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206H Series

Power Units

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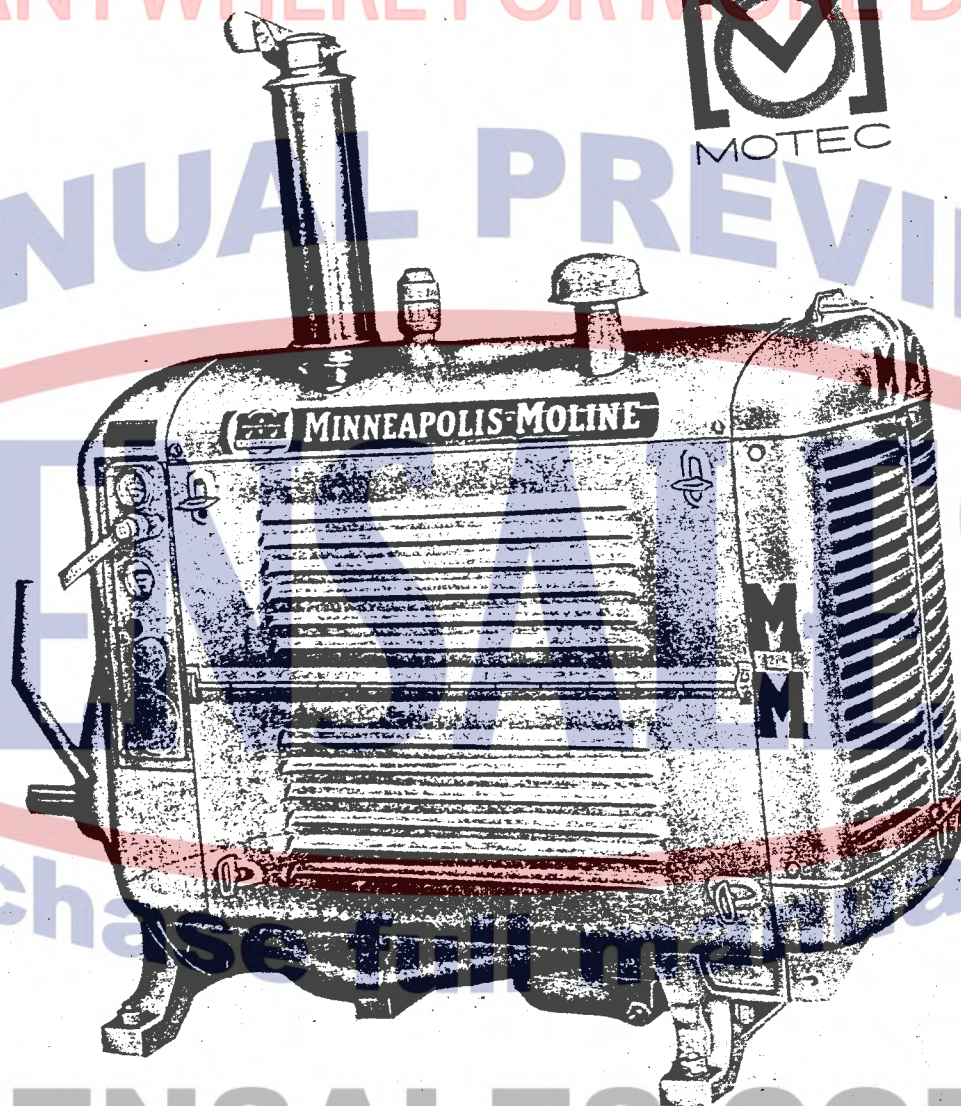
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MM-S-206H PWR

MAINTENANCE MANUAL

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206H SERIES

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POWER UNITS

MINNEAPOLIS
MOLINE

AUTOMOTIVE

SPECIFICATIONS

GENERAL

Bore and stroke	3 $\frac{5}{8}$ " x 5"
Number of cylinders	4
Piston displacement	206 cu. in.
Maximum horsepower at 1500 rpm (without radiator and fan)	
Gasoline	Approx. 51
LP-Gas	Approx. 52
Natural gas	Approx. 47.5

CRANKSHAFT

Material	Drop-forged steel, heat treated
Main bearings	
Front	Precision type — Trimetal
Center	Precision type — Trimetal
Rear	Precision type — Bimetal

CONNECTING RODS

Material	Drop-forged steel, heat treated
Type of bearing	Precision type — Trimetal

PISTONS

Material	(206H-4A) Cast iron; (206H-4B and some 206H-4A) Aluminum
Rings	3 compression; 1 oil with expander
Piston pin	Full floating

VALVE MECHANISM

Type	Valve-in-head
Valve seat inserts	Exhaust valves
Valve rotators (Gasoline only)	Exhaust valves; positive type
Tappets	Cylindrical type
Camshaft material	Cast proferall metal
Camshaft drive	Helical gear

VALVE CLEARANCE

(Engine running at normal operating temperature)	
Exhaust valve	.010"
Intake valve	.008"

OILING SYSTEM

Oil pump	Gear type
Intake screen	Float-o-screen type
Oil filter	Full flow, replaceable cartridge
Crankcase capacity	6 quarts
Filter capacity	1 quart
Lubrication	Full pressure lubrication to all main and connecting rod bearings, and to front and center camshaft bearings. Metered oil to valve mechanism and distributor drive shaft
Crankcase ventilation	Breather on valve cover

A radiator cooling system, a pressure-type radiator cooling system, and a surge-tank (expansion-tank) cooling system are available from Minneapolis-Moline for the 206H-4A Power Units.

The installation of any of these systems is explained under its respective heading in this section of the manual. The 206H-4B Power Units come factory-equipped with pressure-type radiators.

In some districts or on some applications, it may be desirable to use a cooling-tower cooling system for 206H-4A Power Units. Blueprints of this type of system will be furnished by the Minneapolis-Moline Engineering Department upon request.

INSTALLING A SURGE TANK

When using the 206H-4A Power Unit on irrigation applications, it may be desirable to use a surge tank (expansion tank) cooling system. When using a surge tank, the water circulates through the engine, goes into the surge tank, then through coils which are usually submerged in an irrigation ditch; the water returning from the coils recirculates through the engine. The surge tank provides an expansion chamber for the fluid in the cooling system as the fluid heats and expands. Since the tank is higher than the highest part of the engine, there is no chance of steam forming in the engine and causing "hot spots". The pressure cap on the tank is designed to relieve at approximately 7 pounds.

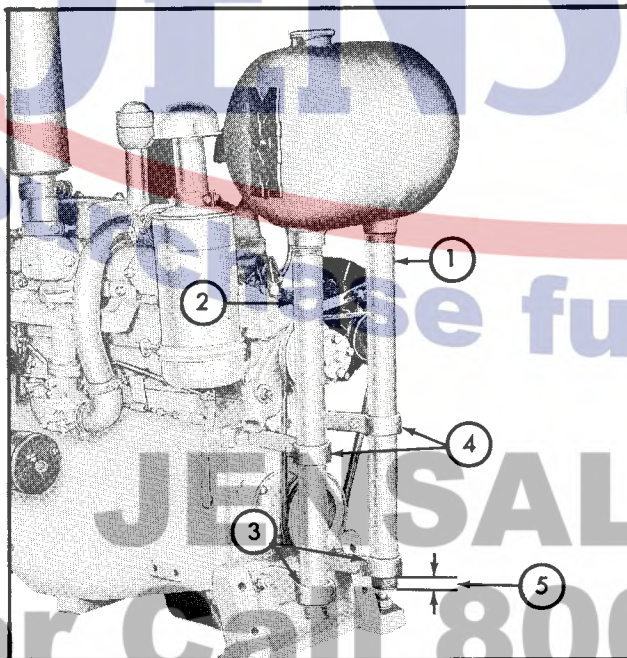


FIG. 2

1. Support pipe (no opening to tank)
2. Pipe
3. Lower brackets
4. Upper brackets
5. 1½" below lower bracket

To install the surge tank, first install the mounting brackets as shown in Fig. 2.

Apply pipe-joint compound to the pipe threads, and install the pipes in the bottom of the surge tank. Notice that only one of the pipe holes in the tank opens into the tank. The pipe on the left side of the engine (generator side) is used only as a support for the tank. Install the MM emblem at each end of the tank. Lower the tank and pipes into the mounting brackets until about 1½ inches of each pipe extend below the lower bracket. Do not tighten the mounting bolts and nuts at this time.

Install the pipe nipple in the tank inlet. Before installing the thermostat and hose, make certain the thermostat is correctly positioned in the hose. The bellows end of the thermostat should be toward the cylinder head. Install the tube, hose, and clamps. Tighten all the mounting bolts and clamps.

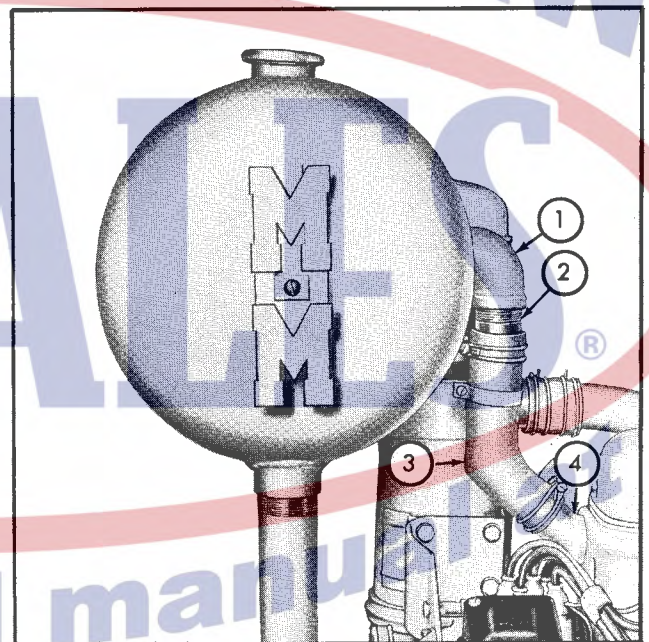


FIG. 3

- | | |
|----------------|-----------------------------|
| 1. Tank inlet | 3. Hose (thermostat inside) |
| 2. Pipe nipple | 4. Tube |

The remainder of the surge-tank installation depends on the location of the splash pit, the mounting of the power unit, etc. All pipes from the surge tank to the copper tubing connections must be 1½-inch galvanized pipe and pipe fittings.

Fig. 4 is an illustration of a typical surge-tank installation. The system, regardless of the location of the splash pit, must have a slight, continual slope away from the tank. To prevent air locks, the lowest point in the tubing must also be the furthest point from the tank. If this precaution is not taken, valves or petcocks must be installed to bleed the line of air. Connections should be simple so the system can be drained easily.

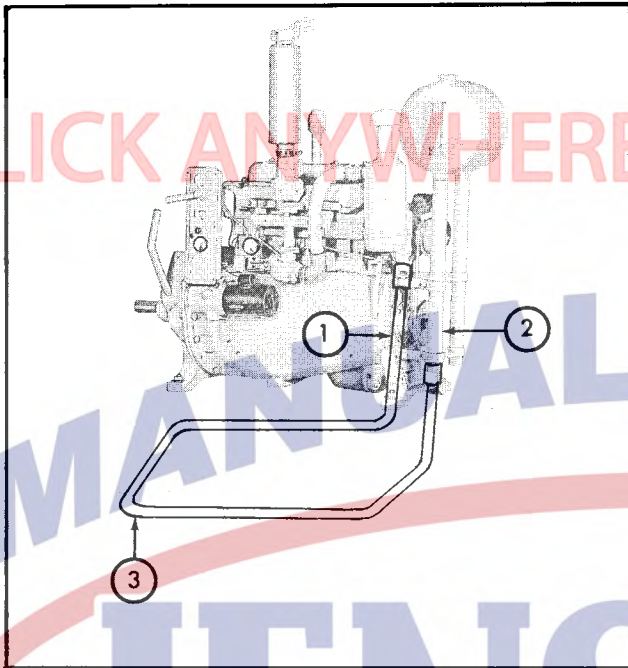


FIG. 4

1. Return line from splash pit
2. Pipe from tank to splash pit
3. Furthest point should be lowest point

The 206H-4A Power Unit requires at least 10 feet of 1-inch copper tubing, in the splash pit, to allow proper cooling of the fluid. If the splash pit is too small for a single loop of tubing, the tubing may be shaped or coiled to fit.

INSTALLING RADIATOR AND FAN (206H-4A)

Install an "O" ring in the tube opening in the cylinder head; install the tube, hose, and thermostat; make certain to install the thermostat with the bellows end of the thermostat toward the head. Install the fan blades.

Install the radiator and lower hose. Make sure to tighten all the hose clamps and mounting bolts. When filling the cooling system, be sure to follow the instructions under the heading "Radiator Cooling System".

A fan guard is also available from Minneapolis-Moline. The fan guard prevents foreign material from interfering with the operation of the fan and is also an added safety feature. The fan guard mounts on the engine side of the fan shroud.

NOTE: Some states require the use of a fan guard as an added safety precaution.

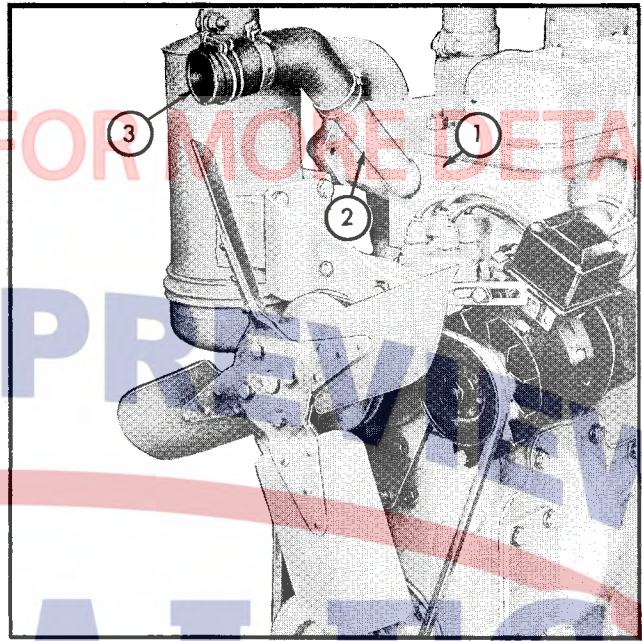


FIG. 5

1. Head
2. Tube
3. Hose

INSTALLING PRESSURE-TYPE RADIATOR CAP (206H-4A)

A pressure cap can be installed on 206H-4A Units equipped with a radiator having cast iron top and bottom tanks. The use of a pressure cap will allow the engine to be operated at higher temperatures without loss of cooling fluid.

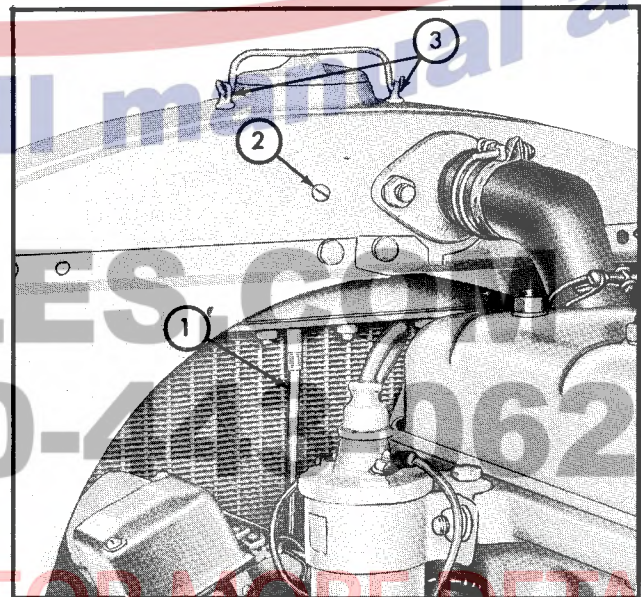


FIG. 6

1. Overflow pipe
2. Slotted pipe plug
3. Eye bolts

To install the pressure cap, first remove the side panels and hood (if the unit has enclosures). Remove the fan shroud, the overflow pipe, and the radiator cap. Remove the slotted pipe plug shown in Fig. 6, and install it in the overflow pipe opening. Remove the eye bolts from each side of the radiator cap opening.

Install the connector with the small opening in the adaptor. Assemble the flange, adaptor, and gasket as shown in Fig. 7. Make certain the hole in the adaptor and in the flange line up, and then press the flange into the adaptor.

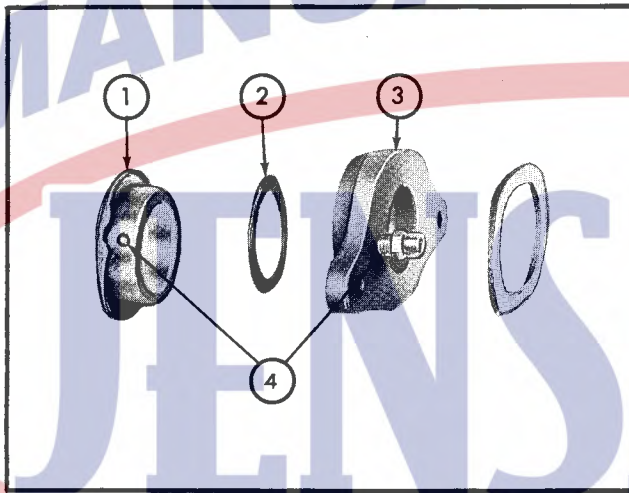


FIG. 7

1. Flange
2. Gasket
3. Adaptor
4. Holes lined up

Slide a ball connector, a nut, and the tubing connector fitting on the tubing before attempting to bend the tubing. The tubing connector which goes into the rear of the top tank is drilled out large enough to allow the copper tubing to pass through the fitting. Bend the copper tubing to the approximate shape shown in Fig. 8. Place the lower adaptor gasket on the radiator. Insert the bent end of the tubing through the hole in the rear of the radiator tank. Slide the other ball connector and nut on the tubing, and fasten the tubing to the connector in the adaptor. When tightening the nut, it may be necessary to pull the tube up through the opening in the top of the radiator tank far enough to allow room for a wrench.

Install a stud on each side of the radiator cap opening. Slide the adaptor on the studs, and secure the adaptor with the nuts and lock washers.

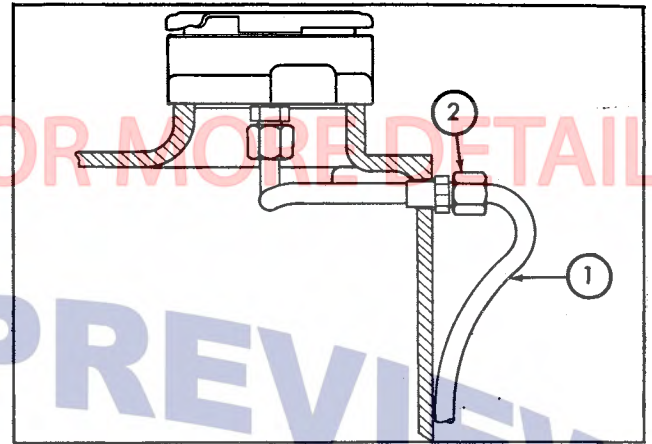


FIG. 8

1. Copper tubing
2. Connector in rear of tank

Install and tighten the connector in the opening in the rear of the top tank. Fig. 8. Bend the new tubing as necessary so the tubing will pass between the fan shroud and the radiator. The tubing should follow the contour of the shroud down to the bottom tank. Make certain the fan blades do not touch any part of the tubing before starting the engine.

The pressure cap is designed so it will relieve at approximately seven pounds pressure. Check the cap gasket and the vacuum valve occasionally. Replace the cap if the gasket is cracked or damaged, or if the vacuum valve is not operating properly.

Make certain the cap is always on tight while the engine is running. Remove the radiator cap slowly. Turning the cap to the first notch will relieve the pressure.



FIG. 9

1. Gasket
2. Vacuum valve