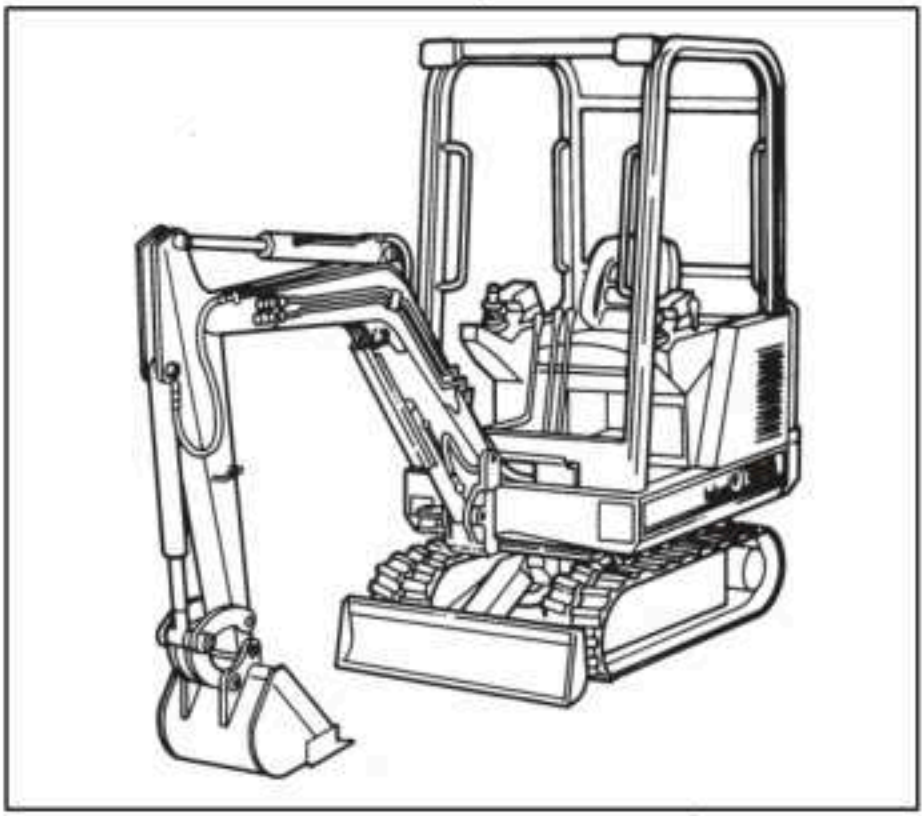
X 320

Excavator

Service Manual

(S/N 511720001 & Above)



MELROE
INGERSOLL-RAND

6722642 (4–94)

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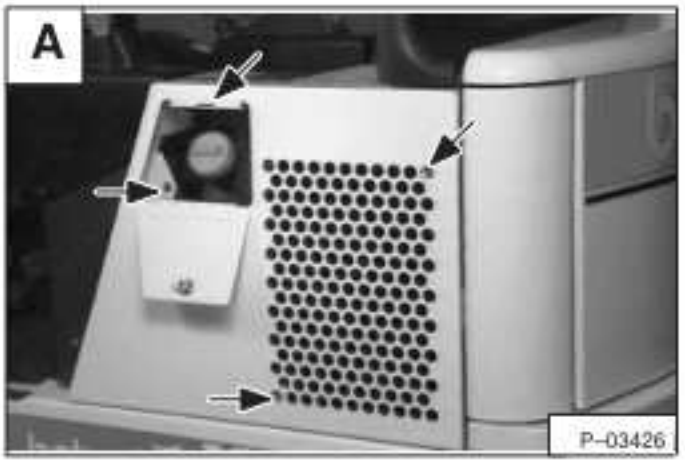
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Removal and Installation (Cont'd)

Remove the left hand side cover by opening the fuel fill door and removing the four bolts **[A]**.

Slide the cover out from the frame and remove.

Installation: Tighten the bolts to 14–18 ft.–lbs. (20–25 Nm) torque.



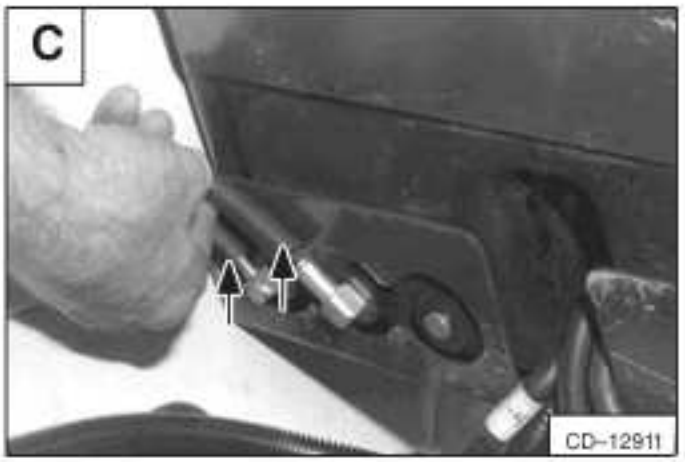
Remove the three bolts holding the control console to the frame and the front engine cover **[B]**.

Installation: Tighten the bolts to 29–37 ft.–lbs. (40–50 Nm) torque.

Tilt the top of the console out from the excavator.



Remove the two fuel hoses from the bottom of the fuel tank **[C]**.



Disconnect the two wire harnesses that go to the left hand control console **[D]**.



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Control Console Removal and Installation (Cont'd)

Loosen the jam nut on the engine shut off cable **[A]**.

Remove the cable from the control console.



Disconnect the wire harnesses going to the right console **[B]**.



Remove the three bolts holding the control console to the frame and the engine cover **[C]**.



Install a chain hoist to the top sides of the control console and lift the console from the excavator **[D]**.



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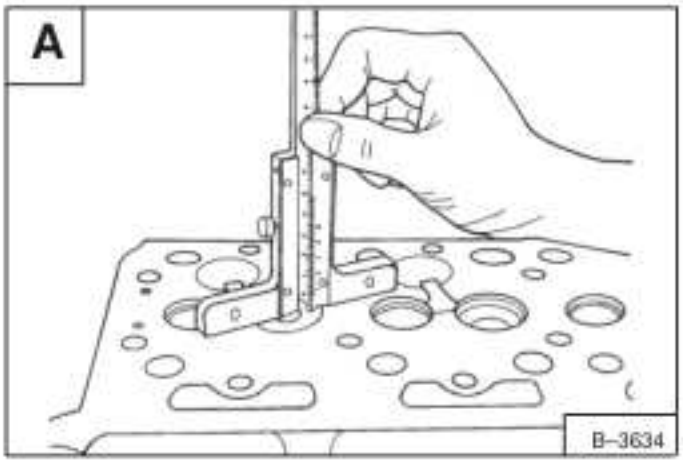
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Servicing the Cylinder Head and Valves (Cont'd)

Install the valve in the seat and check the depth **[A]**.

The specifications for the depth of the valves is 0.043–0.051" (1,09–1,30 mm).

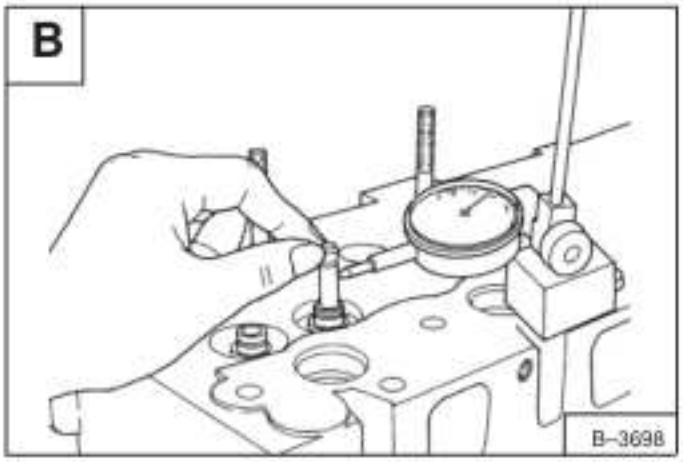
If the measurement is more than specifications, add the correct thickness of washer under the valve spring to keep the correct spring tension.



Clean the valve guide. Install the valve in the cylinder head. Install a dial indicator **[B]**.

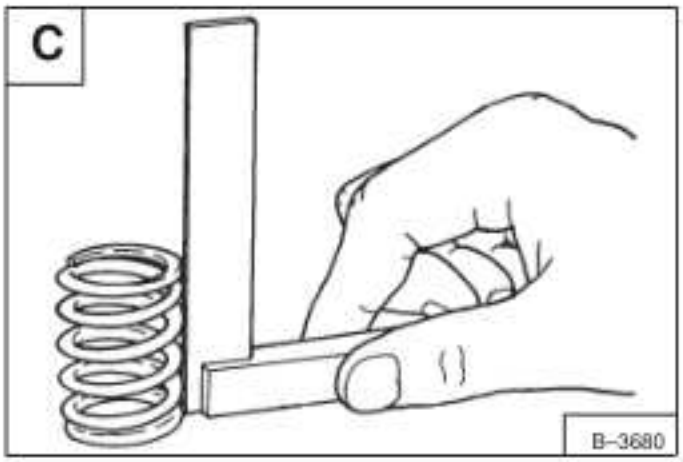
Measure the clearance of the valve guide and the valve. The measurement must be 0.0014–0.0026" (0,04–0,07 mm).

Replace the valve guide and valves as needed. Make sure to ream the inside diameter of the new guide to the correct dimension of 0.076–0.077" (7,01–7,04 mm).



Checking Valve Springs

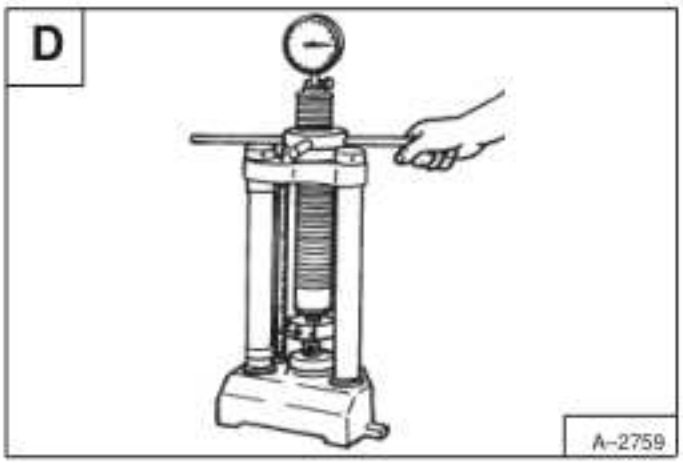
Measure the valve spring. The length of the spring must be 1.382–1.402" (35,1–35,6 mm). Check the valve spring with a square to make sure it is straight **[C]**.



Put the valve spring in a tester **[D]**.

Push down on the spring 1.22" (31 mm), the compression load must be 16.5 lbs. (7,5 kg.)

Replace the valve spring if it does not meet these specifications.



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HYDRAULIC SYSTEM OPERATION

To Be Used With

HYDRAULIC FLOW CHART

For Model

320 EXCAVATOR (S/N 20001 & Above)
(ISO & Standard)

Chart # 6722840 (Printed March 1994)

CHART LEGEND

1. **HYDRAULIC RESERVOIR** . . . 3.65 Gals. (Vented) (13.8L) (Tank Capcity)
2. **RESERVOIR FILL NECK SCREEN** (60 Mesh)
3. **HYDRAULIC RESERVOIR PLUG**
4. **HYDRAULIC FILTER ELEMENT** 10 Micron
5. **FILTER BY-PASS** . . . . . 25 PSI (172 kPa)
6. **HYDRAULIC PUMP** . Triple Section-Gear Pump: 3 x 4.00 GPM (15,1 L/min.), @ 2500 RPM
7. **SWING MOTOR**
8. **SWING MOTOR RELIEF VALVE** 1275 PSI (8971 kPa)
9. **HYDRAULIC CONTROL VALVE** 3 Section-Boom Swing and Blade Cylinders and Swing Motor
10. **MAIN RELIEF VALVE** (Three Spool Control Valve) . 2400 PSI (16552 kPa)
11. **LOAD CHECK VALVE** (Blade Cylinder)
12. **LOAD CHECK VALVE** (Boom Swing Cyl.)
13. **BUILD-UP VALVE** . . 200 PSI (1379 kPa)
14. **ACCUMULATOR**
15. **JOYSTICK MANIFOLD**
16. **JOYSTICK SUPPLY SOLENOID VALVE**
17. **PRESSURE REDUCING VALVE** 363 PSI (2500 kPa)
18. **L.H. JOYSTICK CONTROL**
19. **R.H. JOYSTICK CONTROL** (With Horn Switch)
20. **FRONT AUXILIARY HYDRAULICS**
21. **ARM CYLINDER**
22. **BOOM CYLINDER**
23. **BLADE CYLINDER**
24. **BUCKET CYLINDER**
25. **BOOM SWING CYLINDER**
26. **ONE-WAY RESTRICTOR** (2) .125" (3,18)
27. **HYDRAULIC CONTROL VALVE** 6 Section - R.H. Travel, Boom, Bucket Auxiliary, Arm and L.H. Travel
28. **MAIN RELIEF VALVE** (P1 Port) (6-spool Valve . . . . . 2400 PSI (16552 kPa)
29. **MAIN RELIEF VALVE** (P2 Port) (6-spool Valve . . . . . 2400 PSI (16552 kPa)
30. **PORT RELIEF VALVE** . . (Boom Cylinder) 3000 PSI (20690 kPa)
31. **PORT RELIEF VALVE** . . (Boom Cylinder) 3000 PSI (20690 kPa)
32. **PORT RELIEF VALVE** . (Bucket Cylinder) 3000 PSI (20690 kPa)
33. **PORT RELIEF VALVE** . . (Arm Cylinder) 3000 PSI (20690 kPa)
34. **PORT RELIEF VALVE** . . (Arm Cylinder) 3000 PSI (20690 kPa)
35. **OIL COOLER**
36. **DRAIN BLOCK**
37. **SCREEN FILTER - DRAIN BLOCK** 100 Mesh
38. **SWIVEL JOINT**
39. **RIGHT SIDE TRAVEL MOTOR**
40. **LEFT SIDE TRAVEL MOTOR**
41. **TRAVEL MOTOR BRAKE SPOOL**
42. **RESTRICTOR** . . . . . (2) .039" (1,0)

FLUID FLOW EXPLANATION

The fluid flows by gravity from the reservoir 1 to the 3 section hydraulic gear pump 6. The 3 section gear pumps are coupler driven from the engine. Each gear pump section is protected by a relief valve located in the control valve it supplies.

Fluid from the hydraulic pump 6 (Engine flywheel end) is forced to the pressure reducing valve 17 P2port and to the 6-spool hydraulic control valve 27 P2 port (Inlet). These valve sections control R.H. travel, Boom and Bucket.

Fluid from the center section hydraulic pump 6 is forced to the P2 port of the 6-spool hydraulic control valve 27. These valve sections control L.H. travel, Arm and Auxiliary. Adjustable relief valves 29 & 28 are located at each end of the 6-spool hydraulic control valve 27.

With all spools in the neutral position, the open center control valve allows fluid to flow to the oil cooler 35. When a spool is activated, the fluid flows to the base or rod end of a cylinder 21, 22 & 24. The fluid on the other side of the cylinder flows back to the 6-spool hydraulic control valve 27. When a cylinder reaches the end of the stroke the pressure increases to 2450 PSI (16897 kPa) and opens the relief valve 28 or 29. The fluid then flows through the 6-spool hydraulic control valve 27 internally and back to the oil cooler 35.

The 6-spool hydraulic control valve has Port Relief Valves in both ports of the Boom section 30 & 31, the Rod end of the Bucket section 32 and both ports of the Arm section 33 & 34.

The auxiliary spool is hollow, and while in neutral, fluid flows through the center of the spool to the tank port of the valve. When the auxiliary spool is activated two pump flows are combined to supply more fluid to the auxiliary quick couplers 20 mounted on the boom. The female coupler is pressure and the male coupler is return. The auxiliary fluid return flows through the 6-spool hydraulic control valve 27 internally and back to the oil cooler 35.

Fluid from the end cap section of the hydraulic pump 6 is forced to the pressure reducing valve 17 P1 port and to the 3-spool control 20 P1 port (Inlet). Fluid under pressure because of the buildup valve 13 is also directed to the joystick manifold 15 at 200 PSI (1379 kPa) to charge the accumulator 14. The accumulator stores fluid under pressure at 200 PSI (1379 kPa) to operate a joystick function if the engine stops.

The console lock-out microswitch is located in the left console of all excavators. If the excavator is equipped with the ROPS Canopy, and addition microswitch is used in the right console to lock-out the fluid flow to the joysticks if the console is raised to access the operators area. When the console(s) is lowered, the microswitch activates the joystick supply solenoid valve 16 and fluid is allowed to flow to the joysticks 18 and 19.

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