

# PURKEYS

## 1200+ WITH TIMER

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### USER GUIDE





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## GENERAL INFORMATION

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### IMPORTANT SAFETY INSTRUCTIONS

To ensure reliable service, your power inverter must be installed and used properly. Please read the installation and operating instructions thoroughly prior to installation and use. Pay particular attention to the WARNING and CAUTION statements against certain conditions and practices that may result in damage to your inverter. The WARNING statements identify conditions or practices that may result in personal injury.

Read All Instructions Before Using This Power Inverter!

### WARNING

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, EXPLOSION, OR INJURY

1. Do not connect to AC distribution wiring.
2. Remove appliance plug from outlet strip or turn off inverter before working on the appliance. Multiple outlet power strips with switches and circuit breakers only interrupt power to the “hot” receptacle terminals. The “neutral” terminals remain powered with respect to the “ground” terminal.
3. Do not make any electrical connections or disconnections in areas designated as IGNITION PROTECTED. This includes 12 volt DC cigarette plug connections and terminal connections.
4. This is not a toy.
5. DO NOT install inverter into air vents.

### CAUTION

1. Do not use with positive ground electrical systems (all late-model tractors or trucks have negative ground systems). Reverse polarity connections will result in a blown fuse and may cause permanent damage to the inverter.
2. This inverter will not operate high wattage appliances over the output power limit or surge power limit.
3. Grounding the neutral connection will cause the inverter to shut down. Do not operate this inverter if it is wet. Do not install in the engine compartment—please install in a well-ventilated area.
4. This inverter is not tested for use with medical devices.

### IMPORTANT CABLE INFORMATION

Substantial power loss and reduced battery operating time result from inverters installed with cables that are not able to supply full power due to excessive cable length or insufficient gauge. The installer/operator should be especially aware of the requirements to maintain secure, tight, water-resistant electrical connections and to provide strain relief for the DC cables and the appliance wiring. Cable insulation must be the appropriate type for the environment. The inverter harness supplied by Purkeys was specifically designed for each tractor model. This harness meets or exceeds all requirements for safe and effective inverter operation.

### INTRODUCTION

Your new power inverter is an advance-designed DC to AC inverter. With proper care and appropriate usage, it will provide years of dependable service. This inverter is designed with a universal protection circuit that provides added safety features, automatic shutdown, earth fault protection, and a low battery alarm to prevent damage to your battery system.

This power inverter is configured with the latest low interference technology, Universal Protection Circuit (UP-Circuit), and soft start circuit to improve the inverter operation.

**Low Interference Technology:** Greatly improves the interference problems of common power inverters. You will now enjoy a clean and powerful AC source.

**UP-Circuit:** Provides full automatic inverter and battery pack protection. This includes overheat protection, battery pack protection, overload protection, short circuit protection, and earth fault protection.

**Soft Start Circuit:** Provides three major features. First, it provides gradual voltage ramp-up during inverter start-up. This eliminates failed cold starts under load. Second, it provides output that momentarily dips in voltage and quickly recovers. This eliminates most shutdowns from momentary overloads. Third, the inverter automatically restarts when the overload that caused the inverter to shut down is removed.

## PROTECTIVE FEATURES OF THE INVERTER

### OVER TEMPERATURE PROTECTION

If the temperature inside the inverter is too high, the unit will automatically shut down. Allow the unit to cool for at least 15 minutes before restarting after a heat-related shutdown. Unplug unit while cooling.

### LOW BATTERY VOLTAGE PROTECTION

This condition is not harmful to the inverter, but could shorten battery life. The inverter automatically shuts down when the input voltage drops to 11.5 volts.

### OVER VOLTAGE PROTECTION

The inverter will automatically shut down when the input voltage exceeds 15.5 volts DC. Input voltage exceeding 16 volts could damage the inverter.

### OVERLOAD PROTECTION

The inverter will automatically shut down when the continuous draw exceeds rated watts.

### SHORT CIRCUIT PROTECTION

This inverter will shut down. Remove the short circuit and restart the inverter.

### EARTH FAULT PROTECTION

This inverter complies with the standard current leakage allowance. When large current leakage to earth terminal occurs, the protection circuit will activate and shut down the inverter, which prevents electric shock. To restart the inverter, turn it off. Then unplug the fault AC appliance and turn the inverter back on.

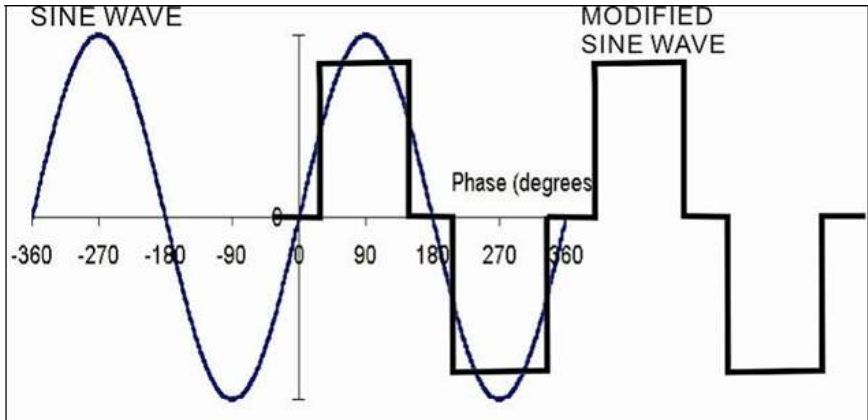
### LOW BATTERY ALARM

An alarm will sound when the voltage from the battery pack drops to 11.0 volts. This is an indication that the battery pack needs to be recharged or there is excessive voltage drop in the input cables.

**NOTE:** It is normal for the alarm to sound while the unit is being connected to or disconnected from the power source. This is not indicative of problems.

### WAVE FORM

This inverter is a modified sine wave inverter. Some devices, such as medical equipment, may require a PURE SINE WAVE inverter. Please check with us to verify.



## OPERATING ENVIRONMENT

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For best operating results, the inverter should be placed on a flat surface such as a floor, wall, or other solid surface. The inverter should only be used in locations that meet the following criteria:

**Dry:** Do not allow water and/or other liquids to come in contact with the power inverter.

**Cool:** Ambient air temperature should be between 30° F and 105° F. Do not place the inverter on or near a heating vent or any piece of equipment that is generating heat above room temperature. Keep the power inverter away from direct sunlight if possible.

**Ventilated:** Keep the area surrounding the power inverter clear to ensure free air circulation around the unit. Do not place items on or over the power inverter during operation.

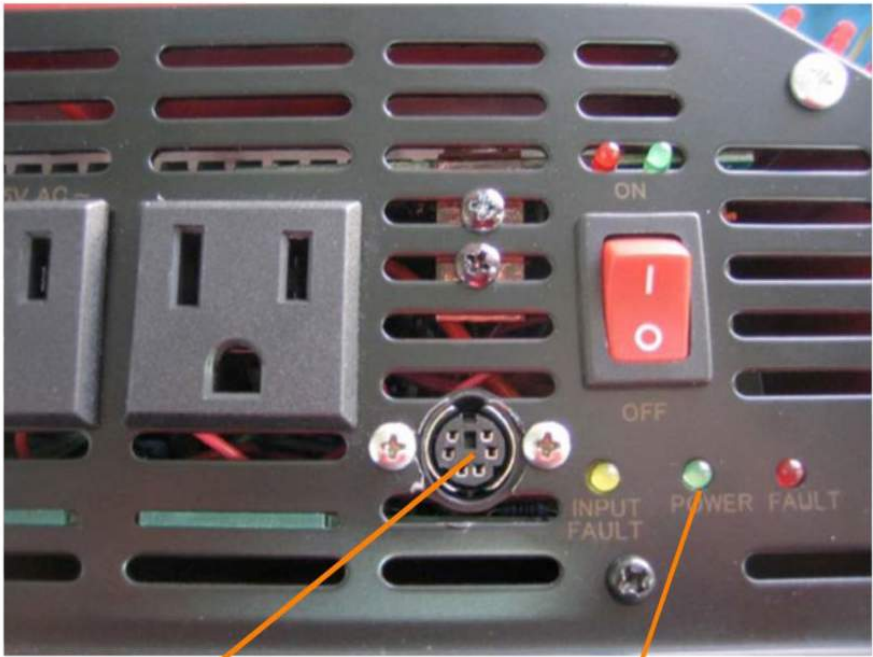
**Safe:** Do not use the power inverter near flammable materials or in any locations that may accumulate flammable fumes or gasses.

**Mounting:** The power inverter can be operated in any position; however, if mounted on a wall, mount horizontally so the indicators, switch, outlets and terminal blocks located on the front panel are visible and accessible.



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### CALL-OUTS



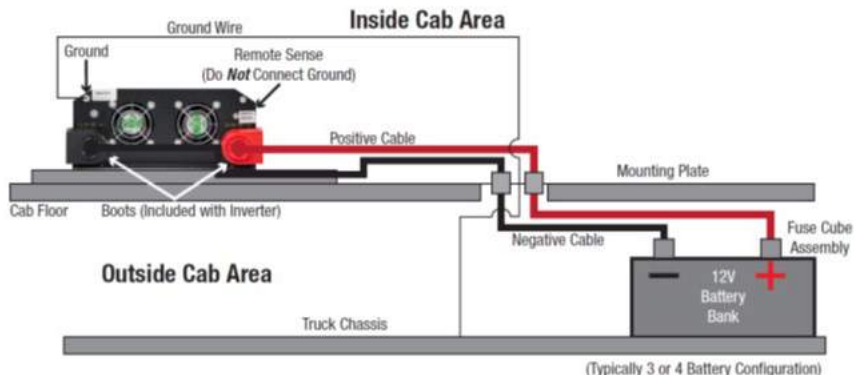
**Mini DIN Connector:  
Programing the Inverter**

**Bottom LEDs (yellow, green, red):  
Indicate Inverter Functions**

## INSTALLATION INSTRUCTIONS

As each inverter installation environment is unique, our custom harnesses contain vehicle-specific instructions for each vehicle manufacturer.

### General Layout Diagram



### Wiring Harness Kit



### GROUND AND REMOTE SENSE NOTES

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#### CHASSIS GROUND OR FAULT GROUND CABLE

The chassis ground lug is used to connect the chassis of the inverter to the DC grounding point, as required by regulations. Installing the grounding cable is a protective measure used to provide a path for fault currents. The inverter has 12 volt positive and negative connected to the electronics inside the inverter. If the positive cable comes in contact with the chassis of the inverter, the ground cable will conduct the fault currents long enough to cause the over current protection (fuse or breaker) to interrupt the circuit between the inverter and the battery (should be zero volts).

#### R-TERMINAL OR REMOTE SENSE STUD

The R-Terminal or Remote Sense stud is used to tell the inverter if the engine is running or not. (Should be 7 to 14 volts when the engine is running and zero volts when the engine is off.)

## INVERTER TROUBLESHOOTING

DC Input Power Issues		
CONDITION	POSSIBLE CAUSE	ACTION NEEDED
No AC output: yellow LED lit; green LED not lit	DC input below 10.5 volts	Test batteries and conduct voltage drop test. Also check the vehicle charging system.
No AC output: red and green LEDs not lit	Inverter fuse cube open	Check fuse cube at battery. (* see page 12)
Low battery alarm sounds abnormal	Bad connection or wiring issues	Conduct voltage drop test and repair or replace as needed.
Low battery alarm	Low battery voltage	Recharge or replace batteries. Also check the vehicle charging system.
Yellow LED lit when power is on	Weak batteries or cables issues	Test batteries and conduct voltage drop test.

AC Output Power Issues		
CONDITION	POSSIBLE CAUSE	ACTION NEEDED
No AC output: yellow LED lit; green LED not lit	Inverter overheat	Remove or reduce load, wait for inverter to cool.
No AC output: red and green LEDs not lit	Inverter output power limited by overload/short circuit protection circuit	Reduce load or remove short circuit. Use Kill-A-Watt to measure load.
TV/Radio interference: snow in picture or buzz in speakers	Appliance too close to inverter	Keep inverter and antenna distant from each other. Use shielded antenna cable. Connect antenna with amplifier.
Motorized power tool won't start	Excessive start-up load	If appliance does not start, it is drawing excessive wattage and will not work with this inverter. Check with Kill-A-Watt tester.
Motorized power tool does not operate at correct speed	Purely inductive load	Make the load not purely inductive. For example, operate an incandescent lamp at the same time as motor.

## Timer Controlled Unit Issues

TROUBLE/ INDICATION	POSSIBLE CAUSE	SUGGESTED REMEDY
Red LED turns off and on while the on/off switch is on	Timer has timed out. The inverter has been used the entire run time during this time period.	Must wait until the remaining time of set period expires or reset the timer. See page 17 for timer reset instructions.
Red LED is on and the on/off switch is off	The timer is turned off, but the set period time is still running	No action required. Inverter must be turned on if you need the inverter to run.
Green LED is on and the on/off switch is on	The timer is on and the set period timer is on.	No action required. If the inverter is not being used, turn the inverter off to save run time.

\* Verify that the fuse cube is good.



Good Fuse Cube



Bad Fuse Cube

### INVERTER VOLTAGE DROP TEST

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1. Using the Handheld Electrical Tester (TF-014): Turn the tester on, press “Y” for menu.
2. Select “V Drop Menu” and press “ENTER.”
3. Select “Generic V Drop” and press “ENTER.”
4. Enter in the rated current to test at (Use 150 amps to test the inverter harness) and press “ENTER.”
5. Connect the large alligator clips to the inverter input posts (red to positive and black to negative) and press “ENTER.”
6. Connect the small alligator clips to the battery pack (red to positive and black to negative) and press “ENTER.”
7. The tester will show the results for the voltage drop on the positive cable and the results for the voltage drop on the negative cable.
8. The positive and negative results must be added together to get the total voltage drop for the complete circuit.
9. The total voltage drop for the complete circuit must be less than .5 volts to be within spec.

Positive Voltage Drop

+ Negative Voltage Drop

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= Total Voltage Drop

(Must be less than .5 volts  
to be within spec)





### KILL-A-WATT OPERATION

1. The LCD shows all meter readings: Volts, Amps, Watts, HZ (frequency), VA, Power Factor, KWH, and Hour. The unit will start to accumulate KWH and powered duration time after power is applied.
2. Press Volt button for true RMS Voltage display.
3. Press Amp button for true RMS output current display.
4. The Watt/VA button is a toggle function button. Press the Watt/VA button once to display Watt meter, then press button again to display VA meter. The LCD will display Watts as the active power, where VA is the apparent Power ( $VA = V_{rms} Arms$ ).
5. The HZ/PF button is a toggle function button. Press the HZ/PF button once to display the frequency (Hertz), then press the button again to display the Power Factor. HZ is the frequency of output voltage, where PF is the Power Factor ( $PF = W/V_{rms} Arms$ ).

#### WARNING:

Do not exceed maximum ratings as detailed on the label.



The KWH/Hour button is a toggle function button. Press the KWH/Hour button once to display the cumulative energy consumption since power was applied to the unit. Press the button again to display the cumulative time since power was applied to the unit.

Consumption will be displayed in Kilowatt-Hours (ranging from 0.01 KWH to 9999 KWH). Time will initially be displayed as Hours:Minutes (starting at 00:00) and switch to Hours (up to 9999). Counters will re-cycle to zero when they reach their maximum. To reset, momentarily remove power from unit.

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### INVERTER INSTRUCTIONS

1. Turn the inverter on. If you see two green lights, the inverter is ready for use. See image below.



2. If the red LED is flashing (see image below), the inverter has timed out and needs to be reset. Proceed to step 3.



3. Turn the inverter off.

1. Disconnect the power going to the inverter by removing the red (+) positive lead from the fuse cube in the battery box. See image below.
2. Short out the power inputs using a capacitor drain tool by connecting the positive and negative on the inverter. This will drain the internal inverter capacitors. See image below.



3. Remove capacitor drain tool (referenced in step 5).
4. Insert the resetting adapter tool into the inverter's mini-din connector to reset the timer. See image below.



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5. Hook power back up to the inverter (reverse of step 4) and turn the on/off switch to "ON." The red and green LEDs should come on at the same time. Wait five seconds and detach the reset adapter.



6. Turn the inverter off and then back on. Both green lights should come on and the inverter will turn on. See image below.



## LIMITED COMMERCIAL WARRANTY POLICY

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Purkeys Fleet Electric, Inc. (hereafter “Purkeys”), warrants each product to be free of defects in material or workmanship under normal use and service. This warranty is for the benefit of Original Equipment Manufacturers, Dealers, Warehouse Distributors, Fleets, or other End Users (hereafter “Customers”) and covers products manufactured by Purkeys and sold new to Customers either directly by Purkeys or by its authorized dealers, distributors, or agents. The length of the Warranty Period is 36 months.

The warranty period commences on the in-service or install date and is not transferable. Failure to provide the in-service or install date on the warranty claim form will cause the warranty period to begin on the date the part was manufactured or date of sale recorded on the original sales invoice, whichever is earlier.

A completed warranty claim form should accompany all parts submitted to Purkeys for consideration for repair or replacement under warranty. The submitted claim form should contain all of the information required. Lack of a properly or fully completed claim form will result in delay or denial of warranty claim. Claims must be submitted no later than 30 days after part is removed.

This warranty does not apply if, in sole judgement of Purkeys, the product has been damaged or subjected to accident, faulty repair, improper adjustment, improper installation or wiring, neglect, misuse, or alteration or if the product failure is caused by defects in peripheral vehicle components or components attached to the Product or failure of a part not manufactured by Purkeys.

This warranty shall not apply if any Purkeys product is used for a purpose for which it is not designed or is in any way altered without the specific prior written consent of Purkeys. ANY Product alleged by a Customer to be defective must be inspected by Purkeys as a part of the warranty claims process in order to confirm that the part has failed as a result of a defect in material or workmanship.

Transportation for products and parts submitted to Purkeys for warranty consideration must be prepaid by Customer. Repaired or replaced products and or components will be returned to Customer pre-paid by Customer or “freight collect” to the address provided by Customer in the warranty claim form. No charge will be made for labor or material in effecting such repairs.

The Warranty provided by Purkeys hereunder is specifically limited to repair or replacement of the Product as Purkeys deems most appropriate in its sole discretion. Purkeys neither assumes nor authorizes any other person to assume on its behalf any other warranty or liabilities in connection with Purkeys products. The Warranty does not apply to fuses or other “consumable” or maintenance items which are or may be a part of any Purkeys product.

**THIS WARRANTY DOES NOT APPLY TO LOSS OF VEHICLE OR EQUIPMENT, LOSS OF TIME, INCONVENIENCE, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. PURKEYS SPECIFICALLY DISCLAIMS AND SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES arising out of or from the use of Purkeys products by the Customer.**

**THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, INCLUDING COMMON LAW WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, AND ANY OTHER EXPRESS OR IMPLIED WARRANTIES. ALL OTHER SUCH WARRANTIES ARE SPECIFICALLY DISCLAIMED.**

This Limited Commercial Warranty supersedes all previous Warranty Policies issued by Purkeys and any of its suppliers.

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***WATT*** *Keeps You Trucking*