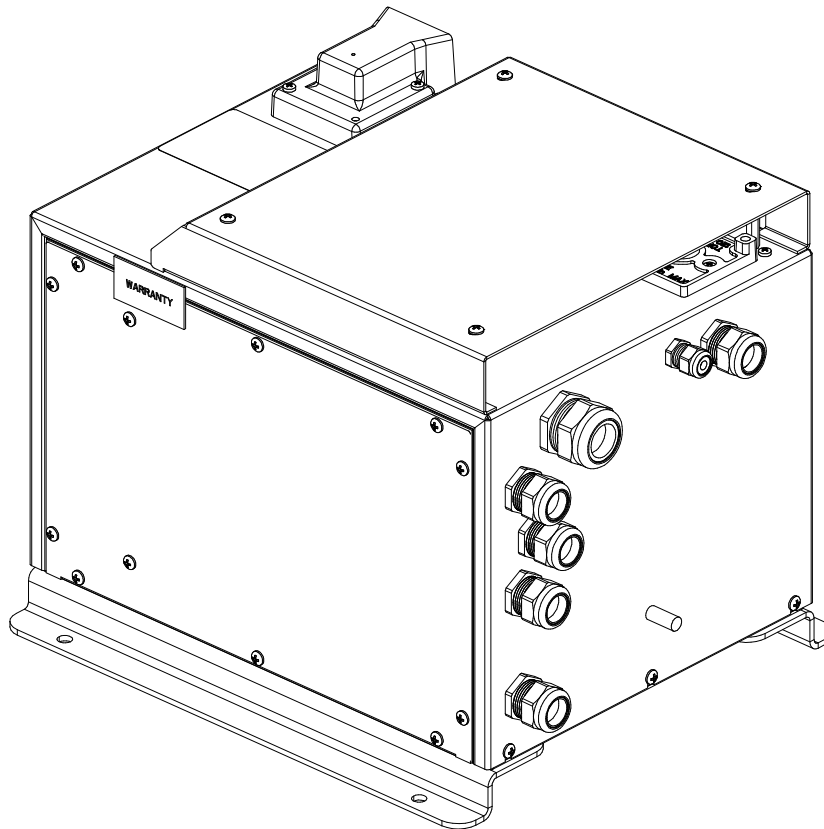


Owner's Manual
MPG
Dynamic Power System



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1-800-AC POWER

Mobile Power Generator Dynamic Power System
OWNER'S MANUAL

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PLEASE NOTE YOUR MODEL AND SERIAL NUMBER HERE FOR FUTURE REFERENCE

Model Number	
Serial Number	
Date of Installation	

Note



Important Information

Warning



Failure to observe
Warning could cause
damage to equipment
or personal injury

Section 1 – General

The Mobile Power Generator is a power inversion system designed with “state-of-the-art” technology, which incorporates innovative engineering techniques for long-term reliable performance.

The MPG Dynamic Power System incorporates an inverter with Trusine® technology, and a custom designed Leece-Neville three-phase alternator. Internally, the Mobile Power Generator converts the three-phase AC output of the alternator into 120 Volts AC RMS at 60 Hertz, supplying 3000 Watts at a speed of 2400-RPM (Alternator), 916-RPM (Engine), assuming a 2.62:1 Alternator to Crankshaft pulley diameter ratio. Furthermore, it provides up to 100 Amps of DC charging capability for the battery and provides power to the 12-Volt accessories. The overall MPG system can output a total of 4100-Watts (combination of the DC and AC power outputs).

The Vanner Incorporated Trusine® Mobile Power Generator’s technology incorporates high frequency switching techniques to achieve a pure sine wave output. This means that even waveform sensitive instruments can be used with the MPG. When operating inductive loads such as a motor, Trusine® technology actually recycles the reactive energy from the reactive load so that it operates at a higher efficiency.

Specifications

AC OUTPUT:	
Voltage (RMS)	120 VAC +5%/-10%
Current (RMS)	25 Amps
Overload Protection	30 Amp Circuit Breaker
Frequency	60 Hz ± 0.1%
AC Waveform	Sine Wave
Total Harmonic Distortion (THD)	Less than 5.0%
Power Factor Allowed	-1 to 1
Continuous Output Rating @ 40°C	25 Amps ^(note 1)
Surge Capacity @ 40°C	4,500 Watts (2 Seconds)
DC OUTPUT:	
Voltage	14.0 Volts +2%/-8%
Current	100 Amps ^(note 1)
ALTERNATOR PORTS:	
3-phase Input Voltage	42 Volts Line-Line
3-phase Input Current	26 Amps
Field output voltage (nominal)	Up to 24 Volts DC
Field output voltage (surge)	Up to 48 Volts DC for 2 seconds
SYSTEM PERAMETERS:	
Ambient Operating Temperature	-40°C to +40°C (-40°F to +104°F)
Cooling Exhaust Fan 120 CFM	Thermostatically Controlled
Chassis	Heavy-duty Aluminum
Dimensions	10" W x 9.9" H x 15" D
Weight Mobile Power Generator/Alternator	45 Pounds
Specified alternator	Vanner Part # 011812
Note 1 – Total output power (DC load plus AC load) should not exceed 4,100 Watts.	



Table 1 – Specifications

Standard Features of the MPG

1. **Pure Sine Wave Output** - Vanner's exclusive Trusine® technology maintains constant-peak and constant-width pure sine wave output with less than 5% total harmonic distortion and no power factor limitation on load operation.
2. **Vehicle integration** - The Mobile Power Generator integrates directly into the vehicle's electrical system.
3. **Mounting Versatility** - The Mobile Power Generator comes in two mounting configurations, Frame Rail Box Mount, and Shelf Mount. The MPG can mount directly inside a Frame Rail box freeing up valuable cab and compartment space. The Shelf Mount configuration allows the MPG to be mounted wherever there is available space for the unit and cables. See Section 5 for all mounting requirements.
4. **Over-Current Protection** - The Mobile Power Generator System is protected by a 30-Amp circuit breaker located on the Mobile Power Generator enclosure and also by internal solid-state current limiting circuitry, which limits the DC output current to 100 Amps.

5. **Precise AC Voltage Regulation** - The Mobile Power Generator regulates the 120 VAC output to be within +5/-10% tolerance under all load conditions.
6. **Increased Reliability** - The Mobile Power Generator incorporates the regulator electronics normally located inside the alternator or inside the engine compartment. This relocation allows for better environmental conditions for the circuitry, and thus better reliability.
7. **High Temperature Protection** - The Mobile Power Generator's AC output automatically shuts off when the internal ambient temperature reaches a predetermined undesirable level.
8. **CAN Bus capable** - The Mobile Power Generator is controlled by and communicates with the vehicle via CAN bus (J1939 protocol).
9. **Robust Enclosure** - The Mobile Power Generator is protected by a rugged aluminum water-resistant enclosure, which stands up to extreme road conditions and indirect power cleaning.

(DO NOT DIRECTLY POWER CLEAN THIS UNIT!)

Section 2 – Configuration Drawings and Dimensions



Mobile Power Generator Mount

NOTE: All dimensions are in inches.

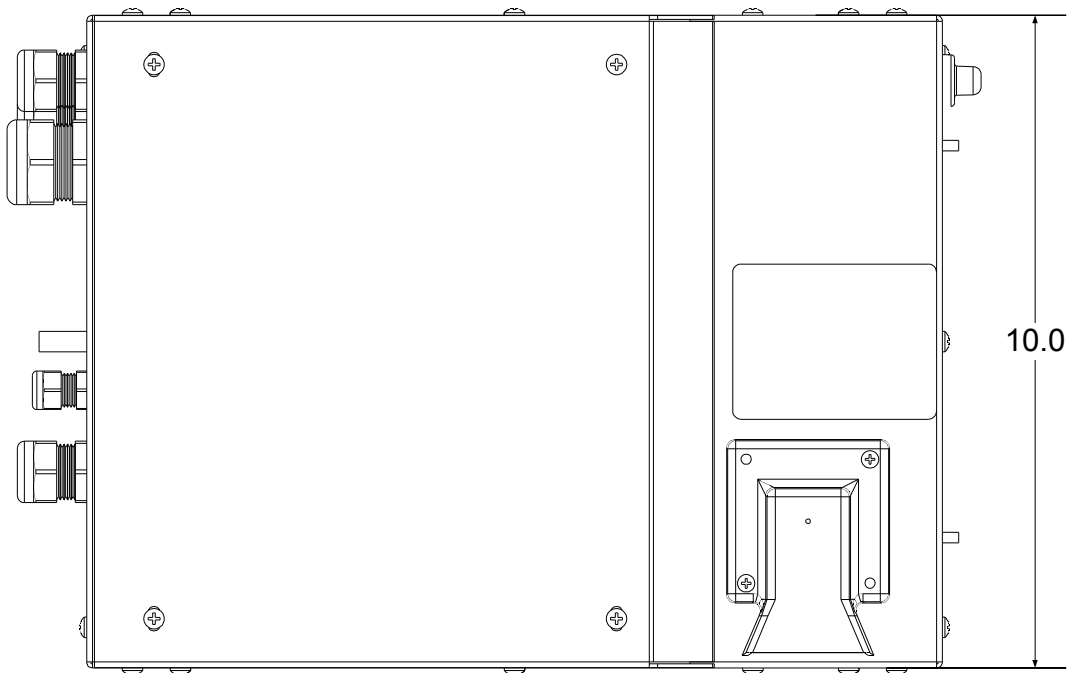


Figure 1 - MPG Mount Top View

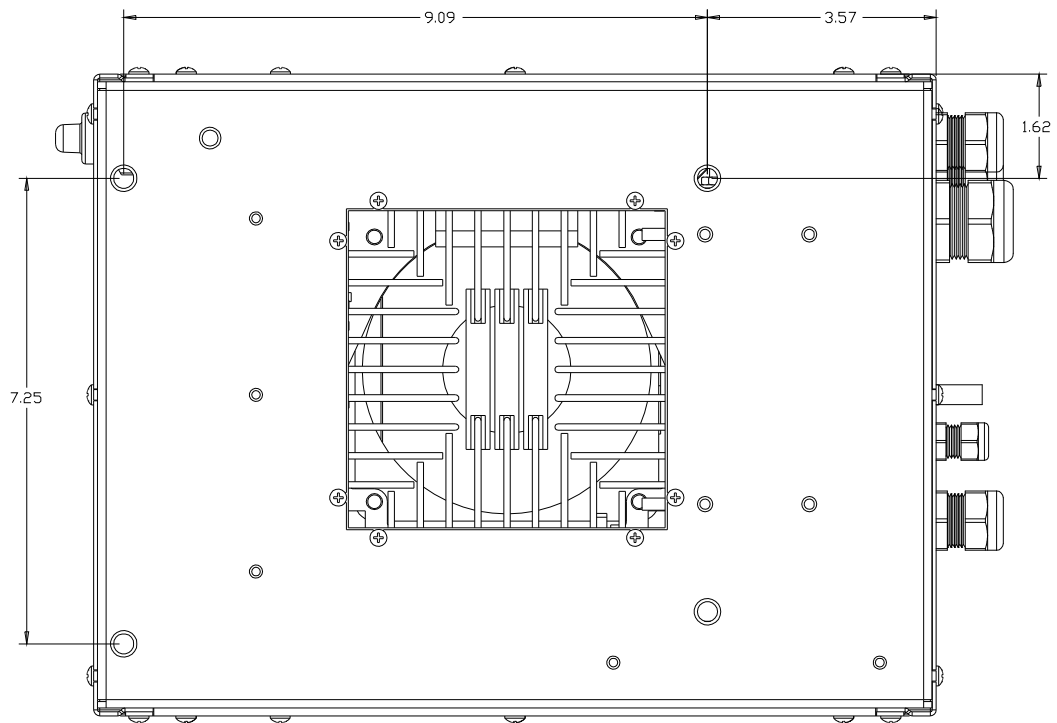


Figure 2 – MPG Bottom View and Hole Locations

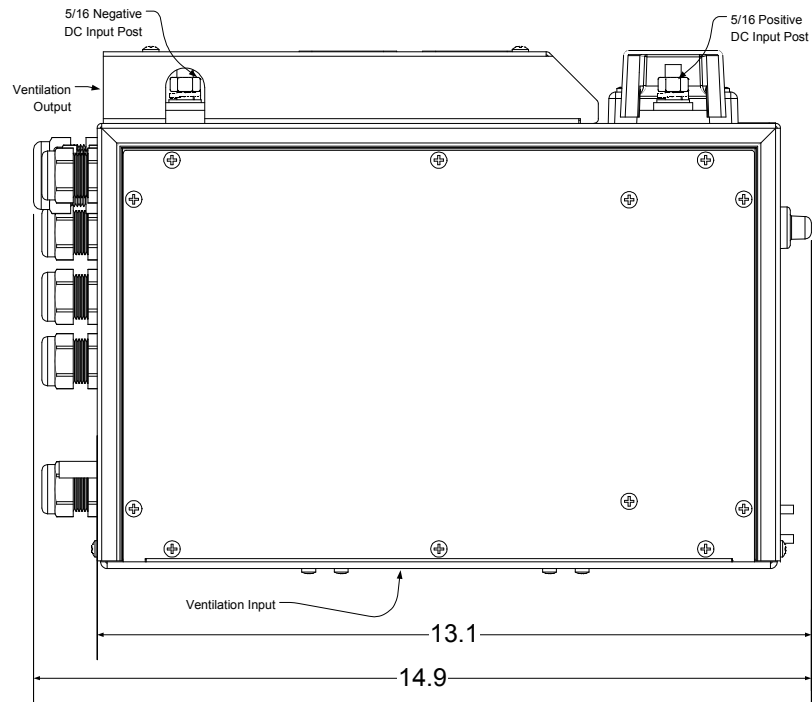


Figure 3 – MPG Side View

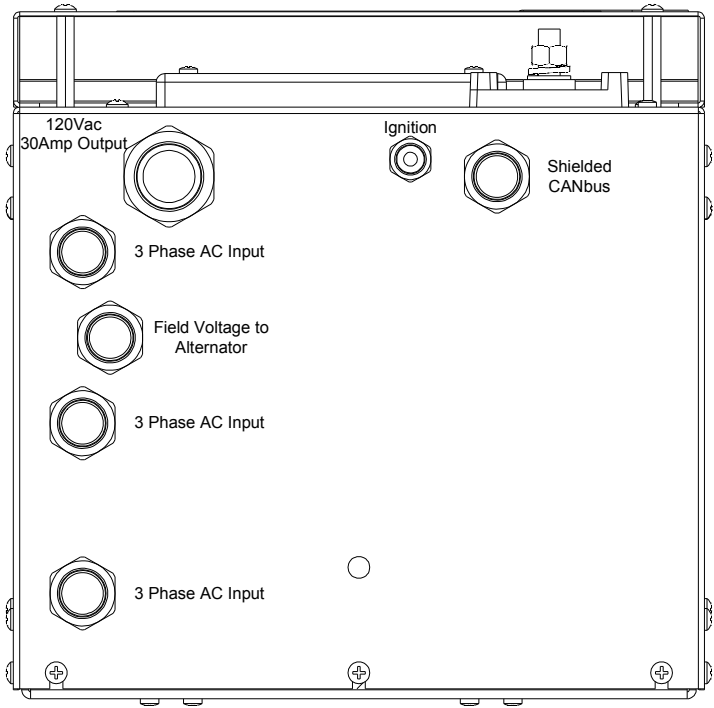


Figure 4 – MPG Back View

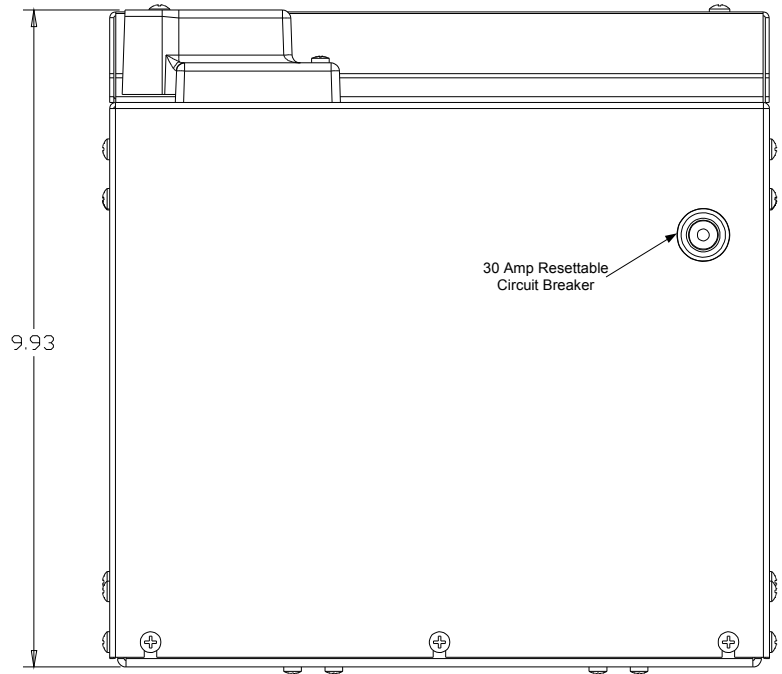


Figure 5 – MPG Front View

Mobile Power Generator Shelf Mount



Note: The MPG Shelf Mount

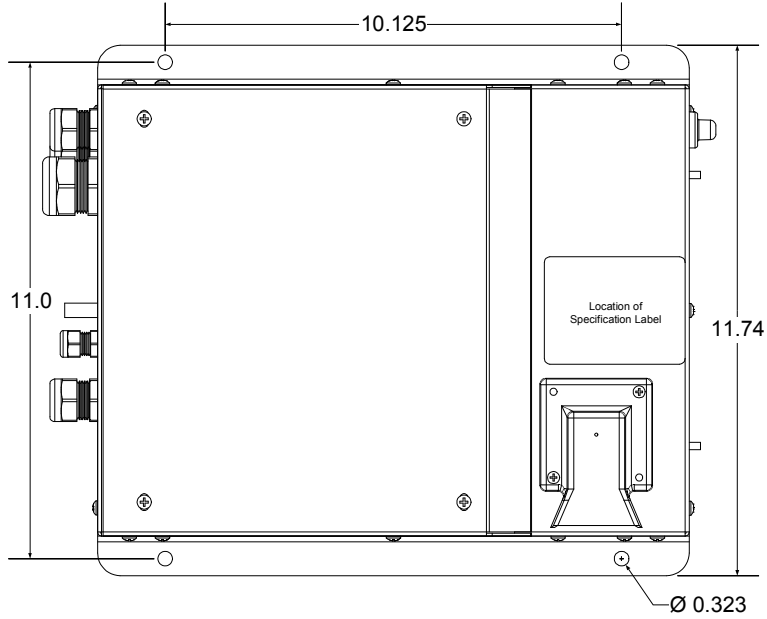


Figure 6 - Shelf Mount Top View and Hole Locations

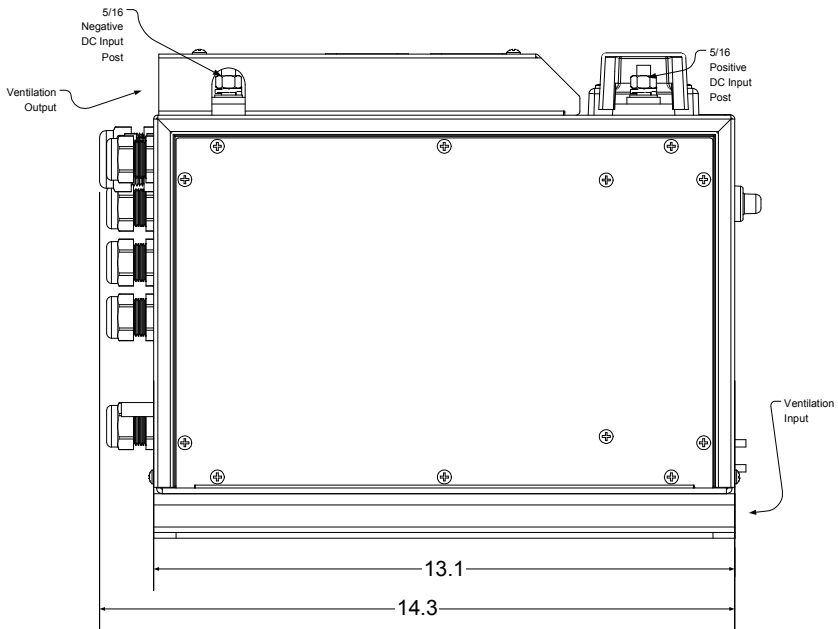


Figure 7 - MPG Shelf Mount Side View

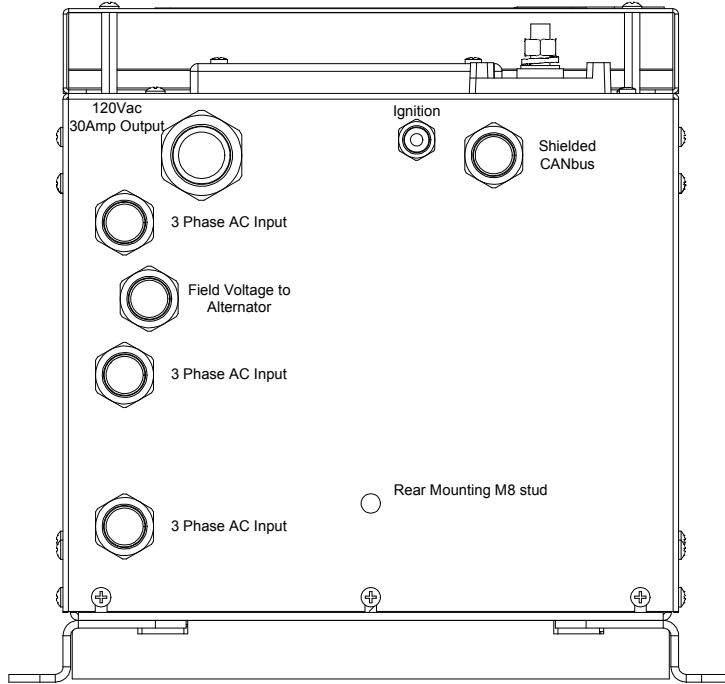


Figure 8 – MPG Shelf Mount Rear View

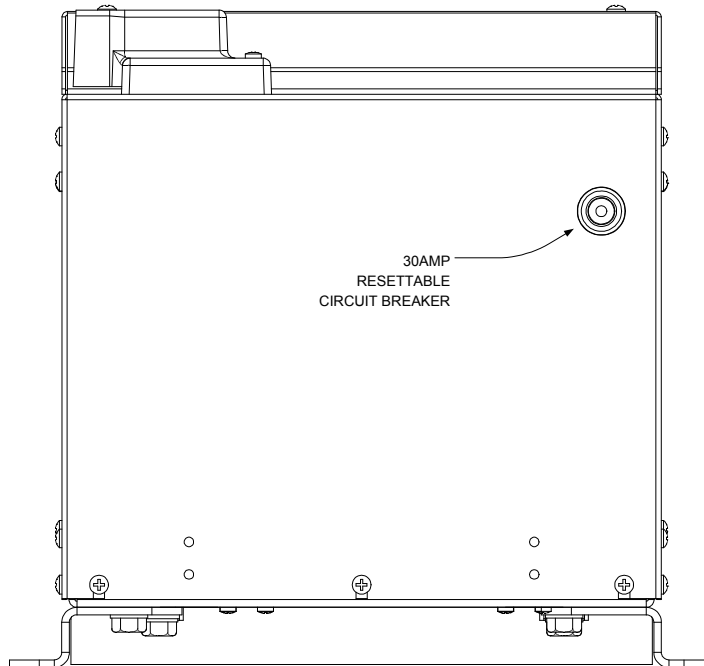


Figure 9 - MPG Shelf Mount Front View

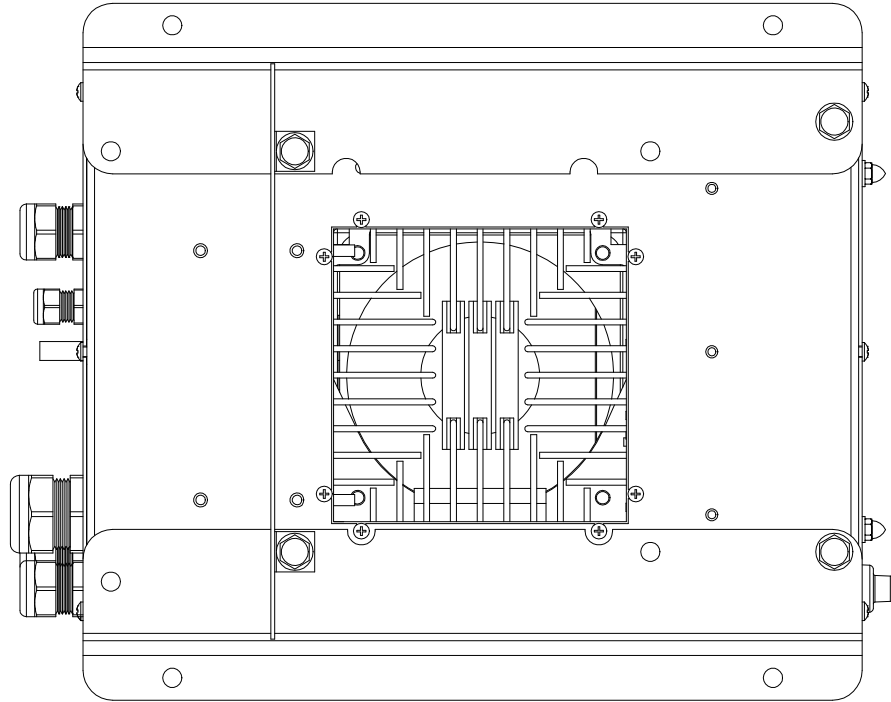


Figure 10 – MPG Shelf Mount Bottom View

Section 3 – Operation

Principles of Operation

The Vanner Mobile Power Generator Dynamic Power System consists of two major components;

- Mobile Power Generator
 - Trusine® Power Inverter
 - Battery Voltage Regulator
- Alternator (with wiring harness)

The Mobile Power Generator

When the engine starts and supplies an ignition signal, the Mobile Power Generator system will turn on the field control that energizes the alternator. This allows the alternator to immediately produce power for the Mobile Power Generator and begin recharging the battery to 14 Volts. When AC power is needed, the user can turn the inverter on via the ON/OFF switch on the dashboard. If the MPG shuts down for any faults, the user must turn off the inverter then turn it back on again using the switch. A light on the dash switch will indicate Mobile Power Generator status. If the inverter is working properly the light will remain solidly ON. If an error condition exists, the light on the switch will blink a code to indicate the error condition that has occurred. (See page 21 for MPG Blink Codes)

The Mobile Power Generator is rated for 25 Amps AC at 120 Volts and 100 Amps at 12 Volts (when a large amount of AC power is required for starting a load, the battery voltage will drop because all of the available power is being diverted to the 120Volts AC. Once the AC load is reduced, more power will be available for battery charging and the battery voltage will return to normal. The MPG is comprised of two separate but distinct controls, the Inverter and the Voltage Regulator.

Inverter

The Inverter is responsible for providing 120-Volt AC, 60-Hertz power. Whenever the vehicle is running at 916 RPM (engine RPM using a 2.62:1 pulley ratio), or above, the inverter can provide 3,000 Watts (25 Amps AC RMS at 120 V AC) of clean, AC sine wave power. The MPG system will provide these values of AC and DC power, previously mentioned, even while the vehicle is in motion. The output is protected from short circuit and overload conditions. As with all power electronics operating in extremely high ambient temperatures, the AC and DC output currents derate (see figures 11 and 12). The inverter will shut down to protect the internal circuitry from excessively high temperatures. Once the inverter cools down, cycling of the dash mounted ON/OFF switch will restart the inverter.

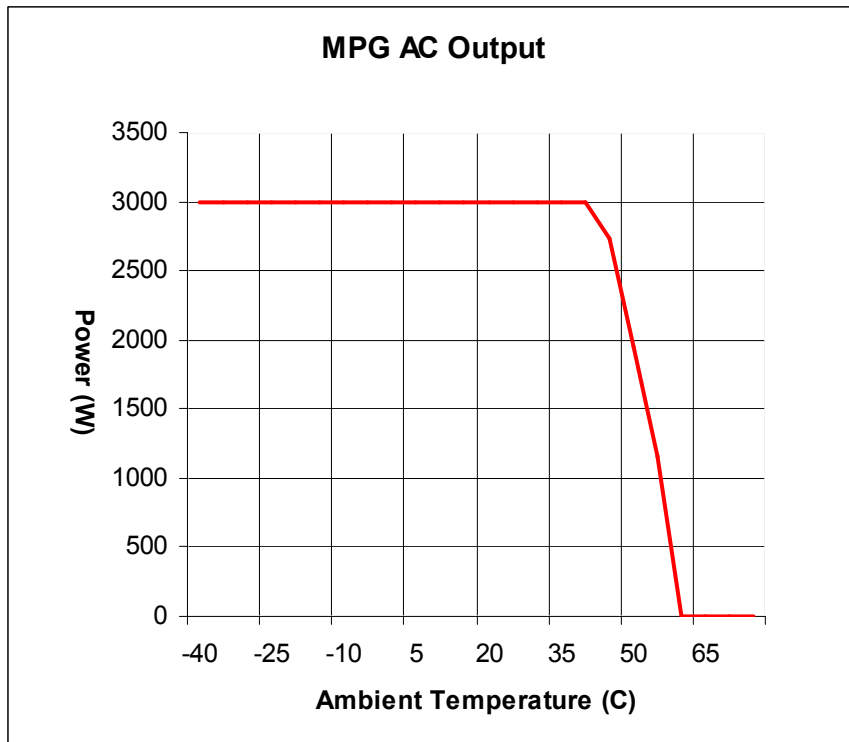


Figure 11: AC Derating Curve

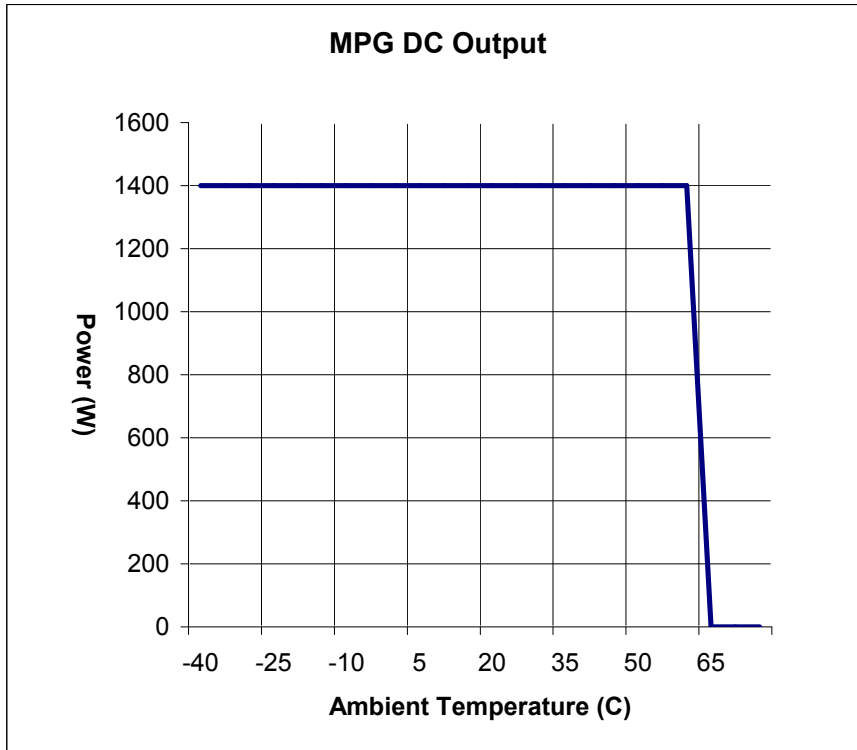


Figure 12: DC Derating Curve

Voltage Regulator

The Voltage Regulator is responsible for maintaining the battery voltage, which is used for all 12-Volt vehicle loads. The internal MPG controls regulate the alternator's output to maintain the charging voltage to the battery and provide up to 100 Amps of DC load power. If load conditions cause the internal temperature of the MPG to reach an unsafe temperature, the MPG will shut down to protect its internal circuitry. Once the system cools down, the regulator will resume operation, and cycling of the On/Off switch will restart the inverter.

The Alternator

The alternator used with this system supplies three-phase AC power directly to the MPG. The Lece-Neville alternator is designed to supply full power at an engine speed of 916 RPM (or higher) and provide surge power at a slightly higher engine speed. System reliability is increased because the electronics for the voltage regulator are mounted in the water-resistant Mobile Power Generator box and not inside the alternator. Alternators with internalized voltage regulators are exposed to all of the elements and elevated temperatures under the hood, which greatly reduces the longevity of the regulator electronics.

Section 4 – Pre-Installation Precautions



General Precautions

1. Do not expose the Mobile Power Generator to direct water spray (i.e. power washing), snow, rain, or direct inclement weather conditions.
2. Do not cover or obstruct the bottom ventilation opening. Doing this will increase the risk of overheating and diminished performance.

3. Do not install the Mobile Power Generator in a zero clearance compartment. This may result in overheating or diminished performance.
4. Do not use wiring or fixtures not recommended or sold by Vanner Incorporated or Vanner approved suppliers. This may increase the risk of fire, electrical shock, or injury to personnel.
5. All AC and DC electrical wiring must be performed by a certified technician to ensure compliance with all applicable national and local wiring regulations.
6. Verify wiring connections are in good electrical condition to avoid a risk of fire and/or electrical shock.
7. All external conductors must use proper wire size to avoid overheating or diminished performance. See page 18 for Wire size chart.
8. Do not operate the Mobile Power Generator unit if it has been dropped or damaged in any way until it has been verified to be safe by Vanner Incorporated.
9. Always disconnect the AC **and** DC connections to the Mobile Power Generator before attempting any vehicle electrical maintenance. This reduces the risk of electrical shock. **Turning the inverter off DOES NOT prevent electrical shock.**
10. The Mobile Power Generator must be properly grounded in accordance with local and national codes and ordinances before operation. For most installations, the negative (ground) conductor should be bonded to the grounding system at one and only one point in the system.
11. Battery temperature should be above 32° Fahrenheit (0° Celsius) for optimum Mobile Power Generator performance.
12. Do not disassemble the Mobile Power Generator. See the service section of this manual for instructions on obtaining service. Attempting to service the Mobile Power Generator unit or alternator may result in a risk of electrical shock, fire and will void warranty.
13. Periodically, check connections for proper electrical connectivity and remove any corrosive build-up.



Battery Precautions

1. Always have someone within hearing range of your voice to come to your aid when you work near a lead acid battery.
2. Have close access to plenty of fresh water and soap in case battery acid contacts skin, clothing, or eyes.
3. Always wear complete eye protection and clothing protection. Avoid touching eyes while working near batteries.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 20 minutes. Get medical attention immediately.
5. NEVER smoke or allow a spark or flame near a battery. Gases produced by batteries are **highly explosive**.
6. Always take proper precautions when working with power tools around batteries. Potential exists for sparks, short-circuit of the battery or other electrical parts that could cause hazardous conditions.

Section 5 – Installation of Mobile Power Generator



WARNING: Before doing any work in, or around, the MPG do one of the following:

1. Turn the vehicle battery disconnect switch (if equipped) to the “OFF” position.
2. Disconnect the main negative (-) battery cable.



Note: The Mobile Power Generator must be installed with the alternator and wiring harness provided in the optional installation kit (See Section 7 page 26) or must be wired using Vanner recommended cable sizes and cable lengths with proper mating connectors (see Section 7 page 26). Failure to follow these requirements can result in improper product operation, damages to the unit, personal injury, and will void the warranty.



Note: Prior to drilling the MPG mounting holes, review how wiring is to enter the compartment and orient the MPG to avoid obstacles and facilitate cable routing. Also, consider the possibility that the MPG may need to be removed at a later date.

Shelf Mount Installation

Once a location for the MPG has been determined on the vehicle, temporarily place the unit in the desired location. Insure that the unit is oriented so that the incoming wiring harness does not have any hard bends or clearances that would prevent easy removal of the 3 Alternator Phases, CAN, Alternator Field, Ignition, AC output, DC input, or Chassis Ground cables. Once the unit is in its final position use the 4 mounting holes on the shelf mounting brackets (See Figure 6 for hole locations) to hard mount the unit. The unit provides for its own ventilation through the design of the mounting brackets.

Ventilation Requirements

Do not install the MPG in a zero clearance compartment. Ventilation **MUST** be supplied for proper operation of the MPG unit.

- a. **For best cooling**, outside air must be available to BOTH intake and exhaust.
- b. For best results in an **enclosed space**, the MPG should NOT be subjected to ambient temperatures outside the recommended -40°F to $+122^{\circ}\text{F}$ temperature range.
- c. 2 inches of clearance **MUST** be given to the intake **and** outlet sides of the MPG shelf mount configuration (See Figure 7 for Fan Inlet and Outlet Locations).



Note: If the MPG will be mounted in an enclosed compartment, ventilation holes **MUST** be provided in addition to the clearances specified above.



Note: For the top ventilation opening, do not cut opening in top compartment panel if it will subject MPG to rain, snow etc. If a ventilation hole cannot be put in the top of the compartment put opening(s) at the top side(s) of the compartment. Total opening area should be 21,600-sq. mm (33 sq. in.)

Alternator Harness:

The harness from the Mobile Power Generator to the alternator must be properly routed and securely fastened to avoid any hot or sharp areas, and to prevent cable movement. If the wiring harness needs to be lengthened, use the same gauge wire for the new section as is in the harness. Failure to use the proper size wire can result in overheating conditions that could cause fire, personal injury, and void of warranty. Polarity is not an issue with the 3-phase cables.

General Cable Installation Tips:



WARNING: POSITIVE AND NEGATIVE DC CABLES FROM THE MPG TO THE BATTERIES MUST NOT EXCEED 14 FEET IN LENGTH! ALL DC CABLES FOR THE MPG MUST BE TIED TOGETHER AT NO LONGER THAN 6-INCH INTERVALS FOR THE ENTIRE DC CABLE LENGTH!



1. **WARNING:** DC cables should be as short as possible. The optional installation kit includes all DC cables. The Mobile Power Generator is polarity sensitive and careful attention must be paid to the polarity. The black DC cable must be connected to the battery negative (-) and the negative (-) Mobile Power Generator terminal, located under the top cover (blue). (See Figure 3 – Side View) The red DC cable must be connected to the fuse which is connected to the positive (+) battery connection and the positive (+) Mobile Power Generator terminal, located under the red cover. (See Figure 3 – Side View)
2. Route the DC positive and negative cables as close together as possible, use cable ties at no greater than 6-inch intervals to keep them together. This will reduce electromagnetic radiation that could interfere with sensitive electronics and damage to the MPG system.
3. Route the AC power wiring separately from the DC wiring and low voltage wiring such as audio and video signal wires with as much physical separation, from the AC wires, as possible.
4. AC power cables, which need to pass through steel or other ferrous metal walls, need to pass through the same hole. If two holes are required cut a slot connecting the two holes to prevent a transformer effect that can generate excessive heat within the metal. Ensure that cables passing through bulkheads have proper protection from edges that could cause the insulation to wear off through normal vibration or slice into the cables producing risk of short circuit, high heat, or personal injury.



5. **WARNING:** Do not connect the Mobile Power Generator to the battery at this time. Final battery connections will be made after all installation issues have been inspected.



6. **WARNING:** Poorly made high current connection may cause fire and/or personal injury and damage due to improper connections are not covered under warranty.



7. **WARNING:** Be sure of the polarity of the DC input wiring. Reverse polarity may severely damage your Mobile Power Generator. Damage resulting from this condition is not covered under warranty. Fire and/or explosion of batteries may occur due to very high currents.



8. **WARNING:** An inline 150 Amp DC fuse is **REQUIRED** (See Section 7 – Page 26) on the positive (+) battery cable to properly protect the Mobile Power Generator and batteries. Failure to properly fuse the input leads to the MPG can result in damage to the unit and will void the warranty.

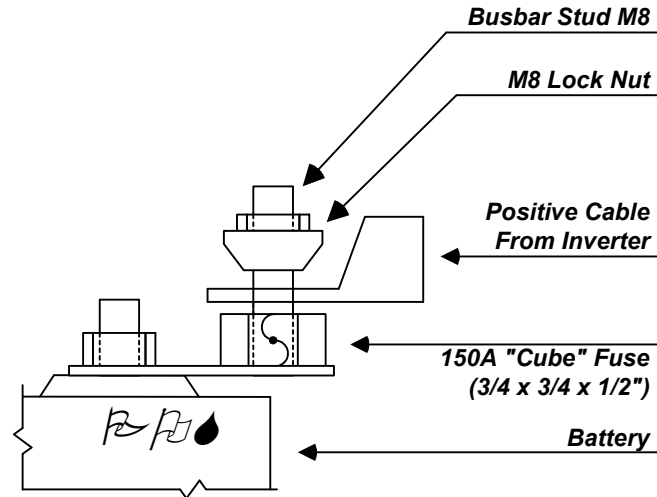


Figure 13 - Cube Fuse Wiring

9. Table 2 (below) shows the **minimum** cable size to be used when wiring the DC input to the MPG. Wire sizing charts published in the NEC may allow a greater Amperage capacity than we recommend. We have sized the cable for a minimum voltage drop to maintain better performance of your Mobile Power Generator installation. Failure to use cable of large enough gauge may result in over temperature conditions or performance degradation which could result in fire or personal injury. Damage due to improper cable size is not covered under the warranty.

Mobile Power Generator – DC Cable and Fuse Chart		
Model Number	Mobile Power Generator	
Cable Size	Distance from battery to unit in feet (multiply distance by two to allow for Positive and Negative cables)	
	4 gauge.	3 Feet
	2 gauge.	6 Feet
	1/0	6 to 14 Feet
Fuse – Cube Fuse 150 Amp Assy. Vanner 011268		

Table 2 – DC Cable and Fuse Chart

DC Wiring Installation

The DC input terminals are located on the top of the Mobile Power Generator unit. The negative terminal is located under the top cover (blue), which must be removed for cable installation. The MPG DC input terminals require cables with a 5/16" (max size) ring lug. The positive terminal protective cover is installed with (2) 6-32 Phillips machine screws.



WARNING:

Never make electrical connections to a "live" unit. Make the connections to the Mobile Power Generator first and the batteries last.

Procedure

- Step 1: Make sure that the batteries are disconnected from the vehicle. (See **WARNING** Page 15)
- Step 2: Route, but DO NOT connect, the negative DC (black) input cable from the Mobile Power Generator to the battery. Make sure to protect all cables from where they can touch hard or sharp edges.
- Step 3: Install the in-line fuse on the positive battery terminal, or within 18 inches of the battery or DC wiring bus system.
- Step 4: Route, but DO NOT connect, the positive DC (red) input cable from the Mobile Power Generator to the in-line fuse on the battery or DC wiring bus system. Make sure to protect all cables from where they contact hard or sharp edges.
- Step 5: **Connect the Mobile Power Generator to the battery in THIS order.**
- A) Remove the protective cover on the DC positive terminal (red) and the Mobile Power Generator top cover (blue) to reveal the negative DC terminal.
 - B) Install cables with 5/16" ring lugs to terminals.
 - C) Install washers and nuts and torque terminal nuts to a **MAXIMUM** of 120 in. Pounds (10 ft/lb.).
 - D) Reinstall the protective cover onto positive DC terminal (red) and reinstall the Mobile Power Generator top cover (blue).
 - E) Connect cables to the battery noting proper polarity Black to negative, Red to positive.
- Step 6: Verify all connections are tight and that the cables are secure.

AC Wiring



Preliminary Considerations

1. **Output Voltage:** The AC output voltage of the MPG is 120 VAC, 25 Amps, 60Hz, single phase, 3 wire.
AC wire size selection: To properly size the AC output wiring, use wire that is rated for 30 Amps. Failure to use cable of large enough gauge may result in over temperature conditions, fire or personal injury and damage due to improper cable size is not covered under the warranty.
2. The AC output is located on the backside of the MPG at the end of a 4-foot pigtail. (See Figure 4 page 9)

3. To connect to the AC output plug, you will need a Watertight and weather proof connection, Vanner recommends the following Watertight Safety-Shroud plug and socket:

Hubbell part No. HBL2611SW 125-Volt 30-Amp Twist Lock Male Inline Plug
Hubbell part No. HBL2613SW 125-Volt 30-Amp Twist Lock Female Inline Plug

Using this part combination will allow for a weather resistant connection to the MPG unit.



4. **WARNING: Feeding AC Voltage into the Mobile Power Generator will cause damage to the unit!** The power distribution circuits must be designed to prevent AC power feeding back from an external source (shore power or a generator) into the Mobile Power Generator's AC output. Failure to appropriately safeguard this condition is not covered under warranty.
5. The Ground terminal in the AC output-wiring compartment should be tied to chassis ground for safety to prevent possible shock hazards. Connect a #8 AWG (minimum) wire to this terminal and then to chassis of the vehicle, or the installation's grounding system. Damage due to improper grounding will void the warranty.



WARNING: Failure to connect the chassis bonding lug on the MPG to the chassis of the vehicle, or the installation's grounding system may result in a lethal shock hazard.

AC Wiring Procedure

- Step 1: Connect to the AC output using a #10 AWG or larger copper conductor.
- Step 2: Connect Bonding Lug to ground. Use a #10 AWG or larger copper conductor to connect the ground terminal to the chassis of the vehicle, the installation's grounding system, or to earth ground.
- Step 3: Verify Installation making sure all connections are tight and secure for maximum performance.

Manual Engine Idle RPM Adjustment

In situations where more power might be required for loads that pull a large surge when starting. Raising the engine idle speed may allow the load to start. Look in the vehicle owner's manual to see if there is an idle adjustment available. Usually this feature is called a PTO override and typically uses the cruise control buttons to increase the engine idle speed.

System Start-up and Testing

- Step 1: Completely install the Mobile Power Generator System following the system design considerations and instructions provided previously in this manual.
- Step 2: Verify the System ON/OFF switch located on the vehicle dash is in the OFF position.
- Step 3: Connect the battery to the Mobile Power Generator.
- Step 4: If the Vehicle is equipped with a Battery Disconnect switch turn it to the "ON" position.

- Step 5: Turn ignition to the ON but NOT running position. You should measure approximately 0.5-Volts DC across the 2 field wires on the Alternator, and +12 to +14-Volts DC on the Ignition cable.
- Step 6: Start engine and let it run at normal idle.
- Step 7: Verify battery voltage is rising and there is charging current.
- Step 8: Place the System ON/OFF switch located on the vehicle dash to the ON position.
- Step 9: The AC output light (located on the rocker switch) should be ON, indicating the presence of AC power. If so equipped, the dash mounted AC voltmeter should indicate 120 Volts.
- Step 10: At this point raise the engine speed to 916 RPM, apply AC loads up to 3000 Watts to verify full-power operation.
- Step 11: Turn off engine and battery current should go to zero Amps providing doors are shut, lights off, etc.
- Step 12: System is now ready for operation.

Section 6 – Service and Troubleshooting

Before calling, determine and record the following information:

1. Mobile Power Generator model number and serial number.
2. Alternator model number and pulley diameters of Alternator AND crankshaft.
3. Vehicle year, make, model, and engine.
4. Auto throttle model (if equipped) and engine RPM setting or manual engine idle rpm set.
5. AC load Wattage and description of load.
6. DC charging current and voltage measured across the Mobile Power Generator positive and negative DC cables.

Vanner Customer Service: **1-800-AC POWER**

Mobile Power Generator Blink codes

The LED in the dash mounted switch flashes a number of times during a two-second period to indicate the error status of the MPG. The LED flash codes are defined as follows:

- LED Off – Power Pak 3 AC output is off.
- LED On solid – Power Pak 3 AC output is on.
- LED flashes once in two seconds – High battery cutout
- LED flashes twice in two seconds – Low battery cutout
- LED flashes three times in two seconds – Overload (over current)
- LED flashes four times in two seconds – Over temp

Troubleshooting



Note: Troubleshoot the Mobile Power Generator while the Mobile Power Generator is still in the vehicle. Do not attempt to run the dynamic Mobile Power Generator from a DC power supply or battery charger.

General

The following are the most common questions heard by Vanner service professionals. If your situation does not apply to the following categories, please contact your local Vanner Service Center.

Equipment Required: Volt/Ohm Meter (Fluke 87 or higher recommended), Clamp-on Ampere Meter (Extech 382080 or equal), and a small flat blade screwdriver.

SYMPTOM: Mobile Power Generator is turned on but no output power is available.

SOLUTION:

- A. Verify that the vehicle is running.
- B. Verify 30-Amp breaker is not tripped on the side of the Mobile Power Generator enclosure. (See Figure 5 or Figure 9)
- C. Verify Mobile Power Generator switch is turned on.
- D. Verify Mobile Power Generator is getting 12 Volts on the Ignition wire.
- E. Verify CAN bus cable is connected to both the Mobile Power Generator and the vehicle connectors.

SYMPTOM: Mobile Power Generator won't support the desired load.

SOLUTION:

- A. Verify the idle adjustment is working (See page 21 – Manual Throttle Adjustment) if equipped.
- B. Increase engine/alternator RPM.
- C. Verify total Mobile Power Generator load (AC Watts plus DC Watts) is less than approximately 4100 total Watts. (AC Volts x AC Amps = AC Watts, DC Volts x DC Amps = DC Watts. Total Watts = AC Watts + DC Watts.)
- D. Verify that all 3 AC input cables from alternator are securely connected to Mobile Power Generator and alternator.
- E. Verify that the alternator field cables are securely connected to Mobile Power Generator and alternator.
- F. Verify alternator is working properly. See Section on Alternator Checkout Procedure (page 23).
- G. Make sure Mobile Power Generator is rated for desired load.



WARNING: DO NOT OPEN THE Mobile Power Generator. Potentially fatal electric shock and/or serious Mobile Power Generator damage may result even after the Mobile Power Generator is removed from the vehicle. Only a Vanner Qualified Technician may perform service inside the Mobile Power Generator. Failure to comply will void the warranty.

Alternator Checkout Procedure

The following tests will verify if the alternator is working properly and should uncover most alternator problems. Readings should be taken at the alternator, while the engine is running.



WARNING: Use extreme care around the alternator while engine is running.

The 3 Phase Input Power Harness is made up of the three heavy wires running from the alternator AC taps and connected through three water tight connectors entering the Mobile Power Generator.

1. Verify the three AC taps are working and are balanced by taking the following readings with the Mobile Power Generator ON while running a 1000-Watt AC load with 20 Amps of DC load.
 - a. Using the multimeter AC scale, note the three voltages between the three AC taps, 1 to 2, 2 to 3, and 1 to 3.
 - Proper readings will be between 35 and 45 Volts AC.
 - All three readings should be equal or within 1.0 Volt of each other.
 - b. Using the clamp-on Amp meter read the AC current in each of the three AC tap wires.
 - The readings should be equal or within 2 Amps of each other.
2. To check the alternator field control wire measure the DC voltage between the two field wires.



Note: The Field Voltage measurement **MUST** be made **ACROSS** the two terminals.

Correct readings are:

Mobile Power Generator OFF _____ 2 to 24 VDC

Mobile Power Generator ON under load _____ 4 to 24 VDC

Under surge conditions, the field control voltage can go as high as 30 Volts DC (for 3 seconds).

The field voltage should decrease as RPM increases while running a constant load. The DC current through the field control wire should measure 1 to 6 DC Amps whenever the engine is running.

Alternator Pulley Selection

For optimal performance the alternator pulley needs to be the correct diameter. A crankshaft pulley to alternator pulley ratio of 2.62:1 is recommended. For example, if the crankshaft pulley diameter is 8.25 inches then the alternator pulley diameter should be 3.15 inches ($8.25 / 2.62 = 3.15$).

By having the correct size alternator pulley the system will be able to provide the full 3000-Watts of AC, and 1000-Watts of DC power at 916 RPM (engine RPM).

Section 7: Parts and Cabling

Parts:

Vanner Part Number	Item Description
012168	Pad Mount Alternator
011812	J-180 Mount Alternator
012718	T-Mount Alternator
011889	Alternator Belt
011888	Alternator Pulley (2.4" Diameter)
D013028	3-Phase Alternator and Field cable Harness
MPG-SMSW	Smart Switch and CAN/ Ignition Cable Harness
D012892	Cube Fuse Assembly
MPG-CMK	Kit - MPG Shelf Mount Bracket
MPG-RMB	Kit - MPG Frame Rail Mounted 15" Box
D012890	Alternator Phase Mating Connector (10 pack)
D012891	Alternator Field Mating Connector (10 pack)
D911793	Mobile Power Generator (MPG) Manual

Table 3 - Vanner MPG Part Numbers

Cabling Recommendations:

Cable Purpose	Vanner Recommended Cable Length	Vanner Recommended Cable Gage	MPG Required Lug Size	Vanner Connector Required
Alternator Phase Cable	20 Feet ea. (no more, no less)	4 AWG	5/16" Ring Lug	D012890
Field Wire	20 Feet	14 AWG	8 Stud Ring	D012891
Battery Cable	As short as possible but NO Longer than 14 feet	(See pg. 20 Table 2)	5/16" Ring Lug	N/A

Table 4 - Cable Recommendations

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Specifications Subject to Change
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