

EIMCO COAL MACHINERY INC.

A TAMROCK COAL COMPANY

Safety System Approval #31D108-0

Approval Number(s)..... -31-110-0,--1--and --2-----

Items and functions used in this document must be maintained in order for the power system to be considered permissible. For a complete vehicle permissibility evaluation, this checklist must be used in conjunction with a vehicle permissibility checklist and, if so equipped, an electrical system checklist.

ALL INSPECTIONS AND TESTS SHALL BE PERFORMED IN FRESH AIR.

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(WEEKLY) - DESIGNATES THOSE INSPECTION CHECKS THAT MUST BE PERFORMED DURING THE WEEKLY MAINTENANCE EXAMINATION IN ACCORDANCE WITH 30 CFR, SECTION 75.1914.

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1. () It has been determined that the area in which the tests are to be performed is fresh air.

2. () This machine utilizes an MWM Model 916-6 diesel engine.

INTAKE SYSTEM

Fig 1a & 1b show the assembled intake system.

(WEEKLY) 3. () All components appear to be the same as one of the diagrams shown in Figure 1a & 1b.

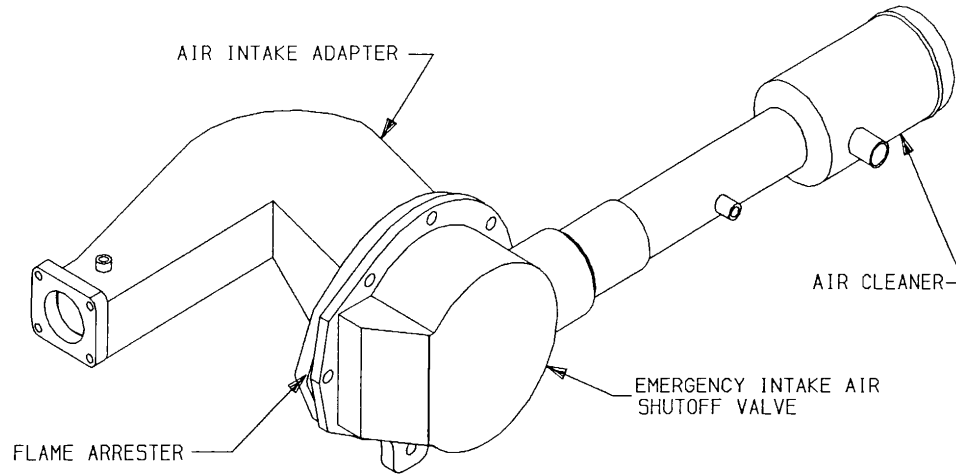


Figure 1a. Assembled Intake System

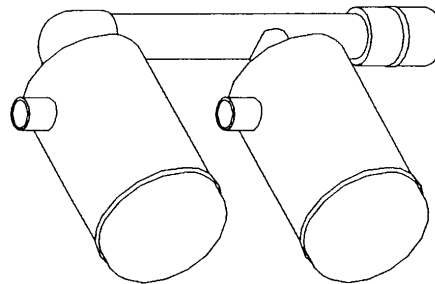


Figure 1b. Optional Intake System

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(WEEKLY) 4. () A metal clad gasket (6 pieces) is installed between each flange of the intake manifold and engine head as shown in Figure 2.

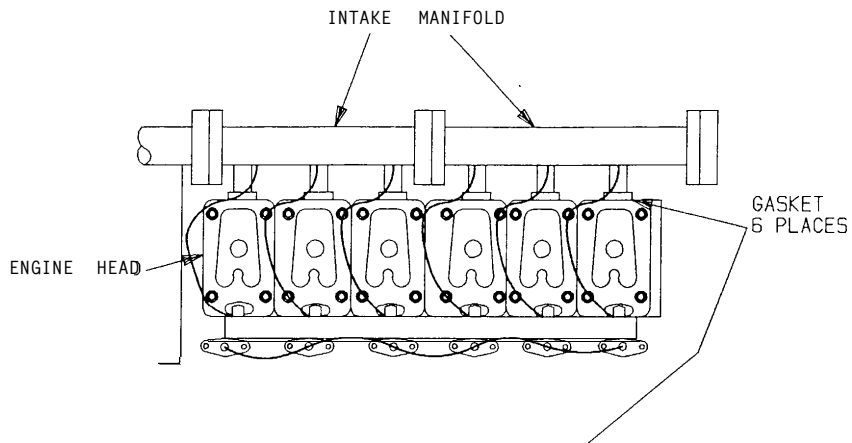


Figure 2. Gaskets Between Intake Manifold and Engine Head

(WEEKLY) 5. () A gasket is installed between the air intake adapter and the engine as shown in Figure 3.

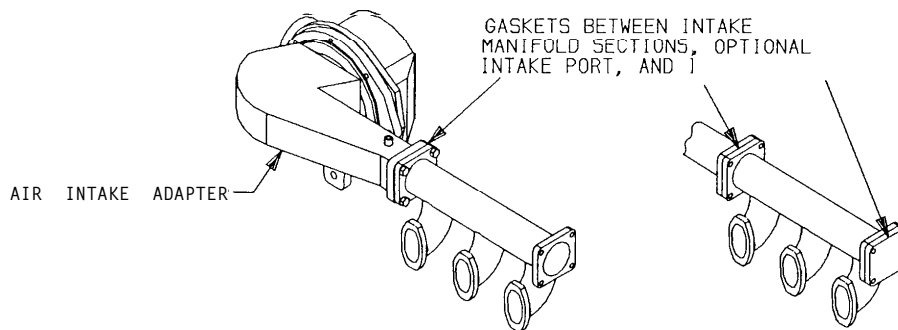


Figure 3. Gaskets Between Air Intake Adapter and Engine

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(WEEKLY) 6. () A gasket is installed under the cover plate for the MWM optional intake port located on opposite end of intake manifold, and between the front and rear sections of the intake manifold as shown in Figure 3.

(WEEKLY) 7. () The fasteners securing the air intake adapter to the engine intake manifold are in place and tight

(WEEKLY) 8. () The fasteners securing the two halves of the intake manifold and the cover plate for the optional intake port are in place and tight,

3. () Remove the intake Flame arrester. The intake flame arrester is shown in Figure 4. The flame arrester core is clean and has no apparent damage.

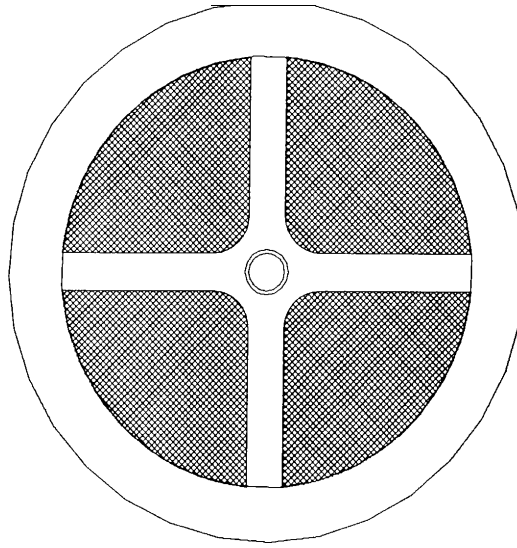


Figure 4. Intake Flame Arrester

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10. () A $\emptyset.018$ inch wire gauge cannot pass through the openings of the flame arrester core as shown in Figure 5. The procedure for making this inspection (dated August 5, 1985) is attached.

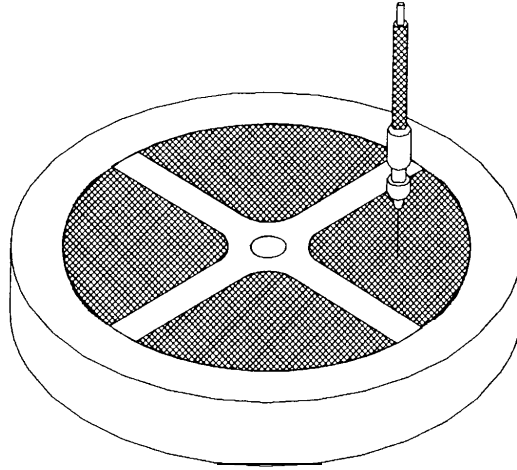


Figure 5. Wire Gauge Cannot Pass Through Flame Arrester

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EVALUATION PROCEDURES FOR INSPECTING CRIMPED-RIBBON TYPE
INTAKE FLAME ARRESTERS ON DIESEL-POWERED EQUIPMENT
(AUGUST 5, 1985)

1. Remove flame arrester assembly from housing.
2. Place on flat surface with a contrasting background under the flame arrester such as, brattice cloth or a clean white cloth.
3. Adequate lighting is required; cap Lamp Lighting is not sufficient.
4. Visually inspect each side of flame arrester for openings or spaces, obviously greater than the triangular spaces of the core. These kinds of openings may have been caused by prying a screwdriver or other such objects against or through the flame arrester core during manufacturing or in mine maintenance. Flame arrester cores with such damage must not be permitted to be used on permissible equipment.
5. Visually inspect each side of the core for places where the windings of the flame arrester core appear to be separating such that gaps can be seen. If such gaps exist they must be checked as follows:
 - a. The only measuring tool considered acceptable for performing this evaluation is an 0.018 inch calibrated plug gauge. (Sometimes called a wire gauge.) The plug gauge is to be mounted in a gauge holder (Figure 6) weighing 1 to 1.5 ounce and projecting at Least one inch out of the end.

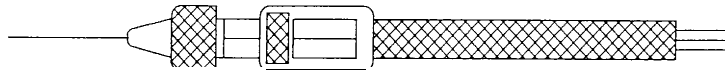


Figure 6

- b. Grasp the gauge holder Lightly between the index finger and thumb. Place the wire tip at the point in question; making sure the plug gauge is vertical. Using only the weight of the gauge and holder see if it will enter the apparent gap. Do not attempt to force or wiggle the gauge through the opening.
 - c. If the plug gauge enters the opening, the flame arrester core must not be used on permissible equipment.
6. Visually inspect the triangles in the flame arrester core (both sides) for triangles that appear to be larger than the rest. If such conditions exists, these openings must be checked as previously described in Section 5 a, b, c.
7. Finally, if the flame arrester core passes all of the above evaluations, a final check should be performed on at least 5 triangles on each side of the core with the procedure described in Section 5 a, b, c. In performing this check, the tip of the plug gauge must be placed against a specific triangular opening. If this special care is not taken, the evaluation will be invalid.

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(WEEKLY) 11. () A copper gasket is installed between the intake flame arrester and the air intake adapter as shown in figure 7.

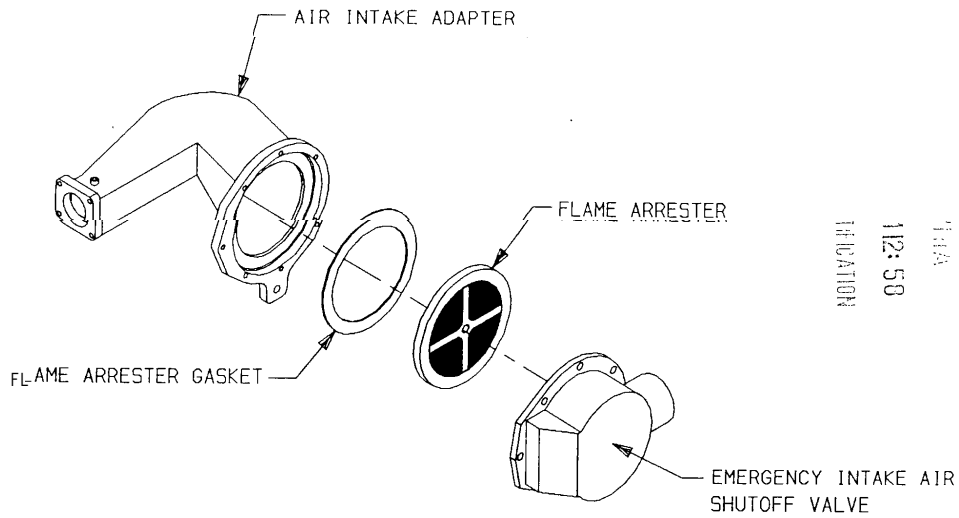


Figure 7. Flame Arrester Gasket

(WEEKLY) 12. () The fasteners securing the intake air shut-off housing and flame arrester to the air intake adapter are in place and tight.

(WEEKLY) 13. () The complete intake system has no signs of damage. There are no loose connections, cracks, or missing port plugs (or caps).

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EXHAUST SYSTEM

The exhaust system of the engine includes a water-cooled exhaust manifold, exhaust pipe, a waterbath exhaust conditioner and a make up water tank.

[WEEKLY) 14. () The fasteners securing the exhaust manifold to the engine are in place and tight as shown in Figure 8.

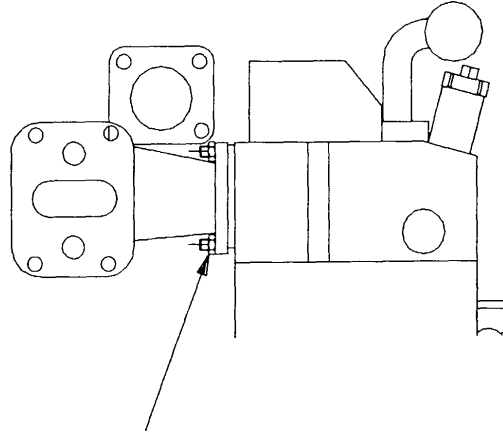


Figure 8. Water-Cooled Exhaust Manifold

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[W E E K L Y) 15. () A metal clad gasket (6 pieces) is installed between each flange of the exhaust manifold and engine head as shown in figure 9.

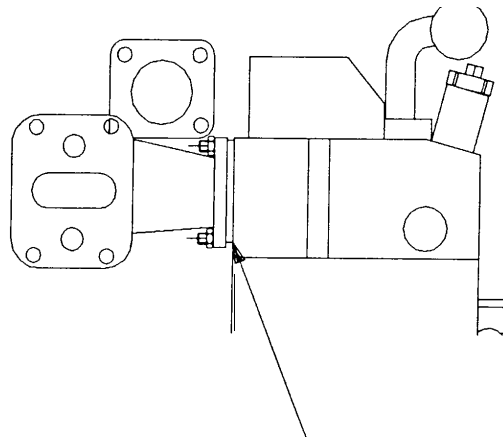


Figure 9. Gasket Between Exhaust Manifold and Engine

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(W E E K L Y) 16. () A gasket is installed between the flange of the exhaust pipe and the flange of the exhaust manifold as shown in Figure 10.

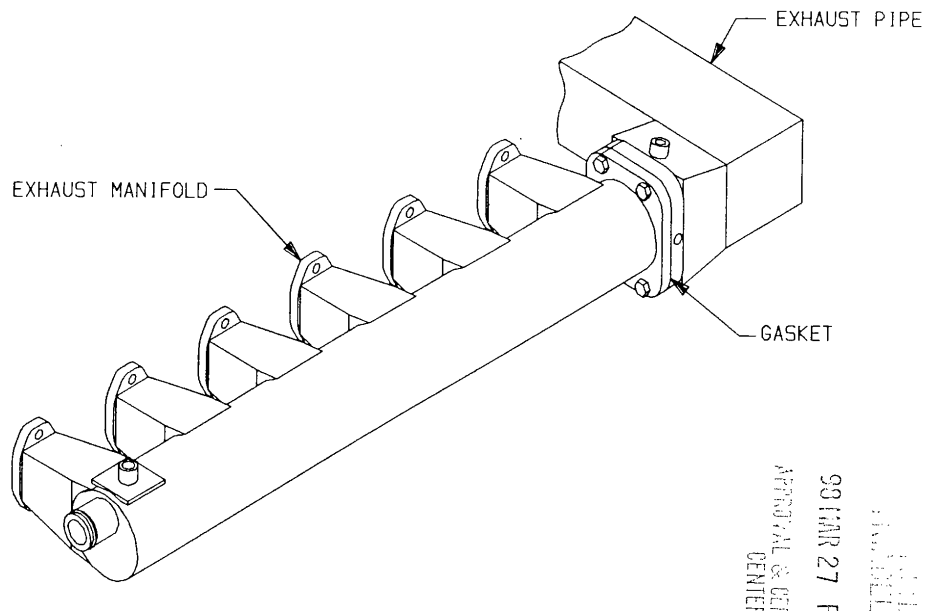


Figure 10. Gasket Between Exhaust Pipe and Exhaust Manifold Flange

(W E E K L Y) 17. () Fasteners securing the exhaust pipe to the flange of the exhaust manifold are in place and tight.

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(WEEKLY) 18. () A phosphor bronze gasket is installed between the flange of the exhaust pipe and the flange of the exhaust conditioner as shown in Figure 11.

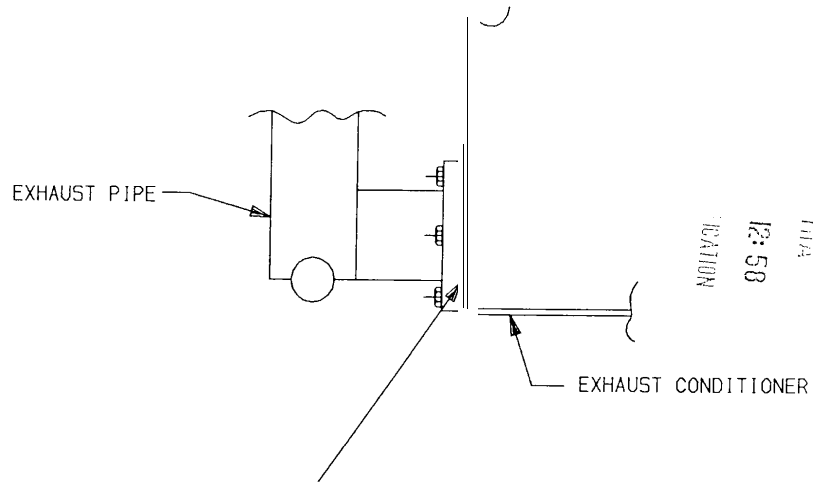


Figure 11. Gasket Between Exhaust Pipe and the Flange of the Exhaust Conditioner.

(WEEKLY) 19. () Fasteners securing the exhaust pipe to the flange of the exhaust conditioner are in place and tight.

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20. () Remove exhaust conditioner cover.
21. () A phosphor bronze gasket is installed between the flange of the exhaust conditioner and the flange of the scrubber insert as shown in Figure 12.

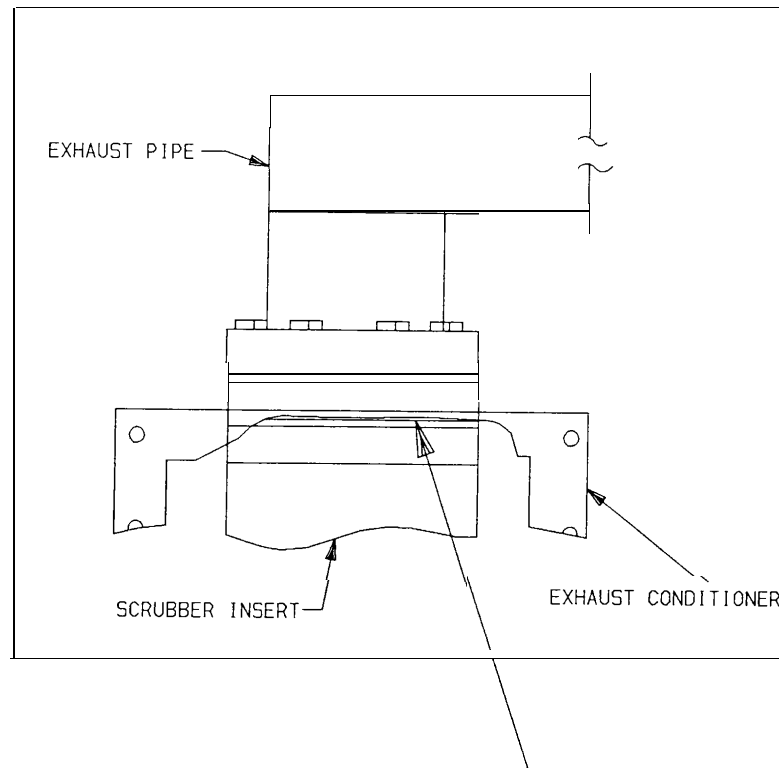


Figure 12. Gasket Between Exhaust Conditioner Flange and Scrubber Insert Flange.

22. () Replace exhaust conditioner cover. All fasteners securing the cover are in place and tight.

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(WEEKLY) 23. () The exhaust conditioner is in good condition with no open holes or cracks due to corrosion, accidents, missing plugs, etc.

SYSTEM OPERATION

(WEEKLY] 24. () The engine shuts down when the -push to stop engine- button is held in.

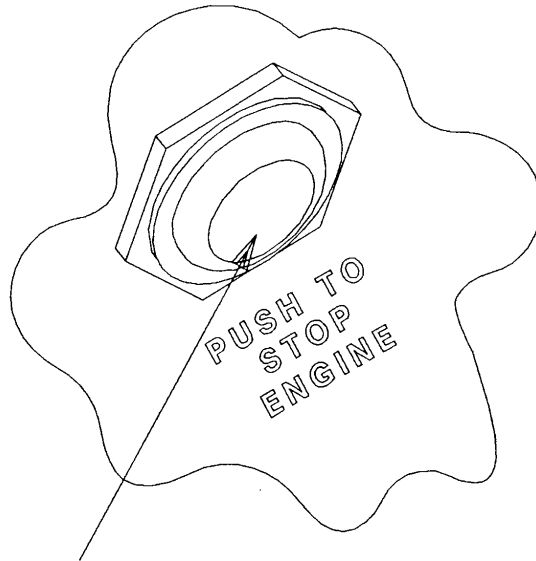


Figure 13. "Push To Stop Engine- Button

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25. () Connect a manometer or magnehelic (vacum gauge) to the intake vacuum port shown in Figure 14. Run the engine at full throttle with no Load. The intake vacuum does not exceed 20 inches of water.

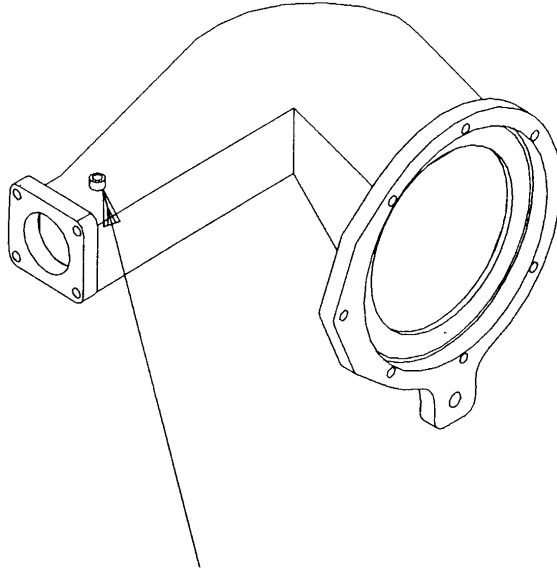


Figure 14. Intake Vacuum Location

26. () Remove the manometer or magnehelic and securely reinstall the vacuum port plug.

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27. () Connect a manometer or magnehelic to the test port in the exhaust manifold Flange shown in Figure 15. Run the engine at full throttle no load, with exhaust conditioner filled to normal operating water Level. The exhaust back pressure does not exceed 40 inches of water.

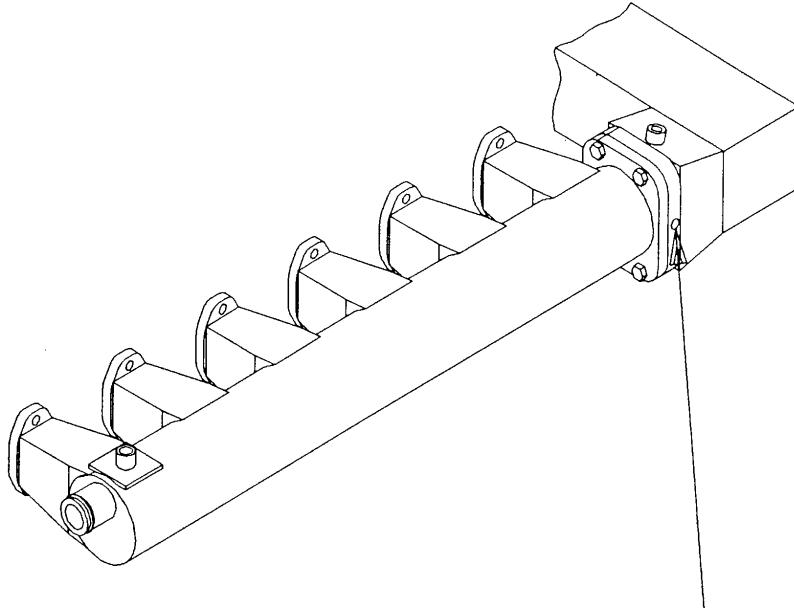


Figure 15. Location of Exhaust System Back Pressure Test Port

28. () Shut engine down and remove manometer or magnehelic and securely reinstall test plug.
- (WEEKLY) 29. () With engine running, check the air system for Leaks (i.e., hose connections, sensors, air tanks, air tank drain valves, filters, control valves, float valve, etc.). No leaks were found.

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(WEEKLY) 30. () Test for conditioner normal. operating water level. Run engine for about 5 minutes at low idle. Shut down the engine. Remove 1 1/4" NPT Fill/Check plug. Operating level is correct if a slight trickle of water occurs out of the Fill/Check port, or if water can be observed at a level no more than 1/2" below bottom of the Fill/Check port.

If the level is lower than that, adjust the level control valve accordingly.

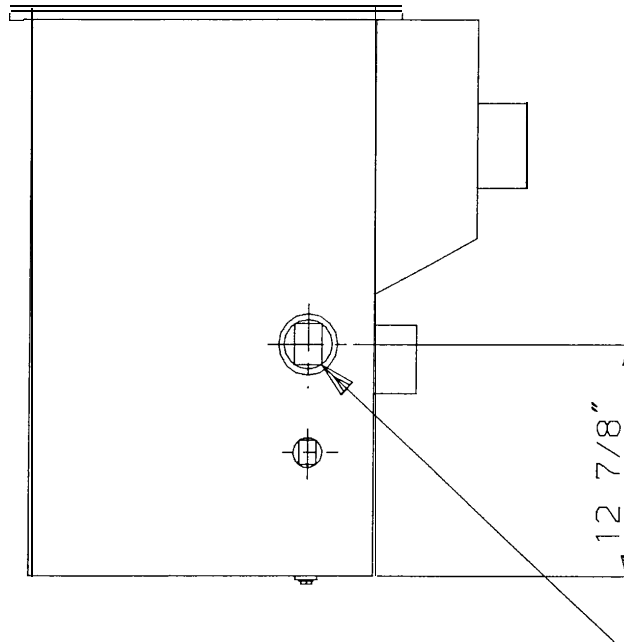


Figure 16. Location of Exhaust Conditioner Normal Operating Level Check Plug.

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31. () The safety system includes two high coolant temperature shutdown sensors. One in engine coolant outlet and one in exhaust manifold coolant outlet as shown in Figure 17.

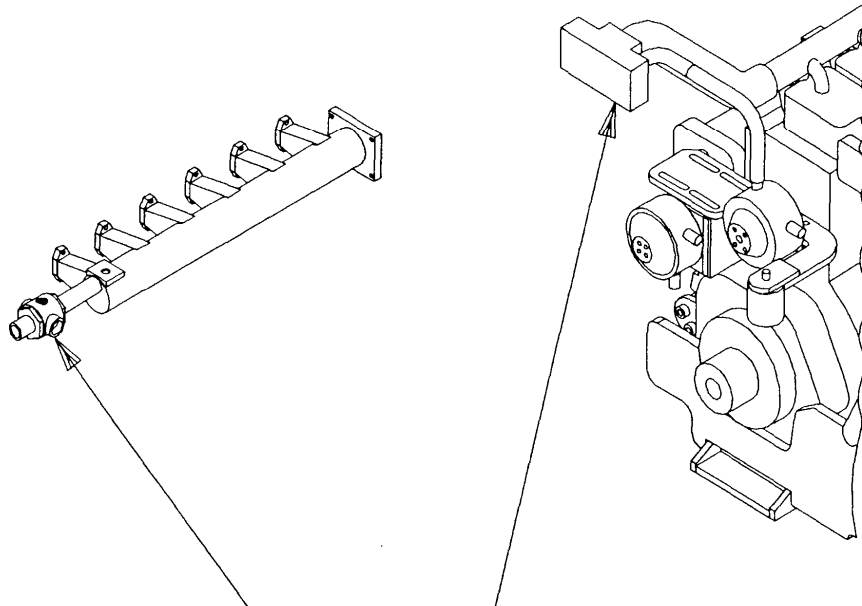


Figure 17. Location of High Coolant Temperature Sensors

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Test the temperature sensor valves. Two test methods are offered for information. Either method is acceptable.

METHOD 1 :

Unscrew each sensor valve and install a pipe plug in its place. Reattach the safety system air hoses to the sensors. Start the engine and immerse the end of one temperature sensor valve into a heated and agitated water/antifreeze mixture. The sensor must open and exhaust the safety system air pressure and shut down the engine before exceeding the maximum temperature specified below. Repeat procedure for the second sensor.

METHOD 2:

- a. With engine idling, slowly remove sensor hose venting safety system air pressure. This must cause the engine to shutdown.
- b. Remove each sensor and attach to Low pressure shop air and test as described in Method 1, above.

32. () Exhaust manifold sensor shuts engine down before temperature exceeds 212° F.
33. () Engine water outlet sensor shuts engine down before temperature exceeds 194° F.
34. () The temperature sensors are reinstalled and safety system air hoses are securely attached.

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(WEEKLY) 35. () Test for proper exhaust conditioner Low water shutdown. The check port on the exhaust conditioner for checking the proper Low water shutdown level is shown in Figure 18. The bottom of the check port is 8 3/16" above the outside bottom of the exhaust conditioner.

Close the valve located in the water supply Line between the makeup tank and the exhaust conditioner. Start the engine and operate (it) at medium speed. After the engine shuts down remove the plug from the exhaust conditioner Low water test port. CAUTION! EXHAUST CONDITIONER WATER MAY BE HOT! Water must flow from the Low water test port.

(W E E K L Y) 36. () Replace the Low water check plug.

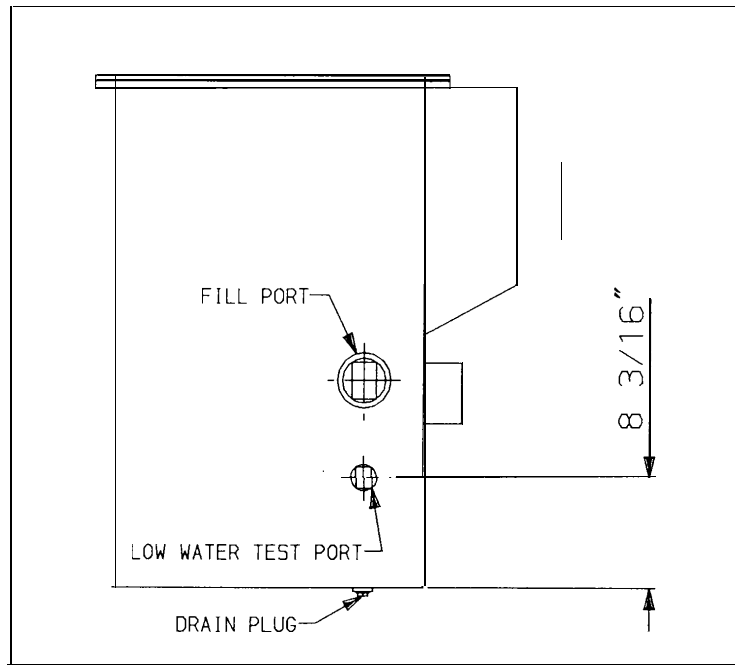


Figure 18. Location of Low Water Test Port and Fill Port.

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- (WEEKLY) 37. () After the engine has automatically shutdown due to Low water, try restarting the engine prior to replenishing the water. The engine may turn over but must not start.
- (WEEKLY) 38. () Drain the exhaust conditioner removing the drain plug at bottom of exhaust conditioner. CAUTION! EXHAUST CONDITIONER WATER MAY BE HOT!
- (WEEKLY) 39. () Instruct a helper to place a finger on the exhaust (vent) port of the exhaust conditioner Low water shutdown valve. Start the engine, operate it at high idle, and engage the emergency intake air shut-off valve. The valve handle is shown in Figure 19. The air shut-off valve closes immediately and shuts down the engine.
- () Reset the emergency intake air shut-off valve.
- (WEEKLY) 40. o Replace the exhaust conditioner drain plug at bottom of exhaust conditioner.
- () Replenish exhaust conditioner water through the fill port Located 12 7/8 inches above outside bottom of exhaust conditioner.

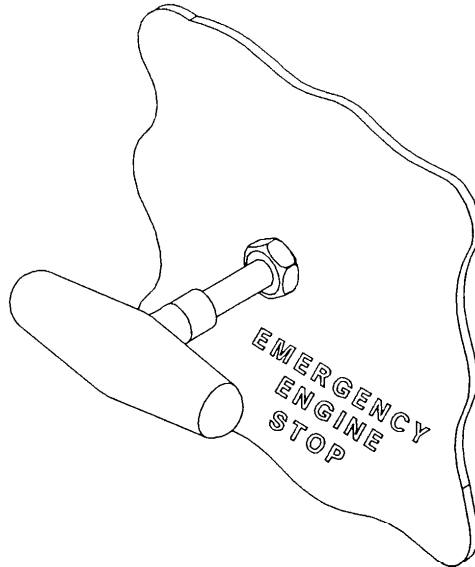


Figure 19. Location of Air Shut-Off Handle

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