

TM 11-1410

WAR DEPARTMENT TECHNICAL MANUAL

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Reference List 20-4

PREVENTIVE MAINTENANCE MANUAL

FOR RADIO SETS SCR-270-B, SCR-270-C, SCR-270-D, SCR-270-E,
SCR-270-BA, SCR-270-CA, SCR-271, SCR-271-A, SCR-271-AA,
SCR-271-AAA, SCR-271-AB, SCR-271-B, SCR-271-BA, SCR-271-D,
SCR-271-E, SCR-271-F, SCR-271-G, SCR-271-H, SCR-271-J, SCR-271-K,
SCR-271-L, SCR-271-LA, SCR-271-M.

*UNCLASSIFIED per WD Circular #43
8 May 46*

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WAR DEPARTMENT

21 JUNE 1944

WAR DEPARTMENT TECHNICAL MANUAL
TM 11-1410

PREVENTIVE MAINTENANCE MANUAL

FOR RADIO SETS SCR-270-B, SCR-270-C, SCR-270-D, SCR-270-E,
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WAR DEPARTMENT,

WASHINGTON 25, D. C., 21 June 1944.

TM 11-1410, Preventive Maintenance Manual for Radio Sets SCR-270-B, SCR-270-C, SCR-270-D, SCR-270-E, SCR-270-BA, SCR-270-CA, SCR-271, SCR-271-A, SCR-271-AA, SCR-271-AAA, SCR-271-AB, SCR-271-B, SCR-271-BA, SCR-271-D, SCR-271-E, SCR-271-F, SCR-271-G, SCR-271-H, SCR-271-J, SCR-271-K, SCR-271-L, SCR-271-LA, SCR-271-M, is published for the information and guidance of all concerned.

[A. G. 300.7 (5 May 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

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For explanation of symbols, see FM 21-6.

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WARNING

HIGH VOLTAGE

is used in the operation of
this equipment.

DEATH ON CONTACT

may result if operating personnel
fail to observe safety precautions.

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the turntable in order to facilitate any emergency work on the antenna. If this is the case, see that there is sufficient tension on the cable to hold the turns firmly on the drum.

(6) The winch brake lining. Look for signs of wear. Replace the lining if it is worn down to a point where the rivets can be seen. If the rivets are scoring the drum replace the lining.

(7) The ratchet on the winch reel. Look for corrosion and dirt.

(8) The winch cable. Make certain the cable is clean. Keep the cable off the ground and free of dirt. Whenever the antenna is raised or lowered inspect the cable. Look for broken strands, dust, and sand. Make sure there are no kinks in the cable. A kink in the cable means an eventual break. See that the cable is properly oiled and when not in use covered with a burlap bag. When rewinding the cable make sure it winds on the reel in even layers.

C. CLEAN.

(1) The platform. Brush off the platform and remove all grime and grease. Remove all rust spots with a wire brush and #00 sandpaper. Wipe down the platform with a cloth dipped in gasoline. Repaint any exposed metal spots to match the surrounding surface.

(2) The tower. Clean any rust, grime and grease on the tower and ladder rungs. Clean any stand-off insulator clamp that has become corroded.

(3) The winch cable. If the cable is gummed with dirt, dust, or sand, clean it with a brush or cloth and gasoline. Clean all exposed metal surfaces and gear teeth of the winch; apply a

light film of oil or grease as a lubricant and rust preventive. Always keep the cable cleaned and oiled. The cable winch assembly must be wrapped in a canvas when not in use, in order to keep out dust, sand, and water.

(4) The winch. Clean all dirt, excess grease and rust spots off the winch assembly. Remove all caked grease from the winch gears and apply a clean film of grease or oil. Remove all rust spots with a wire brush and repaint to match the surrounding surface. When the winch has been maintained and cleaned thoroughly, put a canvas covering over the whole unit and tie it down firmly to the winch supports.

(5) The entire area around the tower base. Use a rake to keep the whole area clean and neat.

L. LUBRICATE.

(1) The four shaft bearings with a few drops of No. 30 engine oil. Each bearing has an oil hole on the top. Clean out the oil hole before applying oil. Clean the reduction gear teeth of rust and caked grease, and apply a thin film of grease or oil to lubricate it and prevent rusting.

Caution: Keep the brake band and brake drum free from oil and grease.

(2) The winch cable. Apply a light film of engine oil SAE No. 10 to the winch cable as a lubricant whenever it becomes dry. After every cleaning apply a light film of this oil to the cable. Always keep the cable clean and oiled.

c. REFERENCES.

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Section X.

POWER UNITS

146. Item 102—Preparatory Steps, Maintenance of Le Roi Engine

a. TOOLS NEEDED. One-half to one hour before the official maintenance shut-down period begins, arrange on a piece of canvas near the Le Roi engine the following tools and equipment. (See fig. 154.)

- (1) Air blower (if available).
- (2) Allen wrench.
- (3) Brush, stiff cleaning.

- (4) Brush, paint, 1-inch, 1-1/2-inch, two.
- (5) Battery pliers.
- (6) Cloth, cleaning.
- (7) Cleaning agents (carbon tetrachloride, alcohol, naphtha).
- (8) Container (five-gallon size), kerosene or diesel oil.
- (9) Container for nuts, bolts, and screws.
- (10) Canvas.
- (11) Commutator cleaning tools.



- (12) Di
- (13) Ex
- (14) Fe
- (15) Gr
- (16) Hy
- (17) Ho
- (18) M
- (19) Oi
- (20) Oi
- (21) Pl
- (22) Pa
- (23) Pa
- (24) Sa
- (25) Sc
- (26) Sp

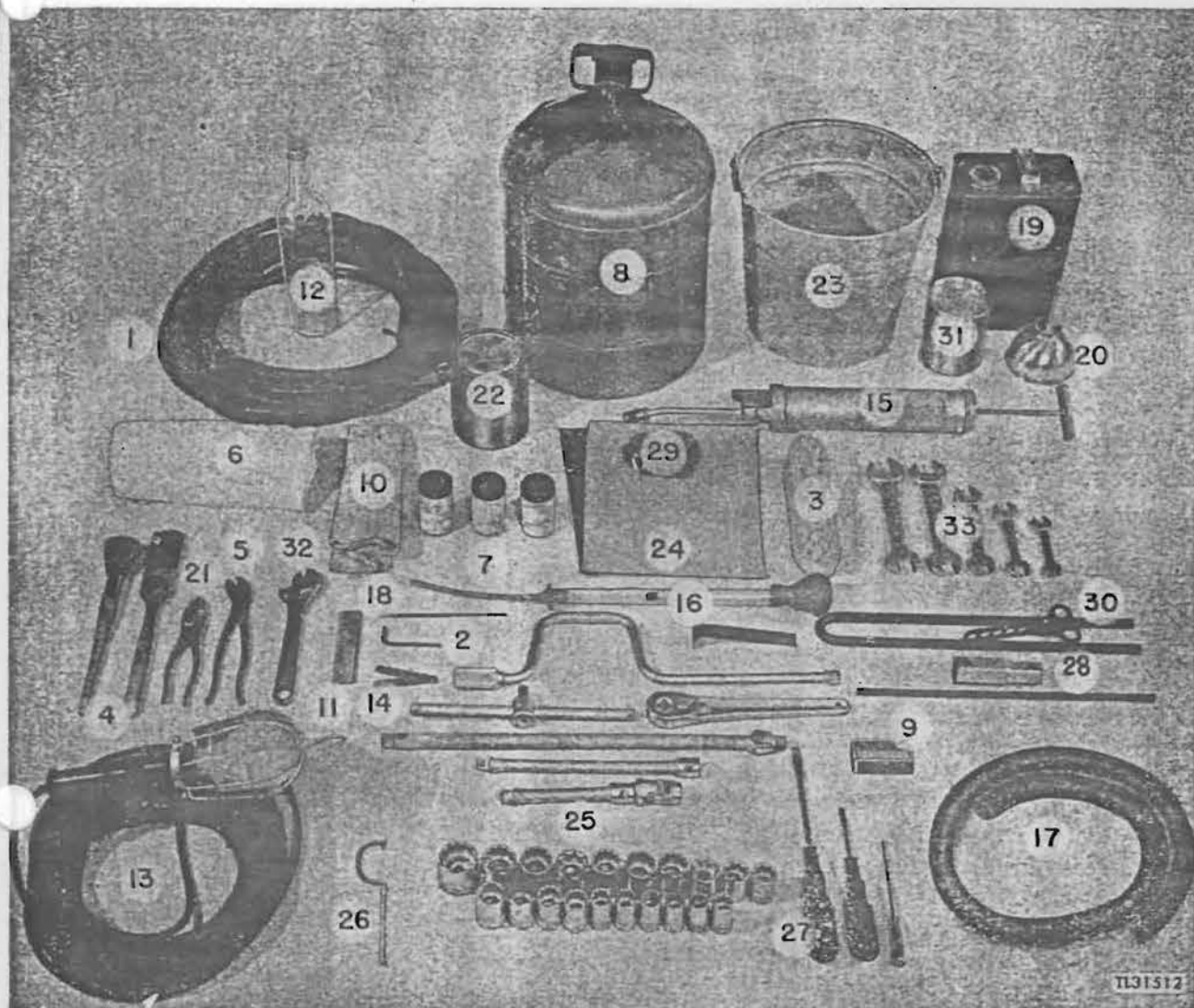


Figure 154. Le Roi engine maintenance tools.

- | | |
|--|--|
| (12) Distilled water. | (27) Screw drivers, 4-inch by $\frac{1}{4}$ -inch, 8-inch, |
| (13) Extension light. | 6-inch by $\frac{1}{4}$ -inch, three. |
| (14) Feeler gauge (in kit). | (28) Spark-plug wrench. |
| (15) Grease gun with fitting. | (29) Cloth, crocus. |
| (16) Hydrometer. | (30) Valve lifter. |
| (17) Hose, 5-feet by 1-inch diameter. | (31) Vaseline (petroleum jelly), 1 can. |
| (18) Magneto point file. | (32) Wrench, adjustable end, 8-inch. |
| (19) Oil, can. | (33) Wrenches, $\frac{5}{8}$ -inch, $\frac{9}{16}$ -inch, $\frac{1}{2}$ -inch, |
| (20) Oilcan (lubricating oil). | $\frac{7}{16}$ -inch, and $\frac{3}{8}$ -inch, five. |
| (21) Pliers. | Forty articles needed. |
| (22) Paint can. | <i>b. SAFETY PRECAUTIONS.</i> (1) The moment the |
| (23) Pail for kerosene or other solvent. | radio set is officially off the air for maintenance, |
| (24) Sandpaper, #00 and #000. | shut off the Le Roi engine and allow it to cool |
| (25) Socket wrenches. | before performing maintenance. Guards, shields, |
| (26) Spanner wrench. | or screens must not be removed until the engine |
| | is stopped. |

(2) Do not blow or suck on any gas line to clear the line, as the gasoline may contain tetraethyl lead, a deadly poison.

(3) Do all washing of parts with kerosene outside of the van or building.

(4) Do not spill any electrolyte (battery acid) on the clothes or spatter any into the eyes.

(5) Do not touch the exhaust pipe or manifold, as they are extremely hot while the engine is in operation and for some time after the engine has been idle.

(6) When working on the generator while it is operating (as would be the case when the alternator slip rings require cleaning), take care to prevent personal injury from the rotating machinery. Never perform maintenance on the power generator without first rolling up your sleeves and removing your tie. In addition, turn the field rheostat to its extreme clockwise position in order to reduce the voltage on the brushes to a minimum. When the cleaning operation is completed return the control to its normal setting.

Caution: While the Le Roi engine is operating always keep the power house or van well ventilated to prevent poisoning by carbon monoxide gas.

c. EQUIPMENT CAUTION. (1) When draining water from the radiator take care to prevent spilling water on the battery compartment.

(2) Never use the flexible gas line to drain the water.

(3) Never add anything except distilled water to the battery unless in an emergency.

(4) Do not allow any dirt to drop into the battery cells.

(5) Do not disturb any adjustments while performing maintenance on the carburetor or governor.

(6) Never run the gasoline engine without water in the cooling system.

147. Item 103—Cooling System

a. EQUIPMENT CAUTION. (1) When draining water from the radiator take care to prevent spilling water on the battery compartment.

(2) Never use the flexible gas line to drain the water.

b. LOCATION. The cooling system consists of the radiator, fan and water pump assembly, thermostat, water jackets and associated hoses and couplings. (See figs. 155 and 157.)

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. Remove the grill guard from the front of the radiator by removing the six screws which hold the grill guard to the radiator.

F. FEEL.

The radiator core. The heat should be uniformly distributed.

I. INSPECT.

(1) The radiator for leaks.

(2) The radiator mounting including the radiator grill guard. Check to see that they are secure.

(3) The hose and clamps. (See fig. 155.) Look for leaks and check the hose condition for deterioration and the clamps for corrosion and tightness.

(4) The fan belt. Check for tears, frayed edges, split belt, and proper adjustment.

(5) The fan guard for tight mounting.

T. TIGHTEN.

(1) The radiator. To tighten the radiator mounting, remove the battery inspection plate in order to reach the mounting bolts.

(2) Be careful when tightening the hose clamp so as not to cut through the hose or snap the head off the screw bolt. If a leak persists, notify the person in charge before replacing the hose.

NOTES: 1. Before removing any hose, drain the water from the radiator. If antifreeze is being used, save it in a clean container and put it back into the engine.

2. Some engines have water-cooled manifolds with pressure plugs (welch plugs) built into the manifold water jackets. If these plugs leak, remove and replace them.

C. CLEAN.

(1) The radiator. Wipe the radiator frame with a cloth to remove all dirt. If the radiator fins are covered with dust or dirt, use the air blower and blow out all dirt in the radiator core.

(2) The hose and hose-clamps. Remove all oil or grease from the hoses. Use a dry clean cloth. Remove rust or corrosion from the clamps with sandpaper and paint the spot to match the surrounding surface.

(3) The thermometer. Use a clean, dry cloth.

(4) The radiator. If the water in the radiator is dirty, flush and refill with clean water. If antifreeze is used, test its specific gravity with a hydrometer. See the Equipment Performance Manual (TM 11-1310) item 11 for details as to the amount of antifreeze required for protection.

A. ADJUST.

(1) The fan belt if necessary. Adjustment is provided by loosening two bolts on the fan hub and changing the width of the pulley. Use the spanner wrench for the hub adjustment. When tightening the bolts on the fan hub do not over-tighten. These bolts snap very easily.

(2) The generator drive belt if necessary. Adjustment is made by shifting the generator position. (See item 9 in TM 11-1310.)

d. REMARKS. If the water in the cooling system is dirty, as evidenced by rust and pieces of scale or other foreign matter, drain and flush the radiator in the following manner:

(1) Fill the radiator with clean water. Pour one-half the contents of a box of Oakite or similar quantity of washing soda into the radiator.

(2) Place a piece of cardboard against the face of the radiator. Start the engine and allow it to run for at least 30 minutes after the water temperature reaches 190°F.

(3) Drain and flush the cooling system, and then refill with clean water. If the engine still overheats, and routine maintenance has failed to remedy the condition, notify the person in charge.

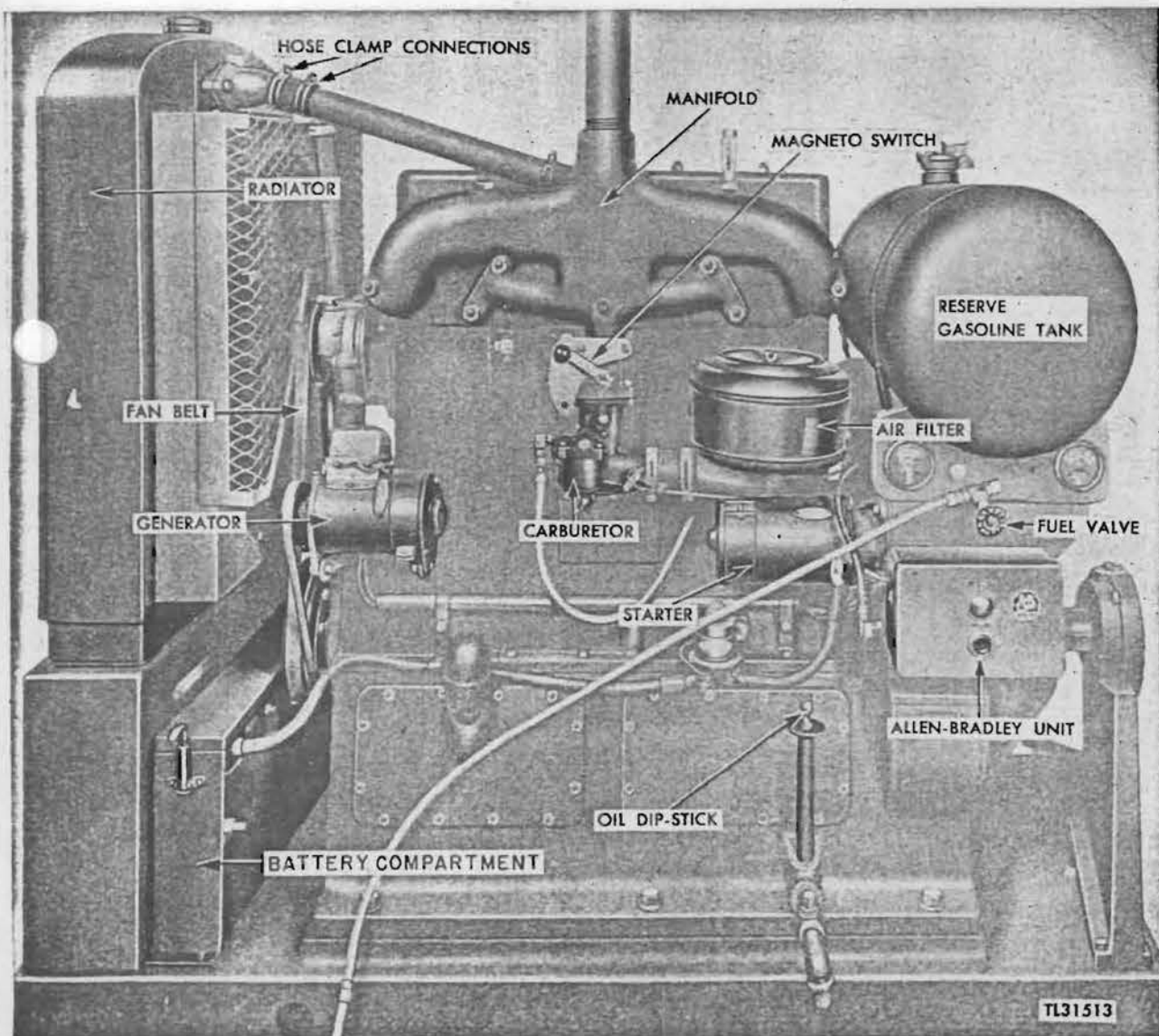


Figure 155. Le Roi gasoline engine, right side.

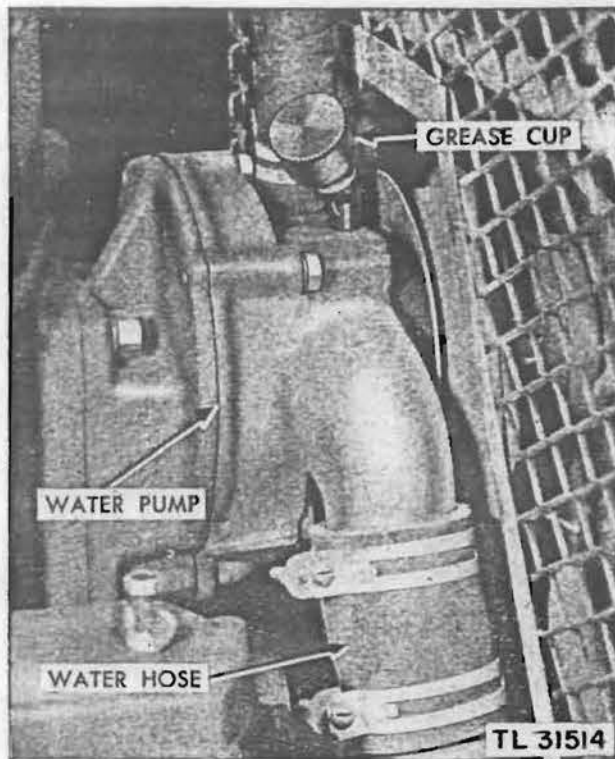


Figure 156. Engine water pump.

c. REFERENCES.

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148. Item 104—Water Pump and Fan Assembly

a. LOCATION. The water pump is located between the engine block and the radiator. (See fig. 156.)

b. MAINTENANCE PROCEDURE.

I. INSPECT.

(1) The water pump and fan blades for tightness of mounting. Check all assembly bolts.

(2) The water pump. Look for leaks and rust.

(3) The fan assembly. Look for cracks and crystallization. (Crystallization may be recognized by a number of tiny cracks that shine through the paint.)

C. CLEAN.

The water-pump and fan assembly. Use a clean, dry cloth. If any rust is found, it should be sandpapered off and the spot repainted to match the surrounding surface.

L. LUBRICATE.

The water pump. The lubricant is applied by

turning the grease cup (fig. 156) on the water pump a few turns until it is snug, usually about two complete turns are needed during operations. If the cup is empty, refill with WB-2 lubricant (grease, general purpose No. 2). Do not use any other lubricant. Always clean the old grease out of the cup and fitting before putting in new grease.

c. REMARKS. The water pump may leak because of wear after considerable use. Notify the person in charge if the water pump must be replaced.

d. REFERENCES.

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149. Item 105—Lubricating System

a. EQUIPMENT CAUTION. (1) Do not open any of the inspection plates or access plates on the engine during a sand or dust storm.

(2) Use extreme care when removing access plates. The gaskets are easily damaged. A damaged gasket should be replaced with a new one immediately. Before removing access plates be sure to have spare gaskets in case some are damaged.

(3) When tightening any oil line connections, be careful not to strip the coupling threads or damage the brass nuts. These parts are made of soft material and are easily damaged.

(4) Before putting oil in the engine be sure the oil does not contain dirt or other foreign matter. Always use new oil. (In some locations, oil becomes contaminated from condensation.)

b. LOCATION. Components of the lubricating system are the oil pump, oil filter, pressure relief valve, oil level, pressure gauge, crankcase and cylinder head breathers, and oil lines. (See fig. 157.)

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. When cleaning the oil pan, drain the oil from the engine. Connect a length of hose from the drain plug to the container. Remove handhole covers in order to gain access to the oil pan for inspection and cleaning.

I. INSPECT.

(1) The oil lines. Look for leakage.

(2) The cylinder-head and crankcase breathers. Remove the breathers. Wash them in kero-

sene or allow to
 (3) T discolor
 oil need
 (4) T the han
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 (5) T the con
 pins are

sene or other solvent, dip in clean engine oil, allow to drain, and replace them.

(3) The oil. When lubricating oil becomes discolored or diluted, it is an indication that the oil needs changing.

(4) The cylinder lines for water leaks when the handhole covers are removed. This condition indicates a defective packing on the bottoms of the cylinder sleeves. Notify the person in charge immediately.

(5) The interior of the crankcase, including the connecting rod bearings. See that no cotter pins are loose or missing.

C. CLEAN.

(1) The oil pan. Wash thoroughly with kerosene or other solvent and a stiff brush.

NOTE: Do not use cotton or wool waste, as fibers from it may stick to the rough surface, causing stoppage of the screen and clogging oil lines in the lubricating system.

(2) Oil strainer screen.

NOTE: The oil strainer screen may be cleaned when the handhole covers are removed.

(3) The oil lines. Wipe with a clean cloth.

(4) The crankcase handhole covers. Wipe with a cloth. Remove any rust with sandpaper. Wipe with kerosene or some solvent and repaint to match the surrounding surface.

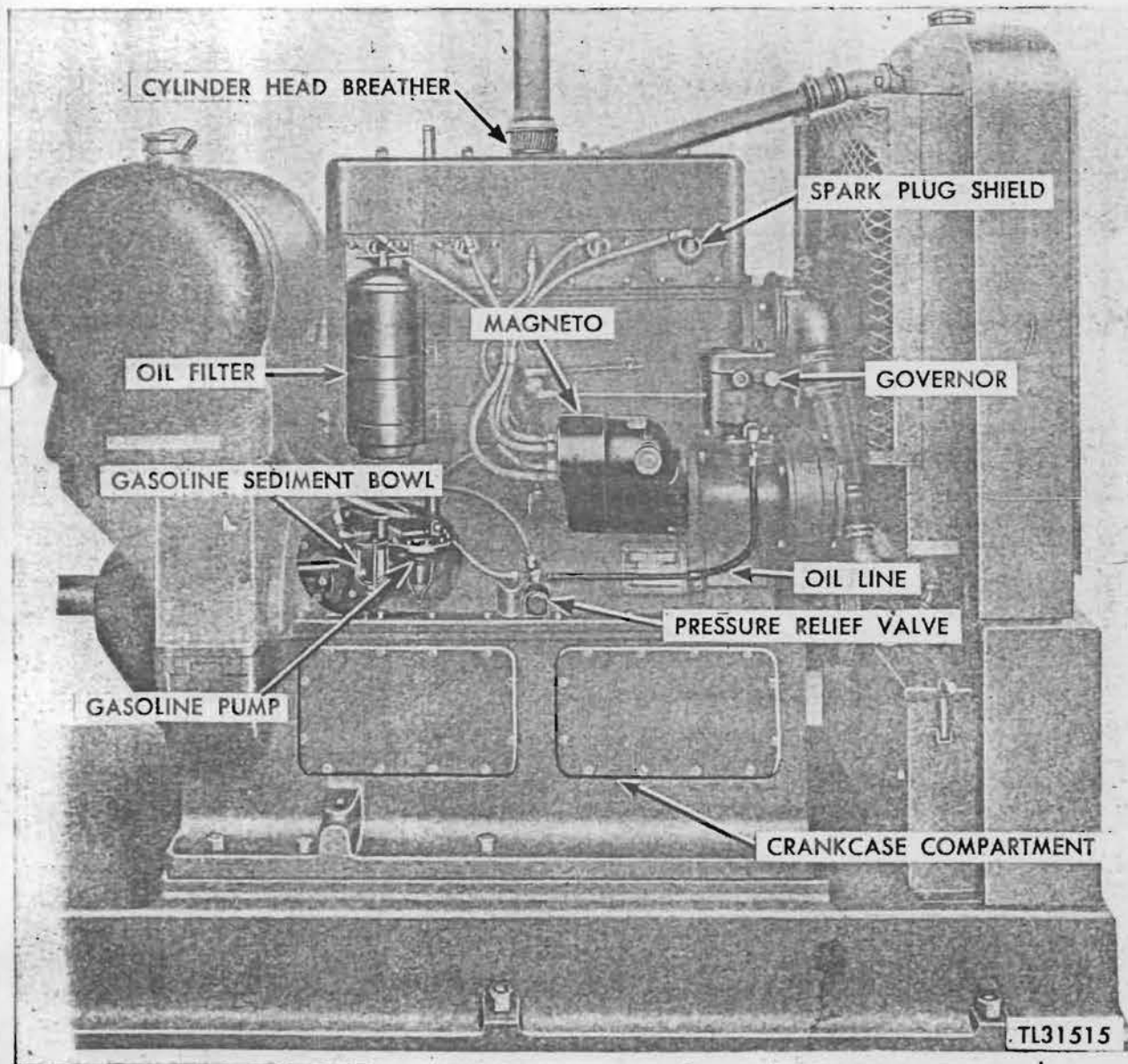


Figure 157. Le Roi gasoline engine, left side.

(5) The oil filter. Whenever the oil becomes discolored, replace the oil filter cartridge. It cannot be cleaned. (Oil must be changed at this time.) Filter service operations are as follows:

- (a) Stop the engine.
- (b) Remove the drain plug and allow the filter to drain.
- (c) Remove the top cover assembly by unscrewing the cover cap screw.
- (d) Remove and discard the used cartridge.
- (e) Inspect the bottom support plate and the top of the case. Clean the inside of the filter case thoroughly to insure a new seal when a refill cartridge is inserted. Use a clean cloth moistened with a solvent.
- (f) Replace the drain plug.
- (g) Place the new refill cartridge in the case.

Caution: Make sure that the wire handle on the cartridge is properly placed so that it will not interfere with the cover.

(h) Clean the top cover of the oil filter. If the gasket has become hard or brittle, replace it with a new gasket, or place the old one in hot water for about ten minutes to soften it if it is unbroken.

(i) Replace the top cover assembly. Tighten the cover cap screw. Do not overtighten.

L. LUBRICATE.

(1) The engine. Add new oil of the proper grade when the oil level is low. Do not bring the oil level above the full mark. Drain off any excess oil. When the oil becomes discolored or diluted it must be changed. Some of the factors affecting the frequency of the oil change are listed below.

- (a) Condition of the engine.
- (b) Operating temperature.
- (c) Humidity.
- (d) Dust or sand in the air.

(2) Under normal operating conditions, the oil should be changed every week or approximately every 150 hours of operation. When the oil is changed replace the filter cartridge.

(3) The following oils are recommended when the engine is operating in temperatures which are consistently within the indicated range.

(4) Above 32° F., SAE 30 oil, engine, lubricating. Army Spec. 2-104-B. Below 32° F., but not below 0°, SAE 20 oil. (If this is not available,

use SAE 10 oil, engine, lubricating. Army Spec. 2-104-B.) Below 0° F., SAE 10 oil, engine, lubricating, Army Spec. 2-104-B, diluted with 10 percent kerosene.

(5) Thoroughly drain out all old oil from the crankcase before adding new oil.

d. REMARKS. The oil supply is contained in the oil pan and oil is fed to the moving parts of the engine by a gear type pump. This pump draws oil out of the oil pan through a screen of small mesh which prevents foreign material from being drawn into the lubricating system. Normal oil pressure is between 20 and 40 pounds.

e. REFERENCES.

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150. Item 106—Fuel System

a. SAFETY PRECAUTIONS. Do not blow or suck on any gas line to clear the line. Gasoline may contain tetraethyl lead. This is a deadly poison. (See item 102.)

b. EQUIPMENT CAUTION. When tightening any fuel line connection, take care not to strip the thread as the coupling nut and threaded parts are made of a soft material (brass or copper).

c. LOCATION. The fuel system consists of the fuel pump, the gas lines, and the carburetor. The gas lines lead from the fuel pump to the cut-off valve, from the fuel pump to the carburetor, from the cut-off valve to the reserve tank, and to the gas drum. (See figs. 155 and 157.)

d. MAINTENANCE PROCEDURE; PREPARATORY STEPS. Connect the air blower.

I. INSPECT.

(1) All fuel line connections for leaks.

NOTE: The lead used in gasoline will leave a red deposit about the carburetor and gas lines. This is not necessarily an indication of leaks.

(2) The fuel pump. Check for leaks and tightness of mounting.

(3) The gas line leading from the out-off valve to the gasoline drum. Check for leaks and frayed covering.

C. CLEAN.

(1) The fuel pump. Remove the sediment bowl and strainer, wash out, and replace. Wipe the outside with a clean cloth. Moisten with kerosene or other solvent to remove any excess

oil or grease. Replace the

(2) The fuel clean cloth.

e. REFERENCE

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151. Item 106

a. EQUIPMENT

adjustments

the carburetor

(2.)

b. LOCATION

the instrument

c. MAINTENANCE

I. INSPECT

The carburetor

(1) Proper

(2) Backlash

(3) Leaks

(4) Tight

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Figure

C. CLEAN

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(2) The fuel

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oil or grease. (See TM 11-1310, item 10, sec. C.) Replace the sediment bowl gasket, if necessary.

(2) The fuel lines. Wipe the gas lines with a clean cloth.

e. REFERENCES.

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151. Item 107—Carburetor

a. EQUIPMENT CAUTION. Do not disturb any adjustments while performing maintenance on the carburetor. (See Item 102, Equipment Caution 2.)

b. LOCATION. The carburetor is located on the instrument side of the engine. (See fig. 155.)

c. MAINTENANCE PROCEDURE.

I. INSPECT.

The carburetor for:

- (1) Proper action of the throttle-control rods.
- (2) Backlash and free play.
- (3) Leaks in the gas line.
- (4) Tightness of mounting.

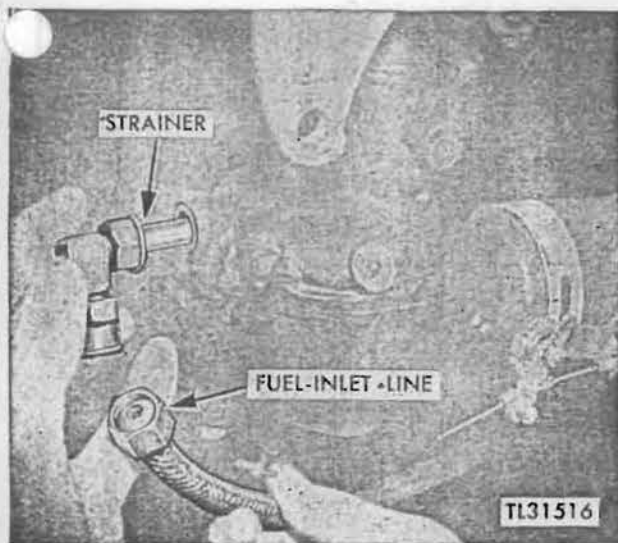


Figure 158. Removing carburetor strainer.

C. CLEAN.

(1) The float chamber. Remove the pipe plug from the bottom of the carburetor and allow gasoline in the float chamber to drain out, then replace the screw. See Remarks below.

(2) The strainer. Disconnect the coupling nut from the fuel inlet line and remove the strainer.

(See fig. 158.) Wash thoroughly in kerosene or other solvent and replace.

L. LUBRICATE.

Linkage rods. Apply a few drops of engine oil on the linkage rods from the governor to the carburetor bushing.

d. REMARKS. If the carburetor must be removed from the engine for a general overhaul or repair, notify the person in charge. Whenever the engine is in transit, see that the float chamber of the carburetor is filled with gasoline. This prevents undue vibration of the carburetor float.

e. REFERENCES.

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152. Item 108—Air Cleaner

a. SAFETY PRECAUTIONS. Do all washing with kerosene outside of van. Keep away from open flame. (See Item 102, Safety Precaution 3.)

b. EQUIPMENT PRECAUTIONS. When removing the filter always clean it and refill with new oil.

c. LOCATION. The air cleaner is located on the carburetor side of the engine. (See fig. 155.) The cleaner is attached to the side of the cylinder block by means of a cast iron mounting.

d. MAINTENANCE PROCEDURE; PREPARATORY STEPS. Loosen the wingnut and remove the entire filter unit.

I. INSPECT.

- (1) The filter element for cleanliness and security of mounting.
- (2) The oil bowl for cleanliness and security of mounting.

C. CLEAN.

- (1) The air cleaner (wet type).
 - (a) Remove the dirty oil from the bowl. Rinse the bowl with kerosene or some other solvent and then dry thoroughly.
 - (b) Wash the filter element in a container of kerosene or other solvent.
- (2) The air cleaner (dry type). Disassemble the cleaner and swish the element several times through a pan of engine oil.

L. LUBRICATE.

- (1) Air cleaner (the wet type). Fill the oil bowl to the proper level with clean engine oil.
- (2) Air cleaner (the dry type). Dip the element in medium or light engine oil. When

excess oil has drained off, the filter is ready for use.

e. REMARKS. Proper functioning of the air cleaner is important in obtaining the maximum power from the engine.

f. REFERENCES.

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153. Item 109—Governor

a. EQUIPMENT CAUTION. Do not disturb any adjustment on the governor in the process of performing maintenance. (See Item 102, Equipment Caution 2.)

b. LOCATION. The governor is located on the magneto side of the engine. (See fig. 157.)

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. (1) Disconnect the governor oil line from the governor.

NOTE: It may be necessary to loosen the holding clamp on the governor oil line. Loosen the coupling nut and remove the governor oil line from the three-way oil line tap. (See fig. 159.)

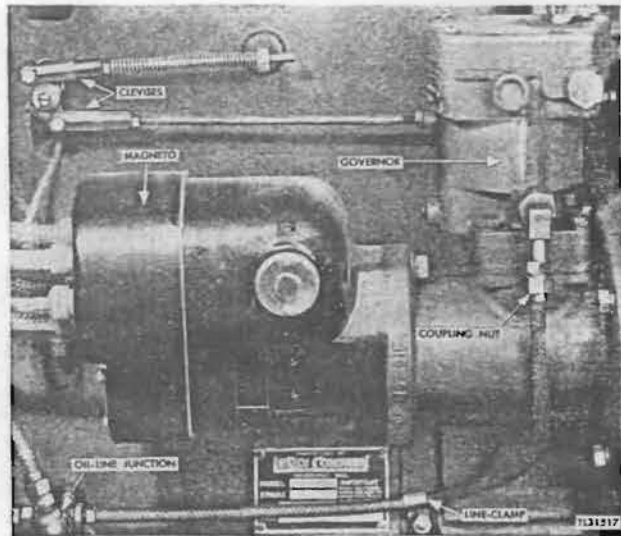


Figure 159. Governor and oil lines.

(2) Remove the cotter pin and clevis from the governor control line at the base of governor torque arm. Use the slip-joint or combination pliers.

Caution: Do not use the pliers anywhere within the governor.

(3) Remove the four governor mounting bolts with the correct size open-end wrench.

(4) Carry the governor to the work bench.

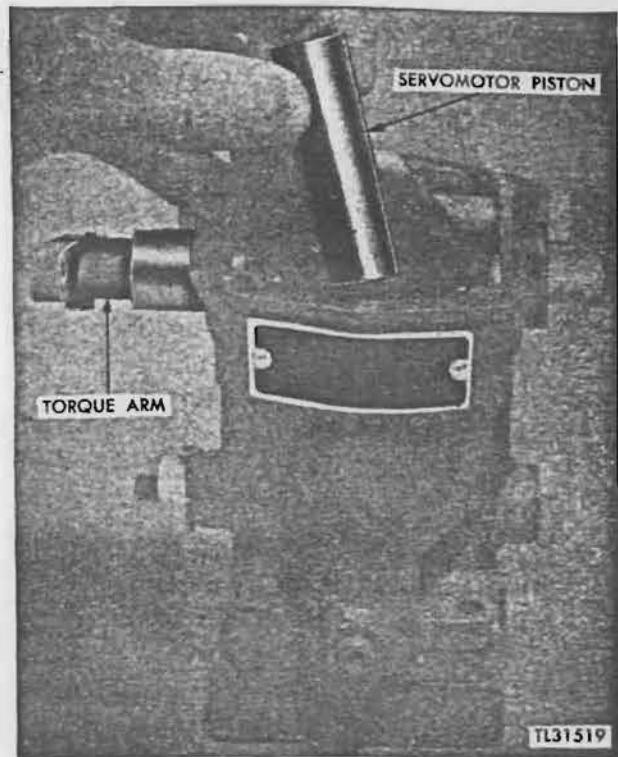


Figure 160. Removing servomotor piston from governor.

I. INSPECT.

The working parts. Check for cleanliness and proper tightness.

C. CLEAN.

(1) The interior of the governor. Remove the three cover screws and the cover.

(2) The servomotor piston cylinder thoroughly. Remove the servomotor piston (fig. 160) by moving the torque arm and pressing the floating level to make room for the piston to be moved. The piston must be thoroughly polished. Use crocus cloth moistened with gasoline. Dry thoroughly.

(3) The exterior of the governor. Wipe with a clean cloth.

L. LUBRICATE.

The servomotor piston and all moving parts with light engine oil. This is done before reassembling the governor.

d. REMARKS. The governor is adjusted to maintain constant speed with various changes in load. The speed is correct when the frequency meter indicates 60 cycles at normal load.

e. REFERENCES.

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154. Item

a. EQUIPMENT CAUTION. Do not apply grease on the contact points only to reassemble the shields.

b. LOCATION. The contact points are on the left side of the engine.

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. (1) Remove the contact plate. (2) Remove the contact points. I. INSPECT. (1) The contact points should be properly cleaned. Use a fine fiber brush.



Figure 154. Contact points.

for cleanliness. Check the contact points for rust, corrosion and wear. The contact points must meet squarely.

(2) The contact points should be cleaned and the contact points should be adjusted.

(3) The contact points should be checked for wear or broken.

(4) All contact points should be cleaned.

C. CLEAN. (1) The contact points should be cleaned with 20000 sandpaper.

Corrosion from the contact points should be removed. The contact points should be cleaned after they are removed.

154. Item 110—Magneto and Spark Plugs

a. EQUIPMENT CAUTION. Do not get oil or grease on the contact points. The pliers are used only to remove the wingnuts on the spark plug shields.

b. LOCATION. The magneto is located on the left side of the engine. (See fig. 157.)

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. (1) Remove the breaker-point inspection plate. (See fig. 161.)

(2) Remove the spark-plug shields.

I. INSPECT.

(1) The interrupter contacts. Check for proper clearance. Crank the engine until the fiber bumper rests on the top of the cam. Inspect

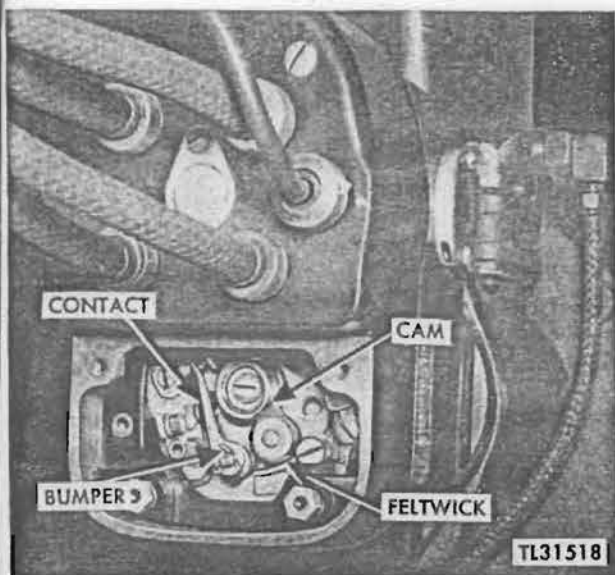


Figure 161. Magneto inspection plate removed.

for cleanliness and proper alignment. Contact points must be free from oil, grease, and corrosion and the full surfaces of both contacts must meet squarely.

(2) The cable connections. Check for cleanliness and tightness.

(3) The spark plugs. Look for dirty, cracked, or broken porcelain.

(4) All mounting bolts. Check for loose parts.

C. CLEAN.

(1) The contact points. Use a point file or #0000 sandpaper to remove any arc pits or corrosion from the contact surfaces. The contacts should be clean and bright. Always readjust them after cleaning.

(2) The magneto. Clean the magneto with a clean cloth.

(3) Spark plugs, porcelain, and contacts when dirty.

A. ADJUST.

(1) The interrupter contacts to a cam opening from 0.014 to 0.016 inch. To make this adjustment shift the adjustable contact bracket by means of the eccentric screw, until the correct opening has been reached. After adjustment, secure the bracket by means of its fastening screws. Check with a feeler gauge.

(2) Spark plug gaps to 0.025 to 0.030 inch, if necessary.

L. LUBRICATE.

The magneto cam-lubricating felt wick. Place a few drops of SAE No. 50 engine oil on the wick after every 500 hours of operation. Take care to prevent the oil from getting on the contact surfaces. (See fig. 161.)

d. REMARKS. If the contact points require renewal, or the magneto must be removed from the engine, notify the person in charge.

e. REFERENCES.

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155. Item 111—Battery-Charging Generator

a. LOCATION. The battery charging generator is located on the right side of the engine when facing the radiator. (See fig. 155.)

b. MAINTENANCE PROCEDURE.

F. FEEL.

All terminals on the generator. Check for tightness and excessive heat.

I. INSPECT.

(1) The brushes and commutator. Notify the person in charge if the brushes are worn and need replacement.

(2) The brush spring-tension. If the springs are not all equal in tension replace those that are weak.

(3) The commutator for cleanliness.

(4) The bearings. Check the end-play and side-play of the generator shaft. Notify the person in charge if the generator must be removed from the engine.

(5) Connections on the generator. Check for loose or dirty connections.

C. CLEAN.

(1) The commutator. To do this it is neces-

sary to have the engine running at a low speed. (See item 102.) Hold a folded piece of canvas or a canvas-covered stick against the commutator until the commutator is bright and clean. If the canvas commutator strip is not sufficiently abrasive, use #0000 sandpaper.

NOTE: Never use emery cloth.

(2) The outside of the generator, using a clean cloth.

L. LUBRICATE.

The hinged cap oilers in the generator. Add 2 to 3 drops of light engine oil (SAE No. 10) to each hinged cap oiler daily.

c. REMARKS. Never operate the generator on open circuit (circuit between the generator and battery disconnected). To do so will damage the generator. It is possible to operate with the circuit open between the generator and battery if the lead is disconnected from the terminal of the generator.

d. REFERENCES.

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156. Item 112—Battery

a. SAFETY PRECAUTIONS. (1) Do not spill any electrolyte (battery acid) on the clothes or spatter any into the eyes.

(2) Do not hold an open flame near the vent caps of the battery. (See Item 102, Safety Precautions 1 and 4.)

b. EQUIPMENT CAUTIONS. (1) Do not add any water other than distilled water to the battery except in an emergency.

(2) Do not allow any foreign material to fall into the battery cells.

c. LOCATION. The battery is located in the battery compartment under the radiator. (See fig. 155.)

d. MAINTENANCE PROCEDURE; PREPARATORY STEPS. (1) Remove the cover from the battery compartment by releasing the two cover clamps.

(2) Remove the front cover from the battery compartment by removing the eight screws.

I. INSPECT.

(1) The terminals. Check for corrosion, tightness, and for protection against corrosion.

(2) The electrolyte.

(a) Check the specific gravity, using the hydrometer. The optimum specific gravity is between 1.275 and 1.295.

(b) Check the level. It should be one-half inch above the plates. If low, add distilled water. Whenever distilled water is added and the surrounding temperature is below freezing, run the engine for at least ten minutes. This is to insure mixing the distilled water with the electrolyte which will, in turn, protect the battery against freezing.

C. CLEAN.

(1) The cable terminals. Use hot water to remove any terminal corrosion. If this fails to remove the corrosion, disconnect the cable from the battery and scrape the terminal clean.

(2) The battery. Use a cloth saturated with warm water.

NOTE: Avoid getting any hot water into the battery cells.

(3) The filler caps. Open any clogged filler-cap venthole.

L. LUBRICATE.

The terminal surfaces, after tightening the connections, apply a thin coat of petroleum jelly over the terminal surfaces. If petroleum jelly is unavailable, water pump grease is a satisfactory substitute.

e. REMARKS. Keep a supply of distilled water on hand in a glass jar. Use a clean syringe or rubber tubing when adding water to the cells.

(1) If the battery is defective as evidenced by a broken case or failure to take a charge, notify the person in charge.

(2) If the battery is in a low state of charge, refer to item 15 in Equipment Performance Manual for possible trouble in the charging generator. If the charging rate and all of the wiring and connections are satisfactory and the battery charge is insufficient, notify the person in charge.

(3) A battery in a low state of charge is subject to freezing at much higher temperatures than a fully charged battery. Always keep the battery well charged.

f. REFERENCES.

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157. Item 113—Cranking Motor (Starter)

a. SAFETY PRECAUTIONS. In doing this job it may be necessary to turn the cranking motor. Make certain the throttle is in the stop position so that the engine does not start while the cranking motor is turning.

b. EQUIPMENT CAUTIONS. Cranking motor to one time w periods ca and fail. I battery.

c. LOCATION. Right side.

d. MAINTENANCE STEPS. Re ing motor. F. FEEL.

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b. **EQUIPMENT CAUTION.** Never operate the cranking motor more than 30 seconds at any one time without pausing to permit the cranking motor to cool off. Excessively long cranking periods cause the cranking motor to overheat and fail. In addition it tends to run down the battery.

c. **LOCATION.** The starter is located on the right side of the engine. (See fig. 155.)

d. **MAINTENANCE PROCEDURE; PREPARATORY STEPS.** Remove the cover band from the cranking motor.

F. FEEL.

The connections on the magnetic switch and cranking motor for tightness.

I. INSPECT.

(1) The magnetic switch. See that the connections are tight and the cover plug is securely in place. Check the mounting screws for tightness.

(2) Brush holder and connections.

(3) The cranking motor. Check for:

(a) Brush wear. Replace the brushes if they are too short.

(b) Brush spring-tension. Correct tension is from 36 to 40 ounces.

(c) The commutator. See that it is clean. (If it is not, see C(2) below.)

(d) Any abnormal noises. If any abnormal noises indicate the need for removing the cranking motor, notify the person in charge.

(e) Loose mounting.

G. CLEAN.

(1) The outside of the cranking motor. Use a clean cloth.

(2) The commutator. Place the throttle control in stop position. Then hold the canvas commutator tool against the commutator. At the same time press the starting button. If this does not clean it properly, proceed as follows: If ridges or grooves are cut in the commutator use #0000 sandpaper and finish by using the folded canvas. See commutator cleaning tools in chapter 2 for more details. If the ridges and grooves cannot be removed, notify the person in charge.

(3) The outside of the magnetic switch. Use a clean cloth.

e. **REMARKS.** Whenever the cranking motor is disassembled for cleaning, put a few drops of light engine oil in each bushing. If the cranking motor must be removed from the engine, notify the person in charge.

f. REFERENCES.

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158. Item 114—Cylinder Head

a. **SAFETY PRECAUTIONS.** Do not touch the exhaust pipe or manifold. They are extremely hot while the engine is in operation.

b. **EQUIPMENT CAUTION.** Do not race the engine if the cylinder-head cover is removed.

c. **LOCATION.** The cylinder-head assembly comprises the upper parts of the gasoline engine.

d. **MAINTENANCE PROCEDURE; PREPARATORY STEPS.** (1) Throttle down the engine to the lowest obtainable speed.

(2) Remove the cylinder-head cover. Take care not to break the gasket.

I. INSPECT.

(1) The valves. See that they are thoroughly lubricated by the engine oil pressure system.

(2) Valve clearance. Check by the use of the feeler gauge.

(3) The rocker arms. See that they are being lubricated.

(4) Rocker arm adjustment nut.

(5) Head bolts for tightness.

(6) Manifold bolts for tightness.

T. TIGHTEN.

The head bolts. Use the sequence shown in figure 162. Nuts should be drawn down to 100 foot-pounds on the torque wrench. Greater pressure may result in the stud snapping. (Be extremely careful when using socket wrench.)

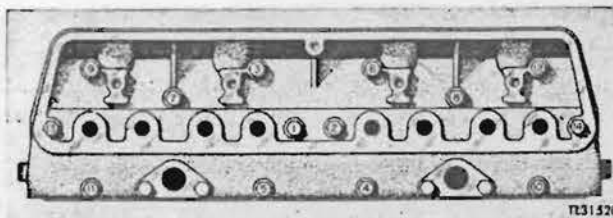


Figure 162. Sequence of tightening cylinder-head nuts.

C. CLEAN.

The cylinder-head cover. Wipe with a cloth moistened with kerosene or other solvent.

A. ADJUST.

The valve clearance, if necessary. When the motor is hot the valve clearance should be 0.015-inch. When the engine is cold the valve clear-

ance should be 0.018-inch. To adjust, loosen the locknut on the tappet adjusting screw. Adjust the tappet screw for proper clearance. Tighten the locknut without disturbing the adjustment. Having finished, recheck the tappet clearance.

e. REMARKS. Do not apply pressure when tightening the cylinder-head cover. Tighten sufficiently to stop all leaks. If the cylinder head is cracked, or has broken valve springs, or in any way indicates the necessity for removal, notify the person in charge.

f. REFERENCES.

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159. Item 115—Allen-Bradley Safety Control Switches

a. EQUIPMENT CAUTION. Disconnect the battery leads when performing this item.

b. LOCATION. The Allen-Bradley unit is located below the engine instrument panel on the side of the engine. (See fig. 155.)

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. Remove the screw at the bottom of the case, and lift off the cover.

F. FEEL.

(1) The relay coils. They should be warm but not hot. The heat should be evenly distributed.

(2) The relay connections.

I. INSPECT.

(1) All contact surfaces. Look for signs of pitting and corrosion. If the location of any contact makes the inspection difficult, use the dental mirror and extension light.

(2) The operation of the relays by moving the plunger arms with the fingers. **DO THIS GENTLY** to avoid bending the elements. They should operate easily and smoothly. When the relay is closed, all the contact surfaces must be perfectly aligned and must make positive contact.

(3) All leads. See that all leads are properly positioned so they do not interfere with the operation of the relay.

(4) All terminals for loose or poorly soldered, dirty, or corroded connections.

(5) The entire relay assemblies for general mechanical condition and cleanliness.

d. REFERENCES.

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160. Item 116—Cleaning the Engine

a. SAFETY PRECAUTIONS. Before cleaning the engine allow sufficient time for it to cool. (See item 102.)

b. LOCATION (fig. 163).

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. (1) Remove battery plate and disconnect the battery terminal.

(2) Connect the air blower.

I. INSPECT.

The engine. Look for dirt, rust, and any excessive oil or grease. Check wires, connections, assemblies, and mounting bolts for tightness.

C. CLEAN.

(1) The entire engine when sufficiently cool. Use a cloth. If this fails to remove oil or grease, moisten the cloth with kerosene. Use a brush in corners or places where a cloth cannot reach. Use an air blower where possible. Remove any rust spots with #00 sandpaper. Wipe with a dry cloth and repaint to match the surrounding surface.

(2) The engine base. Repeat the same procedure for cleaning as that used for the cylinder block in (1) above.

d. REFERENCES.

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161. Item 117—Coupling Between Engine and Alternator

a. EQUIPMENT CAUTION. Take care when tightening the coupling bolts. They should be tightened with equal tension.

b. LOCATION. The coupling connects the engine and the alternator. (See fig. 163.)

c. MAINTENANCE PROCEDURE:

I. INSPECT.

The coupling. Check the general condition. Look for loose nuts, bolts, grease, and rust.

d. REFERENCES.

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162. Item 118—Alternator and Exciter

a. SAFETY PRECAUTIONS. When performing maintenance on the generator while the engine is running (as will be the case when the slip rings and commutator require cleaning), **take care to**



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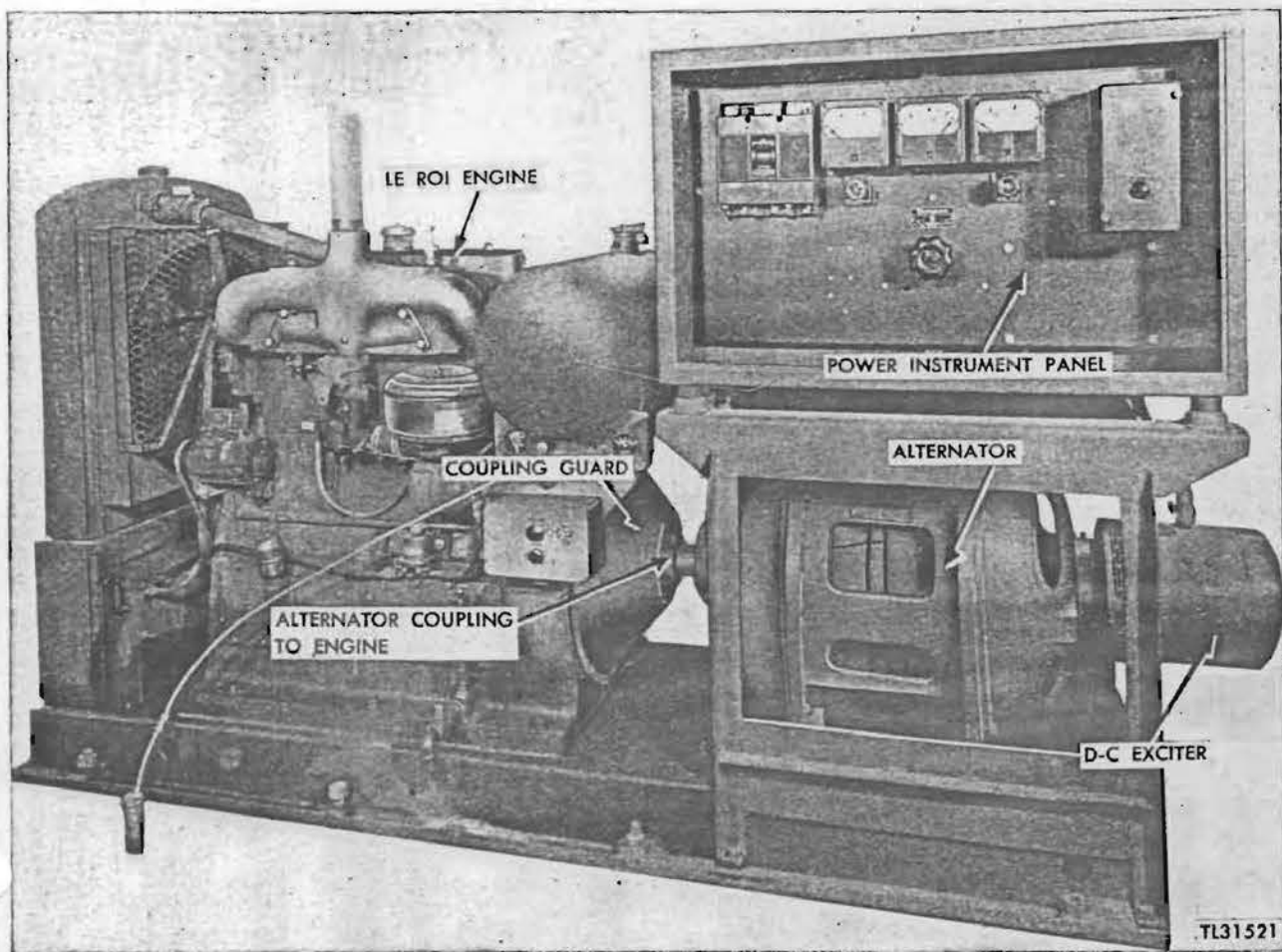


Figure 163. Power unit.

prevent personal injury from rotating machinery. Never perform maintenance on this generator without first rolling up your sleeves and removing your tie. (See item 102.)

b. LOCATION. The alternator is mounted directly behind the engine. (See fig. 163.)

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. (1) Remove the end plate. Three screws fasten the end plate to the frame of the exciter.

(2) Whenever the slip rings require cleaning, keep the engine running at low speed.

(3) Set the field rheostat to minimum position to reduce voltage (full clockwise direction).

(4) Open (OFF position) the main circuit breaker.

F. FEEL.

(1) The housing and the front and rear bearings. The temperature of these bearings should be distributed evenly over the bearing surface. They should be warm but not hot. At no time

should the temperature of the alternator or exciter housings rise 50° above ambient temperature. Both bearings should be approximately the same temperature.

(2) All connections. If any connection is hot, see that the contacts are clean and the connection tight.

I. INSPECT.

(1) All brush holders, terminals, and mountings for tightness and proper position.

(2) All brushes for wear. There are four brushes on the alternator slip rings and four on the exciter commutator. The exciter brushes should be replaced when they are worn down to the point where the brush tension spring is within 1/8-inch of the end of its travel in the slot on the side of the brush holder.

(3) The alternator brushes. These should be replaced when they are worn down to 3/4-inch in length.

(4) The appearance of the two slip rings. Check the slip ring surfaces for signs of dirt, pitting, and corrosion.

(5) Brush springs on the alternator. Check the tension of the four brush springs by lifting the springs out with the fingers; note whether all four springs on the alternator brushes have an approximately equal tension. Repeat for the exciter brush springs. Do not drop a spring on the brush.

(6) The commutator surfaces of the d-c generator. They should be clean and bright.

L. LUBRICATE.

As indicated below. Proceed as follows:

(1) Remove the bottom sump pipe fitting from each bearing. Use an Allen wrench.

(2) Remove the top bearing plug and lower sump plug from each bearing.

(3) Install a zerk fitting in place of the top grease cover plug.

(4) Load the hand-pressure grease gun with Ordnance Spec. AXS-637 (grease, lubricating special). Apply one ounce every three months (24 hours a day operation) or every 2,000 hours of operation. Force one ounce of grease into the bearing, allowing any excess, or old grease to drain out of the grease sump while the alternator is running. Keep sump cleaned out.

(5) Repeat this for the opposite bearing.

(6) After greasing, remove the zerk fitting and replace the cover plug and the sump pipe fitting for each bearing.

d. REMARKS. One zerk fitting is required for applying grease to the alternator bearings. If no zerk fitting is available, remove one from the antenna mount or the motor vehicle. Whenever a zerk fitting is removed from the antenna mount or motor vehicle, it should be returned immediately after use.

c. REFERENCES.

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163. Item 119—Power Instrument Panel

a. LOCATION. The power instrument panel is located directly above the generator as shown in figure 163.

b. MAINTENANCE PROCEDURE; PREPARATORY STEPS. (1) Remove the two knurled nuts holding the silverstat cover.

(2) Remove the rear panel, which is fastened to the instrument control box by six screws.

F. FEEL.

(1) All terminals and connections.

(2) All transformers. The transformer heat should be evenly distributed. There should be no hot spots.

(3) All connections for overheating.

(4) Silverstat field coil. Place the hand on the silverstat field coil and feel for temperature. The temperature should be evenly distributed over the windings.

I. INSPECT.

(1) All mounting bolts and nuts for the power instrument panel and power control box. Gently tug on parts to test for tightness.

(2) The silverstat wiper contact on the silverstat rheostat. Note whether the brush is worn. The brush should be replaced when it is within approximately 1/16-inch of the brush holder. Once the silverstat has been properly installed, there is little or no maintenance required. **DO NOT TAMPER WITH ANY ADJUSTMENT.** Replace the cover and tighten the knurled nuts in place.

(3) All components inside the inclosure for dirt, corrosion, overheating, loose mountings or assembly bolts, and loose connections.

C. CLEAN.

All dirt or other foreign matter from within the power instrument control box; use the air blower and a one-inch paint brush. Use sandpaper to remove all rust, then paint over the spots to match the surrounding surface.

c. REMARKS. After completing this item, the power instrument control box rear panel should be replaced. The six knurled-head flange screws have an identifying mark on the knurled screw range. This mark coincides with the direction of the flange clamps and serves as a guide when replacing the panel.

d. REFERENCES.

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164. Item 120—Power Panel Meters

a. EQUIPMENT CAUTION. Do not overtighten the bolts on the meter terminals. Be careful to prevent damage to the meters during maintenance. Only the voltmeter and ammeter require zero adjustment. Never attempt to



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165. Item 1 (a. SAF power is junction these pa b. Equ file on th is made platinum plating c. Loc the righ junction d. MA PREPARA F. FEEL

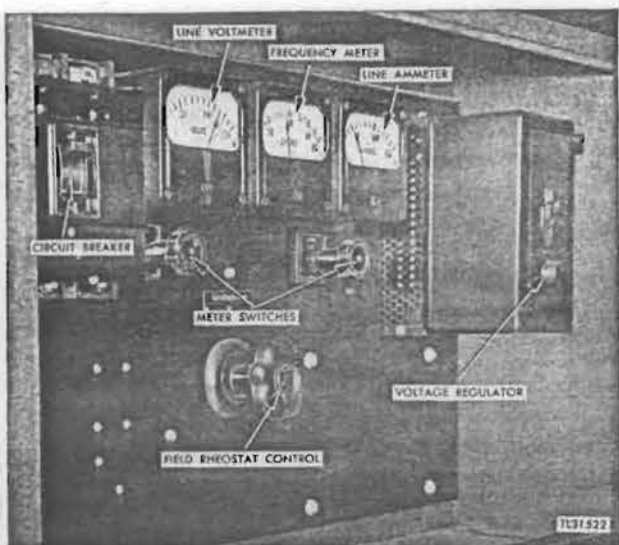


Figure 164. Power instrument panel.

zero-set the frequency meter. To prevent any attempts at adjustment of the frequency meter, keep a piece of tape over the zero setscrew of this meter.

b. LOCATION. The line voltmeter and the line ammeter are mounted on the generator instrument panel as shown in figure 164.

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. To perform maintenance on the rear of

the meter, remove the back panel from the instrument compartment.

I. INSPECT.

- (1) The terminals on the meters.
- (2) For loose, broken, or frayed connections on the terminal leads.
- (3) The meter glasses and cases for cracks. Cover any cracks with transparent tape to keep out dust and dirt until a replacement can be made. Do not obscure the scale.
- (4) Mountings of meters. Make sure that each meter is firmly mounted to the instrument panel.
- (5) The zero setting of each meter. Always stand exactly in front of the meter when doing this to avoid the error of parallax.

A. ADJUST.

The pointers on the two meters to zero using the small screw driver. (See Remarks, item 20.)

d. REMARKS. When a meter has been out of use for a period of 15 minutes or longer, the needle will read zero if the adjustment is correct. If the needle is not at zero, tap the meter case lightly. If the error persists, make the adjustment outlined above.

e. REFERENCES.

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Section XI.

VANS AND BUILDINGS

165. Item 121—Light Relay and Junction Box 1 (Power Van)

a. SAFETY PRECAUTION. Make sure that no power is being supplied to the light relay or junction box while performing maintenance on these parts.

b. EQUIPMENT CAUTION. Never use a rough file on the contact surfaces. The contact surface is made of conductive material, such as silver, platinum, or tungsten. Filing will remove the plating and make the relay unreliable.

c. LOCATION. The light relay is located on the right side of Power Van K-31 above the junction box No. 1. (See fig. 165.)

d. MAINTENANCE PROCEDURE (LIGHT RELAY); PREPARATORY STEPS. Remove the relay cover.

F. FEEL.

(1) The relay coil. If the relay coil is warm, the heat should be distributed evenly over the coil.

(2) The connections to the relay. Feel for temperature and tightness.

I. INSPECT.

(1) The contacts. Look for signs of dirt, oxidation, pitting, and corrosion. The contacts should be clean and bright.

(2) The relay mounting screws. Check for tightness.

e. MAINTENANCE PROCEDURE (JUNCTION BOX 1); PREPARATORY STEPS. Open junction box No. 1.

F. FEEL.

The eighteen connections on the terminal block and the three phase connections on the inner

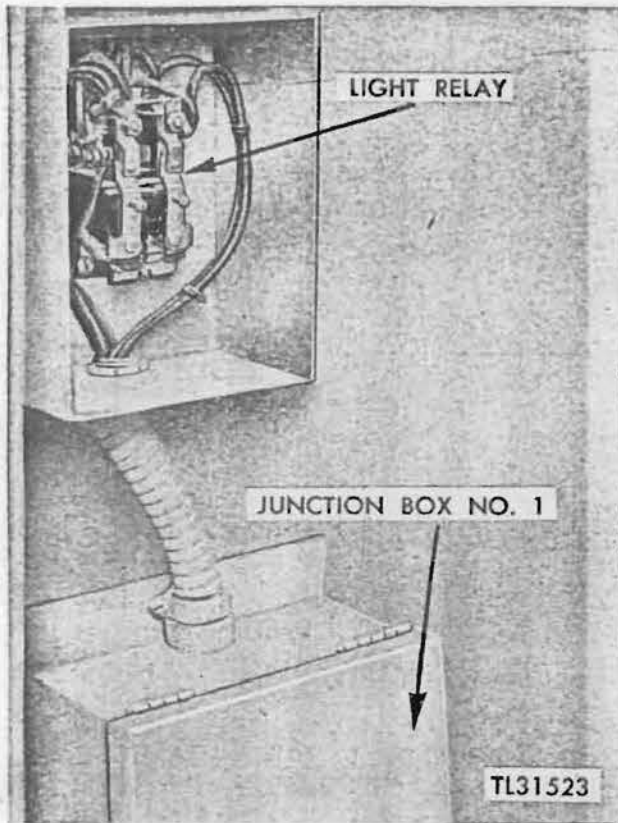


Figure 165. Light relay in power truck.

right side of the box for temperature. (See fig. 166.) These connections should be warm but not hot. Excessive heat indicates a defective connection.

I. INSPECT.

The general condition of the junction box. Inspect all leads and connections. Gently tug on each lead to check for rosin joints or broken wires on the lug. See that the insulation on the cables is not being cut by the metal edges of the box at the point at which the cables enter the box. Make sure that the terminal block is firmly mounted within the box and the box securely mounted to the van wall.

f. REFERENCES.

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166. Item 122—Wall Switch and Junction Boxes (Front Wall of Operations Truck K-30-(*))

a. EQUIPMENT CAUTION. Be careful when tightening screws on the terminal strips. These screws are made of brass and strip very easily.

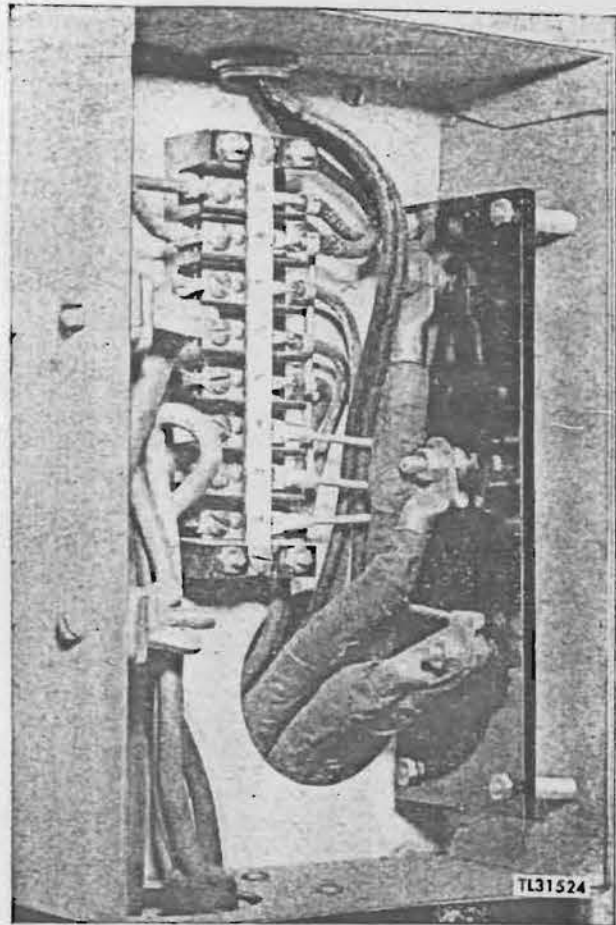


Figure 166. Junction box No. 1.

b. LOCATION. The boxes and switch are mounted on the front wall of Truck K-30- () above the plotting table. (See fig. 167.)

c. MAINTENANCE PROCEDURE (JUNCTION BOXES JB-2 AND JB-3); PREPARATORY STEPS. Open the doors of the junction boxes.

F. FEEL.

The connections to the terminal blocks. These should be cool. A hot connection indicates a faulty connection or an overloaded condition.

I. INSPECT

(1) Each lead for rosin joints and broken wires at the lugs. Note whether the leads are properly positioned so the insulation is not cut by the metal edges of the junction box.

(2) The terminal block to see that it is securely mounted in the junction box. Make sure the wingnuts are tight on the clamp holding the leads where they enter the junction box.

(3) The inside of the junction box for cleanliness.



Figure 167

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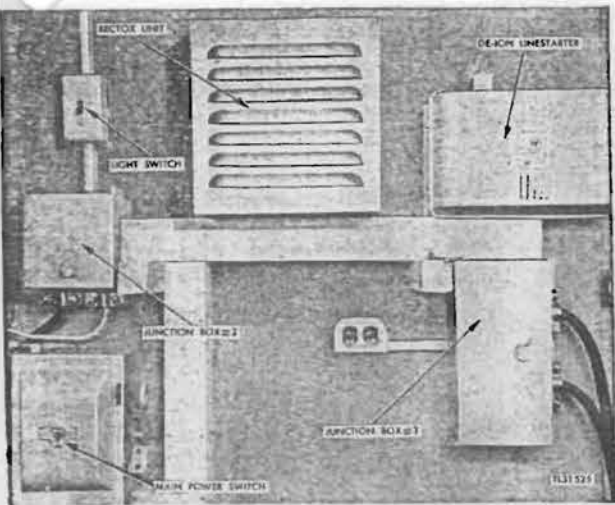


Figure 167. Power panel in Operations Truck K-30.

(4) The door over the junction box. It must operate smoothly and easily.

L. LUBRICATE.

The junction box. If necessary, apply a few drops of lubricating oil to the box hinges.

d. MAINTENANCE PROCEDURE (WALL SWITCH); PREPARATORY STEPS. Open the door of the switch box by releasing the door catch.

F EEL.

(1) The body of each fuse for temperature. This should be slightly above ambient temperature.

(2) The contact clips. A hot spot is an indication of a loose or corroded clip.

(3) The line connections in the junction box. All of these connections should be cool.

I. INSPECT.

(1) The three switch blades and the contact clips for cleanliness. See that the bakelite mounting is fastened firmly to the switch box and that the box is mounted securely to the wall.

(2) All leads. See that they are positioned properly and do not interfere with the normal operation of the switch.

(3) The two springs on the switch arm. See that they are in place and properly positioned.

(4) All leads entering the box. They must be positioned so that the metal edges of the box do not cut the insulation on the wires.

(5) The operation of the switch. The action of the switch should be such that the break between the switch arm and its contact is clean and fast.

A. ADJUST.

Fuse clip tension. After cleaning a contact on any of the fuses in the switch box, adjust the clip tension so that the fuse and the clip make firm connection through the length of the fuse contacts.

L. LUBRICATE.

(1) The door of the switch box if it does not operate quietly and smoothly. Apply a few drops of lubricating oil to the door hinges.

(2) The switch arm. If the operation is abnormally stiff, apply a few drops of oil to the shaft at the point where it enters the box.

e. REFERENCES.

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167. Item 123—Wall Switches and Junction Box 2 (Front Wall of Operations Truck K-62-B)

a. EQUIPMENT CAUTION. Exercise care when tightening screws on the terminal strips. These screws are made of brass and strip very easily.

b. LOCATION. Three power switches and junction box No. 2 are mounted on the front wall of the operating van above the plotting table. (See fig. 168.)

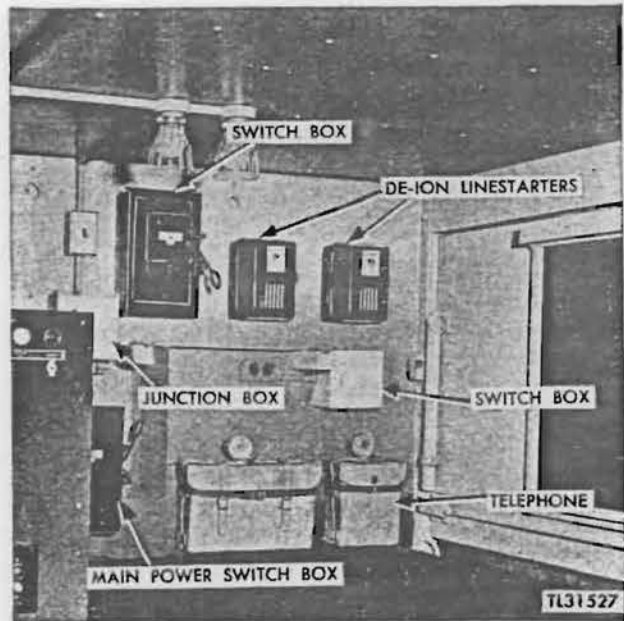


Figure 168. Power panel in Operations Truck K-62.

C. MAINTENANCE PROCEDURE; PREPARATORY STEPS: Open the doors of the switch boxes and of Junction Box JB-2.

F. FEEL.

(1) The connections on terminals, 5, 6, 7, 8, and 9 of the terminal block in Junction Box No. 2. These contacts should be cool.

(2) The temperature of all the fuses in the switch boxes by feeling the body of each fuse with the fingers. The temperature should be slightly above ambient temperature.

(3) All contact clips. A hot spot is an indication of a loose or corroded clip.

(4) All line connections in the junction box.

I. INSPECT.

(1) Each lead for rosin joints and broken wires on the lugs.

(2) The general condition of the junction box. Make sure that it is mounted securely to the van wall.

(3) The switch blades on all switches and the contact clips. Check for cleanliness.

(4) The bakelite mounting. It must be fastened firmly to each switch box.

(5) All leads. See that they are positioned properly and do not interfere with the normal operation of the switches.

(6) The springs on the switch arms. See that the springs are in place and properly positioned.

(7) All leads entering the switch boxes. Leads must be positioned so that the metal edges of the boxes do not cut the insulation on the wires.

(8) The operation of each switch. The action of the switch should be such that the break between the switch arm and the contact is clean and fast.

(9) All connections on the terminal block in Junction Box JB-2. See that all connections make firm electrical contact.

(10) Door of the junction box. See that it operates smoothly.

(11) Hinges on the switch box doors. See that operation is smooth.

(12) Switch arms. See that operation of the switch arms is not too stiff.

NOTE: Rotate the fuses about thirty degrees within the clips whenever maintenance is performed in the switch boxes. Be careful that the caps of the renewable-type fuses do not loosen or they will heat and blow out.

A. ADJUST.

Fuse clip tension. After cleaning a contact on any of the fuses in the switch box, adjust the

clip tension so that the fuse and the clip make firm connection through the length of the fuse contacts.

L. LUBRICATE.

(1) Junction box door if it does not operate smoothly. Apply a few drops of lubricating oil to the door hinges.

(2) Hinges on the switch box doors.

(3) Switch arms if operation is abnormally stiff. Apply a few drops of oil to the shafts at the points where they enter the boxes.

d. REFERENCES.

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168. Item 124—De-ion Linestarters and Rectox Unit (Front Wall of Operations Truck K-30-(*))

a. SAFETY PRECAUTION. Before performing maintenance on this item, throw the main power switch (on the front wall of the operating van) to the OFF position.

b. EQUIPMENT CAUTION. When working on the rectox unit, avoid damage to the rectifier plates. Never adjust the end nuts on the rectox unit.

c. LOCATION. The de-ion linestarters and the rectox unit are mounted on the front wall of the operating van above the plotting table. (See fig. 167.)

d. MAINTENANCE PROCEDURE (DE-ION LINE-STARTERS); PREPARATORY STEPS: Open the doors to the De-ion linestarters by releasing the door catch.

F. FEEL.

The wiring terminals for temperature and tightness and the field coils in the de-ion starting box for abnormal heating. If the coils have been running excessively hot, an odor of burning varnish or insulation may be present. Make this examination immediately after shut-down.

I. INSPECT.

(1) The relay assemblies for evidence of dirt or corrosion.

(2) The relay field coils for signs of overheating.

(3) The wiring for position, deteriorated or damaged insulation.

(4) The terminals for evidence of corrosion or loose connections.

(5) The are secure

(6) The box and each rela the unde plunger is When ei lock the c this locki

(7) All tain none

(8) Re or corrosi

C. CLEAN

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(2) Wl that clea for clean

(a) Re the base

(b) Pu lifting it

(c) Gr assembly bly from ary and relay; als for close

(d) Re

(e) T ing foll

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(2) T the relay bolts.

(3) St will hav this, re detach t screws.

(5) The relay mounting. Be sure the relays are securely mounted in the box.

(6) The action of the relays. Reach in the box and test the movements of the contacts on each relay by lifting the contact plunger from the under side with the finger. The contact plunger in each relay should raise and fall easily. When either contact plunger is raised, it will lock the other in the off position. Note whether this locking arrangement is working correctly.

(7) All terminals and connections. Make certain none have worked loose.

(8) Relay contacts. Check for signs of pitting or corrosion.

C. CLEAN.

(1) Relay contacts that are dirty, pitted, or corroded. Use the crocus-cloth cleaning tool and a cloth moistened with carbon tetrachloride. If the contact surfaces are pitted, use the #0000 sandpaper-covered cleaning tool first, then polish with the crocus-cloth cleaning tool. Wipe with a dry, clean cloth.

(2) When inspection of the contacts indicates that cleaning is necessary, disassemble the relay for cleaning and close inspection.

(a) Remove the two yoke mounting screws at the base of the coil frame.

(b) Pull the metal yoke away from the frame, lifting it slightly at the same time.

(c) Grasp the plunger and moving contact assembly with the hand and remove the assembly from the relay. Figure 3B shows the stationary and the moving contacts of this type of relay; also it illustrates how they can be removed for close inspection and cleaning.

(d) Reassemble the relay in the reverse order.

(e) To remove stationary contacts for cleaning follow steps 3, 4, and 5 below.

e. ALTERNATE METHOD. (1) Remove the four bolts that hold the relay mounting board to the weatherproof box.

(2) Turn the unit upside down and remove the relay plungers by unscrewing the two center bolts.

(3) Stationary contacts that require cleaning will have to be removed one at a time. To do this, remove wire from the terminal and then detach the contact arm by removing mounting screws.

(4) Withdraw the contact for cleaning.

(5) Replace each stationary contact and connect the wire before proceeding to clean the others. This operation prevents errors.

(6) When all contacts have been cleaned, replace the plungers and tighten securely.

(7) Bolt the mounting board to the weatherproof box. Make sure all washers and lock-washers are put back when reassembling.

(8) Arrange wires neatly taking care that there is no interference with the movement of the plunger.

f. MAINTENANCE PROCEDURE (RECTOX UNIT, RADIO SET SCR-270); PREPARATORY STEPS: Remove the four screws holding the metal cover and lift the cover from the rectox unit.

I. INSPECT.

The interior of the rectox cabinet. See that the leads are properly positioned and the parts securely mounted. All connections must be inspected for tightness, and the interior of the box must be clean, with no dirt or corrosion.

g. REFERENCES.

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169. Item 125—De-ion Linestarters (Front Wall of Operations Truck K-62-(*))

a. SAFETY PRECAUTION. Before performing this maintenance, throw the main power switch (on the van wall) to the OFF position.

b. LOCATION. The De-ion linestarters are mounted on the wall of the operating van above the plotting table. (See fig. 168.)

c. MAINTENANCE PROCEDURE; PREPARATORY STEPS. Open the doors of the two De-ion linestarters. (See item 123, under Maintenance Procedure (De-ion Linestarter)). Follow the same maintenance procedure for these two linestarters.

L. LUBRICATE.

The relay cabinet door hinges if they operate stiffly. Apply a few drops of lubricating oil. Wipe off any excess oil.

d. REFERENCES.

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170. Item 126—Power Distribution Panel BD-111-(*).

a. SAFETY PRECAUTIONS. (1) Throw the main power switch to the OFF position.

(2) Remove the three main-line fuses.

(3) Do not place the hands under the upper side of the main fuse compartment.

b. EQUIPMENT CAUTION. When opening the inner door to the main-line fuse compartment, do not permit the door to drop on the converti-fuse cases.

c. LOCATION. The power panel (fig. 169) is mounted on the wall of the transmitter room to the right of the keying unit.

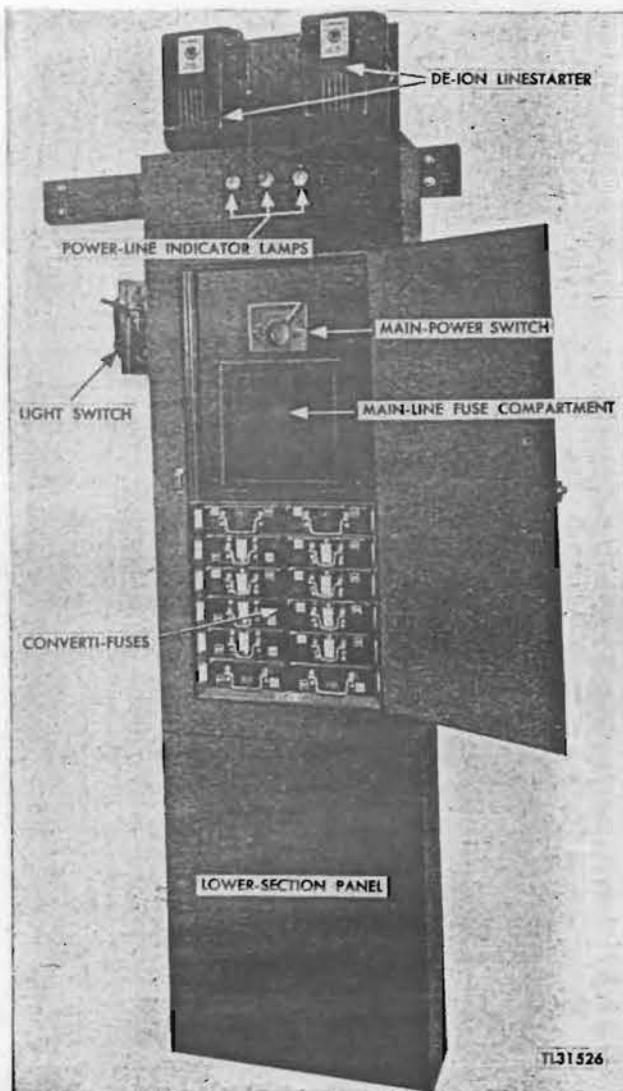


Figure 169. Power distribution panel Radio Set SCR-271-(*).

d. MAINTENANCE PROCEDURE; PREPARATORY STEPS: (1) Open the outer door of the power distribution panel.

(2) Throw the main power switch to the OFF position.

(3) Open the inner door of the main fuse compartment.

(4) Remove the three main-line fuses.

(5) Using a screwdriver, remove all screws from the lower section of the power distribution panel (fig. 169) and remove the panel.

F. FEEL.

(1) All terminals on the three terminal blocks for excessive heating.

(2) Fuses and connections to fuses for excessive heat. All should be uniformly warm but not hot.

I. INSPECT.

(1) The insulated covering of all cables and leads for cracked or deteriorated conditions.

(2) The terminal blocks for cracks or breaks.

(3) All leads to the terminal blocks for loose or broken connections.

(4) The ground bus bar located above the three terminal blocks. Be sure that it is mounted securely.

(5) The bakelite mountings supporting the ground bus bar, for cracks or breaks.

(6) All leads fastened to the ground bus bar for loose or broken connections.

(7) The tightness of the three leads fastened to the lower ends of the three-phase terminals. These terminals are located directly above the ground bus bar.

(8) Bakelite cases of the converti-fuses. Remove from their receptacles each of the converti-fuses from 1 through 12 (fig. 169), and inspect the bakelite cases for cracks or breaks. Make sure that all terminals are mounted firmly and are free from dirt and corrosion. Remove each cartridge fuse from the converti-fuse cases and check the fuse-holder clips for proper tension. Make sure that the clips are mounted firmly and are free from dirt and corrosion. Check cartridge fuse and terminals for corrosion.

(9) All terminals in the converti-fuse receptacles. Examine for dirt and corrosion. Check all receptacles for loose or broken terminals.

(10) The spring clips of the main-line fuse holders. Make sure that each is mounted firmly and is free from dirt and corrosion.

(11) Using one of the main fuses, insert one end of the fuse into each spring clip and test for proper tension.

Caution: Do not place the hands under the upper side of the main fuse compartment.

(12) All main fuse terminals for dirt or corrosion. Check the fuse caps on all the renewable type main fuses to be sure they are tight.

C. CLEAN.

(1) All dust and dirt from the main-line fuse compartment using the air blower, paint brush, and cleaning cloth. Use sandpaper to remove any rust spots and paint over any exposed metal parts with black metal paint.

(2) The twelve converti-fuse cases. Remove the twelve cases. Using the air blower, paint brush, and cleaning cloth, remove all dust and dirt from the converti-fuse compartments, or receptacles. Having cleaned the fuse cases return them to their proper receptacles.

(3) All dust and dirt from the lower compartment of the distribution panel using the air blower, paint brush, and cleaning cloth.

(4) All panels and doors with a clean cloth. Remove any rust spots with sandpaper, and paint the exposed metal parts with black paint. Replace the lower panel.

(5) The three glass jewels of the indicator lamps. Remove and clean with the cleaning cloth. (See fig. 169.)

(6) The three pilot bulbs. Remove and clean with a cloth. After cleaning, replace the three indicator bulbs and glass jewels.

Note: It may be necessary to use friction tape to remove the three pilot bulbs.

L. LUBRICATE.

(1) Main fuse compartment door. Apply a few drops of light oil to the latch and hinges of the main fuse compartment door.

(2) The terminals of each converti-fuse. Apply a very small quantity of vaseline or petroleum jelly. Insert and remove the converti-fuses from their receptacles several times after greasing, to properly distribute the vaseline or petroleum jelly to the contact terminals in the converti-fuse compartments.

(3) The latch on the outer panel-door when necessary. Apply a few drops of light oil. Wipe off all excessive oil.

Note: After cleaning, replace the main line fuses and close both panel doors.

e. REFERENCES.

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171. Item 127—Power Supply Truck K-31-(*)

a. MAINTENANCE PROCEDURE.

I. INSPECT.

(1) The walls, floor, and ceiling for signs of dirt, water, grime, rust, and foreign matter.

(2) All covers on the floor conduits.

(3) The relay and junction boxes. Inspect for cleanliness and security of mounting to the van wall.

(4) All doors, including the locks, hinges, and chains. Check for general condition and ease of operation.

(5) Fire extinguishers, they should be in place and fully charged at all times.

(6) Light switches, sockets, and convenience outlets, for general mechanical condition.

C. CLEAN.

(1) The walls, ceiling, and floor of the van. Use sandpaper and kerosene to remove all rust and grime. Wipe with a clean cloth, and repaint any exposed metal spots to match the surrounding surface.

(2) All grime and rust from the doors, hinges, locks, and chains. Use the wire brush and sandpaper to remove the rust, then wipe with a cloth dipped in kerosene. Paint any exposed metal parts to match the surrounding surface.

L. LUBRICATE.

(1) All door locks that do not operate smoothly. Apply a small amount of graphite powder to the lock mechanism through the key slot.

(2) The door hinges. Apply lubricating oil to rusty, squeaking, or sticking hinges.

b. REFERENCES.

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172. Item 128—Operations Trucks (K-30-(*) and K-62-(*))

a. MAINTENANCE PROCEDURE.

I. INSPECT.

(1) The walls, floor, and ceiling for signs of dirt, dust, water, grime, rust, and deterioration.

(2) All covers on the floor conduits. Check these for cleanliness and security of fastening.

(3) The wall junction boxes, switches, and linestarters. Check for cleanliness and security of mounting.

(4) All doors, including the locks, hinges, and chains. Check for general condition and ease of operation.

(5) Light switches, sockets, and outlets for general mechanical condition.

(6) The plotting table for general condition.

C. CLEAN.
(1) The walls, ceiling, and floor of the van. Use sandpaper and kerosene to remove all signs of rust and grime. Wipe with a clean cloth, and repaint any exposed metal to match the surrounding surfaces.

(2) All grime and rust from the doors, hinges, locks, and chains. Use the wire brush and sandpaper to remove the rust, and wipe with a cloth dipped in kerosene. Paint any exposed metal parts to match the surrounding surfaces. After the interior of the van has been thoroughly cleaned, police the area around the van.

L. LUBRICATE.

(1) All door locks that do not operate smoothly. Apply a small amount of graphite powder to the lock mechanism through the key slot.

(2) The door hinges. Apply lubricating oil to rusty, squeaking, or sticking door hinges.

b. REFERENCES.

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173. Item 129—Operations and Power Houses (Radio Set SCR-271-[*])

a. EQUIPMENT CAUTION. While performing maintenance, be careful to prevent damage to any of the equipment.

b. MAINTENANCE PROCEDURE.

I. INSPECT.

(1) The general condition of the walls and floors in the two buildings.

(2) The light fixtures. Make sure that all light bulbs are in place and operating properly. Check the condition of all light switches. Check all light domes for cracks or other defects. Make sure that all light domes and fixtures are fastened securely.

(3) The general condition of all doors and windows; all hinges and locks, making sure that all are free from rust and operating smoothly. Replace any cracked or broken window panes. If the windows have originally been blacked out, repaint any exposed glass surfaces through which light may be visible.

(4) All louvres and screens, making sure that all screens are intact. Make all necessary repairs to any loose or broken window louvres and screens.

(5) The general condition of the window shades (and black-out screens), if used.

C. CLEAN.

(1) All walls and ceilings of both buildings, using the hand-brush and a dampened cleaning cloth.

(2) All light fixtures, light domes, and lamp bulbs using a dampened cleaning cloth, and dry thoroughly with a clean, dry cloth.

(3) All doors, screens, and window casings, using the hand-brush and cleaning cloth. If the window panes have not been blacked-out, thoroughly wash all windows.

(4) All dust and dirt from floor conduits, and clean the window louvres with a dry, cleaning cloth.

L. LUBRICATE.

Doors, screens, and windows. Apply a few drops of lubricating oil to the locks, hinges, and clamps of all doors, screens, and windows. Wipe off any excess oil.

c. REMARKS. Whenever the buildings are in need of repainting, notify the person in charge.

d. REFERENCES.

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START-STOP PROCEDURES AND MAINTENANCE SCHEDULE

174. Starting Procedure

a. Turn ON the power supply.

Caution: Make certain that the circuit breaker on the generator power panel is in the OFF position.

(1) When using commercial power, throw the commercial entrance switch ON.

(2) When using Power Unit PE-74:

(a) Move the throttle lever about $\frac{1}{4}$ inch off the magneto switch (start position).

(b) If the engine temperature is below 70° pull out the CHOKE about one inch. After the engine turns over a few times, return the choke to the normal position.

(c) Press the control marked START and hold it in until the engine fires. If the engine does not fire, release the control, wait about thirty seconds, and repeat the procedure.

(d) When the engine is running smoothly, set the throttle at the RUN position.

(3) When using Power Unit PE-185:

(a) Start the Buda Diesel engine by pushing the control marked STOP all the way in.

(b) Pull out the control marked THROTTLE half way.

(c) Use the START button. In cold weather depress the heater button for about ten seconds before depressing the starter button. If the engine does not start the first time, it may be necessary to press the heater button each time before pressing the starter button. Press the control marked STARTER; when the engine fires, release the control.

(d) When the engine is running smoothly, push the throttle all the way in.

(e) Pull out the control marked HOWLER SWITCH to put the howler horn in operation.

b. Adjust controls on generator power panel.

(1) Be sure the field rheostat is in the full counterclockwise position.

(2) To adjust the phase voltages, set the con-

trol marked VOLTMETER to select any one of the three phases. The voltmeter directly above the switch indicates the voltage on that phase.

(3) Adjust the voltage regulator marked SILVERSTAT so that the meter reads 120 volts.

(4) Set the phase selector switch to the other two positions and check each for a reading of 120 volts on the voltmeter.

(5) Throw the circuit breaker on the generator power panel to the ON position.

c. Throw rectifier main line circuit breaker ON.

Caution: Check to see that the output voltage and filament voltage controls are set to the full counterclockwise position.

d. Throw on the main power switch in the operating van.

e. Throw the transmitter circuit breaker labeled A.C. POWER to the ON position.

f. To start the water cooling unit, press the button on the top of the low pressure control switch.

g. Press the black button marked START on the transmitter filament switch. The filament control must be in the full counterclockwise position.

h. Increase the filament current very slowly in 10-ampere steps by turning the filament current control. At 150 amperes the transmitter-ready indicator on the keyer will glow. In locations where temperature ranges are 40° F., take from 20 to 30 minutes total time between zero and 170 amperes. In tropical locations, the total time necessary is about 10 to 15 minutes.

i. At the keying unit press the black button labeled START on the MAIN POWER switch.

j. Throw the keyer CIRCUIT BREAKER to the ON position.

k. Press the black button labeled START on the HIGH VOLTAGE switch.

Caution: Be sure the supply voltage control is turned completely counterclockwise and the bias-voltage control is completely clockwise. After 1 minute turn on blower toggle switch, if the temperature is above 50° F. The blue indicator lamp (BLOWER) will glow.

l. Turn the control labeled KEYING SUPPLY VOLTAGE CONTROL slowly clockwise until the voltmeter labeled KEYING SUPPLY VOLTAGE indicates 5,000 volts.

m. At the oscilloscope, turn the control labeled SEN. clockwise until the power switch snaps ON.

n. Adjust the control labeled INT until a baseline appears on the oscilloscope screen.

o. Adjust the control labeled VERT. POS. to set the baseline in the center of the screen.

p. Adjust the control labeled FOCUS until a clear sharp baseline is obtained.

q. Readjust the intensity control to obtain the proper brilliance for the trace.

r. At the rectifier insert the key in the lock labelled CONTROL LOCK and turn it clockwise.

s. Press rectifier high voltage START switch. Depending on the setting of the switch labeled CONTROL SELECTOR in the back of the rectifier unit, the start button is pressed at either the operator's position in the operating van or at the rectifier front panel. If the selector is set for LOCAL, the button is pressed at the rectifier panel. If the selector is set for REMOTE, the button is pressed at the operator's position.

Caution: The controls labeled OUTPUT VOLTAGE CONTROL and FILAMENT VOLTAGE CONTROL must be in the full counterclockwise position.

t. Turn the control labeled FILAMENT VOLTAGE CONTROL slowly clockwise until the pointer on the filament voltage meter is at the red mark.

u. Turn the control labeled OUTPUT VOLTAGE CONTROL on the rectifier slowly clockwise until a voltage of 15,000 volts is indicated on the output voltmeter. Be sure the bias-voltage control on the keyer is completely clockwise.

v. At the keyer turn the control labeled BIAS CONTROL slowly counterclockwise. Watch the meter labeled PLATE MILLIAMMETER at the back of the transmitter unit. When the meter

reads the optimum operating values for the station (between 165-200 milliamperes), stop turning the bias control. The toggle switch on the receiver must be in the OFF position before any adjustments are made with the bias control.

w. Throw receiver power switch to ON position.

Caution: Never turn on the receiver if the spark gaps are not operating. If at any time the spark gaps cease operating, turn the receiver off immediately. Once the spark gaps are operating, the receiver may be returned to normal operation.

x. Throw the motor generator switch for the AP-2 controls (tower switch) to the ON position. There must be no obstruction to the antenna movement when these controls are turned on.

175. Stopping Procedure

a. Throw the motor generator switch (tower switch) to the OFF position.

b. Throw the power switch on the receiver to the OFF position.

c. Turn the control labeled BIAS VOLTAGE CONTROL on the keying unit clockwise to maximum.

d. At the rectifier turn the control labeled OUTPUT VOLTAGE to the maximum counterclockwise position.

e. Turn the control labeled FILAMENT VOLTAGE CONTROL on the rectifier slowly counterclockwise until completely off.

f. Press the button labeled STOP on the rectifier CONTROL switch.

g. Turn the key in the CONTROL LOCK of the rectifier counterclockwise.

h. Turn the oscilloscope intensity control completely counterclockwise.

i. Turn the control labeled SEN. on the oscilloscope counterclockwise until the power switch snaps OFF.

j. Turn the KEYING SUPPLY VOLTAGE CONTROL on the keying unit completely counterclockwise.

k. Press the red button labeled STOP on the HIGH VOLTAGE switch.

l. Throw the switch labeled CIRCUIT BREAKER to the OFF position.

m. Press the red button labeled STOP on the MAIN POWER switch of the keying unit.

... Slowly decrease the filament current in 10-ampere steps by turning the filament current control counterclockwise.

NOTE: In locations where temperature ranges are below 32° F., take from 20 to 30 minutes total time between 170 to ... amperes. In tropical locations, the total time necessary is about 10 to 15 minutes.

o. Press the red button marked STOP on the transmitter filament switch. Let the water cooling unit operate for approximately 2 minutes.

p. Throw the transmitter circuit breaker labeled A.C. POWER to the OFF position.

q. Throw the main power switch in the operating van to the OFF position.

r. Throw the circuit breaker labeled MAIN LINE on the rectifier unit to the OFF position.

s. Throw the circuit breaker on the generator power panel to the OFF position.

t. Turn off power supply. (1) If using commercial power throw the commercial power switch to the OFF position.

(2) Stop Le Roi gasoline engine, if using Power Unit PE-74. Move throttle lever to one-fourth inch from stop position. Allow the engine to idle for about one minute. Set throttle magneto-micro switch (stop position). Close fuel valves.

(3) Stop Buda Diesel engine, if using PE-185. Push in the control marked HOWLER SWITCH to take the howler horn out of operation. Set throttle. Push the throttle half way in, allow engine to idle for about 1 minute. Push throttle in. Pull stop control OUT.

176. Maintenance Schedule and Assignment Sheet

This section of the manual describes the Preventive Maintenance Schedule. Basically, the

maintenance schedule indicates the "when" and the "what" of the maintenance program. The specific information supplied by the Maintenance Schedule is as follows:

a. The name of the component on which maintenance work is to be done.

b. The specific item (in the designated component) on which maintenance is to be completed.

c. The day of the week the job is to be done.

d. The number of times the work is done each month.

e. Code letters (F, I, T, C, A, L) which specify the particular maintenance operations that are to be performed. F = Feel; I = Inspect; T = Tighten; C = Clean; A = Adjust; L = Lubricate.

f. Code numbers which identify the items. Items are numbered 1 to 30 inclusive. The complete maintenance schedule for a year's work is given on seven scheduled sheets—one sheet for each day in the week.

177. Maintenance Schedule

Each schedule sheet consists of eight vertical columns. The first column in the schedule for each day lists the Item Number. The second column gives the Code Letter (F, I, T, C, A, L) of the maintenance operation to be performed; the third indicates the Item Title. Columns 4, 5, 6, 7, and 8 indicate the frequency at which the items are to be performed. For example, blank spaces across all five columns indicate that the particular item is to be performed once a week. Shaded spaces indicate that the item is not performed during the week shaded.

For example:

1	2	3	4	5	6	7	8
Item No.	Operations	Items	Maintenance to be done				
			First	Second	Third	Fourth	Fifth
50	IC	High-voltage bushings and insulators					1
51	IC	Relays (45, 46, 47, 48, 49)					
52	I	Fan and Motor (41)					1
52	L	Motor (41)					

¹ Once-a-week maintenance
Once-a-month maintenance

178. Assignment Sheet

a. The assignment sheet is used in conjunction with the schedule. Seven assignment sheets correspond to seven maintenance schedule sheets. These seven assignment and seven schedule sheets cover the period of one year. In other words, there is a Monday assignment sheet for the Monday schedule sheet, a Tuesday assignment sheet for the Tuesday schedule sheet, a Wednesday for the Wednesday, etc. Used together, the schedule and assignment sheets enable the scheduling of all maintenance jobs to be performed during the course of a year.

b. The assignment sheet is divided into twelve main blocks, each block representing one month. Months are divided into weeks as indicated under column 14. In other words, on the Monday sheet these figures indicate the first, second, third, fourth, and fifth Mondays of a month. On the Tuesday sheet, they represent

the first, second, third, fourth, and fifth Tuesdays of the month, etc.

c. The assignment of specific men on the crew to particular items of maintenance can be made in columns 9, 10, and 11. As shown in the sample below, the open spaces under ASSIGNMENTS are used for entering the initials of the men assigned for the various jobs. The other column under assignments is used for entering the code numbers of the items to be performed by each man. In the sample below, J.C. is to perform items 21 through 30, E.B. 31-36, E.R. 37-45 on the first Tuesday of January. On the second and third Tuesdays of the month, the jobs have been interchanged. In July, J.C. is to perform items 20 through 28, E.B. 29-32, and E.R. 30 through 45 on the first Tuesday of that month. Again on the second and third Tuesdays of the month the jobs have been interchanged. In this way specific assignments for an entire year can be made with the assignment sheet.

ASSIGNMENTS FOR TUESDAY

M O N T H	9	10	11	12	13	14	9	10	11	12	13	M O N T H
	Assignments			Disposition	Checked by		Assignments			Disposition	Checked by	
J A N U A R Y	JC	EB	ER			First	JC	EB	ER			J U L Y
	21-30	31-36	37-45				20-28	29-32	30-45			
	JC	EB	ER			Second	JC	EB	ER			
	37-45	21-30	31-36				30-45	20-28	29-32			
	EB	ER	JC			Third	EB	ER	JC			
	37-45	21-30	31-36				30-45	20-28	29-32			
					Fourth							

Column 12 DISPOSITION is used to record any jobs that have not been completed or that have been performed unsatisfactorily. The item number and initials of the maintenance man

are to be recorded here in case of an incompletd job. Column 13 is for the approval of the person in charge.