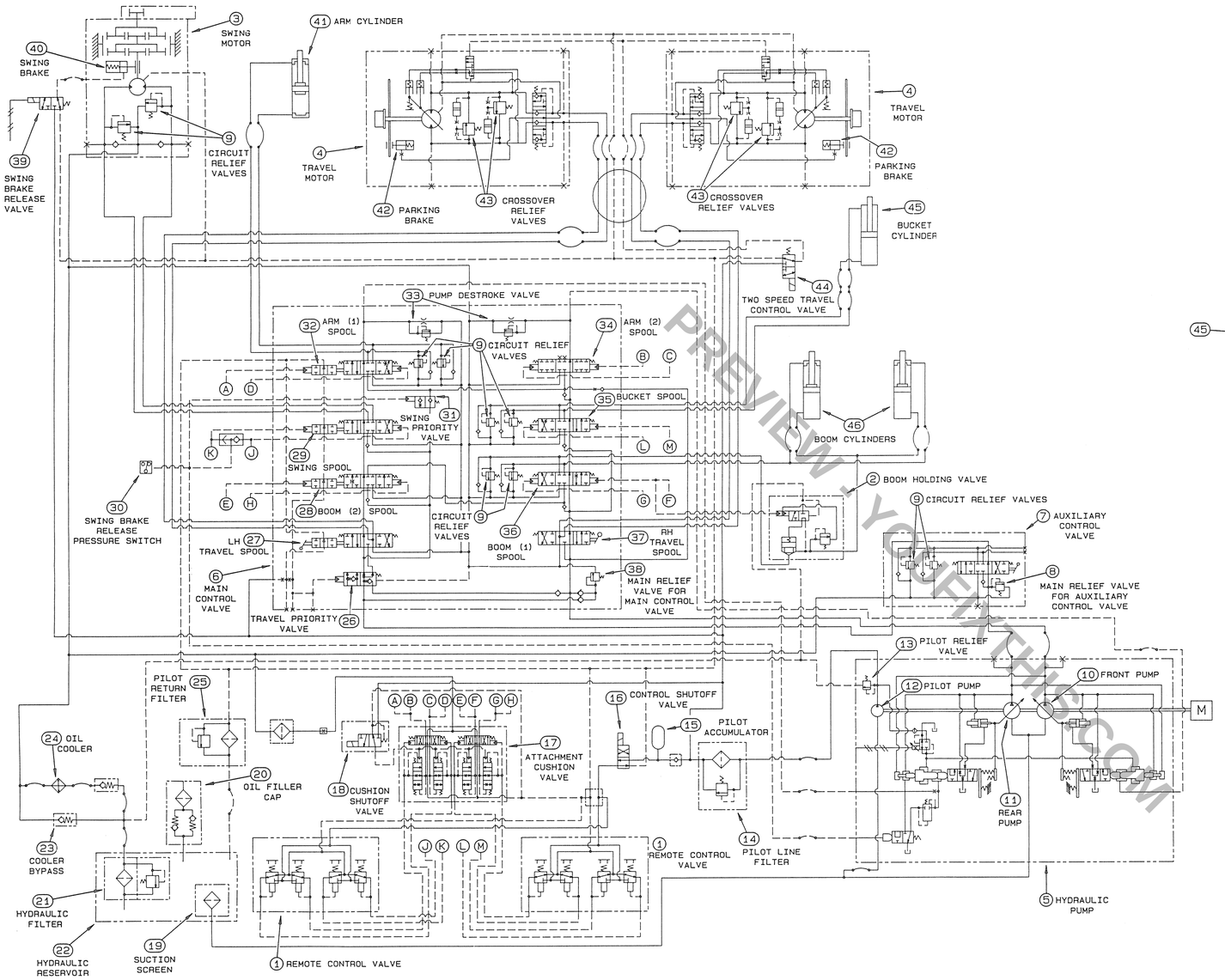
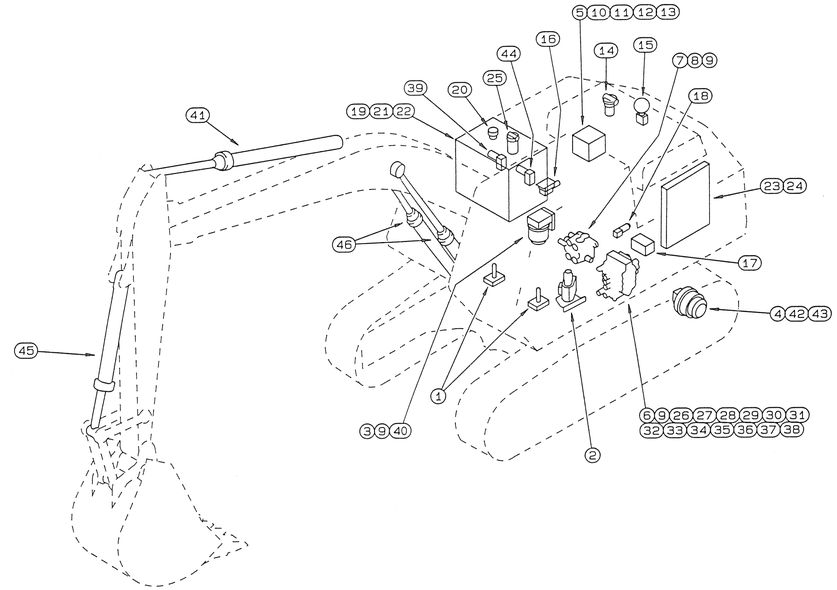




1. REMOTE CONTROL VALVE
2. BOOM HOLDING VALVE
3. SWING MOTOR
4. TRAVEL MOTOR
5. HYDRAULIC PUMP
6. MAIN CONTROL VALVE
7. AUXILIARY CONTROL VALVE
8. MAIN RELIEF VALVE FOR AUXILIARY CONTROL VALVE
9. CIRCUIT RELIEF VALVES
10. FRONT PUMP
11. REAR PUMP
12. PILOT PUMP
13. PILOT RELIEF VALVE
14. PILOT LINE FILTER
15. PILOT ACCUMULATOR
16. CONTROL SHUTOFF VALVE
17. ATTACHMENT CUSHION VALVE
18. CUSHION SHUTOFF VALVE
19. SUCTION SCREEN
20. OIL FILLER CAP
21. HYDRAULIC FILTER
22. HYDRAULIC RESERVOIR
23. COOLER BYPASS
24. OIL COOLER
25. PILOT RETURN FILTER
26. TRAVEL PRIORITY VALVE
27. LH TRAVEL SPOOL
28. BOOM (2) SPOOL
29. SWING SPOOL
30. SWING BRAKE RELEASE PRESSURE SWITCH
31. SWING PRIORITY VALVE
32. ARM (1) SPOOL
33. PUMP DESTROKE VALVE
34. ARM (2) SPOOL
35. BUCKET SPOOL
36. BOOM (1) SPOOL
37. RH TRAVEL SPOOL
38. MAIN RELIEF VALVE FOR MAIN CONTROL VALVE
39. SWING BRAKE RELEASE VALVE
40. SWING BRAKE
41. ARM CYLINDER
42. PARKING BRAKE
43. CROSSOVER RELIEF VALVES
44. TWO SPEED TRAVEL CONTROL VALVE
45. BUCKET CYLINDER
46. BOOM CYLINDERS

9010 HYDRAULIC AND ELECTRICAL SCHEMATIC

Additional copies of this hydraulic and electrical schematic can be ordered through Technical Publications Distribution System. The part number is 7-45710.

B9301305A

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TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. Not applicable if special graphites, molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs



Size	Pound-Feet	Newton metres
1/4 in	9-11	12-15
5/16 in	17-21	23-28
3/8 in	35-42	48-57
7/16 in	54-64	73-87
1/2 in	80-96	109-130
9/16 in	110-132	149-179
5/8 in	150-180	203-244
3/4 in	270-324	366-439
7/8 in	400-480	542-651
1.0 in	580-696	787-944
1-1/8 in	800-880	1085-1193
1-1/4 in	1120-1240	1519-1681
1-3/8 in	1460-1680	1980-2278
1-1/2 in	1940-2200	2631-2983

Grade 8 Bolts, Nuts, and Studs



Size	Pound-Feet	Newton metres
1/4 in	12-15	16-20
5/16 in	24-29	33-39
3/8 in	45-54	61-73
7/16 in	70-84	95-114
1/2 in	110-132	149-179
9/16 in	160-192	217-260
5/8 in	220-264	298-358
3/4 in	380-456	515-618
7/8 in	600-720	814-976
1.0 in	900-1080	1220-1465
1-1/8 in	1280-1440	1736-1953
1-1/4 in	1820-2000	2468-2712
1-3/8 in	2380-2720	3227-3688
1-1/2 in	3160-3560	4285-4827

NOTE: *Use thick nuts with Grade 8 bolts.*

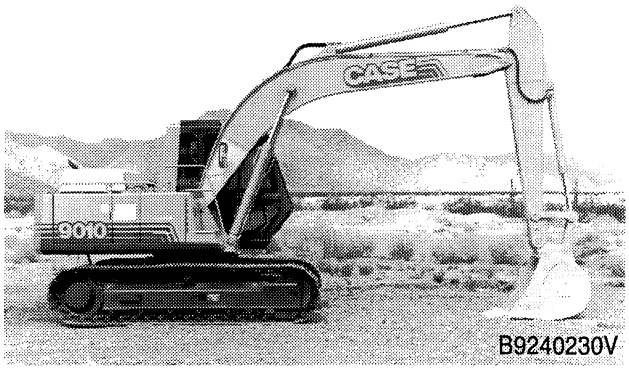
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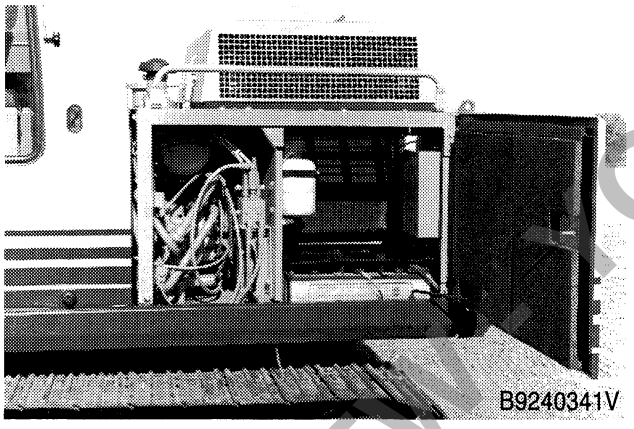
ENGINE

Removal

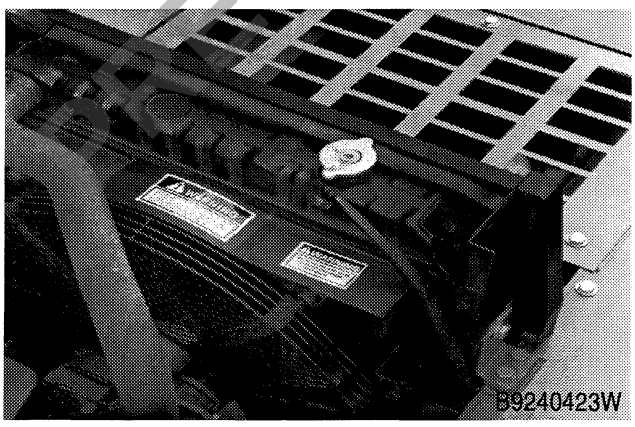
1. Park the machine on a hard level surface. Lower the tool to the floor and stop the engine.



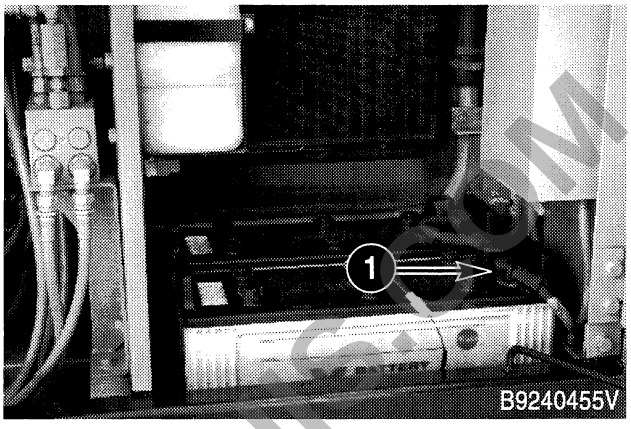
2. Open the access doors over the engine and on each side of the engine compartment. Remove the access covers from under the engine and the radiator.



3. Make sure that the engine is cool and remove the radiator cap. Open the drain valve and drain the cooling system. The cooling system holds 5 U.S. gallons (18.9 litres) of coolant.



4. Remove the access cover for the batteries and disconnect the ground cable.



1. Ground Cable

5. Remove the muffler and the mounting bracket for the muffler.

6. Disconnect the hose for the air cleaner from the turbocharger.

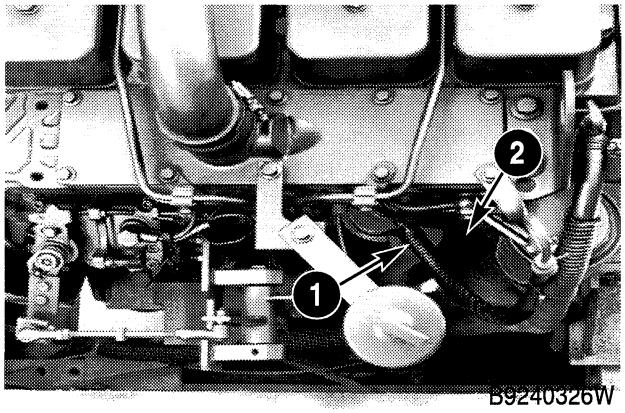
7. Disconnect the top (3) and bottom (4) radiator hoses from the radiator.

8. Disconnect the hose (2) for the coolant reservoir from the radiator.

9. Remove the fan guard and the fan shroud from the radiator.

10. Remove the cap screws and hardware that hold the fan and the spacer to the engine.

11. Disconnect the fuel supply hose and the fuel return hose. Install a plug in each hose.



1. Supply Hose *2. Return Hose*

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TROUBLESHOOTING EXAMPLE 2

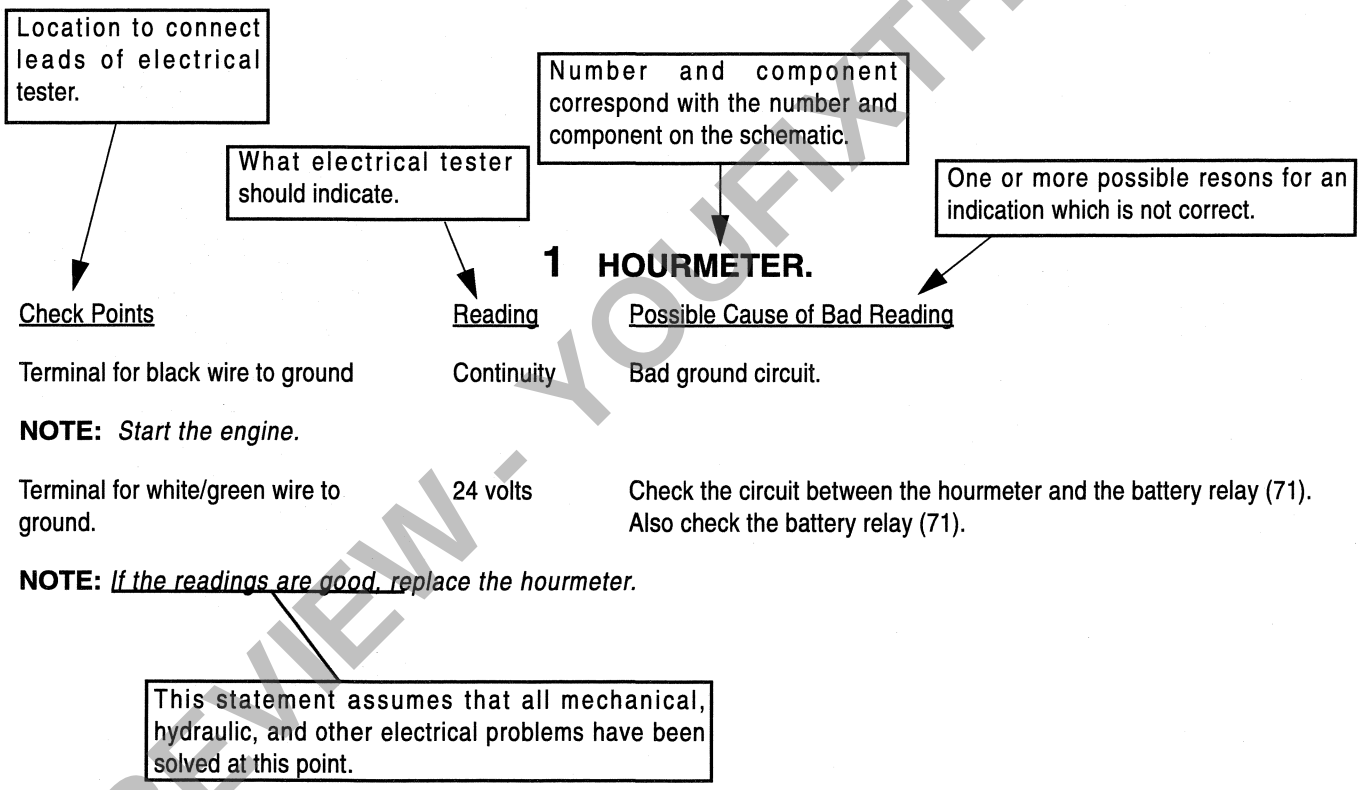
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TROUBLESHOOTING 5

NOTE: The J I Case Company reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

TROUBLESHOOTING EXAMPLE



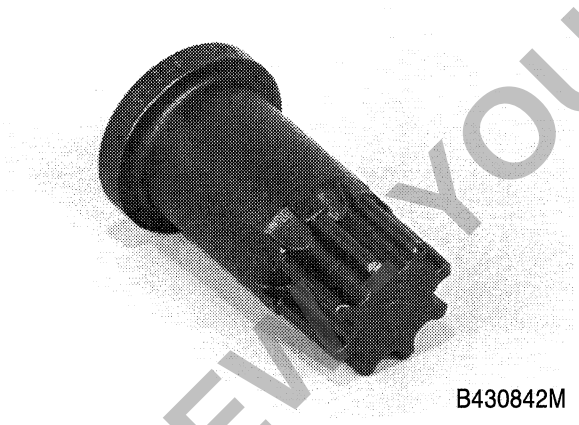
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SPECIFICATIONS

Cooling system capacity	5 U.S. gallons (18.9 litres)
Special torques	
Bolts that hold the engine mounts to the frame	195 to 231 pound-feet (264 to 313 Nm)
Cap screws that hold the rear engine mounts to the engine	71 to 83 pound-feet (96 to 112 Nm)
Cap screws that hold the front engine mounts to the engine	71 to 83 pound-feet (96 to 112 Nm)
Cap screws that hold the fan and the spacer to the engine	38 to 45 pound-feet (51 to 61 Nm)
Cap screws that hold the hydraulic pump to the flywheel housing	48 to 56 pound-feet (65 to 76 Nm)
Weight of the hydraulic pump	201 pounds (91 kg)
Weight of the engine	772 pounds (350 kg)

SPECIAL TOOLS



B430842M

CAS-1690 Tool used to rotate the flywheel.

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NOTE: The J I Case Company reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

SPECIFICATIONS

Cooling System capacity ..... 5 U.S. gallons (18.9 litres)

Special torques

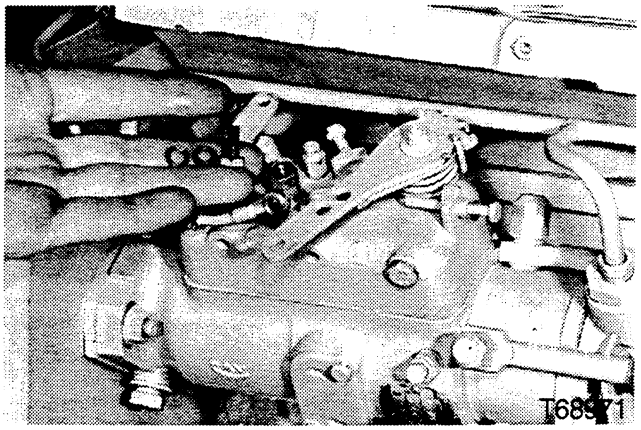
Cap screws that hold the fan and spacer to the engine ..... 38 to 45 pound-feet (51 to 61 Nm)

Weight of the radiator ..... 117 pounds (53 kg)

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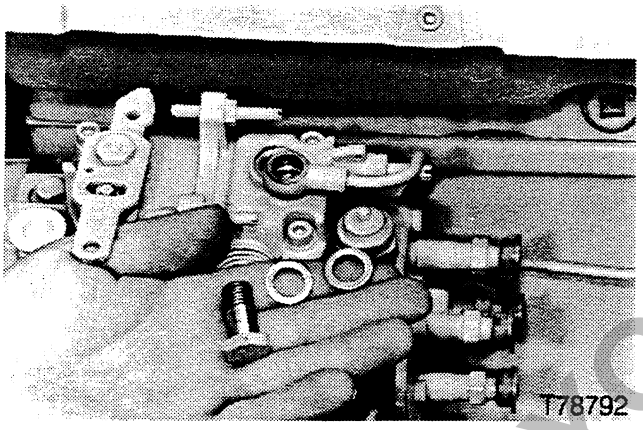
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STEP 13 CAV INJECTION PUMP



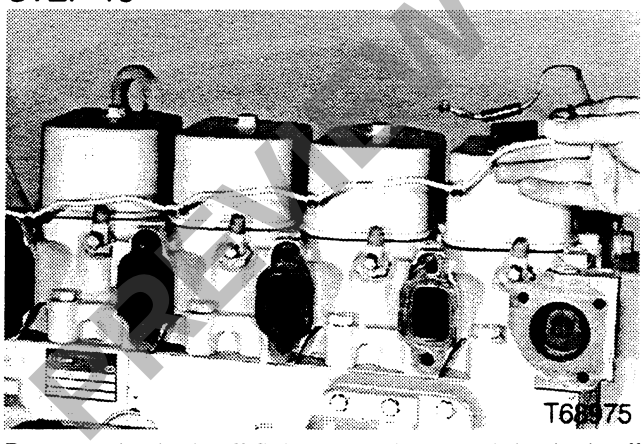
Remove the leak off fitting and gasket.

STEP 14 BOSCH INJECTION PUMP



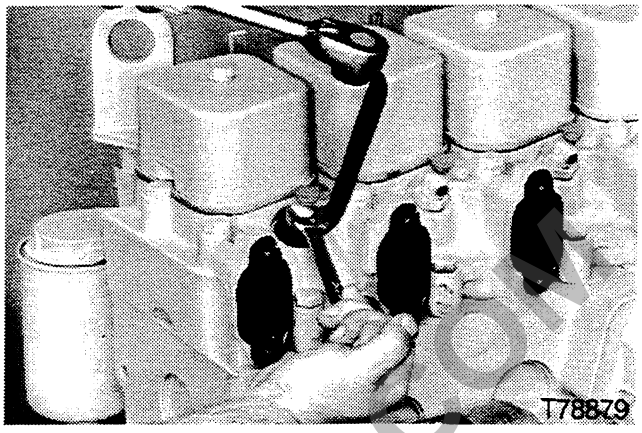
Remove the leak off fitting and gaskets.

STEP 15



Remove the leak off fittings, gaskets and the leak off line.

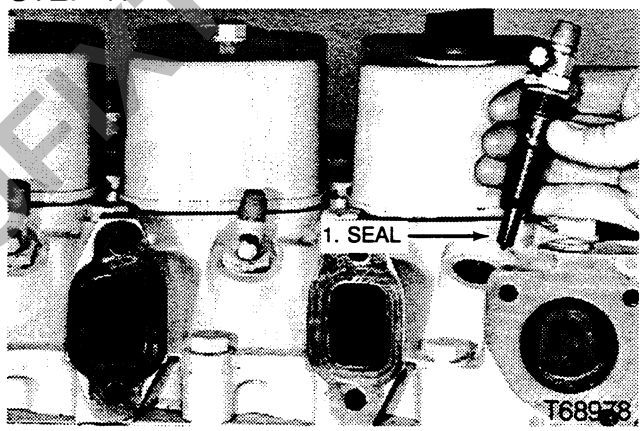
STEP 16



Loosen the nut on the injectors.

NOTE: *The injector must not rotate in the bore of the cylinder head. This will damage the cylinder head.*

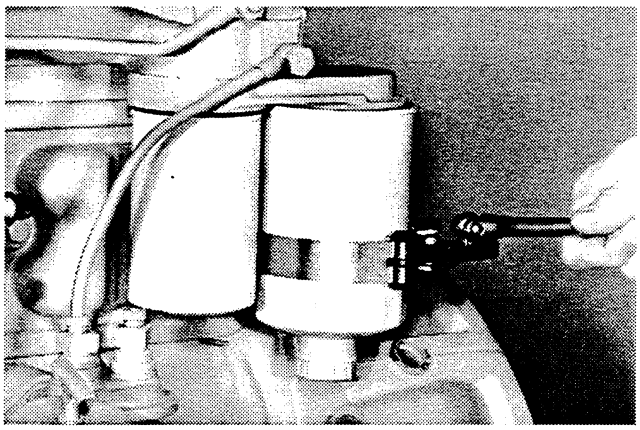
STEP 17



Remove the injectors from the cylinder head.

NOTE: *Make sure the injector seal is removed from the cylinder head.*

STEP 18



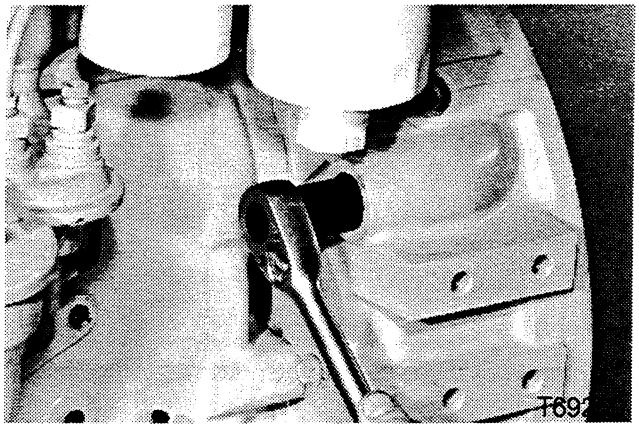
Use a strap type wrench to remove the fuel filters.

NOTE: *Some engines have a single fuel filter.*

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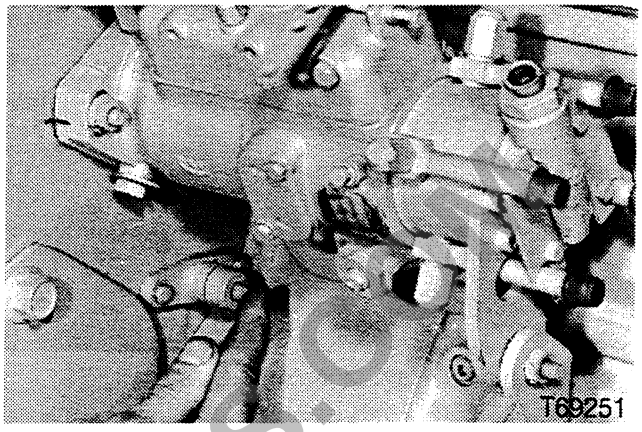
LOCATING TOP CENTER

STEP 98



Install the engine rotating tool into the flywheel housing. Rotate the engine four revolutions to make sure the push rods are seated correctly.

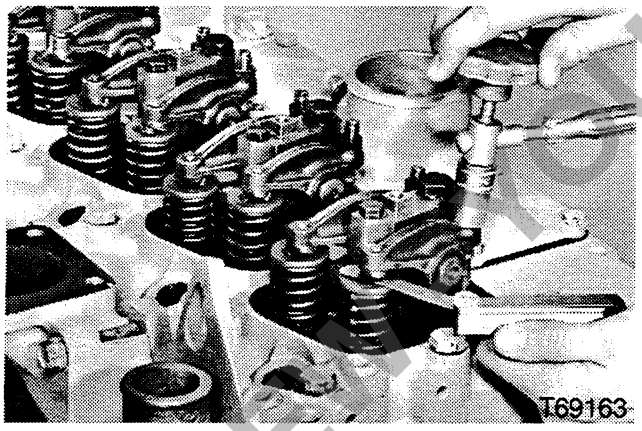
STEP 99



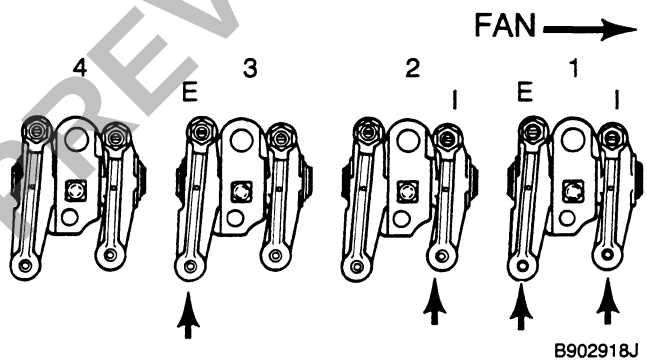
While turning the engine, push the lock pin in. When the lock pin moves into the camshaft gear the engine will be at top center.

ADJUSTING THE ROCKER ARM TO VALVE CLEARANCE
Cold Setting

STEP 100



Check and adjust the intake and exhaust valves as the arrows show below.

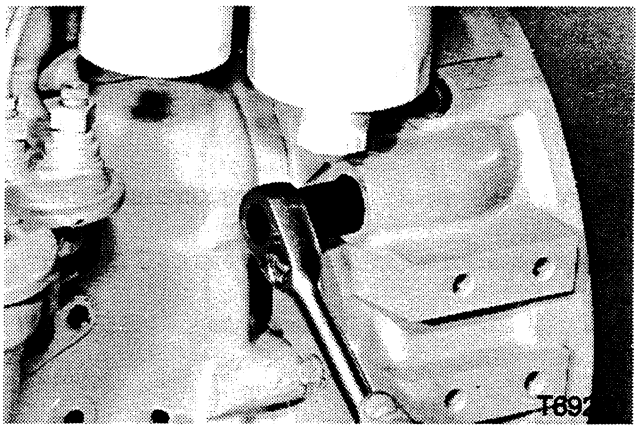


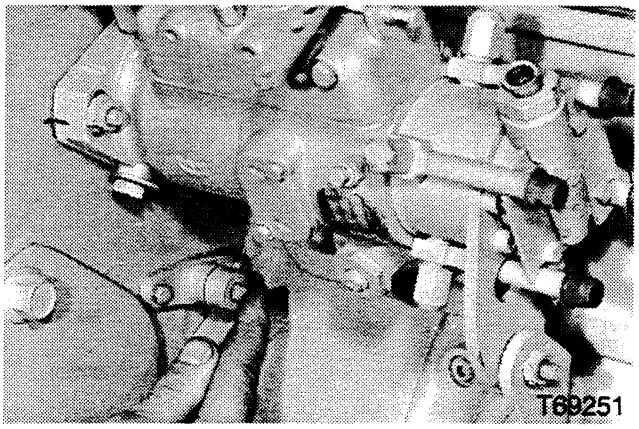
Number one cylinder top center compression stroke.

Valve Clearance, Cold: Intake Valves - 0.254 mm

Exhaust Valves - 0.508 mm

STEP 101

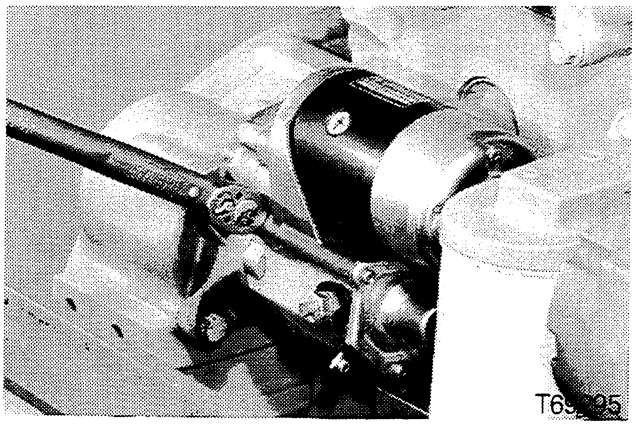




Install the engine rotating tool. Move the engine a small amount in each direction. Pull the lock pin out.

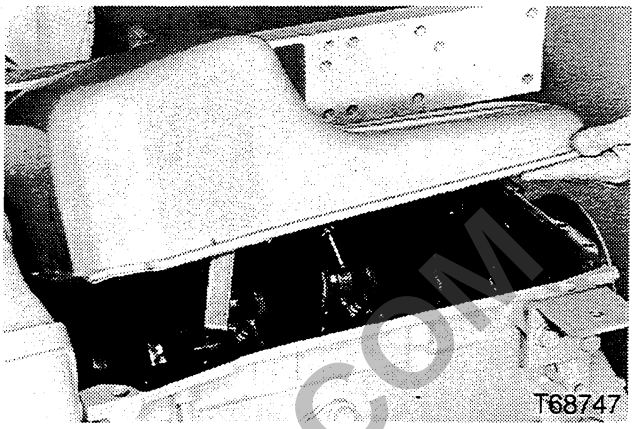
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STEP 74



Install the starter bolts and tighten the bolts to a torque of 39 to 47 Nm.

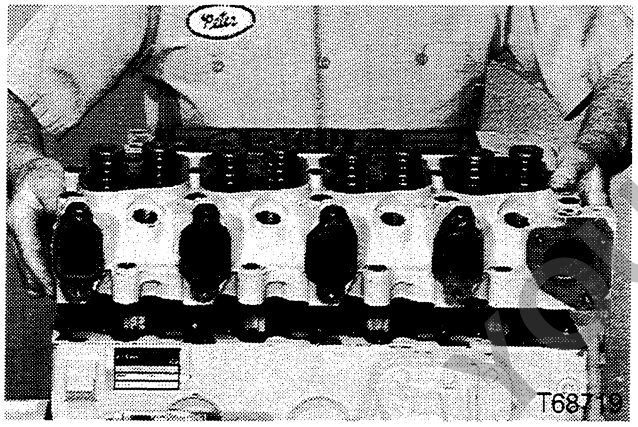
STEP 75



Install the engine oil pan. See Section 2445 in the service manual for oil pan installation.

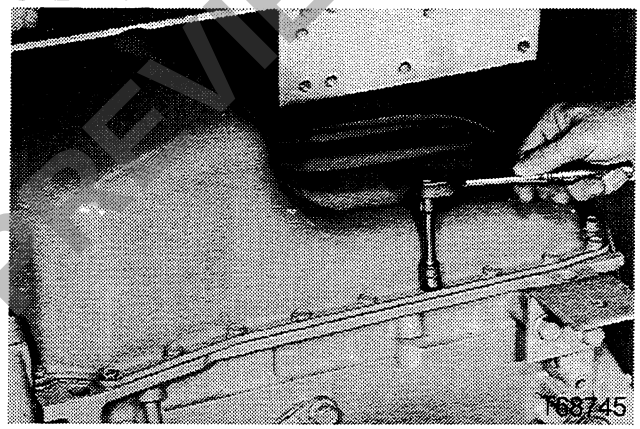
REMOVAL OF PISTONS AND RODS

STEP 76



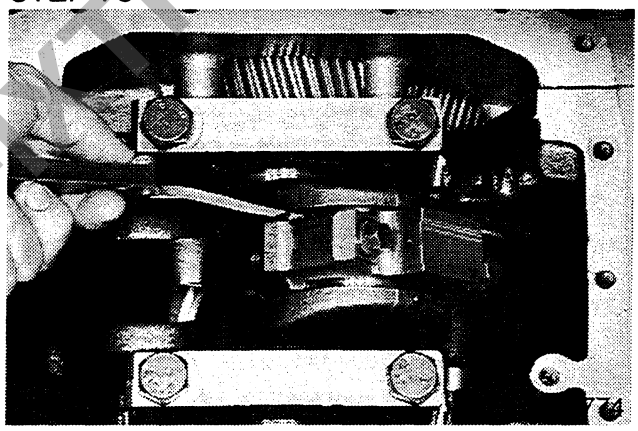
Remove the manifolds and cylinder head from the engine. See Section 2415 of the service manual for removal.

STEP 77



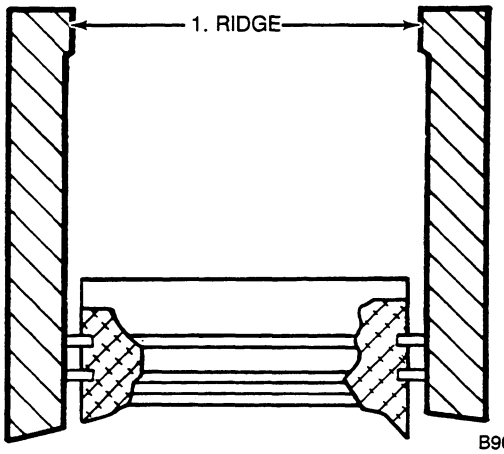
Remove the engine oil pan and inlet tube. See Section 2445 of the service manual for removal.

STEP 78



Check the side clearance of the piston connecting rods. Replace the connecting rods if the side clearance is more than 0.330 mm.

STEP 79



Remove the carbon from the top of the cylinder walls. Check the cylinder walls for a ridge at the top of the ring movement zone. A ridge will cause damage to the piston when the piston is removed. A ridge will have to be removed with a ridge reamer.

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CRANKSHAFT RECONDITIONING

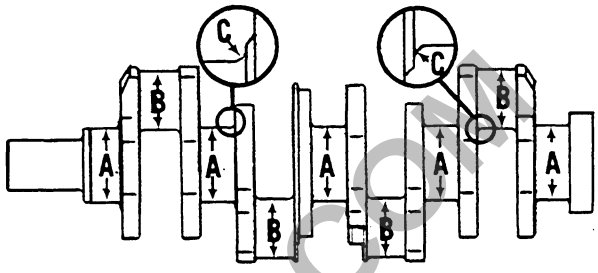
See crankshaft inspection on Page 46. If the crankshaft is worn or damaged, it is recommended that you have a qualified engine shop regrind the crankshaft according to the following instructions.

There are two hardening methods used to harden the journals of the crankshaft. One hardening process is induction hardening which hardens the journals to a depth of 2.00 mm. The other hardening process is deep nitroc which is a gas nitriding process. This hardening process hardens the journals to a very shallow depth. Any time you grind a journal on a crankshaft that has been deep nitroc hardened, you must reharden the crankshaft.

Crankshafts hardened by the deep nitroc process are stamped with the letter "N" on the pulley end (nose) of the crankshaft. Induction hardened crankshafts are not identified.

Grinding a Crankshaft

Grind the crankshaft to the following specifications:



A = Main Bearing Journals

Standard diameter	82.987 to 83.013 mm
0.25 mm undersize diameter	82.737 to 82.763 mm
0.50 mm undersize diameter	82.487 to 82.513 mm
0.75 mm undersize diameter	82.237 to 82.263 mm
1.00 mm undersize diameter	81.987 to 82.013 mm

B = Connecting Rod Journals

Standard diameter	68.987 to 69.013 mm
0.25 mm undersize diameter	68.737 to 68.763 mm
0.50 mm undersize diameter	68.487 to 68.513 mm
0.75 mm undersize diameter	68.237 to 68.263 mm
1.00 mm undersize diameter	68.987 to 68.013 mm

C = 1.23 to 1.27 mm radius smoothly blended to the reground journal

Surface finish = 0.4 micrometers

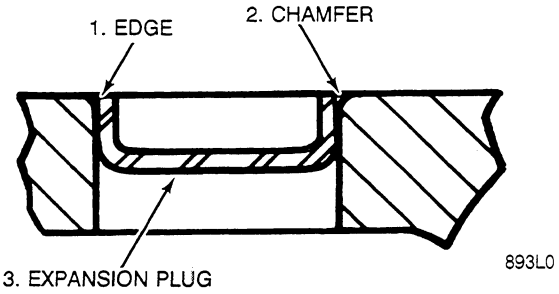
Crankshaft Rehardening

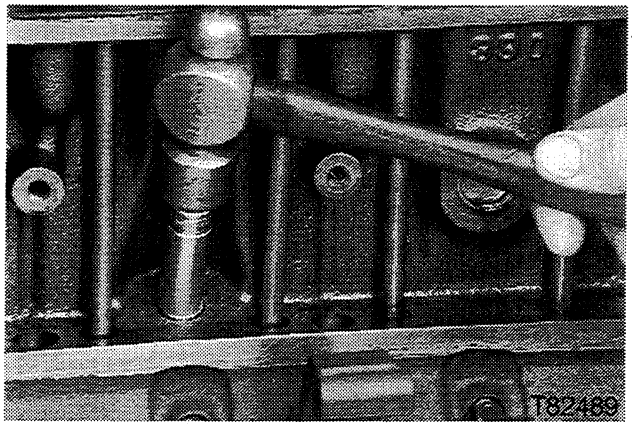
Remember that any time you grind a crankshaft that was hardened with the deep nitroc process, you must reharden the crankshaft. Reharden the crankshaft to a minimum hardness of 450 HV 0.2 Rockwell.

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STEP 320

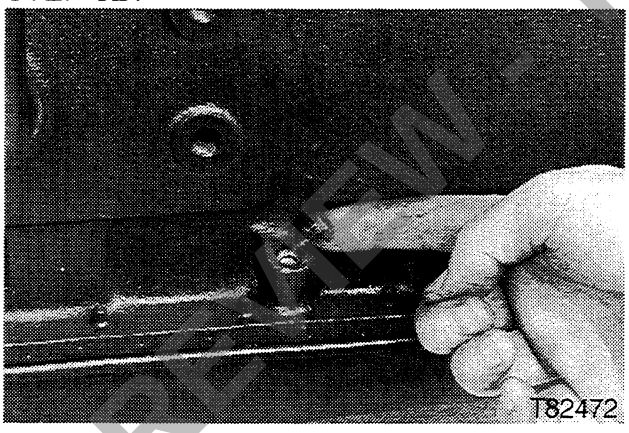




Install the expansion plug into the cylinder block until the top edge of the expansion plug is even with the bottom edge of the chamfer.

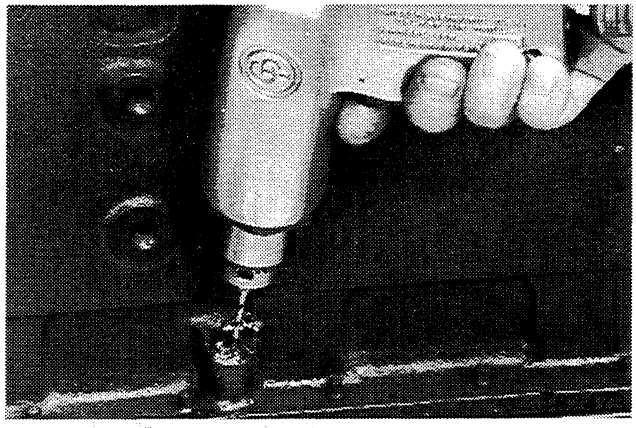
10 mm Expansion Plugs

STEP 321



Put a small amount of grease in the expansion plug.

STEP 322

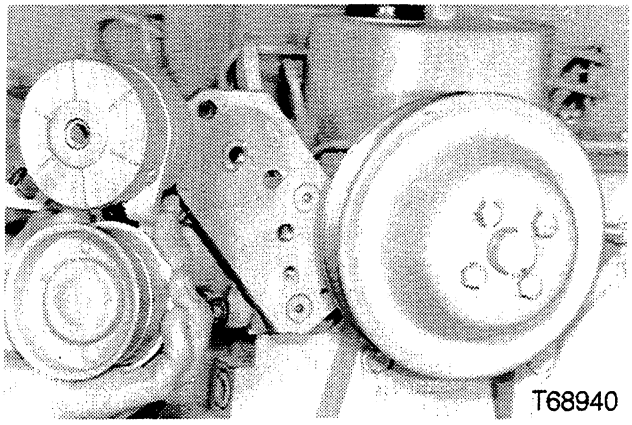


Drill a small hole in the center of the expansion plug.

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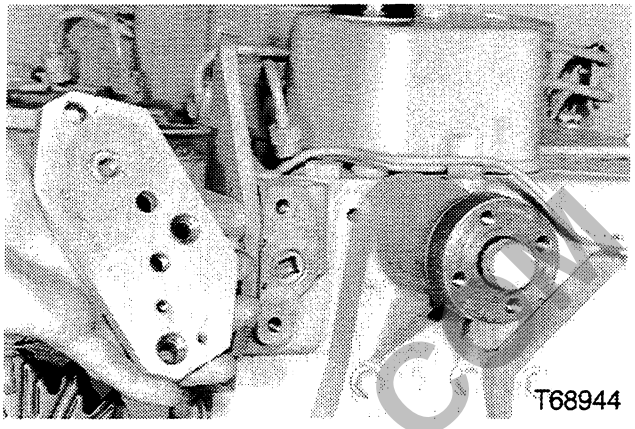
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STEP 36



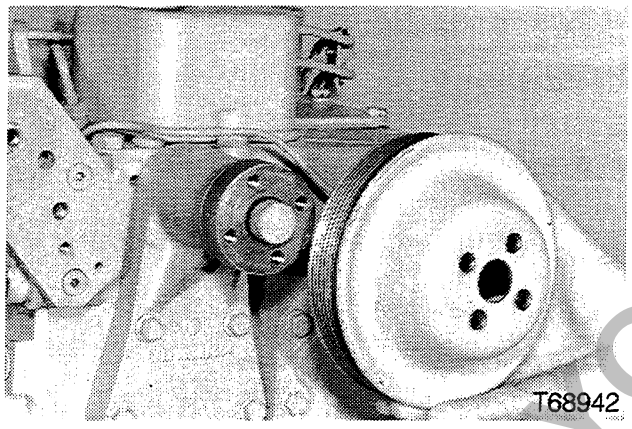
Remove the tensioner bolt and the belt tensioner.

STEP 38



Remove the belt tensioner bolts and the bracket.

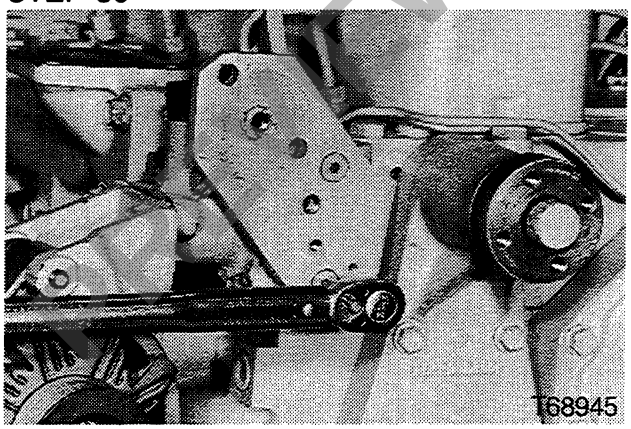
STEP 37



Remove the retaining bolts and fan belt pulley.

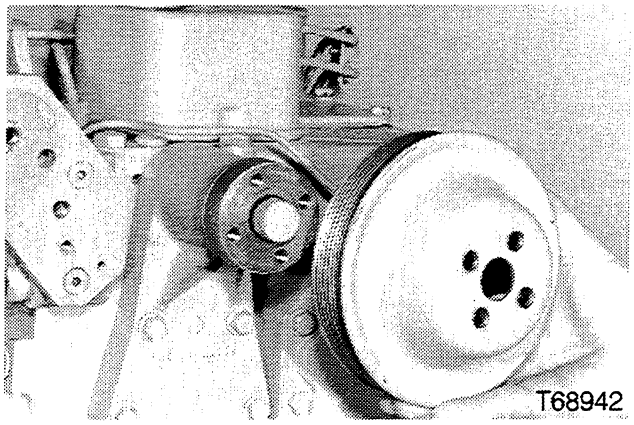
Installation

STEP 39



Install the tensioner bracket and tighten the Allen head bolts to a torque of 21 to 27 Nm.

STEP 40

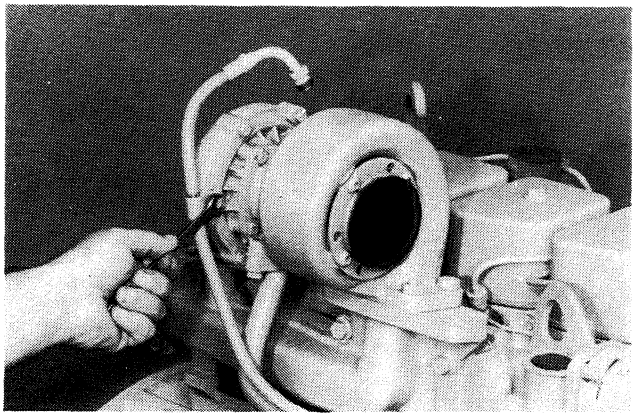


Install the fan belt pulley and retaining bolts.

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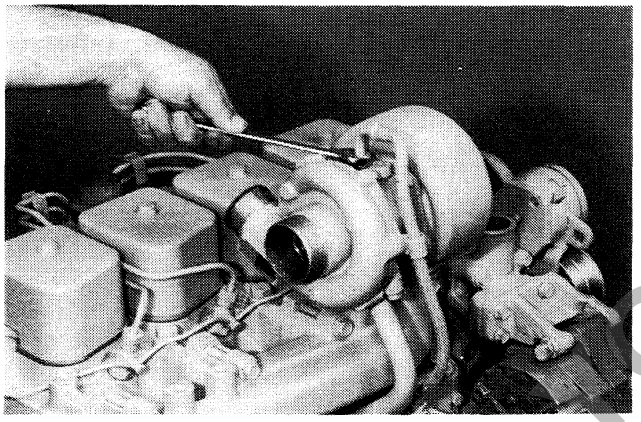
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STEP 98



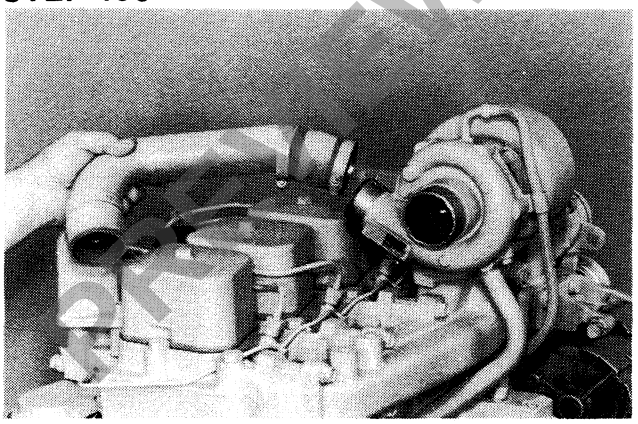
Install a tighten the bolt for the oil supply tube clamp.

STEP 99



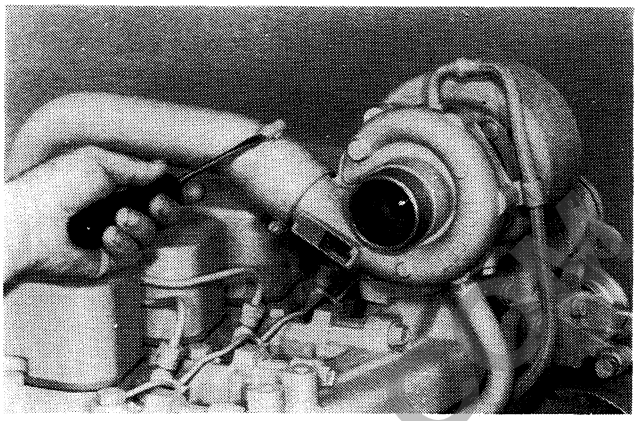
Connect and tighten the oil supply tube to the turbocharger.

STEP 100



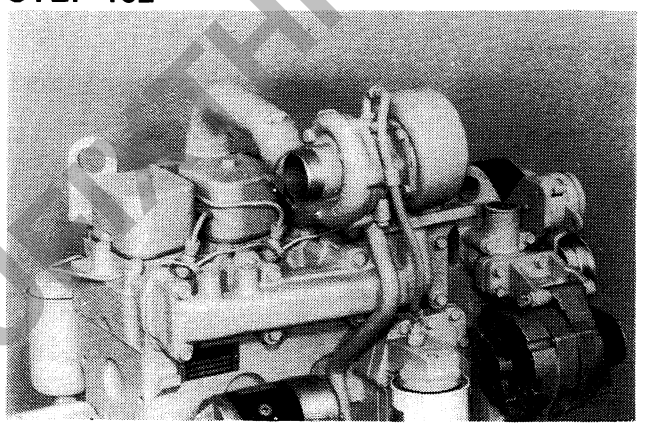
Install the air intake hose.

STEP 101



Install and tighten the air intake hose clamps.

STEP 102



Turbocharger installed on engine.

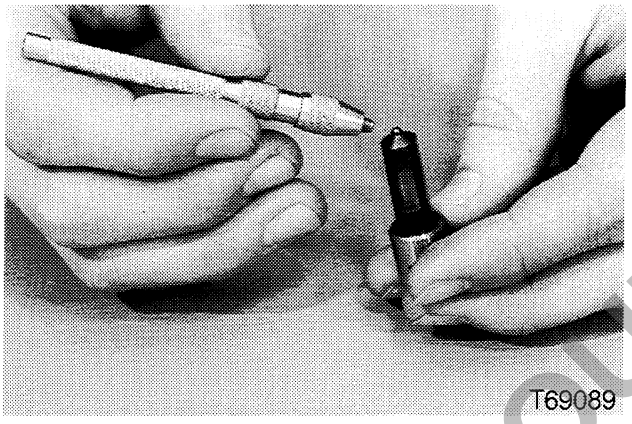
NOTE CASE CORPORATION reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

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Cleaning and Inspection

1. All parts must be put in a solvent to loosen the carbon deposits.

2. Use the Nozzle Cleaning Kit, OEM 1068, to clean the injectors. A brass wire brush must be used to clean the outside of the tip body. Use cleaning wires to remove the carbon from the spray orifices. Use cleaning wires that are 0.0127 to 0.0254 mm smaller in diameter than the spray orifice. Put the cleaning wire in a pin vise, the end of the wire must extend 0.79 mm past the tip of the pin vise. A longer length of pin will hit the opposite side of the sac hole and will break.


T69089

3. Use a stone to remove sharp edges from the end of the wire. A small flat on one side of the wire will make it easier to cut the carbon from the orifice. Put the cleaning wire in the spray orifice and turn the wire until the wire is free. Wash the body with clean solvent and look at the tip. The nozzle tip must be replaced if the orifice in the tip shows damage at the edges. Damage to the orifice will change the spray pattern.


T69090

4. Clean all channels with compressed air. Direct the air through both ends of the nozzle tip assembly. All Carbon deposits must be removed.


T69088

5. Make sure that the nozzle valve slides freely in the nozzle body.

6. Carefully clean the nozzle valve and the inside diameter of the body to remove all dirt, varnish and other foreign deposits.

7. The injector valve must be cleaned with a brush to remove deposits from the seat location. Varnish must be removed with a solvent and a cleaning pad made of felt. Do not put the valve in a motor driven lathe to clean the valve. This method can remove too much material from the valve which can change valve lift. Look at the valve for pitting or damage which can cause leakage.

8. Replace all parts that show damage.

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SECTION INDEX - ELECTRICAL

Section Title	Section Number
Electrical Specifications and Troubleshooting	4001
Electric Schematic Foldout	In Rear Pocket
Batteries	4002
Systems Display Panel	4005
Starter and Starter Solenoid	4006
Alternator	4009

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42 CONTROL LIMIT SWITCH (ATTACHMENT CONTROL SHUTOFF LIMIT SWITCH)

Check Points	Reading	Possible Cause of Bad Reading

NOTE: *Disconnect the connector from the control limit switch. Put the key switch in the ON position. Put the control rocker switch (attachment control rocker switch) in the UNLOCKED position, check for voltage at the connector.*

Terminal for violet 1 wire to ground.	24 volts	Bad circuit between the control limit switch and the control rocker switch (55). Also check the control rocker switch (55).
Terminal for violet 1 wire to terminal for violet wire.	24 volts	Bad circuit between the control limit switch and the attachment control switch solenoid (50) . Also check the attachment control switch solenoid (50) .

NOTE: *If the readings are good, replace the control limit switch.*

43 WIPER RELAY

44 WIPER INTERMITTENT RELAY

45 CUSHION HOLD-IN RELAY (ATTACHMENT CONTROL)

Check Points	Reading	Possible Cause of Bad Reading

NOTE: *Disconnect the connector from the cushion hold-in relay and check for voltage at the wiring side of the connector. Put the key switch in the ON position. Have another person hold the attachment cushion control switch in the CUSHIONED position.*

Terminal for sky blue wire to ground.	24 volts	Bad circuit between the cushion hold-in relay and the attachment cushion control switch (57). Also check the attachment cushion control switch (57).
Terminal for sky blue wire to terminal for black wire.	24 volts	Bad ground connection.

NOTE: *Have another person hold the attachment cushion control switch in the NORMAL position.*

Terminal for black/white wire to terminal for black wire.	24 volts	Bad circuit between the cushion hold-in relay and the cushion relay (46). Also check the cushion relay (46).

NOTE: *If the readings are good, replace the cushion hold-in relay.*

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8. Connect the leads of the remote starter switch to the battery terminal and the switch terminal on the starter solenoid.

NOTE: *Steps 9 through 11 must be done rapidly. Do not apply a load to the battery for more than 15 seconds at one time. After 15 seconds turn the load control to the* OFF *position for 60 seconds to allow the tester to cool.*

9. Actuate the remote starter switch and turn the load control until the voltmeter indicates 11 volts.

10. Look at the ammeter and make a record of the ammeter indication.

11. Use the hand held tachometer to check the armature shaft speed. Make a record of the armature shaft speed.

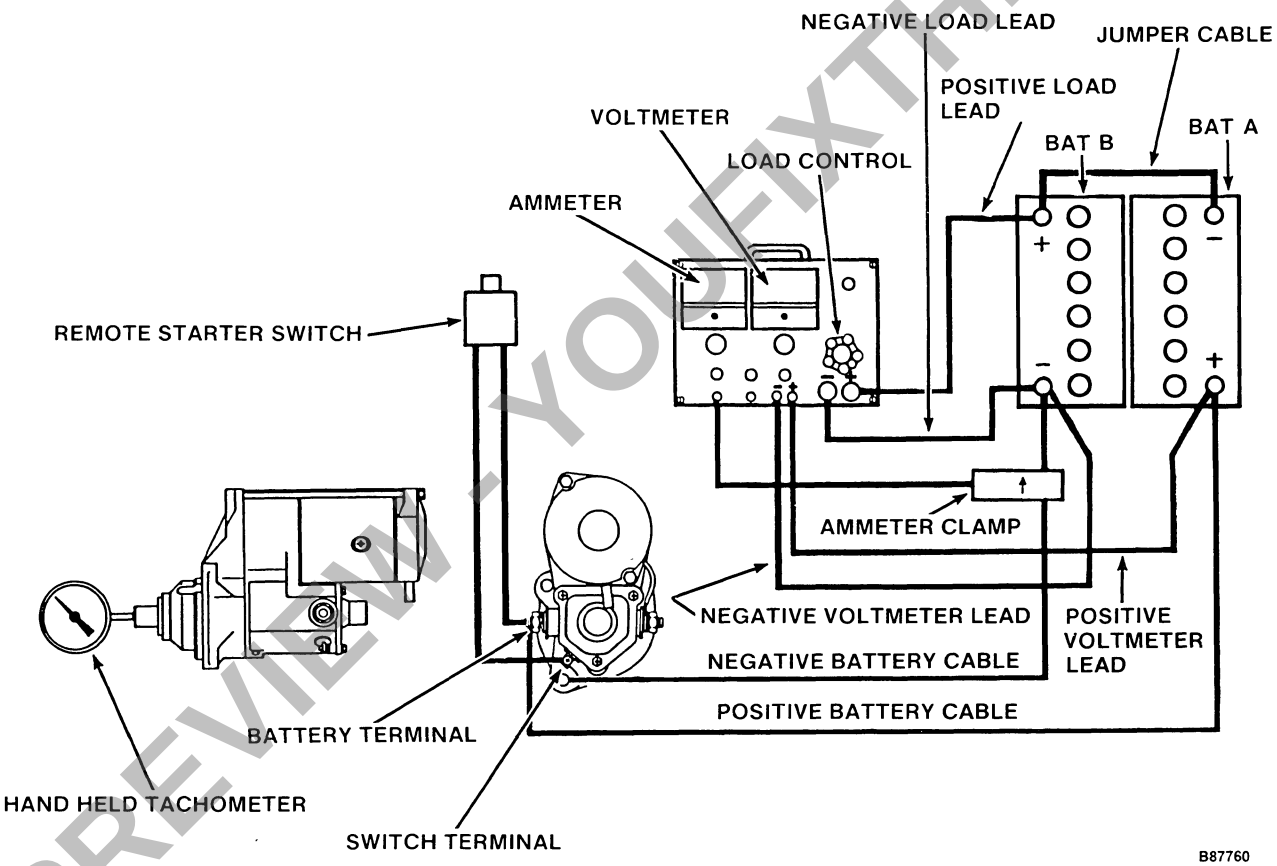
12. Release the remote starter switch and turn the load control to the OFF position.

13. Disconnect the negative battery cable from the starter.

14. Disconnect the remainder of the test connections.

15. See Understanding No-Load Test Result on page 4006-6.

Test Procedure, 24 Volt Starter



1. The following test procedure is for the use a Sun Electric VAT-33 tester. Other test equipment can be used. Connect the test equipment according to the instructions of the manufacturer of the equipment.

2. Fasten the starter in a vise or use another method to prevent the starter from moving.

3. Connect a jumper cable between the two batteries as shown in the illustration.

4. Connect the positive battery cable to the positive post of battery A and to the battery terminal of the starter solenoid.

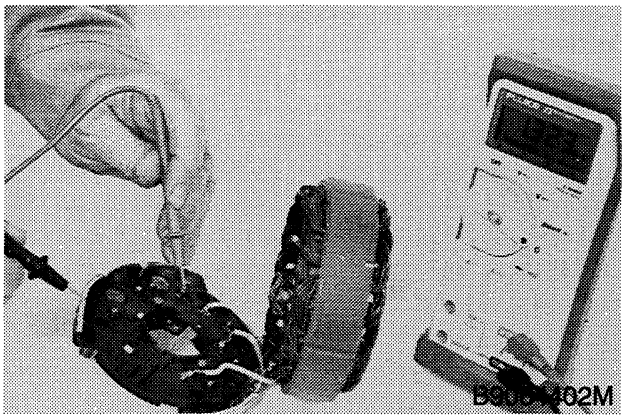
5. Connect the negative battery cable to the negative post of battery B and to the mounting flange on the starter.

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TESTING THE RECTIFIER BRIDGE

STEP 44



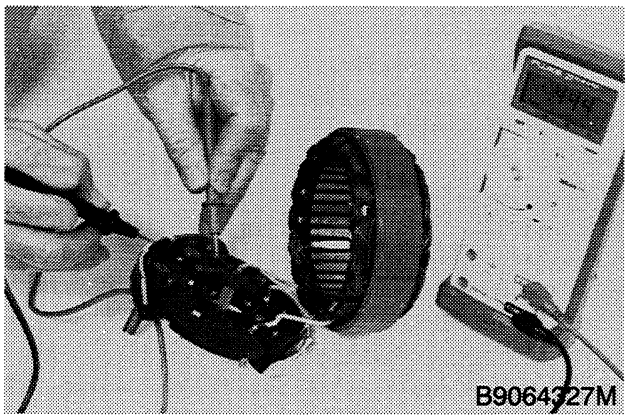
Touch the leads of the ohmmeter to a positive diode and the heat sink as shown. Then reverse the leads. There must be a high reading and a low or zero reading. Then test the other two positive diodes. If a positive diode did not have readings as specified, the positive diode is bad and a new rectifier bridge must be installed.

STEP 45



Touch the leads of the ohmmeter to a negative diode and the heat sink as shown. Then reverse the leads. There must be a high reading and a low or zero reading. Then test the other two negative diodes. If a negative diode did not have readings as specified, the negative diode is bad and a new rectifier bridge must be installed.

NOTE: *If the tester you are using has a diode test function, use the tester according to the instructions of the manufacturer to check the positive and negative diodes.*



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CARRIER ROLLER

Removal

1. Park the machine on a hard level surface.
2. See Track Tension in this section and do step 5 to make the track as loose as possible.
3. Connect the hand pump CAS-10219 to the ram CAS-10886 and install the ram between the track frame and the track. Operate the hand pump to lift the track from the carrier roller.
4. Remove the cap screws and hardened washers that hold the bracket for the carrier roller to the track frame.
5. Remove the carrier roller.

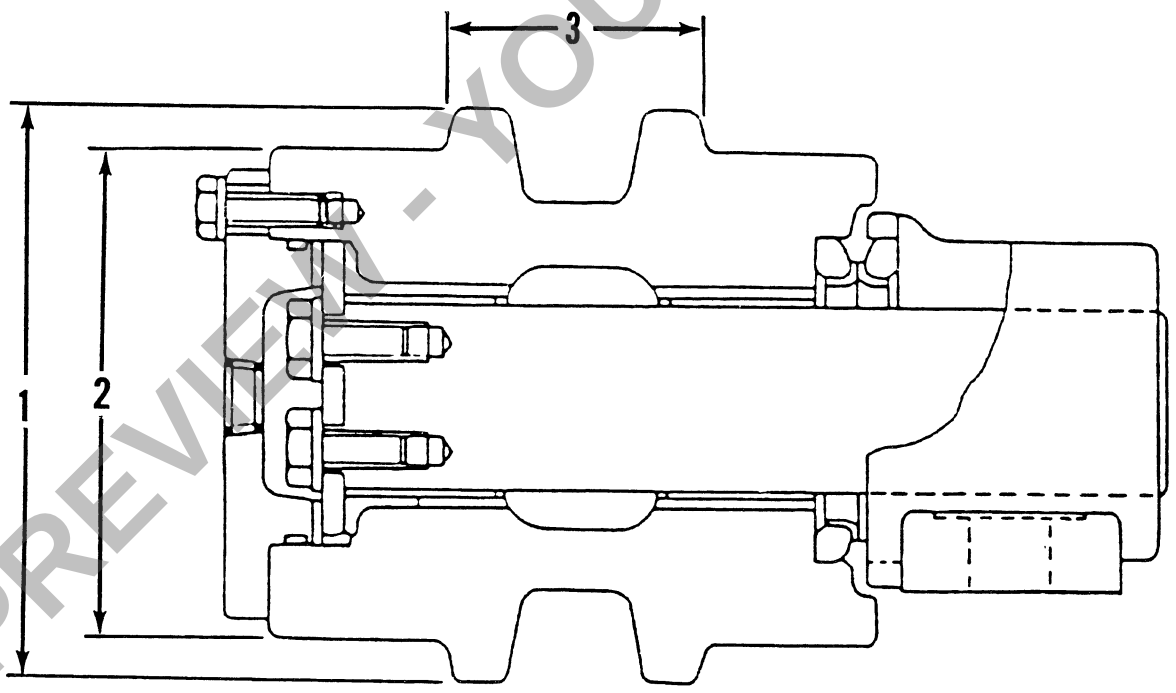
Installation

Installation is the reverse sequence of removal.

1. If necessary, replace the shim between the bracket for the carrier roller and the track frame.
2. Tighten the cap screws that hold the bracket for the carrier roller to the track frame to the torque specifications shown on page 3.
3. See Track Tension in this section and adjust the tension of the track.

Carrier Roller Reconditioning

When the carrier roller is worn to the limits shown, the carrier roller must be reconditioned or a new carrier roller installed. See the illustration for the reconditioning specifications.



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1. 5.20 Inches (132 mm) *2. 4.41 Inches (112 mm)* *3. 2.44 Inches (62 mm)*

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Section

8001

HYDRAULIC SPECIFICATIONS, TROUBLESHOOTING, AND PRESSURE CHECKS

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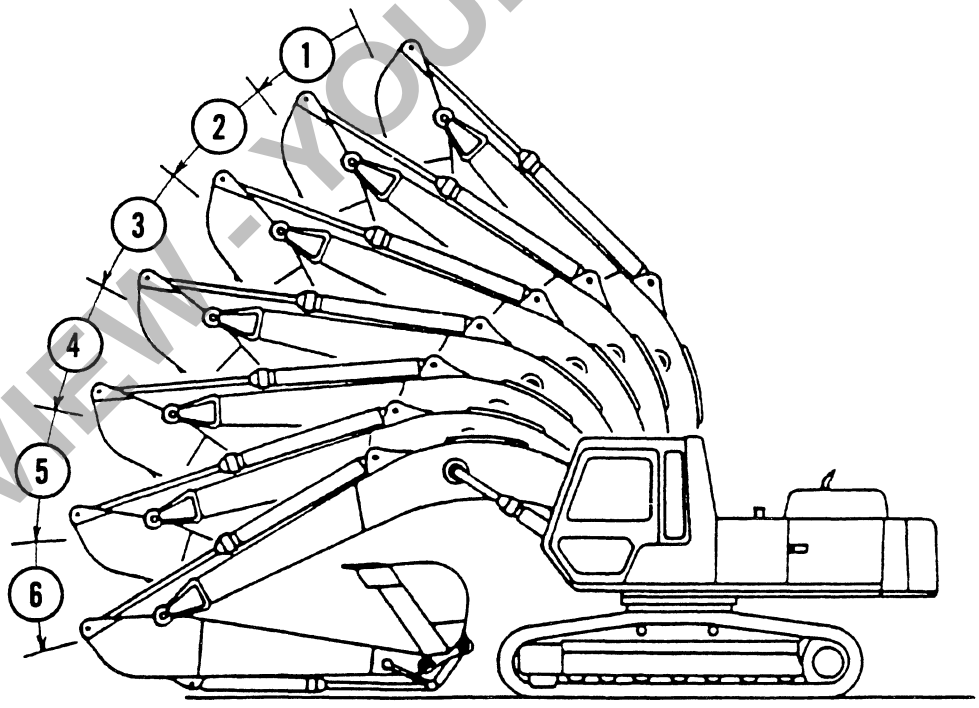
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CHECKING THE ACCUMULATOR

> **WARNING:** *The accumulator on this machine contains highly pressurized nitrogen gas. If the accumulator system does not work correctly, replace the accumulator. DO NOT try to repair the accumulator. Failure to follow these instructions and the procedure below can cause injury or death.*

The accumulator in this machine lets you lower the arm and boom to the ground if the engine stops running during operation. Use the following procedure to check the accumulator:

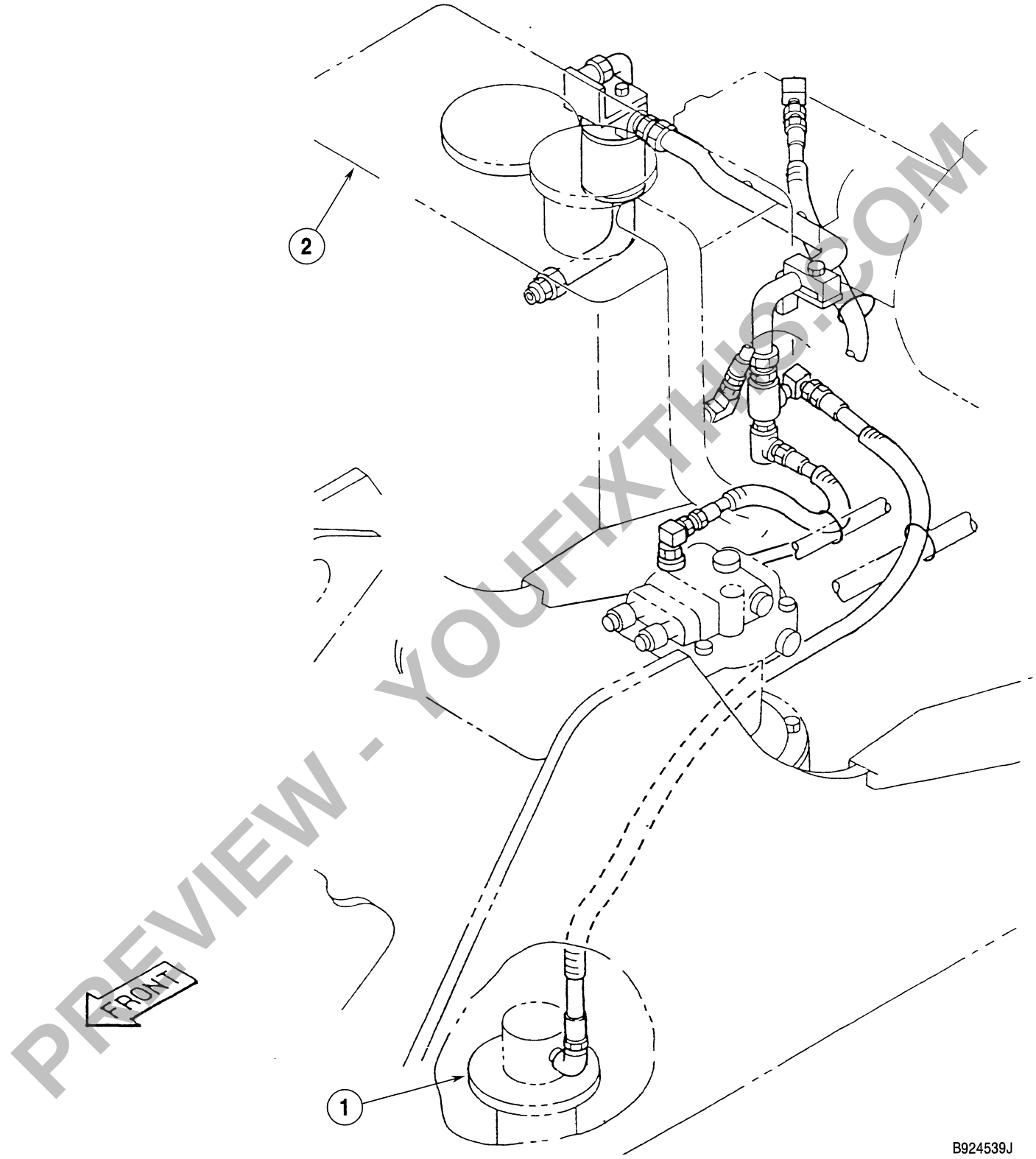
1. Clear the area of all persons and obstructions.
2. Start the engine. Raise the boom and arm to maximum height.
3. Stop the engine.
4. Turn the key switch to the ON position, but do not start the engine.
5. Refer to the following illustration. Use the boom control lever to lower the boom a small amount. Do this step at least six times.
   A. If the boom moves down three times or more, the accumulator is good.
   B. If the boom moves down less than two times, replace the accumulator.



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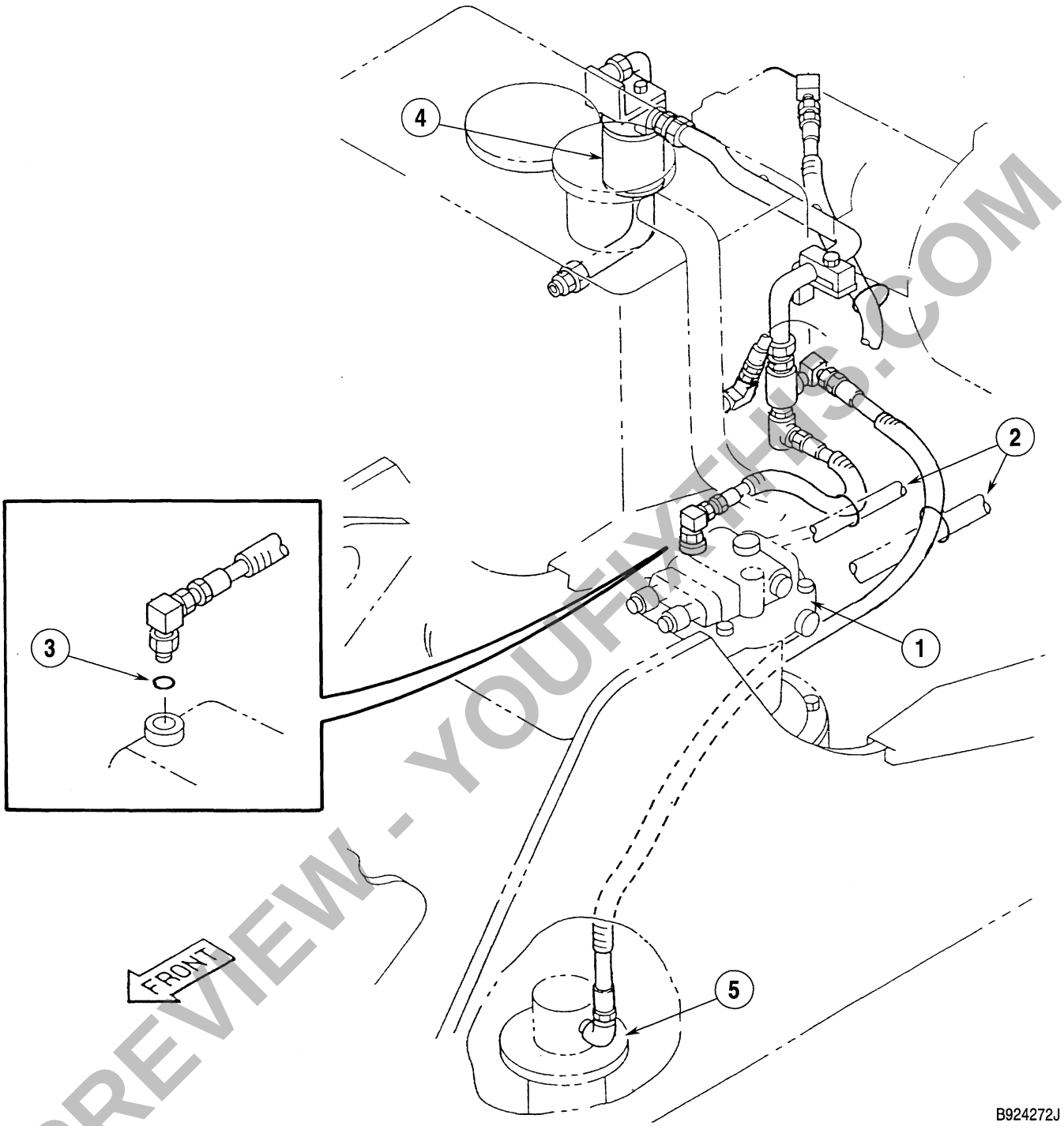


1. Hydraulic Swivel *2. Hydraulic Reservoir*

Hydraulic Swivel Drain Line Installation

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1. Swing Motor Assembly
2. To Main Control Valve
3. O-Ring
4. Oil Filter
5. Hydraulic Swivel

Swing Motor Hydraulic Installation

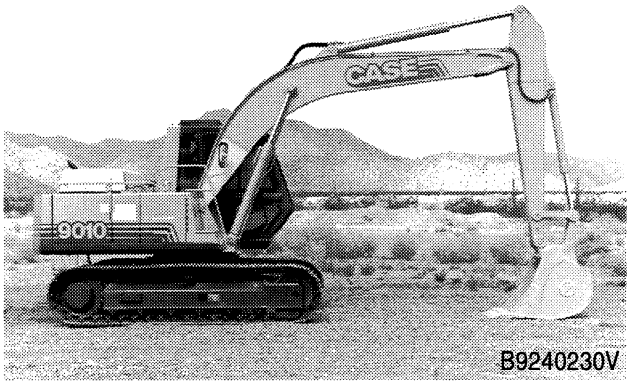
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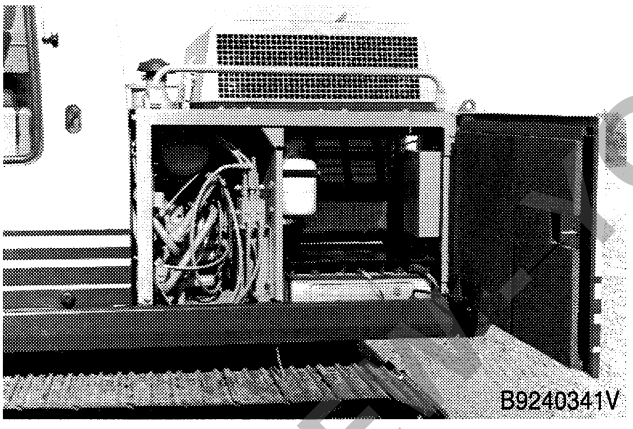
AUXILIARY CONTROL VALVE

Removal

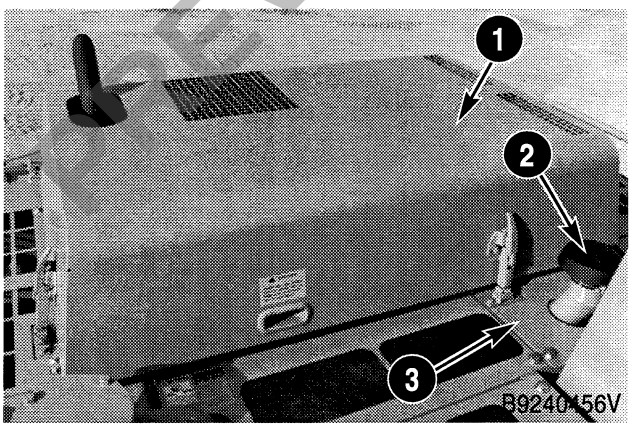
1. Park the machine on a hard level surface. Lower the tool to the floor and stop the engine.



2. Open the access door on the left hand side of the machine.

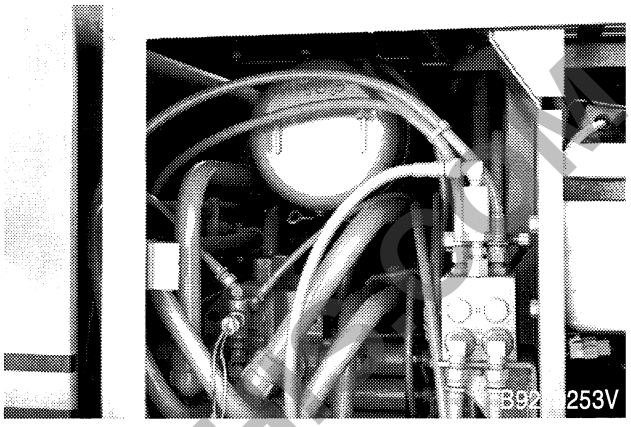


3. Open the access door over the engine. Remove the air cleaner cap and the cover over the air cleaner.



1. Access Door
2. Air Cleaner Cap
3. Cover

4. Remove the air cleaner and the mounting hardware for the air cleaner.



5. Clean the auxilary control valve and the area around the auxiliary control valve.

6. Drain the hydraulic reservoir. The hydraulic reservoir holds 21.9 U.S. gallons (320 litres).

7. Put identification tags on the tubes connected to the auxiliary control valve for correct assembly.

8. Disconnect the tubes from the auxiliary control valve. Remove the tubes from the auxiliary control valve as required so that the auxiliary control valve is free of obstructions. Install a plug in each tube and a cap on each fitting.

9. Disconnect the linkage from the spool for the auxiliary control valve.

10. Connect acceptable lifting equipment to the auxiliary control valve.

11. Remove the cap screws and hardened washers and shims that hold the auxiliary control valve to the frame.

12. Lift the auxiliary control valve and remove the auxiliary control valve from the machine.

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