688 EXCAVATOR

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CASE CORPORATION

Lep 8-66052

February 1991

REPLACES FORM NO· 8-66051

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SAFETY RULES

This symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED. The message that follows the symbol contains important information about safety. Carefully read the message. Make sure you fully understand the causes of possible injury or death. 1-1-C

NOTE: *To prevent injury on job, follow the Warning, Caution, and Danger notes in this section and other sections throughout this manual. Follow the instructions carefully.*

The procedures recommended and shown in this manual are good, effective service methods. However, all possible procedures and service hazards may not be covered. therefore, if you use a tool or procedure not recommended, you must make sure the method you select is a safe method.

Put the warning tag shown below on the key for the key switch when you are servicing or repairing this machine. One warning tag is on every new machine. You can buy additional warning tags, part number 331–4614, from Service Parts Supply.



WARNING

Read operator's manual to familiarize yourself with control lever functions.

Operate machine and equipment controls from the seat position only. Any other method could result in serious injury.

This is one man machine, no riders allowed.

Before starting engine, study operator's manual safety messages. Read all safety signs on machine. Clear the area of other persons. Learn and practice safe use of controls before operating.

It is your responsibility to understand and follow manufacturer's instructions on machine operation, service, and to observe pertinent laws and regulations. Operator's and service manuals may be obtained from your J I Case dealer.

If you Wear clothing that is too loose or do not use the correct safety equipment for your job, you can be injured. Always wear clothing that will not catch on objects. Extra safety equipment that can be required includes hard hat, safety shoes, ear protection, eye or face protection, heavy gloves and reflector clothing.

When working in the area of the fan belt with the engine running, avoid loose clothing and use extreme caution.

When doing checks and tests on the equipment hydraulics, follow the procedures as they are written. DO NOT change the procedure.

When putting the hydraulic cylinders on this machine through the necessary cycles to check operation or to remove air from a circuit, make sure that all people are out of the way.

Use insulated gloves or mittens when working with hot parts.

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TORQUE SPECIFICATIONS

Torque specifications of bolts mounted with thick washers unless indicated otherwise. These torque specifications do not concern the engines and hydraulic components.

TORQUE SPECIFICATIONS ± 10%									
	Grade 8.8			Grade 10.9			Grade 12.9		
Size	Pound-Feet	Newton Metres	Kilogram Metres	Pound-Feet	Newton Metres	Kilogram Metres	Pound-Feet	Newton Metres	Kilogram Metres
M5 0.19 in	4	5.5	0.56	5.5	7.5	0.76	6.6	9	0.92
M6 0.23 in	6.6	9	0.92	9.2	12.5	1.27	11	15	1.53
M8 0.31 in	16.5	22.5	2.3	23	31.5	3.2	26.5	36	3.67
M10 0.39 in	32	44	4.5	45	62	6.3	55	75	7.65
M12 0.46 in	57	77.5	7.9	81	110	11.2	95	130	13.2
M14 0.55 in	88	120	12.2	125	170	17.3	155	210	21.4
M16 0.62 in	140	190	19.4	195	265	27	236	320	32.6
M18 0.70 in	192	260	26.5	269	365	37.2	320	435	44.3
M20 0.78 in	273	370	37.7	383	520	53	457	620	63.2
M22 0.86 in	369	500	51	516	700	71.4	619	840	85.6
M24 0.94 in	471	640	65.2	665	900	92	796	1080	110
M27 1.06 in	702	950	97	996	1350	137.7	1195	1620	165.2
M30 1.17 in	955	1300	132.5	1328	1800	183.6	1593	2160	220.3

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ENGINE SPECIFICATIONS

General

Type	4 Cylinder, 4 Stroke Cycle, Valve-In-Head
Firing Order	1,3,4,2
Bore	102mm
Stroke	120mm
Piston Displacement	3.92 Litres
Compression Ratio	17.0 to 1
No Load Governed Speed	2080 to 2200 RPM
Rated Engine Speed	2040 to 2070 RPM
Engine Idle Speed	850 t0 900 RPM
Valve Tappet Clearance (Exhaust) (Cold)	0.508 mm
(Intake) (Cold)	0.254 mm
Thermostat Operating Range	181°F to 203°F (83°C to 95°C)

Piston and Connecting Rods

Rings Per Piston	3
Number of Compession Rings	2
Number of Oil Rings (two piece)	1
Type of Pins	Full Float
Type Bearings	Steel Back Leaded Bronze

Main Bearings

Number of Bearings	5
Type of Bearings	Replaceable

Engine Lubricating System

Oil Pressure	42 to 54 PSI (290 to 372 kPa) (2.90 to 3.72 bar) with Engine Warm at Rated Engine Speed
Type of System	Pressure and Spray Lubrication
Oil Pump	Rotor Type
Oil Filter	Full Flow Turn on Type
Oil Capacity (with filter)	11 Quarts (10.4 litres)
(without filter)	10 Quarts (9.5 litres)

Fuel System

Fuel Injection Pump	CAV
Pump Timing	Top Center
Fuel Injectors	Bosch 17 mm Opening Pressure (New) 3190 to 3310 PSI (21 994 to 22 821 kPa) (220 to 228 Bar)
Governor	Variable Speed, a Part of the Injection Pump
First Stage Fuel Filter	Turn on Type
Second Stage Fuel Filter	Turn on Type
Lift Pump	5 to 7 PSI (34 to 48 kPa) (0.34 to 0.48 Bar)

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FLUIDS AND LUBRICANTS CHART

Fuel tank	
Capacity	58.1 U.S. gallons (220 litres)
Specifications	See page 1212-3
Engine crankcase	
Capacity - With filter change	11 U.S. quarts (10.5 litres)
Specifications	See page 1212-4
Engine cooling system	
Capacity - With heater	7.4 gallons (28 litres)
Type of coolant	ethylene glycol antifreeze and water mixed 50% ethylene glycol and 50% water
Hydraulic system	
Capacity - Reservoir	21.1 U.S. gallons (80 litres)
Complete system	34.3 U.S. gallons (130 litres)
Specifications	MS-1230 hydraulic fluid Case part number B17639 (5 U.S. gallons, 19 litres)
Final drive transmission	
Capacity - each	1.76 U.S. quarts (1.7 litres)
Specifications	Case IH Gear Lube (SAE 85W/140)
Alternate	SAE 85/140 API GL-5
Swing Transmission	
Capacity	1.76 U.S. quarts (1.7 litres)
Specifications	Case IH Gear Lube (SAE 85W/140)
Alternate	SAE 85/140 API GL-5
Batteries	
Specifications	drinking or distilled water
Grease fittings	
Specifications	Case IH molydisulfide grease

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MAINTENANCE SCHEDULE

Increase the frequency of service if the machine is operated under severe conditions.

MAINTENANCE SCHEDULE

REF. NUMBER	SERVICE POINTS	NO. OF POINTS	LUBRICATE	CHECK	CLEAN	CHANGE	SECTION	FREQUENCY
1	Track Tension	2		▒			5503	⬢ As Required
2	Air Cleaner*	1			▒		2001	
3	Hydraulic Filters**	2				▒	8201	
4	Engine Oil Level	1		▒				○ 10 Hours
5	Hydraulic Reservoir Level	1		▒			8201	
6	Air Cleaner Dust Valve	1			▒		2001	
7	Drive Belt	1		▒				
8	Drain Water From Fuel Tank	1		▒				
9	Coolant Level	1		▒				
10	Boom, Arm, and Bucket Pivot Points	19	▒				1212	⬭ 50 Hours
11	Turntable Ring Gear and Bearing	4	▒				1212	
12	Track Tension	2		▒			5503	● 100 Hours
13	Oil Level in Swing Reducer	1		▒			6001	
14	Swing System Ring Gear	1			▒			
15	Fluid Level in Batteries	2		▒			4005	
16	Oil Level in Final Drive Transmission	2		▒			6001	▲ 250 Hours
17	Track Shoe Mounting Bolt Torque	2		▒			5503	
18	Engine Oil and Filter	2				▒		
19	Radiator Fins				▒			
20	Engine Fuel Filter	2				▒	3410	□ 500 Hours
21	Hydraulic Filters	5				▒	8201	
22	Drive Belt	1				▒	4000	▬ 1000Hours
23	Oil in the Hydraulic Reservoir	1				▒	8201	■ 2000 Hours
24	Hydraulic Reservoir Breather	1				▒	8201	
25	Oil in the Final Drive Transmissions	1				▒	6001	
26	Oil in the Swing Reducer	1				▒	6001	
27	Engine Coolant	1				▒		

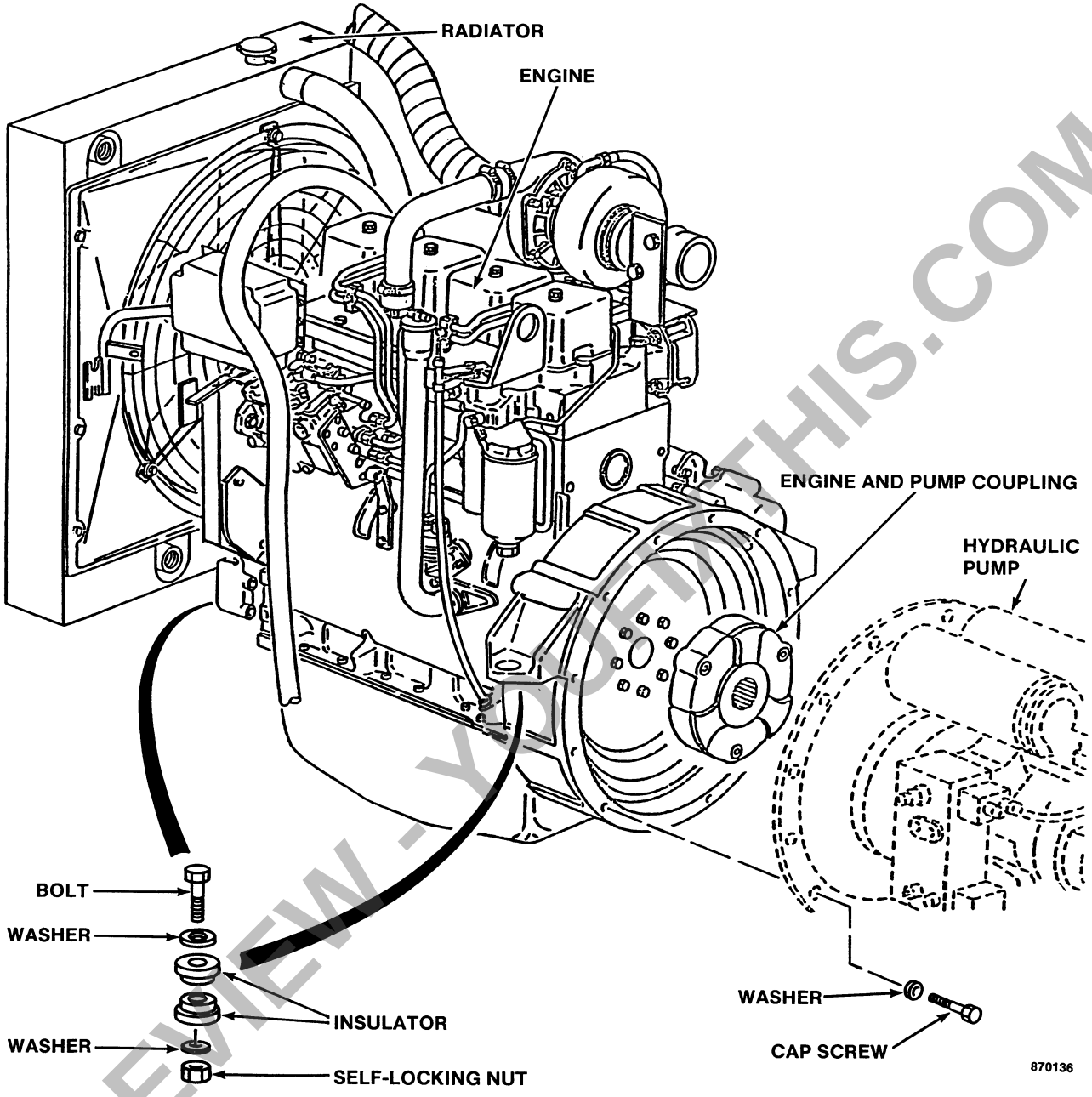
*Service the air cleaner when the warning lamp illuminates.

**Replace the hydraulic filter elements when the warning lamp illuminates.

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ENGINE



Engine Installation

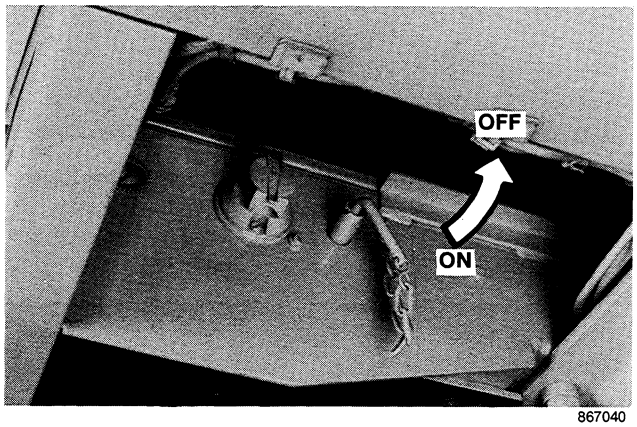
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Removal

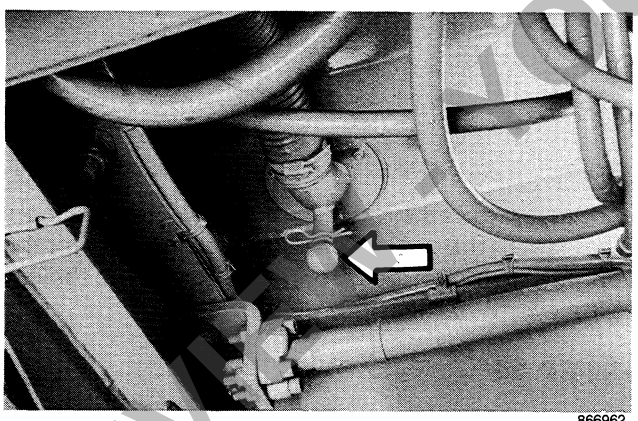
STEP 1
Park the machine on a level surface.

STEP 2
Lower the attachments to the floor and stop the engine.

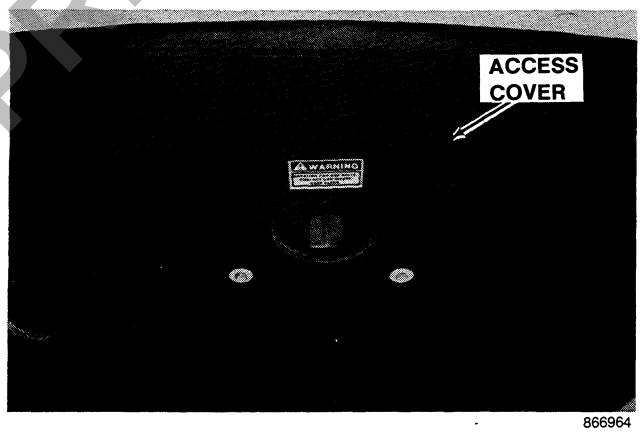
STEP 3


867040

Move the master disconnect switch to the OFF position.

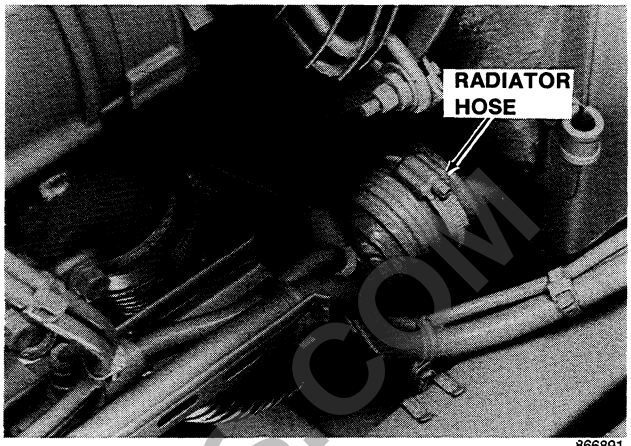
STEP 4

866962

Close the shutoff valve for the hydraulic reservoir.

STEP 5


866964

Remove the access cover for the engine from under the upper structure.

STEP 6


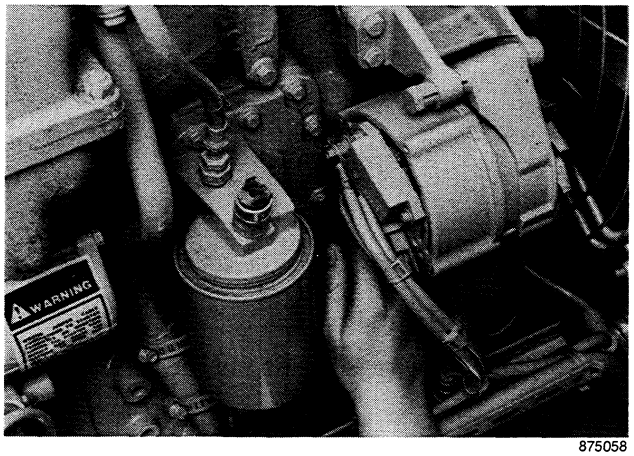
866891

The lower radiator hose must be removed to drain the coolant from the engine and the radiator. Remove the cap from the radiator. Disconnect the lower radiator hose from the engine. Drain the coolant from the radiator and the engine.

STEP 7


875057

Disconnect the wires from the engine oil pressure switch.

STEP 8


875058

Disconnect the wires from the battery terminal on the alternator.

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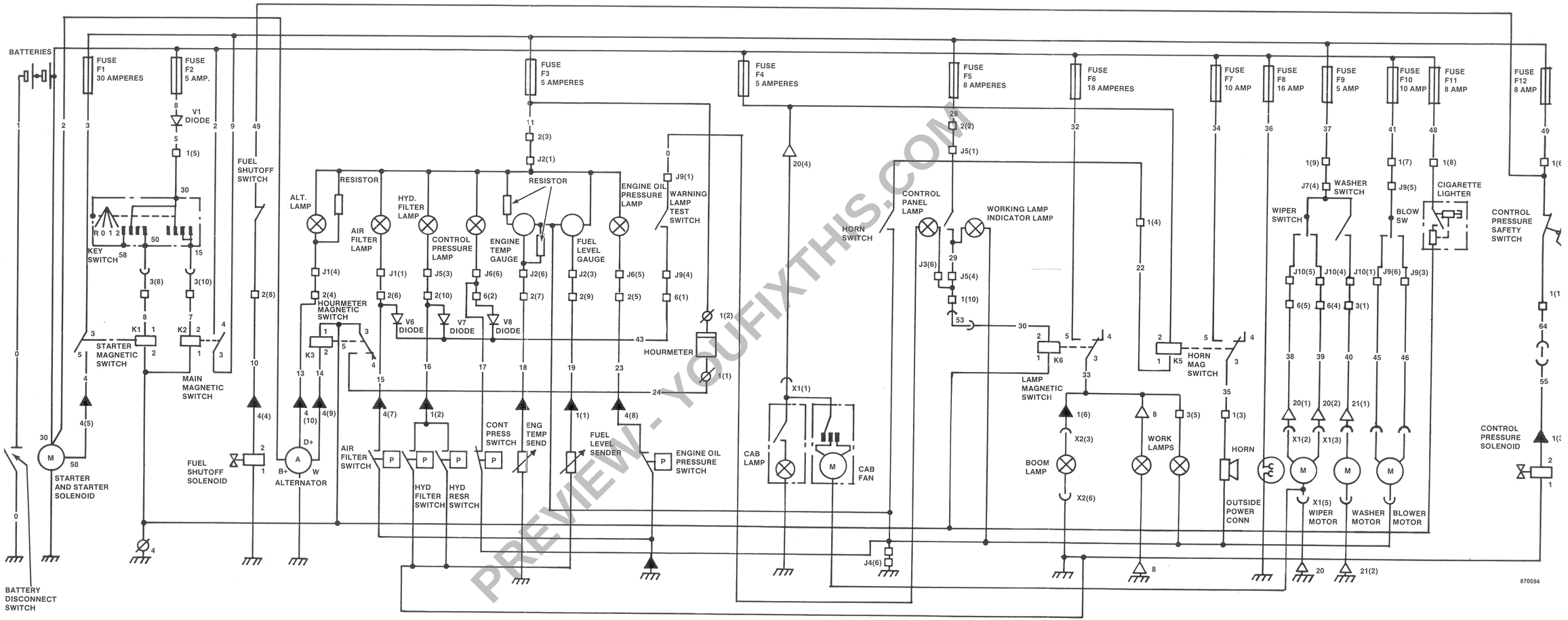
Troubleshooting guide for the diesel fuel injection system.

NOTE: *It is assumed that the engine is in good working order and properly tuned, and that the electrical system has been checked and repaired as necessary.*

SYMPTOM: Starting Problem	Engine surges at idle	Rough idle when engine is warm	Engine misses under load	Low Power	Excessive Fuel Consumption	Engine cannot be shut off	Poor performance **or** black smoke **or** low power	Fog-like exhaust in full-load range (white or blue)	Incorrect idle or maximum speed	Engine does not rev up	CAUSE † REMEDY
■		■	■	■			■	■		■	Improper fuel in the tank † Drain tank, flush system, fill with proper fuel
■	■		■	■				■		■	Tank empty **or** tank vent blocked † Fill tank/bleed system, check tank vent (See Section 3410)
■	■	■	■				■	■		■	Air in the fuel system † Bleed fuel system, eliminate air leaks (See Section 3410)
	■	■									Pump rear support bracket loose † Replace as necessary (See Section 3412)
■						■					Voltage supply malfunction/stop solenoid defective † Correct electrical faults/replace stop solenoid (See Section 3412)
■			■	■			■			■	Fuel filter blocked † Replace fuel filter (See Section 3410)
■			■	■			■			■	Fuel-supply lines blocked/restricted † Test all fuel supply lines - flush or replace
■			■	■							Loose connections, injection lines leak or broken † Tighten the connection, eliminate the leak
■			■				■			■	Paraffin deposit in fuel filter † Replace filter, use Diesel Fuel no. 1 (See Operators Manual)
■			■	■	■	■	■			■	Pump-to-engine timing incorrect † Readjust timing (See Section 3412)
		■	■	■	■	■					Injection nozzle defective † Repair or replace (See Section 3413)
				■	■	■					Engine air filter blocked † Replace air filter element
■	■		■	■		■					Injection sequence does not correspond to firing order † Install fuel injection lines in the correct order (See Section 3412)
	■		■	■			■	■		■	Overflow fitting interchanged with inlet fitting † Install fittings in their proper positions (See Section 3412)
■	■				■	■		■		■	Cold-start device malfunction (If equipped) † Check cold-start mechanism (If equipped)
■		■		■		■				■	Low or uneven engine compression † Repair as necessary (See Section 2425)
■	■	■	■	■	■	■	■	■		■	Fuel injection pump defective or cannot be adjusted † Replace (See Section 3412)

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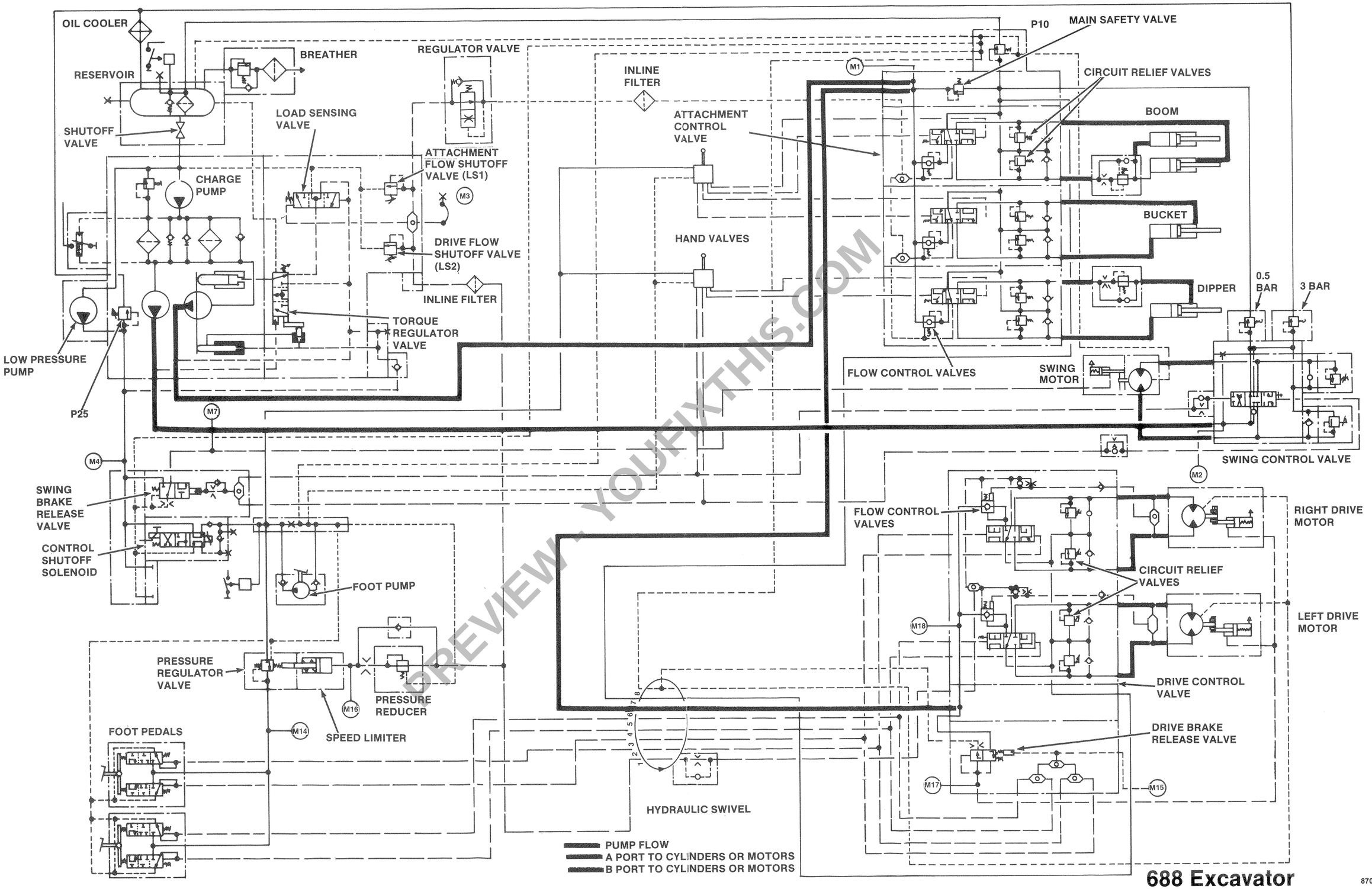
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1 ∅1 HOURMETER TERMINALS
2 ∅4 MAIN CIRCUIT BOARD GROUND CIRCUIT
3 □J CONTROL PANEL TERMINALS
4 □1,2,3,4,5,6 MAIN CIRCUIT BOARD TERMINALS
5 △ CABLE
6 ▲ MOULDED CABLE
7 ▲4 ENGINE HARNESS
8 △8 UPPER STRUCTURE LAMP CIRCUIT
9 △20 CAB CONNECTION HARNESS
10 X1 CONNECTION IN CAB

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Section

1001

SAFETY RULES, SERVICE MANUAL INTRODUCTION, AND TORQUE SPECIFICATIONS

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CASE CORPORATION

Lep 8-67631

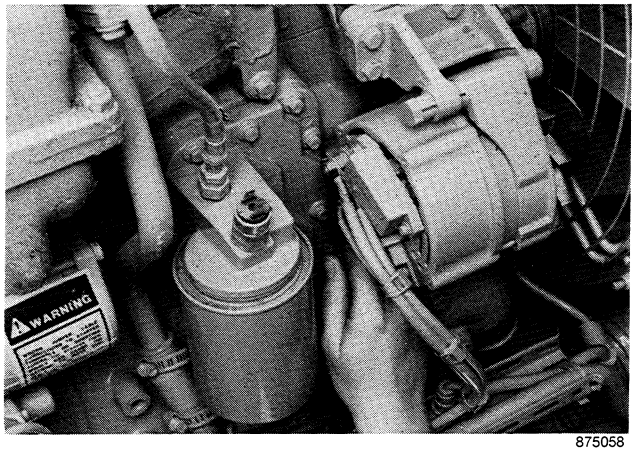
REPLACES FORM NO. Lep 8-67630

Printed in England

Issued May 1987, Revised June, 1988

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STEP 36



875058

Connect the wires to the battery terminal on the alternator.

STEP 37



875057

Connect the wires to the engine oil pressure switch.

STEP 38

Connect the lower radiator hose to the engine.

STEP 39

Fill the radiator with coolant and install the radiator cap on the radiator. Make sure that the coolant level in the coolant reservoir is correct. See Section 1212 for engine coolant specifications.

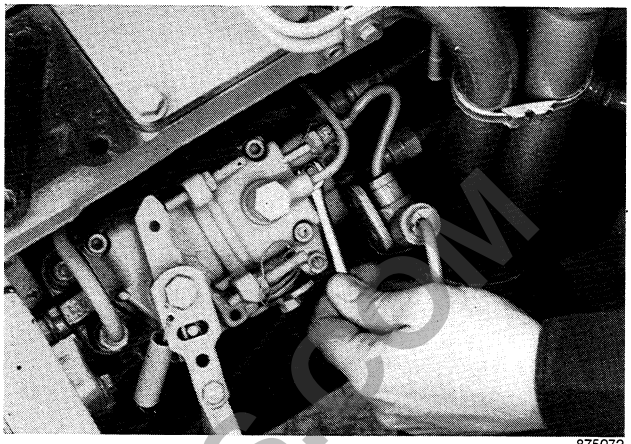
STEP 40

Open the shutoff valve for the hydraulic reservoir.

STEP 41

Move the master disconnect switch to the ON position.

STEP 42



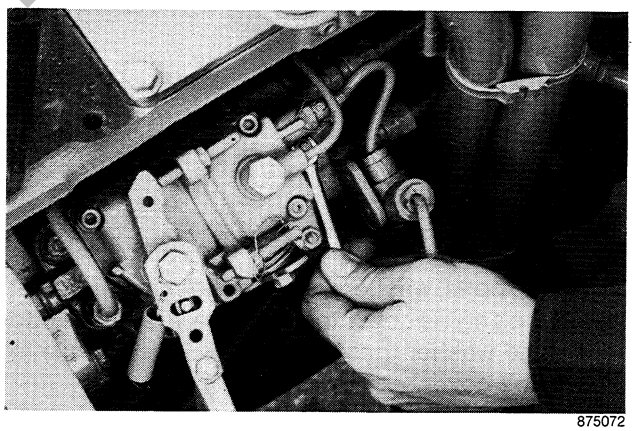
875072

Disconnect the wire from the fuel shutoff solenoid on the fuel injection pump.

STEP 43

Hold the key switch in the start position for 30 seconds. During this time, the oil pump in the engine will fill the turbocharger with oil.

STEP 44



875072

Connect the wire to the fuel shutoff solenoid on the fuel injection pump.

STEP 45

See Section 3001 to remove the air from the fuel system. Start and run the engine at idle for two minutes.

STEP 46

Stop the engine.

STEP 47

Check the coolant level in the coolant reservoir. Add coolant as required.

STEP 48

Check the oil level in the hydraulic reservoir. Add oil as required. See Section 8001 for specifications.

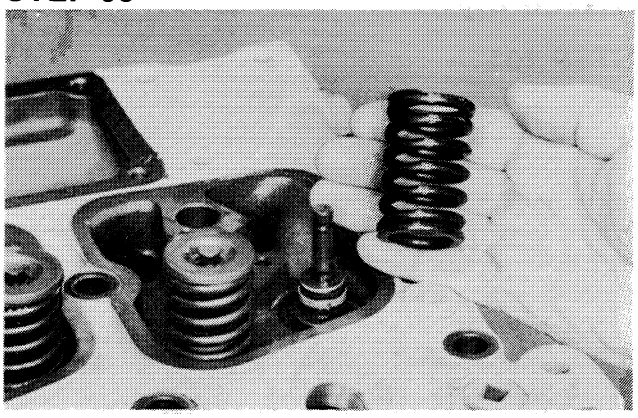
STEP 49

Check for leaks.

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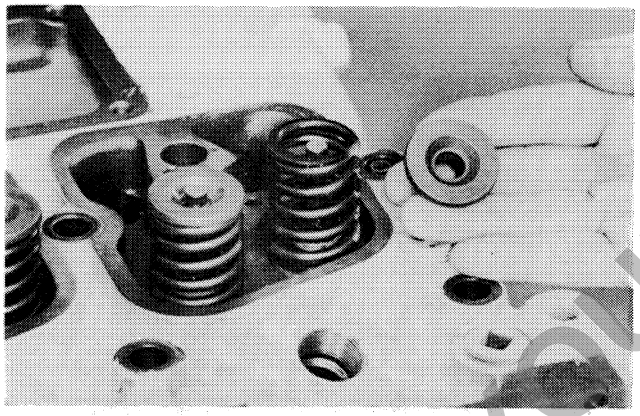
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STEP 93



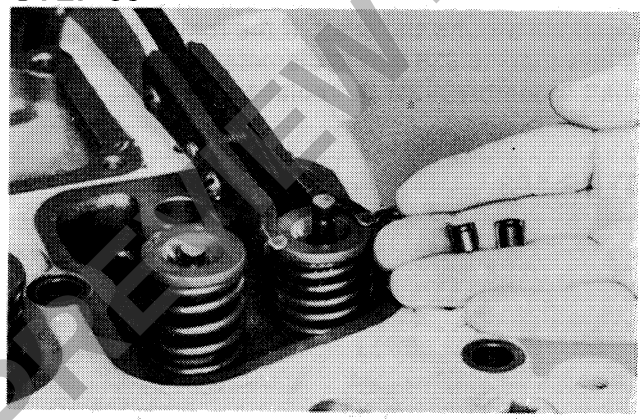
Install the valve springs.

STEP 94



Install the valve spring caps.

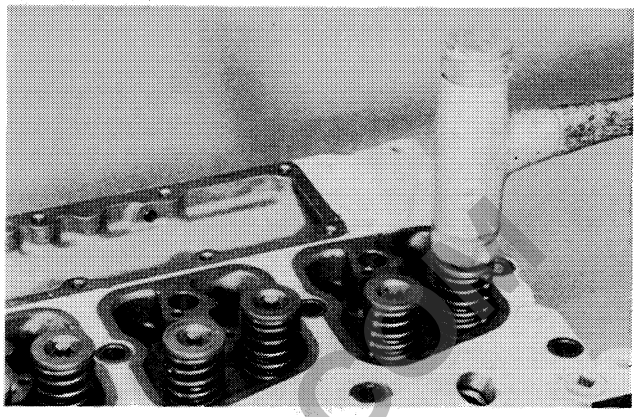
STEP 95



Push down the valve springs with a spring compressor. Install the valve keepers.

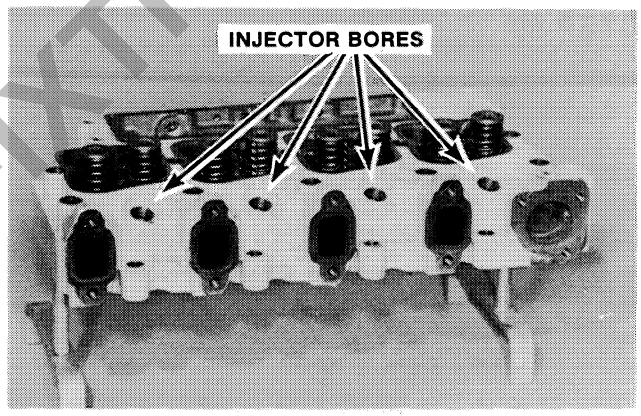
NOTE: *Always install new valve keepers when new valves are installed.*

STEP 96



Remove the spring compressor and hit the end of the valve stems with a soft hammer to seat the valve keepers.

STEP 97

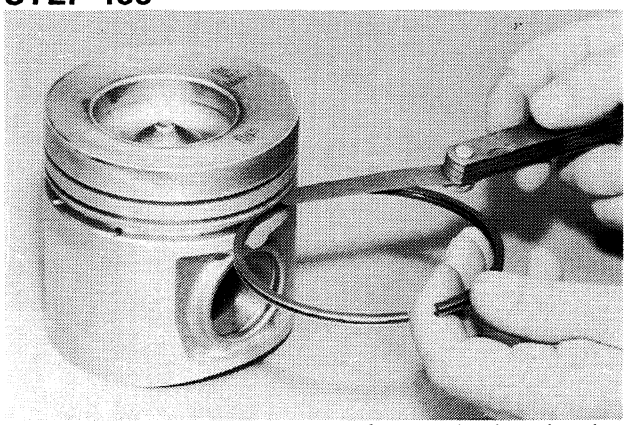


Clean the injector bores with a bore cleaner.

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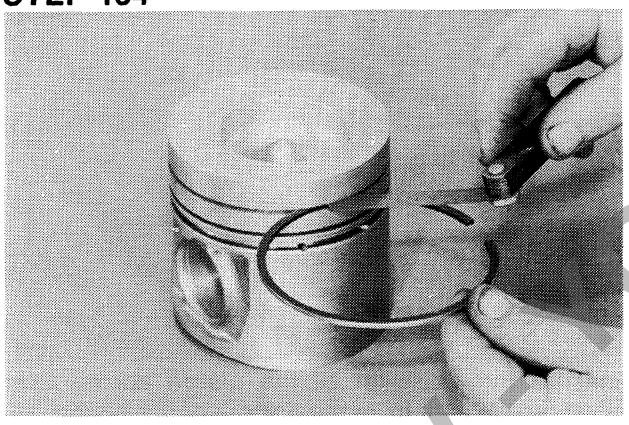
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STEP 153



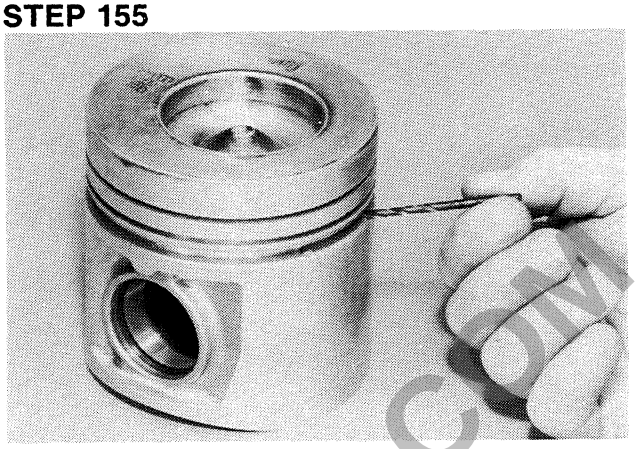
Check the side clearance of the oil ring in the piston. Insert a feeler gauge between the upper surface of a new ring and the piston lands to check the clearance. Replace the piston if side clearance is more than 0.13 mm.

STEP 154



Check the side clearance of the first and second compression rings. Replace the piston if the side clearance is more than 0.15 mm.

STEP 155

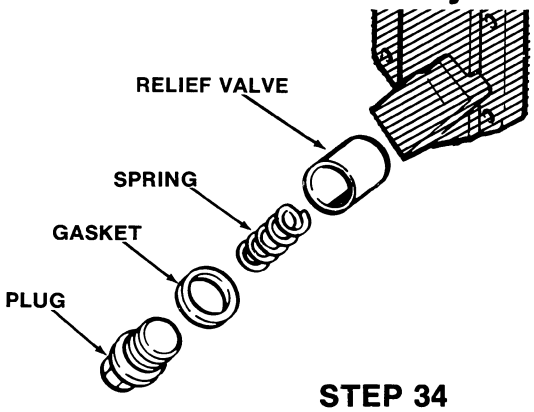


Clean the piston holes with a small drill or fine wire.

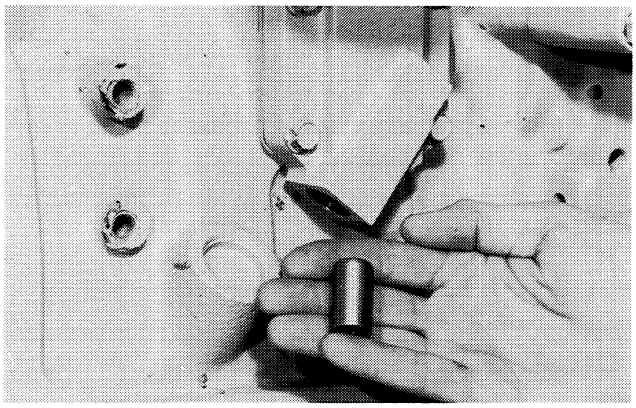
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Relief Valve Assembly

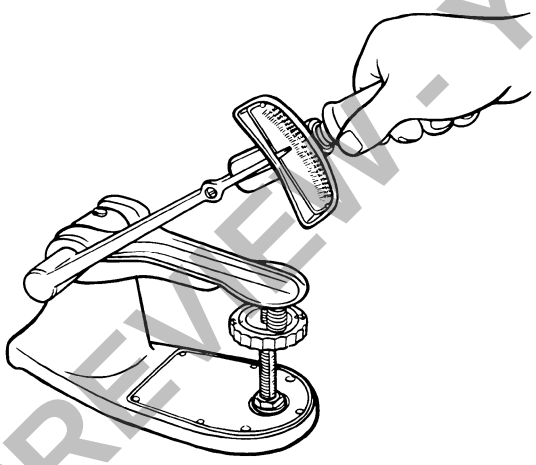


STEP 32



Install the relief valve.

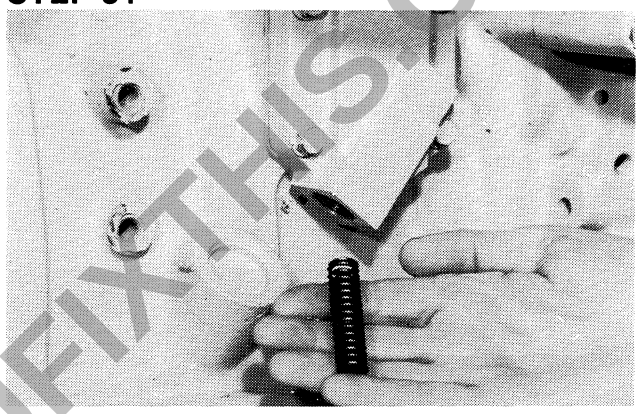
STEP 33



Check the relief valve spring for the following specifications:

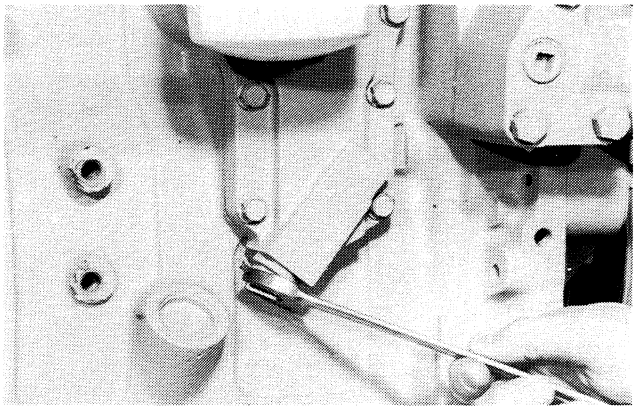
Free Length	55.83 mm
Wire Diameter	2.03 mm
Outside Diameter	14.02 mm
Number of Coils	17
Assembled Height:	
Compress to 44.98 mm	63 to 79 N
Spring Load Height:	
Compress to 39.98 mm	95 to 113 N

STEP 34



Install the relief valve spring.

STEP 35

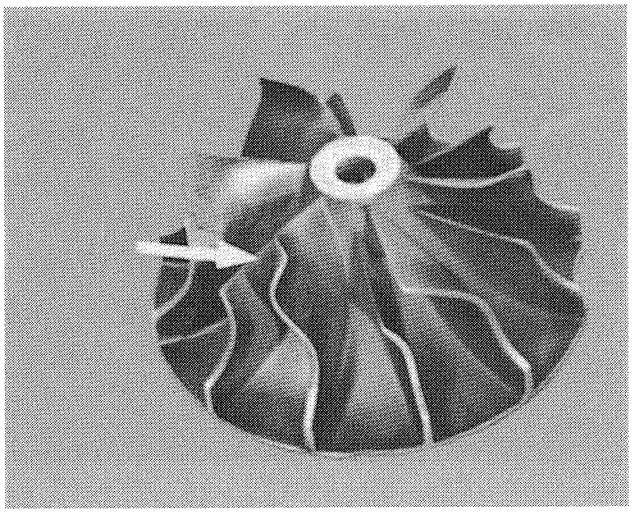


Install the relief valve plug and tighten.

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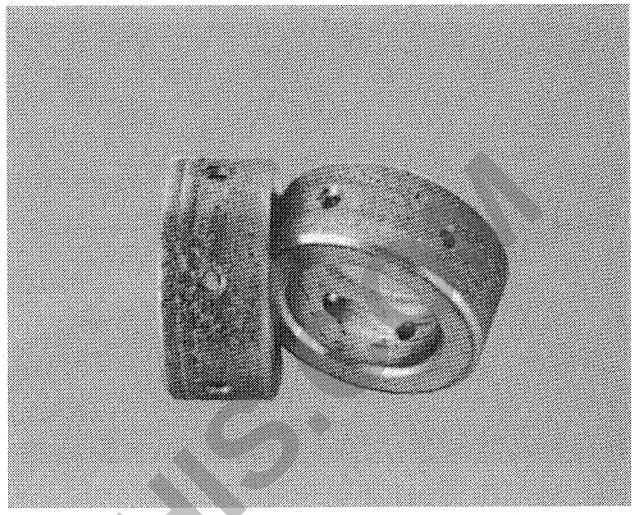
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Blade Edges Lifted



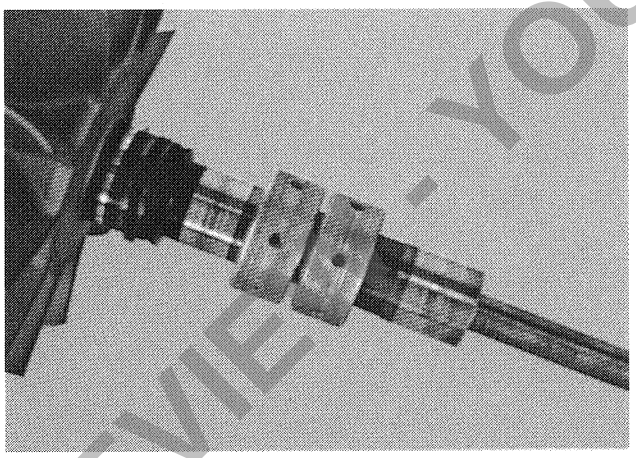
Blade edges of the compressor wheel lifted by improper removal of the compressor housing. Housing should not be pried off but lifted straight off.

Bearing Damage



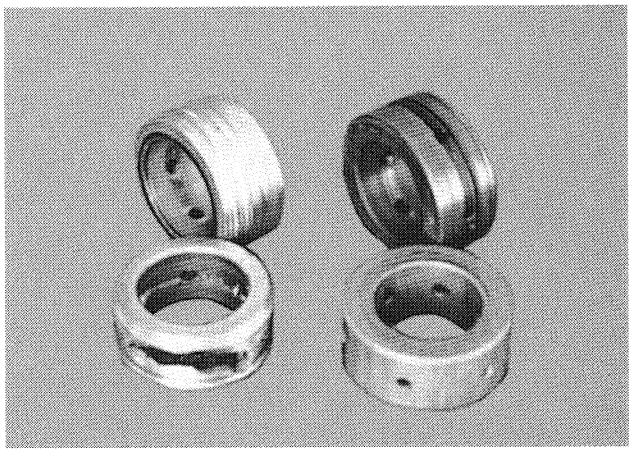
Engine bearing material imbedded in the bearing surfaces. Checkout the engine for possible bearing failure.

Turbine Shaft & Bearings



Turbine shaft and bearings showing effect of oil starvation.

Bearing Failure



Bearing failures occur in two separate areas. Scoring on the inside as well as the outside is attributed to dirty oil. Abrasive wear can also cause erosion around the oil holes in the bearings. A good bearing is shown in the lower right for comparison.

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THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.



WARNING

When testing or adjusting fuel injectors, do not place your hands or arms in front of the injector nozzle.

The fuel spray from an injector has sufficient penetrating power to puncture the flesh and destroy tissue. Should the fuel enter the blood stream, it may cause blood poisoning.

In the event the skin is punctured from the discharge of an injector, apply the following first aid immediately, then have the injury examined by a physician as quickly as possible.

Wash the injured part with boric acid solution, support the injured finger or hand with a splint and sling so the injured part will remain absolutely at rest until a physician can examine it.

SPECIFICATIONS

Part Number		Spray Angle	Number of Orifices	Spray Orifice Size	Opening Pressure	
Robert Bosch	Case				New	Used
0430132001	J904197	155 Degrees	4	0.28 mm	3475 to 3625 PSI (23 959 to 24 994 kPa) (240 to 250 Bar)	3200 to 3625 PSI (22 063 to 24 994 kPa) (220 to 250 Bar) Reset to 3475 to 3625 PSI (23 959 to 24 994 kPa) (220 to 250 Bar) When Opening Pressure Falls Below 3200 PSI (22 063 kPa)(220 Bar)

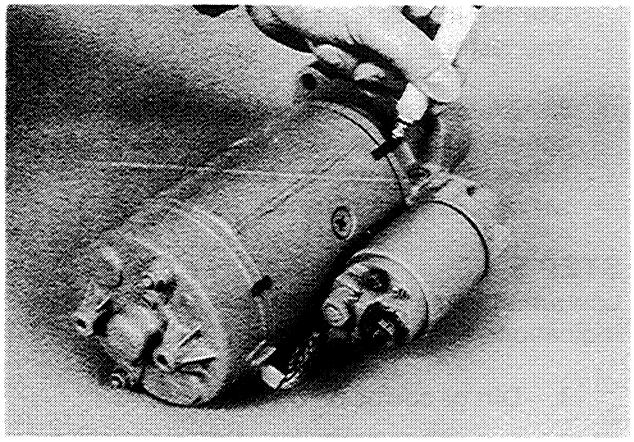
	U.S. Value	Metric Value
Valve Leakage Rate	No Leakage Permissible Slight Moistening of Nozzle Tip Permissible	
Maximum Opening Pressure Variation Between Each Cylinder	150 PSI with Set of Injectors	1034 kPa (10.34 Bar)

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DISASSEMBLY

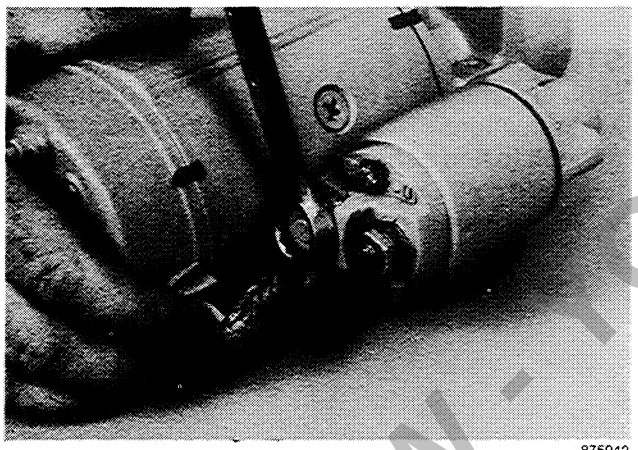
STEP 1



875941

Make alignment marks on the drive housing, the field frame, and the end cover.

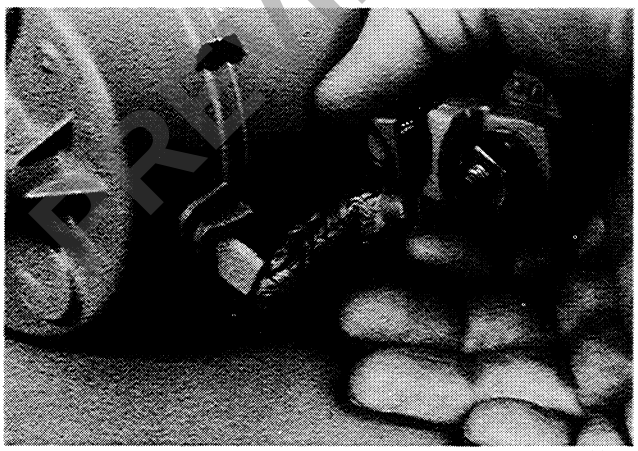
STEP 2



875942

Remove the nut and lock washer from the lower terminal on the starter solenoid.

STEP 3



875943

Remove the cable from the terminal.

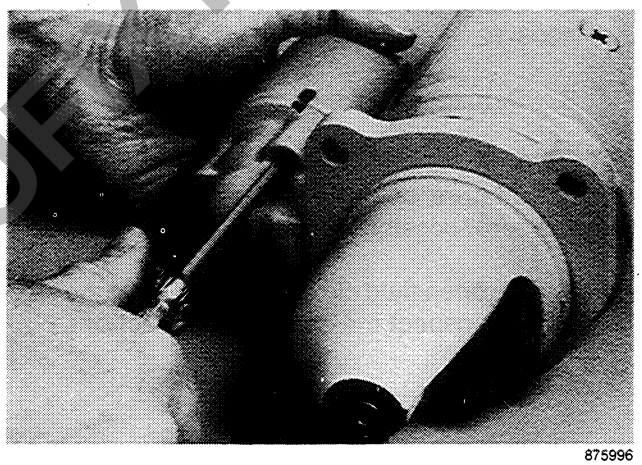
STEP 4



876944

Make an alignment mark on the starter solenoid and the drive housing.

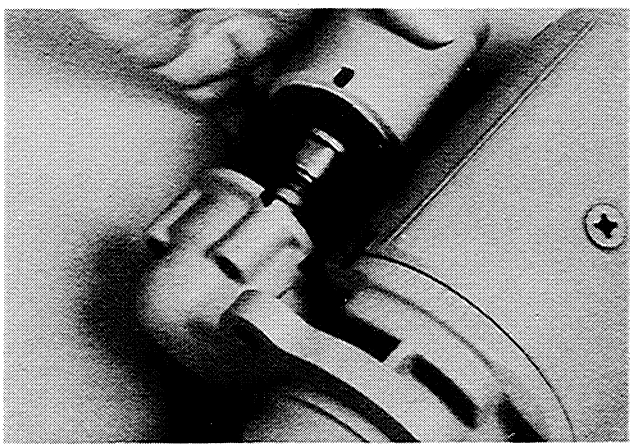
STEP 5



875996

Remove the screws that fasten the starter solenoid to the drive housing.

STEP 6



875946

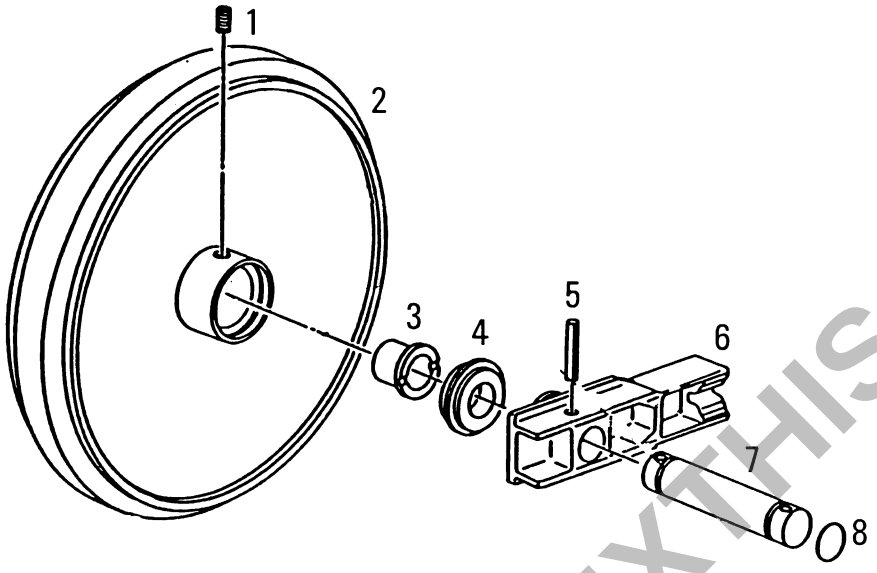
Remove the starter solenoid from the drive housing and the control lever.

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IDLER

The following illustration shows an ITM idler. Your machine can have an ITM or a ITRAC idler. The idlers used on this machine are similar and the repair procedures are the same.



850027

1. *Plug*
2. *Idler*
3. *Bushing*
4. *Rubber Rings and Metal Rings*
5. *Roll Pin*
6. *Mounting Bracket*
7. *Shaft*
8. *O-ring*

Disassembly

STEP 1



420934

Drain the oil from the idler.

STEP 2



420936

Put the idler on support blocks. Drive the roll pin from the mounting bracket and shaft.

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STEP 10



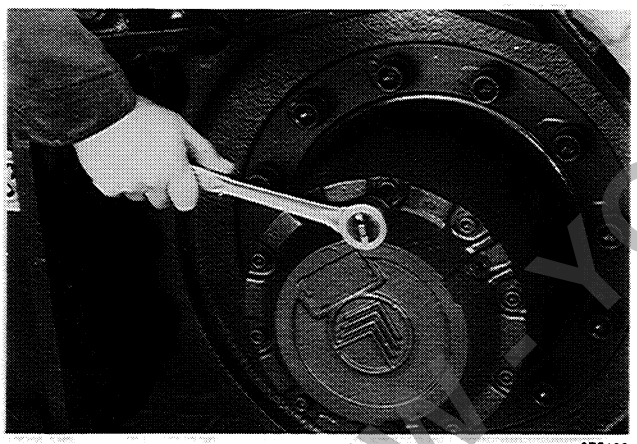
875128

Install the piston shaft and the third stage carrier in the hub.

STEP 11

Apply Loctite 242 to the threaded holes in the hub.

STEP 12



875180

Install the gasket and planetary cover. Install and tighten the Allen screws that fasten the planetary cover to the hub to 63 pound-feet (85 N m, 8.7 kg/m).

STEP 13

See Section 6000. Install the drive motor on the brake housing.

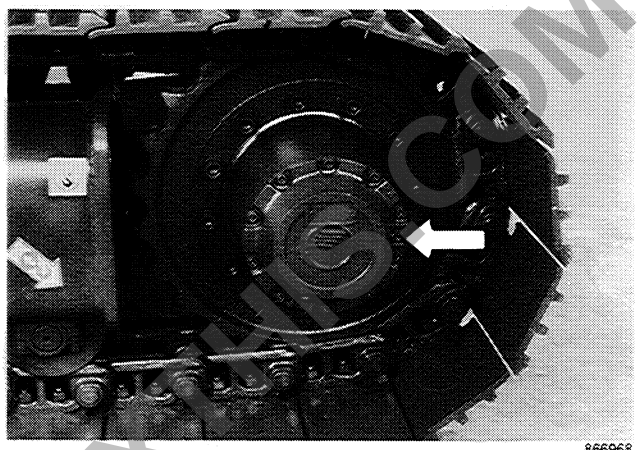
STEP 14

See page 5503-4. Adjust the track tension.

STEP 15

Fill the final drive with 1.76 quarts (1.7 litres) of Case IH Gear Lubricant.

STEP 16



866968

Start and run the engine at idle. Move the machine until the final drive is in the position shown. Remove the fill plug. Fill the final drive until the lubricant is even with the bottom of the fill hole.

STEP 17

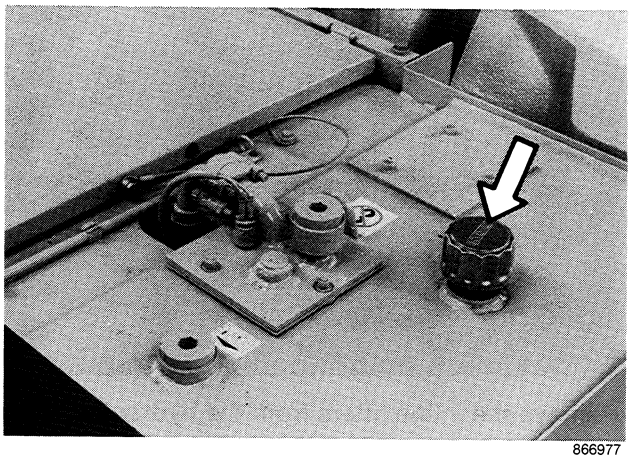
Install the fill plug in the planetary cover.

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Return Filter

STEP 1



866977

Loosen the breather two turns to release any air pressure from the hydraulic reservoir.

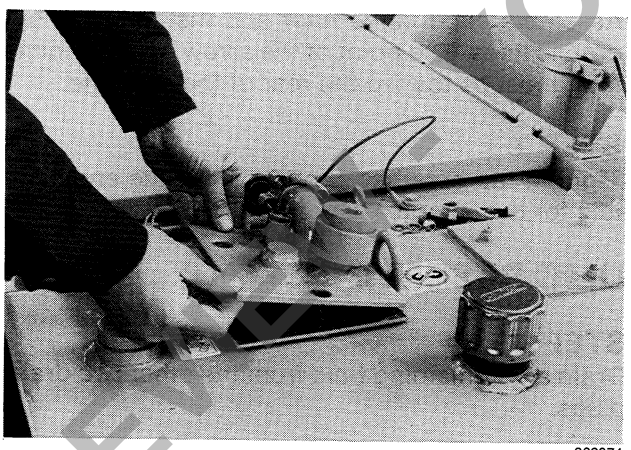
STEP 2

Disconnect the hose from the flange fitting in the return filter cover.

STEP 3

Loosen and remove the three nuts and flat washers that fasten the cover to the hydraulic reservoir.

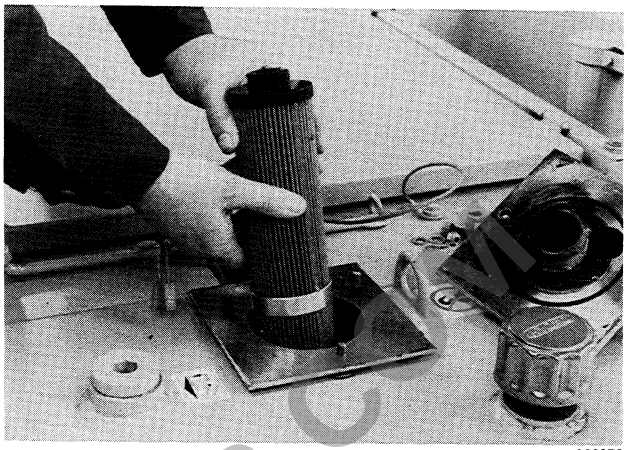
STEP 4



866974

Remove the cover.

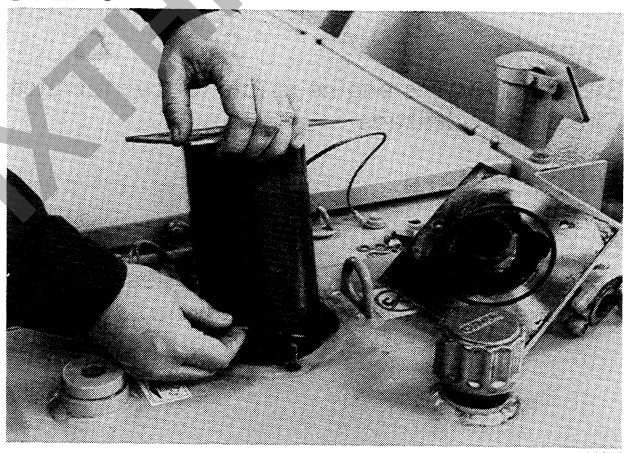
STEP 5



866973

Remove and discard the filter element.

STEP 6



866972

Lift the housing from the hydraulic reservoir. Inspect the gasket. If you install a new gasket, make sure that the long lip on the gasket is down.

STEP 7

Install a new filter element.

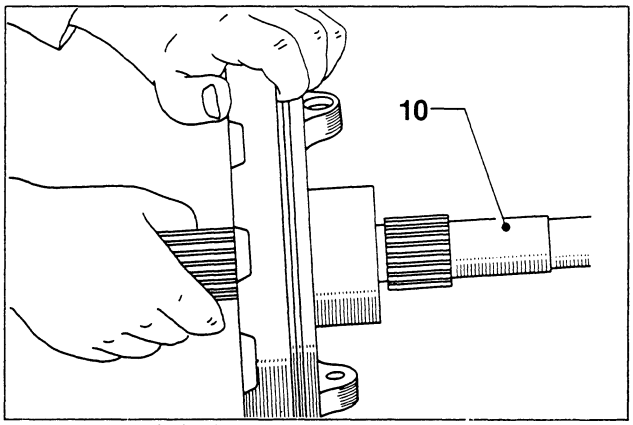
STEP 8

Inspect the O-ring in the cover. Use a new O-ring as necessary. Use grease to hold the O-ring in place.

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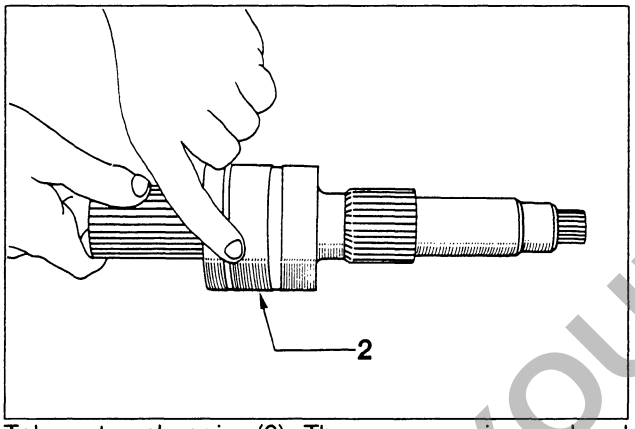
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STEP 70



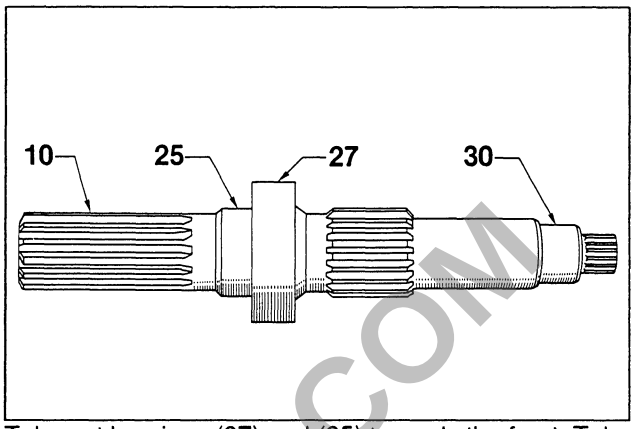
Take out shaft (10) by pulling it towards the front.

STEP 71



Take out seal carrier (2). Throw away o-ring seal and sealing ring.

STEP 72

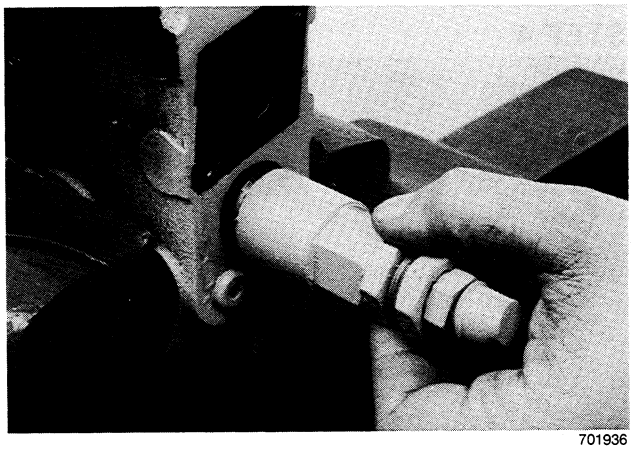


Take out bearings (27) and (25) towards the front. Take out inner race of fearing (30).

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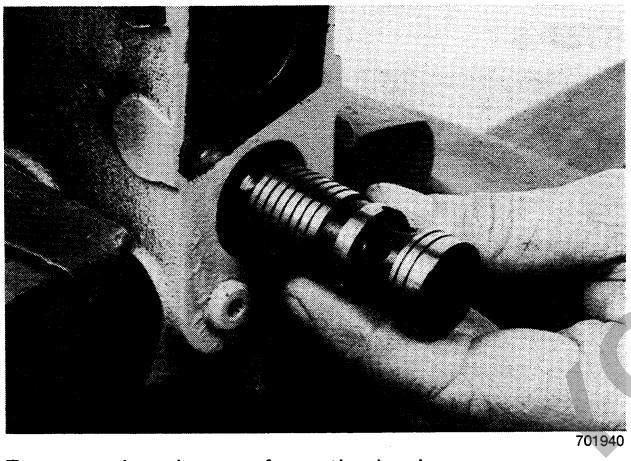
STEP 7



701936

Remove the flow control valve.

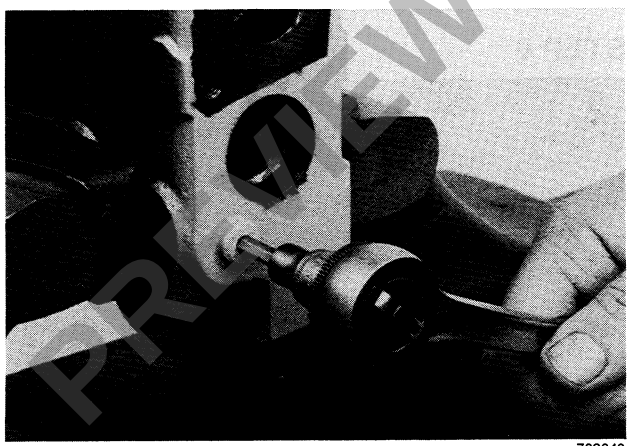
STEP 8



701940

Remove the plunger from the body.

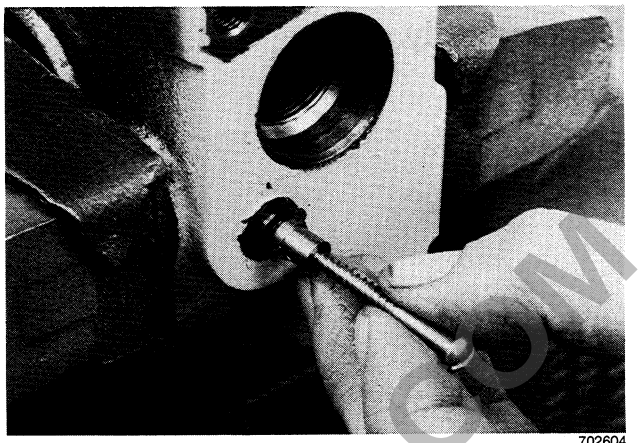
STEP 9



702640

Loosen and remove the plug.

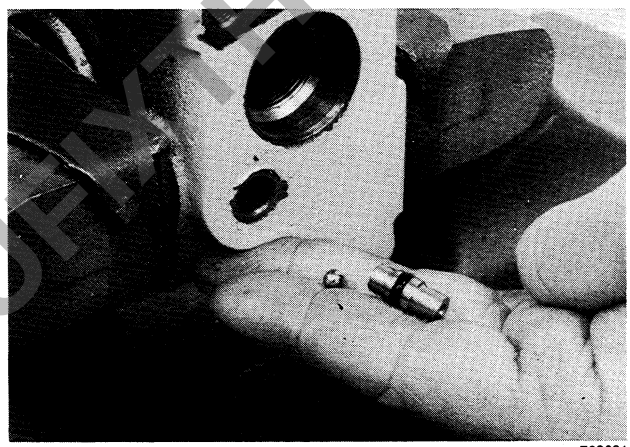
STEP 10



702604

Install a screw into the threads of the piston. Pull the piston from the body.

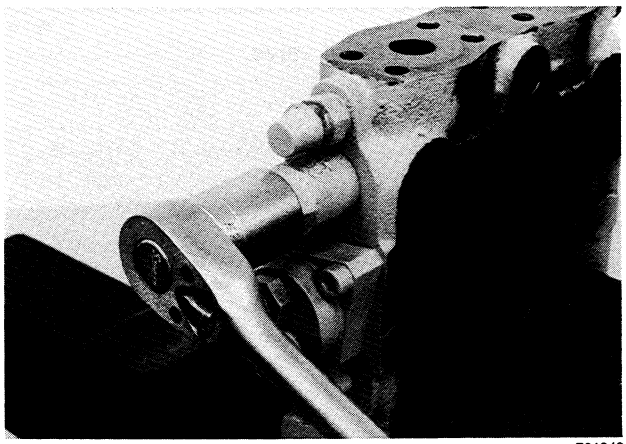
STEP 11



702601

Remove the ball.

STEP 12



701942

Loosen the other circuit relief valve.

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ASSEMBLY 7

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