



EPEQ® INVERTER3000+ Manual Part No. 090242-OP_r00



USER GUIDE

INSTALLATION/OPERATION MANUAL AND SERVICE PARTS LIST KEEP THE MANUAL WITH THE VEHICLE

NOTE: Read this manual before installing, operating or servicing this equipment. Failure to comply with the operation and maintenance instructions in this manual will VOID THE EQUIPMENT WARRANTY.

This publication contains the latest information available at the time of preparation. Every effort has been made to ensure accuracy. Vanair®, a Lincoln Electric Company reserves the right to make design change modifications or improvements without prior notification.

Making unauthorized modification to the system components WILL VOID THE WARRANTY! Always contact Vanair® before making any changes to the EPEQ® INVERTER3000+.

EPEQ® ELECTRIFIED POWER
EQUIPMENT®

EXCLUDES
ELIMENT® BATTERY



VANAIR® VANTAGE
WARRANTY

This limited warranty supersedes all previous Vanair® warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY—Subject to the expressed terms and conditions set forth below, Vanair®, a Lincoln Electric Company ("Vanair"), of Michigan City, Indiana (USA), warrants to the original retail purchaser of new Vanair® equipment that such equipment is free from defects in materials and workmanship when shipped by Vanair®.

For warranty claims received by Vanair® within the applicable warranty periods described below, Vanair® will repair or replace any warranted equipment, parts or components that fail due to defects in material or workmanship or refund the purchase price for the equipment, at Vanair's discretion. Vanair® is not responsible for time or labor to gain access to the machine to perform work. **WARRANTY WILL BE VOID IF GENUINE VANAIR® PARTS AND FLUIDS ARE NOT USED.**

Vanair® must be notified in writing within thirty (30) days of any such defect or failure. **All warranty or returns must be pre-authorized in writing prior to performing warranty work.** Call Vanair® for process and forms. Vanair® will provide instructions on the warranty claim procedures to be followed.

Warranty will commence upon receipt of the Warranty Registration Card. If the Warranty Registration Card is not received within six (6) months of shipment from Vanair®, the warranty commencement date shall be thirty (30) days from the date of shipment from Vanair®. Records of warranty adherence are the responsibility of the end user.

1. Inverters: 1 Year Parts / 1 Year Labor
2. Converters: 1 Year Parts / 1 Year Labor
3. Chargers: 1 Year Parts / 1 Year Labor
4. Electric Motors: 1 Year Parts / 1 Year Labor
5. Alternators: 1 Year Parts / 1 Year Labor
6. Compressor Air End:
 - Rotary Screw: Lifetime with Vanair® Authorized Service Kits and Lubricants : 3 Years Labor
 - Reciprocating: 3 Years Parts / 1 Year Labor
7. Hydraulic Pumps/Motors: 2 Years Parts / 1 Year Labor
8. EPEQ® Solar Assist™:
 - Solar Panel: 5 Year Parts / 1 Year Labor
 - Charge Controller: 2 Years Parts / 1 Year Labor
 - Installation Kit: 1 Year Parts / 1 Year Labor
9. 1 Year Parts / 1 Year Labor on the following:
 - All electronics and controls including, but not limited to:
 - (i) I/O Boards
 - (ii) Modules
 - (iii) Panel Boxes
 - (iv) Instrumentation
 - (v) Clutches
 - (vi) Solenoids
 - (vii) Running Gear/Trailers
 - (viii) Cooler Cores and Fans

This Limited Warranty shall not apply to:

1. Consumable components, such as: shaft seals, valves, belts, filters, capacitors, contactors, relays, brushes, wire or parts that fail due to normal wear and use.
2. Items furnished by Vanair®, but manufactured by others, such as engines and trade accessories (these items are covered by the manufacturer's warranty, if any).
3. Equipment that has been modified by any party other than Vanair® or equipment which has not been used and maintained in accordance with Vanair's specifications.

4. Equipment which has been improperly installed and/or improperly operated, based upon Vanair's specifications for the equipment or industry standards.
5. Equipment installed by non-authorized or third party personnel. Vanair® products are intended for purchase and use by commercial/industrial users and persons trained and experienced in the use and maintenance of industrial equipment.

In the event of a warranty claim covered by this Limited Warranty, the exclusive remedies shall be, at Vanair's sole discretion: (i) repair; or (ii) replacement; (iii) where authorized in writing by Vanair® in appropriate cases, the reasonable cost of repair or replacement at an authorized Vanair® service facility; or (iv) payment of (or credit for) the purchase price (less reasonable depreciation based upon actual use) upon return of the equipment at the warranty claimant's risk and expense. Vanair® will pay standard ground freight for any warranty item shipped to and from Vanair® or (Vanair® designated facility) within the first year of the applicable warranty period. Any additional expedited freight cost is the responsibility of the purchaser.

TO THE GREAT EXTENT PERMITTED BY APPLICABLE LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES APPLICABLE TO THE VANAIR® EQUIPMENT. IN NO EVENT SHALL VANAIR® BECOME LIABLE FOR DIRECT, INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT OR LOST BUSINESS OPPORTUNITY), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY. IN NO EVENT SHALL VANAIR® BECOME OBLIGATED TO PAY MORE ON ANY WARRANTY CLAIM THAN THE PURCHASE PRICE ACTUALLY PAID BY THE ORIGINAL RETAIL PURCHASER.

THIS LIMITED WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER WARRANTY OR GUARANTY ARISING BY OPERATION OF LAW. ANY WARRANTY NOT EXPRESSLY PROVIDED HEREIN, IMPLIED WARRANTY, GUARANTY AND ANY REPRESENTATION REGARDING THE PERFORMANCE OF THE EQUIPMENT, AND ANY REMEDY FOR BREACH OF CONTRACT, IN TORT, OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE, OR COURSE OF DEALING ARE EXCLUDED AND DISCLAIMED BY VANAIR®.

Some states in the United States of America do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, and as such, the above limitations and exclusions may not apply to you. This warranty provides specific legal rights. Other rights may be available to you, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be saved, the limitations and exclusions set out forth above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

**ALL WARRANTY OR
RETURNS MUST BE
PRE-AUTHORIZED PRIOR
TO PERFORMING
ANY WARRANTY WORK.**

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VANAIR®
A Lincoln Electric Company

Warranty Claims Procedure

Warrantied Vanair® Parts

Owners of Vanair® equipment must follow this process for repair or replacement of warrantied items. Do not return items without prior authorization from the Vanair® Warranty Administrator.

PROCEDURE: Customers needing assistance in troubleshooting a system and/or returning parts, please follow the steps below.

1. Locate the machine's serial number(s).
2. Make a list of the symptoms/condition/ malfunctions noticed along with any applicable temperature and pressure readings, and also the number of operational hours if available.
3. Note that the above information is required on the Return Material Authorization Form; necessary for warranty processing if the warranty claim is deemed valid by the service case review.
4. Contact the Vanair® Service Department by phone (1-844-VANSERV or 1-219-879-5100) to speak with a Service Technician.
5. Vanair® Service will troubleshoot the problem based on the information provided by the customer, and attempt to return the unit to service as quickly as possible.
6. If the unit cannot be returned to service, and Vanair® determines this matter is a warranty issue, the Service Technician will provide a case number for the unit. The Warranty Department will then assign an RMA (Return Material Authorization) number that will provide for the return of the item to Vanair® for analysis and a final determination as to the item's warranty status.

7. Warranty Claims are solicited via a case number provided by the Vanair® Service Department. Blank Warranty Claim forms can be found on the Vanair® website under the Resources section.

All of the field information including the case number, serial number and description of the work performed is required.

IMPORTANT NOTES:

If the part is not returned by the customer to the Vanair® Service Department within 30 days, the RMA becomes void and any claims will be denied.

All labor claims or invoices must be approved by the Vanair® Warranty Administrator prior to starting repair work along with the cost of the repair. All paper work associated with the returned item and warranty repair cost must reference the RMA number issued against the part, and be forwarded to Vanair® within 30 days of the completion of work.

The RMA number must appear on the outside of the package where it can be seen before being returned.

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SECTION 1: Safety

1.1 GENERAL INFORMATION

The products provided by Vanair®, are designed and manufactured for safe operation and maintenance, but ultimately, it is the responsibility of the operators and maintenance personnel to use this equipment safely. Part of that responsibility is to read and be familiar with the contents of this manual before operation or performing maintenance actions.

NOTICE

The installation and maintenance of this system is the responsibility of the customer. Before using the unit, READ ALL instructions and cautionary markings on or provided with the unit, and all appropriate sections of this guide.

The EPEQ® INVERTER3000+ contains no user-serviceable parts. See Warranty section for how to handle product issues.

1.2 SUMMARY OF DANGERS, WARNINGS, CAUTIONS, AND NOTES

These notifications are placed throughout the manual in the sections where they apply. This subsection is a general summary of their contents.

1.2.1. DANGERS

DANGER

Identifies actions or conditions which will cause death, severe injury, equipment damage or destructive malfunctions.

- **DO NOT** touch electrical wires or components while the machine is operating.
- **DO NOT** cover or obstruct any air vent openings and/or install in a zero-clearance compartment
- **DO NOT** touch your eyes while using this unit.
- **DO NOT** drop any metal tool or object on the battery. Doing so could create a spark or short circuit which goes through the battery or another electrical tool that may create an explosion.
- Keep unit away from moist or damp areas.

- Keep tools or other conductive objects away from live electrical parts.
- When working with electrical equipment or lead-acid batteries, have someone nearby in case of an emergency.
- Wear eye protection and gloves.
- Study and follow all the battery manufacturer's specific precautions when installing, using and servicing the battery connected to the inverter.
- Keep fresh water and soap on hand in the event battery acid comes in contact with eyes. If this occurs, cleanse right away with soap and water for a minimum of fifteen (15) minutes and seek medical attention.
- Batteries produce explosive gases. **DO NOT** smoke or have an open spark or fire near the system.

1.2.2. WARNINGS

WARNING

Identifies actions or conditions which, if not avoided, could cause death or severe bodily injury.

- **DO NOT** perform any modifications to this equipment without prior factory approval.
- **DO NOT** operate the equipment while feeling ill.
- **DO NOT** operate the system with any safety bypass, safety systems disabled or rendered inoperative.
- **DO NOT** operate the system if there is a known unsafe condition. Disable the equipment by disconnecting it from its power source. Install a lock-out tag to identify the equipment as inoperable to others until it can be repaired or replaced.
- **DO NOT** operate this equipment while you are under the influence of alcohol, drugs, or medications that may have any effect on physical capabilities or judgment.

- **DO NOT** attempt to service the equipment while it is operating!
- 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
- **DO NOT** expose unit to moisture, snow, water, etc.
- Unit provides high voltage AC; treat the AC output socket the same as regular wall AC sockets at home.
- **DO NOT** install the unit near flammable fumes or gases (such as propane tanks or large engines).
- **DO NOT** cover the ventilation openings. Always operate unit in an open area.
- Prolonged exposure to high heat or freezing temperatures will decrease the working life of the unit.
- **DO NOT** connect AC power sources like utility power or generator to the AC outputs of the unit. It will damage the unit and may cause fire. Feeding AC to the AC output of the unit is not covered by warranty.
- The EPEQ® INVERTER3000+ unit is designed for use on 12V auxiliary battery systems only. Using in a higher voltage auxiliary battery system will damage the unit and lead to unit explosion.
- **DO NOT** use flammable solvents or cleaners for cleaning the system or its parts.
- **DO NOT** operate the system with any components removed or damaged, or with other safety devices disabled.
- **DO NOT** wear loose jewelry (e.g. bracelets, necklaces, etc.), unbuttoned cuffs, ties, or loose-fitting clothing when you are working near rotating or moving parts.
- **ALWAYS** confine long, loose hair when working near rotating or moving parts. Also remove long necklaces, bracelets, lanyards, etc. while operating this equipment.
- **ALWAYS** wear proper PPE (personal protective equipment) required for the type of work being performed or for the equipment being used: such as gloves, work shoes, eye and hearing protection. **NEVER** substitute proper hearing protection with earphones or headphones used for listening to audio music or radio programs. These are **NOT** a valid substitute for proper, professional hearing protection and may additionally cause distraction.
- Before performing maintenance or repair operations on the system, ensure that all power has been removed and has been locked out to prevent accidental application.
- **DO NOT** assume that because the system is turned **OFF** that all electrical power has dissipated.
- Install, operate, and maintain this equipment in full compliance with all applicable OSHA, federal, state, local codes, standards, and MSHA regulations when equipment is used in mining operations.
- When lifting objects, be aware of proper lifting techniques to avoid injury.
- **ALWAYS** read and follow safety related precautions found on containers of hazardous substances.

1.2.3. CAUTIONS

CAUTION

Identifies actions or conditions which will cause minor or moderate injury, or damage to the equipment.

- Before performing maintenance, or replacing parts, remove all electric power.
- **DO NOT** use the system for unintended purposes. High current is capable of causing serious, even fatal injuries.
- **DO NOT** operate the system outside of its specified operating range.

1.3 FCC AND EMC INFORMATION

This equipment was tested and complies with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

1.4 LIMITATIONS ON USE

DO NOT use in connection with life support systems or other medical equipment or devices.

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SECTION 2: Specifications

2.1 GENERAL INFORMATION

The tables and figures in this section provide the operational, output, and dimensional specifications of the system. Contact the Vanair® Service Department if additional specifications not included in this manual are required.

1. This system includes a 3000W inverter, a 100A AC charger, dual 50A DC-DC battery chargers configurable for either solar or alternator input, and a 30A transfer switch that supplies AC output power from utility power or inverter-generated battery power.
2. The integrated 30A transfer switch automatically transfers the load to battery power when utility power is unavailable.
3. The included display provides full control of the Bi-Directional Inverter Charger (**BIC**) and both DC-DC chargers.
4. The AC charger and both DC-DC chargers are multi-stage battery chargers compatible with a variety of battery types. Each charger operates independently. The dual DC-DC chargers are connected in parallel, with each capable of delivering up to 50A of charging current at 12V. Each charger can also operate independently. Each DC-DC charger accepts input from a 12V vehicle electrical system and can also accept solar input from panels rated between 15-100VOC.

5. This manual explains how to operate the system safely and effectively. Read and follow all instructions and safety precautions before use.

2.2 PRODUCT DESCRIPTION

290090 - EPEQ® INVERTER3000+

120VAC 60Hz, NEMA 5-20

(Inverter: 12V, 3000W)

(AC Charger: 100A)

(DC-DC Chargers: 50A x 2)

The EPEQ® INVERTER3000+ includes the following items:

- EPEQ® INVERTER3000+ base unit
- Multi-function display
- 25' RJ12 display cable
- AC strain relief for AC input and AC output wiring
- Operator manual

Table 2-A: EPEQ® INVERTER3000+ Rating

Model No.	Rating			AC Output Types
	Inverter	Chargers	Bypass	
290090	3000W	12V - 200A	30A	• 20A GFCI • Hardwire

2.3 UNDERSTANDING THE UNIT

WARNING

All wiring should be performed by a qualified technician or licensed electrician to ensure compliance with applicable electrical codes and safety requirements. Failure to follow these instructions may result in equipment damage, serious injury, or death.

Before installing the unit, consider the following:

CAUTION

Use or store the unit indoors in a clean, dry location protected from direct sunlight, excessive heat, moisture, and conductive contaminants.

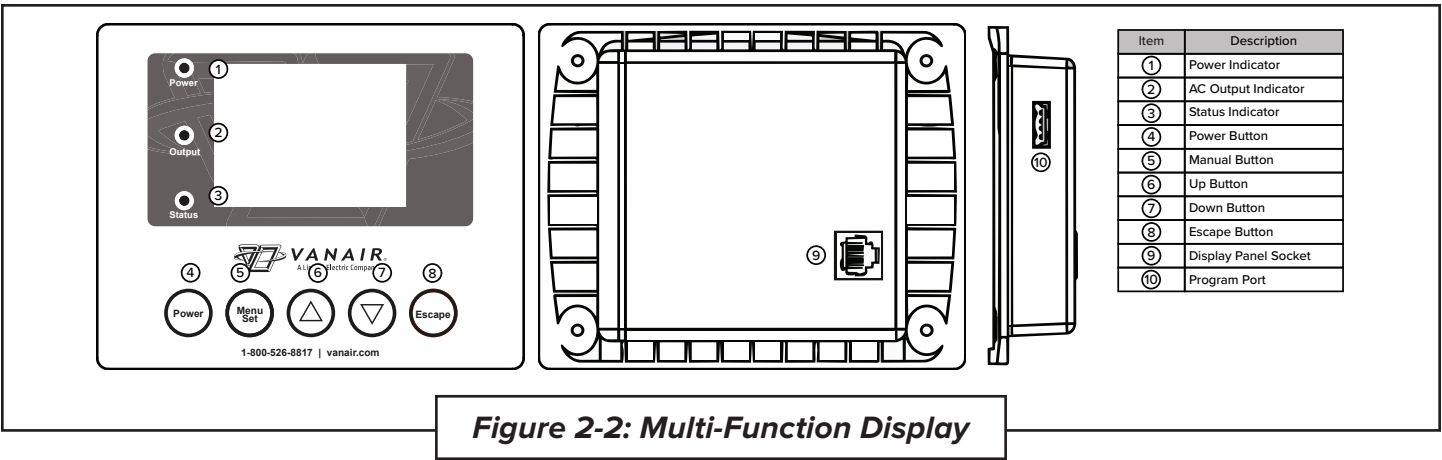
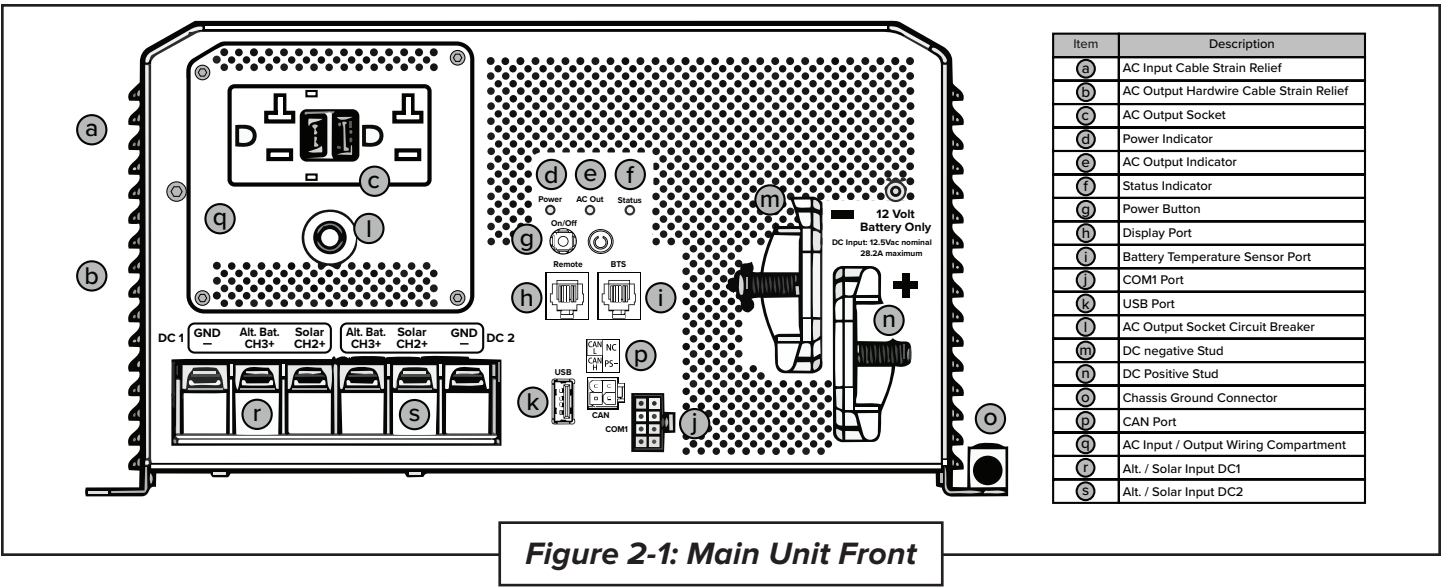
CAUTION

Provide a minimum clearance of three (3) inches around the unit to ensure adequate ventilation.

Table 2-B: Estimated Run Times on 12V Aux Battery

AC Load	12V/120AH	12V/240AH	12V/480AH
50W	22 hrs	44 hrs	90 hrs
100W	11.5 hrs	23 hrs	48 hrs
200W	5 hrs	11 hrs	22 hrs
500W	2 hrs	4 hrs	8 hrs
1000W	49 mins	2 hrs	4 hrs
1500W	27 mins	1 hr	2 hrs
2000W	15 mins	49 mins	110 mins
2500W	N.R.	37 mins	80 mins
3000W	N.R.	27 mins	1 hr

N.R. - Not Recommended. Based on more than 2C discharged on battery capacity. Estimated run times are for reference use only. Actual run times may vary on battery type used.



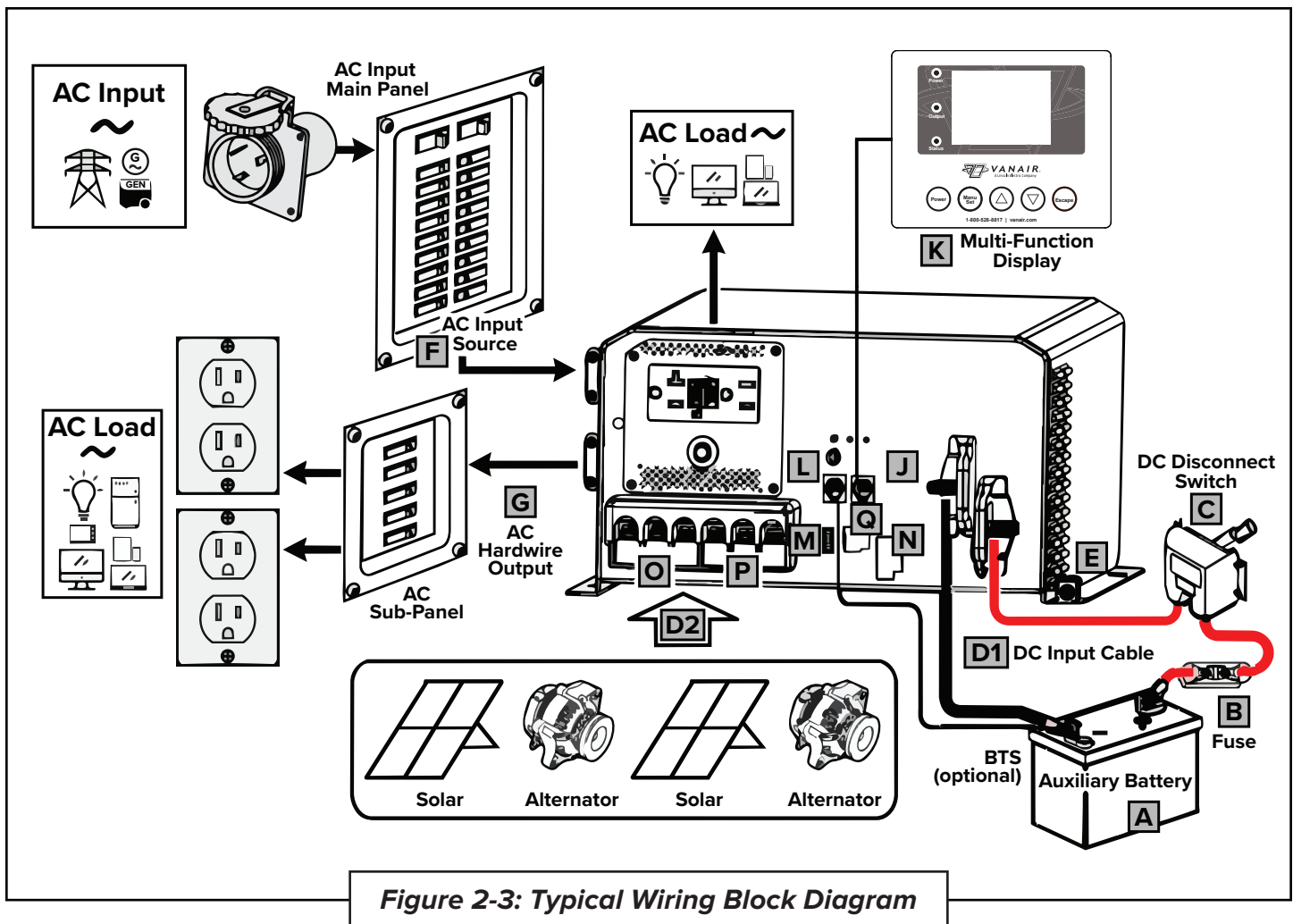


Figure 2-3: Typical Wiring Block Diagram

[A] Auxiliary Battery

- The use of 12V lithium or deep-cycle batteries is strongly recommended for inverter applications.
- Battery capacity should be selected based on the AC load requirements and the expected operating duration. For optimal performance, use the maximum practical battery capacity for the application.

[B] DC Fuse or Circuit Breaker Used for CH1

- A DC-rated fuse or circuit breaker must be installed in the DC positive conductor.
 - **CH1** fuse/circuit breaker rating: 400A DC
- Determine the battery bank short-circuit current rating from the battery manufacturer. The selected fuse or circuit breaker must be capable of safely interrupting the maximum available fault current.

- For battery banks with a total capacity below 500Ah, an ANL fuse is typically sufficient. For larger battery banks, use a Class-T fuse.

[C] DC Disconnect Switch Used for CH1

- A DC disconnect switch installed in the DC positive conductor is recommended. The switch rating must be equal to or greater than the selected fuse or circuit breaker rating. Use ignition-protected switches where required by applicable codes.
- The disconnect switch isolates the battery bank from the unit during maintenance, troubleshooting, or extended periods of non-use. An A/B/A+B/OFF style switch may also be used for selecting between multiple battery banks, if equipped.

[D1] DC Input Cable Used for House Battery CH1 Connection

- Use insulated, low-resistance, multi-strand conductors for all DC input wiring.
- All DC conductors must be copper and rated for a minimum temperature of 221°F.

CAUTION

These recommendations assume the use of the cable and fuse sizes specified in this manual. Undersized conductors may cause low-voltage shutdown under heavy loads, excessive heating, insulation failure, or fire, resulting in equipment damage, serious injury, or death. Wire ampacity must meet or exceed the rating of the installed fuse or circuit breaker.

Table 2-C: Thinnest DC Input Wires Gauge

Connection to Auxiliary Battery CH1	≤ 5 Feet (Recommended)	≤ 7.5 feet	≤ 10 feet
Auxiliary Battery CH1	#4/0 AWG	300 kcmil (MCM)	400 kcmil (MCM)
NOTE: The typically recommended wire length is limited to 5 feet or less for each of the positive and the negative. For longer wires, a proportionally thicker gauge is required to compensate for additional voltage drop.			

[D2] DC Input Cable for DC1 and DC2

- Use insulated, low-resistance, multi-strand conductors for all DC input wiring.
- All DC conductors must be copper and rated for a minimum temperature of 221°F.

Table 2-D: Recommended Fuse/Breaker Size, Wire Length and Size

Connection for DC1 and DC2		Fuse/Breaker	Wire Length	Size
CH2 Solar Panel	12V 720W	60A	< 20 ft	AWG #6 / 16mm ²
CH3 Alternator/Starter Battery	12V Input	80A	< 5 ft	AWG #6 / 16mm ²
NOTE: The 12V/720W solar panel sizes and the related fuse size, length and wire are for reference use only, consult the solar panel manufacturer for fuse protection size.				

[E] Chassis Ground**DANGER**

The unit chassis must be properly grounded before operation. Never operate the unit without an approved chassis ground connection. Failure to comply may result in death or serious injury.

Table 2-E: Thinnest Wire Gauge for Chassis Ground

Recreation Vehicle	Marine
#8 AWG	#3/0 AWG
These guidelines assume you are using the DC supplied cable and fuse sizes recommended in this manual. If you are using different sizes, refer to the applicable installation code for the DC grounding detail. In marine applications, the main AC-DC ground bonding may require galvanic isolators to avoid galvanic corrosion. Check your local electrical codes (i.e. NEC, UL, ABYC...).	

[F] AC Input Source

An AC input source is typically utility power or an AC generator. Acceptable input voltage and frequency ranges are listed in the specifications.

Table 2-F: Acceptable AC Input Range

Voltage Range	Frequency Range
90 - 140VAC	30 - 100Hz

An automatic or manual source selector switch may be used to select between multiple AC sources. The AC main panel normally contains a main circuit breaker that provides overcurrent protection and serves as a disconnecting means.

Additional branch circuit breakers protect individual loads, including the circuit supplying the unit. During bypass operation, the AC input source powers both the AC output loads and the battery charger.

Table 2-G: AC Input Connection Sizes

Input Circuit Breaker	Input Wire Connection
30A (maximum)	#10 AWG (minimum)
• Follow the electrical and/or building code when you choose AC branch breaker and AC input wire size. Connect the unit to any AC input source. • Smaller size AC input wire can be used when a lower amperage rated AC input circuit breaker is used from upstream to feed the unit.	

The unit is not designed to operate with non-sinewave AC input sources commonly produced by some generators.

[G] AC Hardwire Output

An AC sub-panel is required and must include an AC output circuit breaker and branch circuit protection. Use the same conductor size specified for the AC input wiring.

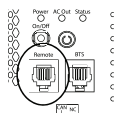
[H] AC Output Socket and [I] AC Output Thermal Breaker

The system includes a dedicated AC output receptacle for direct AC power distribution. A thermal breaker provides overcurrent protection and prevents excessive current draw from the receptacle.

Table 2-H: AC Output Socket and Thermal Breaker

AC Output Socket	AC Output Thermal Breaker
NEMA 5-20 GFCI	20A

[J] Remote Port



This port connects the multi-function display to the unit. Use only the supplied RJ12 communication cable.

[K] Multi-Function Display



Provides operating information, system status, and access to configuration settings.

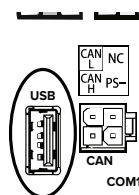
[L] BTS Port (Auxiliary Battery Temperature Measurement)

The **BTS** port connects the optional battery temperature sensor, which monitors battery temperature and allows the unit to automatically adjust charging voltage. When lithium battery charge profiles are selected, the sensor also prevents charging when battery temperatures are outside acceptable operating limits.

[M] USB Port (System Firmware Upgrade)

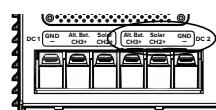
The USB port is intended solely for firmware updates. It must not be used to charge mobile phones or other USB-powered devices. Improper use may damage the unit and is not covered under warranty. One port is located on the side of the multi-function display, and an additional port is located beneath the display connector on the unit.

[N] COM1 Port (DC Input Voltage Selection for DC1 and DC2)



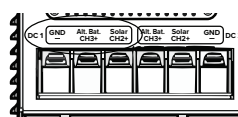
The **COM1** port controls **DC1** and **DC2** DC-DC charger operation and provides an inverter **ON/OFF** control function. Refer to **Section 3.10: DC1, DC2, COM1 Port 12V IGN Connection** for setup details.

[O] DC1 Port (DC1 DC-DC Charger Input Terminals)



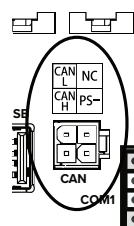
The **DC1** port includes three terminals (**Alt. Bat CH3+**, **Solar CH2+**, and **GND (-)**) used for DC-DC Charger 1 connections.

[P] DC2 Port (DC2 DC-DC Charger Input Terminals)



The **DC2** port includes three terminals (**Alt. Bat CH3+**, **Solar CH2+**, and **GND (-)**) used for DC-DC Charger 2 connections.

[Q] CAN Port (4 Pins)



The **CAN** port supports **CAN** and **RVC** communications. Incorrect connections may damage the unit and are not covered under warranty. Verify pin assignments and **CAN High/CAN Low** polarity before connecting.

NOTICE

Specifications are subject to change without notice.

Table 2-I: Acceptable AC Input Range

Bypass Mode Current (Maximum)			Inverter Mode Current (Maximum)		
Total AC Output	AC Output Hardwire	AC Output Socket	Total AC Output	AC Output Hardwire	AC Output Socket
30A	30A	GFCI 20A*	25A	25A	GFCI 20A *

* Limited by AC Output Thermal Breaker connected in series with the AC Output Socket.

** Limited by Inverter maximum AC Output Current during inverter mode.

Table 2-J: Specifications

Inverter Charger Section	
Running as Inverter on Inverter Charger	
AC Output Power	3000W
AC Output Current	25A
AC Surge Power (Peak)	6000W
AC Output Voltage/Frequency	120VAC / 60 Hz
AC Output Waveform	Sinewave (<3% THD)
Nominal DC Input Voltage	12.5VDC
No Load battery draw (Inverter Mode)	< 3ADC
DC Input Voltage operating range	10.5 – 16.5VDC
Under Voltage Alarm	11.0 - 12.5VDC
Under Voltage Alarm Recovery	11.5 - 13.0VDC
Under Voltage Shutdown	10.5 - 12.0VDC
Under Voltage Recovery	11.5 - 13.0VDC
Over Voltage Shutdown / Recovery	16.5 / 16.0VDC
AC Transfer Switch	
Transfer Time	< 30 ms
Transfer Relay Rating	30A
AC Input Source Setting	15, 20, 30A
AC Output Hardwire (max.)	30A
AC Output Socket (max.)	GFCI 20A
Display	
Display Port	RJ12
Inverter Mode	Battery Voltage, DC Current, AC Output Power
Charger Mode	Charging Voltage, Charging Current, AC Input Power
Running as AC Battery Charger on Inverter Charger	
Charging Voltage Range	13.8 - 14.8VDC
Float Voltage Range	13.0 - 14.0VDC
Recharge Voltage Range	12.8 - 14.0VDC
Bulk Charge Current Range	25 - 100A
Absorption-Float Current Range	2 - 20A
Battery Type	Gel, Flooded, AGM, Lithium, Program, Power Supply
Charge Cycle Stages	Bulk / Absorption / Float / Recharge
Maintenance Recharge Cycle	7 days
Power Factor Correction	> 95%
Efficiency	> 80%

Table 2-J: Specifications

Dual DC-DC Charger Section (DC1, DC2)	
Priority Setting	P1: Solar priority, P2: Alternator only, P3: Solar only P4: Alternator priority with ignition start, P5: Alternator priority with auto-start
Alternator Input	12V
Alternator Input Startup Voltage	12V Alternator: 11.5 - 13.7VDC
DC Output Charging Current	5-50A (each DC-DC Charger, 100A maximum total)
Alternator Input Current Setting	40 – 100A
Reverse Charging	12V Alternator Battery: 13.5V @ 30A
Safety and Environmental	120VAC Series
Conformance	UL 458, CSA C22.2 No. 107.2-01
EMI/EMC	FCC Part 15 Class B
Agency Markings	TUV
Operating Temperature	32 - 104°F (0 - 40°C)
Storage Temperature	-4 - 140°F (-20 - 60°C)
Relative Humidity	5-90% non-condensing
Operating Altitude	Up to 9,843 ft (3000 m) above sea level
Weights and Dimensions	
Weights	25.8 lbs. (11.7 kg)
Dimensions	19.7 x 12.1 x 6.2 inches (500 x 307 x 158 mm)

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SECTION 3: Installation

3.1 GENERAL INSTRUCTIONS

This section provides general guidelines for selecting a mounting location and preparing the EPEQ® INVERTER3000+ for operation. Installation requirements may vary depending on the application, available ventilation, and access to electrical and other utility connections. Installation in a fully enclosed compartment is generally not recommended, as restricted airflow may reduce cooling performance. If an enclosed installation is necessary, provisions should be made to maximize airflow around the unit, such as a pull-out mounting platform or removable enclosure panels. For enclosed installations, a safety interlock switch on the access door is recommended to ensure operation only when adequate ventilation is available.

WARNING

Explosion hazard!

DO NOT install the unit near flammable fumes or gases (such as propane tanks or large engines).

DO NOT cover the ventilation openings. Always operate the unit in a well-ventilated area.

3.2 CHOOSING THE LOCATION

- The unit should only be installed in locations that meet the following requirements:
- DO NOT** allow water or other liquids to drip, splash, or accumulate on the unit.
- Ambient temperature **MUST** remain between -4 - 104°F (-20 - 40°C).
- Maintain a minimum clearance of three inches around the unit. Additional clearance will improve ventilation and overall performance.

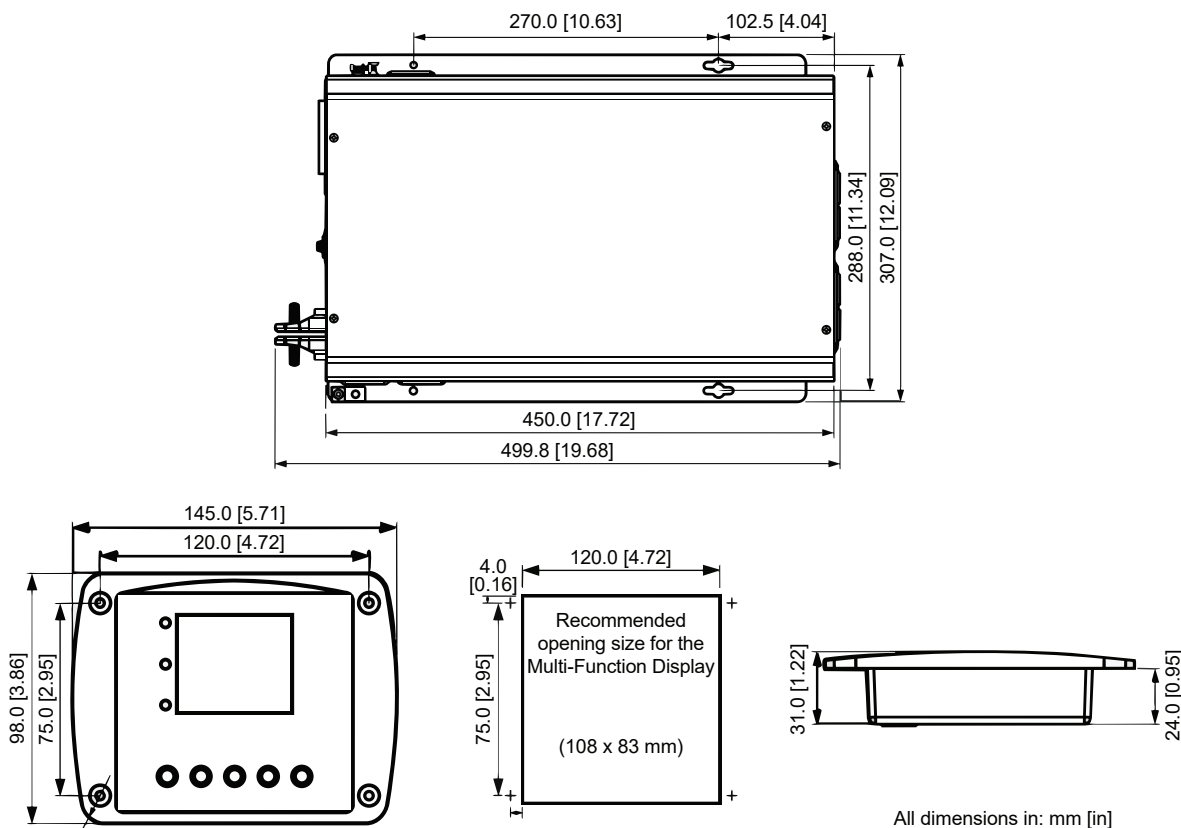


Figure 3-1: Mounting and Overall Dimensions

3.3 MOUNTING THE UNIT

1. Select a suitable mounting location.
2. The unit may be mounted in any orientation.
3. Use the mounting template provided to mark the mounting hole locations.
4. Drill the four mounting holes, position the unit, and securely fasten it to the mounting surface.

3.3.1. DC AUXILIARY BATTERY DC3 CONNECTION

WARNING

Electrical Shock Hazard! The unit's ON/OFF switch does not disconnect DC power from the house battery. Before servicing any circuits connected to the unit, use the DC disconnect switch or disconnect the DC input cables to isolate the battery. Failure to follow these instructions could result in death or serious injury.

CAUTION

Reversing the house battery polarity at the DC3 input terminals **WILL** damage the unit. Damage caused by reversed polarity is **NOT** covered under warranty.

NOTICE

Field wiring DC terminal tightening torque: 12-13Nm

1. Connect a negative DC input cable between the battery negative terminal and the unit **DC3** negative terminal.
2. Verify that the disconnect switch is in the **OFF** position. Connect a positive DC input cable between the unit **DC3** positive terminal and one terminal of the disconnect switch.
3. Connect a DC input cable between the opposite terminal of the disconnect switch and one terminal of the fuse holder or DC-rated circuit breaker (**OFF** position).
4. Connect a DC input cable between the remaining fuse holder or circuit breaker terminal and the house battery positive terminal.

NOTE: For marine applications, the DC fuse or DC-rated circuit breaker must be installed within seven (7) inches (17.8 cm) of the house battery positive terminal.

5. Install the selected fuse in the fuse holder.

3.3.2. CHASSIS DC GROUND CONNECTION:

1. Connect a grounding conductor between the unit's chassis ground lug, located near the DC input terminals, and the common grounding point.
2. For recreational vehicles (RVs), the common grounding point is typically the vehicle chassis or a dedicated DC grounding bus.
3. For marine applications, the common grounding point is typically the DC ground bus or engine negative bus.

CAUTION

Do not use the chassis DC ground lug for AC grounding. Refer to *Section 3.4: AC Input and AC Output Hardwire Connections* for AC grounding requirements.

3.4 AC INPUT AND AC OUTPUT HARDWIRE CONNECTIONS

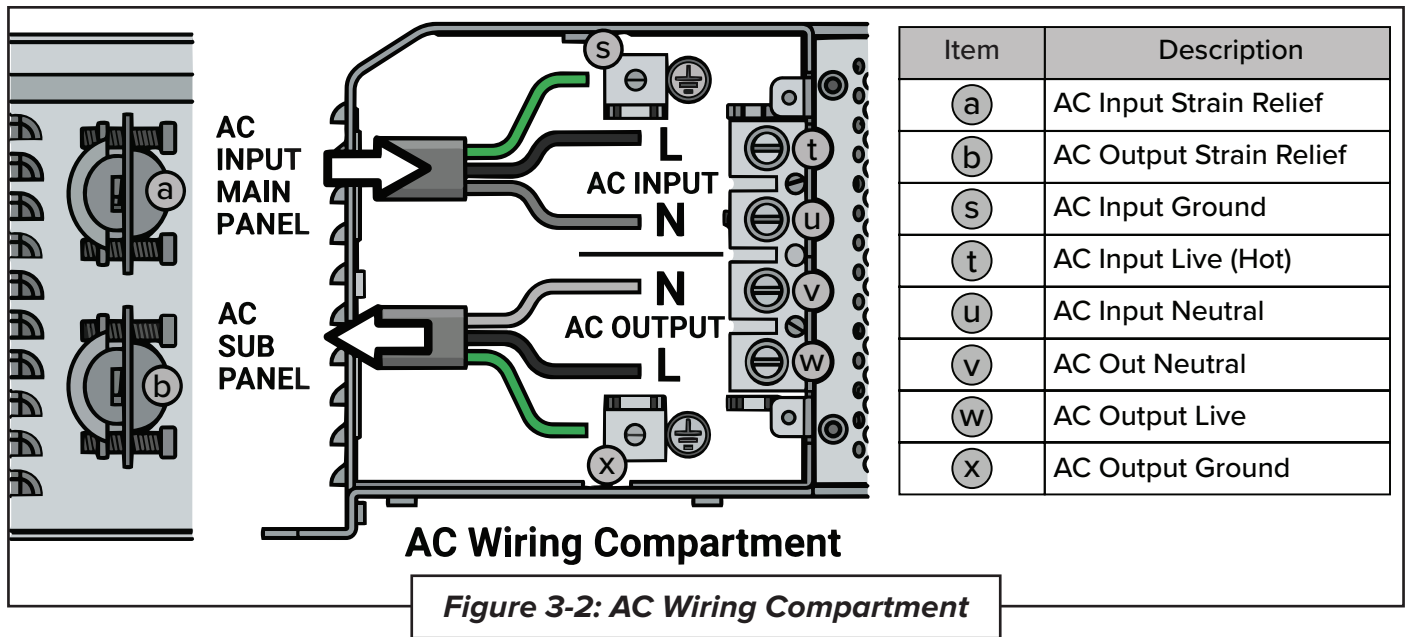
WARNING

Before making any AC input or AC output hardwire connections, verify that the AC input source is de-energized and the DC disconnect switch is in the **OFF** position. Confirm the location of the AC input connector inside the wiring compartment before making any connections. Connecting wiring to the AC output connector instead of the AC input connector may damage the unit and could result in fire.

Remove the AC compartment cover by removing the four screws located on the front of the cover.

3.4.1. FOR AC INPUT CONNECTIONS

1. Route the AC input cable through the AC input strain relief **(a)** on the unit.
2. Connect the AC main panel grounding wire to the AC input ground terminal **(s)**. Solid conductors may be secured directly under the terminal screw. Stranded conductors must use an approved ring terminal.
3. Connect the AC main panel live wire to the AC input live (hot) terminal **(t)**.
4. Connect the AC main panel neutral wire to the AC input neutral 'N' terminal **(u)**.
5. Tighten the strain relief to secure the AC input cable.



3.4.2. FOR AC OUTPUT HARDWIRE CONNECTIONS

1. Route the AC output cable through the AC output strain relief **(b)** on the unit.
2. Connect the AC sub-panel grounding conductor to the AC output ground terminal **(x)**. Solid conductors may be secured directly under the terminal screw. Stranded conductors must use an approved ring terminal.
3. Connect the AC sub-panel live wire to the AC output live (hot) terminal **(w)**.
4. Connect the AC sub-panel neutral conductor to the AC output neutral 'N' terminal **(v)**.
5. Tighten the strain relief to secure the AC output cable.

3.5 MULTI-FUNCTION DISPLAY CONNECTION

Route the RJ12 cable from the unit to the desired display location. Connect one end to the display port on the main unit and connect the other end to the display socket located on the rear of the multi-function display.

3.6 BTS (BATTERY TEMPERATURE SENSOR) CONNECTION (OPTIONAL)

For improved charging accuracy based on battery temperature, an optional **BTS** (sold separately) may be installed. The **BTS** can also suspend charging when battery temperature exceeds 140°F or falls below 32°F. Refer to **Table 5-A** for additional information. Use the following procedure to install the **BTS**:

1. Connect the RJ12 connector of the **BTS** cable to the **BTS** port on the main unit.
2. Install the **BTS** ring terminal on the negative terminal of the battery bank.

3.7 QUICK TEST ON UNIT AFTER INSTALLATION

1. Connect a small AC load, such as a 40W light bulb, to the AC output of the unit.
2. Turn the DC disconnect switch **ON** to supply battery power to the unit. Press and hold the **ON/OFF** button on the main unit, or the power button on the display panel, for approximately one (1) second to turn the inverter **ON**.
3. Verify that the **Status** LED on the display illuminates amber, indicating the inverter is operating. Confirm that the AC output indicator illuminates green, indicating AC power is available.

1. Verify that the 40W light bulb turns **ON**.
2. Turn **ON** the main circuit breaker on the AC input panel.
3. Turn **ON** the AC input circuit breaker supplying power to the unit.
4. If an AC input source is available, the amber Status LED will flash for approximately ten (10) seconds, indicating AC input has been detected. The LED will then change to solid green or flashing green, indicating the unit is operating from the AC input source.
5. Verify that the 40W light bulb remains **ON**.
6. The unit is now properly installed and operating correctly.

3.8 GFCIS AND MONTHLY TESTING

A Ground Fault Circuit Interrupter (GFCI) is a protective device that disconnects power when leakage current to ground exceeds a predetermined threshold. GFCIs are designed to protect personnel from electrical shock and are commonly required in wet or damp environments. Marine and recreational vehicle installations require GFCI protection on branch circuits connected to the unit's AC output.

The following 20A, 120/125VAC, 60Hz cURus-listed GFCI devices are approved for use with this unit:

Grande Electric Inc.: **G1520FLA-R**

Copper Wiring Device: **SGF20GY**

Leviton Mfg Co. Inc.: **GFNT2**

1. For units equipped with a GFCI, the device must be tested monthly.
2. Turn the unit **ON** in either **Bypass** mode or **Battery Power** mode. Connect a small AC load, such as a 40W light bulb, to the GFCI outlet.
3. Verify that the AC load is **ON**.

4. Press the **TEST** button to trip the GFCI. A clicking sound should be heard. Verify that the AC load turns **OFF**. If the load sense ("LdS") feature is set to **OFF**, the unit will display error code **E13** (AC Output GFCI Tripped).
5. Press the **RESET** button until a click is heard to restore GFCI operation.
6. Verify that the AC load turns **ON** again.

CAUTION

A tripped GFCI outlet cannot be reset while the unit is operating in Battery Power mode with the load sense feature enabled. Disable the load sense feature before attempting to reset the GFCI.

3.9 RESETTING THE GFCI OUTLET WHEN TRIPPED

3.9.1. WHEN UTILITY AC INPUT SOURCE IS AVAILABLE

1. Disconnect all AC loads from the GFCI outlet.
2. Press the **RESET** button until a click is heard to reset the GFCI outlet.
3. Reconnect the AC loads and verify proper operation.

3.9.2. WHEN UTILITY AC INPUT SOURCE IS NOT AVAILABLE

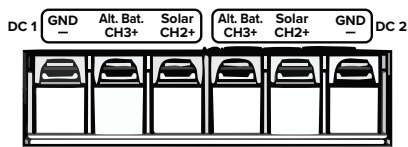
1. Disconnect all AC loads from the GFCI outlet.
2. Turn the unit **ON** and verify it is operating in **Battery Power** mode.
3. Set the load sense ("LdS") setting to **OFF**.
4. Press the **RESET** button until a click is heard to reset the GFCI outlet.
5. Reconnect the AC loads and verify proper operation.

CAUTION

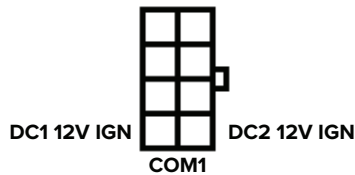
A tripped GFCI outlet can only be reset when continuous AC power is available at the GFCI outlet.

3.10 DC1, DC2, COM1 PORT 12V IGN CONNECTION

The system contains dual DC-DC chargers, **DC1** and **DC2**. Each charger is capable of supplying up to 50A of charging current at 12V and may operate independently or in parallel. Each charger includes a dedicated alternator input (**CH3**) that can operate from either a 12V vehicle charging system when configured through the **COM1** port and corresponding unit settings. Each DC-DC charger also includes a dedicated solar input (**CH2**) that accepts solar panel input from 15 - 100V VOC.



Before connecting alternator or solar inputs, review the available configuration options and select the one most appropriate for your application. Certain alternator configurations require specific **COM1** port wiring. For charger setup options such as charging current and startup thresholds, refer to **Section 4.5**.



3.11 CONFIGURATION 1: USE WITH SOLAR INPUT ONLY

(Priority "PRI" - "P3" setting use only)

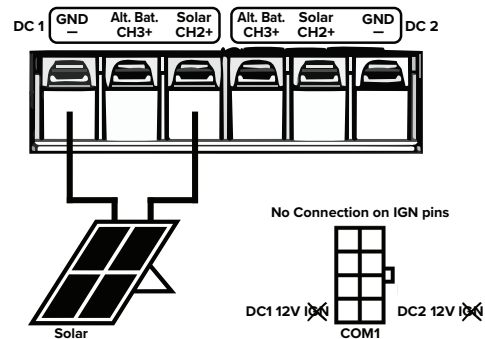
NOTICE

Because alternator input is not used in this configuration, no connection is required to the COM1 port pins labeled DC1 12V IGN, DC2 12V IGN.

3.11.1. FOR SINGLE SET OF SOLAR PANELS < 720W

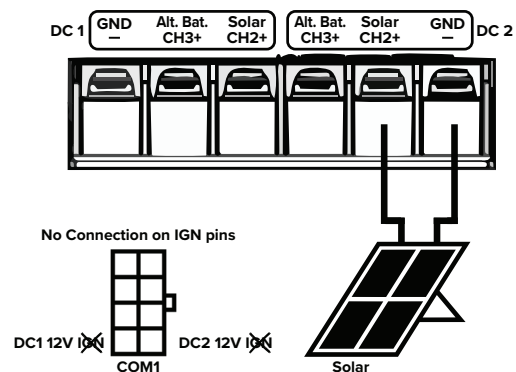
When the total available solar power is less than 720W, a single DC-DC charger (either **DC1** or **DC2**) is sufficient.

- Connect the solar panel positive (+) lead to the selected charger's **Solar CH2+** terminal and the solar panel negative (-) lead to the corresponding **GND (-)** terminal.



Or

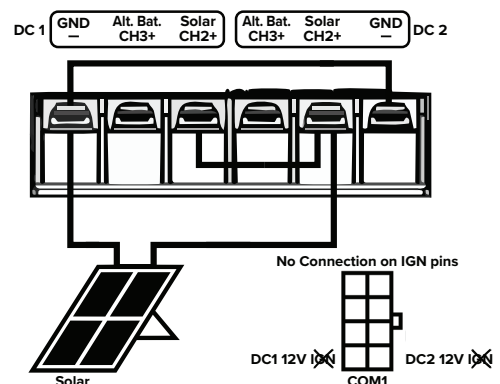
- Connect the solar panel positive (+) lead to **DC2 Solar CH2+** and the negative (-) lead to **DC2 GND (-)** when using **DC2**.



3.11.2. FOR SINGLE SET OF SOLAR PANELS > 720W

When available solar power exceeds 720W, both **DC1** and **DC2** chargers must be used.

- Connect **DC1 Solar CH2+** and **DC2 Solar CH2+** together using #8 AWG wire.
- Connect the solar panel positive (+) lead to **DC1 Solar CH2+**.
- Connect **DC1 GND (-)** and **DC2 GND (-)** together using #8 AWG wire.
- Connect the solar panel negative (-) lead to **DC2 GND (-)**.

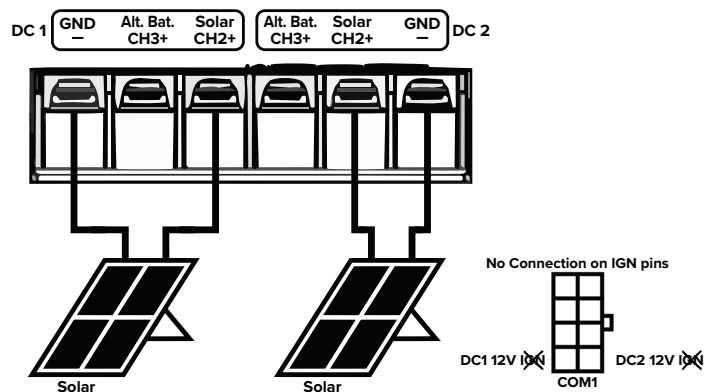


3.11.3. FOR USE WITH TWO SETS OF SOLAR PANELS

When two independent solar arrays are available, connect one array to each charger. Each charger will operate independently.

1. Connect the first solar array positive (+) lead to **DC1 Solar CH2+**.
2. Connect the first solar array negative (-) lead to **DC1 GND (-)**.
3. Connect the second solar array positive (+) lead to **DC2 Solar CH2+**.
4. Connect the second solar array negative (-) lead to **DC2 GND (-)**.

NOTE: Because alternator input is not used in this configuration, no **COM1** port **IGN** connections are required.



3.12 CONFIGURATION 2: USE WITH ALTERNATOR INPUT ONLY

(Priority "PRI" - "P2" setting use only)

3.12.1. 12V 60A MIN ALTERNATOR SYSTEMS

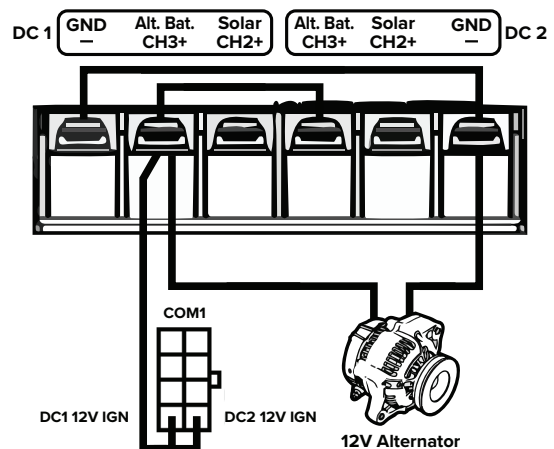
If a single 12V alternator system is in use:

NOTICE

When more than 60A at 12V is available, both DC1 and DC2 chargers should be used to maximize charging performance. See Section 3.12.2.

1. Connect **DC1 Alt. Bat CH3+** and **DC2 Alt. Bat CH3+** together using #8 AWG wire.
2. Connect the alternator positive (+) lead to **DC1 Alt. Bat CH3+**.

3. Connect **DC1 GND (-)** and **DC2 GND (-)** together using #8 AWG wire.
4. Connect the alternator negative (-) lead to **DC2 GND (-)**.
5. Set **INP DC1** and **INP DC2** to 12V.
6. Connect **COM1 DC1 12V IGN** and **DC2 12V IGN** together and connect them to **DC1 Alt. Bat CH3+**. Set priority (**PRI**) to **P2**. The charger will start automatically when alternator voltage reaches the configured startup threshold. Alternator current configuration (**ALT**) is also required.



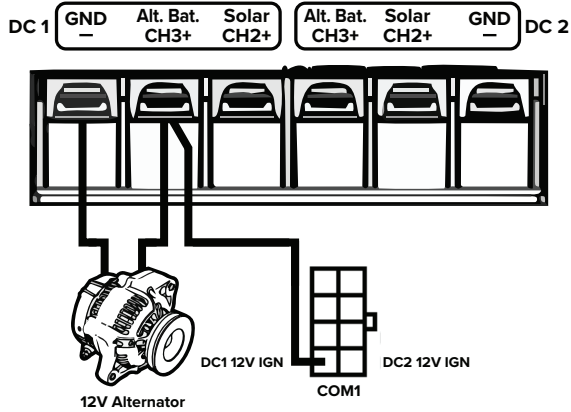
3.12.2. DUAL ALTERNATOR SYSTEMS

When two 12V alternator systems are available, connect each alternator system to a dedicated DC-DC charger.

Connect the first alternator system to DC1:

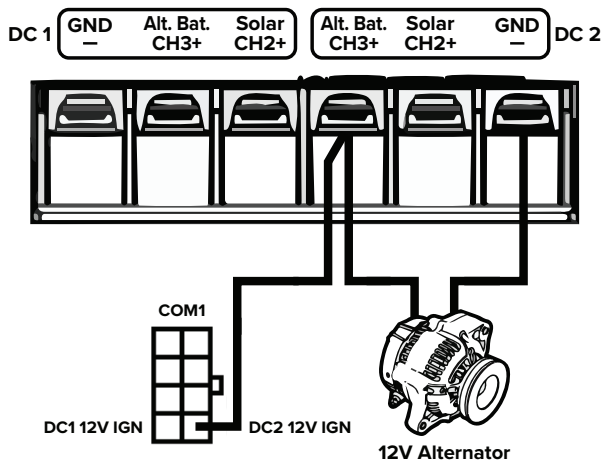
1. Connect the first alternator positive (+) lead to **DC1 Alt. Bat CH3+**.
2. Connect the first alternator negative (-) lead to **DC1 GND (-)**.
3. Set **INP DC1** to 12V.

4. Connect **COM1 DC1 12V IGN** to **DC1 Alt. Bat CH3+** and set priority (**PRI**) to **P2**. The charger will automatically start when the alternator input voltage reaches the configured startup threshold. Alternator current configuration (**ALT**) is also required.



Connect the second alternator system to DC2:

5. Connect the second alternator positive (+) lead to **DC2 Alt. Bat CH3+**.
6. Connect the second alternator negative (-) lead to **DC2 GND (-)**.
7. Set **INP DC2** to 12V.
8. Connect **COM1 DC2 12V IGN** to **DC2 Alt. Bat CH3+** and set priority (**PRI**) to **P2**. The charger will automatically start when the alternator input voltage reaches the configured startup threshold. Alternator current configuration (**ALT**) is also required.

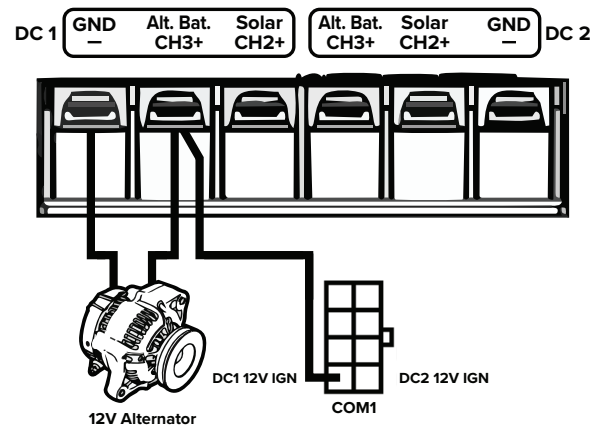


3.12.3. 12V 60A MAX ALTERNATOR SYSTEMS

When only one alternator system is available, connect the alternator to **DC1** only.

1. Connect the alternator positive (+) lead to **DC1 Alt. Bat CH3+**.
2. Connect the alternator negative (-) lead to **DC1 GND (-)**.
3. Set **INP DC1** to 12V.
4. Connect **COM1 DC1 12V IGN** to **DC1 Alt. Bat CH3+** and set priority (**PRI**) to **P2**. The charger will automatically start when the configured startup voltage is reached.

NOTE: No connection is required to **DC2 12V IGN**.



3.13 CONFIGURATION 3: MULTIPLE INPUTS

(Priority P1, P4, or P5 settings only)

Alternator Connection(s)

3.13.1. 12V 60A MIN ALTERNATOR SYSTEMS

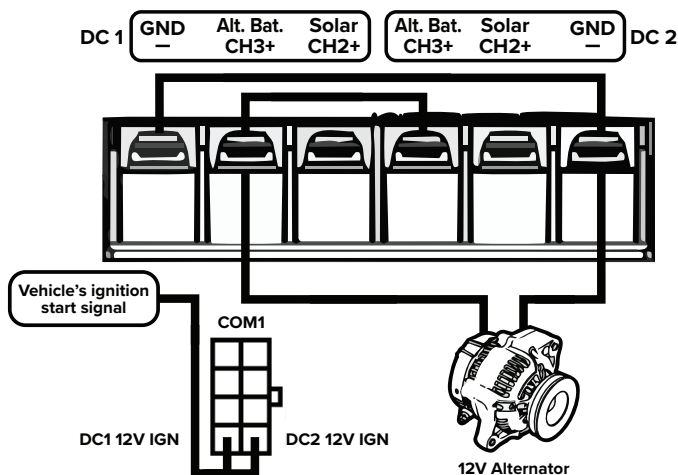
NOTICE

When more than 60A at 12V is available, both DC1 and DC2 chargers should be used to maximize charging performance.

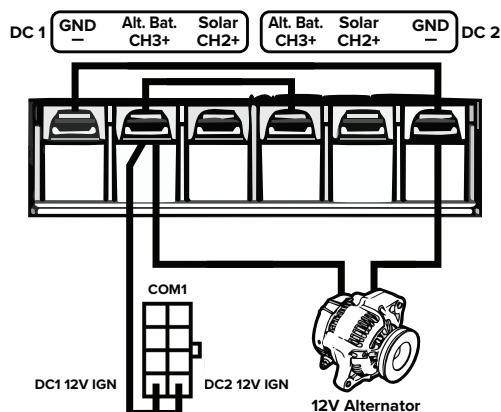
1. Connect **DC1 Alt. Bat CH3+** and **DC2 Alt. Bat CH3+** together using #8 AWG wire.
2. Connect the alternator positive (+) lead to **DC1 Alt. Bat CH3+**.
3. Connect **DC1 GND (-)** and **DC2 GND (-)** together using #8 AWG wire.
4. Connect the alternator negative (-) lead to **DC2 GND (-)**.

5. Set **INP DC1** and **INP DC2** to 12V.

- To enable charging with a vehicle ignition signal, connect **COM1 DC1 12V IGN** and **DC2 12V IGN** together and connect them to the vehicle ignition signal. Set priority (**PRI**) to **P4**. Charging will begin when the ignition signal is present. Alternator current configuration (**ALT**) is also required.



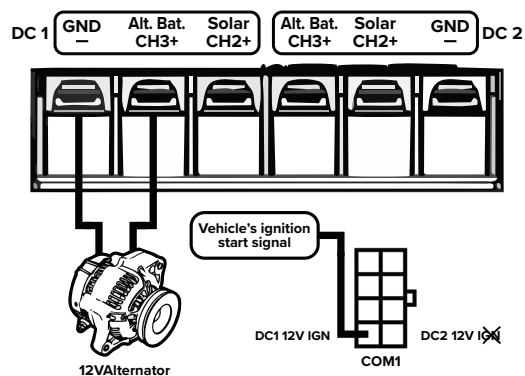
- To enable automatic charging based on alternator voltage, connect **COM1 DC1 12V IGN** and **DC2 12V IGN** together and connect them to **DC1 Alt. Bat. CH3+**. Set priority (**PRI**) to **P1** or **P5**. Charging will begin automatically when the alternator input voltage reaches the configured startup threshold. Alternator current configuration (**ALT**) is also required.

**3.13.2. DUAL ALTERNATOR SYSTEMS**

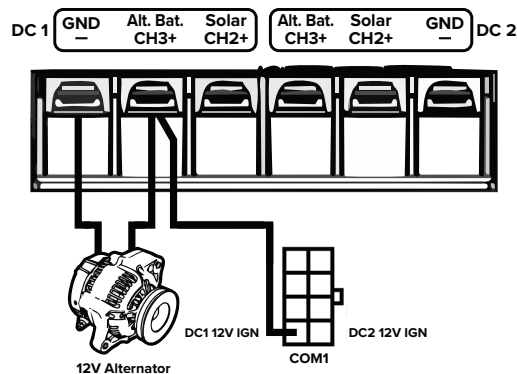
When two 12V alternator systems are available, connect each alternator system to a dedicated DC-DC charger.

Connect the first alternator system to DC1:

- Connect the first alternator positive (+) lead to **DC1 Alt. Bat. CH3+**.
- Connect the first alternator negative (-) lead to **DC1 GND (-)**.
- Set **INP DC1** to 12V.
 - If you want to control DC-DC charger operation using the vehicle ignition signal, connect the **COM1 DC1 12V IGN** pin to the vehicle ignition signal and set priority (**PRI**) to **P4**. Charging will begin when the ignition signal is present. Alternator current configuration (**ALT**) is also required.

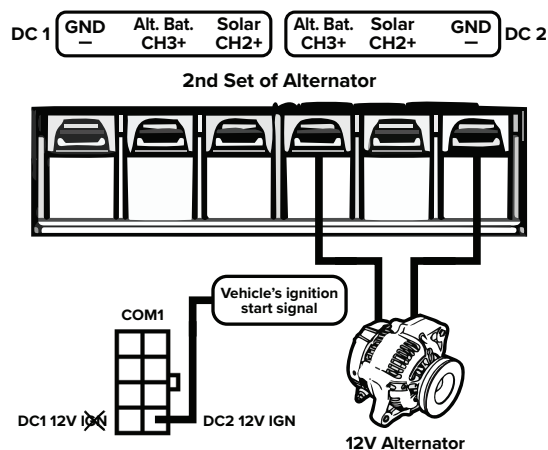


- If you want charging to start automatically based on alternator voltage, connect the **COM1 DC1 12V IGN** pin to **DC1 Alt. Bat. CH3+** and set priority (**PRI**) to **P1** or **P5**. Charging will begin automatically when the alternator input voltage reaches the configured startup threshold. Alternator current configuration (**ALT**) is also required.

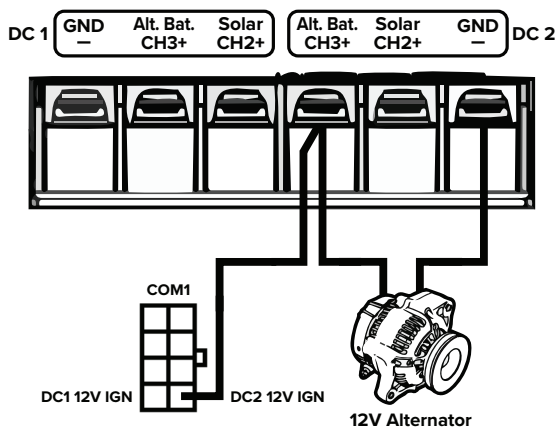


Connect the second alternator system to DC2:

4. Connect the second alternator positive (+) lead to **DC2 Alt. Bat CH3+**.
5. Connect the second alternator negative (-) lead to **DC2 GND (-)**.
6. Set **INP DC2** to 12V.
 - If you want to control DC-DC charger operation using the vehicle ignition signal, connect the **COM1 DC2 12V IGN** pin to the vehicle ignition signal and set priority (**PRI**) to **P4**. Charging will begin when the ignition signal is present. Alternator current configuration (**ALT**) is also required.

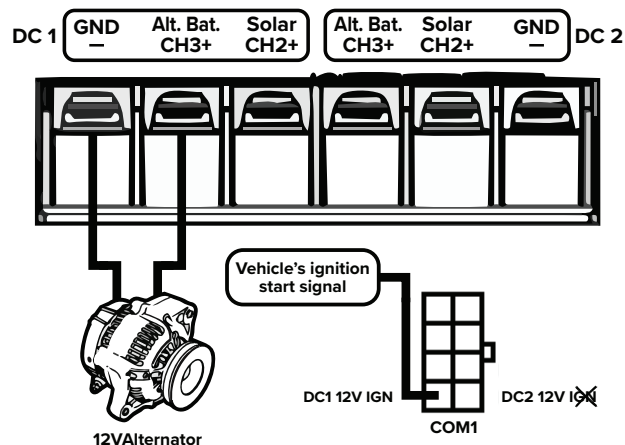


- If you want charging to start automatically based on alternator voltage, connect the **COM1 DC2 12V IGN** pin to **DC2 Alt. Bat CH3+** and set priority (**PRI**) to **P1** or **P5**. Charging will begin automatically when the alternator input voltage reaches the configured startup threshold. Alternator current configuration (**ALT**) is also required.

**3.13.3. 12V 60A MAX ALTERNATOR SYSTEMS**

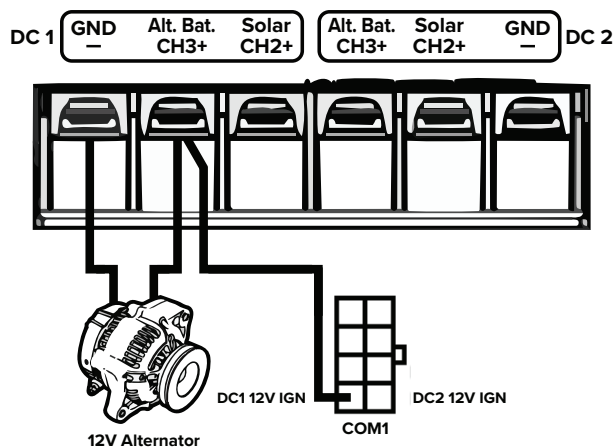
When only a single lower-capacity alternator system is available, connect the alternator to **DC1** only.

1. Connect the alternator positive (+) lead to **DC1 Alt. Bat CH3+**.
2. Connect the alternator negative (-) lead to **DC1 GND (-)**.
3. Set **INP DC1** to 12V.
 - If you want to control DC-DC charger operation using the vehicle ignition signal, connect the **COM1 DC1 12V IGN** pin to the vehicle ignition signal and set priority (**PRI**) to **P4**. Charging will begin when the ignition signal is present.



- If you want charging to start automatically based on alternator voltage, connect the **COM1 DC1 12V IGN** pin to **DC1 Alt. Bat CH3+** and set priority (**PRI**) to **P1** or **P5**. Charging will begin automatically when the alternator input voltage reaches the configured startup threshold.

NOTE: No connection is required to the **DC2 12V IGN** pin.

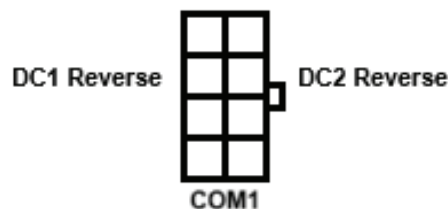


3.14 COM1 PORT DC1 REVERSE AND DC2 REVERSE PINS CONNECTION

The unit includes a bidirectional charging (reverse charging) feature. Applying a high signal (>10V, 30V maximum) to the **DC1 Reverse** pin on the **COM1** port enables reverse charging, provided the house battery is above 12VDC. Reverse charging is automatically disabled when the house battery voltage drops below 10.5VDC.

- When the **DC1 Reverse** or **DC2 Reverse** input is enabled, normal DC-DC charging from the alternator or solar source to the house battery is suspended, and charging current is redirected from the house battery to the alternator/starter battery. The house battery becomes the power source for charging the battery connected to the corresponding **Alt. Bat CH3+** terminal.
- The alternator/starter battery will be charged at 13.5V with a maximum charging current of 20A.

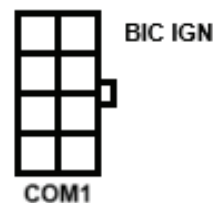
- The same functionality applies independently to **DC2** when the **DC2 Reverse** pin is activated. In this mode, the house battery supplies charging current to the battery connected to **DC2 Alt. Bat CH3+**.
- The reverse charging process will automatically terminate when the house battery voltage decreases to approximately 12.5V.



3.15 COM1 PORT BIC IGN PIN CONNECTION

The **BIC IGN** pin on the **COM1** port provides remote inverter **ON/OFF** control.

- Applying a high signal (>10V, 30V maximum) to the **BIC IGN** pin will turn the inverter **ON**.
- Removing the signal will turn the inverter **OFF**.



SECTION 4: Operation

4.1 GENERAL INFORMATION

The unit is configured with factory default settings that support standard inverter-charger operation. The multi-function display provides real-time system status information and allows users to customize operating parameters as required.

Once configuration is complete, the display may be disconnected if desired, as the unit is capable of operating without the display connected.

4.2 NORMAL OPERATION

When the unit is operating, the multi-function display shows battery voltage by default.

Pressing any button will activate the display backlight for approximately ten (10) seconds.

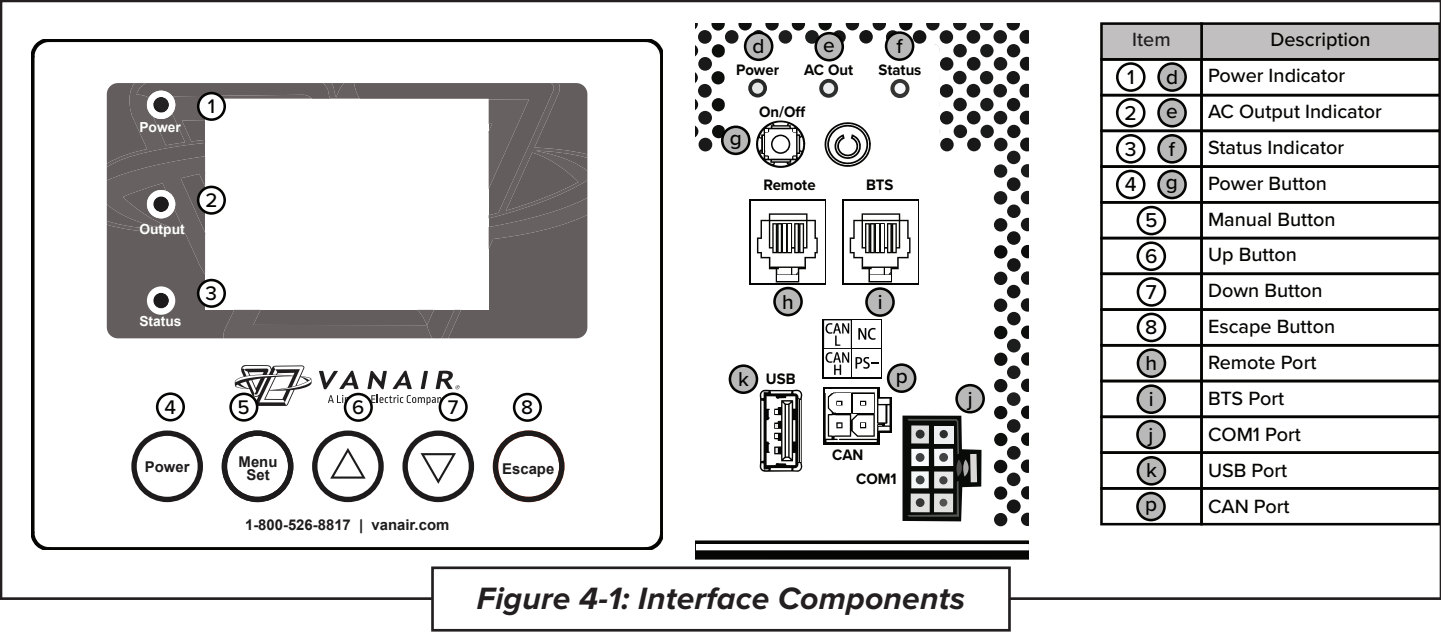


Figure 4-1: Interface Components

Table 4-A: Understanding The Indicator/Push Button/Unit Functions

Indicator	Status	Function
Power	ON	Unit is power ON .
AC Output	ON	AC output switch is turned ON and AC is available at the output socket.
	OFF	AC output switch is turned OFF and AC is not available at the output socket.
Status	Green	AC output is running from utility.
	Green (Flash)	AC output is running from utility and battery charger is charging the battery.
	Orange	AC output is running from inverter.
	Orange (Flash)	Utility is detected and is under verification. AC output is still running from inverter and will switch to utility in about ten (10) seconds.
	Red	Error/warning occurs. Display will show error or warning code.

4.2.2. POWER BUTTON

(Same function as the green **ON/OFF** push button on the main unit)

- To turn the inverter **ON**, press and hold the button until a beep is heard (approximately one (1) second). The display will illuminate, all icons will briefly appear, and the firmware revision information for both the main unit and display panel will be shown.
- To turn the inverter **OFF**, press and hold the button until a beep is heard (approximately one (1) second). The display will turn **OFF**. Wait approximately three (3) seconds for the internal relays to disengage before attempting to turn the unit on again.

NOTICE

When AC input power is available, the Power button cannot be used to turn the unit OFF.

4.2.3. MENU/SET BUTTON

Press once to view the unit settings. Refer to *Section 4.2.5: Viewing/Changing Unit Setting* for additional information.

4.2.4. ▲ AND ▼ BUTTONS:

Use the ▲ and ▼ buttons to scroll through Battery Voltage (V), DC Current (A), and AC Output Power (KW) displays.

4.2.5. ESCAPE BUTTON

Press and hold for five (5) seconds to turn the AC Output Switch **ON** or **OFF**. This function serves as an AC output enable/disable control for the output socket.

4.2.6. VIEWING/CHANGING UNIT SETTING

When the unit is operating normally, press the **Menu/Set** button once to access the settings listed in the *Table 4-B*.

Use the ▲ and ▼ buttons to scroll through available settings. To modify a setting, press and hold the **Menu/Set** button for five (5) seconds until the selected parameter begins flashing.

Use the ▲ and ▼ buttons to select the desired value. To save the new setting, press and hold the **Menu/Set** button until a confirmation beep is heard.

Press the **Escape** button once to return to **Normal Operation**. If no button is pressed for approximately five (5) seconds, the display will automatically return to **Normal Operation**.

Table 4-B: Unit Setting Function Chart

Unit Setting	Display	Description and Available Setting
Inverter Mode	INT ABU	ON : Use as inverter only. No bypass functions.
		ABU (Default): Auto Backup. Inverter automatically turns ON when AC blackout.
		MBU : Manual Backup. When AC blackout occurs, inverter has to be manually turned ON by using the Power button on either the display panel or the Power button on the main unit.
		OFF : Inverter function is disabled. No AC backup when AC blackout.
Inverter AC output Load Sense	LOS OFF	OFF (Default): Continuous AC output when inverter is ON .
		10 : Continuous AC output when inverter is ON and AC load is > 10W.
		15 : Continuous AC output when inverter is ON and AC load is > 15W.
		20 : Continuous AC output when inverter is ON and AC load is > 20W.
		25 : Continuous AC output when inverter is ON and AC load is > 25W.
Battery Low Disconnect	BLO 10.5*	Battery low disconnect voltage selectable ranges is 10.5 - 12.0V (0.1V steps) * (Default voltage is set to 10.5V*)

Table 4-B: Unit Setting Function Chart

Unit Setting	Display	Description and Available Setting
Battery Low Warning	BLA 11.0*	Battery low warning voltage selectable ranges is 11.0 - 12.5V (0.1V step)* (Default voltage is set to 11.0V*)
Battery Low Recovery	BLR 12.0*	Battery low recovery voltage selectable ranges is 11.5 - 13.0V (0.1V step)* (Default voltage is set to 12.0V*)
Audible Buzzer	ALM ON	ON (Default): Buzzer is enabled. Unit buzzes when warning or error occurs. OFF: Buzzer is disabled. Unit does not buzz when warning and error occur.
AC Charger mode	CHG ON	ON (Default): AC charger is enabled. Charge battery when AC input is available. OFF: AC charger is disabled. No battery charging when AC input is available.
Auxiliary Battery Type	BAT GEL	GEL (Default): GEL battery, default bulk charge/float voltage is 14.2/13.8V*
		AGM: AGM battery, default bulk charge/float voltage is 14.3/13.4V*
		FLO: Flooded battery, default bulk charge/float voltage is 14.4/13.5V*
		LI: Lithium battery, default bulk charge/float voltage is 13.9/13.5V*
		PGM: Program, default bulk charge/float voltage is 13.8/13.2V*
		PSY: Power supply mode, default power supply voltage 13.8V*
Bulk Current	BUL 100	12V/3000W Models: Selectable ranges 100A, 80A, 60A, 40A, or 25A (Default 100A) .
Bulk/Absorption Voltage	ABS 14.2*	Bulk/absorption voltage is based on the battery type chosen. All battery types have selectable ranges of 13.8 - 14.8V*. (Default on GEL battery is 14.2V*)
Absorption to Float Current	ABS 10	12V/3000W Models: Selectable Range: 20A, 15A, 10A, 5A, or 2A (Default 10A) .
Float Voltage	FLO 13.8*	Float voltage is based on the battery type chosen. All battery types have selectable ranges of 13.0 - 14.0V*. (Default on GEL battery is 13.8V*)
Recharge Voltage	REC 12.8*	Battery recharge voltage selectable range: 12.8 - 14.0V (0.1V step)* (Default on GEL, AGM, Flooded, PGM battery setting is 12.8V* and Li setting is 13.2V).
Battery Temperature	BTM NOR	HI: High > 95 °F NOR (Default): Normal 59 - 95 °F LOW: Low < 59 °F
AC Input Source Circuit Breaker	CBR 30	Range: 30A, 20A, 15A (Default 30A) .
Alternator Current Setting	ALT 100A	Alternator current setting is based on the alternator size used on the vehicle that will be used for Alternator DC input charging used. Selectable range are 40 - 100A (10A increments) (Default 100A)
DC-DC Charger Quiet Mode	QUI OFF	DC-DC charger quiet mode setting is based on a quiet environment (example during nighttime) is required. This setting will disable the fan operation and charging current will be reduced to around 50% (Default OFF)
DC-DC Charger DC1 Priority setting	PRI DC1	DC-DC charger 1 (DC1) priority. This setting is used to set which DC input channel (alternator or solar) will be used for auxiliary battery charging. (Default P5)
DC-DC Charger DC1 Alternator I/P	INP DC1	DC-DC charger (DC1) alternator input. This setting is used to select what alternator input system type (12V) is in used. (Default 12V)
DC1 Charging Current	DC1A DC1	This setting is used to set the DC1 charging current. The available charging current is 5-50A (Default: 50A)
DC2 Charging Current	DC2A DC2	This setting is used to set the DC1 charging current. The available charging current is 5-50A (Default: 50A)

Table 4-B: Unit Setting Function Chart

Unit Setting	Display	Description and Available Setting
DC1 Alternator Startup Voltage	ALT DC1 13.2V	This setting controls the alternator startup voltage. DC1 will use the alternator to charge the auxiliary battery when it reaches the alternator startup voltage. If INP DC1 above is set to 12V alternator system, the available startup voltage range is 11.5 - 13.7V (Default: 13.2V)
DC2 Priority setting	PRI DC2	DC-DC Charger 2 (DC2) priority. This setting is used to set which DC input channel (alternator or solar) will be used for auxiliary battery charging. (Default P5)
DC2 Alternator Input	INP DC2	DC-DC Charger 1 (DC1) alternator input. This setting is used to select what alternator Input system type (12V) is in used.
DC2 Alternator Startup Voltage	ALT DC2 13.2V	This setting is used to set the alternator startup voltage. DC2 will start to use the alternator to charge the auxiliary battery when it reaches the alternator startup voltage. If INP DC2 above is set to 12V alternator system, the available startup voltage range is 11.5 - 13.7V (Default: 13.2V)
Factory Default	BTM NOR	Select YES to reset all settings to default.

4.3 UNDERSTANDING THE DISPLAY ICONS

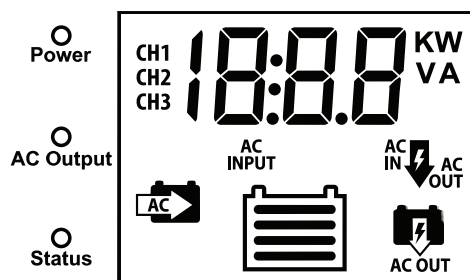


Table 4-C: Display Icons

Icon	Meaning
	Solid: Unit is running in Battery Charger mode and is charging the battery.
	Solid: Unit is running in Bypass mode. (The transfer switch is switched to AC Input Source). AC output power is running from AC input source. AC output is available at both the AC output socket and the AC output hardwire terminal if AC output switch is turned ON (indicated by AC output indicator located on the left side of the display and also the main unit being ON). NOTE: Press and hold the Escape button on the display panel for five (5) seconds to toggle AC output switch ON/OFF .
AC INPUT	Solid: AC input is available and is in the operating range. Flashing: AC input is detected and is under verification before switching to Bypass mode. This normally takes about ten (10) seconds.
	Solid: Unit is running in Battery mode (the transfer switch is switched to inverter). AC output power is running from the inverter. AC output is available at both the AC output socket and the AC output hardwire terminal if AC output switch is turned ON (indicated by AC output indicator located on the left side of the display and also the main unit being ON). NOTE: Press and hold the Escape button on the display panel for five (5) seconds to toggle AC output switch ON/OFF .

Table 4-C: Display Icons

Icon	Meaning														
 Battery Inverter Mode	Battery bar(s) in solid indicating the unit is running in Battery mode. The bars show estimated remaining battery power. 4 solid bars: Battery is Full 3 solid bars: Battery capacity with 75% remaining 2 solid bars: Battery capacity with 50% remaining 1 solid bar: Battery capacity with 25% remaining No bar: Battery is empty. Inverter will shut down when it reaches under-voltage shutdown point. NOTE: This indicator is for reference use only. It varies depending on battery health or type used.														
 Charger Mode	Battery bar(s) with the last bar flashing indicates the unit is running in Bypass mode and the battery charging process is in progress. The charging stages are indicated by the number of bars. <table> <tr> <td></td><td> 4 bars in solid: Indicates the battery is fully charged and it is in Float stage </td></tr> <tr> <td></td><td> Top bars flashing: Indicates the battery is in absorption charging stage </td></tr> <tr> <td></td><td> Second top bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 13.5V </td></tr> <tr> <td></td><td> Second bottom bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 12.5V </td></tr> <tr> <td></td><td> Bottom bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 11.5V </td></tr> <tr> <td></td><td> No bar: Indicates the battery is in Bulk charging stage and the battery is > 10.5V </td></tr> <tr> <td></td><td> Battery icon flashing: Indicates the battery is in Bulk charging stage and the battery is below 10.5V </td></tr> </table>		4 bars in solid: Indicates the battery is fully charged and it is in Float stage		Top bars flashing: Indicates the battery is in absorption charging stage		Second top bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 13.5V		Second bottom bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 12.5V		Bottom bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 11.5V		No bar: Indicates the battery is in Bulk charging stage and the battery is > 10.5V		Battery icon flashing: Indicates the battery is in Bulk charging stage and the battery is below 10.5V
	4 bars in solid: Indicates the battery is fully charged and it is in Float stage														
	Top bars flashing: Indicates the battery is in absorption charging stage														
	Second top bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 13.5V														
	Second bottom bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 12.5V														
	Bottom bar flashing: Indicates the battery is in Bulk charging stage and the battery is > 11.5V														
	No bar: Indicates the battery is in Bulk charging stage and the battery is > 10.5V														
	Battery icon flashing: Indicates the battery is in Bulk charging stage and the battery is below 10.5V														
CH1	CH1 is ON indicating DC-DC Charger DC1 is active.														
CH2	CH2 is ON indicating DC-DC Charger DC2 is active.														
CH3	CH3 is ON indicating AC charger is active.														
28	A icon ON indicates the display shows battery discharge current (28A as shown).														
0.80	kW icon ON , it indicates the display shows AC output power in kW (0.80kW = 800W as shown).														
12.8	V icon ON , it indicates the display shows battery voltage in V (12.8V as shown).														
E01	Warning icon ON , it indicates the display shows error/warning code (E01 as shown, battery low disconnected error).														
E9U	Equalization on flooded battery is in process. This function is available for use with flooded battery type only. The display will also show the equalization voltage during the process. Follow the instruction provided by the battery manufacturer when performing the equalization process.														
X.XX	During unit startup, the display will shows the unit's firmware revision level multiple times, it indicates different firmware's revision level. It is recommended to record the start up revision after unit is purchase and this information may require when there is any warranty returns claim.														

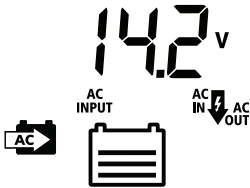
4.4 EXPLORING THE UNIT SETTINGS

4.4.1. INVERTER AND AC CHARGER FUNCTIONS

- Automatic Backup with Battery Charger
Function Enabled - Unit Default Setting (**INT** = **ABU**, **CHG** = **ON**)

When AC input power is available, the charger remains active and the inverter remains in standby mode. If AC input power is interrupted, the inverter automatically turns on and supplies power to the connected loads, providing seamless backup operation.

Table 4-D: Automatic Backup with AC Battery Charger Function Enabled

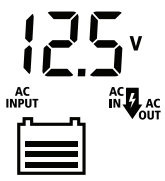
INT CHG	ABU ON	Meaning
When AC input source or shore power is available, unit is running in Bypass mode. AC output is getting the power from the AC input source or shore power. Charger is enabled and inverter is in standby condition. NOTE: This is the unit DEFAULT setting.		
		Display shows battery voltage (14.2V), use ▲ or ▼ button to see DC Current charging the battery, AC input power. AC INPUT is ON indicates AC input source is in use. AC IN is ON indicates AC output is getting the power from AC input source. AC is ON indicates the charger is enabled and is charging the battery.  icon indicates the charging stage of the battery.
○ Power ○ AC Output ○ Status		Power indicator on indicates unit is ON. - If AC Output indicator is ON, it indicates the AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). - If AC Output indicator is OFF, it indicates the AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). - Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. - If Status indicator is solid green, it indicates battery is fully charged. - If Status indicator is flashing green, it indicates battery charging is in progress. NOTE: In Bypass mode, the Power button function is disabled. It cannot be used to turn OFF the unit.
When there is a blackout (AC input source or shore power is not available), unit is running in Inverter/Battery Mode. Unit will automatically switch to getting AC power from the inverter. Charger is disabled.		
		Display shows battery voltage (12.8V), use ▲ or ▼ button to see DC Current discharge from battery, AC output power. AC OUT is ON indicates inverter is providing AC power.  icon indicates estimated battery capacity.
○ Power ○ AC Output ○ Status		Power indicator on indicates unit is ON. - If AC Output indicator is ON, it indicates AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). - If AC Output indicator is OFF, it indicates AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). - Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. - If Status indicator is solid amber, it indicates inverter is running. - If Status indicator changes to flashing amber, it indicates AC input source is detected and will switch back to Bypass mode shortly. NOTE: In Inverter/Battery mode, the Power button can be used to temporarily turn the unit OFF to save battery power if AC output power is not required. When AC input source or shore power returns, unit will automatically turn ON and run in Bypass mode again.

2. Automatic Backup with AC Battery Charger Function Disabled - (INT = **ABU**, CHG = **OFF**)

This mode is intended for applications that use an alternative battery charging source. The unit's internal AC charger remains disabled at all times.

A separate charging source is required to maintain battery charge. If AC input power is interrupted, the inverter automatically turns on and continues supplying power to the connected loads while in standby operation.

Table 4-E: Automatic Backup with Battery Charger Function Disabled

INT CHG	ABU ON	Meaning
When AC input source or shore power is available, unit is running in Bypass mode. AC output is getting the power from the AC input source or shore power. Charger is disabled. Inverter is in standby condition.		
		Display shows battery voltage (12.5V), use ▲ or ▼ button to see DC Current (always 0A because charger is disabled), AC Input Power. AC INPUT is ON indicates AC input source is in use. AC IN/OUT is ON indicates AC output is getting the power from AC input source.  icon indicates estimated battery capacity. NOTE: When this setting is used, AC charger is disabled. A separate Battery Charger or other battery charging source is required to charge the battery.
 Power  AC Output  Status		Power indicator on indicates unit is ON. - If AC Output indicator is ON, it indicates the AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). - If AC Output indicator is OFF, it indicates the AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). - Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. Status indicator is solid green indicates unit is running in Bypass mode. NOTE: In Bypass mode, the Power button function is disabled. It cannot be used to turn OFF the unit.
When there is a blackout (AC input source or shore power is not available), unit is running in Inverter/Battery mode. Unit has automatically switched to getting AC power from the inverter.		
		Display shows battery voltage (12.8V), use ▲ or ▼ button to see DC current discharged from battery, AC output power. AC OUT is ON indicates inverter is providing AC power.  icon indicates estimated battery capacity.
 Power  AC Output  Status		Power indicator on indicates unit is ON. - If AC Output indicator is ON, it indicates AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). - If AC Output indicator is OFF, it indicates AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). - Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. - If Status indicator is solid amber, it indicates inverter is running. - If Status indicator changes to flashing amber, it indicates AC input source is detected and will switch back to Bypass mode shortly. NOTE: In Inverter/Battery mode, the Power button can be used to temporarily turn the unit OFF to save battery power if AC output power is not required. When AC input source or shore power returns, unit will automatically turn ON and run in Bypass mode again.

3. Manual Backup with AC Battery Charger Function Enabled - (INT = MBU, CHG = ON)

This is another commonly used operating mode. When AC input power is available, the battery charger remains enabled.

If a power outage occurs, the inverter does not start automatically. The inverter must be turned on manually when backup power is required.

Table 4-F: Manual Backup with AC Battery Charger Function Enabled

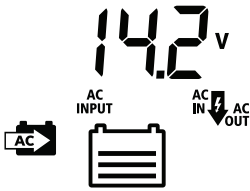
INT CHG	ABU ON	Meaning
When AC input source or shore power is available, unit is running in Bypass mode. AC output is getting the power from the AC input source or shore power. Charger is enabled. Inverter is disabled.		
		Display shows battery voltage (14.2V), use ▲ or ▼ button to see DC current charging the battery, AC input power. AC INPUT is ON indicates AC input source is in use. AC IN/OUT is ON indicates AC output is getting the power from AC input source. AC is ON indicates the charger is enabled and is charging the battery.  icon indicates the charging stage of the battery.
 Power  AC Output  Status		Power indicator on indicates unit is ON. - If AC Output indicator is ON, it indicates AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). - If AC Output indicator is OFF, it indicates AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). - Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. - If Status indicator is solid green, it indicates battery is fully charged. - If Status indicator is flashing green, it indicates battery charging is in progress. NOTE: In Bypass mode, the Power button function is disabled in this stage. It cannot be used to turn OFF the unit.
When there is a blackout (AC input source or shore power is not available), unit will not provide AC backup as inverter is disabled. Display remains ON for ten (10) seconds with the following appearance:		
		Display shows battery voltage (12.6V), use ▲ or ▼, button to see DC current (always 0A because charger is OFF), AC input power (always 0W because inverter is disabled).  icon indicates estimated battery capacity. NOTE: Under this condition, display and unit will turn OFF after ten (10) seconds. At any time, if an AC input source is detected, unit will switch back to Bypass mode automatically in about ten (10) seconds. During the ten (10) second period, Power indicator turns ON and Status indicator remains OFF.
 Power  AC Output  Status		Power indicator on indicates unit is ON. AC Output indicator is OFF (AC output is not available due to the inverter being set to Manual Backup mode - MBU). Status indicator is OFF.

Table 4-F: Manual Backup with AC Battery Charger Function Enabled

INT CHG	ABU ON	Meaning
If AC output is required during a blackout, press and hold the Power button for one (1) second to manually turn ON the inverter.		
		Display shows battery voltage (12.8V), use ▲ or ▼ button to see DC current discharged from battery, AC output power.  is on indicates inverter is providing AC power.  icon indicates estimated battery capacity.
 Power  AC Output  Status		• Power indicator on indicates unit is ON. • If AC Output indicator is ON, it indicates AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). • If AC Output indicator is OFF, it indicates AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). • Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. • If Status indicator is solid amber, it indicates inverter is running. • If Status indicator changes to flashing amber, it indicates AC input source is detected and will switch back to Bypass mode shortly. NOTE: The Power button can be used to turn the unit OFF if AC output power is not required. When AC input source or shore power returns, unit will automatically turn ON and run in Bypass mode again.

4. Manual Backup with AC Battery Charger Function Disabled - (INT = MBU, CHG = OFF)

In this mode, the inverter does not automatically start during a power outage and must be turned on manually when backup power is needed.

The internal AC charger remains disabled at all times. A separate charging source is required to maintain battery charge.

Table 4-G: Manual Backup with AC Battery Charger Function Disabled

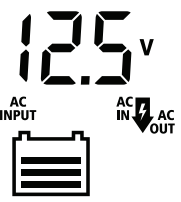
INT CHG	ABU ON	Meaning
When AC input source or shore power is available, unit is running in Bypass mode. AC output is getting the power from the AC input source or shore power. Both charger and inverter are disabled.		
		Display shows battery voltage (12.5V), use ▲ or ▼ button to see DC current (always 0A because charger is disabled), AC input power.  is ON indicates AC input source is in use.  is ON indicates AC output is getting the power from AC input source.  icon indicates estimated battery capacity. NOTE: When this setting is used, AC charger is disabled. A separate battery charger or other battery charging source is required to charge the battery.

Table 4-G: Manual Backup with AC Battery Charger Function Disabled

INT CHG	ABU ON	Meaning
 Power  AC Output  Status		• Power indicator on indicates unit is ON. • If AC Output indicator is ON, it indicates AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). • If AC Output indicator is OFF, it indicates AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). • Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. • Status indicator is solid green indicates unit is running in Bypass mode. NOTE: In Bypass mode, the Power button function is disabled in this stage. It cannot be used to turn OFF the unit.
When there is a blackout (AC input source or shore power is not available), unit will not provide AC backup as inverter is disabled. Display remains ON for ten (10) seconds with the following appearance:		
 		Display shows battery voltage (12.6V), use ▲ or ▼ button to see DC Current (always 0A because charger is OFF), AC input power (always 0W because inverter is disabled).  icon indicates estimated battery capacity. NOTE: Under this condition, display and unit will turn OFF after ten (10) seconds. At any time, if an AC input source is detected, unit will switch back to Bypass mode automatically in about ten (10) seconds. During the ten (10) second period, Power indicator turns ON and Status indicator remains OFF.
 Power  AC Output  Status		• Power indicator on indicates unit is ON. • AC Output indicator is OFF (AC output is not available due to the inverter being set to Manual Backup (MBU) mode). • Status indicator is OFF
If AC output is required during a blackout, press and hold the Power button for one (1) second to manually turn ON the inverter.		
  		Display shows battery voltage (12.8V), use ▲ or ▼ button to see DC Current discharged from battery, AC output Power.  is on indicates inverter is providing AC Power.  icon indicates estimated battery capacity.
 Power  AC Output  Status		• Power indicator on indicates unit is ON. • If AC Output indicator is ON, it indicates AC output Switch is turned ON (AC is available at the output socket and the output hardwire terminal). • If AC Output indicator is OFF, it indicates AC output Switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). • Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. • If Status indicator is solid amber, it indicates inverter is running. • If Status indicator changes to flashing amber, it indicates AC input source is detected and will switch back to Bypass mode shortly. NOTE: The Power button can be used to turn the unit OFF if AC output power is not required. When AC input source or shore power returns, unit will automatically turn ON and run in Bypass mode again.

5. No Backup with AC Battery Charger Function Enabled - (INT = OFF, CHG = ON)

In this mode, the unit functions as an AC transfer switch and battery charger only.

AC output power is available only when AC input power is present. The charger remains active whenever AC input power is available, while inverter operation is disabled.

Table 4-H: No Backup with AC Battery Charger Function Enabled

INT CHG	ABU ON	Meaning
When AC input source or shore power is available, unit is running in Bypass mode. AC output is getting the power from the AC input source or shore power. Charger is enabled. Inverter is disabled.		
		Display shows battery voltage (14.2V), use ▲ or ▼ button to see DC current charging the battery, AC input power. AC INPUT is on indicates AC input source is in use. AC IN/OUT is on indicates AC output is getting the power from AC input source. AC is on indicates the charger is enabled and is charging the battery.  icon indicates the charging stage of the battery.
 Power  AC Output  Status		Power indicator on indicates unit is ON. - If AC Output indicator is ON, it indicates AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). - If AC Output indicator is OFF, it indicates AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). - Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. - If Status indicator is solid green, it indicates battery is fully charged. - If Status indicator is flashing green, it indicates battery charging is in progress. NOTE: In Bypass mode, the Power button function is disabled. It cannot be used to turn OFF the unit.
When there is a blackout (AC input source or shore power is not available), unit will not provide AC backup as inverter is disabled. Display remains ON for ten (10) seconds with the following appearance:		
		Display shows battery voltage (12.6V), use ▲ or ▼ button will see DC current (always 0A because charger is OFF), AC input power (always 0W because inverter is disabled).  icon indicates estimated battery capacity. NOTE: Under this condition, display and unit will turn OFF after ten (10) seconds. At any time, if AC input source is detected, unit will switch back to Bypass mode automatically in about ten (10) seconds. During the ten (10) second period, Power indicator turns ON and Status indicator remains OFF.
 Power  AC Output  Status		Power indicator on indicates unit is ON. AC Output indicator is OFF (AC output is not available due to the inverter being set to OFF). Status indicator is OFF. After ten (10) seconds, display and unit will turn OFF. - Press and hold the Power button for one (1) second to turn ON the display to check the battery status.

6. Inverter Only with No Bypass or Battery Charger Function - (INT = ON, CHG = ON or OFF)

This mode is intended for applications where connected loads must always receive clean sine-wave power from the inverter.

Press and hold the **Power** button for one (1) second to turn the inverter **ON** or **OFF**. In this mode, inverter-only operation overrides charger settings and disables the charger under all conditions. A separate charging source is required to maintain battery charge.

Table 4-I: Inverter Only

INT CHG	ABU ON	Meaning
With inverter turned on and no AC input source or shore power is detected.		
NOTE: Unit is running as inverter only, no bypass and AC battery charging function		
		Display shows battery voltage (12.8V), use ▲ or ▼ button to see DC current discharged from battery, AC output power.  is on indicates inverter is providing AC Power.  icon indicates estimated battery capacity.
 Power  AC Output  Status		• Power indicator on indicates inverter function is ON. • If AC Output indicator is ON, it indicates AC output Switch is turned ON (AC is available at the output socket and the output hardwire terminal). • If AC Output indicator is OFF, it indicates AC output Switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). • Press and hold Escape button for five (5) seconds to toggle AC output Switch ON and OFF. • Status indicator is solid amber indicates inverter is running. NOTE: The Power button can be used to turn inverter ON and OFF.
With inverter turned on with AC input source or shore power is detected.		
		With AC input source detected, the AC INPUT will be shown on the display but there is no inference to the AC Output. AC output is still getting the power from the inverter. Display shows battery voltage (12.8V), use ▲ or ▼ button to see DC Current discharged from battery, AC output Power. AC INPUT is on indicates AC Input Source is detected.  is on indicates inverter is providing AC Power.  icon indicates estimated battery capacity.
 Power  AC Output  Status		• Power indicator on indicates inverter function is ON. • If AC Output indicator is ON, it indicates AC output Switch is turned ON (AC is available at the output socket and the output hardwire terminal). • If AC Output indicator is OFF, it indicates AC output Switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). • Press and hold Escape button for five (5) seconds to toggle AC output Switch ON and OFF. • Status indicator is solid amber indicates inverter is running. NOTE: The Power button can be used to turn inverter ON and OFF.

7. AC Bypass Only, No AC Battery Charger or Inverter Function - (**INT = OFF, CHG = OFF**)

In this mode, the unit operates solely in **AC Bypass** mode. When AC input power is available, AC output power is supplied directly from the AC input source.

The battery charger and inverter functions are both disabled. During a power outage, no AC backup power will be available. A separate charging source is required to maintain battery charge.

Table 4-J: AC Bypass only, AC Charger and Inverter Functions are disable

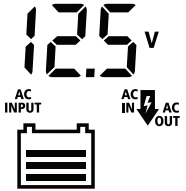
INT CHG	ABU ON	Meaning
When AC input source or shore power is available, unit is running in Bypass mode. AC output is getting the power from the AC input source or shore power.		
		Display shows battery voltage (12.5V), use ▲ or ▼ button to see DC current (always 0A because charger is disable), AC input power. AC INPUT is on indicates AC input source is in use. AC IN is on indicates AC output is getting the power from AC input source.  icon indicates estimated battery capacity. NOTE: When this setting is used, AC charger is disabled. A separate battery charger or other battery charging source is required to charge the battery.
 Power  AC Output  Status		• Power indicator on indicates unit is ON. • If AC Output indicator is ON, it indicates AC output switch is turned ON (AC is available at the output socket and the output hardwire terminal). • If AC Output indicator is OFF, it indicates AC output switch is turned OFF (AC is not available at the output socket and the output hardwire terminal). • Press and hold Escape button for five (5) seconds to toggle AC output switch ON and OFF. • Status indicator is solid green indicates unit is running in Bypass mode. NOTE: In Bypass mode, the Power button function is disabled. It cannot be used to turn OFF the unit.
When there is a blackout (AC input source or shore power is not available), unit will not provide AC Backup as inverter is disabled. Display remains ON for ten (10) seconds with the following appearance:		
		Display shows battery voltage (12.6V), use ▲ or ▼ button will see DC current (always 0A because charger is OFF), AC input power (always 0W because inverter is disabled).  icon indicates estimated battery capacity. NOTE: Under this condition, display and unit will turn OFF after ten (10) seconds. If the AC input source is detected, unit will switch back to Bypass mode automatically in about ten (10) seconds. During the ten (10) second period, Power indicator turns ON and Status indicator remains OFF.
 Power  AC Output  Status		• Power indicator on indicates unit is ON. • AC Output indicator is OFF (AC output is not available due to the inverter being set to OFF). • Status indicator is OFF • After ten (10) seconds, display and unit will turn OFF. • Press and hold the Power button for one (1) second to turn ON the display to check the battery status. • If AC input source is detected, unit will switch back to Bypass mode automatically in about ten (10) seconds. During the ten (10) second period, Power indicator turns ON and Status indicator remains OFF.

Table 4-K: Load Sense Function

LDS	This Load Sense function is only effective when the unit is running as inverter (battery power) mode.
	OFF: Unit provides continuous AC output power all the time.
	10: Load Sense power setting is set to 10W. Unit will provide continuous AC output only when the AC load connected to the AC output is > 10W. AC output will switch back to pulsing AC output every few seconds when the AC Load connected is approximately 3W or less.
- The Load Sense power rating is available at power levels of 10W, 15W, 20W, and 25W. - This setting is designed to reduce battery power when the unit is running as inverter and the AC Load demand is small. - Under this setting the GFCI tripping detection error code (E13) does not work, and a tripped GFCI cannot be reset when the function is in operation. See more details in Section 3.9.	

Table 4-L: Battery Disconnect Function

BLD	Battery low disconnect voltage has selectable range: 10.5-12.0V (0.1V steps) (Default 10.5V)	
	The battery low disconnect voltage has to be with a minimum of 0.5V below the battery low alarm (BLA) voltage.	
	Battery low alarm Selectable range: 11.0-12.5V (0.1V step) (Default 11.0V)	
BLA	The battery low alarm voltage has to be with a minimum of 0.5V above the battery low disconnect (BLd) voltage and has to be with a minimum of 0.5V below the battery low recovery (bLr) voltage.	
BLR	Battery under voltage recovery selectable range: 11.5-13.0V (0.1V step) (Default 12.0V)	
	The battery low recovery voltage has to be with a minimum of 0.5V above the battery low alarm (bLA) voltage.	
Battery Over-Voltage Disconnect		16.5V (Not User selectable)
Battery Over-Voltage Recovery		16.0V (Not User selectable)

Table 4-M: Alarm Function

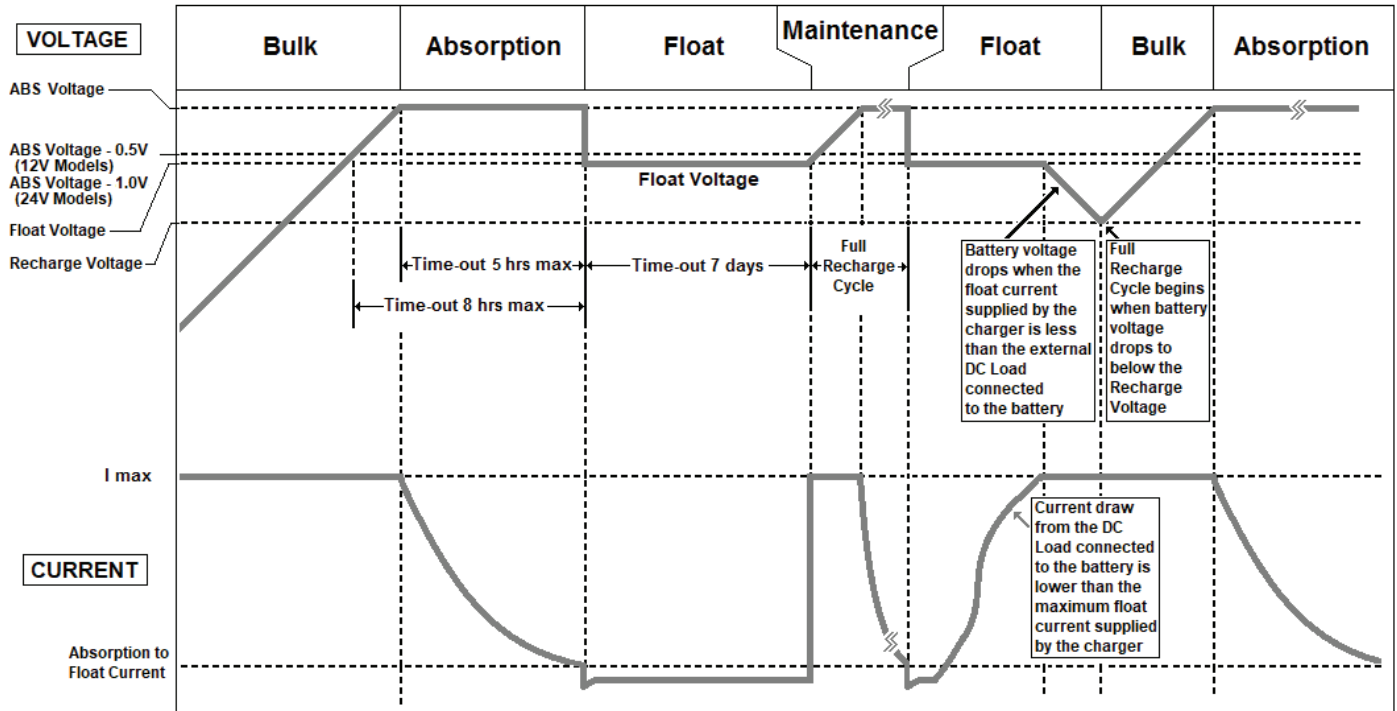
ALM	Fault and warning audible alarm can be enabled (ON - Default) or disabled (OFF).
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8. Charger Functions

Table 4-N: Auxiliary Battery Charging Voltage Setting (Default)

Battery Type	Bulk/Absorption (AbS)	Float (FLO)	Recharge (rEC)
GEL	13.8-14.8V (14.2V)	13.0-14.0V (13.8V)	12.8-14.0V (12.8V)
Flooded	13.8-14.8V and 15.8V (14.4V)	13.0-14.0V (13.5V)	12.8-14.0V (12.8V)
AGM	13.8-14.8V (14.3V)	13.0-14.0V (13.4V)	12.8-14.0V (12.8V)
Lithium	13.8-14.8V (13.9V)	13.0-14.0V (13.5V)	12.8-14.0V (13.2V)
Program	13.8-14.8V (13.8V)	13.0-14.0V (13.2V)	12.8-14.0V (12.8V)
Power Supply	13.0-14.0V (13.8V)		
- Consult the battery manufacturer when choosing the bulk and float voltage for the auxiliary battery. - When selecting the float voltage, it has to be with a minimum of 0.4V below bulk voltage setting. - The recharged voltage determines the restart cycle of the battery bank. The charger will go through a full recharge cycle when the battery voltage drops to the recharge voltage set value. When selecting the recharge voltage, it has to be with a minimum of 0.4 below the float voltage setting. - If power supply is chosen, the charger will provide a constant voltage to charge the battery bank.			

GEL, AGM, Flooded and Program Battery Charging Profile



Lithium Battery Charging Profile

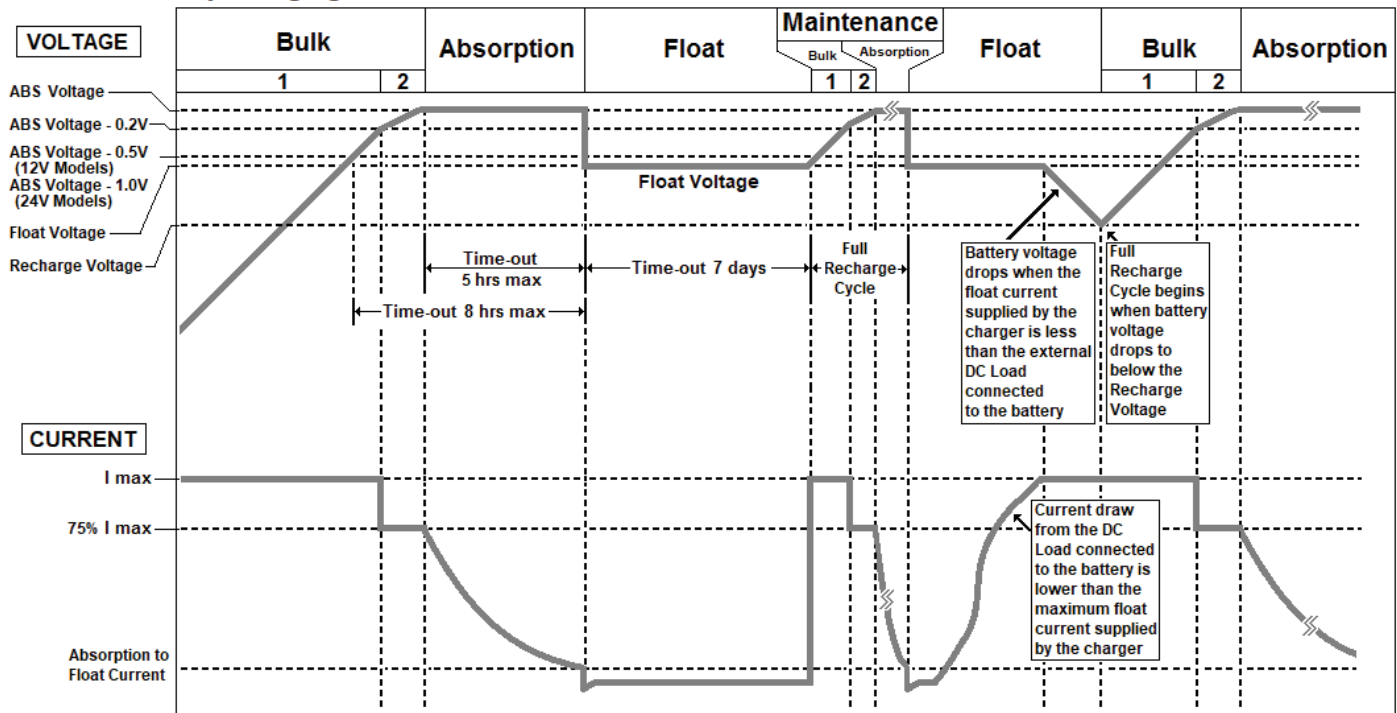


Figure 4-8: Battery Charging Cycle

Table 4-O: Auxiliary Battery AC Charging Current Setting

Bulk Stage	Absorption to Float Stage
100A, 80A, 60A, 40A, 25A (Default: 100A)	20A, 15A, 10A, 5A, 2A (Default: 10A)
- Consult the battery manufacturer when choosing the bulk stage charging current of the auxiliary battery. For a sealed lead acid battery, the rule of thumb for the maximum charging current is 1/5 of battery capacity. - The absorption to float stage current determines the transition from absorption stage to float stage. If an external DC load is connected to the auxiliary battery, a higher current setting is recommended to compensate for the extra current drawn from the external DC load. - In order to avoid the tripping of the external AC source branch breaker, when high powered AC loads are connected to the AC output, the charging current will automatically be reduced so that the total AC input current (AC output current + AC charger current) is maintained below the set values of the AC Input circuit breaker (Cbr). See more details in AC source circuit breaker function.	
NOTE: When the battery charging process start, the unit will first measure the battery voltage, if it sense the battery voltage is below 9.5V, the charger current is automatically reduce to < 25A. It will resume back to the set charger current when the battery is charge to above 9.5V in fifteen (15) minutes. See more details on error codes E01 and E11 in Section 5.1.	

Table 4-P: Battery Temperature Setting (bTM)

No Battery Temperature Sensor (BTS) installed
There are three (3) settings (Low, Normal, High) available for battery temperature setting. - Setting to Low temperature will compensate the charging voltage by +0.675V on GEL and flooded battery type and +0.525V on AGM battery type. - Setting to Normal will have no change to the selected charging voltage. - Setting to High temperature will compensate the charging voltage by -0.27V on GEL and flooded battery type and -0.21V on AGM battery type.
Optional Battery Temperature Sensor (BTS) Installed (Part Number: BTS10K)
- If the temperature measured by the BTS is below 77°F, the charging voltage will be compensated with +0.015V per °F on GEL and flooded battery or +0.012V per °F on AGM battery. - If the temperature measured by the BTS is above 77°F, the charging voltage will be compensated with -0.015V per °F on GEL and flooded battery or -0.012V per °F on AGM battery.
There is no voltage adjustment compensation when battery type of lithium, program or power supply is selected.

Table 4-Q: Flooded Battery Equalization Setting

Equalization setting can only be set on flooded batteries. Before the equalization begins, the unit will automatically fully charge the battery first, followed by one hour of equalization. Consult and follow the instruction provided by the battery manufacturer when performing the equalization process. - Select Eq under Bulk/Absorption Voltage (AbS Voltage) setting. - The unit will start a full flooded battery charging cycle first before the equalization begins. The Equalization Voltage is set to 15.8V and current is limited to 1/10 of the set bulk stage charging current. - Display will show Equ and the battery voltage during the equalization period. - The unit cannot determine when to terminate the equalization of the battery. A one (1) hour timeout is set as a safety feature and requires the user to continually reactivate it as necessary after checking the batteries manually. - To terminate the equalization process, change and save the battery type to other types like AGM, GEL etc. and then change and save it back to the flooded type battery.

Table 4-R: Battery Recharge Timer

The charger will restart a full charging cycle automatically if the float stage is maintained for seven (7) days.

9. DC1 and DC2 DC-DC Charging Operation from Alternator Input

Table 4-S: Function Operating from Alternator Input

Normal Operation	Alternator/Starter Input (CH3)
Input Voltage Range	10.5-16.0V
Alternator Start-Up Voltage INP-CH1/CH2	11.5-13.7V
Check Voltage CHE	0.4V below INP CH1/CH2 Start-Up Voltage
Under-Voltage Shutdown (with load)	10.5V
Over-Voltage Shutdown and Recovery	16.0/15.5V

NOTE: The start-up voltage **INP-CH1/CH2** setting determines the start-up voltage of alternator charging. Once the charging cycle is started, if the alternator input voltage drops to below the check voltage, the unit will start a three (3) mins checking **CHE** process. During the three (3) mins **CHE** checking cycle, while the unit is charging, it will stop the charge for five (5) seconds and by the end of the five (5) seconds, the **CH3** voltage is measured. If the measured voltage has bounced back to higher than the **CHE** voltage, it will continue the charging process. But if the measured voltage has not bounced back to higher than the **CHE** voltage, it will terminate the charging process. The unit will then wait for the **CH3** to bounce back to above the alternator start-up voltage and restart the charging cycle again. Also, at any time, if the **CH3** voltage drops to below 11.5V, the charger will instantly start the **CHE** process. If the alternator input drops to below the **Under Voltage Shutdown** voltage, the charging process will instantly be terminated, and the unit will again wait for the **CH3** to bounce back to above the start-up voltage and restart the charging cycle again.

10. DC1 and DC2 DC-DC Charging Operation from Solar Input

Table 4-T: Function Operating from Solar Input

Normal Operation	PV Solar Array/Panel (CH2)
PV Input Voltage Range	15-100V
PV Input Low Voltage Sensing	10-15V
PV Input Under Voltage Recovery	18V
PV Input Over Voltage Shutdown	> 100V
PV Input Over Voltage Recovery	< 98V
PV Charging Mechanism	MPPT type (approx. 97% efficiency)
Maximum Input Current	80A (*Note)

***NOTE:** The charger limits the input current of **CH2** to 40A maximum. If a 12V solar panel is used, the maximum solar input power that can be used on a single DC-DC charger is around 720W. You can however “overdrive” the MPPT controller. Please note that doing this is partially an economic decision. You can install more power than the controller can use, and this will contribute to better power availability. We suggest a total maximum overdrive of 20% (around 860W). The extra solar panel power can compensate for cloudy (or intermittent sunny) days, so as to harvest more solar energy.

11. AC Source Circuit Breaker Function

Table 4-U: AC Source Circuit Breaker Setting

CBR	Selectable Values: 30, 20, 15A (Default: 30A)
This setting limits the total AC current draw from the AC source during the Bypass mode to avoid tripping the AC source branch breaker. The selected value has to be the same or smaller than the rating of the AC source branch breaker.	

12. Factory Default Settings

Table 4-V: Factory Default Setting

MFQ	Select Yes to reset all the settings to the preset factory default settings.
NOTE: The setting for battery type is GEL. If another battery type is used, select Yes to set all the parameter to factory default, then proceed to the battery type and make change to the new battery type.	

13. Understanding the **Inv ON/OFF** function

When the inverter setting **INT** is configured for **Manual Backup** mode (**MbU**), applying a +12V signal (16VDC maximum) to the **Inv ON/OFF** pin on the **COM1** port will turn the inverter **ON**. Removing the signal will turn the inverter **OFF**.

Use of the **Inv ON/OFF** pin overrides the power **ON/OFF** controls on both the multi-function display and the main unit.

4.5 DC1 AND DC2 DC-DC CHARGERS SETTING

1. The system contains two DC-DC chargers whose outputs are connected in parallel to the main DC input terminal (**CH3**). Each charger may operate independently and includes a dedicated alternator input capable of accepting either a 12V vehicle charging system.
2. Each DC-DC charger also includes a solar input capable of accepting solar panel voltages from 15-100VOC.
3. **DC1** and **DC2** use the same configuration menu structure and must be configured individually. The following parameters are available for each charger.

4.5.1. PRIORITY PRI DC1 AND PRI DC2 SETTING

Five priority settings are available for each DC-DC charger to determine whether alternator input or solar input is used as the primary charging source.

PRI DC1 P1 to P5: Selects the operating priority for the **DC1** DC-DC charger.

1. **P1 Solar Priority:** The auxiliary battery is charged from solar input whenever solar power is available and within the operating range. If solar power is unavailable, charging automatically switches to alternator input when available and within the operating range.
2. **P2 Alternator Only:** The auxiliary battery is charged exclusively from alternator input. Solar input will not be used under any condition.

3. **P3 Solar Only:** The auxiliary battery is charged exclusively from solar input. Alternator input will not be used under any condition.
4. **P4 Alternator Priority with Ignition Signal:** The auxiliary battery is charged from alternator input when the alternator is within the operating range and an ignition signal is present. If either condition is not met, charging automatically switches to solar input when available and within the operating range.
5. **P5 Alternator Priority Auto Start Charging:** The auxiliary battery is automatically charged from alternator input whenever the alternator is within the operating range. If alternator input becomes unavailable, charging automatically switches to solar input when available and within the operating range. For this mode, the ignition input pin must be connected to a valid high signal or alternator source. The same priority options are available for **DC2**.

4.5.2. ALTERNATOR 12V INPUT SETTING FOR DC1 AND DC2

1. **INP DC1 12V:** Selects the alternator input voltage for the **DC1** or **DC2** DC-DC charger.
2. Correct configuration is essential. An incorrect setting may result in overcharging or undercharging of the alternator battery during reverse-charging operation.
3. This software setting is overridden by the associated hardware configuration through the **COM1** port **DC1 12V IGN** and **DC2 12V IGN** connections.
4. The same setting is available for **DC2**.

4.5.3. ALTERNATOR START-UP VOLTAGE SETTING

ALT DC1 or DC2 Voltage

1. **ALT DC1 13.7V:** Sets the alternator input voltage threshold at which **DC1** begins charging.
2. Available settings range from 11.5-13.7V.

NOTE: The same setting is available for **DC2** as **ALT DC2**.

4.5.4. DC-DC CHARGING CURRENT SETTING DC1A DC1 OR DC2A DC2

1. **DC1A DC1 50A:** Sets the charging current output of the **DC1** DC-DC charger.
2. Available current settings range from 5-50A in 5A increments.
3. The same charging current setting is available for **DC2**.

4.5.5. ALTERNATOR CURRENT ALT SETTING

1. **ALT 100A:** This setting should be reduced when a smaller alternator is used to supply both **DC1** and **DC2 Alt. Bat CH3+** inputs. Reducing the setting helps prevent alternator overload.
2. Selectable current settings range from 40-100A in 10A increments.
3. For example, if ALT is set to 80A, each DC-DC charger is limited to a maximum alternator input current of 40A.

4.5.6. QUIET MODE SETTING

1. **QUI OFF** or **ON:** Controls fan operation for the DC-DC chargers.
2. When set to **ON**, fan operation is suspended during charging and charging current is automatically reduced. This mode is intended for applications where reduced noise is desired, such as overnight operation.
3. **Quiet** mode automatically expires after eight hours, at which time the setting returns to **OFF** and normal fan operation resumes.

4.5.7. REVERSE CHARGING SETTING

1. Both DC-DC chargers feature bi-directional charging capability that allows the auxiliary battery to recharge the alternator battery connected to the corresponding **Alt. Bat CH3+** input. This feature can be useful when the alternator or starter battery has been discharged by connected DC loads.
2. When enabled, the charger provides a regulated output of 13.5V at 30A to recharge the alternator battery.

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SECTION 5: Troubleshooting

5.1 UNDERSTANDING ERROR CODES

Table 5-A: Inverter and AC Charger Error Codes

Code	Condition	Corrective Action
NOTE: When the Inverter or the AC Charger warning or error occurs, the display will first show BIC and then follow with the listed error or warning code below. Please see the related condition and perform the corrective action to clear the error.		
E01 (Battery mode)	No AC output. Inverter shutdown due to low battery voltage.	Recharge the battery immediately and restart unit.
	NOTE: E01 will shows for about thirty (30) seconds. Then, the display will turn OFF and the unit will shutdown completely.	
E01 (Bypass mode)	No battery is connected to the unit.	Check the battery connection.
	Battery voltage remains < 9.5V. A large portion of the charger current provided is used to maintain the DC load connected to the battery. E01 will turn OFF when the battery voltage is charged to > 9.5V.	Remove or turn off DC load connected to the battery to minimize the charging time to > 9.5V. If this condition is ignored, the charger will terminate the charging process. <i>(See note below)</i>
	NOTE: The charger current with battery voltage < 9.5V is limited to ~25A and there is a fifteen (15) minute timer to allow the charger to charge the battery to > 9.5V. If battery voltage remains < 9.5V after fifteen (15) minutes of charge, the charger will shutdown and show E11 (Bad battery).	
E02	When unit is in Battery/Inverter mode, unit senses the battery voltage is too high and inverter has shutdown.	Check battery voltage or determine if any external charger is connected to the battery bank that leads to high battery voltage.
E03	When unit is in Battery/Inverter mode, AC output is overloaded or short-circuited and inverter has shutdown.	Check load connected to the output. Reduce load and restart the unit.
	NOTE: E03 will shows for about thirty (30) seconds. After thirty (30) seconds, display will turn OFF and unit will shutdown completely.	
E04	When unit is in Battery/Inverter mode, internal temperature is too high and inverter has shutdown.	Turn unit OFF and wait for fifteen (15) minutes before restarting. Check if any object has blocked the airflow of the unit.
E05	When unit is in Battery/Inverter mode input battery voltage is low and warning occurs.	Recharge battery as unit will shutdown shortly.
E06	Not used.	Not used.
E07	When unit is in Batter/Inverter mode Internal temperature is high and is close to over-temperature shutdown limit.	Reduce load and check if any ventilation of the unit is blocked.
E10	When unit is in Bypass mode, battery charging voltage too high.	Check battery setting. Check for any other DC power sources connected to the battery has high voltage.
E11	House battery voltage low	• Check corrective action in E01 (Bypass mode) and restart the charging process by removing and reconnecting the AC input source. • Check if there is any heavy DC load connected to the battery as stated in E01 (Bypass mode). Restart the charging process. • Change to a new battery.
E12	When unit is in Bypass mode, Internal transfer switch temperature is high and shutdown occurs.	Reduce load and check if any ventilation of the unit is blocked.

Table 5-A: Inverter and AC Charger Error Codes

Code	Condition	Corrective Action
E13	AC output GFCI tripped.	Reset the GFCI.
	NOTE: This error function is not effective when Load Sense function (LdS) is in use.	
E14	Not used.	Not used.
E15	AC back feed to unit AC output.	Check AC input and AC output wiring.
E16	Internal fault. Unit damage.	Consult customer service for assistance.
E17	AC input current withdrawn from the unit is close to the set AC Circuit Breaker (Cbr) rating.	Reduce AC load. Check the AC circuit breaker (Cbr) rating match with the external AC input source branch breaker rating.
E18	AC input current drawn by unit is beyond the current rating of the transfer switch. (30A for 120V model, 16A for 230V model). AC output switch is switched OFF .	Reduce AC load connected to unit. Press and hold Escape button for five (5) seconds to reset AC output switch to provide AC output from AC input source.
E19	Battery temperature sensed by BTS is > 140°F. Battery charging cycle terminates.	Cool down the battery. Battery charging cycle will automatically resume when the temperature drops to below 122°F.
E20	Battery temperature sensed by BTS is > 131°F and is close to battery temperature thermal shutdown.	Check battery and environmental temperature or add ventilation to the battery compartment.
E21	With Lithium battery setting, the BTS sense the battery temperature is low.	Check lithium battery and environmental temperature. The charging cycle will resume when temperature increases to > 41°F.
E33	Communication error.	Communication error.

Table 5-B: DC1 and DC2 Chargers Error Codes

Code	Condition	Corrective Action
NOTE: When the DC Charger error or warning occurs, the display will first show DC1 or DC2 and then follow with the related error or warning code below. Please see the related condition and perform the corrective action to clear the error.		
E01	DC-DC charger alternator input voltage high.	- Check alternator input voltage. - Check COM1 port IGN related connection. - The related pin DC1 12V IGN or DC2 12V IGN should be connected to the correct alternator battery system.
E02	Alternator input voltage low.	Check battery or alternator input voltage connected to the DC1 and DC2 ALT battery input ports.
E03	Solar input high.	Check solar input voltage connected to the DC1 and/or DC2 Solar input ports.
E04	Solar input low.	Check solar input voltage connected to the DC1 and/or DC2 Solar input ports.
E05	Battery charging voltage too high.	Check battery setting. Check for any other DC power sources connected to the battery that have high voltage.
E06	DC-DC charger internal temperature is high and is close to over-temperature shutdown limit.	Check unit ventilation and the unit environmental temperature.
E07	BTS has sensed the house battery temperature high.	Cool down the battery. Battery charging cycle will automatically resume when the temperature drops to below 122°F.
E08	No solar input.	Check solar connection on DC-DC charger DC1 or DC2 .

Table 5-B: DC1 and DC2 Chargers Error Codes

Code	Condition	Corrective Action
E09	No alternator input.	Check alternator connection on DC-DC charger DC1 or DC2 .
E10	No or low auxiliary battery connected to the system.	Check auxiliary battery voltage connected to the CH3 house battery port.
E11	With lithium battery setting, BTS senses the temperature is low.	Check environmental temperature and the battery temperature.
E12	Auxiliary battery voltage low.	Check auxiliary battery voltage connected to CH3 auxiliary battery.

5.2 AC LOAD ON INVERTER

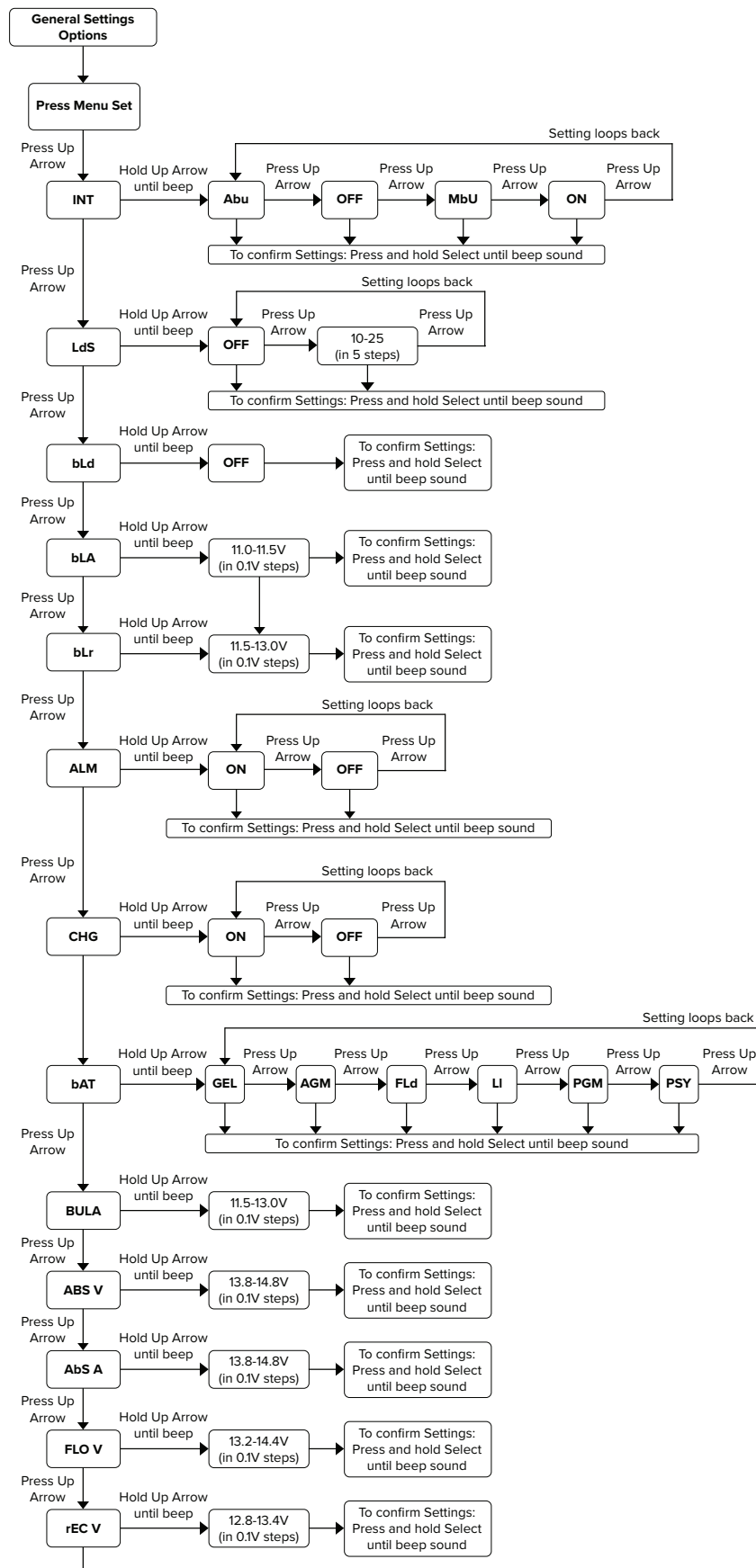
Although the EPEQ® INVERTER3000+ can provide high surge power up to two times the rated output power, some high surge loads like air conditioners, sump-pumps, heavy-duty motors, etc. may still trigger the inverter protection system even though the load falls within the power rating of the inverter. A higher power inverter-charger is required for these appliances.

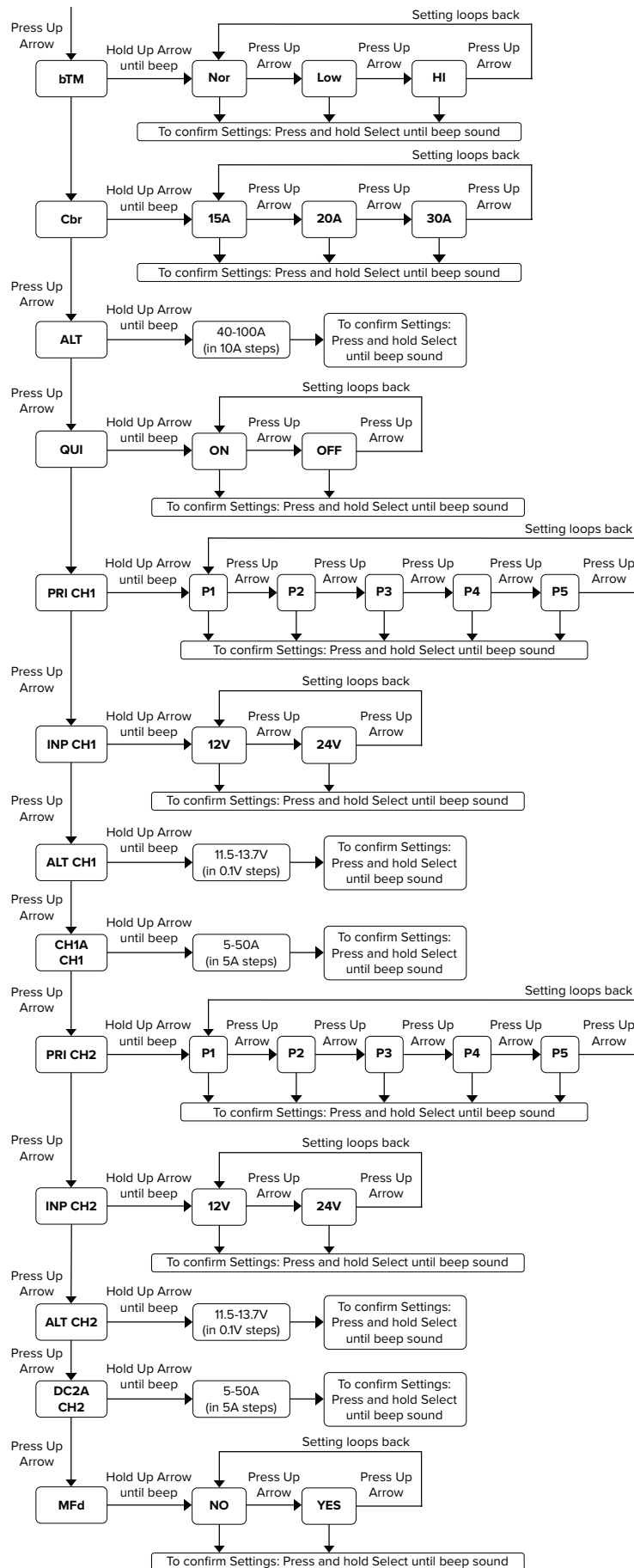
To troubleshoot the unit, please note the error code displayed on the main unit and review **5.1 Understanding Error Codes**.

Table 5-C: Troubleshooting Guide

Problem	Condition	Corrective Action
No AC Output at AC Output Socket	The thermal breaker on the unit is tripped.	Reset the thermal breaker.
	The AC output switch is turned OFF .	Press and hold the ESCAPE button for five (5) seconds to turn ON the AC output.
	With unit running from AC input source or shore power, the AC input source is available but is outside the acceptance range.	Check AC input source. Operating range of AC input is 95-139VAC. Unit start-up AC voltage is higher than 99VAC and below 132VAC.
	Unit is set to Inverter OFF .	Check unit Int setting.
	Check error code on display. Inverter may be overloaded.	Reduce AC load. Inverter may be overloaded.
	DC over-voltage, under-voltage, or other shutdown type errors in addition to overload.	Check battery voltage.
	GFCI may have tripped.	Reset GFCI.
Charger Did Not Supply Charging Current	Check charger setting. Charger may be set to OFF .	Set Charger function CHG to On.
	Unit had determined the battery is bad. See also description in error code E01 (Bypass mode) and E11 .	Check battery and remove the DC load connected to the battery and restart the charger again.
	Battery is with BTS installed and it senses the battery temperature is high (E19).	Check battery temperature or environmental temperature. Battery charging cycle will resume when the battery cools down to acceptable level. For more information, <i>see Section 5.1</i> .
	Battery is with BTS installed and it senses the battery temperature is too low to accept charge (E21).	Check battery temperature or environment temperature. Battery charging cycle will resume when the battery temperature increase to acceptable temperature. For more information, <i>see Section 5.1</i> .

5.3 REMOTE DISPLAY UNIT SETTING FLOW CHART





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