Section V
COOLING SYSTEM
CONTENTS

DATA AND SPECIFICATIONS

MODELS	C-75	C-76, IM-1-2-4
COOLING		
Type	Pressure Vent	
Capacity:		
With Heater	22 qts.	25 qts.
Without Heater	21 qts.	24 qts.
Radiator Cap Relief:		
Valve Pressure—psi	14	
With Air Conditioning	14	
WATER PUMP		
Type	Centrifugal	
Bearing Type	Ball Bearing	
THERMOSTAT		
Type	Choke	
Starts to Open (up to)	158° to 162° F.	(Air Cond. 177° to 182° F.)
Fully Open	185° F.	(Air Cond. 202° F.)
FAN BELT		
Number Used (Standard Steering)	one	
(Power Steering)	two	
Type	V	
Tension	½ in. Slack	

DATA AND SPECIFICATIONS (Cont'd)

MODELS	C-75*	C-76, IM-1-2-4
FAN		
Number of Blades	six	
Diameter	18 in.	
RADIATOR-TO-BLADE		
Clearance	Top—¾ in. Bottom—¾ in.	
RADIATOR		
Type	Cellular Tubular or Fin and Tube	
Thickness (Standard)	1⅞ inch Cellular Tubular	2¼ inch Cellular Tubular
(With Air Conditioning)	2 inches Fin and Tube 2¼ inch Cellular Tubular	2½ inch Fin and Tube 2½ inch Cellular Tubular

*All Models with Air Conditioning have a box type fan shroud, six blade fan.

SPECIAL TOOLS

Tool Number	
C-311	Flushing Gun
C-3208	Remover—Water Pump Shaft Bushing
C-3476	Puller—Plastic Water Pump Impeller Insert
C-3468	Sleeve—Water Pump Bearing and Shaft Installing
C-551	Refacer—Water Pump Housing Seat

TIGHTENING REFERENCES

	(Foot-Pounds)
Water Pump Body to Housing	30
Water Pump Body Bolt	30
Water Pump Inlet Elbow Bolt	30

Section V

COOLING SYSTEM

The cooling system incorporates a fin and tube type, full flow radiator and a centrifugal water pump. On cars equipped with Air Conditioning—Heater Unit, the engine cooling system has an 180° F. thermostat, 14 pound radiator pressure cap and sufficient permanent type anti-freeze to insure the engine coolant 20° F. in the summer time, and more permanent type anti-freeze in the winter according to the atmospheric temperatures. **The 180° F. thermostat and the 14 pound radiator pressure cap is for year around operation and sufficient permanent type anti-freeze to insure the engine coolant to 20° F. is required for the summer time.**

1. FLUID FAN DRIVE (FIG. 1.)

(All Models with Air Conditioning)

The fluid fan drive consists of a rotor driven by the shaft which is secured to the water pump flange. The rotor is enclosed by the housing to which the fan is bolted. This housing is mounted on the shaft through two single row, sealed-for-life, ball bearings.

A nominal clearance space is maintained between the housing and rotor. The rotor is free to float along the axis of the shaft and anti-friction material has been applied to its faces in case of contact of these faces and the housing. The housing is partially filled with a special, heavy fluid and the drag of the fluid between the housing and rotor provides the driving force rotating the fan.

The power required to rotate the fan increases very rapidly with speed. The fluid fan drive has been designed to provide the necessary driving force to maintain cooling at low speeds and to limit the top speed of the fan at higher engine speeds, thus making more power available to the wheels and eliminating the fan noise encountered at higher engine speeds.

a. Engine Overheating

If the fan drive operates below its minimum design speed, excessive engine heating may occur. Check as follows: (1) The water pump to engine speed ratio is 1.1 to 1. The drive characteristics are such that a 1 to 1 ratio between the crank pulley and the fan should be obtained at an engine speed of 1400 R.P.M. or above. This can be checked with a timing light. The speed of the fan and crank shaft pulley is the same when both components are stopped by the timing light. If both components are stopped by the timing light at 1400 Engine R.P.M. or at a higher engine speed, the drive is satisfactory. If, however, the engine speed at which this occurs is less than 1400 R.P.M. the drive is operating at below minimum speed and must be replaced with a new unit. **Do Not Remove Filler Plug or Add Fluid to Drive Unit.**

b. Excessive Fan Noise

Should the drive lock-up, excessive fan noise will result. This may occur if a bearing fails or if drive is binding internally. On a properly functioning unit the fan can be rotated relative to the water pump pulley with only light finger pressure. When rotating the fan by hand there will be a marked decrease in the effort to rotate it after the blade has been turned through several complete revolutions. If there is excessive fan noise, and if the drive cannot be rotated relative to the pump pulley, it is defective and must be replaced.

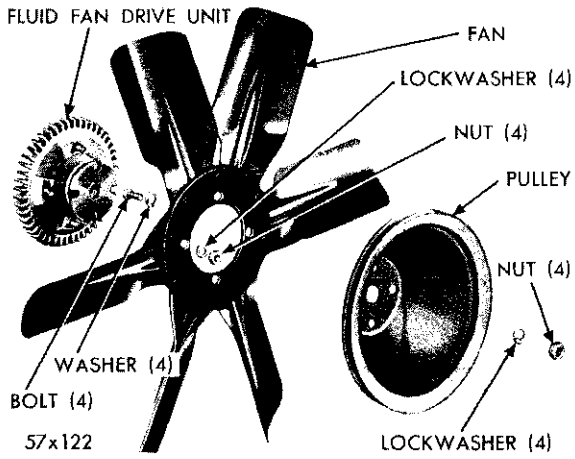

Fig. 1—Fluid Fan Drive (Exploded View)

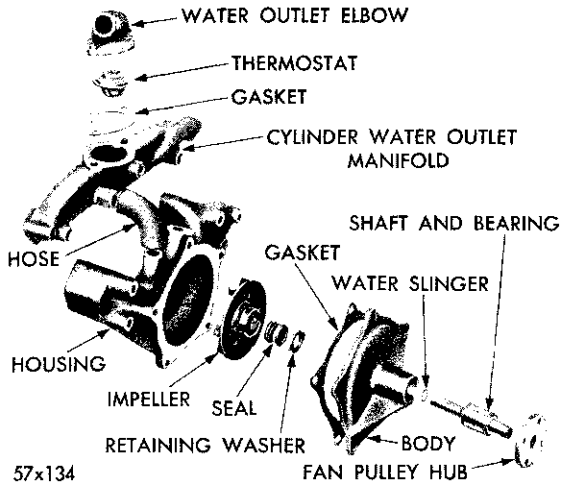

Fig. 2—Water Pump Assembly (Exploded View)

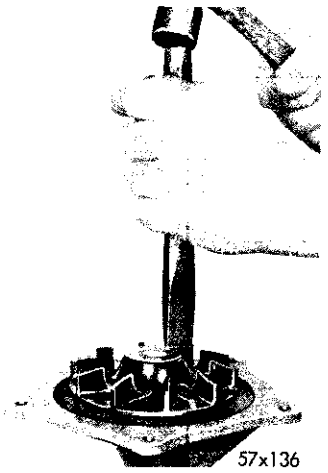

Fig. 4—Removing Plastic Impeller

2. WATER PUMP

a. Removal from Car (See Fig. 2).

Drain cooling system and remove upper half of fan shroud (Air Conditioning Models only). Loosen the power steering pump or idler pulley, generator, and remove all belts. Remove fan, spacer and pulley. On Air Conditioning Models, remove the pulley from water pump fan hub, loosen all nuts from fan to remove the fluid fan drive, as shown in Figure 1. Remove bolts holding water pump body to housing and remove water pump.

b. Disassembly

Remove fan hub from shaft with puller Tool C-3208, (Fig. 3). Support pump body on hub end and remove impeller by breaking the plastic away from metal insert, as shown in Figure 4. Remove impeller metal insert using Tool C-3476.

NOTE: Shaft and bearing assembly do not have to be removed to service a leaking pump.

Support body on fan hub end and press out shaft and bearing assembly.

CAUTION

Shaft and bearing assembly can be removed only in the direction described. If an attempt is made to remove shaft in opposite direction, damage to water pump body will result.

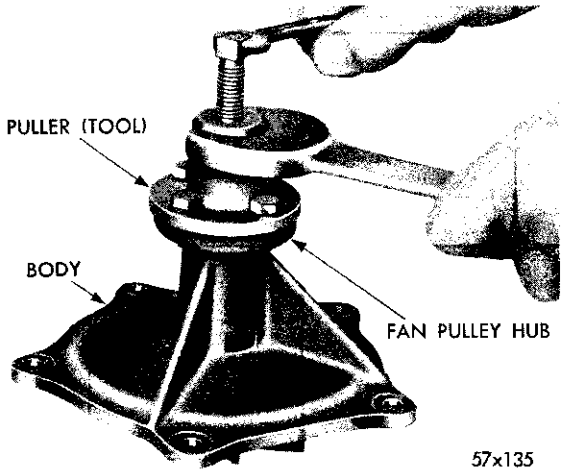

Fig. 3—Removing Fan Hub with Puller using Tool C-3208

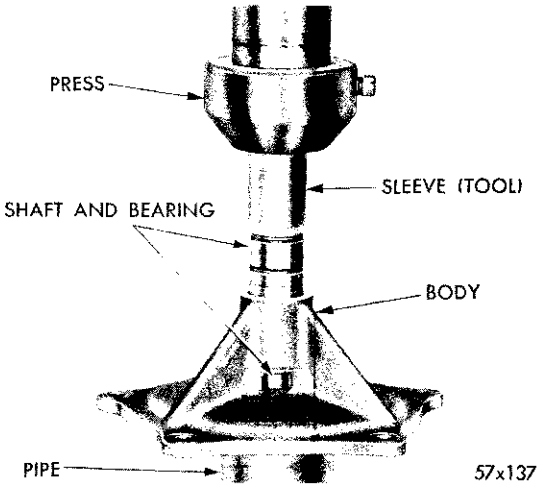

Fig. 5—Installing Shaft and Bearing Assembly (Tool C-3468)

NOTE: Bearing assemblies removed from water pumps for any reason should not be used again because damage to bearings usually results during removal.

Clean parts thoroughly. Inspect condition of seal seat and recondition using refacing Tool C-551.

c. Assembly (Fig. 1)

Support pump body as close to center bore as possible in an arbor press. **DO NOT SUPPORT BODY ON ATTACHING FACE, OR ON SEAL SEAT.** Press shaft and bearing assembly into body, using Tool C-3468, as shown in Figure 5.

NOTE: The .090 inch dimension must be maintained when installing new shaft and bearing assembly, as shown in Figure 6.

CAUTION

When pressing on impeller, support the pump body so that pressure is applied to the shaft and not to the pump body. If pressure is applied to pump body, damage to bearings will result. Press impeller on evenly to prevent breakage.

Install fan hub while supporting pump body on impeller and on shaft, as this will apply pressure to the end of shaft, and not to the body. Maintain .330 inch dimension, as shown in Figure 6.

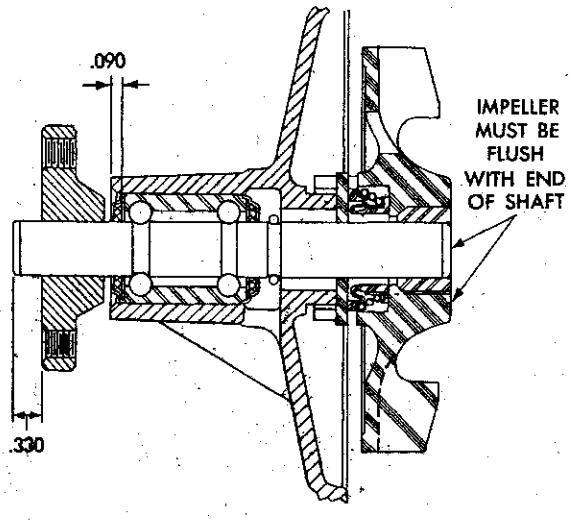

Fig. 6—Schematic Drawing (Water Pump)

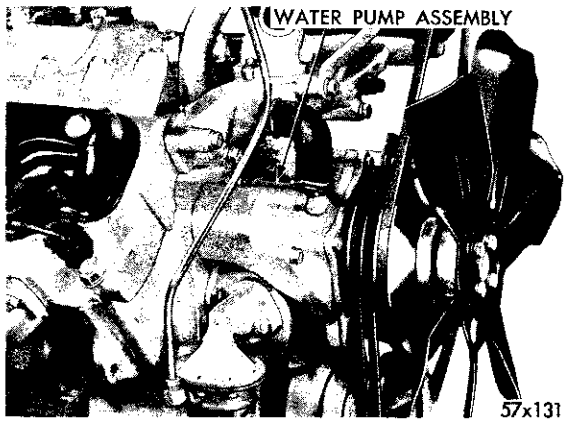

Fig. 7—Water Pump Installed (SpitFire Engine)

d. Installation on Car (Fig. 7)

Install water pump body on housing, using new gasket. Tighten bolts to 30 foot-pounds torque. Install pulley, spacer and fan. (On Air Conditioning Models, assemble the fan to the fluid fan drive and pulley, and attach the assembly to the water pump. Tighten nuts to 15 foot-pounds torque. Install the upper half of fan shroud, run the engine, and check for leaks.

3. RADIATOR

The Torque Converter oil cooler is now located in the bottom of the pan in the radiator tank, which is an integral part of the radiator. The bottom of the radiator tank therefore, acts in the capacity of a heat exchanger in that the oil flowing from the torque converter is directed thru a tube into the bottom of the radiator pan, coming out on the opposite side of the radiator to be returned to the torque converter. See Transmission Section XI, for operation.

a. Removal

Remove the two oil cooler connections at the bottom of the radiator and drain the oil from the tank. Drain the cooling system, remove hoses, fan shroud (On Air Conditioning Models only), and radiator support bolts. Remove the radiator.

b. Installation

Attach radiator to radiator support bolts and

reconnect the two oil cooler connections. Install fan shroud (if so equipped) connect hoses and refill cooling system. Check for leaks. Add sufficient oil to the torque converter to refill the system.

c. Cleaning Radiator

Drain cooling system and refill with clean SOFT water and add the contents of one can (No. 1 top-compartment) of MOPAR Cooling System Cleaner. Run engine at a fast idle for ½ to ¾ hour.

Drain cooling system and refill with clean water. Pour conditioner (No. 2 bottom-compartment) into radiator and run engine for ten minutes. Flush entire cooling system until water runs clean. Refill radiator with clean SOFT water. Use MOPAR Radiator Rust Inhibitor during the summer months.

4. REVERSE FLUSHING

Reverse flushing of the cooling system is the forcing of water through the cooling system, using air pressure, in a direction opposite to that of the normal flow of water.

a. Cylinder Block

Drain radiator and remove hoses at radiator. Remove thermostat and reinstall thermostat housing. Install flushing gun Tool C-311, or other suitable flushing gun to the inlet hose. Connect water hose of gun to a pressure water source and the air hose of gun to a pressure air source. Turn on water, and when cylinder block is filled, turn on the air in short blasts. Allow cylinder block to fill between the blasts of air. Continue this procedure until water runs clean. Check thermostat and if satisfactory, reinstall; otherwise, replace. Use a new thermostat housing gasket. Refill cooling system.

b. Radiator

Drain cooling system and remove hoses from engine. Install flushing gun Tool C-311, or other suitable flushing gun in radiator outlet house. Fill radiator and turn on air in short blasts.

NOTE: Do not apply excessive pressure when pressure flushing radiator, as damage to radiator may result.

Continue this procedure until water runs clean. Refill cooling system. Run engine and check for leaks.

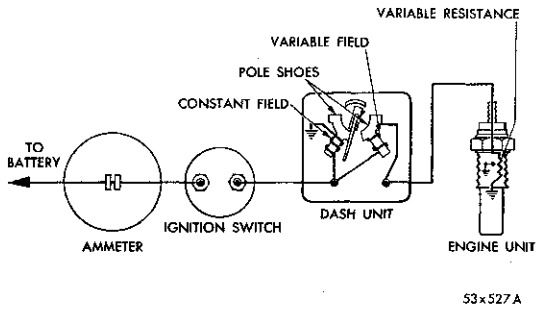

Fig. 8—Water Temperature Gauge

5. WATER TEMPERATURE GAUGE (Fig. 8)

a. Dash Unit

Consists of two electro-magnets, one connected to the ignition switch and ground, and the other electro-magnet between the ignition switch and a variable resistance to ground sending unit in the engine water. The temperature of the water varies the current in the one electro-magnet which pulls against the pointer (and other magnet) away from (C) cold position.

b. Sending Unit

The sending unit is located in the water outlet manifold and transmits the water temperature to dash unit.

c. Electrical Circuit (Testing)

Remove wire at sending unit and turn ignition switch on. Gauge hand should not move. If hand moves, the wire is grounded or gage is defective. Remove wire at dash gauge terminal "GA", and if hand still moves, replace dash gauge; otherwise, replace wire. If gauge operates correctly and wire is not grounded, replace the engine unit.

6. THERMOSTAT (Testing) (Fig. 9)

The thermostat starts to open at 158-162 degrees F. (177-182 degrees F. for Air Conditioned) and is fully opened at 185° Std. (202° for Air Conditioned). Place thermostat in a pail of water with a thermometer and heat water until thermostat starts to open. Check

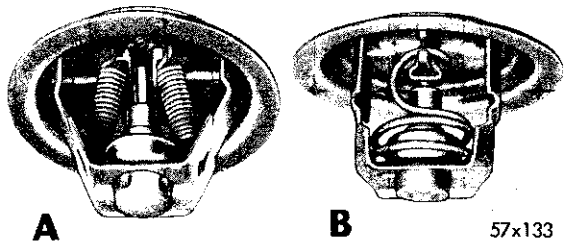

Fig. 9—Thermostat Assembly

thermometer and continue heating until thermostat is wide open, and again check thermometer. Replace thermostats that do not open completely, open at too low temperature or open at too high temperature.

7. RADIATOR PRESSURE CAP

Radiators are equipped with a 14 psi cap, as shown in Figure 10. Always check identification number on cap, when replacing.

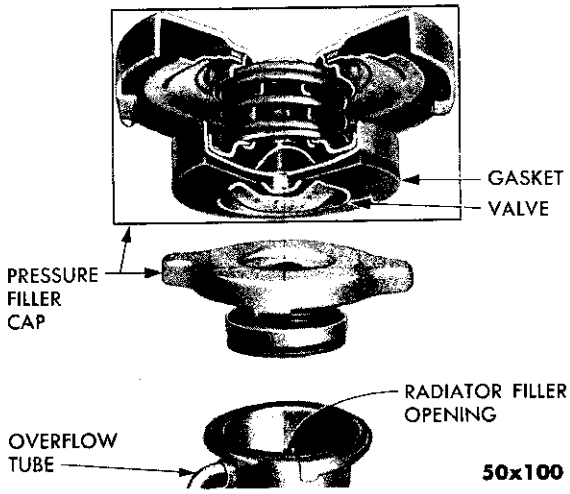

Fig. 10—Radiator Pressure Cap

WARNING

When removing pressure cap, turn it counterclockwise to the stop, permitting built up pressure to escape through overflow tube. This will prevent hot water from spraying out of radiator filler opening.

SERVICE DIAGNOSIS

8. POOR CIRCULATION

a. Check for low coolant level and refill to 1¼ inches below filler neck.

b. Inspect and replace hoses if collapsed.

c. Check for plugged radiator or cylinder block and reverse flush as necessary.

d. Check for loose water pump impeller and repair as necessary.

e. Check for loose or defective fan belt, tighten or replace as necessary.

9. OVERHEATING

a. Refer to Poor Circulation listed in Paragraph 11.

b. Check for plugged air passages of radiator coil and clean passages by applying air pressure on reverse side of radiator case.

c. Check for sticking thermostat and replace as necessary.

d. Check for excessive sludge in the crankcase. Drain and flush crankcase as necssary. In severe cases, remove oil pan and clean inside of block by hand.

10. OVERCOOLING

a. Check temperature gauges and replace as necessary.

b. Check operation of thermostat (could be sticking) in the open position.