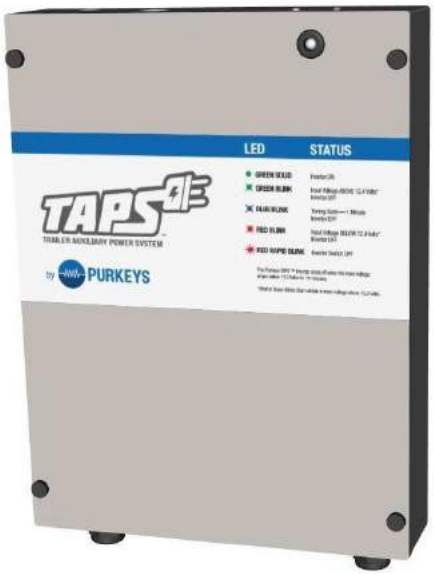
PURKEYS

TRAILER AUXILIARY POWER SYSTEM TAPS™

INSTALLATION GUIDE



INST070 Doc 2.01

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GENERAL INFORMATION

The Trailer Auxiliary Power System (TAPS)™ is designed to provide auxiliary AC power at 110 volts in a trailer, so that AC devices can be powered while on the trailer. In this application, the AC power allows a device such as an electric pallet jack to be charged by its own AC battery charger when the tractor is running between stops. It allows the pallet jack to be kept at a high enough state of charge that it stays functional during the hours of operation.

This trailer-based system receives DC power from the tractor via the dual pole power cord. If mounted on a straight truck, it receives DC power from the tractor batteries. The inverter converts DC power to 110 volt AC power, which is then delivered to the 110 volt AC receptacle via a protected three wire conductor. The TAPS is managed by a smart inverter, which will not turn the inverter on until it sees DC input voltage of 13.2 volts. To achieve this voltage, the tractor's engine must be running and the electrical system must be functioning properly.

Once the smart inverter turns on the inverter, it will stay on until the voltage drops below 12.3 volts for 10 minutes or until the voltage drops below 11 volts. Once the smart inverter turns off the inverter, it will not turn back on until the voltage again reaches at least 13.2 volts. The tractor engine must be started and the engine must be running. With the smart inverter logic built in, the inverter will only run between stops and will turn off when the engine is turned off at each stop. There is a one-minute timer at shutdown and startup of the smart inverter.

LOGIC OF THE SYSTEM - CHARGING ELECTRIC PALLET JACKS

- Tractor powers the inverter via dual pole stinger cable, or directly from tractor batteries if on a straight truck.
- Inverter only operates when the tractor's engine is running.
- Inverter is mounted in front of the trailer.
- AC line from inverter to back of trailer is in a liquid-tight conduit. There is very little voltage drop in 110 VAC lines versus 12 VDC lines.
- Smart Inverter makes the entire operation automatic.
- External LED is mounted to enclosure to assure the operator of proper system function.
- Built-in LED is on the AC receptacle at the back of the trailer to assure the operator that there is power.

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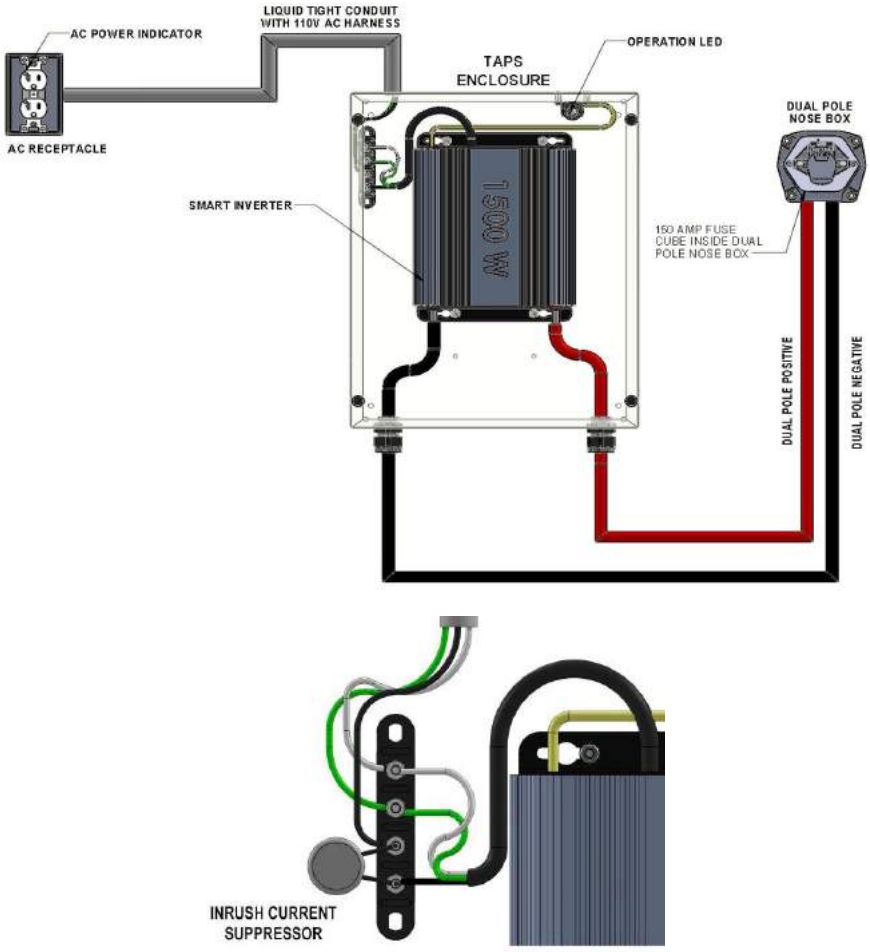
SYSTEM DIAGRAM FOR DUAL POLE APPLICATION

Components:

- Dual Pole Nosebox
- Dual Pole Positive (+)
- Dual Pole Negative (-)
- Smart Inverter
- Liquid Tight Conduit with 110 VAC Harness
- 110 V Receptacle with Power Indication

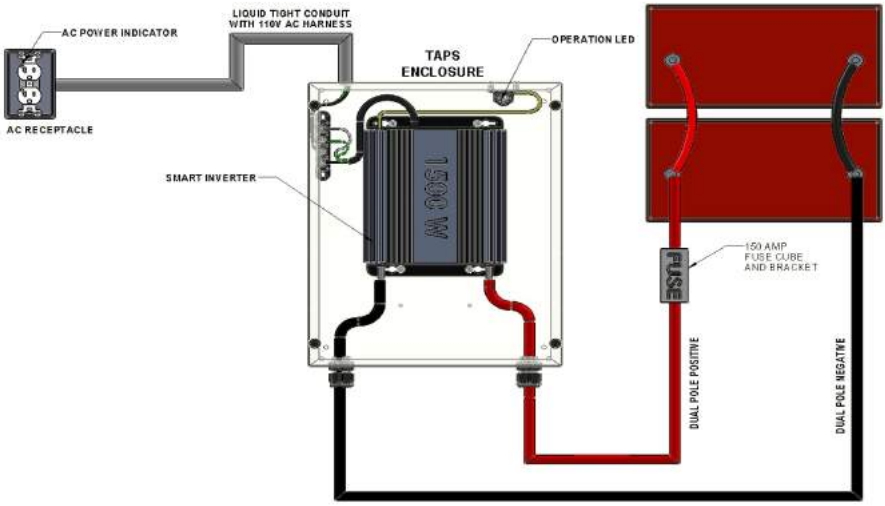


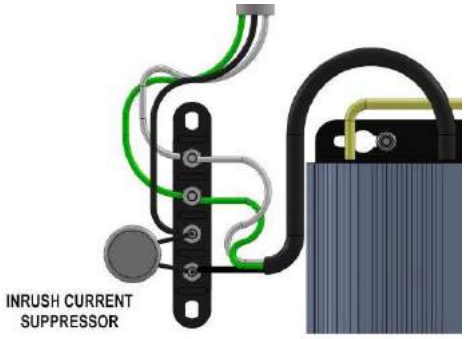
AC connections at the 4-terminal junction strip

SYSTEM DIAGRAM FOR STRAIGHT TRUCK APPLICATION

Components:

- 150 Amp Fuse Cube and Bracket
- Dual Pole Positive (+)
- Dual Pole Negative (-)
- Smart Inverter
- Liquid Tight Conduit with 110 VAC Harness
- 110 V Receptacle with Power Indication





AC connections at the 4-terminal junction strip

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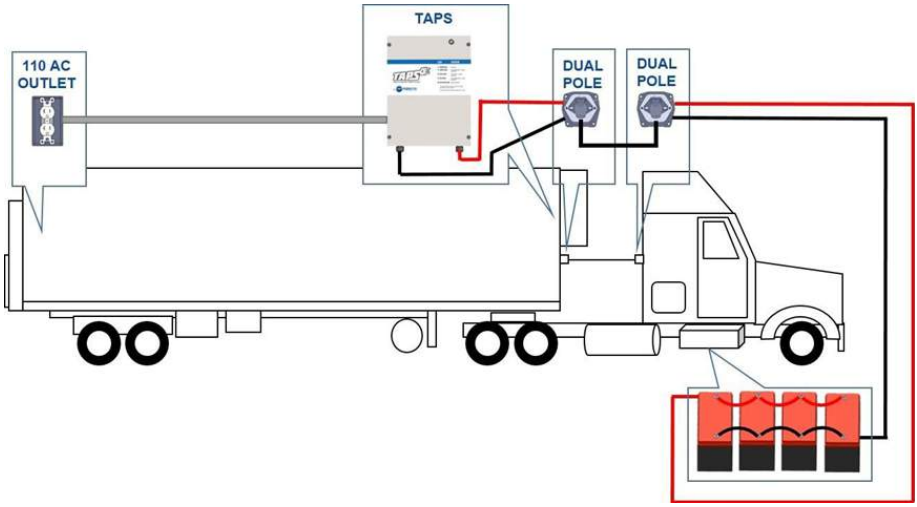
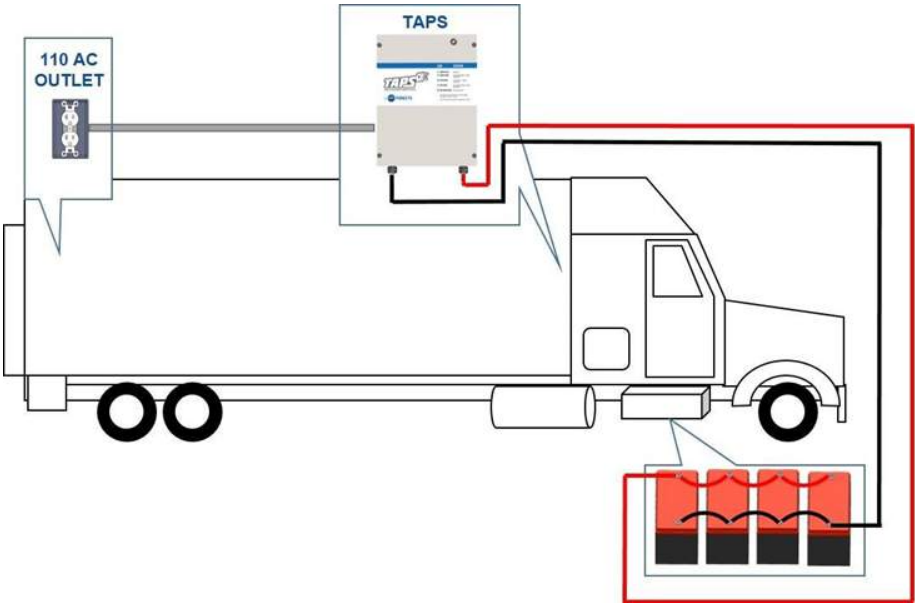
DUAL POLE CONFIGURATION



STRAIGHT TRUCK CONFIGURATION

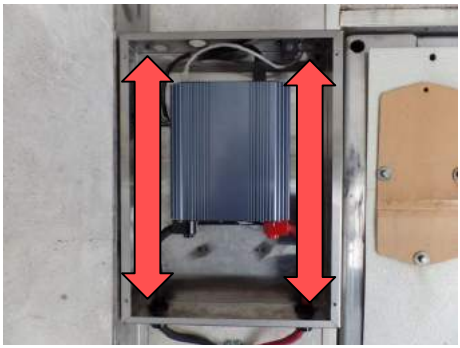


MOUNTING THE TAPS ENCLOSURE

Step 1: Remove the front panel by loosening the 4 thumbscrews on the corners of the enclosure.

Step 2: Mount the TAPS enclosure in a suitable location on the inside front of the trailer. Use the supplied #10 x 1 ½ inch self-tapping screws and secure the box to the wall via the mounting holes on the inside of the TAPS enclosure.

Note: Leave the front panel off for the AC harness installation.



TAPS enclosure mounting complete.

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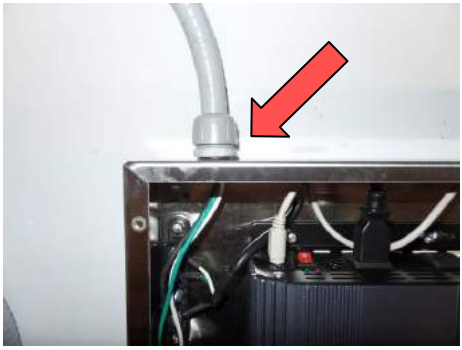
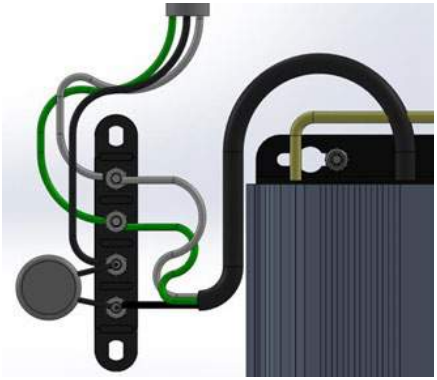
110 VAC HARNESS INSTALLATION

Step 1: Route the end of the 110 VAC harness that contains the three wires with the #10 eyelets through the hole at the top of the TAPS enclosure. Secure the harness to the enclosure using the supplied liquid-tight fitting.

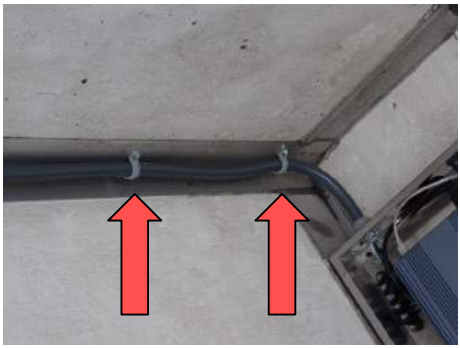


Important! To reduce the risk of electrical shock, make sure the inverter does not have power before making the following connections.

Step 2: Attach the white wire to the top post, the green wire to the 2nd post, and the black wire to the 3rd post (open leg of inrush current suppressor). Tighten each connection.



Step 3: Route the AC harness to the corner of the inside of the trailer where the side wall and the ceiling meet. Route along this edge all the way to the back of the trailer. Use the supplied plastic cable clamps to secure this harness to the trailer wall.

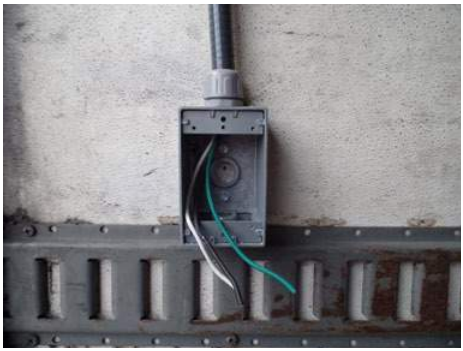


Note: To prevent the AC harness from sagging, place the cable clamps approximately every 18 inches.

Step 4: Mount the sealed AC receptacle box in a suitable location on the side wall at the back of the trailer.

Note: It may be necessary to recess the receptacle into the trailer wall to prevent it from getting damaged. Consult with your trailer manufacturer first.

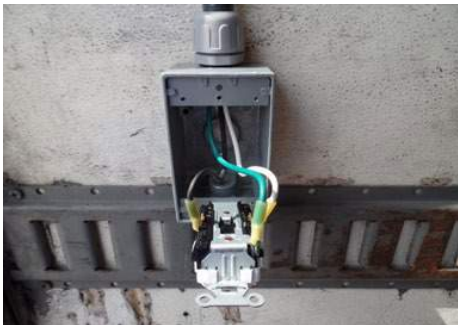
Step 5: Route the three AC wires into the AC receptacle box and secure the harness to the box using the supplied liquid tight connector.



Step 6: Ensure the AC wires will reach the location on the AC receptacle where they will be secured, and cut off the excess wire.

Step 7: Strip ¼ inch of insulation off the ends of all three AC wires and crimp on the supplied #10 spade terminals. Apply heat to shrink the heat shrink on the spade terminals.

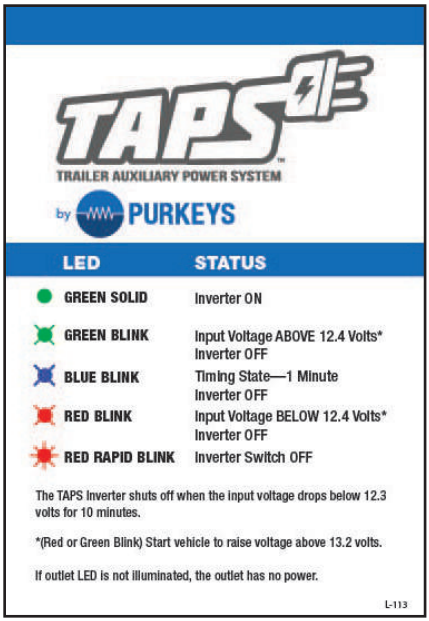
Step 8: Connect the white wire to the silver screw, the green wire to the green screw, and the black wire to the gold screw on the AC receptacle.



Step 9: Place the supplied foam gasket and plastic face plate over the AC receptacle. Insert the AC receptacle into the AC receptacle box and tighten the mounting screws.

Step 10: Install the AC receptacle cover.

Note: Included is a sticker that is intended to be placed near the AC receptacle to show the status of the LED lights (see image below).



110 VAC harness installation complete.

INPUT CABLE ROUTING FOR DUAL POLE APPLICATION

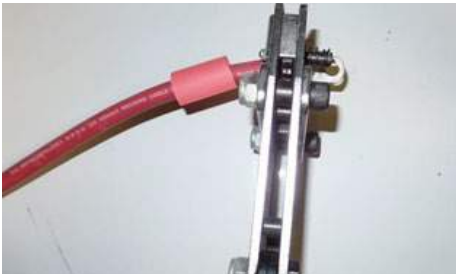
Step 1: Route the 1/0 red and black input cables down the trailer wall. Secure the cables separately to the trailer wall using the supplied plastic clamps.

Important: Ensure that the positive and negative cables are routed so they cannot touch. Due to normal vibrations, the cables could potentially rub through the insulation, causing a short if they are touching.

Step 2: Route the 1/0 red and black input cables through the trailer wall and out to the dual pole nosebox.

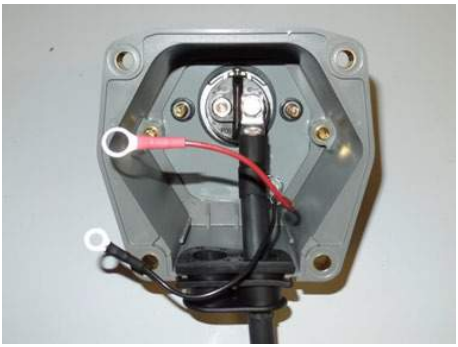
Note: Cut the cables to length once a location for the dual pole nosebox has been determined.

Step 3: Once the cables are through the trailer wall, crimp the supplied 3/8 inch cable lug onto the 1/0 red positive cable. Apply heat to the heat shrink to seal the connection.

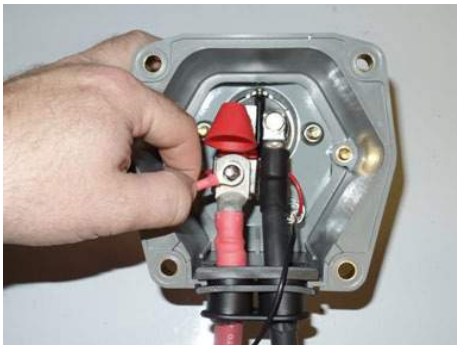


Step 4: Crimp the supplied ¼ inch cable lug onto the 1/0 black negative cable. Apply heat to the heat shrink to seal the connection.

Step 5: Slide the 1/0 black negative cable through the black rubber grommet located at the bottom of the dual pole box. Attach the cable to the post marked (NEG). Use a 7/16 inch socket or nut driver to tighten this connection.



Step 6: Slide the 1/0 red positive cable through the black rubber grommet located at the bottom of the dual pole box. Place the 1/0 red cable over the fuse cube post and on top of the fuse cube. Place the smaller red LED wire on top of the 1/0 red cable. Secure this connection using the supplied fuse cube nut.



Note: Make sure the ring terminal of the smaller LED wire is on top of the larger dual pole cable.

Step 7: Ensure the foam gasket is behind the dual pole nosebox and bolt the box onto the front of the trailer in a suitable location using the supplied 5/16-18 X 1 ½ self-tapping screws.

Important: To reduce the risk of electrical shock, make sure that the AC harness installation is complete before plugging in the dual pole cable from the vehicle into the trailer dual pole receptacle.

Input cable routing for dual pole application complete.

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INPUT CABLE ROUTING FOR STRAIGHT TRUCK APPLICATION

Step 1: Route the 1/0 red and black input cables down the trailer wall. Secure the cables separately to the trailer wall using the supplied plastic clamps.

Important! Ensure that the positive and negative cables are routed so they cannot touch. Due to normal vibrations, the cables could potentially rub through the insulation, causing a short if they are touching.

Step 2: Route the 1/0 red and black input cables through the trailer wall or floor toward the vehicle battery box. It may be necessary to use the supplied cable pass-through plate as shown in this illustration. Using a 3 ½ inch hole saw, cut a hole in the wall or floor to mount the cable pass-through plate.

Step 3: Once the cables are through the trailer wall or floor, ensure they will reach the positive and negative posts on the vehicle batteries. Plan for a little slack in the cables, and cut off any excess cable.

Step 4: Crimp the supplied 3/8 inch cable lugs onto the 1/0 black negative cable and the 1/0 red positive cable. Apply heat shrink to seal the connection.

Step 5: Attach the supplied fuse cube and bracket assembly to the 1/0 red positive cable. Tighten the fuse cube nut.

Note: The fuse cube nut is tapered to ensure that the nut is tightened all the way so there is no air gap between the cable lug and the fuse cube nut.

Step 6: Attach the fused 1/0 red positive cable to the vehicle positive battery post and the 1/0 black negative cable to the vehicle negative battery post.

Important: Make sure that the AC harness installation is complete before making connections at the vehicle batteries.

Input cable routing for straight truck application complete.

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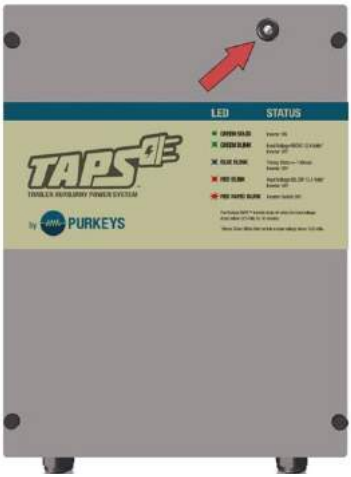
LED INDICATION AND OPERATION



LED STATUS	CONDITION	ACTION NEEDED
Solid Green LED	Input voltage at the positive and negative post on the inverter is above 13.2 volts. Vehicle battery at a good state of charge.	Normal operation, no action required.
Green Blinking LED	Input voltage at the positive and negative post on the inverter is above 12.4 volts. Vehicle battery at a good state of charge	Start the vehicle to raise the voltage above 13.2 volts.
Blue Blinking LED	Timing state.	Wait one minute.
Red Blinking LED	Input voltage at the positive and negative post on the inverter is below 12.4 volts. Vehicle battery at a low state of charge.	Start the vehicle to raise the voltage above 13.2 volts.
Rapid Red Blinking LED	The inverter switch is in the off position.	Turn the inverter switch to the on position.

INVERTER TROUBLESHOOTING

DC Power Issues		
TROUBLE/ INDICATION	POSSIBLE CAUSE	SUGGESTED REMEDY
No AC output: No LEDs lit, low battery alarm sound	DC input fell below 11 volts.	Test batteries and conduct voltage drop test. Also check the vehicle charging system.
No AC output: No LEDs lit, low battery alarm sound	Inverter fuse cube open.	Check fuse cube at dual pole receptacle or the vehicle battery if on a straight truck.

AC Output Power Issues		
TROUBLE/ INDICATION	POSSIBLE CAUSE	SUGGESTED REMEDY
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 LED 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, 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 will not 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. Operate an incandescent lamp at the same time as motor.

INVERTER VOLTAGE DROP TEST

Step 1: Using the Purkeys Handheld Electrical Analyzer or Auto Meter BCT-200J tester: Turn the tester on, press Y ENTER for menu.

Step 2: Select VDROP MENU and press Y ENTER.

Step 3: Select GENERIC VDROP and press Y ENTER.

Step 4: Enter in the rated current to test (use 120 amps to test the inverter harness) and press Y ENTER.

Step 5: Connect the large alligator clips to the inverter input posts (red to positive and black to negative) and press Y ENTER.

Step 6: Connect the small alligator clips to the battery pack (red to positive and black to negative) and press Y ENTER.

Step 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.

Step 8: The positive and negative results must be added together to get the total voltage drop for the complete circuit.

Step 9: The total voltage drop for the complete circuit must be less than ".396" to be within specification.

TESTING INVERTER OUTPUT

An AC power tester, such as a Kill-A-Watt, can be used to test the inverter output voltage and current.

Step 1: The LCD shows all meter readings: Volts, Current, Watts, Frequency, Power Factor, and VA. The unit will start to accumulate KWH and Powered Duration Time (hours) after power is applied.

Step 2: Press the Volt button for true RMS Voltage (volts) display.

Step 3: Press the Amp button for true RMS output current (amps) display.

Step 4: The Watt/VA button is a toggle function button. Press the Watt/VA button once to display the 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—Vrms Arms).

Step 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/Vrms Arms).

Warning: Do not exceed maximum ratings as detailed on the label.

Note: 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 (from 0.01 KWH to 9999 KWH). Time will initially be displayed as Hour:Minutes (from 00:00) and switch to Hours (to 9999). Counters will recycle to zero when they reach their maximum. To reset, momentarily remove power from unit.

NOTES

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LIMITED COMMERCIAL WARRANTY POLICY

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 24 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.


WATT Keeps You Trucking