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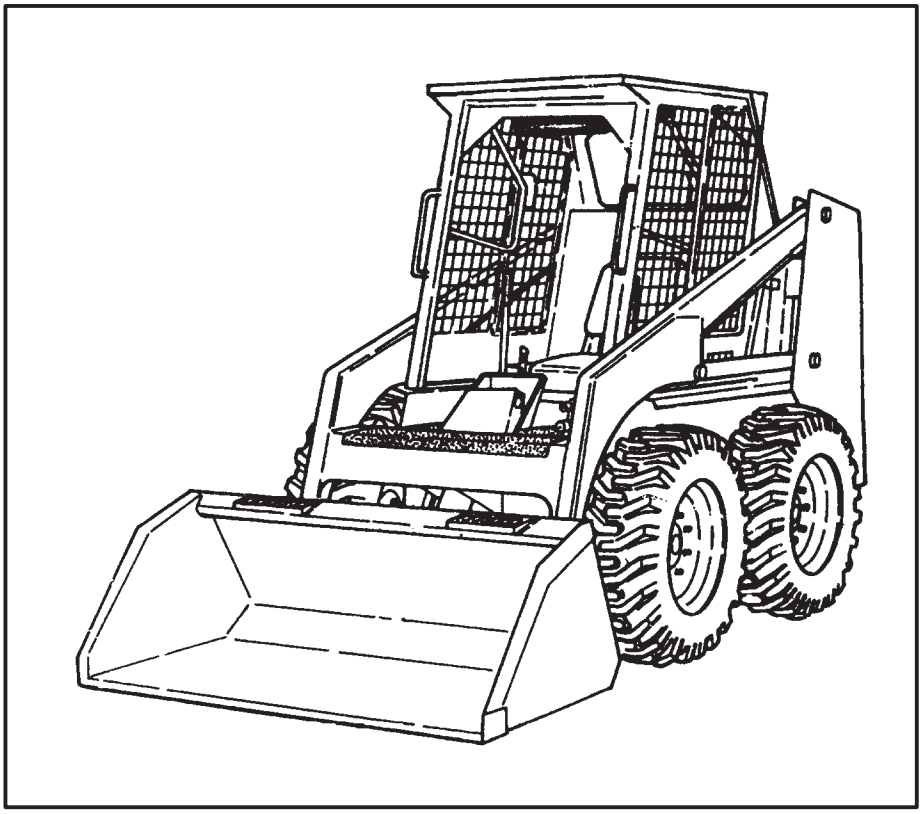
# Service Manual



MELROE
INGERSOLL-RAND

bobcat®

6566135 (10–86) Printed in U.S.A.

# 1–PREVENTIVE MAINTENANCE

## 1–1 INTRODUCTION

The Preventive Maintenance Section of this Service Manual gives general maintenance procedures for the Bobcat loader. The other sections of the Service Manual will give the detailed description needed for disassembly and assembly and when replacement parts are needed.

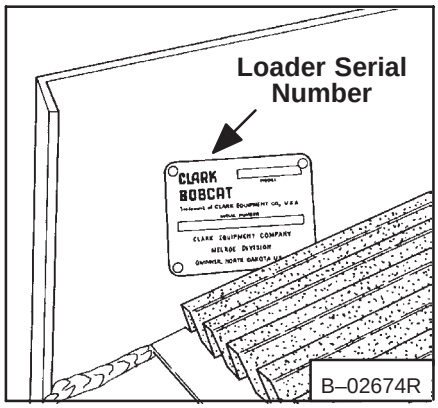


**Fig. 1–1** Loader Serial Number

### 1–1.1 Serial Number Identification

It is important to make correct reference to the Serial Number of the Bobcat loader and/or engine when making repairs or ordering parts. It is possible that the present loaders do not use all the same parts as the earlier loaders. It is possible that different procedures are used for service repair.

### 1–1.2 Loader Serial Number

The Bobcat loader serial number plate location is on the inside of the left upright, above the grill (Fig. 1–1).

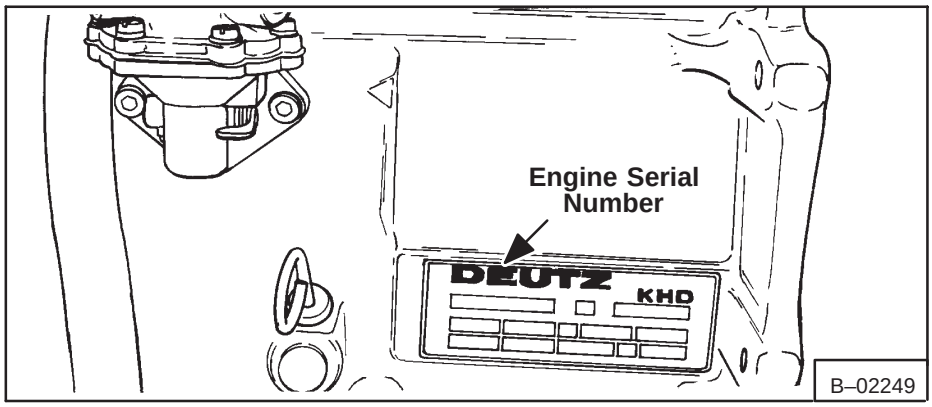
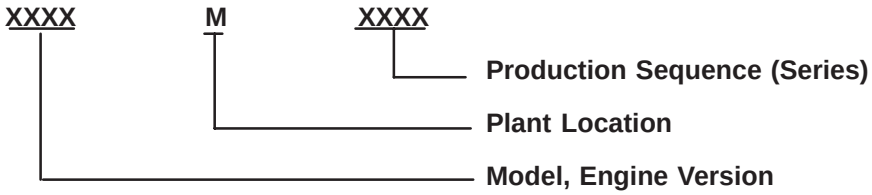


**Fig. 1–2** (641) Engine Serial Number

Explanation of the Serial Number:




### 1–1.3 Engine Serial Number

**641 Deutz:** (Fig. 1–2) The engine serial number location is on the right side of the cylinder block. Use all the numbers when ordering parts for this engine.

**642 Ford:** (Fig. 1–3) The engine serial number location is on the right side of the valve cover. Use all the numbers when ordering parts for this engine.

**643 Kubota:** (Fig. 1–4) The engine serial number location is on the left side above the speed control arm. Use all the numbers when ordering parts for this engine.

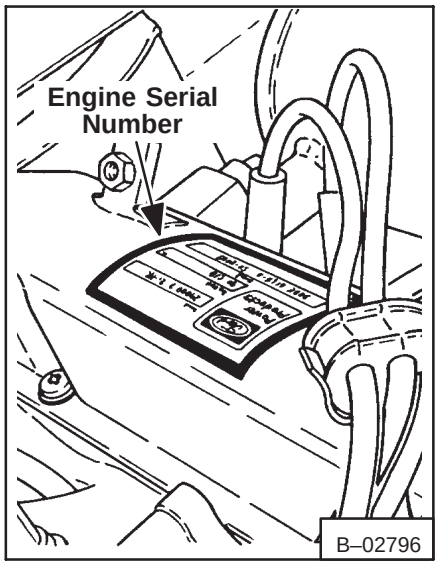


**Fig. 1–3** (642) Engine Serial Number

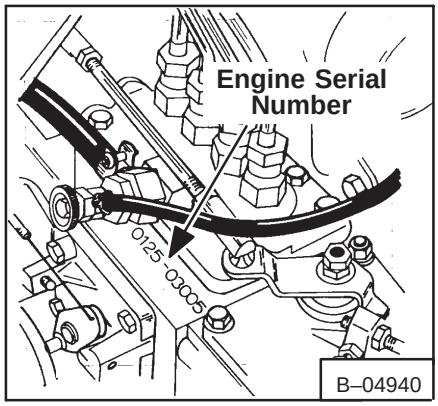


**Fig. 1–4** (643) Engine Serial Number

### 1–5.1 Removing Coolant From The Cooling System

To remove coolant (642):

**⚠ WARNING**

**Do not remove radiator cap when the engine is hot. You can be seriously burned.**

**W–2070–1285**

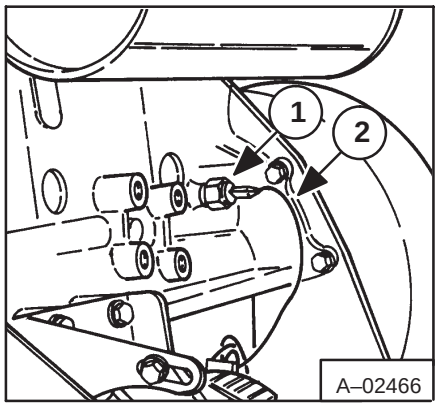



**Fig. 1–27** Sender Switch (642)

1. Put a funnel under the temperature sender switch (Fig. 1–27, Item 1) to keep coolant from getting into the engine compartment.
2. Remove the grill (Fig. 1–28, Item 1).
3. Remove the radiator cap (Fig. 1–28, Item 2). The grill must be removed to do this.
4. Remove the wire (Fig. 1–27, Item 2) connected to the sender switch. Remove the sender switch (Fig. 1–27, Item 1).

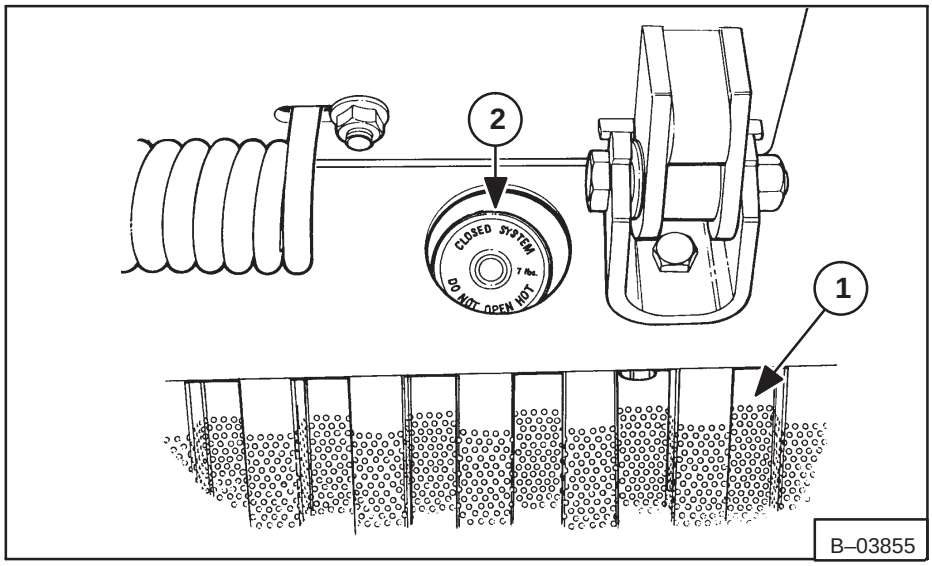



**Fig. 1–28** Grill And Radiator Cap

To fill the cooling system (642):

1. Install the sender switch (Fig. 1–27, Item 1).
2. Connect the wire (Fig. 1–27, Item 2) to the sender switch.
3. Premix 50% water and 50% anti–freeze in a separate container (See Paragraph 8B–1.8, Page 8B–2 for capacity).
4. Fill the radiator with the mixed coolant and install the radiator cap.
5. Install the grill (Fig. 1–28, Item 1).
6. Fill the coolant recovery tank 1/3 full.

**NOTE: Protect the cooling system from freezing temperatures and overheating by adding premixed 50/50 ethylene glycol and water to the system.**

To remove coolant from the cooling system (643):

**⚠ WARNING**

**Do not remove radiator cap when the engine is hot. You can be seriously burned.**

**W–2070–1285**

The valve to remove the coolant is on the left side of the engine block (Fig. 1–29).

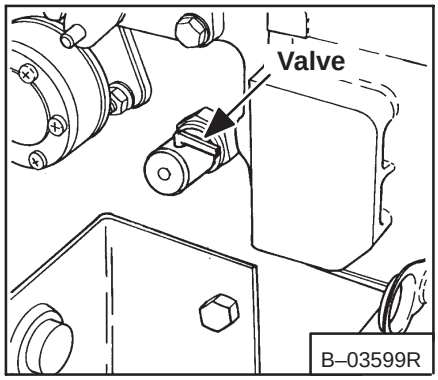



**Fig. 1–29** Valve For Removing Coolant (643)

**Revised Dec. 83**

## SPARK ARRESTOR MUFFLER

The spark arrestor muffler must be cleaned every 100 hours. Wear safety goggles.

**⚠ WARNING**

**Stop engine and allow the muffler to cool before cleaning the spark chamber. Wear safety goggles. Failure to obey can cause serious injury.**

**W–2011–1285**

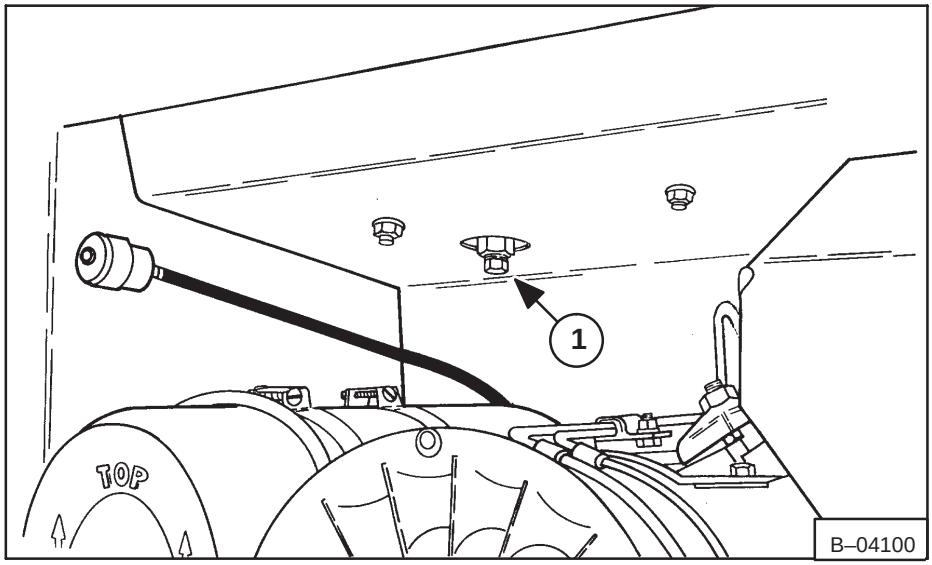



**Fig. 1–59** Spark Arrestor Muffler (641)

1. Stop the engine.
2. Open the rear door.
3. Remove the plug at the bottom of the muffler (641, Fig. 1–59, Item 1) (642, Fig. 1–60, Item 1) (643, Fig. 1–61, Item 1).

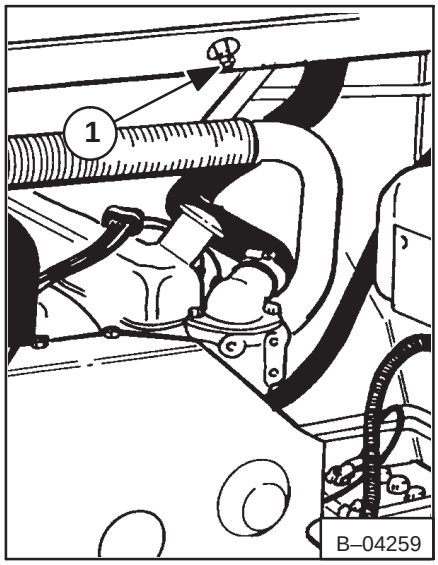



**Fig. 1–60** Spark Arrestor Muffler (642)

**⚠ WARNING**

**DO NOT run the engine in an area that has materials that can cause combustion. Wear safety goggles.**

**W–2309–0398**

4. Hold a block of wood over the outlet of the muffler.
5. Start the engine and run it for about 10 seconds.
6. Stop the engine and install the plug.
7. Close the rear door.

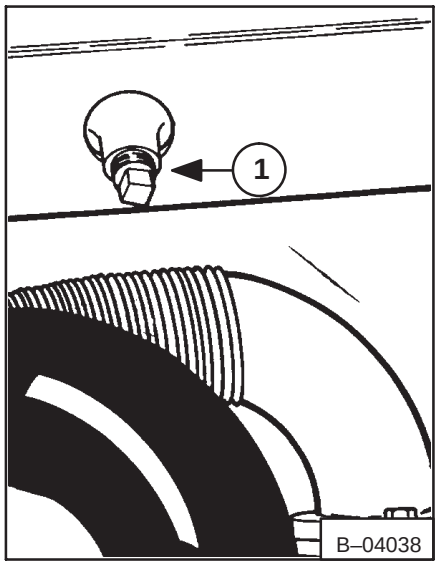



**Fig. 1–61** Spark Arrestor Muffler (643)

## LEGEND

1. RESERVOIR, Capacity: 3.5 Gal. (13,2 L) System Capacity: 6.0 Gal. (22,7 L)
2. HYDROSTATIC MOTOR
3. HYDRAULIC PUMP (Vane), 10.8 GPM (40,8 L/min.) @ 2600 RPM
4. FILTER, 40 micron, Bronze
5. TEMPERATURE SWITCH, (S/N 12999 & Below) 225-232°F (107-111°C)

   PRESSURE SWITCH, (S/N 13001 & Above) 17-20 PSI (118-144 kPa)
6. PRESSURE RESTRICTOR, (S/N 13001 & Above)

6[a]. PRESSURE RESTRICTOR, (S/N 12999 & Below)

7. PORT BLOCK
8. CHARGE BY-PASS VALVE, 43-57 PSI (296-393 kPa)
9. COLD WEATHER BY-PASS VALVE, 200-224 PSI (1379-1544 kPa)
10. TILT CYLINDER
11. AUXILIARY QUICK COUPLERS
12. LIFT CYLINDER
13. HYDRAULIC CONTROL VALVE (MELROE) 641 (S/N 13001-13208, 642 (S/N 13001-13523), 643 (S/N 13001-13504)

13[a]. LOAD CHECK VALVES (Three)

13[b]. RESTRICTOR, 0.125" (3,175 mm) Diameter



13[c]. MAIN RELIEF VALVE, 1800-1950 PSI (12411-13445 kPa) Measured at Quick Couplers

13[d]. ANTI-CAVITATION VALVE

HYDRAULIC CONTROL VALVE (VICTOR), 641, 642, 643 (S/N 12999 & Below)

14[a]. MAIN RELIEF VALVE, 1800-1950 PSI (12411-13445 kPa) Measured at Quick Couplers

14[b]. RESTRICTOR, 0.125" (3,175 mm) Diameter

14[c]. LOAD CHECK VALVES (Three)

15. FILTER, 10 Micron Element
16. FILTER BY-PASS, 72 PSI (496 kPa)
17. OIL COOLER
18. PRESSURE SWITCH (S/N 12999 & Below) 2.5-3.5 PSI (17-24 kPa)

    TEMPERATURE SWITCH (S/N 13001 & Above) 225°-232°F (107-111°C)
19. ORIFICE, 0.156" (3,962 mm) Diameter
20. HYDROSTATIC PUMPS
21. HIGH PRESSURE RELIEF VALVES, 3000 PSI (20685 kPa)
22. REPLENISHING VALVES
23. CHARGE RELIEF VALVE, (Non-Functional)

# BUCKET POSITION FLOW CHART

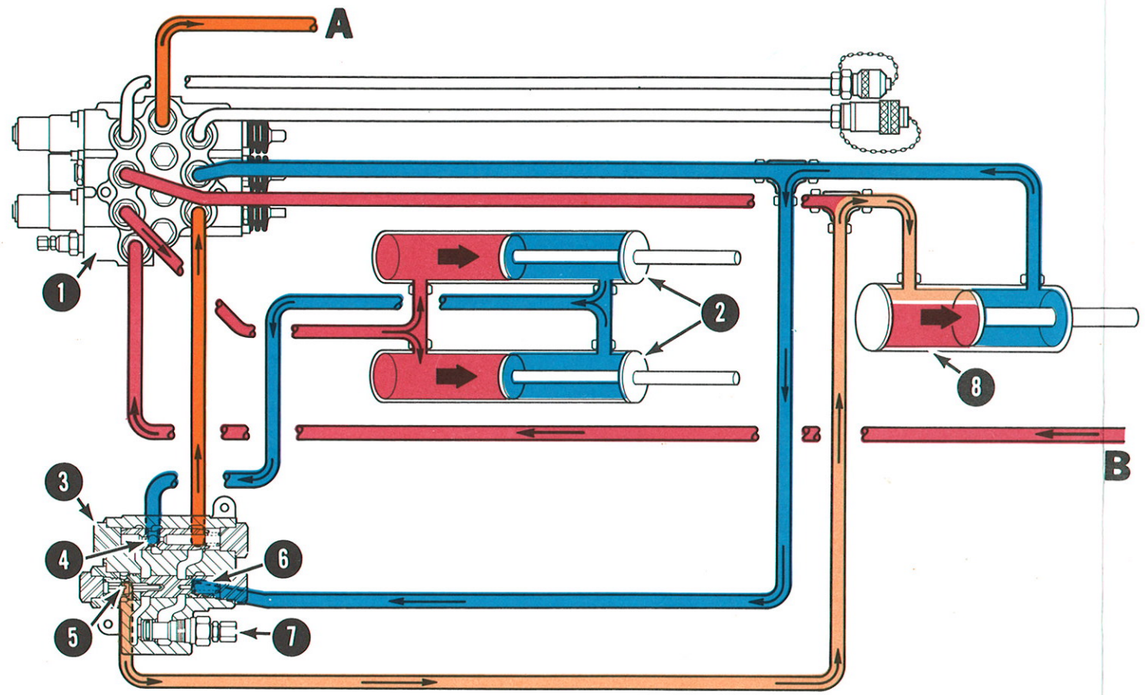
**For Models**

**bobcat 641, 642, 642B, 643 W/Melroe Hyd. Control Valve**

**and**

**Optionally Equipped W/Dukes Bucket Position Valve**

Chart # 6570287 (Printed May 1986)

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**NOTE**
**Chart shows fluid flow in the Lifting Position and with the Bucket Positioning Valve in operation.**

RED - - - - - - - - High Pressure
BLUE - - - - - - - Low Pressure
ORANGE- - - - - Charge Pressure
LT. ORANGE- - - Bucket Position Fluid

**NOTE**
**Use with Hydraulic Chart #6570266. References "A" & "B" indicate location of hydraulic circuitry connection.**



## CHART LEGEND

1. HYDRAULIC CONTROL VALVE (Melroe)
2. LIFT CYLINDERS
3. BUCKET POSITION VALVE (Optional)
4. FLOW DIVIDER SPOOL
5. CHECK POPPET VALVE
6. FLOW RETURN SPOOL
7. RELIEF VALVE
8. TILT CYLINDER

## OIL FLOW EXPLANATION

### BUCKET POSITIONING SYSTEM OPERATION

When the lift spool of the control valve (1) is engaged to raise the lift arms, the fluid from the rod end of the lift cylinders (2) is directed through the bucket position valve (3) . The bucket position valve has a flow divider spool (4) which directs 20% of the returning fluid directly back to the lift section of the control valve (1) . The remaining 80% of the fluid goes through a check poppet valve (5) and to the base end of the tilt cylinder (8) . This forces the tilt cylinder rod out and adjusts the position of the bucket as the lift arms are raisedd. Since the fluid is trapped in the base end of the tilt cylinder (tilt pedal is in neutral), the pressure will increase and push the flow return spool (6) open and allow fluid from the rod end of the tilt cylinder (8) to the return to the lift section of the control valve (1) along with the 20% of the returning fluid from the rod end of the lift cylinders (2) . When the tilt cylinder is fully extended and the lift arms are still raising, fluid goes over the relief valve (7) and back to the lift section of the control valve (1) .

## 2–3 HYDRAULIC CONTROL VALVE (Victor)

**IMPORTANT**

**When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.**

**I–2003–0888**

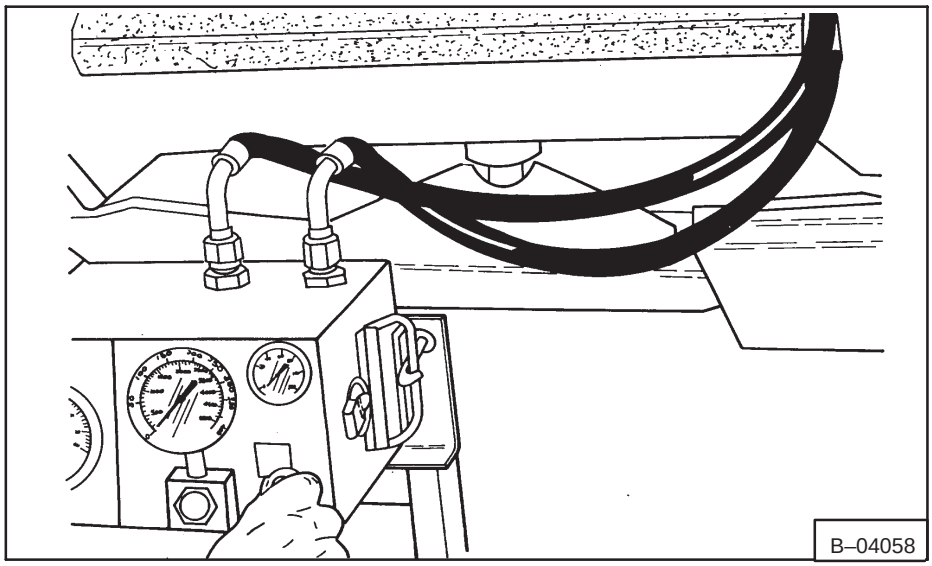


**Fig. 2–3** Checking The Relief Valve

Wear in the control valve or spools will cause the hydraulic cylinders to move when the controls are in neutral position. Wear can also cause loss of hydraulic power.

If the lift arm or tilt cylinder still move or extend after they have been checked and no damage has been found, check the control valve for the following:

1. Spool not centering in the valve section when the pedal is released. The spring can be broken or check the pedal linkage and adjust it so it will keep the spool in the neutral position.
2. Check for leaks in the valve because of wear or damaged valve body.
3. Replace valve as necessary.

### 2–3.1 Relief Valve

**Checking The Relief Valve**

The tools listed will be needed to do the following procedure:

MEL10003 Tester
MEL10006 Flow Meter Test Kit

**NOTE: Oil must be warm to do this procedure.**

1. Stop the engine.

**⚠ WARNING**

**Loader must be restrained for some service and repair. When balance of loader is changed by removal of lift arms or engine, or when it is necessary to rotate axles, jackstands should be put under both front axles and both rear corners of frame. Blocks by wheels can be climbed and do not stop loader.**

**W–2310–0398**

2. Activate the auxiliary hydraulic control (right steering lever) to release the hydraulic pressure.
3. Connect the male–end quick coupler to the inlet of the tester and the female–end quick coupler to the outlet (Fig. 2–3).

13. Remove the spool from the vise. Put oil on the spool. Carefully install the spool into the auxiliary section of the control valve.

14. Install the detent end cap.

15. Install the bolts. Tighten the bolts to 90–100 in.–lbs. (10–11 Nm) torque.

16. Install the washer and snap ring on the detent sleeve (Fig. 2–45a).

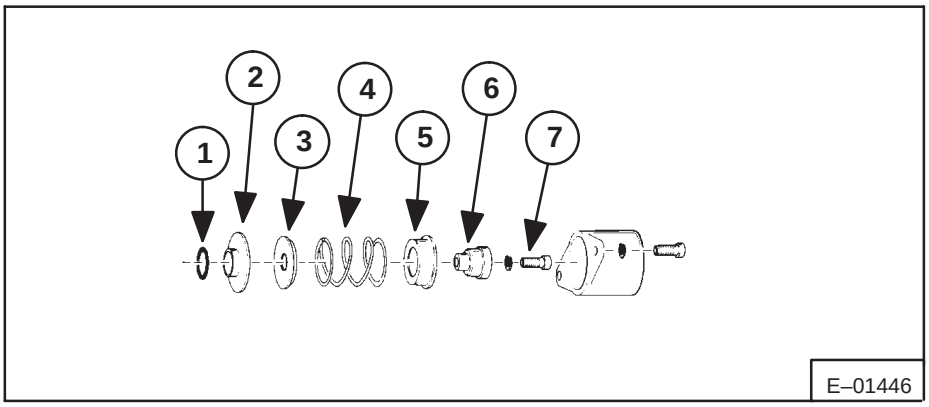


**Fig. 2–44a** Tilt Centering Spring Assembly

17. Put oil on the O–ring (Fig. 2–44a, Item 1). Install the O–ring on the tilt spool.

18. Put oil on the tilt spool. Carefully install it into the tilt section of the control valve.

19. Install the back–up washer, end cap, centering spring, end cap and adaptor (Fig. 2–44a, Items 2 thru 6).

20. Put LOCTITE on the bolt (Fig. 2–44a, Item 7). Install and tighten the bolt to 90–100 in.–lbs. (10–11 Nm) torque.

21. Install the end cap.

22. Install the end cap bolts. Tighten the bolts to 90–100 in.–lbs. (10–11 Nm) torque.

23. Repeat steps 1 thru 16 to install the detent assembly and the lift spool in the control valve.

24. Install the O–ring, filter, boot, boot retainer on each of the three spools (Fig. 2–46a).

25. Install the bolts for the boot retainers. Tighten the bolts to 90–100 in.–lbs. (10–11 Nm) torque on each of the three spools. Check all three spools for correct function and detent.

26. Install the main relief valve. Tighten to 50–60 ft.–lbs. (68–81 Nm) torque.

27. Install the plug, with new O–rings and back–up washers, into the tilt section port (Fig. 2–24a, Item F2).

28. Tighten the plug to 50–60 ft.–lbs. (68–81 Nm) torque.

29. Install the anti–cavitation valve, with new O–rings and back–up washers, into the tilt section port (Fig. 2–24a, Item E2).

30. Tighten the anti–cavitation valve to 50–60 ft.–lbs. (58–81 Nm) torque.

31. Install the load check valves into the stop section of the control valve (Fig. 2–24a, Items C1, C2 and C3). Use new O–rings and back–up washers.

32. Tighten the load check valves to 50–60 ft.–lbs. (68–81 Nm) torque.

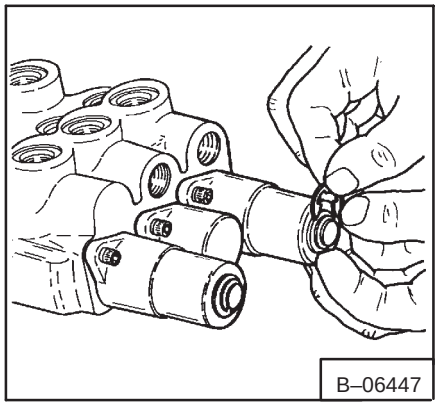


**Fig. 2–45a** Detent Sleeve Snap Ring

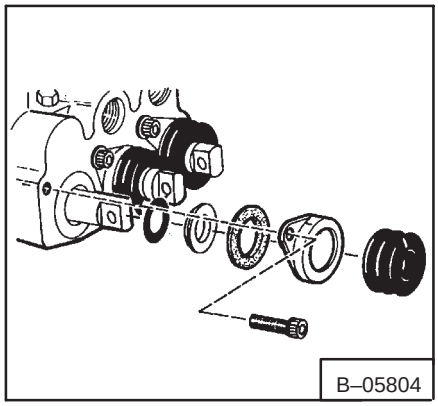


**Fig. 2–46a** Rubber Boot & Retainer

13. Remove the piston from the tool and install on the shaft (Fig. 2–69).

14. Install the nut and tighten to 195–205 ft.–lbs. (264–278 Nm) torque (Fig. 2–70).

15. Put oil on the seals, O–rings and end cap threads (Fig. 2–71).

16. Install the assembly in the cylinder housing (Fig. 2–72).

17. Tighten the end cap with a spanner wrench (Fig. 2–73).

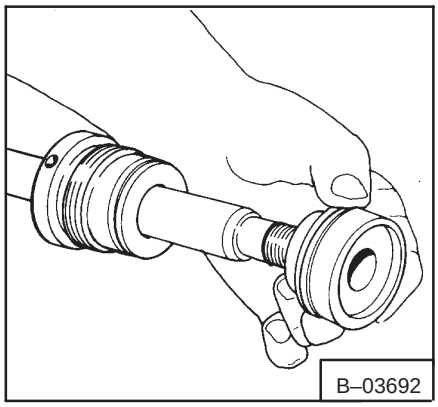


**Fig. 2–69** Installing The Piston

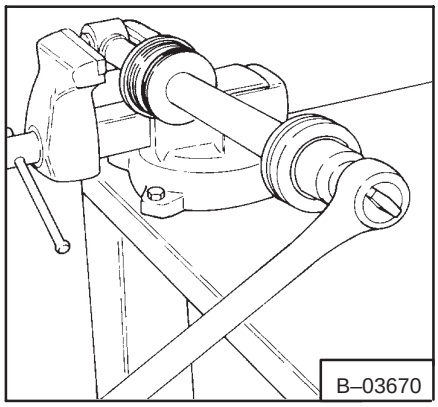


**Fig. 2–70** Tightening The Nut

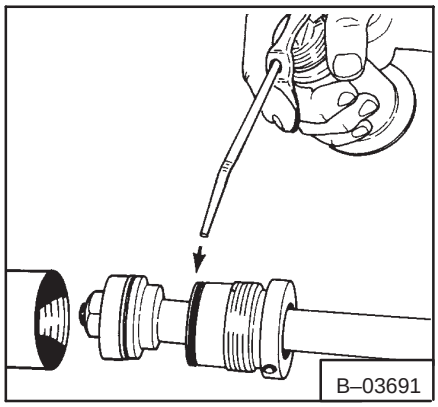


**Fig. 2–71** Putting Oil On The Seals

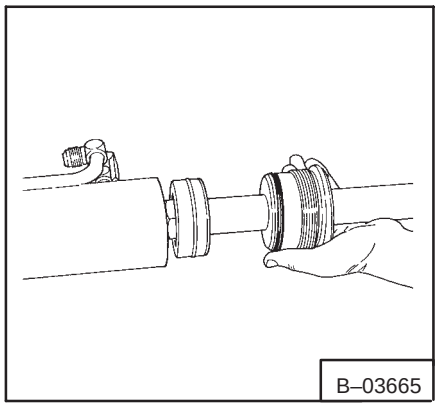


**Fig. 2–72** Installing Assembly

**2–5.5 Installation Of The Lift Cylinder(s)**

1. Install the lift cylinder in the loader.

2. Connect the hydraulic hoses and tighten (Fig. 2–77).

3. Install the pin in the base end of the lift cylinder (Fig. 2–74).

4. Install the pin in the rod end of the cylinder.

5. Install the bolt and locknut in the rod end pin (Fig. 2–75).

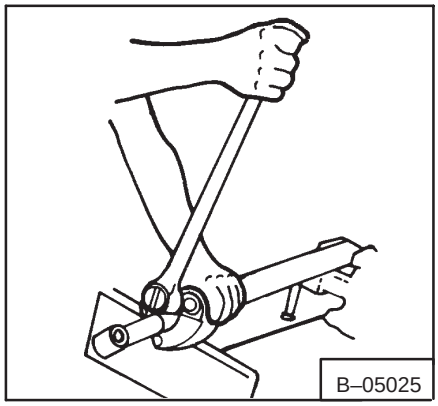


**Fig. 2–73** Tightening End Cap

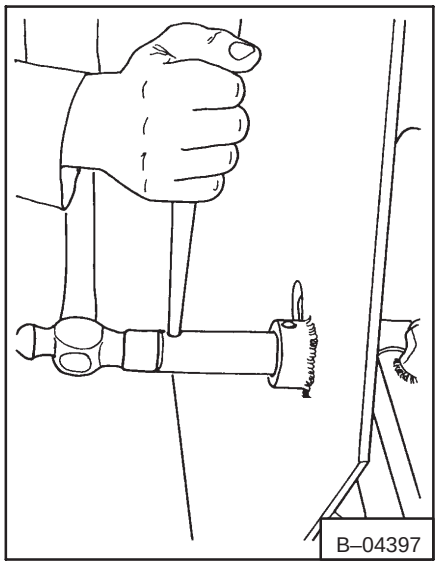


**Fig. 2–74** Installing Pin

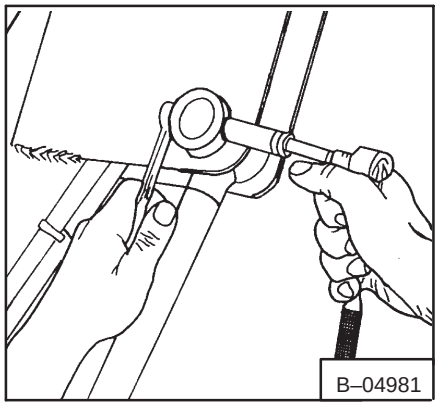


**Fig. 2–75** Installing Bolt And Locknut

## 3 HYDRAULIC SYSTEM

### 3–1 Troubleshooting

The following troubleshooting chart is provided as an assistance in locating and correcting problems which are most common. Many of the recommended procedures must be done by authorized Bobcat Service Personnel only.

| PROBLEM | CAUSE |
|---|---|
| No drive on one side, in one direction. | 1, 2, 3, 4, 5 |
| No drive on one side in both directions. | 2, 3, 5, 6, 7, 8 |
| The loader does not move in a straight line. | 2, 3, 4, 6, 8, 9, 10 |
| The hydrostatic system is overheating. | 4, 11, 12, 13, 14, 15 |
| The warning light comes ON (Low charge pressure). | 15, 16, 17, 18 |

**KEY TO CORRECT THE CAUSE**

1. The hydrostatic system has a fluid leak.
2. The steering linkage needs adjustment.
3. The high pressure replenishing valve(s) are damaged.
4. The shuttle valve in the hydrostatic motor is not working correctly.
5. The balance plate seals in the hydrostatic motor are damaged.
6. The hydrostatic pumps have damage.
7. The final drive chain is broken.
8. The hydrostatic motor has damage.
9. The tires do not have the correct tire pressure.
10. The tires are not the same size.
11. The hydrostatic fluid is not at the correct level.
12. The oil cooler has a restriction.
13. The temperature sending switch is not operating correctly.
14. The control valve is not operating correctly.
15. The loader is not being operated at the correct RPM.
16. The sender is defective.
17. Pump is defective or worn hydrostatics.
18. 40 micron filter is plugged.

### 3–5.4 Removing The Port Block

1. Stop the engine. Drain the hydraulic/hydrostatic reservoir.

2. Raise the operator cab (See Paragraph 5–1, Page 5–1).

**IMPORTANT**

**When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.**

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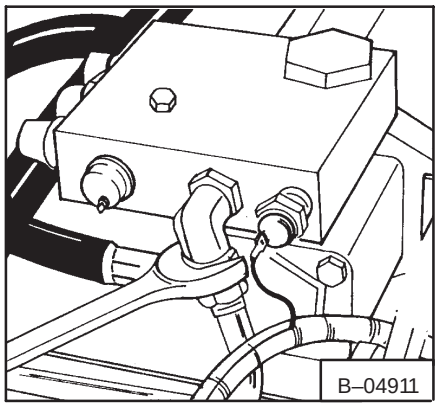


**Fig. 3–32** Removing Hoses

3. Remove the hydraulic hoses and tubelines from the port block (Fig. 3–32).

4. Remove the small bolt from the port block. Remove the large bolt at the top of the port block (Fig. 3–33). Use tool MEL1193.

5. Remove the port block from the hydraulic pump.

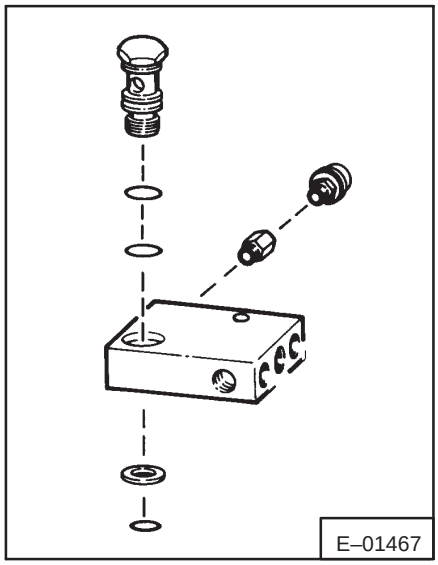


**Fig. 3–32a** Large Bolt And O–Rings

### 3–5.5 Installing The Port Block

1. Install new O–rings on the large bolt (Fig. 3–32a).

2. Install the port block on the hydraulic pump and tighten the large bolt (Fig. 3–33) so there will be no leakage at 200 PSI (1379 kPa).

3. Install the small bolt in the port block and tighten 25–28 ft.–lbs. (34–38 Nm) torque.

4. Install the hoses and the tubelines to the correct port in the port block.

5. Fill the hydraulic/hydrostatic reservoir with the correct oil.

6. Lower the operator cab (See Paragraph 5–1, Page 5–1).

7. Start the engine and run the engine for several minutes.

8. Stop the engine and check the reservoir oil level. Add oil as needed.

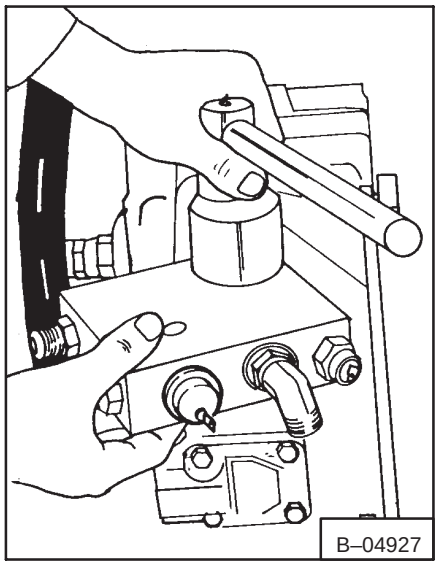


**Fig. 3–33** Removing Bolt

9. Turn the mounting flange while installing it over the shaft. Be careful not to damage the seals.

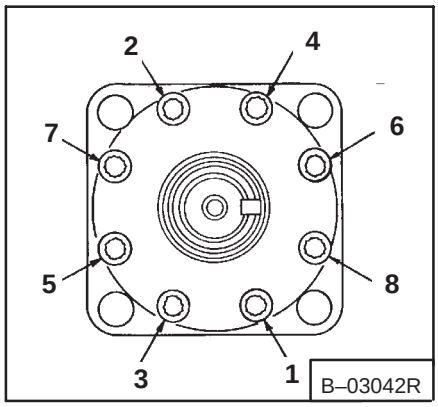

**Fig. 3–68** Tightening Sequence

10. Put oil on the threads of the eight bolts (Fig. 3–64, Item 5). Install the bolts in the mounting flange and tighten them with your hand only.

11. Put the motor in a vise and tighten the bolts evenly to 250 in.–lbs. (28 Nm) torque. Use the correct tightening sequence (Fig. 3–68).

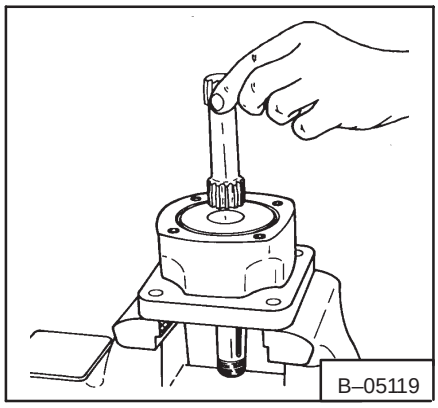

**Fig. 3–69** Installing Drive Shaft

12. Install the key in the keyway of the shaft.

13. Put the motor in a vise with the output shaft down (Clamp the sides of the mounting flange only).

14. Put a small amount of oil on the output shaft.

15. Put petroleum jelly on the 3.500 inches (88,9 mm) diameter O–ring and install it in the outer groove in the bearing housing.

16. Install the main drive in the output shaft (Fig. 3–69).

17. Put petroleum jelly on the two 0.250 inch (6,35 mm) diameter O–rings. Install the O–rings, one on each side of the geroler ring.

15. Remove the pintle cover and the shims (Fig. 3–108 & 3–109).

**IMPORTANT**

**Avoid damage to the shims under the pintle covers. If shims are damaged, install new shims. Use the procedure given in the manual to install shims.**

**I–2011–0284**

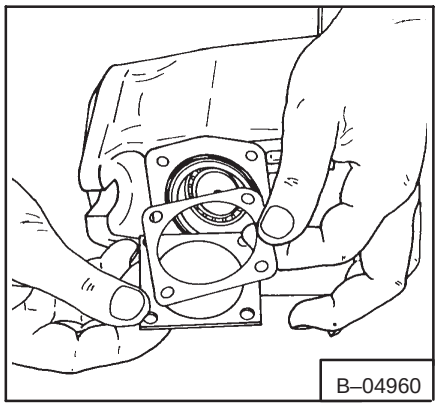


**Fig. 3–108** Removing Pintle Cover Bolts

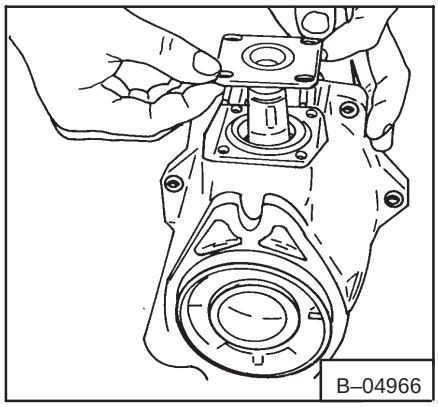


**Fig. 3–109** Removing Cover And Shims

16. Remove the O–rings (Fig. 3–110 & 3–111).

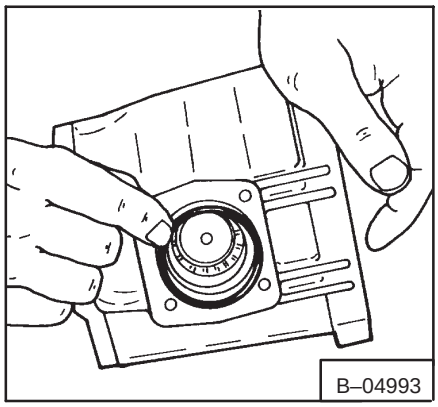


**Fig. 3–110** Removing O–Rings

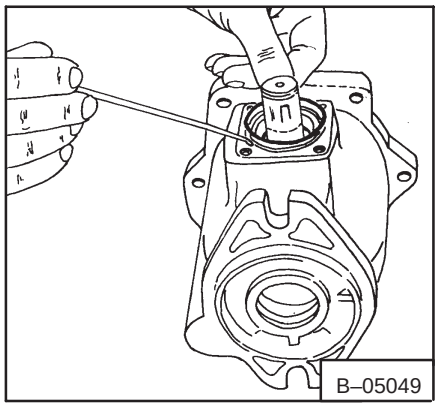


**Fig. 3–111** Removing O–Rings

17. Remove the bearing spacers from the pump housing (Fig. 3–112 & 3–113).

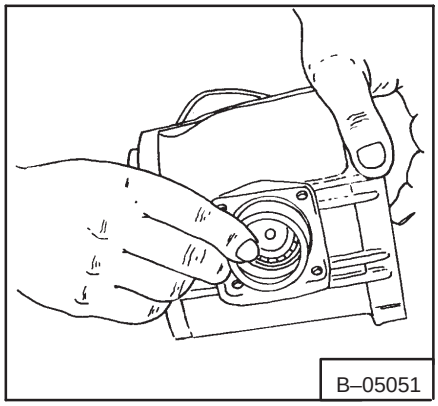


**Fig. 3–112** Removing Bearing Spacers

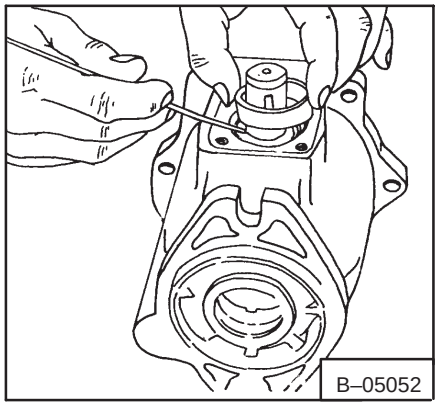


**Fig. 3–113** Removing Bearing Spacers

18. Move the yoke from side to side to loosen the bearing races. Remove the races and the bearings (Fig. 3–114).

19. Turn the yoke at an angle and remove the yoke and the shaft together (Fig. 3–115).

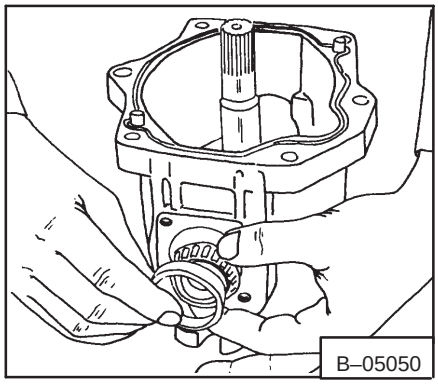


**Fig. 3–114** Removing Races And Bearings

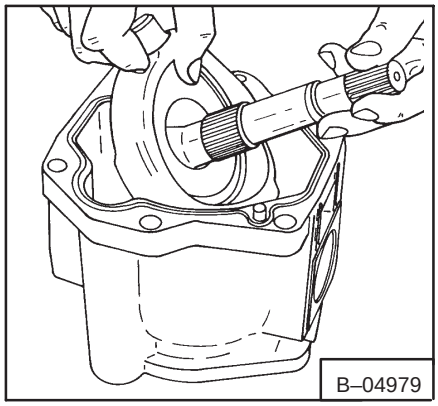


**Fig. 3–115** Removing Yoke And Shaft

**IMPORTANT**

**Use the correct wafer plate (Fig. 3–149). Plates with two or four feathering grooves (Fig. 3–149, Item 1) are interchangeable, but front and rear plates are not interchangeable.**

**I–2166–0398**

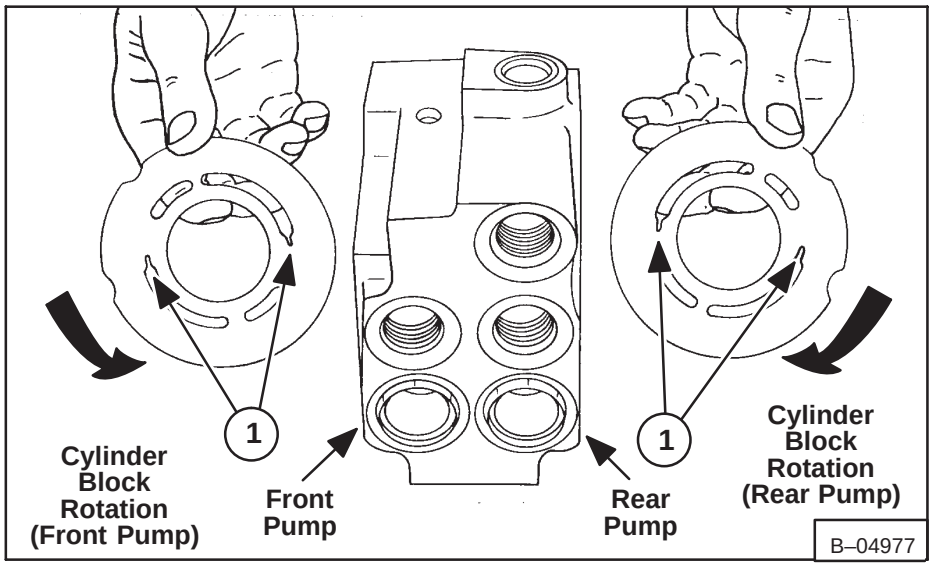


**Fig. 3–149** Correct Wafer Plate

3. Put the splined coupler on the drive shaft (Fig. 3–150).

4. Make sure the gasket and the alignment pins are in the correct location and install the housing on the manifold block.

5. Install the six screws and tighten 23–26 ft.–lbs. (31–35 Nm) torque.

6. Turn the vane pump shaft in the intermediate shaft until it is against the shoulder. Then turn the vane pump shaft out to align the splines.

7. Put the splined coupling over the splines on the intermediate shaft and the vane pump shaft.

8. Install the snap ring in the groove on the vane pump shaft.

9. Install the wafer plate (For #2 housing). The wafer plate must be flat against the manifold block.

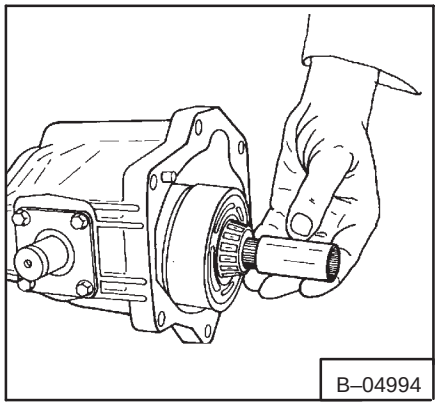


**Fig. 3–150** Installing Coupler

**IMPORTANT**

**Use the correct wafer plate (Fig. 3–149). Plates with two or four feathering grooves (Fig. 3–149, Item 1) are interchangeable.**

**I–2166–0398**

10. Make sure the gasket and the alignment pins are in position and install the housing on the manifold block. Turn the vane pump shaft so that the splines are in alignment.

11. Install the six screws and tighten 23–26 ft.–lbs. (31–35 Nm) torque.

12. Install the large O–ring on the end of the #2 housing and install the vane pump.

13. Install the two screws to hold the vane pump and tighten 54–66 ft.–lbs. (73–89 Nm) torque.

11. Use a puller to remove the outer bearing cone (Fig. 4–21).

12. Clean and check all the parts for wear and damage.

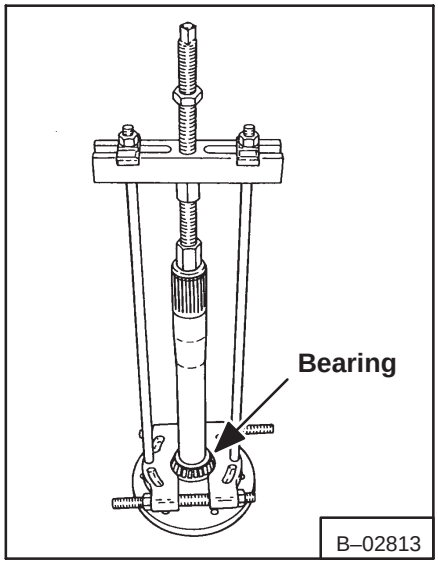


**Fig. 4–21** Removing The Outer Bearing

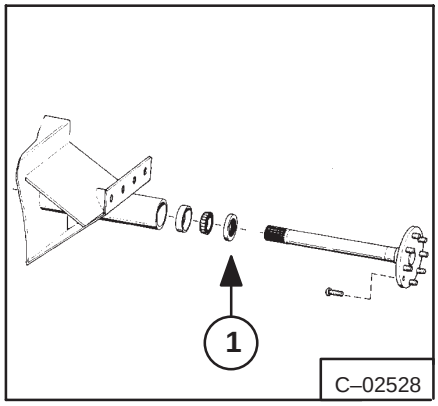


**Fig. 4–22** Axle Wear Sleeve

### 4–3.2 Assembly Of The Axles

1. Lubricate the new axle seal (Fig. 4–22, Item 1) and install the seal over the axle flange.

**NOTE: The spring loaded side of the seat must be up.**

2. Pack bearings with grease.

3. Install the bearing cone on the axle and drive the bearing over the first raised surface of the axle using a pipe (Figure 4–23). DO NOT damage the bearing.

4. Drive the bearing onto the axle over the second raised surface using the pipe (Fig. 4–24).

5. Install the outer axle bearing cup using an arbor of the correct size (Fig. 4–25). The inner bearing cup can be pulled into position using a long bolt and a washer.

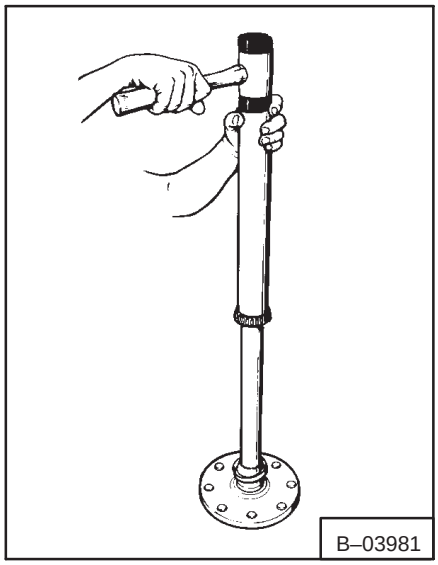


**Fig. 4–23** Installing Bearing

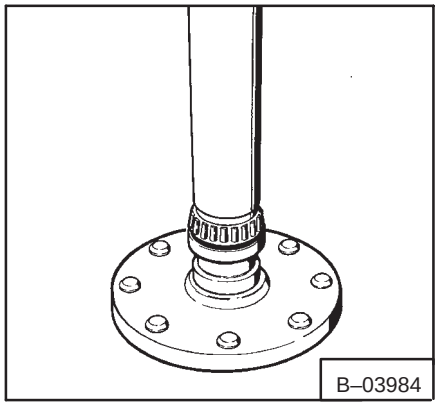


**Fig. 4–24** Installing Bearing

### 4–3.3 Installing The Axles

The tool listed will be needed to do the following procedure:

MEL1051 Seal Installation Tool

1. Put the sprocket into the chaincase with the chain in position.

**NOTE: The wide part of the sprocket hub goes toward the inside for the front axles and toward the outside on the rear axles.**

2. Install the axle assembly into the axle housing.

3. Install the inner halves of the installation tool MEL1051, used to install the axle (Fig. 4–16).

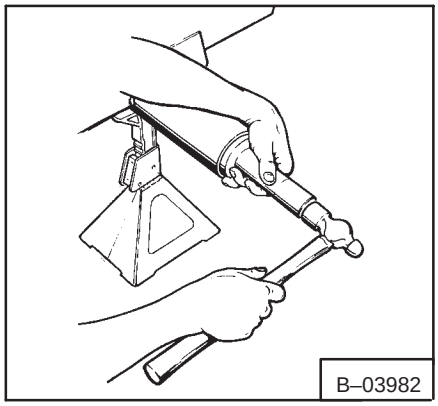


**Fig. 4–25** Installing Bearing Cup

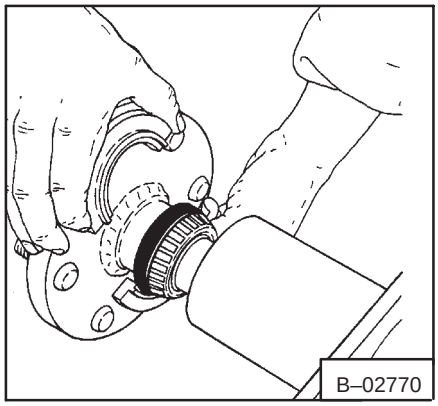


**Fig. 4–26** Axle Installation Tool

### 5–3.4 Installing The Bob–Tach

1. Position the Bob–Tach between the lift arms.

2. Using a punch push the pivot pin into the lift arms (Fig. 5–33) using the grease fitting hole.

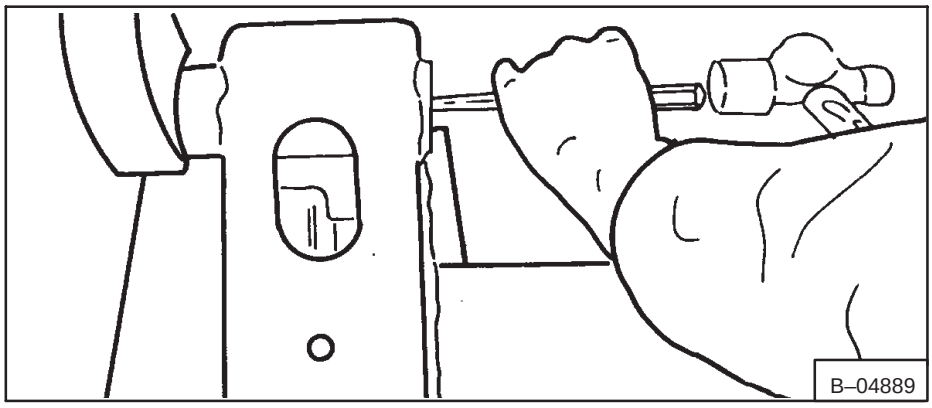


**Fig. 5–33** Putting Pin Into Position

3. Install the bolt into the pivot pin and tighten to 125–140 ft.–lbs. (170–190 Nm) torque.

4. Install the grease fitting and tighten.

5. Put the floor jack under the Bob–Tach.

6. Install new seals at the rod end of the tilt cylinder shaft (Fig. 5–34).

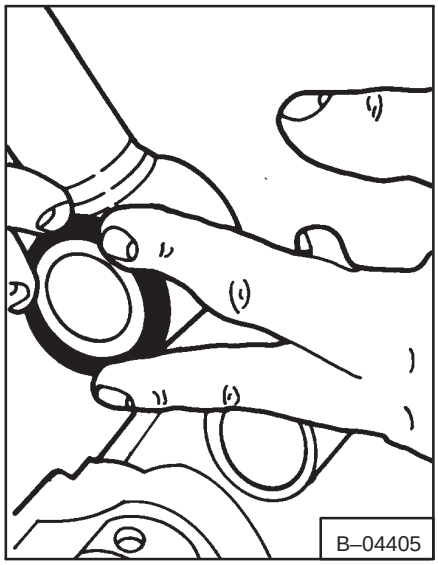


**Fig. 5–34** Installing Seals

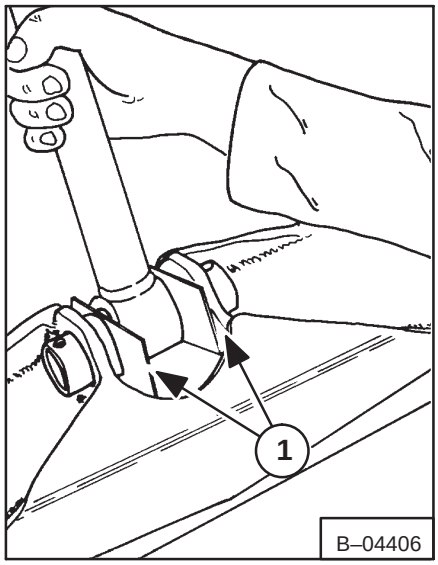


**Fig. 5–35** Installing Rod End

7. Lift the Bob–Tach with the floor jack.

8. Put a piece of shim stock (Fig. 5–35, Item 1) on each side of the seals at the rod end of the cylinder. Install the rod end of the tilt cylinder in the Bob–Tach frame.

9. Install the rod end pin (Fig. 5–36).

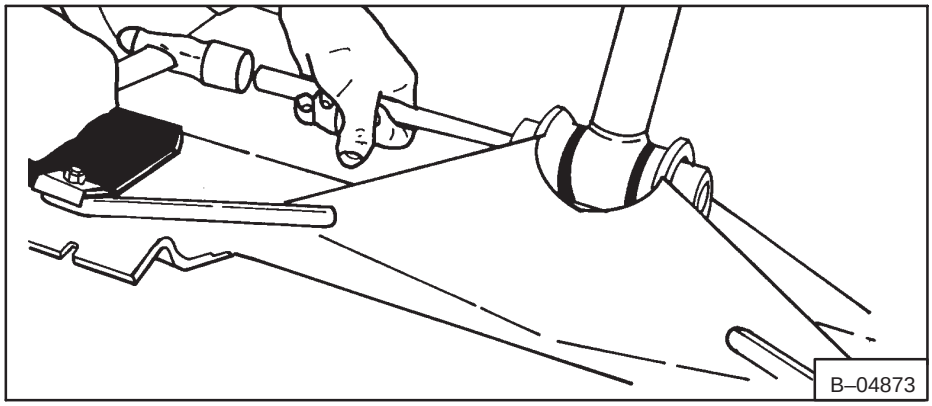


**Fig. 5–36** Installing Pin

# ELECTRICAL SYSTEM


| | Paragraph Number | Page Number |
|---|---|---|
| ALTERNATOR | 6–6 | 6–5 |
| BATTERIES | 6–3 | 6–3 |
| ELECTRICAL SYSTEM INFORMATION | 6–2 | 6–2 |
| STARTER | 6–7 | 6–9 |
| TROUBLESHOOTING | 6–1 | 6–1 |
| WIRE HARNESS FOR THE ENGINE | 6–5 | 6–5 |
| WIRE HARNESS FOR THE OPERATOR GUARD | 6–4 | 6–3 |




**WARNING**

**Instructions are necessary before operating or servicing machine. Read Operation & Maintenance Manual, and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments. repairs or service. Failure to follow instructions can cause injury or death.**

**W–2144–0189**

# ENGINE HARNESS

641 (S/N 11001—12999)
741 (S/N 11001—11885)

## WIRE LEGEND

| NO.'s | COLOR | GAUGE |
|---|---|---|
| 0 | Black | Cable |
| 1 | Red | Cable |
| 10A | Black | 16 |
| 10B | Black | 16 |
| 12C | White/Orange | 16 |
| 14 | Orange | 12 |
| 14A | Orange | 12 |
| 14C | Orange | 12 |
| 14F | Light Green | 16 |
| 14R | White/Lt. Green | 16 |
| 19C | Orange/Yellow | 16 |
| 21 | White | 16 |
| 21A | White | 16 |
| 23 | White/Black | 16 |
| 28 | Lt. Blue/Black | 16 |
| 28A | Red | 10 |
| 28B | Lt. Blue/Orange | 10 |
| 28S | White/Green | 16 |
| 31P | Purple | 16 |
| 31T | White/Purple | 16 |
| 32P | Yellow | 16 |
| 32T | Yellow/Black | 16 |
| 66 | Orange/Green | 16 |

## PARTS LEGEND

1. Operator Cab Harness Connector
2. Engine Connector
3. Back-Up Alarm Switch (Optional)
4. Trans. Oil Temperature Sender
5. Trans. Charge Pressure Sender
6. Brake Switch (Future)
7. Unfused Live Accessory
8. Fuel Solenoid Valve (Optional)
9. Pre-Heat Relay Solenoid
10. Pre-Heat Plug
11. Future Temp. Switch
12. Engine Oil Pressure Sender
13. Starter Relay Solenoid
14. Starter
15. Alternator
16. Battery
17. Excess Fuel Solenoid
18. Diode

# ENGINE HARNESS

* 643 (S/N 13001 — 21230) Delco
* 743 (S/N 14085 — 27387) Delco
643 (S/N 21231 & Above) Melroe
743 (S/N 27388 & Above) Melroe

## WIRE LEGEND

| NO.'s | COLOR | GAUGE |
|---|---|---|
| 0 | Black | Cable |
| 1 | Red | Cable |
| 1A | Red | 8 |
| 1B | Red | 10** |
| 1C | Red | 12 |
| 1D | Red | 12 |
| 10A | Black | 12 |
| 12C | Orange | 16 |
| 14F | Light Green | 16 |
| 14R | Lt. Green/White | 16 |
| 19C | Red/White | 16 |
| 21R | White | 16 |
| 21S | White/Green | 12*** |
| 23F | White/Black | 16 |
| 28 | Lt. Blue/Black | 16 |
| 28B | Lt. Blue/Orange | 10 |
| 28S | Lt. Blue/Yellow | 16 |
| 31P | Yellow/Lt. Green | 16 |
| 32F3 | Yellow/Dk. Blue | 16 |
| 32PT | Yellow | 16 |
| 32T | Yellow/Black | 16 |
| 35H | Yellow/Brown | 16 |
| 36T | Purple/White | 16 |
| 60B | Black | 16 |
| 66 | Orange/Green | 16 |

** 12 gauge on S/N 13001—21230 for Model 643 and S/N 14085—27387 for Model 743.

*** 16 gauge on S/N 13001—13383 for Model 643 and S/N 14085—14999 for Model 743.

## PARTS LEGEND

1. Operator Cab Harness Connector
2. Fused & Live Accessories
3. Fuse & Switched Accessories
4. Chassis Connector
5. Back-Up Alarm Switch (Optional)
6. Trans. Fluid Temp. Switch
7. Trans. Charge Pressure Switch
** 8. Hyd. Fluid Filter Pressure Switch
9. Starter
10. Engine Glow Plugs
11. Engine Oil Pressure Switch
12. Fuel Shut-Off Solenoid (Optional)
13. Engine Coolant Temp. Sender
14. Alternator
15. Battery
16. Pre-Heat Relay
17. Start Relay
18. Diode

9. Connect the wire harness connectors (Fig. 6–2).
10. Connect the negative cable to the battery.
11. Close the rear door.

## 6–5 WIRE HARNESS FOR THE ENGINE

### 6–5.1 Removing The Wire Harness For The Engine

1. Open the rear door, disconnect the negative cable from the battery.
2. Disconnect the wires at all the engine terminal locations.
3. Remove the wiring harness from the engine compartment.

### 6–5.2 Installing The Wire Harness For The Engine

1. Position the new harness in the engine compartment.
2. Connect the wires to the correct terminals (See the electrical chart in the front of the section).
3. Connect the harness connector.
4. Connect the negative battery cable.
5. Close the rear door.

## 6–6 ALTERNATOR

### 6–6.1 Checking The Alternator

**⚠ WARNING**

**Put jackstands under the front axles and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.**

**W–2017–0286**

To check the wiring harness, use the following procedure:

1. Turn the ignition switch to the ON position.
2. Connect the voltmeter between the ground and the No. 1 terminal (Fig. 6–9). Check for 12 volts.
3. Connect the voltmeter between the ground and the No. 2 terminal (Fig. 6–9). Check for 12 volts.
4. Connect the voltmeter between the ground and the BAT terminal (Fig. 6–9). Check for 12 volts.
5. If any of the test in steps 2, 3 & 4 show zero voltage, the wiring has a defect.

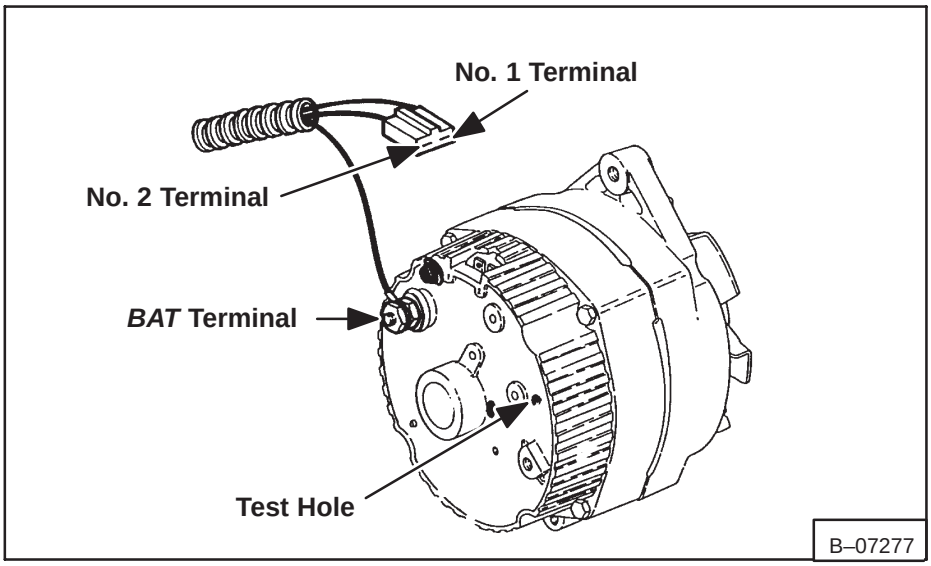


**Fig. 6–9** Terminal Location For The Alternator

## ENGINE SERVICE (641)


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| CYLINDER, PISTONS AND CONNECTING RODS | 7A–8 | 7A–15 |
| ENGINE FRONT COVER | 7A–10 | 7A–17 |
| ENGINE MOUNTS | 7A–17 | 7A–24 |
| ENGINE OIL COOLER | 7A–15 | 7A–24 |
| ENGINE REMOVAL | 7A–6 | 7A–19 |
| ENGINE SERVICE | 7A–5 | 7A–9 |
| ENGINE SHROUDING | 7A–16 | 7A–24 |
| FLYWHEEL | 7A–14 | 7A–23 |
| FUEL INJECTION NOZZLES | 7A–3 | 7A–7 |
| FUEL SYSTEM | 7A–2 | 7A–2 |
| GOVERNOR | 7A–11 | 7A–20 |
| MUFFLER | 7A–18 | 7A–25 |
| OIL PUMP, FILTER HOUSING AND RELIEF VALVE | 7A–9 | 7A–17 |
| STARTER | 7A–19 | 7A–25 |
| TROUBLESHOOTING | 7A–1 | 7A–1 |
| UNIVERSAL JOINT | 7A–13 | 7A–23 |


**641 DEUTZ**

**⚠ WARNING**

**Instructions are necessary before operating or servicing machine. Read Operation & Maintenance Manual, and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments. repairs or service. Failure to follow instructions can cause injury or death.**

**W–2144–0189**

4. Press the large ball bearing over the drive shaft with the closed side toward the v–belt pulley.

5. Press the fan shaft with the bearing installed into the housing.

6. Put the cooling fan in a vice. Clamp the cooling fan by the pulley.

7. Position the rotor wheel and tighten the bolt to the correct torque as specified in Section 8 of Deutz Technical Data.

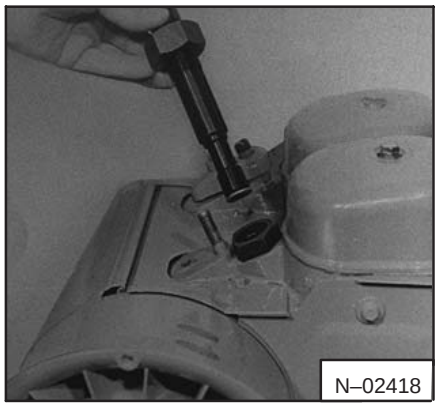

**Fig. 7A–33** Checking Compression

### 7A–4.4 Installation Of The Blower Fan

Installation is the reverse of removal.

**Fig. 7A–34** Installing Shims

## 7A–5 ENGINE SERVICE

1. All specifications are given in Section 8 *DEUTZ TECHNICAL DATA*.

2. To check compression install compression tester in the injector opening (Fig. 7A–33). Turn the engine four revolutions or until highest reading is obtained. Compression must be 340–413 PSI (23,5 – 28,5 bar).

3. Install new bearing in the air blower each time the engine is overhauled.

4. Special bolts are used in many locations of the engine. These bolts are first tightened to 22 ft.–lbs. (30 Nm) torque. Then tighten them in steps to correct torque. (See Section 8 *DEUTZ TECHNICAL DATA).*

5. When overhauling an engine always install new gaskets, O–rings and seals.

6. Install the correct number of shims on each cylinder during assembly (Fig. 7A–34).

**NOTE: Check the piston clearance to determine the number of shims.**

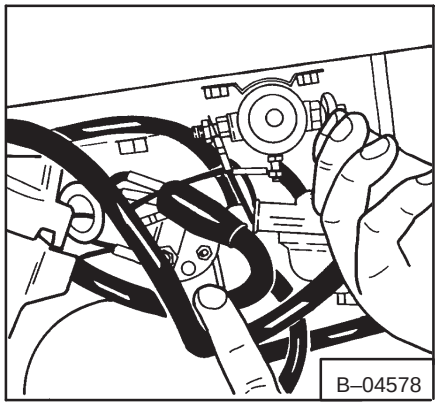

**Fig. 7A–35** Disconnecting Solenoid Wires

## 7A–6 ENGINE REMOVAL

To remove the engine from the Bobcat loader:

1. Disconnect the negative battery cable. Then disconnect the positive battery cable (The negative battery cable must be removed first).

2. Disconnect the ground wire from the frame.

3. Disconnect the wires from the solenoid (Fig. 7A–35).

4. Remove the grill (Fig. 7A–36).

5. Release the tie clamp holding the fuel line to the shield (Fig. 7A–37).

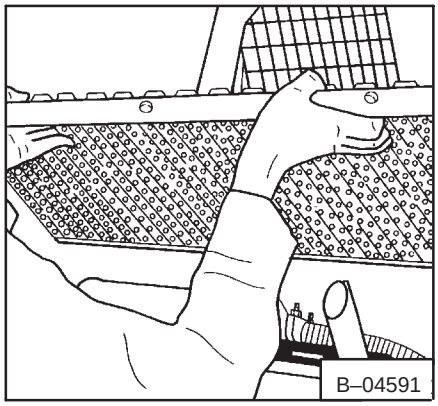

**Fig. 7A–36** Removing Grill

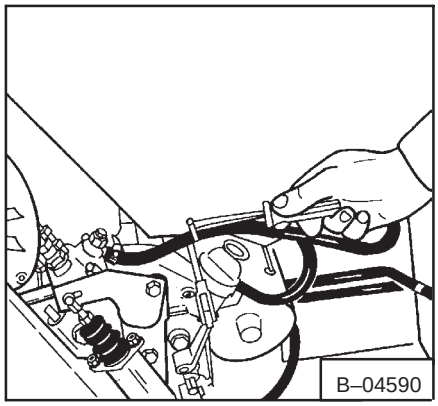

**Fig. 7A–37** Releasing Tie

2. Put the shaft in position to install the control arm (Fig. 7A–95).

3. Put the spring on and connect it as shown in figure 7A–97.

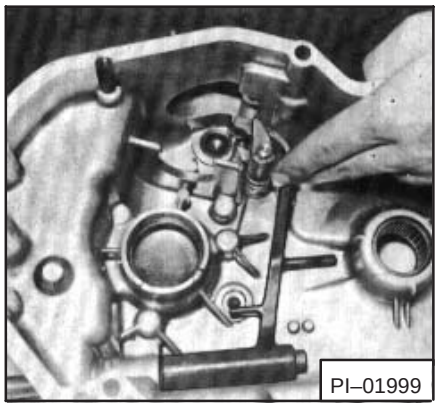


**Fig. 7A–95** Control Arm Linkage

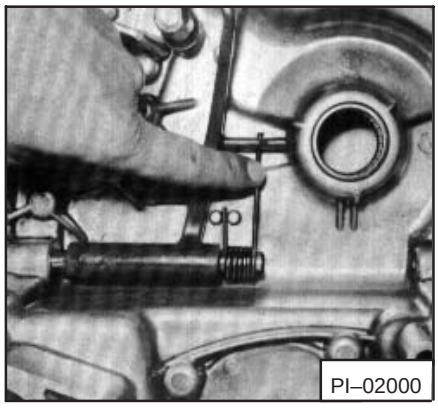


**Fig. 7A–96** Lever Spring

4. Move the shaft in more and install the governor spring. Tighten the bolts that hold the spring in position (Fig. 7A–95).

5. Install a snap ring on each side of the control arm (Fig. 7A–98).

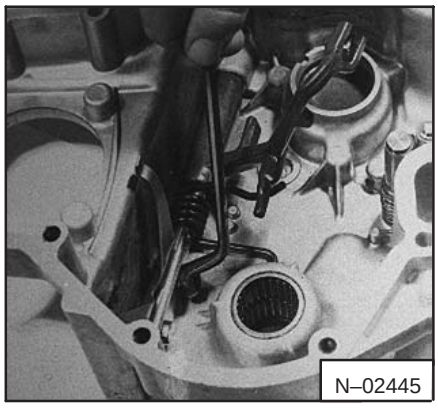


**Fig. 7A–97** Installing Governor Spring

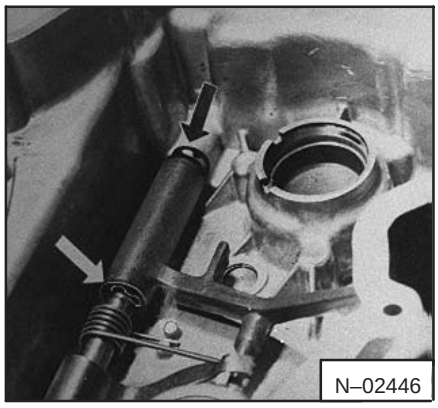


**Fig. 7A–98** Installing Snap Rings

6. Install the O–ring on the shaft (Fig. 7A–99). Install the throttle lever and leaf spring on the shaft and install the locking pin (Fig. 7A–100).

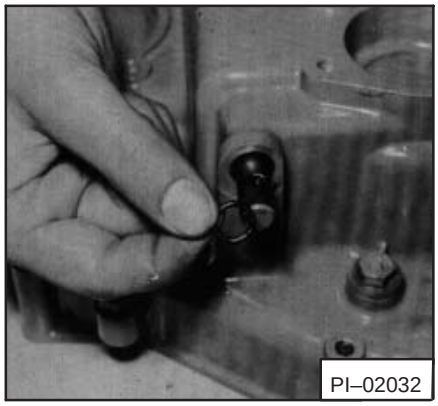


**Fig. 7A–99** Installing O–Rings On Shaft

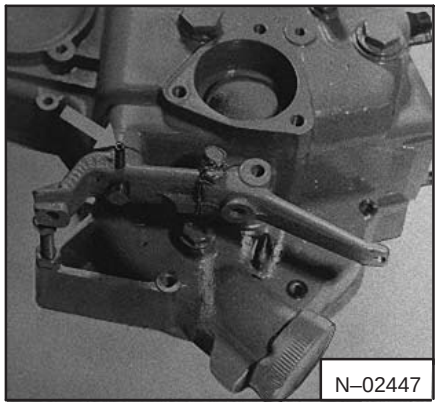


**Fig. 7A–100** Installing Roll Pins

### 7A–10.4 Installation

1. Put dowel pins in front cover and apply gasket sealant to the front cover (Fig. 7A–101).

2. With the camshaft pushed against its contact surface measure the distance (Fig. 7A–102) from the front of the collar to the front of the engine housing.

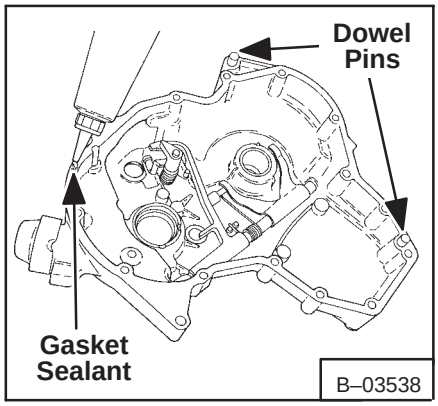


**Fig. 7A–101** Location Of Dowel Pins

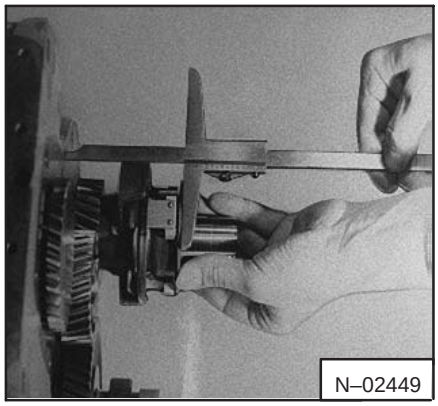


**Fig. 7A–102** Checking End Clearance

## 7B–1 Troubleshooting

| PROBLEM | CAUSE | CORRECTION |
|---|---|---|
| Engine will not turn over with the starter. | Battery has lost its charge. | Charge the battery. Check the functions of the charging system. |
| | Loose battery connection. | Clean battery connections and cables. Tighten the clamps. |
| | Loose starter connections. | Tighten the connections. |
| | Starter switch has damage. | Make replacement of the switch. |
| | Fuse has damage. | Install a new fuse of the correct amp. rating. |
| | Damaged or disconnected wiring harness. | Connect or make replacement of the wiring. |
| | Starter or solenoid has damage. | Make repair as needed. |
| Engine does not start or is difficult to start. | Wrong starting procedure. | Refer to *Starting Procedure* in the Bobcat Operator's Manual. |
| | No fuel in the tank. | Add fuel. |
| | Air cleaner is dirty. | Make replacement of the air cleaner element. |
| | Fuel tank vent in cap has restriction. | Remove the cap and clean the vent. |
| | Fuel line has air leak or dirt or water. | Correct as needed. |
| | Fuel pump has damage. | Make replacement of the pump. |
| | Hydraulic/Hydrostatic load on the engine. | Put all controls in neutral position and warm the oil in the reservoir during very cold temperatures. |
| | Ignition system has damage. | Check and make repairs as needed. |
| | Crankcase oil is thick. | Use engine oil of correct viscosity (See *Oil Specification Chart*). |
| Engine does not run smoothly or stops. | Damaged ignition system (spark plugs, points, etc.) or timing is not correct. | Make repairs as needed. |
| | Dirty fuel mixture, or restriction in fuel filter or vent. | Clean as needed. |
| | Below normal compression. | Check for loose cylinder head bolts or loose spark plugs. |
| | Water in the fuel. | Make replacement of the fuel. |
| Engine overheats. | Engine is overloaded. | Operate at rated RPM. |
| | Radiator grill is dirty. | Remove the grill and clean. |
| | Dirty engine oil. | Make replacement of the engine oil and the filter. |
| | Exhaust system has restriction. | Correct as necessary. |
| | Ignition timing is wrong. | Make adjustment as needed. |
| | Coolant level is low. | Add coolant. |
| | Oil cooler has restriction. | Find restriction and make correction. |

8. Remove the bolts from the manifold (Fig. 7B–25).

9. Remove the exhaust pipe from the muffler (Fig. 7B–26).

10. Remove the throttle rod from the governor linkage (Fig. 7B–27).

11. Remove the coil wire and remove the other wires (Fig. 7B–28) from the coil.

12. Remove the air cleaner hose from the engine (Fig. 7B–29).

13. Remove the coolant hoses from the engine.

14. Remove the solenoid from the recovery tank bracket (Fig. 7B–30).

15. Disconnect the fuel line from the engine.

16. Remove the engine ground cable (Fig. 7B–31).

17. Remove the engine mounting bolts (Fig. 7B–32).

18. Raise the operator guard (See Paragraph 5–1, Page 5–1).

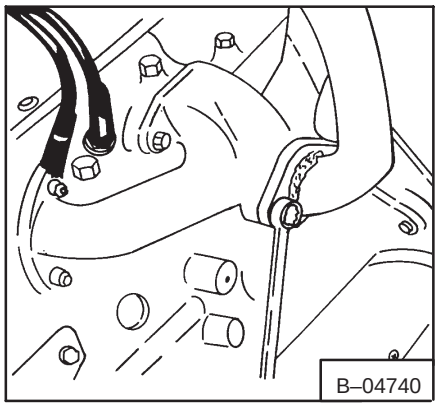


**Fig. 7B–25** Removing Exhaust Pipe

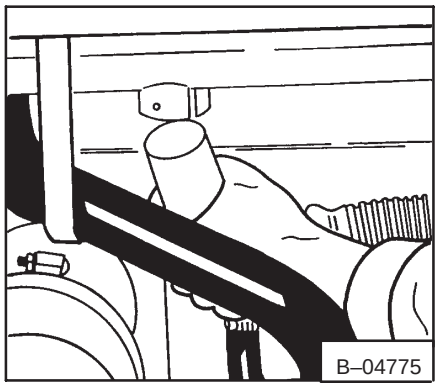


**Fig. 7B–26** Removing Exhaust Pipe From Muffler

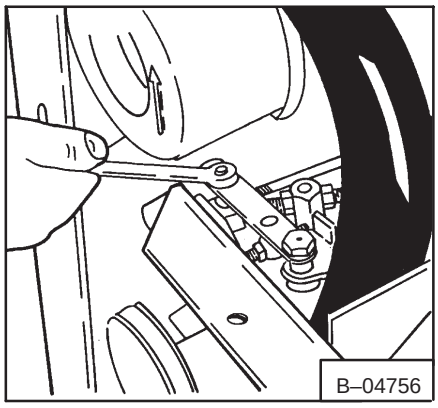


**Fig. 7B–27** Removing The Throttle Rod

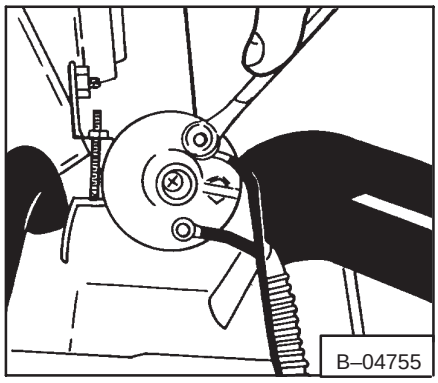


**Fig. 7B–28** Removing The Wires From The Coil

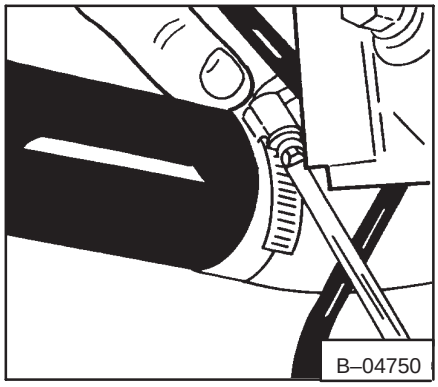


**Fig. 7B–29** Removing The Air Cleaner Hose

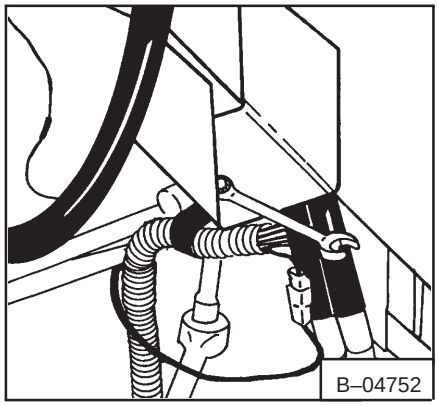


**Fig. 7B–30** Removing The Solenoid

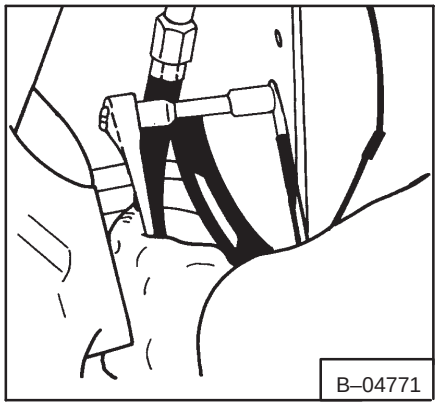


**Fig. 7B–31** Removing The Engine Ground

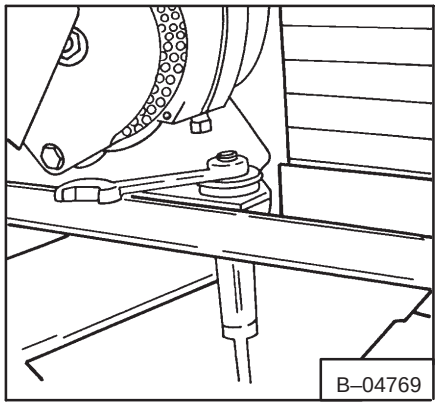


**Fig. 7B–32** Removing The Eng. Mtg. Bolts

## 7B–19 VALVE PUSHRODS

### 7B–19.1 Removing The Valve Pushrods

1. Remove the rocker shaft bolts evenly and lift off the rocker arm shaft assembly.
2. Remove the pushrods and keep them in the correct order.

### 7B–19.2 Installing The Valve Pushrods

1. Put oil on both ends of the pushrods and install them in the correct bores.
2. Put oil on the valve stem and the rocker arm pads, and install the rocker arm shaft assembly on the cylinder head. Put the pushrods on the adjustment screws. Tighten the bolts 25–30 ft.–lbs. (34–41 Nm) torque.
3. Make adjustment of the valve lifters according to the specifications.

## 7B–20 INTAKE MANIFOLD

### 7B–20.1 Removing The Intake Manifold

1. Remove the coolant from the cooling system.
2. Disconnect the throttle linkage from the throttle lever on the carburetor.
3. Disconnect the fuel line from the carburetor.
4. Disconnect the water hose from the intake manifold.
5. Remove the intake manifold.

### 7B–20.2 Installing The Intake Manifold

1. Put a water resistant sealer to both sides of the new gasket and around the water port. Install it on the cylinder head.
2. Install the intake manifold and tighten the nuts and bolts evenly 15–18 ft.–lbs (20–24 Nm) torque.
3. Connect the water hose to the intake manifold.
4. Connect the fuel line to the carburetor.
5. Connect the throttle linkage
6. Install the dipstick tube bracket to the intake manifold and install the fastening bolt.
7. Fill the cooling system with the correct coolant.
8. If a new manifold is to be installed, put all the needed parts on the new manifold.

### 7B–31.2 Installing The Rear Oil Seal

1. Install a new crankshaft rear oil seal (Fig. 7B–54).
2. Put a new gasket on the rear oil seal carrier using a sealing compound at the end, and the carrier on the block rear surface. Tighten the bolts evenly to specifications.
3. Put new gaskets on the block flange using sealing compound at each end. Install the end seals with the chamfered end into the grooves, again using a sealing compound and install the oil pan. Tighten the bolts to the correct torque using the steps in (Fig. 7B–55).
4. Install the flywheel on the crankshaft flange. Be sure contact surfaces of flywheel and crankshaft are clean. Tighten the bolts evenly to specifications.

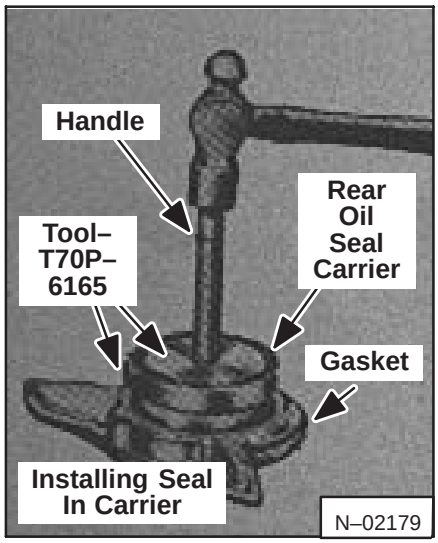


**Fig. 7B–54** Installing OIl Seal For Crankshaft

### 7B–32 MAIN BEARINGS

The cast iron crankshaft is supported by five bearings.

The main bearing caps must be kept in original position. An arrow in the cap points to the front of the engine location marks are on the caps.

The front bearing cap has the letter *F.* The second cap has the number *2*. The center cap has the letter *C.* The fourth cap has the number *4*. The rear cap does not have a marking.

### 7B–32.1 Removing The Main Bearings

1. Remove the main bearing caps and the thrustwashers. Keep the caps in order so each cap will be installed in its original position.
2. Remove the bearing halves from the cylinder block and from the caps.
3. Check the caps and the crankshaft for damage.
4. Install new bearing halves in the cylinder block and from the bearing caps.
5. Make sure the crankshaft and the bearings are free from dirt and other debris.
6. Measure the bearing clearances using Plastigage (See Paragraph 7B–6.10, Page 7B–13).

### 7B–32.2 Installing The Main Bearings

1. Clean the crankshaft and the bearings.
2. Install the crankshaft thrustwashers.


**Fig. 7B–55** Tightening Sequence For Oil Pan Bolts

## ENGINE SERVICE (643)


| | Paragraph Number | Page Number |
|---|---|---|
| ASSEMBLY OF THE ENGINE | 7C–6 | 7C–21 |
| BLOWER HOUSING | 7C–11 | 7C–27 |
| FLYWHEEL | 7C–8 | 7C–24 |
| FUEL SYSTEM | 7C–2 | 7C–2 |
| MUFFLER | 7C–9 | 7C–24 |
| RADIATOR | 7C–10 | 7C–25 |
| REMOVING AND INSTALLING ENGINE | 7C–3 | 7C–5 |
| REPAIRING CYLINDER HEAD | 7C–4 | 7C–8 |
| REPAIRING THE ENGINE | 7C–5 | 7C–13 |
| STARTER | 7C–12 | 7C–28 |
| TROUBLESHOOTING | 7C–1 | 7C–1 |
| UNIVERSAL JOINT | 7C–7 | 7C–24 |


**WARNING**

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**W–2144–0189**

13. Remove the cylinder head (Fig. 7C–29).

14. Remove the gasket and the O–ring.

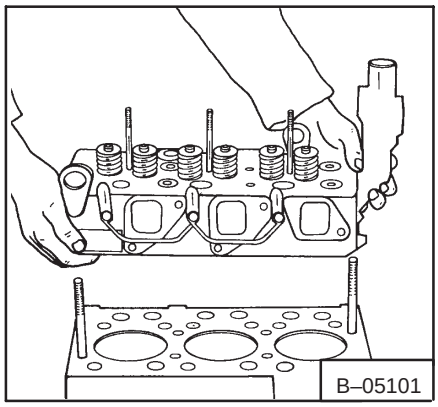


**Fig. 7C–29** Removing The Cylinder Head

### 7C–4.2 Disassembly Of The Cylinder Head

**NOTE: There may be a shim under the cylinder head gasket. Use the shim over again or replace it with the same size shim.**

1. Remove the valve cap and the valve spring collet (Fig. 7C–30).

2. Remove the valve spring retainer.

3. Remove the seal on the valve and remove the valve from the cylinder head.

4. Remove the thermostat (Fig. 7C–31).

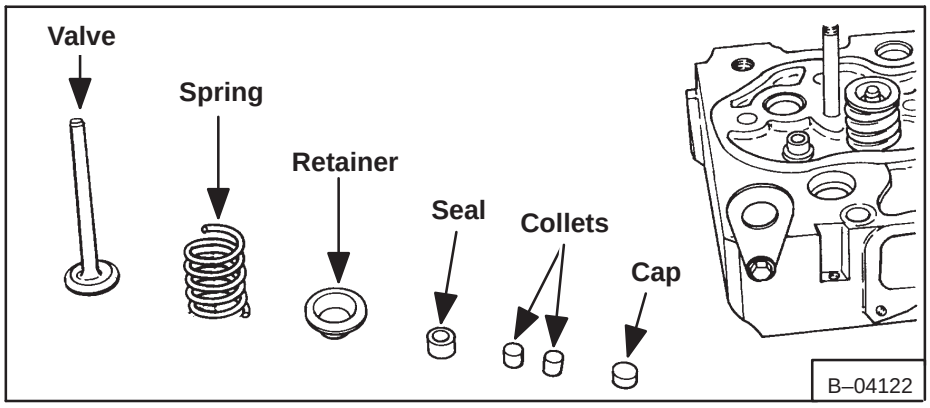


**Fig. 7C–30** Removing The Valves

### 7C–4.3 Servicing The Cylinder Head

1. Clean the surface of the cylinder head.

2. Put a straight edge on the cylinder head (Fig. 7C–32).

**NOTE: Do not put the straight edge across the combustion chamber.**

3. Put a feeler gauge between the straight edge and the surface of the cylinder head.

4. The maximum distortion of the cylinder head surface is ± 0.002 inch (± 0,05 mm).

5. If the measurement is more than the specifications, remove the combustion chamber then grind the cylinder head (max. allowable is 0.004 inch). Check valve recess after servicing. See Steps 10 & 11. Grind the same amount of material from the bottom of the combustion chamber as was removed from the head.

6. Clean the surface of the valve surface.

7. Measure the width of the valve seat (Fig. 7C–33).

8. The correct width of the valve seat is 0.0827 inch (2,1 mm) and the seat angle is 45 degrees.

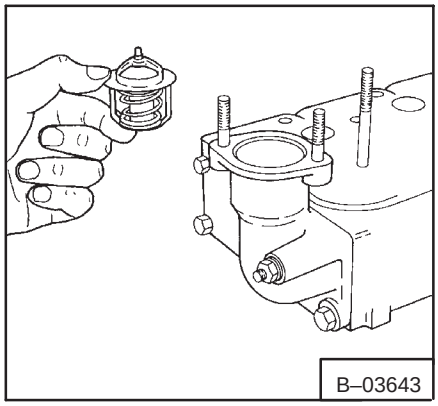


**Fig. 7C–31** Removing The Thermostat

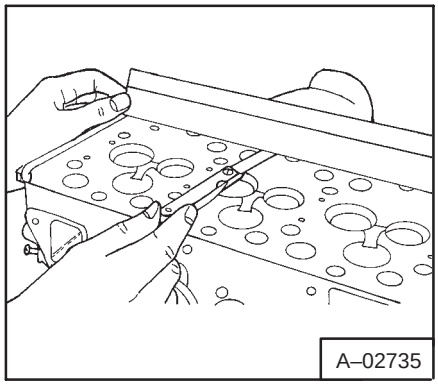


**Fig. 7C–32** Checking Cylinder Head Surface

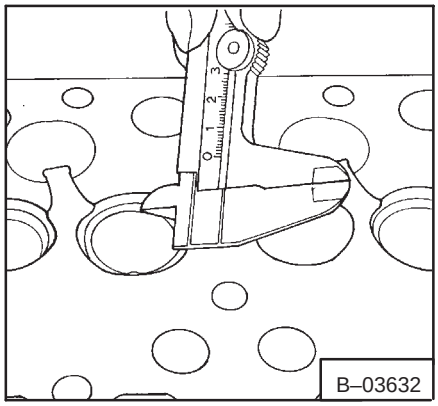


**Fig. 7C–33** Checking The Valve Seat

8. Remove the main bearing and measure the plastic gauge (Fig. 7C–81).

9. The specification for the outside diameter of the main crankshaft journal is 2.0441 – 2.0449 inches (51,921 – 51,940 mm). The inside diameter of the crankshaft main bearing is 2.0465 – 2.0482 inches (51,980 – 52,025 mm). The allowable wear limit of the two items is 0.0079 inch (0,2 mm). Replace the parts as needed.

10. Measure the connecting rod bearings (Fig. 7C–82). The specification is 1.7327 – 1.7343 inch (44,010 – 44,052 mm). The allowable wear limit is 0.0079 inch (0,2 mm). Replace as needed.

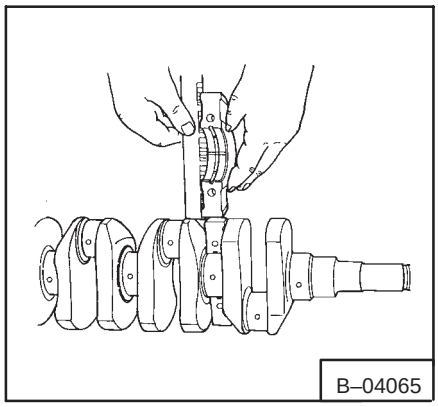


**Fig. 7C–81** Checking Main Bearings

11. Measure the connecting rod crankpins (Fig. 7C–83). The specification is 1.7307 – 1.7313 inches (43,959 – 43,975 mm). The allowable wear limit is 0.0079 inch (0,2 mm). Replace as needed.

12. If the crankpins are not to specifications grind them (Fig. 7C–84).

    (a) Crankshaft corner radius (A) must be 0.1378R + 0.0079 inch (3,5R + 0,2 mm).

    (b) The oil hole (B) must be chamfered to 0.0394 to 0.0591R inch (1–1,5R mm).

See Specifications Page 8C – 4 for each undersize.

13. When the crankshaft is installed the end play can be checked (Fig. 7C–85). If the endplay is more than 0.0059 – 0.0122 inch (0,15 – 0,31 mm) replace the thrust bearings on the main bearing.

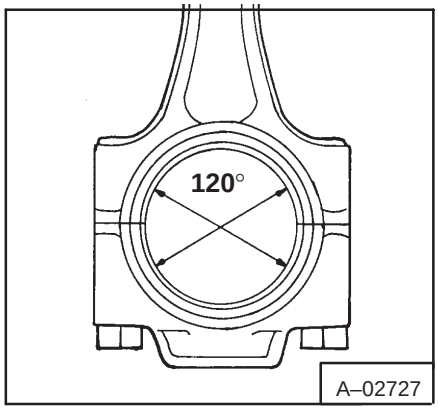


**Fig. 7C–82** Checking Rod Bearings

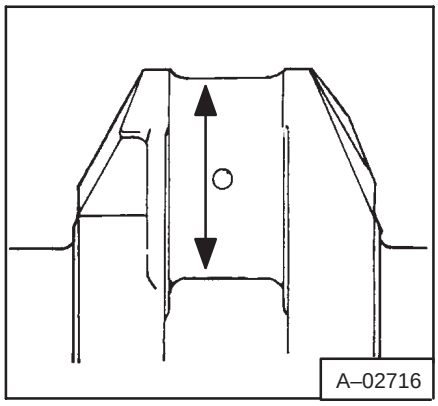


**Fig. 7C–83** Checking Journals (Crankpin)

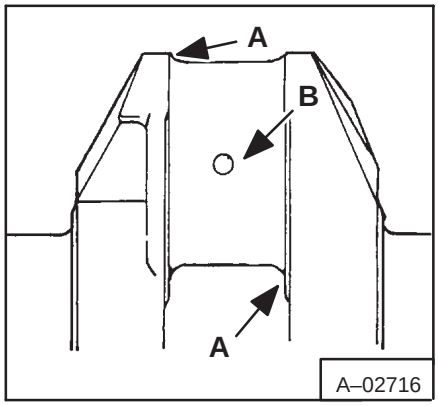


**Fig. 7C–84** Connecting Rod Journal

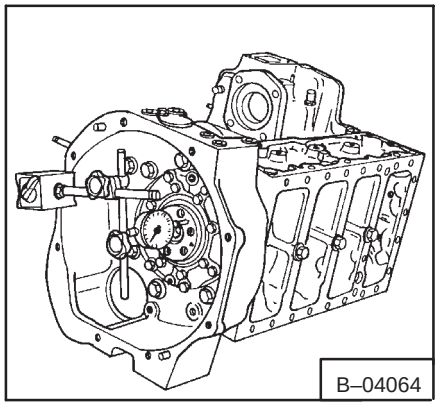


**Fig. 7C–85** Checking Crankshaft Endplay

### 7C–5.7 Servicing The Cylinder Liners

1. Use a micrometer to measure the inside diameter of the cylinder liner (Fig. 7C–86).

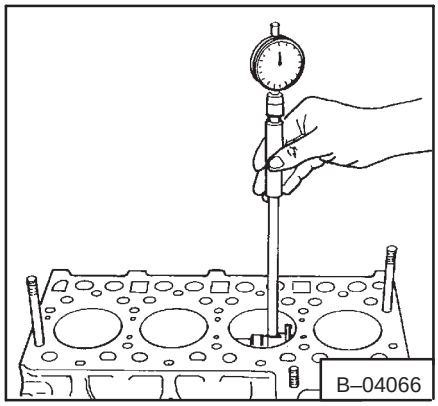


**Fig. 7C–86** Checking Cylinder Wear

# TECHNICAL DATA


| | Paragraph Number | Page Number |
|---|---|---|
| ENGINE SPECIFICATIONS (DEUTZ ENGINE – 641) | 8A–1 | 8A–1 |
| ENGINE SPECIFICATIONS (FORD ENGINE – 642) | 8B–1 | 8B–1 |
| ENGINE SPECIFICATIONS (KUBOTA ENGINE – 643) | 8C–1 | 8C–1 |
| TECHNICAL DATA | 8D–1 | 8D–1 |


**⚠ WARNING**

**Instructions are necessary before operating or servicing machine. Read Operation & Maintenance Manual, and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments. repairs or service. Failure to follow instructions can cause injury or death.**

**W–2144–0189**

## TECHNICAL DATA (642 FORD)


| | Paragraph Number | Page Number |
|---|---|---|
| ENGINE SPECIFICATIONS | 8B–2 | 8B–3 |
| LOADER SPECIFICATIONS | 8B–1 | 8B–1 |


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**W–2144–0189**

## TECHNICAL DATA (643 KUBOTA)


| | Paragraph Number | Page Number |
|---|---|---|
| ENGINE SPECIFICATIONS | 8C–2 | 8C–3 |
| LOADER SPECIFICATIONS | 8C–1 | 8C–1 |


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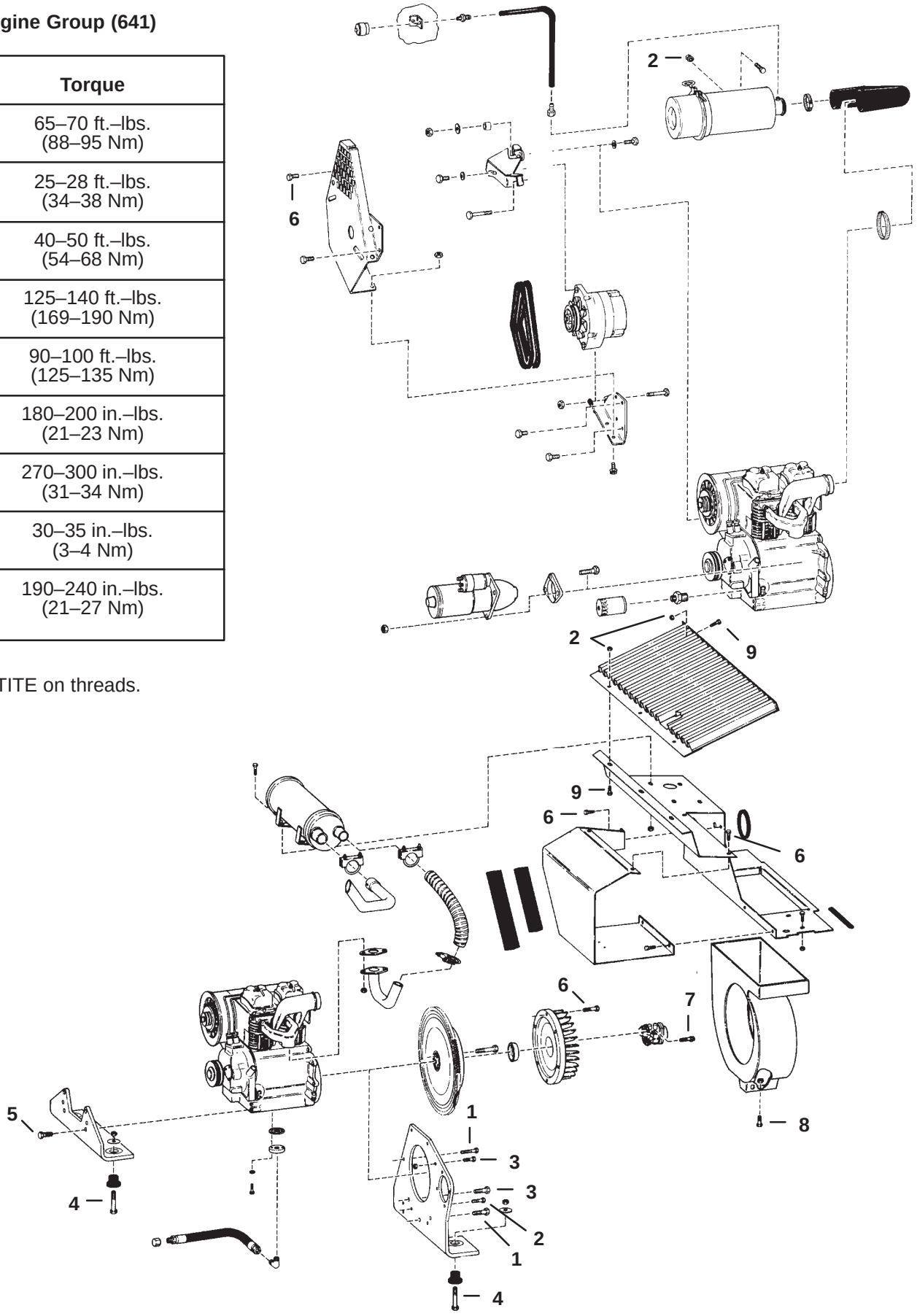
**W–2144–0189**

## 8D–1 TORQUE SPECIFICATIONS

### 8D–1.1 Engine Group (641)

| Ref. | Torque |
|---|---|
| 1. | 65–70 ft.–lbs. (88–95 Nm) |
| 2. | 25–28 ft.–lbs. (34–38 Nm) |
| 3. | 40–50 ft.–lbs. (54–68 Nm) |
| 4. | 125–140 ft.–lbs. (169–190 Nm) |
| 5.* | 90–100 ft.–lbs. (125–135 Nm) |
| 6. | 180–200 in.–lbs. (21–23 Nm) |
| 7.* | 270–300 in.–lbs. (31–34 Nm) |
| 8. | 30–35 in.–lbs. (3–4 Nm) |
| 9. | 190–240 in.–lbs. (21–27 Nm) |

* Put LOCTITE on threads.




E–01345
D–01557

## 8D–2 HYDRAULIC/HYDROSTATIC FLUID SPECIFICATIONS

### 8D–2.1 Hydraulic/Hydrostatic Fluid

Use Clark hydraulic/hydrostatic transmission fluid (P/N 6563328). If this fluid is not available, use 10W–30 or 10W–40 SAE Motor Oil.

DO NOT use automatic transmission fluids in this loader or permanent damage to the transmission will result.

**⚠ WARNING**

**Diesel fuel or hydraulic fluid under pressure can penetrate the skin or eyes. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks but do not use bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention.**

**W–2310–0398**

Where temperatures below zero are common, loaders must be kept in a warm building. Extra warm–up time must be used each time the loader is started during cold temperature conditions. Cold fluid will not flow easily and it makes action of the hydraulic function slower. Loss of fluid flow to the hydrostatic transmission pump (indicated by *TRANS* light ON) will cause transmission damage in less than 60 seconds time.

**IMPORTANT**

**Stop the engine if the TRANS light comes ON and stays ON. The light indicates the loss of fluid flow to the hydrostatic pumps which will cause transmission damage in less than 60 seconds time.**

**I–2078–0895**

MELROE
INGERSOLL-RAND

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640–4
Revision Number

30 December 1983
Date

# SERVICE MANUAL REVISION

**ROUTE TO ATTENTION**

| | |
|---|---|
| PARTS MANAGER | ☐ |
| SERVICE MANAGER | ☒ |
| SALES MANAGER | ☐ |

**AFFECTING:**

**Product** BOBCAT LOADER

**Model** 641, 642, 643

**Manual No.** 6566135 (10–81)

**NOTICE** **Insert This Sheet With The Above Listed Manual For Future Reference.**

The attached pages are a revision to the 641, 642, 643 Service Manual (P/N 6566135).

Take out the following pages from the Service Manual and put in the revised pages as follows:

| TAKE OUT | PUT IN |
|---|---|
| **SECTION 1** | |
| 1–3, 1–4 | 1–3 (Revised Dec. 83), 1–4 (Revised Dec. 83) |
| 1–5, 1–6 | 1–5 (Revised Dec. 83), 1–6 (Revised Dec. 83) |
| 1–11, 1–12 | 1–11 (Revised Dec. 83), 1–12 (Revised Dec. 83) |
| 1–13, 1–14 | 1–13 (Revised Dec. 83), 1–14 (Revised Dec. 83) |
| **SECTION 2** | |
| | *Hydraulic Flow Charts |
| 2–1, 2–2 | 2–1, 2–2 (Revised Dec. 83) |
| 2–3, 2–4 | 2–3 (Revised Dec. 83), 2–4 (Revised Dec. 83) |
| 2–5, 2–6 | 2–5 (Revised Dec. 83), 2–6 |
| 2–11, 2–12 | 2–11 (Revised Dec. 83), 2–12 (Revised Dec. 83) |
| 2–17, 2–18 | 2–17 (Revised Dec. 83), 2–18 (Revised Dec. 83) |
| 2–19, 2–20 | 2–19 (Revised Dec. 83), 2–20 |
| **SECTION 3** | |
| | *Hydrostatic Flow Chart |
| 3–7, 3–8 | 3–7 (Revised Dec. 83), 3–8 (Revised Dec. 83) |
| 3–9, 3–10 | 3–9 (Revised Dec. 83), 3–10 (Revised Dec. 83) |
| 3–11, 3–12 | 3–11 (Revised Dec. 83), 3–12 (Revised Dec. 83) |
| 3–19 (Revised Aug. 83), 3–19a (Added Aug. 83) | 3–19 (Revised Dec. 83), 3–19a (Revised Dec. 83) |
| 3–20 (Revised Aug. 83) | 3–20 (Revised Dec. 83), 3–20a (Added Dec. 83) |
| 3–21, 3–22 | 3–21 (Revised Dec. 83), 3–22 (Revised Dec. 83) |
| 3–23, 3–24 | 3–23 (Revised Dec. 83), 3–24 (Revised Dec. 83) |
| 3–25, 3–26 | 3–25 (Revised Dec. 83), 3–26 |
| 3–35 | 3–35 (Revised Dec. 83) |

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**AFFECTING:**

**Product** BOBCAT LOADER

**Model** 641, 642, 643

**Manual No.** 6566135 (10–81)

**NOTICE** **Insert This Sheet With The Above Listed Manual For Future Reference.**

The attached sheets are a revision to the 641, 642, 643 Service Manual (P/N 6566135).

This revision includes new information on Pump Alignment.

Remove the following pages from the Service Manual and put in the revised pages as follows:

| TAKE OUT | PUT IN |
|---|---|
| 3–23 (Revised Aug. 84), 3–24 (Revised Mar. 84) | 3–23 (Revised Aug. 84), 3–24 (Revised July 85) |

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# SERVICE MANUAL REVISION

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| SERVICE MANAGER | ☒ |
| SALES MANAGER | ☐ |

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| TAKE OUT | PUT IN |
|---|---|
| 7C–9 (Revised Apr. 89), 7C–10 (Revised Apr. 89)<br>7C–17 (Revised Dec. 83), 7C–18 | 7C–9 (Revised Apr. 89), 7C–10 (Revised Oct. 90)<br>7C–17 (Revised Oct. 90), 7C–18 |
| 8C–3 (Revised Apr. 89), 8C–4 (Revised Apr. 89) | 8C–3 (Revised Apr. 89), 8C–4 (Revised Oct. 90) |

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