CONTENTS

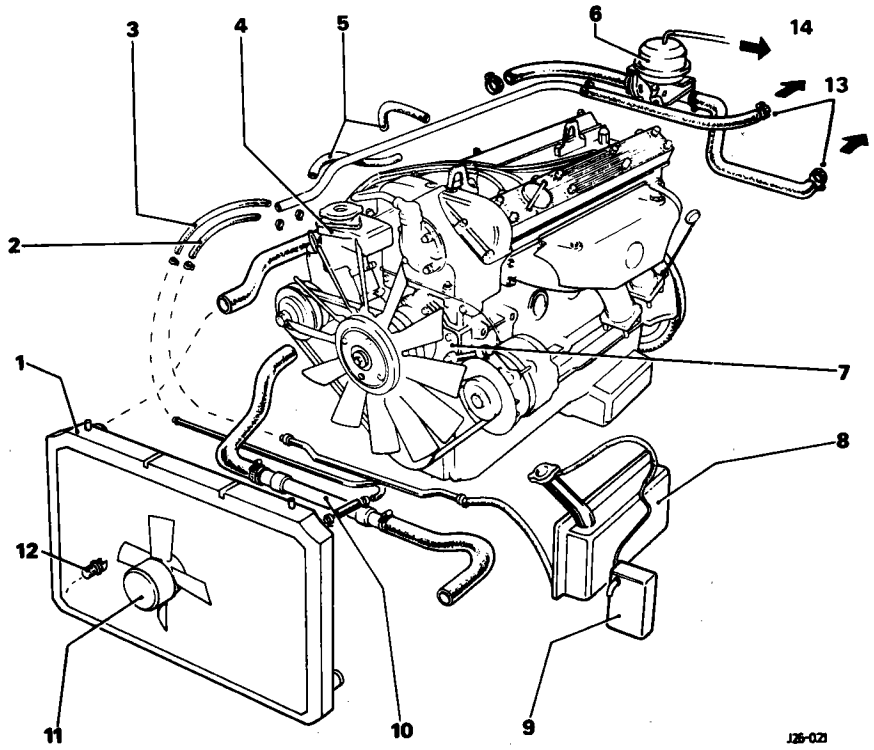


Fig. 1

1. Radiator matrix
2. Radiator vent. pipe
3. Expansion pipe
4. Header tank (Thermostat housing)
5. Fuel injection throttle housing heater pipe
6. Water control valve.
7. Water pump
8. Remote header tank
9. Atmospheric tank
10. Transmission oil cooler
11. Single or twin fan
12. Fan thermostat
13. To heater matrix
14. To vaccum control

COOLING SYSTEM

Description 26.00.00

The cooling system consists of a radiator matrix, A; a water pump, B—belt driven by the engine crankshaft; a header tank, C, and a remote header or expansion tank, D; a thermostatic valve located in the header tank is fitted to ensure a rapid warm-up from cold.

Air-conditioned cars are fitted with either single or twin electric fans, E, mounted in front of the condenser and radiator, in addition to the engine-driven fan. The electric fans are thermostatically controlled and it is possible, in very hot conditions, for them to continue to operate after the engine has been switched off. They will switch off automatically when the coolant temperature drops to 92°C. Under cold start condition coolant is forced by the water pump through the cylinder block, cylinder head, and the induction manifold to the thermostatic valve housing, C. The valve is closed and the coolant is therefore returned via a by-pass drilling, to the water pump suction inlet.

The heater matrix, K, is purged during this period by opening the heater control valve, L, at the matrix inlet and allowing pump suction to remove trapped air. The radiator has a vent pipe, M, through which, during the initial cold filling, the radiator is vented. When engine temperature rises to a predetermined level the thermostatic valve opens and allows hot coolant to flow into the top of the radiator. Full pump suction then draws coolant from the base of the radiator and starts the full cooling circuit; coolant expansion due to the rise in temperature is accommodated by the expansion tank, D, via expansion pipe, N.

Cars fitted with automatic transmission have a cooling tube, O, included in the centre section of the radiator bottom hose.

We use and recommend BP Type H21 or Union Carbide UT184 or Unipart Universal anti-freeze which should be used at the specified concentration whenever the cooling system is refilled. For topping-up purposes, only reputable brands of anti-freeze, formulated and approved for 'mixed metal' engines be used.

IMPORTANT NOTE: The concentration of anti-freeze must not be allowed to fall below the recommended strength as sediment may be formed in the cooling system by certain types of anti-freeze at low concentrates.

A 40% solution by volume in the United Kingdom (55%, U.S.A./Canada and all other countries) must be used at all times, either by topping-up or replenishing the cooling system. For maximum corrosion protection, the concentration should never be allowed to fall below 25%. Always top-up with recommended strength of anti-freeze, NEVER WITH WATER ONLY.

In countries where it is unnecessary to use anti-freeze, Marston SQ 35 Corrosion Inhibitor must be used in the cooling system in the proportion of 1 part SQ 36 to 24 parts water. CHANGE COOLANT EVERY TWO YEARS. The system should be drained, flushed and refilled with fresh anti-freeze (or Corrosion Inhibitor), mixed with 1 satchet of 'Barrs Leaks'.

An alternative coolant known as CARBUROL FORLIFE is recommended where temperatures below 10°C (14°F) are not encountered. Before Carburol Forlife is used, the coolant already present in the system must be drained out and the system flushed before filling with Carburol Forlife. Once in use the system should be topped-up with Carburol Forlife only, and a label giving this information should be affixed in an appropriate and prominent position.

TORQUE WRENCH SETTINGS

NOTE: Set the torque wrench to the mean of the figures quoted unless otherwise specified.

ITEM	DESCRIPTION	TIGHTENING TORQUE		
		Nm	kgf m	lbf ft
Radiator to front cross-member	3/8 in U.N.F. nut	29,8 to 35,2	3,05 to 3,59	22 to 26
Retainer to radiator cross-member	5/16 in U.N.F. nut	19 to 24,4	1,94 to 2,48	14 to 18
Fan cowl upper bracket to body	1/4 in U.N.F. nut	8,1 to 9,5	0,83 to 0,96	6 to7
Expansion tank to valance	5/16 in U.N.F. nut	10,8 to 13,6	1,10 to 1,38	8 to 10
Engine oil cooler pipes	1 1/16 in U.N.S. nut	54,3 to 61	5,53 to 6,22	40 to 45
Deflector and bracket to cowl	1/4 in U.N.F. bolt	8,1 to 9,5	0,83 to 0,96	6 to 7
Lower bracket to cowl	1/4 in U.N.F. nut	6,1 to 7,5	0,62 to 0,76	4.5 to 5.5
Lower cowl bracket to body	1/4 in U.N.F. bolt	8,1 to 9,5	0,83 to 0,96	6 to 7

COOLANT

Drain and refill **26.10.01**

Draining

With the engine cold, remove the pressure cap at the expansion tank and the sealing cap at the engine header tank. Check the condition of the seals on the pressure caps, renew seals or caps.

Remove the radiator drain plug, and drain the radiator.

Remove the engine block drain plug, and drain the engine block.

Insert a water hose in the remote header tank, and regulate the flow so that the tank remains full with a minimum of overflow. Start the engine and run it at fast idle (about 1000 rev/min) until the water from the drain holes becomes clear. Stop the engine, turn off the tap and allow the system to empty.

Refilling

Refit the radiator and engine drain plugs.

Set the heater control to 'DEF' ('HIGH' non-air conditioned cars only).

Slowly pour the recommended coolant mixture into the engine header tank.

When the header tank is completely full with coolant refit the sealing cap.

Start and run engine at fast idle (1 000 rev/min) for approximately five minutes.

Switch off the engine, carefully remove the pressure cap from expansion tank, and if necessary add coolant to bring level to the base of filler neck. Refit the cap.

NOTE: It is not important if coolant is above this level as excess liquid will be ejected through the vent pipe.

When the engine is cold, remove the header tank cap to check that it is full. If not top it up and run the engine for another five minutes and check the coolant level in the header tank again, after the engine has cooled. If the tank is not full a leak has developed in the system which must be traced and rectified.

TOPPING-UP AND CHECKING COOLANT LEVEL

NOTE: This procedure must only be carried out when the engine is cold.

Remove the pressure cap from expansion tank, and if coolant is below the base of filler neck add specified coolant mixture to correct level. Refit the pressure cap.

EXPANSION TANK

Remove and refit **26.15.01**

Removing

Remove the pressure cap and sealing cap.

Remove windscreen washer reservoir and the bracket rear upper securing screw.

Disconnect the expansion pipe from the bottom of the expansion tank and the overflow pipe from the filler neck.

Remove expansion tank securing nut and bolt, carefully displace windscreen reservoir bracket, and lift the tank clear.

Refitting

Carefully displace the windscreen washer reservoir and locate the expansion tank to the inner wing.

Fit and tighten nut and bolt to secure.

Refit the expansion pipe to the bottom of expansion tank and the overflow pipe to the filler neck.

Fit and tighten the windscreen washer reservoir bracket securing screws.

Refit the washer reservoir.

Top-up cooling system.

Refit pressure cap and sealing cap.

FAN/STEERING PUMP BELT TENSION

Check and adjust **26.20.01**

Slacken the power steering pump adjuster link trunnion bolt (1, Fig. 2).
Slacken adjuster link eye-bolt (2, Fig. 2) at power-assisted steering pump and pump pivot bolt (3, Fig. 2).
Slacken the adjuster link locknut (4, Fig. 2).

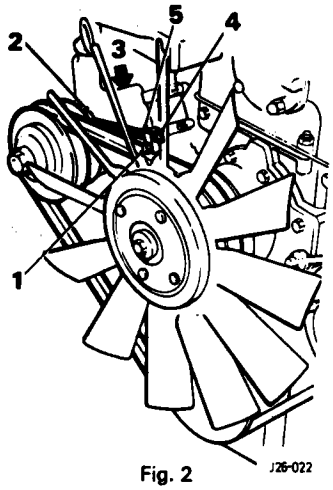


Fig. 2

Tighten the adjuster nut (5, Fig. 2), and check the tension. Deflecting force 2,9 kgf (6.4 lbf). Deflection longest run 4,3 mm (0.17 in).
Tighten the locknut.
Tighten the adjuster link trunnion bolt.
Tighten adjuster link eye-bolt and tighten pump pivot bolt nut.

FAN/STEERING PUMP BELT

Remove and refit **26.20.07**

Removing

Slacken the power steering pump adjuster link trunnion bolt (1, Fig. 2).
Slacken adjuster link eye-bolt (2, Fig. 2) at the power-assisted steering pump.
Slacken the pump pivot bolt nut (3, Fig. 2).
Slacken the adjuster link locknut (4, Fig. 2) and press the pump towards the engine.
Remove the belt.

Refitting

Manoeuvre the belt over the fan blades and pulleys.
Tighten the adjuster nut (5, Fig. 2).
Check the belt tension. Deflecting force 2,9 kgf (6.4 lbf). Deflection on longest run 4,3 mm (0.17 in).
Tighten the locknut, adjuster link trunnion bolt, adjuster link eye-bolt and pump pivot bolt nut.

FAN AND TORQUATROL UNIT

Remove and refit **26.25.19**

Removing

Remove the top fan cowl from the top rail and from the main cowl.
Restrain pulley with a suitable spanner, and remove the Torquatrol securing bolt (1, Fig. 3).

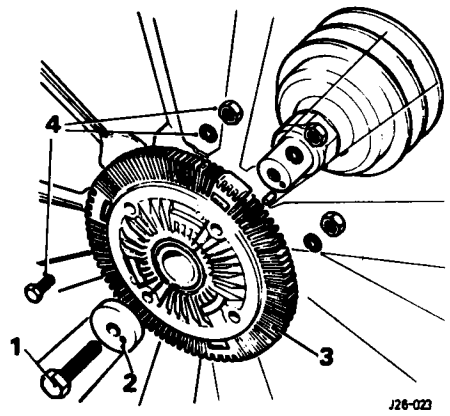


Fig. 3

Remove the pegged washer (2, Fig. 3).
Gently tap Torquatrol unit (3, Fig. 3) forward from pulley spigot and lift unit from car.
Remove nuts and bolts (4, Fig. 3) securing fan assembly.
Remove fan assembly.

Refitting

Locate fan to Torquatrol unit, secure with the nuts and bolts, lightly grease the spigot and offer Torquatrol unit on to pulley.
Secure the Torquatrol unit using the pegged washer and centre bolt.

NOTE: Ensure that the washer locates on pin in pulley spigot before tightening bolt.

Sit the top cowl to the main cowl assembly, and secure to top rail.

FAN MOTOR

Remove and refit **26.25.22**

Removing

Remove the radiator lower grille, and unclip the harness from the fan motor mounting cross-beam.
Disconnect the fan motor harness at the block connector.
Remove the cross-beam to body securing bolts, spacers and washers.
Remove the fan motor mounting frame to cross-beam securing nuts and bolts.
Displace the motor for access and remove the mounting frame to cross-beam spacing washers.
Remove the cross-beam and the fan assembly.
Remove the fan blades.
Remove the fan motor securing nuts and bolts.
Remove the fan motor and fan motor mounting rubbers.

Refitting

Fit fan motor and fan mounting rubber to frame, secure with fixing nuts and screws.
Fit and align the fan blades; secure with circlip.
Fit the fan motor assembly to vehicle.
Fit and align the mounting cross-beam.
Fit the spacers and washers to body, fit but do not tighten the cross-beam to body securing bolts.
Fit mounting rubber to cross-beam washers.
Align the mounting frame to cross-beam.
Secure with the fixing nuts and bolts.
Connect the fan motor harness block connector, and clip the harness to the cross-beam.
Tighten the cross-beam securing bolts.
Refit the radiator grille.

FAN MOTOR RELAY

Remove and refit **26.25.31**

Removing

Remove the screw securing the relay cover to the wing valance and remove the cover.
Note and disconnect the cables from the relay.
Remove the relay.

Refitting

Identify and re-connect the cables to the relay.
Refit the relay to its mounting position.
Refit the relay cover.
Fit and tighten screw to secure.

THERMOSTATIC SWITCH

Remove and refit **26.25.35**

Removing

Drain the radiator, see operation 26.10.01
Jack up vehicle and place two stands.
Note and disconnect the cables from switch.
Remove the switch.

Refitting

Fit and tighten the thermostatic switch.
Identify and connect cable to the switch.
Remove stands, lower the vehicle, and refill the radiator, see operation 26.10.01.

RADIATOR BLOCK

Cars fitted with Air Conditioning

Remove and refit **26.40.04**

WARNING: Under no circumstances must any portion of the air conditioning system be disconnected by anyone other than a qualified refrigeration engineer. Blindness can result if the gas contained within the system comes into contact with eyes.

Removing

Drain the coolant from the radiator, see operation 26.10.01.
Disconnect the battery.
Remove the bonnet.
Slacken the clips securing the top hose, bottom hose and expansion pipe to the radiator.
Disconnect the hoses from the radiator.
Unclip the cable harness from the top rail.
Remove the top rail to body and top rail to fan cowl securing nuts/bolts.
Reposition the cowl from top rail.
Remove top rail to air conditioning condenser securing bolts and remove the spacers.
Unclip the receiver/drier from top rail.
Remove the receiver/drier to top rail securing bolts and remove the spacers.
Reposition the top rail from radiator location.
Remove the air cleaner ram pipe.

Disconnect the coolant level probe.
Displace the radiator to gain access to thermostatic switch.
Note and disconnect cables from switch.
Lift radiator from car, and recover the foam rubber padding.

Refitting

Locate radiator in a position to reconnect the thermostatic switch.
Reposition the radiator into its mounting rubbers and reposition the air conditioning pipes.
Reconnect the coolant level probe.
Refit the air cleaner ram pipe.
Align the top rail to the radiator, and fit but do not tighten the securing nuts and bolts.
Fit the top rail to condenser spacers, and fit but do not tighten the securing nuts and bolts.
Locate the fan cowl to the top rail.
Fit nuts and bolts to secure.
Tighten all the nuts and bolts.
Align the receiver drier with the top rail, fit the spacers and secure the receiver drier with the fixing bolts.
Clip the air conditioning pipe and cable harness to the top rail.
Connect bottom hose, top hose, and the expansion pipe to the radiator.
Tighten hose clips.
Refill the radiator with coolant, see operation 26.10.01.
Reconnect the battery.
Refit the bonnet.

RADIATOR BLOCK

Cars fitted with Heater only

Remove and refit **26.40.04**

Removing

Drain the coolant from the radiator, see operation 26.10.01.
Disconnect the battery.
Remove the bonnet.
Slacken clips and remove the top hose, bottom hose and expansion pipe from the radiator.
Unclip the cable harness from the top rail.
Remove the top rail to body securing nuts and bolts.
Remove the top rail to fan cowl securing nuts and bolts.
Displace the cowl from the top rail, and the top rail from the radiator location.
Remove the air cleaner ram tube.
Disconnect the coolant level probe, and lift the radiator from car.
Recover the rubber foam padding.

Refitting

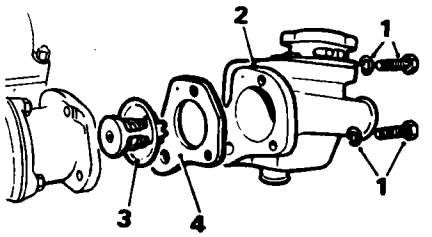
Fit radiator to the mounting rubbers, and reconnect the coolant level probe.
Fit and secure the air cleaner ram pipe.
Align the top rail to the radiator.
Fit but do not tighten the securing nuts and bolts.
Secure the fan cowl to top rail, and tighten all securing nuts and bolts.
Reclip the cable harness to the top rail.
Fit and secure bottom hose, top hose and expansion pipe to the radiator.
Refill the radiator with coolant, see operation 26.10.01.
Reconnect the battery.
Refit the bonnet.

THERMOSTAT

Remove and refit **26.45.01**

Removing

Partially drain the coolant from the radiator.
Disconnect the battery.
Slacken the vent pipe clips and remove the pipe from the filler neck.
Slacken the top hose clips and disconnect the hose from the filler housing.
Slacken water pump to the filler housing clip.
Remove the filler housing securing bolts (1, Fig. 4).



J26-024

Fig. 4

Displace the engine breather pipe clip bracket and remove the spacing washer.
Carefully break the joint and remove the thermostat housing (2, Fig. 4) from the water pump hose.
Remove the thermostat (3, Fig. 4) from the thermostat housing.
Discard the old gasket (4, Fig. 4) and clean the sealing faces.
Remove all sludge or scale present.

Refitting

Refit the thermostat into the thermostat housing.
Replace the filler housing gasket and fit the filler housing.
Fit the spacing washers and align the engine breather pipe bracket.
Fit and tighten the filler housing securing bolts.
Refit the water pump to filler housing hose, top hose and vent pipe.
Tighten all the clips.
Refill the radiator with coolant, see operation 26.10.01.
Reconnect the battery.

WATER PUMP

Remove and refit **26.50.01**

Removing

Drain the coolant, see operation 26.10.01.
Remove the fan cowl and the Torquatrol assembly (Fig. 5).

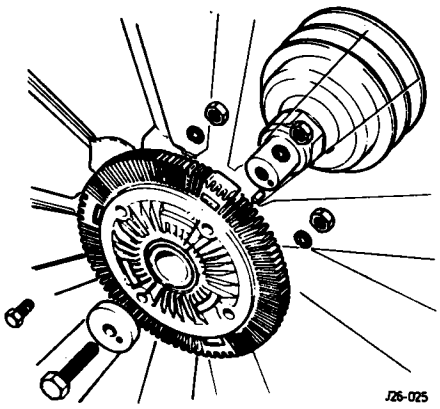


Fig. 5

Release and screw back inner locknut (1, Fig. 6) at the power-assisted steering pump adjuster trunnion.
Slacken the nut of the pivot bolt (2, Fig. 6) and slacken the bolt (3, Fig. 6) securing the adjusting link to the pump.
Slacken the bolt securing the trunnion block (4, Fig. 6) and swing the pump towards the engine.
Remove the belt.
Remove the trunnion bolt and pivot the pump away from the engine.

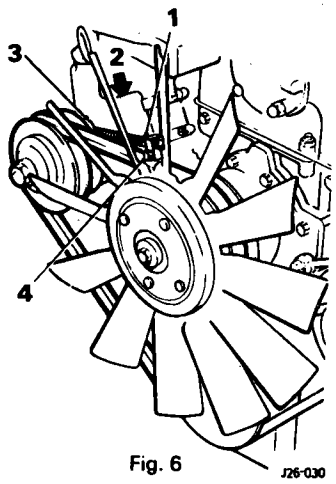


Fig. 6

Cars fitted with heater only

Slacken the alternator adjuster trunnion bolt (1, Fig. 7), remove the alternator adjuster pivot bolt (2, Fig. 7) and slacken the alternator mounting bolt (3, Fig. 7).
Pivot the alternator adjuster from the engine, and release the tension from the belt.

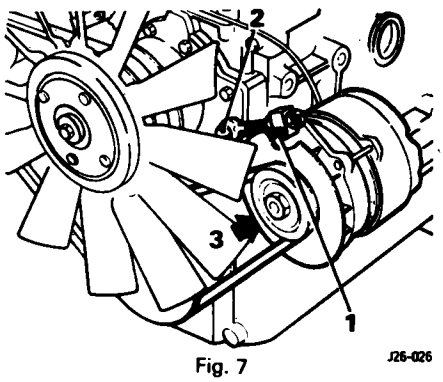


Fig. 7

Cars fitted with air conditioning
Slacken the two compressor pivot bolts on front and rear flanges.
Slacken the compressor trunnion bolt and remove the adjuster pivot bolt.
Pivot the adjuster from the water pump and release the tension from drive belt.

All cars
Disconnect the oil cooler to water pump hose at the water pump.
Disconnect the throttle housing to water pump hose at the water pump.
Loosen the clips on the heater return pipe and the filler housing hose.
Remove the nuts and bolts securing the water pump.
Disconnect the water pump hose from the pump. Displace the pump from the studs and disconnect from the filler housing. Remove the pump assembly.
Remove and discard the gasket.

Refitting

Fit a new gasket to the timing cover.
Fit the pump to the filler housing.
Locate the pump onto the timing cover, and into the water pipe hose.
Tighten the clips.
Fit and tighten securing the nuts and bolts 'by diagonal selection'.
Connect the throttle housing hose, and oil cooler hose to the water pump.

Cars fitted with air conditioning
Pivot the compressor to tighten the drive belt.
Pivot the adjuster to the water pump and fit the adjuster pivot bolt.
Adjust and check for correct drive belt tension, refer to Drive Belt Tension Data.
Tighten locknut and all bolts.

Cars fitted with heater only
Pivot the alternator and tighten the drive belt.
Pivot the adjuster towards the engine, and refit the adjuster pivot bolt.
Adjust and check for correct drive belt tension, refer to Drive Belt Tension Data.
Tighten the locknut and all the bolts.

All cars
Pivot the power-assisted steering pump towards the engine.
Fit but do not tighten the trunnion bolt.
Refit the drive belt, and adjust the nuts on the links to obtain the correct belt tension, refer to Drive Belt Tension Data.
Retighten all bolts and nuts.
Refit the Torquatrol assembly and fan cowl.
Refill the radiator with coolant, see operation 26.10.01

ADDITIONAL WORK FOR WATER PUMP RENEWAL — FEDERAL VEHICLES

Remove the air pump — 17.25.07.
Release the air conditioning compressor belt tension 82.10.01 and remove the link arm pivot bolt.
Undo and remove the air pump mounting bracket to the timing cover securing bolt.
Displace and remove the bracket spacer.

On removal of water pump securing bolts:-
Remove the air pump mounting bracket.

On refitting of the water pump securing bolts:-
Fit the air pump mounting bracket.
Fit the bracket spacer.
Fit and tighten the bracket securing bolt.
Refit the compressor link arm pivot bolt and re-adjust the belt tension.
Refit the air pump assembly.

DRIVE BELT TENSION DATA

Driving belt for	Deflection force kg	lb	Deflection mm	in
P.A.S. pump and water pump	2,9	6.4	4,3	0.17
Alternator	1,45	3.2	3,8	0.15
Compressor	2,9	6.4	4,3	0.17

WATER PUMP

Overhaul **26.50.06**

Remove water pump, see operation 26.50.01.

Dismantling

Use extractor bolt (⅜" U.N.F. X 2 in).
Slacken the locknut (1, Fig. 8) and remove the bearing lockscrew (2, Fig. 8).
Support the body of the pump on press bed, close around impeller.
Using a suitable mandrel acting against the case of bearing, press the bearing/spindle and impeller assembly (3, Fig. 8) from the body of the pump.
Press the bearing/spindle assembly from the impeller (Fig. 9).

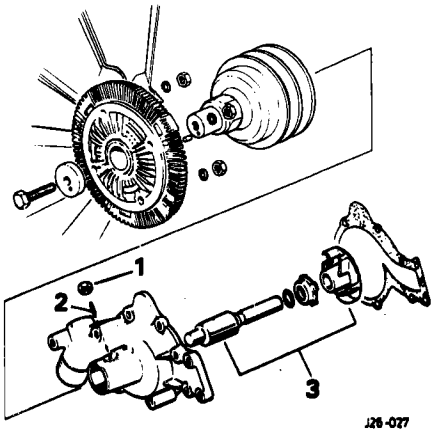


Fig. 8

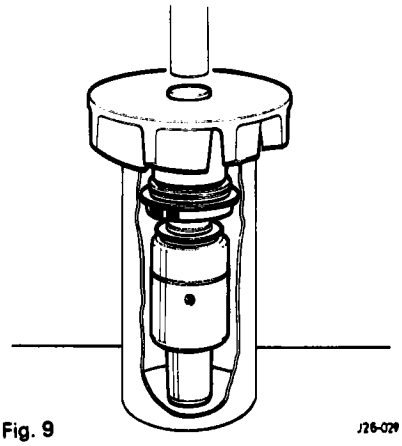


Fig. 9

Inspection

Thoroughly clean all parts of the pump except the bearing/spindle assembly in a suitable cleaning solvent.
Inspect the bearing for excessive play and remove any burrs, rust or scale from the shaft using fine emery cloth.

NOTE: Wrap the bearing in a clean cloth to prevent contamination by emery dust.

If signs of wear or corrosion are evident in bearing bore or on the face in front of the impeller, the body of the pump must be replaced.

Reassembling

Align the location hole in the bearing with the tapped hole in the pump body and press the bearing/spindle assembly into the body until the holes coincide.
Fit the bearing lockscrew and secure using the locknut.
Coat the outside of the brass seal housing with a suitable sealing compound, and fit into the recess in the pump body.
Carefully press the impeller onto the spindle until the dimension (A) shown on illustration (Fig. 10) is obtained. A = 0.381 ± 0.07 mm (0.015 ± 0.003 in)
Press pulley onto spindle, taking care to ensure that impeller is not moved from dimensions given above.
Refit the water pump, see operation 26.50.01.

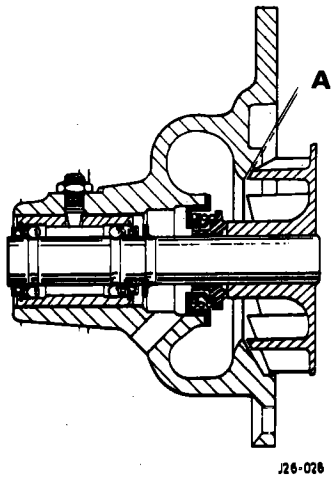


Fig. 10