McGRAW-EDISON

Onan

PRELIMINARY COPY

Installation Guide

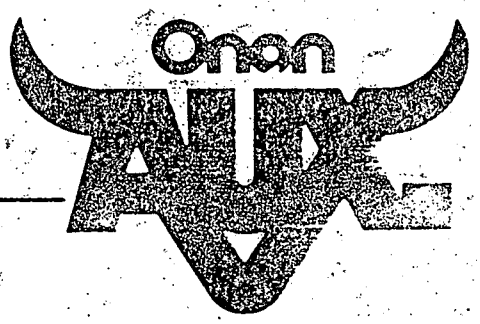
3.0RDJA DIESEL

AUX

GenSet

- Auxiliary Power Generators For Trucks
- Over The Rail Mount ENG ONLY

IMPORTANT
Read Through Entire Installation Guide Prior To Actual Installation



974-0625
4-82
Printed in U.S.A.

SAFETY PRECAUTIONS

The following symbols in this manual signal potentially dangerous conditions to the operator or equipment. Read this manual carefully. Know when these conditions can exist. Then, take necessary steps to protect personnel as well as equipment.

WARNING ***Onan uses this symbol throughout this manual to warn of possible serious personal injury.***

CAUTION ***This symbol refers to possible equipment damage.***

Do not work on this equipment when mentally or physically fatigued.

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that could result in serious, personal injury. Take care in following these recommended procedures.

- **Use Extreme Caution Near Gasoline. A constant potential explosive or fire hazard exists.**

  Do not fill fuel tank with engine running. Do not smoke or use open flame near the unit or the fuel tank.

  Be sure all fuel supplies have a positive shutoff valve.

  The fuel supply and return lines must be routed separately and never tied together with any electrical wiring. Use a flexible section of fuel line between generator compartment and stationary remote fuel tank in truck chassis. This flexible section must be 100% NON-METALLIC to prevent electrical current from using it as a conductor.

  Have a fire extinguisher nearby. Be sure extinguisher is properly maintained and be familiar with its proper use. Extinguishers rated ABC by the NFPA are appropriate for all applications.

- **Guard Against Electric Shock**

  Disconnect 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 surfaces to be damp when handling electrical equipment.

  Jewelry is a good conductor of electricity and should be removed when working on electrical equipment.

  DO NOT PLUG MOBILE, PORTABLE OR STANDBY SETS DIRECTLY INTO A HOUSE RECEPTACLE TO PROVIDE EMERGENCY POWER. It is possible for current to flow from generator into the utility line. This creates extreme hazards to anyone working on lines to restore power.

  Use extreme caution when working on electrical components. High voltages cause injury or death.

  Follow all state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician.

- **Do Not Smoke While Servicing Batteries**

  Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.

- **Exhaust Gases Are Toxic**

  Provide an adequate exhaust system to properly expel discharged gases. Check exhaust system regularly for leaks. Ensure that exhaust manifolds are secure and not warped.

  Be sure the unit is well ventilated. Don't use discharged cooling air for compartment heating since it could contain poisonous exhaust gases.

- **Keep The Unit And Surrounding Area Clean**

  Remove all oil deposits. Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent engine damage and may present a potential fire hazard.

  Do NOT store anything in the generator compartment such as oil or gas cans, oily rags, chains, wooden blocks, etc. A fire could result or the generator set operation (cooling, noise and vibration) may be adversely affected. Keep the compartment floor clean and dry.

  Do not steam clean the generator set while the engine is running. When cleaning, do not spray directly into the generator, control box, or air cleaner.

- **Protect Against Moving Parts**

  Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be worn because of the danger of becoming caught in moving parts.

  Make sure all nuts and bolts are secure. Keep power shields and guards in position.

  If adjustments *must* be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

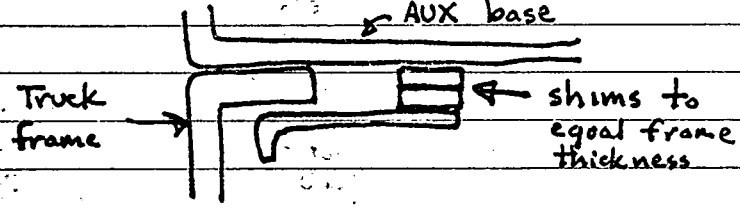
Installation Tips

1. Install beveled washers correctly

2 per bolt

see page ____

2. Install shims on clamp



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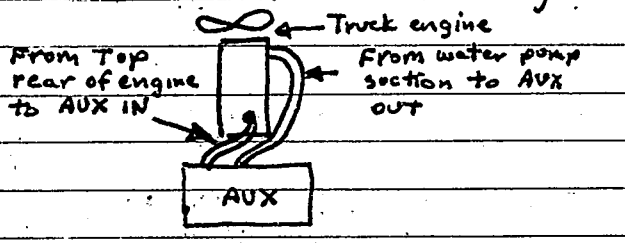
3. Install hoses correctly



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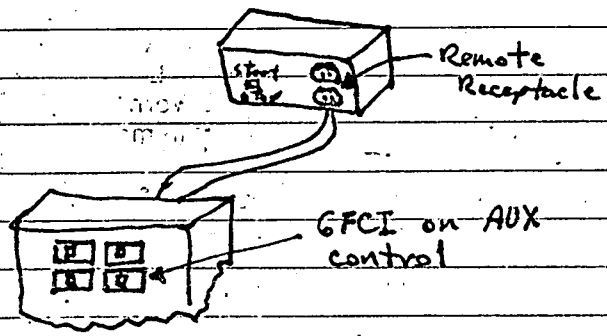
4. Remote receptactal to GFCI



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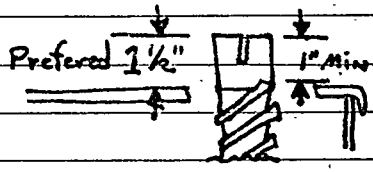
5. Correct exhaust tube adjustment



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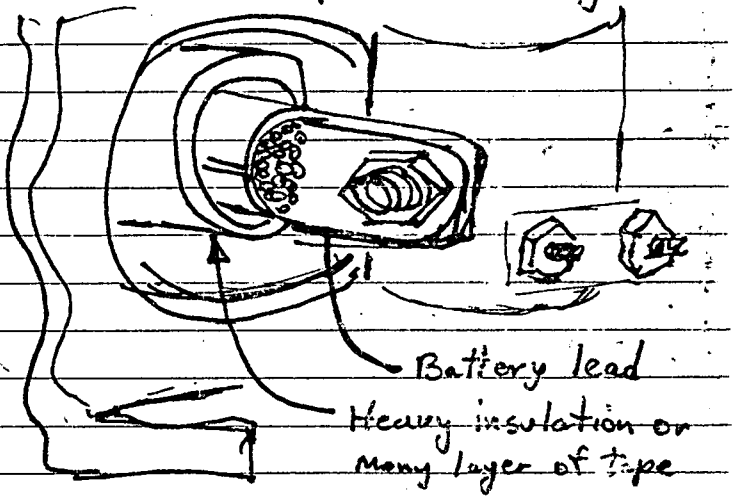
6. Protect positive battery lead



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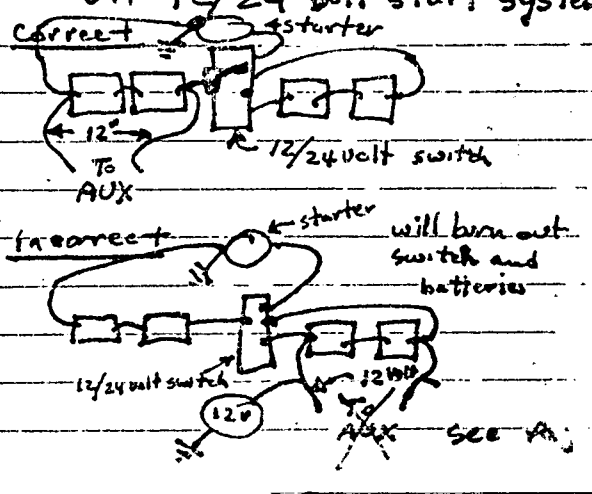
7. Connect to the CORRECT battery terminals on 12/24 volt start system



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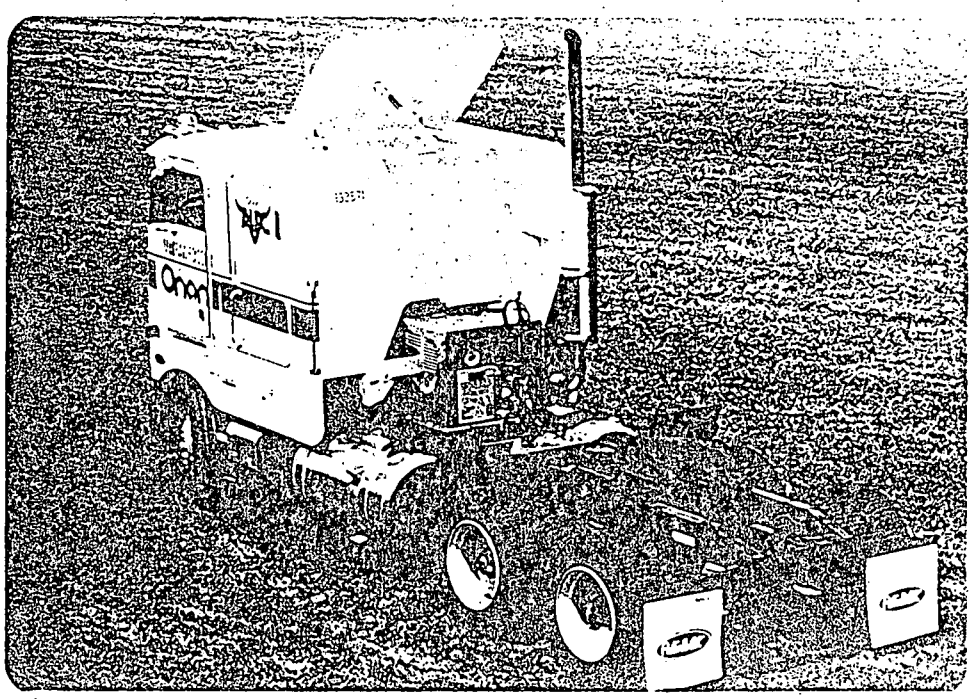
Typical AUX installation



Introduction

This manual covers detailed installation procedures and recommended practices for installing the Onan 3.0RDJA diesel powered auxiliary generator set in an "Over-The-Rail" configuration ONLY. Read through the entire manual for familiarity prior to actually installing this generator set. This manual is arranged in a logical sequence of steps that should be followed when performing the actual installation. The remote control, muffler and exhaust tubing, connectors and hardware required for installation are packaged in an accessory kit supplied with each set when shipped. Do NOT proceed with the installation if any items are missing.

Any items not supplied but required to complete the installation are specified and recommended where appropriate throughout the manual. Some of these items will be available in Optional kit form from Onan. All other items specified and required should be procured locally prior to starting the actual installation.

This generator set is shipped from the factory completely assembled within the insulated compartment housing for protection during shipping. Some housing panels and internal compartment wiring require disassembly prior to installing the generator set in place over the truck frame rails.

WARNING

ONAN RECOMMENDS THAT GENERATOR SET INSTALLATION AND ALL SERVICE ONLY BE DONE BY PERSONS QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE. TO PREVENT POSSIBLE INJURY AND/OR EQUIPMENT DAMAGE IT IS IMPERATIVE THAT THE SERVICE PERSON BE QUALIFIED.

IF IT IS NECESSARY TO RELOCATE OR MODIFY ANY MAJOR TRUCK CHASSIS COMPONENTS SUCH AS BATTERIES, TANKS, TOOL BOXES OR ANY OTHER TRUCK ACCESSORIES, ALL WORK MUST BE PERFORMED BY AN EXPERIENCED TRUCK DEALER OR SERVICE PERSON ONLY. THESE CONDITIONS MUST BE IDENTIFIED PRIOR TO PERFORMING ANY PART OF THE AUXILIARY GENERATOR SET INSTALLATION. THE COMPLETED INSTALLATION MUST CONFORM TO FEDERAL MOTOR CARRIER SAFETY REGULATIONS, TITLE 49, PART 393 AND FOLLOW THE RECOMMENDED PRACTICES OF THE AMERICAN TRUCKING ASSOCIATION MAINTENANCE COUNCIL.

Pre-Installation Instructions

PRE-INSTALLATION EVALUATION

~~TO ESTABLISH IF SUFFICIENT ROOM BETWEEN TRAILER AND CAB~~

Each truck chassis must be evaluated and certain measurements must be made by the installer prior to starting any installation. These measurements determine whether there is sufficient, unobstructed space to permit installation of the generator set compartment ~~and the fuel tank~~ in their recommended locations.

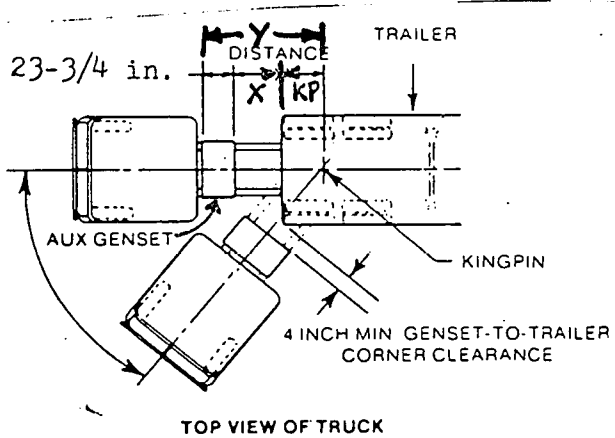
If seperate fuel tank option is also being installed see fuel section

The generator sets are designed primarily for installation in Class 7 or 8 long haul trucks. Exact compartment mounting location along the truck frame rail will vary between different ~~conventional~~ cab and chassis truck makes and models.

This model is designed for Over the Rails only do not side mount

In cab-over-engine type trucks for "Over-the-Rail" installations, a location as ~~far forward toward~~ close to the back wall of truck cab is most suitable for purposes of better axle weight distribution. See Figure 2.

Distance "X" listed in Table 1, when measuring for installation, MUST be maintained to allow for any truck maneuver in order to proceed with any Over-the-Rail installation. Reference ~~illustration~~ Figure 2 when measuring distance "X".

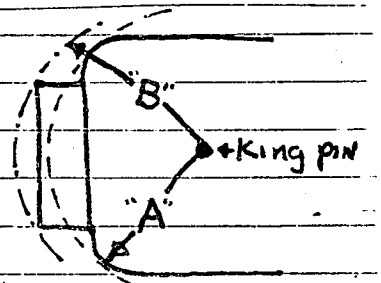


TOP VIEW OF TRUCK

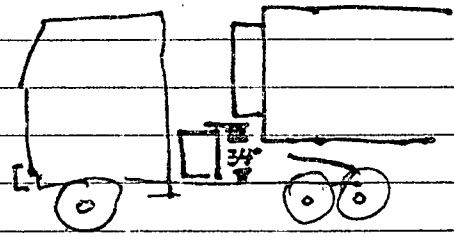
Figure 2

For application other then those listed in table 1 ~~on~~.

Step 1 Identify the distance from king pin to corner Dimention 'A'



Step 2 I.f the refer ~~extend~~ - is greater then 'A' then it's dem ent ion 'B' must be used * Except when the high th ~~of the~~ AUX is not interfed with



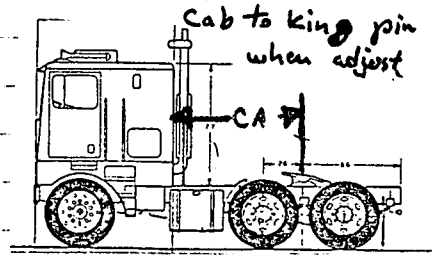
step 3. ~~Then Add A or B to~~ Add A or B + Min Gap 4" + AUX 23.75 = Y

Table 1

	King Pin distance (KP) inches	min space (X) inches square corner	min space (X) inches 10" round corner
96" wide Trailer	36	28	24
	48	24	20
102" wide trailer	36	30.5	26.5
	48	26	22

Y must be Less then CA

Cab to king pin setting when adjust



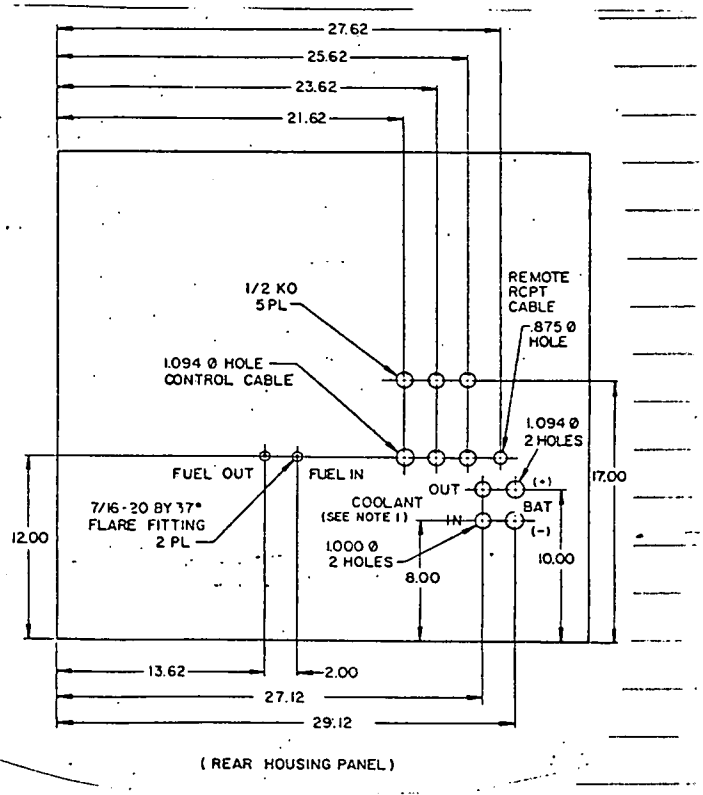
COMPARTMENT SIZE AND LOCATION

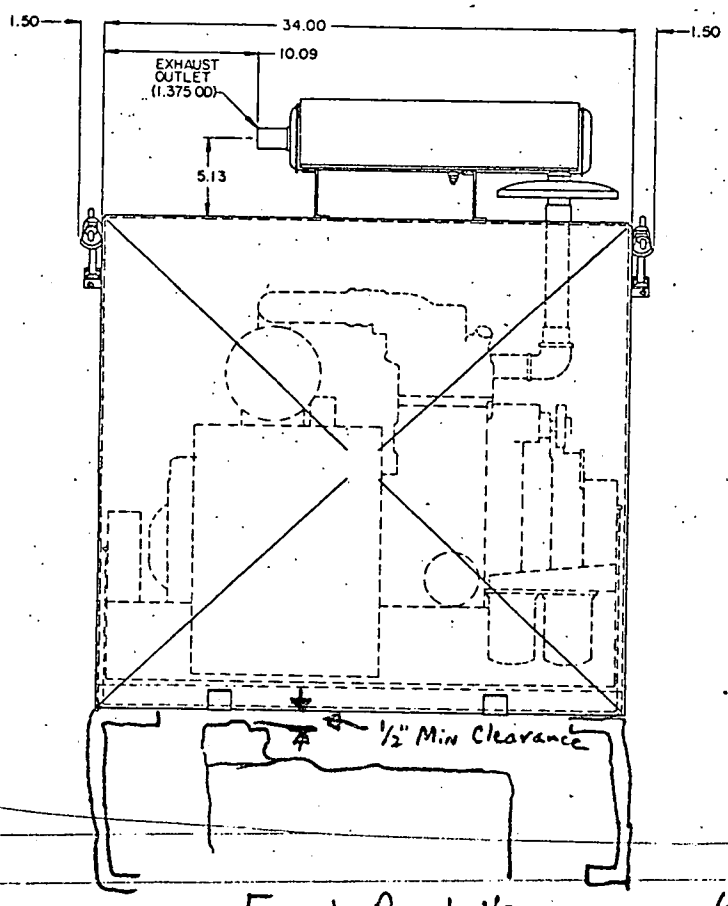
- Design variables in truck wheelbase and cab styles may require relocation of batteries. tool boxes, etc., to make room for the generator set Some degree of modification and possibly relocating some of these chassis components may be necessary to provide the physical space (length) required to proceed with the installation of the generator compartment.

WARNING ***If it is necessary to relocate or modify any major truck chassis components such as batteries, tanks or tool boxes or any other truck accessories, all work must be performed by an experienced truck dealer or service person only. These conditions must be identified prior to performing any part of the auxiliary generator set installation. The completed installation must conform to Federal Motor Carrier Safety Regulation, Title 49. Part 393 and follow the recommended practices of the American Trucking Association Maintenance Council.***

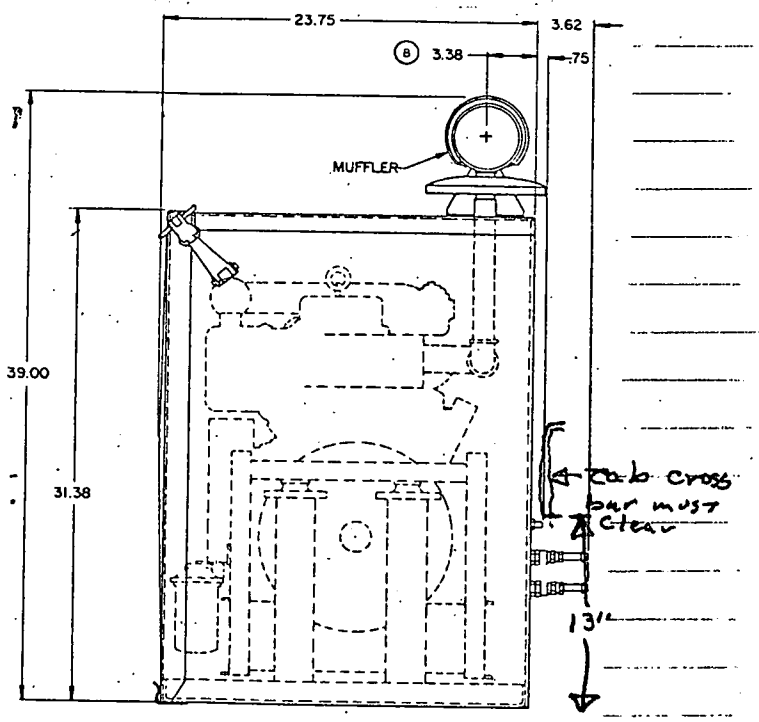
- The physical size(primarily depth)of the generator compartment requires a MININUM, UNOBSTRUCTED OPEN SPACE of 23-3/4 inches parallel to (lengthwise) the truck frame rails directly behind the cab. Measure along the frame rails in the desired mounting location to verify this space is available. See Figure 3 for minimum over-all installation dimensions.

- A minimum vertical clearance of 1/2 inch must be maintained between the generator set housing baseplate (where installed over truck frame rails) and any permanent truck chassis component underneath generator set compartment. Spacers should not be used to obtain this clearance. Housing baseplate can be moved horizontally to obtain this clearance as long as minimum space (23-3/4 inches)is NOT reduced. Housing baseplate must rest on truck frame rails when installed as shown in Figure 3.





Front Panel View



Side panel View

Specifications

Do we really need this page?
or if needed lets expand and put on back cover? or last page

The SI metric equivalents are printed in parenthesis immediately following the U.S. customary unit of measure

COMPARTMENT SIZE

Height (Without Muffler)	31.38 in. (797mm)
Width	34.00 in. (863mm)
Depth	23.75 in. (603mm)
Approximate weight including compartment	560 lbs. (254kg)
Starting System Voltage	12- volts DC
Battery Ground (Positive ground optional)	Negative Ground Standard
Starting System	Motorized Alternator Cranking
Cranking Current	300 Amperes
Break-away Current (Maximum)	475 Amperes
Fuel	Diesel
Remote Fuel Tank Capacity	11.5 Gallons (44L)
Length	24 in. (609mm)
Width	15.50 in. (393mm)
Depth	7.50 in. (190mm)
Fuel Pump	Mechanical
Fuel Return and Supply line Connection Size	SAE -4 37°Flare

NOTE: Refer to auxiliary generator set Operator's manual for complete engine-generator specifications.

Hose size
Battery cables size
DC Remote cable
AC wire - 15 Amp circuit
AC wire - 20 Amp circuit
Point gap flicker
Coolent capacity
Valve lash
0.1

ment wiring require disassembly prior to installing the generator set in place over the truck frame rails to simplify the mounting plate and wiring connections to the truck chassis. Proceed as follows:

1. Remove the compartment front cover by releasing the rubber straps on top and then lift cover up and out from detents on bottom of front panel.

2. Remove the top compartment panel by removing eight 5/16-18 x 3/4 inch hex head capscrews around the top housing perimeter as shown in Figure 4.

3. Remove the four 5/16-18 x 3/4 inch hex head capscrews which secure the left side housing panel to the rear(back) panel of the compartment as shown in Figure 4.

NOTE: Left and right sides are determined While facing the hinged front cover of the generator set.

4. Remove the two 1/4-20 x 5/8 inch hex head capscrews on the exterior of the rear(back)housing panel which secure the compartment fan assembly to the rear(back)panel as shown in Figure 4. These two bolts are 5-7/8 inches in (to center)from left rear corner of the compartment.

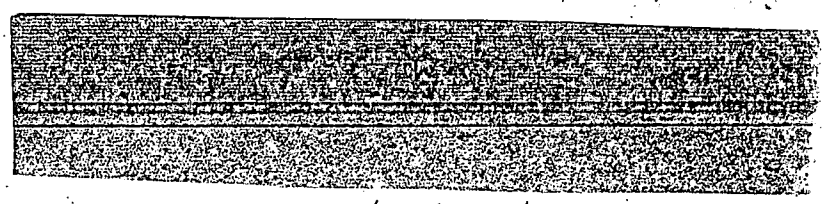
5. Unplug the fan assembly AC cord and the water solenoid AC cord from the duplex receptacle on top of the generator end of the set inside the housing.

6. Remove the three 3/8-16 x 3/4 inch hex head capscrews that hold the left side panel to the mounting tray as shown in Figure 4. Set this panel aside for now.

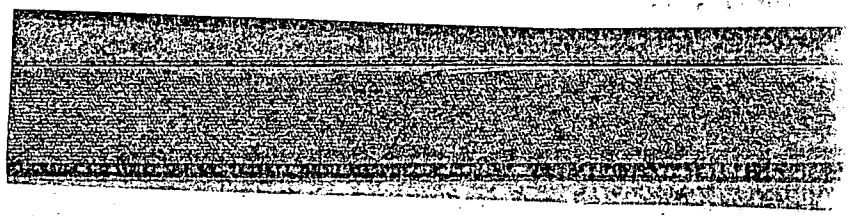
7. Use an appropriately sized chain or portable hoist with chain inserted through the lifting eye on top of engine to position the generator set "in place" over the truck frame rails in the desired mounting location and check for adequate clearance(over-all compartment dimensions are shown in Figure 3).

WARNING *Make certain that housing baseplate is adequately supported during the installation procedure.*

8. Remove the four 5/16-18 x 3/4 inch hex head capscrews which secure the right side housing panel to the rear(back) panel of the compartment as shown in Figure 4.



9. Remove the two 3/8-16 x 3/4 inch hex head capscrews and the single(front) 3/8-16 x 1-3/4 inch hex head capscrew that hold the right side panel to the mounting tray as shown in Figure 4. carefully lift and place this panel on top of the generator set for now. NOTE: This panel will be reassembled after mounting clamps and truck battery cables have been installed.



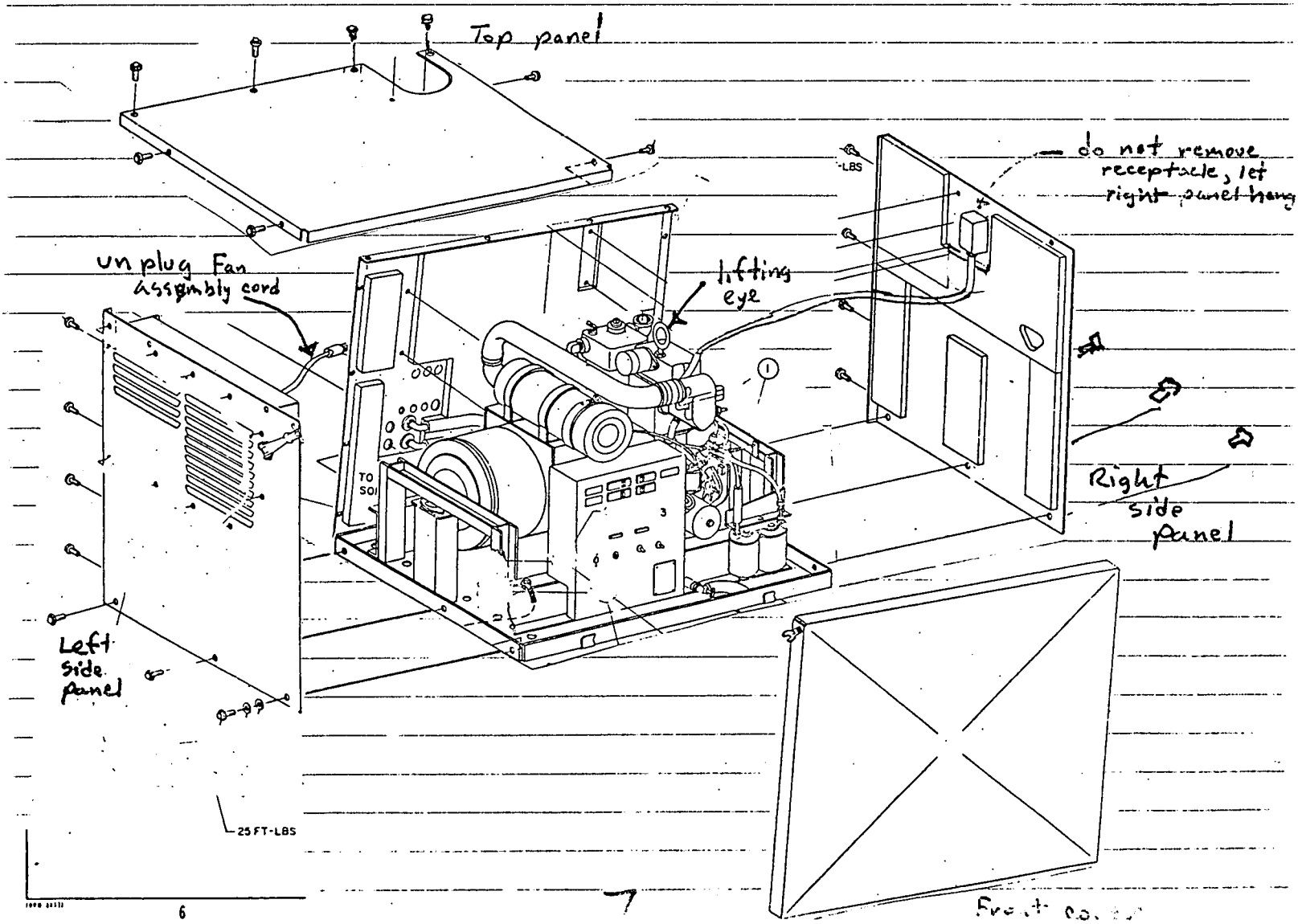
Compartment DISASSEMBLY and Installation

Step 1. Remove the compartment front cover, top compartment panel and right and left side panel in order.

CAUTION: Do NOT disconnect or remove the AC duplex receptacle, internal wiring or the external cover and gasket installed in top center of right side housing panel.

Step 2. Use an appropriately sized hoist (set weight approx 560lbs) lift set using hook inserted through the lifting eye

NOTE: Removal of rear(back)panel is NOT required for installation of the generator set.



Step 3 Place the generator set on the truck frame in the position selected. Double check for proper minimum clearances

Step 4

Temporarily hold one mounting clamp in position (inside from underneath) against top frame rail flange of truck as shown in Figure 4. Determine the number of 1/4 inch and/or 1/16 inch thick spacers (in any combination NOT to exceed 3/4 inch per mounting clamp) required to fill any gap between baseplate and mounting clamp under baseplate. These spacers are necessary to balance out the leverage of each mounting clamp. Total thickness of spacers used must match truck frame rail flange thickness under each of the four mounting clamps. Use the same combination and number of spacers with each of the four mounting brackets.

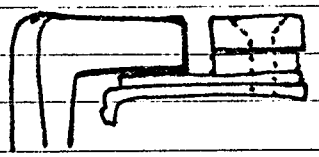


Figure 4

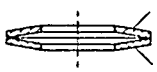
Step 5 assemble required number of spacers to all four mounting clamps using 5/16-18 x 1-1/2 inch allen head capscrews and 5/16 lock nuts provided Torque nuts to 15 foot pounds (20 N•m). See Figure 4. Top spacer has recessed mounting hole to accept special allen head capscrews.

Step 6

Choose any two of ten possible pairs of pre-drilled mounting holes(per side) that do NOT interfere with any existing chassis hardware, frame cross members or any other chassis components (underneath baseplate).

Step 7

Install the four mounting clamps with spacers ~~as required~~, two on each side under top flange of truck frame rails (~~from inside frame rails~~) using 1/2-13 x 2 inch hex head cap screws and two special 1/2 inch conical washers on each capscrew positioned as shown in Figure ~~6~~ 5 detail B. Tighten all eight capscrews until conical washers are flat (approximately 10-20 foot pounds-13.5 -27 N•m). Do NOT over-torque.



Conical washers positioned correctly

Figure 5

CAUTION

The mounting bolts are torqued correctly when the special washers are flat. See Figure 5, detail A.

Do NOT overtighten conical washers.

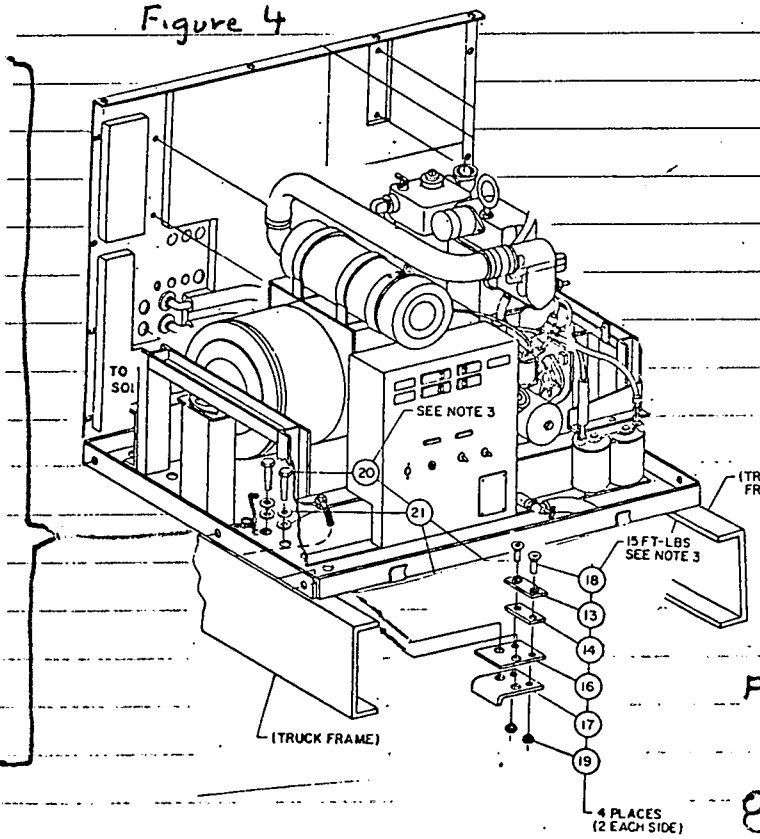


Figure 6

Compartment and GenSet Installation

OVER-THE-RAIL MOUNT ONLY

After generator set is positioned properly on truck frame rails and mininum clearances have been checked, mounting tray must be securely clamped to truck frame rails using clamps, spacers and hardware supplied in the unit accessory package. Proceed as follows:

1. _____ ,on each side of truck.(4 mounting clamps total).

2.

3. The number of spacers used will vary depending upon the thickness of the truck frame rails.

Do NOT exceed the 3/4 inch maximum spacer thickness for each clamp. See Figure 4 and detail A.

4. Remove housing mounting clamp and

5.

6. Mounting clamps have weld nuts to simplify installation. These special washers determine the correct amount of clamping force on the bearing surfaces of the 4 mounting clamps.

COMPARTMENT ASSEMBLY

1.

NOTE: The longer right front housing bolt (3/8-16 x 1-3/4 inches)and hardware is left out until the battery cables are installed. See Page__, Step__, shown in Figure__.

2.

Capscrews are inserted from exterior side of rear panel (near corner)through flange of side panel which contains self-cinching nuts on inside of rear panel as required. See Figure 4.

3.

Compartment - Partial Assembly

After the generator set is installed on the truck chassis, the compartment housing can be partially assembled and wired as follows:

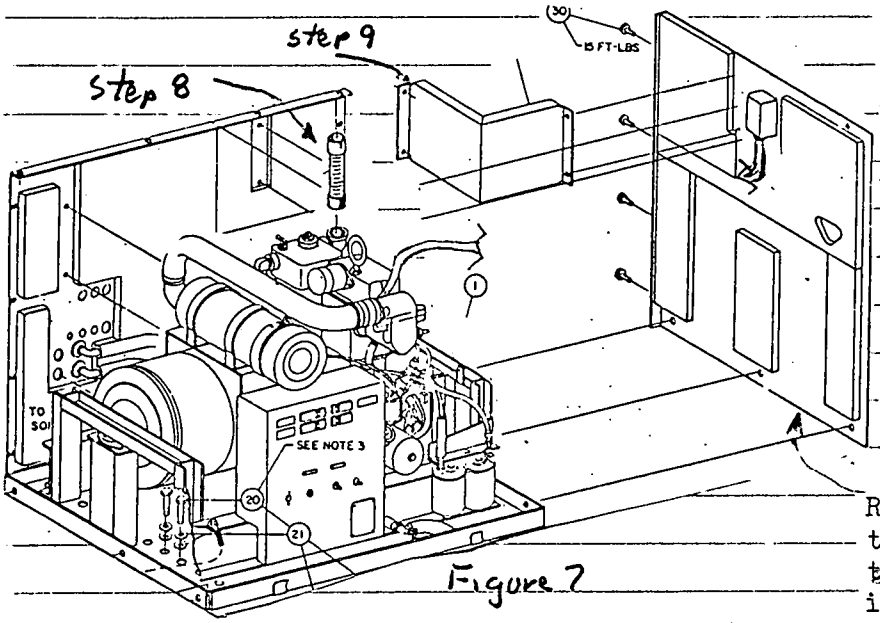


Figure 7

step 8

Install threaded end of 9-1/4 inch flexible exhaust tube(supplied in accessory package)into generator set exhaust pipe elbow in upper right rear corner of compartment as shown in Figure 7. Tighten securely.

step 9

8. Position the compartment interior exhaust shield in the upper right rear corner around the generator set exhaust pipe. Line up mounting holes and secure using 1/4-20 x 5/8 inch hex head capscrews supplied in accessory package. Capscrews are inserted from exterior side of the compartment into self-cinching nuts that are already positioned on the shield. Torque at 7 foot pounds(9N·M). See Figure 7.

NOTE:
The left hand side of the compartment housing can be installed after all AC and DC wiring is completed inside the generator set control panel and through the rear panel of compartment housing as outlined in the Electrical Loads and Connections Section.

step 10

Replace the right hand side panel of the compartment housing by installing ~~two~~ 3-3/8-16 x 3/4 inch hex head capscrews ~~in the bottom center and rear holes to~~ secure panel to the mounting tray. See Figure 7. Torque all 3/8 inch capscrews at 25 foot pounds(34N·M).

Install the four 5/16-18 x 3/4 inch hex head capscrews which secure the right hand side panel to the rear(back)panel of the compartment housing. Torque these bolts at 15 foot pounds(20N·M).

Compartment - Electrical

step 11 Water-tight 3/4 inch metal strain relief connectors(supplied by customer) should be installed in the two 1 ~~1/8~~ 2 3/4 inch diameter holes in the lower right hand corner of the rear(back)panel at this time. See Figure 8. Battery cables are installed through these connectors later but for ease of installation, the connectors should be installed prior to reassembling the compartment housing.

step 12

Determine ~~which~~ 15 knockouts at 12" in the rear (back)panel of the housing will be ~~used~~ suitable for the external 20 amp AC load circuits, and fuel line. ~~If any~~ These must clear the cross brace on the cab.

Caution } Make sure the cabs cross brace clears the knockout selected.

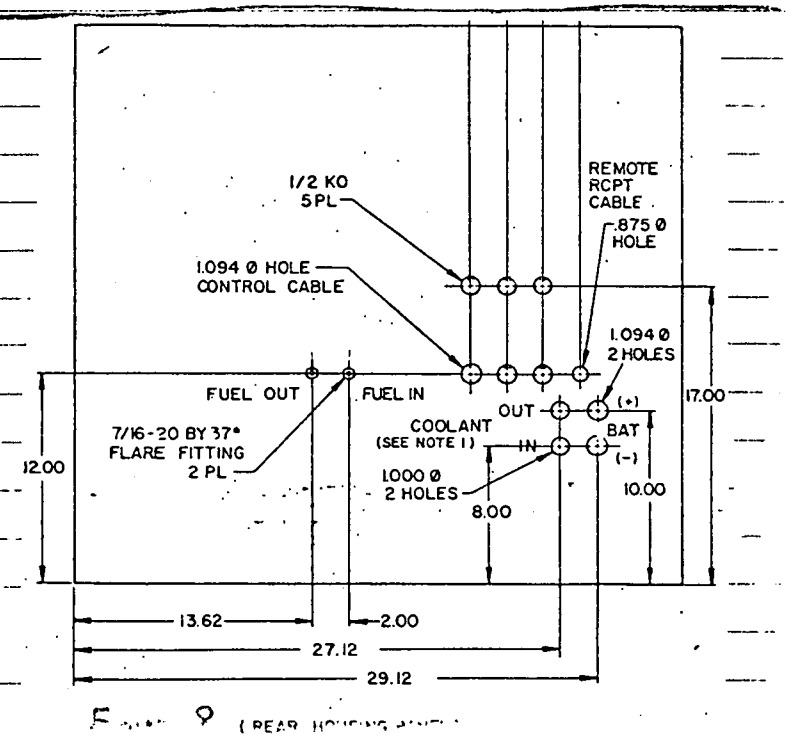


Figure 8 (REAR HOUSING PANEL)

Typically two additional circuits are connected, one 20 Ampere circuit for air conditioning/heater and a 15 Ampere circuit for ~~the~~ oil ~~pan~~ and battery blanket heaters.

. Install a 3/4 inch water-tight strain relief connector in ~~this~~ the 1.094 hole near the fuel in (for control cable) but do not tighten yet.
Remove selected knockouts in rear(back) panel and install ~~3/4 or~~ 1/2 inch water-tight strain relief connectors as required for additional circuits to seal wiring and cables but do not tighten yet.

Electrical Loads and Connections

GENERAL WIRING RECOMMENDATIONS

Wiring harnesses for interconnection of the auxiliary generator set to each individual AC load circuit and remote start panel must be fabricated and hand wired during the installation of the generator set.

WARNING ***Installation of all wiring must conform to all applicable codes and follow National Electrical Code standards and recommended practices. A qualified electrician should inspect all wiring.***

- Use multistrand wire throughout the truck during installation. Specific sizes for main feeder conductors and individual AC load circuit wiring are specified (where required) in this section of the installation guide. All wiring must be of adequate size, properly insulated, and supported in an approved manner. Observe all wiring size recommendations and amperage specifications where listed. Do NOT splice any wiring in the main AC feeder conductors.

CAUTION ***Do NOT use solid metal conductors anywhere in this installation. They may develop metal fatigue from vibration and eventually break.***

- Mount all switches and controls securely to prevent damage from vibration and road shock. All switches must be vibration-proof to prevent accidental opening or closing while the truck is in motion.

- Route all AC and DC wiring along the inside of the truck frame rails where possible. Keep away from rotating or moving shafts and linkages of the truck. Use insulated hold-down clamps spaced approximately every 18 inches and closer together in bends or near high heat sources. Plastic tie wraps can be used in between heavier insulated clamps. Use additional protective sleeving (such as heater hose) over wiring wherever it crosses over frame rails or in sharp bends. Any existing holes in truck cross suport frame members used for routing of wiring should be grommeted to protect wiring.

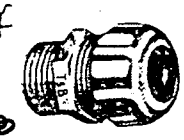
WARNING ***Do NOT tie any electrical wiring to the fuel or hydraulic lines of the truck because of fire hazard. Keep all wiring away from the exhaust pipe.***

WARNING ***All holes to the inside of the truck cab must be sealed to prevent poisonous exhaust gases from entering the interior or a storage compartment. Use water tight strain reliefs (1/2 inch or 3/4 inch) or silicone rubber sealant to seal around all openings made for electrical wiring.***

CAUTION ***Do NOT drill any additional new holes in the truck frame rails or cross-support frame members for routing wiring through. Any existing holes used for routing of wiring should be protected with grommets.***

- Use water-tight strain relief connectors (1/2 inch or 3/4 inch) whenever wiring passes through any exterior panel, cab wall or truck cab compartment. Use Romex connectors only on interior wiring, such as that which passes through cab wall partitions, panels or shelves.

LOAD CIRCUIT RECOMMENDATIONS



- All AC load should be on a 120 volt AC load. Onan recommends using 12-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts, AC 90°C operation for all 20-amp circuits such as sleeper cab air conditioners. Most other truck chassis starting aids such as lube oil heaters, battery heaters, electric cab heaters, etc should use 14-gauge, 3-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts AC, 90°C operation for these 15-amp circuits. Romex connectors must be used in set control panel knock-outs to secure wiring. Some slack should be allowed in wiring for movement caused by vibration to prevent breakage. Barrel connectors must be used on load wiring connections at 15-amp circuit breakers to safely secure wiring connections because of wire size.

WARNING ***Do NOT use Poly-vinyl-chloride type wire on any AC or DC load or control circuit wiring in this application. Overloading this type of wire causes a chlorine gas emission which creates a poisonous hydrochloric acid condition.***

- Onan recommends using 14-gauge, 3-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts AC, 90°C operation for all 15-amp circuits such as AC duplex receptacles or other accessory loads not to exceed 15 amps. Romex connectors must be used in set control panel knock-outs to secure wiring. Some slack should be allowed in wiring for movement caused by vibration to prevent breakage. Barrel connectors must be used on load wiring connections at 15-amp circuit breakers to safely secure wiring connections because of size. Ground fault circuit breaker does not require barrel connectors.

Lubricate the wire outer jacket with liquid soap, motor oil or other suitable material to aid in assembly of strain relief connectors.

Figure B

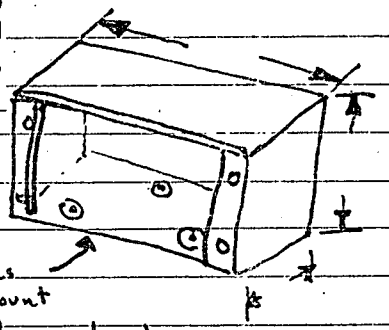
Connecting the Remote Panel to Gen Set

MOUNTING REMOTE PANEL

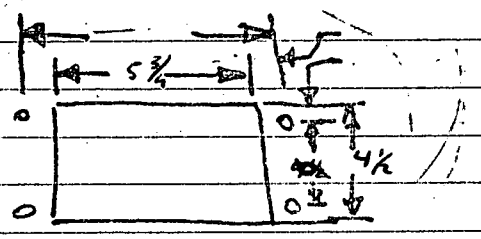
A remote control panel is provided which allows the driver to start the generator set from within the cab area of the truck. The panel contains start-stop and preheat rocker switches, running time meter, buzzer alarm and one AC duplex receptacle.

Step 1

Find The best location for the Remote control panel. One of the most popular locations for this panel (Figure 9) ~~is located~~ on the wall behind the drivers seat. From this location the operator can easily turn the set on or off while standing on the ground or from the sleeper. This location should not be more then 35 feet from the Gen set or the Remote control cable kit (#335-0 - option) will not reach.



Remote box



Panel cutout for flush mounting

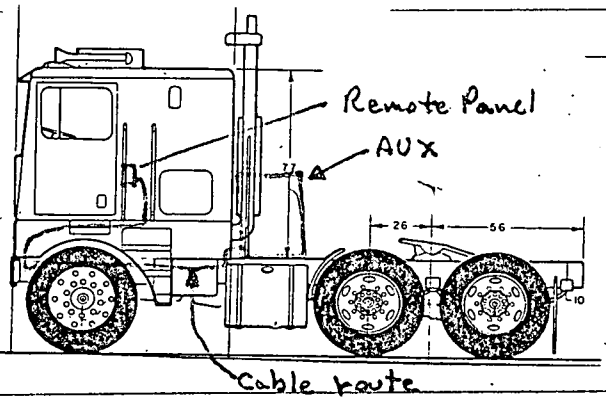


Figure 9

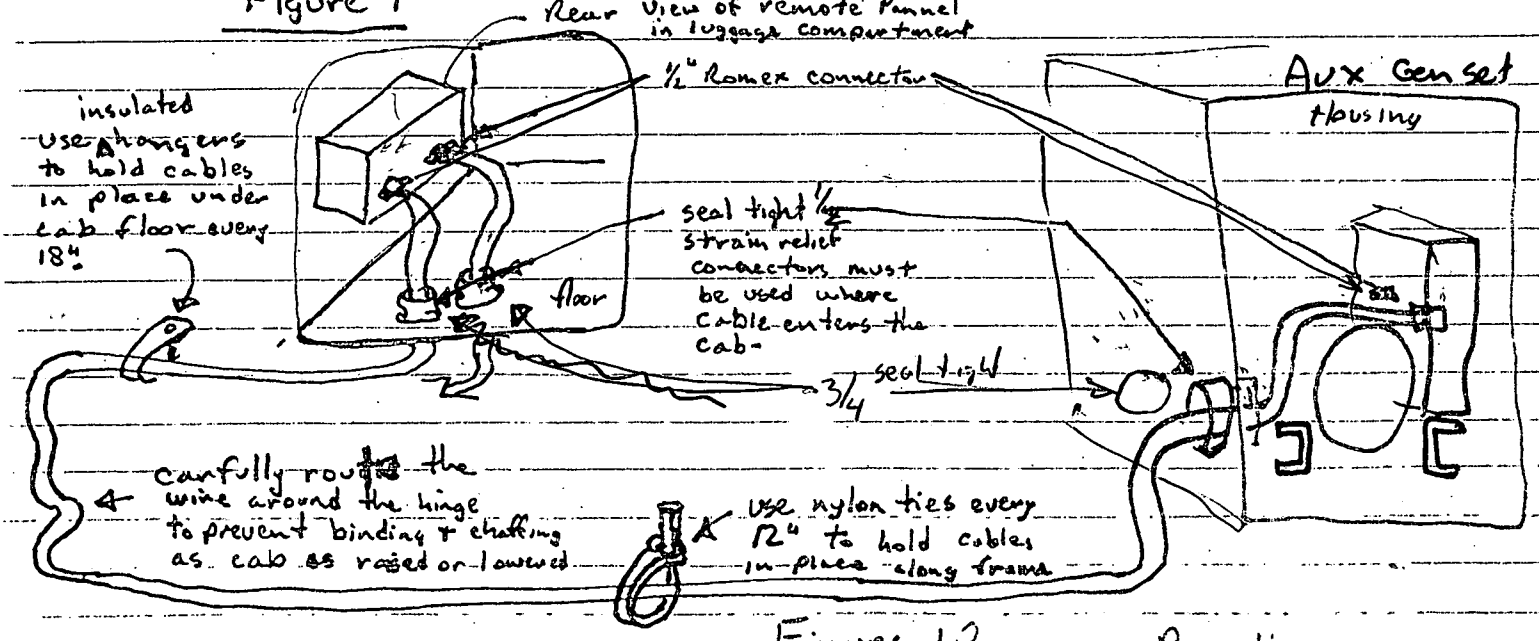


Figure 10

Panel

Step 2

Route both cables by best path from Gen Set to Remote panel location - Avoid

1. exhaust pipes by 3" min
2. Do not tie to hydrolic lines
3. Do not tie to fuel lines

Do

1. use seal tight connecters at entrance to cab

Seal

WARNING *All holes leading to the inside of the truck cab for electrical wiring must be sealed to prevent poisonous exhaust gases from entering the cab interior.*

2. Use hold down clamps every 18" or closer underneath the cab to secure the cables.
3. Use nylon cable ties every 12" or closer along the frame to secure the cables

WARNING *Do NOT install remote starting panel without the remote control box housing. A potential shock hazard exists because of the exposed terminals of the AC receptacle.*

**Remote cable is NOT supplied due to variation in length requirement between truck makes and models. Color coded bulk cable (6-conductor, 16-gauge type SO multistrand wire in a neoprene jacket) is available from Onan as part of the separate optional control wiring kit referenced in the beginning of the *Electrical Loads and Connections section.* *This kit includes all necessary wiring and hardware to interconnect the remote starting panel (with duplex receptacle) to the generator set control panel. Step-by-step installation instructions provided with each kit.* HRC

CAUTION *Do NOT use solid wire or wire smaller than 16-gauge in size. Solid wire will fatigue due to vibration and break. Wire smaller than 16-gauge will result in poor starting from remote panel and short service life.*

GENSET Terminal No.	REMOTE PANEL Terminal No.	CIRCUIT FUNCTION	WIRING COLOR CODE
1	1	Ground	White
2	2	Stop	Red
3	3	Start	Green
4	4	Remote Alarm Signal	Orange
5	5	Diesel Preheat	Blue
6	6	Running Time Meter and Switch S1 Integral Running Light	Black

FIGURE 12. REMOTE STARTING PANEL INSTALLATION

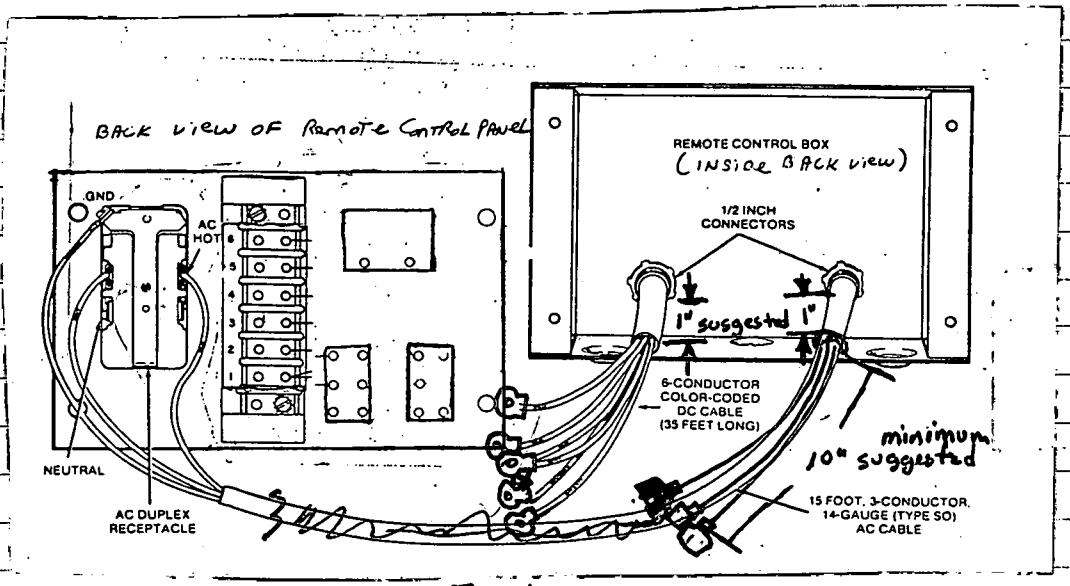


Fig 11

Remote Starting Panel Installation

MOUNTING REMOTE PANEL

A remote control panel is provided which allows the driver to start the generator set from within the cab area of the truck. The panel contains start-stop and preheat rocker switches, running time meter, buzzer alarm and one AC duplex receptacle.

Remote panel has three 5/16 inch mounting holes in bottom panel for shelf mounting and two 7/8 inch holes in back panel for DC control harness and AC supply conductor for receptacle. Use 14-20 screws of suitable length to securely bolt panel in desired location.

Exact location of remote panel varies according to owner preference and set location as well as type of truck chassis. Remote panel is usually located near driver's seat in cab or in a convenient location within sleeper cab. Generator set can be started at compartment location if desired. Housing front cover must be removed for access to set control

CONNECTING REMOTE PANEL TO GENERATOR SET

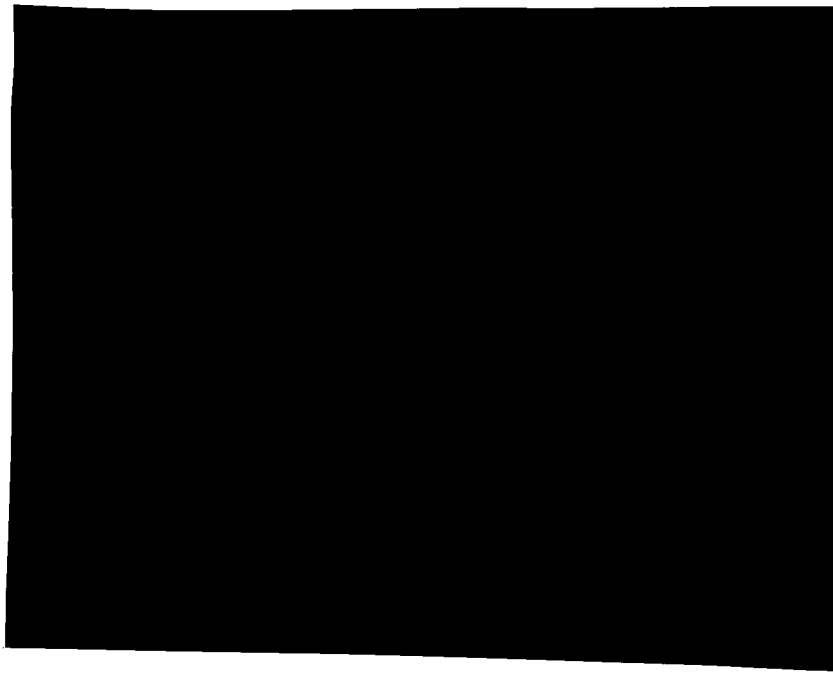
A 6-conductor, 16-gauge (type SO) neoprene-jacketed multistrand wire cable is required for connecting the remote control starting panel to the generator set control panel. The cable must be fabricated during the installation, cut to required length and hand wired to the remote terminal block inside the remote panel and inside the generator set control panel. Ring type terminals should be used to connect remote cable to terminal blocks inside both controls.

Route the DC control cable along the inside of the truck frame rails where possible.
Secure cable every 18 inches along the run with insulated hold-down clamps (closer together in bends or near high heat sources). Use nylon tie wraps as required in between clamps.

Some slack should be allowed in wiring for movement from vibration

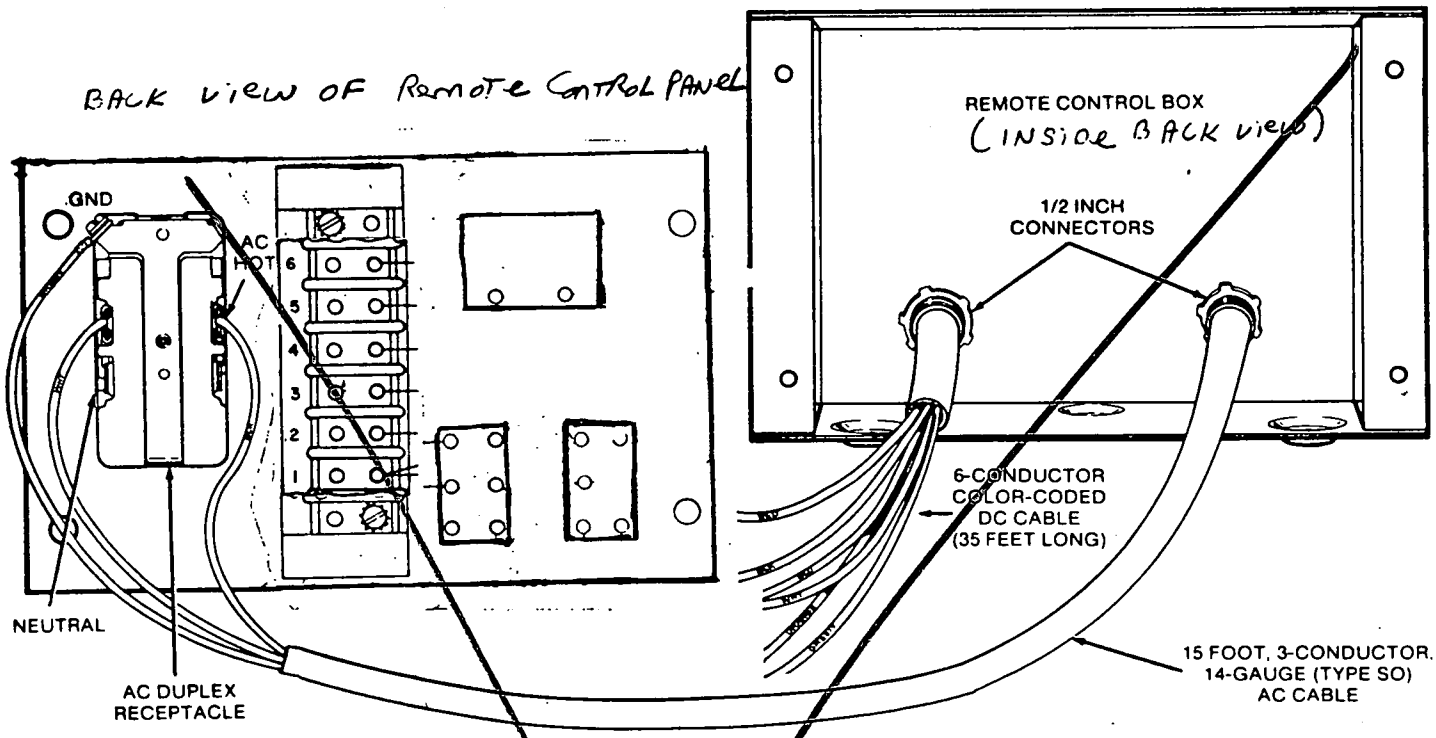
A 1/2 inch WATER-tight strain relief connector or Romex connector should be used on DC cable where cable enters remote panel. Remote panel location and method of mounting (wall or shelf) determines which connector to use. See Figure

On cab-over engine type truck chassis, all routing of any wiring, regardless of type or function MUST be long enough and routed in such fashion that raising and lowering of cab for access to engine will NOT interfere with wiring. Allow slack at the nose (hinged point) of the cab for raising cab as required.



Refer to interconnection wiring diagram shown in Figure ___ and remote panel wiring connections according to circuit function, terminal block no. and suggested color code illustrated in Figure ___ (see chart). Use Heyco strain reliefs or Romex connectors on cable when routing through entry holes in remote panel to secure wiring and seal any entry holes.

WARNING ***All holes leading to the inside of the truck cab for electrical wiring must be sealed to prevent poisonous exhaust gases from entering the cab interior.***



GENSET Terminal No.	REMOTE PANEL Terminal No.	CIRCUIT FUNCTION	WIRING COLOR CODE
1	1	Ground	White
2	2	Stop	Red
3	3	Start	Green
4	4	Remote Alarm Signal	Orange
5	5	Diesel Preheat	Blue
6	6	Running Time Meter and Switch S1 Integral Running Light	Black

FIGURE REMOTE STARTING PANEL INSTALLATION

McGR W-EDISON

Onan

PRELIMINARY COPY

Installation Guide

3.0RDJA DIESEL

AUX

GenSet

- Auxiliary Power Generators For Trucks
- Over The Rail Mount ENG ONLY

IMPORTANT
Read Through Entire Installation Guide
Prior To Actual Installation

974-0625
4-82
Printed in U.S.A.

SAFETY PRECAUTIONS

The following symbols in this manual signal potentially dangerous conditions to the operator or equipment. Read this manual carefully. Know when these conditions can exist. Then, take necessary steps to protect personnel as well as equipment.

WARNING ***Onan uses this symbol throughout this manual to warn of possible serious personal injury.***

CAUTION ***This symbol refers to possible equipment damage.***

Do not work on this equipment when mentally or physically fatigued.

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that could result in serious, personal injury. Take care in following these recommended procedures.

- **Use Extreme Caution Near Gasoline. A constant potential explosive or fire hazard exists.**

  Do not fill fuel tank with engine running. Do not smoke or use open flame near the unit or the fuel tank.

  Be sure all fuel supplies have a positive shutoff valve.

  The fuel supply and return lines must be routed separately and never tied together with any electrical wiring. Use a flexible section of fuel line between generator compartment and stationary remote fuel tank in truck chassis. This flexible section must be 100% NON-METALLIC to prevent electrical current from using it as a conductor.

  Have a fire extinguisher nearby. Be sure extinguisher is properly maintained and be familiar with its proper use. Extinguishers rated ABC by the NFPA are appropriate for all applications.

- **Guard Against Electric Shock**

  Disconnect 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 surfaces to be damp when handling electrical equipment.

  Jewelry is a good conductor of electricity and should be removed when working on electrical equipment.

  DO NOT PLUG MOBILE, PORTABLE OR STANDBY SETS DIRECTLY INTO A HOUSE RECEPTACLE TO PROVIDE EMERGENCY POWER. It is possible for current to flow from generator into the utility line. This creates extreme hazards to anyone working on lines to restore power.

  Use extreme caution when working on electrical components. High voltages cause injury or death.

  Follow all state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician.

- **Do Not Smoke While Servicing Batteries**

  Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.

- **Exhaust Gases Are Toxic**

  Provide an adequate exhaust system to properly expel discharged gases. Check exhaust system regularly for leaks. Ensure that exhaust manifolds are secure and not warped.

  Be sure the unit is well ventilated. Don't use discharged cooling air for compartment heating since it could contain poisonous exhaust gases.

- **Keep The Unit And Surrounding Area Clean**

  Remove all oil deposits. Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent engine damage and may present a potential fire hazard.

  Do NOT store anything in the generator compartment such as oil or gas cans, oily rags, chains, wooden blocks, etc. A fire could result or the generator set operation (cooling, noise and vibration) may be adversely affected. Keep the compartment floor clean and dry.

  Do not steam clean the generator set while the engine is running. When cleaning, do not spray directly into the generator, control box, or air cleaner.

- **Protect Against Moving Parts**

  Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be worn because of the danger of becoming caught in moving parts.

  Make sure all nuts and bolts are secure. Keep power shields and guards in position.

  If adjustments *must* be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

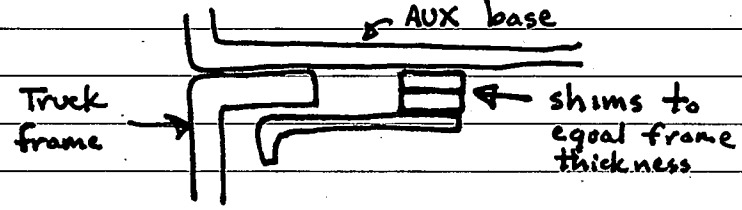
CRITICAL Installation Tips

1. Install beveled washers correctly

2 per bolt

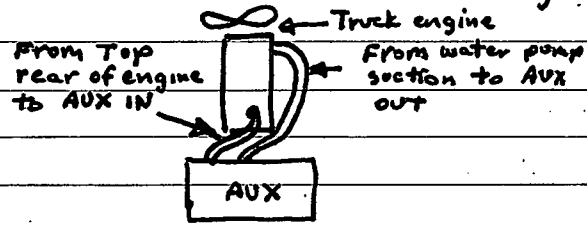
see page ____

2. Install shims on clamp



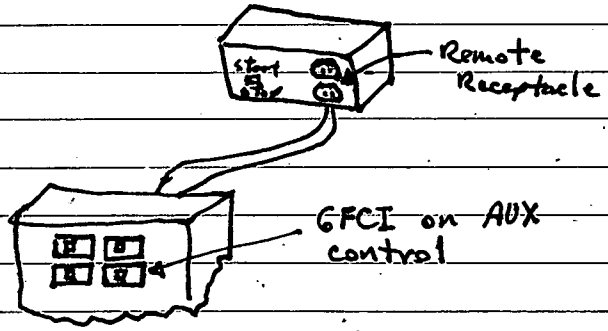
see page ____

3. Install hoses correctly



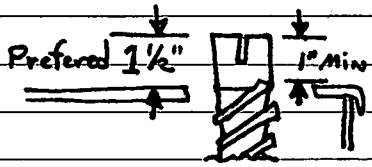
see page ____

4. Remote receptactal to GFCI



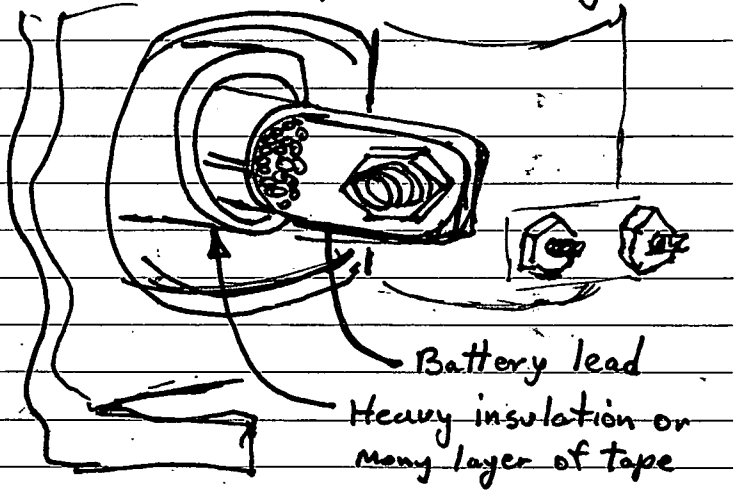
see page ____

5. Correct exhaust tube adjustment



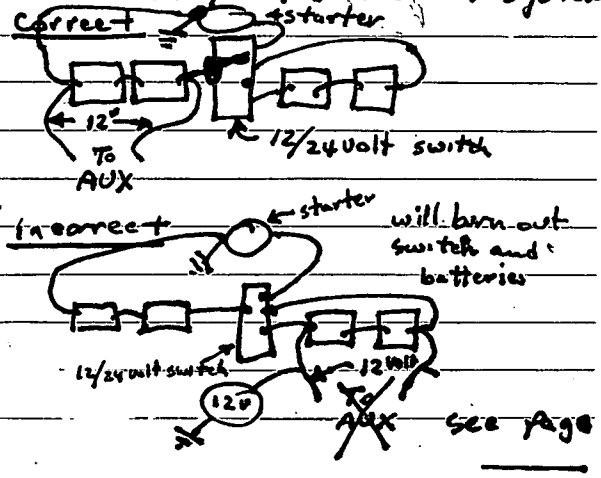
see page ____

6. Protect positive battery lead



see page ____

7. Connect to the CORRECT battery terminals on 12/24 volt start systems



see page ____

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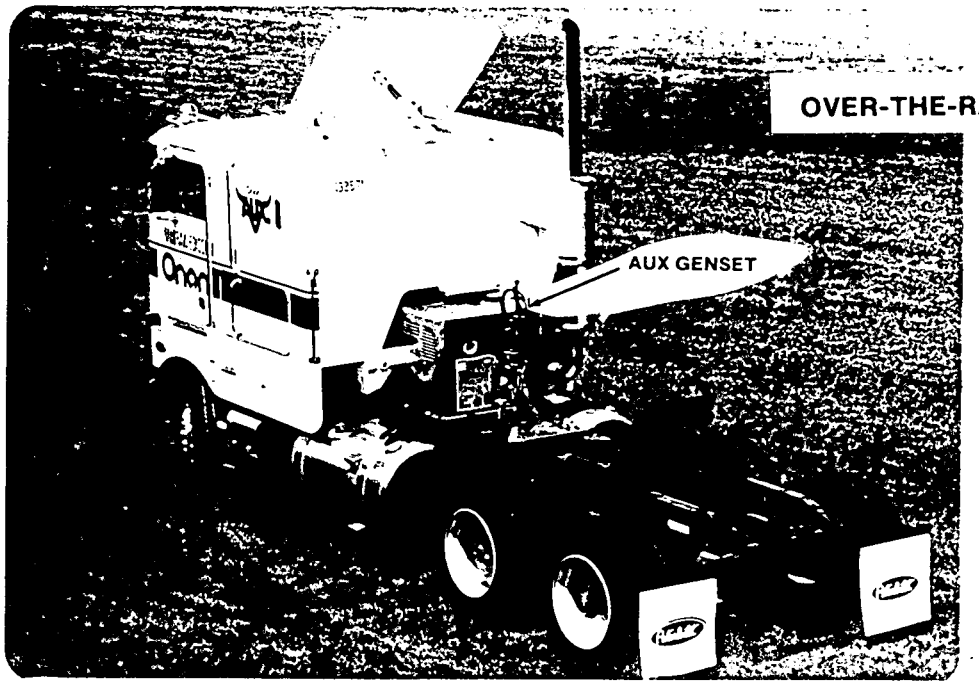
Figure 1. Typical AUX installation



OVER-THE-RAIL INSTALLATION

Introduction

This manual covers detailed installation procedures and recommended practices for installing the Onan 3.0RDJA diesel powered auxiliary generator set in an "Over-The-Rail" configuration ONLY. Read through the entire manual for familiarity prior to actually installing this generator set. This manual is arranged in a logical sequence of steps that should be followed when performing the actual installation. The remote control, muffler and exhaust tubing, connectors and hardware required for installation are packaged in an accessory kit supplied with each set when shipped. Do NOT proceed with the installation if any items are missing.

Any items not supplied but required to complete the installation are specified and recommended where appropriate throughout the manual. Some of these items will be available in Optional kit form from Onan. All other items specified and required should be procured locally prior to starting the actual installation.

This generator set is shipped from the factory completely assembled within the insulated compartment housing for protection during shipping. Some housing panels and internal compartment wiring require disassembly prior to installing the generator set in place over the truck frame rails.

WARNING

ONAN RECOMMENDS THAT GENERATOR SET INSTALLATION AND ALL SERVICE ONLY BE DONE BY PERSONS QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE. TO PREVENT POSSIBLE INJURY AND/OR EQUIPMENT DAMAGE IT IS IMPERATIVE THAT THE SERVICE PERSON BE QUALIFIED.

IF IT IS NECESSARY TO RELOCATE OR MODIFY ANY MAJOR TRUCK CHASSIS COMPONENTS SUCH AS BATTERIES, TANKS, TOOL BOXES OR ANY OTHER TRUCK ACCESSORIES, ALL WORK MUST BE PERFORMED BY AN EXPERIENCED TRUCK DEALER OR SERVICE PERSON ONLY. THESE CONDITIONS MUST BE IDENTIFIED PRIOR TO PERFORMING ANY PART OF THE AUXILIARY GENERATOR SET INSTALLATION. THE COMPLETED INSTALLATION MUST CONFORM TO FEDERAL MOTOR CARRIER SAFETY REGULATIONS, TITLE 49, PART 393 AND FOLLOW THE RECOMMENDED PRACTICES OF THE AMERICAN TRUCKING ASSOCIATION MAINTENANCE COUNCIL.

Pre-Installation Instructions

PRE-INSTALLATION EVALUATION

TO ESTABLISH IF SUFFICIENT ROOM BETWEEN TRAILER AND CAB

Each truck chassis must be evaluated and certain measurements must be made by the installer prior to starting any installation. These measurements determine whether there is sufficient, unobstructed space to permit installation of the generator set compartment and the fuel tank in their recommended locations.

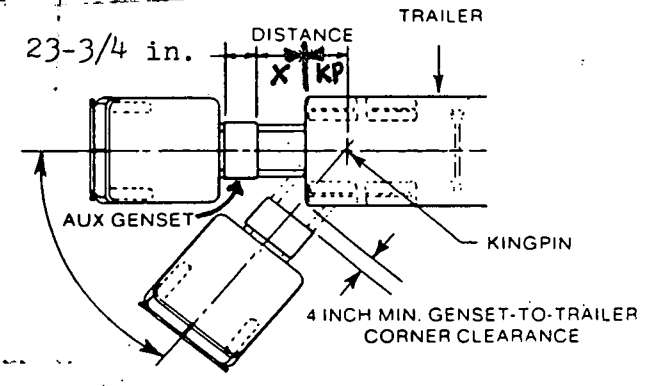
separate paragraph Ref to FUEL TANK OPTION & FUEL SECTION

The generator sets are designed primarily for installation in Class 7 or 8 long haul trucks. Exact compartment mounting location along the truck frame rail will vary between different ~~conventional~~ COE truck makes and models.

Spell out

In cab-over-engine type trucks for "Over-the-Rail" installations, a location as ~~far forward toward~~ close to the back wall of truck cab is most suitable for purposes of better axle weight distribution. See Figure 9.

Distance "X" listed in Table 1, when measuring for installation, MUST be maintained to allow for any truck maneuver in order to proceed with any Over-the-Rail installation. Reference ~~illustration~~ Figure 9 when measuring distance "X".

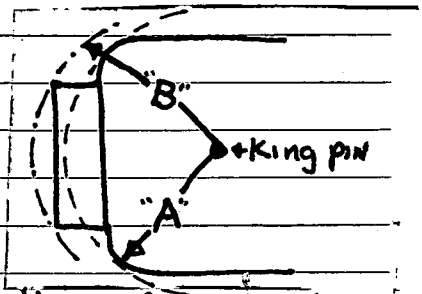


TOP VIEW OF TRUCK

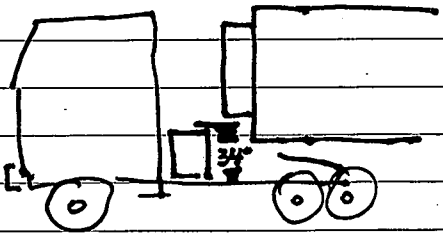
Figure 9

For application other then those listed in table 1 ~~.~~.

Step 1 Identify the distance from king pin to corner Dimention 'A'



Step 2 If the refer ~~extend~~ is greater then 'A' then it's dem~~e~~nsion 'B' must be used * Except when the high th of the AUX is not interfed with



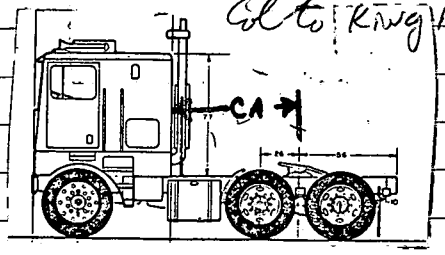
step 3. ~~Then Add A or B to~~

Add A or B + Min Gap 4" + AUX 23.75 = Y

Table 1

	King Pin distance (KP) inches	min space (X) inches square corner	min space (X) inches 10" round corner
96" wide Trailer	36	28	24
	48	24	20
102" wide trailer	36	30.5	26.5
	48	26	22

Dimension [Y] must be Less then CA to KingPin



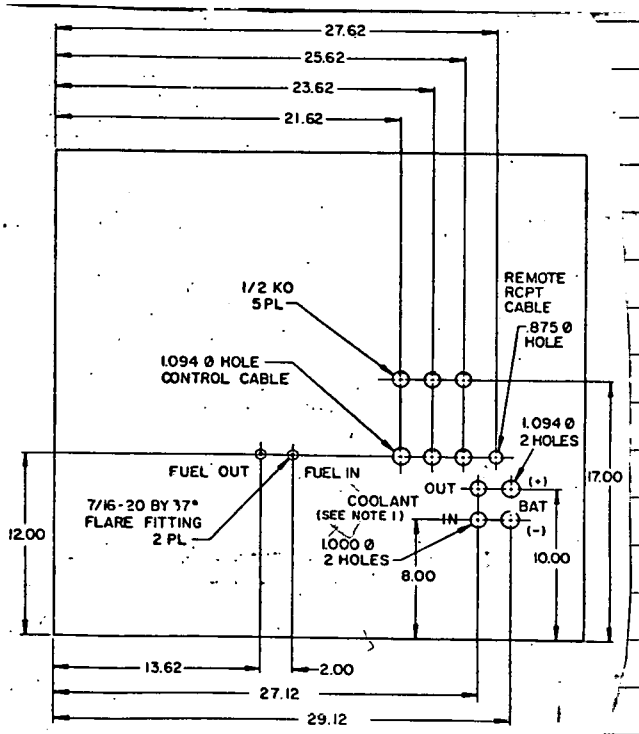
COMPARTMENT SIZE AND LOCATION

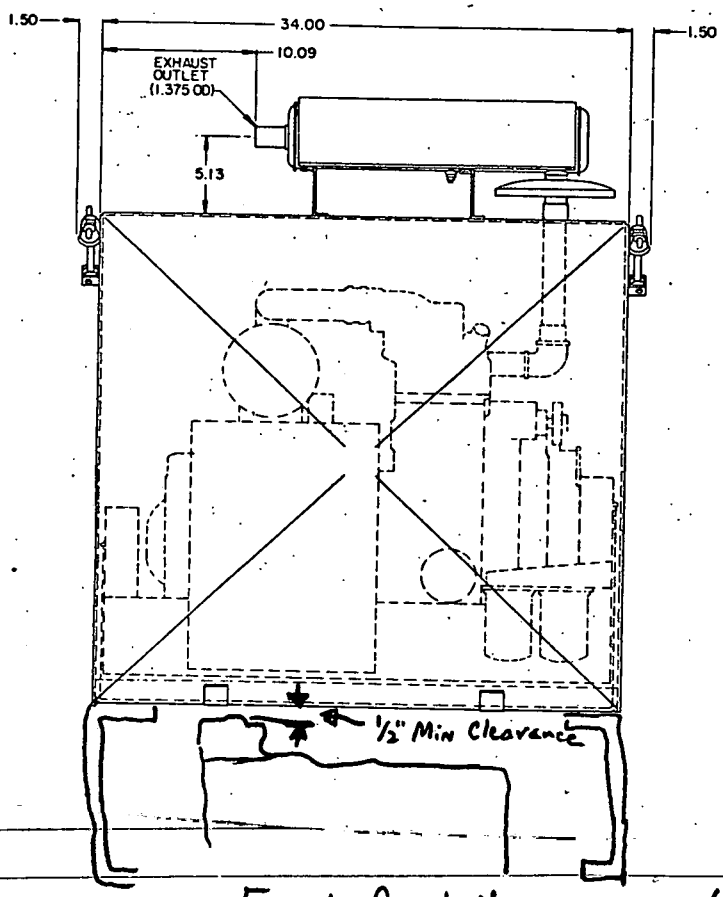
- Design variables in truck wheelbase and cab styles may require relocation of batteries, tool boxes, etc., to make room for the generator set. Some degree of modification and possibly relocating some of these chassis components may be necessary to provide the physical space (length) required to proceed with the installation of the generator compartment.

WARNING ***If it is necessary to relocate or modify any major truck chassis components such as batteries, tanks or tool boxes or any other truck accessories, all work must be performed by an experienced truck dealer or service person only. These conditions must be identified prior to performing any part of the auxiliary generator set installation. The completed installation must conform to Federal Motor Carrier Safety Regulation, Title 49, Part 393 and follow the recommended practices of the American Trucking Association Maintenance Council.***

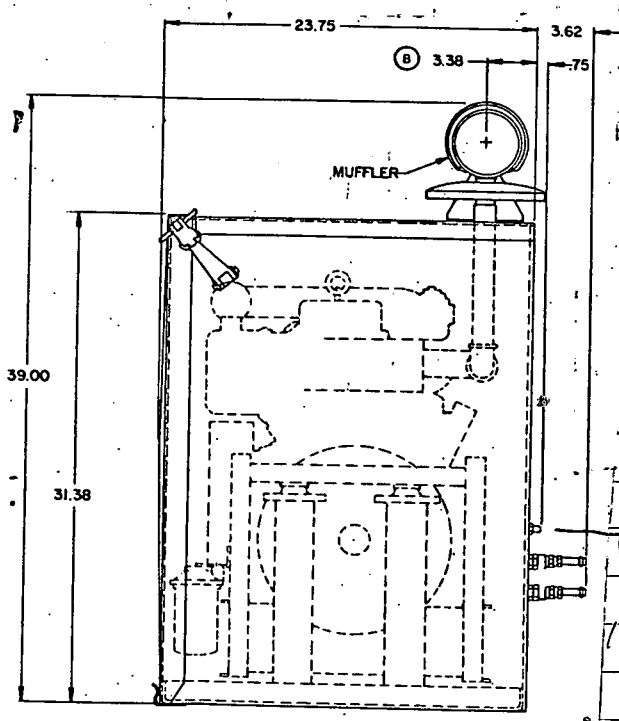
- The physical size (primarily depth) of the generator compartment requires a MININUM, UNOBSTRUCTED OPEN SPACE of 23-3/4 inches parallel to (lengthwise) the truck frame rails directly behind the cab. Measure along the frame rails in the desired mounting location to verify this space is available. See Figure 3 for minimum over-all installation dimensions.

- A minimum vertical clearance of 1/2 inch must be maintained between the generator set housing baseplate (where installed over truck frame rails) and any permanent truck chassis component underneath generator set compartment. Spacers should not be used to obtain this clearance. Housing baseplate can be moved horizontally to obtain this clearance as long as minimum space (23-3/4 inches) is NOT reduced. Housing baseplate must rest on truck frame rails when installed as shown in Figure 3.





Front Panel View



Side panel View

Specifications

Do we really need this page?

or if needed lets expand and put on back cover or last page

The SI metric equivalents are printed in parenthesis immediately following the U.S. customary unit of measure

COMPARTMENT SIZE

Height (Without Muffler)	31.38 in. (797mm)
Width	34.00 in. (863mm)
Depth	23.75 in. (603mm)
Approximate weight including compartment	560 lbs. (254kg)
Starting System Voltage	12- volts DC
Battery Ground (Positive ground optional)	Negative Ground Standard
Starting System	Motorized Alternator Cranking
Cranking Current	300 Amperes
Break-away Current (Maximum)	475 Amperes
Fuel	Diesel
Remote Fuel Tank Capacity (OPTIONAL)	~~11.5~~ Gallons (44L)
Length	24 in. (609mm)
Width	15.50 in. (393mm)
Depth	7.50 in. (190mm)
Fuel Pump	Mechanical
Fuel Return and Supply line Connection Size	SAE -4 37°Flare

NOTE: Refer to auxiliary generator set Operator's manual for complete engine-generator specifications.

ADD ~~Hose~~ water (Cooling) hose SIZES AND ?

Battery Cable Sizes

Fuel Return Fitting

Fuel Supply Fitting

Some housing panels and internal compartment wiring require disassembly prior to installing the generator set in place over the truck frame rails to simplify the mounting plate and wiring connections to the truck chassis. Proceed as follows:

1. Remove the compartment front cover by releasing the rubber straps on top and then lift cover up and out from detents on bottom of front panel.
2. Remove the top compartment panel by removing eight 5/16-18 x 3/4 inch hex head capscrews around the top housing perimeter as shown in Figure 4.
3. Remove the four 5/16-18 x 3/4 inch hex head capscrews which secure the left side housing panel to the rear(back) panel of the compartment as shown in Figure 4.

NOTE: Left and right sides are determined While facing the hinged front cover of the generator set.

4. Remove the two 1/4-20 x 5/8 inch hex head capscrews on the exterior of the rear(back)housing panel which secure the compartment fan assembly to the rear(back)panel as shown in Figure 4. These two bolts are 5-7/8 inches in (to center)from left rear corner of the compartment.
5. Unplug the fan assembly AC cord and the water solenoid AC cord from the duplex receptacle on top of the generator end of the set inside the housing.
6. Remove the three 3/8-16 x 3/4 inch hex head capscrews that hold the left side panel to the mounting tray as shown in Figure 4. Set this panel aside for now.
7. Use an appropriately sized chain or portable hoist with chain inserted through the lifting eye on top of engine to position the generator set "in place" over the truck frame rails in the desired mounting location and check for adequate clearance(over-all compartment dimensions are shown in Figure 3).

WARNING ***Make certain that housing baseplate is adequately supported when setting it in place on frame rails. Injury may result if the baseplate should fall off frame rails during the installation procedure.***

8. Remove the four 5/16-18 x 3/4 inch hex head capscrews which secure the right side housing panel to the rear(back) panel of the compartment as shown in Figure 4.

[redacted]

9. Remove the two 3/8-16 x 3/4 inch hex head capscrews and the single(front) 3/8-16 x 1-3/4 inch hex head capscrew that hold the right side panel to the mounting tray as shown in Figure 4. carefully lift and place this panel on top of the generator set for now. NOTE: This panel will be reassembled after mounting clamps and truck battery cables have been installed.

[redacted]

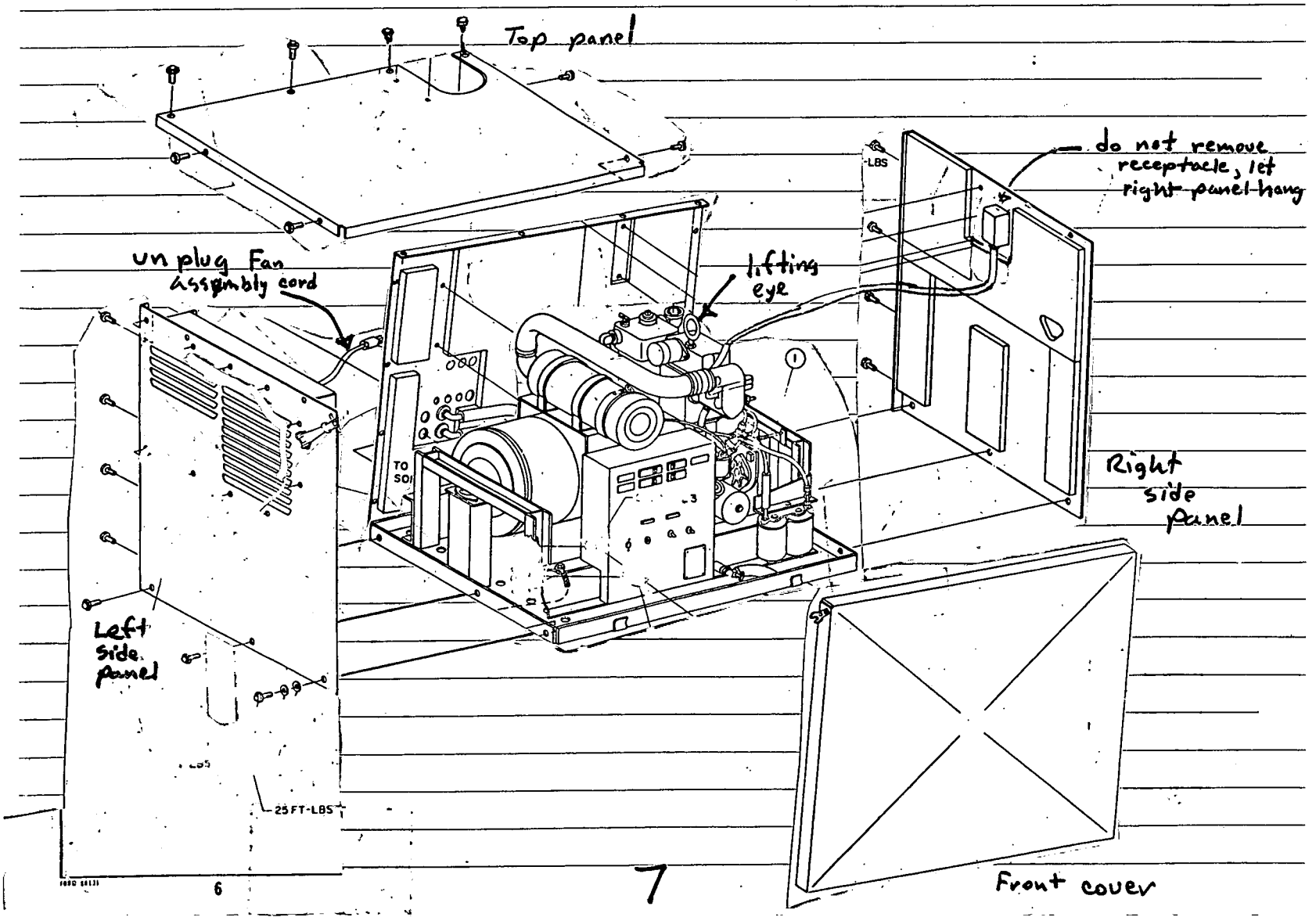
Compartment DISASSEMBLY and Installation

Step 1. Remove the compartment front cover, top compartment panel and right and left side panel in order.

CAUTION: Do NOT disconnect or remove the AC duplex receptacle, internal wiring or the external cover and gasket installed in top center of right side housing panel.

Step 2. Use an appropriately sized hoist (set weight approx 560lbs) lift set using hook inserted through the lifting eye

NOTE: Removal of rear(back)panel is NOT required for installation of the generator set.



Compartment and GenSet Installation

OVER-THE-RAIL MOUNT ONLY

After generator set is positioned properly on truck frame rails and mininum clearances have been checked, mounting tray must be securely clamped to truck frame rails using clamps, spacers and hardware supplied in the unit accessory package. Proceed as follows:

1. [illegible] on each side of truck. (4 mounting clamps total).

2. [illegible]

3. The number of spacers used will vary depending upon the thickness of the truck frame rails. [illegible]

Do NOT exceed the 3/4 inch maximum spacer thickness for each clamp. See Figure 4 and detail A.

4. Remove housing mounting clamp and [illegible]

5. [illegible]

6. Mounting clamps have weld nuts to simplify installation. These special washers determine the correct amount of clamping force on the bearing surfaces of the 4 mounting clamps. [illegible]

COMPARTMENT ASSEMBLY

1. [illegible]

NOTE: The longer right front housing bolt (3/8-16 x 1-3/4 inches) and hardware is left out until the battery cables are installed. See Page__, Step__, shown in Figure__.

2. [illegible] Capscrews are inserted from exterior side of rear panel (near corner) through flange of side panel which contains self-cinching nuts on inside of rear panel as required. See Figure 4.

3. [illegible]

Step 3 Place the generator set on the truck frame in the position selected. Double check for proper minimum clearances

Step 4

Temporarily hold one mounting clamp in position (inside from underneath) against top frame rail flange of truck as shown in Figure 4. Determine the number of 1/4 inch and/or 1/16 inch thick spacers (in any combination NOT to exceed 3/4 inch per mounting clamp) required to fill any gap between baseplate and mounting clamp under baseplate. These spacers are necessary to balance out the leverage of each mounting clamp.

Total thickness of spacers used must match truck frame rail flange thickness under each of the four mounting clamps. Use the same combination and number of spacers with each of the four mounting brackets.

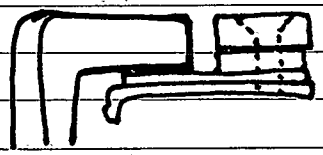


Figure 4

Step 5

assemble required number of spacers to all four mounting clamps using 5/16-18 x 1-1/2 inch allen head cap screws and 5/16 lock nuts provided. Torque nuts to 15 foot pounds (20 N•m). See Figure 4. Top spacer has recessed mounting hole to accept special allen head capscrews.

Step 6

Choose any two of ten possible pairs of pre-drilled mounting holes(per side) that do NOT interfere with any existing chassis hardware, frame cross members or any other chassis components (underneath baseplate).

Step 7

Install the four mounting clamps with spacers ~~as required~~, two on each side under top flange of truck frame rails ~~(from inside frame rails)~~ using 1/2-13 x 2 inch hex head cap screws and two special 1/2 inch conical washers on each capscrew positioned as shown in Figure ~~4 detail B~~. Tighten all eight capscrews until conical washers are flat (approximately 10-20 foot pounds-13.5 -27 N•m). Do NOT over-torque.

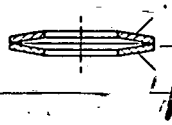


Figure 5

CAUTION Do NOT overtighten conical washers. The mounting bolts are torqued correctly when the special washers are flat. See Figure ~~5 detail A~~.

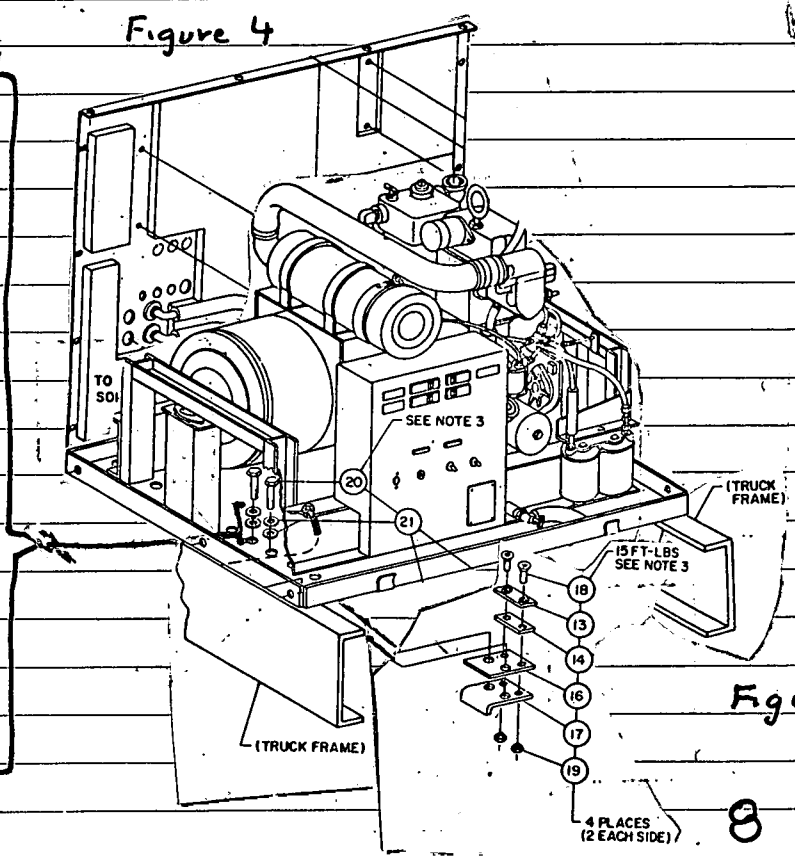


Figure 6

Compartment - Partial Assembly

After the generator set is installed on the truck chassis, the compartment housing can be partially assembled and wired as follows:

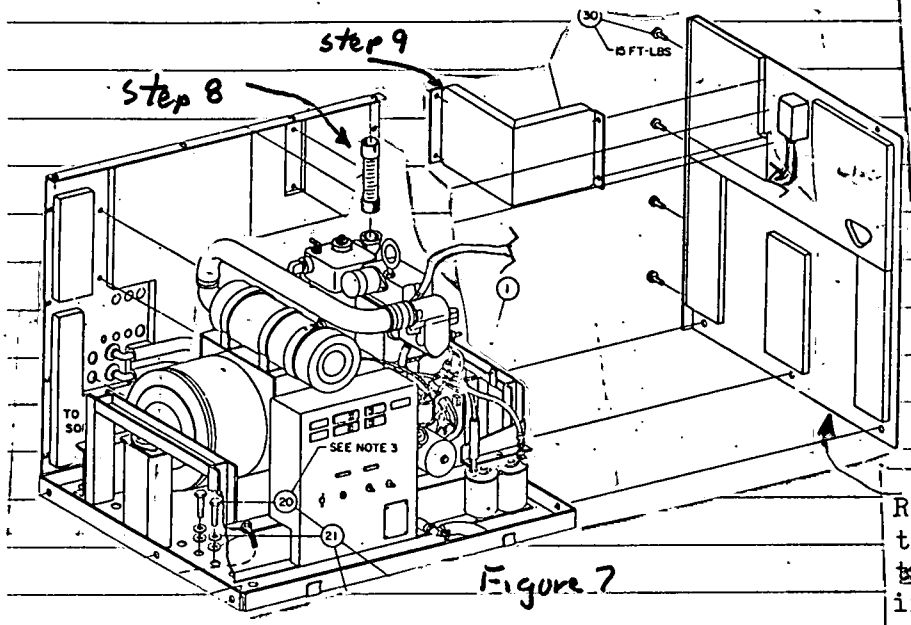


Figure 7

step 8

Install threaded end of 9-1/4 inch flexible exhaust tube(supplied in accessory package)into generator set exhaust pipe elbow in upper right rear corner of compartment as shown in Figure 7. Tighten securely.

step 9

Position the compartment interior exha shield in the upper right rear corner around the generator set exhaust pipe. Line up mounting holes and secure using 1/4-20 x 5/8 inch hex head capscrews supplied in accessory package. Capscrews are inserted from exterior side of the compartment into self-cinching nuts that are already positioned on the shield. Torque at 7 foot pounds(9N·M). See Figure 7.

NOTE:
The left hand side of the compartment housing can be installed after all AC and DC wiring is completed inside the generator set control panel and through the rear panel of compartment housing as outlined in the Electrical Loads and Connections Section.

step 10

Replace the right hand side panel of the compartment housing by installing ~~two~~ 3-3/8-16 x 3/4 inch hex head capscrews ~~in the bottom center and rear holes to~~ secure panel to the mounting tray. See Figure 7. Torque all 3/8 inch capscrews at 25 foot pounds(34N·M).

Install the four 5/16-18 x 3/4 inch hex head capscrews which secure the right hand side panel to the rear(back)panel of the compartment housing. Torque these bolts at 15 foot pounds(20N·M).

Compartment - Electrical

step 11 Water-tight 3/4 inch metal strain relief connectors(supplied by customer) should be installed in the two 1.094 inch diameter holes in the lower right hand corner of the rear(back)panel at this time. See Figure 8. Battery cables are installed through these connectors later but for ease of installation, the connectors should be installed prior to reassembling the compartment housing.

step 12

Determine which knockouts in the rear (back)panel of the housing will be used for the external 15A 20 amp AC load circuits, if any.

Caution Make sure the cabs cross brace clears the Knockout selected.

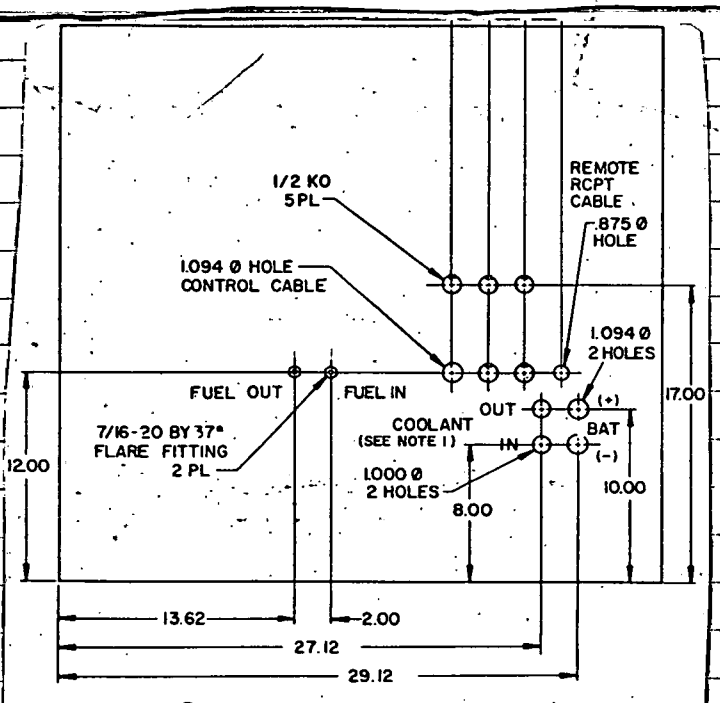


Figure 8 (REAR HOUSING PANEL)

Electrical Loads and Connections

GENERAL WIRING RECOMMENDATIONS

Wiring harnesses for interconnection of the auxiliary generator set to each individual AC load circuit and remote start panel must be fabricated and hand wired during the installation of the generator set.

WARNING ***Installation of all wiring must conform to all applicable codes and follow National Electrical Code standards and recommended practices. A qualified electrician should inspect all wiring.***

- Use multistrand wire throughout the truck during installation. Specific sizes for main feeder conductors and individual AC load circuit wiring are specified (where required) in this section of the installation guide. All wiring must be of adequate size, properly insulated, and supported in an approved manner. Observe all wiring size recommendations and amperage specifications where listed. Do NOT splice any wiring in the main AC feeder conductors.

CAUTION ***Do NOT use solid metal conductors anywhere in this installation. They may develop metal fatigue from vibration and eventually break.***

- Mount all switches and controls securely to prevent damage from vibration and road shock. All switches must be vibration-proof to prevent accidental opening or closing while the truck is in motion.

- Route all AC and DC wiring along the inside of the truck frame rails where possible. Keep away from rotating or moving shafts and linkages of the truck. Use insulated hold-down clamps spaced approximately every 18 inches and closer together in bends or near high heat sources. Plastic tie wraps can be used in between heavier insulated clamps. Use additional protective sleeving (such as heater hose) over wiring wherever it crosses over frame rails or in sharp bends. Any existing holes in truck cross suport frame members used for routing of wiring should be grommeted to protect wiring.

WARNING ***Do NOT tie any electrical wiring to the fuel or hydraulic lines of the truck because of fire hazard. Keep all wiring away from the exhaust pipe.***

WARNING ***All holes to the inside of the truck cab must be sealed to prevent poisonous exhaust gases from entering the interior or a storage compartment. Use water tight strain reliefs (1/2 inch or 3/4 inch) or silicone rubber sealant to seal around all openings made for electrical wiring.***

CAUTION ***Do NOT drill any additional new holes in the truck frame rails or cross-support frame members for routing wiring through. Any existing holes used for routing of wiring should be protected with grommets.***

- Use water-tight strain relief connectors (1/2 inch or 3/4 inch) whenever wiring passes through any exterior panel, cab wall or truck cab compartment. Use Romex connectors only on interior wiring, such as that which passes through cab wall partitions, panels or shelves.

LOAD CIRCUIT WIRING RECOMMENDATIONS

- All AC load circuits throughout truck chassis should be on separate circuit breakers for each load. Onan recommends using 12-gauge, 3-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts, AC 90°C operation for all 20-amp circuits such as sleeper cab air conditioners. Most other truck chassis starting aids such as lube oil heaters, battery heaters, electric cab heaters, etc should use 14-gauge, 3-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts AC, 90°C operation for these 15-amp circuits. Romex connectors must be used in set control panel knock-outs to secure wiring. Some slack should be allowed in wiring for movement caused by vibration to prevent breakage. Barrel connectors must be used on load wiring connections at 15-amp circuit breakers to safely secure wiring connections because of size.

WARNING ***Do NOT use Poly-vinyl-chloride type wire on any AC or DC load or control circuit wiring in this application. Overloading this type of wire causes a chlorine gas emission which creates a poisonous hydrochloric acid condition.***

- Onan recommends using 14-gauge, 3-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts AC, 90°C operation for all 15-amp circuits such as AC duplex receptacles or other accessory loads not to exceed 15 amps. Romex connectors must be used in set control panel knock-outs to secure wiring. Some slack should be allowed in wiring for movement caused by vibration to prevent breakage. Barrel connectors must be used on load wiring connections at 15-amp circuit breakers to safely secure wiring connections because of size. Ground-fault circuit breaker does not require barrel connectors.

Lubricate the wire outer jacket with liquid soap, motor oil or other suitable material to aid in assembly of strain relief connectors.

Figure B

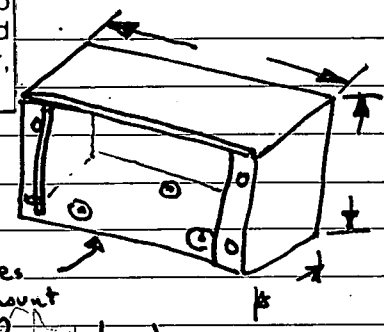
Connecting the Remote Panel to Gen Set

MOUNTING REMOTE PANEL

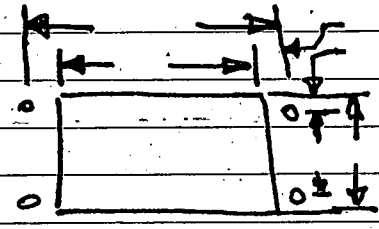
A remote control panel is provided which allows the driver to start the generator set from within the cab area of the truck. The panel contains start-stop and preheat rocker switches, running time meter, buzzer alarm and one AC duplex receptacle.

Step 1

Find the best location for the Remote control panel. One of the most popular locations for this panel (Figure 9) ~~Station Wagon~~ on the wall behind the drivers seat. From this location the operator can easily turn the set on or off while standing on the ground or from the sleeper. This location should not be more then 35 feet from the Gen set or the Remote control cable kit (#335-0156 - option) will not reach.



Remote box



Panel cutout for flush mounting

should be able to see RTM for maintenance INTERVALS

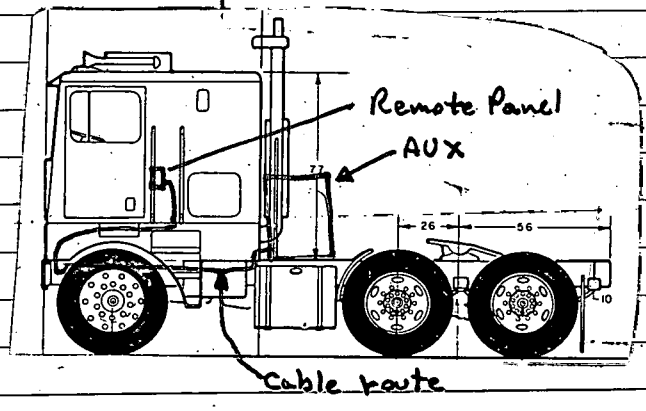


Figure 9

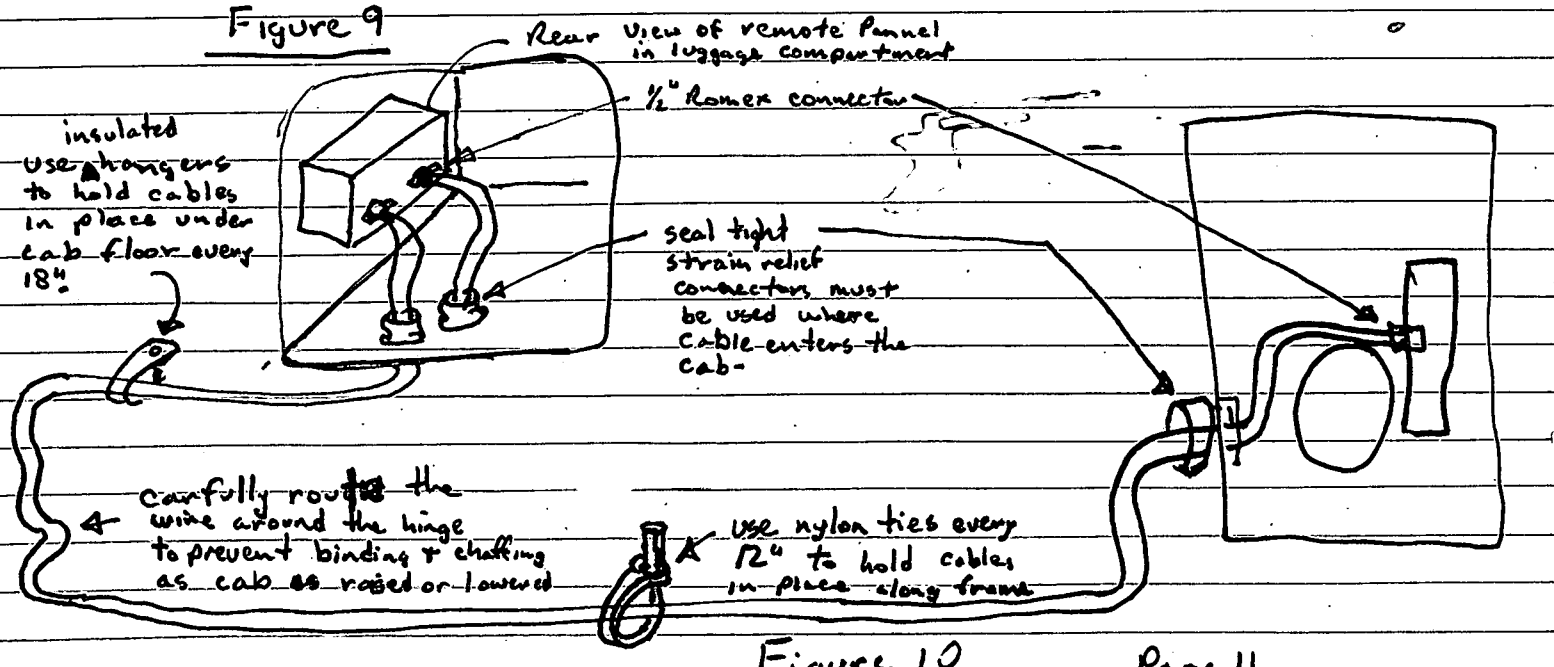


Figure 10

Typically two additional circuits are connected, one 20 Ampere circuit for air coutioning /heater and a 15 Ampere circuit for lub oil and battery blanket heaters.

Install a 3/4 inch water-tight strain relief connector in the hole near the fuel in (for control cable) but do not tighten yet.
Remove selected knockouts in rear(back) panel and install 1/2 inch water-tight strain relief connectors as required for addition circuits to seal wiring and cables but do not tighten yet.

Step 2

Route both cables by best path from Gen set to Remote panel location - Avoid,

1. exhaust pipes by 3" min
2. Do not tie to hydrolic lines
3. Do not tie to fuel lines

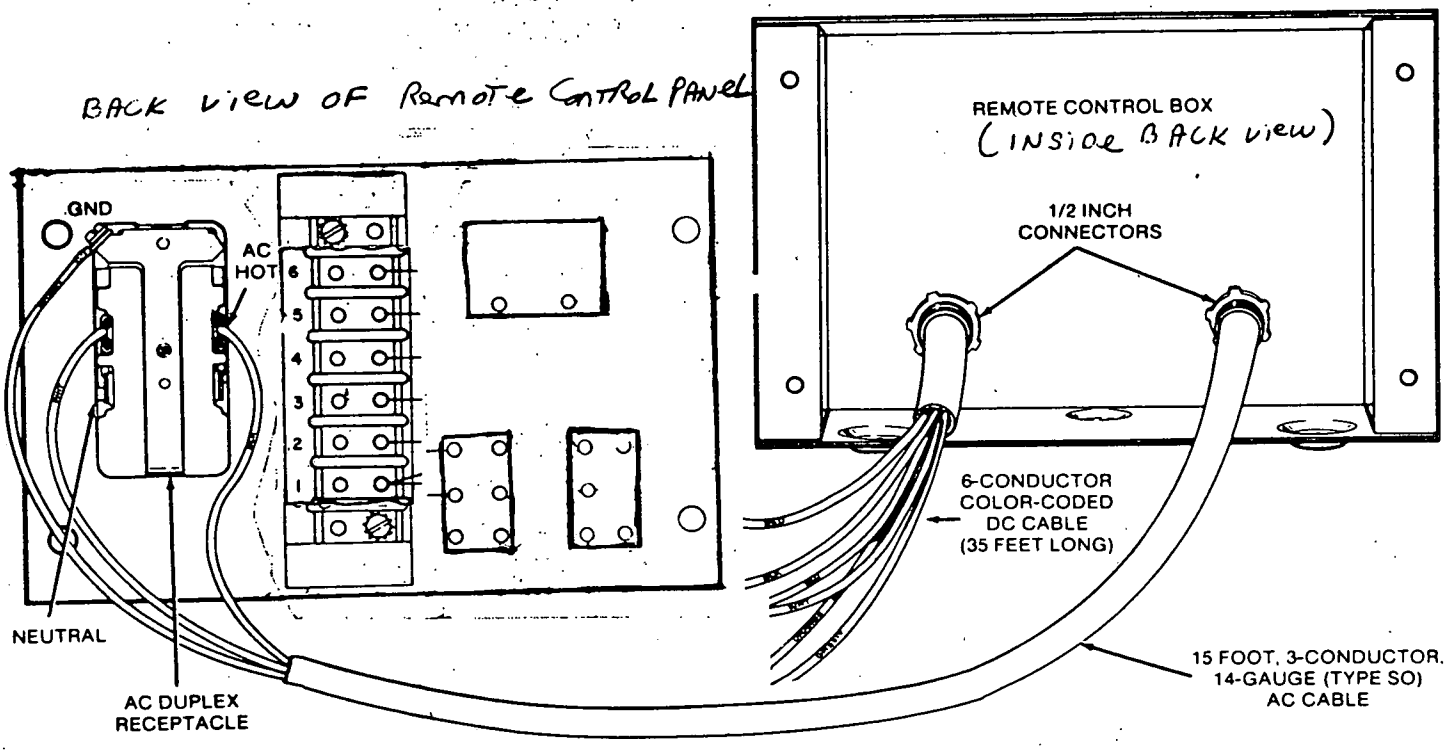
Do

1. use seal tight connecter at entrance to cab

Seal

WARNING All holes leading to the inside of the truck cab for electrical wiring must be sealed to prevent poisonous exhaust gases from entering the cab interior.

2. Use hold down clamps every 18" or closer underneath the cab to secure the cables.
3. use nylon cable ties every 12" or closer along the frame to secure the cables



GENSET Terminal No.	REMOTE PANEL Terminal No.	CIRCUIT FUNCTION	WIRING COLOR CODE
1	1	Ground	White
2	2	Stop	Red
3	3	Start	Green
4	4	Remote Alarm Signal	Orange
5	5	Diesel Preheat	Blue
6	6	Running Time Meter and Switch S1 Integral Running Light	Black

FIGURE . REMOTE STARTING PANEL INSTALLATION

Remote Starting Panel Installation

Remote panel has three 5/16 inch mounting holes in bottom panel for shelf mounting and two 7/8 inch holes in back panel for DC control harness and AC supply conductor for receptacle. Use 14-20 screws of suitable length to securely bolt panel in desired location.

Exact location of remote panel varies according to owner preference and set location as well as type of truck chassis. Remote panel is usually located near driver's seat in cab or in a convenient location within sleeper cab. Generator set can be started at compartment location if desired. Housing front cover must be removed for access to set control

CONNECTING REMOTE PANEL TO GENERATOR SET

A 6-conductor, 16-gauge (type SO) neoprene-jacketed multistrand wire cable is required for connecting the remote control starting panel to the generator set control panel. The cable must be fabricated during the installation, cut to required length and hand wired to the remote terminal block inside the remote panel and inside the generator set control panel. Ring type terminals should be used to connect remote cable to terminal blocks inside both controls.

Route the DC control cable along the inside of the truck frame rails where possible.
Secure cable every 18 inches along the run with insulated hold-down clamps (closer together in bends or near high heat sources). Use nylon tie wraps as required in between clamps.

Some slack should be allowed in wiring for movement from vibration

A 1/2 inch WATER-tight strain relief connector or Romex connector should be used on DC cable where cable enters remote panel. Remote panel location and method of mounting (wall or shelf) determines which connector to use. See Figure

On cab-over-engine type truck chassis, all routing of any wiring, regardless of type or function MUST be long enough and routed in such fashion that raising and lowering of cab for access to engine will NOT interfere with wiring. Allow slack at the nose (hinged point) of the cab for raising cab as required.

WARNING ***Do NOT install remote starting panel without the remote control box housing. A potential shock hazard exists because of the exposed terminals of the AC receptacle.***

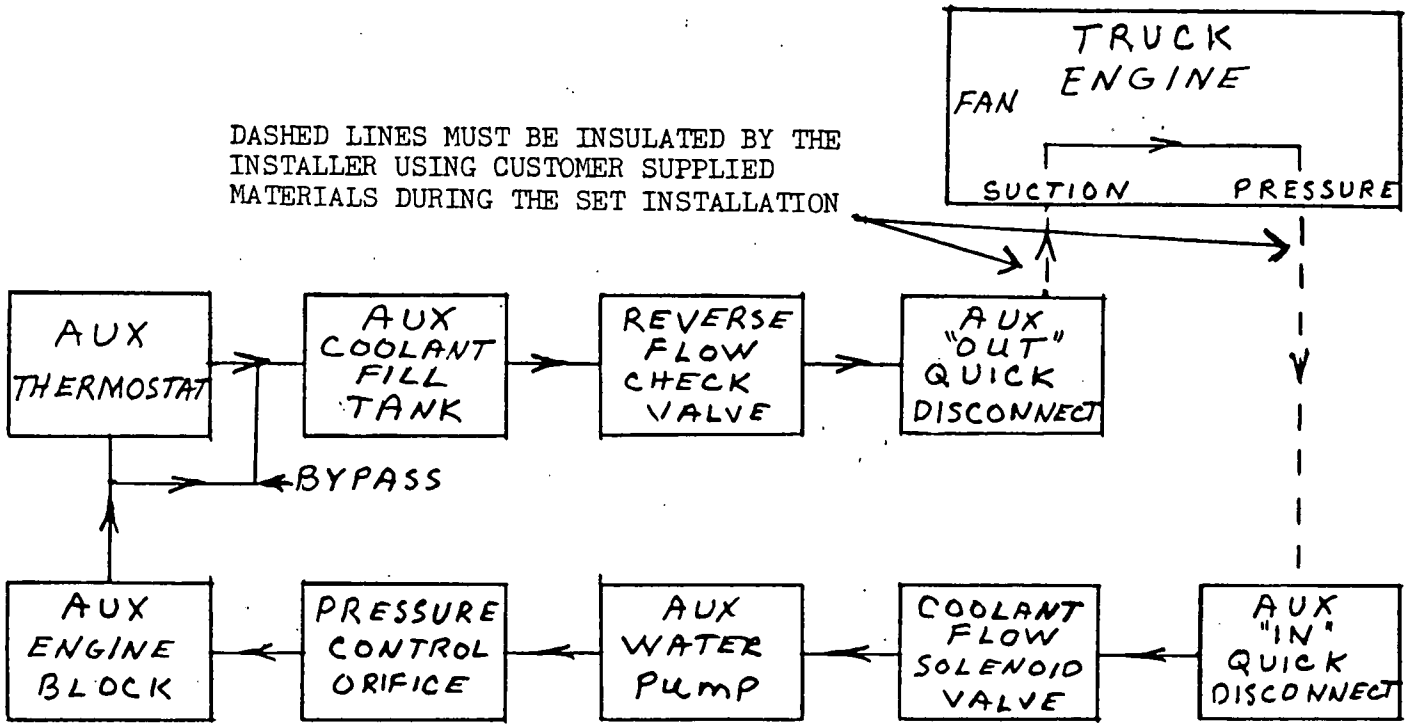
Remote cable is NOT supplied due to variation in length requirement between truck makes and models. Color coded bulk cable (6-conductor, 16-gauge type SO multistrand wire in a neoprene jacket) is available from Onan as part of the separate optional control wiring kit referenced in the beginning of the *Electrical Loads and Connections* section. *This kit includes all necessary wiring and hardware to interconnect the remote starting panel (with duplex receptacle) to the generator set control panel. Step-by-step installation instructions provided with each kit.* ARE

CAUTION ***Do NOT use solid wire or wire smaller than 16-gauge in size. Solid wire will fatigue due to vibration and break. Wire smaller than 16-gauge will result in poor starting from remote panel and short service life.***

Refer to interconnection wiring diagram shown in Figure ___ and remote panel wiring connections according to circuit function, terminal block no. and suggested color code illustrated in Figure ___ (see chart). Use Heyco strain reliefs or Romex connectors on cable when routing through entry holes in remote panel to secure wiring and seal any entry holes.

WARNING ***All holes leading to the inside of the truck cab for electrical wiring must be sealed to prevent poisonous exhaust gases from entering the cab interior.***

Cooling system



BLOCK DIAGRAM OF COOLING SYSTEM FLOW

AUX GENERATOR SET COOLING SYSTEM OPERATION

The generator set cooling system is a closed system with it's own coolant flow solenoid valve, water pump, thermostat, fill tank and safety shutdowns. The block diagram shows the entire cooling system flow between the truck's cooling system and within the generator set. Two insulated cooling lines(customer supplied)must be connected between the rear "in" and "out" quick disconnect couplings of the generator set compartment and the truck engine cooling system. The generator set coolant is used to warm the truck engine when the truck engine is NOT running and also dissipates the heat of the generator set coolant at the same time.

The coolant flow solenoid valve inside the generator set compartment isolates the set cooling system from the truck engine cooling system when the generator set is NOT running. There is a variable pressure control orifice in the generator set cooling system which isolates the generator set cooling system from the higher pressure in the truck cooling system when both the generator set and the truck engine are running. There is a "check valve"in the OUT(pressure)side of the generator set cooling system which isolates the set cooling system from the truck cooling system if the truck is running and the generator set is not.

The generator set thermostat starts to open at approximately 145°F(generator set internal bypass allows cooling flow during set warm up). A high water temperature cut out switch closes at approximately 215°F to shut the generator set down if the coolant exceeds this temperature. There is also a safety cut out switch that senses "skin temperature" of the generator set cylinder head and automatically shuts the set down if this temperature exceeds approximately 250°F.

A thermostatically controlled fan assembly inside the compartment that is powered by the generator set maintains the compartment temperature within an acceptable range to prevent overheating of the set.

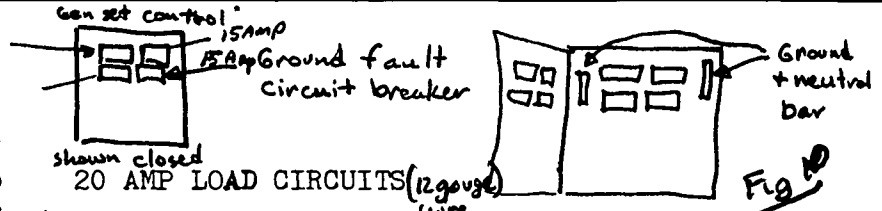


Figure 9 20 Amp 15 Amp

Connecting 120 AC duplex receptacles

- ~~All AC duplex receptacles must be connected to the 15-amp ground fault circuit breaker in the gen set control panel.~~ Both the hot (black) and neutral (white) load conductors must be connected to the hot and neutral terminals on the ground fault circuit breaker. The (green) ground lead (conductor) is connected to the grounding bus bar inside the set control panel. If additional external AC duplex receptacles must have weather protective covers and nickel plated contacts in the receptacle suitable for heavy-duty use. All AC duplex receptacles regardless of where installed, must have the hot and neutral load conductors connected to a ground fault protected circuit breaker. The AC receptacle box (if not water-proof) must be installed inside a weather protected area such as a tool box, storage compartment or sleeper cab.

WARNING ***All AC convenience receptacles regardless of use, must be protected by ground fault protection devices for safety. Any cold weather starting aids may be connected to standard circuit breakers if they are three wire devices.***

- If 120 volt AC plug-in type loads (such as engine heaters) are used, use a water and dust tight 3-prong hospital grade connector with nickel plated contacts and rubber O-ring or equivalent (Onan part # 323-1222) for sealing.

CONNECTING FEEDER CONDUCTORS TO CIRCUIT BREAKERS IN GENERATOR SET CONTROL PANEL

The standard load distribution section within the generator set control panel has one 20-amp and two 15-amp circuit breakers and one 15-amp circuit breaker with built-in ground fault circuit interrupter protection. Fig 9 ~~The branch load circuits should be equally divided between the breakers using wire sized according to the amperage of each load.~~

The AC feeder cables from each individual load circuit must be adequately sized and properly routed through the generator set compartment housing and into the set control panel ~~(see previous sections on general and load circuit wiring recommendations)~~. The individual load circuit conductors can now be properly connected to the appropriate circuit breaker inside the generator set control panel.

CAUTION ***Use ONLY the type of circuit breakers as supplied by Onan. Other types may nuisance trip because of road shock or vibration.***

Current for any one output conductor must not exceed the nameplate rating. When more than one load circuit is available, divide the load equally between them. Refer to AC interconnection diagram shown in Figure__. Proceed as follows:

20 AMP LOAD CIRCUITS (12 gauge wire) Fig 10

1. Cut the AC feeder cable to the required length making sure there is enough extra wire inside the set control panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
2. Strip back the insulation on each of the 3 conductors in the 12-gauge AC cable. No terminals are required as each connection is a "set screw" type
3. Connect the black AC Hot conductor to the terminal of the 20-amp circuit breaker.
4. Neutral and ground conductors (white and green conductors) should both be connected to the closest 6-terminal grounding bar ~~(located on each side of the control panel)~~. Figure 10 ~~Barrel type connectors are not required on any grounding bar connections.~~

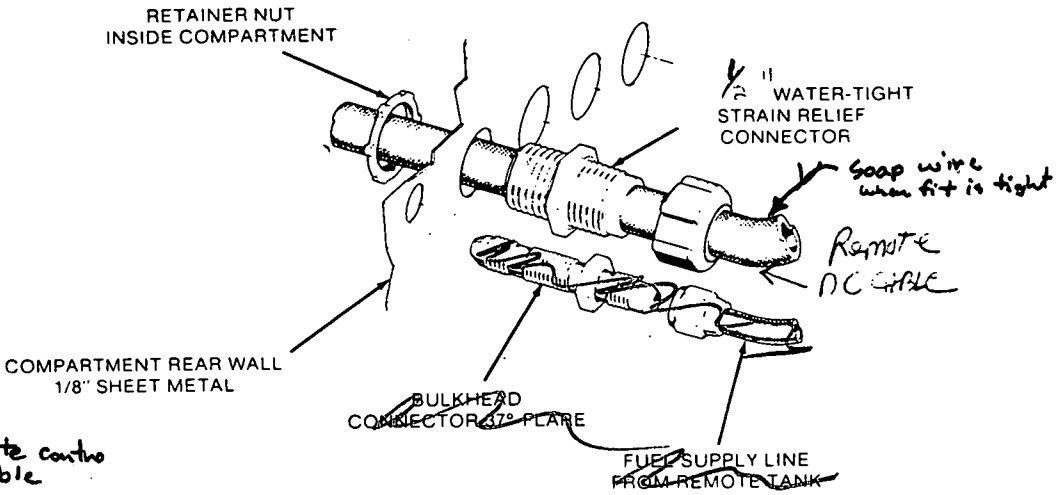
15 AMP LOAD CIRCUITS (14 gauge wire)

1. Cut the AC feeder cable to the required length making sure there is enough extra wire inside the set control panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
2. Strip back the insulation on each of the 3 conductors in the 14 gauge AC cable. No terminals are required as each connection is a "set screw" type
3. Connect the black AC Hot conductor to the terminal of either of the two 15 amp circuit breakers provided. A barrel connector must be crimped on the conductor prior to connection in order to fill the large "set screw" type terminal on the circuit breaker properly. (Picture or drawing Fig 11)

   NOTE: Barrel connectors would not be required on the circuit breaker if two separate AC Hot load wires are connected to the same circuit breaker. This will fill the set screw terminal enough to allow for good clamping force.

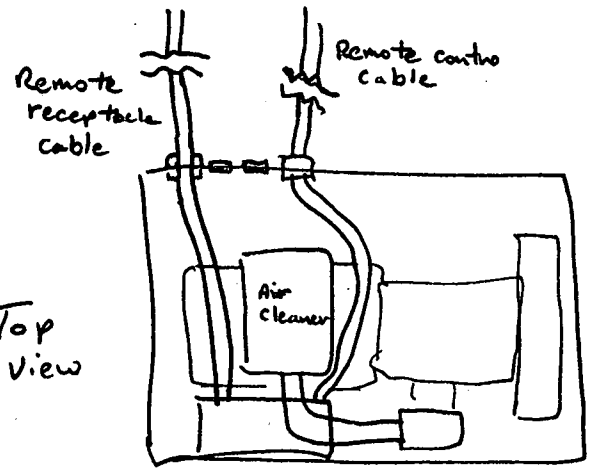
CAUTION: Be careful not to overload circuit breaker if more than one AC load circuit is connected to the same circuit breaker.

4. Neutral and ground conductors(white and green conductors)should both be connected to the closest 6-terminal grounding bar(located on each side of the control panel). Barrel type connectors are not required on any grounding bar connections. Fig 10



View from outside back

Fig 13



Top View

Fig 11

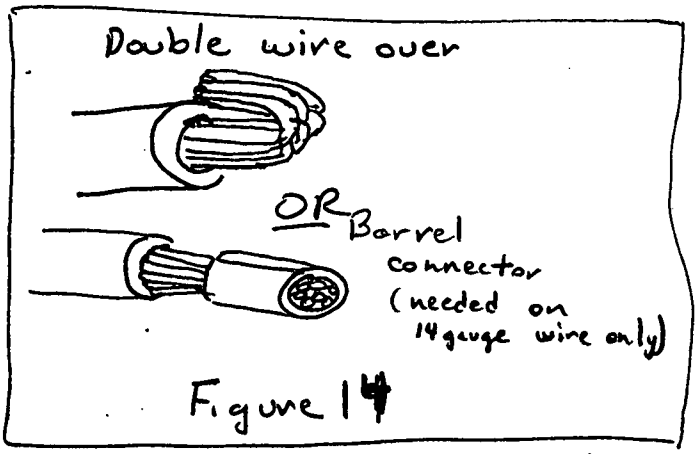
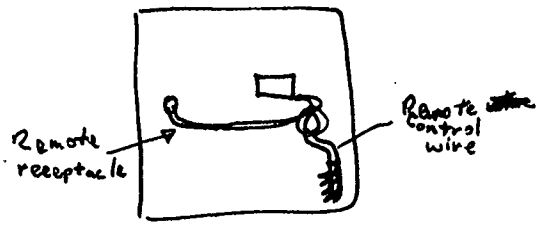


Figure 14



Front Control Door open

Fig 12

Connecting GenSet To Truck Battery

STARTING SYSTEM

The battery cables must be properly sized and connected to the 12-volt ~~(negative ground only)~~ accessory side of the truck battery rack in order for the generator set to crank properly under all operating conditions. ~~Most trucks have 12-volt batteries wired in parallel.~~ The Onan genset as supplied is wired for 12 volt cranking, negative ground. It can be modified for positive ground.

BATTERY CABLE RECOMMENDATIONS

- ~~Double 00 (2/0)~~ #2 cable conforming to SAEJ1127-type SGR is recommended for both positive (+) and negative (-) battery cables up to 10 feet in length (per cable).

Battery cables are not supplied as length requirements vary between installations. ~~Double 00 (2/0)~~ battery cable is available from Onan for use in cables of 10 feet or less. Order part number 334-~~0882~~ and specify length when ordering.

- For longer length cable runs, cable size increases and voltage drop must meet the requirements of SAE J-541a. The maximum allowable voltage drop (between set and truck battery while cranking) for the generator set is 0.48 volts.

ROUTING BATTERY CABLES

Route battery cables through 1-1/8 inch O.D. holes ~~(or knockouts)~~ in compartment rear wall as shown in Figure 15. Route cables through access holes prior to installing any battery terminal connectors as they will be too large to go thru the Water-tight 3/4 inch metal strain relief connectors which must be used on each cable going through compartment access holes. Use suitable sleeving or grommets at entry point to existing truck battery compartment.

Battery terminal connectors of suitable size and type must be obtained through a local truck dealer or service outlet.

CONNECTING BATTERY CABLES

1. Connect positive battery cable to large bottom terminal on start solenoid. It is located on the front of the generator set (below control) as shown in Figure 16 & insulate the positive terminal.
2. Connect the negative battery cable, ~~generator set ground strap and housing to truck frame electrical bonding strap~~ to the same location on the ~~side of the compartment (Engine end)~~ Genset chassis as shown in the assembly sequence in Figure 15. Assemble mounting hardware and all three cable terminals as shown in Figure , detail A. Mounting hardware is supplied in accessory package. Opposite end of 16 inch truck electrical bonding strap must be attached to a convenient bolt on the side of the truck frame rail. If no existing bolt or bolt hole is available, installer must drill a new hole in the side of the truck frame rail within reach of the electrical bonding strap. Refer to Pre-Installation Section for special precautions PRIOR to drilling any new holes in truck frame rail.

CAUTION ***A negative battery cable must be installed. Do NOT rely on truck chassis to carry generator set cranking current.***

3. Connect positive (+) and negative (-) cables to corresponding truck battery terminals (attach negative last). Check terminals at battery and on set for clean, tight connections. Re-inspect periodically.

Vehicle chassis (truck frame) ground and the battery and generator set ground should all be electrically connected to be a 0 ground potential. All Onan units are designed for negative ground application.

CAUTION ***For 24-volt truck battery starting systems, generator set must be connected across 12-volt battery that is grounded during cranking. Do NOT connect across battery(s) that are switched for cranking at 24 volts.***

Use a voltmeter (0-30 volts DC minimum) to determine which truck battery is always grounded. Connect the voltmeter negative (-) lead to the truck chassis. Connect the voltmeter positive (+) lead to one 12-volt battery positive (+) terminal. It should read 12 volts with truck not running. Now crank the truck engine. If voltage remains at 12 volts or less while cranking, connect the auxiliary generator set battery cables to that same battery. If the voltage increases to approximately 24 volts while cranking, do NOT connect to that battery. Connect the generator set to the other 12-volt truck battery.

CAUTION ***Connecting the generator set to the truck battery that is switched during cranking may damage the grounded battery and the truck charging system.***

Refer to Pre-start section in Operator's manual prior to initial operation of the auxiliary generator set.

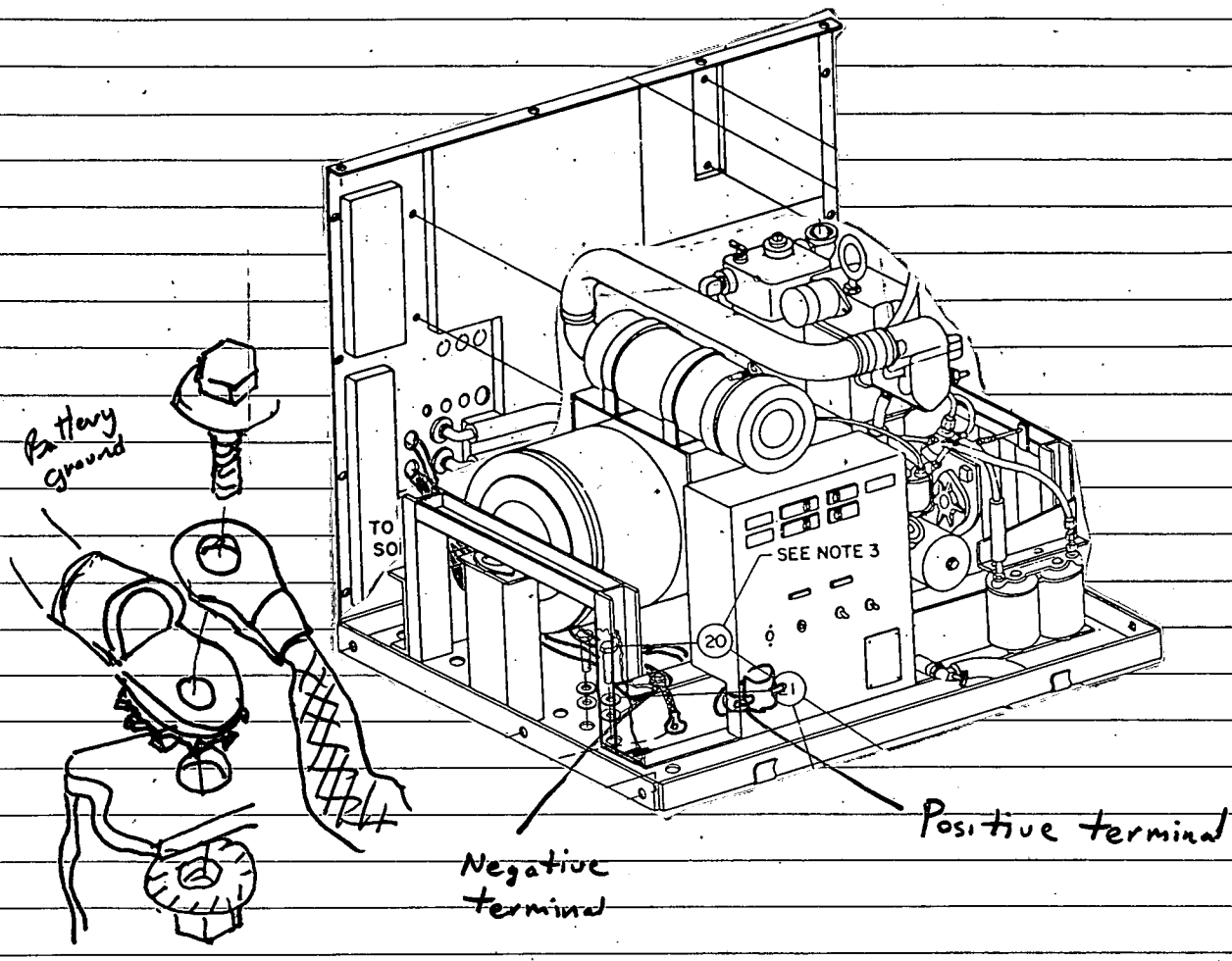


Figure 15

POSITIVE GROUND STARTING AND CHARGING SYSTEMS

Some foreign truck manufacturers and certain U.S. built special application or types of trucks may use a POSITIVE GROUND Starting system. If the auxiliary generator set is being installed in one of these applications, provisions have been made inside the generator set control(after some minor modifications) to quickly and easily convert the set's wiring when necessary.

Control and battery cable connections at both the generator set control and the truck battery rack will change. The previous recommendations for battery cable size and routing do not change.

Consult factory if necessary to convert the auxiliary generator set to a positive ground starting and charging system

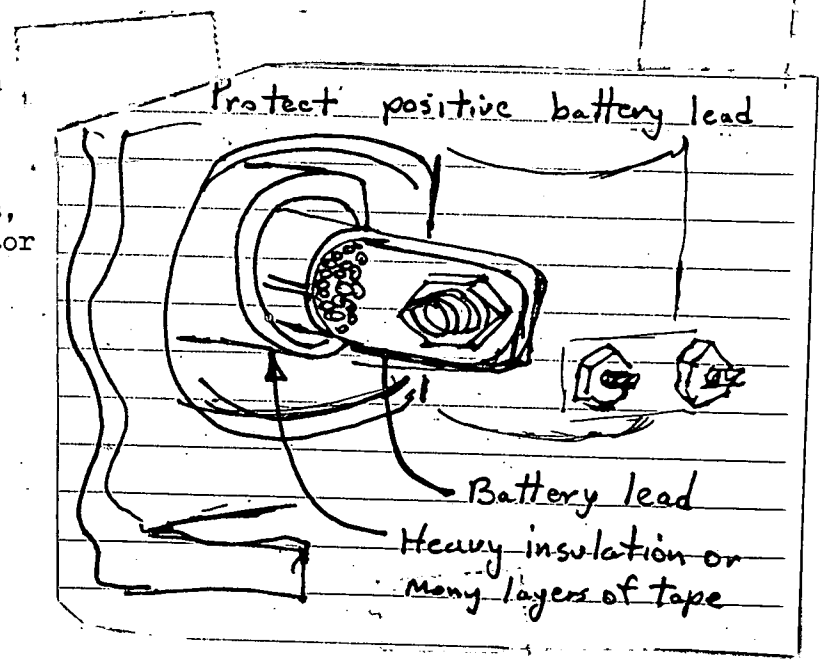


Figure 16

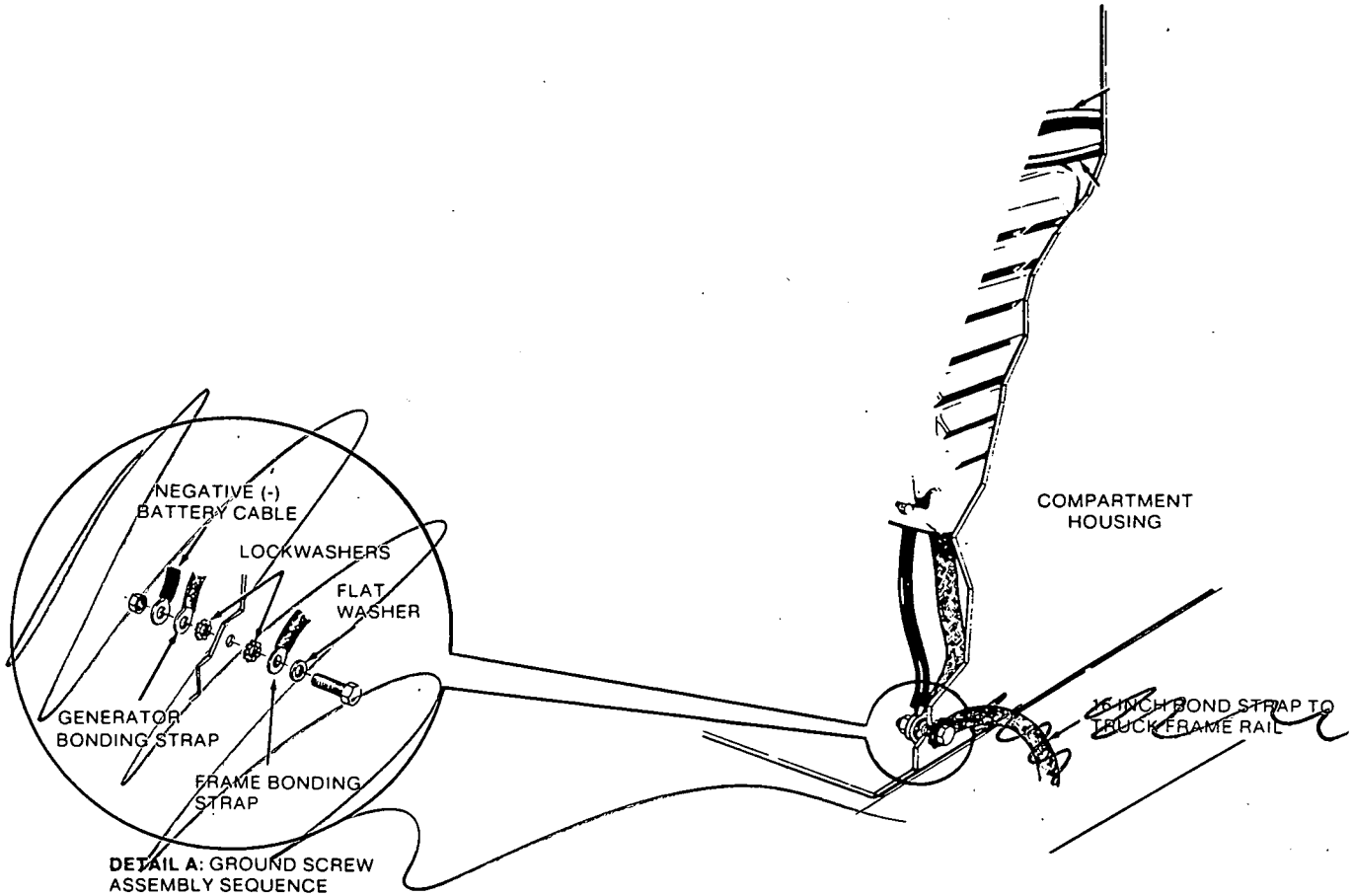


FIGURE BATTERY AND GROUND CABLE CONNECTIONS FOR OVER-THE-RAIL MOUNTED INSTALLATIONS ONLY

8. Plug the AC cord for the compartment fan assembly into duplex receptacle on top of generator end of the set inside the compartment.

9. Two tether straps(supplied in accessory kit)must be installed(one on each housing side panel)to control movement of the set when the truck is in operation. Locations shown in Figure 4 are for reference ONLY. The tether straps can be installed under any one of the five 3/8 inch hex head capscrews which secure housing side panels to generator set mounting tray.

NOTE: Do NOT install a tether strap under the right front housing bolt on the right hand side panel. This bolt is left out and used for electrical ground strap to truck frame rail when battery cables are installed. See page __(Figure__).

Choose a tether location that is close or convenient to an existing frame bolt or frame hole. Use at least a 3/8 inch Grade 5 bolt for attaching tether to truck frame rail. If no existing bolt or bolt hole is available, installer must drill a new hole in the side of the truck frame rail. Refer to Pre-Installation Section for special precautions PRIOR to drilling any new holes in truck frame rails.

CAUTION *Check the area inside the truck frame rail so that the drilling of holes will not interfere with any truck wiring, fuel, air or hydraulic lines.*

CAUTION *Do NOT use a sharp tool for marking hole locations. Marks for mounting holes must be made with pencil lead. Cracks will start around the edge of the hole if a sharp tool is used to mark the location. Refer to Figure / for approved method of making marks on truck frame rail.*

NOTE: Top compartment panel MUST be left off until generator set cooling system is primed. Refer to Cooling System Section.

COOLING LINES, CLAMPS AND INSULATING MATERIAL RECOMMENDATIONS

This section contains specific recommendations for the hose, hose clamps and insulating material for the cooling lines and general hook-up recommendations for interfacing with the cooling systems on the most commonly used truck engines. The truck engine cooling system connection points(suction and pressure ports)vary between engine manufacturers.
NOTE: Coolant hoses, insulating material and hose clamps are NOT supplied due to the variation in length requirements between truck models and engine manufacturers. Use ONLY the type of material specified throughout this section to complete the installation.

Two 5/8 inch I.D. coolant hoses require SAE type 20R3 silicone hose, and SAE-J536 type F hose clamps plus extended tang with a 3/4 to 1-inch nominal clamping range. These clamps should be worm-gear operated and the tang must extend around inside of clamp area that contacts hose to prevent puncturing this type of hose.
CAUTION: Wire type hose clamps should not be used for securing silicone hose to prevent puncturing hose when tightened.

1.05 inch I.D. polyethylene insulating tubing (such as Nomaco "Thermacel")or silicon rubber tubing capable of operating in a temperature range of -40°F to 210-220°F must be used to insulate the coolant hoses for the length required in each application. The truck cooling system must be drained prior to installing these coolant lines.

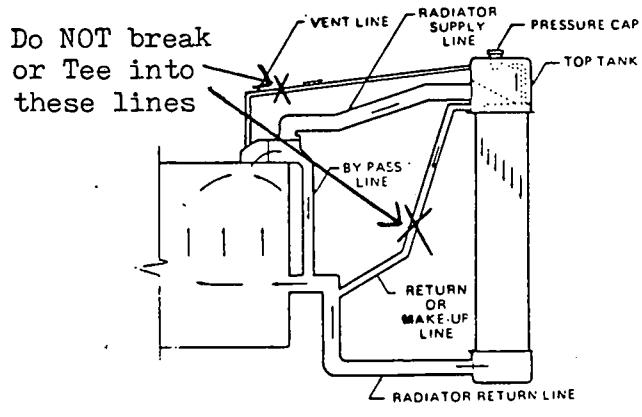
Two female quick disconnect couplings(supplied in accessory package), connect to mating threaded couplings already installed in rear (back)panel of generator set compartment. Each connection is identified by lettering stamped into sheet metal above each connector. These special connectors are spring loaded to self seal when disconnected and remain open when connected together.

CAUTION: Coolant lines between truck engine and generator set MUST be insulated in order to avoid excessive heat loss and to heat the truck engine adequately for cold weather starting. Proper connections are critical for the generator set to function properly without overheating.

TRUCK CONNECTIONS

The "OUT" coolant line connection on the generator set rear panel should be connected to the SUCTION side of the truck cooling system. One acceptable method for this connection is to parallel the truck cab heater taps on the truck engine. The manual shut-off valves which control coolant flow to the truck cab heater core is an acceptable location to tee into this line.
CAUTION: Tee connection MUST be made to the truck engine side of the shut-off valve. Do NOT remove any manual shut-off valves in the truck cooling system. For summer operation, these valves are normally closed.

The return line is from the PRESSURE side of the truck engine cooling system to the "IN" connection on the generator set rear panel. A block drain plug or a pressure tap on the truck engine water manifold are two possible locations to tee into the truck cooling system for this coolant line.
NOTE: The physical location of these connection points and possible interference with other existing engine components will vary between truck engine models and manufacturers. Tee-in location must have adequate clearance for the pipe size required without any sharp bends in hose lines and using the most direct and shortest coolant line lengths possible.
CAUTION: Never connect any auxiliary generator set cooling lines to any engine coolant ports that are directly connected to the truck engine radiator. These would include engine-to-radiator vent lines and/or coolant "make up"line on certain models of truck engines. Connecting into either of these lines **may** cause the truck engine water pump to malfunction(cavitate), overheating the engine or more serious engine damage such as scoring of cylinder walls. See block diagram example following.



INITIAL FILL AND VENTING OF GENERATOR SET COOLING SYSTEM

After the auxiliary generator set is installed and the generator set cooling system has been properly connected to the truck engine cooling system; the entire cooling system must be primed as follows:

1. Close all drains and refill truck engine radiator using anti-freeze/water mixture for the coldest expected ambient temperature(a 50/50 mixture of water and ethylene glycol type anti-freeze protects to -34°F).
2. Remove fill plug on top of generator set engine coolant fill tank and open petcock (vent)next to the fill plug as shown in Figure__.
3. Add approximately one gallon of water/ anti-freeze mixture to generator set. Replace fill plug using pipe thread sealing compound but leave petcock(vent)open.
4. Connect the AC plug of the generator set coolant flow solenoid valve into an external 115-volt AC source to open the valve for coolant flow.
   CAUTION: Do NOT run the auxiliary generator set to prime the cooling system.
5. Start truck engine and run until clean coolant flows out of the open petcock (vent)on the generator set engine. Then close petcock on generator set.
   CAUTION: No coolant flow may indicate incorrect cooling line connections between truck cooling system and generator set compartment inlet and outlet connections on rear panel.
6. Run truck until thoroughly warm and then check for any coolant leaks at both the truck engine coolant line connection points and all coolant lines inside the generator compartment.
7. Stop truck engine and reconnect the coolant flow solenoid valve AC plug to the duplex receptacle on top of the generator set above generator. Recheck all coolant line clamps and connections for leaks. After truck engine cools down, remove radiator cap and add coolant if required.

Exhaust System

WARNING

ENGINE EXHAUST GAS (CARBON MONOXIDE) IS DEADLY!

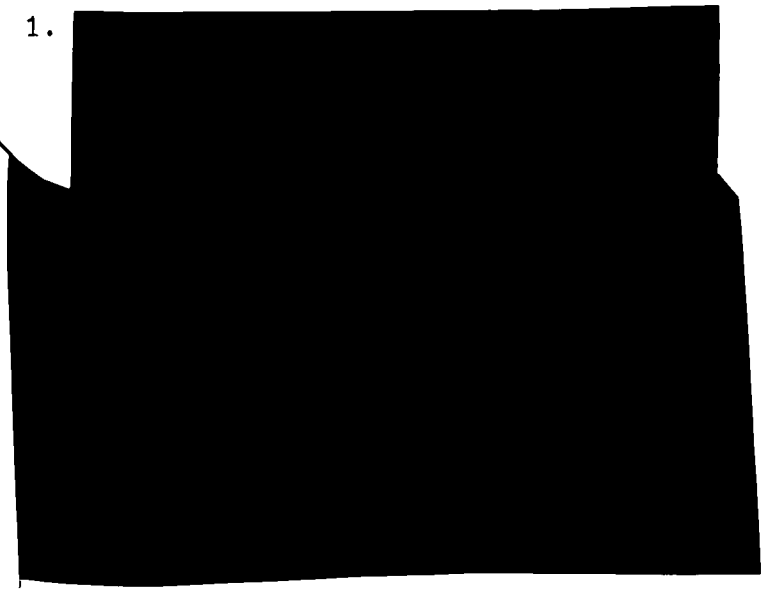
Carbon monoxide is an odorless, colorless gas formed by incomplete combustion of hydrocarbon fuels. Carbon monoxide is a dangerous gas that can cause unconsciousness and is potentially lethal. Some of the symptoms or signs of carbon monoxide inhalation are:

- *Dizziness*
- *Intense Headache*
- *Weakness and Sleepiness*
- *Vomiting*
- *Muscular Twitching*
- *Throbbing in Temples*

If you experience any of the above symptoms, get out into fresh air immediately.

The best protection against carbon monoxide inhalation is proper installation and regular, frequent inspections of the complete exhaust system. If you notice a change in the sound or appearance of exhaust system, shut the unit down immediately and have it inspected and repaired by a competent mechanic.

MUFFLER INSTALLATION

1. 

3. Install top compartment housing panel using eight 5/16-18 x 3/4 inch hex head capscrews around the top housing perimeter as shown in Figure 4. Capscrews are inserted from exterior side of top panel into self-cinching nuts prelocated inside compartment as required. Torque bolts at 15 foot pounds(20N·M).
4. Position muffler inlet and rain shield above exhaust tube and slide muffler down into exhaust tube so that muffler rest on top of housing as shown in Figure Push down completely.
5. Line up the four holes in muffler mounting brackets with pre-drilled holes on top of generator housing.
   NOTE: Self clinching nuts are prepositioned inside housing panel for muffler mounting bolts.
6. Install four 5/16-18 x 3/4 inch hex head capscrews through muffler mounting brackets and torque to 15 foot pounds.
7. Install 1-1/2 inch U-bolt type automotiv muffler clamp around muffler to exhaust tube connection(under rain shield)as shown in Figure 4 and torque nuts to 11 foot pounds(15·N·M).
   CAUTION: The ONLY acceptable meand of fastening the muffler inlet and exhaust tube together is approved SAE 1-1/2 inch U-bolt type automotive muffler clamp.
8. Recheck muffler mounting bolts to be certain they are properly tightened.

WARNING: This generator set MUST NOT be installed inside or under the truck cab or sleeper cab on any cab-over-chassis type truck. The generator set exhaust system MUST be terminated in the open air behind the truck or sleeper cab. Never direct the exhaust under the truck chassis in any installation.

WARNING: Do NOT terminate poisonous carbon monoxide exhaust gas under truck cab or sleeper. Keep all openings to truck cab area near generator set closed when generator set is operating.

FUEL TANK LOCATION

The remote fuel tank is designed for mounting between truck frame rails in all applications. It is intended to be mounted as far forward as possible between truck frame cross-support members (usually behind transmission and above drive shaft) if space permits. Mounting the fuel tank requires an unobstructed opening measuring 16-1/2 inches lengthwise (parallel to truck frame rail) by 25 inches wide (between frame rails) by 10-1/2 inches depth (above truck drive shaft). The 10-1/2 inch of depth requirement includes up to 3 inches of vertical clearance above truck drive shaft to allow for suspension rebound under the weight of the loaded trailer and road shock vibration.

WARNING ***Do NOT modify the Onan supplied fuel tank for installation outside the truck frame rails without checking for compliance with Federal Motor Carrier Safety Regulation, Title 49, Part 393.67 (b)(2). The fuel tank is not designed to comply with DOT regulations for side-mounted fuel tanks.***

FUEL TANK INSTALLATION

Install remote fuel tank using the assembly sequence illustrated in Figure 1. Perform the steps in order listed to minimize installation problems.

1 ***DIESEL AND SIDE-MOUNTED GASOLINE SETS*** Position fuel tank in the selected unobstructed opening between truck frame rails. Tank may be installed with fuel fill, fuel pick-up and fuel level gauge on either driver or curb side as desired by the owner.

WARNING ***Always shut off truck engine and generator set prior to filling the fuel tank to prevent fire and explosion hazard and do NOT smoke.***

2. Position the two L-shaped mounting brackets on the inside (underneath) of the top truck frame rail flange (one on each side), so that weld nuts in brackets line up with pre-drilled mounting holes in fuel tank flanges as shown in Figure 1. The rubber vibration isolator pads on both the fuel tank flanges and fuel tank mounting brackets must contact the truck frame rail flange.

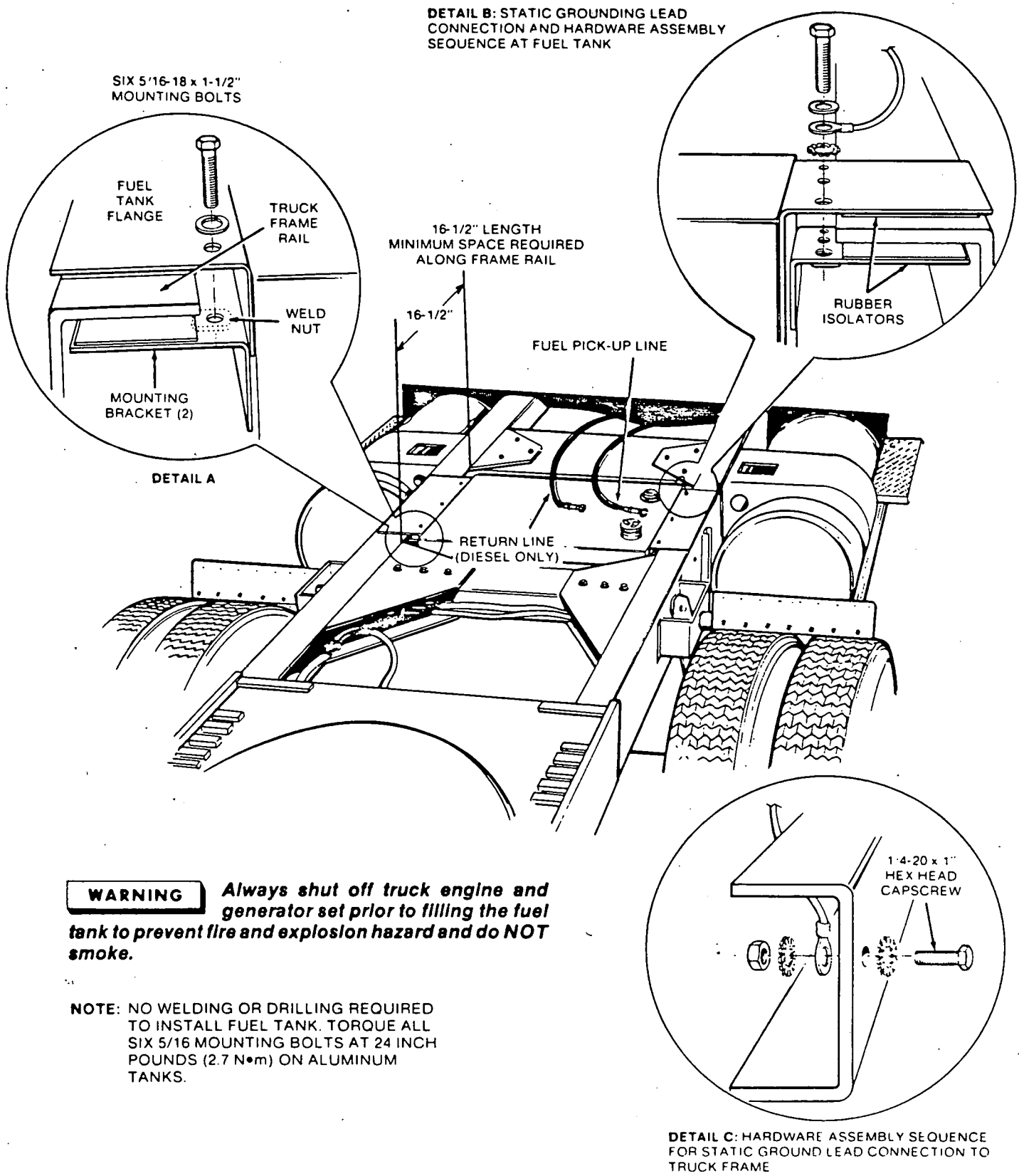
Pre-drilled mounting hole location in fuel tank flange is usually adequate to securely fasten fuel tank in most installations. Some trucks may have variations in width of frame rail flange area or width between truck frame rails that could require spacing and drilling new mounting holes in fuel tank flanges. When installed, the vertical surface of the mounting bracket should rest against the side of the fuel tank and the wider surface area of the mounting bracket (surface with rubber isolation pad) should be relatively close to radius of truck frame rail. See detail A in Figure 1. If not, new 3/8 inch mounting holes will have to be spaced and drilled in fuel tank flange as required so that fuel tank is held securely in position.

3. Install 5/16-18 x 1-1/2 inch hex head capscrews and lockwashers in center mounting holes only (one on each side). Mounting hardware assembly sequence is shown in Figure 1, detail A.
4. The 18 inch 12-gauge static ground lead must be installed under the most convenient fuel tank mounting screw as dictated by physical location and layout of truck chassis components in each installation. Fuel tank terminal end of ground lead is a 5/16 inch eyelet terminal. Install this terminal under most convenient 5/16 inch capscrew and lockwasher on top of fuel tank mounting flange. See Figure 1, detail B. The remaining chassis end of static grounding lead has 1/4 inch eyelet terminal. Locate a nearby hole in truck frame rail within reach of the lead and attach terminal with 1/4-20 x 1 inch screw, lockwashers, and nut. Hardware assembly sequence is shown in Figure 1, detail C.

If no existing hole is available, a 5/16 inch hole must be drilled (within reach of grounding lead) in the side (vertical surface) of truck frame rail. Hole must be located as close to vertical center of the frame rail as possible. Be careful not to locate hole where drilling might puncture fuel tank.

CAUTION ***Do NOT drill any new holes in truck frame rails any closer than 2 inches to top or bottom flange area of frame rail. Bolt holes in frame rails MUST NOT be located any closer to frame rail flanges than present bolt hole pattern. If in doubt, consult truck manufacturer's chassis manual. No drilling whatsoever is allowed in the top or bottom frame rail flanges.***

5. Install three remaining 5/16-18 x 1-1/2 inch hex capscrews and lockwashers in fuel tank mounting brackets. Hardware assembly sequence is shown Figure 1, detail B. Torque all six mounting screws 24 inch pounds (2.7 N•m).
6. Verify that the ground strap and all mounting bolts are securely tightened following torque specifications where listed. With installation completed, check for adequate clearance above truck drive shaft and bottom of fuel tank. Allow 3 inch clearance for suspension rebound and road shock vibration with loaded trailer coupled to truck.



WARNING ***Always shut off truck engine and generator set prior to filling the fuel tank to prevent fire and explosion hazard and do NOT smoke.***

NOTE: NO WELDING OR DRILLING REQUIRED TO INSTALL FUEL TANK. TORQUE ALL SIX 5/16 MOUNTING BOLTS AT 24 INCH POUNDS (2.7 N•m) ON ALUMINUM TANKS.

FIGURE FUEL TANK INSTALLATION

DIESEL FUEL SUPPLY AND RETURN LINE RECOMMENDATIONS

The fuel supply and return lines from the remote fuel tank to generator compartment inlet and return fittings on the rear(back) panel are not supplied due to variation in length requirements between trucks. The following recommendations pertain to material size and routing of fuel supply and return lines:

- Use an approved flexible, double fabric reinforced, non-organic fuel line such as SAE type 100R5 or 100R3 in 1/4 inch I.D. size.
- Route fuel supply and return lines as far away as possible from hot engine or exhaust areas. This reduces chance of fire danger.
- Do NOT route or tie fuel lines together with any AC or DC electrical wiring.
- Install fuel line so it is accessible for service but protected from physical damage.
- Do NOT drill any additional holes in frame rails or frame cross support members for routing of fuel lines.

WARNING ***Always shut off truck engine and generator set prior to filling the fuel tank to prevent fire and explosion hazard and do NOT smoke.***

FUEL SUPPLY AND RETURN LINE INSTALLATION

1. Use fuel hose fittings with 7/16-20 thread size and SAE 37° flare to match fittings provided for compartment connectors and fuel tank connections.
2. Use protective sleeving such as heater hose over sections of fuel line that pass over frame rails. Any existing holes in frame cross support members used for routing of fuel line should be protected with rubber grommets to prevent chaffing.
3. Use clamps or ties without sharp edges to secure fuel line approximately every 18 inches along the run.
4. Connect fuel supply and return line to bulkhead connectors on rear wall of the generator compartment. The supply line is connected to the "IN" fitting and the return line is connected to the "OUT" fitting on the rear panel. Connect opposite ends of supply and return lines to 37°flare fittings on remote fuel tank. Direction of fuel tank fittings must be adjusted during installation to prevent kinks or sharp bends in either supply or return line.

CONNECTING GENERATOR SET TO TRUCK FUEL TANK

Provisions can be made to utilize the truck fuel tank to supply the auxiliary generator set if the truck chassis space is not available to install the remote fuel tank or if a larger fuel supply is desired.

CAUTION: For operation in colder ambient temperatures(below 32°F-0°C), a separate remote fuel tank may be required for the auxiliary generator set because of specific fuel requirements to control fuel waxing. See Operator's manual for complete recommendations.

Many truck fuel tanks contain an extra unused dip tube already installed in fuel tank that can be easily adapted to the proper fittings to connect to the bulkhead fittings on the generator housing rear (back)panel.
The fuel return line for the generator set can be connected to the same point as the truck engine fuel return line using the same fittings and fuel line material as required for the remote fuel tank connections. See Fuel Supply and Return Line Recommendations.

If no existing spare dip tube is available in either truck fuel tank, special modifications are necessary to connect supply and return lines.

WARNING: Any truck fuel tank modifications MUST conform to all requirements of the Federal Motor Carrier Safety Regulation, Title 49,Part 393.67-Liquid Fuel Tanks.

The new dip tube installed from the top should be a mininum of 3/8 inch I.D. size and reach to within 1 inch of the bottom of the fuel tank.

For diesel fuel ONLY, a connection can be made below the fuel level such as in the end of the truck fuel tank.

WARNING: Any below level fuel tank fitting MUST be installed in a flange or spud designed to accommodate the fitting on any truck fuel tank.

Special diesel fuel recommendations are necessary for the auxiliary generator set in cold weather climates to control fuel waxing and ensure easier cold weather "cold starts". Refer to Fuel Recommendations section in the Operator's manual for complete requirements.

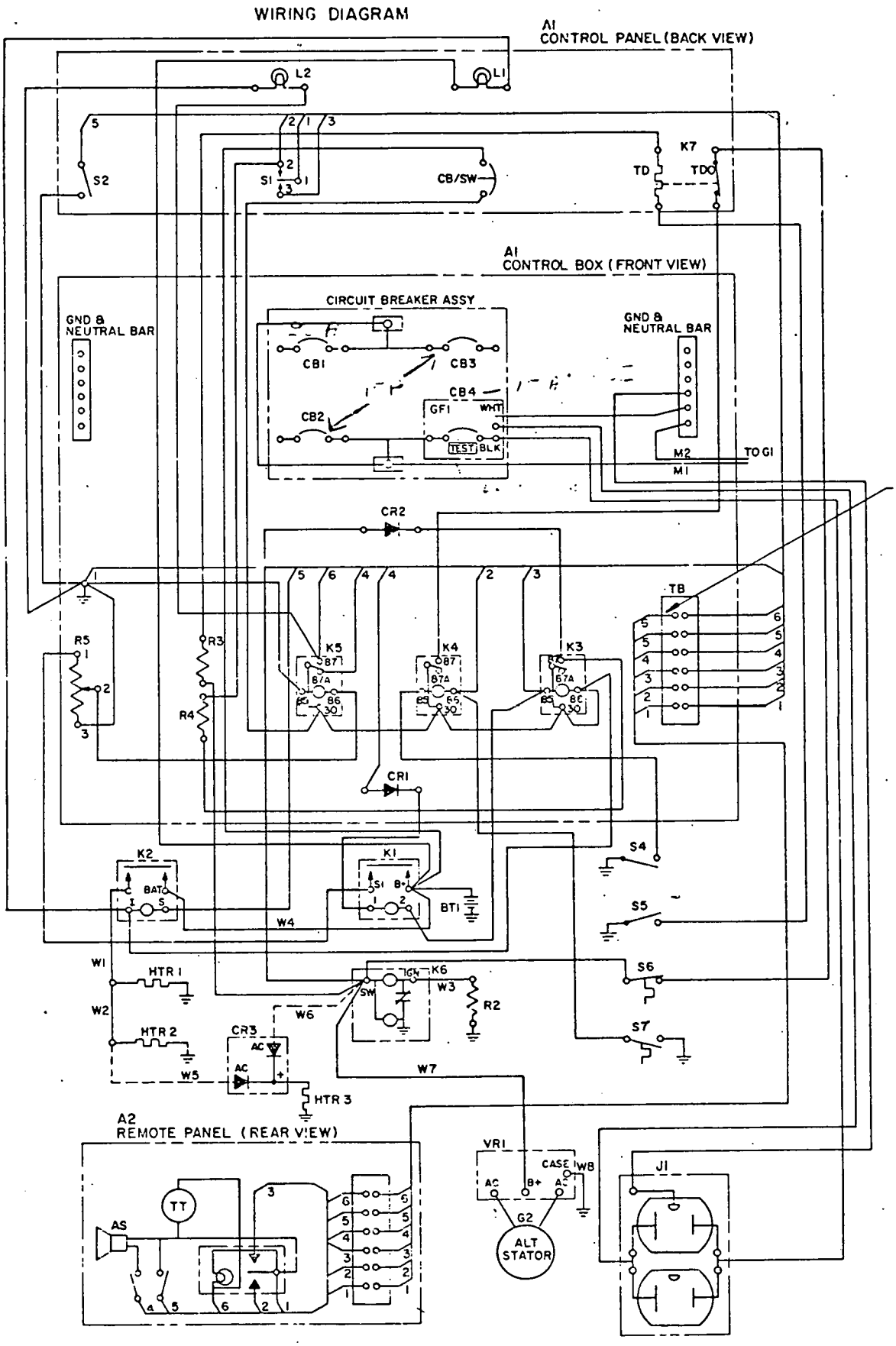


FIGURE . ELECTRICAL SYSTEM WIRING DIAGRAM

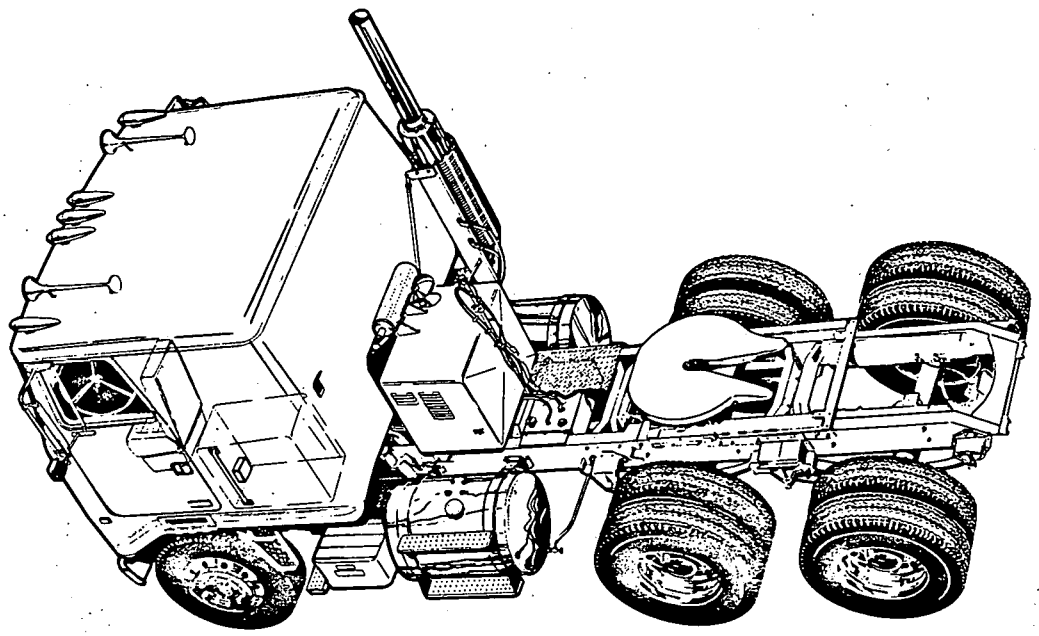


FIG. 1

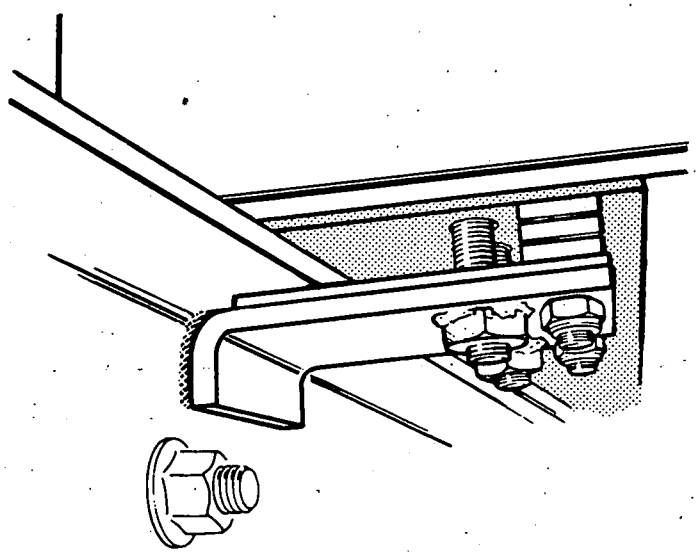


FIG. 2

FIG. 3

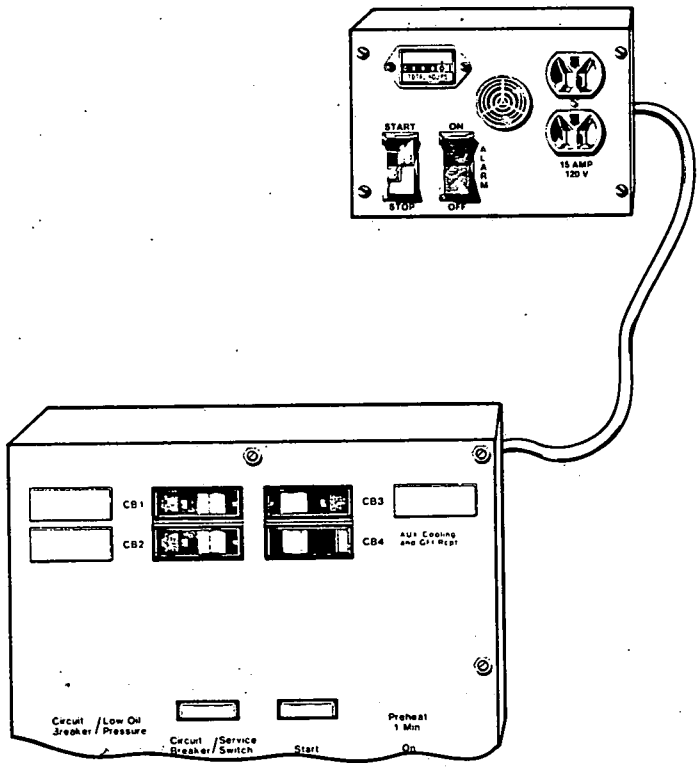

START
ON
STOP
OFF
ALARM
15 AMP
120 V
CB1
CB2
CB3
CB4
Circuit Breaker / Low Oil Pressure
Circuit Breaker / Service Switch
Start
Preheat 1 Min
On

FIG 5

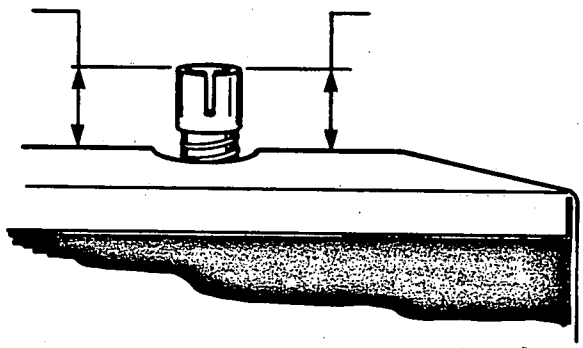


FIG 6

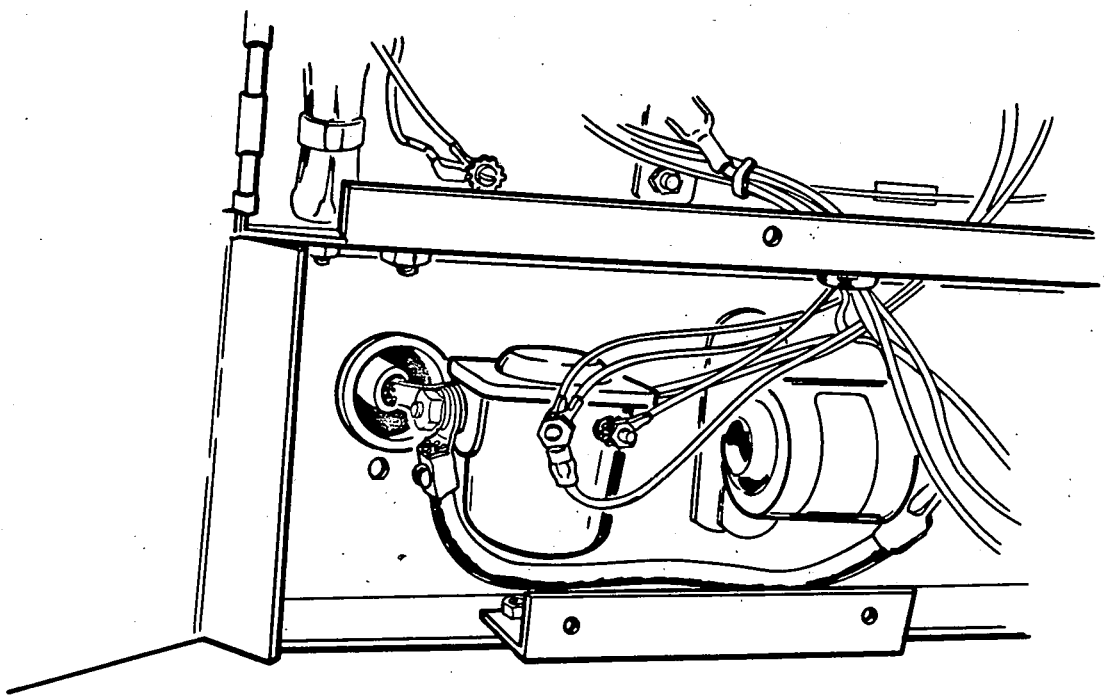


FIG. 7

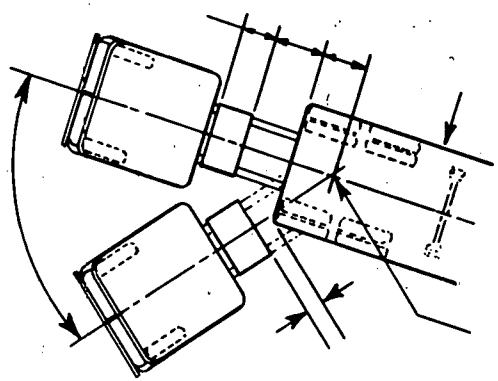
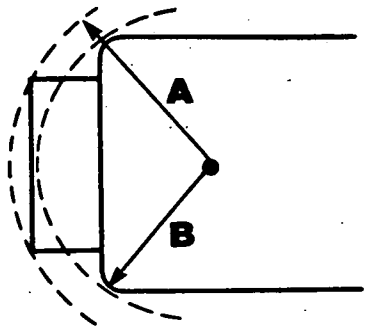
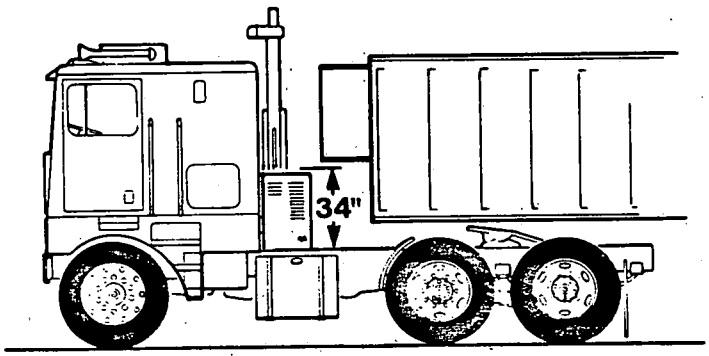


FIG 9





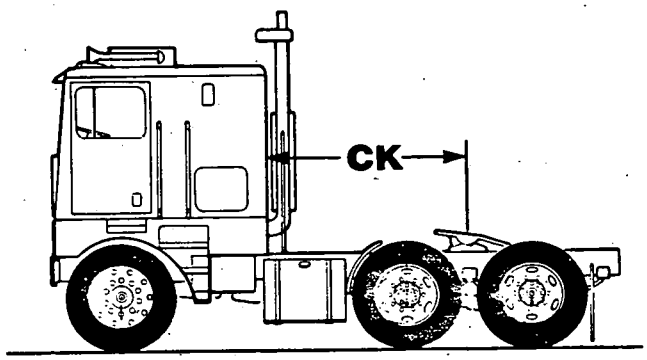


FIG. 10

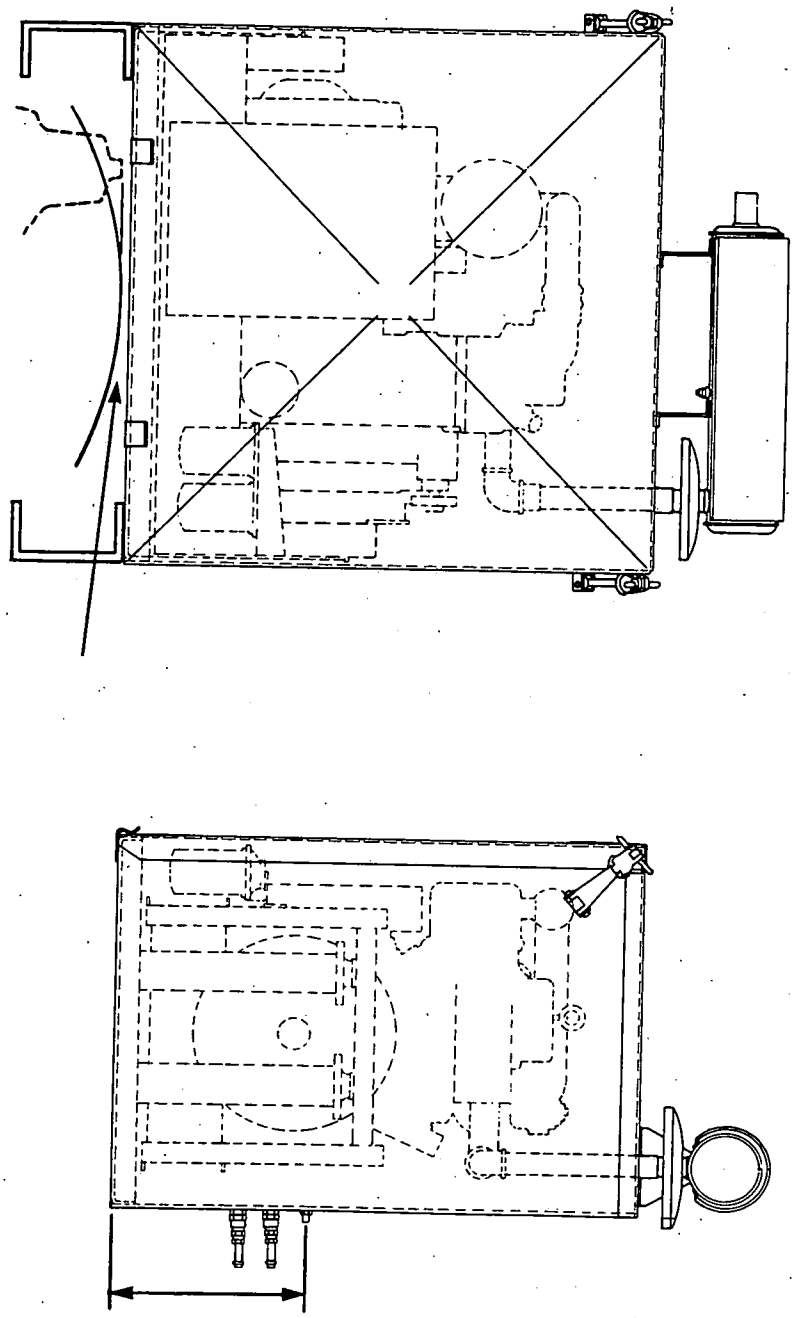


FIG. 11

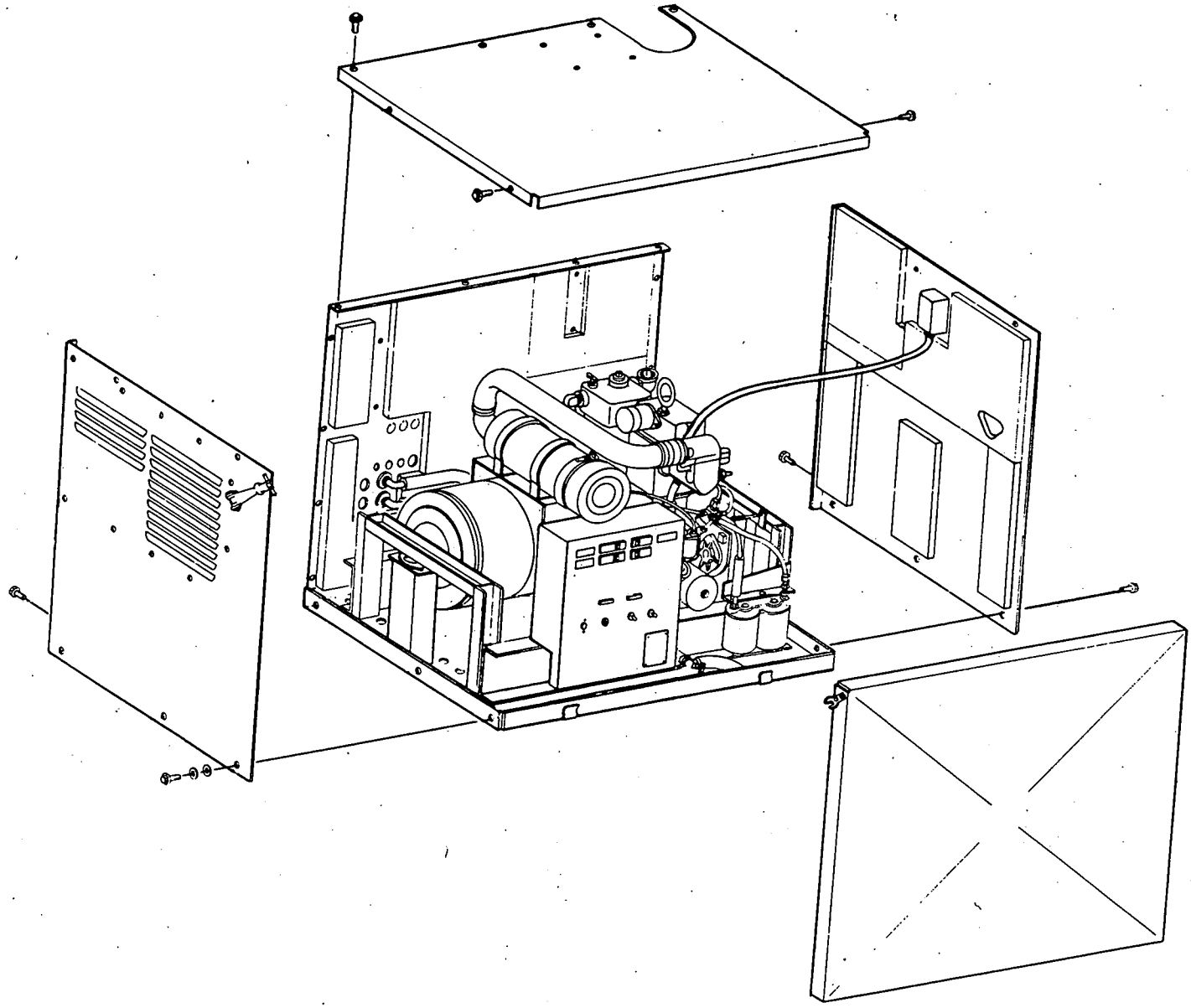


FIG. 12

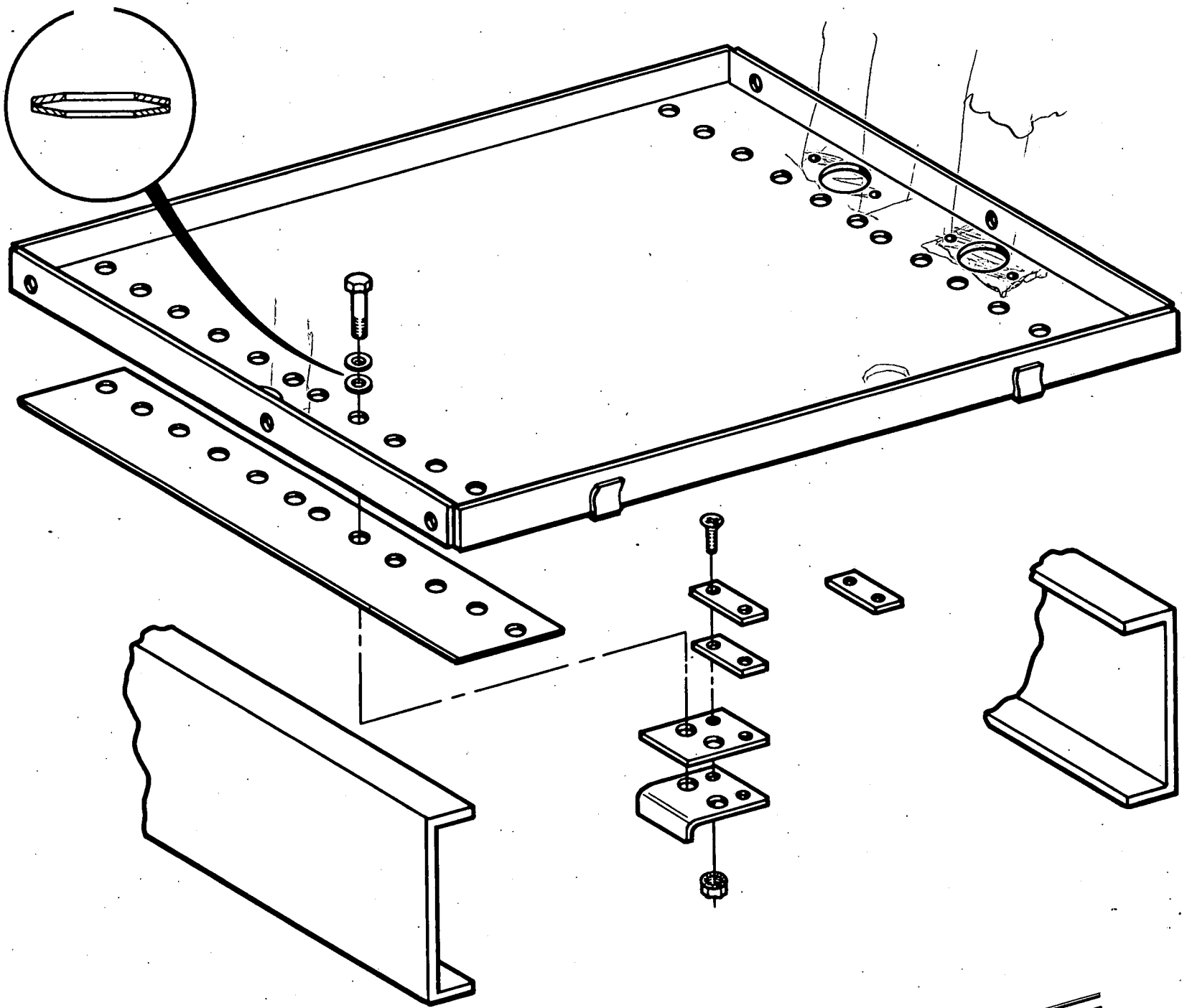


FIG. 13

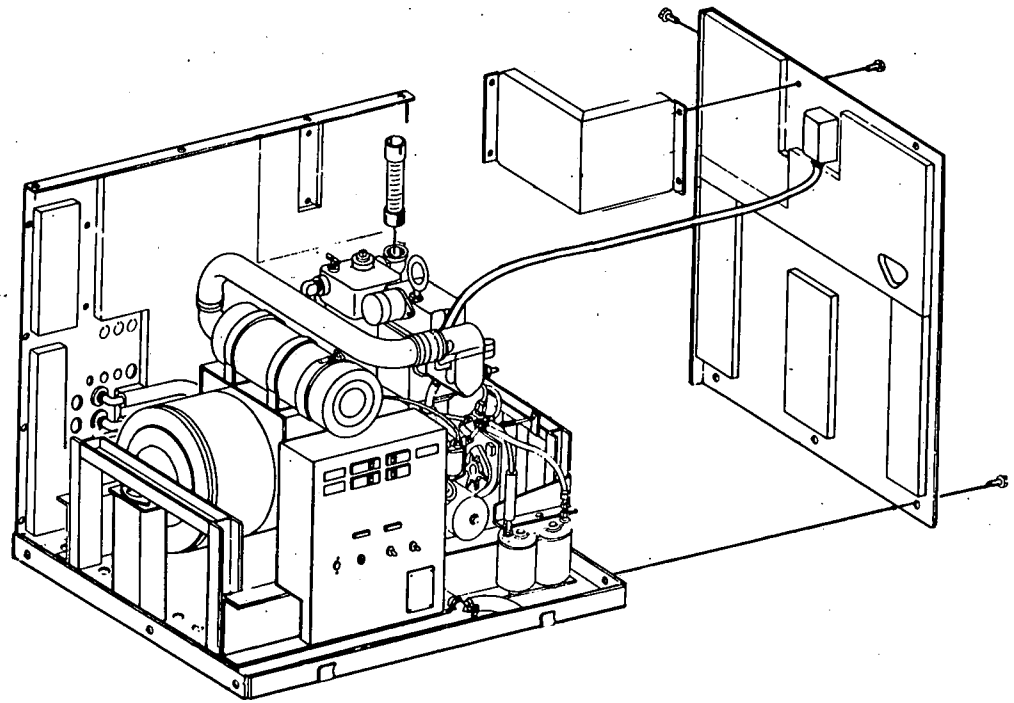


FIG. 14

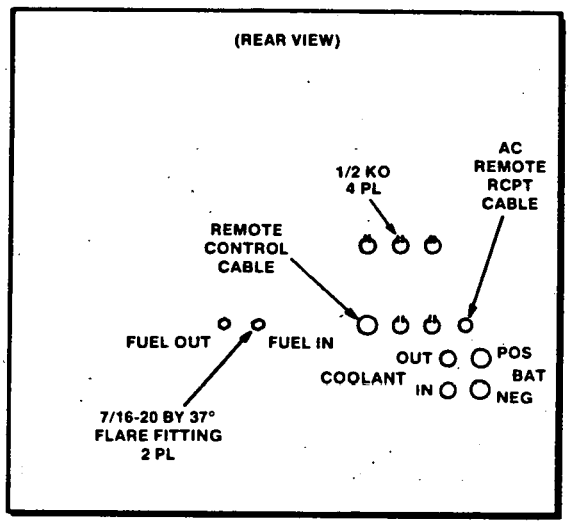

(REAR VIEW)
1/2 KO
4 PL
AC
REMOTE
RCPT
CABLE
REMOTE
CONTROL
CABLE
FUEL OUT
FUEL IN
OUT
POS
COOLANT
IN
BAT
NEG
7/16-20 BY 37°
FLARE FITTING
2 PL

FIG. 15

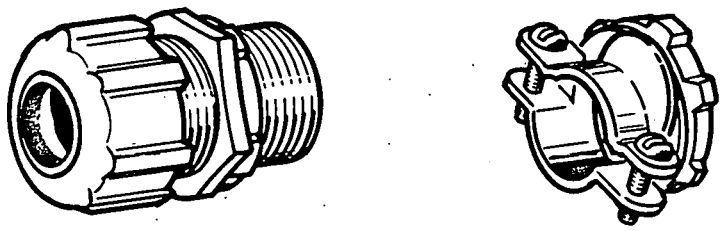


FIG. 16

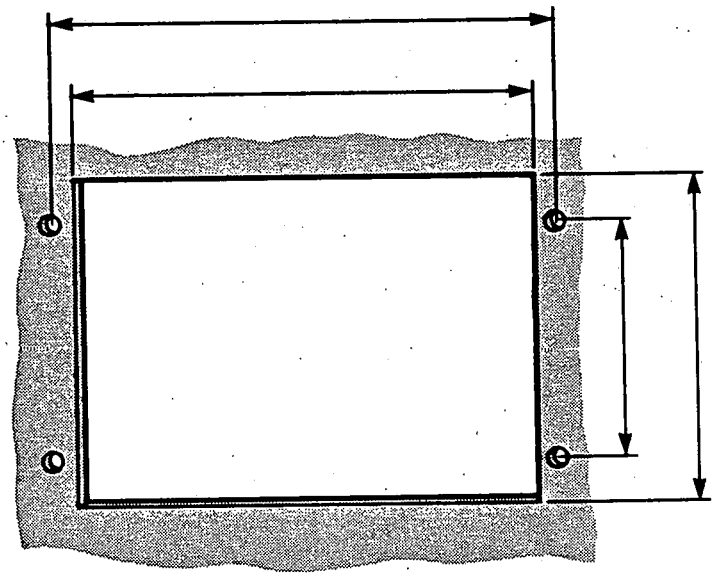


FIG.17

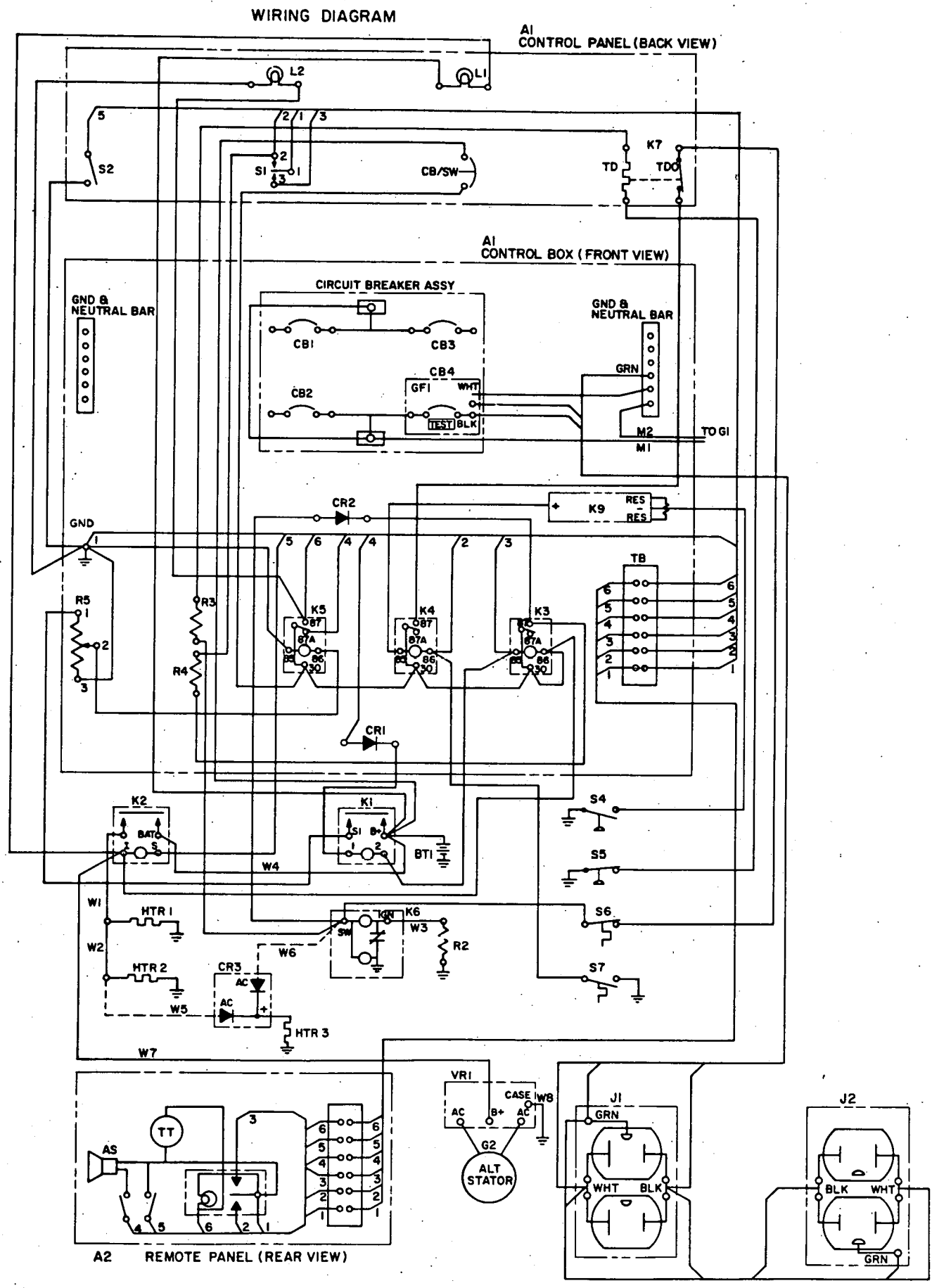

WIRING DIAGRAM
A1
CONTROL PANEL (BACK VIEW)
L2
L1
S2
S1
CB/SW
K7
TD
TDO
A1
CONTROL BOX (FRONT VIEW)
CIRCUIT BREAKER ASSY
GND & NEUTRAL BAR
CB1
CB3
CB4
CB2
GFI
WHT
TEST
BLK
GRN
M2
M1
TO GI
CR2
K9
RES
GND
TB
R5
R3
R4
K5
K4
K3
CR1
K2
K1
BAT
S
S1
B+
BT1
W4
S4
S5
S6
S7
W1
HTR 1
W2
HTR 2
W5
HTR 3
CR3
AC
IGN
SW
K6
W3
R2
W6
W7
VR1
CASE
W8
G2
ALT STATOR
J1
J2
AS
TT
A2
REMOTE PANEL (REAR VIEW)

FIG. 21

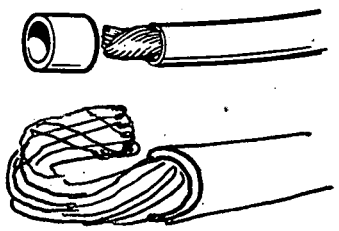


FIG. 22

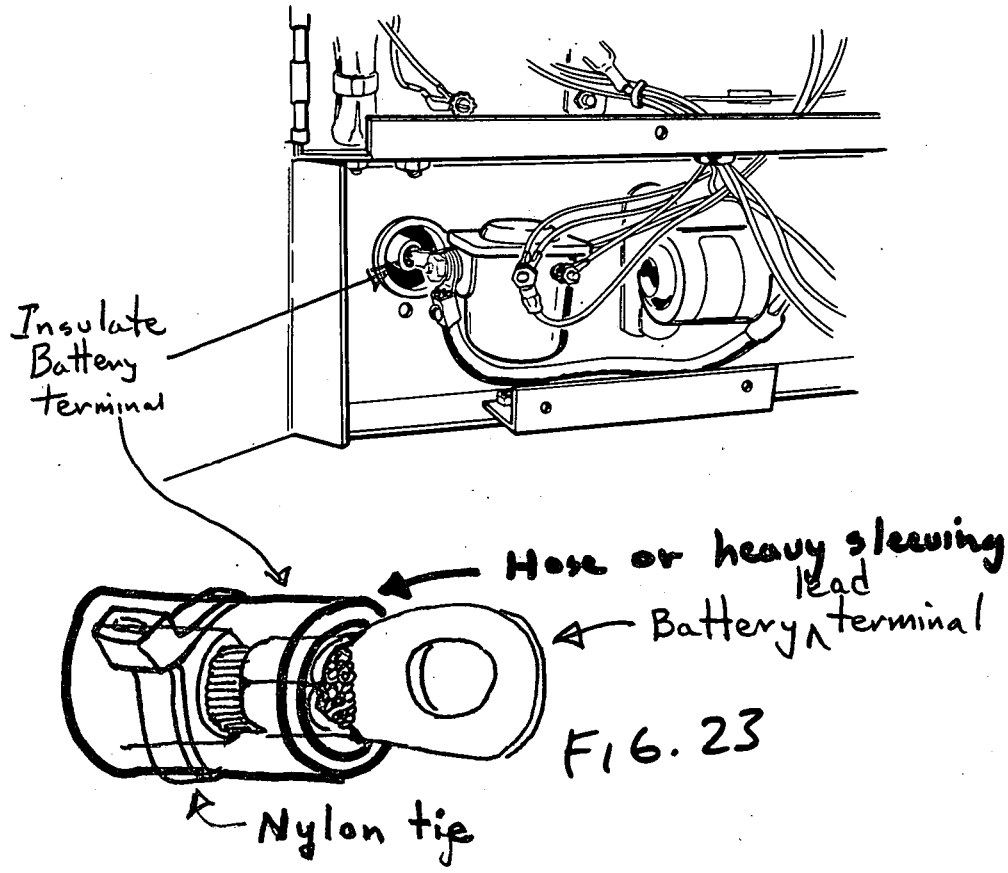

Insulate Battery terminal
Hose or heavy sleeving
lead
Battery terminal
Nylon tie

FIG. 23

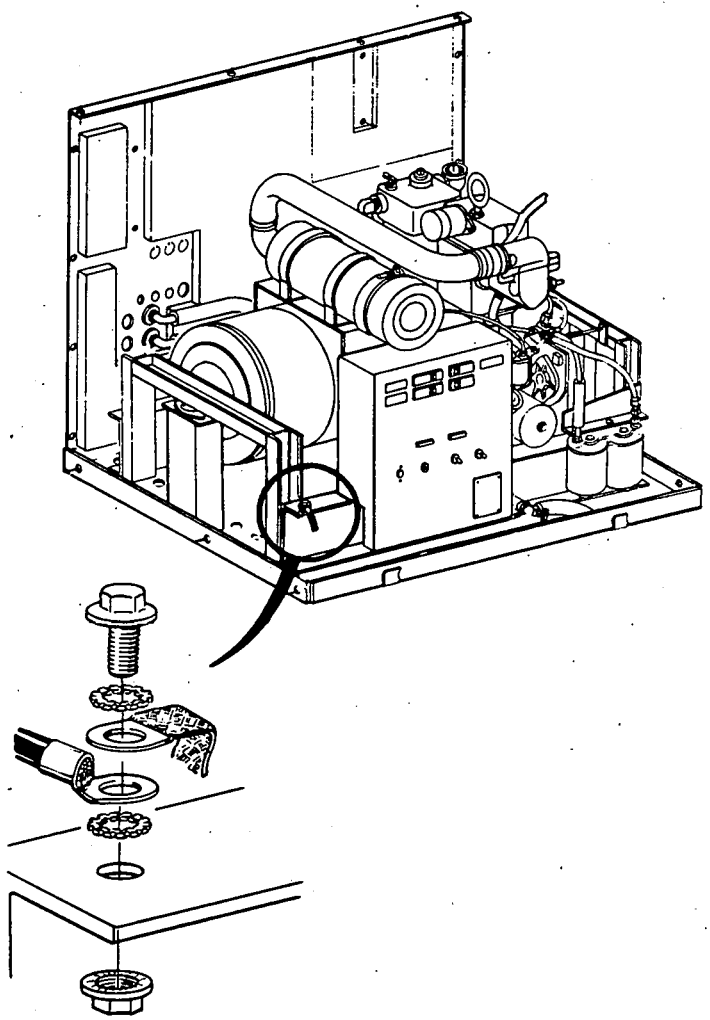


FIG. 24

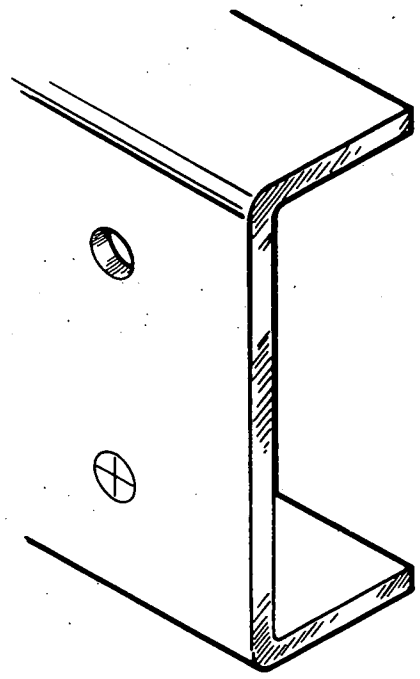


FIG. 26

McGRAW-EDISON

Onan

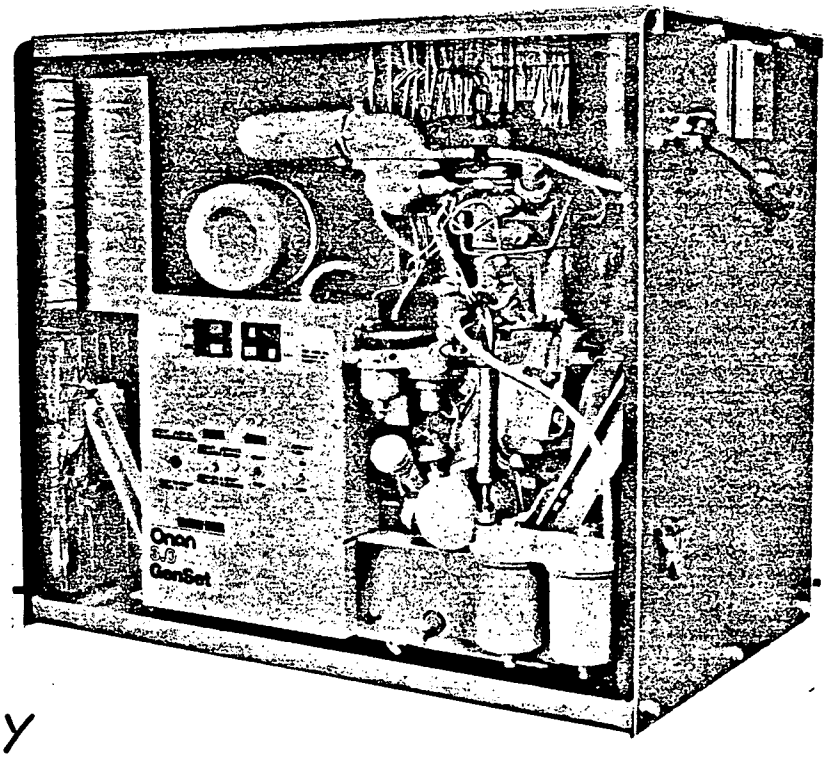
SERIES RDJA

AUX

GenSet

3.0 kW

Installation Guide



- Auxiliary Power Generators For Trucks
- Over The Rail Mount ING ONLY

IMPORTANT

Read Through Entire Installation Guide Prior To Actual Installation

Onan AUX

974-0625
11-82
Printed in U.S.A.

SAFETY PRECAUTIONS

The following symbols in this manual signal potentially dangerous conditions to the operator or equipment. Read this manual carefully. Know when these conditions can exist. Then, take necessary steps to protect personnel as well as equipment.

WARNING ***Onan uses this symbol throughout this manual to warn of possible serious personal injury.***

CAUTION ***This symbol refers to possible equipment damage.***

Do not work on this equipment when mentally or physically fatigued.

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that could result in serious, personal injury. Take care in following these recommended procedures.

- **Use Extreme Caution Near Gasoline. A constant potential explosive or fire hazard exists.**

  Do not fill fuel tank with engine running. Do not smoke or use open flame near the unit or the fuel tank.

  Be sure all fuel supplies have a positive shutoff valve.

  The fuel supply and return lines must be routed separately and never tied together with any electrical wiring. Use a flexible section of fuel line between generator compartment and stationary remote fuel tank in truck chassis. This flexible section must be 100% NON-METALLIC to prevent electrical current from using it as a conductor.

  Have a fire extinguisher nearby. Be sure extinguisher is properly maintained and be familiar with its proper use. Extinguishers rated ABC by the NFPA are appropriate for all applications.

- **Guard Against Electric Shock**

  Disconnect 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 surfaces to be damp when handling electrical equipment.

  Jewelry is a good conductor of electricity and should be removed when working on electrical equipment.

  DO NOT PLUG MOBILE, PORTABLE OR STANDBY SETS DIRECTLY INTO A HOUSE RECEPTACLE TO PROVIDE EMERGENCY POWER. It is possible for current to flow from generator into the utility line. This creates extreme hazards to anyone working on lines to restore power.

  Use extreme caution when working on electrical components. High voltages cause injury or death.

  Follow all state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician.

- **Do Not Smoke While Servicing Batteries**

  Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.

- **Exhaust Gases Are Toxic**

  Provide an adequate exhaust system to properly expel discharged gases. Check exhaust system regularly for leaks. Ensure that exhaust manifolds are secure and not warped.

  Be sure the unit is well ventilated. Don't use discharged cooling air for compartment heating since it could contain poisonous exhaust gases.

- **Keep The Unit And Surrounding Area Clean**

  Remove all oil deposits. Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent engine damage and may present a potential fire hazard.

  Do NOT store anything in the generator compartment such as oil or gas cans, oily rags, chains, wooden blocks, etc. A fire could result or the generator set operation (cooling, noise and vibration) may be adversely affected. Keep the compartment floor clean and dry.

  Do not steam clean the generator set while the engine is running. When cleaning, do not spray directly into the generator, control box, or air cleaner.

- **Protect Against Moving Parts**

  Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be worn because of the danger of becoming caught in moving parts.

  Make sure all nuts and bolts are secure. Keep power shields and guards in position.

  If adjustments *must* be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

Table of Conten s

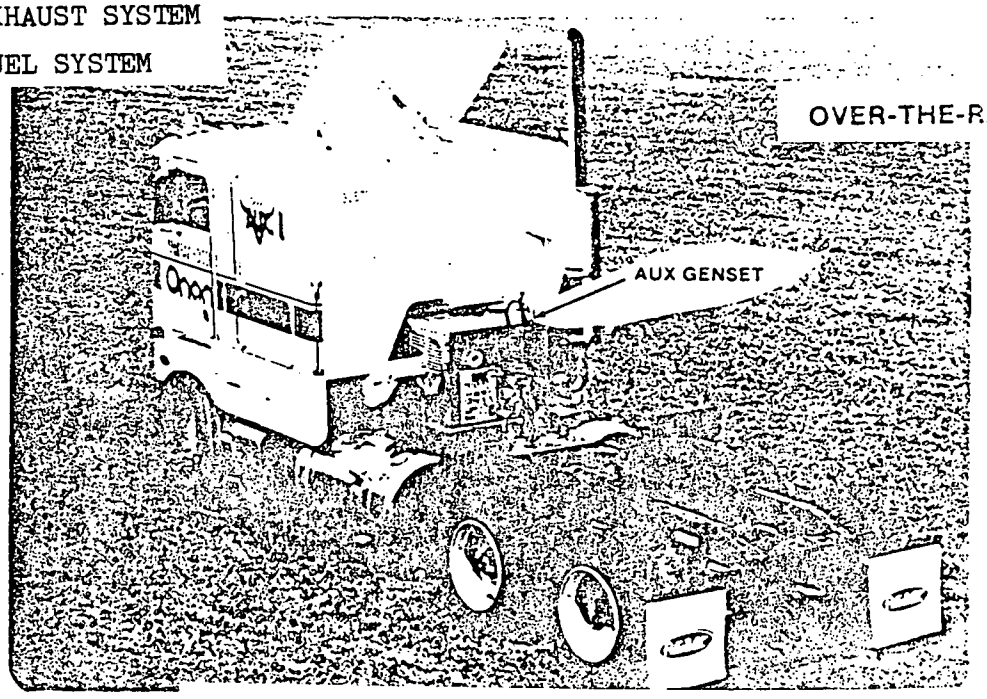


FIGURE 1. TYPICAL AUXILIARY GENERATOR SET INSTALLATION

IF YOU HAVE ANY QUESTIONS CONCERNING THE INSTALLATION PROCEDURES, CONTACT THE ONAN DISTRIBUTOR WHERE PURCHASED OR THE ONAN FACTORY IN MINNEAPOLIS, MINNESOTA 55432

Introduction

This manual covers detailed installation procedures and recommended practices for installing the Onan 3.0RDJA diesel powered auxiliary generator set in an "Over-The-Rail" configuration ONLY. Read through the entire manual for familiarity prior to actually installing this generator set. This manual is arranged in a logical sequence of steps that should be followed when performing the actual installation. The remote control, muffler and exhaust tubing, connectors and hardware required for installation are packaged in an accessory kit supplied with each set when shipped. Do NOT proceed with the installation if any items are missing.

Any items not supplied but required to complete the installation are specified and recommended where appropriate throughout the manual. Some of these items will be available in Optional kit form from Onan. All other items specified and required should be procured locally prior to starting the actual installation.

This generator set is shipped from the factory completely assembled within the insulated compartment housing for protection during shipping. Some housing panels and internal compartment wiring require disassembly prior to installing the generator set in place over the truck frame rails.

WARNING

ONAN RECOMMENDS THAT GENERATOR SET INSTALLATION AND ALL SERVICE ONLY BE DONE BY PERSONS QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE. TO PREVENT POSSIBLE INJURY AND/OR EQUIPMENT DAMAGE IT IS IMPERATIVE THAT THE SERVICE PERSON BE QUALIFIED.

IF IT IS NECESSARY TO RELOCATE OR MODIFY ANY MAJOR TRUCK CHASSIS COMPONENTS SUCH AS BATTERIES, TANKS, TOOL BOXES OR ANY OTHER TRUCK ACCESSORIES, ALL WORK MUST BE PERFORMED BY AN EXPERIENCED TRUCK DEALER OR SERVICE PERSON ONLY. THESE CONDITIONS MUST BE IDENTIFIED PRIOR TO PERFORMING ANY PART OF THE AUXILIARY GENERATOR SET INSTALLATION. THE COMPLETED INSTALLATION MUST CONFORM TO FEDERAL MOTOR CARRIER SAFETY REGULATIONS, TITLE 49, PART 393 AND FOLLOW THE RECOMMENDED PRACTICES OF THE AMERICAN TRUCKING ASSOCIATION MAINTENANCE COUNCIL.

CRITICAL INSTALLATION PROCEDURES

When installing and clamping the auxiliary generator set on the truck frame rails, the following items in particular are important to ensure safe, reliable operation of the generator set. Detailed installation instructions are provided for each of these items in the installation guide.

1. When clamping the generator set to the truck frame rails, be sure the proper number and size shims are used on all four mounting clamps. See Figure 2.

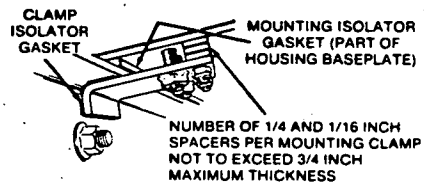


FIGURE 2. Spacer Assembly and Mounting Clamps

2. Install and torque conical(beveled) washers exactly as shown in Figure 3 (two on each mounting bolt-16 total).

FIGURE 3. Conical Washer Assembly

3. Be sure to install interconnecting cooling system hoses between truck engine and generator set properly. Engine hose connections will vary depending on truck engine and manufacturer. See Figure 4.

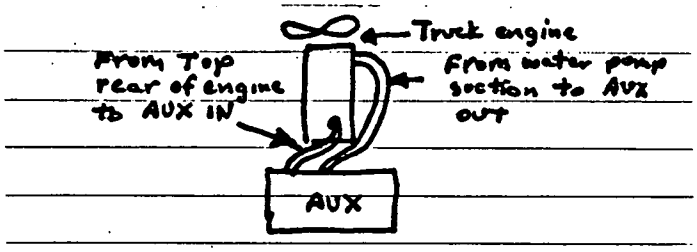


FIGURE 4. Typical Cooling Hose Connections

4. All AC duplex receptacles MUST be connected to the Ground FAult Circuit Breaker in the generator set control panel including the remote control panel AC duplex receptacle. See Figure 5.

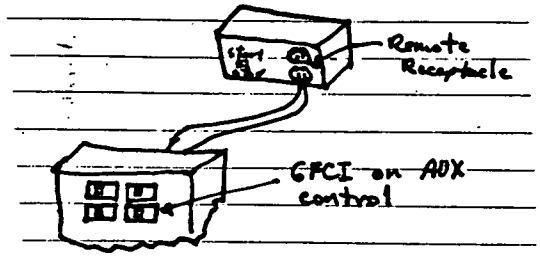


FIGURE 5. Connecting Remote Panel AC Duplex Receptacle to GFCI Circuit Breaker in Set Control Panel

5. Flexible exhaust tube engagement and alignment is CRITICAL to prevent any exhaust leaks and allow free movement of the set on its vibration mounts. See Figure 6.

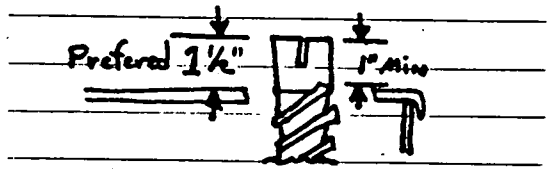


FIGURE 6. Correct Exhaust Tube Adjustment

6. Positive battery cable routing and connection to generator set start solenoid MUST be insulated and clamped to prevent chafing. See Figure 7.

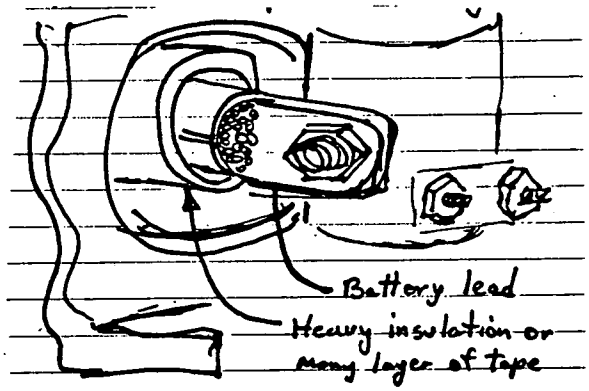


FIGURE 7. Protecting Positive Battery Cable Connection at Start Solenoid.

7. Positive and Negative battery cable connections are crucial for proper operation of the set and will vary between 12 and 24 volt truck starting systems. The generator set is prewired for Negative Ground applications but can be modified for Positive Ground installations. See Figure 8.

FIGURE 8. Battery Cable Connections for 12/24 volt Truck Starting Systems

Specifications

Move To Back page

The SI metric equivalents are printed in parenthesis immediately following the U.S. customary unit of measure

COMPARTMENT SIZE

Height (Without Muffler)	31.38 in. (797mm)
Width	34.00 in. (863mm)
Depth	23.75 in. (603mm)
Approximate weight including compartment	560 lbs. (254kg)
Starting System Voltage	12- volts DC
Battery Ground	Negative Ground Standard
Starting System	Motorized Alternator Cranking
Cranking Current	300 Amperes
Break-away Current (Maximum)	475 Amperes
Fuel	Diesel
Remote Fuel Tank Capacity	11.5 Gallons (44L)
Length	24 in. (609mm)
Width	15.50 in. (393mm)
Depth	7.50 in. (190mm)
Fuel Pump	Mechanical
Fuel Return and Supply line Connection Size	SAE -4 37°Flare

NOTE: Refer to auxiliary generator set Operator's manual for complete engine-generator specifications.

WARNING

EXHAUST GAS IS DEADLY!

Exhaust gases contain carbon monoxide, a poisonous gas that might cause unconsciousness and death. It is an odorless and colorless gas formed during combustion of hydrocarbon fuels. Symptoms of carbon monoxide poisoning are:

- *Dizziness*
- *Headache*
- *Weakness and Sleepiness*
- *Vomiting*
- *Muscular Twitching*
- *Throbbing in Temples*

If you experience any of these symptoms, get out into fresh air immediately, shut down the unit and do not use until it has been inspected.

The best protection against carbon monoxide inhalation is proper installation and regular, frequent inspections of the complete exhaust system. If you notice a change in the sound or appearance of exhaust system, shut the unit down immediately and have it inspected and repaired at once by a competent mechanic.

Pre-Installation Instructions

PRE-INSTALLATION EVALUATION

Each truck chassis must be evaluated and certain measurements must be made by the installer prior to starting any installation. These measurements determine whether there is sufficient, unobstructed space to permit installation of the generator set compartment and the optional remote fuel tank (Kit #415-0520)in their recommended locations.

Refer to the "Fuel Section" of this manual for detailed information on the space requirements for mounting the Optional Remote Fuel Tank between the truck frame rails.

The generator sets are designed primarily for installation in Class 7 or 8 long haul trucks. Exact compartment mounting location(as close to the back wall of the truck cab as possible while still allowing sufficient clearance for hose and wiring connections on the rear panel of the generator set housing)will vary between different conventional truck makes and models due to chassis and component variations.

In cab-over-engine type truck installations, a location as close to the back wall of the truck cab is most suitable for purposes of better weight distribution. Again, sufficient clearance for hose and wiring connection on the rear panel of the generator set housing MUST be maintained. Special allowances MUST be made to allow for tilting the cab up and also prevent interference with any cross-brace in the lower center of the cab rear wall in the opening referred to as the "dog-house". See Figure 9.

In all cases regardless of chassis type, the diesel auxiliary generator set is designed for "Over-the-Rails" mounting ONLY!

Distance "X" listed in Table 1, when measuring for installation, MUST be maintained to allow for any truck maneuver in order to proceed with any Over-the-Rail installation. Refer to Figure 9 when measuring distance "X".

TABLE 1

	King Pin Distance (Inches)	Mininum Space(X) Inches Trailer Type	
		Square Corner	10 Inch Round Corner
96 inch wide Trailer	36	28	24
	48	24	20
102 inch wide Trailer	36	30.5	26.5
	48	26	22

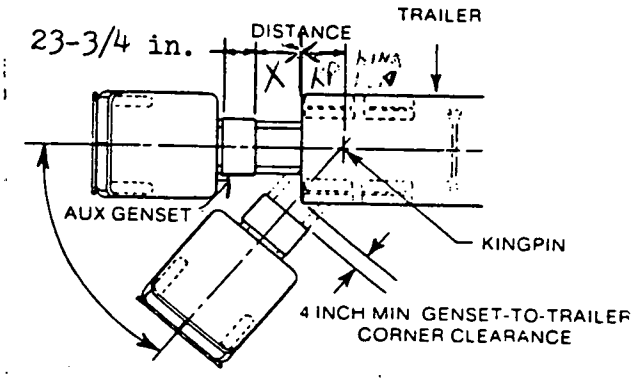


FIGURE 9. Measuring Distance "X" Mininum Installation Space

For most applications other than those listed in Table 1, the following three steps should be used to determine if there is sufficient space and adequate clearance to proceed with the installation of this auxiliary generator set in an "Over-the-Rails" configuration.

1. Identify the distance from king pin to corner dimension "A" as shown in Figure 10 or
2. Identify the distance from king pin to corner dimension "B", which includes allowance for a referigeration unit (Refer), if dimension "B" is greater than dimension "A"as long as the height of the generator set(31-3/8 inches) does NOT interfer with the refer as shown in Figure 10.
3. Add dimension "A" or "B" plus 4 inches to the generator set depth(23.75 inches) which equals dimension "C".

Dimension "C" MUST be less than Cab-to-Kingpin distance to location of 5th wheel to physically install the auxiliary generator set.

If the movable type 5th wheel can be adjusted to a distance that is LESS than dimension "C", we suggest that forward travel of the fifth-wheel be restricted to prevent trailer from accidentally interferring with the generator set in a turn. See Figure 10 and calculate dimension "C" PRIOR to proceeding with any Over-the-Rails installation.

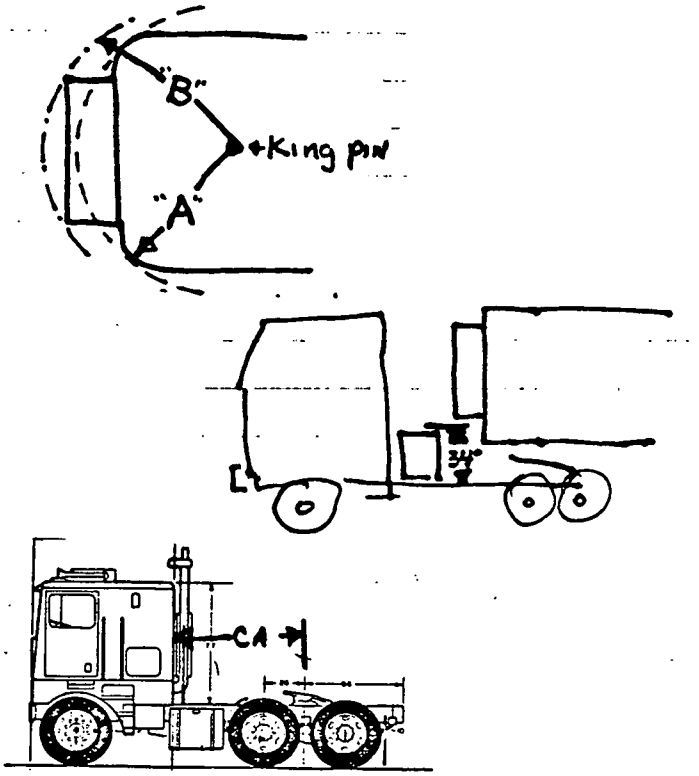


FIGURE 10.. Measuring Distance "C" Mininum Installation Space

COMPARTMENT SIZE AND LOCATION

- Design variables in truck wheelbase and cab styles may require relocation of batteries, tool boxes, etc., to make room for the generator set. Some degree of modification and possibly relocating some of these chassis components may be necessary to provide the physical space (length) required to proceed with the installation of the generator compartment.

WARNING ***If it is necessary to relocate or modify any major truck chassis components such as batteries, tanks or tool boxes or any other truck accessories, all work must be performed by an experienced truck dealer or service person only. These conditions must be identified prior to performing any part of the auxiliary generator set installation. The completed installation must conform to Federal Motor Carrier Safety Regulation, Title 49, Part 393 and follow the recommended practices of the American Trucking Association Maintenance Council.***

- The physical size(primarily depth)of the generator compartment requires a MININUM, UNOBSTRUCTED OPEN SPACE of 23-3/4 inches parallel to (lengthwise) the truck frame rails directly behind the cab. Measure along the frame rails in the desired mounting location to verify this space is available. See Figure// for minimum over-all installation dimensions.

- A minimum vertical clearance of 1/2 inch must be maintained between the generator set housing baseplate (where installed over truck frame rails) and any permanent truck chassis component underneath generator set compartment. Spacers should not be used to obtain this clearance. Housing baseplate can be moved horizontally to obtain this clearance as long as minimum space (23-3/4 inches)is NOT reduced. Housing baseplate must rest on truck frame rails when installed as shown in Figure //.

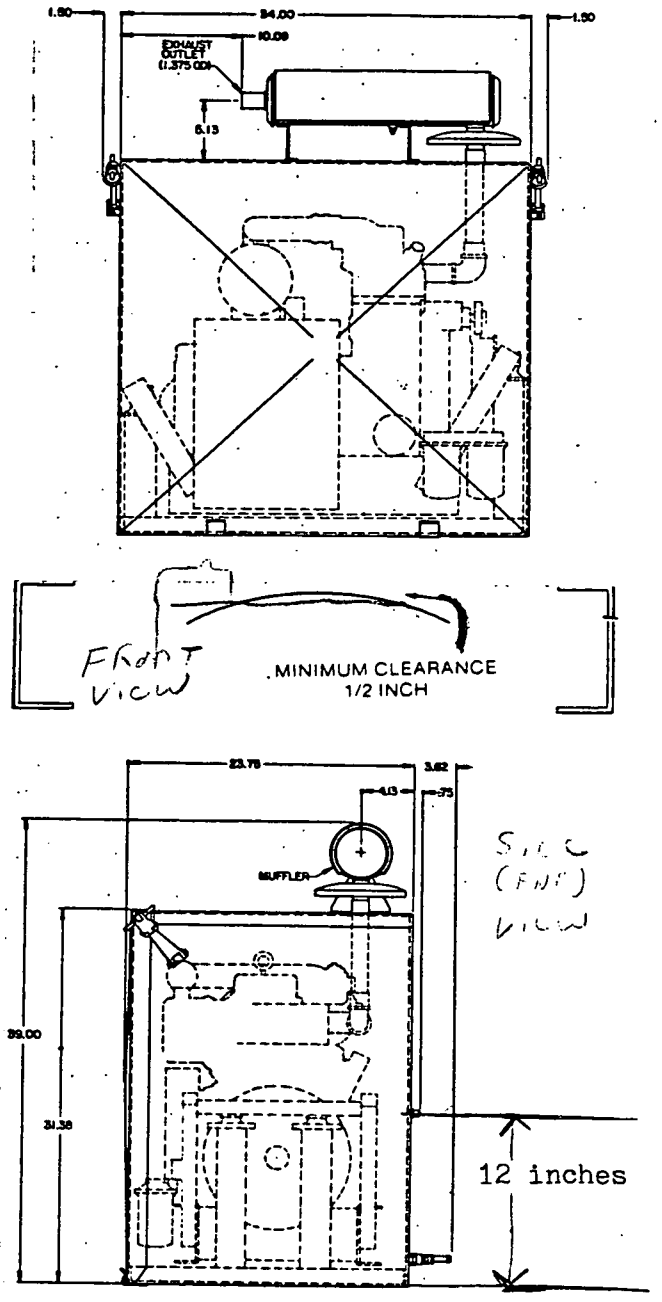


FIGURE 11. Mininum Compartment Installation Dimensions (Over-The-Rail Mounting).

CAUTION:

On Cab-Over-Engine type trucks, be sure the cab cross-brace clears all knockouts selected for the routing of wiring, battery, electrical, cooling and fuel line connections.

Compartment DISASSEMBLY and Installation

Some housing panels and internal compartment wiring require disassembly prior to installing the generator set in place over the truck frame rails to simplify the mounting plate and wiring connections to the truck chassis. Proceed as follows:

1. Remove the compartment front cover, top compartment panel, left and right side panels in the sequence listed as shown in Figure 12.

NOTE: Left and right sides are determined while facing the hinged front cover of the generator set.

CAUTION: Do NOT disconnect or remove the AC duplex receptacle, internal wiring or the external cover and gasket installed in top center of right side panel. Allow this panel to rest against the side of the engine when hoisting the set into position over the truck frame rails.

NOTE: Unplug the compartment fan assembly AC cord from the duplex receptacle on top of the generator end of the set inside the housing PRIOR to removing the left side panel of the generator housing.

NOTE: Removal of rear(back)panel is NOT required for installation of the generator set.

2. Use an appropriately sized chain or portable hoist with chain inserted through the lifting eye on top of engine to position the generator set "in place" over the truck frame rails in the desired mounting location and check for adequate clearance(over-all compartment dimensions are shown in Figure 11).

WARNING *Make certain that housing baseplate is adequately supported when setting it in place on frame rails. Injury may result if the baseplate should fall off frame rails during the installation procedure.*

3. Temporarily hold one mounting clamp in position (inside from underneath) against top frame rail flange of truck as shown in Figure 13, detail "A". Determine the number of 1/4 inch and/or 1/16 inch thick spacers (in any combination NOT to exceed 3/4 inch per mounting clamp) required to fill any gap between baseplate and mounting clamp under baseplate. These spacers are necessary to balance out the leverage of each mounting clamp.

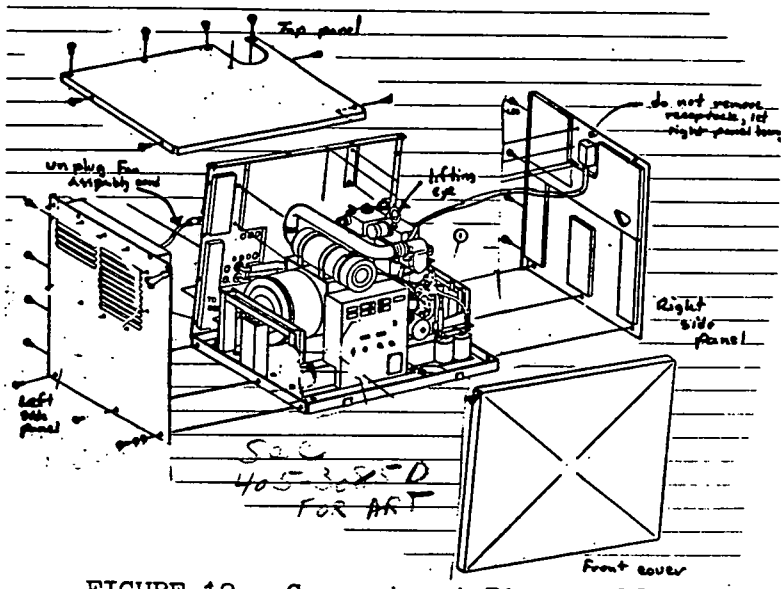


FIGURE 12. Compartment Disassembly

Total thickness of spacers used must match truck frame rail flange thickness under each of the four mounting clamps. Use the same combination and number of spacers with each of the four mounting brackets.

CAUTION: Do NOT exceed the 3/4 inch maximum spacer thickness for each clamp to safely secure generator set to truck frame rails.

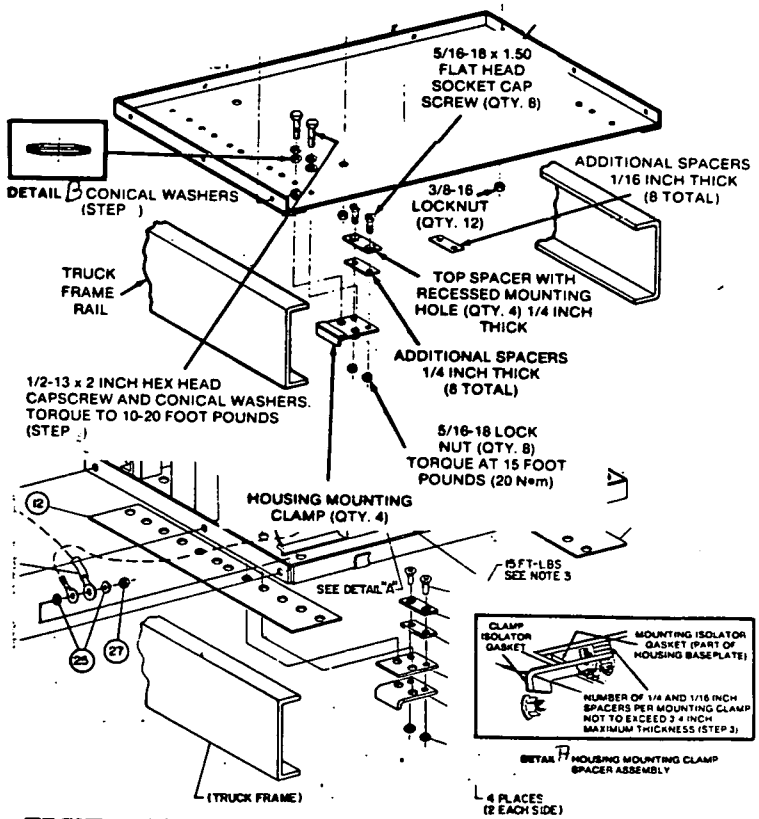


FIGURE 13. Mounting Clamp Spacer Assembly

4. Assemble required number of spacers to all four mounting clamps using 5/16-18 x 1-1/2 inch allen head cap screws and 5/16 lock nuts provided. Torque nuts to 15 foot pounds (20 N•m). See Figure 13. Top spacer has recessed mounting hole to accept special allen head capscrews.

5. Choose any two of ten possible pairs of pre-drilled mounting holes(per side) that do NOT interfere with any existing chassis hardware, frame cross members or any other chassis components (underneath baseplate)on each side of truck.(4 mounting clamps total).

6. Install four mounting clamps with spacers (as required). two on each side under top flange of truck frame rails using 1/2-13 x 2 inch hex head cap screws and two special 1/2 inch conical washers on each capscrew positioned as shown in Figure 13, detail "B". Tighten all eight capscrews until conical washers are flat (approximately 10-20 foot pounds-13.5 -27 N•m). Do NOT over-torque. The mounting bolts are torqued correctly when the special washers are flat. See Figure 13 detail "B".

CAUTION ***Do NOT overtighten conical washers.***

Compartment RE-ASSEMBLY (Partial)

After the generator set is installed on the truck chassis, the compartment housing can be partially assembled and wired as follows:

1. Install threaded end of 9-1/4 inch flexible exhaust tube(supplied in accessory package)into generator set exhaust pipe elbow in upper right rear corner of compartment as shown in Figure14. Tighten securely.

2. Position the compartment interior exhaust shield in the upper right rear corner around the generator set exhaust pipe. Line up mounting holes and secure using 1/4-20 x 5/8 inch hex head capscrews supplied in accessory package. Capscrews are inserted from exterior side of the compartment into self-cinching nuts that are already positioned on the shield. Torque at 7 foot pounds(9N·M). See Figure 14.

NOTE:
The left hand side of the compartment housing can be installed after all AC and DC wiring is completed inside the generator set control panel and through the rear panel of compartment housing as outlined under Compartment Electrical Requirements following.

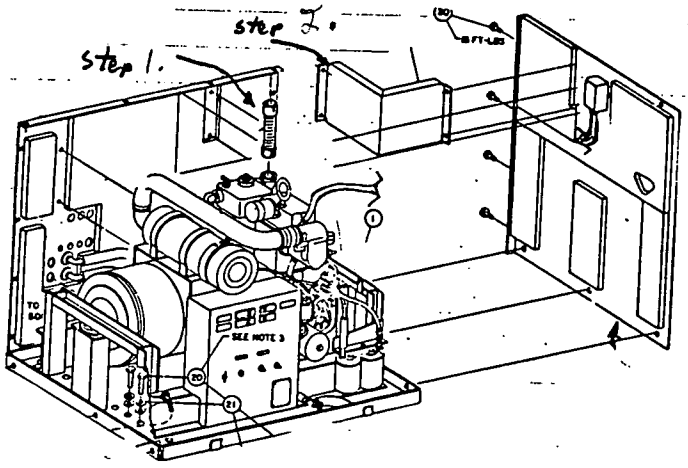


FIGURE 14. Compartment Reassembly

3. Replace the right hand side panel of the compartment housing by installing three 3/8 -16 x 3/4 inch hex head capscrews in bottom holes to secure panel to the mounting tray as shown in Figure 14. Torque all 3/8 inch capscrews at 25 foot pounds(34N·M).

4. Install the four 5/16-18 x 3/4 inch hex head capscrews which secure the right hand side panel to the rear(back)panel of the compartment housing. Capscrews are inserted from exterior side of rear panel (near corner)through flange of side panel which contains self-cinching nuts on inside of rear panel as required. See Figure 14. Torque these bolts at 15 foot pounds(20N·M).

COMPARTMENT ELECTRICAL REQUIREMENTS

1. Water-tight 3/4 inch metal strain relief connectors(supplied by customer) should be installed in the two 1-1/8 inch diameter holes in the lower right hand corner of the rear(back)panel at this time. See Figure 15. Battery cables are installed through these connectors later but for ease of installation, the connectors should be installed prior to reassembling the compartment housing.

2. Determine which knockouts in the rear (back)panel of the housing will be used for the external 15 AND 20 amp AC load circuits

CAUTION: On Cab-Over-Engine type trucks, be sure the cab cross-brace clears all knockouts selected for the routing of all wiring, battery, electrical, cooling and fuel line connections. If the pre-located knockouts in the rear panel interfer with the cab cross-brace, relocate and punch new knockouts as required.

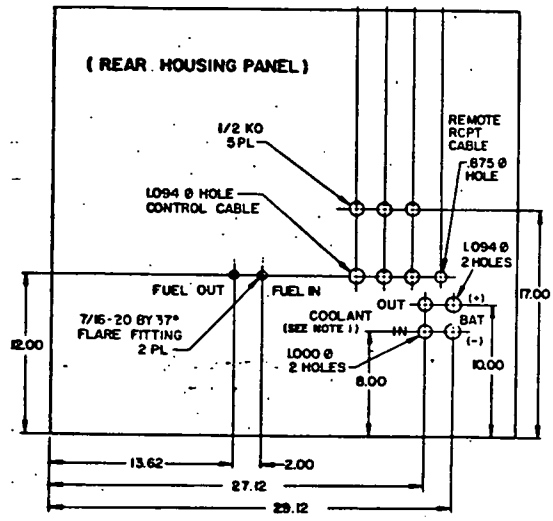


FIGURE 15. Compartment Rear Housing Panel

Wiring Recommendations - General

~~GENERAL WIRING RECOMMENDATIONS~~

WARNING ***Installation of all wiring must conform to all applicable codes and follow National Electrical Code standards and recommended practices. A qualified electrician should inspect all wiring.***

- Use multistrand wire throughout the truck during installation. Specific sizes for main feeder conductors and individual AC load circuit wiring are specified (where required) in this section of the installation guide. All wiring must be of adequate size, properly insulated, and supported in an approved manner. Observe all wiring size recommendations and amperage specifications where listed. Do NOT splice any 120 volt AC wiring.

CAUTION ***Do NOT use solid metal conductors anywhere in this installation. They may develop metal fatigue from vibration and eventually break.***

- Mount all switches and controls securely to prevent damage from vibration and road shock. All switches must be vibration-proof to prevent accidental opening or closing while the truck is in motion. Do NOT use any mercury or ("silent") switches.
- Route all AC and DC wiring along the inside of the truck frame rails where possible. Keep away from rotating or moving shafts and linkages of the truck. Use insulated hold-down clamps spaced approximately every 18 inches and closer together in bends or near high heat sources. Plastic tie wraps can be used in between heavier insulated clamps. Use additional protective sleeving (such as heater hose) over wiring wherever it crosses over frame rails or in sharp bends. Any existing holes in truck cross suport frame members used for routing of wiring should be grommeted to protect wiring.

WARNING ***Do NOT tie any electrical wiring to the fuel or hydraulic lines of the truck because of fire hazard. Keep all wiring away from the exhaust pipe.***

WARNING ***All holes to the inside of the truck cab must be sealed to prevent poisonous exhaust gases from entering the interior or a storage compartment. Use water tight strain reliefs (1/2 inch or 3/4 inch) or silicone rubber sealant to seal around all openings made for electrical wiring.***

CAUTION ***Do NOT drill any additional new holes in the truck frame rails or cross-support frame members for routing wiring through. Any existing holes used for routing of wiring should be protected with grommets.***

- Use water-tight strain relief connectors (1/2 inch or 3/4 inch) whenever wiring passes through any exterior panel, cab wall or truck cab compartment. Use Romex connectors only interior wiring passes through cab wall on interior wiring which passes through cab wall partitions, panels or shelves. See Figure 16.

water-tight Romex

FIGURE 16. Water-tight and Romex Connectors.

LOAD CIRCUIT WIRING RECOMMENDATIONS

- All AC load circuits throughout truck chassis should be on separate circuit breakers for each load. Onan recommends using 12-gauge, 3-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts, AC 90°C operation for all 20-amp circuits such as sleeper cab air conditioners. Most other truck chassis starting aids such as lube oil heaters, battery heaters, electric cab heaters, etc should use 14-gauge, 3-conductor (type SO) neoprene-jacketed multistrand wire rated at 600 volts AC, 90°C operation for these 15-amp circuits. Romex connectors must be used in set control panel knock-outs to secure wiring. Some slack should be allowed in wiring for movement caused by vibration to prevent breakage.

Lubricate the wire outer jacket with liquid soap, motor oil or other suitable material to aid in assembly of strain relief connectors.

WARNING ***Do NOT use Poly-vinyl-chloride type wire on any AC or DC load or control circuit wiring in this application. Overloading this type of wire causes a chlorine gas emission which creates a poisonous hydrochloric acid condition.***

- Two additional circuits are usually added, one 20 amp circuit for an air/conditioner/heater and a 15 amp circuit for lube oil and battery blanket heaters. Install a 3/4 inch water-tight strain relief connector in the 1-1/8 inch diameter hole in the rear panel(closest to "fuel in" connector) for the remote control panel power cable, but do not tighten yet.

  Remove selected knockouts in rear(back) panel and install 1/2 inch water-tight strain relief connectors as required for additional circuits to seal wiring and cables but do not tighten yet.

Remo e Si.arting Panel Installation

REMOTE PANEL LOCATION AND MOUNTING

A remote control panel is provided which allows the driver to start the generator set from within the cab area of the truck. The panel contains start-stop and preheat rocker switches, running time meter, buzzer alarm and one AC duplex receptacle.

The remote panel has three 5/16 inch mounting holes in bottom panel for shelf mounting and two 7/8 inch holes in back panel for DC control harness and AC supply conductor for receptacle. Use 14-20 screws of suitable length to securely bolt panel in desired location.

Exact location of remote panel varies according to owner preference and set location as well as type of truck chassis. Remote panel is usually located near driver's seat in cab or in a convenient location within sleeper cab. Generator set can be started at compartment location if desired. Housing front cover must be removed for access to set control

One of the most popular mounting locations for the remote control panel is on the cab wall behind the driver's seat on the right hand side of the seat. Exact mounting location should allow for easily reading the running time meter for establishing maintenance intervals and be easily reached when driving as well as when using the sleeper cab area. It should NOT be more than 35 feet from the generator set location so that optional remote control cable kit(# 335-0156)can be utilized for installation. This optional kit contains all required AC and DC wiring cable, connectors, terminals and step by step installation instructions. It does NOT contain mounting hardware due to location variations and size of hardware required.

WARNING ***Do NOT install remote starting panel without the remote control box housing. A potential shock hazard exists because of the exposed terminals of the AC receptacle.***

The remote control panel cutout dimension requirements are shown in Figure 17. The panel mounting location requires 6 inches mininum depth clearance for wiring access when mounted in desired location. The cutout size is 5-3/4 inches wide by 4-1/4 inches in height for flush mounting. A pictorial system wiring diagram is shown in Figure 18. The following installation instructions assume usage of the components offered in the optional remote control cable kit(335-0156). Proceed as follows:

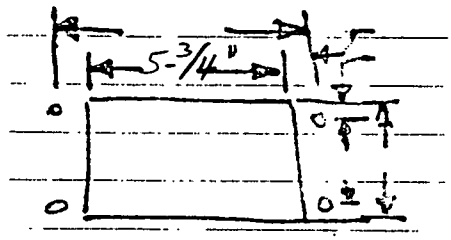


FIGURE 17. Panel Cutout Dimensions for Flush Mounting.

CONNECTING REMOTE PANEL TO GENERATOR SET

1. Route the 16 gauge, 6 conductor, 35 foot DC cable through the 3/4 inch strain relief connector near the fuel inlet fitting on the rear panel of the generator set housing.

   Some slack should be allowed in wiring for movement from vibration and to allow generator set to rock on the mounts.

2. Remove the 10-32 x 3/8 inch truss head machine screws which secure the genset control box cover.

3. Punch out the knockout in the back panel of the genset control box next to the Ground Fault Circuit Breaker. It is right above the AC cable already wired to this GFCI breaker as shown in Figure 19.

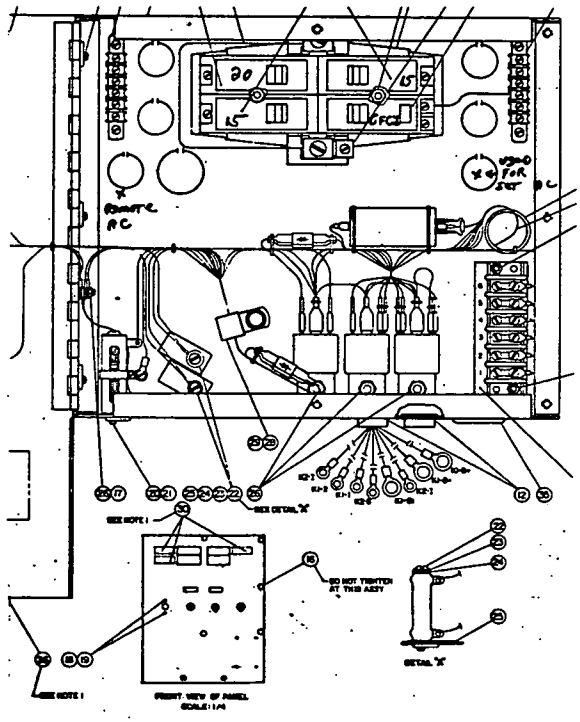
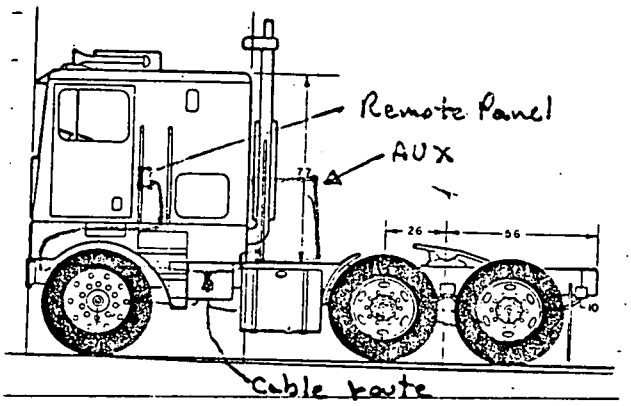
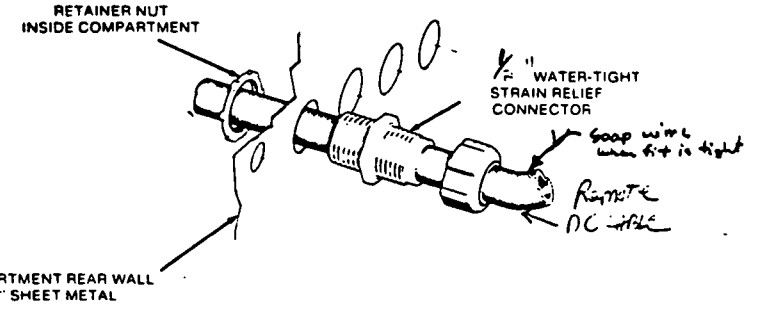
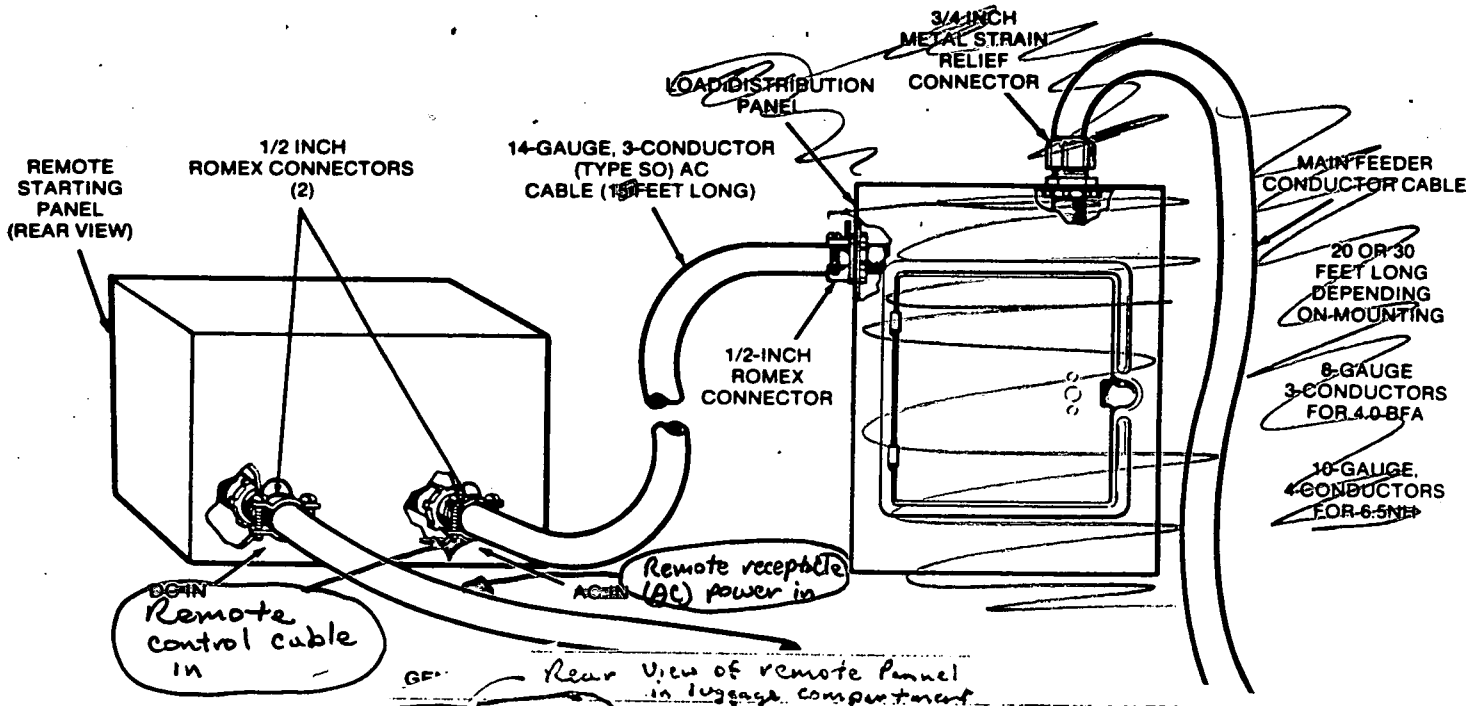


FIGURE 19. GenSet Control Box







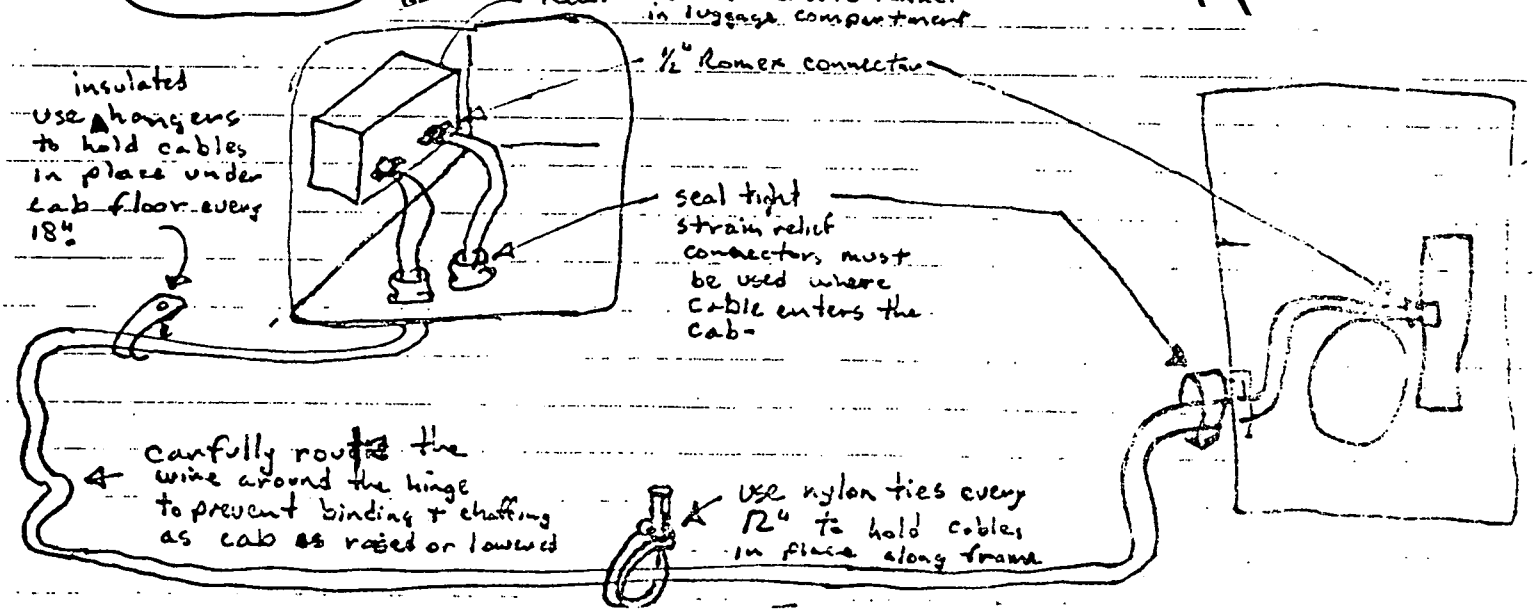


FIGURE 18. Remote Control/Generator Set Pictorial Wiring Diagram.

GENSET Terminal No.	REMOTE PANEL Terminal No.	CIRCUIT FUNCTION	WIRING COLOR CODE
1	1	Ground	White
2	2	Stop	Red
3	3	Start	Green
4	4	Remote Alarm Signal	Orange
5	5	Diesel Preheat	Blue
6	6	Running Time Meter and Switch S1 Integral Running Light	Black

4. Install a 1/2 inch Romex commector in this knockout and route 6-conductor DC cable through connector in rear panel of genset control box as shown in Figure 19.

CAUTION ***Do NOT use solid wire or wire smaller than 16-gauge in size. Solid wire will fatigue due to vibration and break. Wire smaller than 16-gauge will result in poor starting from remote panel and short service life.***

5. Ring terminals are supplied in kit to connect remote cable to terminal strip in genset control box following wire color code and chart in Figure 19.

6. Install a 1/2 inch strain relief connector in the 7/8 inch diameter hole opposite the remote control cable(same row of knockouts)in the rear panel of the genset housing as shown in Figures 15 and 18.

7. Route the 14 gauge, 3-conductor AC supply cable through the 1/2 inch strain relief connector in the rear panel of the genset housing as shown in Figures 15 and 18.

8. Install a 1/2 inch Romex connector in the open hole in the upper left side of the genset control box rear panel as shown in Figure 19.

9. Route the 14 gauge, 3-conductor AC supply cable through this Romex connector in the genset control box and connect it to the Ground Fault Circuit Breaker. Follow the same wire color code for the connections as the existing circuit already connected to this breaker. See Figure 19.

Some slack should be allowed in wiring for movement from vibration and to allow generator set to rock on the mounts.

WARNING ***All AC convenience receptacles regardless of use, must be protected by ground fault protection devices for safety. Any cold weather starting aids may be connected to standard circuit breakers if they are three wire devices.***

10. Route both the DC control cable and the AC supply cable using the most direct path between genset and remote control panel location. Stay along the inside of the truck frame rails where possible. Secure cables every 18 inches along the run with insulated hold-down clamps (closer together in bends and near high heat sources). Use nylon tie wraps as required in between clamps. Use the most direct wire routing possible to minimize wire length required.

NOTE:
On cab-over-engine type truck chassis, all routing of any wiring, regardless of type or function MUST be long enough and routed in such fashion that raising and lowering of cab for access to engine will NOT interfere with wiring. Allow slack at the nose (hinged point) of the cab for raising cab as required.

WARNING ***All holes to the inside of the truck cab must be sealed to prevent poisonous exhaust gases from entering the interior or a storage compartment. Use water tight strain reliefs (1/2 inch or 3/4 inch) or silicone rubber sealant to seal around all openings made for electrical wiring.***

CAUTION ***Do NOT drill any additional new holes in the truck frame rails or cross-support frame members for routing wiring through. Any existing holes used for routing of wiring should be protected with grommets.***

REMOTE PANEL CONNECTIONS
DC Control Cable

1. A 1/2 inch water tight strain relief connector should be used on both the DC and AC cables when cables enter the truck cab, luggage compartment etc. A Romex connector should be used on both cables at point of entry into remote panel as shown in Figure 20.

2. Ring terminals are supplied in kit to connect remote DC control cable to the terminal strip in remote panel following wire color code and chart in Figures 19 and 20.

AC Supply Cable

1. Cut cable to required length making sure there is enough extra wire inside remote control panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.

2. Strip back the outer insulation on one end of the foot, 14-gauge, 3-conductor AC cable approximately 6 inches.

3. Install two blade-type terminals, one on the black and one on the white conductor of the AC cable. Terminals are identified in Figure 20.

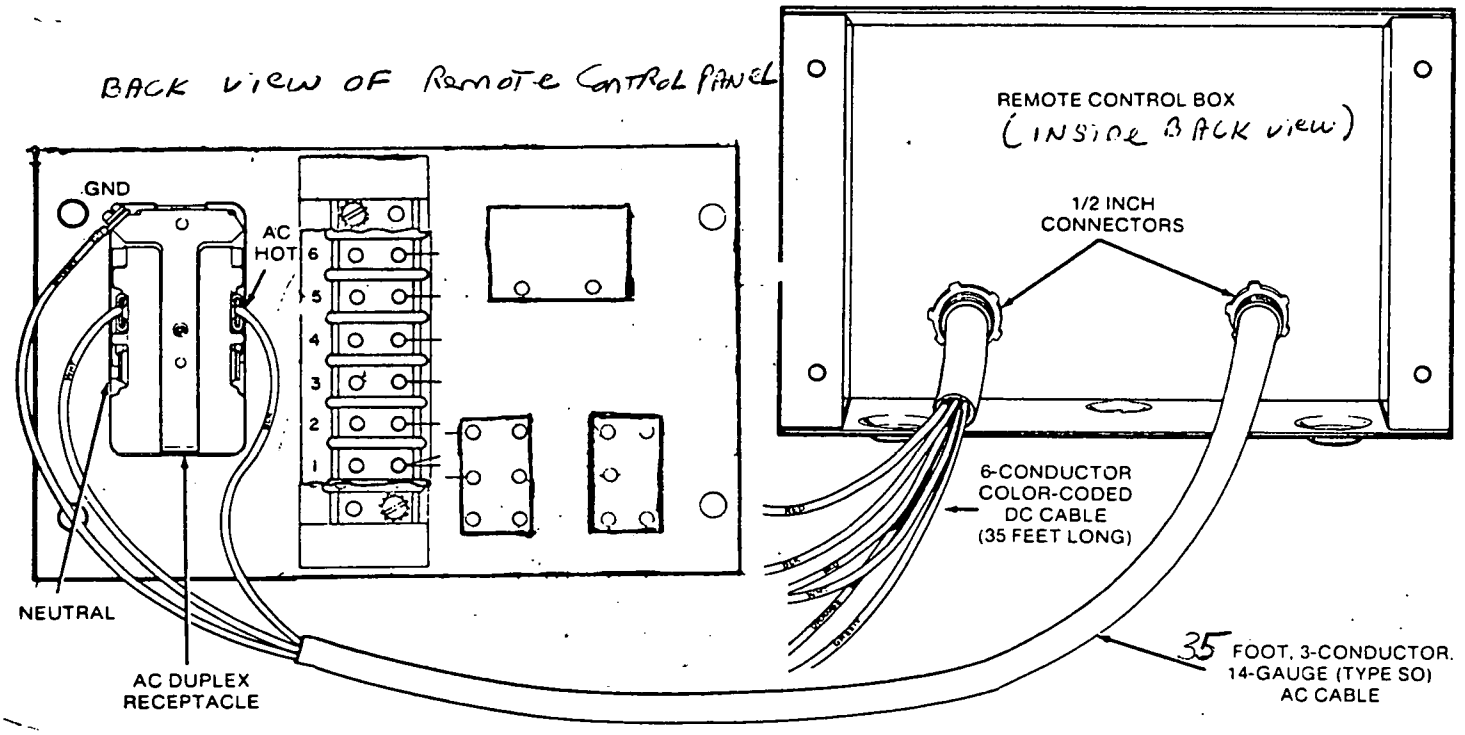


FIGURE 20. Remote Starting Panel Wiring Connections

4. Install a spade terminal (blue in color) on the green (ground) conductor of the 35-foot AC cable.
5. Connect the black conductor to the AC Hot (gold contact) terminal of the duplex receptacle as shown in Figure 20.
6. Connect the white conductor to the AC neutral (silver contact) terminal of the duplex receptacle as shown in Figure 20
7. Connect the green ground conductor with spade terminal to the ground screw on top corner of receptacle as shown in Figure 20.

CONNECTING 120 VOLT AC DUPLEX RECEPTACLE

Both the hot(black)and neutral(white) load conductors must be connected to the hot and neutral terminals on the ground fault circuit breaker. The ground conductor(green) is connected to the ground bus bar inside the set control panel. Any additional external AC duplex receptacles must have weather protective covers and nickel plated contacts in the receptacle suitable for heavy-duty use. use. All AC duplex receptacles regardless of where installed, must have the hot and neutral load conductors connected to a ground fault protected circuit breaker. The AC receptacle box (if not water-proof) must be installed inside a weather protected area such as a tool box, storage compartment or sleeper cab.

WARNING ***All AC convenience receptacles regardless of use, must be protected by ground fault protection devices for safety. Any cold weather starting aids may be connected to standard circuit breakers if they are three wire devices.***

If 120 volt AC plug-in type loads (such as engine heaters) are used, use a water and dust tight 3-prong hospital grade connector with nickel plated contacts and rubber O-ring or equivalent for sealing such as Onan part numbers 323-1218(male end)and 323-1219(female end).

CONNECTING FEEDER CONDUCTORS

TO CIRCUIT BREAKERS IN GENERATOR SET CONTROL PANEL

The standard load distribution section within the generator set control panel has one 20-amp and two 15-amp circuit breakers and one 15-amp circuit breaker with built-in ground fault circuit interrupter protection.

The AC feeder cables from each individual load circuit must be adequately sized and properly routed through the generator set compartment housing and into the set control panel(see previous sections on general and load circuit wiring recommendations). The individual load circuit conductors can now be properly connected to the appropriate circuit breaker inside the generator set control panel.

CAUTION ***Use ONLY the type of circuit breakers as supplied by Onan. Other types may nuisance trip because of road shock or vibration.***

Current for any one output conductor must not exceed the nameplate rating. When more than one load circuit is available, divide the load equally between them. Refer to AC interconnection diagram shown in Figure 21. Proceed as follows:

20 AMP LOAD CIRCUITS

1. Cut the AC feeder cable to the required length making sure there is enough extra wire inside the set control panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
2. Strip back the insulation on each of the 3 conductors in the 12-gauge AC cable. No terminals are required as each connection is a "set screw" type
3. Connect the black AC Hot conductor to the terminal of the 20-amp circuit breaker as shown in Figures 19 and 21.
4. Neutral and ground conductors(white and green conductors)should both be connected to the closest 6-terminal grounding bar(located on each side of the control panel). See Figure 19.

15 AMP LOAD CIRCUITS

1. Cut the AC feeder cable to the required length making sure there is enough extra wire inside the set control panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
2. Strip back the insulation on each of the 3 conductors in the 14 gauge AC cable. No terminals are required as each connection is a "set screw" type
3. Connect the black AC Hot conductor to the terminal of either of the two 15 amp circuit breakers provided as shown in Figures 19 and 21. A barrel connector must be crimped on the conductor prior to connection in order to fill the large "set screw" type terminal of the circuit breaker properly as shown in Figure 22.

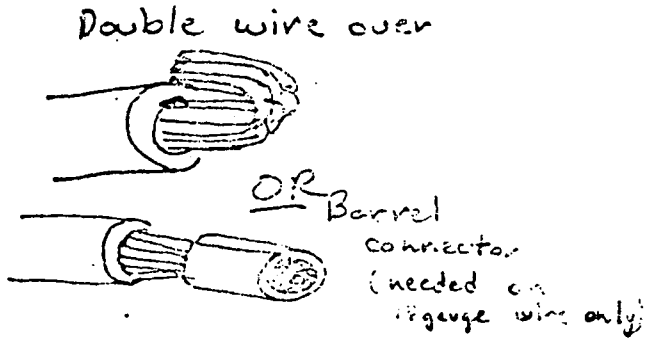


FIGURE 22. Barrel Connector Installation

NOTE Barrel connectors would not be required on the circuit breaker if two separate AC Hot load wires are connected to the same circuit breaker. This will fill the set screw terminal enough to allow for good clamping force.

CAUTION: Be careful not to overload circuit breaker if more than one AC load circuit is connected to the same circuit breaker.

4. Neutral and ground conductors(white and green conductors)should both be connected to the closest 6-terminal grounding bar(located on each side of the control panel). Barrel type connectors are not required on any grounding bar connections.

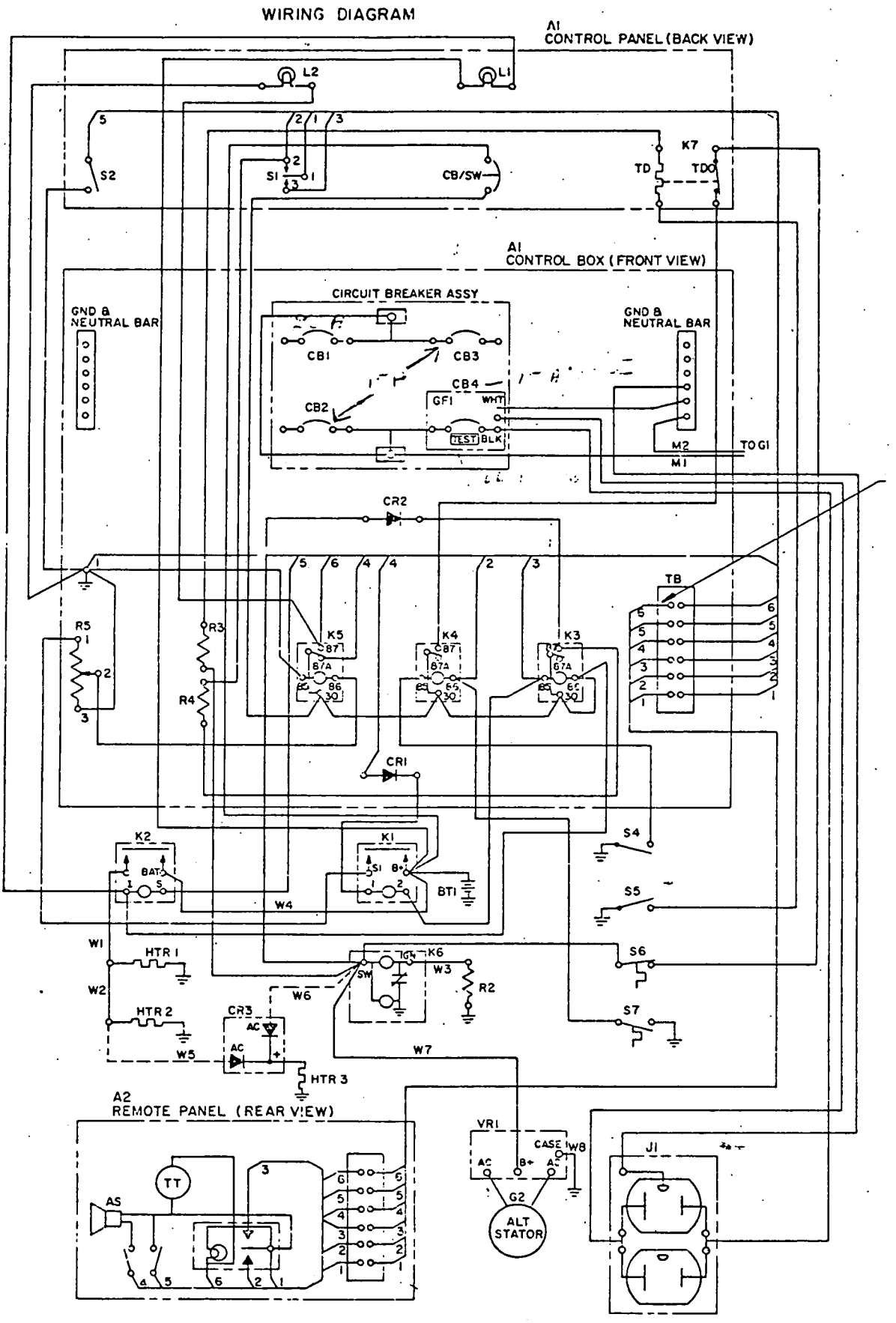


FIGURE 91. ELECTRICAL SYSTEM WIRING DIAGRAM

Connecting GenSe To Truck Battery

STARTING SYSTEM

The battery cables must be properly sized and connected to the 12-volt negative ground accessory side of the truck battery rack in order for the generator set to crank properly under all operating conditions. The auxiliary genset is shipped wired for 12 volt, negative ground starting and charging systems. It is easily modified for positive ground applications, covered later in this section.

BATTERY CABLE RECOMMENDATIONS

- Number 2(2) cable conforming to SAEJ1127-type SGR is recommended for both positive (+) and negative (-) battery cables up to 10 feet in length (per cable).

Battery cables are not supplied as length requirements vary between installations. NUMBER 2 (2) battery cable is available from Onan for use in cables of 10 feet or less. Order part number 334-0 and specify length when ordering.

- For longer length cable runs, cable size increases and voltage drop must meet the requirements of SAE J-541a. The maximum allowable voltage drop (between set and truck battery while cranking) for the generator set is 0.48 volts.

ROUTING BATTERY CABLES

Route battery cables through 1-1/8 inch O.D. holes in compartment rear wall as shown in Figure 15. Route cables through access holes prior to installing any battery terminal connectors. as they will be too large to fit through the Water-tight 3/4 inch metal strain relief connectors WHICH must be used on each cable going through compartment access holes. Use suitable sleeving or grommets at entry point to existing truck battery compartment.

Battery terminal connectors of suitable size and type must be obtained through a local truck dealer or service outlet.

CONNECTING BATTERY CABLES (ground)

1. Connect positive battery cable to large bottom terminal on start solenoid. It is located on the front of the generator set (below control) as shown in Figure 23 and insulate the positive terminal.
2. Connect the negative battery cable and the ground strap to the same location on the genset chassis as shown in the assembly sequence in Figure 24. Assemble mounting hardware and all three cable terminals as shown in Figure 24, detail A. Mounting hardware is supplied in accessory package. Opposite end of 16 inch truck electrical bonding strap must be attached to a convenient bolt on the side of the truck frame rail. If no existing bolt or bolt hole is available, installer must drill a new hole in the side of the truck frame rail within reach of the electrical bonding strap. Refer to Pre-Installation Section for special precautions PRIOR to drilling any new holes in truck frame rail.

CAUTION ***A negative battery cable must be installed. Do NOT rely on truck chassis to carry generator set cranking current.***

3. Connect positive (+) and negative (-) cables to corresponding truck battery terminals (attach negative last). Check terminals at battery and on set for clean, tight connections. Re-inspect periodically.

Vehicle chassis (truck frame) ground and the battery and generator set ground should all be electrically connected to be a 0 ground potential. All Onan units are designed for negative ground application.

CAUTION ***For 24-volt truck battery starting systems, generator set must be connected across 12-volt battery that is grounded during cranking. Do NOT connect across battery(s) that are switched for cranking at 24 volts.***

Use a voltmeter (0-30 volts DC minimum) to determine which truck battery is always grounded. Connect the voltmeter negative (-) lead to the truck chassis. Connect the voltmeter positive (+) lead to one 12-volt battery positive (+) terminal. It should read 12 volts with truck not running. Now crank the truck engine. If voltage remains at 12 volts or less while cranking, connect the auxiliary generator set battery cables to that same battery. If the voltage increases to approximately 24 volts while cranking, do NOT connect to that battery. Connect the generator set to the other 12-volt truck battery.

CAUTION ***Connecting the generator set to the truck battery that is switched during cranking may damage the grounded battery and the truck charging system.***

Refer to Pre-start section in Operator's manual prior to initial operation of the auxiliary generator set.

POSITIVE GROUND STARTING AND CHARGING SYSTEMS

Some foreign truck manufacturers and certain U.S. built special application or types of trucks may use a POSITIVE GROUND Starting system. If the auxiliary generator set is being installed in one of these applications, provisions have been made inside the generator set control(after some minor modifications) to quickly and easily convert the set's wiring when necessary.

Control and battery cable connections at both the generator set control and the truck battery rack will change. The previous recommendations for battery cable size and routing do not change.

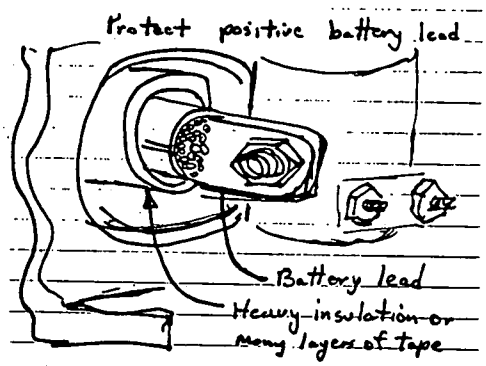


FIGURE 23. Insulating Positive Battery Terminal Connection

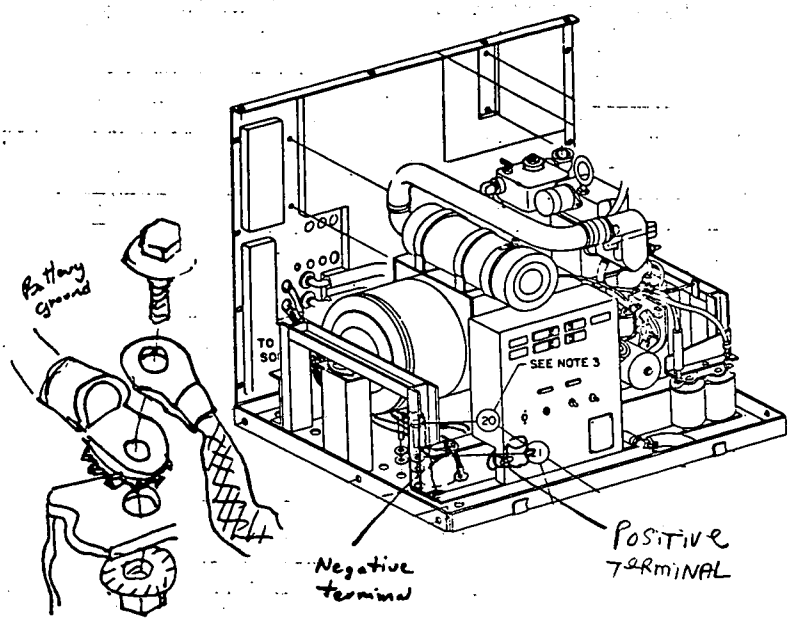


FIGURE 24. Battery Cable Routing and Connections

Compartment RE-ASSEMBLY

The left hand side of the compartment housing can be installed after all AC and DC wiring is completed inside the generator set control panel and through the rear panel of compartment housing. Proceed as follows:

1. Position left hand side of compartment housing in place and secure to base plate using three 3/8-16 x 3/4 inch hex head capscrews in bottom holes of side panel.

NOTE: Baseplate contains weldnuts to simplify installation of side panels because of limited access from the inside of the compartment.

2. Install the four 5/16-18 x 3/4 inch hex head capscrews which secure the left hand side panel to the rear(back)panel of the compartment housing. Capscrews are inserted from exterior side of rear panel (near corner)through flange of side panel which contains self-cinching nuts on inside of rear panel as required. See Figure 25. Torque bolts at 15 foot pounds (20N·M).

3. Replace the two 1/4-20 x 5/8 inch hex head capscrews which secure the inside compartment fan assembly to the rear (back)panel in the upper left rear corner. Capscrews are inserted from the exterior side of the rear panel into self-cinching nuts inside compartment. Torque bolts at 7 foot pounds(9N·M).

4. Plug the AC cord for the compartment fan assembly into duplex receptacle on top of generator end of the set inside the compartment.

5. Two tether straps(supplied in accessory kit)must be installed(one on each housing side panel)to control movement of the set when the truck is in operation. Locations shown in Figure 25 are for reference ONLY. The tether straps can be installed under any one of the five 3/8 inch hex head capscrews which secure housing side panels to generator set mounting tray.

Choose a tether location that is close or convenient to an existing frame bolt or frame hole. Use at least a 3/8 inch Grade 5 bolt for attaching tether to truck frame rail. If no existing bolt or bolt hole is available, installer must drill a new hole in the side of the truck frame rail. Refer to Pre-Installation Section for special precautions PRIOR to drilling any new holes in truck frame rails.

CAUTION *Check the area inside the truck frame rail so that the drilling of frame holes will not interfere with any truck wiring, fuel, air or hydraulic lines.*

CAUTION *Do NOT use a sharp tool for marking hole locations. Marks for mounting holes must be made with pencil lead. Cracks will start around the edge of the hole if a sharp tool is used to mark the location. Refer to Figure for approved method of making marks on truck frame rail.*

NOTE: Top compartment panel MUST be left off until generator set cooling system is primed. Refer to Cooling System Section.

FIGURE 25. Compartment Assembly, Left Side and Tether straps

TRUCK FRAME RAIL MOUNTING CONSIDERATIONS

Most truck chassis manufacturer's assume NO WARRANTY for frame failures resulting from improperly mounted accessories. Always consult the truck manufacturer's chassis manual for specific recommendations and procedures prior to any lifting, jacking, drilling or any other frame modifications.

Manufacturers do NOT recommend welding on frame rails as these parts may be heat treated for greater strength. Clamping completely around the entire frame rail is also discouraged because of the flexing, twisting and stress placed on frame members under load and due to vibration. Any new holes drilled in frame rails cannot be located any closer to frame flanges than the existing bolt pattern regardless of frame material. NO drilling whatsoever is allowed in the top or bottom frame rail flanges.

Marks for any new FRAME holes must be made with pencil lead. Do NOT use a sharp tool for making scribe marks to prevent cracks from starting or extending beyond the circumference of the drilled hole. See Figure for approved method of making scribe marks on truck frame rails. All bolts should fit freely through holes and not be forced into place.

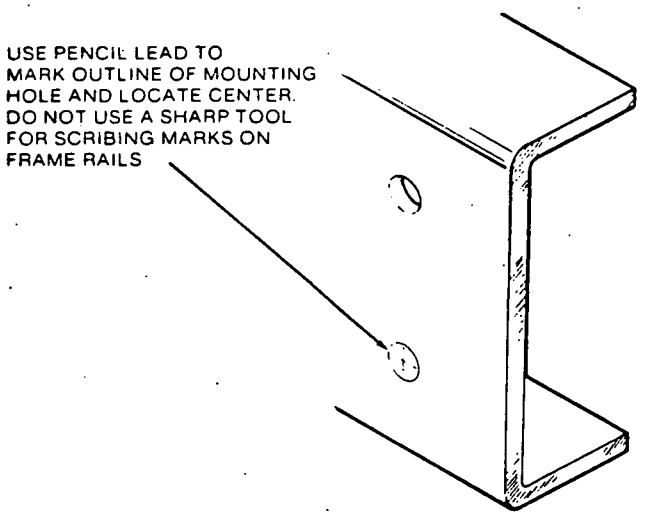


FIGURE MARKING HOLE LOCATION ON TRUCK FRAME RAIL

Onan Corporation
A Subsidiary of
McGraw-Edison Company
1400 73rd Avenue N.E.
Minneapolis, MN 55432

612 574-5000
Telex 29 0476 (U.S.)
Telex 29 0856 (outside U.S.)
TWX 910 576-2833
Cable ONAN

INSTALLING COMPARTMENT TOP AND MUFFLER

3. Install top compartment housing panel using eight 5/16-18 x 3/4 inch hex head capscrews around the top housing perimeter as shown in Figure 4. Capscrews are inserted from exterior side of top panel into self-cinching nuts prelocated inside compartment as required. Torque bolts at 15 foot pounds(20N·M).

4. Position muffler inlet and rain shield above exhaust tube and slide muffler down into exhaust tube so that muffler rest on top of housing as shown in Figure Push down completely.

5. Line up the four holes in muffler mounting brackets with pre-drilled holes on top of generator housing.
NOTE: Self clinching nuts are prepositioned inside housing panel for muffler mounting bolts.

6. Install four 5/16-18 x 3/4 inch hex head capscrews through muffler mounting brackets and torque to 15 foot pounds.

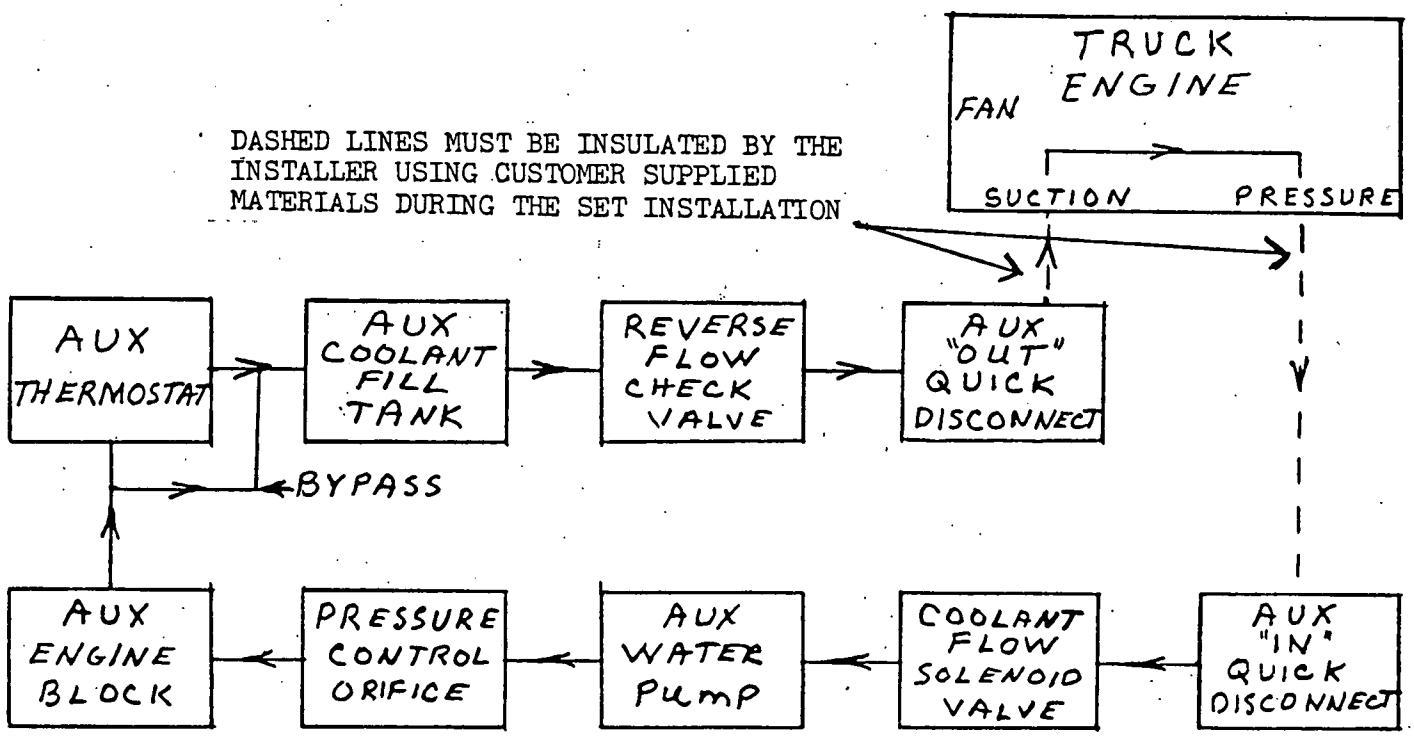
7. Install 1-1/2 inch U-bolt type automotive muffler clamp around muffler to exhaust tube connection(under rain shield)as shown in Figure 4 and torque nuts to 11 foot pounds(15·N·M).
CAUTION: The ONLY acceptable meand of fastening the muffler inlet and exhaust tube together is approved SAE 1-1/2 inch U-bolt type automotive muffler clamp.

8. Recheck muffler mounting bolts to be certain they are properly tightened.

WARNING: This generator set MUST NOT be installed inside or under the truck cab or sleeper cab on any cab-over-chassis type truck. The generator set exhaust system MUST be terminated in the open air behind the truck or sleeper cab. Never direct the exhaust under the truck chassis in any installation.

WARNING: Do NOT terminate poisonous carbon monoxide exhaust gas under truck cab or sleeper. Keep all openings to truck cab area near generator set closed when generator set is operating.

Cooling system



BLOCK DIAGRAM OF COOLING SYSTEM FLOW

AUX GENERATOR SET COOLING SYSTEM OPERATION

The generator set cooling system is a closed system with it's own coolant flow solenoid valve, water pump, thermostat, fill tank and safety shutdowns. The block diagram shows the entire cooling system flow between the truck's cooling system and within the generator set. Two cooling lines(customer supplied)must be connected between the rear "in" and "out" quick disconnect couplings of the generator set compartment and the truck engine cooling system. The generator set coolant is used to warm the truck engine when the truck engine is NOT running and also dissipates the heat of the generator set coolant at the same time.

The coolant flow solenoid valve inside the generator set compartment isolates the set cooling system from the truck engine cooling system when the generator set is NOT running. There is a variable pressure control orifice in the generator set cooling system which isolates the generator set cooling system from the higher pressure in the truck cooling system when both the generator set and the truck engine are running. There is a "check valve"in the OUT(pressure)side of the generator set cooling system which isolates the set cooling system from the truck cooling system if the truck is running and the generator set is not.

The generator set thermostat starts to open at approximately 145°F(generator set internal bypass allows cooling flow during set warm up). A high water temperature cut out switch closes at approximately 215°F to shut the generator set down if the coolant exceeds this temperature. There is also a safety cut out switch that senses "skin temperature" of the generator set cylinder head and automatically shuts the set down if this temperature exceeds approximately 250°F.

A thermostatically controlled fan assembly inside the compartment that is powered by the generator set maintains the compartment temperature within an acceptable range to prevent overheating of the set. Check to be sure that nothing is installed in front of the louvers on the side of the compartment to block this air flow. The fan cycles on and off depending on the ambient temperature within the compartment. If the ambient temperature exceeds 65°F, the fan will operate continuously. If the ambient temperature is below 45°F, the fan probably will not run at all.

INITIAL FILL AND VENTING OF GENERATOR SET COOLING SYSTEM

After the auxiliary generator is installed and the generator set cooling system has been properly connected to the truck engine cooling system; the entire cooling system must be primed as follows:

1. Close all drains and refill truck engine radiator using anti-freeze/water mixture for the coldest expected ambient temperature (a 50/50 mixture of water and ethylene glycol type anti-freeze protects to -34° F).
2. Remove fill plug on top of generator set engine coolant fill tank and open petcock (vent) next to the fill plug as shown in Figure 3.
3. Add approximately one gallon of water/anti-freeze mixture to generator set. Replace fill plug using pipe thread sealing compound but leave petcock (vent) open.
4. Connect the AC plug of the generator set coolant flow solenoid valve into an external 115-volt AC source to open the valve for coolant flow.
5. Start truck engine and run until clean coolant flows out of the open petcock (vent) on the generator set engine. Then close petcock on generator set.

CAUTION ***No coolant flow may indicate incorrect cooling line connections between truck cooling system and generator set compartment inlet and outlet connections on rear panel.***

6. Run truck until thoroughly warm and then check for any coolant leaks at both the truck engine coolant line connection points and all coolant lines inside the generator compartment.
7. Stop truck engine and reconnect the coolant flow solenoid valve AC plug to the duplex receptacle on top of the generator set. Recheck all coolant line clamps and connections for leaks. After truck engine cools down, remove radiator cap and add coolant if required.

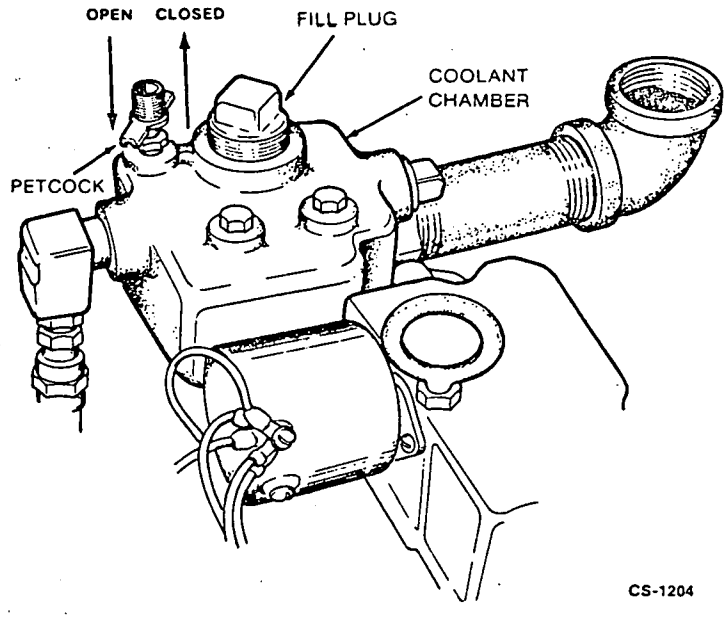


FIGURE PRIMING COOLING SYSTEM

10/1

Gary

THIS INFO OR a PORTION of it Removed from Pre-installation section should be added to beginning of fuel section

GENSET FUEL TANK SIZE AND LOCATION

The remote fuel tank is designed for mounting between truck frame rails. It is intended to be mounted as far forward as possible between truck frame cross-support members (usually behind transmission and above drive shaft) if space permits.

- The remote fuel tank requires an unobstructed open space 16-1/2 inches in length by 25 inches wide by 10-1/2 inches deep for mounting between truck frame rails in all applications. The depth requirement includes allowance for up to 3 inches of clearance above the truck drive shaft to allow for suspension rebound under the weight of the loaded trailer and road shock vibration. See Figure for typical installation.

- The fuel tank should be positioned to allow access to fill spout and provision for reading fuel level gauge along one end on top of fuel tank. If a step plate is used on truck frame ahead of fifth-wheel area, access holes may have to be punched in step plate for those items.

OVER-THE-RAIL INSTALLATIONS

- The fuel tank cannot be mounted underneath the generator set compartment or outside the truck frame rails. The 16-1/2 inches (minimum) of length along the frame rails for the fuel tank is in addition to the 23-3/4 inches(mininum) space required for the generator set in the same plane parallel to(lengthwise) the truck frame rails for a complete installation

WARNING ***Do NOT modify the Onan supplied fuel tank for installation outside the truck frame rails without checking for compliance with Federal Motor Carrier Safety Regulation, Title 49, Part 393.67 (b)(2). The fuel tank is not designed to comply with DOT regulations for side-mounted fuel tanks.***

McGRAW-EDISON

Onan

A248c

Instruction Sheet

Onan Corporation
A Subsidiary of
McGraw-Edison Company
1400 73rd Avenue N.E.
Minneapolis, MN 55432
612 574-5000

11-81

INSTALLING FUEL TANK KITS 415-0506 AND 415-0520

FUEL TANK LOCATION

The remote fuel tank is designed for mounting between truck frame rails in all applications. It is intended to be mounted as far forward as possible between truck frame cross-support members (usually behind transmission and above drive shaft) if space permits. Mounting the fuel tank requires an unobstructed opening measuring 16-1/2 inches lengthwise (parallel to truck frame rail) by 25 inches wide (between frame rails) by 10-1/2 inches depth (above truck drive shaft). The 10-1/2 inch of depth requirement includes up to 3 inches of vertical clearance above truck drive shaft to allow for suspension rebound under the weight of the loaded trailer and road shock vibration.

WARNING ***Do NOT modify the Onan supplied fuel tank for installation outside the truck frame rails without checking for compliance with Federal Motor Carrier Safety Regulation, Title 49, Part 393.67 (b)(2). The fuel tank is not designed to comply with DOT regulations for side-mounted fuel tanks.***

FUEL TANK INSTALLATION

Install remote fuel tank using the assembly sequence illustrated in Figure 1. Perform the steps in order listed to minimize installation problems.

1a. ***DIESEL AND SIDE-MOUNTED GASOLINE SETS*** Position fuel tank in the selected unobstructed opening between truck frame rails. Tank may be installed with fuel fill, fuel pick-up and fuel level gauge on either driver or curb side as desired by the owner.

b. ***OVER-THE-RAIL MOUNTED GASOLINE SETS.*** Place fuel tank in the selected unobstructed opening between truck frame rails. Fuel tank must be positioned so that fill spout is on curb side of truck chassis (opposite side as generator set exhaust).

WARNING ***Fuel tank fill spout must NOT be positioned on same side of truck as generator set exhaust outlet to prevent fire hazard. Never fill fuel tank with truck engine or generator set running.***

2. Position the two L-shaped mounting brackets on the inside (underneath) of the top truck frame rail flange (one on each side), so that weld nuts in brackets line up with pre-drilled mounting holes in fuel tank flanges as shown in Figure 1. The rubber vibration isolator pads on both the fuel tank flanges and fuel tank mounting brackets must contact the truck frame rail flange.

Pre-drilled mounting hole location in fuel tank flange is usually adequate to securely fasten fuel tank in most installations. Some trucks may have variations in width of frame rail flange area or width between truck frame rails that could require spacing and drilling new mounting holes in fuel tank flanges. When installed, the vertical surface of the mounting bracket should rest against the side of the fuel tank and the wider surface area of the mounting bracket (surface with rubber isolation pad) should be relatively close to radius of truck frame rail. See detail A in Figure 1. If not, new 3/8 inch mounting holes will have to be spaced and drilled in fuel tank flange as required so that fuel tank is held securely in position.

3. Install 5/16-18 x 1-1/2 inch hex head capscrews and lockwashers in center mounting holes only (one on each side). Mounting hardware assembly sequence is shown in Figure 1, detail A.

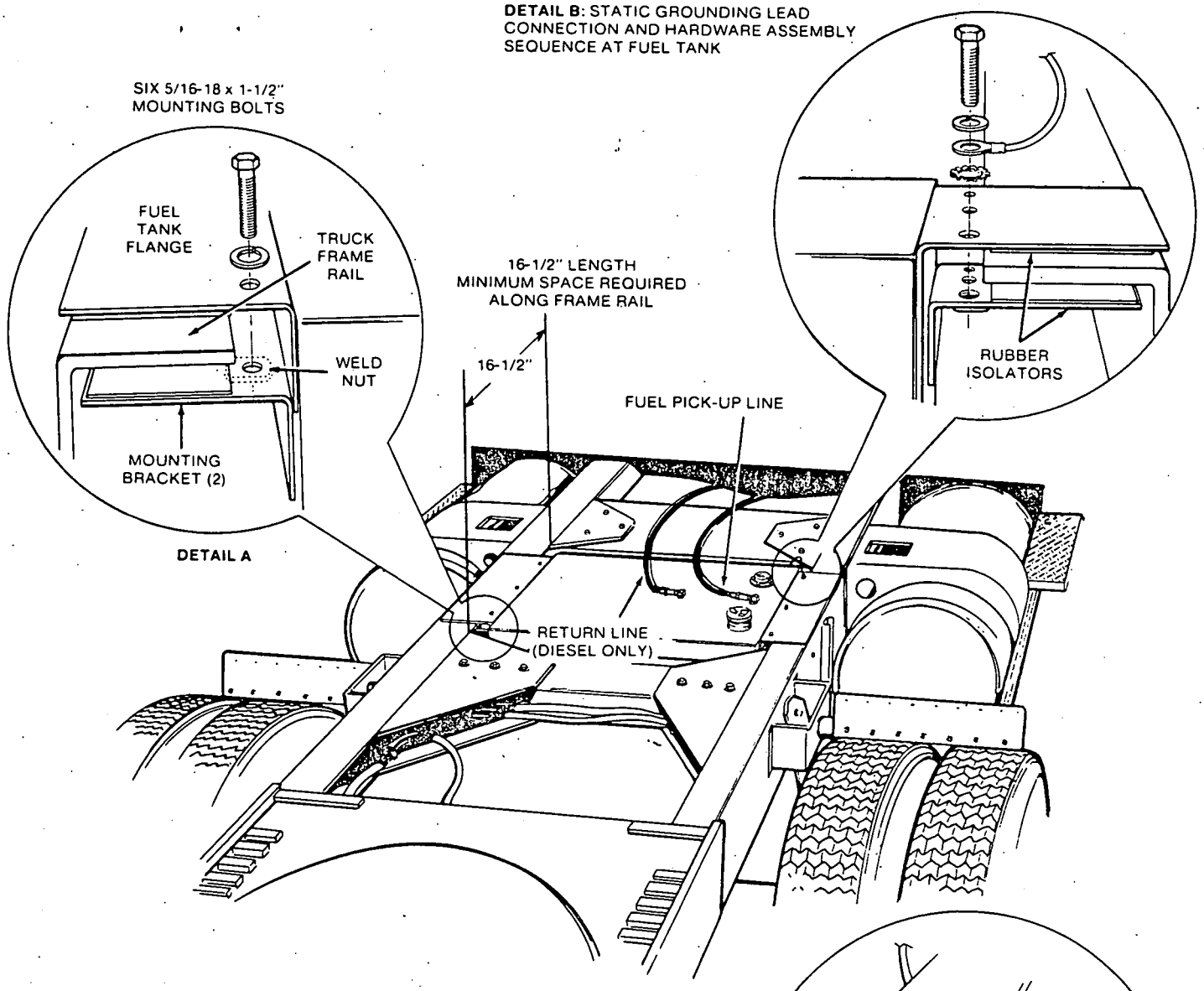
4. The 18 inch 12-gauge static ground lead must be installed under the most convenient fuel tank mounting screw as dictated by physical location and layout of truck chassis components in each installation. Fuel tank terminal end of ground lead is a 5/16 inch eyelet terminal. Install this terminal under most convenient 5/16 inch capscrew and lockwasher on top of fuel tank mounting flange. See Figure 1, detail B. The remaining chassis end of static grounding lead has 1/4 inch eyelet terminal. Locate a nearby hole in truck frame rail within reach of the lead and attach terminal with 1/4-20 x 1 inch screw, lockwashers, and nut. Hardware assembly sequence is shown in Figure 1, detail C.

If no existing hole is available, a 5/16 inch hole must be drilled (within reach of grounding lead) in the side (vertical surface) of truck frame rail. Hole must be located as close to vertical center of the frame rail as possible. Be careful not to locate hole where drilling might puncture fuel tank.

CAUTION ***Do NOT drill any new holes in truck frame rails any closer than 2 inches to top or bottom flange area of frame rail. Bolt holes in frame rails MUST NOT be located any closer to frame rail flanges than present bolt hole pattern. If in doubt, consult truck manufacturer's chassis manual. No drilling whatsoever is allowed in the top or bottom frame rail flanges.***

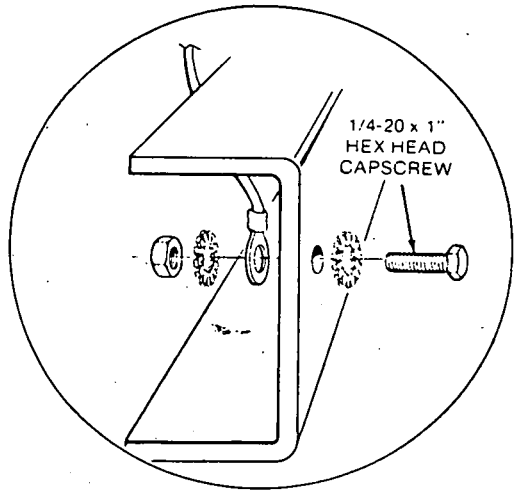
5. Install three remaining 5/16-18 x 1-1/2 inch hex capscrews and lockwashers in fuel tank mounting brackets. Hardware assembly sequence is shown Figure 1, detail B. Torque all six mounting screws 24 inch pounds (2.7 N•m).

6. Verify that the ground strap and all mounting bolts are securely tightened following torque specifications where listed. With installation completed, check for adequate clearance above truck drive shaft and bottom of fuel tank. Allow 3 inch clearance for suspension rebound and road shock vibration with loaded trailer coupled to truck.



WARNING ***Always shut off truck engine and generator set prior to filling the fuel tank to prevent fire and explosion hazard and do NOT smoke.***

NOTE: NO WELDING OR DRILLING REQUIRED TO INSTALL FUEL TANK. TORQUE ALL SIX 5/16 MOUNTING BOLTS AT 24 INCH POUNDS (2.7 N•m) ON ALUMINUM TANKS.



DETAIL C: HARDWARE ASSEMBLY SEQUENCE FOR STATIC GROUND LEAD CONNECTION TO TRUCK FRAME

FIGURE 1. FUEL TANK INSTALLATION

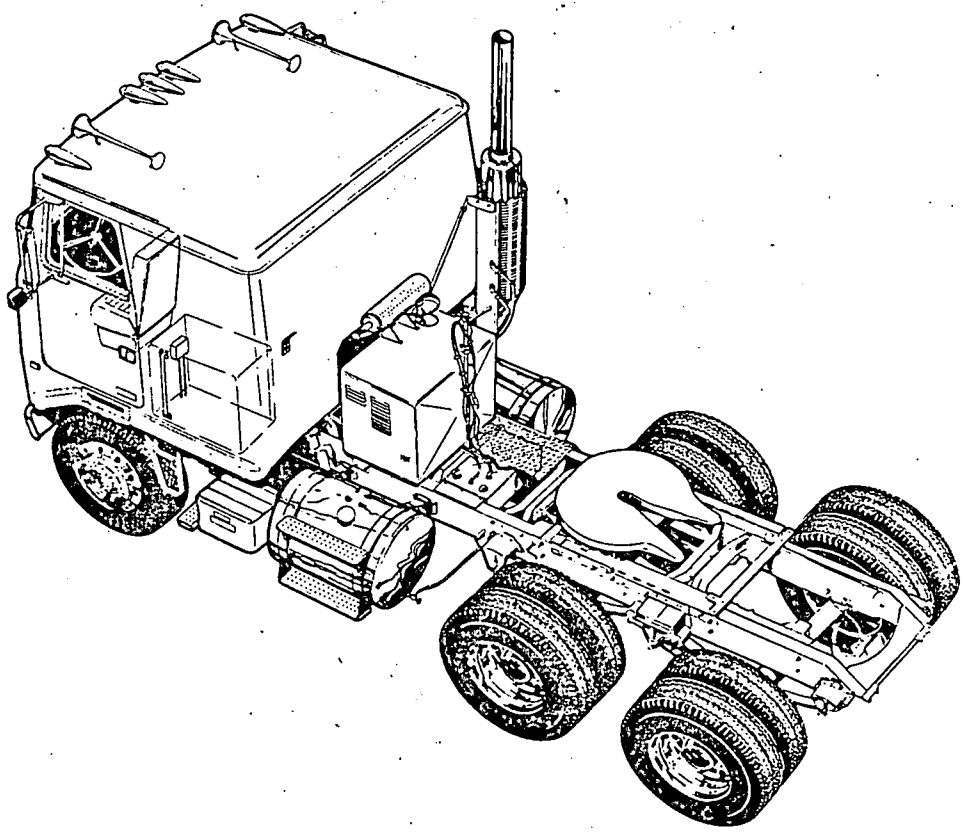


FIG. 1

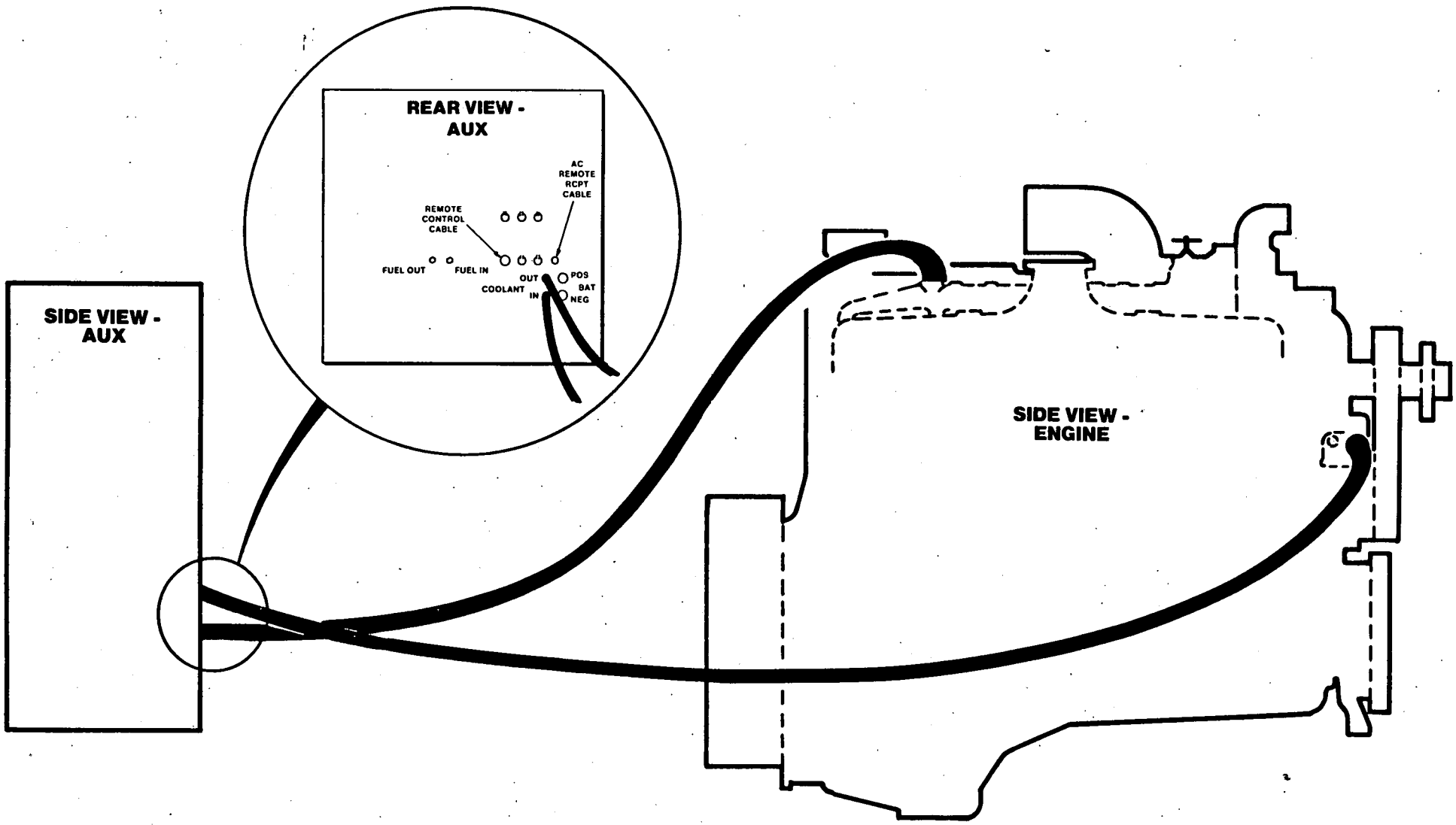

REAR VIEW -
AUX
AC
REMOTE
RCPT
CABLE
REMOTE
CONTROL
CABLE
FUEL OUT
FUEL IN
OUT
COOLANT
IN
POS
BAT
NEG
SIDE VIEW -
AUX
SIDE VIEW -
ENGINE

FIG. 4

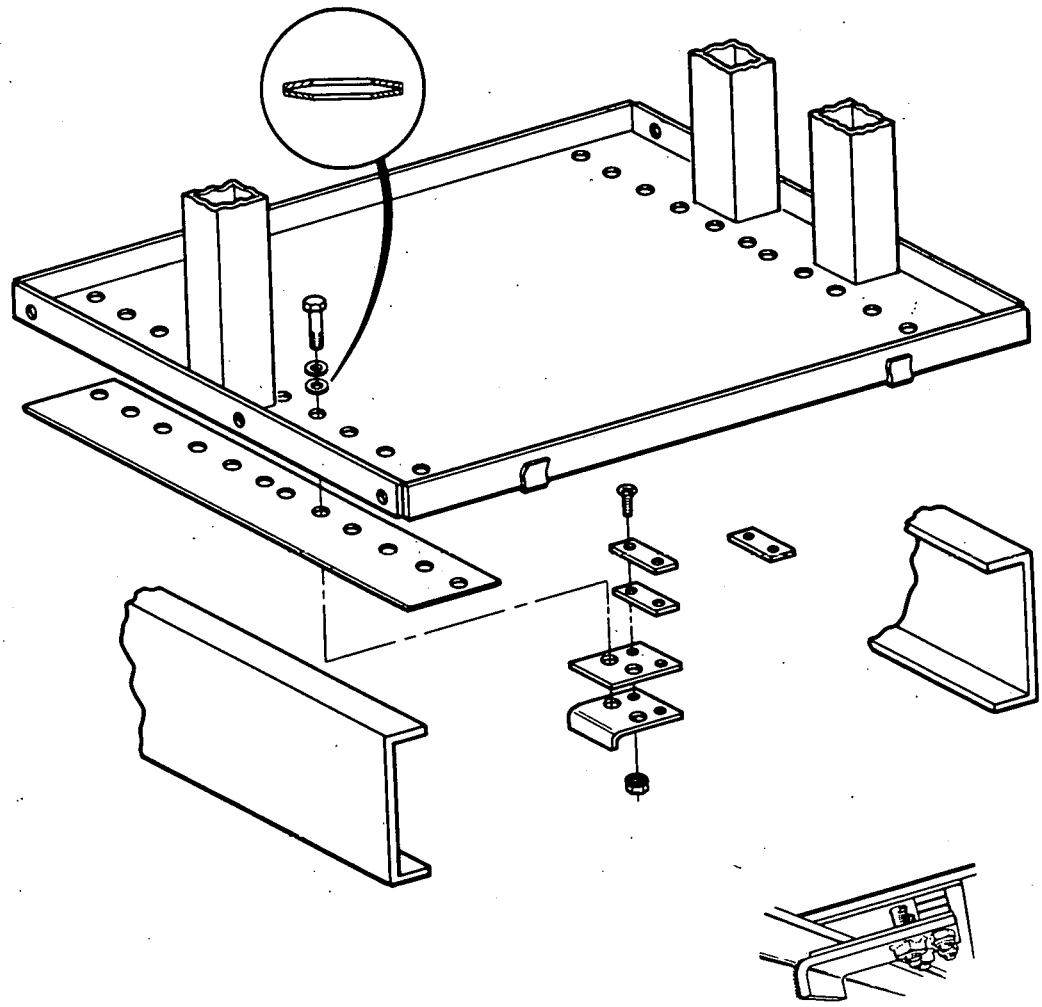


FIG. 13

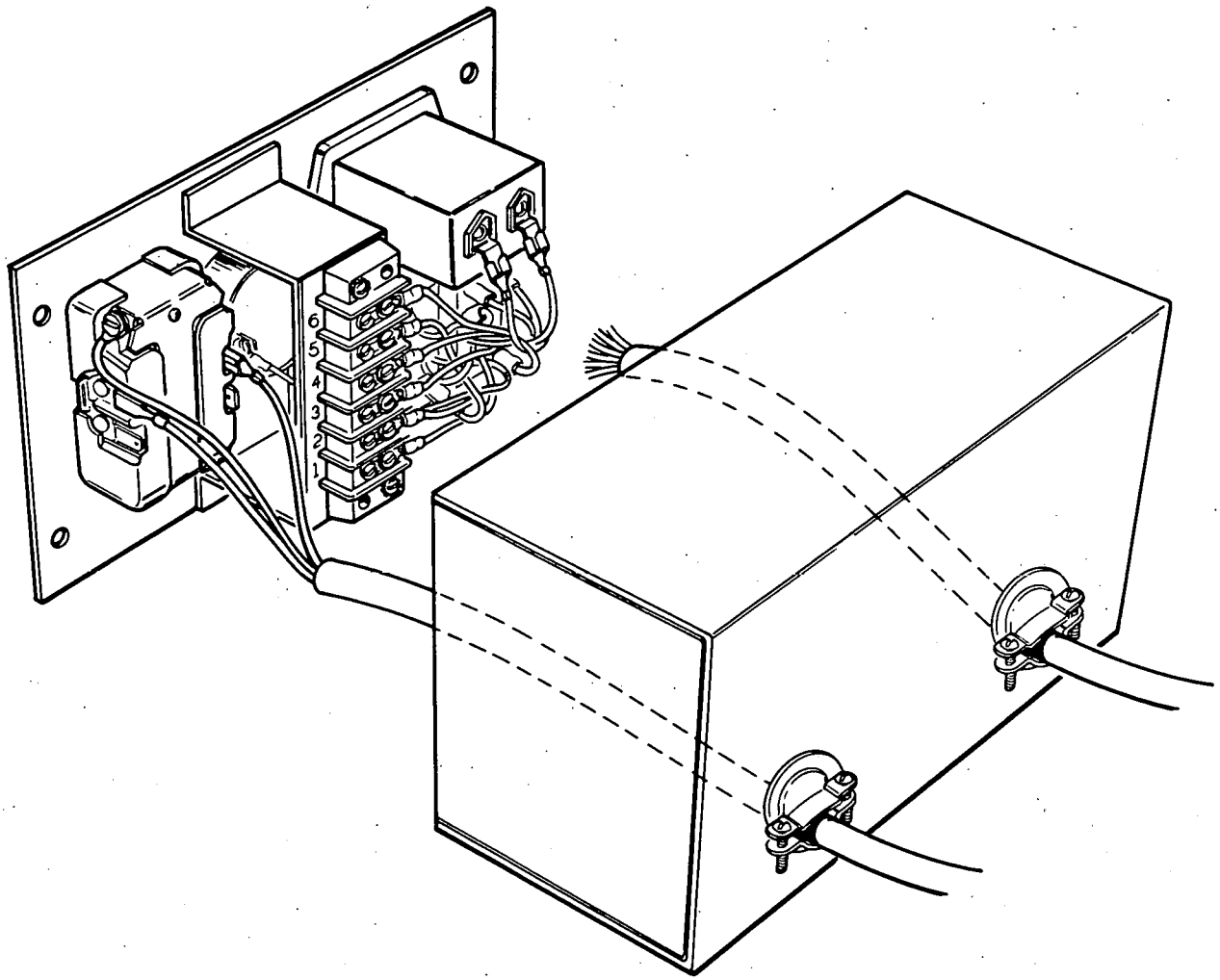


FIG. 20

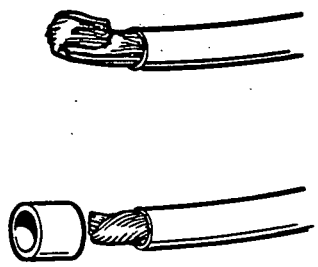


FIG. 22

974-0625 Diesel AUX Guide ART
with Call-outs & Figure ~~titles~~.

Gary
The latest with Call-outs 12/28 JK

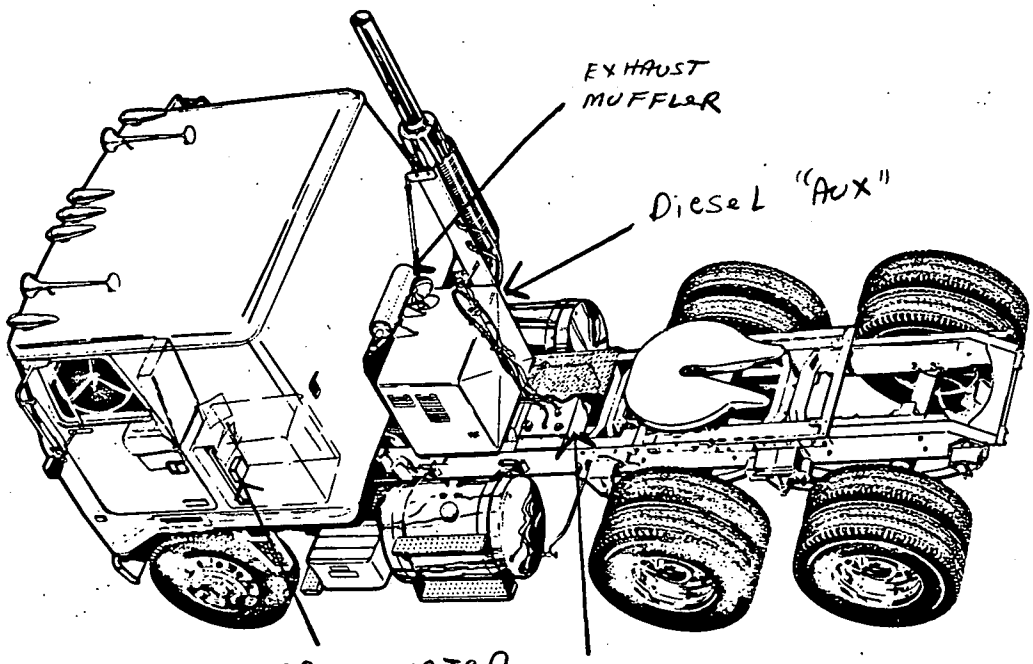


FIG. 1

Figure 1. TYPICAL "OVER-the-RAIL" Generator Set Installation

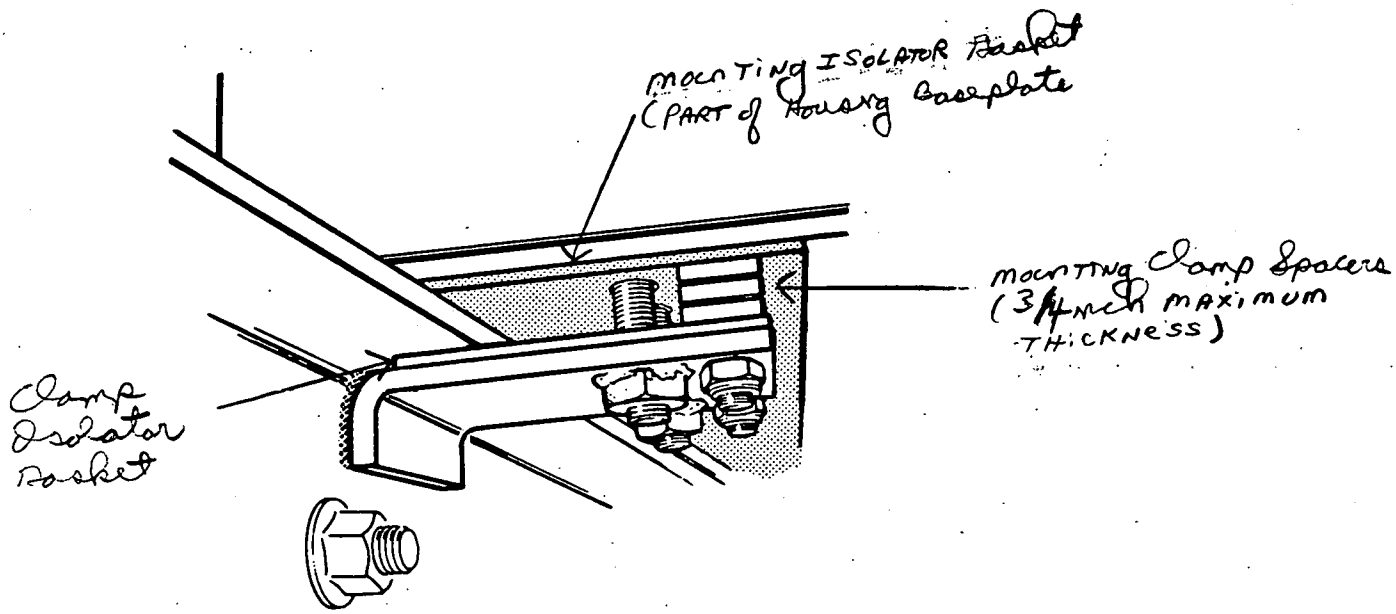


Figure 2. Spacer assembly and mounting clamps

FIG. 2

2 per mating bolt
(16 TOTAL)

assemble as shown

Figure 3. Conical washer assembly

FIG. 3

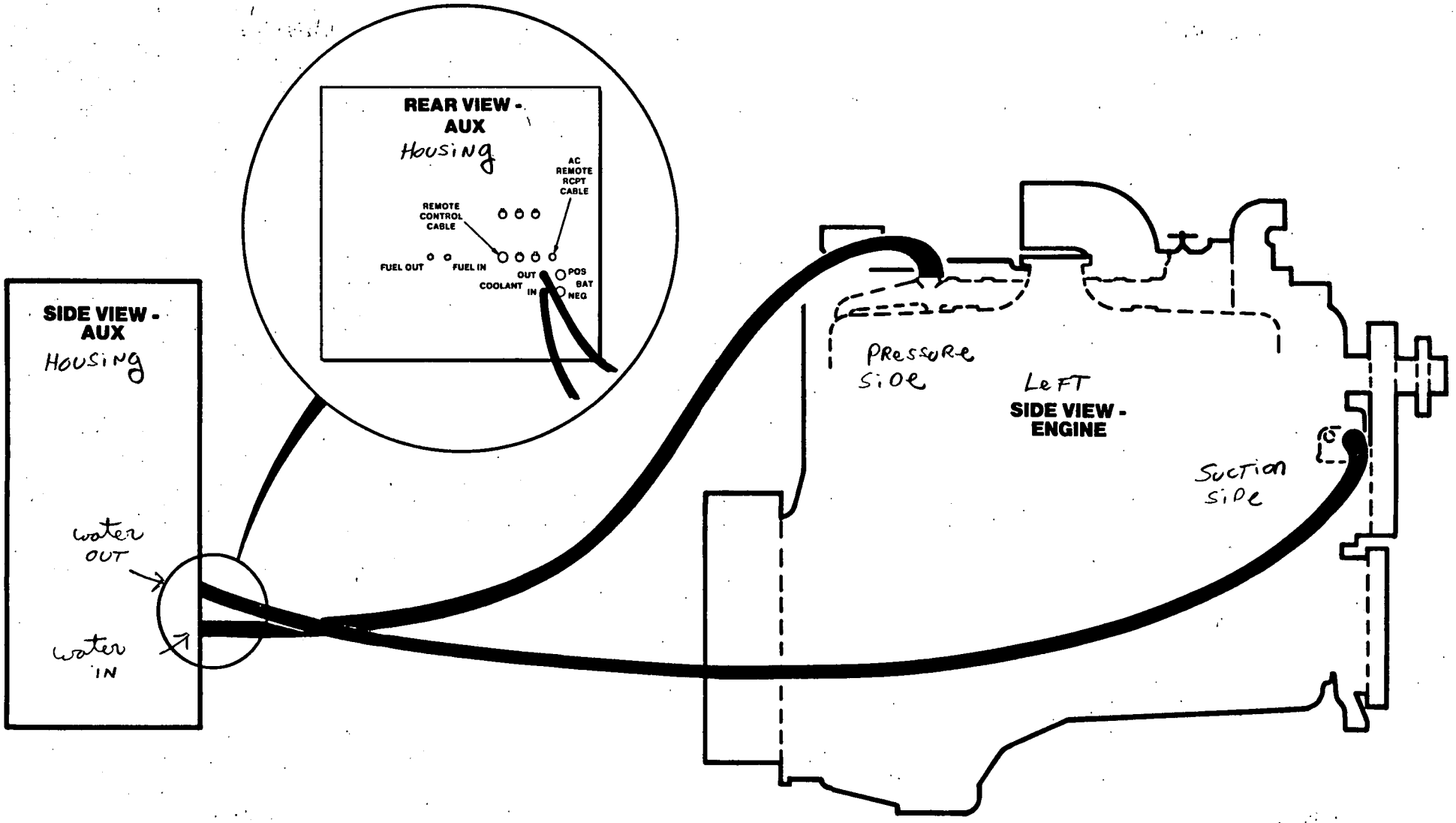
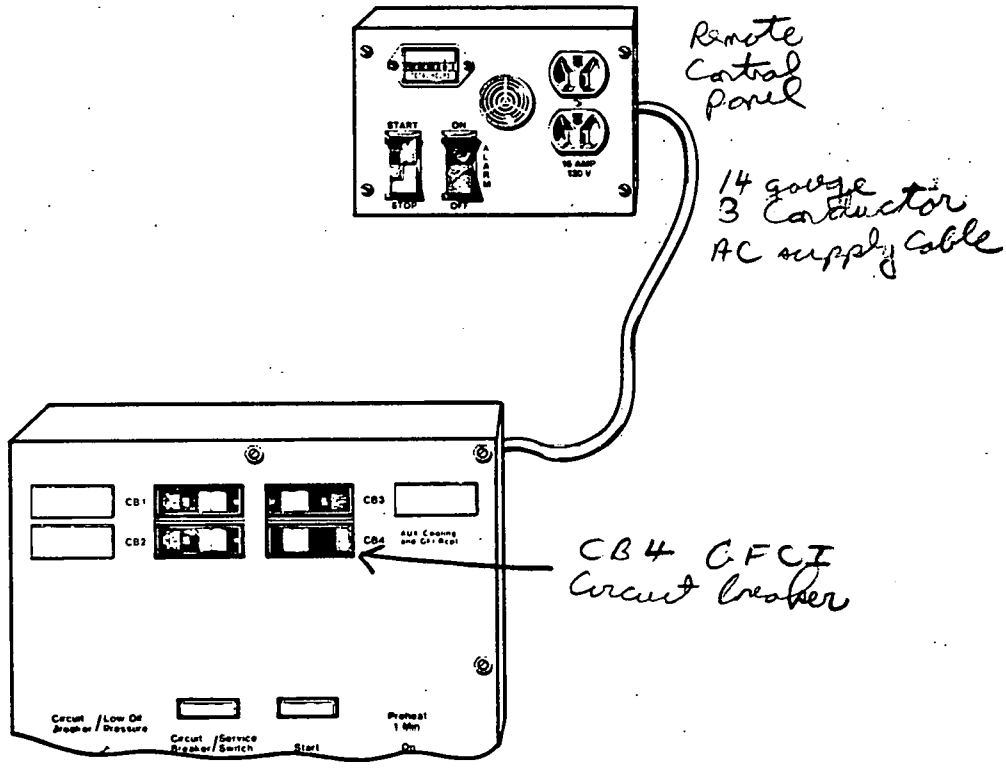


Figure 4. TYPICAL Cooling Hose Connections

FIG. 4



F165

Figure 5. Connecting Remote Panel AC Duplex Receptacle to GFCI Circuit Breaker inside SET MOUNTED Control Panel.

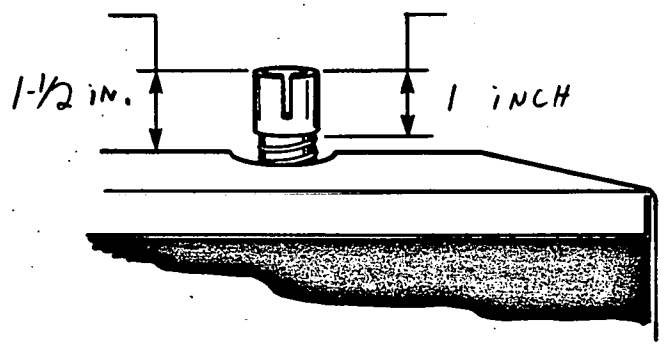


Figure 6. CORRECT EXHAUST TUBE ADJUSTMENT

FIG. 6

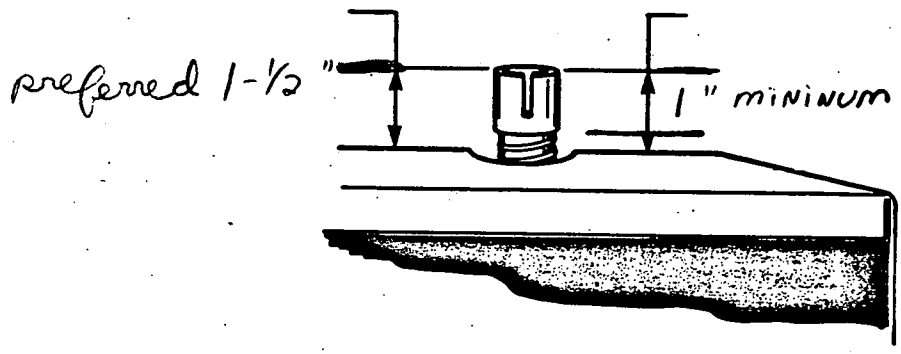


Figure 6. Correct Exhaust Tube Engagement

FIG 6

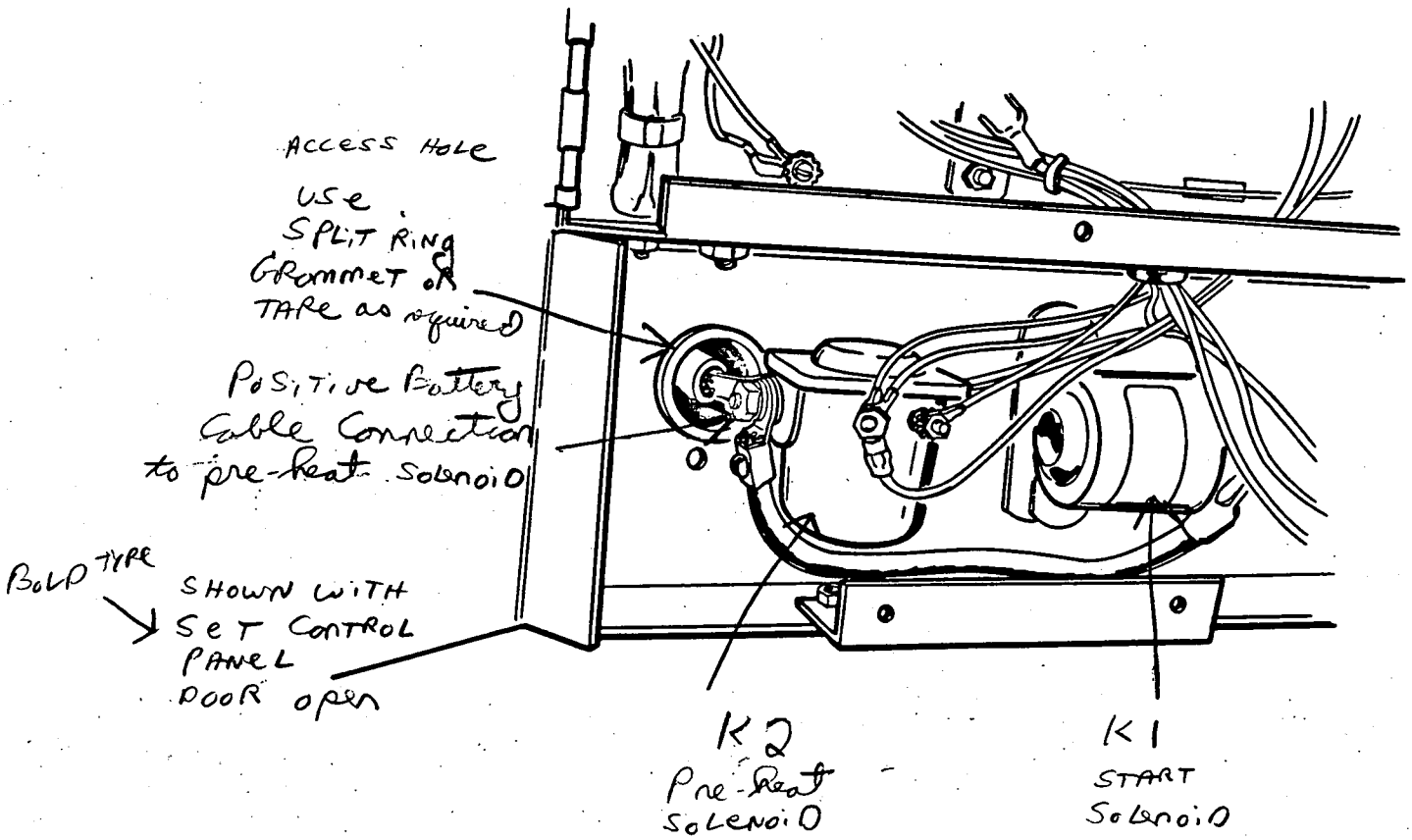


Figure 7. Protecting Positive Battery Cable at START SOLENOID

FIG. 7

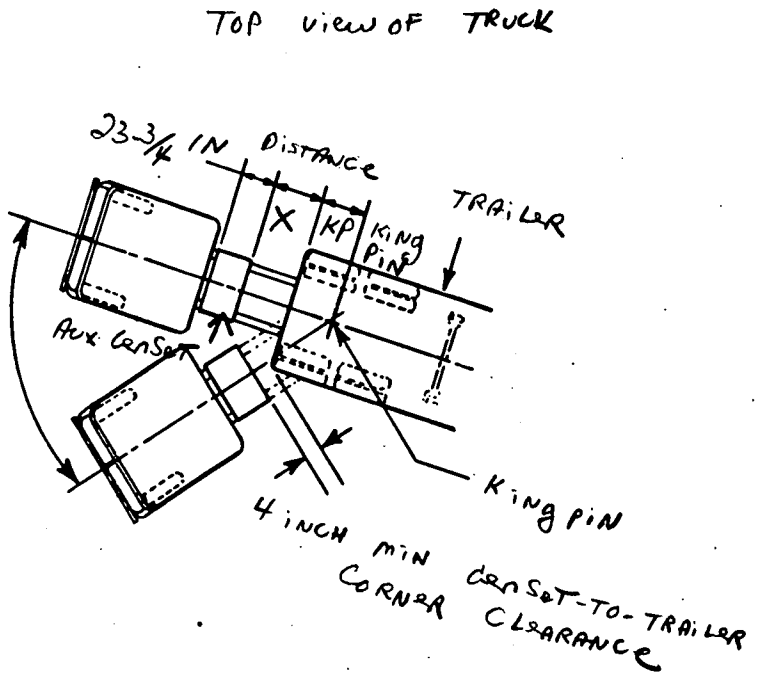
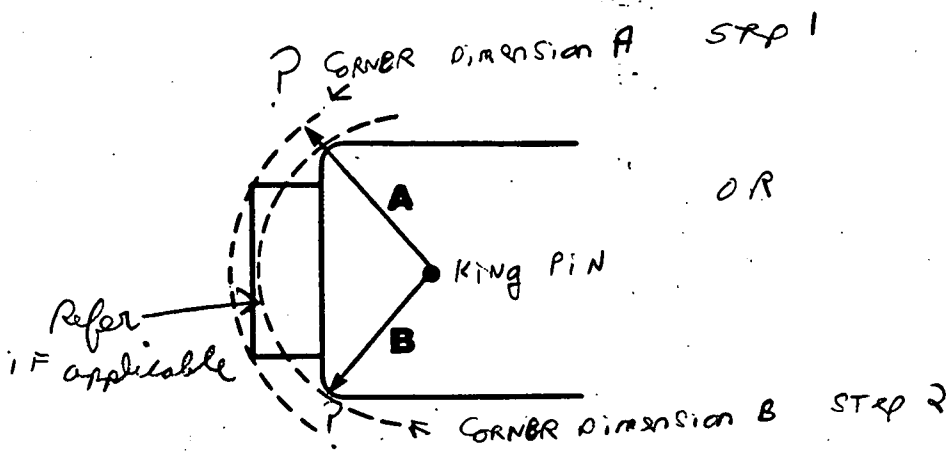
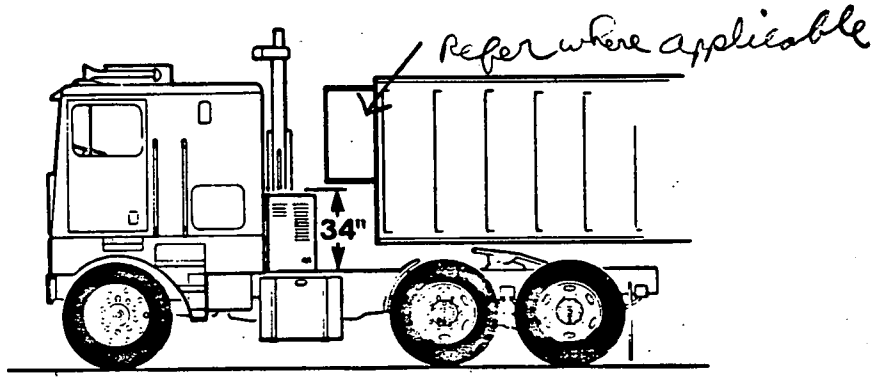


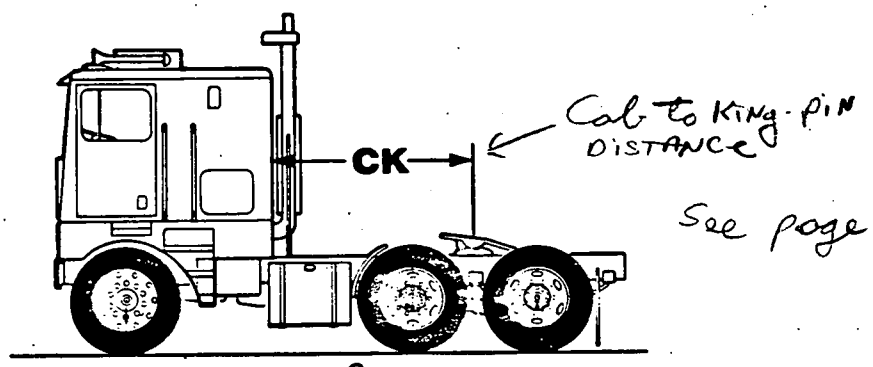
Figure 9. Measuring distance "X" MINIMUM INSTALLATION SPACE (TABLE I)

FIG 9





34" AUX Height WITHOUT MUFFLER



See page 5

STEP 3

CK is: DIMENSION A OR B + 4 inches + 23.75 inches = CK

Figure 10. Measuring distance "C" for MINIMUM INSTALLATION SPACE

FIG. 10

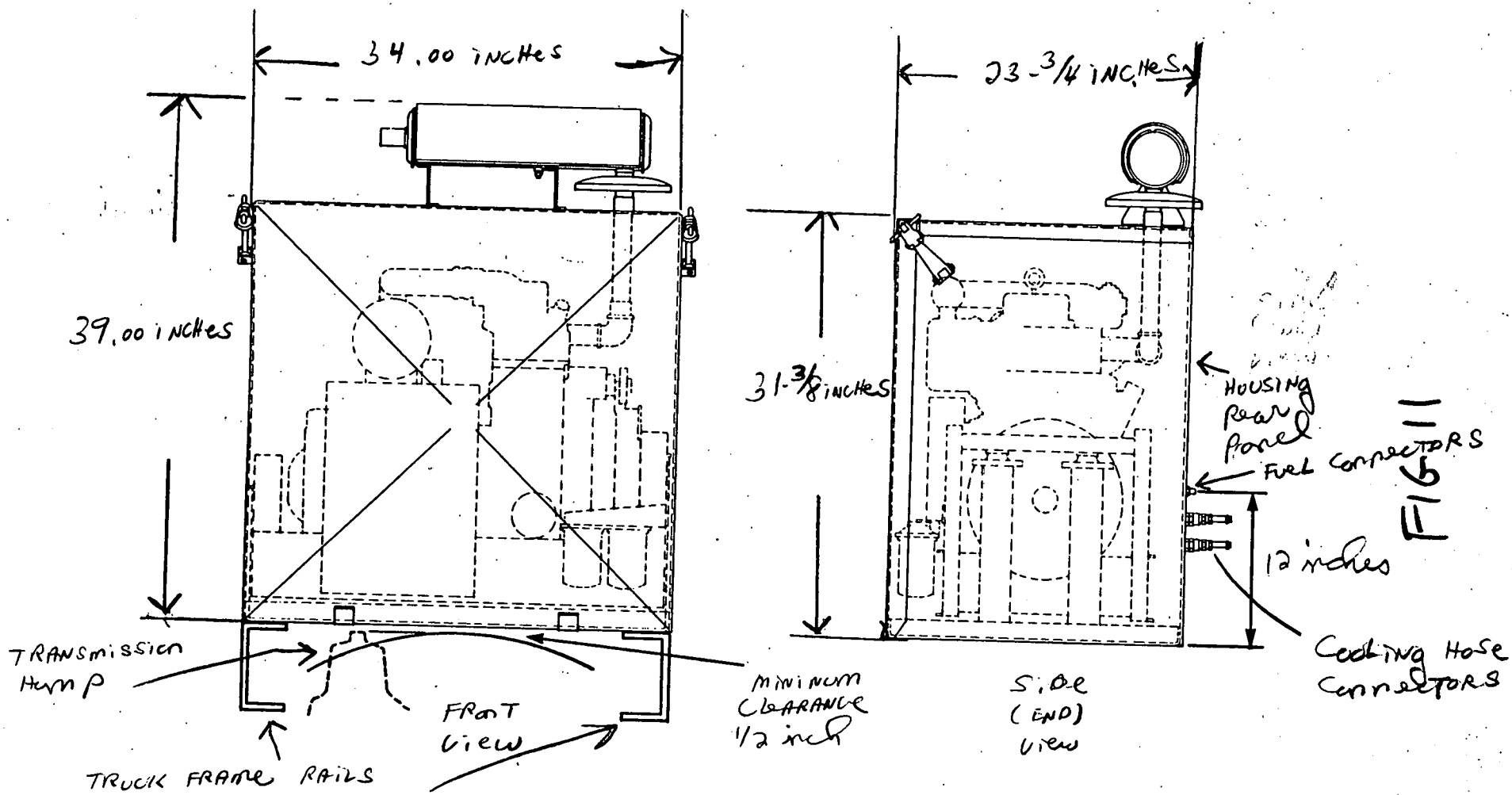


FIG 11

Figure 11. Minimum ~~Compartment~~ Installation Dimensions (Over-the-Rail Mounting)

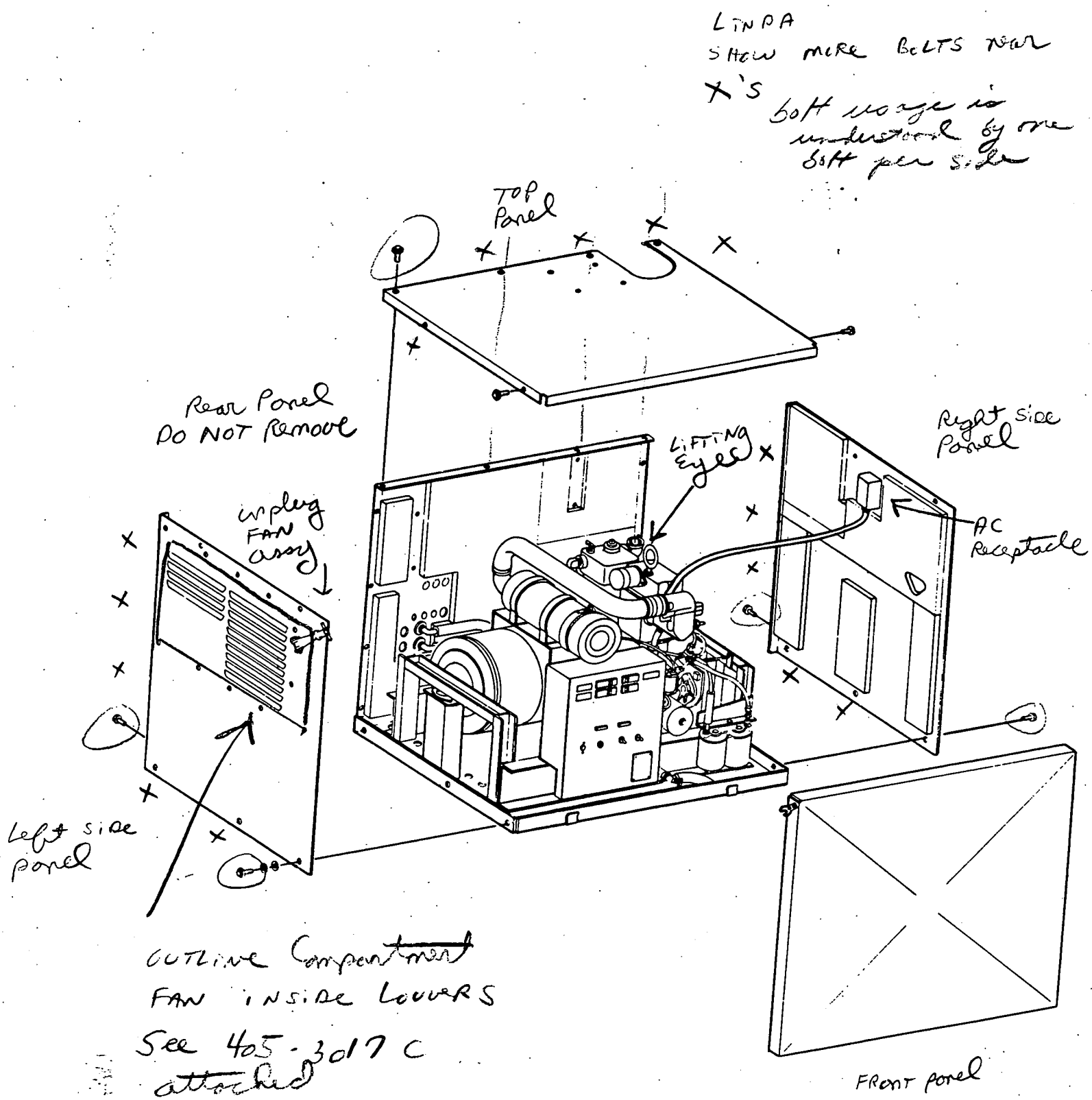


Figure 12. Compartment disassembly

F16.12

10/25

Larry - I don't think all these bolts are necessary
They complicate the drawing - in most cases
2 bolt per side (row of holes) is all that
is needed to represent all hardware for the
other holes, - assuming all hardware
is the same - yes but in this case it
varies and I will be calling out at least
4 different sizes

LK

later sequences to
this over-all view
for reassembly
will have as much
hardware per
illustration.

OK LK

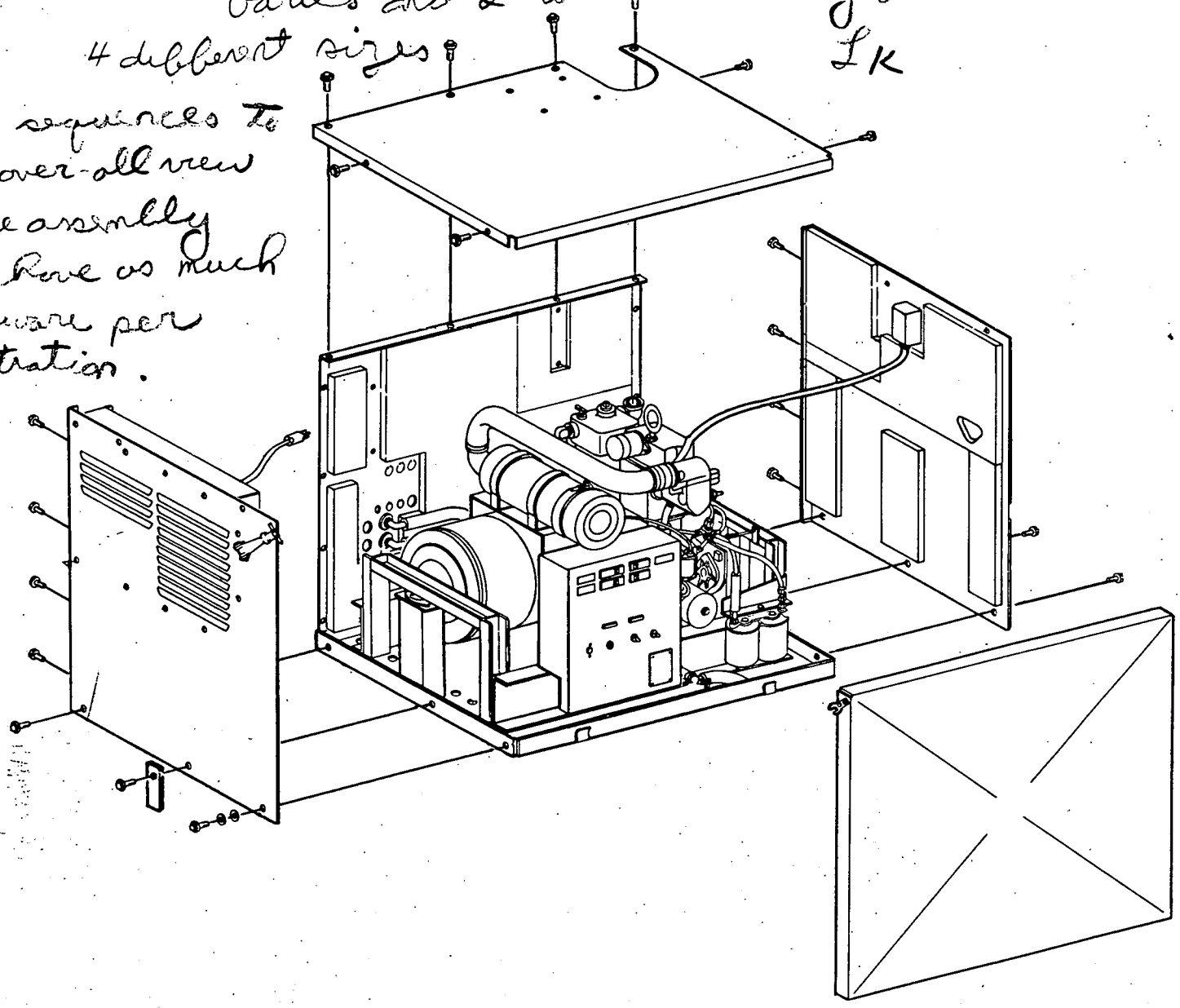


FIG. 12

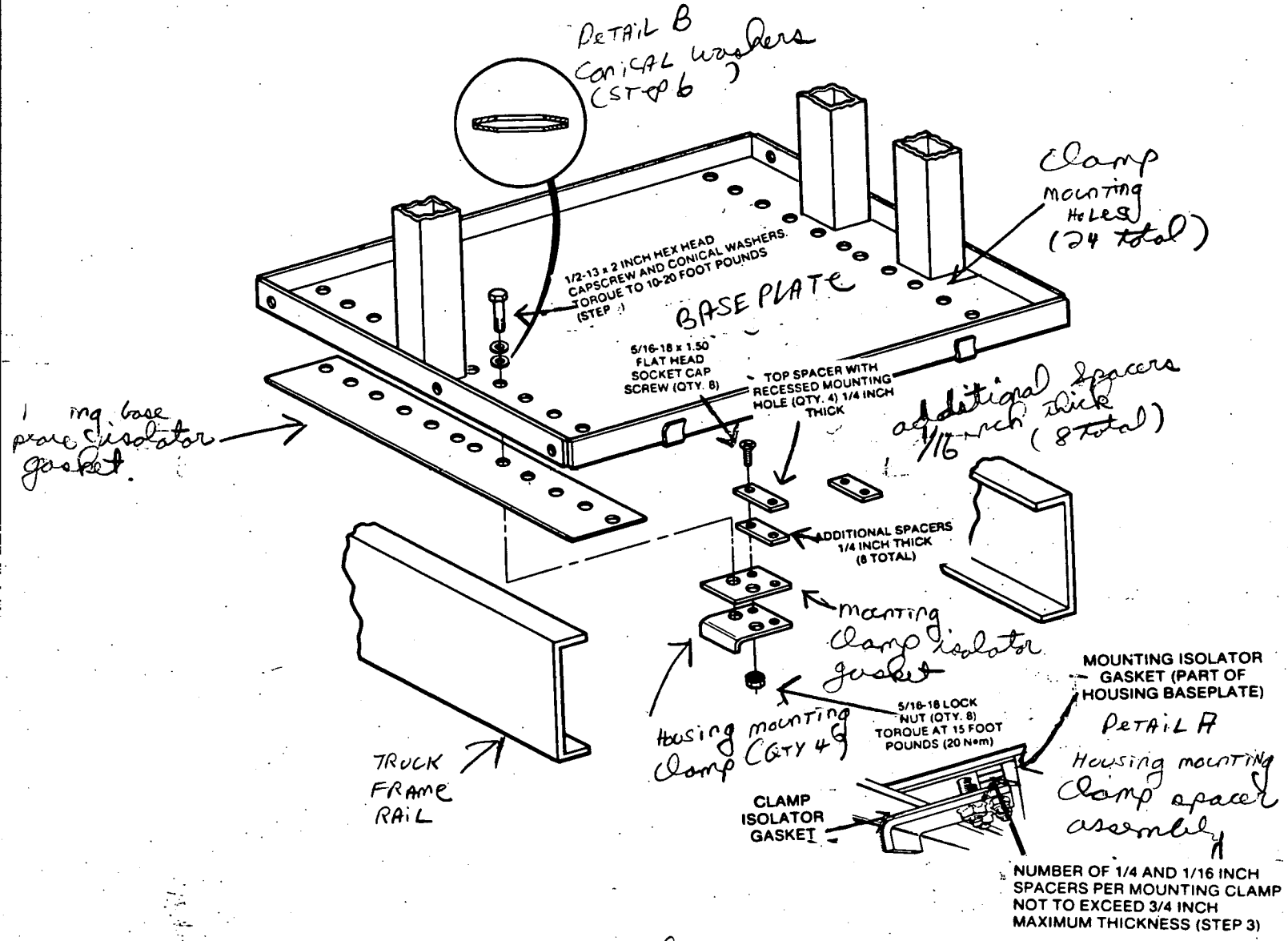


Figure 13 mounting clamp spacer assembly

FIG. 13

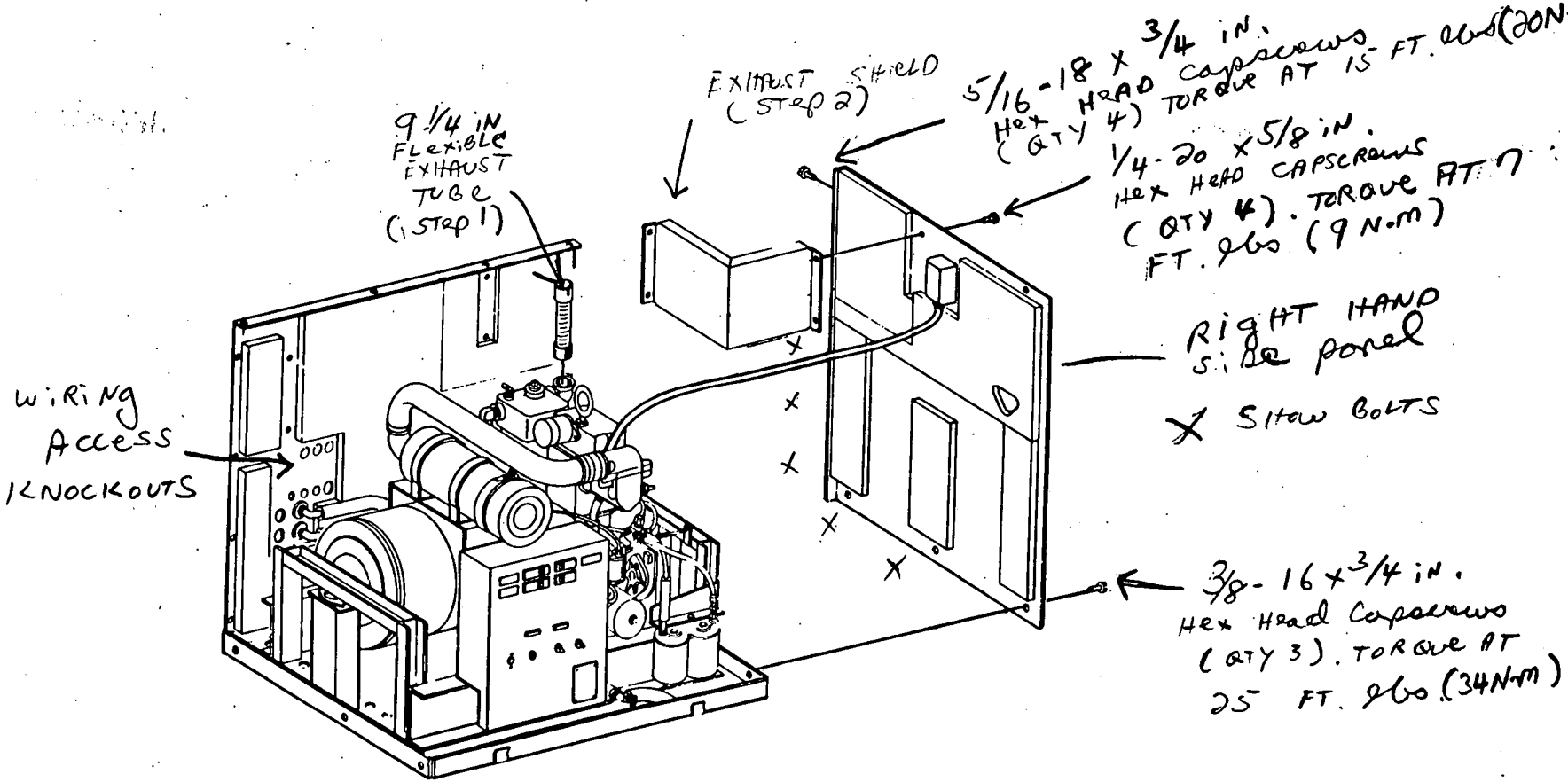


FIG. 14

Figure 14. Compartment Reassembly

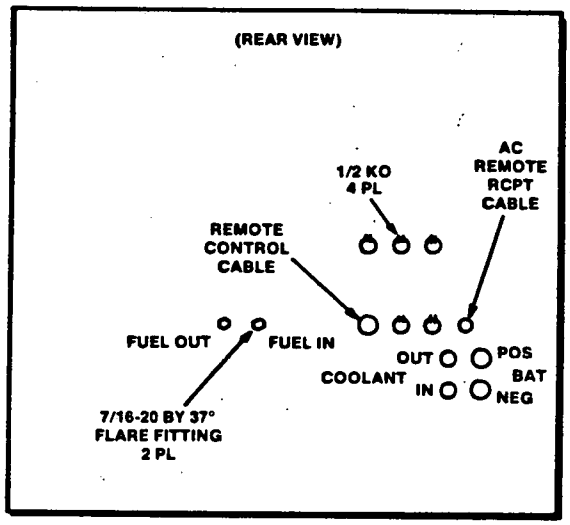


Figure 15. Compartment Rear Housing Panel

FIG. 15

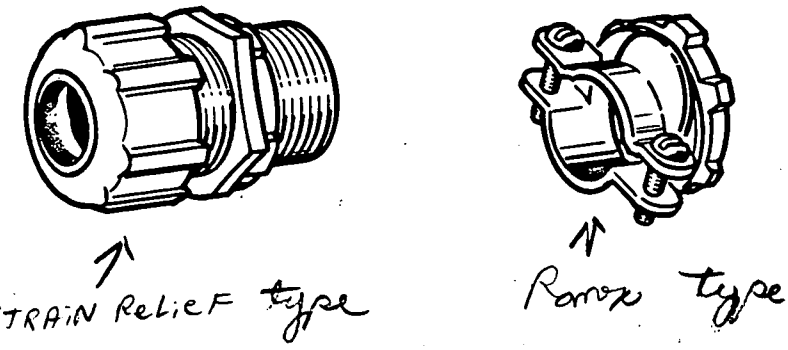


Figure 16. Recommended Wiring Connectors

FIG. 16

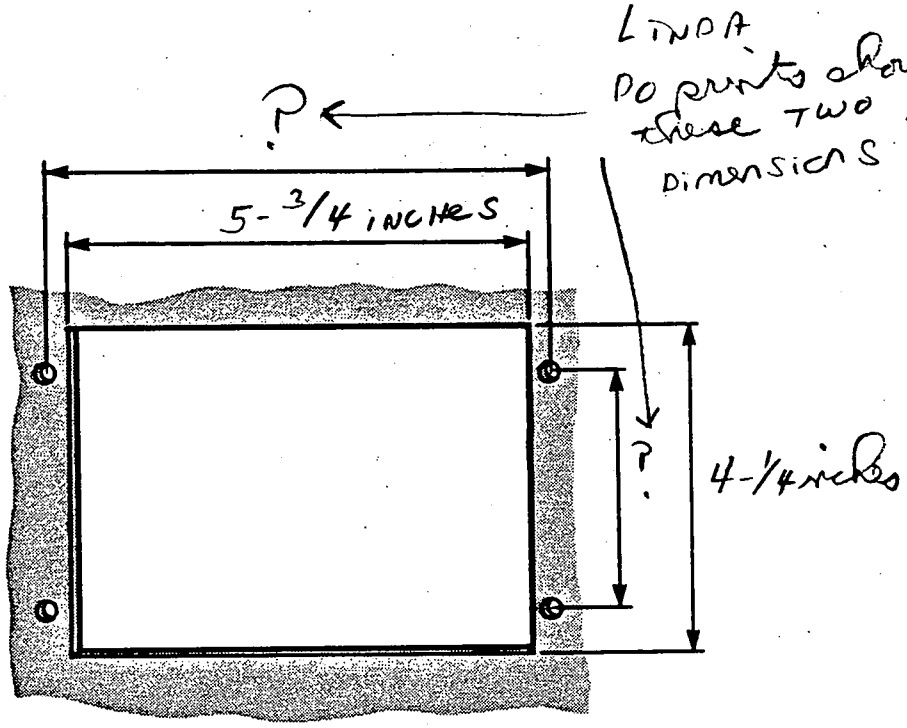


Figure 17. Remote Panel Cutout Dimensions for Flush mounting.

F16.17

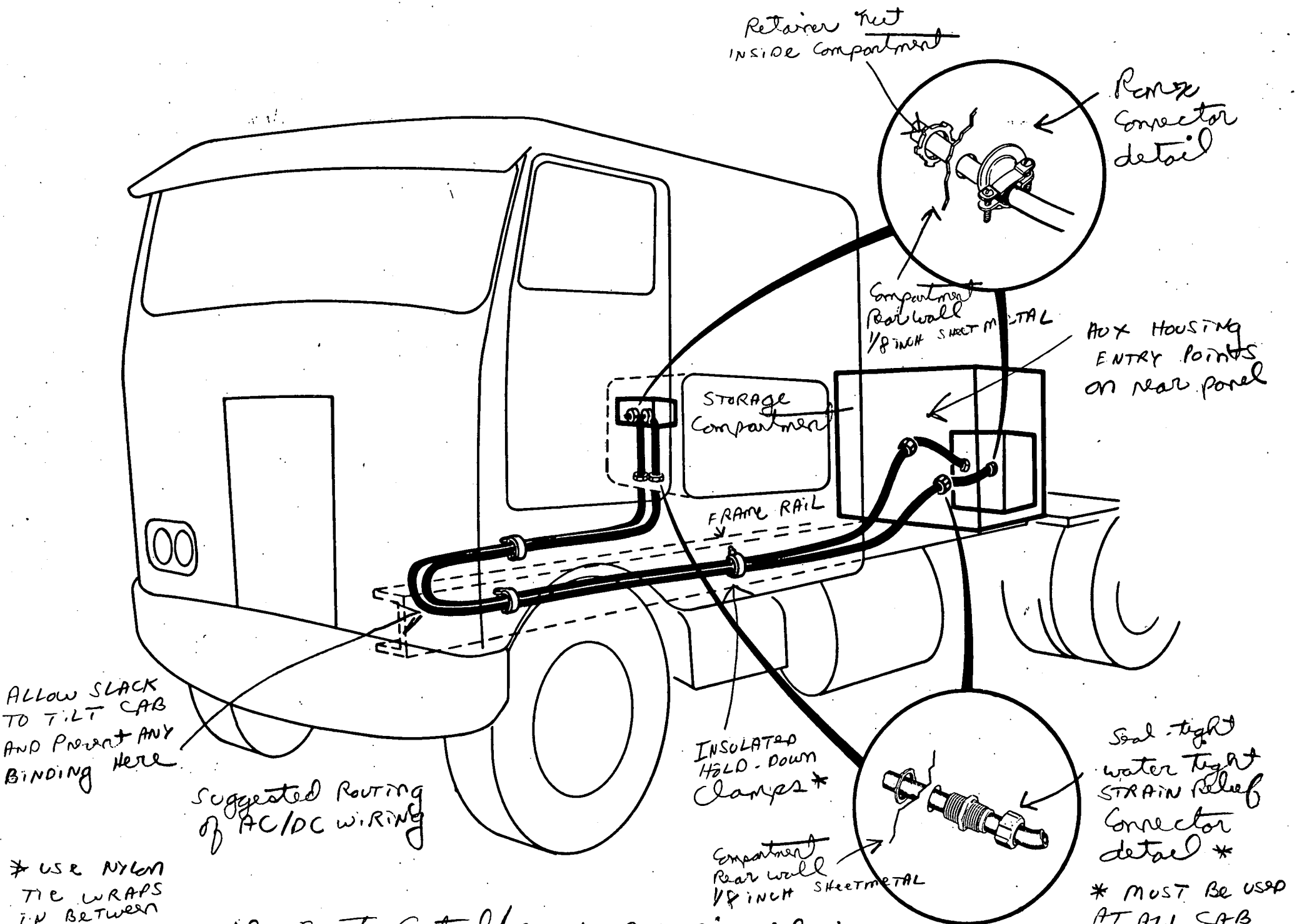


Figure 18. Remote Cartal/Breator Set Pictorial Wiring Diagram

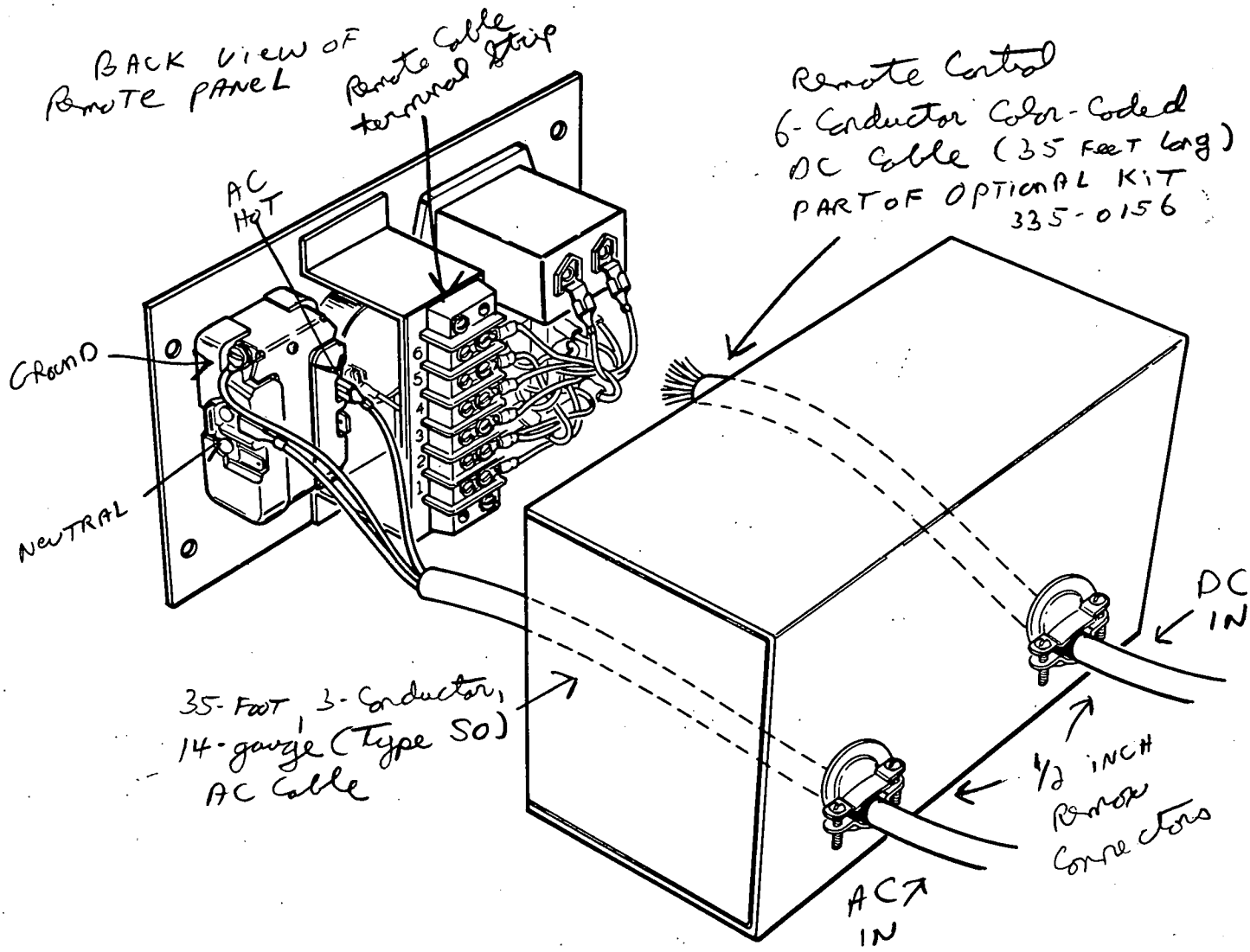


Figure 20. Remote ~~Starting~~ Panel Wiring Connections

FIG. 20

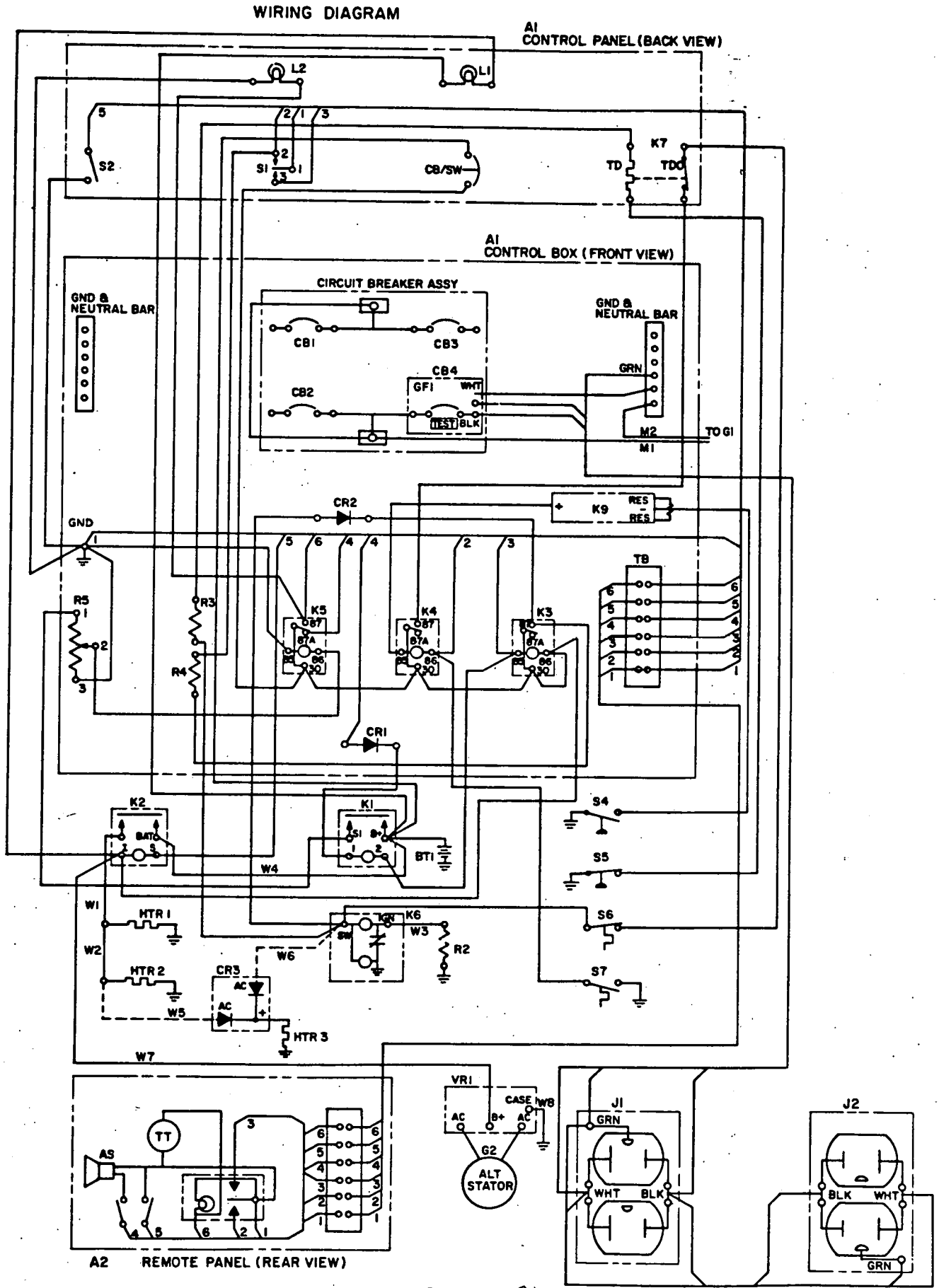


Figure 21, ELECTRICAL SYSTEM WIRING DIAGRAM

FIG. 21

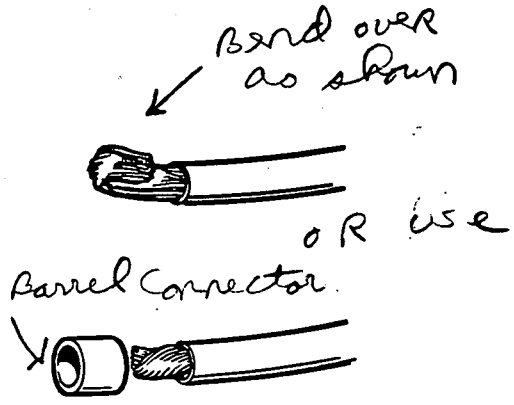
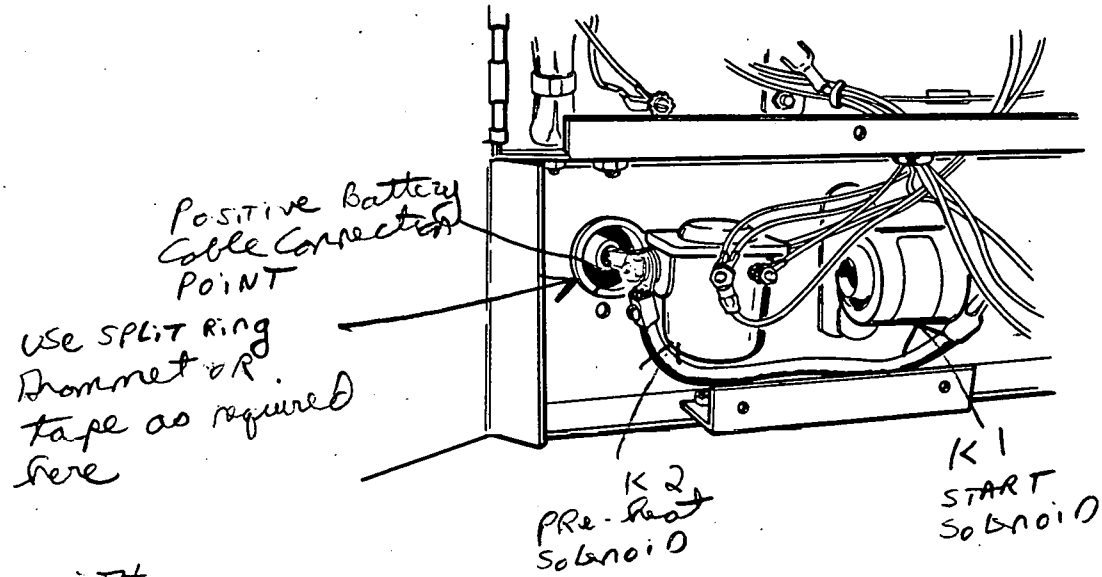


Figure 22. Barrel Connector, FOR 14 gauge AC supply cable

FIG. 22



Bobtype
SHOWN WITH SET CONTROL PANEL DOOR OPEN

Figure 23. INSULATING Positive Battery Terminal Connection.

F16.23

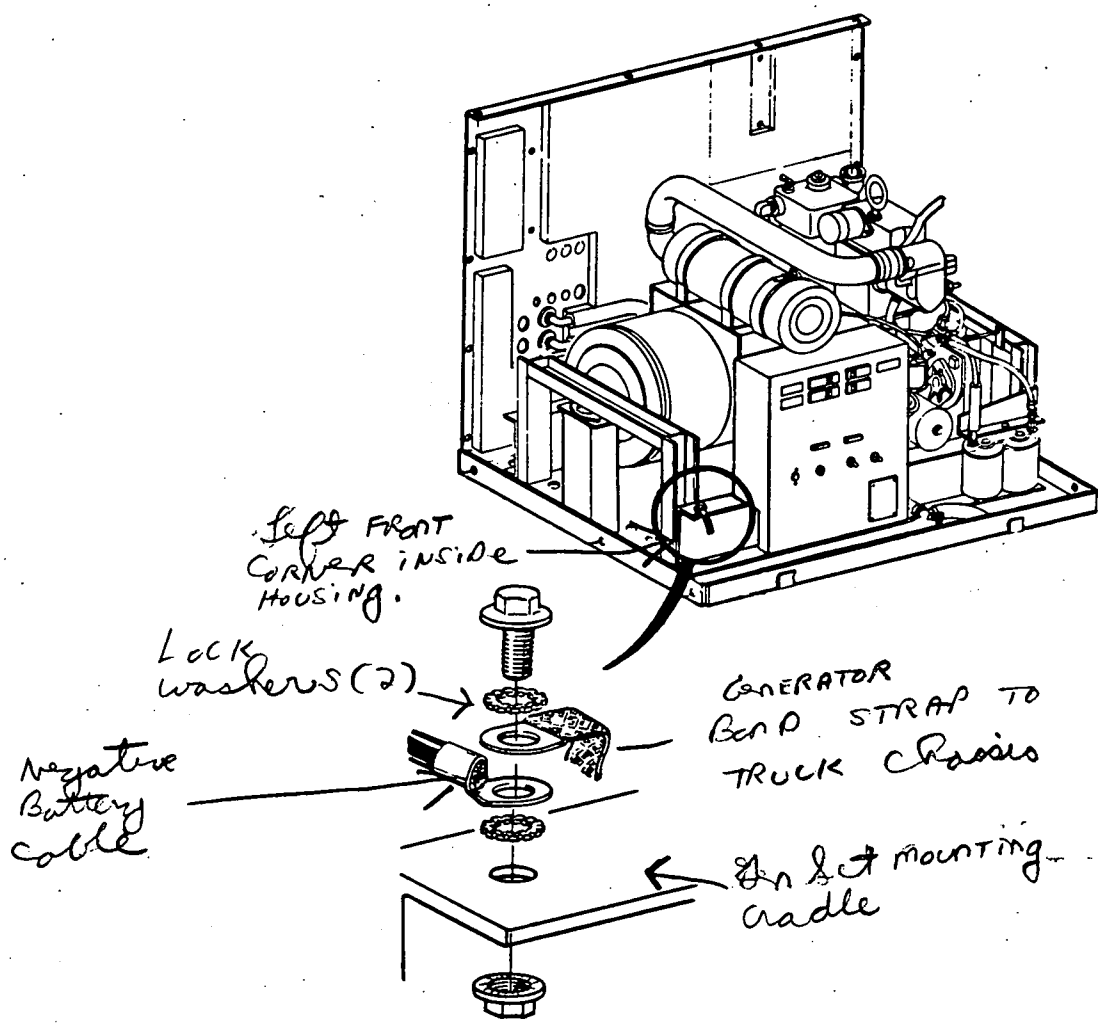


Figure 24. Negative Battery Cable Routing and Connection F16.24

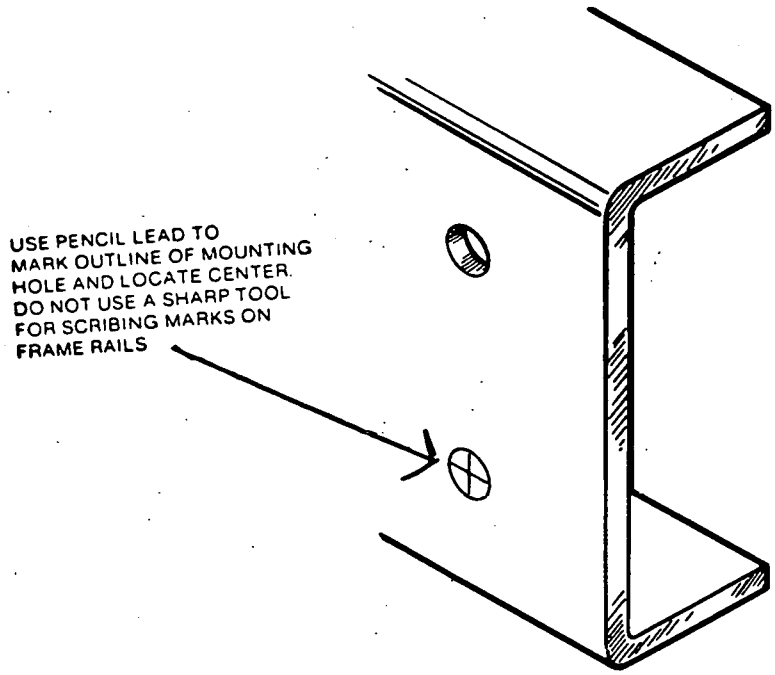


Figure 26. MARKING HOLE LOCATION ON TRUCK FRAME RAIL FOR Tether strap (IF Required)

FIG. 26

Connecting GenSet To Truck Battery

STARTING SYSTEM

The battery cables must be properly sized and connected to the 12-volt ~~(negative-ground-only)~~ accessory side of the truck battery rack in order for the generator set to crank properly under all operating conditions. ~~Most trucks have 12-volt batteries wired in parallel.~~ The Onan genset as supplied is wired for 12 volt cranking, negative ground. It can be modified for positive ground.

BATTERY CABLE RECOMMENDATIONS

- ~~Double 00 (2/0)~~ #2 cable conforming to SAEJ1127-type SGR is recommended for both positive (+) and negative (-) battery cables up to 10 feet in length (per cable).

Battery cables are not supplied as length requirements vary between installations. ~~Double 00 (2/0)~~ battery cable is available from Onan for use in cables of 10 feet or less. Order part number 334-0885 and specify length when ordering.

- For longer length cable runs, cable size increases and voltage drop must meet the requirements of SAE J-541a. The maximum allowable voltage drop (between set and truck battery while cranking) for the generator set is 0.48 volts.

ROUTING BATTERY CABLES

Route battery cables through 1-1/8 inch O.D. holes ~~(or knock-outs)~~ in compartment rear wall as shown in Figure 15. Route cables through access holes prior to installing any battery terminal connectors. Water-tight 3/4 inch metal strain relief connectors must be used on each cable going through compartment access holes. Use suitable sleeving or grommets at entry point to existing truck battery compartment.

be sure to go thru the as they which

Battery terminal connectors of suitable size and type must be obtained through a local truck dealer or service outlet.

CONNECTING BATTERY CABLES

1. Connect positive battery cable to large bottom terminal on start solenoid. It is located on the front of the generator set (below control) as shown in Figure 16 & insulate the positive terminal
2. Connect the negative battery cable, ~~generator set ground strap and housing to truck frame electrical bonding strap~~ to the same location on the ~~side of the compartment (Engine end)~~ as shown in the assembly sequence in Figure 15. Assemble mounting hardware and all three cable terminals as shown in Figure , detail A. Mounting hardware is supplied in accessory package. Opposite end of 16 inch truck electrical bonding strap must be attached to a convenient bolt on the side of the truck frame rail. If no existing bolt or bolt hole is available, installer must drill a new hole in the side of the truck frame rail within reach of the electrical bonding strap. Refer to Pre-Installation Section for special precautions PRIOR to drilling any new holes in truck frame rail.

and the Genset chassis

CAUTION ***A negative battery cable must be installed. Do NOT rely on truck chassis to carry generator set cranking current.***

3. Connect positive (+) and negative (-) cables to corresponding truck battery terminals (attach negative last). Check terminals at battery and on set for clean, tight connections. Re-inspect periodically.

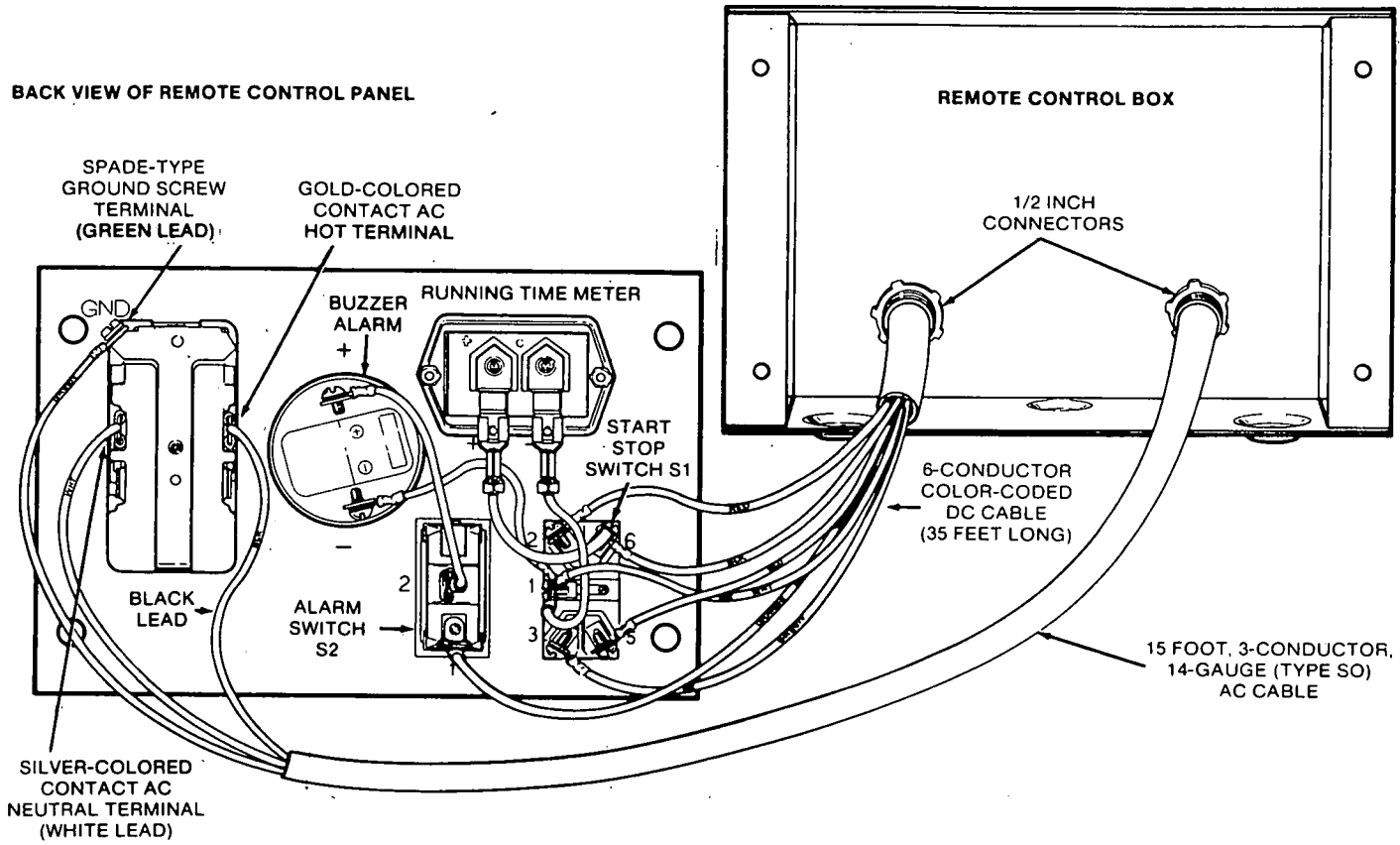
Vehicle chassis (truck frame) ground and the battery and generator set ground should all be electrically connected to be a 0 ground potential. All Onan units are designed for negative ground application.

CAUTION ***For 24-volt truck battery starting systems, generator set must be connected across 12-volt battery that is grounded during cranking. Do NOT connect across battery(s) that are switched for cranking at 24 volts.***

Use a voltmeter (0-30 volts DC minimum) to determine which truck battery is always grounded. Connect the voltmeter negative (-) lead to the truck chassis. Connect the voltmeter positive (+) lead to one 12-volt battery positive (+) terminal. It should read 12 volts with truck not running. Now crank the truck engine. If voltage remains at 12 volts or less while cranking, connect the auxiliary generator set battery cables to that same battery. If the voltage increases to approximately 24 volts while cranking, do NOT connect to that battery. Connect the generator set to the other 12-volt truck battery.

CAUTION ***Connecting the generator set to the truck battery that is switched during cranking may damage the grounded battery and the truck charging system.***

Refer to Pre-start section in Operator's manual prior to initial operation of the auxiliary generator set.



GENSET REMOTE PLUG TERMINAL NO.	REMOTE PANEL CONNECTION POINT	CIRCUIT FUNCTION	WIRING COLOR CODE	TYPE OF TERMINAL
1	Pin 1 of Start-Stop Switch S1 in Remote Panel	Ground	White	Ring
2	Pin 2 of Start-Stop Switch S1 in Remote Panel	Stop	Red	Ring
3	Pin 3 of Start-Stop Switch S1 in Remote Panel	Start	Green	Ring
4	Pin 1 of Alarm On/Off Switch S2 in Remote Panel	Remote Alarm Signal	Orange	Blade
5	Pin 5 of Start-Stop Switch S1 in Remote Panel	Battery Condition Meter (NOT USED)	Blue	Ring
6	Pin 6 of Start-Stop Switch S1 in Remote Panel	Running Time Meter and Switch S1 Integral Running Light	Black	Ring

FIGURE 4. CONNECTING REMOTE STARTING PANEL TO GENERATOR SET AND LOAD DISTRIBUTION PANEL

3. Route the DC control cable along the inside of the truck frame rails where possible. Secure cable every 18 inches along the run with insulated hold-down clamps (closer together in bends and near high heat sources). Use nylon tie wraps as required in between clamps. Use the most direct wire routing possible to minimize wire length required.

[redacted]

4. A 1/2 inch metal strain relief connector or Romex connector should be used on DC cable where cable enters remote panel. Remote panel location and method of mounting (wall or shelf) determines which connector to use. See Figure 4.
5. Five ring terminals and one blade-type terminal are supplied to connect remote cable to components inside remote panel as illustrated in Figure 4 (see chart). Follow color code illustrated in Figure 4. Blade-type terminal is used on the orange conductor ONLY for on/off alarm rocker switch. All other connections require ring terminals.

WARNING ***All AC convenience receptacles regardless of use, must be protected by ground fault protection devices for safety. Any cold weather starting aids may be connected to standard circuit breakers if they are three wire devices.***

13. Connect the green (ground) conductor of the AC cable to the grounding bus bar inside the load distribution panel as shown in Figure 5.

Be sure to install bond screw in grounding bar as shown in Figure 5. This self-tapping bonding screw is supplied loose with distribution panel.

WARNING ***Failure to properly install the bond screw in the grounding bar inside the distribution panel will disable the ground fault circuit breaker which could present an electrical shock hazard through the chassis of the truck.***

After installation and wiring is completed as shown in Figure 6, some small hardware (terminals, connectors and wire) may be left over as there are extra terminals and clamps included in the kit. Refer to pre-start section of Operator's manual prior to starting generator set on initial start-up.

INSTALLING LABELS SUPPLIED WITH GROUND-FAULT CIRCUIT BREAKER

Two loose labels are supplied in conjunction with the ground-fault circuit breaker. Attach the "GFCB" label to the inside cover of the load distribution panel on the hinged cover. Attach the "Test Reminder" label on the inside door of the compartment in which the load distribution panel is mounted or inside the truck cab in a conspicuous location.

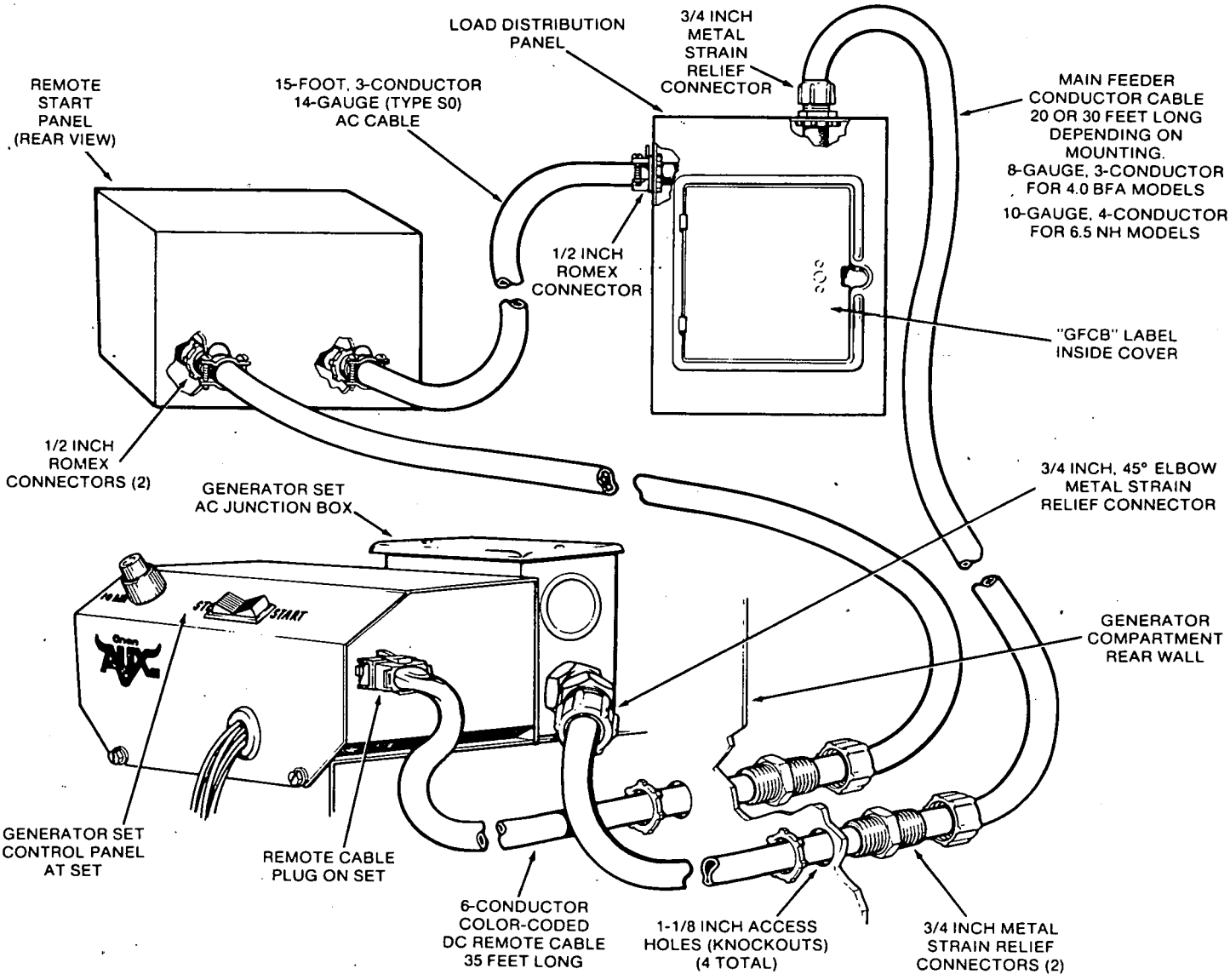


FIGURE 6. PICTORIAL SYSTEM WIRING DIAGRAM

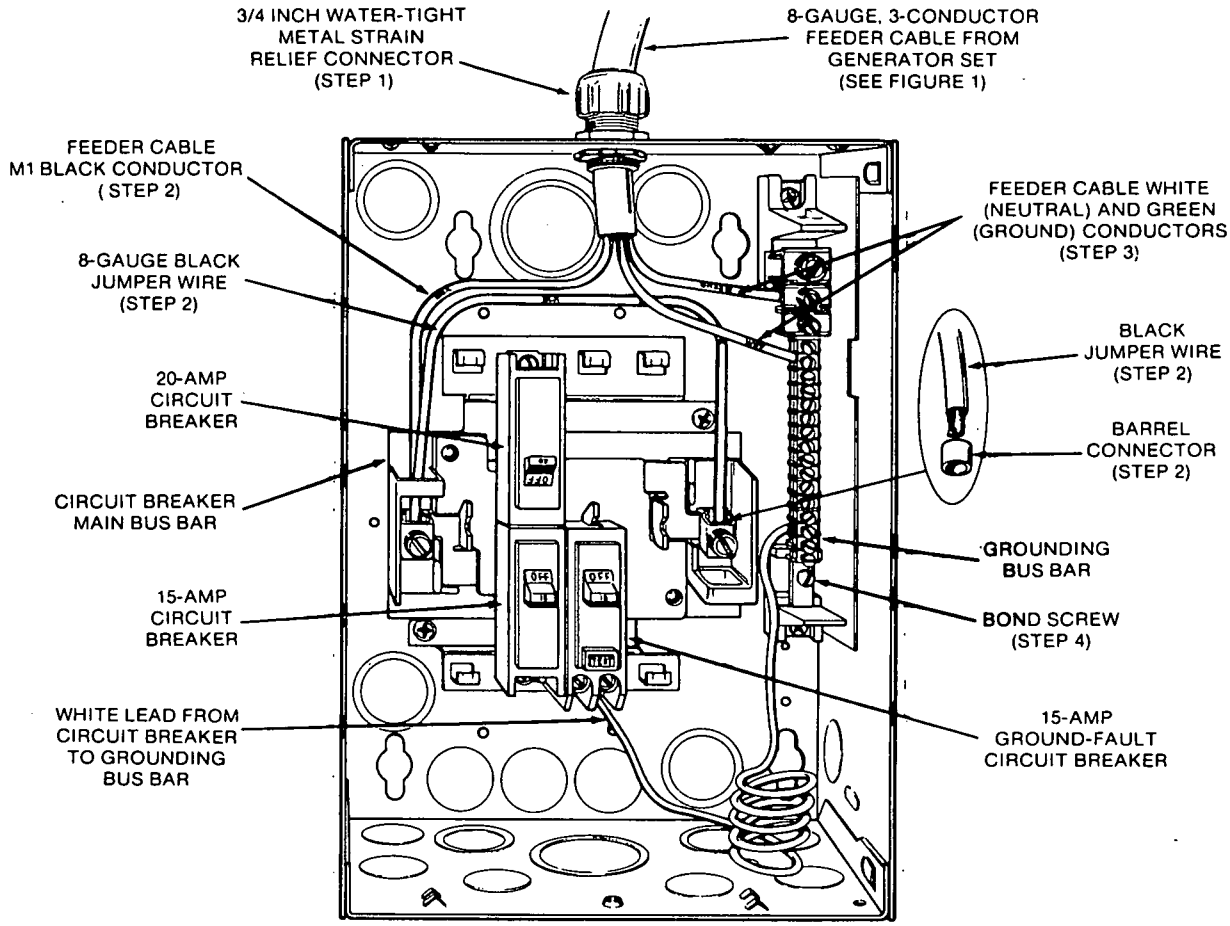


FIGURE 3. CONNECTING FEEDER CONDUCTORS TO LOAD DISTRIBUTION PANEL

WARNING ***Failure to properly install the bond screw in the grounding bar inside the distribution panel will disable the ground fault circuit breaker which could present an electrical shock hazard through the chassis of the truck.***

5. Secure wiring as routed using insulated hold-down clamps spaced approximately every 18 inches along the run (closer together in bends or near high heat sources). Use nylon tie wraps in between clamps as required.

Some slack should be allowed in the wiring to allow for movement from vibration.

WARNING ***All holes to the inside of the truck cab must be sealed to prevent poisonous exhaust gases from entering the interior or a storage compartment. Use water tight strain reliefs or silicone rubber sealant to seal around all openings made for electrical wiring.***

CONNECTING REMOTE PANEL TO GENERATOR SET

The remote control panel allows the driver to start the generator set within the cab area of the truck. The panel contains start-stop and on/off alarm rocker switches, running time meter, buzzer alarm and one AC duplex receptacle. The control wiring in this kit includes all wire and the necessary hardware to interconnect the remote starting panel to the generator set control. Proceed as follows:

1. Plug the 35 foot DC remote cable assembly into mating socket on side of generator set control panel. See Figure 1.

   The remote plug with 6-inch wire leads supplied in unit accessory kit is not used when installing this kit.

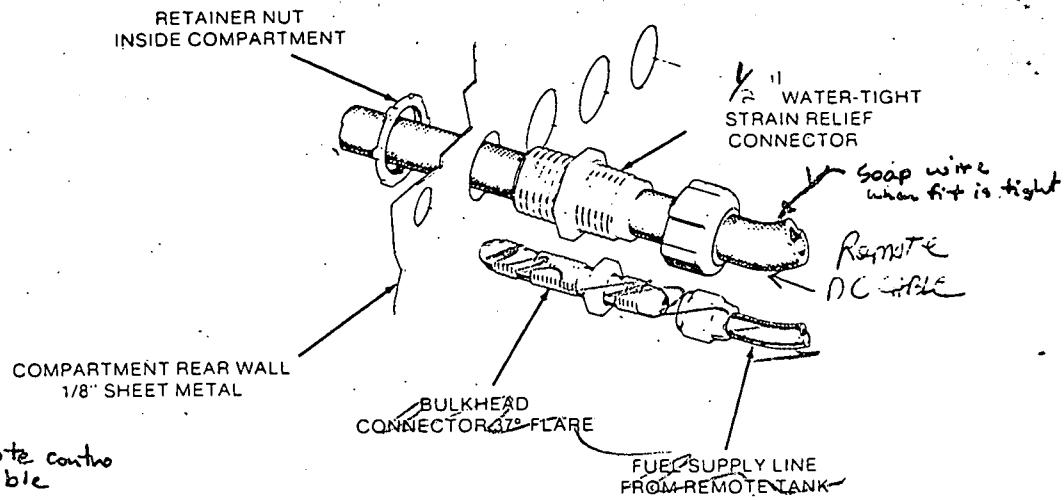
2. Route cable using a 3/4 inch metal strain relief connector, through 1-1/8 inch hole in rear wall of generator compartment. Use the hole next to the AC feeder conductor cable already installed. See Figure 2.

   The two remaining 1-1/8 inch holes in the compartment rear wall are for the negative (-) and positive (+) battery cables which are connected later. Install 3/4 inch metal strain relief connectors and retainer nuts (supplied in kit) in each wiring access hole when battery cables are installed to secure wiring.

   Battery cables are NOT supplied as length requirements vary between installations. Double 00 (2/0) battery cable is available from Onan for use up to ten feet in length per cable. Order part number 334-0885 and specify length when ordering.

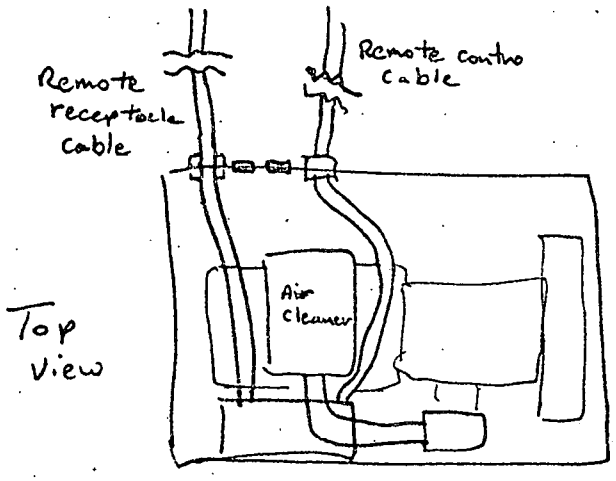
CAUTION: Be careful not to overload circuit breaker if more than one AC load circuit is connected to the same circuit breaker.

4. Neutral and ground conductors(white and green conductors)should both be connected to the closest 6-terminal grounding bar(located on each side of the control panel). Barrel type connectors are not required on any grounding bar connections. Fig 10



View from outside back

Fig 13



Top View

Fig 11

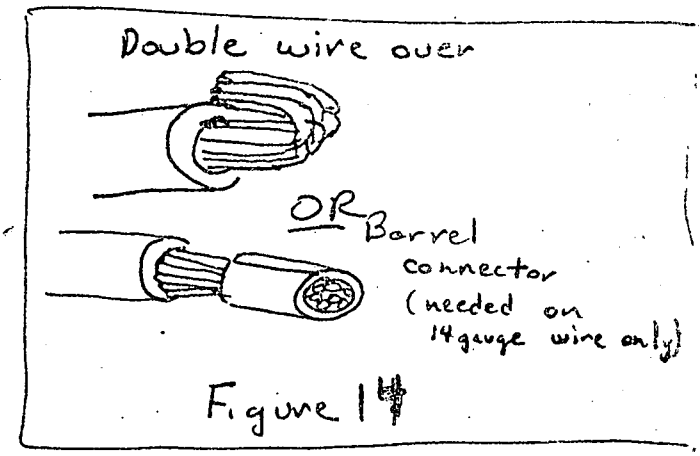
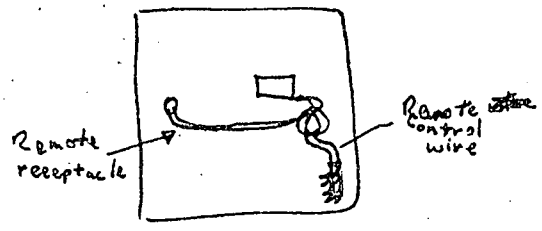


Figure 14



Front Control Door open

Fig 12

8. Plug the AC cord for the compartment fan assembly into duplex receptacle on top of generator end of the set inside the compartment.

9. Two tether straps(supplied in accessory kit)must be installed(one on each housing side panel)to control movement of the set when the truck is in operation. Locations shown in Figure 4 are for reference ONLY. The tether straps can be installed under any one of the five 3/8 inch hex head capscrews which secure housing side panels to generator set mounting tray.

NOTE: Do NOT install a tether strap under the right front housing bolt on the right hand side panel. This bolt is left out and used for electrical ground strap to truck frame rail when battery cables are installed. See page __(Figure__).

Choose a tether location that is close or convenient to an existing frame bolt or frame hole. Use at least a 3/8 inch Grade 5 bolt for attaching tether to truck frame rail. If no existing bolt or bolt hole is available, installer must drill a new hole in the side of the truck frame rail. Refer to Pre-Installation Section for special precautions PRIOR to drilling any new holes in truck frame rails.

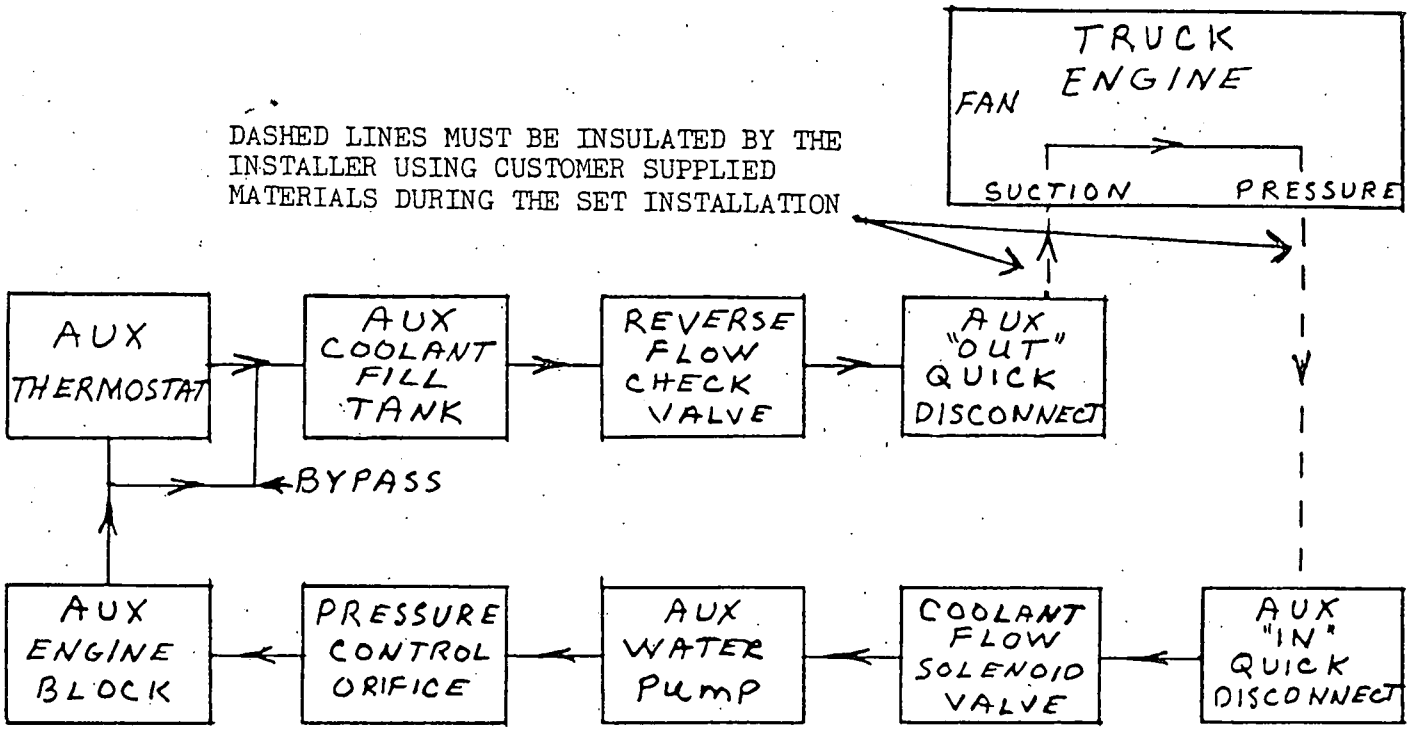
CAUTION *Check the area inside the truck frame rail so that the drilling of frame holes will not interfere with any truck wiring, fuel, air or hydraulic lines.*

CAUTION *Do NOT use a sharp tool for marking hole locations. Marks for mounting holes must be made with pencil lead. Cracks will start around the edge of the hole if a sharp tool is used to mark the location. Refer to Figure / for approved method of making marks on truck frame rail.*

NOTE: Top compartment panel MUST be left off until generator set cooling system is primed. Refer to Cooling System Section.

Cooling System

Barry: Continue your review starting here.



BLOCK DIAGRAM OF COOLING SYSTEM FLOW

AUX GENERATOR SET COOLING SYSTEM OPERATION

The generator set cooling system is a closed system with it's own coolant flow solenoid valve, water pump, thermostat, fill tank and safety shutdowns. The block diagram shows the entire cooling system flow between the truck's cooling system and within the generator set. Two ~~insulated~~ cooling lines(customer supplied)must be connected between the rear "in" and "out" quick disconnect couplings of the generator set compartment and the truck engine cooling system. The generator set coolant is used to warm the truck engine when the truck engine is NOT running and also dissipates the heat of the generator set coolant at the same time.

The coolant flow solenoid valve inside the generator set compartment isolates the set cooling system from the truck engine cooling system when the generator set is NOT running. There is a variable pressure control orifice in the generator set cooling system which isolates the generator set cooling system from the higher pressure in the truck cooling system when both the generator set and the truck engine are running. There is a "check valve"in the OUT(pressure)side of the generator set cooling system which isolates the set cooling system from the truck cooling system if the truck is running and the generator set is not.

The generator set thermostat starts to open at approximately 145°F(generator set internal bypass allows cooling flow during set warm up). A high water temperature cut out switch closes at approximately 215°F to shut the generator set down if the coolant exceeds this temperature. There is also a safety cut out switch that senses "skin temperature" of the generator set cylinder head and automatically shuts the set down if this temperature exceeds approximately 250°F.

A thermostatically controlled fan assembly inside the compartment that is powered by the generator set maintains the compartment temperature within an acceptable range to prevent overheating of the set.

COOLING LINES, CLAMPS AND INSULATING MATERIAL RECOMMENDATIONS

This section contains specific recommendations for the hose, hose clamps and insulating material for the cooling lines and general hook-up recommendations for interfacing with the cooling systems on the most commonly used truck engines. The truck engine cooling system connection points(suction and pressure ports)vary between engine manufacturers.
NOTE: Coolant hoses, insulating material and hose clamps are NOT supplied due to the variation in length requirements between truck models and engine manufacturers. Use ONLY the type of material specified throughout this section to complete the installation.

Two 5/8 inch I.D. coolant hoses require SAE type 20R3 silicone hose and SAE-J536 type F hose clamps plus extended tang with a 3/4 to 1-inch nominal clamping range. These clamps should be worm-gear operated and the tang must extend around inside of clamp area that contacts hose to prevent puncturing this type of hose.
CAUTION: Wire type hose clamps should not be used for securing silicone hose to prevent puncturing hose when tightened.

1.05 inch I.D. polyethylene insulating tubing (such as Nomaco "Thermacel")or silicon rubber tubing capable of operating in a temperature range of -40°F to 210-220°F must be used to insulate the coolant hoses for the length required in each application. The truck cooling system must be drained prior to installing these coolant lines.

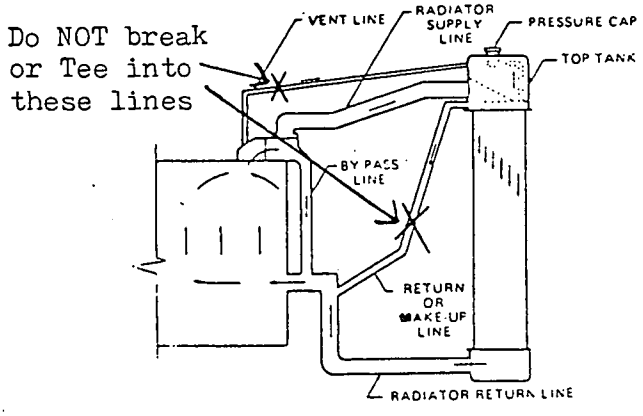
Two female quick disconnect couplings(supplied in accessory package), connect to mating threaded couplings already installed in rear (back)panel of generator set compartment. Each connection is identified by lettering stamped into sheet metal above each connector. These special connectors are spring loaded to self seal when disconnected and remain open when connected together.

CAUTION: Coolant lines between truck engine and generator set MUST be insulated in order to avoid excessive heat loss and to heat the truck engine adequately for cold weather starting. Proper connections are critical for the generator set to function properly without overheating.

TRUCK CONNECTIONS

The "OUT" coolant line connection on the generator set rear panel should be connected to the SUCTION side of the truck cooling system. One acceptable method for this connection is to parallel the truck cab heater taps on the truck engine. The manual shut-off valves which control coolant flow to the truck cab heater core is an acceptable location to tee into this line.
CAUTION: Tee connection MUST be made to the truck engine side of the shut-off valve. Do NOT remove any manual shut-off valves in the truck cooling system. For summer operation, these valves are normally closed.

The return line is from the PRESSURE side of the truck engine cooling system to the "IN" connection on the generator set rear panel. A block drain plug or a pressure tap on the truck engine water manifold are two possible locations to tee into the truck cooling system for this coolant line.
NOTE: The physical location of these connection points and possible interference with other existing engine components will vary between truck engine models and manufacturers. Tee-in location must have adequate clearance for the pipe size required without any sharp bends in hose lines and using the most direct and shortest coolant line lengths possible.
CAUTION: Never connect any auxiliary generator set cooling lines to any engine coolant ports that are directly connected to the truck engine radiator. These would include engine-to-radiator vent lines and/or coolant "make up"line on certain models of truck engines. Connecting into either of these lines may cause the truck engine water pump to malfunction(cavitate), overheating the engine or more serious engine damage such as scoring of cylinder walls. See block diagram example following.



INITIAL FILL AND VENTING OF GENERATOR SET COOLING SYSTEM

After the auxiliary generator set is installed and the generator set cooling system has been properly connected to the truck engine cooling system; the entire cooling system must be primed as follows:

1. Close all drains and refill truck engine radiator using anti-freeze/water mixture for the coldest expected ambient temperature(a 50/50 mixture of water and ethylene glycol type anti-freeze protects to -34°F).
2. Remove fill plug on top of generator set engine coolant fill tank and open petcock (vent)next to the fill plug as shown in Figure__.
3. Add approximately one gallon of water/ anti-freeze mixture to generator set. Replace fill plug using pipe thread sealing compound but leave petcock(vent)open.
4. Connect the AC plug of the generator set coolant flow solenoid valve into an external 115-volt AC source to open the valve for coolant flow.
   CAUTION: Do NOT run the auxiliary generator set to prime the cooling system.
5. Start truck engine and run until clean coolant flows out of the open petcock (vent)on the generator set engine. Then close petcock on generator set.
   CAUTION: No coolant flow may indicate incorrect cooling line connections between truck cooling system and generator set compartment inlet and outlet connections on rear panel.
6. Run truck until thoroughly warm and then check for any coolant leaks at both the truck engine coolant line connection points and all coolant lines inside the generator compartment.
7. Stop truck engine and reconnect the coolant flow solenoid valve AC plug to the duplex receptacle on top of the generator set above generator. Recheck all coolant line clamps and connections for leaks. After truck engine cools down, remove radiator cap and add coolant if required.

Exhaust System

WARNING

ENGINE EXHAUST GAS (CARBON MONOXIDE) IS DEADLY!

Carbon monoxide is an odorless, colorless gas formed by incomplete combustion of hydrocarbon fuels. Carbon monoxide is a dangerous gas that can cause unconsciousness and is potentially lethal. Some of the symptoms or signs of carbon monoxide inhalation are:

- *Dizziness*
- *Intense Headache*
- *Weakness and Sleepiness*
- *Vomiting*
- *Muscular Twitching*
- *Throbbing in Temples*

If you experience any of the above symptoms, get out into fresh air immediately.

The best protection against carbon monoxide inhalation is proper installation and regular, frequent inspections of the complete exhaust system. If you notice a change in the sound or appearance of exhaust system, shut the unit down immediately and have it inspected and repaired by a competent mechanic.

MUFFLER INSTALLATION

1.

3. Install top compartment housing panel using eight 5/16-18 x 3/4 inch hex head capscrews around the top housing perimeter as shown in Figure 4. Capscrews are inserted from exterior side of top panel into self-cinching nuts prelocated inside compartment as required. Torque bolts at 15 foot pounds(20N·M).

4. Position muffler inlet and rain shield above exhaust tube and slide muffler down into exhaust tube so that muffler rest on top of housing as shown in Figure Push down completely.

5. Line up the four holes in muffler mounting brackets with pre-drilled holes on top of generator housing.
NOTE: Self clinching nuts are prepositioned inside housing panel for muffler mounting bolts.

6. Install four 5/16-18 x 3/4 inch hex head capscrews through muffler mounting brackets and torque to 15 foot pounds.

7. Install 1-1/2 inch U-bolt type automotiv muffler clamp around muffler to exhaust tube connection(under rain shield)as shown in Figure 4 and torque nuts to 11 foot pounds(15·N·M).
CAUTION: The ONLY acceptable meand of fastening the muffler inlet and exhaust tube together is approved SAE 1-1/2 inch U-bolt type automotive muffler clamp.

8. Recheck muffler mounting bolts to be certain they are properly tightened.

WARNING: This generator set MUST NOT be installed inside or under the truck cab or sleeper cab on any cab-over-chassis type truck. The generator set exhaust system MUST be terminated in the open air behind the truck or sleeper cab. Never direct the exhaust under the truck chassis in any installation.

WARNING: Do NOT terminate poisonous carbor monoxide exhaust gas under truck cab or sleeper. Keep all openings to truck cab area near generator set closed when generator set is operating.

FUEL TANK LOCATION

The remote fuel tank is designed for mounting between truck frame rails in all applications. It is intended to be mounted as far forward as possible between truck frame cross-support members (usually behind transmission and above drive shaft) if space permits. Mounting the fuel tank requires an unobstructed opening measuring 16-1/2 inches lengthwise (parallel to truck frame rail) by 25 inches wide (between frame rails) by 10-1/2 inches depth (above truck drive shaft). The 10-1/2 inch of depth requirement includes up to 3 inches of vertical clearance above truck drive shaft to allow for suspension rebound under the weight of the loaded trailer and road shock vibration.

WARNING ***Do NOT modify the Onan supplied fuel tank for installation outside the truck frame rails without checking for compliance with Federal Motor Carrier Safety Regulation, Title 49, Part 393.67 (b)(2). The fuel tank is not designed to comply with DOT regulations for side-mounted fuel tanks.***

FUEL TANK INSTALLATION

Install remote fuel tank using the assembly sequence illustrated in Figure 1. Perform the steps in order listed to minimize installation problems.

1 ***DIESEL AND SIDE-MOUNTED GASOLINE SETS*** Position fuel tank in the selected unobstructed opening between truck frame rails. Tank may be installed with fuel fill, fuel pick-up and fuel level gauge on either driver or curb side as desired by the owner.

WARNING ***Always shut off truck engine and generator set prior to filling the fuel tank to prevent fire and explosion hazard and do NOT smoke.***

2. Position the two L-shaped mounting brackets on the inside (underneath) of the top truck frame rail flange (one on each side), so that weld nuts in brackets line up with pre-drilled mounting holes in fuel tank flanges as shown in Figure 1. The rubber vibration isolator pads on both the fuel tank flanges and fuel tank mounting brackets must contact the truck frame rail flange.

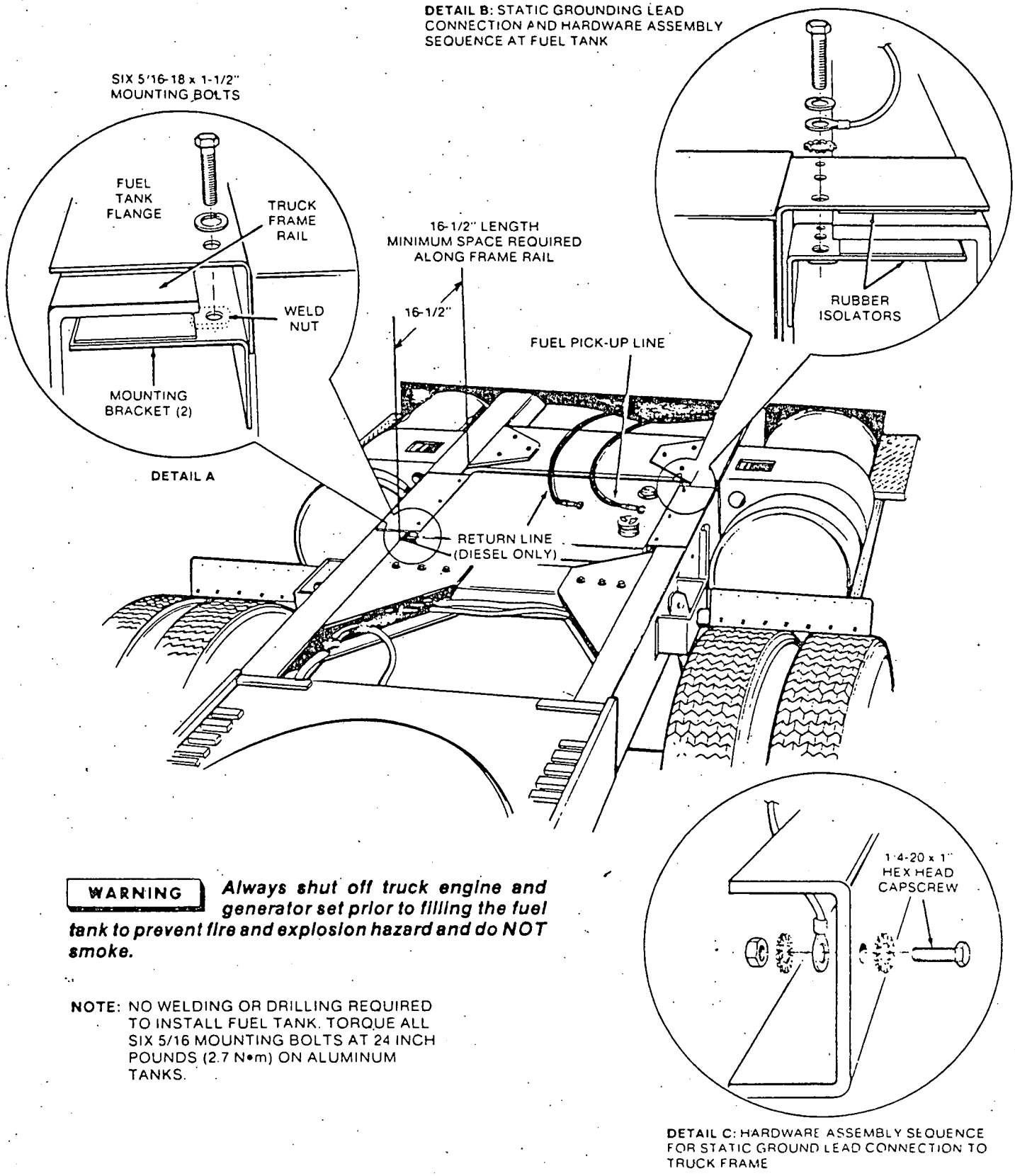
Pre-drilled mounting hole location in fuel tank flange is usually adequate to securely fasten fuel tank in most installations. Some trucks may have variations in width of frame rail flange area or width between truck frame rails that could require spacing and drilling new mounting holes in fuel tank flanges. When installed, the vertical surface of the mounting bracket should rest against the side of the fuel tank and the wider surface area of the mounting bracket (surface with rubber isolation pad) should be relatively close to radius of truck frame rail. See detail A in Figure 1. If not, new 3/8 inch mounting holes will have to be spaced and drilled in fuel tank flange as required so that fuel tank is held securely in position.

3. Install 5/16-18 x 1-1/2 inch hex head capscrews and lockwashers in center mounting holes only (one on each side). Mounting hardware assembly sequence is shown in Figure 1, detail A.
4. The 18 inch 12-gauge static ground lead must be installed under the most convenient fuel tank mounting screw as dictated by physical location and layout of truck chassis components in each installation. Fuel tank terminal end of ground lead is a 5/16 inch eyelet terminal. Install this terminal under most convenient 5/16 inch capscrew and lockwasher on top of fuel tank mounting flange. See Figure 1, detail B. The remaining chassis end of static grounding lead has 1/4 inch eyelet terminal. Locate a nearby hole in truck frame rail within reach of the lead and attach terminal with 1/4-20 x 1 inch screw, lockwashers, and nut. Hardware assembly sequence is shown in Figure 1, detail C.

If no existing hole is available, a 5/16 inch hole must be drilled (within reach of grounding lead) in the side (vertical surface) of truck frame rail. Hole must be located as close to vertical center of the frame rail as possible. Be careful not to locate hole where drilling might puncture fuel tank.

CAUTION ***Do NOT drill any new holes in truck frame rails any closer than 2 inches to top or bottom flange area of frame rail. Bolt holes in frame rails MUST NOT be located any closer to frame rail flanges than present bolt hole pattern. If in doubt, consult truck manufacturer's chassis manual. No drilling whatsoever is allowed in the top or bottom frame rail flanges.***

5. Install three remaining 5/16-18 x 1-1/2 inch hex capscrews and lockwashers in fuel tank mounting brackets. Hardware assembly sequence is shown Figure 1, detail B. Torque all six mounting screws 24 inch pounds (2.7 N•m).
6. Verify that the ground strap and all mounting bolts are securely tightened following torque specifications where listed. With installation completed, check for adequate clearance above truck drive shaft and bottom of fuel tank. Allow 3 inch clearance for suspension rebound and road shock vibration with loaded trailer coupled to truck.



WARNING ***Always shut off truck engine and generator set prior to filling the fuel tank to prevent fire and explosion hazard and do NOT smoke.***

NOTE: NO WELDING OR DRILLING REQUIRED TO INSTALL FUEL TANK. TORQUE ALL SIX 5/16 MOUNTING BOLTS AT 24 INCH POUNDS (2.7 N•m) ON ALUMINUM TANKS.

FIGURE FUEL TANK INSTALLATION

DIESEL FUEL SUPPLY AND RETURN LINE RECOMMENDATIONS

The fuel supply and return lines from the remote fuel tank to generator compartment inlet and return fittings on the rear(back) panel are not supplied due to variation in length requirements between trucks. The following recommendations pertain to material size and routing of fuel supply and return lines:

- Use an approved flexible, double fabric reinforced, non-organic fuel line such as SAE type 100R5 or 100R3 in 1/4 inch I.D. size.
- Route fuel supply and return lines as far away as possible from hot engine or exhaust areas. This reduces chance of fire danger.
- Do NOT route or tie fuel lines together with any AC or DC electrical wiring.
- Install fuel line so it is accessible for service but protected from physical damage.
- Do NOT drill any additional holes in frame rails or frame cross support members for routing of fuel lines.

WARNING ***Always shut off truck engine and generator set prior to filling the fuel tank to prevent fire and explosion hazard and do NOT smoke.***

FUEL SUPPLY AND RETURN LINE INSTALLATION

1. Use fuel hose fittings with 7/16-20 thread size and SAE 37° flare to match fittings provided for compartment connectors and fuel tank connections.
2. Use protective sleeving such as heater hose over sections of fuel line that pass over frame rails. Any existing holes in frame cross support members used for routing of fuel line should be protected with rubber grommets to prevent chaffing.
3. Use clamps or ties without sharp edges to secure fuel line approximately every 18 inches along the run.
4. Connect fuel supply and return line to bulkhead connectors on rear wall of the generator compartment. The supply line is connected to the "IN" fitting and the return line is connected to the "OUT" fitting on the rear panel. Connect opposite ends of supply and return lines to 37°flare fittings on remote fuel tank. Direction of fuel tank fittings must be adjusted during installation to prevent kinks or sharp bends in either supply or return line.

CONNECTING GENERATOR SET TO TRUCK FUEL TANK

Provisions can be made to utilize the truck fuel tank to supply the auxiliary generator set if the truck chassis space is not available to install the remote fuel tank or if a larger fuel supply is desired.

CAUTION: For operation in colder ambient temperatures(below 32°F-0°C), a separate remote fuel tank may be required for the auxiliary generator set because of specific fuel requirements to control fuel waxing. See Operator's manual for complete recommendations.

Many truck fuel tanks contain an extra unused dip tube already installed in fuel tank that can be easily adapted to the proper fittings to connect to the bulkhead fittings on the generator housing rear (back)panel.
The fuel return line for the generator set can be connected to the same point as the truck engine fuel return line using the same fittings and fuel line material as required for the remote fuel tank connections. See Fuel Supply and Return Line Recommendations.

If no existing spare dip tube is available in either truck fuel tank, special modifications are necessary to connect supply and return lines.

WARNING: Any truck fuel tank modifications MUST conform to all requirements of the Federal Motor Carrier Safety Regulation, Title 49,Part 393.67-Liquid Fuel Tanks.

The new dip tube installed from the top should be a mininum of 3/8 inch I.D. size and reach to within 1 inch of the bottom of the fuel tank.

For diesel fuel ONLY, a connection can be made below the fuel level such as in the end of the truck fuel tank.

WARNING: Any below level fuel tank fitting MUST be installed in a flange or spud designed to accommodate the fitting on any truck fuel tank.

Special diesel fuel recommendations are necessary for the auxiliary generator set in cold weather climates to control fuel waxing and ensure easier cold weather "cold starts". Refer to Fuel Recommendations section in the Operator's manual for complete requirements.

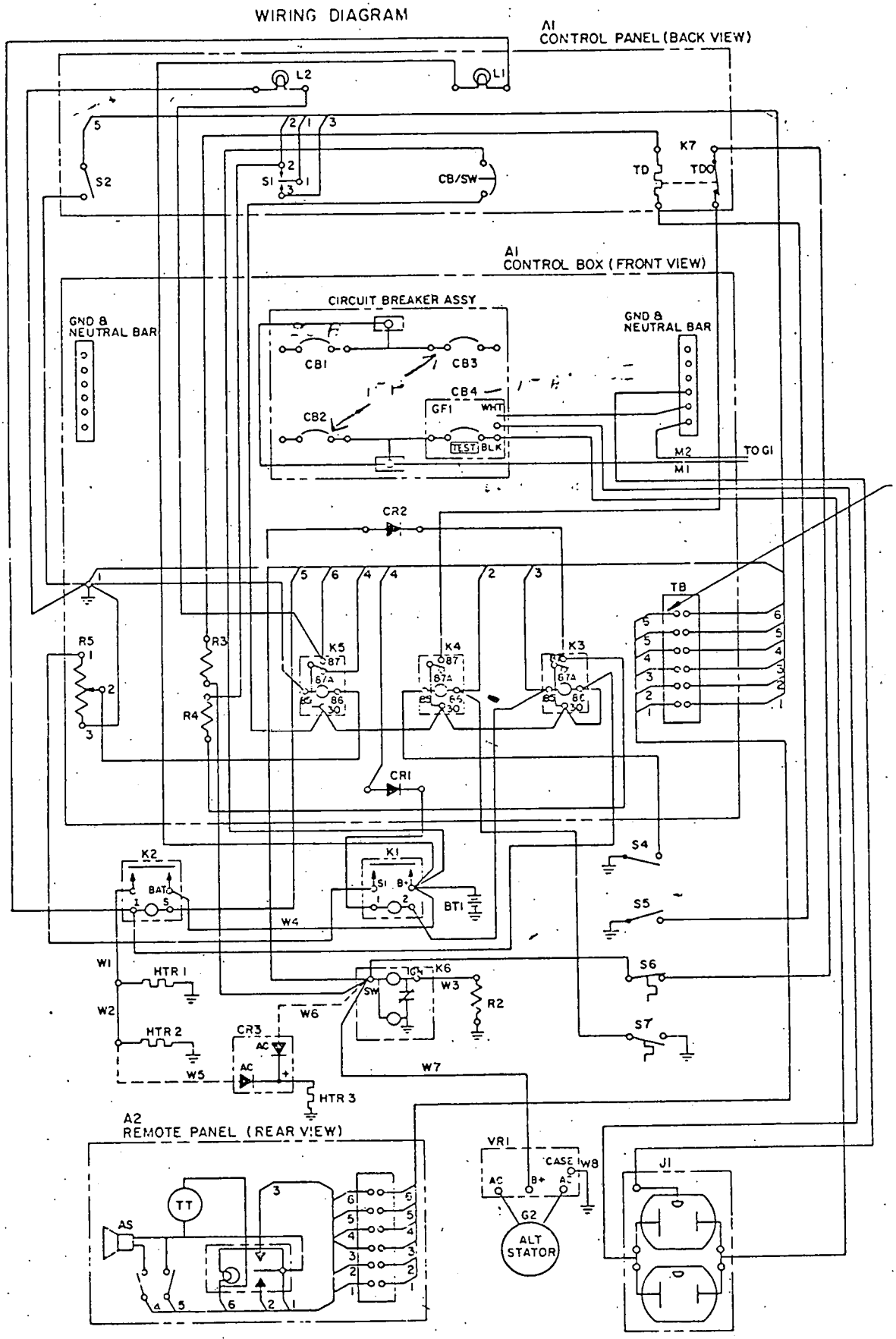


FIGURE . ELECTRICAL SYSTEM WIRING DIAGRAM

CONNECTING REMOTE PANEL AC DUPLEX RECEPTACLE TO LOAD CIRCUIT BREAKER

One AC duplex convenience receptacle is provided in the remote starting panel. This receptacle must be connected to the 15-amp ground fault circuit breaker in the in the generator set control panel.

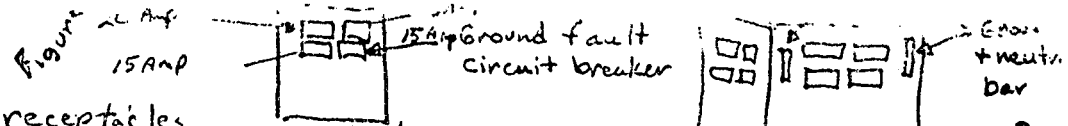
1. Strip back the outer insulation on one end of the foot, 14-gauge, 3-conductor AC cable. approximately 6 inches.
2. Install two blade-type terminals, one on the black and one on the white conductor of the AC cable. Terminals are identified in Figure
3. Install a spade terminal (blue in color) on the green (ground) conductor of the -foot AC cable.
4. Use a 1/2 inch metal strain relief connector or Romex connector on AC cable at entry point into remote panel. Method of mounting panel (wall or shelf) determines which connector to use. See Figure
5. Connect the black conductor to the AC Hot (gold contact) terminal of the duplex receptacle as shown in Figure
6. Connect the white conductor to the AC neutral (silver contact) terminal of the duplex receptacle as shown in Figure
7. Connect the green ground conductor with spade terminal to the ground screw on top corner of receptacle as shown in Figure Conductor terminals (two blade-type and one spade terminal) were installed in steps 2 and 3.
8. Route the AC cable directly to the gen set control panel from the AC duplex receptacle in the remote panel to minimize wiring length required. Secure cable every 18 inches along the run with insulated hold-down clamps and/or nylon tie wraps as required.
9. Route the AC cable through a 1/2 inch Romex connector at the entry point (knock-out) going into generator set control panel as shown in Figure
10. Cut cable to required length making sure there is enough extra wire inside load distribution panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
11. Strip back the insulation on each of the 3 conductors in the 14 gauge AC cable. No terminals are required as each connection at the circuit breaker is a "set screw" type connection.
12. Connect the black and white conductors to the 15-amp circuit breaker which has the built-in ground fault circuit protection. Note the white marking on the circuit breaker for the correct location of the white conductor. The black conductor goes to screw terminal marked "Load" on side of circuit breaker. See Figure

WARNING ***All AC convenience receptacles regardless of use, must be protected by ground fault protection devices for safety. Any cold weather starting aids may be connected to standard circuit breakers if they are three wire devices.***

Connect the green (ground) conductor of the AC cable to the grounding bus bar inside the set control panel as shown in Figure —.

INSTALLING LABELS SUPPLIED WITH GROUND-FAULT CIRCUIT BREAKER

Two loose labels are supplied in conjunction with the ground-fault circuit breaker. Attach the "GFCB" label to the inside cover of the gen set control panel on the hinged cover. Attach the "Test Reminder" label on the inside cover of the set control panel or inside the truck cab in a conspicuous location.



Connecting 120 AC duplex receptacles

- All AC duplex receptacles must be connected to the 15-amp ground fault circuit breaker in the gen set control panel. Both the hot and neutral load conductors must be connected to the hot and neutral terminals on the ground fault circuit breaker. The green ground lead is connected to the grounding bus bar inside the set control panel. Any external AC duplex receptacles must have weather protective covers and nickel plated contacts in the receptacle suitable for heavy-duty use. All AC duplex receptacles regardless of where installed, must have the hot and neutral load conductors connected to a ground fault protected circuit breaker. The AC receptacle box (if not water-proof) must be installed inside a weather protected area such as a tool box, storage compartment or sleeper cab.

WARNING ***All AC convenience receptacles regardless of use, must be protected by ground fault protection devices for safety. Any cold weather starting aids may be connected to standard circuit breakers if they are three wire devices.***

- If 120 volt AC plug-in type loads (such as engine heaters) are used, use a water and dust tight 3-prong hospital grade connector with nickel plated contacts and rubber O-ring or equivalent for sealing.

CONNECTING FEEDER CONDUCTORS

TO CIRCUIT BREAKERS IN GENERATOR SET CONTROL PANEL

The standard load distribution section within the generator set control panel has one 20-amp and two 15-amp circuit breakers and one 15-amp circuit breaker with built-in ground fault circuit interrupter protection. The branch load circuits should be equally divided between the breakers using wire sized according to the amperage of each load.

The AC feeder cables from each individual load circuit must be adequately sized and properly routed through the generator set compartment housing and into the set control panel (see previous sections on general and load circuit wiring recommendations). The individual load circuit conductors can now be properly connected to the appropriate circuit breaker inside the generator set control panel.

CAUTION ***Use ONLY the type of circuit breakers as supplied by Onan. Other types may nuisance trip because of road shock or vibration.***

Current for any one output conductor must not exceed the nameplate rating. When more than one load circuit is available, divide the load equally between them. Refer to AC interconnection diagram shown in Figure__. Proceed as follows:

20 AMP LOAD CIRCUITS (12 gauge wire)

1. Cut the AC feeder cable to the required length making sure there is enough extra wire inside the set control panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
2. Strip back the insulation on each of the 3 conductors in the 12-gauge AC cable. No terminals are required as each connection is a "set screw" type
3. Connect the black AC Hot conductor to the terminal of the 20-amp circuit breaker.
4. Neutral and ground conductors (white and green conductors) should both be connected to the closest 6-terminal grounding bar (located on each side of the control panel). Barrel type connectors are not required on any grounding bar connections.

15 AMP LOAD CIRCUITS (14 gauge wire)

1. Cut the AC feeder cable to the required length making sure there is enough extra wire inside the set control panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
2. Strip back the insulation on each of the 3 conductors in the 14 gauge AC cable. No terminals are required as each connection is a "set screw" type
3. Connect the black AC Hot conductor to the terminal of either of the two 15 amp circuit breakers provided. A barrel connector must be crimped on the conductor prior to connection in order to fill the large "set screw" type terminal on the circuit breaker properly.

NOTE: Barrel connectors would not be required on the circuit breaker if two separate AC Hot load wires are connected to the same circuit breaker. This will fill the set screw terminal enough to allow for good clamping force.

Onan Instruction Sheet A 250
Onan Corporation 1400 73rd Avenue Northeast Minneapolis Minnesota 55432
4-81

POWER AND CONTROL WIRING KIT FOR 4.0 BFA AUX MODELS (Side-Mount Kit 335-0129 and Over-The-Rail Kit 335-0130)

These kits include all necessary wiring and hardware for:

1. Connecting the auxiliary generator set to the load distribution panel,
2. Connecting the AC duplex receptacle in the remote starting panel to the load distribution panel, and
3. Connecting the remote starting panel to the generator set control panel.

The only difference between the two kits is the length of AC main feeder conductor cable. The AC power wiring harness (between generator set compartment and load distribution panel) and the DC control harness (between remote starting panel and generator set control panel) must be hand wired and cut to required length during the installation. Throughout this instruction sheet, illustrations of wiring show ONLY those wires and connections being installed for each major component in that section. Any wiring already installed in previous sections is not illustrated as the installation progresses. Figure 6 shows a complete system pictorial wiring diagram. Figure 7 shows a complete system electrical wiring diagram.

These instructions assume that the generator set and compartment are already mounted and the necessary compartment wiring access holes have already been completed. The load distribution panel and remote starting panel should already be mounted in their desired locations on the truck. Installation of these components is covered in the 900-0322 Installation Guide shipped with each Aux model.

Read through these instructions completely prior to beginning the actual installation. Perform the following steps in the logical order listed to minimize installation problems. Proceed as follows:

GENERAL WIRING RECOMMENDATIONS

WARNING ***Installation of all wiring must conform to all applicable codes and follow National Electrical Code standards and recommended practices. A qualified electrician should inspect all wiring.***

- Route all AC and DC wiring along the inside of the truck frame rails where possible. Keep away from rotating or moving shafts and linkages of the truck. Use insulated hold-down clamps spaced approximately every 18 inches (closer together in bends or near high heat sources). Plastic tie wraps can be used in between heavier insulated clamps. Use additional protective sleeving (such as heater hose) over wiring wherever it crosses over frame rails or in sharp bends. Any existing holes in truck cross support frame members used for routing of wiring should be grommeted to protect wiring.

WARNING ***Do NOT tie any electrical wiring to the fuel or hydraulic lines of the truck because of fire hazard. Keep all wiring away from the exhaust pipe.***

CAUTION ***Do NOT drill any additional new holes in the truck frame rails or cross-support frame members for routing wiring through. Any existing holes used for routing of wiring should be protected with grommets.***

- Use water-tight strain relief connectors (supplied in kit) whenever wiring passes through any housing, compartment, shelf, panel, cab wall or partition.

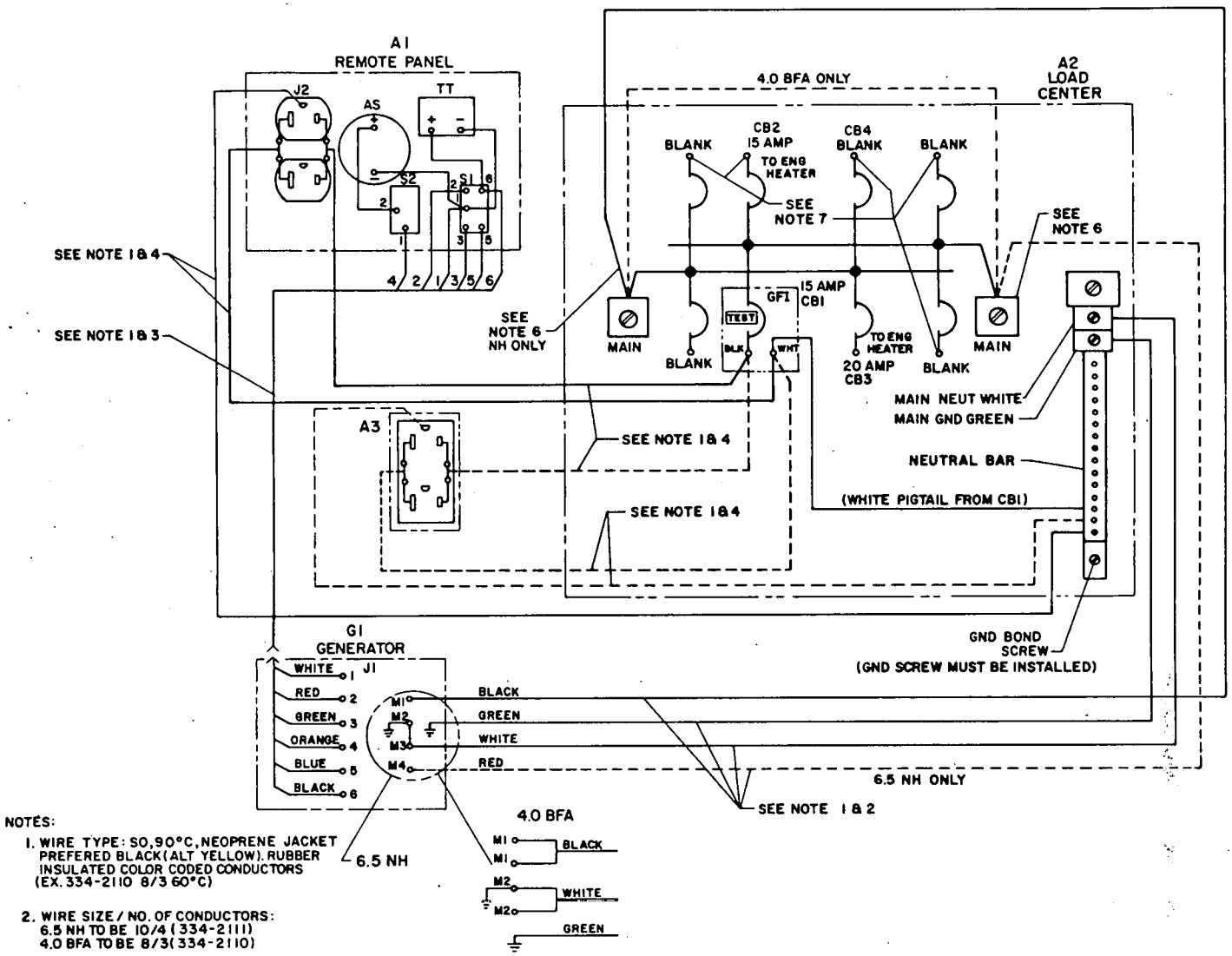
Lubricate the wire outer jacket with liquid soap, motor oil or other suitable material to aid in assembly of strain relief connectors.

WARNING ***All holes to the inside of the truck cab must be sealed to prevent poisonous exhaust gases from entering cab interior. Use a silicone rubber sealant to seal around all openings made for electrical wiring.***

MAIN FEEDER CONDUCTORS

The main feeder conductors supply the AC current from the generator set to the main bus terminal for the circuit breakers in the load distribution panel. Twenty or 30 feet of 8-gauge, 3-conductor (type SO) neoprene-jacketed cable is supplied for use as the main feeder conductor cable. Length varies according to type of mounting.

WARNING ***If wire nuts are used for wiring connections, wrap all connections with electrical tape after installation as further protection against short circuits or loosening due to vibration.***



NOTES:

1. WIRE TYPE: SO, 90°C, NEOPRENE JACKET PREFERED BLACK (ALT YELLOW). RUBBER INSULATED COLOR CODED CONDUCTORS (EX. 334-2110 8/3 60°C)
2. WIRE SIZE / NO. OF CONDUCTORS:
   6.5 NH TO BE 10/4 (334-2111)
   4.0 BFA TO BE 8/3 (334-2110)
3. WIRE SIZE / NO. OF CONDUCTORS:
   6.5 NH & 4.0 BFA TO BE 16/6 (334-2116)
4. WIRE SIZE / NO. OF CONDUCTORS
   6.5 NH & 4.0 BFA TO BE 14/3 (334-2115)
5. BALANCE LOADS AT THE LOAD CENTER ON THE 6.5 NH
6. BARREL CONNECTOR (332-0417, 10GA) FOR THE 6.5 NH & (332-0418, 8GA) FOR THE 4.0 BFA MUST BE CRIMPED ON THE HOT LEADS.
7. BARREL CONNECTOR (332-0430, 14 GA) MUST BE CRIMPED ON THE HOT LEADS OF "LOAD CIRCUITS WHEN 14 GA WIRE IS USED."

	REF DES	QTY	DESCRIPTION
	A1	1	CONTROL PANEL ASSY
	A2	1	LOAD CENTER
*	A3	1	HANDY BOX
		1	RECEPTACLE-DUPLEX
		1	COVER-DUPLEX RCPT
	CB1	1	BREAKER-CIRCUIT GFI (15A)
	CB2	1	BREAKER-CIRCUIT (20A)
	CB3	1	BREAKER-CIRCUIT (15A)
*	CB4	1	BREAKER-CIRCUIT (10A)
	G1	1	GENERATOR
		1	STRAIN RELIEF-CABLE (3/4)
		1	STRAIN RELIEF-CABLE (1/2)

* WHEN USED

FIGURE 7. ELECTRICAL SYSTEM WIRING DIAGRAM

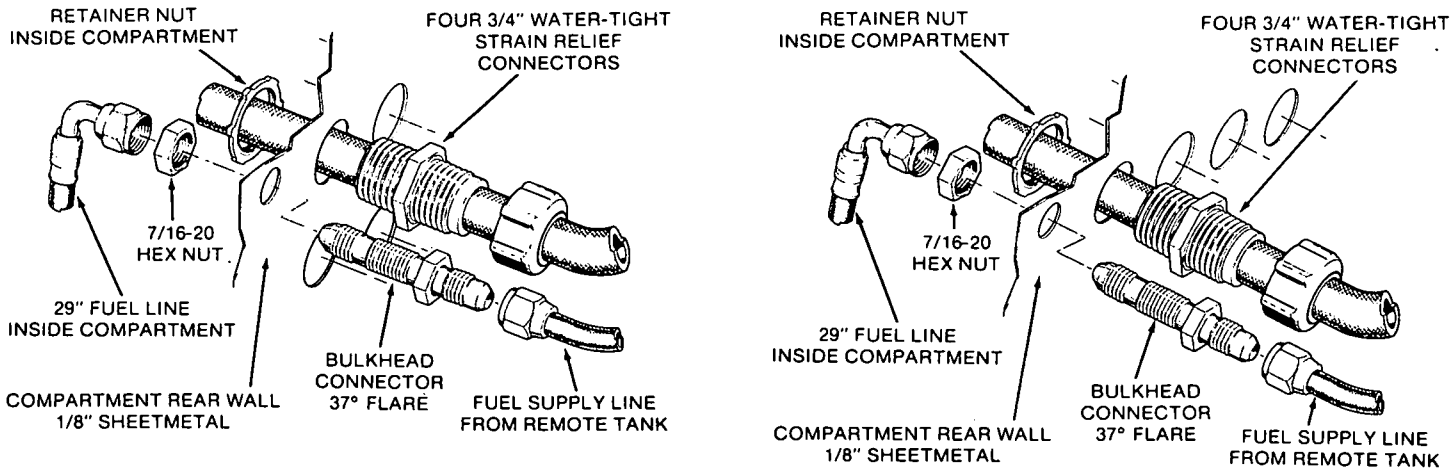


FIGURE 2. COMPARTMENT ACCESS HOLES AND STRAIN RELIEF CONNECTOR INSTALLATION

4. Connect both generator leads labeled M1 (Hot) to the black conductor of the main feeder cable using wire nuts (supplied in kit).
5. Connect both generator leads labeled M2 (Neutral) to the white conductor of the main feeder cable using wire nuts.
6. Wrap both connections (steps 4 and 5) with electrical tape after installation as further protection against short circuits or loosening due to vibration. See Figure 1.
7. Connect the green (ground) conductor with uninsulated ring terminal (installed in step 2) to the generator set AC junction box on top of the set as shown in Figure 1. Use an existing hole in junction box. Figure 1 is for reference only.
8. Route the opposite end of the main supply cable through a second 3/4 inch metal strain relief connector installed in the first 1-1/8 inch diameter hole in left side (rear view) of compartment rear wall (next to fuel fitting) as shown in Figure 2. Secure strain relief connector with another 3/4 inch retainer nut from inside compartment rear wall.

   Some slack should be allowed in wiring for movement from vibration and to allow generator set to rock on the mounts.

9. Route the AC feeder conductor cable along the inside of the truck frame rails where possible. Secure cable every 18 inches along the run with insulated hold-down clamps (closer together in bends or near high heat sources). Use nylon tie wraps as required in between clamps.

On cab-over-engine type truck chassis, all routing of any wiring, regardless of type or function MUST be long enough and routed in such fashion that raising and lowering of cab for access to engine will NOT interfere with wiring. Allow slack at the nose (hinged point) of the cab for raising cab as required.

CONNECTING FEEDER CONDUCTORS TO DISTRIBUTION PANEL

With the distribution panel mounted in the desired location, the AC feeder cables from the generator compartment must be routed and properly secured (see section on *GENERAL WIRING RECOMMENDATIONS.*). The individual conductors (already connected at the generator set) can now be connected to the main bus terminal of the circuit breakers inside the distribution panel. See Figure 3.

1. Route the main feeder cable through a 3/4 inch metal strain relief connector wherever wiring enters cab area, compartment, through any wall or partition on its way to the load distribution panel. Another 3/4 inch metal strain relief connector must be used on feeder cable at entry point (knock-out) into load distribution panel. Secure metal strain relief connector with 3/4 inch retainer nut on the inside wall of the distribution panel. See Figure 3.
2. Connect the black M1 conductor to either one of the large outside terminals on the circuit breaker main bus bar inside the load distribution panel as shown in Figure 3. Connect a jumper wire (8-gauge wire size) from the same main bus terminal to which M1 was connected, to the opposite large outside terminal on the main circuit breaker bus bar. See Figure 3. A barrel connector must be crimped on the opposite end of the 8-gauge jumper wire to fill the large connector of the main bus bar terminal properly. See Figure 3.
3. Neutral and ground conductors (white and green conductors) do NOT require barrel connectors. Connect both of these conductors to the grounding bar within the load distribution panel as shown in Figure 3.
4. Install bond screw in the grounding bar as shown in Figure 3.

CONNECTING FEEDER CONDUCTORS TO GENERATOR AC OUTPUT LEADS

The generator AC output wires (four wires) terminate within the AC junction box on top of the generator set behind the control panel as shown in Figure 1.

The generator AC output load wires (labeled M1, M1, M2 and M2) must be connected to the individual color coded conductors (wires) of the 8 gauge, 3-conductor (type SO) main supply cable (from kit) as indicated in Figure 1. Proceed as follows:

1. Remove approximately eight inches of the outer insulation (neoprene jacket) on the feeder conductor supply cable. Lubricate the wire outer neoprene jacket with liquid soap, motor oil or other suitable material to aid in assembly of metal strain relief connectors.
2. Install cable as far as possible into 3/4 inch water-tight metal strain relief connector (with 45° angle elbow). Attach an uninsulated solderless ring terminal on the end of the green (ground) conductor of the supply cable after it is routed through the metal srain relief connector.
3. Install the 3/4 inch water-tight metal strain relief connector and supply cable into the lower knock-out of the generator set AC junction box as shown in Figure 1. Secure strain relief connector with a 3/4 inch retainer nut on the inside wall of the junction box.

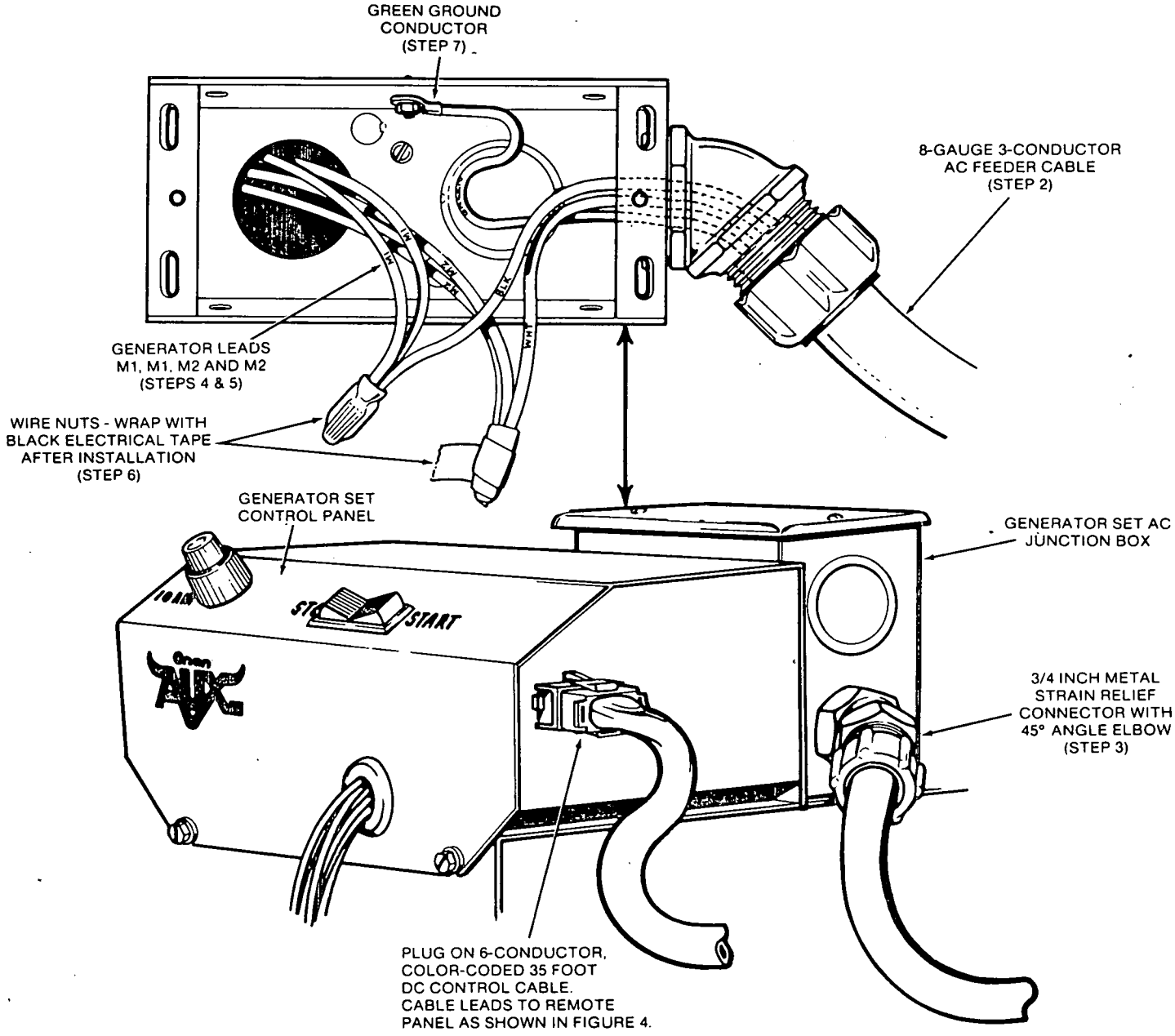


FIGURE 1. CONNECTING FEEDER CONDUCTORS TO GENERATOR AC OUTPUT LEADS

CONNECTING REMOTE PANEL AC DUPLEX RECEPTACLE TO LOAD DISTRIBUTION PANEL

One AC duplex convenience receptacle is provided in the remote starting panel. This receptacle must be connected to the 15-amp ground fault circuit breaker in the load distribution panel. Proceed as follows:

1. Strip back the insulation on one end of the 35-foot, 14-gauge, 3-conductor AC cable.
2. Install two blade-type terminals, one on the black and one on the white conductor of the 35-foot AC cable. Terminals are identified in Figure 3.
3. Install a spade terminal (blue in color) on the green (ground) conductor of the 15-foot AC cable.
4. Use a 1/2 inch metal strain relief connector or Romex connector on AC cable at entry point into remote panel. Method of mounting panel (wall or shelf) determines which connector to use. See Figure 4.
5. Connect the black conductor to the AC Hot (gold contact) terminal of the duplex receptacle as shown in Figure 4.
6. Connect the white conductor to the AC neutral (silver contact) terminal of the duplex receptacle as shown in Figure 4.
7. Connect the green ground conductor with spade terminal to the ground screw on top corner of receptacle as shown in Figure 4. Conductor terminals (two blade-type and one spade terminal) were installed in steps 2 and 3.
8. Route the AC cable directly to the distribution panel from the AC duplex receptacle in the remote panel to minimize wiring length required. Secure cable every 18 inches along the run with insulated hold-down clamps and/or nylon tie wraps as required.
9. Route the AC cable through a 1/2 inch Romex connector at the entry point (knock-out) going into load distribution panel as shown in Figure 5.
10. Cut cable to required length making sure there is enough extra wire inside load distribution panel to make all connections. Allow some slack in the wiring for movement from vibration to prevent breakage.
11. Strip back the insulation on each of the 3 conductors in the 14 gauge AC cable. No terminals are required as each connection at the circuit breaker is a "set screw" type connection.
12. Connect the black and white conductors to the 15-amp circuit breaker which has the built-in ground fault circuit protection. Note the white marking on the circuit breaker for the correct location of the white conductor. The black conductor goes to screw terminal marked "Load" on side of circuit breaker. See Figure 5.

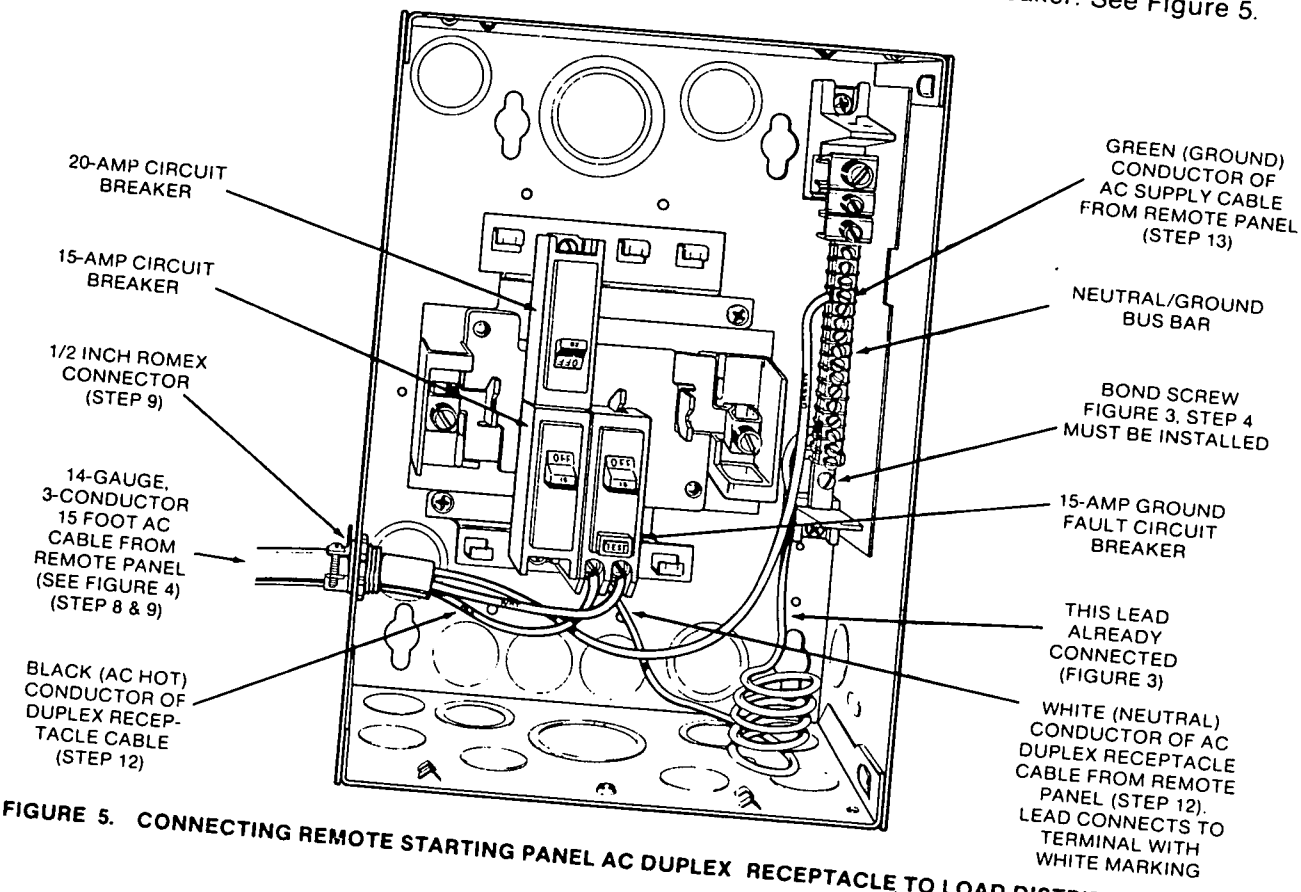


FIGURE 5. CONNECTING REMOTE STARTING PANEL AC DUPLEX RECEPTACLE TO LOAD DISTRIBUTION PANEL

Remote Starting Panel Installation

Remote panel has three 5/16 inch mounting holes in bottom panel for shelf mounting and two 7/8 inch holes in back panel for DC control harness and AC supply conductor for receptacle. Use 14-20 screws of suitable length to securely bolt panel in desired location.

Exact location of remote panel varies according to owner preference and set location as well as type of truck chassis. Remote panel is usually located near driver's seat in cab or in a convenient location within sleeper cab. Generator set can be started at compartment location if desired. Housing front cover must be removed for access to set control

CONNECTING REMOTE PANEL TO GENERATOR SET

A 6-conductor, 16-gauge (type SO) neoprene-jacketed multistrand wire cable is required for connecting the remote control starting panel to the generator set control panel. The cable must be fabricated during the installation, cut to required length and hand wired to the remote terminal block inside the remote panel and inside the generator set control panel. Ring type terminals should be used to connect remote cable to terminal blocks inside both controls.

Route the DC control cable along the inside of the truck frame rails where possible.
Secure cable every 18 inches along the run with insulated hold-down clamps (closer together in bends or near high heat sources). Use nylon tie wraps as required in between clamps.

Some slack should be allowed in wiring for movement from vibration

A 1/2 inch water-tight strain relief connector or Romex connector should be used on DC cable where cable enters remote panel. Remote panel location and method of mounting (wall or shelf) determines which connector to use. See Figure

On cab-over-engine type truck chassis, all routing of any wiring, regardless of type or function MUST be long enough and routed in such fashion that raising and lowering of cab for access to engine will NOT interfere with wiring. Allow slack at the nose (hinged point) of the cab for raising cab as required.

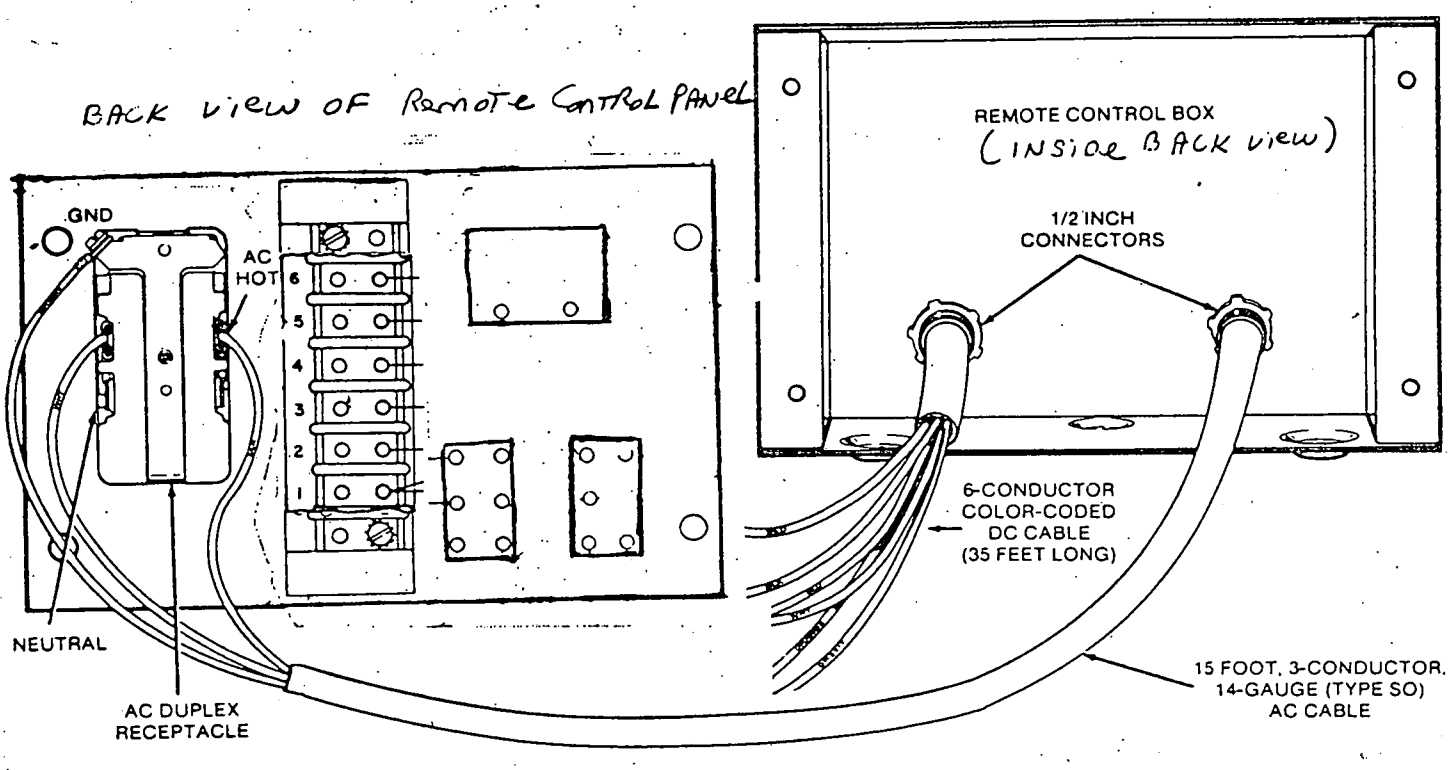
WARNING *Do NOT install remote starting panel without the remote control box housing. A potential shock hazard exists because of the exposed terminals of the AC receptacle.*

Remote cable is NOT supplied due to variation in length requirement between truck makes and models. Color coded bulk cable (6-conductor, 16-gauge type SO multistrand wire in a neoprene jacket) is available from Onan as part of the separate optional control wiring kit referenced in the beginning of the *Electrical Loads and Connections* section. *This kit includes all necessary wiring and hardware to interconnect the remote starting panel (with duplex receptacle) to the generator set control panel. Step-by-step installation instructions provided with each kit.* HRC

CAUTION *Do NOT use solid wire or wire smaller than 16-gauge in size. Solid wire will fatigue due to vibration and break. Wire smaller than 16-gauge will result in poor starting from remote panel and short service life.*

Refer to interconnection wiring diagram shown in Figure ___ and remote panel wiring connections according to circuit function, terminal block no. and suggested color code illustrated in Figure ___ (see chart). Use Heyco strain reliefs or Romex connectors on cable when routing through entry holes in remote panel to secure wiring and seal any entry holes.

WARNING *All holes leading to the inside of the truck cab for electrical wiring must be sealed to prevent poisonous exhaust gases from entering the cab interior.*



GENSET Terminal No.	REMOTE PANEL Terminal No.	CIRCUIT FUNCTION	WIRING COLOR CODE
1	1	Ground	White
2	2	Stop	Red
3	3	Start	Green
4	4	Remote Alarm Signal	Orange
5	5	Diesel Preheat	Blue
6	6	Running Time Meter and Switch S1 Integral Running Light	Black

FIGURE . REMOTE STARTING PANEL INSTALLATION

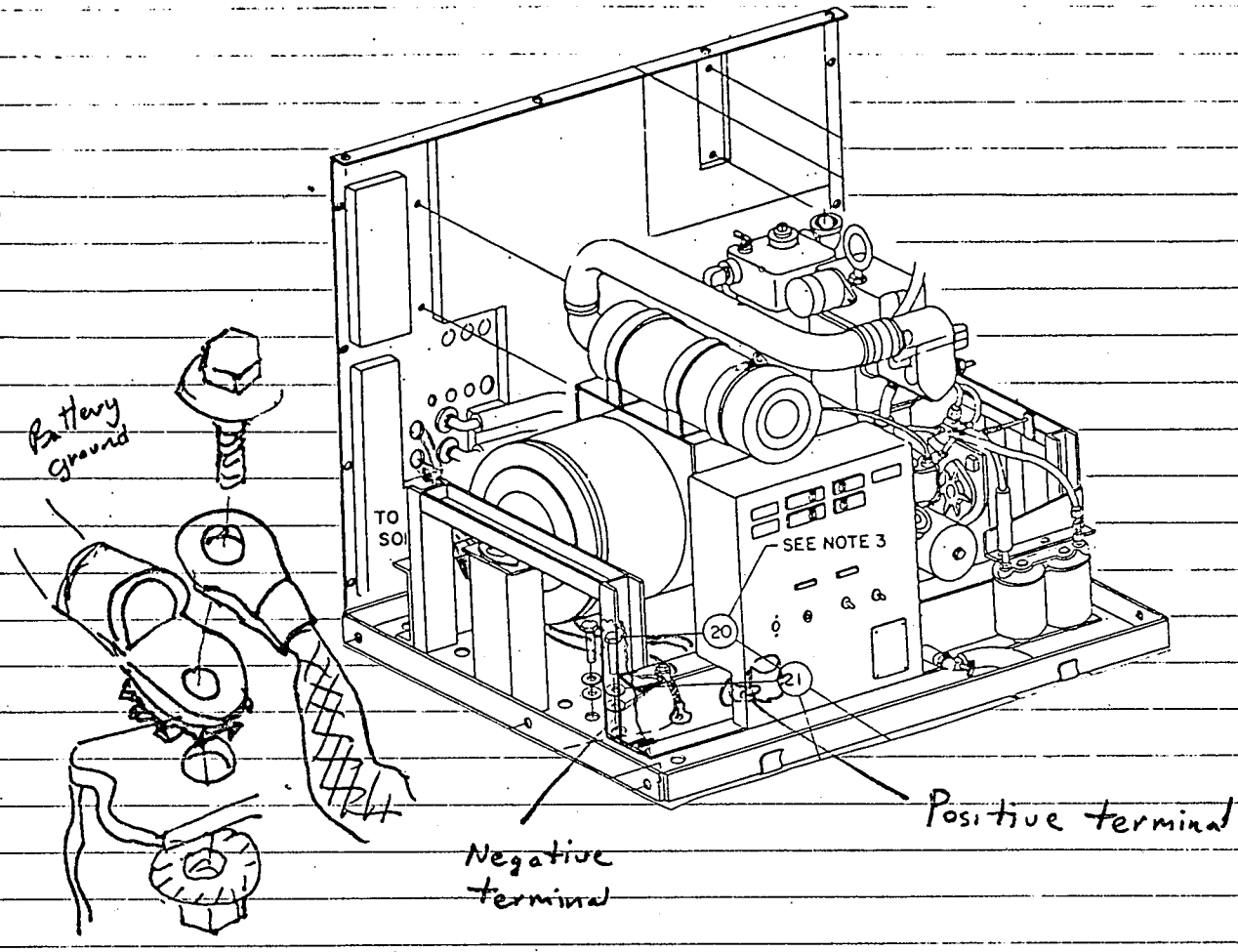


Figure 15

POSITIVE GROUND STARTING AND CHARGING SYSTEMS

Some foreign truck manufacturers and certain U.S. built special application or types of trucks may use a POSITIVE GROUND Starting system. If the auxiliary generator set is being installed in one of these applications, provisions have been made inside the generator set control(after some minor modifications) to quickly and easily convert the set's wiring when necessary.

Control and battery cable connections at both the generator set control and the truck battery rack will change. The previous recommendations for battery cable size and routing do not change.

Consult factory if necessary to convert the auxiliary generator set to a positive ground starting and charging system

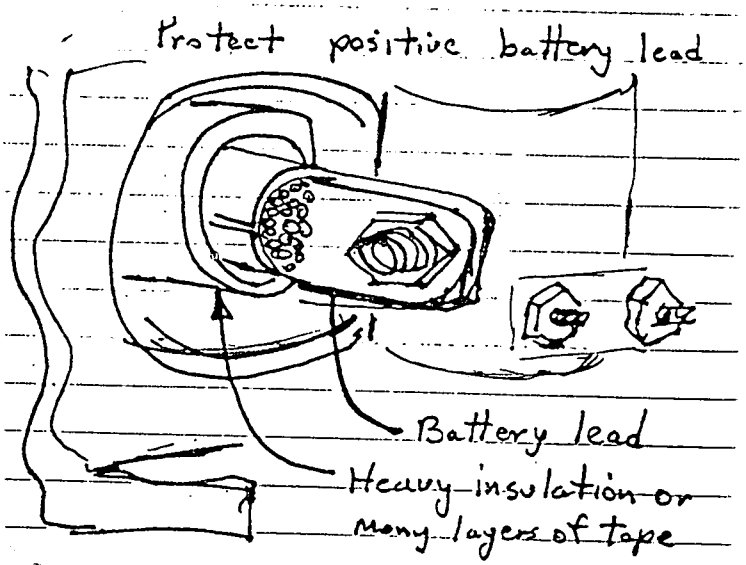


Figure 16

PARTS IDENTIFICATION LIST 900-0323
ACCESSORY KIT 542-0319

This list identifies each major assembly and associated hardware required for a side mounted installation and supplied by Onan. Check off each item prior to performing the actual installation.

HOUSING

QTY	DESCRIPTION	WHERE USED
1	Housing and compartment mounting frame	Generator set compartment mounts on truck frame rail
1	Housing compartment cover	Compartment access cover
1	Housing compartment entry step	Attaches to compartment floor underneath for cab entry
4	5/8-11 x 2" grade 8 hex flange mounting bolt	Mounts housing compartment to truck frame rail
4	5/8-11 hex flange grade 8 nut (prevailing torque)	Used with above bolts for compartment installation
6	3/8-16 x 3/4" hex head cap screw (self locking)	Secures generator set mounting tray to compartment frame
4	3/8-16 x 1" hex head cap screw (self locking)	Secures compartment step to bottom of compartment frame
1	7/16-20 (-4) SAE 37° flare feedthrough connector	Mounts in 1/2" O.D. hole in compartment rear wall for fuel supply line.
1	7/16 hex nut	Secures SAE 37° flare feedthrough connector in compartment rear wall
1	SAE 37° flare 90° male elbow fitting	Installs in generator set fuel pump inlet (bottom hole)
1	29" fuel line assembly with fittings	Compartment (inside) fuel line between fuel pump and compartment rear wall feedthrough connector
1	Hose 14" long	Connect to oil drain fitting on generator set for changing oil

EXHAUST SYSTEM

QTY	DESCRIPTION	WHERE USED
1	Exhaust down tube 12-1/2" long	Connects to generator set exhaust manifold
1	Muffler	Mounts under compartment
1	Asbestos gasket	Installed between exhaust manifold flange and exhaust down tube
2	5/16-18 x 1-1/4" hex head cap screw	Connect exhaust down pipe to exhaust manifold on Gen Set
2	5/16 lock washers	For exhaust cap screws
2	5/16 nuts	For exhaust cap screws
1	Muffler U-bolt clamp 1-5/8" size	Connect muffler to exhaust down pipe on Gen Set
1	5/16-18 x 3/4" hex head cap screw	Connect muffler hanger strap to gen set hanger strap
1	5/16 flat washer	For muffler hanger strap
1	5/16 nut self locking	For muffler hanger strap
1	Tailpipe U-bolt clamp 1-1/2" size	For connecting tailpipe to muffler (customer supplied)

ELECTRICAL COMPONENTS

QTY	DESCRIPTION	WHERE USED
1	Remote control panel with instrumentation	Mounts on control box for remote starting
1	Remote control box	Mounts inside truck
4	10/32 x 3/8" screw slotted hex washers	Attaches control panel to control box
1	Remote plug with 6 inch wire leads	Plugs into set control for remote DC cable

1	Load distribution box	For distribution of generator AC output to each load circuit
1	15 amp circuit breaker	Mounts iside distribution panel
1	15 amp circuit breaker with ground fault provision	Mounts inside distribution panel
1	20 amp circuit breaker	Mounts inside distribution panel
1	10/32 x 1-1/8 self tapping bonding screw	Bonds neutral bar to distribution box inside
4	1-7/16" coarse thread quickscrew (with large flat head and aligning pin)	Attaches cover to load distribution panel
1	Black plastic filler cover	Slides into blank (extra) circuit breaker position in cover of distribution panel

FUEL TANK KIT 415-0506
(Boxed separately and packaged within accessory kit 542-0319)

QTY	DESCRIPTION	WHERE USED
1	Fuel tank 11.5 gallon	Installs between truck frame rails
2	Bracket with gasket	Install fuel tank in position on truck
6	5/16-18 x 1-1/2" hex head cap screws	Fasten fuel tank between truck frame rail flanges
6	5/16 lock washers	Used on fuel tank cap screws
1	18", 12-gauge wire lead	Static ground lead between fuel tank and truck frame
1	5/16 star washer	Used on fuel tank cap screw for static ground lead
1	1/4-20 x 1" hex head cap screw	Attach static ground lead to truck frame
2	1/4" star lock washers	Used on ground lead cap screw
1	1/4 hex nut	Used on ground lead cap screw

CUSTOMER SUPPLIED ITEMS

This list identifies many electrical components such as wiring and connectors recommended for use throughout the installation and available from Onan on an optional basis. Some common hardware is included. These items should also be "on hand" prior to actually performing any installation. The optional items at the end of this section vary according to customer requirements and are not required for every installation.

QTY	DESCRIPTION	WHERE USED
8	Water-tight 3/4" metal strain relief (331-0237*)	Four in generator compartment rear wall; one into generator set AC junction box; one into load distribution panel for main feeder conductor THRU FLOOR & 20AMP CKT FLOOR
* 2	Watertight 1/2" metal strain relief (331-0236*)	One for AC cable into remote panel; one for AC cable out of load distribution panel
As Req	Insulated hold-down clamp 1/2" size (332-1554*)	Secure wiring as routed
As Req	Insulated hold-down clamp 3/4" size (332-1356*)	Secure wiring as routed
2	Barrel connector (crimp-type) for 10-gauge multistrand wire (332-0417*)	Main feeder hot conductors (m1 black & m4 red) inside distribution panel on 6.5 NH models only
2	Barrel connector (crimp-type) for 8-gauge multistrand wire (332-0418*)	Main feeder hot conductor (m1 black) and jumper wire inside distribution panel on 4.0 BFA models only
1	Barrel connector (crimp-type) for 14-gauge multistrand wire (332-0430*)	AC hot receptacle conductor at ground fault - 15 amp circuit breaker inside distribution panel
Per foot As Req	10-gauge 4-conductor (type SO) neoprene-jacketed multi-strand wire rated for 600 VAC, 90°C (334-2111*)	Main feeder conductor cable 6.5 NH models only
Per foot As Req	8-gauge, 3-conductor (type SO) neoprene-jacketed multi-strand wire rated for 600 VAC, 60°C (334-2110*)	Main feeder conductor cable 4.0 BFA models only
Per foot As Req	12-gauge, 3-conductor (type SO) neoprene-jacketed multi-strand wire rated for 600 VAC, 90°C (334-2114*)	20-amp circuit load cable

2 331-27.

* 1/2" ROMEX CONNECTORS QTY 5 (2 AC RECPT. 1 DC AT REMOTE 2 SPT. ACCES)

Per foot As Req	14-gauge, 3-conductor (type SO) neoprene-jacketed multi-strand wire rated 600 VAC, 90°C (334-2115*)	15 amp circuit load cable
4	1/4-20 x 1-1/4" hex head cap screw	Mounting load distribution panel
8	5/16 flat washers	For above cap screw
4	5/16 spring lock washers	For above cap screw
3	1/4-20 x 1-1/4" hex head cap screw	Mounting remote control panel
6	5/16" flat washers	Mounting remote control panel
3	1/4" nut self locking	Mounting remote control panel

OPTIONAL ITEMS

QTY	DESCRIPTION	WHERE USED
	AC duplex receptacle with nickel plated contacts (323-1222*)	Optional AC duplex outlet for plug-in loads
	Weather protective cover for external AC receptacle (323-1223*)	Optional weather protective cover for AC duplex outlet
	AC receptacle box heavy duty (330-0118*)	Optional AC duplex receptacle box for optional duplex outlet
	Water and dust-tight 3-prong hospital grade connector with nickel plated contacts and rubber O-ring seal	For 120 Volt AC plug-in type loads such as engine heaters
	Male end (~~332~~ 323-1218*)	
	Female end (~~332~~ 323-1219*)	
Per foot As Req	Double 00 (2/0) battery cable up to 10 ft. in length (per cable) (334-0885*)	Positive (+) and negative (-) battery cables
	Exhaust Tailpipe Kit (155-1902)	Optional tailpipe for exhaust gases

***Available from Onan under Part No. listed.**