VANAIR®
MOBILE POWER SOLUTIONS®

EPEQ INVERTER6000

EPEQ™ Electrified Power Equipment®
6kW 48V DC - 120/240V AC Split-Phase, Low Frequency Power Inverter
Part Number: 6240000

USER GUIDE

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® Manufacturing, Inc. 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 beginning any changes to the EPEQ™ INVERTER6000 Series system.

Effective Date: January 2023

EPEQ Electrified Power Equipment® INVERTER6000

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EPEQ™ AC INVERTER6000 / CHARGER

The EPEQ™ INVERTER6000 is designed to provide 120/240V AC split-phase power output from a 48V DC source input.

Charging current suggested is 50 +/-5 amps.

SAFETY:

- This unit is designed for indoor use or within a clean, dry compartment, protected from rain, dust and the elements.
- Inverter requires adequate clearance for air circulation and cooling. Do not block ventilation openings or cooling fans.
- Minimum air circulation required is 145 CFM.
- Installers must be certified technicians or licensed electricians.
- Make certain all connecting wiring is in good condition and of adequate size to avoid risk of fire and electric shock. Do not use damaged or undersized wiring.

- Components in this unit can produce electrical arcing or sparks. To avoid risk of fire, do not install this equipment in areas in or around combustible liquids, solids, or gas. This includes any space containing combustion engine powered vehicles or machinery, fuel tanks, fuel lines or fittings that are a part of a fuel system.
- Do not over tighten DC terminals. Torque rated at 17NM or 12.6 ft.lbs.

- **Inverter NOT reverse polarity protected. Check before making connections to inverter. Reverse polarity may cause permanent damage.**
- Turn inverter OFF before disconnecting battery cables.

Do not disassemble the inverter. It contains no serviceable parts and there is a risk of electrical shock or fire. Capacitors inside the case remain charged after all power is disconnected. Contact Vanair customer support for any service issues.

Before any cleaning or maintenance, disconnect both the AC and DC power to reduce risk of electric shock. **Turning off the controls alone, will not reduce the risk.**

Caution - Equipment Damage: The AC output side of the inverter's AC wiring should NEVER be connected to the AC output of a public power source or a generator. This situation could cause permanent damage to the equipment. If the unit survives such a condition, it will shut down until the situation is corrected.

WARNING: EPEQ™ AC Inverters not intended for use with medical devices and lifesaving systems. Any such use is at your own risk.

FEATURES:

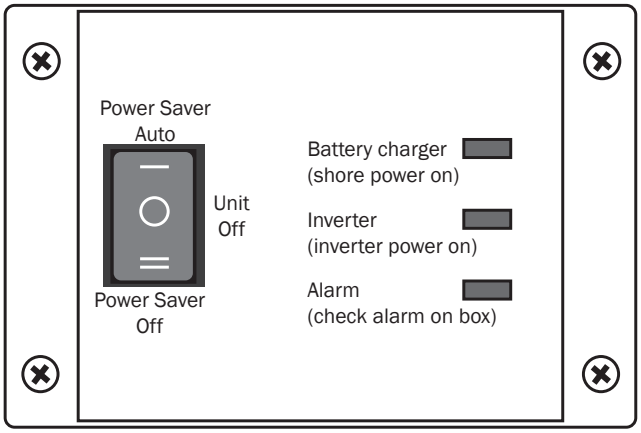
- Auto generator start
- Battery temperature sensing
- Manual selection of output frequency of 50Hz/60Hz
- THD of 3% of nominal battery voltage
- Up to 90% conversion efficiency
- High surge output, 300% peak load for 20 seconds
- AC output fully isolated from DC input
- Cooling is temperature controlled for more efficient cooling
- Soft start - output voltage gradually ramps up from 0V AC over about 1.2 seconds. Helps to avoid sudden, very high-power surge demands on battery source.
- Pure sine wave output
- Audible buzzer and LCD display provides user with comprehensive operational status for easier maintenance and troubleshooting.
- Produces full 6kW of power at 120/240V AC
- Ideal for powering power tools, office equipment, home appliances, industrial equipment, home entertainment, personal electronics and sound equipment.

CAUTION: *The power inverter runs a self-diagnosis when it is turned on. To prevent unintentional overload of the unit, please allow a few seconds for this self-test to complete before powering on any attached tools or appliances. Turning on tools and appliances may cause a surge to start them up. If running more than one tool or appliance – turn them on one by one rather than all at once to avoid a combined surge that could possibly produce an overload condition.*

POWER SAVER

When the power switch is in "UNIT OFF" position, the inverter is powered off. **When the switch is in the "Power Saver Auto" or "Power Saver OFF" position – the inverter is powered ON.**

Power saver mode is designed to conserve battery power when an AC power load is not sensed or being used by attached appliances or equipment. A draw of greater than 25 watts will "wake up" the inverter and it will return to full voltage.



(Please note some energy conserving electronics have power supplies that also remain dormant unless a voltage signal is present. In such cases both the inverter and the attached power supply wait for one another to wake up. Either another current draw is required to bring the inverter out of its power saving mode, or it needs to be changed from power saving mode to full voltage to run such equipment,)

PROTECTION:

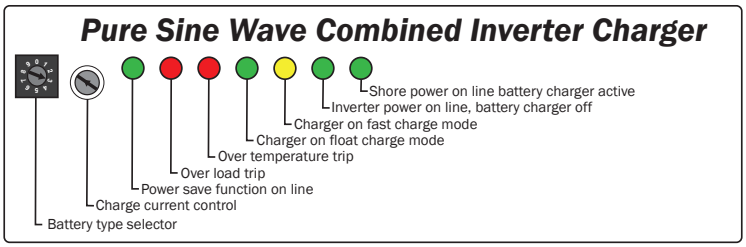
- Built-in protections include:
- AC input over-voltage protection / AC Input low-voltage protection
- Low battery alarm / High battery alarm
- Over temperature protection / Overload protection
- Short-circuit protection (1 second after fault occurs)
- Back feeding protection
- Unit must be reset in most cases following a fault or automatic shutdown. In the case of high heat, the sensor must drop down to 194°F (or 90°C) before it can be reset. In most cases, after clearing a fault the unit must be reset to start working.

LED DISPLAY

On top of the inverter case, you will find the power switch on the left, as well as a row of LEDs and a small display panel towards the right side.

Each LED is clearly labeled to indicate the unit's status. (see image below)

- Shore power on (Green LED)
- Inverter power on (Green LED
- Fast Charge active (Yellow LED)
- Float Charge active (Green LED)
- Over Temperature (Red LED)
- Over Load (Red LED)
- Power Save active (Green LED)



AN AUDIBLE ALARM SOUNDS UNDER THE FOLLOWING CONDITIONS:

- Battery Voltage Low (Green LED lit, beeps for 0.5 sec. every 5 sec.)
- Battery Voltage High (Green LED lit, beeps 0.5 sec. every sec. Faults after 1 min.)

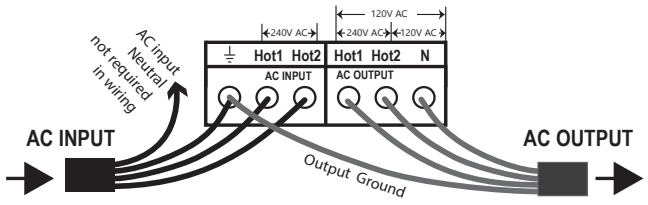
- Invert Mode Over-Load
  - » Only beeps after 14 min. if load is between 110%-125%; then beeps 0.5s every 1s. during 15th minute. Faults after 15 minutes.
  - » If load is between 125%-150%, beeps 0.5s every 1s. Faults after 60s.
  - » If load exceeds 150%, beeps 0.5s every 1 sec. and Faults after 20s.
- Over Temperature (Over Temp. red LED lit, beeps for 0.5s every 1s.)

INSTALLATION

- *DC Input Source Wiring:* It is suggested to keep the inverter as close to the battery as possible. 1m - 5m max.
- Wiring should be properly gauged by the installer. For the 6kW inverter operating from 48V DC, use 2AWG copper wire up to 16'-5" max. (or 5m). Lengths longer than this are not recommended. **NOTE:** *Unit comes pre-wired for connecting to 48V DC power source utilizing Anderson connectors.*
- Terminal lug surface should mate flush with the surface of the inverter terminal – with no washers or spacers in between.
- *AC Terminal Wiring:* 10 to 5 AWG wire suggested for AC wiring terminal block connections. (See image.) Consult a licensed electrician for your specific hardwiring situation.
- Install in dry, clean, cool area with good ventilation.
- AC input neutral not required for split phase models.

- **Never connect Input Neutral to Ground or to Output Neutral! Damage will result not covered under warranty.**
- Output voltage must never be connected to its input AC terminal - overload or damage may result.
- Switch on inverter BEFORE plugging in any appliances.
- **Damage due to AC wiring mistakes are NOT covered by Warranty.**

AC Terminal Wiring



Input: Hot line + Hot line + Ground

Output: Hot line + Hot line + Neutral

OPERATION

1. After the inverter unit is installed, make sure there are no connected tools or devices that are in the "powered on" condition.
2. Check to see the connected battery source is fully charged and will provide proper voltage for the inverter's use.
3. Once the battery is verified to be adequately charged, move the switch on top of the inverter from the "Unit Off" position to the "Power Saver Off" (ON), or "Power Saver Auto" position as desired.
4. Wait a few seconds for the inverter to run self-diagnostic tests.
5. Power on any connected devices or tools – one at a time – to prevent a combined surge, which could result in a FAULT condition.
6. When finished – the inverter can be shut down in reverse order.
7. Power off the connected AC tools or devices.
8. Move the inverter's power switch to the "Unit Off" position.

PHYSICAL SPECIFICATIONS:

- Operating temperature: -14°F to 104°F (-10°C to 40°C);
- Cooling: forced air cooling (2 built-in DC cooling fans)
- Size: 23.5"L x 8.74"W x 7.1"H (59.69cm x 22.2cm x 18.03cm)
- Weight: 72.75 lbs. (33kg)

TROUBLESHOOTING STATUS

The following table is designed to help you quickly identify the most common inverter failures.

		INDICATOR ON TOP COVER							
Status	**Item**	**SHORE POWER ON**	**INVERTER ON**	**FAST CHARGE**	**FLOAT CHARGE**	**OVER TEMP TRIP**	**OVER LOAD TRIP**	**POWER SAVER ON**	**AUDIBLE ALARM**
Line Mode	CC	X		X					
	CV	X		X					
	Float	X			X				
	Standby	X							
Inverter Mode	Inverter On		X						
	Power Saver							X	
Inverter Mode	Battery Low		X						Beep 0.5s every 5s
	Battery High		X						Beep 0.5s every 1s
	Overload On Invert Mode		X				X		Refer to audible alarm
	Over Temp On Invert Mode		X			X			Beep 0.5s every 1s
	Over Temp On Line Mode	X		X		X			Beep 0.5s every 1s
	Over Charge	X		X					Beep 0.5s every 1s
Fault Mode	Fan Lock								Continuous beep
	Battery High		X						Continuous beep
	Inverter Mode Overload						X		Continuous beep
	Output Short						X		Continuous beep
	Over-Temp					X			Continuous beep
	Over-Charge			X					Continuous beep
	Back Feed Short								Continuous beep

TROUBLESHOOTING SYMPTOMS AND CAUSES

The following table is designed to help you resolve the most common operating symptoms.

Symptom	Possible Cause(s)	Recommended Solution(s)
Inverter will not turn on during initial power up.	Batteries are not connected, or loose battery connection. Low battery voltage.	Check the batteries and cable connections. Check DC fuse and breaker,
No AC output voltage and no indicator lights ON.	Inverter has been manually transitioned to OFF mode.	Press the switch to Power Saver on or Power Saver OFF position.
Inverter overload indicator on.	Excessive AC output load or AC output short. Defective inverter.	Check AC output loads and wiring.
Inverter high temperature indicator on.	Excessive ambient temperature or AC output load.	Check AC output loads, increase ventilation, reduce AC load on the inverter if ambient temperature is excessive.
AC output voltage is low and the inverter turns loads OFF in a short time.	Low battery.	Check the condition of the batteries and recharge if possible.
Charger is inoperative and unit will not accept AC.	AC voltage has dropped out of tolerance.	Check the AC voltage for proper voltage and frequency.
Charger is supplying a lower charge rate.	Charger controls are improperly set. Low AC input voltage. Loose battery or AC input connections.	Refer to the section on adjusting the Charger Rate Use qualified AC power source. Check all DC/AC connections.
Charger turns OFF while charging from a generator.	High AC input voltages from the generator.	Load the generator down with a heavy load. Turn the generator output voltage down.
Sensitive loads turn off temporarily when transferring between grid and inverting.	Inverter’s low voltage trip voltage may be too low to sustain certain loads.	Choose narrow AC voltage in the DIP switch, or install a UPS if possible.
Noise from Transformer/case.	Applying specific loads such as a hair dryer.	Remove the loads.

ELECTRICAL SPECIFICATIONS

Electrical Specifications		
	Model	**6kW**
Inverter Output	Continuous Output Power	6000W
	Surge Rating(20s)	18000W
	Capable of Starting Electric Motor	6HP
	Output Waveform	Pure Sine Wave/same as input (Bypass mode)
	Peak Efficiency	88%
	Line Mode Efficiency	>95%
	Power Factor	0.9-1.0
	Nominal Output Voltage rms	120V AC / 240V AC
	Output Voltage Regulation	±10% RMS
	Output Frequency	50/60Hz ±0.3Hz
	Short Circuit Protection	Yes, Current Limit Function (Fault after 1sec)
	Typical Transfer Time	10ms(Max)
	THD	< 10%
DC Input	Nominal Input Voltage	48V DC
	Minimum Start Voltage	40.0V DC
	Low Battery Alarm	42V DC / 44.0V DC
	Low Battery Trip	40.0V DC / 42V DC
	High Voltage Alarm & Fault	64.0V DC
	High DC Input Recovery	62V DC
	Low Battery Voltage Recovery	52.0V DC
	Sleep Mode Threshold	> 25 W when Power Saver On
Charge	Input Voltage Range	Narrow: 194~243V AC;
		Wide: 164~243V AC;
	Input Frequency Range	Narrow: 47-55±0.3Hz for 50Hz, 57-65±0.3Hz for 60Hz
		Wide:43±0.3Hz plus for 50Hz/60H
	Output Voltage	Depends on battery type
	Charger Breaker Rating(230V AC)	30A
	Max Charge Rate	60+/-5A
	Over Charge Protection Shutdown	62.8V DC

ELECTRICAL SPECIFICATIONS (CONT.)

Bypass & Protection	Input Voltage Waveform	Sine wave (Grid or Generator)
	Nominal Voltage	240V AC
	Low Voltage Trip	184V/154V±4%
	Low Voltage Re-engage	194V/164V±4%
	High Voltage Trip	253V±4%
	High Voltage Re-engage	243V±4%
	Max Input AC Voltage	270V AC
	Nominal Input Frequency	50Hz or 60Hz (Auto detect)
	Low Freq Trip	Narrow: 47±0.3Hz for 50Hz, 57±0.3Hz for 60Hz
		Wide:40±0.3Hz for 50Hz/60Hz
	Low Freq Re-engage	Narrow: 48±0.3Hz for 50Hz, 58±0.3Hz for 60Hz
		Wide:45±0.3Hz for 50Hz/60Hz
	High Freq Trip	Narrow: 55±0.3Hz for 50Hz, 65±0.3Hz for 60Hz
		Wide: No up limit for 50Hz/60Hz
	High Freq Re-engage	Narrow: 54±0.3Hz for 50Hz, 64±0.3Hz for 60Hz
		Wide: No up limit for 50Hz/60Hz
	Output Short Circuit Protection	Circuit breaker
	Bypass Breaker Rating (230V AC)	40A
	Bypass Breaker Rating (120V AC)	N/A
Physical Specification	Mounting	Wall/Ground mount
	Inverter Dimensions(LxWxH)	597mm x 216mm x 181mm
		23.5” x 8.5” x 7.1”
	Inverter Weight	33KG (72.75 lbs.)
	Shipping Dimensions(LxWxH)	790mm x 350mm x 340mm
		31.1” x 13.78” x 13.39”
	Shipping Weight	~36KG (~79.36 lbs.)
	Display	Status LEDs

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® Mfg., Inc. ("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 preform 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. EPEQ™ Lithium Welder: 1 Year Parts / 1 Year Labor
6. Alternators: 1 Year Parts / 1 Year Labor
7. Compressor Air End:
   - Rotary Screw: Lifetime with Vanair® Authorized Service Kits and Lubricants : 3 Years Labor
   - Reciprocating: 3 Years Parts / 1 Year Labor
   - Scroll: 1 Year Parts / 1 Year Labor
8. Hydraulic Pumps/Motors: 2 Years Parts / 1 Year Labor
9. 1 Year Parts/Labor on the following:
   - All electronics and controls including, but not limited to:
     (i) I/0 Boards
     (ii) Modules
     (iii) Panel Boxes
     (iv) Instrumentation
     (v) Clutches
     (vi) Solenoids
     (vii) Running Gear/Trailers
     (viii) Cooler Cores and Fans
     (ix) Battery Management Systems and Controllers

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.

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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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EFFECTIVE: MAY 20, 2022

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