.ca

This filter is to be inserted in the main air intake (the right vent hole when facing the control panel). It should only be used in dusty location and removed afterwards.

This filter lowers the cooling efficiency of the unit and should only be used when dust is present in the air. After use, wash with warm water and let dry for a minimum of 24 hours.

U

5.1. Solar panel purchasing and wiring guide

What you will need:

MAXIMUM TOTAL PANEL POWER	800W
PANEL VOLTAGE	24 V - 75 V
RECOMMENDED WIRE GAUGE	10AWG or 12AWG
CONNECTOR TYPE	MC4
DISCONNECT TOOL	MC4 Solar Panel Assembly Tool

5.2. How to choose cable

Cable selection is based on required distance from panel to Batt Pack. All 10AWG and 12AWG Solar Extension Cables with a MC4 connection are compatible with the Batt Pack. Please ensure you purchase a pair of cables; 1x for positive and 1x for negative.

Please minimize cable length to ensure minimal voltage drops.

5.3. How to choose your panel

The panel size should be based on power you will consume over a 24h period. You can work this out by multiplying the rated power of the equipment you are using, by the amount of time it is to be used in a 24h period.

Example:

Equipment: 1 computer, 1 LED light, 1 LED 32" TV

Computer: 8h of operation at 50W	= 400Wh
LED Light: 24h of operation at 12W	= 288Wh
LED 32" TV: 3h of operation at 55W	= 165Wh
TOTAL	= 853Wh consumed in 24h

Approximate amount of hours of sun: 8h

Solar Panel Wattage Required = (Wh Consumed / hours of sun) / 0.6*

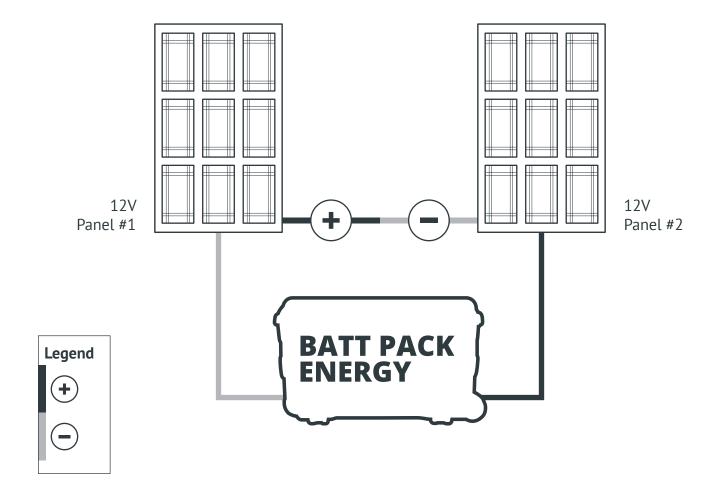
Solar Panel Wattage Required = (853 / 8h) / 06 = 178W

Therefore, we would recommend 200W of solar panels for this specific situation (2x100W). Note that some devices may not run at their rated power, such as tools. These likely operate at a much lower average power draw (2/3 of the rated power can be used). Also, appliances such as fridges may also be intermittent as the power is only drawn when cooling, which can be

10-40% of the time.

^{*}This value corrects for solar charger inefficiencies and other losses.

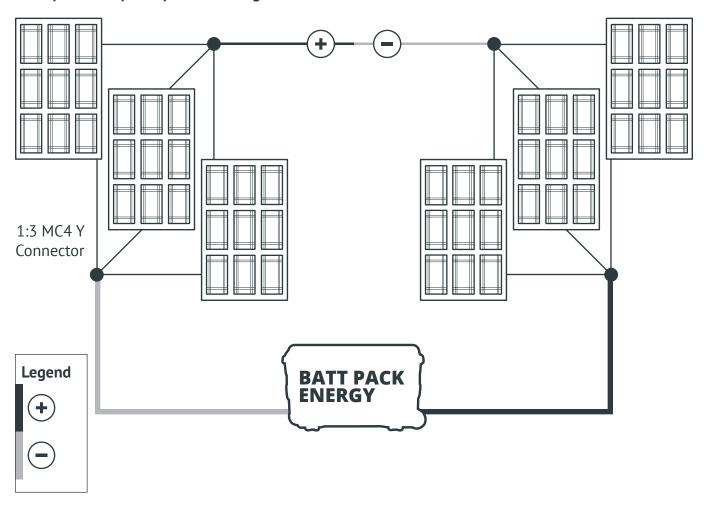
5.4. Standard 12V Panel Connection



Parallel Connection

This is only required if the standard configuration is not achievable. If more than 2 panels must be used to achieve the required output, parallel Y connectors can be used to wire panels in parallel. Parallel configuration can be used if the over all voltage of the panels in series is higher than 75V.

Example of a 6 panel parallel configuration in 2 sets



MC4 Y Connectors are available in 1:2, 1:3 and 1:4 configurations to allow for multiple 12V panels to output a single 12V connection.

24Vdc Panel Connection

 1×24 Vdc (actual measured voltage of 36Vdc) can be plugged directly into the Batt Pack without the need for two panels wired in series. All additional panels must be wired in parallel using a 1:2, 1:3, 1:4 etc. adapter if the 75VCD threshold would be surpassed by a series of connection. Please ensure all adapters and connectors a have a minimum cable gauge of 12AWG.

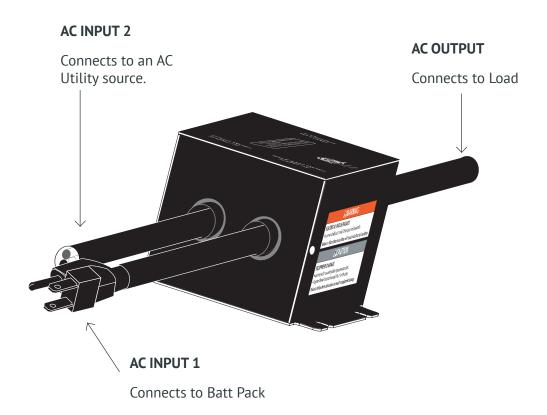
WARNINGS

- No solar controller charger should be used with the batt Pack as it is already built in.
- Never provide a voltage higher than 75V measured at the output of the connected solar system.
- Do not exceed 800W of connected solar panels.
- Never plug the input and output of a solar panel into themselves.
- Only plug in solar panels into the solar panel port.
- Hybrid Power Solutions Inc. is not responsible for any damage to the solar panels, cables or Batt Pack products.

S Z

Recommended Automatic Transfer Switch (ATS): Xantrex 8080915 PROwatt SW

- 1. Chosen home circuit is disconnected from breaker source (input of breaker).
- 2.Breaker is feed (connected) to the AC Output of the Automatic Transfer Switch.
- 3.AC Input 2 from the Automatic Transfer Switch is connected to the main panel power source (Mains/Shore Power).
- 4.AC Input 1 from the Automatic Transfer Switch is plugged into the Batt Pack output port. No special tools or plugs required (see manual).
- 5.Dedicated extension cord is plugged into the Batt Pack Input (charger port) and unit is left ON.



*Multiple ATS can be used to accommodate multiple home circuits up to Batt Pack maximum power threshold.

Hybrid Power Solutions Inc. is not responsible for any damage or injury/death that may occur from wiring its product. We do not represent Xantrex and make no claims on their behalf. Always use a trained and certified electrician when modifying electrical circuits.

7.1. Fuel Gauge Backlight/Audible Warning Interpretation

LED BACKLIGHT	MEANING
Solid Red	Discharge mode
Solid Yellow	Charger Plugged (button off)
Gauge Off, switch in ON position	See Problem/Solution section
Low repetitive audible "beep" (operational)	Cold/hot weather warning or low battery warning
Rapid repetitive audible "beep" (non-operational)	Fault detected, short circuit, power overload, critically low battery

7.2. Problem and Solution Table

PROBLEM	SOLUTION
Charger plugged in but unit not turning ON	Check to ensure power is live from extension cord
Audible warning is heard	Unit is low on energy. Recharge.
	 Power demand exceeds rated capacity. Reduce load.
	 Temperature of unit is too high, let unit cool down. Gauge backlight will be off as well.
	 Fault or Short Detected. Remove load immediately and inspect.
Switch ON and operating but gauge is OFF	 Battery temperature is beyond operating limits. Allow unit to cool if overheat is assumed. If unit is too cool, plug unit in for charging in heated space. If problem persists after a charge cycle, call HPS for diagnostic.
Switch ON but gauge is off and no power is being output.	 Critical fault has occurred. Reset by turning system OFF for 120 seconds. Plug into shore power for charging. If the problem is not corrected, contact HPS for diagnostic.
Gauge is red, but charger is plugged in.	The power button will override the yellow charging light, rest assured the unit is still charging.

U O

8.1. Technical Specifications - DC Charging

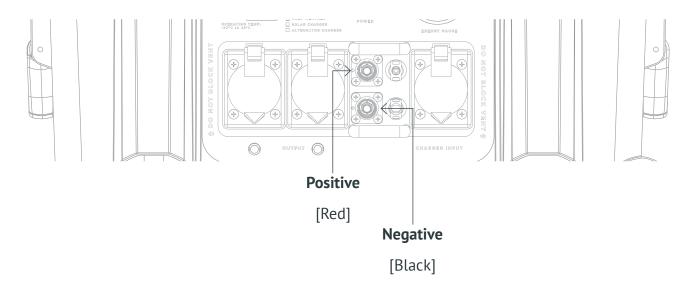
POWER	730W
INPUT VOLTAGE	12-32VDC
MAX INPUT DRAW	65A
SUGGESTED INPUT WIRE GAUGE	Copper, 4AWG
SUGGESTED FUSING	80-125A
SUGGESTED DISCONNECT	Battery isolator 80A minimum
CONNECTOR TYPE	Surlock SLPIPB35BSB0 (negative), SLPIPB35BSR1 (positive)

8.2. Input Source

The alternator charging system allows for various DC inputs to charge the Batt Pack. The system will draw all available amperage up to 730W and is not current limited. It is therefore essential that the source has a current limiting device or allows for the maximum charging capability (up to 65A at 12VDC).

The following power sources are some examples of power inputs:

- 12V or 24V battery
- Vehicle battery connected to alternator
- Wind turbine with wind turbine charger (may not be compatible with all models)
- Solar charger (may not be compatible with all models)



8.3. Fusing

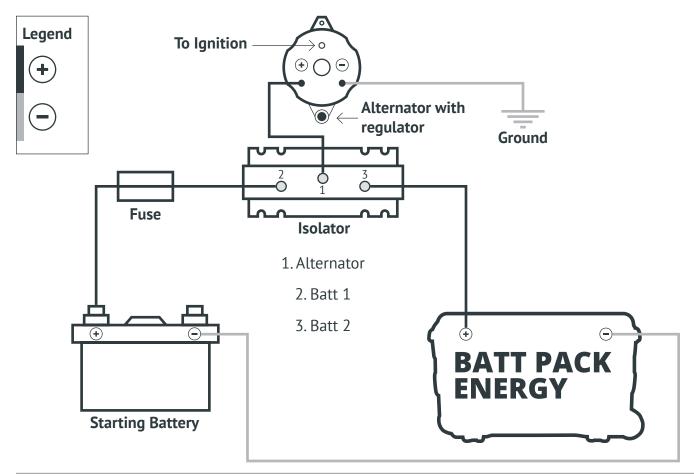
Although the multipurpose DC input is internally fused, these fuses can only be replaced by a qualified HPS technician. It is therefore recommended that an appropriately sized fuse be added when possible. This also ensures that the system is protected from a short circuit on the input wire. A fuse should be placed as close as possible to the input DC power source. Please ensure the fuse is certified for the country of operation along with the voltage and recommended amperage above.

8.4. Source Low Voltage Protection

The multipurpose DC input is configured to only draw power above 12V. Over discharging the input or source battery can cause damage and care must be taken to protect the input. HPS is not responsible for any damage caused to external inputs or power sources. If the minimum voltage threshold for the input battery is above 12V, a battery isolator should be used. Please see the diagram in the next section. A low voltage disconnect rated for the appropriate amperage may also be used.

8.5. Battery Isolation

If the input source can be overdrawn by the Batt Pack, a battery isolator should be used to protect this input source. The following is the general wiring for a battery isolator, but specific instructions are provided by the chosen isolator manufacturer.



8.6. Combined Charging Methods

It is possible to charge the Batt Pack from multiple power sources. For example, the multi-purpose input as well as the standard wall charger may be used simultaneously. In this case, input from the wall charger may be limited if the battery temperature is elevated. In certain scenarios, the multipurpose DC input may be turned off when approaching the final steps of the battery charging process. The rapid charging process from combined source may lower the number of available battery cycles.

9.1. Manufacturer's Warranty Coverage

All Batt Pack Energies supplied by Hybrid Power Solutions are tested for reliability and performance before delivery for correct function and condition.

We grant no warranty or liability for defects and losses that occurs during the use by the customer.

Please refer to this user manual to ensure proper user operation and operating conditions, which will ultimately prolong the life of the Batt pack unit. The warranty does not cover negligence to this manual's directions.

Hybrid Power Solutions (HPS) warrants its products against defects in material and workmanship. Under normal use and service, every hardware portion of the product will be free from physical defects in material and workmanship during the warranty period, or the product will be repaired or replaced as determined solely by HPS. HPS provides a limited warranty for its products only to the person or entity that originally purchased the product from HPS or its authorized distributor or retailer.

9.2. Owner's Warranty Responsibility

If the product does not operate as warranted above during the applicable warranty period, HPS shall, at its option and expense (except for shipping cost), repair the defective product or part, deliver to the customer an equivalent product or part to replace the defective item. All products that are replaced will become the property of HPS. Replacement products may be new or reconditioned as determined by state of the original unit.

Commercial warranty period (unless otherwise contracted) is six (6) months.

Standard warranty period (unless otherwise contracted) is twelve (12) months.

Battery warranty period is set at 24 months or 500 cycles (whichever occurs first) and only covers the battery module.

9.3. Exclusions

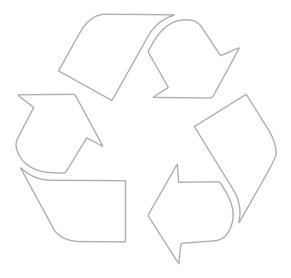
Warranty does not apply, if

- The warranty period is expired,
- The warranty label is broken or removed,
- The serial number label is missing or unrecognizable,
- The product has been modified, opened or repaired by any unauthorized service center or personnel,
- The defect was subject to abuse, improper use not conforming to product manual instructions, or environment conditions more severe than those specified in the manual operating condition and user operation.

- The G Shock sticker has been triggered. (50G)
- The water tape indicator has been triggered.
- Low voltage incident.

9.4 Recycling

Please return the product to HPS for safe recycling. If the battery within the system is suspected to be damaged, please recycle at the closest electronics recycling facility.







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