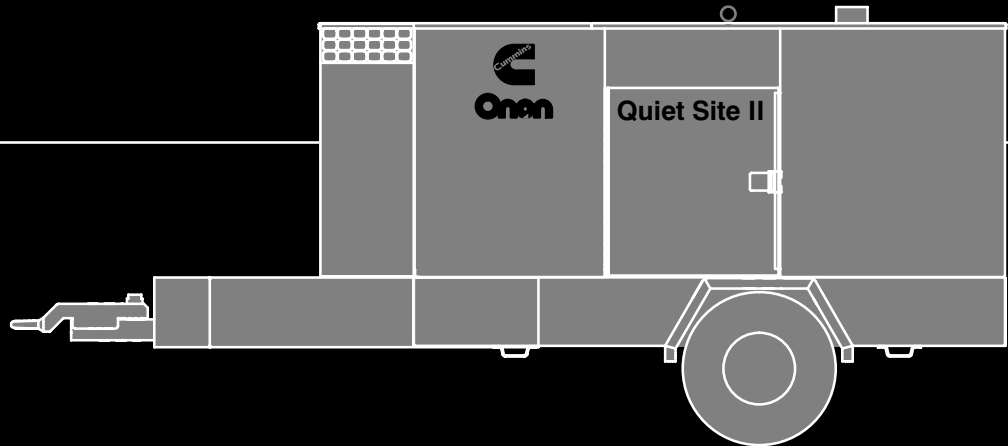
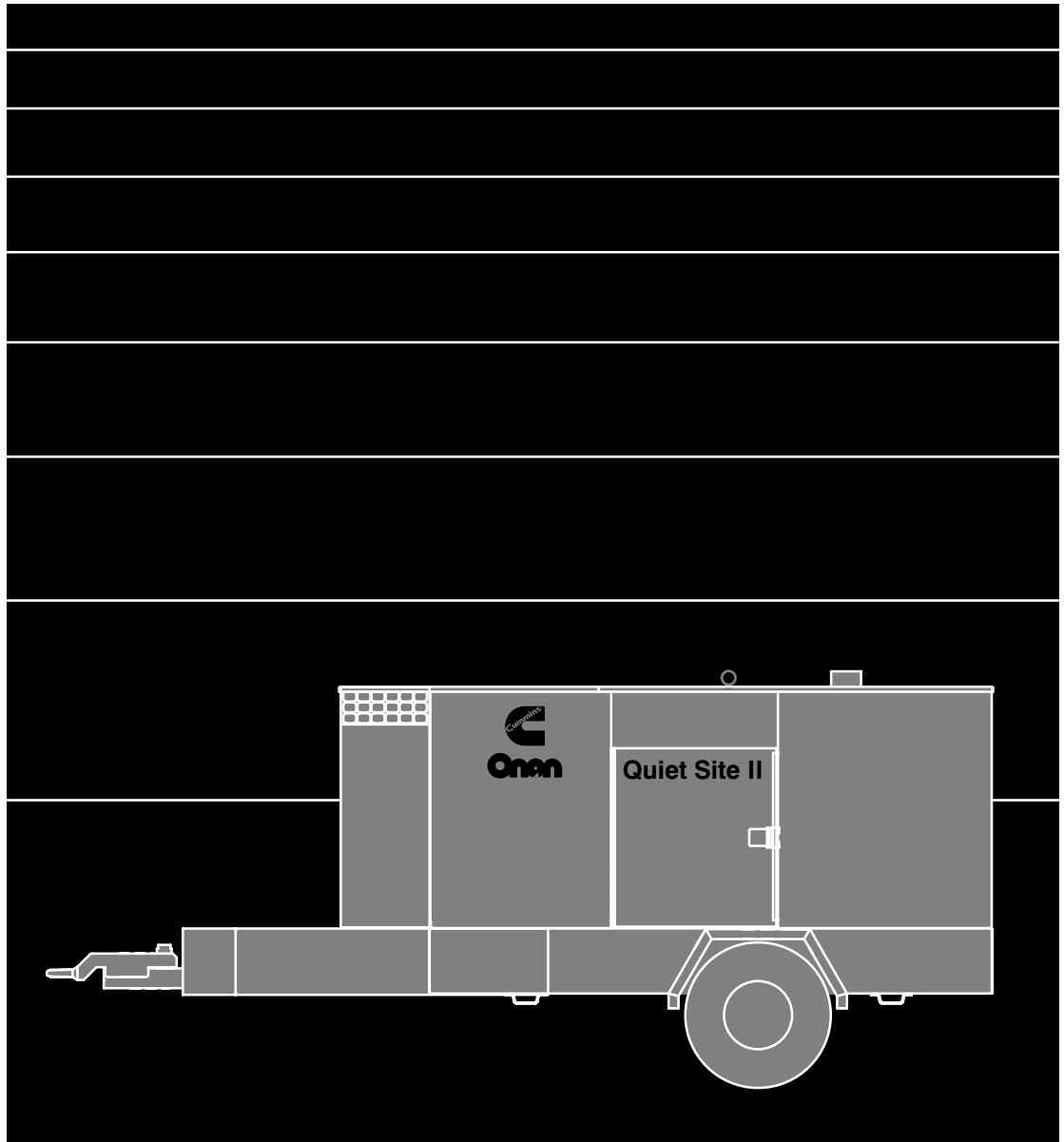




Operator's Manual

Quiet Site II[™] QSDA, QSEA, QSDB, QSFA GENERATOR SETS



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960-0150 4-96

Safety Precautions

Before operating the generator set, read the Operator's Manual and become familiar with it and the equipment. **Safe and efficient operation can be achieved only if the equipment is properly operated and maintained.** Many accidents are caused by failure to follow fundamental rules and precautions.

The following symbols, found throughout this manual, alert you to potentially dangerous conditions to the operator, service personnel, or the equipment.

⚠ DANGER *This symbol warns of immediate hazards which will result in severe personal injury or death.*

⚠ WARNING *This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.*

⚠ CAUTION *This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.*

FUEL AND FUMES ARE FLAMMABLE

Fire, explosion, and personal injury or death can result from improper practices.

- DO NOT fill fuel tanks while engine is running, unless tanks are outside the engine compartment. Fuel contact with hot engine or exhaust is a potential fire hazard.
- DO NOT permit any flame, cigarette, pilot light, spark, arcing equipment, or other ignition source near the generator set or fuel tank.
- Fuel lines must be adequately secured and free of leaks. Fuel connection at the engine should be made with an approved flexible line. Do not use copper piping on flexible lines as copper will become brittle if continuously vibrated or repeatedly bent.

- Be sure all fuel supplies have a positive shutoff valve.
- Do not smoke while servicing lead acid batteries. Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.

EXHAUST GASES ARE DEADLY

- Provide an adequate exhaust system to properly expel discharged gases away from enclosed or sheltered areas and areas where individuals are likely to congregate. Visually and audibly inspect the exhaust daily for leaks per the maintenance schedule. Ensure that exhaust manifolds are secured and not warped. Do not use exhaust gases to heat a compartment.
- Be sure the unit is well ventilated.

MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Keep your hands, clothing, and jewelry away from moving parts.
- Before starting work on the generator set, disconnect starting batteries, negative (-) cable first. This will prevent accidental starting.
- Make sure that fasteners on the generator set are secure. Tighten supports and clamps, keep guards in position over fans, drive belts, etc.
- Do not wear loose clothing or jewelry in the vicinity of moving parts, or while working on electrical equipment. Loose clothing and jewelry can become caught in moving parts. Jewelry can short out electrical contacts and cause shock or burning.
- If adjustment must be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Remove electric power before removing protective shields or touching electrical equipment. Use rubber insulative mats placed on dry wood platforms over floors that are metal or concrete when around electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surface to be damp when handling electrical equipment.
- Use extreme caution when working on electrical components. High voltages can cause injury or death. DO NOT tamper with interlocks.
- Follow all applicable state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician. Tag open switches to avoid accidental closure.
- DO NOT CONNECT GENERATOR SET DIRECTLY TO ANY BUILDING ELECTRICAL SYSTEM. Hazardous voltages can flow from the generator set into the utility line. This creates a potential for electrocution or property damage. Connect only through an approved isolation switch or an approved paralleling device.

GENERAL SAFETY PRECAUTIONS

- Coolants under pressure have a higher boiling point than water. DO NOT open a radiator or heat exchanger pressure cap while the engine is running. Allow the generator set to cool and bleed the system pressure first.

- Benzene and lead, found in some gasoline, have been identified by some state and federal agencies as causing cancer or reproductive toxicity. When checking, draining or adding gasoline, take care not to ingest, breathe the fumes, or contact gasoline.
- Used engine oils have been identified by some state or federal agencies as causing cancer or reproductive toxicity. When checking or changing engine oil, take care not to ingest, breathe the fumes, or contact used oil.
- Provide appropriate fire extinguishers and install them in convenient locations. Consult the local fire department for the correct type of extinguisher to use. Do not use foam on electrical fires. Use extinguishers rated ABC by NFPA.
- Make sure that rags are not left on or near the engine.
- Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and engine damage which present a potential fire hazard.
- Keep the generator set and the surrounding area clean and free from obstructions. Remove any debris from the set and keep the floor clean and dry.
- Do not work on this equipment when mentally or physically fatigued, or after consuming any alcohol or drug that makes the operation of equipment unsafe.

KEEP THIS MANUAL NEAR THE GENSET FOR EASY REFERENCE

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1. Introduction

ABOUT THIS MANUAL

This manual covers operation and maintenance for the Quiet Site generator (genset). Study this manual carefully and comply with each of its warnings and cautions. Using the genset properly and performing regular maintenance can result in longer genset life, better performance, and safer operation.

The Quiet Site genset is designed for temporary or mobile use. Before running the genset, consider these subjects:

Transporting - Guidelines for safely moving the genset.

Positioning - Space requirements for operation and service.

Electrical Connections - Location of electrical connection points for the control and generator.

Pre-start - Items and procedures for preparing the genset for operation.

Startup - Complete system check to ensure proper installation, satisfactory performance, and safe operation.

This manual does not provide application information for selecting a genset. For engineering data, see the Quiet Site specification and product data sheets.

SAFETY CONSIDERATIONS

The Quiet Site genset is designed to provide safe and efficient service when properly operated. However, set safety and reliability depend on factors outside the control of the manufacturer.

To avoid safety hazards, make all electrical connections to the genset exactly as described in this manual. Electrical systems outside the set must comply with all applicable codes. Be sure to complete all inspections and tests and satisfy all code requirements before operating the genset.

MODEL IDENTIFICATION

Always use the complete model and serial number when contacting an Onan[®] dealer or distributor for parts, service or product information. The model number (which includes the specification number) and the serial number are printed on the nameplate located behind the fuel access door (Figure 1-1).

To make your model and serial number easy to find when you need them, record all of the numbers that appear in the model number and serial number area on your Onan nameplate in the area provided in Figure 1-1. It is important to record every number and letter in order to identify the set correctly.

CAUTION

The Quiet Site units have been designed to operate under certain airflow conditions. During operation, there are areas within the enclosure that normally reach a temperature of 180° to 220° F (82° to 104° C). This operating temperature is typically out of range for any non-standard accessory that may be installed inside of the enclosure. Any electronic components will not withstand these temperatures, so they will degrade and eventually fail. Also, depending on the location of such accessories, there may be an obstruction of airflow, which will upset the cooling system of the genset and led to engine and generator overheating / failure and / or accessory failure. Onan recommends that no accessories, other than the options listed for Quiet Site, be installed inside of the Quiet Site enclosure.

The effects of ducting inlet / outlet airflow, with the exception of operating the unit with the enclosure doors open, have not been quantified. The unit is NOT to be operated with the enclosure doors open. If additional ducting is required for indoor or outdoor application, please contact your Onan dealer or distributor for installation recommendations.

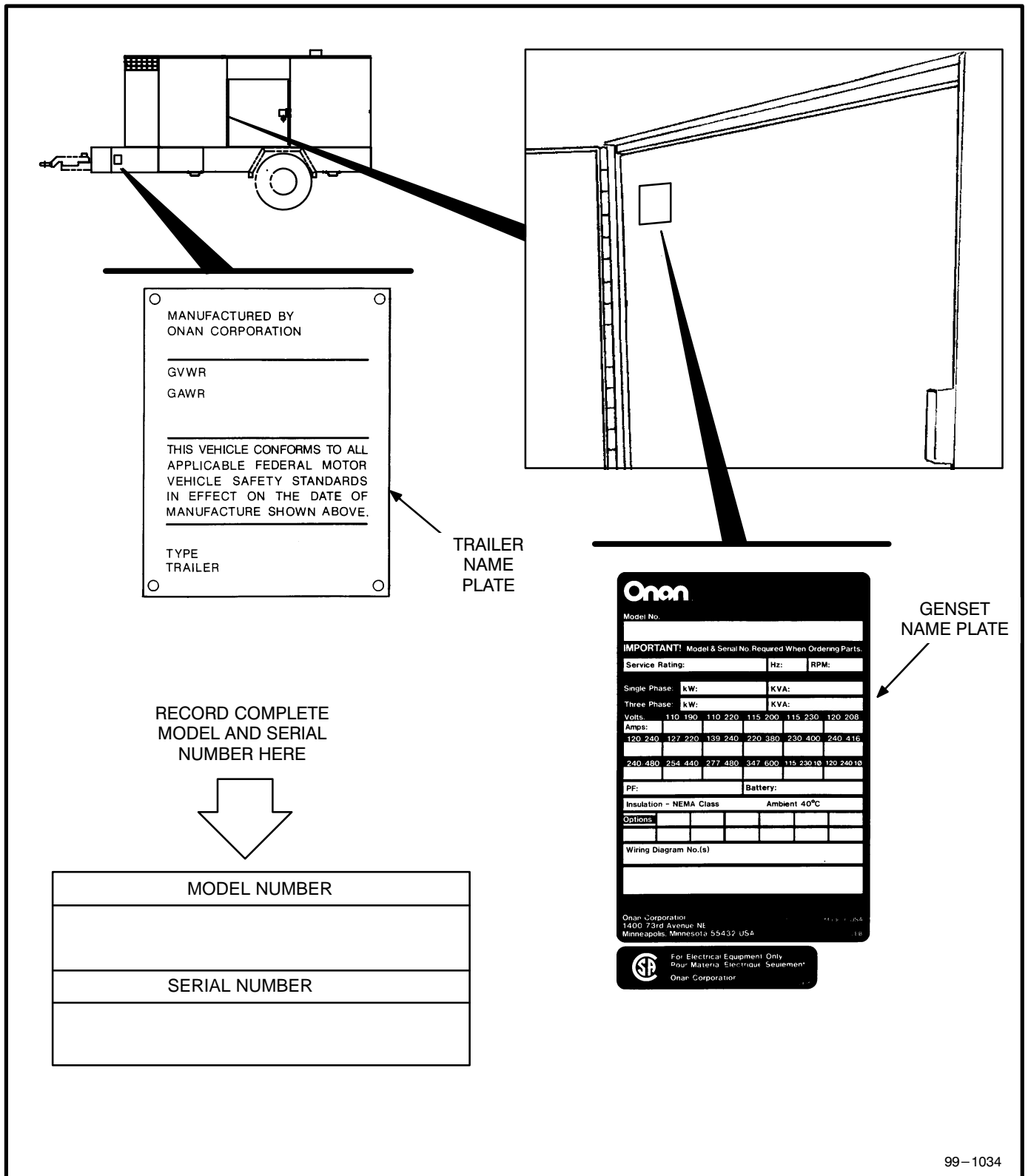


FIGURE 1-1. NAMEPLATE, QUIET SITE GENSET

HOW TO OBTAIN SERVICE

When the generator set requires servicing, contact your nearest dealer or distributor. Factory-trained Parts and Service representatives are ready to handle all your service needs.

If unable to locate a dealer or distributor, consult the Yellow Pages. Typically, our distributors are listed under:

GENERATORS-ELECTRIC,
ENGINES-GASOLINE OR DIESEL

For the name of your local Cummins/Onan or Onan-only distributor in the United States or Canada, call 1-800-888-ONAN (this automated service utilizes touch-tone phones only). By entering your area code and the first three digits of your local telephone number, you will receive the name and telephone number of the distributor nearest you.

For the name of your local Cummins-only distributor, or if you need more assistance, please call Onan Corporation, 1-612-574-5000, 7:30 AM to 4:00 PM, Central Standard Time, Monday through Friday.

When contacting your distributor, always supply the complete Model Number and Serial Number as shown on the generator set nameplate.

Onan gensets are given a complete running test under a variety of load conditions, and are thoroughly checked before leaving the factory. Examine this unit closely when it arrives, for possible shipping damage. Tighten loose parts, replace missing parts and repair all visible damage before starting the unit.

SCHEDULING SERVICE

1. Before calling for service, have the following information available:
 - The complete Onan product model number and serial number.*
 - Date of purchase*
 - Nature of the problem*
2. Contact the authorized dealer or distributor nearest you to explain the problem and make an appointment.
3. If you have difficulty in arranging for service or resolving a problem, please contact the dealer coordinator or service manager at the nearest Cummins/Onan distributor for assistance.

⚠ WARNING

INCORRECT SERVICE OR PARTS REPLACEMENT CAN RESULT IN SEVERE PERSONAL INJURY, DEATH, AND/OR EQUIPMENT DAMAGE. SERVICE PERSONNEL MUST BE QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE.

COMPONENT LOCATIONS

The genset control panel, AC load connections and routine maintenance items are located behind the

two side access doors and the two rear access doors (Figure 1-2). All optional components are also shown in Figures 1-2 and 1-3.

⚠WARNING Operation of the generator set with the side access doors open can result in severe personal injury. Hot components and rotating parts are exposed when the side access doors are open. Do not operate the generator set with the side access doors open.

⚠WARNING Operation of the generator set with the control panel cover or the load panel cover open can result in severe personal injury or death. Hazardous voltages are exposed when these covers are open. Do not operate the generator set with the control panel cover or the load panel cover open.

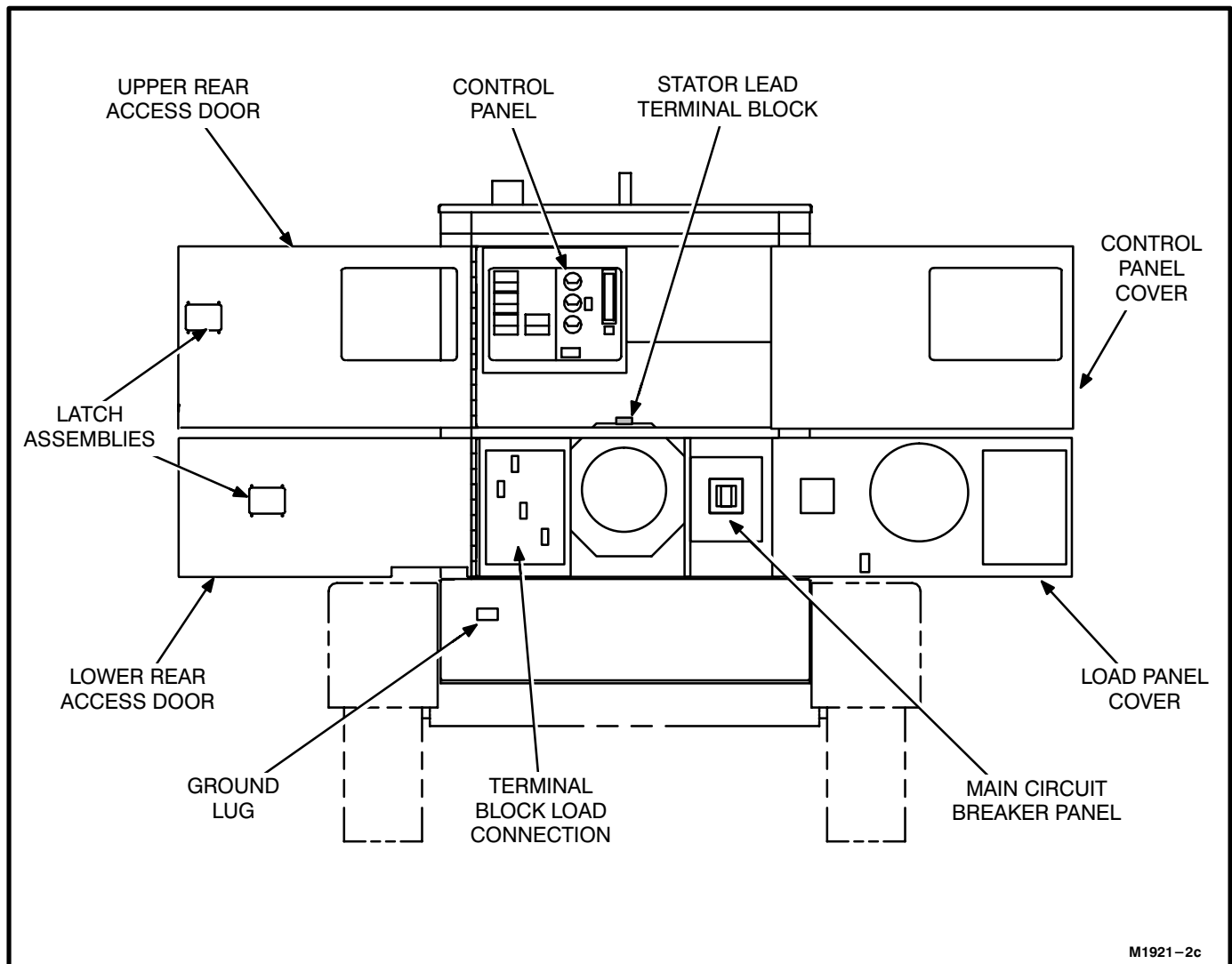


FIGURE 1-2. QUIET SITE GENSET COMPONENT LOCATIONS (REAR VIEW)

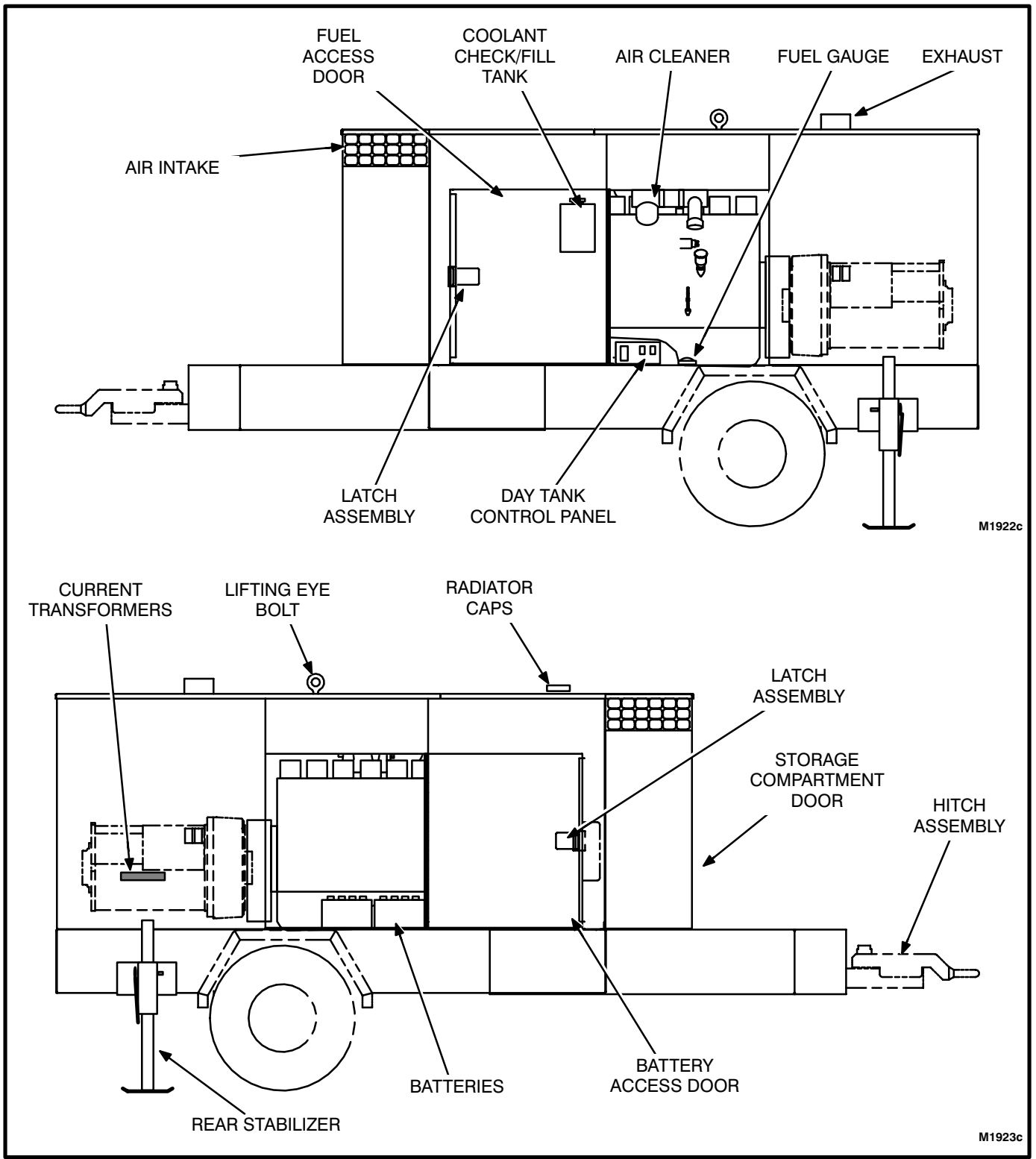


FIGURE 1-3. QUIET SITE GENSET COMPONENT LOCATIONS (SIDE VIEWS)

2. Specifications

TABLE 2-1. STANDARD SERIES SPECIFICATION (65QSDA, 80QSDA, 85QSDB, 100QSDB)

MODELS	65 QSDA	80 QSDA	85 QSDB	100 QSDB
GENERATOR DETAILS				
AC Output:				
Frequency (Hertz)	50	60	50	60
Power:				
– Standby	65kW 81kVA	80kW 100kVA	85kW 106kVA	100kW 125kVA
– Prime	60kW 75kVA	72kW 90kVA	77kW 96kVA	90kW 112kVA
ENGINE				
Cummins Diesel Series	6BT5.9-G1	6BT5.9-G1	6BT5.9-G2	6BT5.9-G2
Engine Speed	1500 RPM	1800 RPM	1500 RPM	1800 RPM
Avg. Fuel Consumption #2 Diesel, gph (l/h) at 1/4 load	1.8 (7)	2.3 (9)	1.9 (7)	2.4 (9)
1/2 load	2.8 (11)	3.5 (13)	3.2 (12)	3.9 (15)
3/4 load	3.9 (15)	4.8 (18)	4.6 (17)	5.6 (21)
Full load	5.0 (19)	6.2 (23)	6.3 (24)	7.2 (27)
ELECTRICAL SYSTEM				
Starting Voltage	24 Volts DC	24 Volts DC	24 Volts DC	24 Volts DC
Battery	Two, 12-Volt	Two, 12-Volt	Two, 12-Volt	Two, 12-Volt
CAPACITIES				
Coolant System (gal/l) *	20 (19)	20 (19)	20 (19)	20 (19)
Oil Capacity (Filter, lines & Crankcase) (qts/l)	17 (16)	17 (16)	17 (16)	17 (16)
Fuel Tank (Trailer)				
– Single wall (gal/l)	90 (341)	90 (341)	90 (341)	90 (341)
– Double wall (gal/l)	80 (303)	80 (303)	80 (303)	80 (303)
LUBRICATING SYSTEM				
Oil Type:				
14°F(-10° C) and above	15W40	15W40	15W40	15W40
-10°F(-23° C) to 14°F(-10° C)	10W30	10W30	10W30	10W30
Below -10°F(-23° C)	5W30	5W30	5W30	5W30

* Does not include coolant recovery tank.

TABLE 2-1. STANDARD SERIES SPECIFICATION (65QSDA, 80QSDA, 85QSDB, 100QSDB) (Cont'd)

MODELS	65 QSDA	80 QSDA	85 QSDB	100 QSDB
WEIGHT (Approximate)				
Dry (with oil & coolant):				
Skid-mounted (lbs/kg)	4225 (1918)	4225 (1918)	4275 (1924)	4275 (1924)
Trailer-mounted (lbs/kg)	4925 (2236)	4925 (2236)	4875 (2259)	4875 (2259)
Wet (with oil, coolant & full fuel tank):				
Skid-mounted (lbs/kg)	4320 (1961)	4320 (1961)	4370 (2057)	4370 (2057)
Trailer-mounted (lbs/kg)	5650 (2565)	5650 (2565)	5700 (2588)	5700 (2588)
DIMENSIONS				
Skid-mounted (see Figure 2-1)				
Trailer-mounted (see Figure 2-2)				
TRAILER HITCH				
Ball (inch)	2, 2-1/4, 2-5/16	2, 2-1/4, 2-5/16	2, 2-1/4, 2-5/16	2, 2-1/4, 2-5/16
Lunette eye	Optional	Optional	Optional	Optional
Trailer Hitch	Class IV	Class IV	Class IV	Class IV

TABLE 2-2. STANDARD SERIES SPECIFICATION (100QSEA, 125QSEA, 125QSFA, 150QSFA)

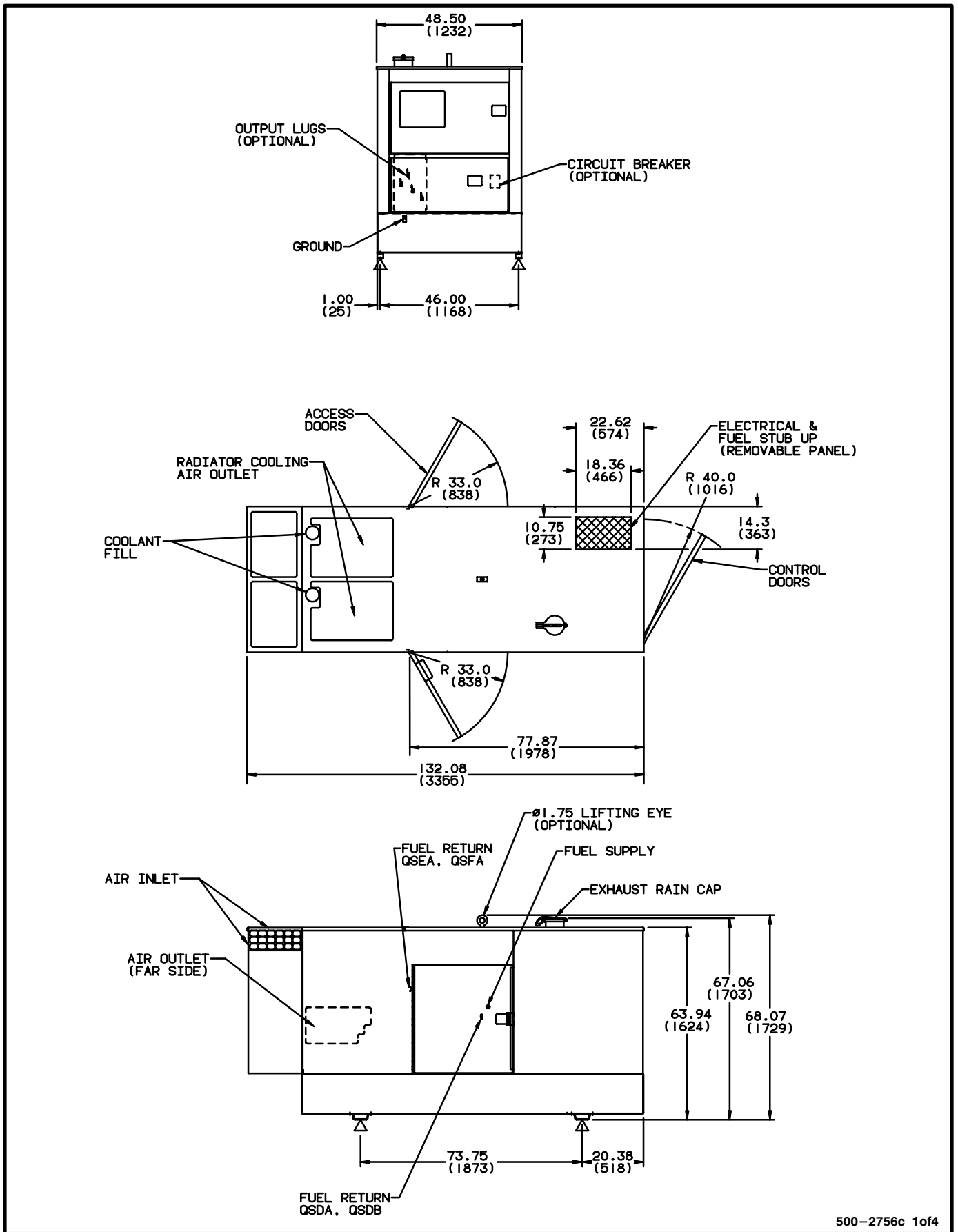
MODELS	100 QSEA	125QSEA	125 QSFA	150 QSFA
GENERATOR DETAILS				
AC Output:				
Frequency (Hertz)	50	60	50	60
Power:				
– Standby	100kW 125kVA	125kW 156kVA	125kW 156kVA	150kW 188kVA**
– Prime	90kW 112kVA	113kW 141kVA	113kW 141kVA	135kW 169kVA
ENGINE				
Cummins Diesel Series	6CT8.3-G	6CT8.3-G	6CTA8.3-G	6CTA8.3-G
Engine Speed	1500 RPM	1800 RPM	1500 RPM	1800 RPM
Avg. Fuel Consumption #2 Diesel, gph (l/h) at 1/4 load	2.4 (9)	3.1 (12)	2.9 (11)	3.6 (14)
1/2 load	3.9 (15)	5.1 (19)	5.0 (19)	5.9 (22)
3/4 load	5.5 (21)	7.0 (26)	7.3 (28)	8.3 (31)
Full load	7.3 (28)	9.2 (35)	9.7 (37)	11.0 (42)
ELECTRICAL SYSTEM				
Starting Voltage	24 Volts DC	24 Volts DC	24 Volts DC	24 Volts DC
Battery	Two, 12-Volt	Two, 12-Volt	Two, 12-Volt	Two, 12-Volt
CAPACITIES				
Coolant System (gal/l) *	22 (20.9)	22 (20.9)	24 (22.8)	24 (22.8)
Oil Capacity (Filter, lines & Crankcase) (qts/l)	20 (19)	20 (19)	20 (19)	20 (19)
Fuel Tank (Trailer)				
– Single wall (gal/l)	90 (341)	90 (341)	90 (341)	90 (341)
– Double wall (gal/l)	80 (303)	80 (303)	80 (303)	80 (303)
LUBRICATING SYSTEM				
Oil Type:				
14°F(-10° C) and above	15W40	15W40	15W40	15W40
-10°F(-23° C) to 14°F(-10° C)	10W30	10W30	10W30	10W30
Below -10°F(-23° C)	5W30	5W30	5W30	5W30

* Does not include coolant recovery tank.

** The broad range alternator is limited to 140 kw, 0.8 P. F. at voltages below 139/240 (low wye) or below 277/480 (high wye)

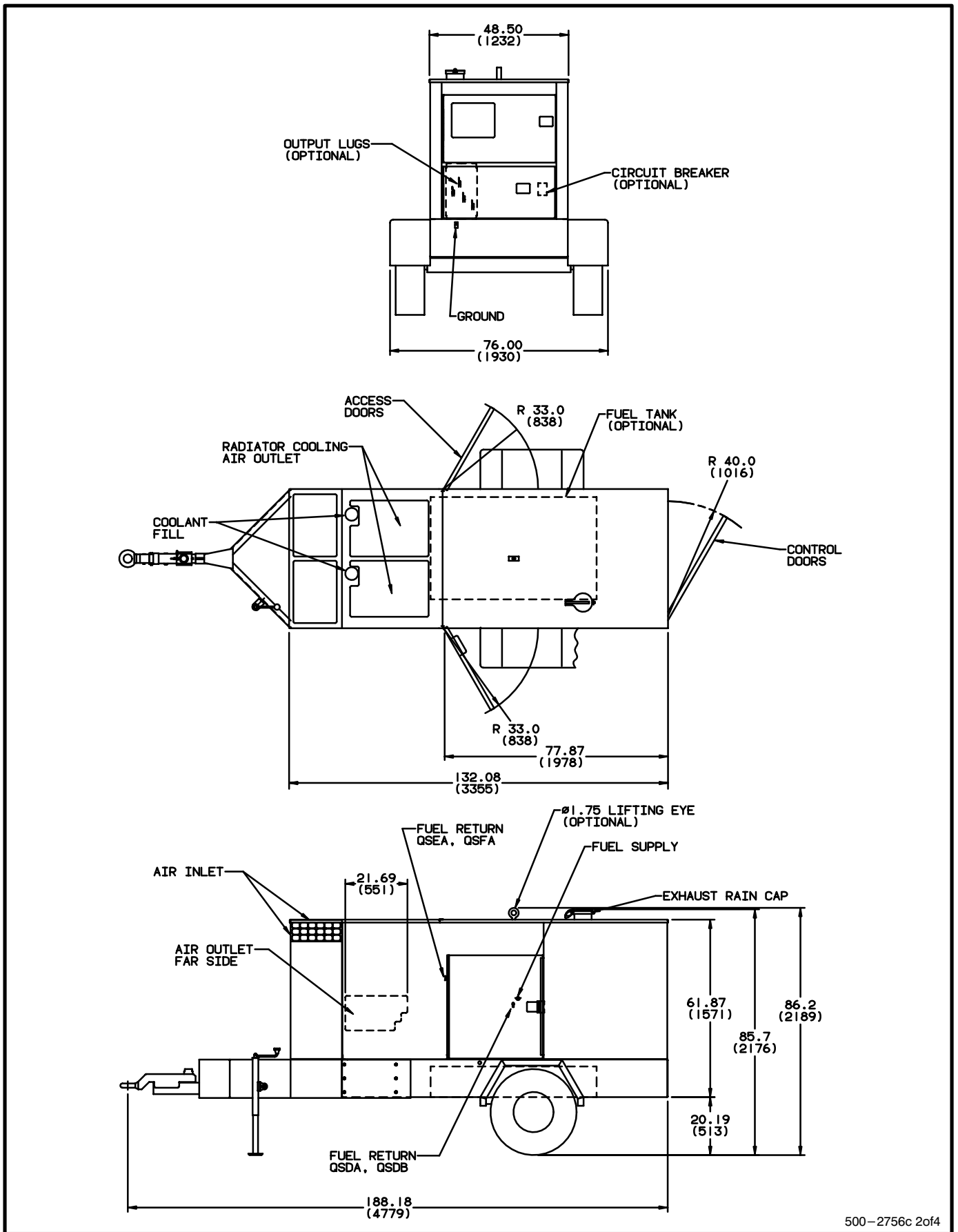
TABLE 2-2. STANDARD SERIES SPECIFICATION (100QSEA, 125QSEA, 135QSFA, 150QSFA) (Cont'd)

MODELS	100 QSEA	125 QSEA	125 QSFA	150 QSFA
WEIGHT (Approximate)				
Dry (with oil & coolant):				
Skid-mounted (lbs/kg)	4825 (2191)	4825 (2191)	4980 (2241)	4980 (2241)
Trailer-mounted (lbs/kg)	5635 (2536)	5635 (2536)	5680 (2579)	5680 (2579)
Wet (with oil, coolant & full fuel tank):				
Skid-mounted (lbs/kg)	4920 (2234)	4920 (2234)	5080 (2286)	5080 (2286)
Trailer-mounted (lbs/kg)	6250 (2838)	6250 (2838)	6410 (2910)	6410 (2910)
DIMENSIONS				
Skid-mounted (see Figure 2-1)				
Trailer-mounted (see Figure 2-2)				
TRAILER HITCH				
Ball (inch)	2-5/16	2-5/16	2-5/16	2-5/16
Lunette eye	Optional	Optional	Optional	Optional
Trailer Hitch	Class IV	Class IV	Class IV	Class IV



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FIGURE 2-1. SKID-MOUNTED GENSET DIMENSIONS



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FIGURE 2-1. TRAILER-MOUNTED GENSET DIMENSIONS

3. Transporting and Positioning the Genset

TRANSPORTING THE GENSET

Towing Vehicle

The towing vehicle must be a truck or other vehicle that can tow a large trailer. Check the owner's manual for the maximum towing capacity of your vehicle. Section 2 of this manual lists the gross weights of all the Quiet Site models. Consult your distributor if in doubt about the capability of your vehicle.

Hitch

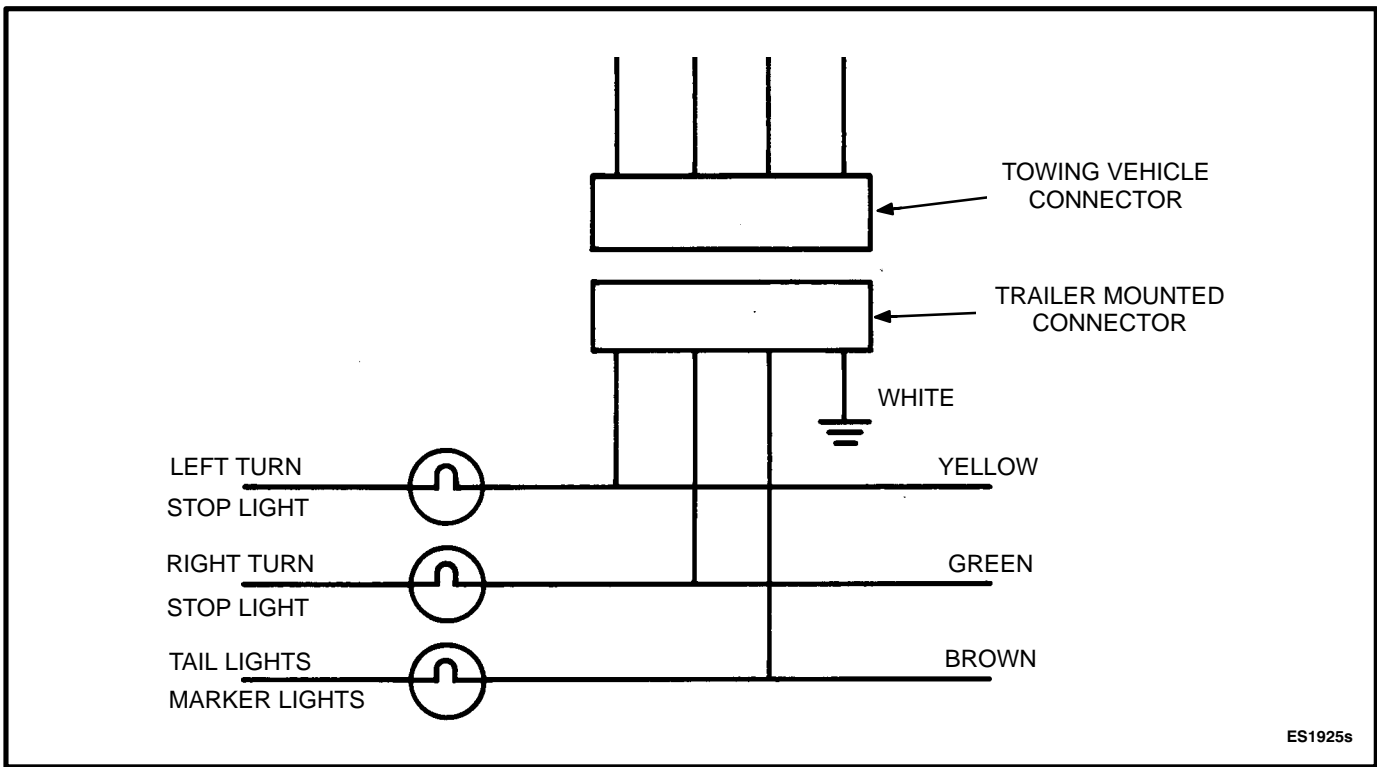
A Class IV trailer hitch must be attached to the vehicle. The hitch may be either the weight-carrying type or the weight-distribution type. Refer to Section 2, *Specifications* for the hitch ball size and genset weight.

The towing capacity of the hitch and ball must be equal or greater than the trailer gross weight. Sway control devices that restrict movement of the trailer tongue cannot be used, because the surge actuator of the trailer braking system must be free to telescope in response to braking requirements.

⚠WARNING *Improper towing practices or the use of substandard or incorrectly assembled towing components can lead to equipment damage, severe personal injury or death. Take care to use high-quality components and assemble them correctly when configuring a vehicle for towing. Make certain to follow the component manufacturers' instructions carefully when setting up a towing package.*

Taillight/Brake Light Connection

A multi-conductor brake/taillight connector is connected through the Quiet Site trailer tongue. Its mating connector is included with the genset, and must be wired into the towing vehicle's electrical system according to the diagram in Figure 3-1.



ES1925s

FIGURE 3-1. QUIET SITE TRAILER ELECTRICAL CONNECTIONS

Towing Vehicle Taillight Wiring

Connect the four-foot trunk connector (3 female, 1 male connection) to the towing vehicle as follows:

1. Make certain that the vehicle lights are OFF.
2. Connect the yellow wire to the left turn signal/stoplight wire in the left rear of the vehicle (truck bed, trunk, etc.) by stripping, soldering and taping the connection, or by using a wire tap device.
3. Connect the green wire to the right turn signal/stop light wire in the same way.
4. Connect the brown wire to the taillight wire.
5. Connect the white (ground) wire to the frame or body of the towing vehicle.

⚠ CAUTION *Many flashers for standard turn signals cannot carry the additional electrical load of trailer turn signals. It is possible that a standard-duty flasher may fail under the additional load of the trailer circuit. If normal taillight operation does not occur when the trailer is connected, obtain a heavy duty replacement flasher.*

Testing Light Circuit

1. Make certain that the white (ground) wire of the vehicle wiring harness is connected to the frame or body of the towing vehicle.
2. Turn on the vehicle headlight switch.
3. With the vehicle headlights in the ON position, the tail lights, side light markers, clearance lamps and identification lamps on the trailer should be lighted.
4. Start the engine of the vehicle and observe the rear lights on the set while someone pushes the brake pedal. The brake lights of the trailer and towing vehicle should light and go out with each application and release of the brake pedal.
5. Move the vehicle turn signal arm into the “left turn” position. The left turn light of the trailer and the towing vehicle should flash at the same time. If the trailer turn signal lights are reversed from those of the towing vehicle, the yellow and green wires of the vehicle connector may have been reversed. Correct this problem by reversing the yellow and green wire connections on the vehicle connector.

Make certain that the ground wires are firmly attached to the trailer and the towing vehicle.

Braking

The Quiet Site genset trailer has a “surge braking” system. When the towing vehicle slows down, the forward movement of the genset pushes against a mechanism in the trailer’s hitch, which actuates a hydraulic braking system on the trailer. A break-away cable is attached between this mechanism and the vehicle; if the towing vehicle and the trailer become accidentally separated due to equipment failure or improper connection of the trailer to the towing vehicle, this breakaway cable will part and the brakes on the trailer will be actuated, stopping the trailer. The Quiet Site trailer braking mechanism is adjusted at the factory to operate correctly.

Periodically check the brake fluid level in the master cylinder reservoir. Keep the master cylinder reservoir at least half full with DOT-3 hydraulic brake fluid.

Attaching the Trailer

This procedure begins with balancing the trailer weight by adjusting the height of the trailer tongue to the height of the hitch on the towing vehicle. Trailer towing will handle best with the trailer properly balanced.

⚠ WARNING *A reliable connection must be made between the trailer hitch and the tongue if the trailer is to be towed safely. Do not attempt to tow the trailer if the hitch or ball are damaged. Unsafe towing practices can cause severe personal injury or death if the trailer becomes unhitched.*

1. With the tongue of the trailer positioned at the same height of the towing vehicle hitch, check the weight of the trailer hitch. The trailer hitch weight should be between 400 and 600 lbs. (180 - 270 kg). If hitch weight is not within these limits, adjust the height of the tongue (see Figure 3-2) as follows:
 - A. Remove the four bolts that secure the tongue to the trailer frame.
 - B. To increase trailer hitch weight, position trailer tongue to next higher position and secure the tongue to the frame with the four bolts.
 - C. To decrease trailer hitch weight, position trailer tongue to the next lower position and secure the tongue to the frame with the four bolts.
2. Bring the rear of the towing vehicle up to the trailer hitch, so that the ball is directly under the trailer hitch.

- Turn the crank on the screwjack to lower the socket of the tongue onto the ball. Remove the pin that holds the trailer screwjack in its vertical position. Move the screwjack into its horizontal storage position and secure it with the pin.
- Ball hitch:** Tighten the wheel on the trailer tongue to secure the hitch ball in the tongue socket. Make certain that the ball latch is in the correct position to retain the ball, and that the hand wheel lock is clicking while tightening the hand wheel. (Press down on the hand wheel lock to loosen the hand wheel in order to unhitch the trailer.)

Lunette eye: Once the lunette eye is placed over the bottom part of the pintle hook, swing the top portion of the hook down onto the lower part, and secure it with the latch and cotter pin.

- Connect the safety chains to the hitch using a crossed pattern under the tongue. Attach the safety chains at the specific locations on the hitch provided for this purpose; never attach chains to the ball mount. The safety chains

should have some slack to permit sharp turns by the trailer, but should not drag on the roadway.

- Connect the breakaway S-hook to a secure point on the towing vehicle (one of the safety chain hook locations may be used). Should the breakaway be accidentally applied while unhitching, pry the spring clip out of the notch to release the lever (see Figure 3-2).

The breakaway system should only operate after both the coupling and safety chains have failed. The breakaway is not a parking brake.

⚠ WARNING *Do not use the breakaway system as a parking brake. Use blocks or chocks to immobilize the genset before operating it. Failure to properly immobilize the set may lead to severe personal injury or death.*

To disconnect the trailer from the towing vehicle, reverse the preceding steps.

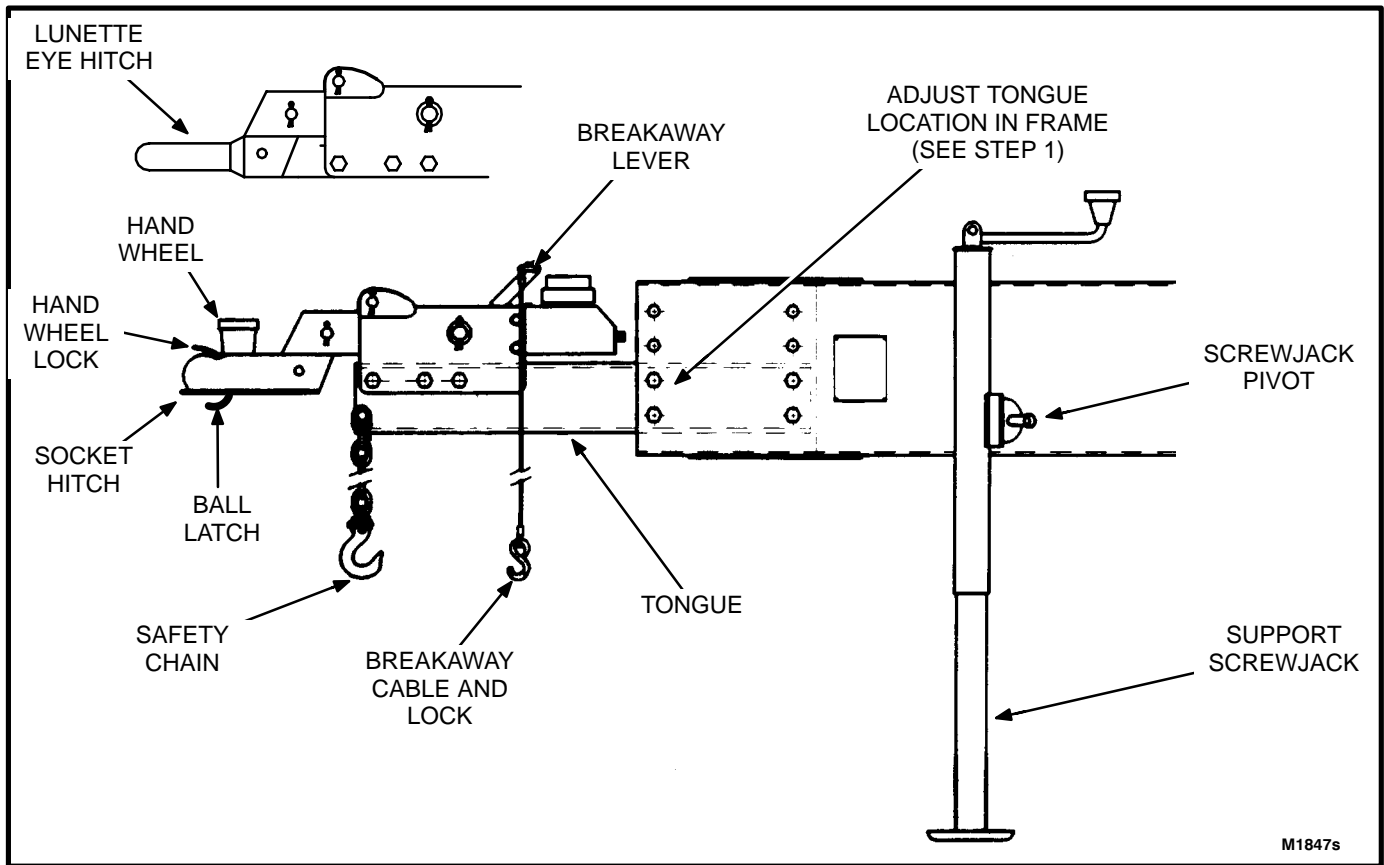


FIGURE 3-2. QUIET SITE TRAILER TONGUE

LOCATING AND POSITIONING THE GENSET

⚠WARNING *Do not attempt to operate the genset unless it is totally immobile. Failure to securely position the genset may lead to severe personal injury or death.*

Lifting Eye (Optional)

The lifting eye at the top of the genset provides a means to hoist the set to the proper location on a particular site, using a hook at the end of a crane or hoist. The gross weight of each of the genset versions is listed in Section 2, *Specifications*.

Position

Select a location for the genset that is level and firmly supported, and removed from any nearby fire hazard. Make certain that the genset is stationary, firmly supported, and as level as possible. The genset may be operated on a surface with as much as a fifteen-degree tilt in any direction from the horizontal; however, make certain to select the most level surface available for the set.

Using wheel blocks or chocks, block the wheels of the genset trailer to immobilize it before attempting to operate the genset. Also, lower rear stabilizers (optional) if provided on genset (see Figure 1-3).

Make certain that all sides of the set are accessible for routine maintenance. Make certain that all air vents and ducts are free of any obstructions.

Exhaust System

The Quiet Site exhaust is discharged upward, through the roof of the genset's enclosure. Make certain that there is at least 12 inches (305 mm) clearance between exhaust pipes and combustible materials, that all connections are tight, and that the exhaust will not be discharged in the vicinity of air ducts or inlets in areas that are occupied by people.

⚠WARNING *Exhaust gas can cause severe personal injury or death. Perform all procedures in accordance with Onan publications to minimize this risk. Do not smoke or allow fire, sparks, arcing equipment or pilot lights in the vicinity while refueling.*

Mechanical Check

Before operating the genset, check the set over for components that may have become loose or damaged by movement. Repair or replace such parts as required.

4. Mechanical Connections

The genset mechanical system installation consists of the following:

- Check ventilation and exhaust systems
- Check all mechanical connections
- Fill the coolant, lubrication and fuel systems
- Prime the fuel system

VENTILATION

The two genset-mounted radiators with engine-driven fans are standard on the genset. Air is pulled into the upper front of the genset housing and through the radiators and exits at the front top of the housing. Air is also routed through the engine and generator compartment and exits at the lower right front corner of the housing. Position the genset so that the air intake and exhaust grills are not blocked.

EXHAUST SYSTEM

Although the Quiet Site uses a self-contained exhaust system, use extreme care in positioning the genset exhaust outlet.

Locate the exhaust outlet away from air inlets to prevent exhaust gases from re-entering an enclosure or room. Exhaust installations are subject to various detrimental conditions such as extreme heat, infrequent operation, and light loads. Regularly inspect the exhaust system both visually and audibly so the entire system remains fume-tight and safe for operation.

⚠WARNING *Inhalation of exhaust gases can result in severe personal injury or death. Use extreme care during installation to maintain a tight exhaust system.*

MECHANICAL CHECK

The genset mechanical system includes fuel, exhaust, ventilation and cooling systems. These systems are self-contained within the genset assembly, making initial setup a relatively simple procedure. However, each of these systems should be checked before every startup. Visually check the genset for loose or damaged components and repair or replace as required.

COOLANT

Engine coolant is drained before shipment. Before starting, fill the cooling system with the recommended coolant according to Section 9, *Cooling System*.

LUBRICATION

Engine oil is drained before shipment. Before starting, fill the crankcase with the recommended oil according to Section 9, *Lubrication System*.

FUEL SYSTEM

In all fuel systems, cleanliness is of the utmost importance. Make every effort to prevent entrance of moisture, dirt or contaminants of any kind.

⚠WARNING *Spilled fuel presents the hazard of fire or explosion which can result in severe personal injury or death. Use extreme care when filling the genset fuel tank.*

The Quiet Site engine normally uses ASTM No. 2 Diesel fuel. Fill the fuel tanks with the recommended fuel, and prime the fuel system as described in Section 9, *Fuel System*.

DAY TANK CONTROLLER (OPTIONAL)

The day tank controller option provides the capability of attaching an auxiliary fuel tank to the main (on board) supply tank of the genset. The auxiliary fuel tank enables the genset to operate for an extended number of hours without refueling.

The main fuel tank of the genset is used as a day tank when the day tank controller is installed (see Figure 4-1). The day tank is used to control the flow of fuel between the auxiliary fuel tank and the genset.

The day tank controller includes a float switch and a fuel transfer pump. When the day tank on the genset is emptied, the float switch in the day tank turns on the transfer pump to refill the day tank from the

auxiliary tank. When the day tank is filled, the float switch will turn off the transfer pump, stopping the flow of fuel to the day tank.

Auxiliary Tank Location

The auxiliary tank must be located near the genset and within the transfer pump lift capability, but below the fuel injection system.

The auxiliary tank top must be below the main tank top to prevent siphoning from the auxiliary tank to the main tank.

⚠ CAUTION *Make certain that a minimum level of fuel is present at all times in the onboard tank. If air is present in the fuel lines, the engine fuel pump may be damaged or destroyed.*

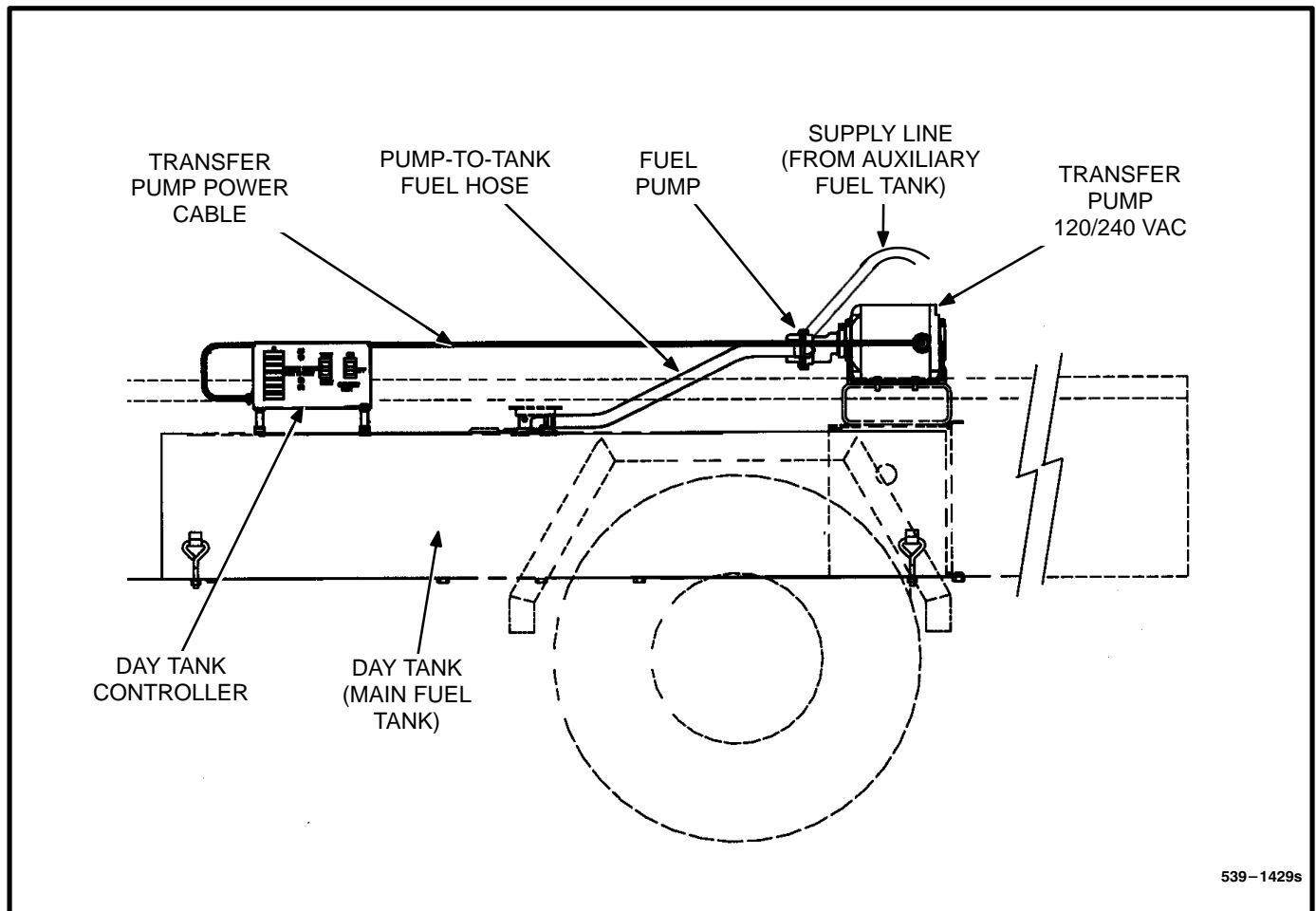


FIGURE 4-1. FUEL TANK CONTROL SYSTEM COMPONENTS

Auxiliary Tank Connection

The following procedure provides the information to connect the auxiliary fuel tank to the transfer pump inlet. The operator must provide the fuel line that is used between the transfer pump inlet and the auxiliary fuel tank.

⚠ WARNING *Generator sets use fuels that are highly flammable and explosive. Faulty installation can lead to leakage and ignition of fuel resulting in severe personal injury, death, and/or property damage. Carefully design and install the fuel system in accordance with all applicable codes.*

1. Pump suction head must not exceed 20 feet, including losses for pipe, valve and fitting friction and derating for altitude. Calculate head losses on the basis of rated pump flow (2 GPM).
2. Use black iron pipe and fittings between the trailer and the auxiliary fuel tank. Use a flexible section of tubing (code approved) between the iron pipe and the inlet of the transfer fuel pump inlet. This tubing should be the same type and size as used between the transfer pump outlet and the day tank.
3. It is recommended that an electric fuel shutoff valve be installed ahead of the pump to maintain pump prime when it is not pumping.

Terminals TB1-8 and TB1-5 (see Figure 4-3) are available for connection of a 120 or 240 VAC electric fuel shutoff valve rated not more than 0.5 amps. The voltage rating of the valve must correspond with the voltage utilized for the pump (see *Day Tank Controller Power Connection* procedure in this section).

⚠ CAUTION *Do not use galvanized fuel lines, fittings or tanks. Condensation in the tank and lines combines with sulfur in the fuel to produce sulfuric acid. The sulfuric acid reacts with the zinc in the galvanized coating and contaminates the fuel.*

Do not use copper tubing for diesel fuel lines. Diesel fuel polymerizes (thickens) in copper tubing during long periods of standby and will clog the fuel injectors.

4. Route the fuel line from the auxiliary fuel tank to the transfer pump. It will be necessary to punch, drill or cut a hole in the genset access cover for this fuel line (refer to the Load Cable/Day Tank Fuel Line Access procedure in Section 5).
5. Once the line is run through this hole and secured in place, the hole must be sealed using RTV or equivalent substance for the genset to retain its sound-insulated qualities.
6. Use pipe thread sealant at each fitting.
7. Attach the external fuel line to the transfer pump inlet. Make certain that the fuel line is tightly connected to the fitting on the fuel transfer pump.
8. Read *Day Tank Control System* in Section 6 before operating the pump control. The transfer pump is self priming. The fuel line length will determine the length of time the pump motor must run to prime the system.
9. Run the genset through several pump-on and pump-off cycles to make sure that the day tank installation is working properly. Observe all of the precautions in Section 7, *Operation*. Fix all fuel leaks before placing the genset in service.

Day Tank Controller Power Connection

Quiet Site gensets with factory-mounted day tank pumps and controllers require that the operator attach power connections to the controller circuit board. AC power to the controller circuit board can be either from the genset or an external source. If the genset is being used in a standby configuration, the day tank controller (see Figure 4-2) should be powered by the emergency bus.

The AC power to the day tank controller can be either 240 VAC or 120 VAC. The factory-mounted day tank controller is shipped in a 240 VAC configuration.

The following procedure provides the information to configure the day tank controller for either 240 VAC or 120 VAC and to attach the AC wires of either voltage level to the day tank controller. See page 11-3 when making connections at the control box terminal board.

⚠ WARNING *Accidental starting of the generator set while working on it can cause severe personal injury or death. Prevent accidental starting by disconnecting the starting battery cables (negative [-] first).*

Arcing can ignite the explosive hydrogen gas given off by batteries, causing severe personal injury. Arcing can occur if the negative (-) battery cable is connected and a tool being used to connect or disconnect the positive (+) battery cable accidentally touches the frame or other grounded metal part of the set. To prevent arcing, always remove the negative (-) cable first, and reconnect it last.

⚠ CAUTION *Always disconnect a battery charger from its AC source before disconnecting the battery cables. Otherwise, disconnecting the cables can result in voltage spikes high enough to damage the DC control circuits of the set.*

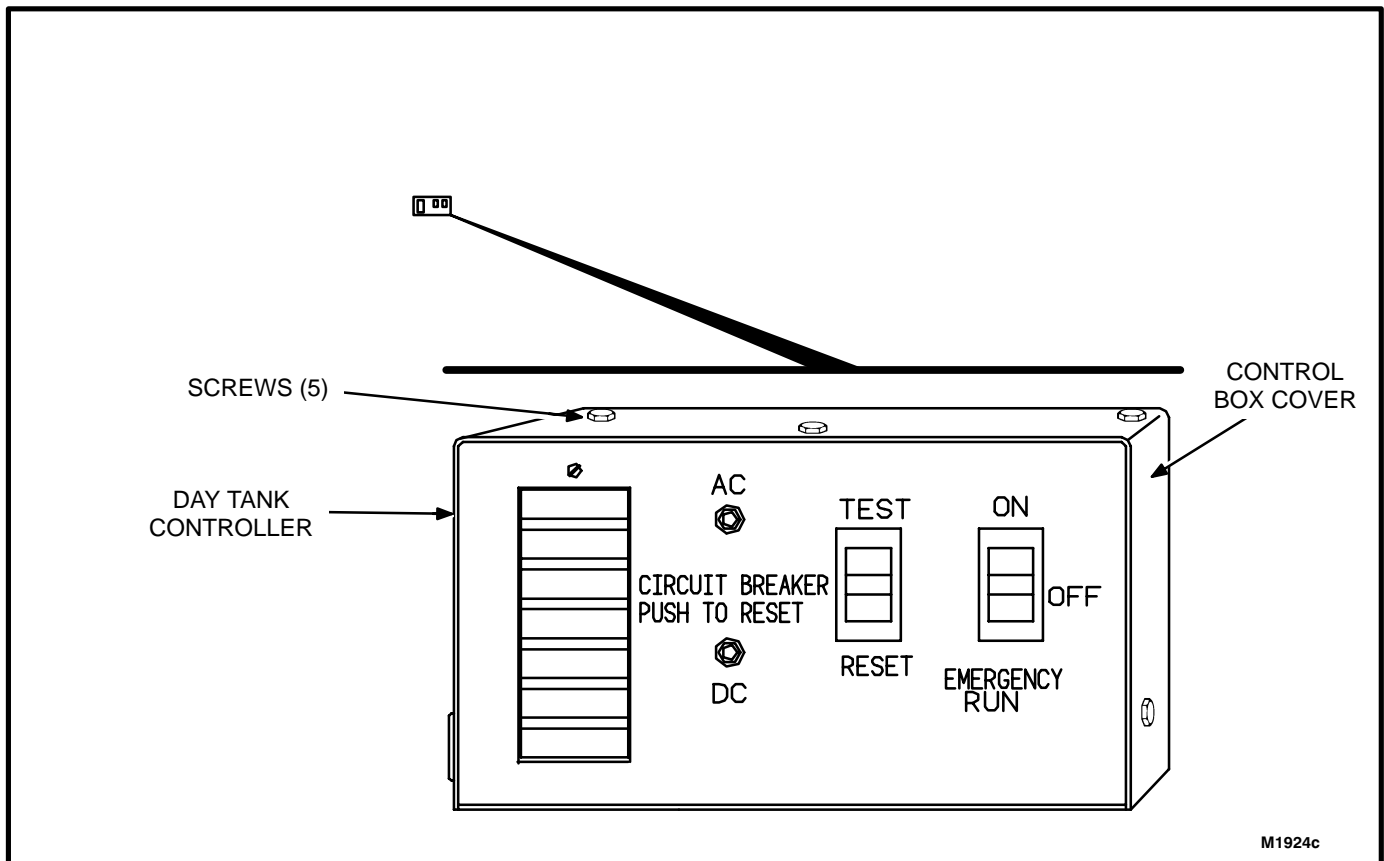


FIGURE 4-2. DAY TANK CONTROLLER

1. Disconnect the battery cables at the battery terminals to prevent accidental starting of the genset. Disconnect the negative (-) cable first.
2. Remove the five screws that secure the control box cover to the control box and remove the control box cover (see Figure 4-2).
3. Check terminal block TB1. Make sure that TB1 is configured for the proper AC input voltage.

To convert the day tank controller from 240 VAC to 120 VAC, perform the following steps.

- A. Remove the two jumpers between terminals **TB1-6** and **TB1-7** in the control box and connect one between terminals **TB1-5** and **TB1-6** and the other between terminals **TB1-7** and **TB1-8**.
- B. Move selector switch **S103** on the control PCB to the up position for 120V.
- C. If the control is equipped with a transformer, remove the two jumpers between terminals **H2** and **H3** and connect one between **H1** and **H3** and the other between **H2** and **H4**.

To convert the day tank controller from 120 VAC to 240 VAC, perform the following steps.

- A. Remove the jumpers between terminals **TB1-5** and **TB1-6**, and **TB1-7** and **TB1-8** in the control box and connect the two jumpers between terminals **TB1-6** and **TB1-7**.
 - B. Move selector switch **S103** on the control PCB to the down position for 240V.
 - C. If the control is equipped with a transformer, remove the jumpers between terminals **H1** and **H3**, and **H2** and **H4** and connect the two jumpers between **H2** and **H3**.
4. To connect the 120 or 240 VAC input power to the day tank pump and controller, open the circuit clamps on the left side of the day tank control box and pass the conductors through to the inside of the box.

5. In a 120 VAC system, connect positive to **T1**, neutral to **T2**, and earth ground to **T3** on **TB1**.
In a 240 VAC system, connect line 1 to **T1**, line 2 to **T4**, and earth ground to **T3** on **TB1**.
6. Tighten the clamps to secure the lines.
7. If a two lead wiring harness is provided, the control does not include a power transformer. To provide 24 VDC for the control circuit, connect terminal **TB1-19** to the positive (+) terminal of the 24 V starter motor solenoid and terminal **TB1-20** to the negative (-) terminal.
8. To immediately shut down the engine when the **LO SHUTDOWN** light comes on, connect terminal **TB1-14** to a good grounding point on the engine block and terminal **TB1-15** to terminal **TB2-16** on the engine control monitor board (ECM).
9. Terminals **TB1-10** through **TB1-17** and **TB2-23** through **TB2-27** are available for connections to remote annunciators.
10. Terminal **TB2-22** is available for connection of a grounding signal to activate the blank red light.
11. Terminals **TB1-8** and **TB1-5** are available for connection of a 120 or 240 VAC electric fuel shutoff valve rated not more than 0.5 amps. The voltage rating of the valve must correspond with the voltage utilized for the pump. See Step 13.
12. Install the control box cover and secure it to the control box with the five screws.
13. Attach a tag to the control box indicating the supply voltage.
14. Connect the battery cables to the battery terminals. Connect the positive (+) cable first.

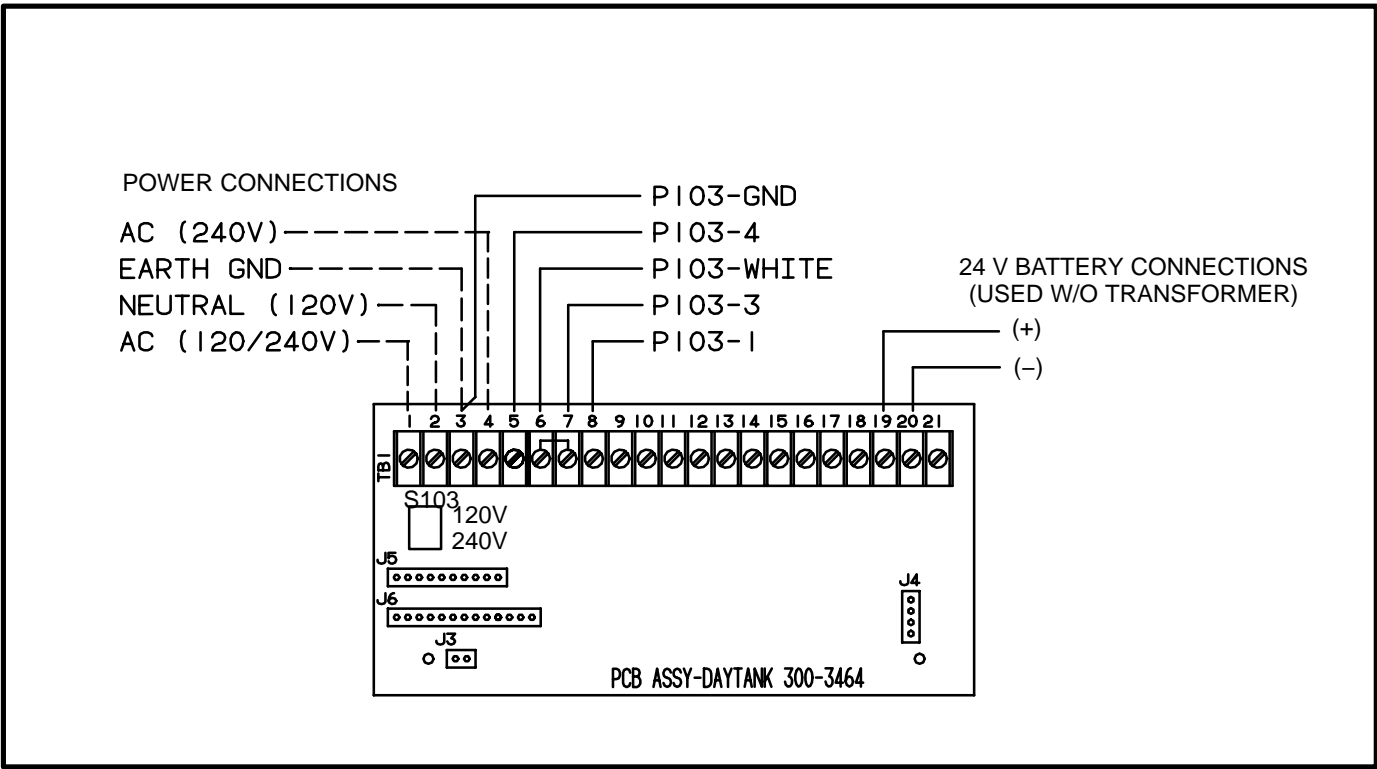


FIGURE 4-3. DAY TANK CONTROLLER TERMINAL CONNECTIONS

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5. Electrical Preparation

The following paragraphs contain the procedures that are used to connect the electrical system of the genset.

⚠WARNING *Each of the operations described in this section should be done only by persons trained and experienced in electrical maintenance. Improper procedures may result in property damage, bodily injury or death.*

Connecting the genset electrical system involves:

- Installation of transfer switch (standby service only)
- Generator voltage connections
- Load connection
- Control wiring
- Battery connection

Local regulations often require that wiring connections be made by a licensed electrician, and that the installation be inspected and approved before operation. All connections, wire sizes, materials used, etc. must conform to the requirements of electrical codes in effect at the installation site.

Before starting the genset, verify that all electrical connections are secure, and that all wiring is complete. Replace and secure any access panels that have been removed during installation. Check that the load cables from the genset are properly connected.

⚠WARNING *Backfeed to utility system can cause electrocution or property damage. Do not connect to any building electrical system except through an approved device and after building main switch is opened.*

TRANSFER SWITCH

If the installation is for standby service, a transfer switch must be used for switching the load from the normal power source to the genset (see Figure 5-1). Either a manual or automatic transfer switch may be used. Follow the installation instructions provided with the transfer switch when connecting the load and control wiring.

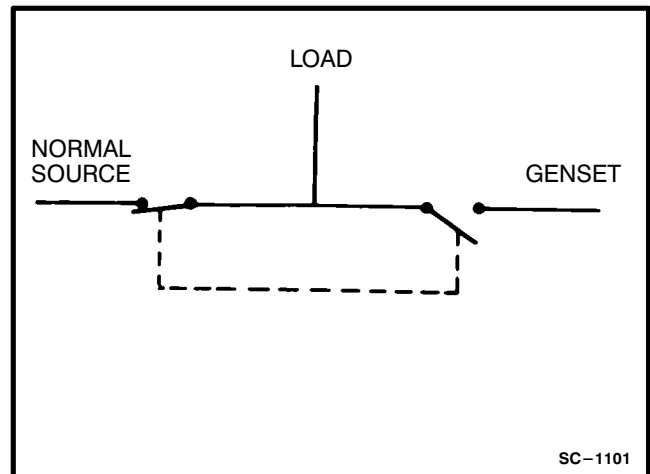


FIGURE 5-1. TYPICAL LOAD TRANSFER FUNCTION

GENERATOR VOLTAGE CONNECTIONS

The generator output voltages and maximum current rating are specified on the generator nameplate. Line-to-neutral voltage is always the lower voltage shown on the nameplate. Line-to-line voltage is the higher rating.

These generators can be configured for the voltages shown in the Reconnections Diagram (see pages 11-4 and 11-5). Before shipping, the generators are normally connected at the factory to produce a specified voltage per customer order. **The installer must always check the stator lead terminal block connections and perform any necessary reconnections to obtain the desired voltage.**

Refer to the Reconnection Diagram (see pages 11-4 and 11-5) when reviewing the voltage connection information, and use the electrical schematic supplied with your genset when actually performing load connections.

⚠CAUTION *Reconnecting factory connected generator sets to lower voltages may reduce set ratings, and also render line circuit breakers too small. Consult with your distributor before performing reconnection for different voltage.*

The 12 leads from the generator are connected to a stator lead terminal block (see Figure 5-3) that is mounted to the top of the generator housing. These 12 leads are labeled T1 through T12 and must be connected correctly before making load connections.

Use the following procedure to reconnect the generator output leads to select the desired output voltage.

⚠WARNING *Accidental starting of the generator set while working on it can cause severe personal injury or death. Prevent accidental starting by disconnecting the starting battery cables (negative [-] first).*

Arcing can ignite the explosive hydrogen gas given off by batteries, causing severe personal injury. Arcing can occur if the negative (-) battery cable is connected and a tool being used to connect or disconnect the positive (+) battery cable accidentally touches the frame or other grounded metal part of the set. To prevent arcing, always remove the negative (-) cable first, and reconnect it last.

⚠CAUTION *Always disconnect a battery charger from its AC source before disconnecting the battery cables. Otherwise, disconnecting the cables can result in voltage spikes high enough to damage the DC control circuits of the set.*

If optional AC ammeter is installed, refer to heading **Current Transformers** in this section, before starting the generator voltage connection procedure.

1. Open the upper rear access door (see Figure 5-2). Grasp the handle of the latch assembly and pull outward to open the access door.
2. Loosen the six captive panel screws that secure the generator control panel cover to the control panel and open the cover.

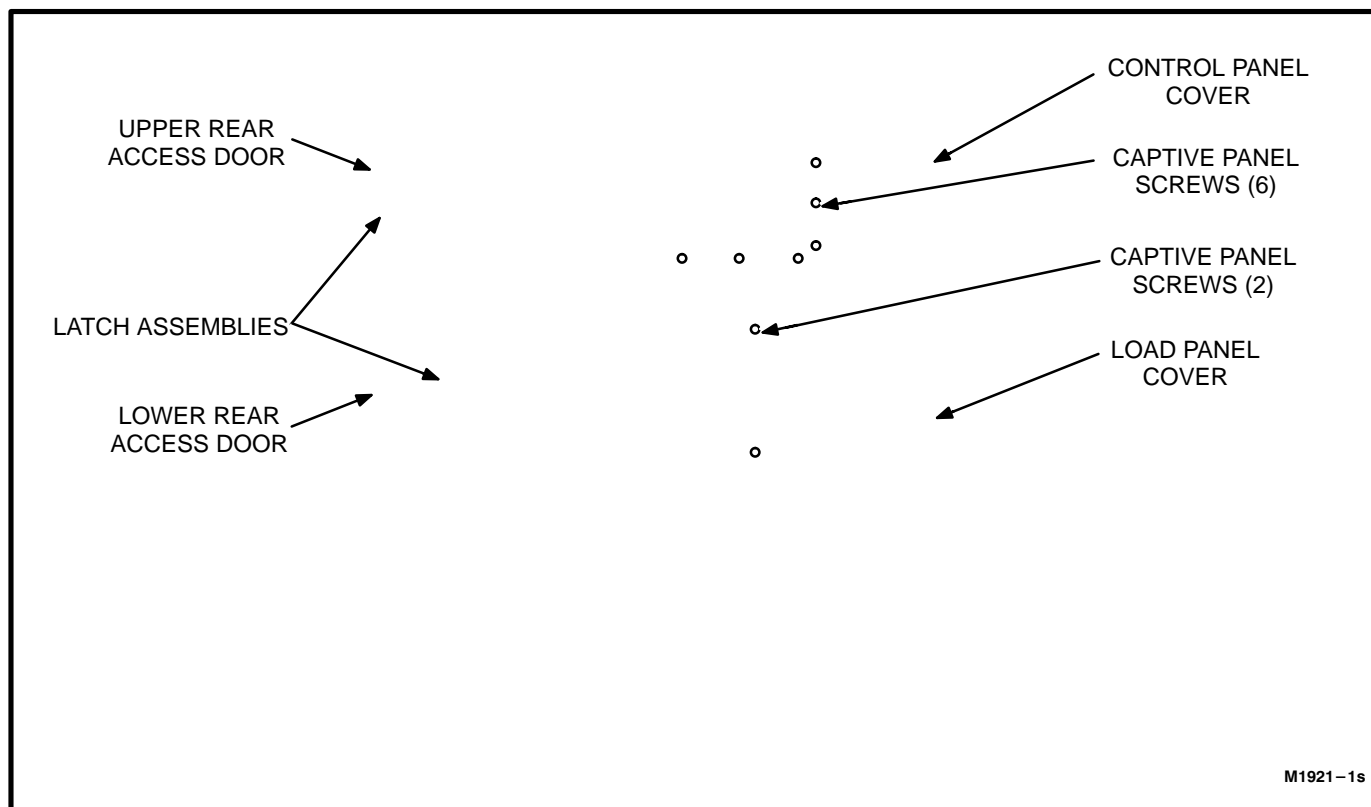


FIGURE 5-2. GENSET REAR PANELS

3. Remove the appropriate generator leads that are attached to the stator lead terminal block (see Figure 5-3) and reconnect the leads for the desired output voltage. See pages 11-4 and 11-5 for typical connections at the stator lead terminal block.
4. Remove the appropriate lead from the current transformers (see Figure 5-4) and reconnect the lead to the appropriate terminal (T2 or T3). See pages 11-4 and 11-5 for typical connections at the current transformers.
5. Close the generator control panel cover and secure it to the control panel with the six captive panel screws.
6. Close the upper rear access door and verify that the door is locked.

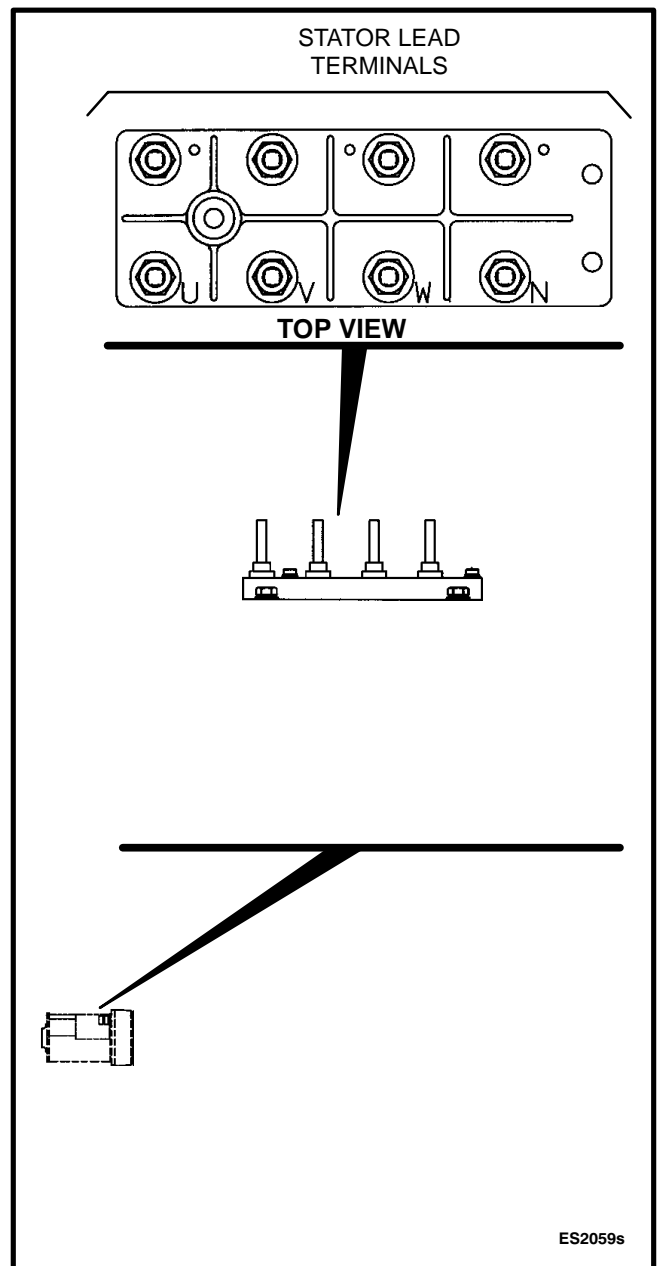


FIGURE 5-3. STATOR LEAD TERMINAL BLOCK

Current Transformers

When changing the output voltage of a genset that contains an optional AC ammeter, the generator output leads that are routed through the current transformers (CT) (see Figure 5-4) and the two wires that are attached to the CT terminals T1, T2 or T3, must be changed for proper meter operation.

The transformers are identified CT21, CT22, and CT23 (three phase only) on the wiring diagram and electrical schematics. Refer to pages 11-4 and 11-5 to identify the output leads that must be routed through each transformer and how the two meter wires are attached to the CT terminals T1, T2 and T3.

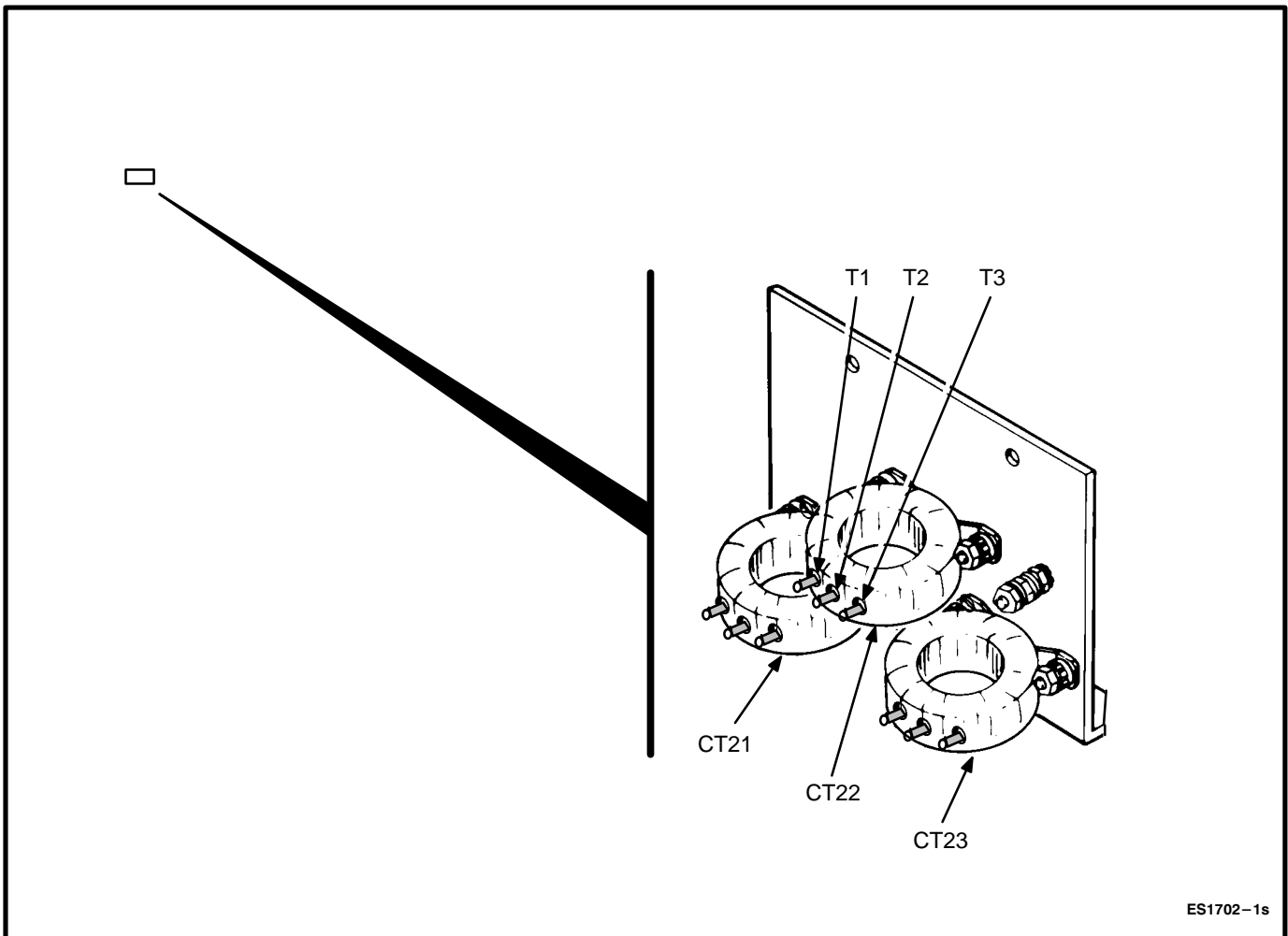


FIGURE 5-4. CURRENT TRANSFORMERS

LOAD CONNECTION

⚠ WARNING *Backfeed to utility system can cause electrocution or property damage. Do not connect to any building electrical system except through an approved device and after building main switch is opened.*

When connecting loads to the genset, balance the loads so that the current flow from each line terminal (L1, L2 and L3) is roughly the same. This is especially important if both single phase and three phase loads are connected. Any combination of single phase and three phase loading may be used as long as all line currents are roughly the same (within 10 percent of median value) and no line current exceeds the nameplate rating of the generator. Check the current flow from each load cable after connections are made, by observing the control panel ammeter.

Load connections to the genset will vary between the standard genset and the addition of the following options.

- Stator Lead Terminal Block (standard genset load connection)
- Optional Main Circuit Breaker Box (without terminal block load connection option)
- Optional Terminal Block Load Connection

The following sections provide the procedures to connect the load cables for each of the three genset configurations.

Stator Lead Terminal Block Load Connection

⚠ CAUTION *Phase rotation of the genset and utility must be the same. Equipment damage can occur. Check and reconnect as necessary.*

For all prime power or construction site gensets, check the rotation of every 3-phase motor before loading and reconnect if necessary.

In a standard genset configuration, all loads are connected to the generator by bolting the load cables to the appropriate terminals on the stator lead terminal block (Figure 5-6). The terminals are stamped U, V, W and N to indicate the line and neutral connections. (Reference: U, V, and W correspond with L1, L2 and L3; and N with L0 respectively).

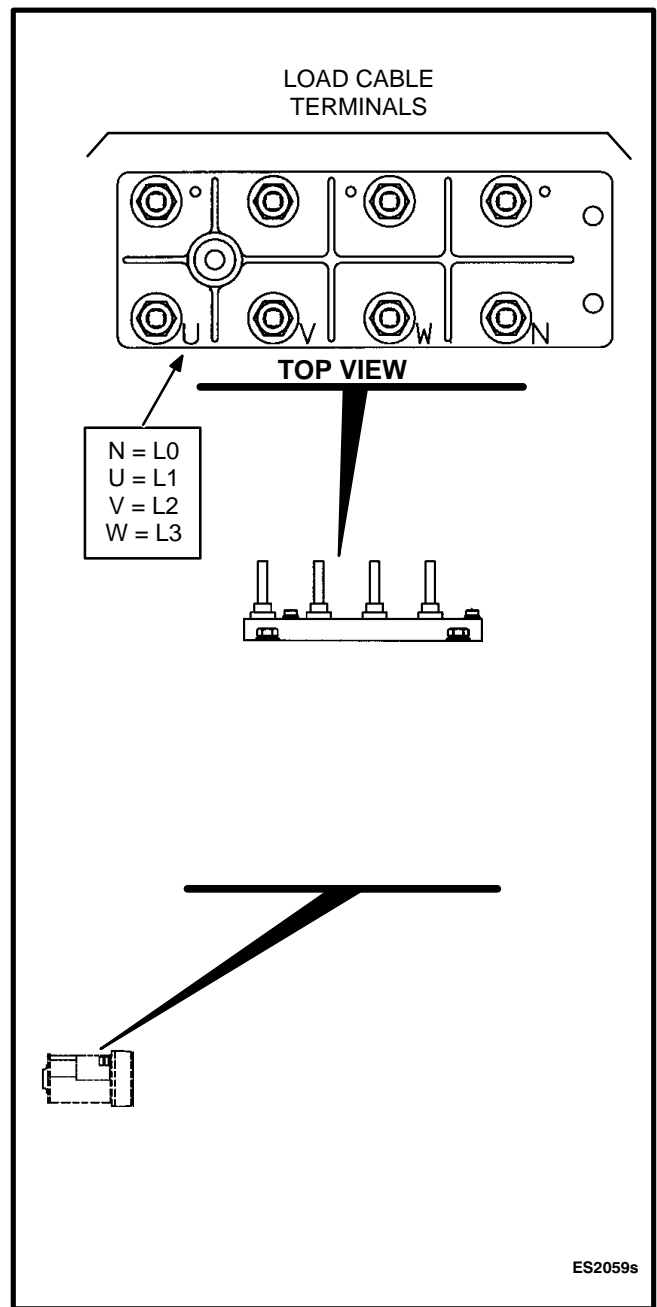
Use the following procedure to connect the load cables in a standard genset configuration.

⚠ WARNING *Accidental starting of the generator set while working on it can cause severe personal injury or death. Prevent accidental starting by disconnecting the starting battery cables (negative [-] first).*

Arcing can ignite the explosive hydrogen gas given off by batteries, causing severe personal injury. Arcing can occur if the negative (-) battery cable is connected and a tool being used to connect or disconnect the positive (+) battery cable accidentally touches the frame or other grounded metal part of the set. To prevent arcing, always remove the negative (-) cable first, and reconnect it last.

⚠ CAUTION *Always disconnect a battery charger from its AC source before disconnecting the battery cables. Otherwise, disconnecting the cables can result in voltage spikes high enough to damage the DC control circuits of the set.*

1. Open the upper rear access door. Grasp the handle of the latch assembly and pull outward to open the access door (see Figure 5-2).
2. Loosen the six captive panel screws that secure the generator control panel cover to the control panel and open the cover.
3. Route the load cables up into the housing of the genset (refer to the Load Cable/Day Tank Fuel Line Access procedure in this section for load cable routing instructions).
4. Attach the load cables to the stator lead terminal block (see Figure 5-6).
5. Close the generator control panel cover and secure it to the control panel with the six captive panel screws.
6. Close the upper rear access door and verify that the door is locked.



**FIGURE 5-6. LOAD CONNECTION TO STATOR
LEAD TERMINAL BLOCK**

Optional Main Circuit Breaker Load Connection

CAUTION Phase rotation of the genset and utility must be the same. Equipment damage can occur. Check and reconnect as necessary.

For all prime power or construction site gensets, check the rotation of every 3-phase motor before loading and reconnect if necessary.

Use the following procedure to connect the load cables to the optional main circuit breaker (see Figure 5-7). (This is required on gensets that do not contain the terminal block load connection option as shown in Figure 5-8.)

WARNING Accidental starting of the generator set while working on it can cause severe personal injury or death. Prevent accidental starting by disconnecting the starting battery cables (negative [-] first).

Arcing can ignite the explosive hydrogen gas given off by batteries, causing severe personal injury. Arcing can occur if the negative (-) battery cable is connected and a tool being used to connect or disconnect the positive (+) battery cable accidentally touches the frame or other grounded metal part of the set. To prevent arcing, always remove the negative (-) cable first, and reconnect it last.

CAUTION Always disconnect a battery charger from its AC source before disconnecting the battery cables. Otherwise, disconnecting the cables can result in voltage spikes high enough to damage the DC control circuits of the set.

1. Open the lower rear access door. Grasp the handle of the latch assembly and pull outward to open the access door (see Figure 5-2).
2. Loosen the two captive panel screws that secure the generator load panel cover to the genset frame and open the load panel.
3. Route the load cables up into the housing of the genset (refer to the Load Cable/Day Tank Fuel Line Access procedure in this section for load cable routing instructions).
4. Attach the load cables to the base of the optional main circuit breaker as shown in Figure 5-7.
5. Close the generator load panel cover and secure it to the genset frame with the two captive panel screws.
6. Close the lower rear access door and verify that the door is locked.

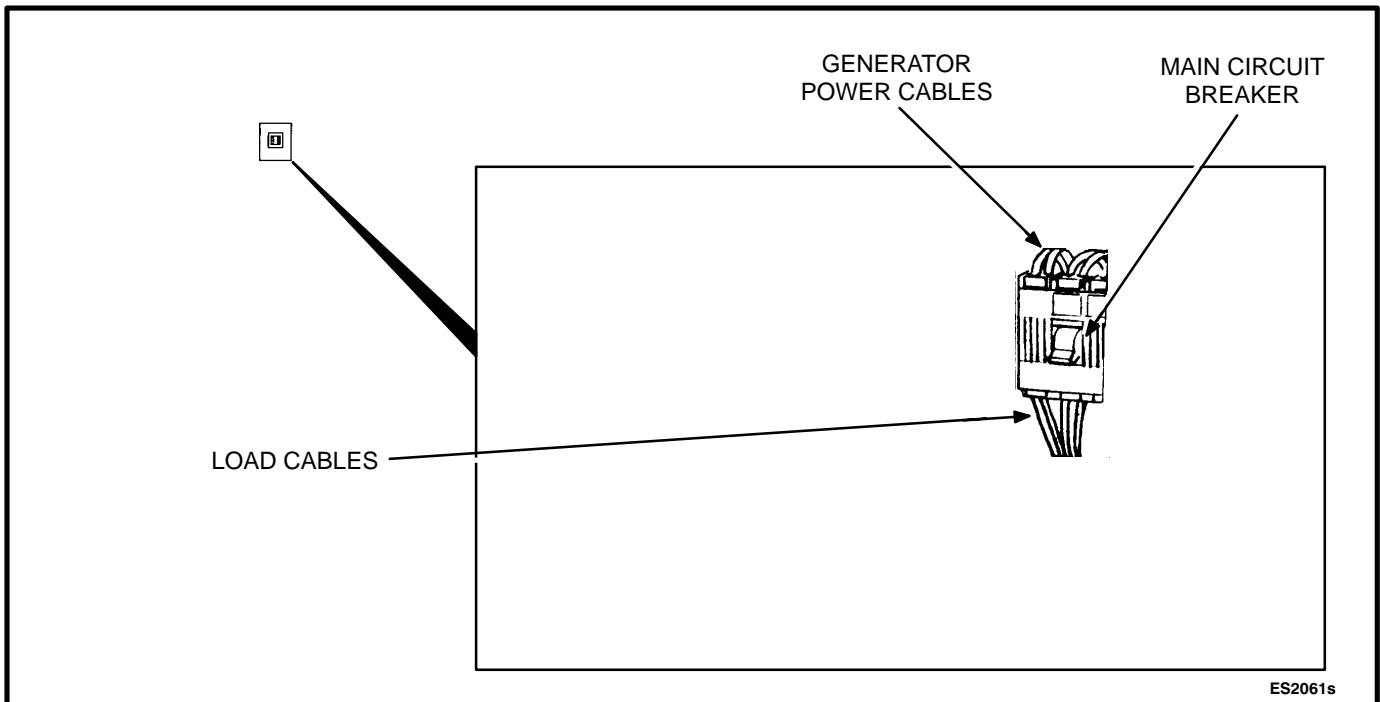


FIGURE 5-7. LOAD CONNECTION TO MAIN CIRCUIT BREAKER

Optional Terminal Block Load Connection

CAUTION Phase rotation of the genset and utility must be the same. Equipment damage can occur. Check and reconnect as necessary.

For all prime power or construction site gensets, check the rotation of every 3-phase motor before loading and reconnect if necessary.

Use the following procedure to connect the load cables to the optional terminal block (see Figure 5-8).

WARNING Accidental starting of the generator set while working on it can cause severe personal injury or death. Prevent accidental starting by disconnecting the starting battery cables (negative [-] first).

Arcing can ignite the explosive hydrogen gas given off by batteries, causing severe personal injury. Arcing can occur if the negative (-) battery cable is connected and a tool being used to connect or disconnect the positive (+) battery cable accidentally touches the frame or other grounded metal part of the set. To prevent arcing, always remove the negative (-) cable first, and reconnect it last.

CAUTION Always disconnect a battery charger from its AC source before disconnecting the battery cables. Otherwise, disconnecting the cables can result in voltage spikes high enough to damage the DC control circuits of the set.

1. Open the lower rear access door. Grasp the handle of the latch assembly and pull outward to open the access door.
2. Lift up on the bottom of the red access cover to expose the L0 through L3 terminals (see Figure 5-8).
3. Bolt the load cables directly to the L0, L1, L2 and L3 terminals. Use 3/8 - 16 inch bolts with the correct nuts and washers.
4. Close the red access cover.
5. Close the lower rear access door and verify that the door is locked.

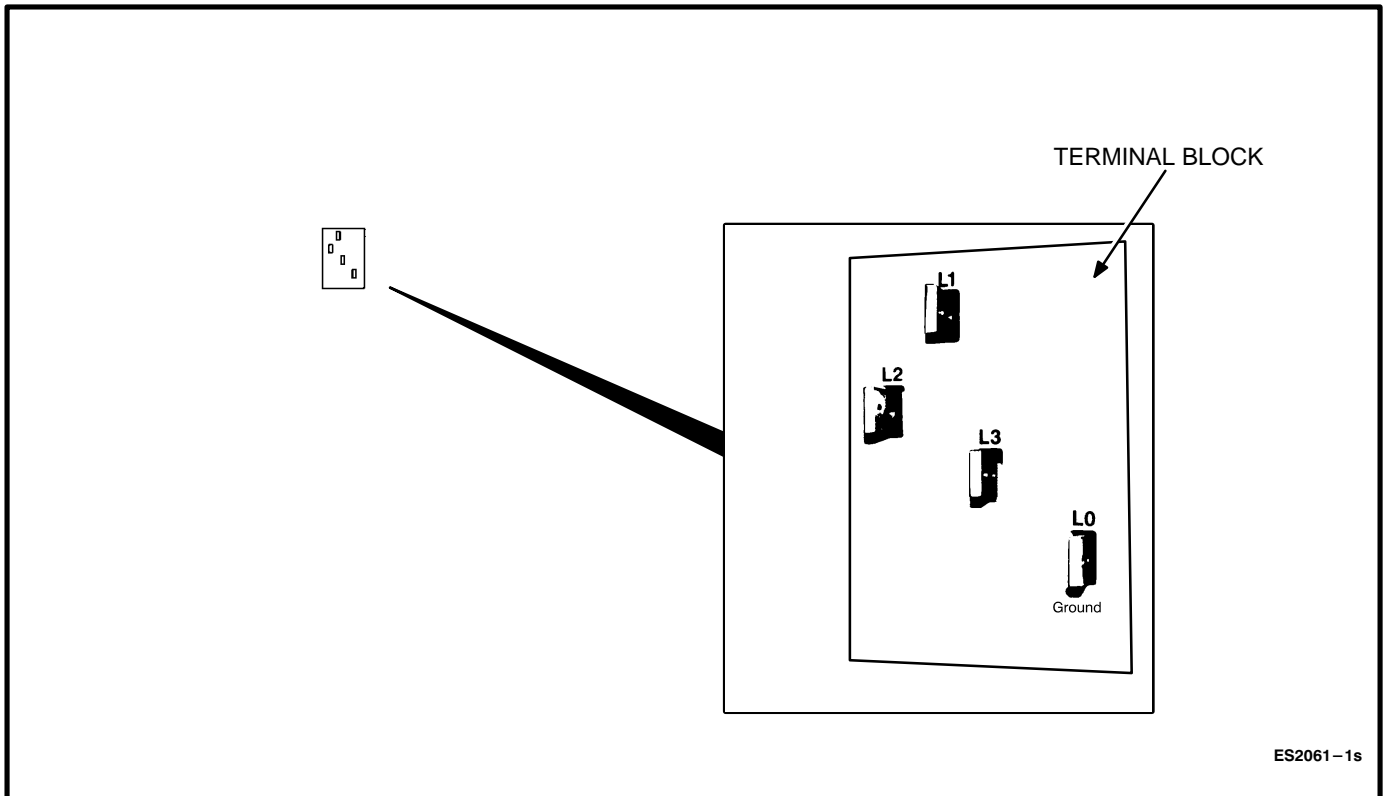


FIGURE 5-8. TERMINAL BLOCK LOAD CONNECTION

LOAD CABLE/DAY TANK FUEL LINE ACCESS COVER

⚠WARNING *Electrical shock can cause severe personal injury or death. After cutting an opening in the Quiet Site housing for electrical cables, make certain to dull or cover any sharp edges. The sharp edges of an opening in the housing can damage electrical insulation, creating a shock hazard. Make certain that the edges of any openings in the housing are smooth, and that the load cables are protected from direct contact with the edges of any openings. Add a grommet or edge strip around the opening to protect the cables.*

The access cover is a square metal plate that is located at the bottom and in the lower right-hand corner of the genset housing (see Figure 5-9). This cover is held in place with six screws to allow the cover to be removed for easier modification.

The access cover must be modified on gensets that contain the day tank option or if the lower rear access door does not contain the optional cut-out for the load cables. (Load cable access is provided only on gensets that contain the optional terminal block load connection panel, Figure 5-8.)

Use the following procedure to remove, modify, and replace the access cover.

1. Remove the six screws that secure the access cover to the base of the trailer and remove the access cover. Screw heads are located inside genset.
2. Make the smallest possible opening in the access cover for the load cables and/or the day tank fuel line. This will allow the least noise to emerge from the genset.
3. File off or bend back any sharp edges in the opening, so as not to endanger the insulation on the load cables or cut the fuel line. It is also recommended that a protective material, such as a plastic grommet or nylon channel be used in the panel openings to protect the cables and fuel line.
4. Install the access cover and secure the access cover to the trailer with the six screws.
5. Insert and secure the load cables and the fuel line into the set.
6. Once the load cables and fuel line are in place, seal the access hole(s) using RTV or silicone sealant. The sealant is used to retain the sound-insulated qualities of the genset.

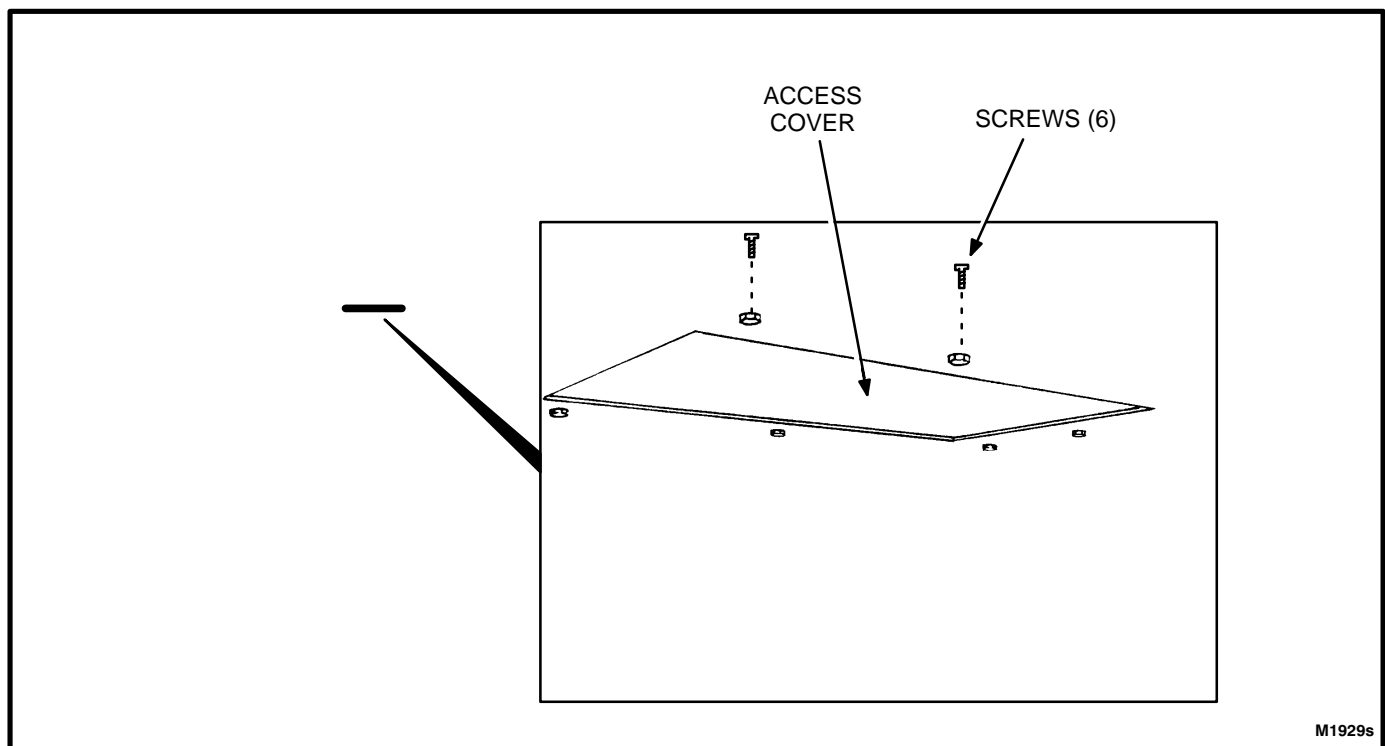


FIGURE 5-9. LOAD CABLE/DAY TANK FUEL LINE ACCESS COVER

GROUNDING

⚠WARNING *Contact with electrical equipment can result in severe personal injury or death. It is extremely important that bonding and equipment grounding be properly done. All metallic parts that could become energized under abnormal conditions must be properly grounded.*

Grounding involves making a conductive connection between the metal parts of the genset (see Figure 5-11) or one of its electrical circuits and the earth. The design and installation of a grounding system is affected by many factors, including the use of multiple transformers, ground fault protection requirements, and the physical location of the generator. Follow the recommendations of the consulting engineer when installing the grounding system.

Typical requirements for bonding and grounding are given in the National Electrical Code, Article 250. All connections, wire sizes, etc. must conform to the requirements of the electrical codes in effect at the installation site.

CONTROL HEATER (OPTIONAL)

A control heater (Figure 5-12) provides a means of humidity/temperature control of the control box interior to protect the components and ensure their effectiveness when the genset is subjected to varying ambient air conditions during extended periods of nonuse. The element is controlled by an adjustable thermostat.

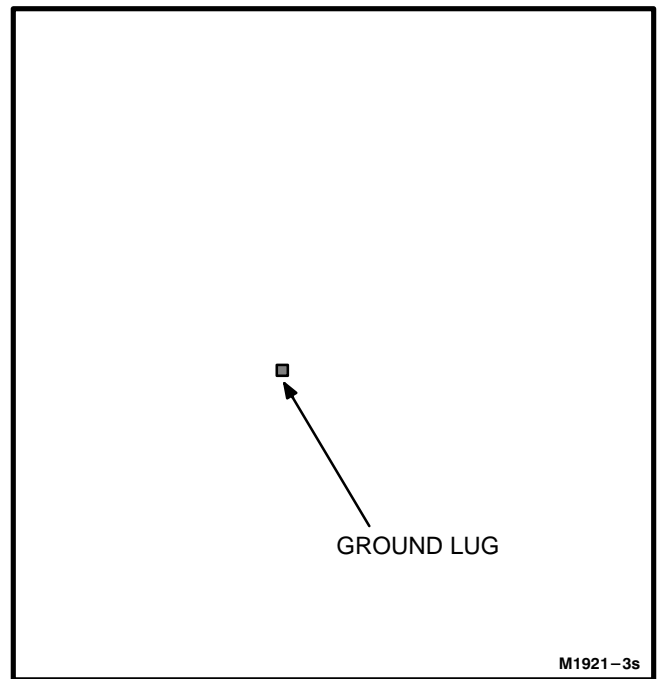


FIGURE 5-11. GENSET GROUND LUG LOCATION

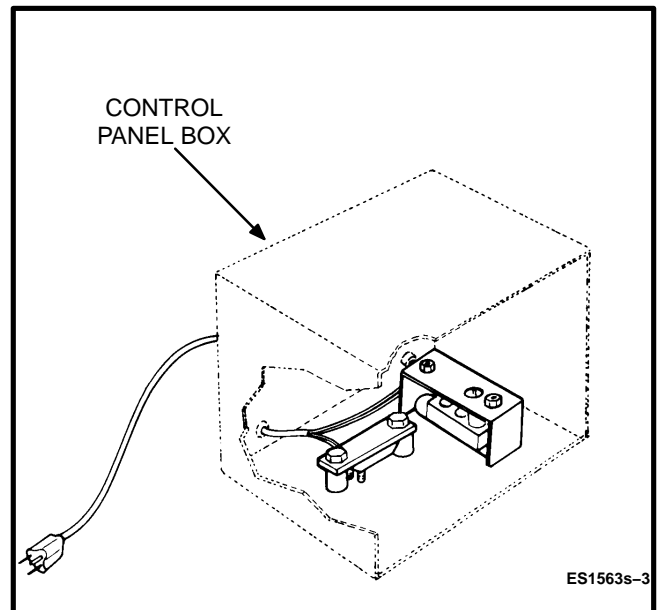


FIGURE 5-12. CONTROL HEATER

CONTROL WIRING

The genset control panel box (Figure 5-13) provides connection points for remote control and monitor options.

If the distance between the genset and the remote station is less than 1000 feet (305 m), use 18 gauge stranded copper wire. If the distance is 1000 to 2000 feet (305 to 610 m), use 16 gauge stranded copper wire. Always run control circuit wiring in a separate metal conduit from AC power cables to avoid inducing currents that could cause problems within the control.

Remote Control Connections

Provision is made inside the control box for addition of optional remote control starting and alarm systems. Connections are made at the terminal block (TB1) that is located on the engine control monitor board (A11) (see Figure 5-13). Connect one or more remote switches across the remote terminal and the B+ terminal. See Page 11-6 for typical connections at TB1 of the engine control monitor board.

Remote Monitor Connections

There are two methods in which the monitor wires of a remote annunciator can be attached to the control box terminals.

If the monitor circuits of the remote annunciator are not powered by a separate AC or DC source, power

must be supplied to the annunciator by the genset. This is accomplished by attaching the monitor wires from the remote annunciator to TB2 of the engine control monitor board.

If a separate AC or DC source is available to power the monitor circuits of the remote annunciator, the control wiring is attached to the optional interface relay modules.

The following sections describe both methods of installing the wiring for the monitor options.

⚠ WARNING *High voltages in the control panel box present an electrical shock hazard which can cause severe personal injury or death. Refer to the Safety Precautions page.*

⚠ CAUTION *Do not install DC control wiring in the same conduit as the AC power. AC voltage-induced currents can create operational problems with electronic solid-state devices.*

Remote Monitor Connections (Engine Monitor Board, TB2): Provision is made inside the control box to add optional remote monitoring to a genset that contains the optional Detector 12 Control (12 light panel). Connections are made on the terminal block (TB2) located on the engine monitor circuit board (A11). See Page 11-6 for typical connections at TB2 of the engine control monitor board.

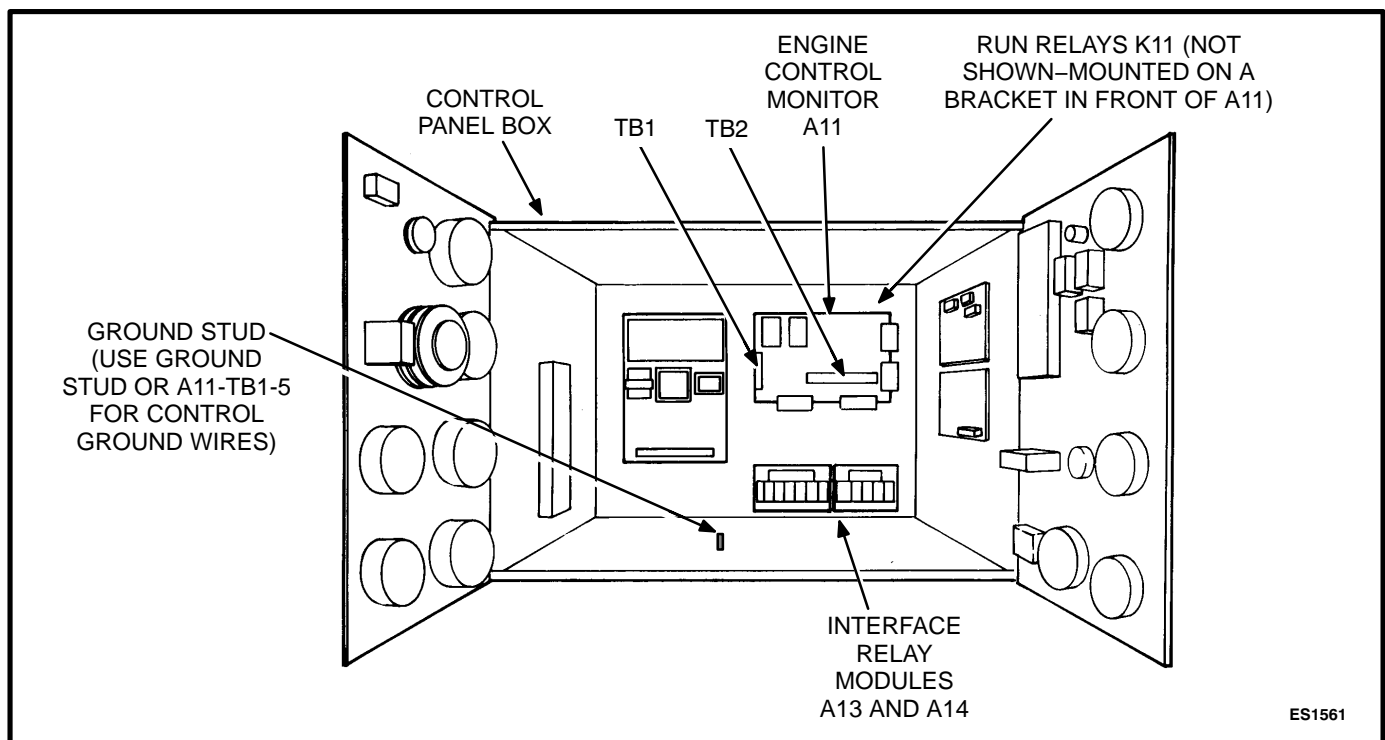


FIGURE 5-13. REMOTE CONTROL AND REMOTE MONITOR CONNECTIONS

Remote Monitor Connections (Optional Interface Relay Modules A13 and A14): These optional relay modules are used to operate a remote alarm annunciator that has an independent power source. As add-on circuit boards, they interface with the remote annunciator signals from the engine control monitor (A11) circuits (Figure 5-14) and allow the use of either AC or DC for alarm drives. The

relays are configured for low side switching by the control and supply sets of contacts for external alarm connections. Typical wiring diagrams are shown in Figure 5-14.

These are normally open contacts and are rated:

- 15 Amp, 250 VAC
- 15 Amp, 30 VDC

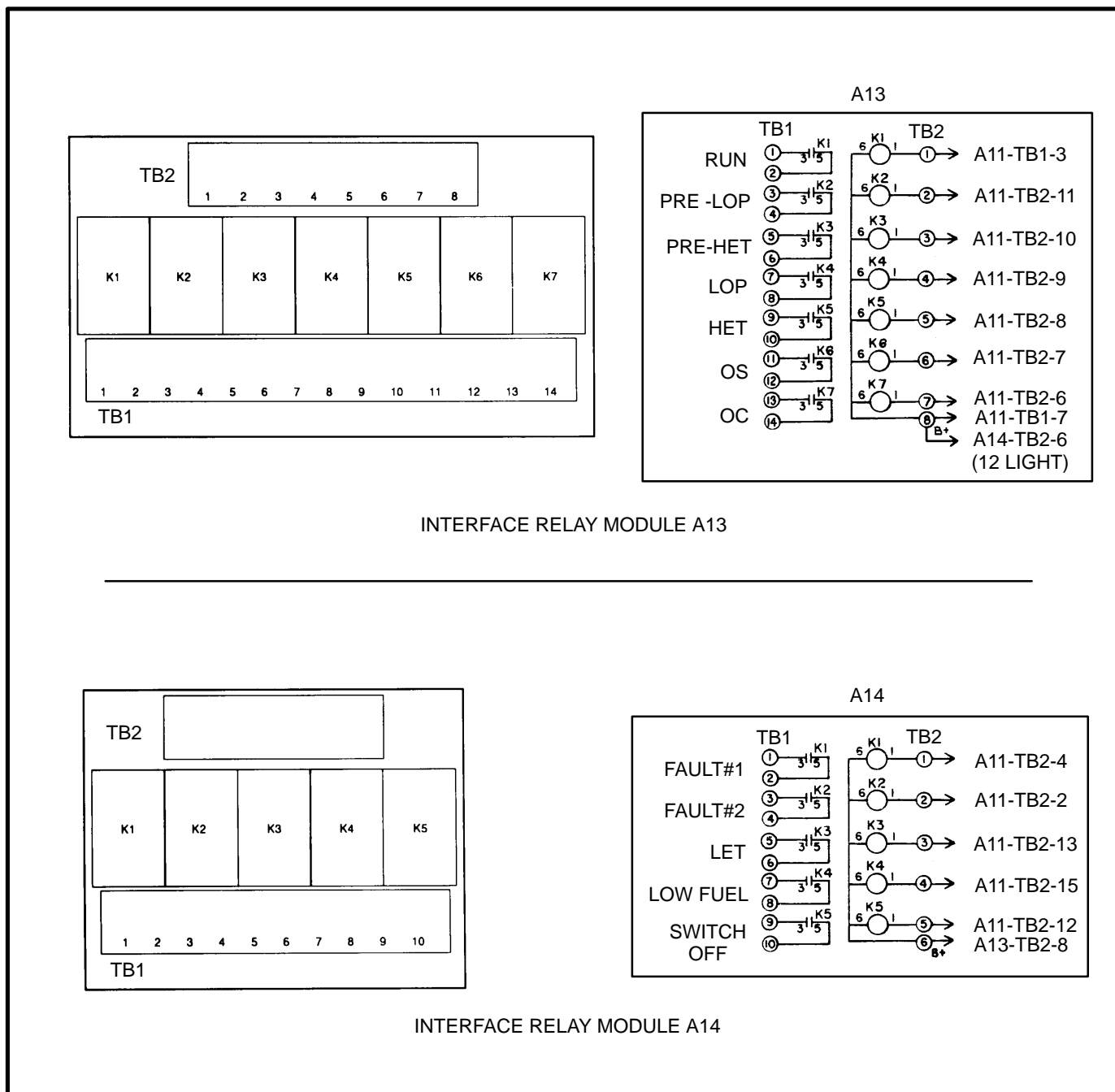


FIGURE 5-14. INTERFACE RELAY MODULES

ES1854s

Run Relays (K11)

The set can be equipped with one to three 3-pole, double-throw relays to control auxiliary equipment such as fans, pumps, and motorized air dampers. The relays are mounted on a standoff bracket in front of the ECM.

The relay contact ratings are:

- 10 amps at 28 VDC or 120 VAC, 80% PF
- 6 amps at 240 VAC, 80% PF
- 3 amps at 480 VAC, 80% PF

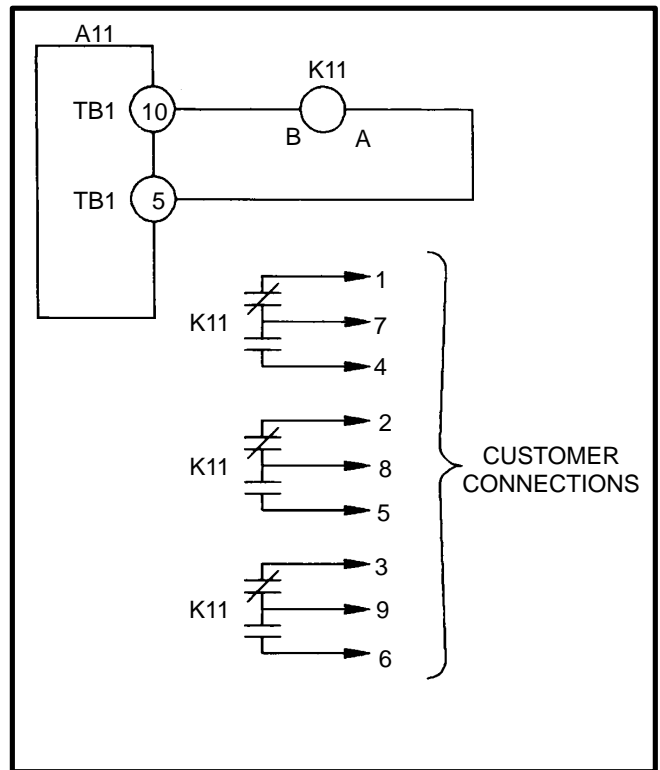


FIGURE 5-15. RUN RELAYS

Time-delayed Start/Stop Module

The genset can be equipped with a module to delay starting and stopping when the start and stop signals are received from the remote controller. It is adjustable to delay starts from 1 to 15 seconds to pre-

vent nuisance starts in installations where momentary power interruptions are frequent. It is adjustable to delay stops 1 to 30 minutes to allow the prime source of power time to stabilize. A typical wiring diagram is shown in Figure 5-16.

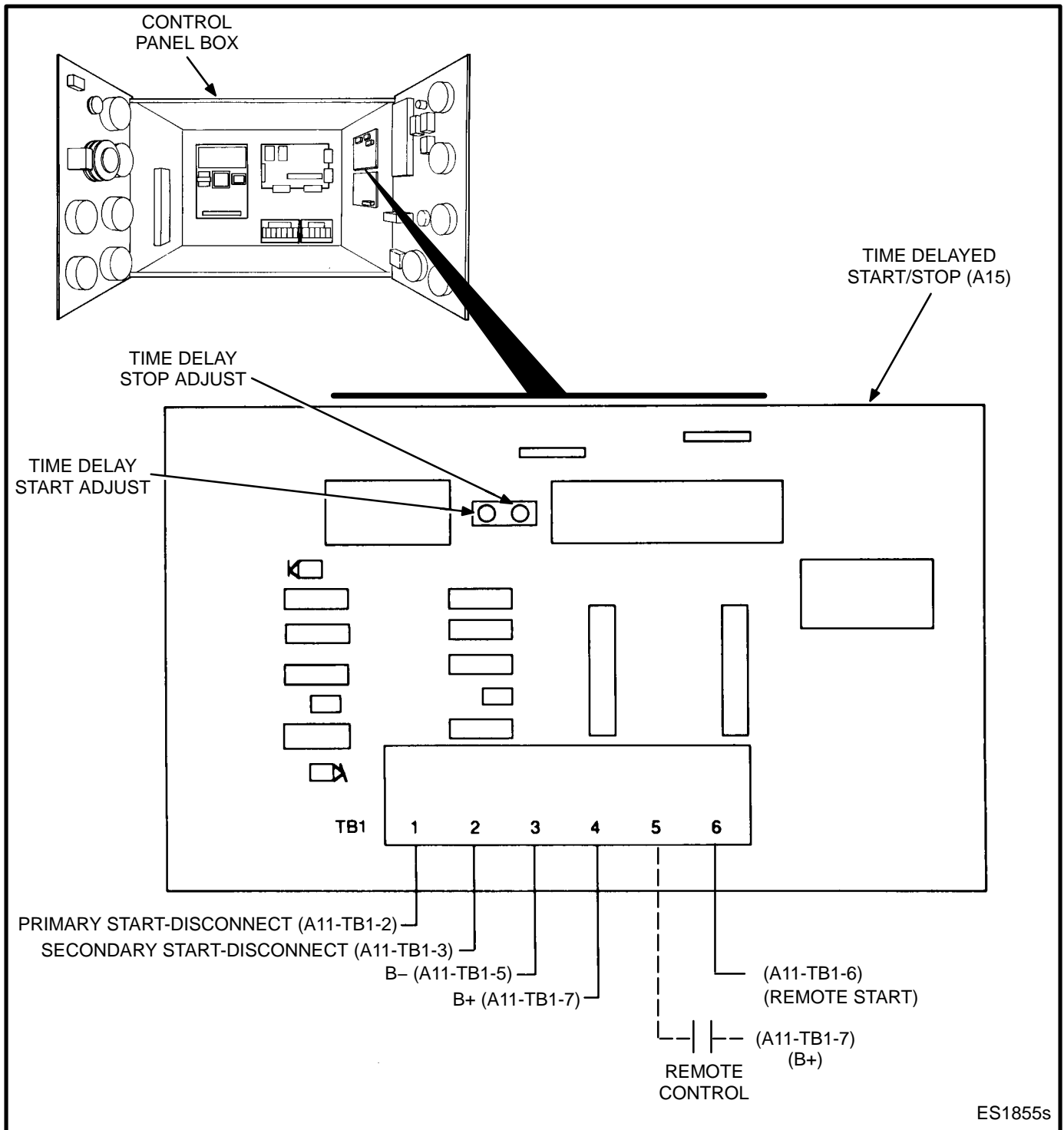


FIGURE 5-16. TIME-DELAYED START/STOP MODULE

MAIN CIRCUIT BREAKER (OPTIONAL)

Depending on site specifications and applicable code requirements, an optional main circuit breaker (Generator Main Circuit Breaker) may be mounted on the genset rear housing.

Main Circuit Breaker Remote Connections

Because of the many different types of main circuit breakers that can be used with the genset, the following descriptions will cover all circuit breaker types.

All breakers supplied are thermal and magnetic trip type. Depending on the requirement, the breaker may also include shunt trip and remote alarm connections. Review the following functions/requirements and Figure 5-17.

- Genset output is connected to the load through the circuit breaker.
- When an overload or short circuit occurs on any one conductor, a common trip bar will disconnect all three conductors.
- The thermal trip action of the breaker is accomplished by bimetal strips. A sustained overcurrent condition will cause a thermal reaction of the bimetal and trip the breaker. Response of the bimetal is proportional to current; high current - fast response, low current - slow response. This action provides a time delay for normal inrush current and temporary overload conditions such as motor starting.

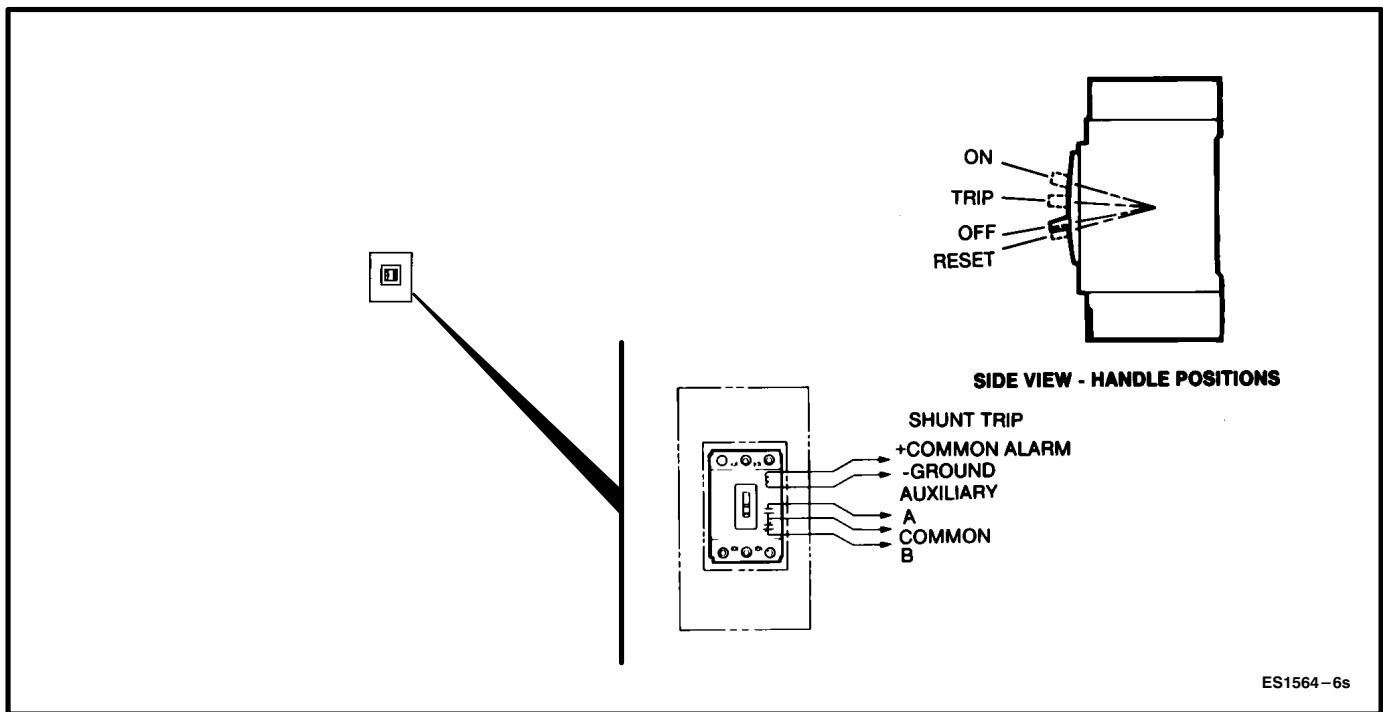


FIGURE 5-17. OPTIONAL MAIN CIRCUIT BREAKER

- The magnetic trip action of the breaker is caused by an electromagnet, which partially surrounds the internal bimetal strips. If a short circuit occurs, the high current through the electromagnet will attract the bimetal armature and trip the breaker. Some breaker models provide front adjustment of the magnetic trip action. These adjustments are normally set at the factory at the high position, but provide for individual conductor settings to suit customer needs.

- The shunt trip mechanism (if equipped) consists of a solenoid tripping device mounted in the breaker with external lead connections for remote signaling. A momentary signal to the solenoid will cause the breaker to trip. (Note that these wires are attached to the optional Pilot Breaker.)

This feature is available in AC or DC voltages, and is normally installed at the factory. The shunt trip mechanism is most often connected to a common fault shutdown circuit of the genset. This quickly disconnects the genset from the load on shutdown, and avoids a reverse power condition.

- Auxiliary contacts (if equipped) are used for local or remote annunciation of the breaker sta-

tus. They usually have one normally-open and one normally-closed contact (1 form C contact) to comply with the annunciator equipment.

- The trip actuator (if applicable) is for periodic exercise of the breaker, to clean it and maintain its proper operation. Rotating this actuator mechanically simulates overcurrent tripping through actuation of linkages not operated by the On/Off handle.
- Operation of the circuit breaker is determined by site-established procedures. In emergency standby installations, the breaker is often placed to the ON position, and is intended for safety trip actuation in the event of a fault condition. If the breaker trips open, investigate the cause and perform remedial steps per the troubleshooting procedures. To close the breaker, the handle must be placed to the Reset position, then to On.

If the distance between the genset and the remote stations is less than 1000 feet (305 mm), use 18 gauge stranded copper wire. If the distance is 1000 to 2000 feet (305 to 610 m), use 16 gauge stranded copper wire. Always run control circuit wiring in a separate metal conduit from AC power cables to avoid inducing currents that could cause problems within the control.

BATTERY CONNECTIONS

⚠WARNING *Ignition of explosive battery gases can cause severe personal injury or death. Do not permit any flame, cigarette, pilot light, spark or other ignition source near the battery.*

Starting the unit requires 24-volt battery current. Use two 12-volt batteries for a normal installation. Connect the batteries in series (negative post of first

battery to positive post of second) as shown in Figure 5-18. Normal installation battery cables are included. Increase the cable size if batteries are located remotely from the genset. Service the batteries as necessary. Infrequent unit use (as in emergency standby service) may allow the batteries to self-discharge to the point where they cannot start the unit. If installing an automatic transfer switch that has no built-in charge circuit, connect a special float charger.

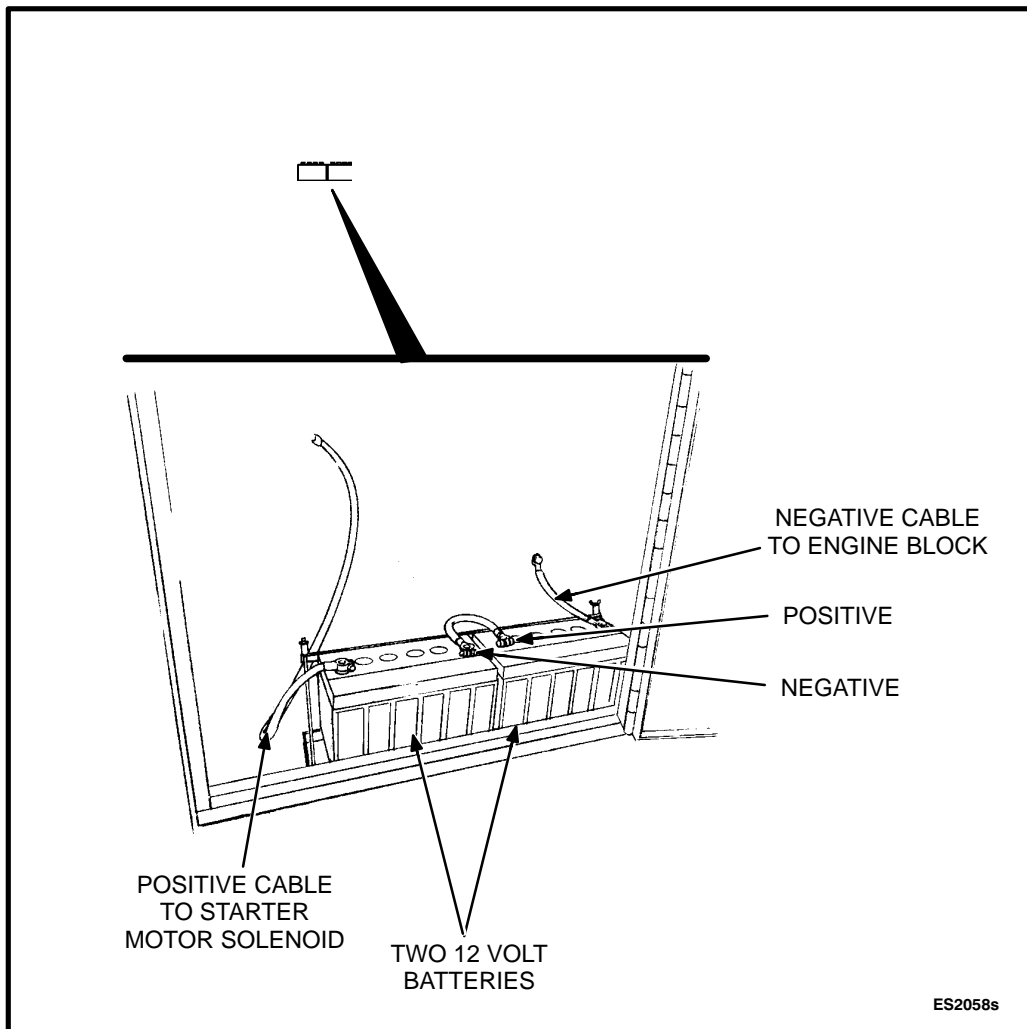


FIGURE 5-18. BATTERY CONNECTIONS

6. Control Panel Description

GENERAL

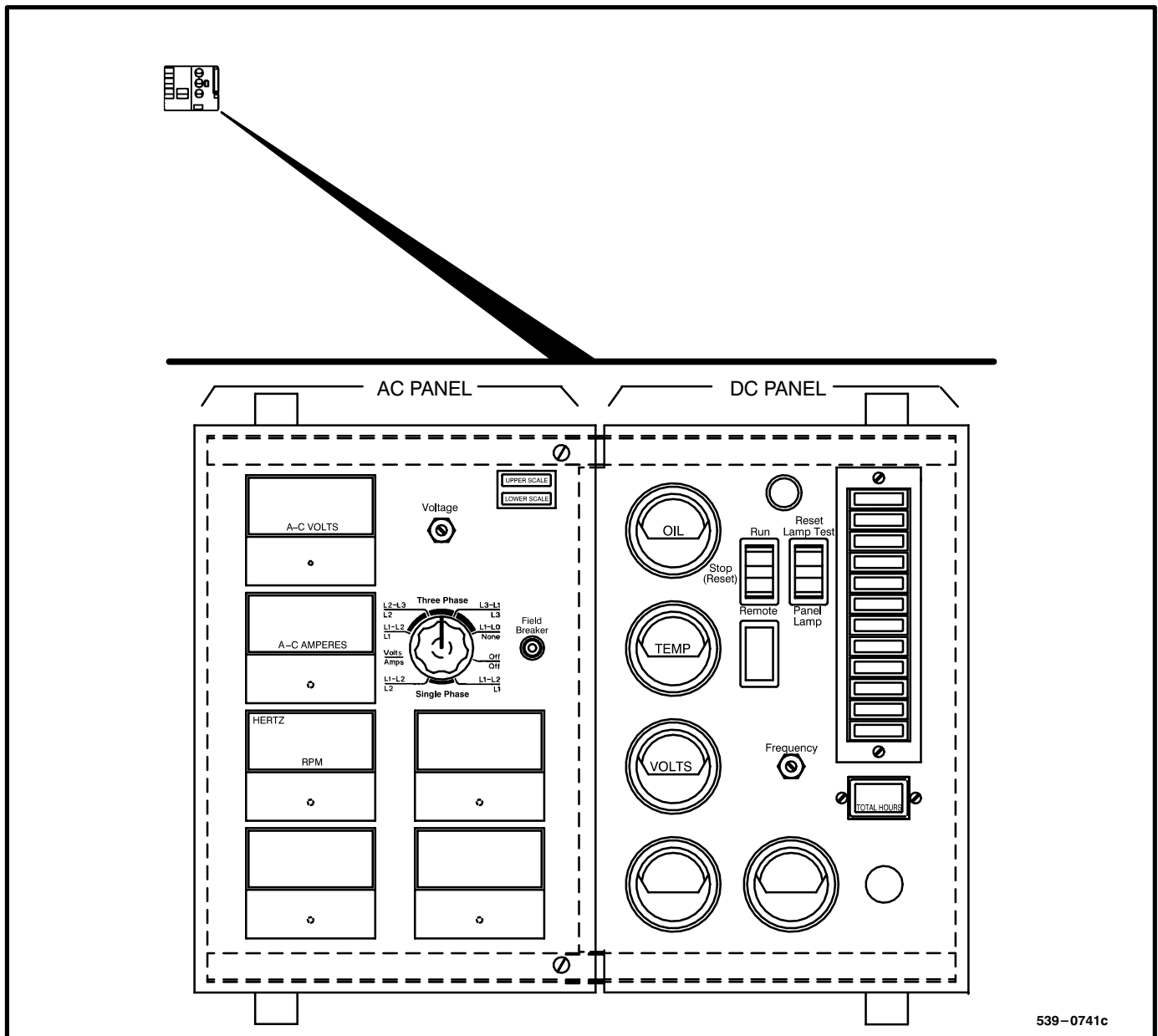
This section describes the function and operation of the standard and optional generator set instruments and control switches.

The two panels described in this section are the main genset control panel with all options installed,

and the control panel of the optional day tank fuel system.

CONTROL PANEL

The control panel is divided into a DC panel for monitoring the engine, and an AC panel for monitoring the generator. All instruments and control switches are located on the face of the control panel, as illustrated in Figure 6-1.



539-0741c

FIGURE 6-1. GENSET CONTROL PANEL

DC Panel Meters and Controls

Figure 6-2 shows the locations of the meters and controls of the DC panel.

Panel Lamp: Illuminates control panel.

Oil Pressure Gauge: Indicates pressure of lubricating oil in engine (connected to a sensor unit on the engine).

Coolant Temperature Gauge: Indicates temperature of coolant circulating in engine (connected to a sensor unit on the engine).

DC Voltmeter: Indicates the battery charging system voltage.

Run/Stop/Remote Switch: Starts and stops the unit either locally, or from a remote location connected to the engine control monitor board.

Running Time Meter: Registers the total number of hours the unit has run. Use it to keep a record of periodic servicing. Time is cumulative; the meter cannot be reset.

Reset/Lamp Test/Panel Lamp Switch: Resets the fault circuit only when the Run/Stop/Remote switch is in the Stop (Reset) position. Tests fault lamps and turns on the control panel lamp.

Tachometer (optional): Provides constant monitoring of engine r/min.

Frequency Adjust Rheostat (Optional): Used in conjunction with the optional electronic governor to adjust engine speed.

Oil Temperature Gauge (optional): Indicates temperature of lubricating oil in engine (connected to a sensor unit on the engine).

Emergency Stop Pushbutton (optional): Push-in switch for emergency shutdown of the engine. To reset, pull switch out and move Run/Stop/Remote switch to the Stop position. Then push test switch to Reset/Lamp Test position.

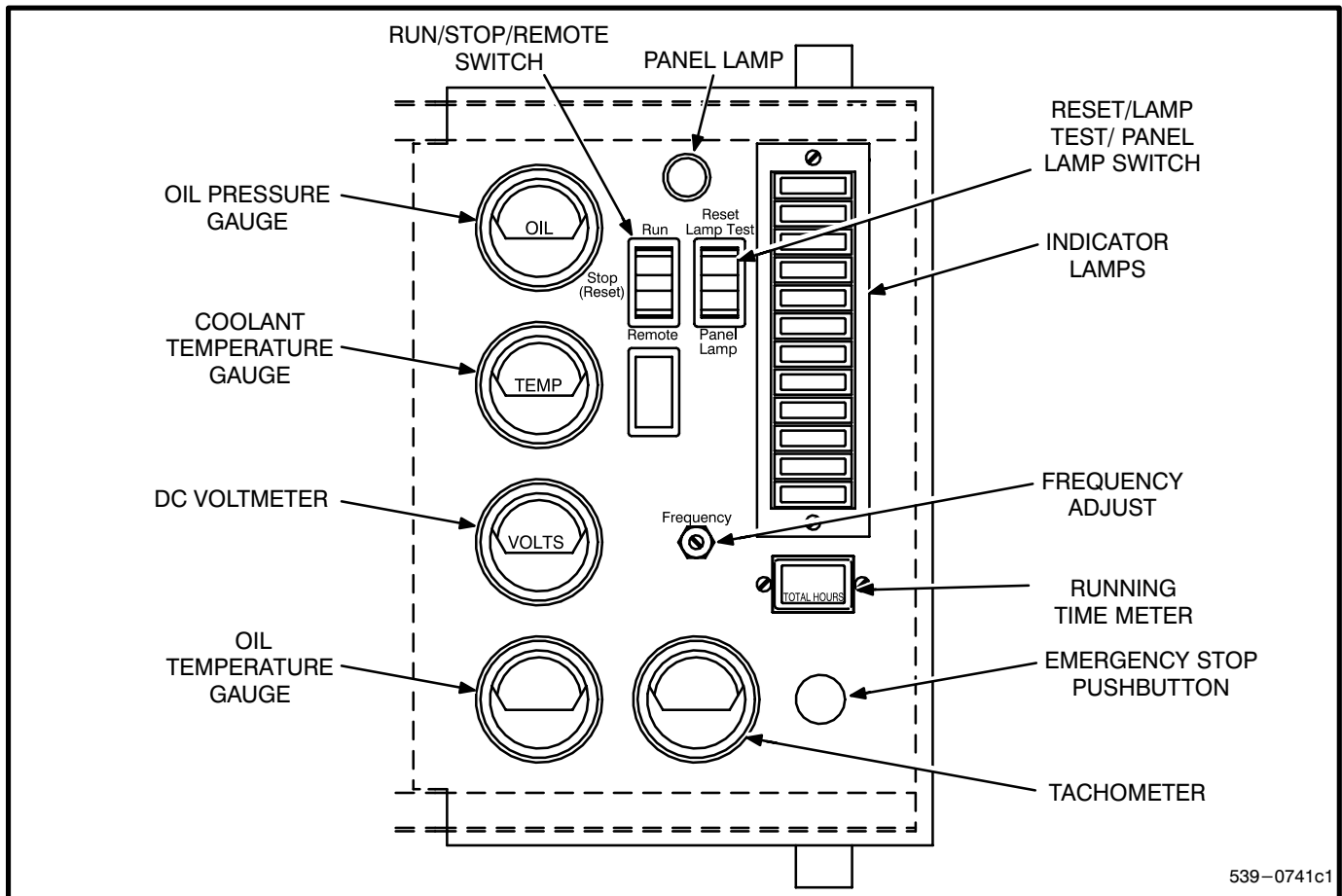


FIGURE 6-2. DC PANEL METERS AND CONTROLS

DC Panel Indicator Seven-Lamps

Figure 6-3 shows the location of the indicator lamps of the DC panel.

The standard control panel has seven indicator lamps which are:

RUN (green) lamp comes on when both starter protection circuits are opened after unit starting.

PRE LO OIL PRES (yellow) indicates engine oil pressure is marginally low (20 psi [137kPa]).

PRE HI ENG TEMP (yellow) indicates engine temperature is marginally high (above 216°F [102°C]).

LO OIL PRES (red) indicates engine has shut down because of critically low oil pressure (14 psi [97kPa]).

HI ENG TEMP (red) indicates engine has shut down because of critically high temperature (above 230°F [110°C]). Also is used to indicate low coolant level.

OVERSPEED (red) indicates engine has shut down because of excessive speed (60 Hz units at 2100 ±90 r/min, and 50 Hz at 1850 ±50 r/min).

OVERCRANK (red) indicates the starter has been locked out because cranking time has exceeded the 75 second limit. The standard cycle cranking allows three 15-second cranking cycles with two 15-second rest periods.

DC Panel Indicator Twelve-Lamps

The optional twelve-lamp control version includes all features of the seven-lamp version plus the following:

FAULT 1 (red): an undetected fault. May be factory programmed as a shutdown or non-shutdown, and as a timed or non-timed fault. (Normally set for timed shutdown).

FAULT 2 (red): Same features as Fault 1 (Normally set for timed shutdown).

LOW ENG TEMP (yellow): Engine temperature is marginally low for starting. Indicates inoperative coolant heater.

LO FUEL (yellow): Indicates fuel supply is marginally low.

SWITCH OFF (flashing red): Indicates generator set is not in automatic start operation mode.

CAUTION *Yellow lamps indicate potential problems that could damage the genset. Refer to Troubleshooting in Section 8.*

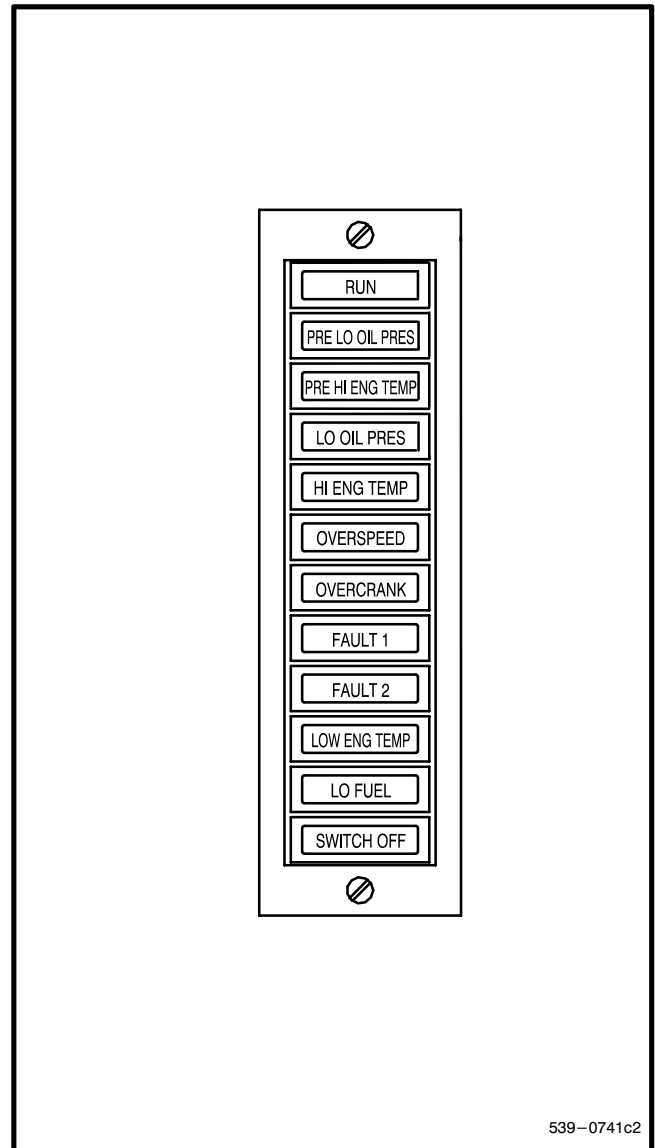


FIGURE 6-3. DC PANEL INDICATORS

AC Panel

Figure 6-4 shows the location of the meters, controls, and indicator lamps of the AC panel.

AC Voltmeter: Dual range instrument indicating AC voltage. Measurement range in use is shown on indicator light.

AC Ammeter: Dual range instrument indicates AC generator line current.

Wattmeter (optional): Continuously gives reading of the generator output in kilowatts.

Power Factor Meter (optional): Indicates percent power factor of AC output.

Frequency/RPM Meter (optional): Indicates generator output frequency in hertz and engine speed in revolutions-per-minute (RPM).

Voltage Adjust Rheostat (optional): Rheostat providing approximately plus or minus five percent adjustment of the rated output voltage.

Upper and Lower Scale Indicators (optional): Indicates which scale to use on the AC voltmeter and ammeter.

Phase Selector Switch (optional): Selects the phases of generator output to be measured by AC voltmeter and AC ammeter.

Engine Pyrometers (optional): Indicate engine exhaust and inlet air temperatures.

Field Breaker: Protects generator exciter and regulator from overheating in the event of certain failure modes.

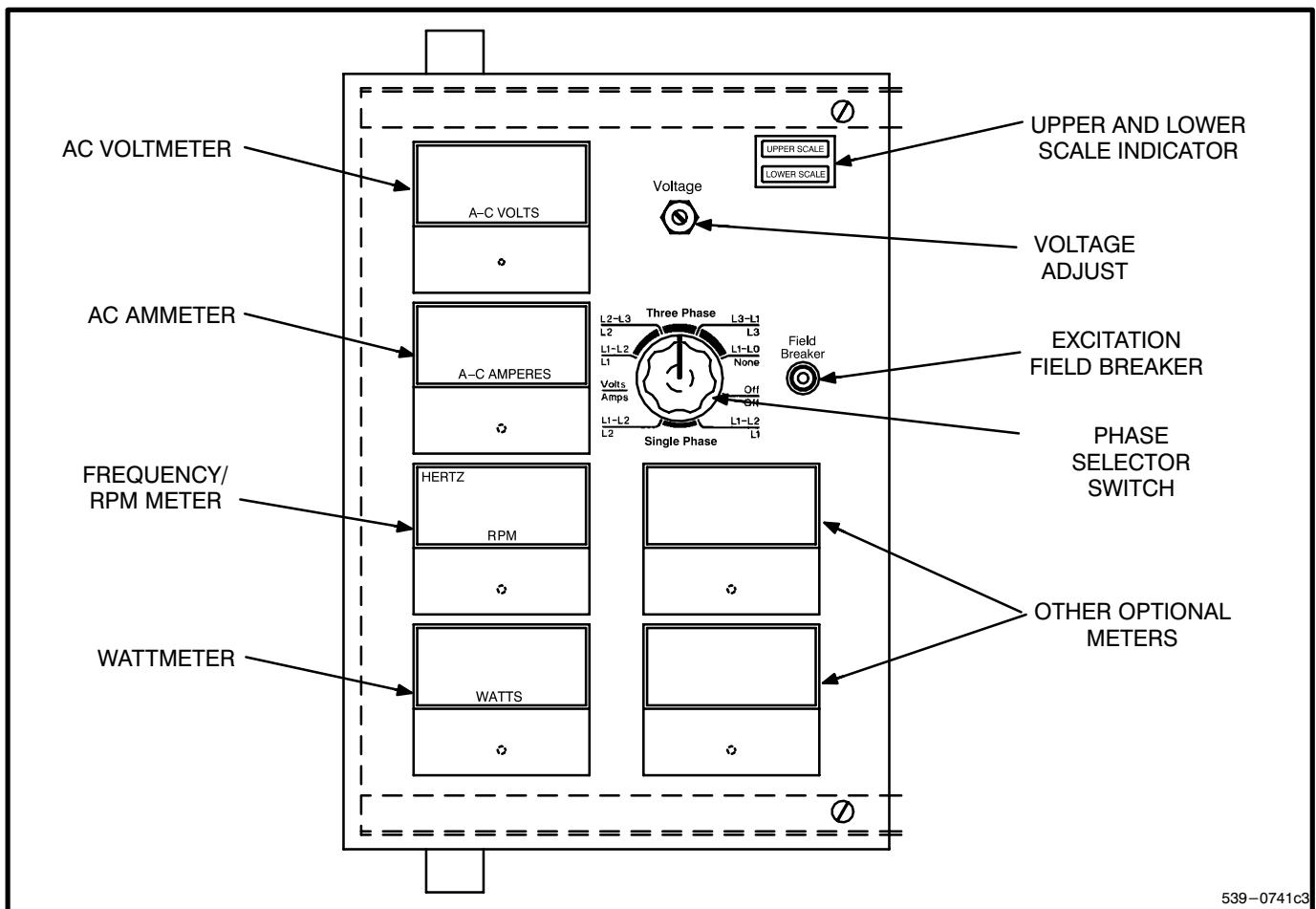


FIGURE 6-4. AC PANEL METERS, CONTROLS, AND INDICATORS

DAY TANK CONTROL SYSTEM

The day tank control system consists of a skid-mounted fuel tank, fuel pump, float switches, and the automatic control. The control operates the fuel pump to maintain a reservoir of fuel in the day tank, and provides a seven light monitor of the system operation. Figure 6-5 shows the control front panel.

This section explains functions of the control panel lamps, components and operation of the day tank fuel control system. All red color lamps indicate a fault condition.

Control Panel Switches and Indicators

The following paragraphs describe the operation of the control switches and indicators.

Indicators:

- **READY** (green): indicates that all the following conditions are met:
 - Control switch is in ON position.
 - If AC power is available for pumping.
 - If DC power is available for internal logic circuits (connections to the engine starting battery might be required).
- **HI FUEL** (red): indicates that the fuel has reached an abnormally high level. It indicates a possible failure of the "pump-off" float switch in the day tank. The lamp can be turned off with the RESET switch after the fuel level drops to normal. The lamp will come back on again during the next pumping cycle if the fault remains.

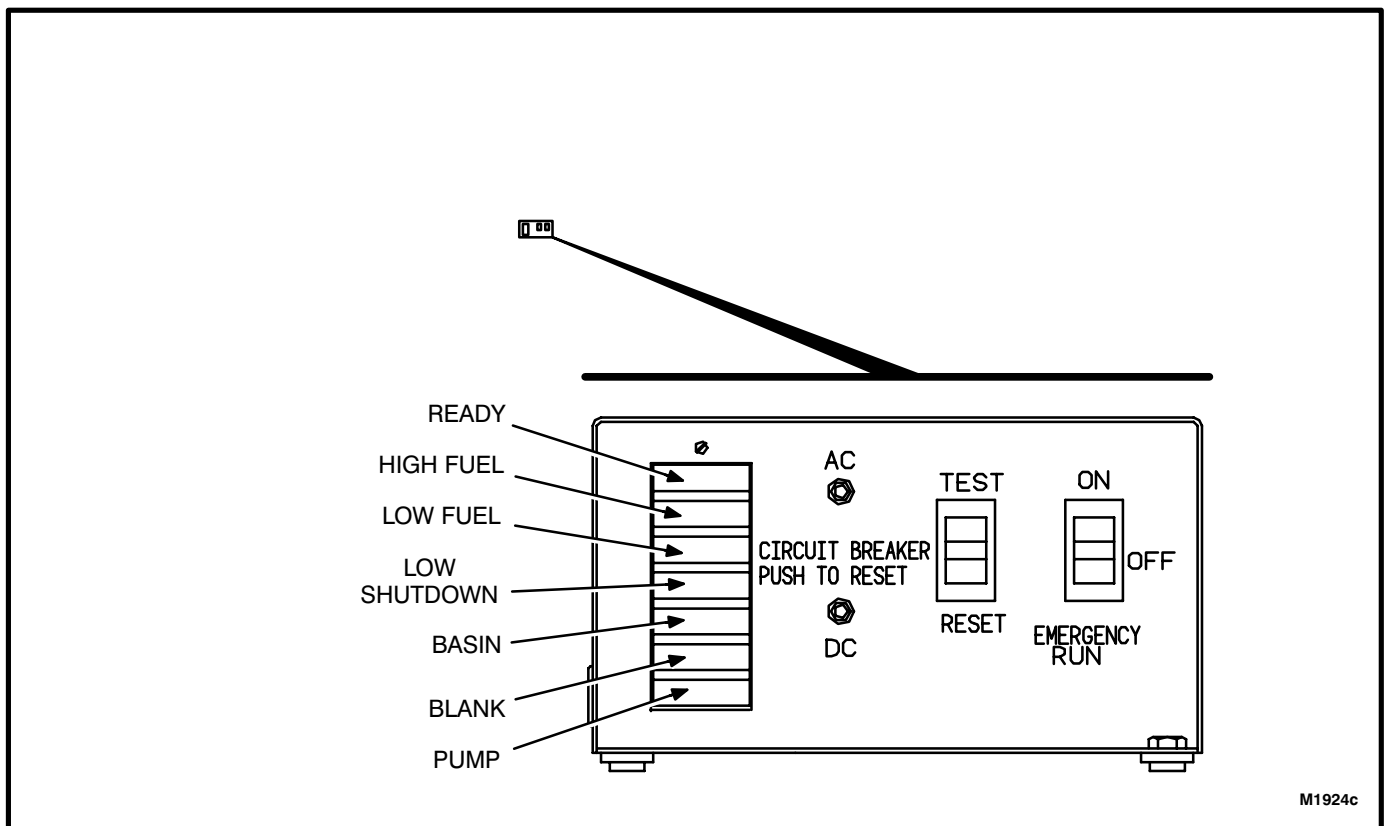


FIGURE 6-5. DAY TANK CONTROL FRONT PANEL

- **LO SHUTDOWN** (red): indicates that the fuel level has dropped to near tank bottom. It indicates a possible empty main fuel tank, fuel line restriction, pump failure, or failure of both the "pump-off" and "low fuel" float switches.

The control should be wired to shut down the genset (optional) as continued operation will allow air to enter the engine injection pump necessitating bleeding to restart the engine. After restoring the tank fuel level, reset circuit with the RESET switch. This switch also restores engine operation if the tank control has been connected to shut down the engine.

⚠ CAUTION *Continued operation with a LO FUEL fault can lead to a low fuel shutdown if the low fuel float switch fails.*

- **BASIN** (red): indicates that the fuel has flooded the optional safety basin surrounding the fuel tank. It indicates possible failure of both the "pump-off" and "high fuel" float switches. The basin float switch turns off the fuel pump. The pump cannot function again until the basin is drained of fuel and the circuit is reset with the RESET switch.
- **BLANK** - For customer use.
- **PUMP** (green): indicates that the fuel pump is running. It will come on and go off as fuel is pumped to maintain the day tank level. The lamp does not come on when the EMERGENCY RUN switch is used.

Switches and Circuit Breakers:

- **ON/OFF/EMERGENCY RUN:** Switches both AC and DC power supplies. The momentary EMERGENCY RUN position allows pump operation if the control fails to operate the pump automatically.
- **TEST/RESET:** Hold the TEST position to test the indicator lamps and pump operating circuits. Replace any lamps that fail to come on. Pressing the RESET position after correcting a

fault condition will restore control operation and turn off the indicator fault lamp. The RESET position also restores engine operation if the fuel control has been connected to shut down the engine.

- **AC and DC CIRCUIT BREAKERS:** Press the breaker reset button to restore control operation if either has tripped.

Operation

The following steps describes how to operate the day tank controller.

1. Push the control switch to the ON position for automatic operation. The green SYSTEM READY light will come on and the pump will fill the tank if AC power is available for pumping and DC power is available for the internal logic circuits. The level of fuel in the tank will be automatically kept between a set of pump-on and pump-off float switches.

When filling an empty tank, the red LO SHUTDOWN and LO FUEL lights will come on when the control switch is pushed to the ON position. This is normal. Push the panel RESET switch to turn off the red lights after the tank has been filled.

If the SYSTEM READY light does not come on, check for correct AC and DC power connections. See Control Wiring Connections and Fuel Pump Motor wiring Connections in Section 4.

2. The green PUMP ON light indicates when the pump is running. It will come on and off as fuel is pumped to maintain the proper level in the tank.
3. Push the control switch to the EMERGENCY RUN position (momentary contact) to pump fuel into the tank if the control fails to operate the pump automatically.

The green PUMP ON light does not come on when the switch is in the EMERGENCY RUN position.

7. Operation

⚠ WARNING

EXHAUST GAS IS DEADLY!

Exhaust gases contain carbon monoxide, an odorless and colorless gas. Carbon monoxide is poisonous and can cause unconsciousness and death. Symptoms of carbon monoxide poisoning can include:

- *Dizziness*
- *Nausea*
- *Headache*
- *Weakness and Sleepiness*
- *Throbbing in Temples*
- *Muscular Twitching*
- *Vomiting*
- *Inability to Think Coherently*

IF YOU OR ANYONE ELSE EXPERIENCE ANY OF THESE SYMPTOMS, GET OUT INTO THE FRESH AIR IMMEDIATELY. If symptoms persist, seek medical attention. Shut down the unit and do not operate until it has been inspected and repaired.

Protection against carbon monoxide inhalation also includes proper installation and regular, frequent visual and audible inspections of the complete exhaust system.

GENERAL

This section describes generator set operation, including pre-start checks, starting, running, and stopping the set. Study this entire section carefully before starting the set. Be completely familiar with the set for safe operation.

PRE-START CHECKS

⚠ WARNING *Accidental starting of the genset while working on it can cause severe personal injury or death. Prevent accidental starting by placing the RUN/STOP/REMOTE SWITCH to the STOP position.*

Before starting, be sure the set is ready for operation by making the following checks. Refer to Section 9, *Maintenance* for the correct procedures.

Mechanical Checks

Check for loose belts and fittings, leaking gaskets and hoses, or any signs of mechanical damage. If any problems are found, have them corrected immediately.

Lubrication

Check the engine oil level. Keep the oil level as near as possible to the high mark on the dipstick, without overfilling (see Figure 7-1).

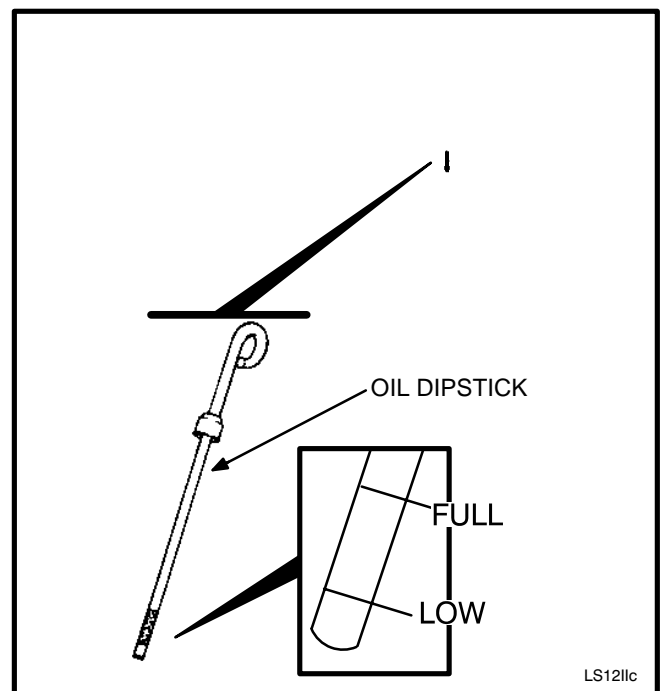


FIGURE 7-1. OIL LEVEL INDICATOR

Coolant

CAUTION *The high engine temperature shutdown system will not operate if the coolant level is too low. The high engine temperature sensor monitors coolant temperature. Loss of coolant will prevent sensor operation and allow the engine to overheat causing severe damage to the engine. Therefore, maintain adequate coolant level for proper operation of the high engine temperature shutdown system.*

The coolant recovery tank should be about two-thirds (2/3) full when the engine is cold. The level will rise as the engine warms up. Note the normal level when the engine is running under load. Add coolant to the recovery tank to replace the normal loss of coolant. Check the entire cooling system for leaks if the level keeps dropping. See Figure 7-2.

WARNING *Contact with hot coolant can result in serious burns. Do not bleed hot pressurized coolant from a closed cooling system.*

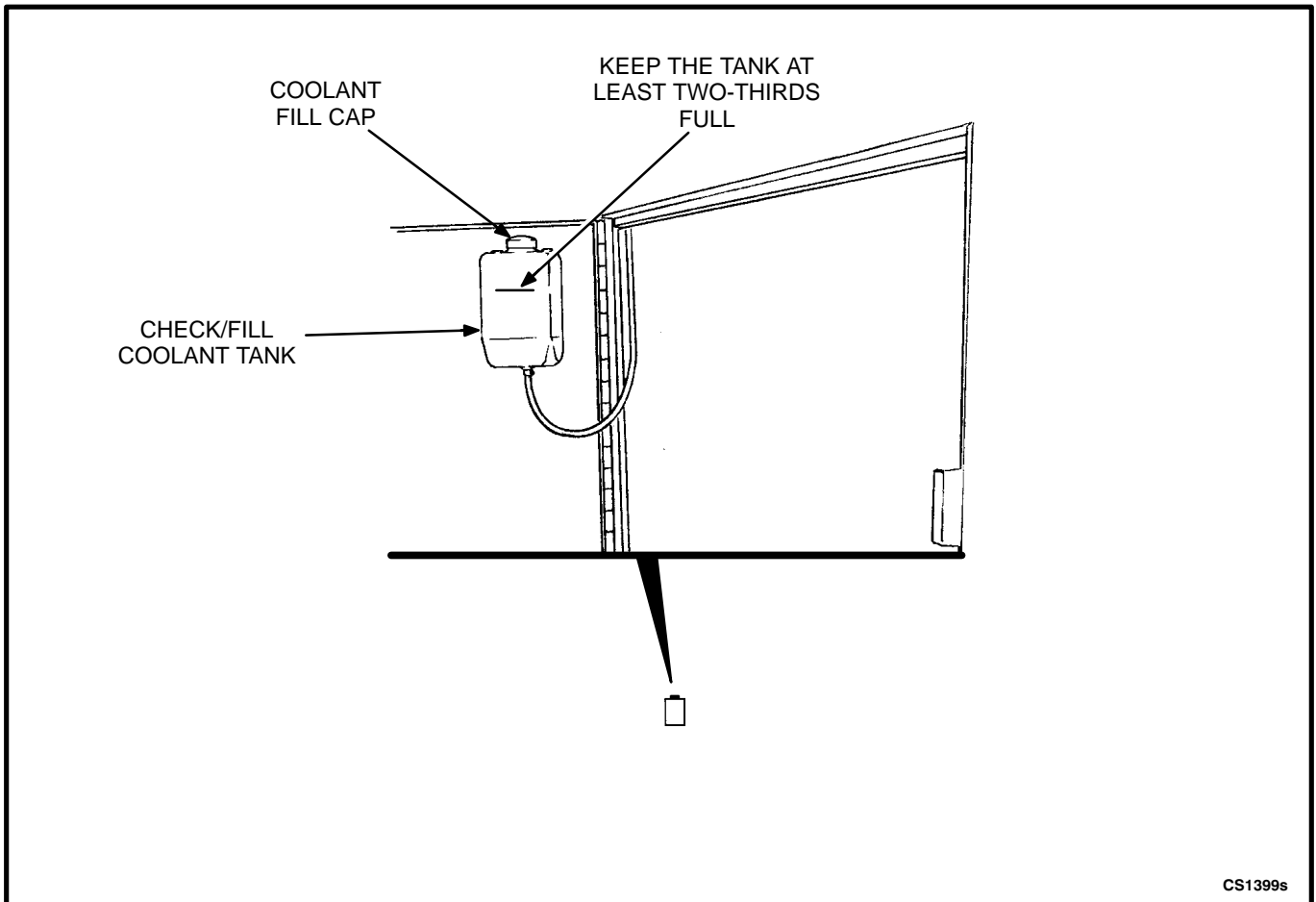


FIGURE 7-2. ENGINE COOLANT LEVEL

DC Electrical System

With the genset off, check the terminals on the battery (see Figure 7-3) for clean and tight connections. Loose or corroded connections create resistance that can hinder starting. Clean and reconnect the battery cables if loose. Always connect the negative battery cable last.

⚠ WARNING *Ignition of explosive battery gases can cause severe personal injury. Do not permit any flame, cigarette, pilot light, spark or other ignition source near the battery.*

⚠ CAUTION *Always disconnect a battery charger from its AC source before disconnecting the battery cables. Otherwise, disconnecting the cables can result in voltage spikes high enough to damage the DC control circuits of the set.*

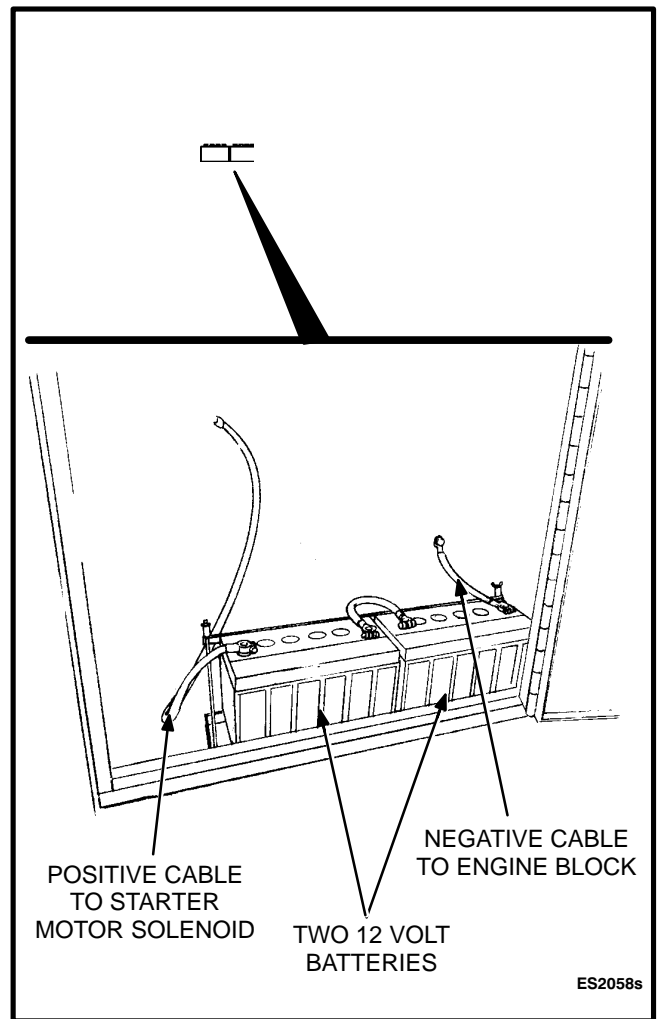


FIGURE 7-3. BATTERY LOCATION

Fuel

Make sure the fuel tank has sufficient fuel (see Figure 7-4) and that the fuel system is primed. If the genset contains the optional day tank controller, refer to Section 6, *Day Tank Control System* before starting the genset.

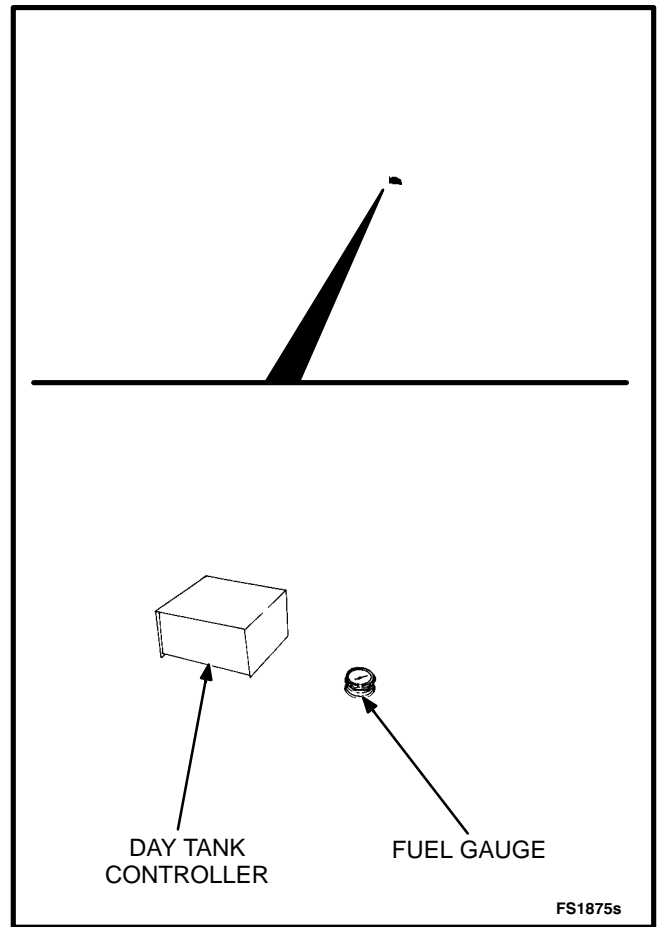


FIGURE 7-4. FUEL GAUGE LOCATION

STARTING

The following sections cover the three different methods used to start the generator set.

⚠ CAUTION *Phase rotation of the genset and utility must be the same. Equipment damage can occur. Check and reconnect as necessary.*

For all prime power or construction site gensets, check the rotation of every 3-phase motor before loading and reconnect if necessary.

Cold Starting With Loads

In accordance with NFPA 110, Onan recommends installing diesel standby generator sets (life safety systems) equipped with coolant heaters in locations where the minimum ambient temperature is above 40°F (4°C). NFPA also requires that the engine coolant be maintained at a minimum of 90°F (32°C) and for most applications, accept the emergency load in 10 seconds or less. Although most Onan generator sets will start in temperatures down to -25°F (-32°C) when equipped with coolant heaters, it might take some running time to warm the engine up before a load can be applied when ambient temperatures are below 40°F (4°C).

The Low Engine Temperature (LET) lamp on the Onan Detector 12 control is provided to meet the requirements of NFPA 110. The LET sensor alarms when the engine coolant temperature falls below 70°F (21°C). In applications where the ambient temperature falls below 40°F (4°C), the LET may be lit even though the coolant heaters are connected. Under these conditions, although the generator set may start, it may not be able to accept load within 10 seconds. When this condition occurs, check the coolant heaters for proper operation. If the coolant heaters are operating properly, other precautions might be necessary to warm the engine before applying a load.

Genset Control Panel

Move the Run/Stop/Remote switch on the control panel (Figure 7-5) to the RUN position. This activates the engine control system and the starting system. The starter will begin cranking, and after a few seconds, the engine should start. (If the engine has an ether starting aid system attached, pull its knob to activate the system. The engine should start. Then push in the knob to stop the ether system.) The starter will disconnect when the engine speed reaches 450 to 570 r/min.

If the engine does not start, the starter will disengage after a 75 second limit, and the OVERCRANK indicator will light. The cycle cranking allows three 15-second cranking cycles with two 15-second rest periods.

To clear an overcrank fault, place the Run/Stop/Remote switch in the STOP position and momentarily depress the Reset switch. Wait two minutes for the starter motor to cool, then repeat the starting procedure. If the engine does not run after a second attempt at starting, refer to the Troubleshooting section.

Starting From Remote Location

Move the Run/Stop/Remote switch on the genset control panel to the REMOTE position. This allows the generator set to be started from a remote switch. Closing the remote switch initiates the starting sequence described in the previous section.

Automatic Starting

Place the Run/Stop/Remote switch on the genset control panel in the REMOTE position if an automatic transfer switch is used. This allows the transfer switch to start the generator set if a power outage occurs, and stop it when the power returns.

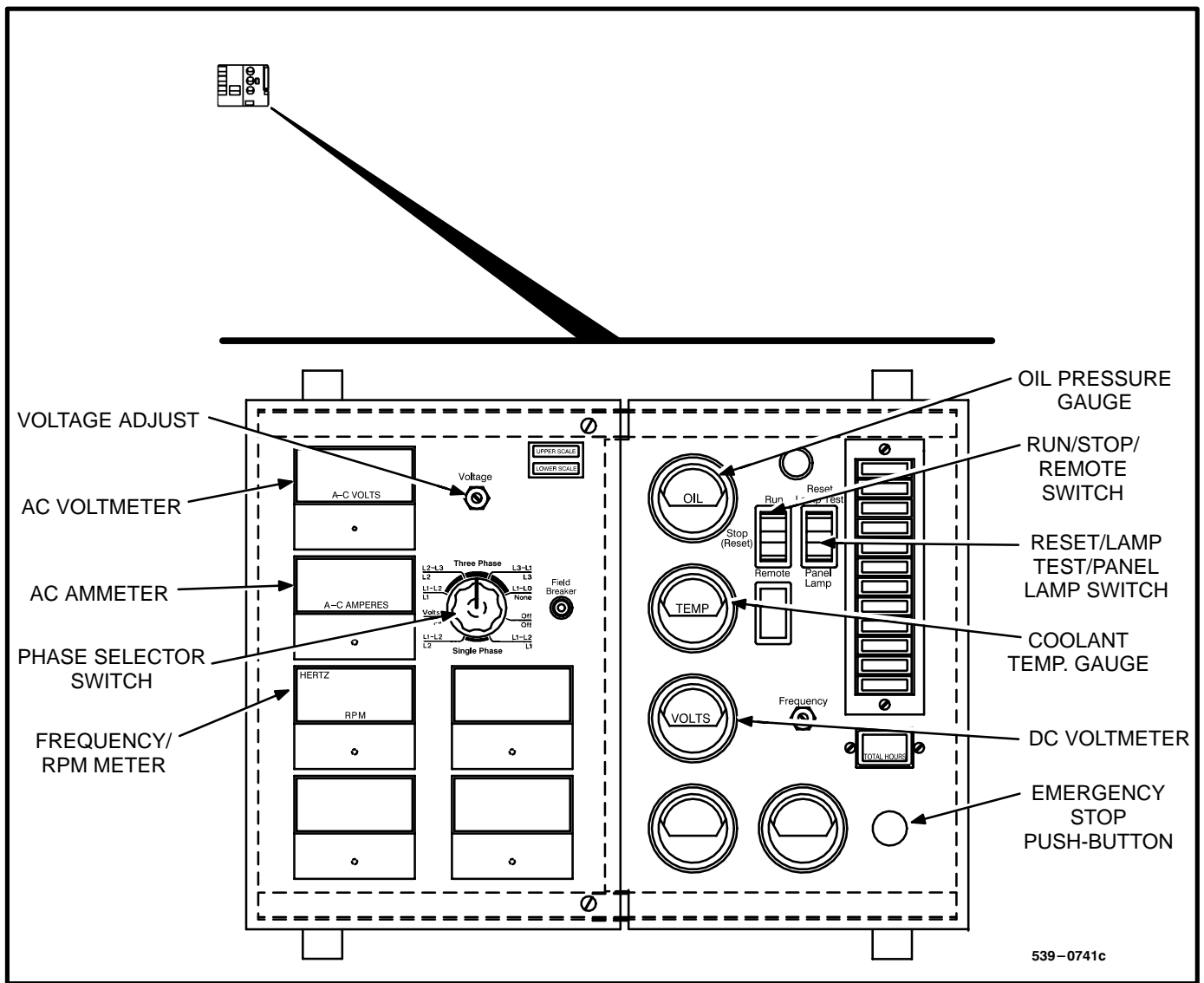


FIGURE 7-5. GENSET CONTROL PANEL

RUNNING

With the genset running, listen for any unusual noises that may indicate mechanical problems and check the oil pressure frequently. Investigate anything that indicates possible mechanical problems.

Before operating the genset under load, make certain the genset will perform correctly by checking the following areas.

Exhaust System

⚠WARNING *Inhalation of exhaust gases can result in severe personal injury or death. Inspect exhaust system audibly and visually for leaks daily. Repair any leaks immediately.*

Inspect the entire exhaust system including the exhaust manifold, muffler and exhaust pipe. Visually and audibly check for leaks at all connections, welds, gaskets, and joints. Make sure exhaust pipes are not heating surrounding area. If any leaks are detected, have them corrected immediately.

Fuel System

⚠WARNING *Leaking fuel will create a fire hazard that can result in severe personal injury or death if ignited by a spark. If any leaks are detected, have them corrected immediately.*

Inspect the fuel supply lines, filters, and fittings for leaks. Check any flexible sections for cuts, cracks, and abrasions and make sure they are not rubbing against anything that could cause breakage.

Engine Gauges

Check the following while the genset is operating. Refer to Figure 7-5 for location of engine gauges.

Oil Pressure Gauge: The oil pressure should be 35 to 55 psi (241 to 379 kPa) when the engine is at operating temperature.

Coolant Temperature Gauge: The coolant temperature should be 170° to 216° F (77° to 102° C) depending on the load and ambient temperature.

DC Voltmeter: This is a voltage reference gauge, indicating condition of the batteries and also of battery charging circuit. Gauge should read approximately 24 to 28 volts while genset is running. If reading is high or low, check batteries and the battery charging circuit.

Generator AC Meters (Optional)

Check the following meters while the genset is operating. Refer to Figure 7-5 for location of the generator AC meters.

Frequency/RPM Meter: The generator frequency and engine RPM should be stable and the reading should be the same as the nameplate rating (50 or 60 hz/1500 or 1800 RPM).

The generator frequency is a result of engine speed, which is automatically controlled. If the generator frequency is below specification, contact an authorized service center.

AC Voltmeter: Turn the phase selector switch to each line-to-line phase selection shown on the volts scale (L1-L2 on single phase gensets: L1-L2, L2-L3, and L3-L1 on three phase gensets). Read the AC voltmeter using the upper or lower scale as indicated by the scale indicator light. At no load, the line-to-line voltage should be the same as the genset nameplate rating. If the reading is incorrect, refer to the Generator Voltage Adjustment procedure at the end of this section.

AC Ammeter: Turn the phase selector switch to each phase selection shown on the amperes scale (L1 and L2 on single phase gensets; L1, L2 and L3 on three phase gensets). Read the ammeter using the upper or lower scale as indicated by the scale indicator light. At no load, the current readings should be zero. With a load applied, each line current should be approximately the same, and no line current should exceed the genset nameplate rating.

STOPPING

Run the genset at no load for three to five minutes before stopping. This allows the lubricating oil and engine coolant to carry heat away from the combustion chamber and bearings.

Normal Stop: If the genset was started at the genset control panel or at a remote control panel, move the Run/Stop/Remote switch or remote starting switch to the STOP position. If the set was started by an automatic transfer switch, the genset will automatically stop about 15 minutes after the normal power source returns.

Emergency Stop: An optional emergency stop button is located on the right side of control panel (see Figure 7-5). Push the button in for emergency stop. Note that no fault indicators will light when the emergency button is used. To reset the fault circuitry, pull the emergency stop button out and move the Run/Stop/Remote switch to the Stop position. Then move the test switch to Reset/Lamp Test position.

Engine Monitor Indicator Lamps

With the genset stopped, hold the Reset/Lamp Test switch in the Test position (see Figure 7-5). All indicator lamps should light. Verify all of the lamps are on and then release the switch. Contact an Onan distributor if any lamps require replacement.

Mechanical Checks

With the genset stopped, check for loose belts and fittings, leaking gaskets and hoses, or any signs of mechanical damage. If any problems are found, have them corrected immediately.

BREAK-IN

Drain and replace the crankcase oil after the first 50 hours of operation on new generator sets. Refer to the Maintenance section of this manual for the recommended procedures.

NO-LOAD OPERATION

Periods of no-load operation should be held to a minimum. If it is necessary to keep the engine running for long periods of time when no electric output is required, best engine performance will be obtained by connecting a "dummy" electrical load. Such a load could consist of a heater element, etc.

EXERCISE PERIOD

This generator set must be able to go from a cold start to being fully operational in a matter of seconds. This can impose a severe burden on engine parts.

Regular exercising keeps engine parts lubricated, prevents oxidation of electrical contacts and generally helps provide reliable engine starting. Exercise the generator set at least once a week for a minimum of 30 minutes with load so the engine reaches normal operating temperatures.

HIGH/LOW OPERATING TEMPERATURES

Use a coolant heater if a separate source of power is available. The optional heater available from Onan will help provide reliable starting under adverse weather conditions.

POWER RATING FACTORS

The generator set power rating applies to sets used in standby applications. The set will operate at the stated rating for the duration of normal utility power interruptions. The rating was established for a standard radiator cooled set running on diesel fuel and operating at an altitude of 300 feet (92 m) with an ambient temperature of 81° F (27° C). For a rating relative to other applications, altitudes, cooling systems, or ambient temperatures, contact an authorized service center.

GENERATOR VOLTAGE CHECK AND ADJUSTMENT

If the optional AC meters are installed, an external control panel-mounted potentiometer is provided for adjusting the AC output (see Figure 7-5).

Move the Run/Stop/Remote switch on the engine control panel to the Run position. Check the following conditions while the genset is operating.

Generator Voltage Adjust

This procedure applies to gensets equipped with the AC meter option only. The AC meter option consists of meters, switches and a voltage adjusting potentiometer on the front of the genset control panel.

⚠WARNING *Use extreme caution when working on electrical components. High voltages can cause injury or death. Do not wear damp clothing (particularly wet shoes) or allow skin surface to be damp when handling electrical equipment.*

1. Move the Phase Selector switch to read generator output current and voltage, and perform the following steps:
 - A. Insert a screwdriver into the Voltage Adjust potentiometer located on the front of the genset control panel and using a wrench carefully loosen the locking nut.
 - B. While observing the voltmeter, slowly turn the screwdriver clockwise to increase voltage or counterclockwise to decrease voltage, and adjust to the rated nameplate voltage.

If correct voltage cannot be attained through this adjustment, contact an authorized service center for assistance.

 - C. After setting the correct voltage, tighten the locking nut, being careful not to change the adjustment.
2. Move the Phase Selector switch to the OFF position.

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