

INSTALLATION

Manual

NP Series and Q Series

AIR-COOLED RECREATIONAL VEHICLE GENERATORS

For Models Powered by Gasoline and LP GAS

GENERAC[®]
C O R P O R A T I O N

GENERAL SAFETY RULES



THE MANUFACTURER SUGGESTS THAT THESE "RULES" FOR SAFE OPERATION BE COPIED AND POSTED IN POTENTIAL HAZARD AREAS OF THE RECREATIONAL VEHICLE. SAFETY SHOULD BE STRESSED TO ALL OPERATORS AND POTENTIAL OPERATORS OF THIS EQUIPMENT.



WARNING:



The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

NOTICE TO INSTALLER

The Installation Instructions have been published by Generac Corporation to aid in the installation of the products described in this manual. Generac assumes that installation personnel are familiar with the procedures for installing such products, or similar products that Generac manufactures. Generac also assumes that personnel have been trained in the recommended installation procedures for these products and that such training includes (a) use of common hand tools, (b) use of special Generac tools, and (c) use of any tools and/or equipment from other suppliers.

We could not possibly know of and advise the recreational vehicle trade of all conceivable methods, procedures or techniques by which to perform an installation. We could not know of the possible hazards that might result from each installation method, procedure or technique. We have not undertaken any such wide evaluation. Therefore, people who use a method, procedure or technique that Generac does not specifically recommend must first completely satisfy themselves that their safety, the safety of the vehicle's occupants and the product's safety is not endangered by the method, procedure or technique selected.

Information, illustrations, specifications, etc., contained in this Installation Manual are based on the latest information available at the time of publication. Every effort has been expended to be sure that such data is both accurate and current. However, the manufacturer reserves the right to change, alter or otherwise improve his product at any time without prior notice.

SAFETY RULES

 Gasoline is extremely **FLAMMABLE** and its vapors are **EXPLOSIVE**. Do not permit smoking, open flame, sparks or any source of heat in the vicinity while handling gasoline. Comply with all regulations governing the storage and handling of gasoline.

- Fuel lines must be properly installed, properly fastened and free of leaks. There must be no possibility of gasoline vapors entering vehicle interior.
- You are required to install an approved, flexible, non-conductive fuel line between the generator fuel connection point and rigid fuel lines.

 If the generator can be equipped with a liquid propane (LP) gas fuel system, install the unit so it complies with all codes, standards and regulations pertaining to such systems. LP gas is highly explosive. The gas tends to settle in low areas where even the slightest spark can ignite it and cause an explosion. Do not allow gas vapors to enter the vehicle.

- Engine exhaust gases contain **DEADLY** carbon monoxide gas. This dangerous gas, if breathed in sufficient concentrations, can cause unconsciousness or even death. Install the exhaust system in strict compliance with applicable codes, standards and regulations. There must be no possibility for exhaust gases entering the vehicle interior and endangering people or animals.



The generator set produces dangerously high electrical voltage. Contact with bare wires, bare terminals, etc., will result in extremely hazardous and possibly lethal electrical shock.

- All applicable electrical codes, standards and regulations must be strictly complied with in the installation and use of this equipment.
- The generator must be properly grounded (bonded) to the vehicle chassis or frame.



If the vehicle electrical circuits can be powered by any other source of electricity (such as a "dockside" power receptacle), there must be no possibility of connecting the different power sources to the vehicle circuits at the same time. The "dockside" (utility) power source must be positively isolated from the vehicle circuits whenever the generator is operating. Failure to isolate the vehicle circuits from the dockside power supply when the generator is running may result in damage to the generator or serious injury or death to dockside (utility) power workers due to backfeed of electrical energy.

- Never work on the equipment while standing in water, while barefoot, or while hands or feet are wet. Dangerous electrical shock will result.
- Jewelry conducts electricity, which can cause dangerous electrical shock. Remove all jewelry (such as rings, watches, or bracelets) before working on this equipment.
- The generator requires an adequate flow of air for cooling and ventilation. Without sufficient cooling air flow, the engine-generator quickly overheats, which causes serious damage to the generator, a fire or an explosion. Generator air inlet and outlet openings must be provided in strict compliance with the manufacturer's recommendations.

- Never work on this equipment while physically or mentally fatigued. Stay alert at all times.



Storage batteries give off **EXPLOSIVE** hydrogen gas while charging. The battery used for cranking and starting this generator should be installed in its own vented compartment. Provide adequate ventilation for the battery, to prevent explosive hydrogen gas from accumulating.

- Never insert any tool or other object through openings in the generator interior, even if the unit is not running. You might seriously injure yourself or damage the equipment.
- Staying alert and using "common sense" are major measures for preventing accidents.

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GENERAL INFORMATION

PURPOSE AND SCOPE OF MANUAL

These Installation Instructions have been prepared especially for the purpose of familiarizing installers and owners of the applicable equipment with the product's installation requirements. Give serious consideration to all information and instructions in the Manual, both for safety and for continued reliable operation of the equipment.

Because of the different recreational vehicle models and the variations between the models, it would be extremely difficult, if not impractical, to provide detailed instructions on every installation possibility. For that reason, instructions and illustrations in this manual are general in nature. Illustrations are not intended to serve as detailed installation blueprints.

The installation should comply strictly with all applicable codes, standards and regulations pertaining to the installation and use of this product. If any portion of this manual appears to be in conflict with such codes, standards or regulations, the applicable codes, standards or regulations must take precedence over the manual.

SAFETY

Before handling, installing, operating or servicing this equipment, be sure to read carefully the "Notice to Installer" and "Safety Rules" at front of this manual. Comply with all SAFETY RULES to prevent death, personal injury or damage to equipment and/or property. Stress safety to all installers, operators and service technicians who work on this equipment.

STANDARDS BOOKLETS

Installation, use and servicing of this equipment should comply strictly with published standards, as well as the manufacturer's recommendations. The following standards booklets (latest revision) are available from the sources indicated:

1. NFPA Standard 501C, "Standard for Recreational Vehicles", available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
2. NFPA 70, "NFPA Handbook of the National Electric Code", obtained from same address as Item 1.
3. ANSI C1-1975 and ANSI 119.2-1975, available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
4. ANSI A119.2/NFPA 501C, available from the Recreational Vehicle Association, 1896 Preston White Drive, Reston, VA 22090.
5. California Administrative Code, Title 25, available from the State of California, Documents Section, P.O. Box 1015, North Highlands, CA 95660.
6. CSA Electrical Bulletin 946, available from the Canadian Standards Association, Housing and Construction Materials Section, 178 Rexdale Boulevard, Rexdale, Ontario, Canada, M9W 1R3.

EQUIPMENT DESCRIPTION

Instructions and information in this section pertain to Generac "NP" and "Q" air-cooled generators, more specifically as listed below. These generators are designed specifically for installing in recreational vehicles. They operate 120 volts, 1-phase, 60 Hertz, AC electrical loads.

NOTE: All units, except the Q40G, may be reconnected for a dual voltage output of 120/240 volts AC.

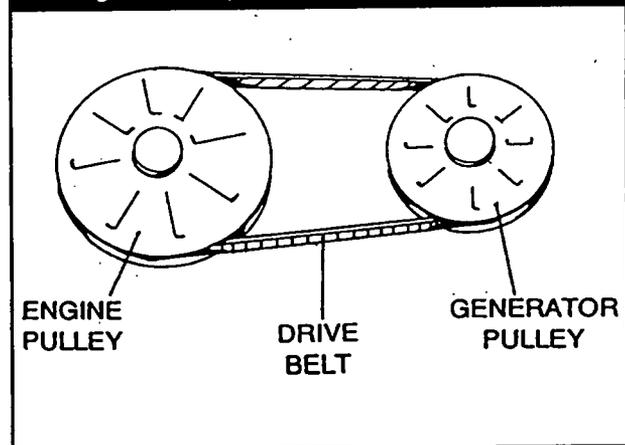
Series	Power (wattage)	Max. Rated Current at 120V
Q-40G	4200	35.0
Q-55G/LP	5500	45.8
Q-70G/LP	7000	58.3
NP-50G	5000	41.6
NP-50LP	4500	37.5
NP-66G/LP	6600	55

ENGINE GENERATOR OPERATING SPEED

The generator's revolving field (rotor) is driven by a 4-cycle engine through a pulley and drive train arrangement (Figure 1). The generator supplies 120/240 volts AC at 60 Hertz when the rotor is operating at 3600 rpm. The drive train arrangement allows the engine to operate at a lower speed than the rotor. Engine speed is held nearly constant by a mechanical, fixed speed governor as follows:

Series Q-40G	2570 rpm
Series Q-55G/LP	2570 rpm
Series NP-50G/LP	2570 rpm
Series NP-66G/LP	2700 rpm
Series Q-70G/LP	2570 rpm

Figure 1 — Typical Pulley and Drive Train



RECONNECTION FOR DUAL VOLTAGE

You can reconnect the generators to supply a dual voltage AC output, if desired. That is, units may be reconnected to operate 120 and/or 240 volts, 1-phase, 60 Hertz, AC loads. This is done by connecting the two stator AC power windings in series as it is shown in Figure 2.

IMPORTANT: UNITS RECONNECTED FOR 120/240 VOLTS DUAL VOLTAGE OUTPUT WILL NOT BE LISTED PER RVIA.

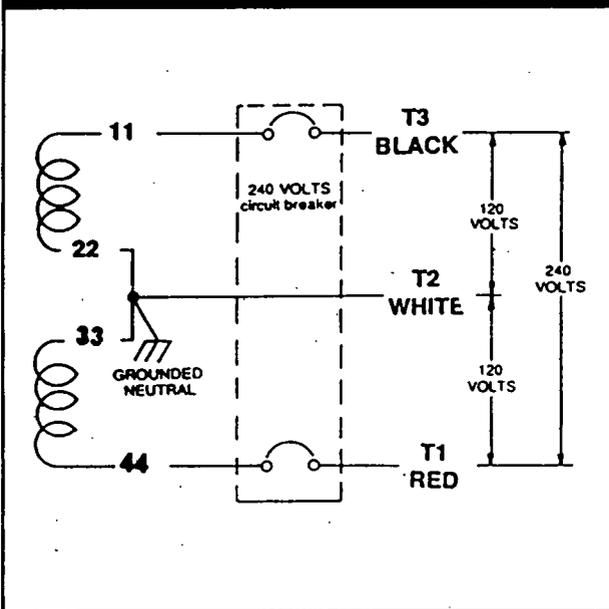
NOTE: The Q-40G can **NOT** be reconnected for a dual voltage output of 120/240 volts AC.

When reconnecting for dual voltage output, the installer should replace the main circuit breakers (CB1 and CB2) with a single adequately rated circuit breaker. Rated maximum continuous load currents are listed below:

- NP-50LP — 18.8 AC amperes
- NP-50G — 20.8 AC amperes
- Q-55G/LP — 22.9 AC amperes
- NP-66G/LP — 27.5 AC amperes
- Q-70G/LP — 29.1 AC amperes

NOTE: This option is unavailable on the Q40 model.

Figure 2 — Reconnection for Dual Voltage Output



SPECIFICATIONS

GENERATOR SPECIFICATIONS

SERIES	Q-40G	NP-50G	NP-50LP	Q-55G/LP	NP-66G/LP	Q-70G/LP
Rotor RPM	3600	3600	3600	3600	3600	3600
Rotor Poles	2	2	2	2	2	2
Engine RPM	2570	2570	2570	2570	2700	2570
Wattage*	4200	5000	4500	5500	6600	7000
Voltage*	120	120	120	120	120	120
Rated Amps*	35	41.6∇	37.5*	45.8‡	55†	58.3Δ
Phase	1	1	1	1	1	1
Frequency	60	60	60	60 Hertz	60 Hertz	60 Hertz
Weight	215 lbs.	207 lbs.	207 lbs.	215 lbs.	213 lbs.	222 lbs.
Length	25 inches					
Width	18.5 inches					
Height	16.68 inches					

* All units, except Q-40G, are reconnectable to 120/240 volts, dual voltage output. When reconnected for dual voltage, units are not listed per RVIA.

∇ Rated maximum continuous current at 240 volts is 20.8 amps.

‡ Rated maximum continuous current at 240 volts is 22.9 amps.

† Rated maximum continuous current at 240 volts is 27.5 amps.

Δ Rated maximum continuous current at 240 volts is 29.1 amps.

* Rated maximum continuous current at 240 volts is 18.8 amps.

ENGINE SPECIFICATIONS

Type of Engine

NP-50G/LP1 Cylinder, 4 Cycle OHVI

NP-66G/LP, Q-70G/LP

Q-40G, Q-55G/LPV-Twin, 4 Cycle OHVI

Number of Cylinders

Q-40G, Q-55G/LP, NP-66G/LP, Q-70G/LP2

NP-50G/LP1

Valve ConfigurationOverhead Valves

Cooling MethodAir-Cooled

Rated Horsepower

NP-50G/LP13 at 3600 RPM

Q-40G16 at 3600 RPM

Q-55G/LP16 at 3600 RPM

NP-66G/LP16 at 3600 RPM

Q-70G/LP19 at 3600 RPM

Displacement

NP-50G/LP363cc

Q-40G480cc

Q-55G/LP480cc

NP-66G/LP480cc

Q-70G/LP570cc

Compression Ratio8.6 to 1

Cylinder BlockAluminum with cast iron sleeve

Type of GovernorMechanical, fixed speed

Air CleanerPaper element with foam pre-cleaner

Starter12 volts DC electric

IgnitionSolid state with flywheel magneto

Recommended Spark PlugsChampion RC12YC

Spark Plug Gap0.030 inch (0.8mm)

Oil FilterGenerac Part No. 70185

Crankcase Oil Capacity1.5 U.S. quarts

Battery Voltage12 volts DC

Recommended Battery§

Amp-Hour Rating70 amp-hour

Cold Cranking Amperes360

Cranking Current100 DC amperes

Battery GroundNegative (-)

§ If ambient temperature is usually below 32°F (0°C), use a battery rated at 95 amp-hours and 450 cold-cranking amperes.

RECOMMENDED FUEL

For the gasoline-powered units: Use clean, fresh UNLEADED gasoline with a minimum octane rating of 87. Leaded REGULAR grade gasoline is an acceptable substitute.

■ FOR GASEOUS FUEL-POWERED UNITS

Use clean, fresh commercial propane gas. The optional LP gas system was designed for a VAPOR WITHDRAWAL type system.

FUEL CONSUMPTION

Gasoline fuel system in U.S. gallons per hour:

% OF WATTS	SERIES				
	NP-50G	Q-40G	Q-55G	NP-66G	Q-70G
25%	0.16	0.16	0.21	0.25	0.27
50%	0.32	0.32	0.42	0.50	0.54
75%	0.46	0.47	0.62	0.74	0.81
100%	0.63	0.63	0.83	0.99	1.08

RECOMMENDED ENGINE OIL

Use oil classified "For Service SF" and having an SAE viscosity rating of 10W-30. Engine crankcase oil capacity is 1.5 U.S. quarts (1.6 liters).

LOCATION AND SUPPORT

GENERATOR LOCATION

The most desirable location for the generator set is between the vehicle's main frame members. However, this is seldom possible. Most units must be installed on the side of the vehicle and are difficult to reinforce.

Many recreational vehicles have been factory equipped with an area for the generator set. Some vehicles may even have a generator compartment, provided by the vehicle manufacturer.

Plan the generator location based on the following:

- The generator set must be installed on a framework that is part of the recreational vehicle, as outlined in the paragraph entitled "Generator Support."
- The location must provide an access opening that is large enough to permit generator removal (unless the generator is to be removed from underneath the supporting framework).
- The location must provide easy access to frequently serviced components, such as filters, oil drains, spark plugs and other common maintenance parts.
- The location must provide sufficient room to allow minimum clearance of at least 1 inch between all sides and 1-1/2 inches on top of the generator. If sound insulation is to be used on compartment walls and ceiling, the minimum recommended applies to the space between the generator and such insulation.
- The location must provide adequate cooling and ventilating air flow for the generator without a great deal of work and expense.

GENERATOR SUPPORT

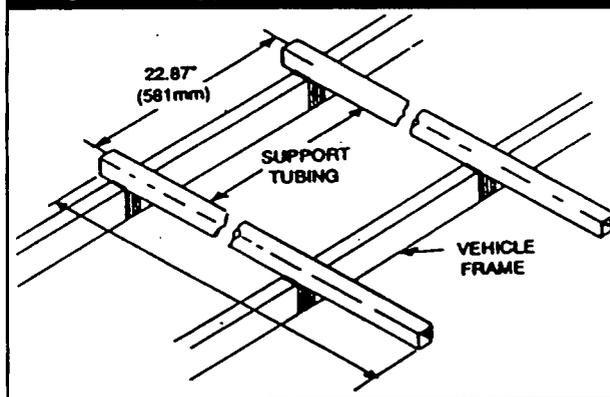
The generator must be securely attached to a metal framework that has been made part of the vehicle frame structure by bolting or welding. The metal framework on which the generator will rest and which will restrain the generator set should consist of at least two horizontal beams. These beams should consist of (a) 1-1/2 inch square, 11 gauge steel tubing OR (b) 1-1/2 inch, 11 gauge angle iron. A typical supporting frame with horizontal support tubing, is shown in Figure 3.

The generator can be installed so that it sits on top of the horizontal support tubing, if the vehicle design permits. Another method is to suspend the generator below the horizontal support tubing by means of suitable, structurally sound metal framework. The following general rules apply:

- Vehicle construction **MUST** be capable of supporting the weight of the generator.
- Whether the generator is mounted above the horizontal support tubing or suspended below the tubing, the supporting frame used must be structurally sound.

- If the generator cannot be bolted directly to the supporting frame or support tubing, consider using additional tubing, angle brackets or other supports to give the supporting frame sufficient strength.

Figure 3 — Typical Horizontal Support Frame

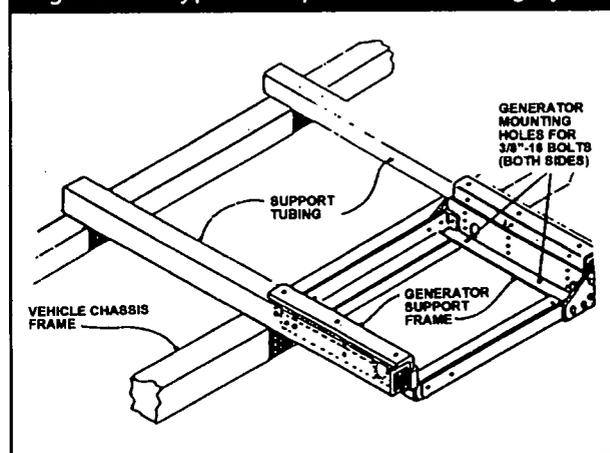


SUSPENDED MOUNTING

If you are going to suspend the generator below the horizontal support tubing, the suspension method you use with the vehicle frame members must have the following: (a) be able to support the weight of the generator; and (b) provide sufficient restraint for the generator. One typical suspended mounting system is shown in Figure 4. The location of a suspended mounting system must be carefully planned, keeping the following general rules in mind:

- Protect the generator against road splash and debris. Baffles or splash guards may be required to protect certain areas of the generator. To make sure the generator is adequately protected, road test the installation through mud, water and slush.

Figure 4 — Typical Suspended Mounting System

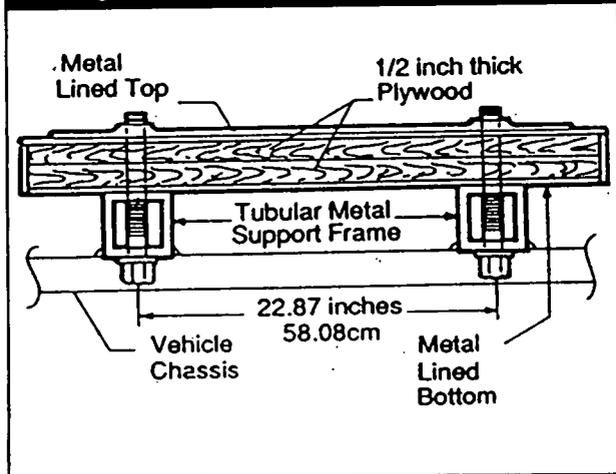


- The installer must make certain the selected location will permit adequate cooling and ventilating air flow to be supplied.

GENERATOR RESTRAINT

Use four 3/8"-16 hardened steel bolts (Grade 5) to fasten the generator to the supporting frame or the support tubing. These bolts must pass through (a) the generator mounting base, (b) the compartment floor, if a compartment is used, and (c) the supporting framework (Figure 5). All bolts must be long enough so that when tight, at least 3 threads are visible past the retaining lock nuts. Refer to "COMPARTMENT" section for location of generator mounting holes.

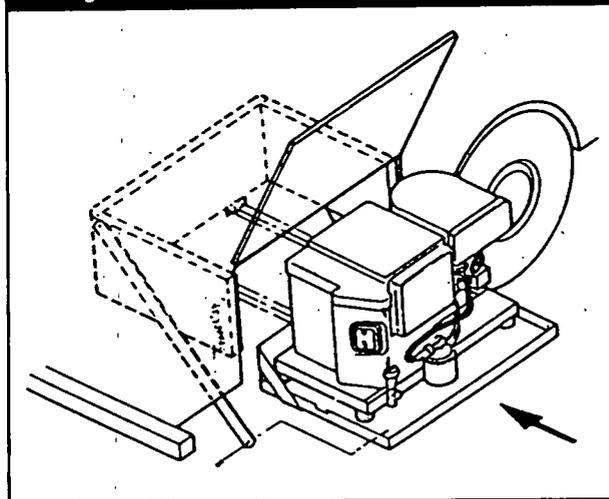
Figure 5 — Generator Restraint (typical)



SWING MOUNT GENERATOR TRAY

If you use a suspended mounting system, the installer may wish to consider using the Generac Model 9164 Swing Mount Generator Tray. The Model 9164 tray allows you to swing the generator downward and away from the vehicle frame. This makes it simple to remove the unit and have easy access to parts (Figure 6).

Figure 6 — Generator on Model 9164 Tray



The tray on which the generator rests is hinged, permitting it to swing downward after two side support rails and a center support rail are unbolted.

Instructions for tray installation are included with the tray mounting kit.

GENERATOR COMPARTMENTS

The generator set may or may not be installed inside a compartment that is constructed specifically for housing a generator. This section applies to generator compartments when they are installed. The following general rules apply to compartments:

- The generator compartment should be either constructed of, or lined with, 26 gauge galvanized steel.

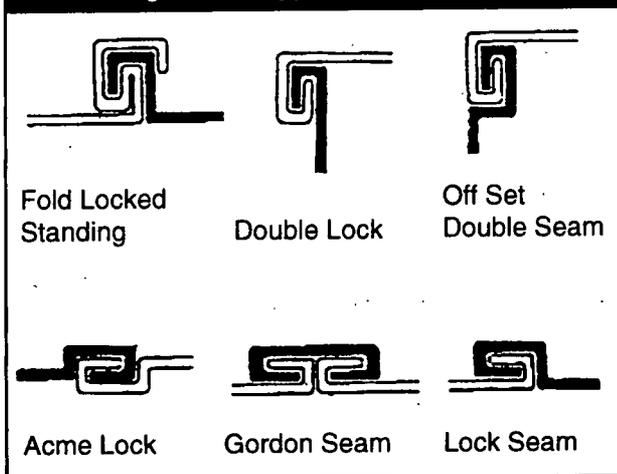
IMPORTANT: ALUMINUM IS NOT AN ACCEPTABLE ALTERNATIVE TO GALVANIZED STEEL, DUE TO ALUMINUM'S LOW MELTING POINT.

- If the compartment is lined with galvanized steel, it may be constructed of any material. Generac recommends that the compartment be constructed of 1/2-inch thick plywood, with the floor made of a double thickness of plywood for added strength.
- All seams, splices and joints of the compartment walls (unless vapor tight by design) should be caulked.

IMPORTANT: CAULKING MUST BE DONE SO THAT THE CAULKING MATERIAL WILL STAY IN PLACE PERMANENTLY. PRESSING SUCH MATERIALS AS PUTTY TAPE ONTO JOINTS AND SEAMS WILL NOT MEET THAT REQUIREMENT. A HIGH QUALITY SILICONE RUBBER SEALANT IS RECOMMENDED.

- Holes and openings through the compartment walls for passage of electrical conduit, conductors, etc, into vehicle living area must be sealed vapor-tight with silicone rubber base sealant.
- If you use flexible metal conduit, seal the conduit at the end where it terminates inside the junction box. Flexible metal conduit is NOT vapor tight along its entire length.
- Seams and joints of the galvanized steel (whether used as a liner or the compartment itself) must be lapped and mechanically secured. Such seams may be manufactured, welded, bolted, riveted, or screwed. Manufactured lock seams are shown in Figure 7.

Figure 7 — Types of Lock Seams

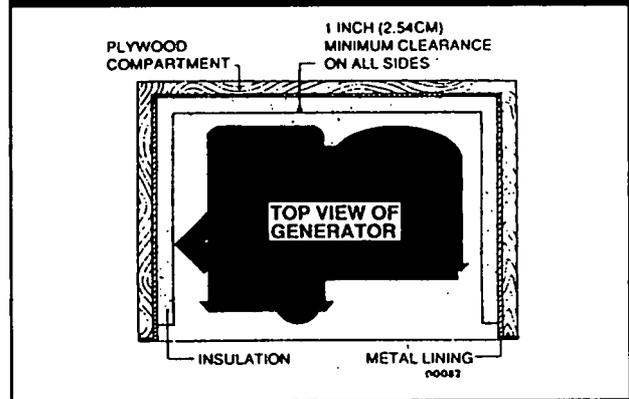


COMPARTMENT SIZE

Plan the compartment size carefully. Provide a minimum of at least 1 inch of clearance between the generator and compartment walls and 1-1/2 inch of clearance between the generator and the ceiling AFTER you have lined the compartment with metal, and AFTER you have installed sound insulation (Figure 8).

NOTE: Refer to the "Dimensions and Features" drawing in the back of this manual.

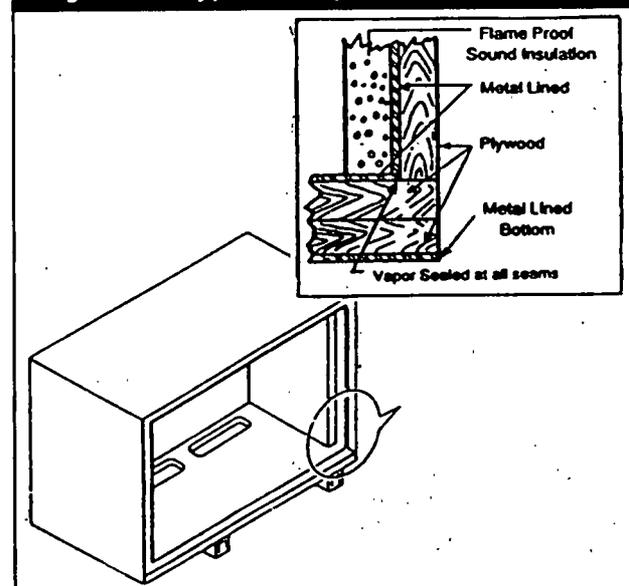
Figure 8 — Provide Clearance Around Generator



COMPARTMENT CONSTRUCTION

- The generator compartment should be constructed of 1/2 inch thick plywood. Make the compartment floor a double thickness of 1/2 inch plywood with the grain of the wood at cross section for added strength (Figure 9).

Figure 9 — Typical Compartment Construction



- Line the entire compartment interior with 26 gauge galvanized steel as described above.

- Line the exterior (underside) of the compartment floor with 26 gauge galvanized steel.
- Vapor seal all compartment seams and joints, to prevent poisonous, flammable or explosive vapors from entering the vehicle interior.

NOTE: Silicone rubber base sealant is an acceptable caulking material. Pressing putty tape onto compartment joints and seams is NOT acceptable.

- After the compartment has been metal lined and vapor sealed, line the compartment interior walls and ceiling with an approved, non-flammable sound insulating material. See "Sound Insulating Materials."



DANGER: DO NOT INSTALL SOUND INSULATION OR ANY ABSORBENT MATERIAL ON THE COMPARTMENT FLOOR INTERIOR. SUCH MATERIALS WILL BECOME SOAKED WITH COMBUSTIBLE OR EXPLOSIVE VAPORS AND LIQUIDS AND WILL BECOME A FIRE HAZARD.

- Openings in compartment walls for passage of electrical conduit, conductors, hoses, cables, etc., must be made vapor tight with suitable caulking material.
- Flexible conduit must be sealed internally at the end where it terminates inside a compartment's electrical junction box.

NOTE: The preceding is required because flexible conduit, due to its unique construction, is not vapor-tight along its entire length.



DANGER: DO NOT INSTALL ANY FLAMMABLE MATERIAL DIRECTLY ABOVE OR AROUND THE COMPARTMENT. HEAT, TRANSFERRED THROUGH THE COMPARTMENT STRUCTURE, MAY BE SUFFICIENT TO IGNITE, CHAR OR DISCOLOR SEAT CUSHIONS, FIBERBOARD AND OTHER FLAMMABLE MATERIALS. YOU MAY NEED TO USE APPROVED NON-FLAMMABLE INSULATING MATERIALS IN HIGH TEMPERATURE AREAS.

SOUND INSULATING MATERIALS

Once installers have determined that compartments are properly constructed and metal lined, they can add acoustical material. This may include additional sealant or insulating material, to reflect noise away from the vehicle interior.

Sound insulating materials should be of a non-flammable type. One excellent insulating material is a 1 inch thick fiberglass having a 2-pound density. When fiberglass is used, its coated side should face toward the compartment interior.

Using a combination of sound insulating materials can often reduce noise more effectively than a single material. For example, a sheet of lead or visco-elastic material, along with a layer of other acoustical material, is more effective than when a single material is used.

COMPARTMENT FLOOR CUTOUTS

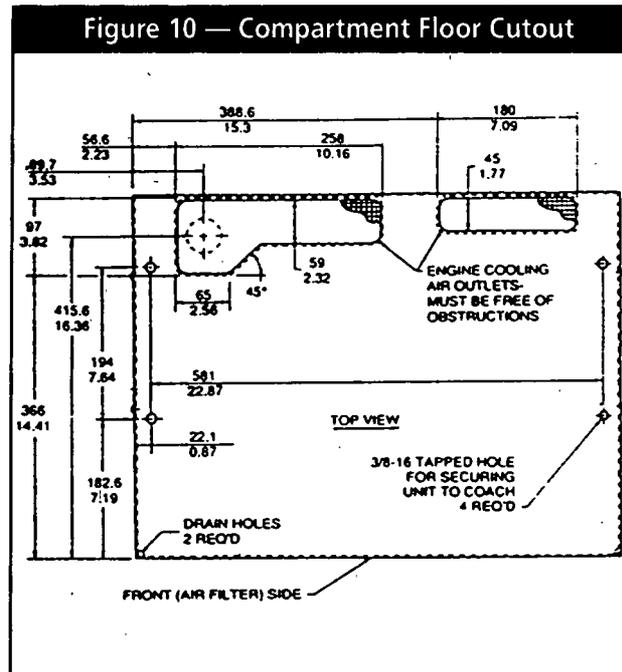
You must provide openings in the generator compartment for the following items (Figure 10):

- Engine exhaust and cooling air outlets
- Generator cooling air inlet
- Four holes for passage of generator mounting bolts. See "Generator Restraint" on Page 6.



DANGER: FUEL LINES AND EXHAUST PIPING MUST NOT PENETRATE INTO VEHICLE LIVING AREA.

Figure 10 — Compartment Floor Cutout



ACOUSTICS

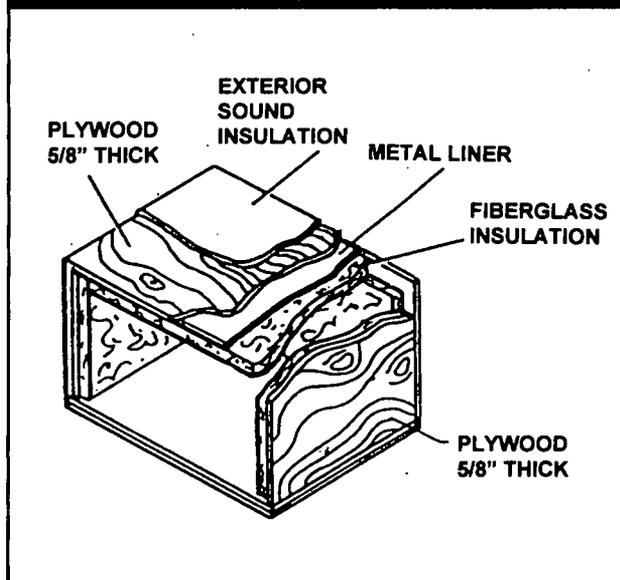
If excessive noise levels should become a problem, the installer may wish to consider the following:

- Using special sound insulating materials.
- Construction of a special noise abatement compartment.

IMPORTANT: ANY METHOD USED TO REDUCE NOISE MUST NOT ADVERSELY AFFECT THE FLOW OF COOLING AND VENTILATING AIR INTO OR OUT OF THE COMPARTMENT.

In addition to the effective use of sound insulating materials, construction of a special noise abatement compartment might be considered to reduce noise levels. Such a compartment might be constructed as follows (Figure 11):

Figure 11 — Typical Noise Abatement Compartment



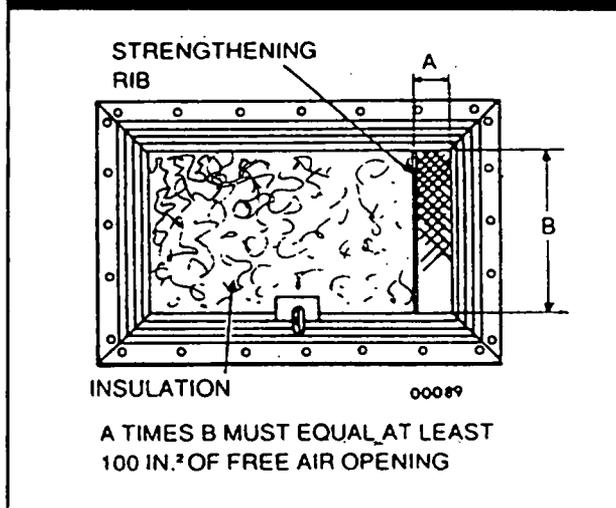
- Use 5/8-inch thick or 3/4-inch thick plywood in the compartment.
- Construct the compartment floor of a double thickness of 5/8-inch or 3/4-inch plywood.
- Line the compartment interior walls and floor, as well as the underside of the floor, with 26-gauge galvanized steel.
- Vapor seal all compartment seams and joints.
- Over the galvanized steel lining, install a selected combination of acoustical materials as mentioned in "Sound Insulating Materials."



DANGER: DO NOT INSTALL ANY INSULATION OR OTHER ABSORBENT MATERIALS ON THE INTERIOR OR UNDERSIDE OF THE COMPARTMENT FLOOR.

- Seal all compartment door edges to prevent noise leakage around the door perimeter.
- Line the compartment door interior (except for air openings) with suitable, fire proof sound insulation (such as 1-inch thick fiberglass with a 2-pound density) See Figure 12.

Figure 12 — Typical Compartment Door Construction



COOLING AND VENTILATING AIR

It is absolutely essential that an adequate flow of air for cooling, ventilating and engine combustion be supplied to the generator set. Without sufficient air flow, the engine-generator quickly overheats. Such overheating can cause serious operating difficulties and may also cause fire and personal injury. The installer must make sure that sufficient air is available to the generator for cooling, ventilating and combustion. The installer must also provide for a path for exhausting the cooling air to the exterior of a compartment, if so equipped.

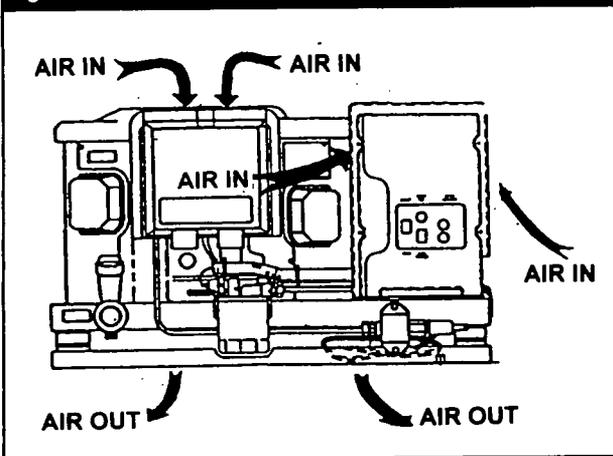


DANGER: NEVER USE DISCHARGED COOLING AIR FOR HEATING OR PERMIT SUCH AIR TO ENTER THE VEHICLE INTERIOR. THIS AIR CONTAINS DEADLY CARBON MONOXIDE GAS AND OTHER POISONOUS, FLAMMABLE OR EXPLOSIVE GASES.

GENERATOR AIR FLOW

Engine operation drives cooling fans for the 2-stage cooling air system. A pressure fan draws cooling air into the top of generator and into the side of the control panel (Figure 13). This air flow cools the engine-generator and electronic components. The second part of cooling system, a suction fan, draws air that is heated from a hot engine into a collector pan at the base of the unit. This heated air (although cooler than exhaust muffler) is directed across the muffler to cool it. The heated air flow is then deflected out the bottom toward the ground.

Figure 13 — Air Flow Through Engine-Generator



COOLING AIR INLET OPENING

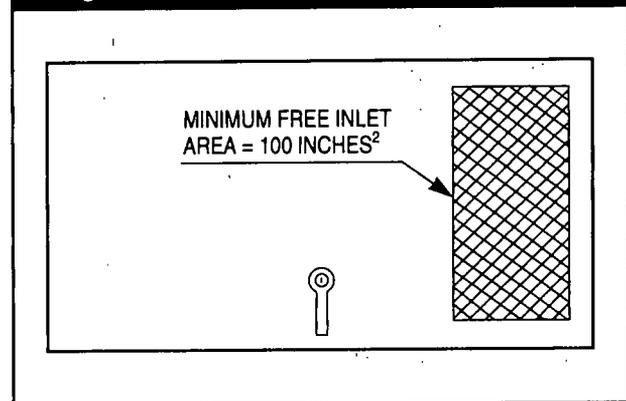
Minimum size of the air inlet opening, whether the generator is housed in a conventional compartment or not, is at least 100 square inches. This rule applies whether inlet air is brought in through an opening in the compartment door (Figure 14) or other means.

NOTE: Screening, louvers, or expanded metal that cover air openings restrict air flow that you must compensate for by making the actual air opening proportionately larger. See "Compensating for Restrictions."

For conventional compartment mounted units, the air inlet is generally provided in the compartment door.

IMPORTANT: IF YOU PLAN TO INSTALL THE GENERATOR IN A COMPARTMENT, BE SURE TO LEAVE AT LEAST ONE AND A HALF (1-1/2") INCHES OF CLEARANCE BETWEEN THE GENERATOR AND COMPARTMENT CEILING. INCLUDE 26 GAUGE GALVANIZED STEEL LINING AND SOUND INSULATION WHEN YOU MEASURE FOR THIS 1-1/2 INCH CLEARANCE. ALLOW 1" ON ALL SIDE WALLS.

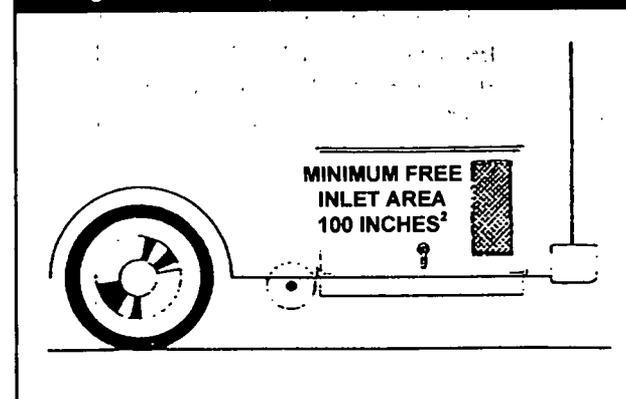
Figure 14 — Air Inlet in Compartment Door



When the unit is installed on a suspended mounting system, one of several different methods of supplying air flow may be used as follows:

- Provide a door in the vehicle skirt having an air inlet opening (Figure 15).

Figure 15 — Suspended Mount: Inlet Door



- Using ductwork (Figure 16 on Page 11). The installer must be sure air is available to the top of the generator since air inlets are located at the top.
- By providing an opening in the vehicle skirt and space above the generator for cooling air flow (Figure 17 on Page 11). Recommended clearance above the top of the generator is at least 1-1/2 inches.

Figure 16 — Air Inlet Using Ductwork

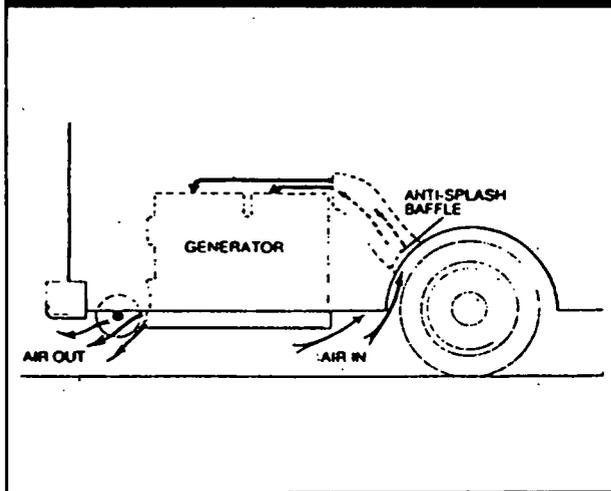
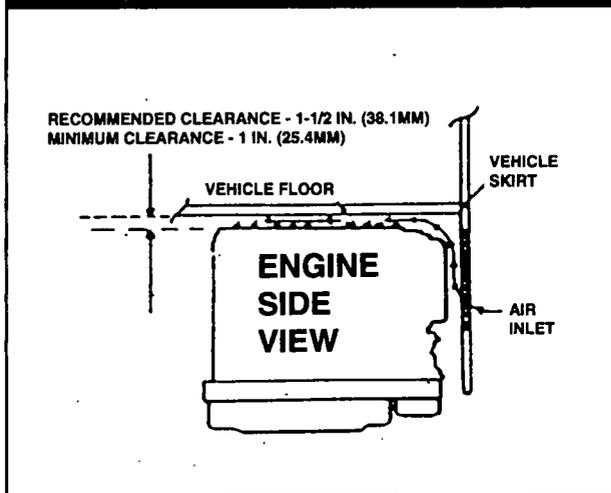


Figure 17 — Air Inlet in Vehicle Skirt



COMPENSATING FOR RESTRICTIONS

Such materials as screening, louvers, or expanded metal can restrict the free flow of air. Compensate for this restriction by making the actual air opening proportionately larger.

Some materials may offer only a 60 percent "free air inlet area." Other more efficient materials may provide up to a 90 percent free air inlet area. The percentage of free air inlet opening is usually available from the material supplier or manufacturer.

TO DETERMINE THE ACTUAL AIR INLET OPENING SIZE REQUIRED, DIVIDE 100 SQUARE INCHES BY THE PERCENTAGE OF FREE AIR INLET AREA FOR THE MATERIAL YOU WILL USE.

For example: If you plan to use screening with an 80% free air inlet area, divide 100 by 0.8, which results in 125 square inches. Minimum actual size of air inlet opening in this case is 125 square inches. An opening that measures 8 inches wide by 16 inches long provides the required air flow (8 x 16 = 128 square inches).

TESTING THE INSTALLATION

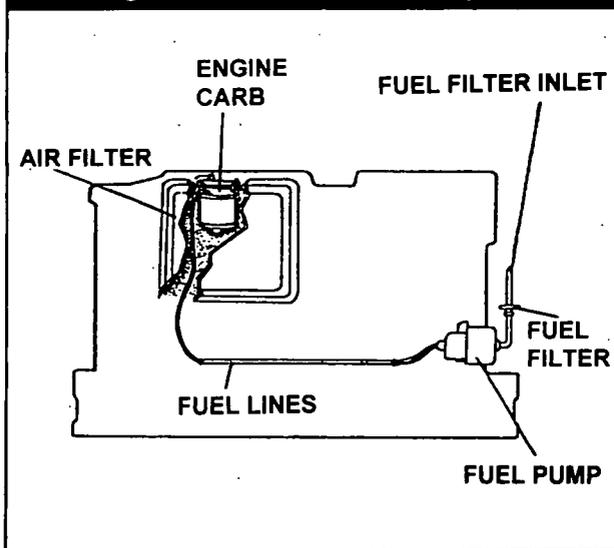
Generac recommends testing the installation to be sure adequate cooling air flow is available to the unit before placing the unit into service. If the unit shows signs of overheating, you will need to enlarge the air openings. Never place a unit into service until absolutely certain that cooling and ventilation is adequate.

IMPORTANT: YOU MUST TEST THE INSTALLATION ESPECIALLY IF YOU BRING IN AIR FROM BELOW THE GENERATOR SET.

GASOLINE FUEL SYSTEM

Installing a gasoline fuel system (Figure 18) for recreational vehicle generator sets must comply with applicable codes, standards and regulations. The entire fuel system must be completely free of leaks. There must be no possibility of gasoline vapors entering the vehicle interior.

Figure 18 — Generator Fuel System



 **DANGER: GASOLINE IS HIGHLY FLAMMABLE AND ITS VAPORS ARE EXPLOSIVE. COMPLY WITH ALL CODES, STANDARDS AND REGULATIONS PERTAINING TO GASOLINE FUEL SYSTEMS USED IN INDUSTRIAL MOBILE GENERATORS. PROPERLY INSTALL AND MAINTAIN THE FUEL SYSTEM AND KEEP IT ENTIRELY FREE OF LEAKS. GASOLINE VAPORS MUST NOT ENTER THE VEHICLE INTERIOR.**

Factory installed generator fuel system components include (a) fuel filter, (b) 12-volt DC electric pump, (c) engine carburetor, and (d) interconnecting lines and fittings. Connect a fuel supply line to the fuel filter inlet. Use a flexible length of approved fuel hose between the fuel filter inlet connection and rigid fuel lines.

FUEL TANK

Either the generator must share the vehicle engine's fuel tank, or you must install a separate fuel tank for the generator set. All fuel tanks installed on the vehicle must be constructed, installed, restrained so it complies with applicable codes, standards and regulations.

If the generator is to share the vehicle engine's tank, separate fuel pickup tubes are required for the engine and the generator. Generac recommends that you make the fuel pickup tube about 2 to 3 inches shorter than the vehicle engine's pickup tube. This prevents the generator from depleting the entire fuel supply during prolonged generator operating periods.



CAUTION: Do NOT tee the generator fuel supply line into the vehicle engine fuel supply line. If this is done, the generator will be starved of fuel when both engines are operating at the same time. Also, while the vehicle engine is not running, generator operation may drain the vehicle engine supply line, making it difficult to start the vehicle engine.

GENERATOR FUEL SUPPLY LINE

■ RIGID FUEL LINES

Those lines used to supply fuel from a tank to the generator must comply with applicable codes, standards and regulations. The following generator rules apply to rigid fuel lines:

- Rigid lines should be of annealed, seamless, drawn aluminum or steel.
- Lines and fittings must comply with SAE J512F, "Standard Automotive Fittings", or with ANSI B126.26 (latest edition).
- Route the fuel line so that at least 2 inches of clearance is maintained between the line and any exhaust system parts.
- Do not attach electrical wiring to fuel lines. Route the wiring so it cannot come into contact with any fuel line.
- Route fuel lines so if they leak, fuel does not drip onto any electrical or exhaust system parts.
- Use non-ferrous metal straps without sharp edges to secure fuel lines.

■ FLEXIBLE FUEL LINE

Use an approved flexible length of fuel hose between the generator fuel inlet connection and rigid fuel lines. This prevents breaking of the line caused by vibration, shifting, settling or movement. The following rules apply:

- The flexible hose must comply with SAE J30B, "Standard for Fuel and Oil Hose". It must be approved for use with gasoline.
- The hose should be at least 6 inches longer than is needed to prevent the hose from rupturing if the generator shifts or settles.

PROPANE GAS FUEL SYSTEM



DANGER: LP (PROPANE) GAS IS HIGHLY EXPLOSIVE. THE GAS IS HEAVIER THAN AIR AND TENDS TO SETTLE IN LOW AREAS, WHERE EVEN THE SLIGHTEST SPARK CAN IGNITE IT AND CAUSE AN EXPLOSION. ONLY COMPETENT, QUALIFIED PERSONS SHOULD BE ALLOWED TO INSTALL, TEST, ADJUST OR SERVICE AN LP GAS FUEL SYSTEM. INSTALL THE OPTIONAL FUEL SYSTEM IN COMPLIANCE WITH APPLICABLE CODES, STANDARDS AND REGULATIONS. AFTER THE INSTALLATION, DO NOTHING THAT MIGHT RENDER THE SYSTEM IN NON-COMPLIANCE WITH APPLICABLE CODES AND STANDARDS.

The LP powered range of Gensets are fitted with non-adjustable factory set system. These systems are tamper-proof to meet 1997 California Air Resources Board for Engine Emissions.

PARTS NOT INCLUDED IN FUEL SYSTEM

The propane fuel system does NOT include such items as (a) gas tank, (b) gas piping, (c) fittings, (d) valves, and (e) primary regulator, used to store the gaseous fuel and deliver it to the gaseous fuel solenoid (Figure 19).



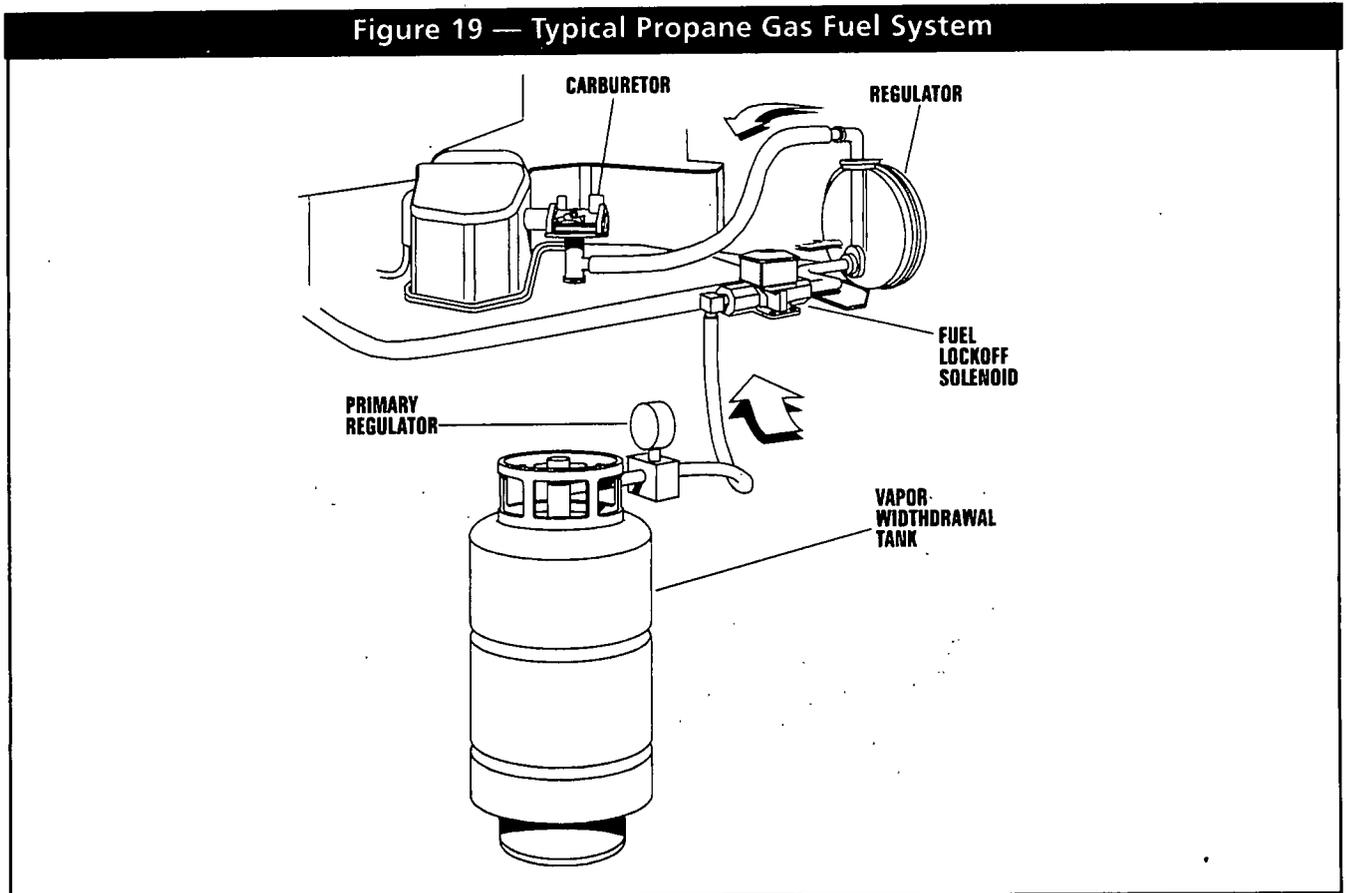
DANGER: USE ONLY APPROVED COMPONENTS IN THE GAS SUPPLY SYSTEM. ALL COMPONENTS MUST BE PROPERLY INSTALLED IN ACCORDANCE WITH APPLICABLE CODES. IMPROPER INSTALLATION OR USE OF UNAUTHORIZED COMPONENTS MAY RESULT IN FIRE OR AN EXPLOSION. FOLLOW APPROVED METHODS TO TEST THE SYSTEM FOR LEAKS. NO LEAKAGE IS PERMITTED. DO NOT ALLOW FUEL VAPORS TO ENTER THE VEHICLE INTERIOR.

SOME IMPORTANT CONSIDERATIONS

When installing an LP gas system, consider seriously the following items:

- All fittings, lines, hoses and clamps must be tight and free of leaks. Apply a pipe sealant to threads when assembling threaded connections. This reduces the possibility of leakage.
- Test the entire fuel system for leaks, using approved test methods.

Figure 19 — Typical Propane Gas Fuel System



- Optimum gas pressure at the inlet to the gaseous fuel solenoid valve and secondary regulator is 11 inches water column.
- The installer's fuel supply connection point is at the gaseous fuel solenoid valve. This is a 3/4 inch (female) connection. Provide a suitable 3/4 inch NPT (male) connector to attach to the fuel supply line.
- Use a length of approved flexible fuel hose between gaseous fuel solenoid valve and rigid gas piping. The flexible line should be at least six (6) inches longer than necessary.

VAPOR WITHDRAWAL

Liquid propane (LP) gas is stored in pressure tanks as a liquid. The gas systems used with these generators were designed only for "vapor withdrawal" type systems. Vapor withdrawal systems use the gas vapors that form above the liquid fuel in the tank. Do NOT attempt to use the generator with any "liquid withdrawal" type system.

PRIMARY REGULATOR

Gas pressure delivered to the solenoid valve must be properly regulated by means of a primary gas regulator. Mount the primary regulator at the gas tank outlet or in the supply line from the gas tank. The following rules apply:

- For best results, the primary regulator supplies gaseous fuel to the secondary regulator at 11 inches water column. Do NOT exceed 14 inches water column.
- The installer must be sure the primary regulator is rated at sufficient gas flow to operate the generator plus all other gas appliances in the circuit.

NOTE: Recommended MINIMUM gas flow rate for all air-cooled NP or Q series generators is 67 cubic feet per hour.

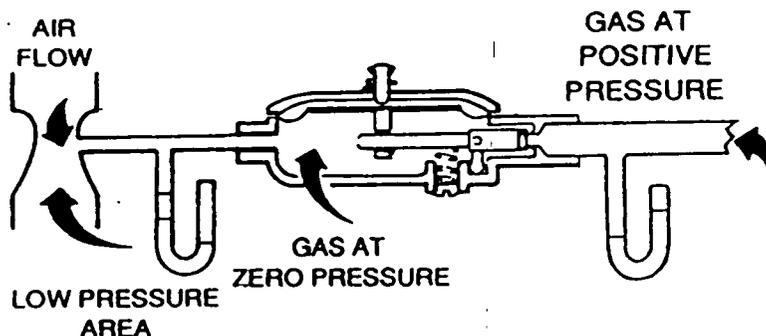
IMPORTANT: IF AN EXISTING PRIMARY GAS REGULATOR DOES NOT HAVE A SUFFICIENT FLOW CAPACITY FOR THE GENERATOR AND OTHER GAS APPLIANCES IN THE CIRCUIT, (a) INSTALL A PRIMARY REGULATOR WITH ADEQUATE FLOW RATE, OR (b) INSTALL A SEPARATE REGULATOR ONLY AND RATED AT LEAST 67 CUBIC FEET PER HOUR. THE INLET SIDE OF ANY PRIMARY REGULATOR THAT SUPPLIES THE GENERATOR MUST CONNECT DIRECTLY TO GAS TANK PRESSURE. DO NOT TEE THE GENERATOR LINE INTO A GAS CIRCUIT FEEDING OTHER AREAS.

GASEOUS CARBURETION

LP gas vapors should be supplied to the secondary regulator inlet at about 11 inches water column (positive pressure). The engine pistons draw air in during the intake stroke (Figure 20). This air passes through a carburetor venturi which creates a low pressure that is proportional to the quantity of air being pumped. The low pressure from the carburetor venturi acts on the regulator diaphragm, to pull the diaphragm toward the source of low pressure. A lever attached to the diaphragm opens a valve to permit gas flow through the carburetor.

The greater the air flow through the carburetor venturi, the lower the pressure at the venturi throat. The lower the pressure at the venturi throat, the greater the diaphragm movement and the greater the movement of the regulator valve. The more the regulator valve opens, the greater the gas flow that is proportional to air flow through the generator.

Figure 20 — Propane Gas Carburetion Diagram



The following facts about the secondary regulator must be emphasized:

- The regulator must be sensitive to venturi throat pressure changes throughout the operating range.
- The regulator must be properly adjusted so it will stop the flow of gas when the engine is not running (no air flow through the carburetor).
- The slightest air flow (and vacuum in the venturi throat should move the regulator valve off its seat and permit gas to flow.

FUEL SUPPLY LINES

- Propane gas lines must be accessible, but protected against possible damage.
- Do NOT connect electrical wiring to any propane gas fuel line or run wiring alongside the lines.
- Route gas lines away from hot engine exhausts.
- Retain gas lines with metal clamps that do not have sharp edges.
- Install an approved length of flexible hose between the gaseous fuel solenoid valve and rigid fuel supply lines. The flexible line must be non-metallic, non-organic and non-conductive. It must be approved for use with LP gas.

EXCESS FLOW VALVE

Propane gas tanks should have an excess flow valve, according to NFPA 501C, Paragraph 3-4.4. This valve and the gas lines must be carefully sized so the valve will close when a fuel line is severed or broken. Consult the Natural-LP Gas Association for information and limitations of excess flow valves.

Manual shutoff valves on the supply tank and elsewhere in the system must be fully open when operating the generator. The excess flow valve functions properly only if all valves are fully open.

LEAKAGE TESTS

Do not place the generator into service until you have properly tested the gas system for leaks. To test the system, you need a separate source of 12 volts DC to open the gaseous fuel solenoid valve.

The leak test must comply fully with NFPA, Paragraph 318. All connections, hoses, valves regulators, fittings, and other fuel system parts must be tested under gas or air pressure of not less than 90 psi (620kPa), while using soap and water or equivalent solution to check for leaks. Other approved methods of testing for leaks may be used, if appropriate. DO NOT USE ANY FLAME TO TEST FOR LEAKS.



DANGER: GASEOUS FUEL LINES BETWEEN THE TANK AND THE SECONDARY REGULATOR ARE UNDER A POSITIVE PRESSURE (ABOUT 11 INCHES WATER COLUMN). GAS PRESSURE AT THE OUTLET SIDE OF THE SECONDARY REGULATOR, HOWEVER, IS A NEGATIVE PRESSURE AND CAN DRAW FLAME INSIDE A LINE OR FITTING AND CAUSE AN EXPLOSION.

EXHAUST SYSTEM

The generator exhaust system must be safely and properly installed. Only approved mufflers and other exhaust system parts must be used. A properly installed exhaust system must be vapor tight, quiet and completely safe.



CAUTION: Never tee the generator engine exhaust pipe into the vehicle engine exhaust piping. This causes excessive back pressure on the generator engine. Also, water from one engine can damage the other engine.



DANGER: THE GENERATOR ENGINE GIVES OFF DEADLY CARBON MONOXIDE GAS THROUGH ITS EXHAUST SYSTEM. THIS DANGEROUS GAS, IF BREATHED IN SUFFICIENT CONCENTRATIONS, CAN CAUSE UNCONSCIOUSNESS OR EVEN DEATH. SYMPTOMS OF CARBON MONOXIDE POISONING ARE (a) INABILITY TO THINK COHERENTLY, (b) VOMITING, (c) TWITCHING MUSCLES, (d) THROBBING IN TEMPLES, (e) DIZZINESS, (f) HEADACHE, (g) WEAKNESS AND SLEEPINESS. IF ANY OF THESE SYMPTOMS ARE EXPERIENCED, MOVE INTO FRESH AIR IMMEDIATELY. IF SYMPTOMS PERSIST, GET MEDICAL ATTENTION. DO NOT OPERATE THE GENERATOR UNTIL ITS EXHAUST SYSTEM HAS BEEN INSPECTED AND REPAIRED.

MUFFLERS AND SPARK ARRESTORS

If the generator is not equipped with a spark arrestor exhaust muffler and is to be used on any forest covered, brush covered or grass covered unimproved land, you may have to install a spark arrestor. The spark arrestor must be maintained in effective working order by the vehicle owner/operator.

For assistance in ordering, installing and maintaining spark arrestor exhaust mufflers, contact your nearest authorized service facility.

Exhaust mufflers supplied by Generac are spark arrestor types. Generac exhaust mufflers for NP and Q series generators do not have a spark arrestor screen, but are of the more efficient "toroid" or "swirl" type. To remove carbon and combustion deposits from such mufflers, remove the PLUG from muffler and run engine for about 15 minutes. Shut down, let the muffler cool and install the plug.



WARNING: BE SURE TO RE-INSTALL THE PLUG FROM THE MUFFLER TIGHTLY. ENGINE VIBRATION COULD CAUSE A LOOSE PLUG TO FALL OUT. WITHOUT THE PLUG IN PLACE, HOT ENGINE EXHAUST IS DIRECTED OUT THE OPENING. THIS HOT EXHAUST, DEPENDING ON THE INSTALLATION, COULD BE DIRECTED TO AREAS NOT ABLE TO WITHSTAND THE EXTREME HEAT SUCH AS WOODEN FLOOR BOARDS OR OTHER FLAMMABLE MATERIALS. THIS COULD RESULT IN A FIRE.

TYPE OF EXHAUST SYSTEM

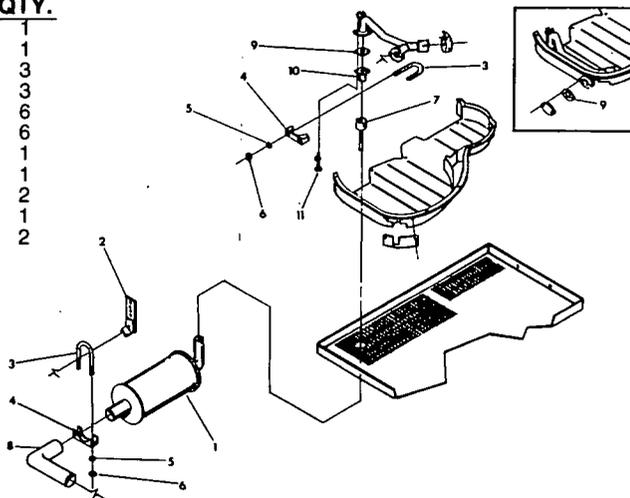
Two types of exhaust systems for "NP" and "Q" series generators are available from Generac. They include these:

- "Out-the-bottom" exhaust system, Model 9742 (Figure 21).
- "Out-the-side" exhaust system, Model 9743 (Figure 22 on Page 17).

NOTE: No matter what type of exhaust kit best fits your recreational vehicle, the mounting base has openings for either "bottom-out" or "side-out" exhaust systems. Use the cover plate provided with the generator to cover the opening you do NOT use.

Figure 21 — Model 9742 Exhaust System

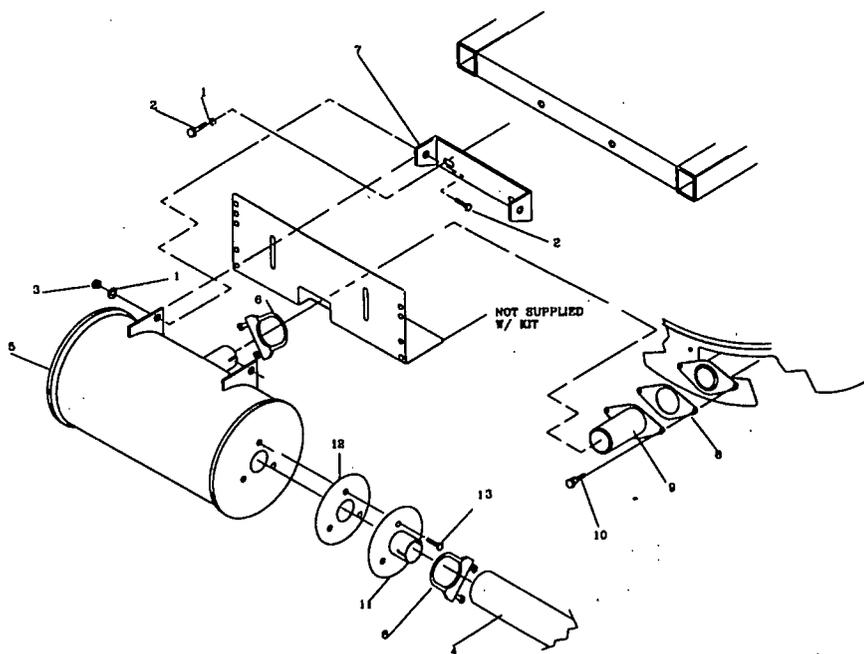
ITEM	PART NO.	DESCRIPTION	QTY.
1	52108	Muffler	1
2	46591	Hanger	1
3	28238	U-Bolt	3
4	28237	Clamp, Saddle	3
5	22129	Lock Washer	6
6	22259	5/16" Hex Nut	6
7	75238	Pipe	1
8	75411	Elbow	1
9	77643	Gasket	2
10	77642	Adaptor, Bottom Out	1
11	68527	M6-1.0 x 20mm Screw	2



EXHAUST SYSTEM SAFETY

- Maintain a clearance of at least 3 inches (76mm) between exhaust system parts and any combustible material (such as wood, felt, cotton, organic fibers or other like material). If you cannot maintain the 3-inch clearance, locate, insulate or shield the exhaust part(s) so that the temperature of any combustible material is not raised more than 117°F (65°C) above the ambient air temperature.
- Terminate the exhaust tailpipe such that exhaust gases will not be drawn back into the generator compartment and recirculated.
- If there is any possibility of the tailpipe or muffler being damaged, protect these damage prone areas by means of a protective device (such as a "skid bar").
- Install the generator exhaust system according to safe automotive practices.
- Use enough exhaust system hangers to prevent any part of the system from being dislocated.
- Use exhaust system parts recommended by Generac. Using unapproved exhaust mufflers and exhaust system parts is the responsibility of the person(s) installing such unauthorized parts.
- Do not terminate the exhaust system under the vehicle.
- Do not terminate the exhaust system under any opening, window or vent which can be opened or is not permanently sealed from the vehicle interior.
- Exhaust piping must be large enough to prevent excessive back pressure on the generator engine.
- Never tee the generator engine exhaust pipe into the vehicle engine exhaust piping. This causes excessive back pressure on the generator engine. Also, water from one engine can damage the other engine.
- Plan exhaust system installation carefully. Comply with all applicable codes, standards and regulations.

Figure 22 — Model 9743 Exhaust Kit



ITEM	PART NO.	DESCRIPTION	QTY.	ITEM	PART NO.	DESCRIPTION	QTY.
1	22129	5/16"-M8 Lockwasher	4	8	77643	Gasket	2
2	42907	M8-1.25 x 16 Screw	4	9	90863	Adaptor	1
3	45771	M8-1.25 Hex Nut	2	10	79246	M6-1.0 x 20mm Capscrew	2
4	81107	Exhaust Pipe Extension	1	11	92676	Muffler Adaptor	1
5	92675A	Exhaust Muffler	1	12	95277	Outlet Adaptor Gasket	1
6	94670	1.120 Exhaust Clamp	2	13	56893	#10-24 x 1/2 Crimptite	3
7	76508	Muffler Bracket	1				

ELECTRICAL CONNECTIONS

The following general rules apply to electrical connections in a recreational vehicle:

- Qualified electricians who are familiar with applicable codes, standards and regulations should install electrical wiring.
- The wiring should comply with codes, standards and regulations. The National Electric Code (NFPA 70), as well as state and local codes, apply.
- Switches and circuit breakers should be of a type approved for use in recreational vehicles and must be mounted and installed to prevent damage from road shock.
- Wiring must be of adequate size, with approved insulative qualities, and properly supported.

Conduit and wire openings into generator compartment (if used) must be vapor-sealed, to prevent entry of flammable, explosive or poisonous gases into the vehicle.

ELECTRICAL JUNCTION BOX

Install an approved, square electrical junction box that has a blank cover on the interior or exterior wall of the area you plan to install the generator (NOT on the generator). Route the generator's AC output leads into this junction box through approved flexible conduit, and into this junction box. This is the point of first termination for generator AC output leads.

WIRING

- Wiring should be of stranded copper to reduce chance that vibration may cause breakage.
- Wire gauge size of wires should be large enough to handle at least 115% of the installed generator's rated maximum current.
- If neutral conductors are used, they must be the same size as other leg wires.
- Route power supply conductors from generator AC output leads T1 (red) and T2 (white), T3 (black) and the green ground wire through approved flexible conduit to the electrical junction box on the compartment wall.

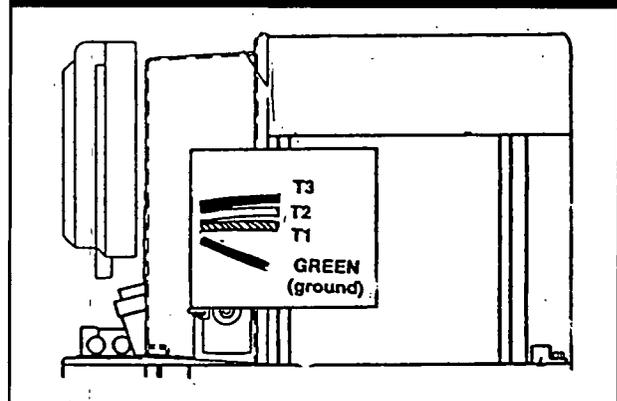
If flexible metal conduit is used between the generator and the compartment junction box, the conduit end that terminates the compartment junction box, must be vapor-sealed. Flexible metal conduit is NOT vapor tight along its entire length.

- From the junction box route power supply wires through approved conduit to either (a) double-pole, double-throw transfer switch, or (b) approved isolation receptacle. Connecting to a transfer switch or isolation receptacle must prevent vehicle electrical circuits from being connected to two different power supplies at the same time (such as generator and dockside power).
- Conductors must be rated 221°F (105°C) or must be of a larger conductor size.

GENERATOR AC CONNECTIONS

Generator AC output leads T1 (red) and T2 (white) and T3 (black) come out of the generator as shown in Figure 23. Leads T1 (red) and T3 (black) are "hot," while T2 (white) is the grounded "neutral". There is also a green lead that connects to ground in the junction box of the recreational vehicle.

Figure 23 — Generator AC Output Leads



Line T1 (red) to T2 (white) is protected against overload by the circuit breaker (CB1). Use this line-to-neutral connection separately to operate 120 volts, 1-phase, 60 Hz, AC loads requiring up to 3600 watts (3.6 kW) of power. Line T3 (black) to T2 (white) is also protected against overload by a circuit breaker (CB2). Use this line-to neutral connection separately to operate similar loads. However, be sure the total unit load does NOT exceed the maximum rating of the generator. The neutral line (T2, white) on all units is a grounded neutral.

NOTE: The generator may be reconnected for dual voltage AC output. (See "Dual Voltage Reconnection on page 3)."



CAUTION: Do NOT connect electrical loads in excess of any circuit breaker rating or you will develop problems with circuit breaker tripping, which causes a loss of AC output. Also, do NOT exceed the generator's rated wattage capacity. Add the watts or amperes of all lighting, appliance, tool and motor loads the generator will operate at one time. This total should be less than the unit's rated wattage/ampere capacity.

CONDUIT

Route the conductors between the generator and the junction box through approved, flexible conduit. The following general rules apply:

- Cut wiring to the required length and allow extra wire for junction box connections.
- Carefully prepare conduit ends, to prevent sharp edges from cutting through wiring insulation.
- Route conduit so it does not interfere with generator movement.
- If you use metallic conduit, vapor seal the end of the conduit where it enters the junction box. Do this because flexible metallic conduit is not vapor proof along its entire length.

ISOLATING DIFFERENT POWER SOURCES

Conductors from the junction box must terminate in a double pole, double throw transfer switch (Figure 24). An alternate method for isolating different power sources is by using an isolating receptacle (Figure 25 on Page 20). Whichever method you use, you must be certain that both power sources are NOT connected at the same time.

POWER SUPPLY CORD

The power supply cord must comply with all applicable codes, standards and regulations. It must be large enough to handle the full amperage to which it will be subjected.

GROUND FAULT CIRCUIT INTERRUPTERS

The National Electric Code (NFPA 70, 551-7) requires that you install ground fault circuit interrupters (GFCIs) on all external and some internal electrical receptacles. Contact your manufacturer or dealer for recommendations.

Figure 24 — Transfer Switch Isolation Method

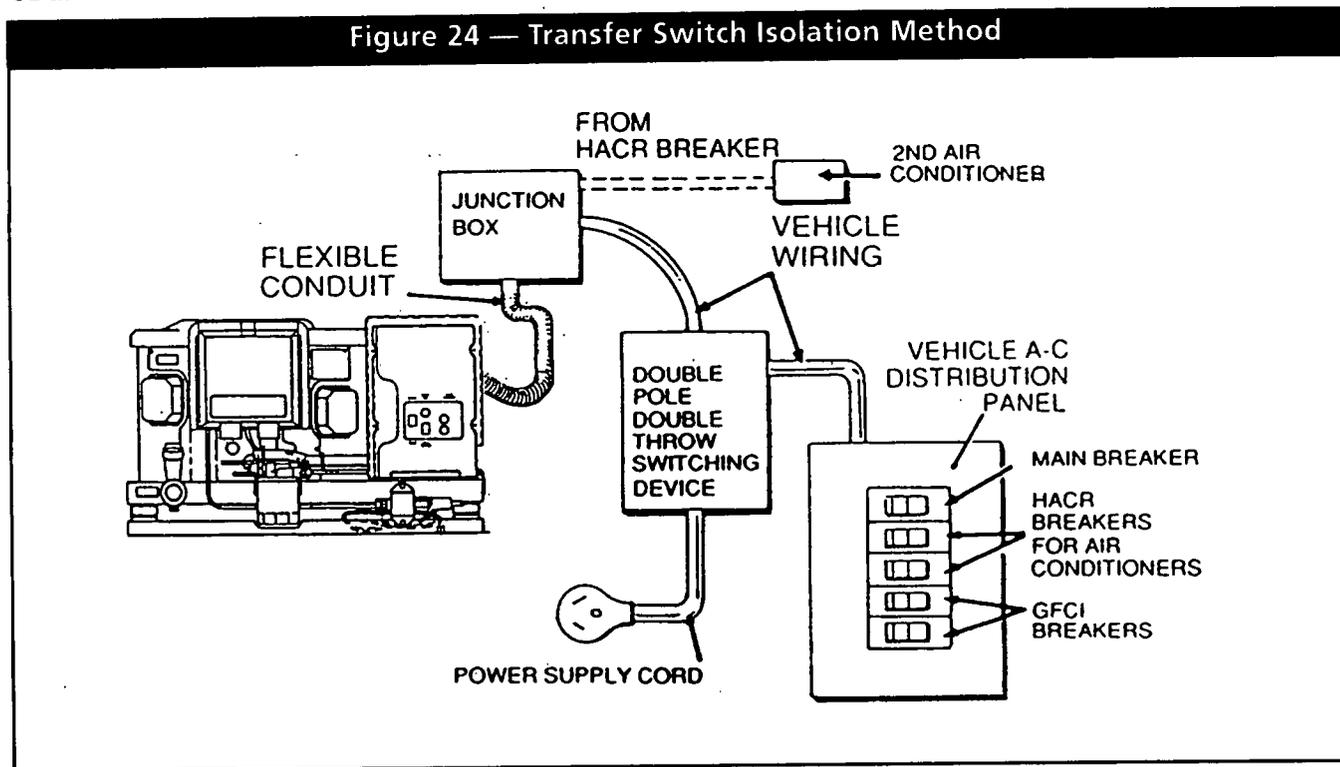
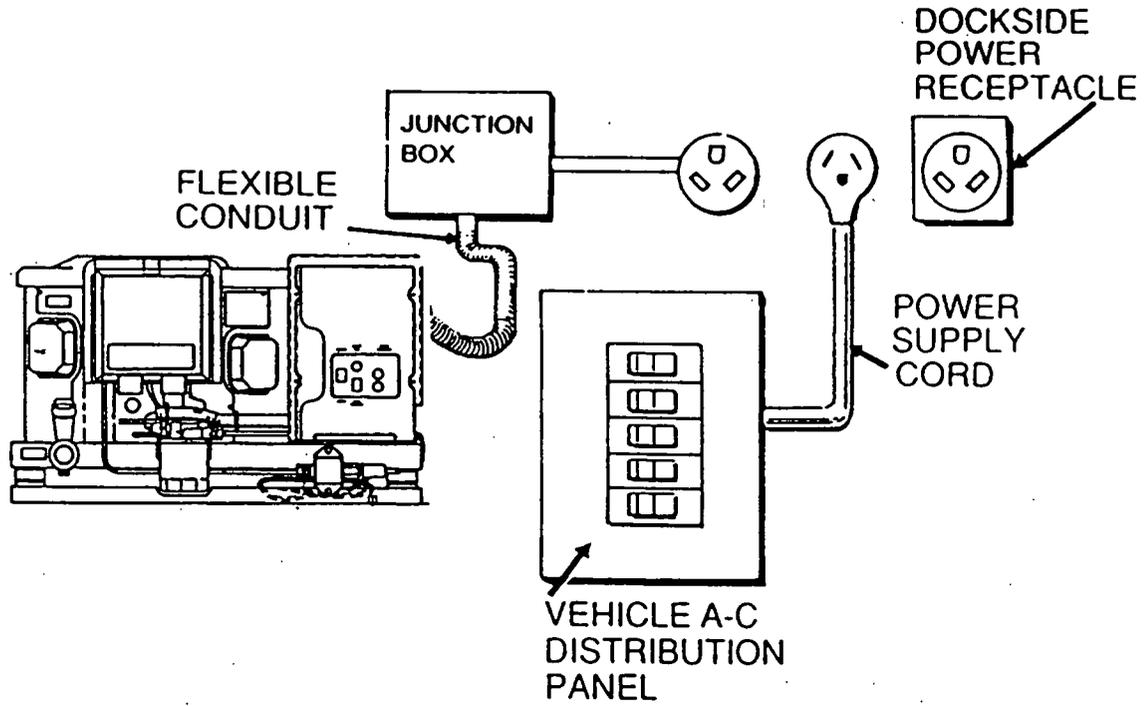


Figure 25 — Installation with Isolation Receptacle



BATTERY INSTALLATION

RECOMMENDED BATTERY

Install a battery that meets the following requirements:

- Battery must be a 12 volt, automotive type storage battery.
- For prevailing ambient temperatures above 32°F (0°C), use a battery rated 70 amp-hours and capable of delivering 360 cold cranking amperes.
- For prevailing ambient temperatures below 32°F (0°C), use a battery rated 95 amp-hours and capable of delivering 450 cold cranking amperes.

IMPORTANT: IF THE BATTERY IS TO BE USED TO POWER OTHER VEHICLE ACCESSORIES, AS WELL AS START THE GENERATOR, YOU MAY NEED A BATTERY WITH A LARGER CAPACITY.

BATTERY CABLES

Using battery cables that are too long or too small in diameter may cause a drop in voltage which causes starting problems. For best cold weather starting, the voltage drop between battery terminals and the generator connection point should not exceed 0.12 volts per 100 amperes of cranking current.

Q Series generators are rated at about 100 DC amperes of cranking current.

Select battery cables based on (a) cable length, and (b) prevailing ambient temperatures. Generally, the longer the cable and the colder the weather, the larger the cable size must be (as shown in the chart in the next column).

CABLE LENGTH in Feet (meters)	CABLE SIZE
0 to 10 (0 to 3)	2*
11 to 15 (3.4 to 4.5)	0
16 to 20 (4.5 to 6)	000

* For warm weather, use No. 2 cable up to 20 feet.

BATTERY CABLE CONNECTIONS

1. Connect the battery cable from the battery post or terminal indicated by a POSITIVE, POS or (+) to the large lug on the starter contactor (Figure 29).
2. Connect the battery cable from the battery post indicated by a NEGATIVE, NEG or (-) to the frame ground connection (Figure 27).
3. Connect cables so the connectors are clean and tight.

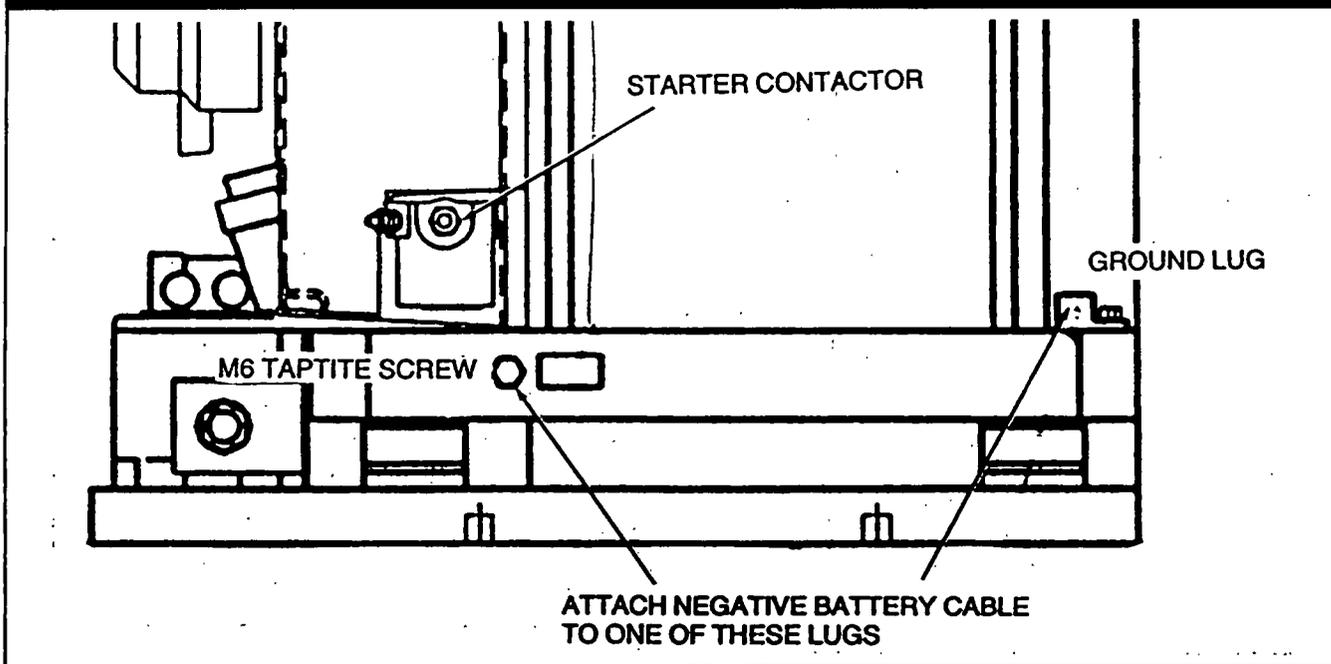
NOTE: Check to be sure the battery cable boot for the starter cable has been installed.

BATTERY COMPARTMENT

Install the generator battery in its own, vented compartment. Place the battery compartment away from any source of heat, sparks or flame.

Provide ventilation openings in the battery compartment. The minimum size of openings should be 2 square inches at the top of the compartment. Mount the battery on a strong, rigid supporting structure, where leaks and spills of battery fluid will not cause damage.

Figure 29 — Connecting Battery Cables



POST INSTALLATION TESTS

The air cooled generator set was factory tested and adjusted to provide maximum power. You should not be required to adjust the unit any further except under special circumstances.



WARNING: DO NOT MAKE ANY UNNECESSARY ADJUSTMENTS. FACTORY SETTINGS ARE CORRECT FOR MOST APPLICATIONS. WHEN MAKING ADJUSTMENTS, HOWEVER, BE CAREFUL TO AVOID OVERSPEEDING THE ENGINE.

BEFORE INITIAL START UP

Before starting, complete the following:

1. Check engine crankcase oil level and, if necessary, fill to dipstick FULL mark with the recommended oil. Do not fill above FULL mark.
2. Check the fuel supply. Gaseous fuel lines must have been properly purged and leak tested in accordance with applicable fuel-gas codes. All fuel shutoff valves in the fuel supply lines must be open.



DANGER: IF AN LP (PROPANE) GAS FUEL SYSTEM HAS BEEN INSTALLED, IT MUST HAVE BEEN PROPERLY TESTED FOR LEAKS BEFORE OPERATING THE SYSTEM IN COMPLIANCE WITH ANSI A119.2/NFPA 501C. NO LEAKAGE IS PERMITTED. YOU MUST BE SURE NO GASEOUS FUEL VAPORS ENTER THE VEHICLE INTERIOR.

INITIAL START

When absolutely certain that the unit has been properly installed and prepared for use, start the engine as follows:

1. Turn off all electrical loads. Do this by setting the generator main circuit breakers to their "OFF" or "OPEN" position.
2. Refer to the Owner's Manual shipped with unit for cranking and starting instructions. The engine may require more cranking for initial starting since the fuel lines have to be primed.
3. Let the engine warm up for about five minutes to allow internal temperatures to stabilize.
4. Carefully inspect the engine-generator for fuel, oil and exhaust system leaks. Before proceeding to the next step, correct any leakage immediately.
5. When engine has stabilized and warmed up, check the no-load voltage and frequency. See "Checking No-Load Voltage and Frequency". Initial tests and adjustments are done at no-load condition.

6. When all tests and adjustments at no-load are completed, apply electrical loads and check for proper operation under load. See "Testing Under Load". Run the unit at least 30 minutes with loads applied.
7. Turn off all electrical loads by setting the generator main circuit breakers to "OFF" or "OPEN."
8. Let the unit run at no-load for a few minutes to stabilize internal engine-generator temperatures. Then, shut down the engine.

IMPORTANT: THE GENERATOR SET WAS THOROUGHLY TESTED AND ADJUSTED AT THE FACTORY BEFORE SHIPPING. NO ADDITIONAL ADJUSTMENT SHOULD BE NECESSARY. ONLY QUALIFIED SERVICE TECHNICIANS WHO HAVE BEEN TRAINED SHOULD PERFORM ADJUSTMENTS OUTLINED IN THIS MANUAL.

CHECKING NO-LOAD VOLTAGE AND FREQUENCY

Connect an accurate AC voltmeter and an AC frequency meter across the generator's AC output leads. This can be done at a convenient point in the circuit (such as the transfer switch terminals or isolating receptacle). Connect the meters across lines T1 (red) and T2 (white); or across line T3 (black) and T2 (white). Line-to-neutral readings will be taken with unit at no-load condition.

1. With generator running, stabilized and warm, check the AC frequency and voltage. Frequency should be about 62 Hz; voltage about 122-126 volts AC.
2. After taking frequency and voltage readings, determine if any adjustment is required as follows:
 - If frequency and voltage are both good, no adjustment is needed.
 - If frequency is high or low, adjust the engine governor to obtain 62 Hertz at no-load. Then, recheck voltage reading.
 - If frequency is good but voltage is high or low, adjust the voltage regulator to obtain 124 volts at 62 Hz (no-load).

NOTE: If the generator has been reconnected to provide a dual voltage AC output (Page 18), line-to-line frequency and voltage readings may be used. Frequency at no-load should be about 62 Hz; line-to-line voltage should be about 244-252 volts.

TESTING UNDER LOAD

After it has been determined that no-load frequency and voltage are correct, apply electrical loads equal to about 75-100% of the unit's rated wattage/ampere capacity. Check frequency with electrical load applied. The frequency should not drop below about 58 Hz under load.

Let the unit run at least 30 minutes with load applied. During this part of the test, check that the unit is not running excessively hot and that adequate cooling air flow is available. You must not allow the unit to overheat during prolonged operation.

NOTE: The generator engine is equipped with a high oil temperature switch. The switch has normally-open (N.O.) contacts which will close at about 284°F (140°C). When the switch contacts close, engine shuts down automatically.

IMPORTANT: GENERAC RECOMMENDS THAT YOU TEST THE GENERATOR FOR ADEQUATE COOLING.

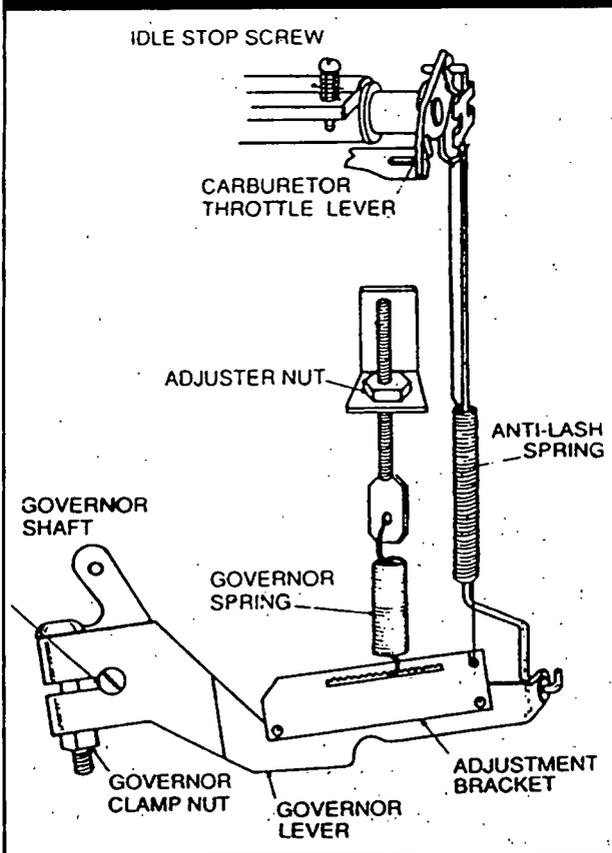
ADJUSTING NO-LOAD FREQUENCY

With engine stopped, visually inspect the ANTI-LASH SPRING. Replace spring if broken or damaged; attach if disconnected.

For Series Q-40G, NP-66G/LP, Q-55G/LP and Q-70G/LP generators proceed as follows (Figure 30):

1. Loosen the GOVERNOR CLAMP NUT.
2. Push spring end of GOVERNOR LEVER all the way up to its wide open throttle position.
 - Hold the GOVERNOR LEVER at wide open throttle and insert screwdriver into slotted end of GOVERNOR SHAFT. Rotate the GOVERNOR SHAFT fully counterclockwise (CCW).
 - While holding the GOVERNOR SHAFT fully counterclockwise and the GOVERNOR LEVER at wide open throttle, tighten the GOVERNOR CLAMP NUT to 70 inch-pounds (8 N-m).

Figure 30 — Governor Adjustment for NP-66G et.al.



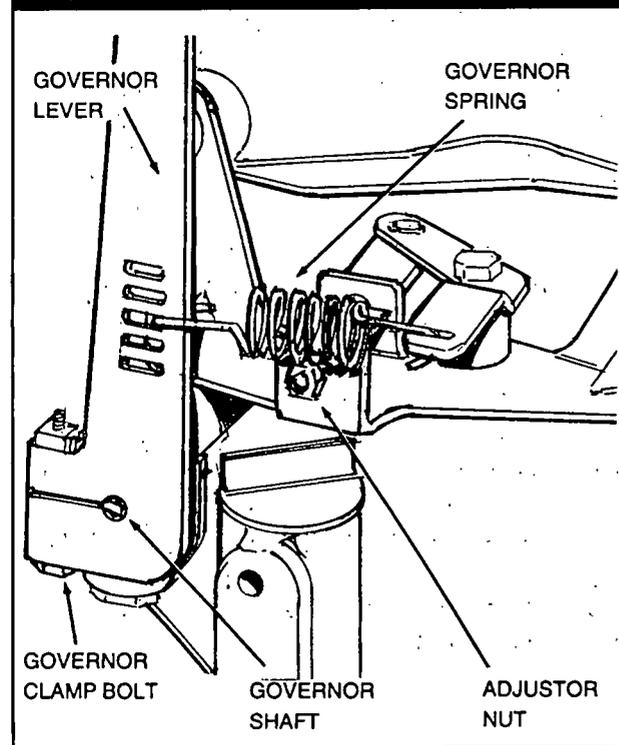
3. Start engine, let it stabilize and warm up at no-load.
4. Turn the ADJUSTER NUT to obtain a frequency reading of 62 Hertz.
5. Determine if the GOVERNOR SPRING is properly located in the notched teeth of the GOVERNOR ADJUSTMENT BRACKET as follows:
 - If droop is excessive, move the GOVERNOR SPRING to the left on the notched teeth of BRACKET (toward GOVERNOR SHAFT).
 - For greater stability, move the GOVERNOR SPRING to the right on notched teeth of BRACKET.
6. After repositioning the SPRING on the BRACKET notched teeth, recheck frequency reading and, if necessary, readjust ADJUSTER NUT to obtain 62 Hertz at no-load.
7. When frequency is correct at no-load, check the AC voltage reading. If voltage is incorrect, the voltage regulator may require adjustment.

For Series NP-50G/LP generators proceed as follows (Figure 31):

NOTE: The governor system is located behind the engine wrapper on the left hand side of the unit.

1. Loosen the GOVERNOR CLAMP BOLT.
2. Push spring end of GOVERNOR LEVER clockwise to wide open throttle position of lever.
 - Hold the GOVERNOR LEVER at wide open throttle and, with a pair of pliers, rotate the GOVERNOR SHAFT fully counter clockwise.

Figure 31 — Governor Adjustment for NP-50G

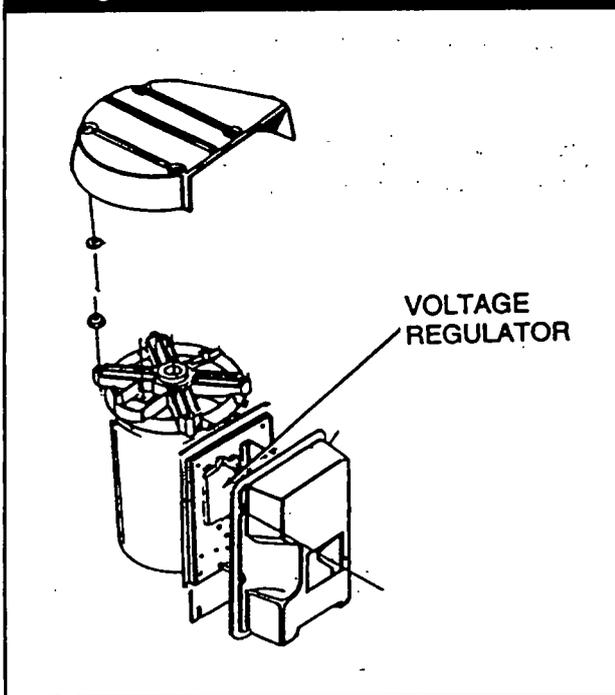


- While holding the GOVERNOR SHAFT fully clockwise and the GOVERNOR LEVER at wide open throttle, tighten the GOVERNOR CLAMP BOLT to 70 inch-pounds (8N-m).
3. Start engine, let it stabilize and warm up at no-load.
 4. Turn the ADJUSTER NUT to obtain a frequency reading of 62 Hertz.
 5. Determine if the GOVERNOR SPRING is properly located in the slot of the GOVERNOR LEVER as follows:
 - If droop is excessive, move the GOVERNOR SPRING down one slot on LEVER.
 - For greater stability, move the GOVERNOR SPRING up one slot on LEVER.
 6. After repositioning the SPRING on a LEVER slot, recheck frequency reading and, if necessary, readjust ADJUSTER NUT to obtain 62 Hertz at no-load.
 7. When frequency is correct at no-load, check the AC voltage reading. If voltage is incorrect, the voltage regulator may require adjustment.

VOLTAGE REGULATOR ADJUSTMENT

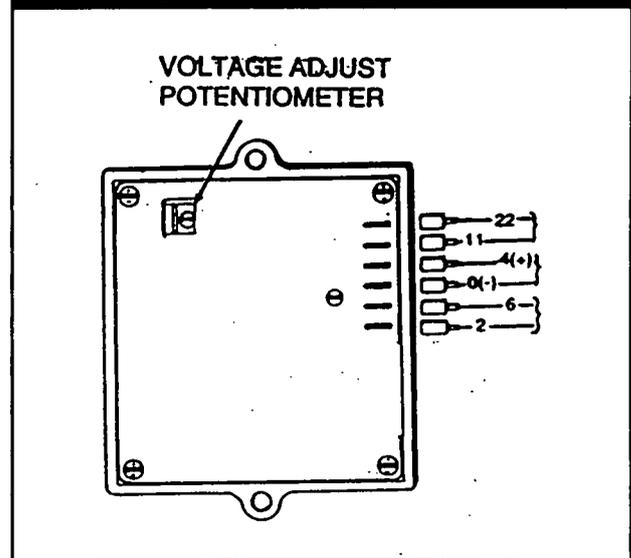
The voltage regulator is housed inside the generator control panel. Remove the cover and front panel as shown in Figure 32.

Figure 32 — Removing Cover and Panel



With frequency at 62 Hertz, AC voltage should read 124 volts. If voltage is incorrect, slowly turn the VOLTAGE ADJUST POT on voltage regulator (Figure 33) until AC voltage is correct.

Figure 33 — Voltage Regulator



INSTALLATION CHECK LIST

LOCATION AND SUPPORT

- 1. The generator is properly located.
- 2. The generator is properly supported.
- 3. The generator is properly restrained.

COMPARTMENT

- 1. Compartment construction is proper.
- 2. Holes/openings are vapor-sealed.
- 3. Compartment size is correct.
- 4. Compartment is vapor-sealed.
- 5. Sound insulation is O.K.
- 6. Floor cutouts properly completed.

COOLING and VENTILATING AIR

- 1. Air flow is adequate.
- 2. Air inlet opening is correct.
- 3. Compensate for restrictions
- 4. Installation has been tested

GASOLINE FUEL SYSTEM

- 1. Fuel tank complies with code.
- 2. Fuel system properly installed.

EXHAUST SYSTEM

- 1. Complies with code requirements.
- 2. Properly and safely installed.

OPTIONAL PROPANE GAS SYSTEM

- 1. System is properly installed.
- 2. Correct pressure at regulator inlet.
- 3. Rated flow of primary regulator is O.K.
- 4. All parts are properly installed.
- 5. System was properly tested for leaks.
- 6. System properly tested/adjusted.

ELECTRICAL CONNECTIONS

- 1. Comply with code requirements.
- 2. Junction box properly installed.
- 3. Wiring meets all standards.
- 4. All connections are correct.
- 5. Conduit properly installed and sealed.
- 6. Generator properly bonded to vehicle.

BATTERY INSTALLATION

- 1. Recommended battery is installed.
- 2. Recommended cables are installed.
- 3. Cables are clean and tight.
- 4. Cables are properly connected.
- 5. Proper ventilation is provided.

POST INSTALLATION TESTS

- 1. All tests properly completed.

ELECTRICAL FORMULAS

TO FIND	KNOWN VALUES	1-PHASE	3-PHASE
KILOWATTS (kW)	Volts, Current, Power Factor	$\frac{E \times I}{1000}$	$\frac{E \times I \times 1.73 \times PF}{1000}$
KVA	Volts, Current	$\frac{E \times I}{1000}$	$\frac{E \times I \times 1.73}{1000}$
AMPERES	kW, Volts, Power Factor	$\frac{kW \times 1000}{E}$	$\frac{kW \times 1000}{E \times 1.73 \times PF}$
WATTS	Volts, Amps, Power Factor	Volts x Amps	$E \times I \times 1.73 \times PF$
NO. OF ROTOR POLES	Frequency, RPM	$\frac{2 \times 60 \times \text{Frequency}}{\text{RPM}}$	$\frac{2 \times 60 \times \text{Frequency}}{\text{RPM}}$
FREQUENCY	RPM, No. of Rotor Poles	$\frac{\text{RPM} \times \text{Poles}}{2 \times 60}$	$\frac{\text{RPM} \times \text{Poles}}{2 \times 60}$
RPM	Frequency, No. of Rotor Poles	$\frac{2 \times 60 \times \text{Frequency}}{\text{Rotor Poles}}$	$\frac{2 \times 60 \times \text{Frequency}}{\text{Rotor Poles}}$
kW (required for Motor)	Motor Horsepower, Efficiency	$\frac{HP \times 0.746}{\text{Efficiency}}$	$\frac{HP \times 0.746}{\text{Efficiency}}$
RESISTANCE	Volts, Amperes	$\frac{E}{I}$	$\frac{E}{I}$
VOLTS	Ohm, Amperes	$I \times R$	$I \times R$
AMPERES	Ohms, Volts	$\frac{E}{R}$	$\frac{E}{R}$

E = VOLTS

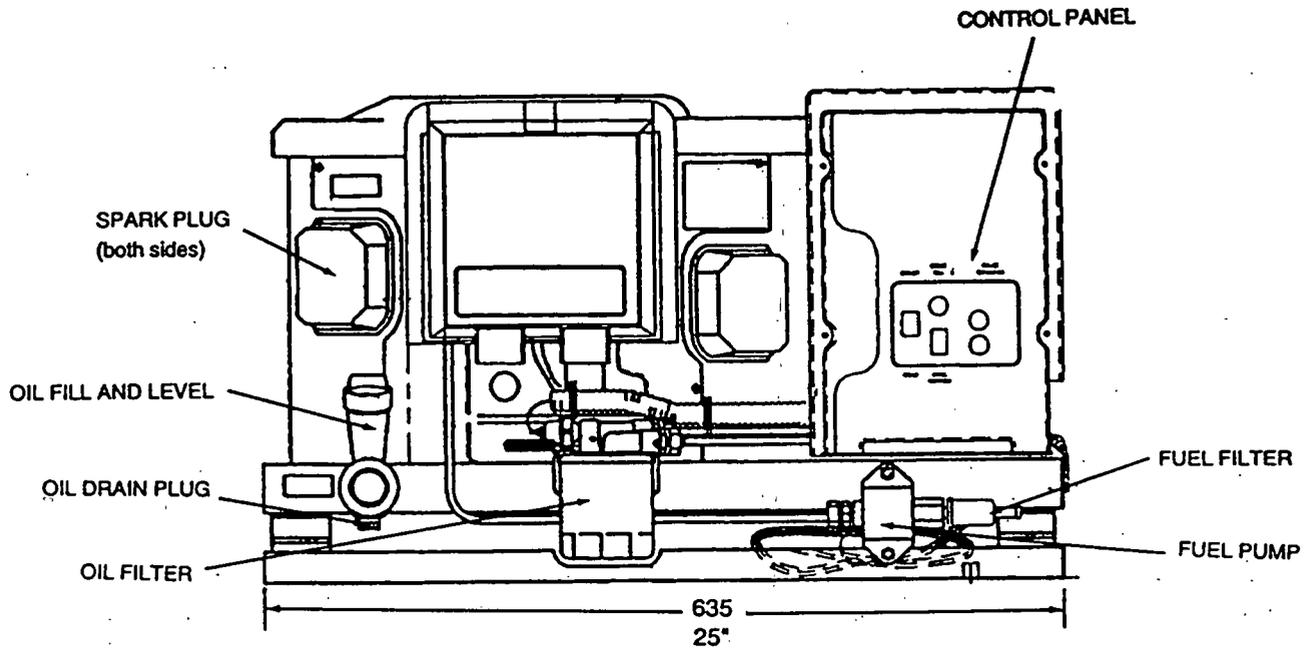
I = AMPERES

R = RESISTANCE (OHMS)

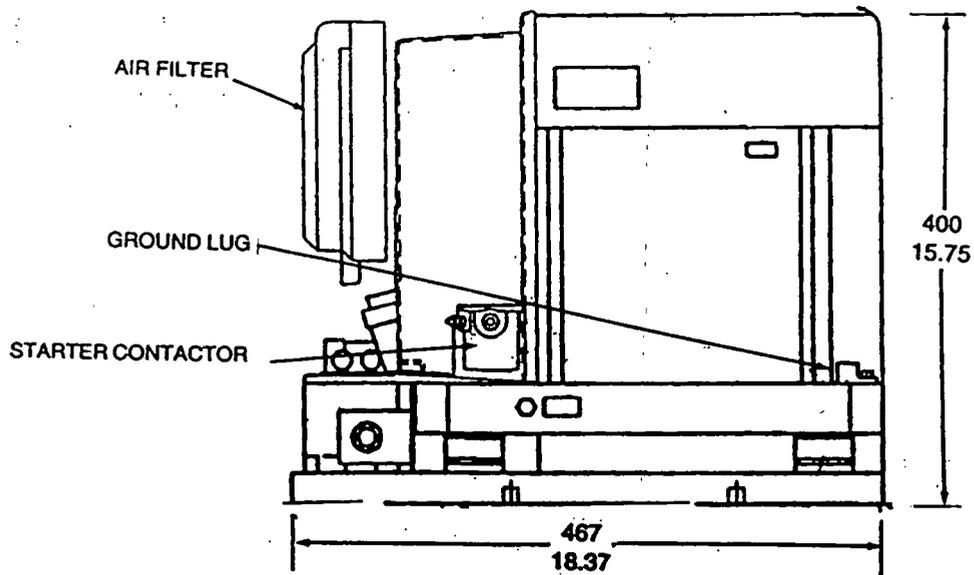
PF = POWER FACTOR

MAJOR FEATURES AND DIMENSIONS

Q-40G, NP-66G/LP, Q-55G/LP, Q-70G/LP

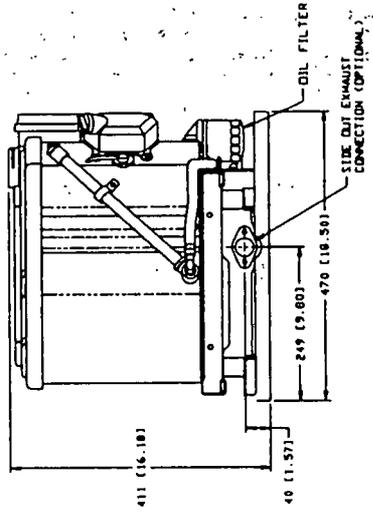
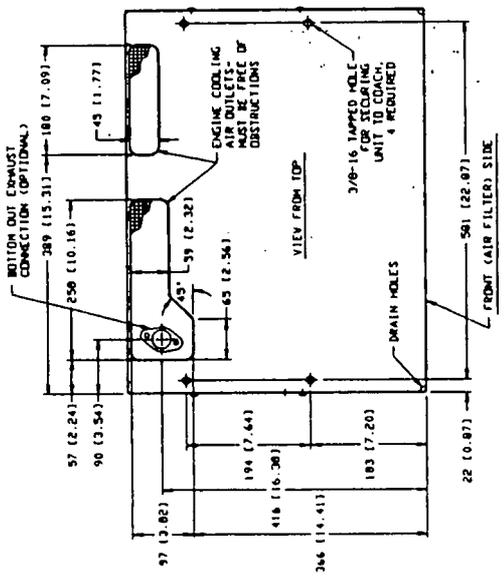
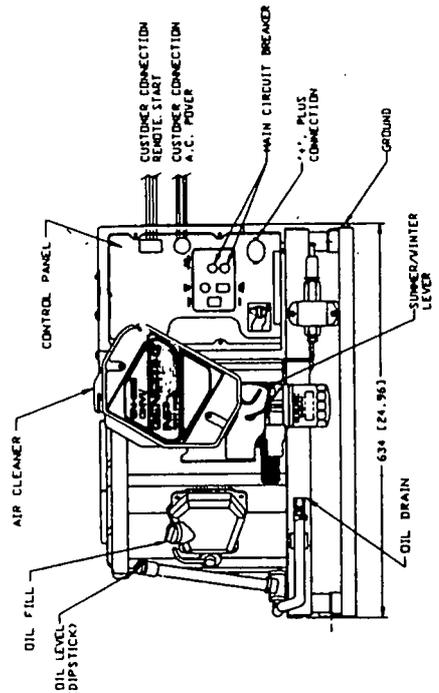
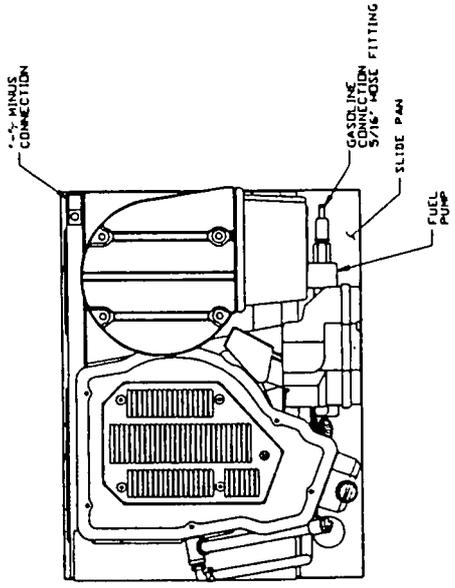


MM
INCH



MAJOR FEATURES AND DIMENSIONS

NP-50G/LP



NOTE: DIMENSIONS IN () ARE INCHES.

GENERAC[®]
CORPORATION

P.O. Box 8 Waukesha, WI 53187

Telephone: (414) 544-4811 FAX: (414) 544-4851