

3-10 COOLING SYSTEM

Coolant Pump

Coolant Pump Removal

- Drain the coolant (see Coolant Draining).
- Loosen the tube clamp (D), and pull off the coolant by-pass tube (E).
- Unscrew the coolant pump mounting bolts, and remove the coolant pump assembly.

NOTE

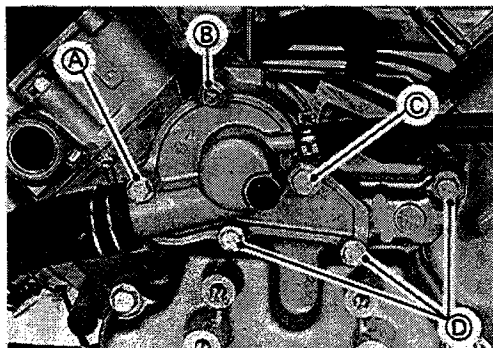
- Note the position of different length of bolts so they can be installed in their original positions.

Installation Notes

- Chip the old gasket off the mating surfaces of the casecover and pump housing.
- Put a new gasket on the pump housing.
- Be sure to suitable set the pump gear to be meshed with the cam gear when installing the pump assembly. Do not force the pump into position.
- Install the mounting bolts and tighten them to the specification (see Torque Table or Exploded View).
- Note the position of different length of bolts.

Bolt Dimensions

- A. Bolt M6 l = 75 mm (2.95 in)
- B. Bolt M6 l = 65 mm (2.56 in)
- C. Bolt M8 l = 70 mm (2.76 in)
- D. Bolt M6 l = 45 mm (1.77 in)



Disassembly

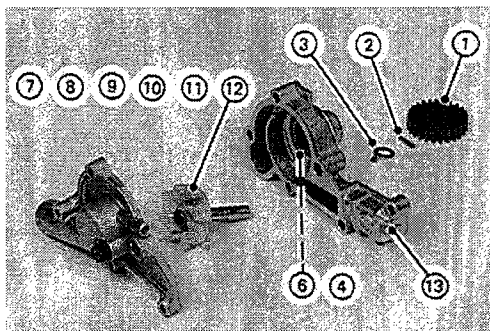
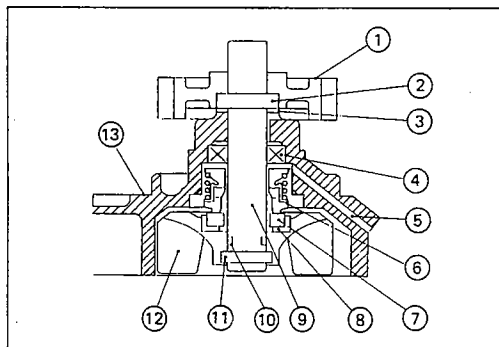
For disassembly, follow the steps (A ~ J) shown below (see Illustration).

NOTE

- Do not attempt to remove the mechanical seal, oil seal and O-ring unless they are to be replaced.

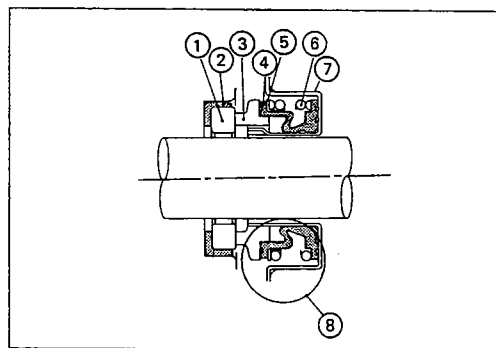
- A. Plastic pump gear (1)
- B. Dowel pin (2)
- C. Claw washer (3)
- D. Extract the impeller subassembly (12)(11)(10)(9)(8)(7) from the pump housing (13).
- E. Mechanical seal cartridge (6)
- F. Oil seal (4)
- G. Dowel pin (11)
- H. Impeller (12)
- I. Mating ring (7) and cup-gasket (8)
- J. O-ring (10)

- | | |
|----------------------------|-------------------|
| 1. Pump Gear | 8. Cup Gasket |
| 2. Dowel Pin (1) | 9. Pump Shaft |
| 3. Claw Washer | 10. O-Ring |
| 4. Oil Seal | 11. Dowel Pin (2) |
| 5. Drainage outlet passage | 12. Impeller |
| 6. Cartridge | 13. Pump Housing |
| 7. Mating Ring | |



Internal Parts – Mechanical Seal

1. Mating Ring (Floating Seat)
2. Cup Gasket (Cushion Ring)
3. Seal Ring
4. Bellows
5. Spring Retainer
6. Coil Spring
7. Casing
8. Cartridge

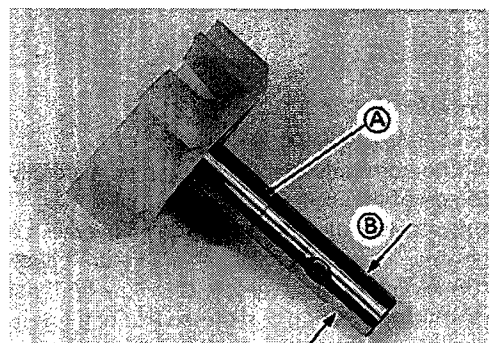
**Pump Parts Inspection**

- Clean All parts except plastic and rubber parts in a bath of high flash-point solvent and dry them compressed air. Clean non-metal parts with detergent and water, and dry them.
- Inspect the pump housing for damage. Mating surfaces should be smooth and free of burrs and nicks. Replace the gasket if necessary.
- Check the other parts for wear or damage, replace the parts if necessary.
- ★ If the mechanical seal is damaged, the coolant leaks through the seal, and drains through the drainage outlet passage.
- ★ If the oil seal is damaged, the engine oil drains through the drainage passage.
- ★ If the mechanical seal parts are damaged, replace the seal as a set.
- Visually check the impeller.
- ★ If the surface is corroded, or if the blades are damaged, replace all internal pump parts.

- Measure the outside diameter (B) of the impeller shaft (A) end with a micrometer at several points.
- ★ If the shaft end diameter is less than service limit, replace the shaft.

Outside Diameter of Impeller Shaft End

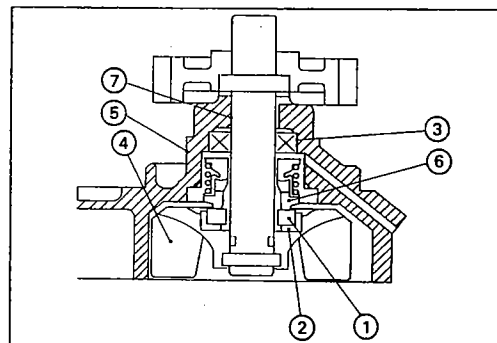
Service Limit: 9.935 mm (0.3911 in)

**Assembly Notes**

- When installing the mating ring (1) into the cup gasket (2), moisten outside surface of the mating ring with fresh water and then push the ring into the stop end. Do not damage mating surfaces.
- Pack some amount of high temperature grease into the oil seal (3). Press in the oil seal using a suitable tools so that the oil seal is flush with the shoulder surface.

NOTE

- The oil seal must be assembled with spring loaded lip toward inside of the engine.



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- When installing the impeller (4) sub assembly to the housing (5), coat mating surfaces between the mating ring and seal ring (6) with a clean water.
- To avoid oil seal damage, coat thin film of engine oil on the pump shaft (7), and then carefully insert pump shaft into the housing.

Radiator

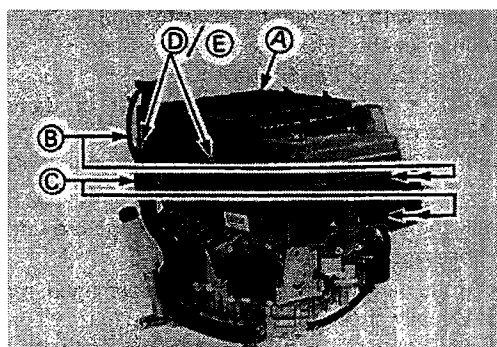
Removal

⚠ WARNING

Always allow the engine to cool before removing the radiator cap. Then remove the cap slowly and carefully to avoid a possible fast discharge of hot coolant which could cause severe burns.

- Remove the radiator cap and drain the coolant in the radiator (A) (see Coolant Draining).
- Loosen the hose clamps (B), and disconnect the radiator hoses (C) at the coolant inlet and outlet of the radiator.
- Unscrew the radiator mounting bolts (D), and remove the distance collars (E).
- Carefully remove the radiator.

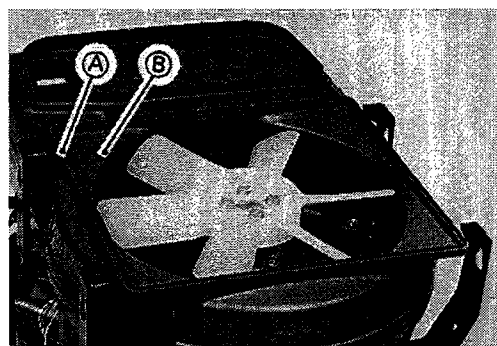
FD590V shown



Radiator Installation Notes – FD440V/FD501V

The radiator seal must sit in the groove (A) of the top half air duct (B). Replace if damaged.

FD501V shown

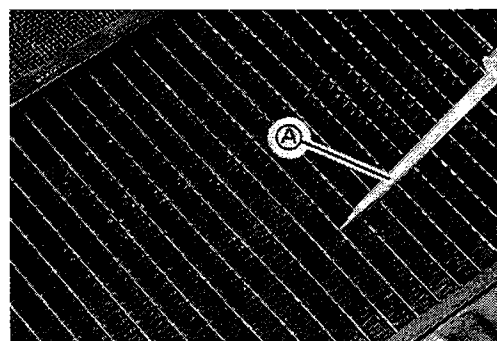


Radiator Inspection

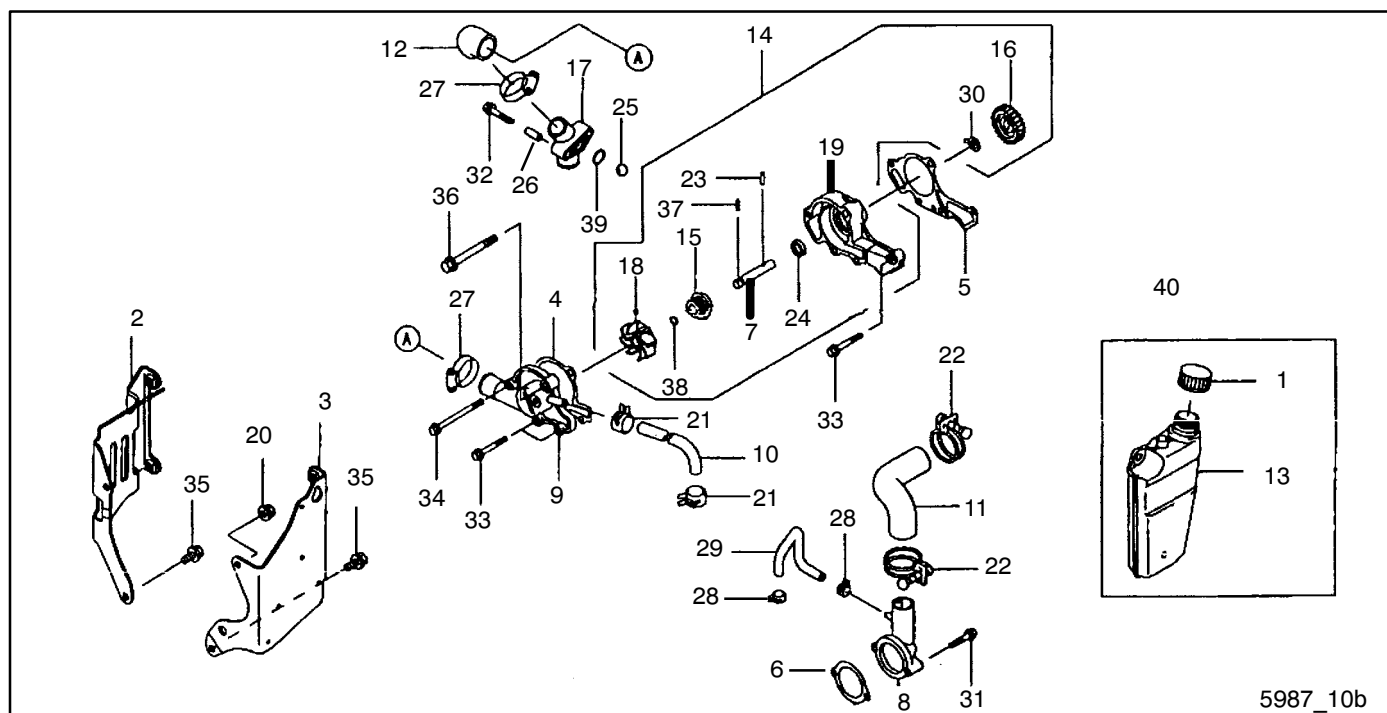
- Check the radiator core.
- ★ If the corrugated fins are deformed, carefully straighten them with the blade of thin screw driver (A).
- Inspect the inlet and outlet tubes for cracks, kinks, dents, and fractured seams. Repair or replace the radiator, if necessary.
- Check for dirt and insects that may be lodged in the radiator. Clean them out by using compressed air or a low-pressure washer.

CAUTION

Using high-pressure water, as from a car wash facility, could damage the radiator fins and impair the radiator's effectiveness.



Group 10: Engine Cooling



Item	Part No.	Description	Qty.		
			1	2	3
1	359939	Cap	1	1	1
2	359940	Bracket	1	1	
2	—	Bracket (See Group 105)			1
3	359941	Bracket	1	1	1
4	359942	Gasket, water pump	1	1	1
5	359943	Gasket, water pump	1	1	1
6	359944	Gasket, thermostat cover	1	1	1
7	359945	Shaft, impeller	1	1	1
8	359946	Cover, thermostat	1	1	1
9	359947	Cover, pump	1	1	1
10	359948	Hose, cooling	1	1	1
11	359949	Hose, cooling	1	1	1
12	359950	Hose, cooling	1	1	1
13	359951	Reservoir	1	1	1
14	359952	Water pump (generator set serial numbers before 758309)	1		
14	GM29876	Water pump (engine model ES04; generator set serial numbers 758309 and after)	1		
14	GM29876	Water pump		1	1
15	359953	Mechanical seal	1	1	1
16	359954	Spur gear (generator set serial numbers before 758309)	1		
16	GM29877	Spur gear (engine model ES04; generator set serial numbers 758309 and after)	1		

Item	Part No.	Description	Qty.		
			1	2	3
16	GM29877	Spur gear	1	1	1
17	359955	Joint	1	1	1
18	359956	Impeller	1	1	1
19	359957	Pump case	1	1	1
20	359958	Nut	1	1	1
21	359959	Clamp	2	2	2
22	359960	Clamp	2	2	2
23	359961	Pin	1	1	1
24	359962	Seal, oil	1	1	1
25	359963	Ball	1	1	1
26	359964	Collar	2	2	2
27	359965	Clamp	2	2	2
28	359966	Clamp	2	2	2
29	359967	Tube	1	1	1
30	359968	Washer	1	1	1
31	359969	Bolt, flanged	2	2	2
32	359970	Bolt, flanged	2	2	2
33	359971	Bolt, flanged	3	3	3
34	359972	Bolt, flanged	1	1	1
35	359973	Bolt, flanged	3	3	3
36	359974	Bolt, flanged	1	1	1
37	359975	Pin, dowel	1	1	1
38	359976	O-ring	1	1	1
39	359977	O-ring	1	1	1
40	229353	Mount			2