HYDRAULIC SYSTEM

HYDRAULIC SYSTEM (CONT'D)

HYDRAULIC SYSTEM (CONT'D)

TIGHTEN ALL HARDWARE PER SIZE TO GRADE 5 TORQUE (SEE STANDARD TORQUE SPECIFICATIONS FOR BOLTS, SECTION SPEC-01) UNLESS OTHERWISE SPECIFIED.

GLOSSARY OF HYDRAULIC/HYDROSTATIC SYMBOLS FOR LOADERS

SYMBOL DESCRIPTION

FLOW LINES and CONNECTIONS

WORKING CIRCUITS - Continuous, Solid Line - Working (Main) Line, Return Line (line conducting fluid from working devices to the reservoir) and Feed Line (main line conductor)

PILOT PRESSURE - Dashed Line - Pilot Line (line which conducts control fluid)

DRAIN CIRCUITS - Dotted Line - Drain Line (drain or bleed line - line conducting fluid from a component housing to the reservoir)

COMPONENTS - Long Chain Line - Enclosure outline for several components assembled in one unit

MECHANICAL CONNECTIONS - Double Line (Shaft, Lever, Piston Rod)

CONNECTED JUNCTION OF OIL LINES (Flow Line Connection)

OIL LINES CROSSING (NOT Connected)

COUPLER - Quick-Acting Coupling (uncoupled, closed by non-return valve)

SYMBOL DESCRIPTION

BASIC and MISCELLANEOUS SYMBOLS

RESTRICTION - Line with Fixed Restriction - Affected by Viscosity (property of resistance to flowing fluid)

VARIABLE ADJUSTMENT RESTRICTION - Regulated or Variable Restriction

TEMPERATURE CONTROL - (indication of temperature)

TEMPERATURE INDICATOR - (temperature measurement - thermometer)

FILTER (strainer or screen) - For fluid conditioning

VENTED AND FILTERED RESERVOIR (reservoir open to atmosphere)

OIL COOLER (heat exchanger) - The arrows in the diamond indicate the extraction of heat (heat dissipation)

PRESSURE SENSOR - Varies electric signal with pressure

DIFFERENTIAL PRESSURE SWITCH - Switch activates when pressure difference reaches specified level

PRESSURE SWITCH - Switch activates when pressure reaches specified level

MUFFLER (silencer) - Reduces noise

Printed in U.S.A.

MC 2340 (6-2-98)

GLOSSARY OF HYDRAULIC/HYDROSTATIC SYMBOLS FOR LOADERS

SYMBOL DESCRIPTION

CYLINDER: Equipment to convert hydraulic energy into linear energy and in which the fluid pressure operates alternately in both directions (forward and backward strokes)

DOUBLE ACTING HYDRAULIC CYLINDER, UNEQUAL DISPLACEMENT - With single piston rod

DOUBLE ACTING HYDRAULIC CYLINDER, UNEQUAL DISPLACEMENT and CUSHION ON ONE END - With single piston rod

PUMP: To convert mechanical energy into hydraulic energy

FIXED CAPACITY DISPLACEMENT HYDRAULIC PUMP - With one direction of flow

VARIABLE CAPACITY DISPLACEMENT BIDIRECTIONAL HYDRAULIC PUMP - With two directions of flow (bidirectional)

MOTOR: To convert hydraulic energy into rotary mechanical energy

FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDRAULIC MOTOR - With two directions of flow (bidirectional)

SYMBOL DESCRIPTION

CONTROL MECHANISMS

CONTROL VALVE WITH DETENT (Holds Valve in Position) - device for maintaining a given position (mechanical)

CONTROL VALVE ACTIVATED BY A PULL BUTTON (manual)

CONTROL VALVE ACTIVATED BY A PUSH-PULL BUTTON (manual)

CONTROL VALVE ACTIVATED BY A LEVER (manual)

CONTROL VALVE ACTIVATED BY A PEDAL (manual)

CONTROL VALVE WITH SPRING RETURN (mechanical)

CONTROL VALVE ACTIVATED BY AN ELECTRIC SOLENOID (electrical)

CONTROL VALVE ACTIVATED BY PILOT PRESSURE (indirect control, pilot actuated by application of pressure)

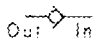
Printed in U.S.A.

MC 2340-2 (6-2-98)

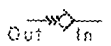
GLOSSARY OF HYDRAULIC/HYDROSTATIC SYMBOLS FOR LOADERS

SYMBOL DESCRIPTION

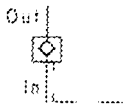
NON-RETURN VALVE, SHUTTLE VALVE: Valve which allows free flow in one direction only



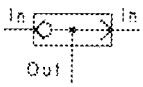
NON-RETURN VALVE (Check Valve) - Used as Replenishing Valve, Load Check Valve or Anticavitation Valve - Opens if the inlet pressure is higher than the Outlet pressure. Often contains internal spring which has NO significant pressure value



SPRING LOADED VALVE (Bypass Valve) - Opens if the inlet pressure is greater than the Outlet pressure plus the spring pressure



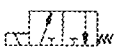
PILOT CONTROLLED NON-RETURN VALVE - It is possible to open the valve by pilot pressure



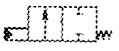
SHUTTLE VALVE - The inlet port connected to the higher pressure is automatically connected to the Outlet port while the other inlet port is closed

DIRECTIONAL CONTROL VALVE: Valve providing for the opening (fully or restricted) or the closing of one or more flow paths (represented by several squares)

TWO PORTS and CLOSED FLOW PATHS



SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (Two Position) - controlled by an electric solenoid (with return spring)

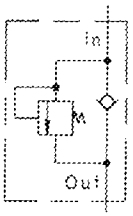


PILOT ACTIVATED DIRECTIONAL CONTROL VALVE (Two Position) - controlled by pressure (with return spring)

SYMBOL DESCRIPTION

PRESSURE CONTROL VALVE: Valve ensuring the control of pressure

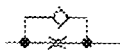
RELIEF VALVE - When the inlet pressure overcomes the opposing force of the spring, the valve opens permitting flow from the Outlet port.



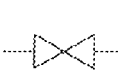
RELIEF/REPLENISHING VALVE or RELIEF/ANTICAVITATION VALVE - When the inlet pressure overcomes the opposing force of the spring, the valve opens permitting flow from the Outlet port - Allows free flow in the opposite direction

DUAL PRESSURE RELIEF VALVE - When the inlet pressure overcomes the opposing force of the spring, the valve opens permitting flow from the Outlet port. Pilot pressure provides a second pressure value.

FLOW CONTROL VALVE: Valve controlling the flow in one or both directions



ONE WAY RESTRICTOR VALVE (Non-Return Valve with Restriction) - Unit allowing free flow in one direction but restricted flow in the other direction



TOW VALVE - Normally in closed position

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MC 2340-3 (6-2-98)

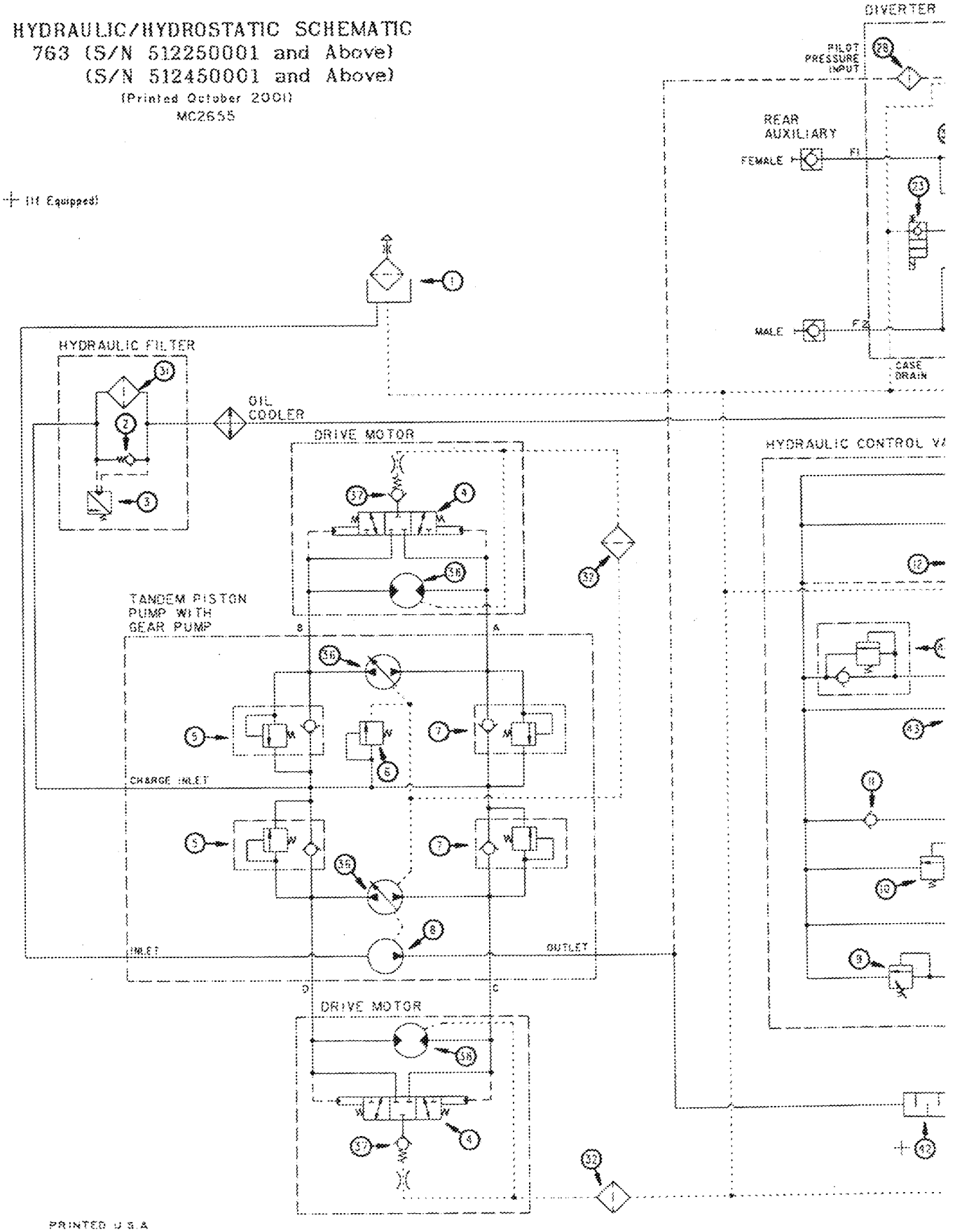
Bobcat®

HYDRAULIC/HYDROSTATIC SCHEMATIC
763 (S/N 512250001 and Above)
(S/N 512450001 and Above)

(Printed October 2001)

MC2655

(If Equipped)



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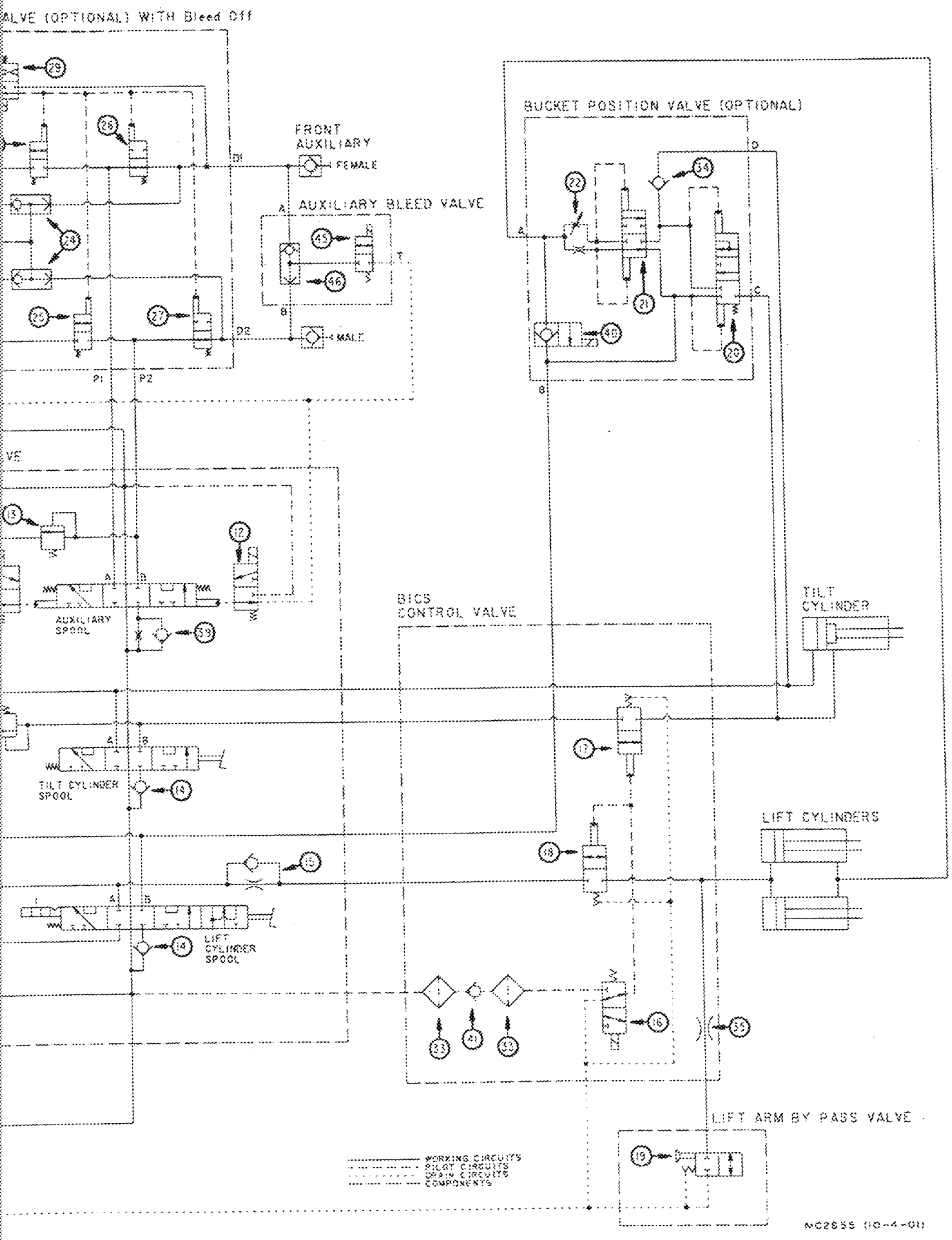

ALVE (OPTIONAL) WITH Bleed Off
FRONT AUXILIARY
FEMALE
AUXILIARY BLEED VALVE
MALE
P1
P2
BUCKET POSITION VALVE (OPTIONAL)
AUXILIARY SPOOL
BICS CONTROL VALVE
TILT CYLINDER
TILT CYLINDER SPOOL
LIFT CYLINDERS
LIFT CYLINDER SPOOL
LIFT ARM BY PASS VALVE
WORKING CIRCUITS
PILOT CIRCUITS
DRAIN CIRCUITS
COMPONENTS
MC2655 (10-4-01)

HYDRAULIC/HYDROSTATIC S(
763 (S/N 512250001 AND
(S/N 512450001 AND

(Printed October 2001)
MC2655LEGEND

LEGEND

1. RESERVOIR:
   Capacity . . . 14 Qts. (13.2 L)
2. SPRING LOADED FILTER BYPASS VALVE: 45-55 PSI (311-379 kPa)
3. DIFFERENTIAL PRESSURE SWITCH: 36-44 PSI (250-300 kPa) Normally Closed
4. DRIVE MOTOR SHUTTLE VALVE
5. RELIEF/REPLENISHING VALVE - HIGH PRESSURE: 5000 PSI (34475 kPa)
6. RELIEF VALVE - CHARGE INLET: 155-165 PSI (1069-1138 kPa) at 14.3 GPM (54 L/min.) at 2650 RPM W/120° F. (49° C.) Fluid
7. RELIEF/REPLENISHING VALVE -HIGH PRESSURE: 5000 PSI (34475 kPa)
8. HYDRAULIC PUMP: Gear Type 14.3 GPM (54 L/min.) at 2650 RPM at 1150 PSI (7929 kPa)
9. RELIEF VALVE - MAIN: 2900-3000 PSI (20000-20685 kPa) at Front Quick Couplers
10. RELIEF VALVE - PORT: 3500 PSI (24132 kPa)
11. ANTICAVITATION VALVE
12. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY
13. RELIEF VALVE - PORT: (Optional) 3500 PSI (24132 kPa)
14. LOAD CHECK VALVE
15. ONE WAY RESTRICTOR VALVE (Optional - ADVANCED HAND CONTROLS ONLY)
16. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT/TILT CONTROL
17. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - BICS LOCK VALVE - TILT CONTROL
18. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - BICS LOCK VALVE - LIFT CONTROL
19. PULL BUTTON ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT ARM BY PASS
20. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
21. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
22. FLOW DIVIDER ADJUSTMENT VALVE
23. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BLEED OFF REAR AUXILIARY ("SV2")
24. LOAD SHUTTLE VALVE - BLEED OFF
25. P
26. P
27. P
28. F
29. S
30. P
31. F
32. F
33. F
34. C
35. R

Printed in U.S.A.

HEMATIC
ABOVE)
ABOVE)

LOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY CLOSED

LOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY OPEN

LOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY OPEN

LTER - DIVERTER VALVE (SINTERED BRONZE)

OLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - TO ACTIVATE REAR AUXILIARY ("SVI")

LOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY CLOSED

LTER - HYDRAULIC (CANISTER)

LTER - CASE DRAIN (SINTERED BRONZE)

LTER - BICS CONTROL VALVE (SCREEN)

HECK VALVE - BUCKET POSITION VALVE

STRICTION

(36) VARIABLE CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC PUMP

(37) SHUTTLE RELIEF VALVE: (Not Adjusiable - Factory Set) 65 PSI (448 kPa)

(38) FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC MOTOR

(39) ONE WAY RESTRICTOR VALVE

(40) SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BUCKET POSITION VALVE (ON/OFF)

(41) CHECK VALVE - BICS CONTROL VALVE

(42) MUFFLER (If Equipped)

(43) RELIEF VALVE - PORT: 3500 PSI (24132 kPa)

(44) RELIEF/ANTICAVITATION VALVE - PORT (TILT BASE END) 3500 PSI (24132 kPa)

(45) SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY BLEED VALVE (USED ON MACHINES WITHOUT REAR AUXILIARY)

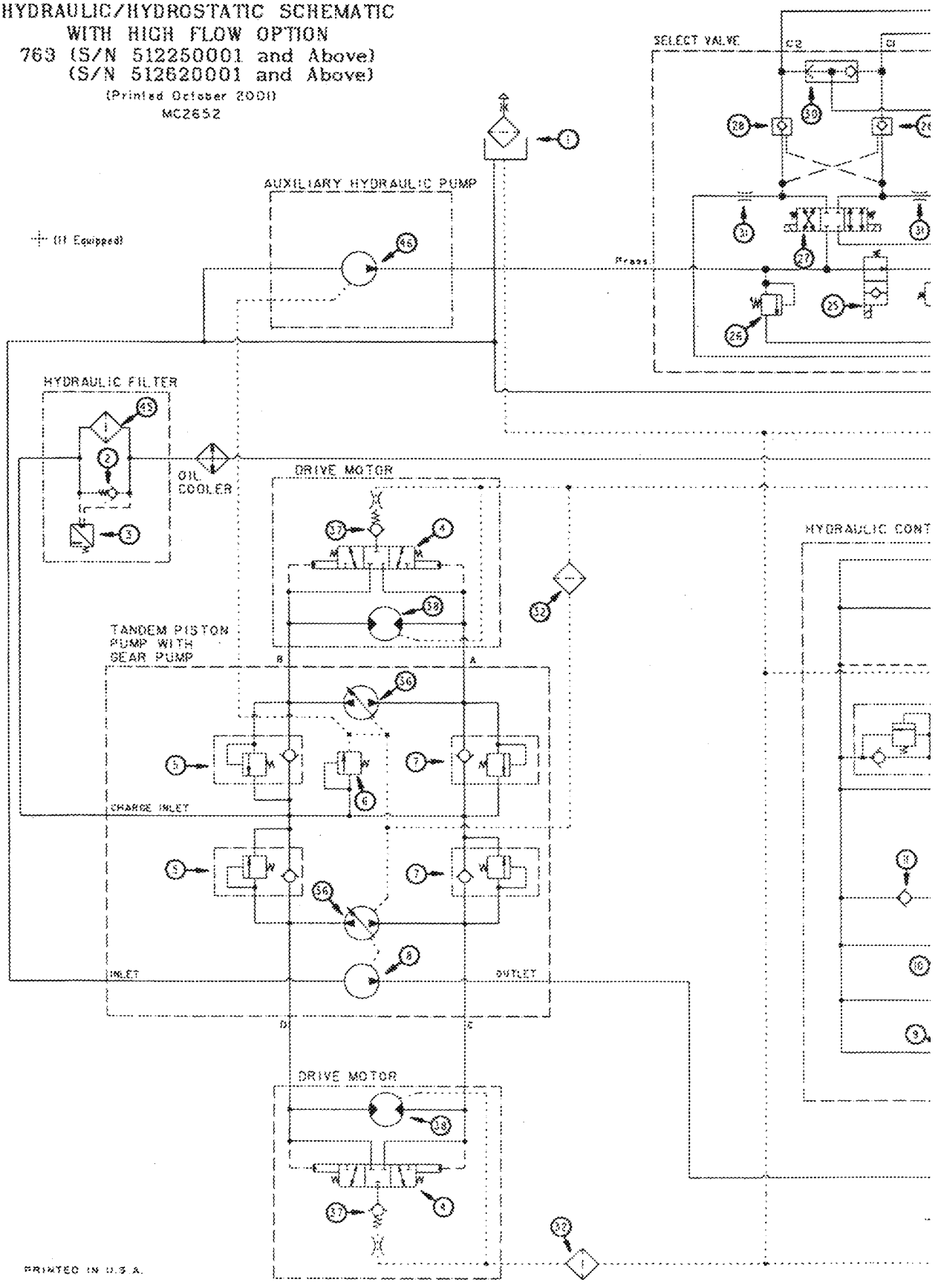
(46) LOAD SHUTTLE VALVE - AUXILIARY BLEED VALVE (USED ON MACHINES WITHOUT REAR AUXILIARY)

NOTE: Unless otherwise specified springs have NO significant pressure value.

HYDRAULIC/HYDROSTATIC SCHEMATIC
WITH HIGH FLOW OPTION
763 (S/N 512250001 and Above)
(S/N 512620001 and Above)

(Printed October 2001)

MC2652



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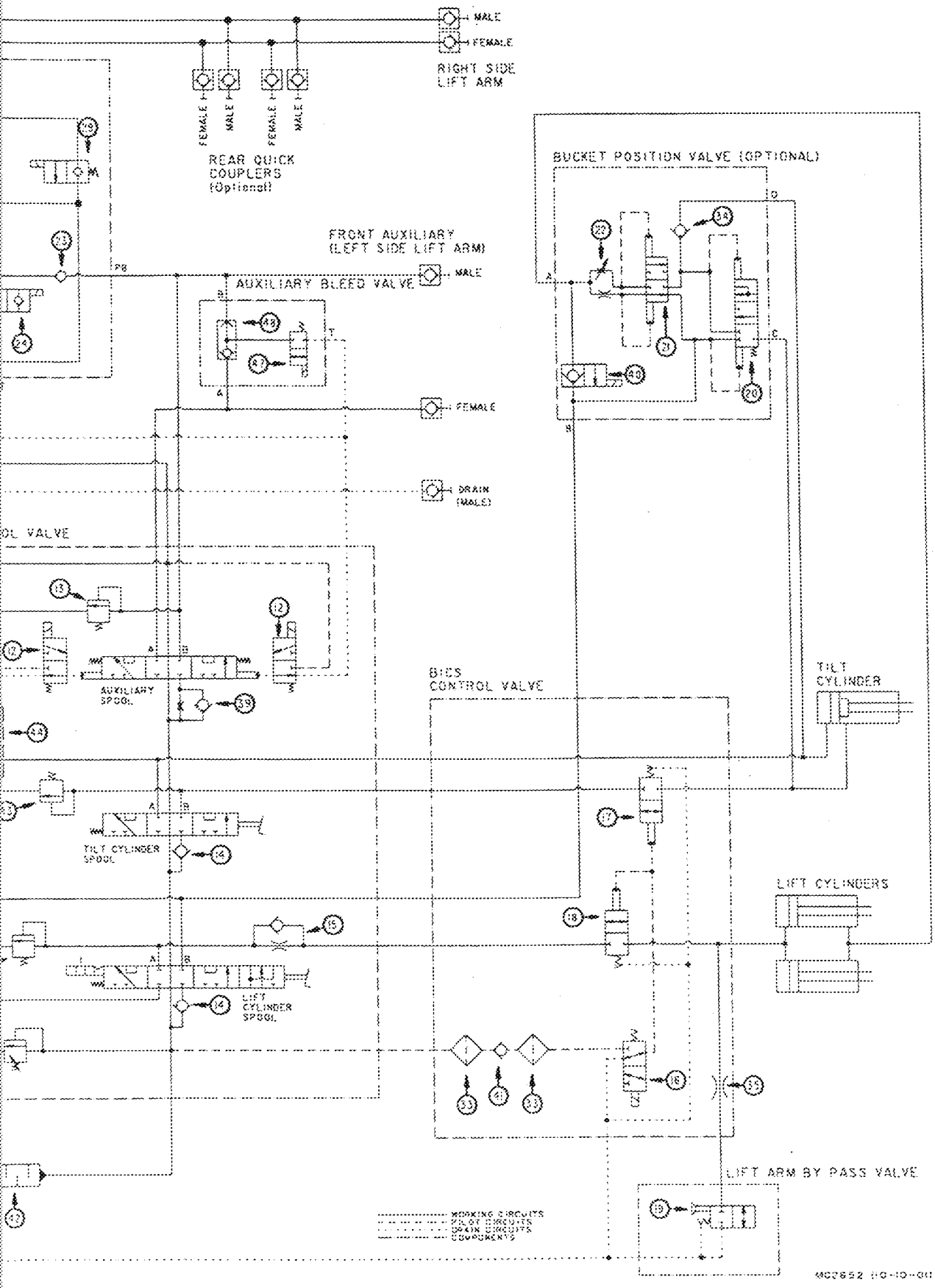
MALE
FEMALE
RIGHT SIDE LIFT ARM
FEMALE
MALE
FEMALE
MALE
REAR QUICK COUPLERS (Optional)
BUCKET POSITION VALVE (OPTIONAL)
FRONT AUXILIARY (LEFT SIDE LIFT ARM)
MALE
AUXILIARY BLEED VALVE
FEMALE
DRAIN (MALE)
AUXILIARY SPOOL
BICS CONTROL VALVE
TILT CYLINDER
TILT CYLINDER SPOOL
LIFT CYLINDERS
LIFT CYLINDER SPOOL
LIFT ARM BY PASS VALVE
WORKING CIRCUITS
PILOT CIRCUITS
DRAIN CIRCUITS
EQUIPMENTS
MC2852 (10-10-01)

HYDRAULIC/HYDROSTATIC SCH
WITH HIGH FLOW OPTIO
763 (S/N 512250001 AND /
(S/N 512620001 AND /

(Printed October 2001)

MC2652LEGEND

LEGEND

1. RESERVOIR:
   Capacity . . . 24 Qts. (23 L)
2. SPRING LOADED FILTER BYPASS VALVE: 45-55 PSI (311-379 kPa)
3. DIFFERENTIAL PRESSURE SWITCH: 36-44 PSI (250-300 kPa) Normally Closed
4. DRIVE MOTOR SHUTTLE VALVE
5. RELIEF/REPLENISHING VALVE - HIGH PRESSURE: 5000 PSI (34475 kPa)
6. RELIEF VALVE - CHARGE INLET: 155-165 PSI (1069-1138 kPa) at 15.0 GPM (56,8 L/min.) at 2850 RPM W/120° F. (49° C.) Fluid
7. RELIEF/REPLENISHING VALVE -HIGH PRESSURE: 5000 PSI (34475 kPa)
8. HYDRAULIC PUMP: Gear Type 15.0 GPM (56,8 L/min.) at 2850 RPM at 1150 PSI (7929 kPa)
9. RELIEF VALVE - MAIN: 2900-3000 PSI (20000-20685 kPa) at Front Quick Couplers
10. RELIEF VALVE - PORT: 3500 PSI (24132 kPa)
11. ANTICAVITATION VALVE
12. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY
13. RELIEF VALVE - PORT: (Optional) 3500 PSI (24132 kPa)
14. LOAD CHECK VALVE
15. ONE WAY RESTRICTOR VALVE (Optional - ADVANCED HAND CONTROLS ONLY)
16. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT/TILT CONTROL
17. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - BICS LOCK VALVE - TILT CONTROL
18. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - BICS LOCK VALVE - LIFT CONTROL
19. PULL BUTTON ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT ARM BY PASS
20. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
21. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
22. FLOW DIVIDER ADJUSTMENT VALVE
23. CHECK VALVE
24. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - HIGH FLOW
25. SO
26. RE
27. SO
28. PI
29. SO
30. LO
31. RE
32. FI
33. FI
34. CH
35. RE
36. VA
37. SH (N
38. FI
39. OI

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EMATIC
N
BOVE)
BOVE)

ENOID ACTIVATED DIRECTIONAL
ONTROL VALVE - DIVERTER
IEF VALVE - MAIN (HIGH FLOW)
3000 PSI (20685 kPa)
0.25 GPM AND 90 DEGREES F.
3450 PSI (23788 kPa)
10.0 GPM AND 120 DEGREES F.
ENOID ACTIVATED DIRECTIONAL
ONTROL VALVE (TWO COIL)
OT TO OPEN CHECK VALVE
ENOID ACTIVATED DIRECTIONAL
ONTROL VALVE - BLEED OFF
D SHUTTLE VALVE
TRICTION
TER - CASE DRAIN (SINTERED
RONZE)
TER - BICS CONTROL VALVE
SCREEN)
CK VALVE - BUCKET POSITION
ALVE
TRICTION
IABLE CAPACITY DISPLACEMENT
IDIRECTIONAL HYDROSTATIC
UMP
TTLE RELIEF VALVE:
t Adjustable - Factory Set)
65 PSI (448 kPa)
ED CAPACITY DISPLACEMENT
IDIRECTIONAL HYDROSTATIC
OTOR
WAY RESTRICTOR VALVE

(40) SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BUCKET POSITION VALVE (ON/OFF)

(41) CHECK VALVE - BICS CONTROL VALVE

(42) MUFFLER (If Equipped)

(43) RELIEF VALVE - PORT:
3500 PSI (24132 kPa)

(44) RELIEF/ANTICAVITATION VALVE - PORT (TILT BASE END)
3500 PSI (24132 kPa)

(45) FILTER - HYDRAULIC (CANISTER)

(46) AUXILIARY HYDRAULIC PUMP:
PUMP CAPACITY:
10 GPM (37,8 L/min.)
at 2850 RPM

(47) SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY BLEED VALVE (USED ON MACHINES WITHOUT REAR AUXILIARY)

(48) LOAD SHUTTLE VALVE - AUXILIARY BLEED VALVE (USED ON MACHINES WITHOUT REAR AUXILIARY)

NOTE: Unless otherwise specified springs have NO significant pressure value.

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-2003-0886

Tighten Procedures

For tightening torques for hydraulic fittings, tubelines etc., See Contents, Page Section SPEC-01. - Hydraulic Connection Specifications.

Troubleshooting Chart

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

⚠ WARNING

Check for correct function after adjustments, repairs or service. Failure to make correct repairs or adjustments can cause injury or death.

W-2004-1285

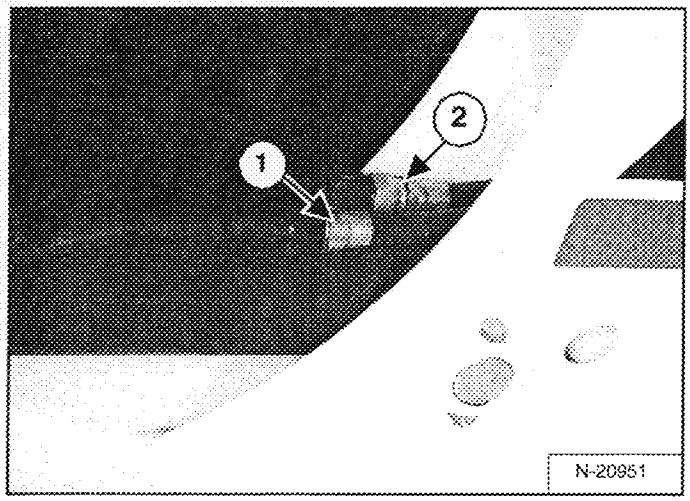
PROBLEM	CAUSE
The hydraulic system will not operate.	1, 2, 3, 5, 8
The transmission warning light comes ON when hydraulics are operating.	1, 3,
Slow hydraulic system action.	1, 3, 4, 6, 8
Hydraulic action is not smooth.	1, 4, 5, 6, 7
Lift arms go up slowly at full engine RPM.	1, 3, 4, 5, 6, 7, 8, 9
The lift arms or Bob-Tach will move when the pedal is in neutral position.	4
By-pass valve stuck.	12
By-pass valve stem bent or broke.	13

KEY TO CORRECT THE CAUSE
1. The fluid level is not correct.
2. The pedal linkage is disconnected.
3. The hydraulic pump has damage.
4. The pedal linkage is not adjusted correctly.
5. Relief valve is not at the correct pressure.
6. Suction leak on the inlet side of the hydraulic pump.
7. Fluid is cold. Wrong viscosity fluid.(See Section SPEC-01)
8. Using the loader for more than its rated capacity.
9. Internal leak in the lift cylinder(s).
10. External leak from the lift cylinder(s).
11. Damaged lift spool.
12. Rotate shaft.
13. Replace manual spool cartridge.

CYLINDER (LIFT)

Checking

Figure 20-20-1



Lower the lift arms. Stop the engine. Pull up on the lift arm by-pass control. Raise the seat bar.

Check only one cylinder at a time.

Disconnect the hose (Item 1) **[Figure 20-20-1]** from the lift cylinder rod end port.

Disconnect the hose (Item 2) **[Figure 20-20-1]** from the lift cylinder base end port.

⚠ WARNING

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

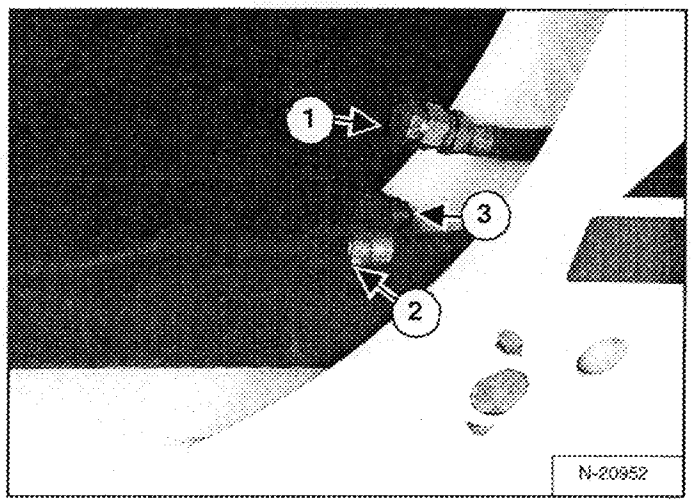
W-2103-1285

⚠ WARNING

Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

W-2072-0496

Figure 20-20-2



Install a plug in the hose (Item 1) **[Figure 20-20-2]** and tighten.

Connect the hose (Item 2) **[Figure 20-20-2]** to the lift cylinder rod end port.

Engage the parking brake. Lower the seat bar. Start the engine. Press the PRESS TO OPERATE BUTTON. Push the top (toe) of the lift pedal.

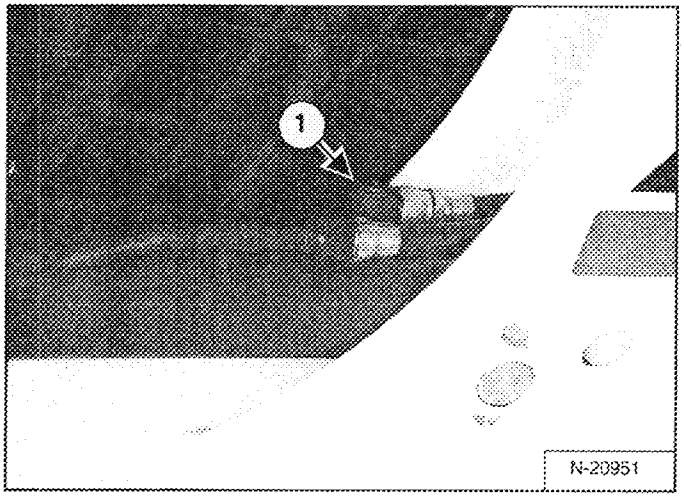
If there is any leakage from the base end cylinder port (Item 3) **[Figure 20-20-2]**, remove the lift cylinder for repair.

Repeat the procedure to check the other lift cylinder.

CYLINDER (LIFT) (CONT'D)

Removal And Installation

Figure 20-20-3

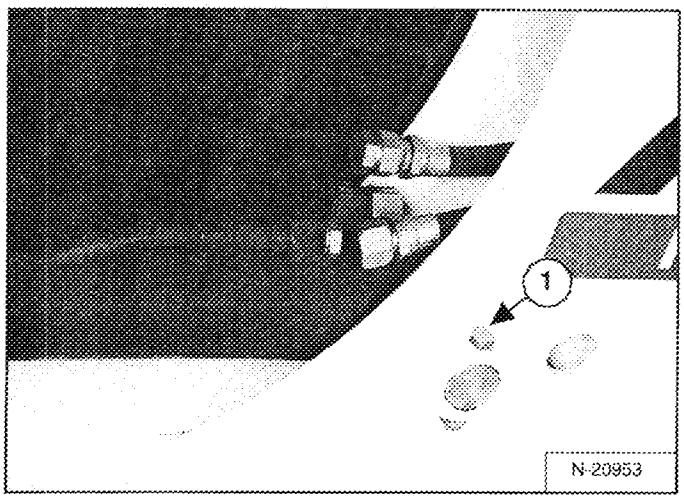


Stop the engine. Pull up on the lift arm by-pass control and move the lift pedal to release the hydraulic pressure.

Disconnect the hoses (Item 1) **[Figure 20-20-3]** from the lift cylinder.

Install plugs in the hoses and tighten.

Figure 20-20-4

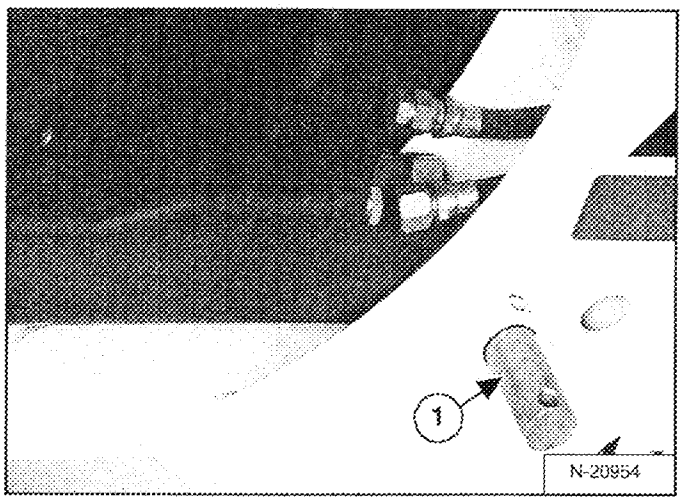


Remove the retainer bolt (Item 1) **[Figure 20-20-4]** and nut from the lift arm pin (both sides).

Installation: Tighten the bolt and nut to 18-20 ft.-lbs. (24-27 Nm) torque.

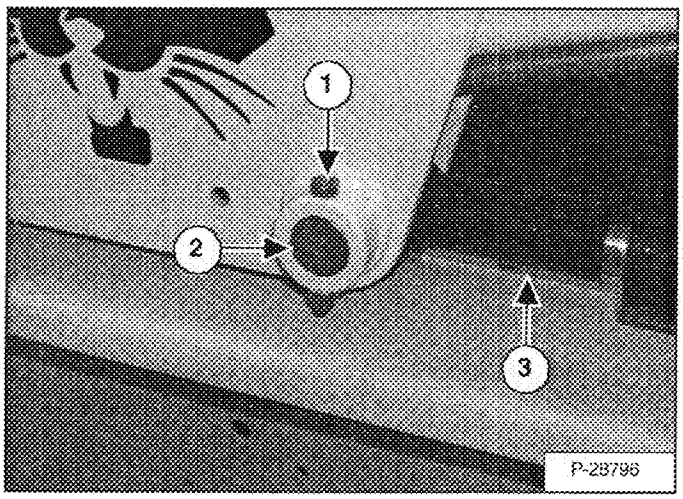
NOTE: Remove the air cleaner (See Contents, Page 20-01) to remove the left rear pivot pin. The pin must be driven out from the engine compartment.

Figure 20-20-5



Remove the lift arm pivot pin (Item 1) **[Figure 20-20-5]** (both sides).

Figure 20-20-6



Remove the retainer bolt (Item 1) **[Figure 20-20-6]** and nut from the lift cylinder rod end pivot pin (both sides).

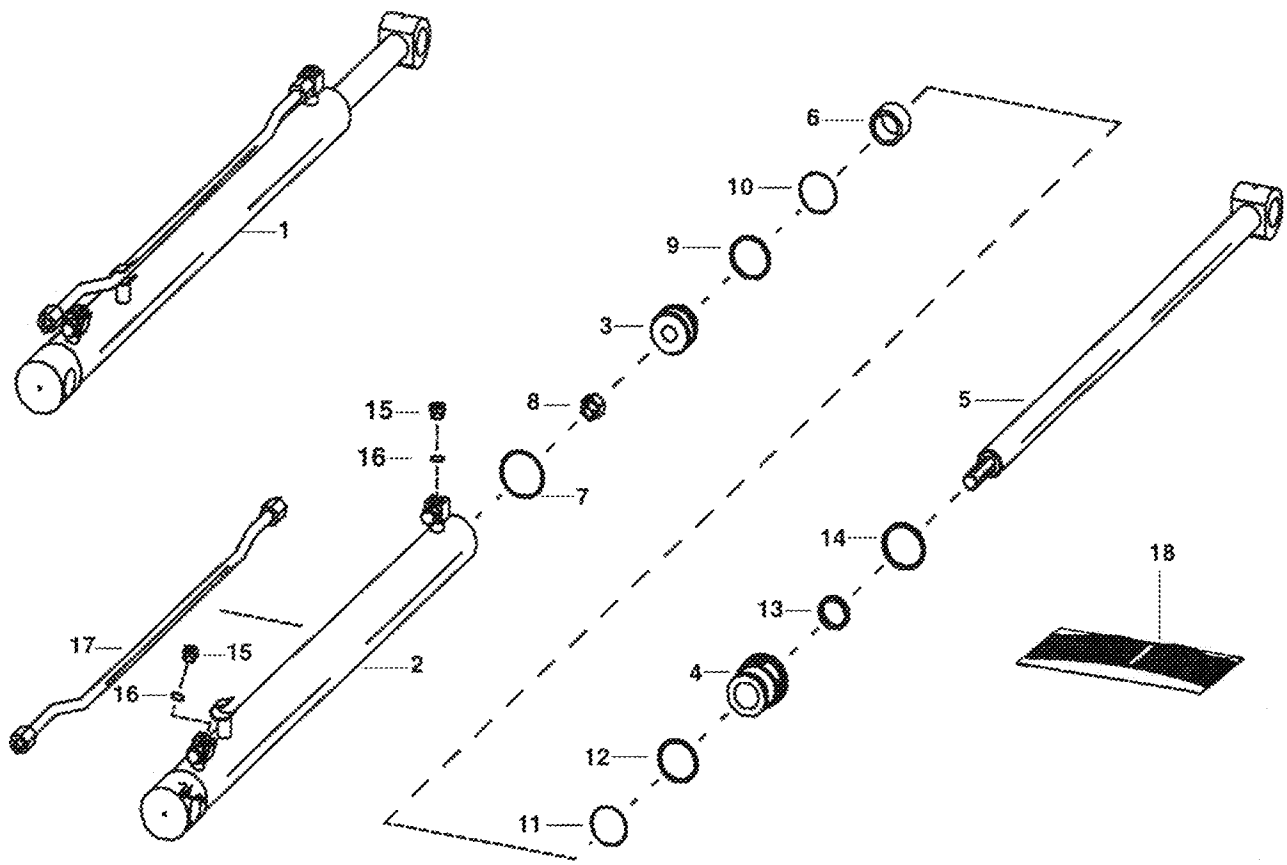
Installation: Tighten the bolt and nut to 18-20 ft.-lbs. (24-27 Nm) torque.

Remove the lift cylinder rod end pivot pin (Item 2) **[Figure 20-20-6]**.

Remove the lift cylinder (Item 3) **[Figure 20-20-6]** from the loader.

Identification

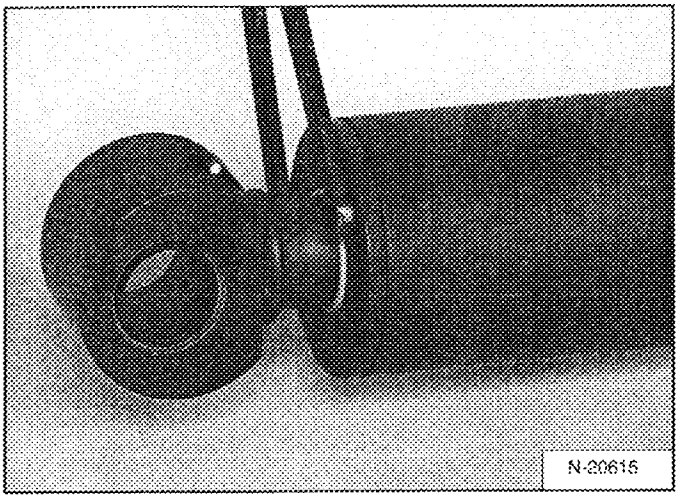
1. Cylinder
2. Case
3. Piston
4. Head
5. Rod
6. Spacer
7. O-ring
8. Nut
9. Ring
10. O-ring
11. O-ring
12. Washer
13. Seal
14. Seal
15. Plug
16. O-ring
17. Tube
18. Seal kit



TS-1096

Disassembly

Figure 20-20-7



Use the following tools to disassemble the cylinder:

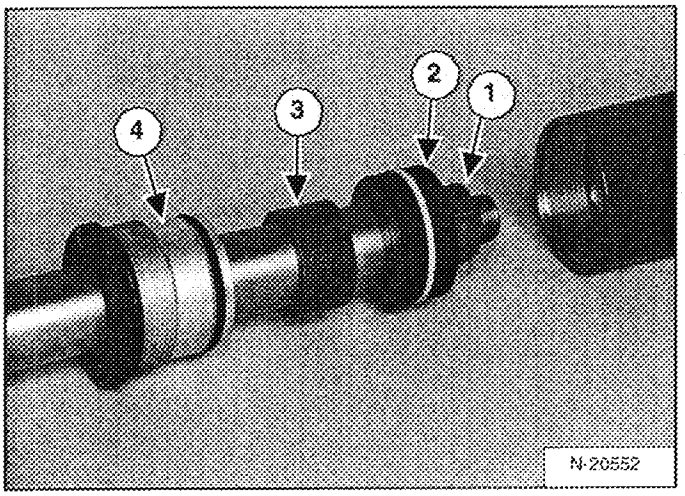
MEL1074 - O-ring Seal Hook
Spanner Wrench

Hold the hydraulic cylinder over a drain pan and move the rod in and out slowly to remove the fluid from the cylinder.

Put the base end of the cylinder in a vise.

Use a spanner wrench to loosen the head **[Figure 20-20-7]**.

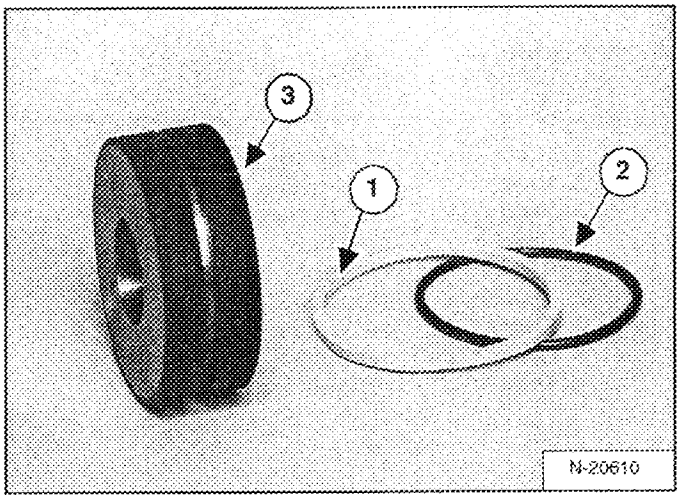
Figure 20-20-8



Remove the head and the rod assembly from the cylinder **[Figure 20-20-8]**. Put the rod end in a vise.

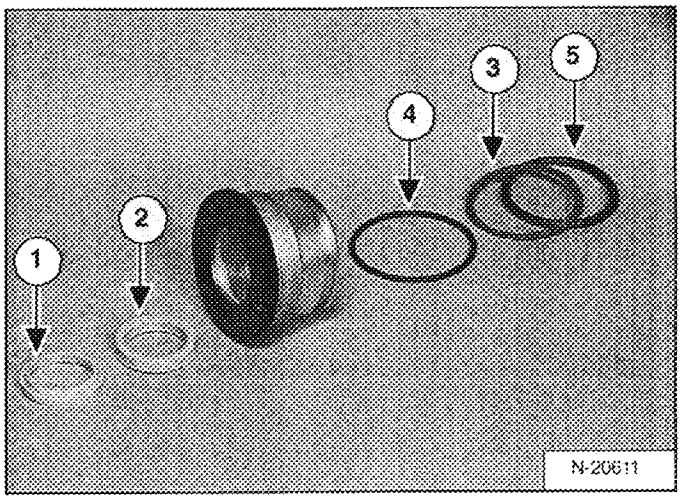
Remove the nut (Item 1), piston (Item 2), spacer (Item 3) and head (Item 4) **[Figure 20-20-8]**.

Figure 20-20-9



Piston: Remove the seal (Item 1) **[Figure 20-20-9]**, and O-ring (Item 2) **[Figure 20-20-9]** from the piston (Item 3) **[Figure 20-20-9]**.

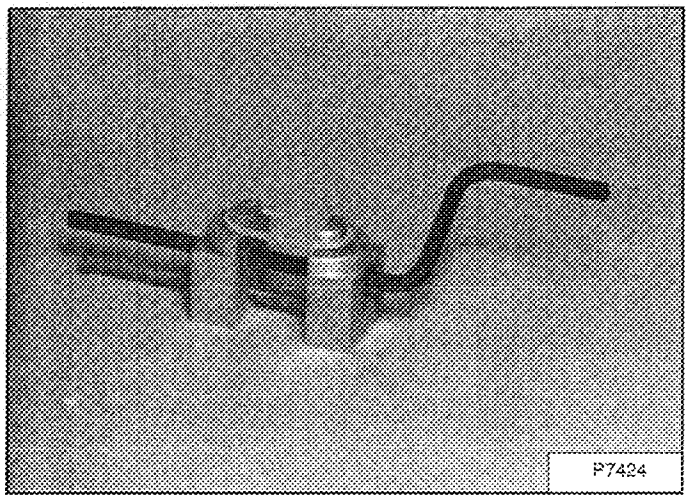
Figure 20-20-10



Remove the wiper seal (Item 1), and rod seal (Item 2), the back up washer (Item 3), the thin O-ring (Item 4) and the thick O-ring (Item 5) **[Figure 20-20-10]** from the head.

Assembly

Figure 20-20-11



Use the following tools to assembly the cylinder:

MEL1396-Seal Installation Tool
MEL1033-Rod Seal Installation Tool
Piston Ring Compressor
Spanner Wrench

Wash the cylinder parts in solvent and air dry them.

Inspect the cylinder parts for nicks, scratches or other damage. Replace any damaged parts.

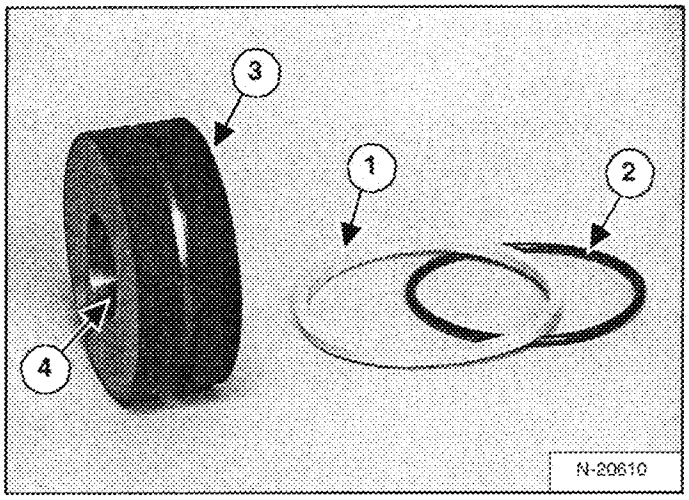
Always install new O-rings and seals during assembly.

Lubricate all O-rings and seals with hydraulic oil during installation.

Install the new seal on the tool and slowly stretch it until it fits the piston **[Figure 20-20-11]**.

Allow the seal to stretch for 30 seconds before installing it on the piston.

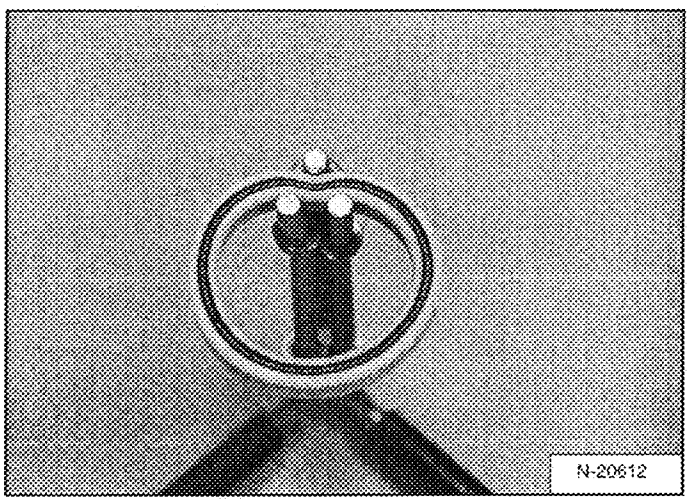
Figure 20-20-12



Piston: Install the O-ring (Item 1) and seal (Item 2) on the piston (Item 3) **[Figure 20-20-12]**.

NOTE: The piston center hole (Item 4) [Figure 20-20-12] has a bevel on one end. The bevel goes toward the rod.

Figure 20-20-13

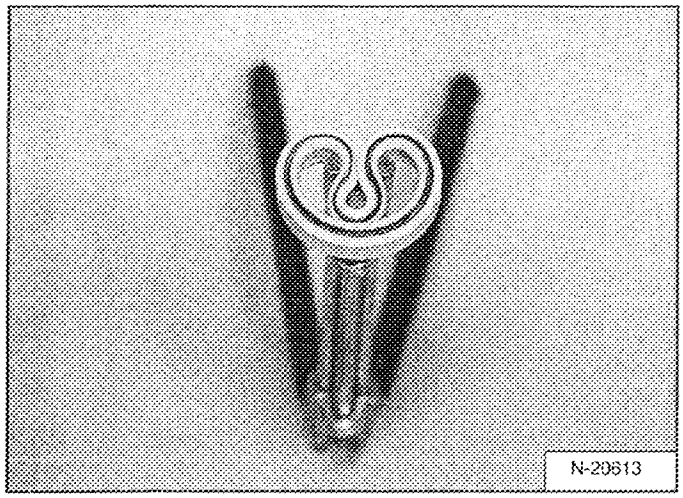


Install the rod seal on the rod seal tool **[Figure 20-20-13]**.

NOTE: During installation the O-ring side of the seal must be toward the inside of the cylinder.

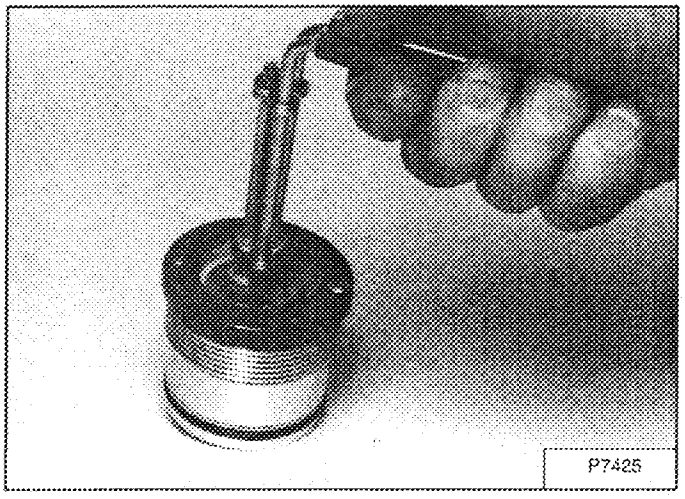
Assembly (Cont'd)

Figure 20-20-14



Rotate the handles to collapse the rod seal **[Figure 20-20-14]**.

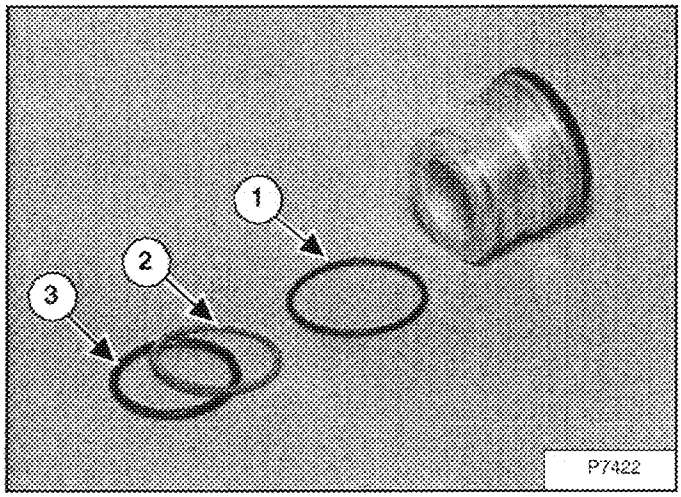
Figure 20-20-15



Install the rod seal in the head **[Figure 20-20-15]**.

Install the wiper seal with the wiper toward the outside of the head.

Figure 20-20-16

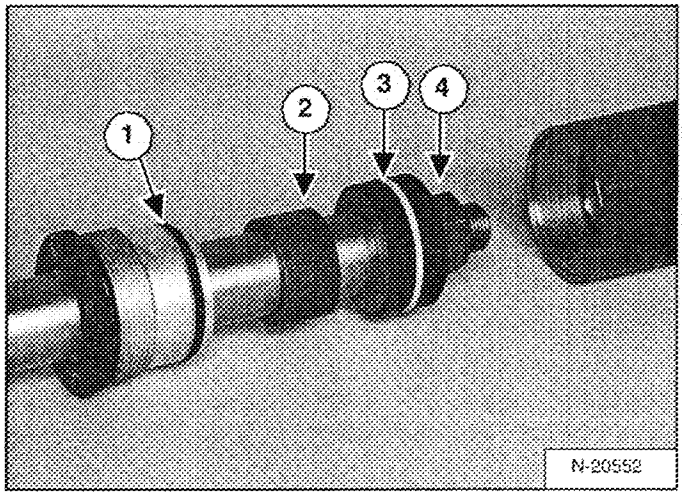


Install the thin O-ring (Item 1) **[Figure 20-20-16]**.

Install the back-up washer (Item 2) and thick O-ring (Item 3) **[Figure 20-20-16]** into the groove on the head.

NOTE: Clean and dry the threads before installing the nut. Install the new nut from the seal kit.

Figure 20-20-17



Install the head (Item 1), and spacer (Item 2) **[Figure 20-20-17]**.

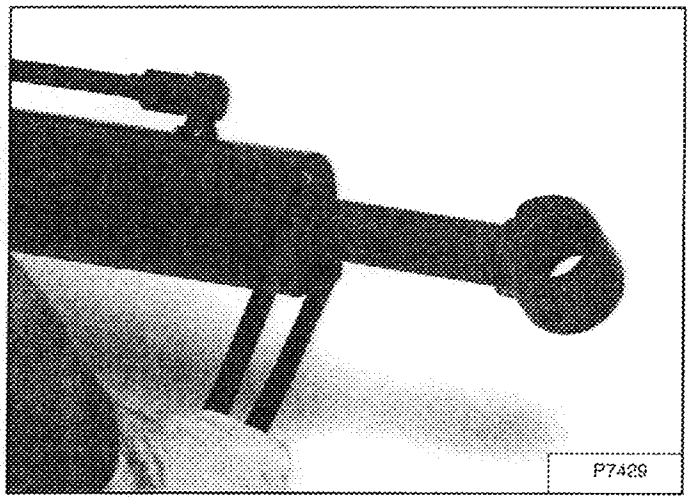
Install the piston (Item 3) **[Figure 20-20-17]**.

Grease the piston where the nut contacts the piston. do not get grease on the threads. Install the new nut (Item 4) **[Figure 20-20-17]**.

Tighten the nut (Item 4) **[Figure 20-20-17]** to 600 ft.-lbs. (814 Nm) torque.

Assembly (Cont'd)

Figure 20-20-18



Put the base end of the hydraulic cylinder in a vise.

Tighten the head using a spanner wrench **[Figure 20-20-18]**.

Bobcat®

CYLINDER (TILT)

Checking

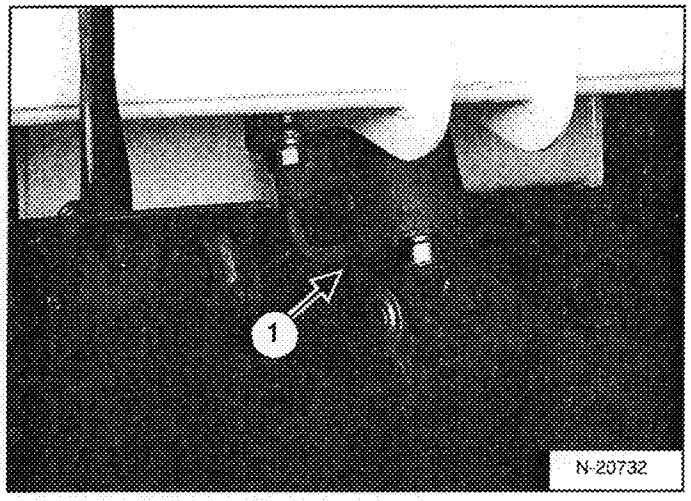
Remove the attachment. Roll the Bob-Tach fully back. Stop the engine. Raise the seat bar.

⚠ WARNING

Hydraulic fluid escaping under pressure can have sufficient force to enter a person's body by penetrating the skin. This can cause serious injury and possible death if proper medical treatment by a physician familiar with this injury is not received immediately.

W-2145-0290

Figure 20-21-1



Disconnect the hose (Item 1) **[Figure 20-21-1]** which goes to the base end of the tilt cylinder.

Install a cap on the fitting and tighten.

Engage the parking brake. Lower the seat bar.

Start the engine and push the Press to Operate button. Push the bottom (heel) of the tilt pedal.

If there is leakage from the open port, remove the tilt cylinder for repair.

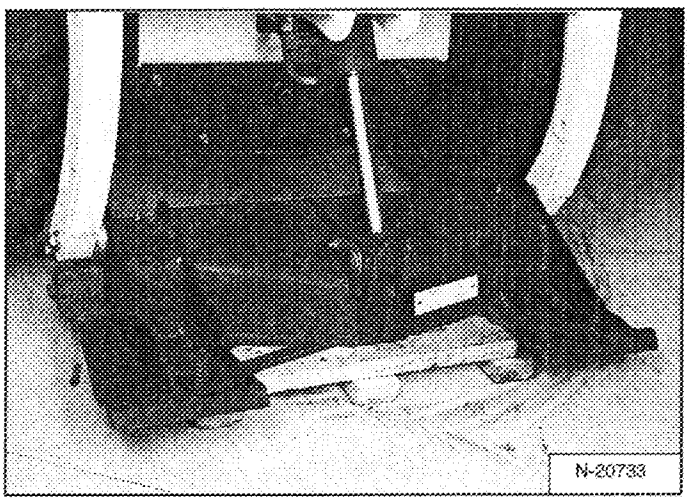
Removal And Installation

⚠ WARNING

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

Figure 20-21-2



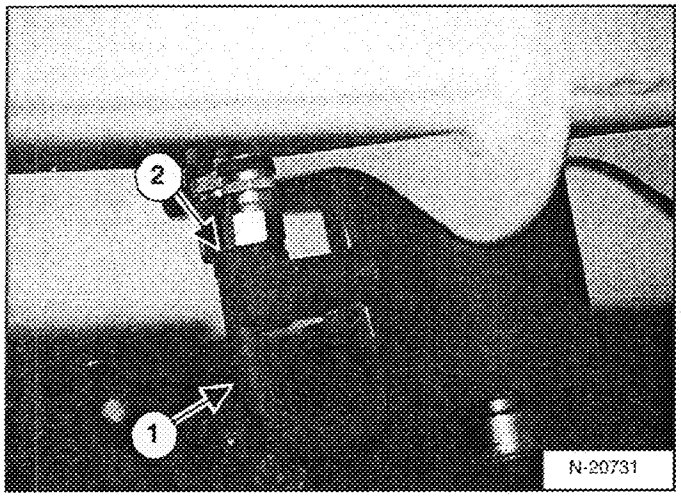
Remove the attachment. Roll the Bob-Tach forward and lower the lift arms.

Place the Bob-Tach flat on a pallet to allow the tilt cylinder base end pin enough clearance to be removed **[Figure 20-21-2]**.

Stop the engine. Move the tilt pedal to release the hydraulic pressure. Raise the seat bar.

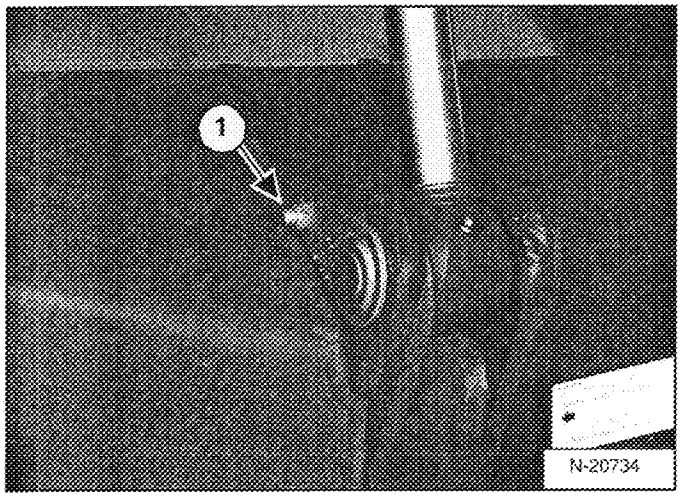
Removal And Installation (Cont'd)

Figure 20-21-3



Disconnect both hydraulic hoses (Item 1 & 2) **[Figure 20-21-3]**.

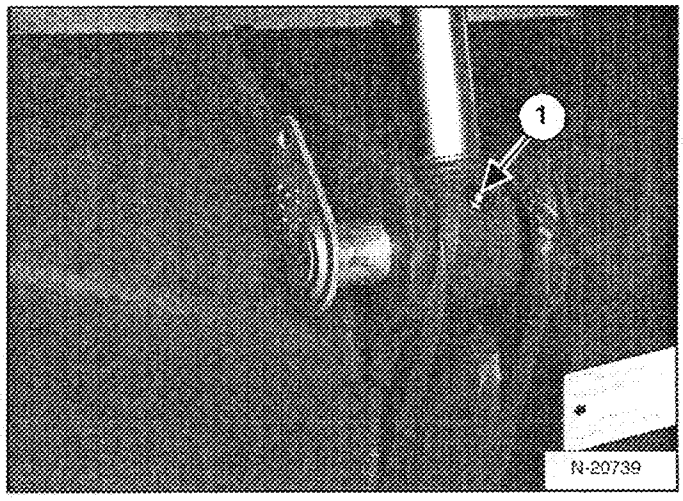
Figure 20-21-4



Remove the retainer nut (Item 1) **[Figure 20-21-4]** from the cylinder rod end pivot pin.

Installation: Tighten the retainer nut to 18-20 ft.-lbs. (24-27 Nm) torque.

Figure 20-21-5



Remove the grease fitting from the rod end pivot pin (Item 1) **[Figure 20-21-5]**.

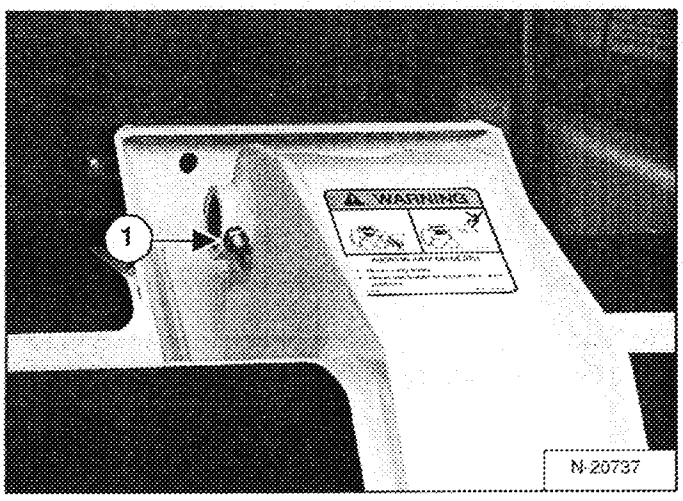
Remove the rod end pivot pin.

⚠ WARNING

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

Figure 20-21-6

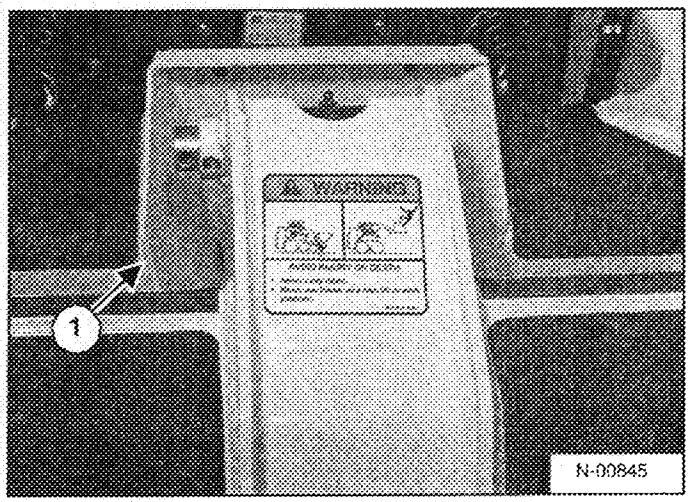


Remove the retainer nut (Item 1) **[Figure 20-21-6]** and bolt from the base end pivot pin.

Installation: Tighten the retainer nut and bolt to 18-20 ft.-lbs. (24-27 Nm) torque.

Removal And Installation (Cont'd)

Figure 20-21-7

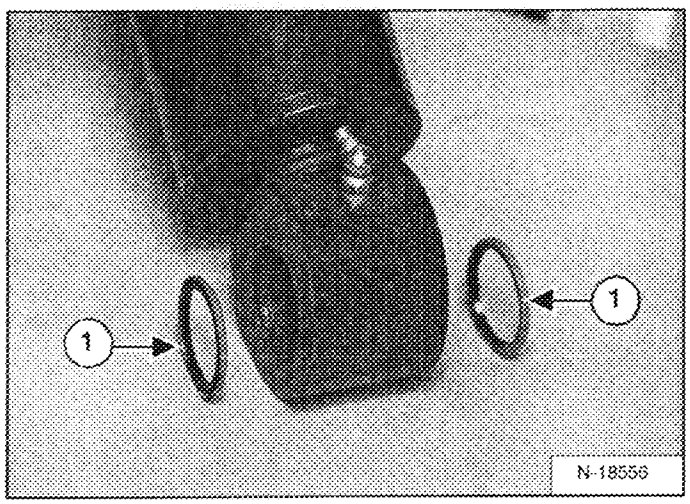


Remove the base end pivot pin (Item 1) **[Figure 20-21-7]**.

Remove the tilt cylinder from the loader.

Rod End Pivot Pin Bushing And Seal Replacement

Figure 20-21-8



Remove the old seal (both sides) from the end of the tilt cylinder **[Figure 20-21-8]**.

Apply a light coat of grease on the new seals (Item 1) **[Figure 20-21-8]**.

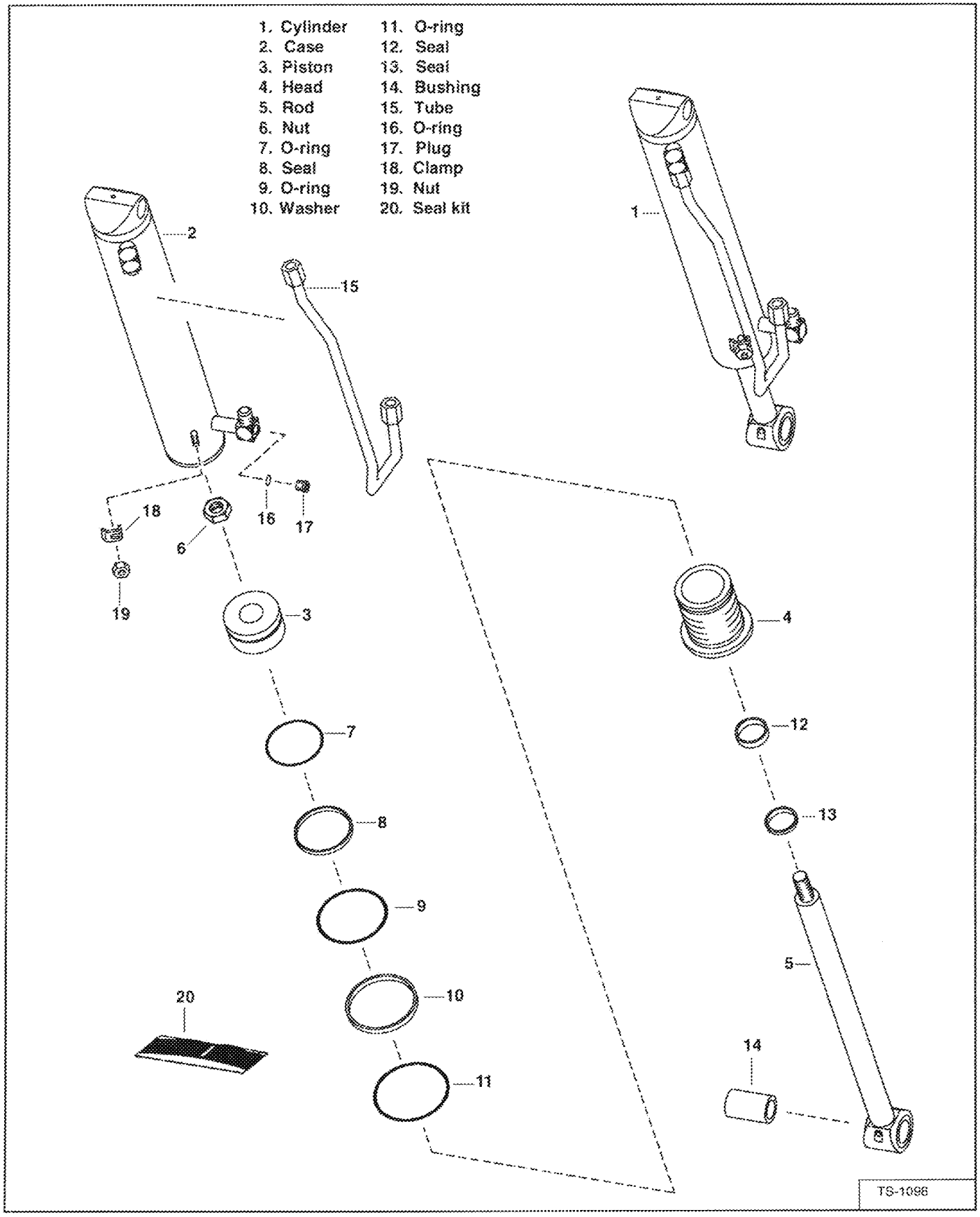
Install the new seals with the lip facing in **[Figure 20-21-8]**.

Install the rod end of the tilt cylinder into the Bob-Tach.

Be careful not to damage the new seals during installation.

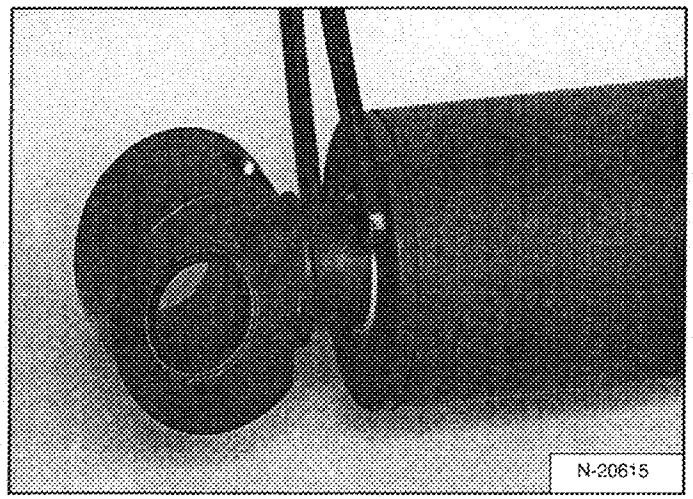
Reserve the removal procedure to install the tilt cylinder.

Identification



Disassembly

Figure 20-21-9



Use the following tools to disassemble the cylinder:

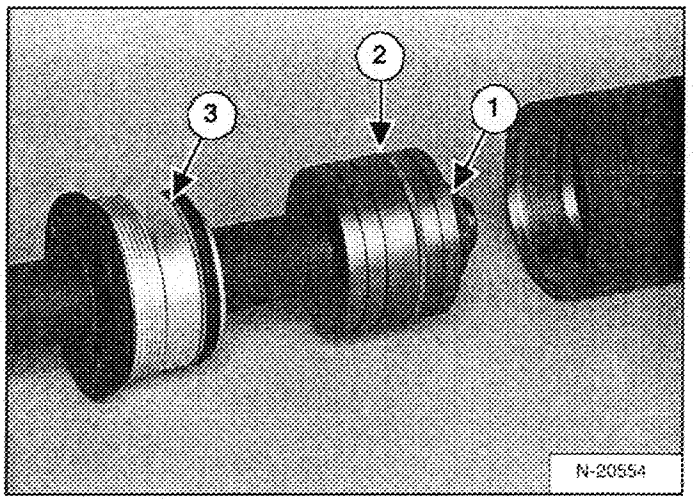
MEL1074 - O-ring Seal Hook
Spanner Wrench

Hold the hydraulic cylinder over a drain pan and move the rod in and out slowly to remove the fluid from the cylinder.

Put the base end of the cylinder in a vise.

Use a spanner wrench to loosen the head **[Figure 20-21-9]**.

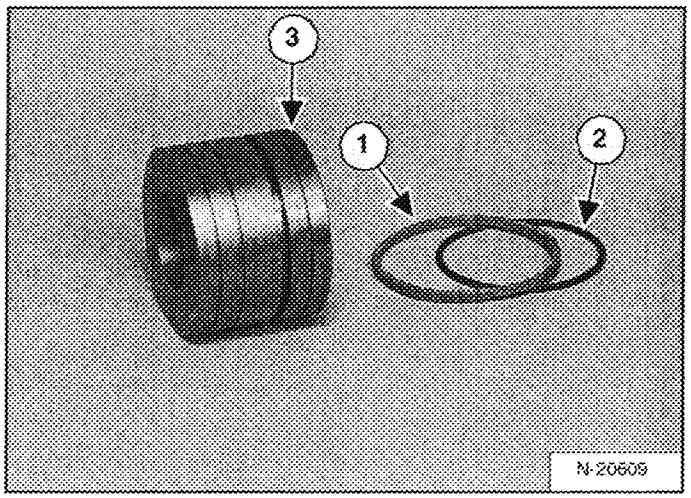
Figure 20-21-10



Remove the head and rod assembly from the cylinder **[Figure 20-21-10]**. Put the rod end in a vise.

Remove the nut (Item 1), piston (Item 2) and head (Item 3) **[Figure 20-21-10]**.

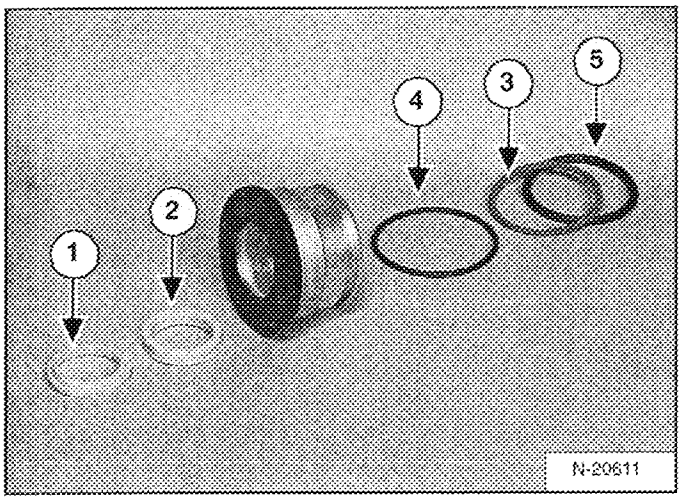
Figure 20-21-11



Piston: Remove the seal (Item 1), and O-ring (Item 2) from the piston (Item 3) **[Figure 20-21-11]**.

Disassembly (Cont'd)

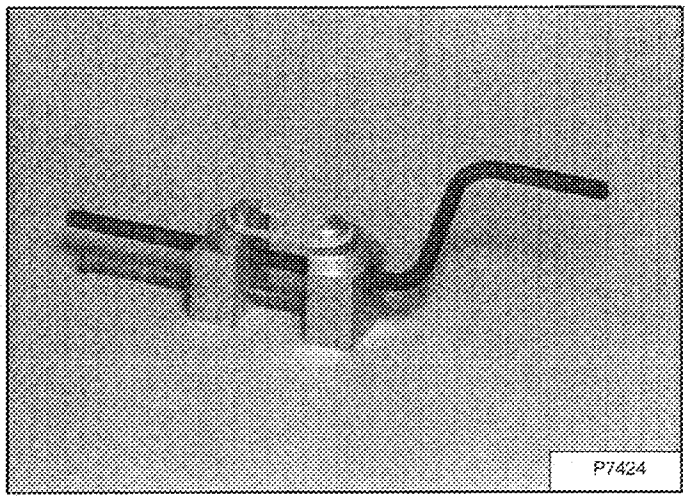
Figure 20-21-12



Remove the wiper seal (Item 1), and rod seal (Item 2), the back up washer (Item 3), the thin O-ring (Item 4) and the thick O-ring (Item 5) **[Figure 20-21-12]** from the head.

Assembly

Figure 20-21-13



Use the following tools to assembly the cylinder:

MEL1396 - Seal Installation Tool
MEL1033 - Rod Seal Installation Tool
Piston Ring Compressor
Spanner Wrench

Wash the cylinder parts in solvent and air dry them.

Inspect the cylinder parts for nicks, scratches or other damage. Replace any damaged parts.

Always install new O-rings and seals during assembly.

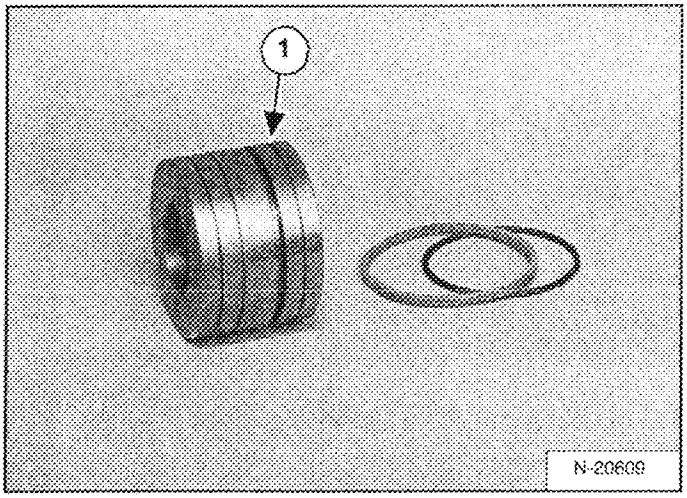
Lubricate all O-rings and seals with hydraulic oil during installation.

Install the new seal on the tool and slowly stretch it until it fits the piston **[Figure 20-21-13]**.

Allow the seal to stretch for 30 seconds before installing it on the piston.

Assembly (Cont'd)

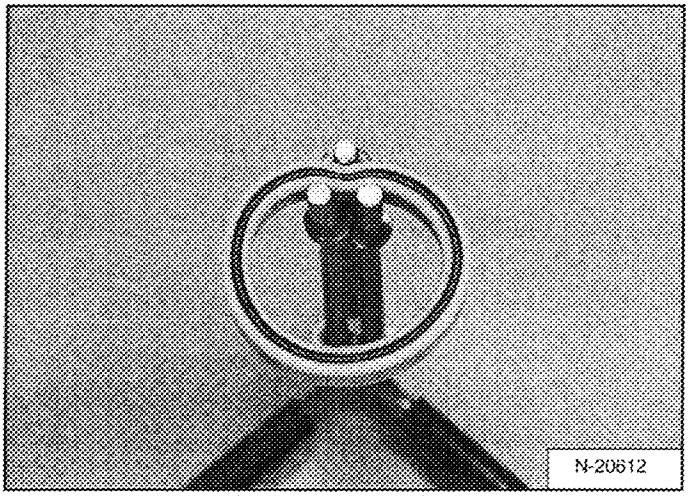
Figure 20-21-14



Install the O-ring and seal on the piston (Item 1) **[Figure 20-21-14]**.

Use a ring compressor to compress the seal to the correct size. Leave the piston in the compressor for about three minutes.

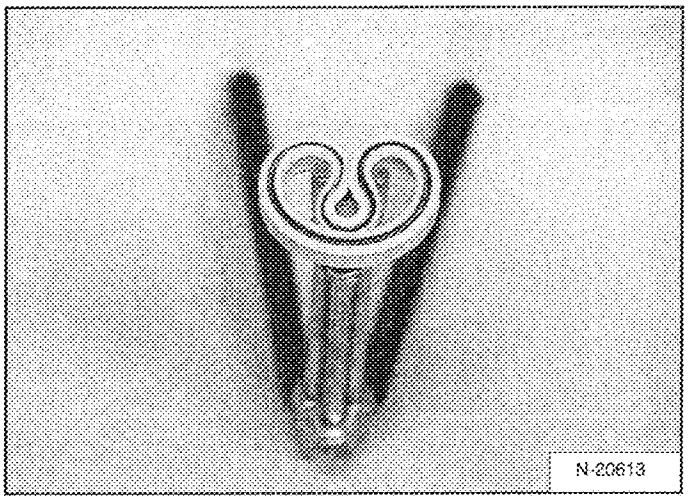
Figure 20-21-15



Install the rod seal on the rod seal tool **[Figure 20-21-15]**.

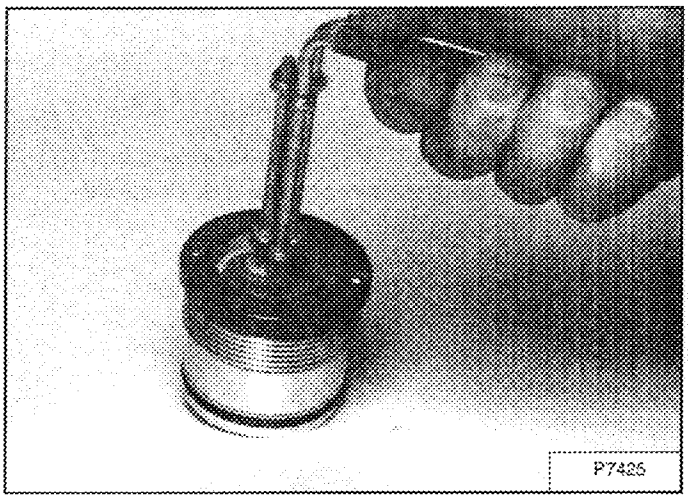
NOTE: During installation the O-ring side of the seal must be toward the inside of the cylinder.

Figure 20-21-16



Rotate the handles to collapse the rod seal **[Figure 20-21-16]**.

Figure 20-21-17

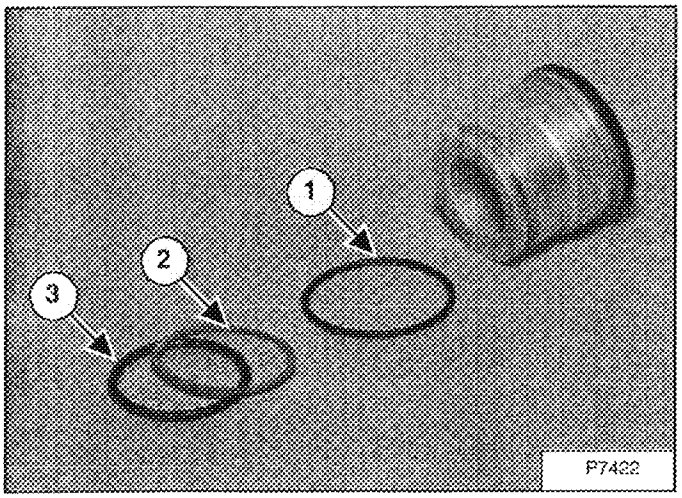


Install the rod seal in the head **[Figure 20-21-17]**.

Install the wiper seal with the wiper toward the outside of the head.

Assembly (Cont'd)

Figure 20-21-18

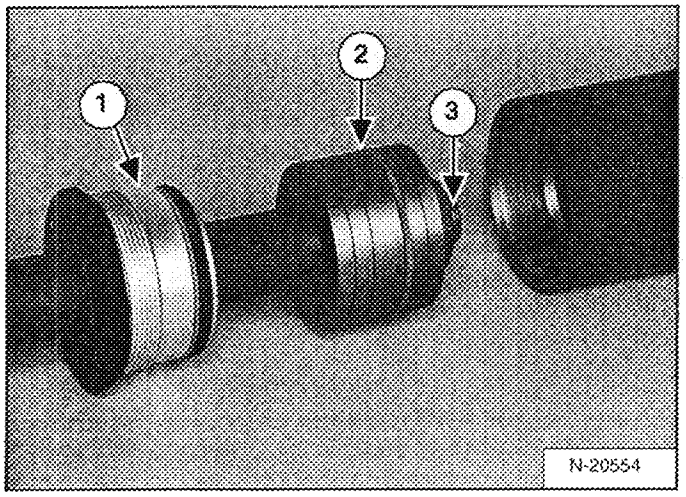


Install the thin O-ring (Item 1) **[Figure 20-21-18]**.

Install the back-up washer (Item 2) and thick O-ring (Item 3) **[Figure 20-21-18]** into the groove on the head.

NOTE: Clean and dry the threads before installing the nut. Install the new nut from the seal kit.

Figure 20-21-19

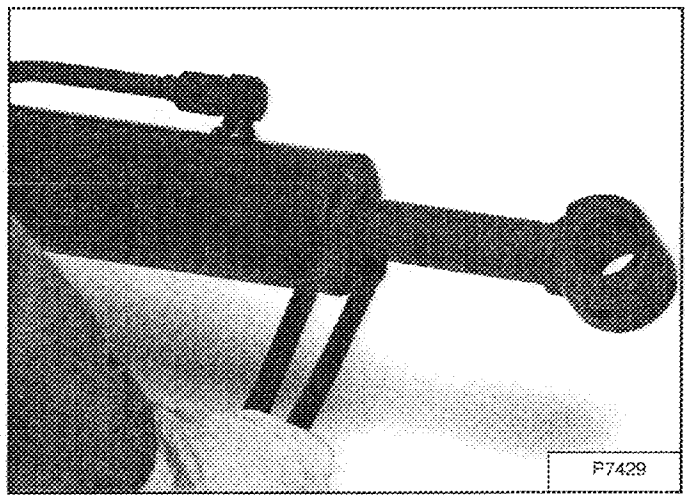


Install the head (Item 1), and the piston (Item 2) **[Figure 20-21-19]**. The small diameter of the piston goes into the cylinder tube first.

Grease the piston where the nut contacts the piston. Do not get grease on the threads. Install the new nut (Item 3) **[Figure 20-21-19]**.

Tighten nut (Item 3) **[Figure 20-21-19]** to 850 ft.-lbs. (1153 Nm) torque.

Figure 20-21-20



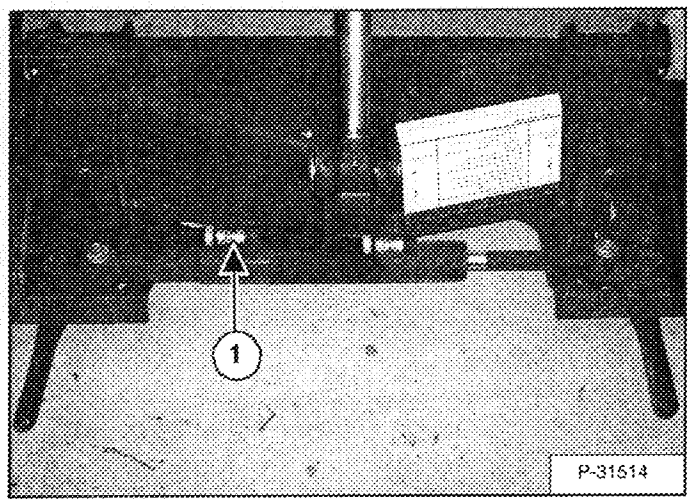
Put the base end of the hydraulic cylinder in a vise.

Tighten the head using a spanner wrench **[Figure 20-21-20]**.

CYLINDER (POWER BOB-TACH)

Checking

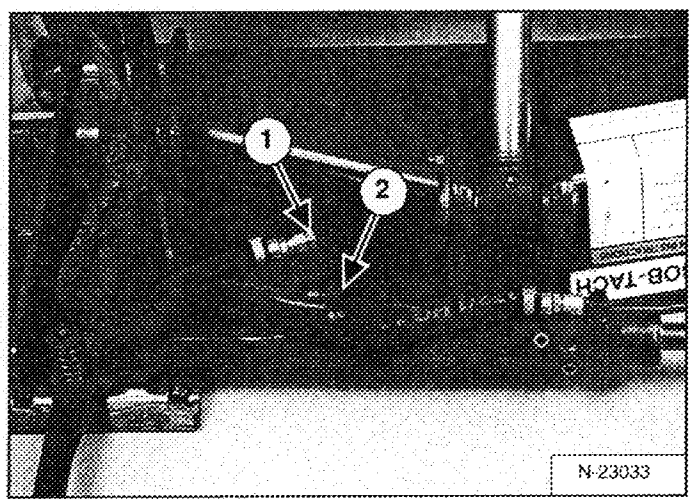
Figure 20-22-1



Tilt the Bob-Tach forward, so it is parallel to the floor **[Figure 20-22-1]**.

Disconnect the hose (Item 1) **[Figure 20-22-1]** from the power Bob-Tach cylinder base end port.

Figure 20-22-2



Install a plug in the hose (Item 1) **[Figure 20-22-2]** and tighten.

Engage the parking brake. Lower the seat bar. Start the engine.

Push and hold the BOB-TACH "WEDGES UP" Switch (Front Accessory Panel).

If there is any leakage from the base end cylinder port (Item 2) **[Figure 20-22-2]**, remove the lift cylinder for repair.

⚠ WARNING

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

⚠ WARNING

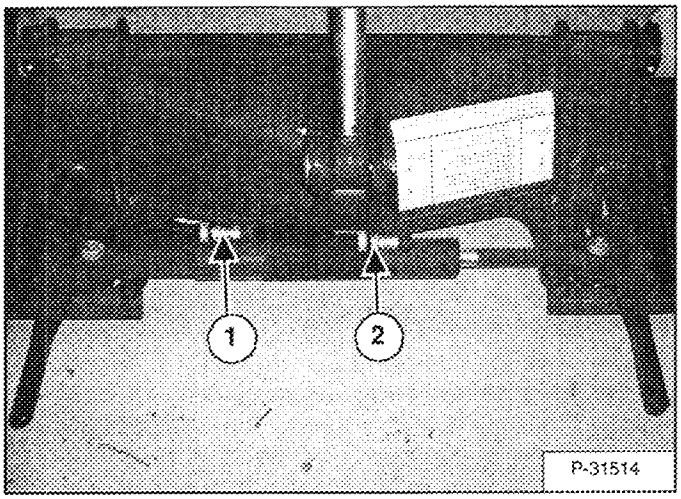
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

W-2072-0496

CYLINDER (POWER BOB-TACH) (CONT'D)

Removal And Installation

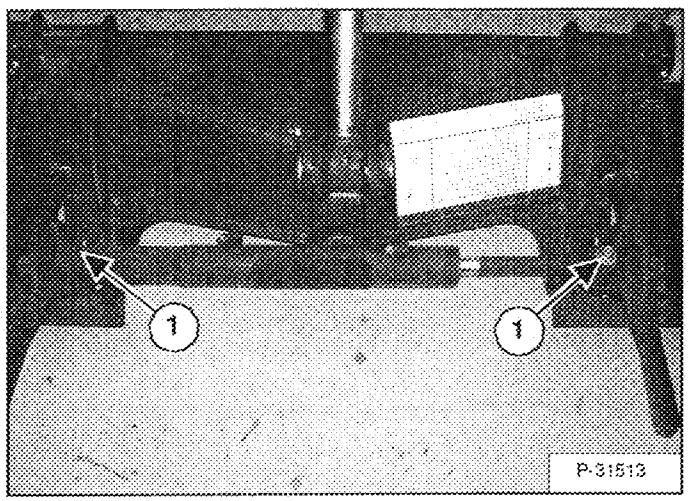
Figure 20-22-3



Disconnect the hoses (Item 1 & 2) **[Figure 20-22-3]** from the cylinder fittings.

Install plugs and cap in fittings.

Figure 20-22-4



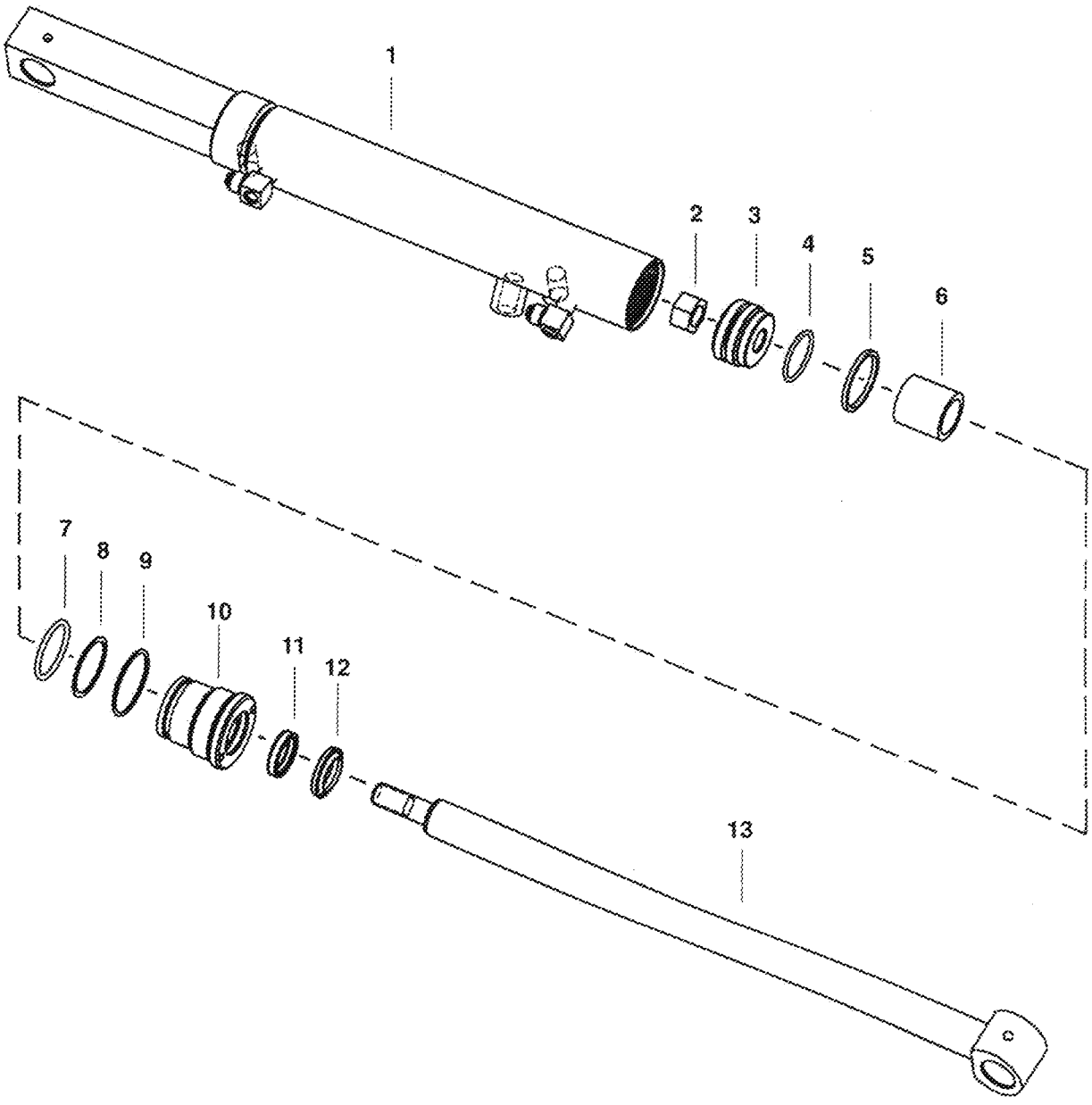
Remove the bolts (Item 1) **[Figure 20-22-4]**.

Installation: Tighten the bolts to 25-28 ft.-lbs. (34-38 Nm) torque.

Remove the washers and cylinder from the lever pivots.

Parts Identification

1. Cylinder
2. Nut
3. Piston
4. O-Ring
5. Ring
6. Spacer
7. O-Ring
8. Ring
9. O-Ring
10. Head
11. Seal
12. Seal
13. Rod



CYLINDER (POWER BOB-TACH) (CONT'D)

Disassembly

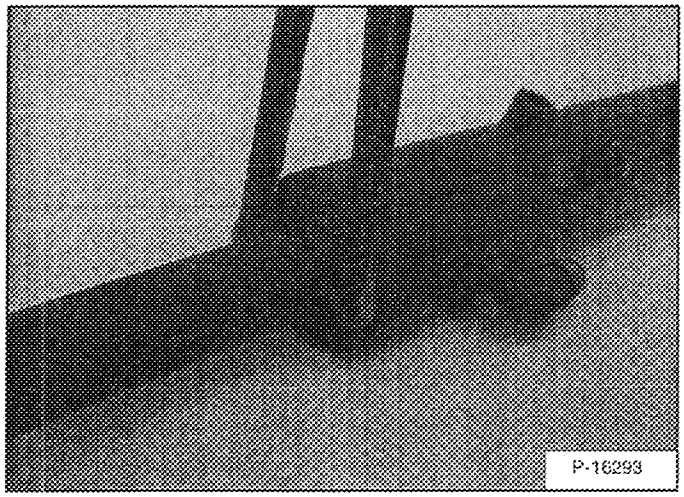
Use the following tools to disassemble the cylinder:

MEL 1074 - O-ring Seal Hook
Spanner Wrench

Hold the hydraulic cylinder over a drain pan and move the rod in and out slowly to remove the fluid from the cylinder.

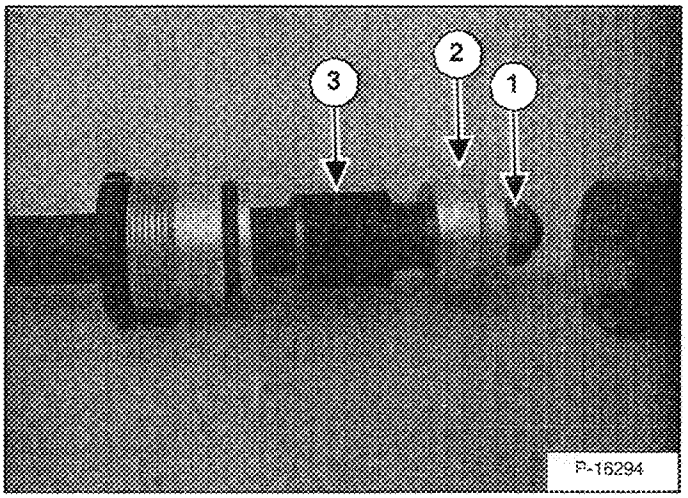
Put the base end of the cylinder in a vise.

Figure 20-22-5



Use a spanner wrench to loosen the head **[Figure 20-22-5]**.

Figure 20-22-6

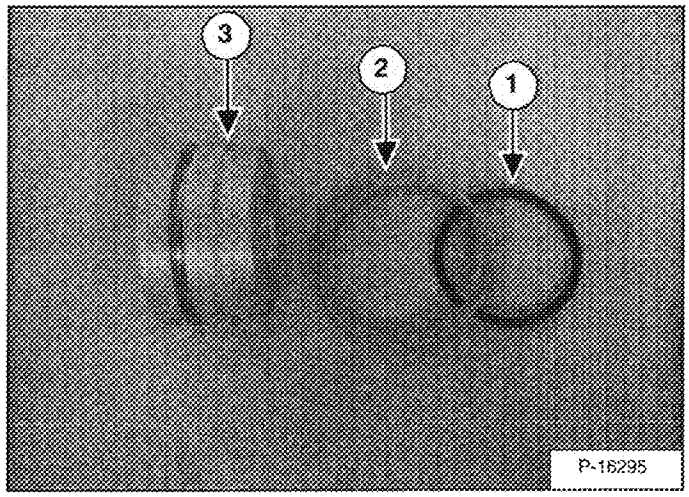


Remove the head and rod assembly from the cylinder **[Figure 20-22-6]**.

Put the rod end in a vise.

Remove the nut (Item 1), piston (Item 2) and head (Item 3) **[Figure 20-22-6]** from the rod.

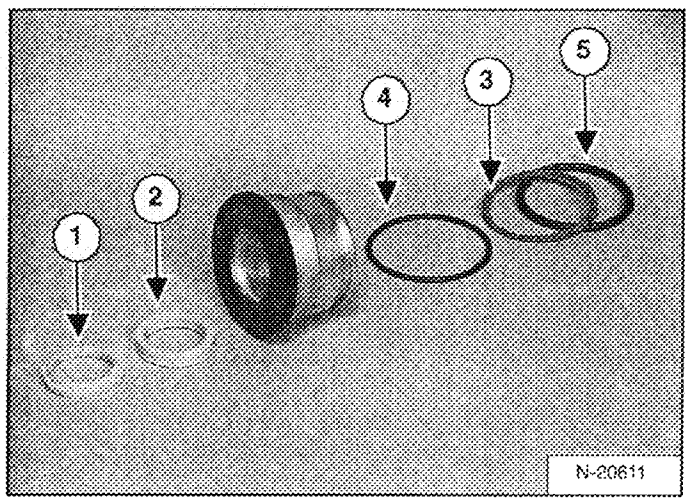
Figure 20-22-7



Piston: Remove the O-ring (Item 1), and seal (Item 2) from the piston (Item 3) **[Figure 20-22-7]**.

Disassembly (Cont'd)

Figure 20-22-8



Remove the wiper seal (Item 1), and rod seal (Item 2), the back-up washer (Item 3), the thin O-ring (Item 4) and the thick O-ring (Item 5) **[Figure 20-22-8]** from the head.

Assembly

Use the following tools to assemble the cylinder:

MEL 1396 - Seal Installation Tool
MEL 1033 - Rod Seal Installation Tool
Piston Ring Compressor
Spanner Wrench

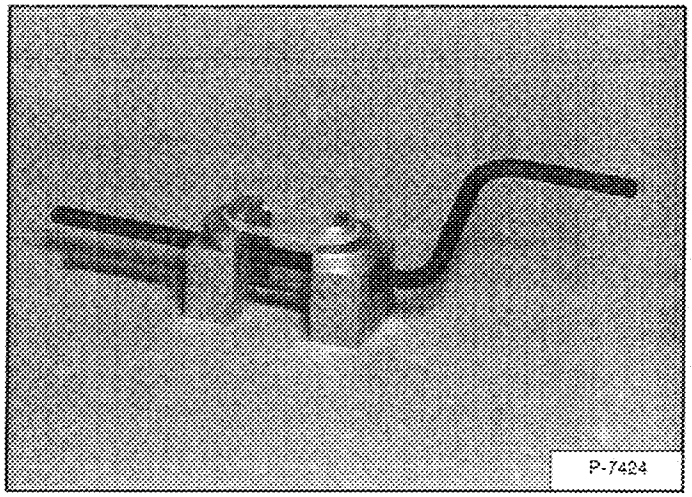
Wash the cylinder parts in solvent and air dry them.

Inspect the cylinder parts for nicks, scratches or other damage. Replace any damaged parts.

Always install new O-rings and seals during assembly.

Lubricate all O-rings and seals with hydraulic oil during installation.

Figure 20-22-9

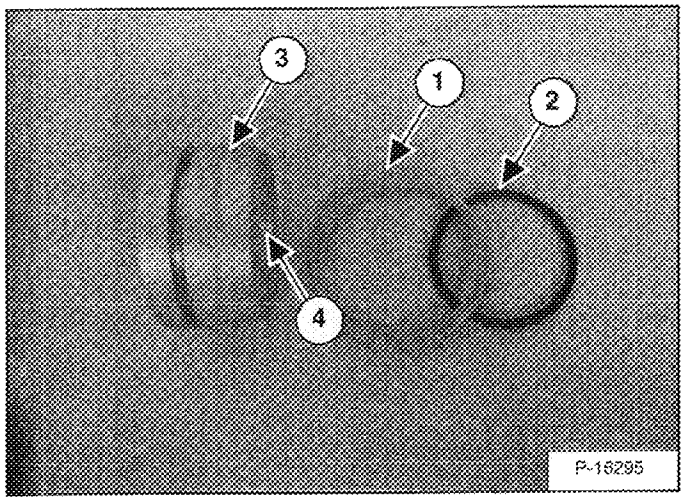


Install the new seal on the tool and slowly stretch it until it fits the piston **[Figure 20-22-9]**.

Allow the seal to stretch for 30 seconds before installing it on the piston.

Assembly (Cont'd)

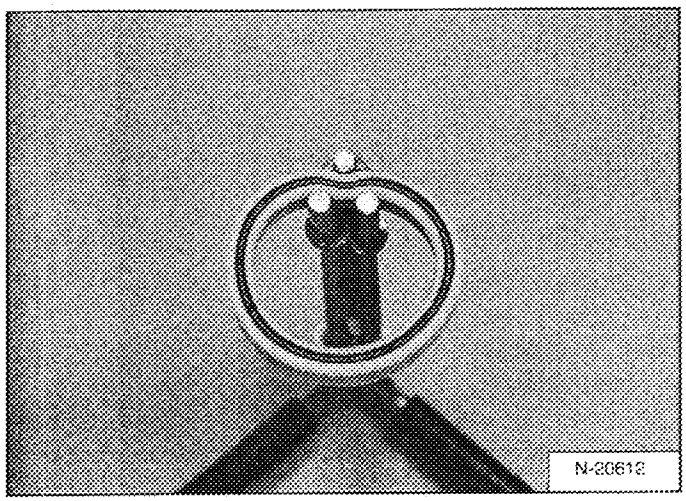
Figure 20-22-10



Piston: Install the O-ring (Item 1) and seal (Item 2) on the piston (Item 3) **[Figure 20-22-10]**.

NOTE: The piston center hole (Item 4) [Figure 20-22-10] has a bevel on one end. The bevel goes toward the rod.

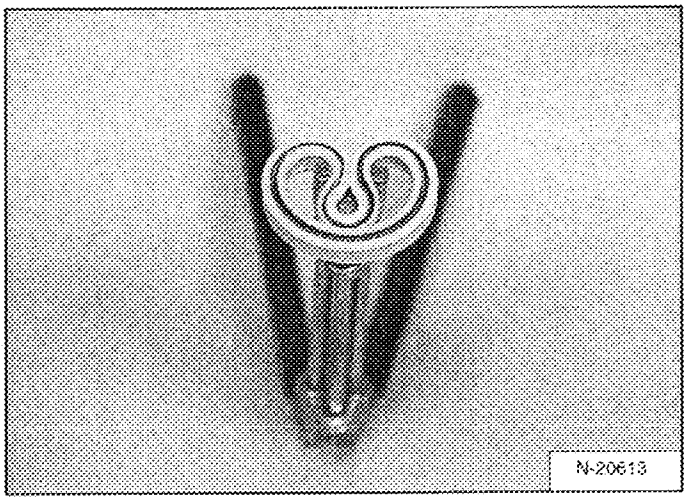
Figure 20-22-11



Install the rod seal on the rod seal tool **[Figure 20-22-11]**.

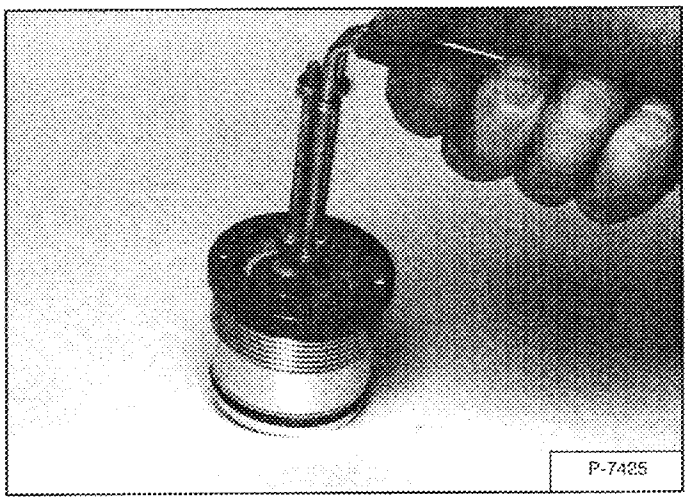
NOTE: During installation the O-ring side of the seal must be toward the inside of the cylinder.

Figure 20-22-12



Rotate the handles to collapse the rod seal **[Figure 20-22-12]**.

Figure 20-22-13

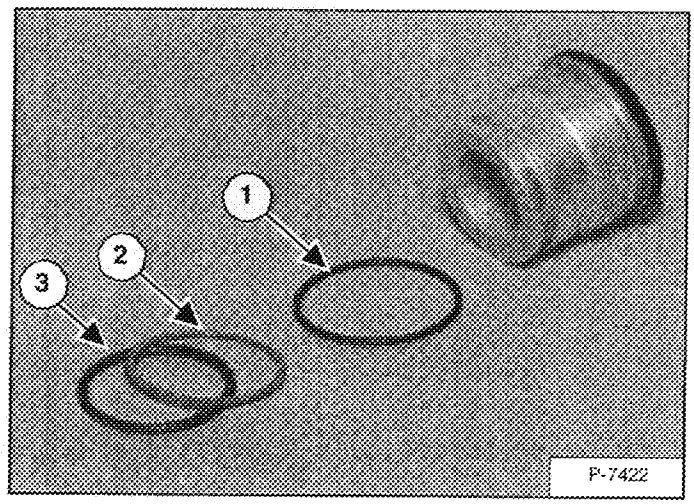


Install the rod seal in the head **[Figure 20-22-13]**.

Install the wiper seal with the wiper toward the outside of the head.

Assembly (Cont'd)

Figure 20-22-14

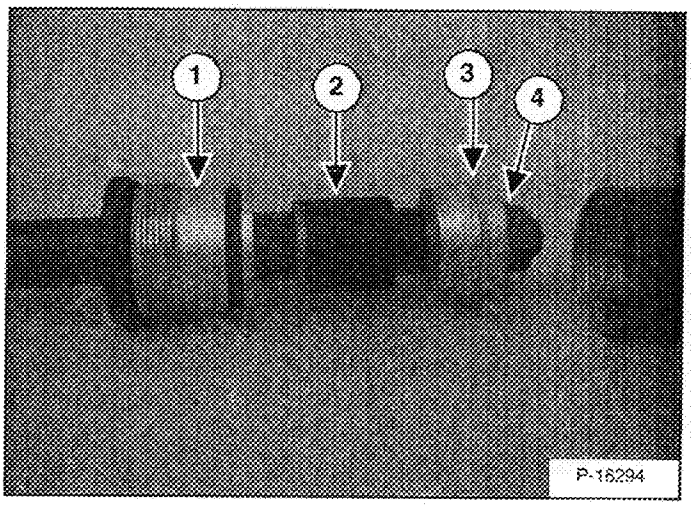


Install the thin O-ring (Item 1) **[Figure 20-22-14]**.

Install the back-up washer (Item 2) **[Figure 20-22-14]** and thick O-ring (Item 3) **[Figure 20-22-14]** into the groove on the head.

NOTE: Clean and dry the threads before installing the nut. Install the new nut from the seal kit.

Figure 20-22-15



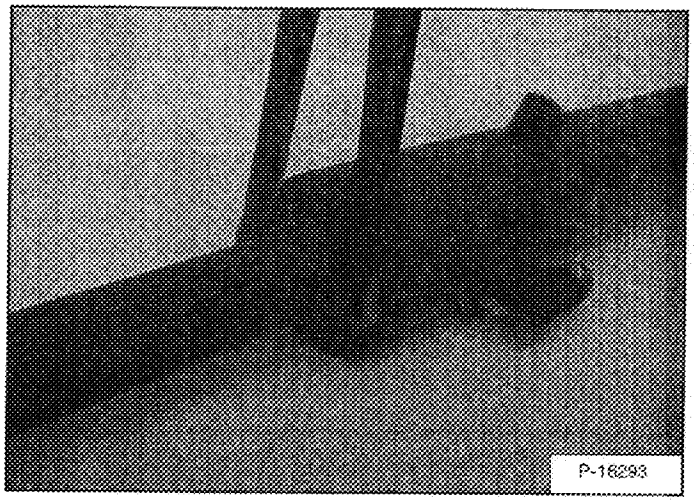
Install the head (Item 1), and spacer (Item 2) **[Figure 20-22-15]**.

Install the piston (Item 3) **[Figure 20-22-15]**.

Lift Cylinder: Grease the piston where the nut contacts the piston, do not get grease on the threads. Install the new nut (Item 4) **[Figure 20-22-15]**.

Tighten the nut to 90 ft.-lbs. (122 Nm) torque.

Figure 20-22-16



Put the base end of the hydraulic cylinder in a vise.

Tighten the head using a spanner wrench **[Figure 20-22-16]**.

Bobcat®

MAIN RELIEF VALVE

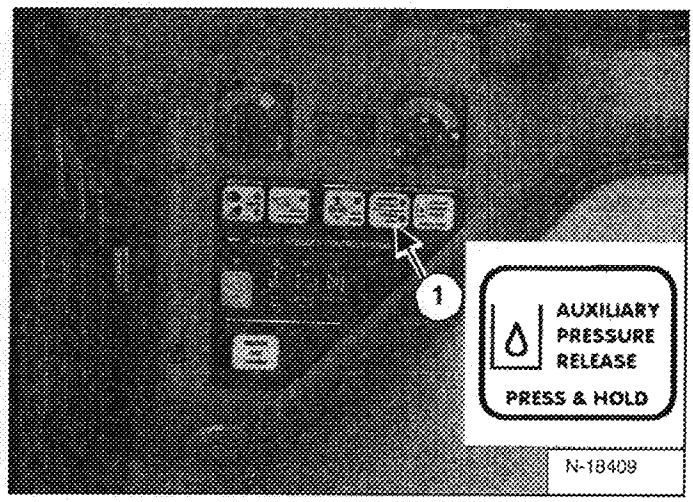
Checking

⚠ WARNING

When the engine is running during service, the steering levers must be in neutral and the parking brake engaged. Failure to do so can cause injury or death.

W-2006-0284

Figure 20-30-1



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

MEL10003 - Hydraulic Tester
MEL10006 - Hydraulic Test Kit

- Press the AUXILIARY PRESSURE RELEASE Button (Item 1) **[Figure 20-30-1]**. Hold it for two seconds. The engine will stop and release hydraulic pressure.
- Pressing the AUXILIARY HYDRAULIC RELEASE Button after pressing the RUN / ENTER Button, when the engine is stopped, will also release hydraulic pressure.

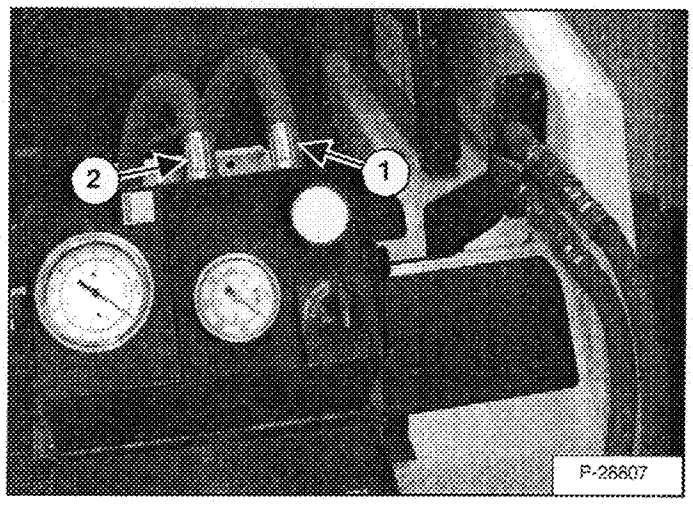
Lift and block the loader. (See Contents Page 10-01.)

IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

Figure 20-30-2



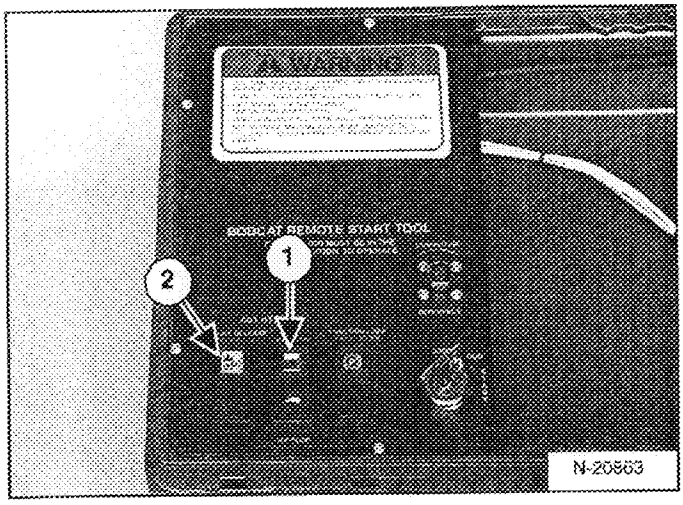
Connect the IN port (Item 1) **[Figure 20-30-2]** of the hydraulic tester to the bottom (female) quick coupler on the loader.

Connect the OUT port (Item 2) **[Figure 20-30-2]** of the hydraulic tester to the top (male) quick coupler on the loader.

MAIN RELIEF VALVE (CONT'D)

Checking (Cont'd)

Figure 20-30-3



Connect the remote start tool. (See Contents, Page 10-01.)

Start the engine with the remote start tool.

Press the maximum flow/variable flow switch (Item 1) **[Figure 20-30-3]** twice to activate maximum flow. The switch will illuminate to indicate the maximum flow rate is active.

The correct pressure for the main relief is 2900-3000 PSI (19996-20685 kPa).

Press the auxiliary pressure release (Item 2) **[Figure 20-30-3]** and hold the switch for three seconds to release hydraulic pressure to the front and/or rear auxiliary couplers.

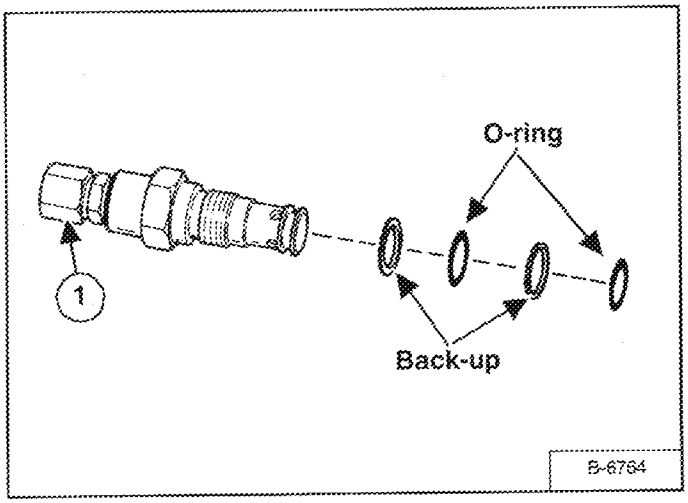
Adjustment

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, tube lines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0888

Figure 20-30-4



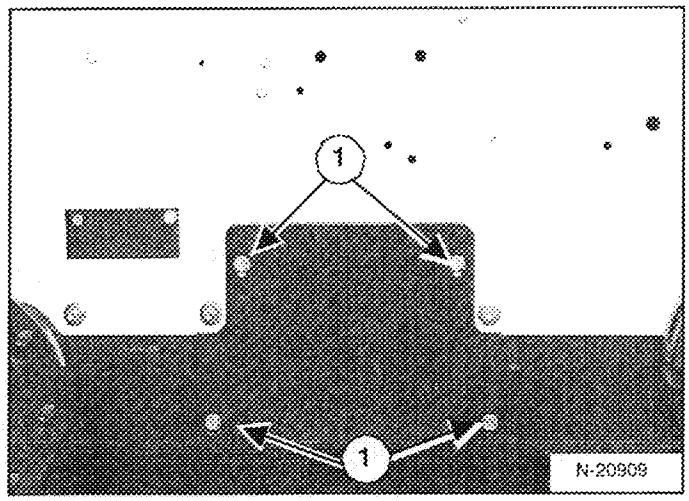
If the pressure is not correct, adjust the main relief valve. Remove the end cap (Item 1) **[Figure 20-30-4]**.

Turn the adjusting screw in or out until the pressure is correct.

NOTE: If the correct pressure can not be reached, replace the main relief valve. Check the pressure setting of the new relief valve.

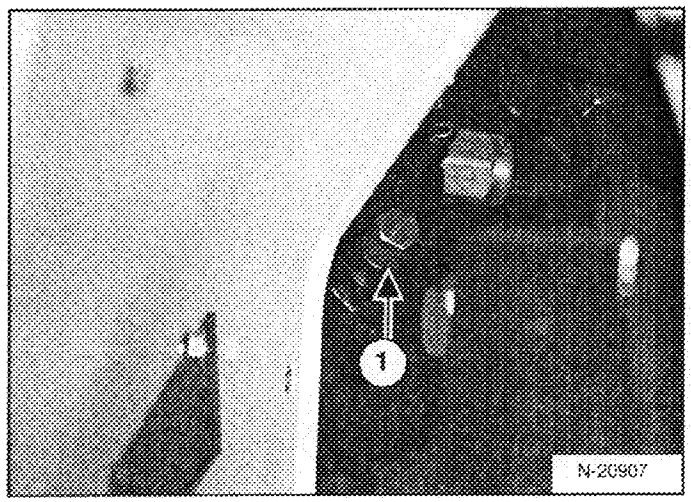
Removal And Installation

Figure 20-30-5



Remove the four motor cover mounting bolts (Item 1) **[Figure 20-30-5]**.

Figure 20-30-6



Clean the area around the control valve. Loosen and remove the main relief valve (Item 1) **[Figure 20-30-6]**.

Remove the O-rings and back-up washers **[Figure 20-30-4]**.

Clean the main relief valve in clean solvent. Use air pressure to dry the valve.

Install new O-rings and back-up washers. Install the main relief valve (Item 1) **[Figure 20-30-6]** and tighten. Check the pressure again. (See Contents Page 20-01.)

Installation: Tighten the main relief valve to 35-40 ft.-lbs. (47-54 Nm) torque.

Bobcat®

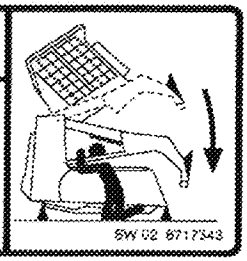
HYDRAULIC CONTROL VALVE (FOOT CONTROL)

Removal And Installation (S/N 512262999 & Below)

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 57061



⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Lift and block the loader. (See Contents Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Stop the engine.

Raise the seat bar.

Raise the operator cab. (See Contents Page 10-01.)

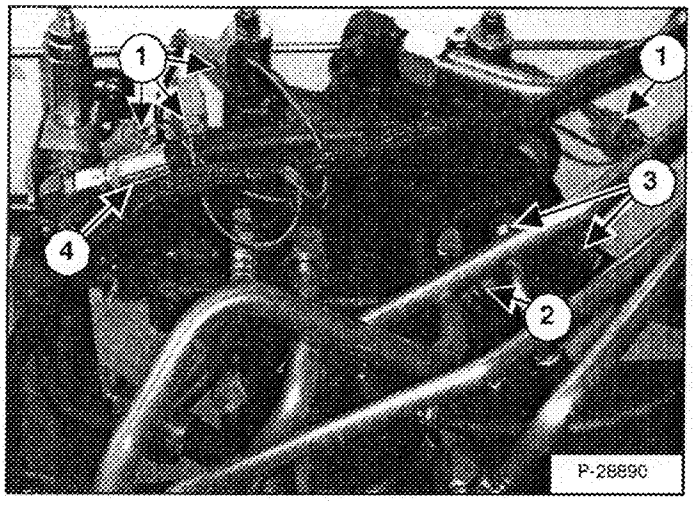
Clean the area around the control valve.

Drain the hydraulic reservoir. (See Contents Page 20-01.)

Mark all tube lines, hoses, and electrical connectors for correct installation.

Remove the control panel. (See Contents Page 50-01.)

Figure 20-40-1



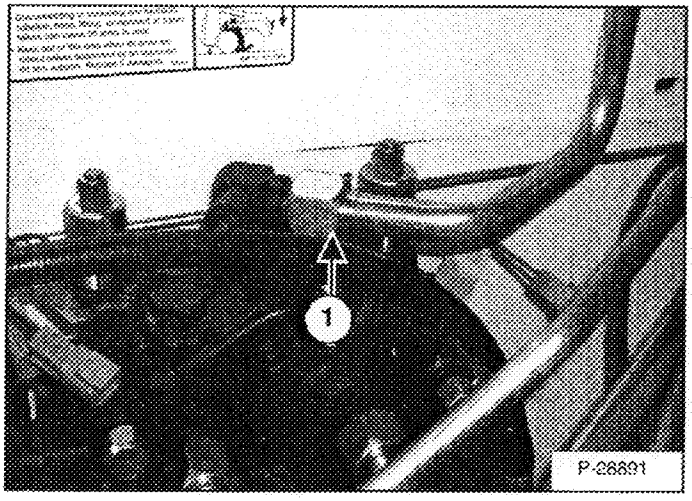
Disconnect the wire harness connectors (Item 1) **[Figure 20-40-1]** from the solenoid connectors.

Disconnect the wire harness connector (Item 2) **[Figure 20-40-1]** from the BICS™ valve solenoid connector.

Disconnect the drain hoses (Item 3) **[Figure 20-40-1]** from the main control valve.

Disconnect the hose (Item 4) **[Figure 20-40-1]** from the lift arm by-pass control valve.

Figure 20-40-2

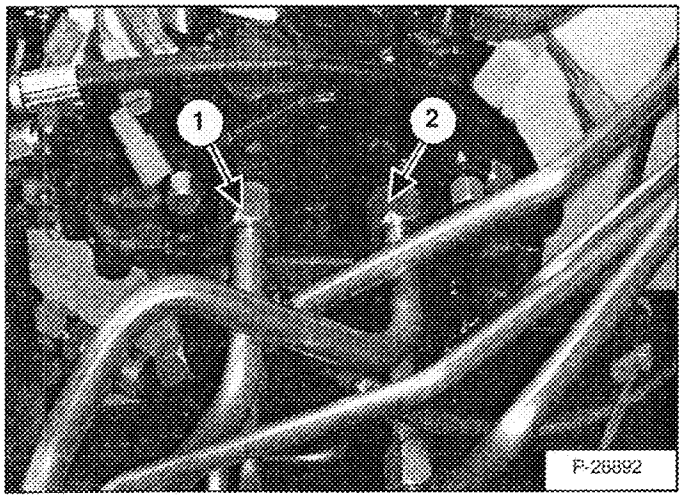


Disconnect the outlet tubeline (Item 1) **[Figure 20-40-2]** from the control valve.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Removal And Installation (Cont'd)(S/N 512262999 & Below)

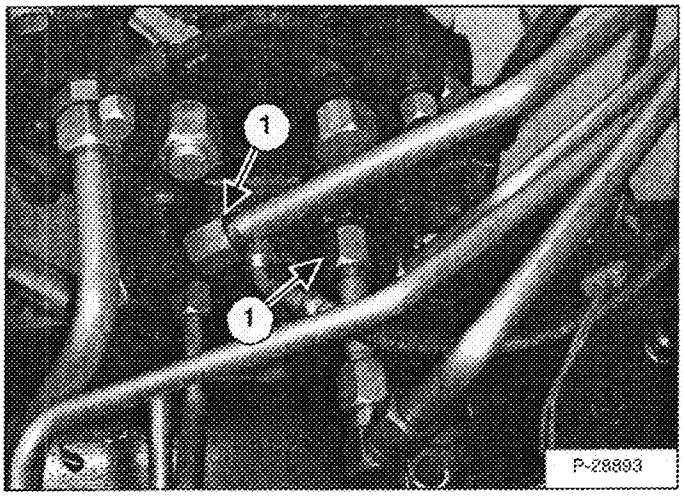
Figure 20-40-3



Disconnect the tubeline (Item 1) **[Figure 20-40-3]** from the auxiliary section of the control valve.

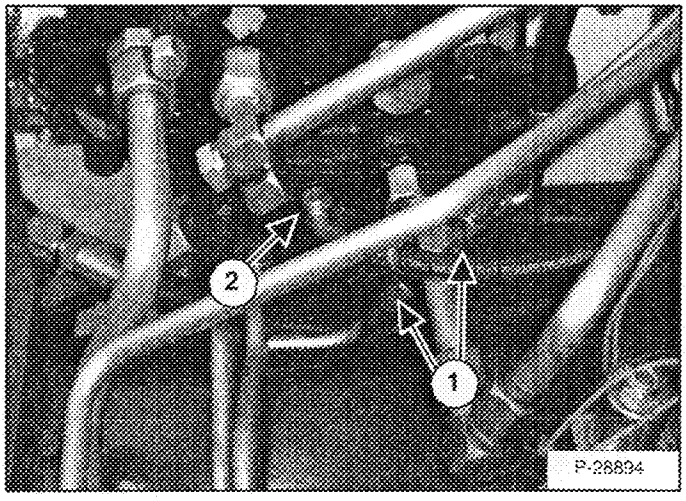
Disconnect and remove the tubeline (Item 2) **[Figure 20-40-3]** from the auxiliary section of the control valve.

Figure 20-40-4



Disconnect the tilt tubelines (Item 1) **[Figure 20-40-4]**.

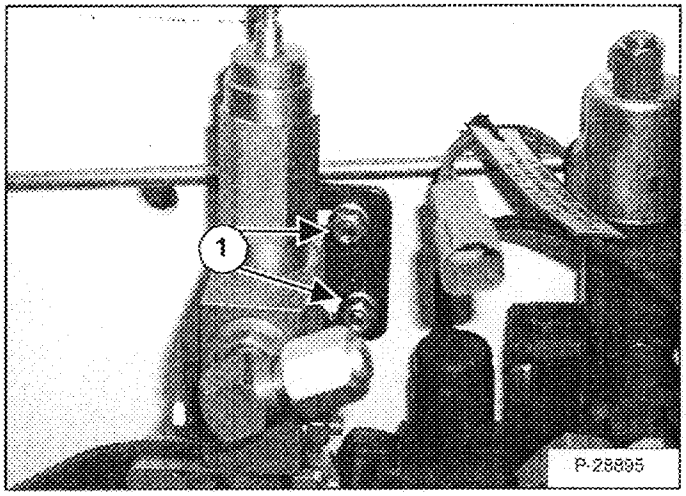
Figure 20-40-5



Disconnect the three tubeline (Item 1) **[Figure 20-40-5]** from the lift section of the control valve.

Disconnect the drain hose (Item 2) **[Figure 20-40-5]**.

Figure 20-40-6

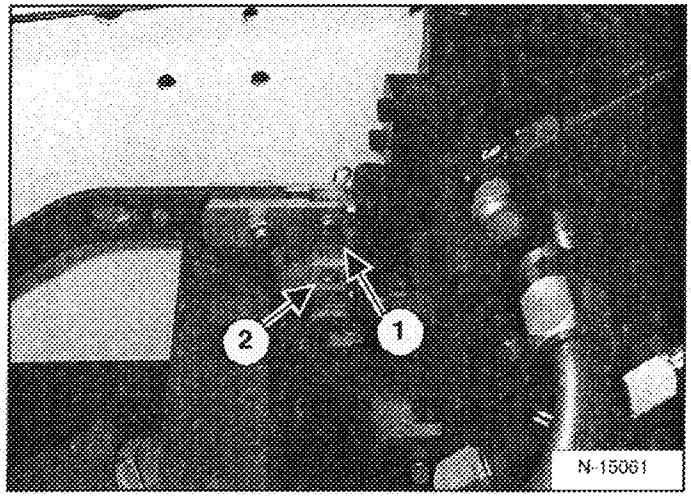


Remove the two mounting bolts (Item 1) **[Figure 20-40-6]** from the lift arm by-pass control bracket.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Removal And Installation (Cont'd)(S/N 512262999 & Below)

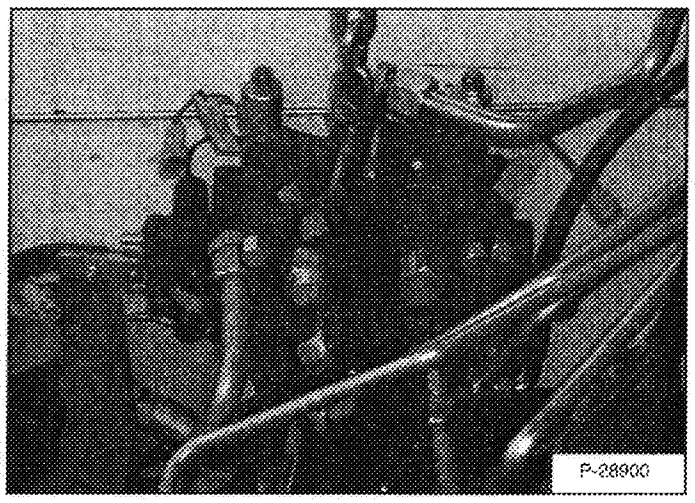
Figure 20-40-7



Remove the clevis pin (Item 1)**[Figure 20-40-7]** from the tilt spool linkage.

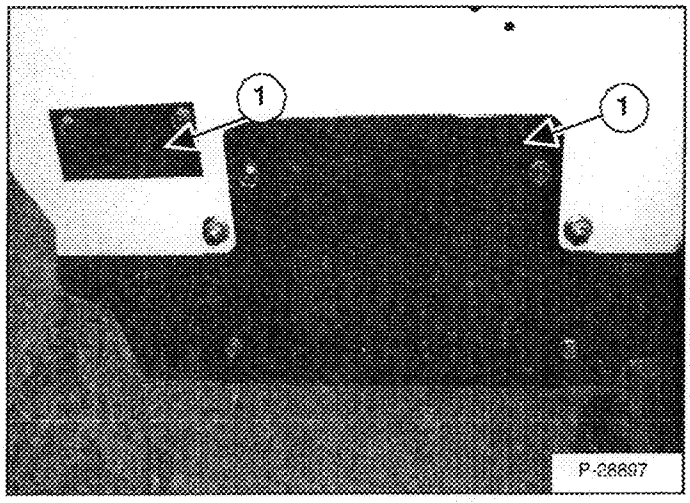
Remove the clevis pin (Item 2) **[Figure 20-40-7]** from the lift spool linkage.

Figure 20-40-8



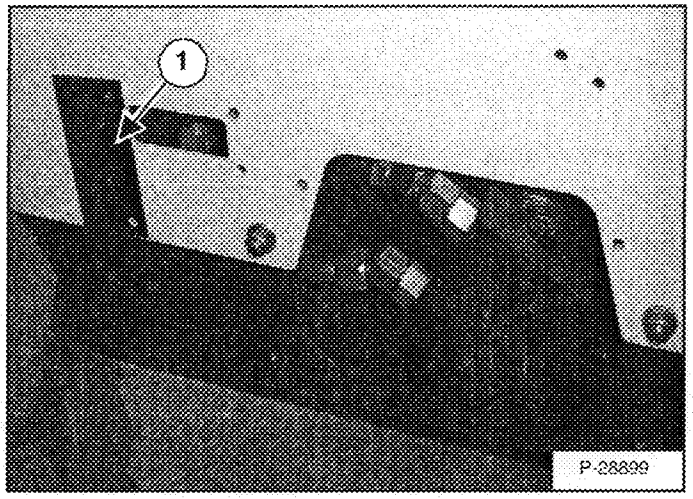
Connect a hoist to the control valve **[Figure 20-40-8]**.

Figure 20-40-9



Locate the access covers (Item 1) **[Figure 20-40-9]** on the right side of the loader frame.

Figure 20-40-10



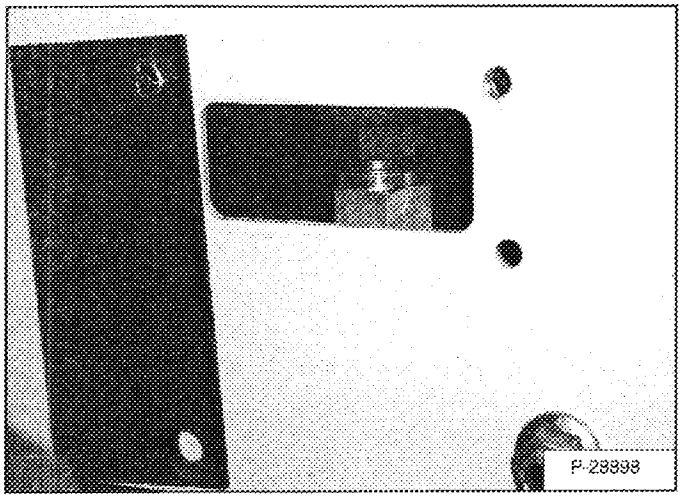
Remove the drive motor cover **[Figure 20-40-10]**.

Loosen one mounting bolt and remove the other mounting bolt from the rectangular access cover (Item 1) **[Figure 20-40-10]**.

Rotate the cover to expose the access slot in the loader **[Figure 20-40-10]**.

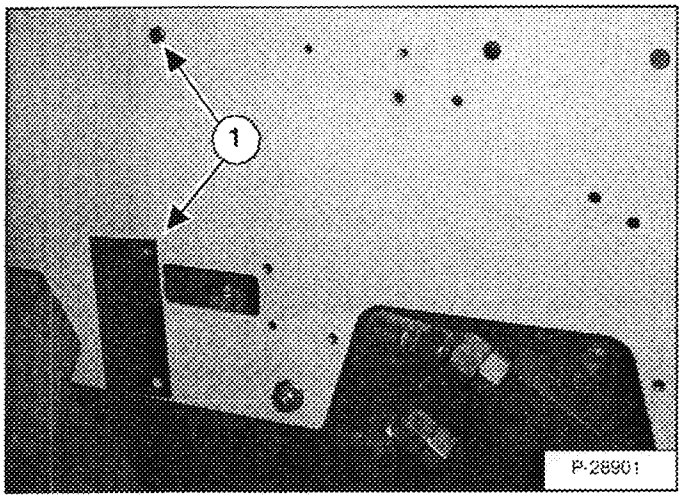
Removal And Installation (Cont'd)(S/N 512262999 & Below)

Figure 20-40-11



Disconnect the inlet hose from the control valve through the access slot **[Figure 20-40-11]**.

Figure 20-40-12



Remove the two control valve mounting bolts/nuts (Item 1) **[Figure 20-40-12]** from the loader frame.

Remove the control valve from the loader.

Installation: Tighten the mounting bolt & nut to 18-20 ft.-lbs. (24-27 Nm) torque.

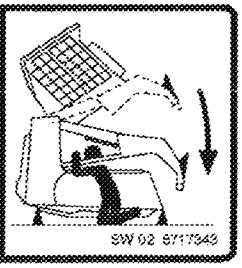
Reverse the removal procedure to install the control valve.

Removal And Installation (S/N 512263000 & Above)

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 57051



⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Lift and block the loader. (See Contents Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Stop the engine. Raise the seat bar.

Raise the operator cab. (See Contents Page 10-01.)

Clean the area around the control valve.

Drain the hydraulic reservoir. (See Contents Page 20-01.)

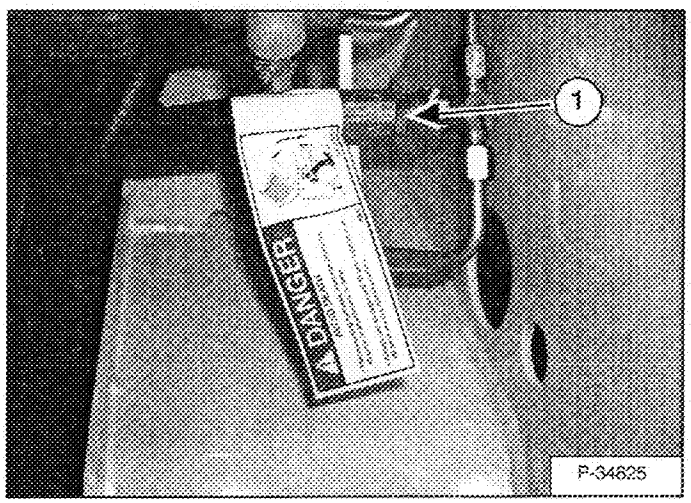
Mark all tubelines for correct installation.

Cap and plug all hoses, tubelines, and fittings.

Remove the control panel. (See Contents Page 50-01.)

Open the rear door.

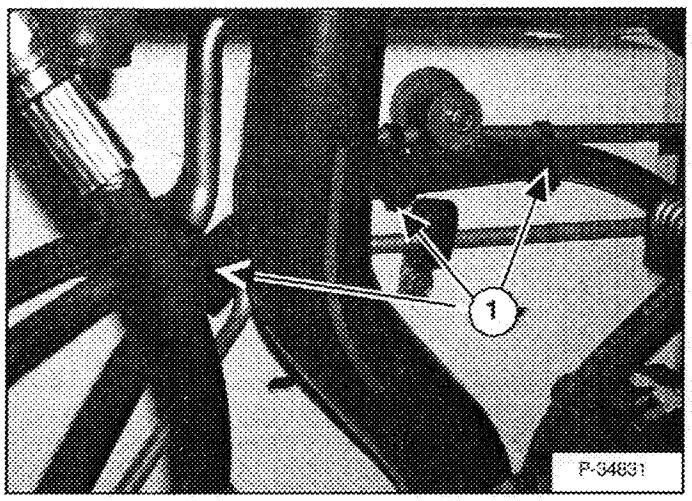
Figure 20-40-13



The fixed end main valve hose assembly (Item 1) **[Figure 20-40-13]** is connected to a fixed end fitting on the control valve. The hose is routed to the back upright where the hose is connected to a tee fitting that feeds the base end of both lift cylinders. The hose must be removed at the back tee fitting, located in the right side upright.

NOTE: Remember the hose routing for ease of control valve installation.

Figure 20-40-14

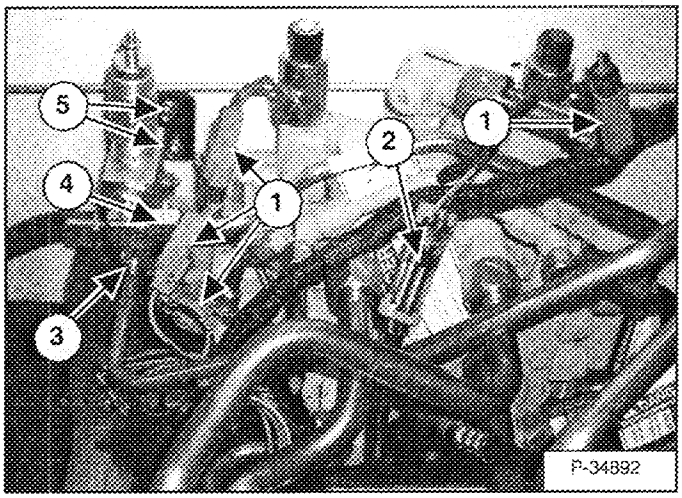


Remove the tie - straps (Item 1) **[Figure 20-40-14]** from the fixed end main valve hose.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Removal And Installation (Cont'd)(S/N 512263000 & Above)

Figure 20-40-15



Label and disconnect the solenoid electrical connectors (Item 1) **[Figure 20-40-15]**.

Label and disconnect the BICS™ electrical connector (Item 2) **[Figure 20-40-15]**.

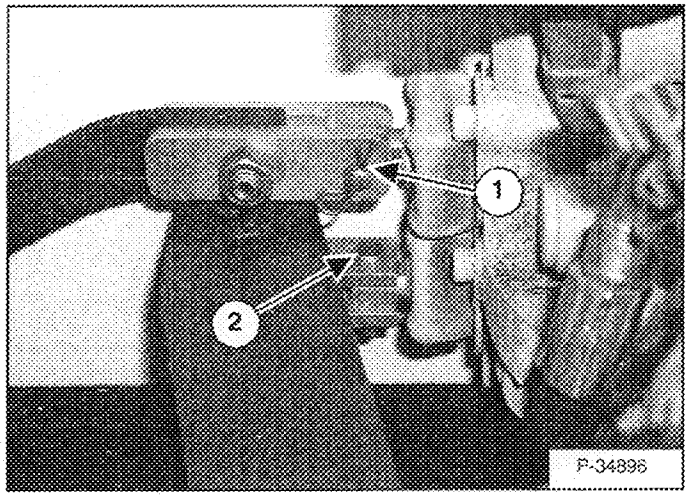
Remove the drain tubeline (Item 3) **[Figure 20-40-15]** from the lift arm by-pass valve.

Disconnect the tubeline (Item 4) **[Figure 20-40-15]** from the control valve.

Remove the bolts (Item 5) **[Figure 20-40-15]** from the lift arm by-pass control valve bracket.

Remove the lift arm by-pass control valve from the loader.

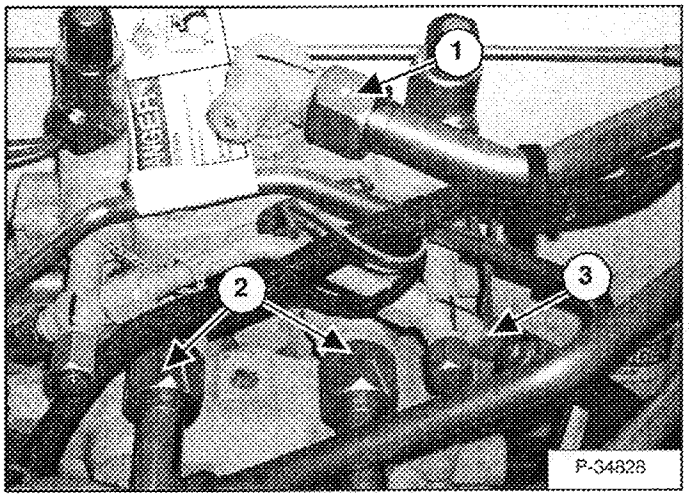
Figure 20-40-16



Remove the clevis pin (Item 1)**[Figure 20-40-16]** from the tilt spool linkage.

Remove the clevis pin (Item 2) **[Figure 20-40-16]** from the lift spool linkage.

Figure 20-40-17



Disconnect the outlet tubeline (Item 1) **[Figure 20-40-17]** from the control valve.

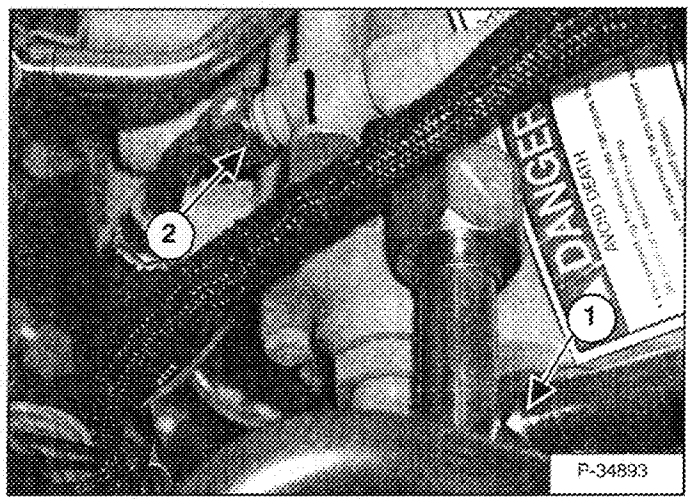
Disconnect the tubeline (Item 2) **[Figure 20-40-17]** from the auxiliary section of the control valve.

Disconnect the drain hose (Item 3) **[Figure 20-40-17]** from the control valve.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Removal And Installation (Cont'd)(S/N 512263000 & Above)

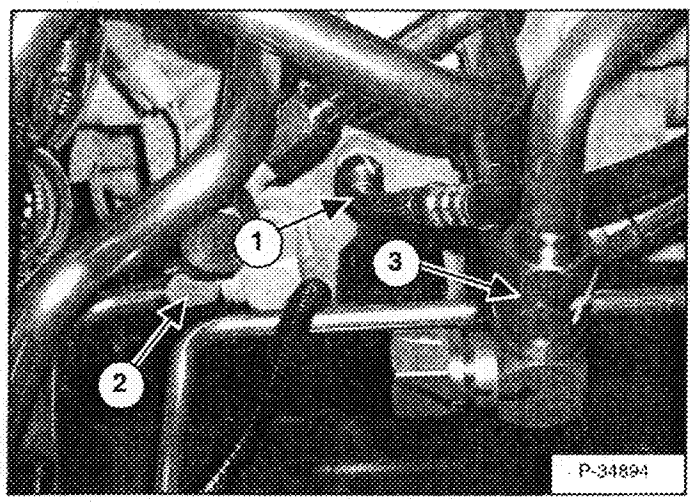
Figure 20-40-18



Disconnect the tilt tubeline (Item 1) **[Figure 20-40-18]** from the control valve.

Disconnect the drain hose (Item 2) **[Figure 20-40-18]** from the control valve.

Figure 20-40-19

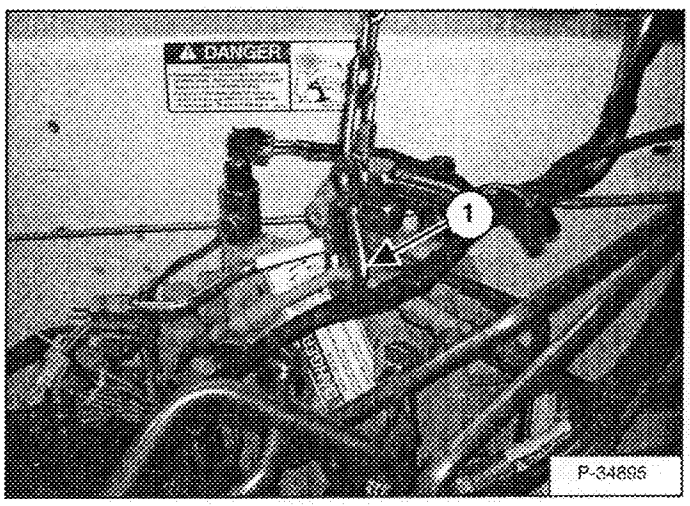


Disconnect the drain hose (Item 1) **[Figure 20-40-19]** from the control valve.

Disconnect the lift tubeline (Item 2) **[Figure 20-40-19]** from the control valve.

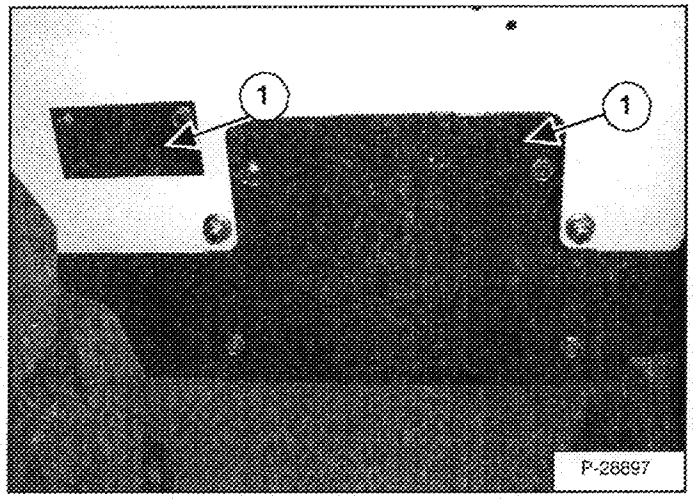
Disconnect the tilt tubeline (Item 3) **[Figure 20-40-19]** from the control valve.

Figure 20-40-20



Connect a hoist to the control valve (Item 1) **[Figure 20-40-20]**.

Figure 20-40-21

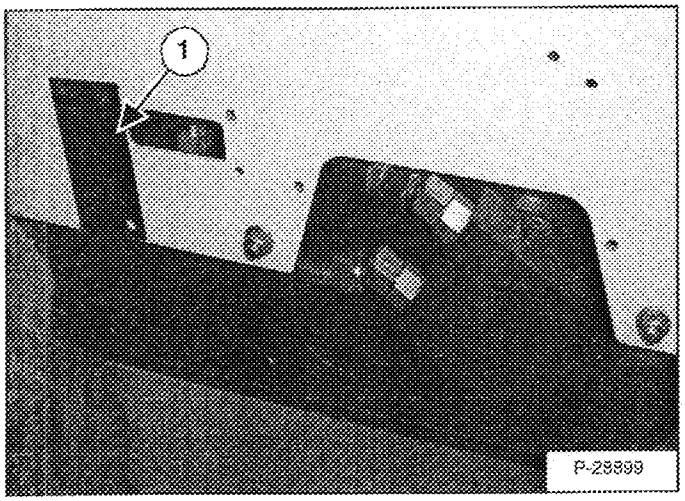


Locate the access covers (Item 1) **[Figure 20-40-21]** on the right side of the loader frame.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Removal And Installation (Cont'd)(S/N 512263000 & Above)

Figure 20-40-22

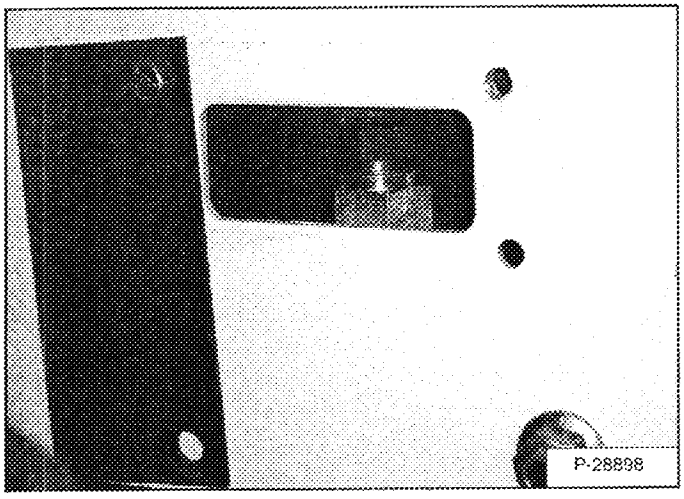


Remove the drive motor cover **[Figure 20-40-22]**.

Loosen one mounting bolt and remove the other mounting bolt from the rectangular access cover (Item 1) **[Figure 20-40-22]**.

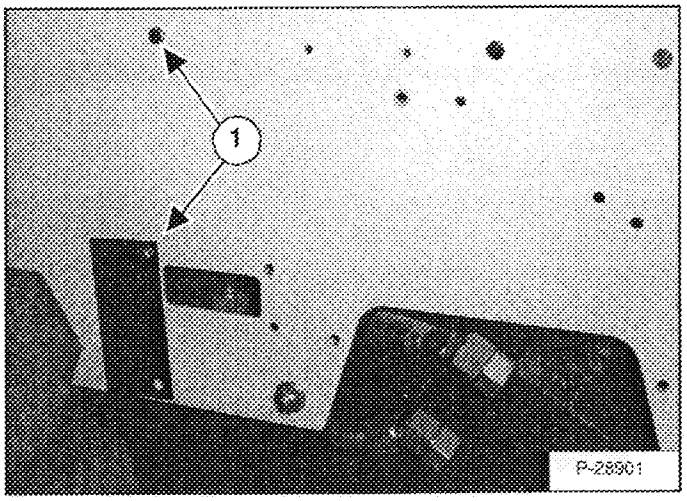
Rotate the cover to expose the access slot in the loader **[Figure 20-40-22]**.

Figure 20-40-23



Disconnect the inlet hose from the control valve through the access slot **[Figure 20-40-23]**.

Figure 20-40-24

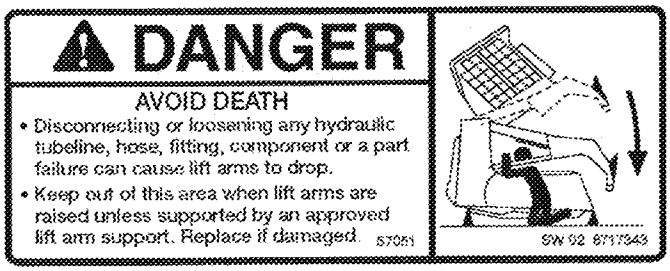


Remove the two control valve mounting bolts/nuts (Item 1) **[Figure 20-40-24]** from the loader frame.

Remove the control valve from the loader.

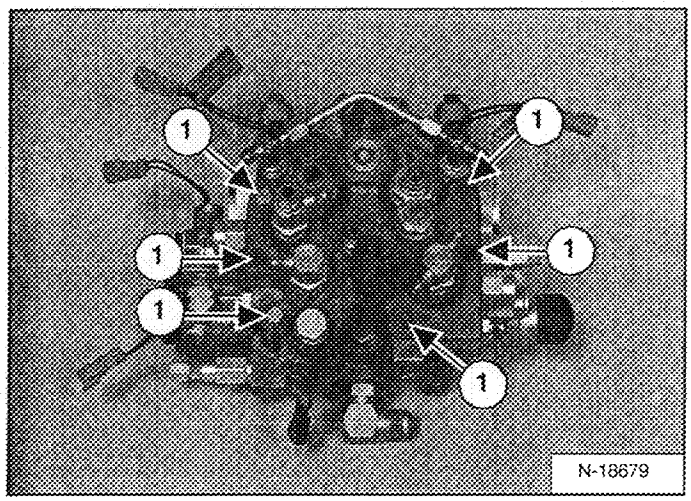
Installation: Tighten the mounting bolt & nut to 18-20 ft.-lbs. (24-27 Nm) torque.

Reverse the removal procedure to install the control valve.



BICS™ Valve, Removal And Installation

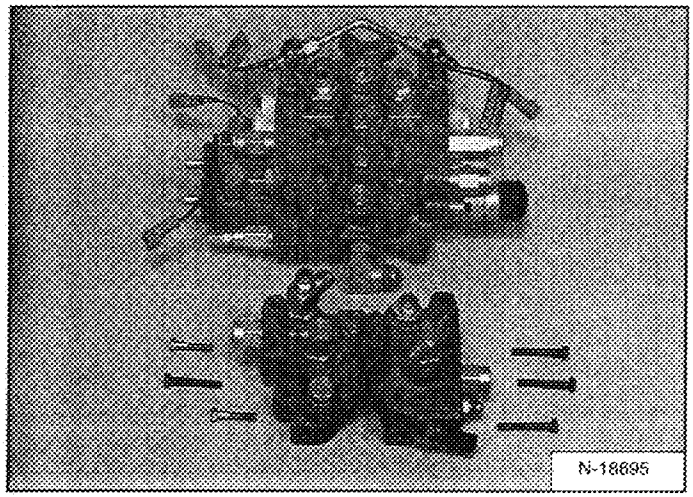
Figure 20-40-25



Remove the hydraulic control valve. (See Removal And Installation (S/N 512262999 & Below) on Page 20-40-1.)

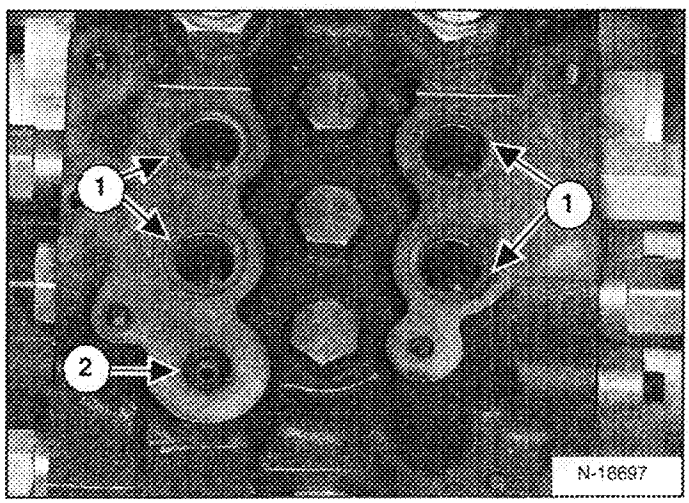
To remove the BICS™ from the control valve loosen and remove the six mounting bolts (Item 1) **[Figure 20-40-25]**.

Figure 20-40-26



Remove the BICS™ valve assembly from the top of the control valve **[Figure 20-40-26]**.

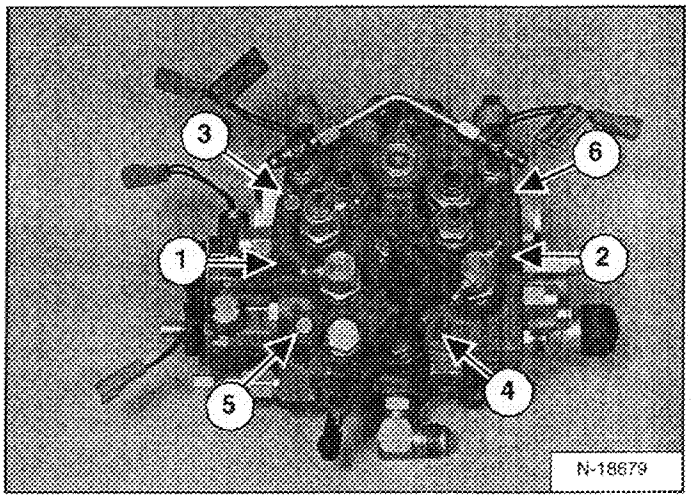
Figure 20-40-27



Remove the four large O-rings (Item 1) and the small O-ring (Item 2) **[Figure 20-40-27]** from the top of the control valve.

Install the four large O-rings (Item 1) and the small O-ring (Item 2) **[Figure 20-40-27]** on the top of the control valve.

Figure 20-40-28



Install the six mounting bolts**[Figure 20-40-28]**.

The chart below lists the correct torque specifications and tightening sequence when reinstalling the BICS™ valve assembly to the control valve. Thoroughly clean

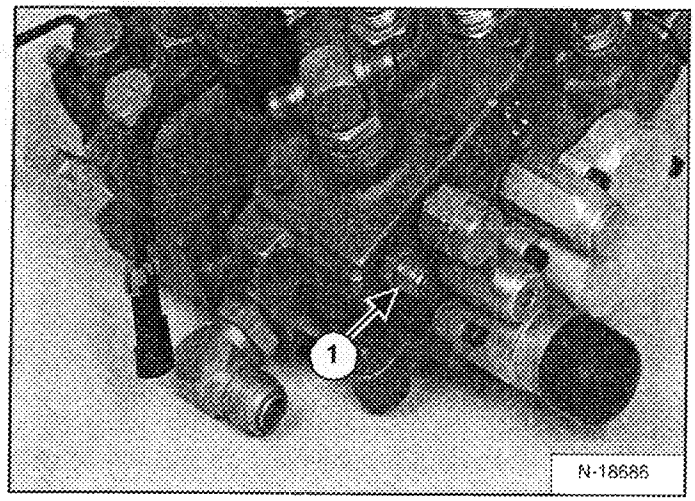
and dry bolts and threads in valve. Use liquid adhesive LOCTITE #242 or equivalent.

STEP	TORQUE	SEQUENCE
1	110-130 in.-lbs. (12,4-14,7Nm)	1,2,3,4,5,& 6
2	190-210 in.-lbs. (21,5-23,7 Nm)	
3*	190-210 in.-lbs. (21,5-23,7 Nm)	

*Torque must be 190-210 in.-lbs. (21,5-23,7 Nm) for every bolt or repeat step 3.

BICS™ Valve, Lift Arm By-Pass Orifice Removal And Installation

Figure 20-40-29



Remove the fitting (Item 1) **[Figure 20-40-29]** from the valve.

Figure 20-40-30

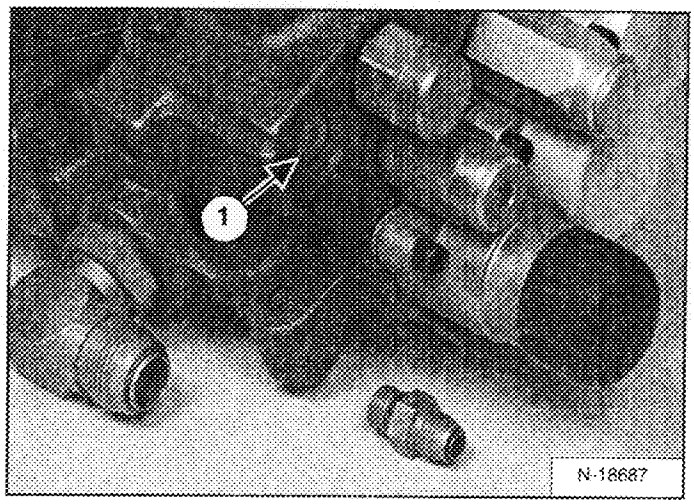
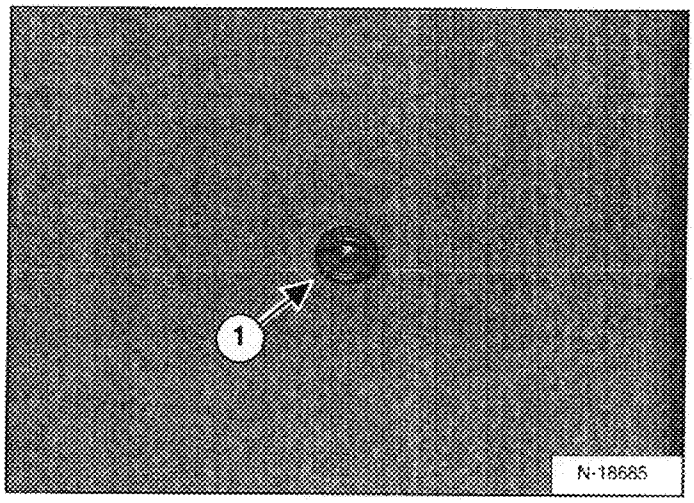


Figure 20-40-31



Using a flat blade screw driver, remove the lift arm by-pass orifice (Item 1) **[Figure 20-40-30]** & **[Figure 20-40-31]**.

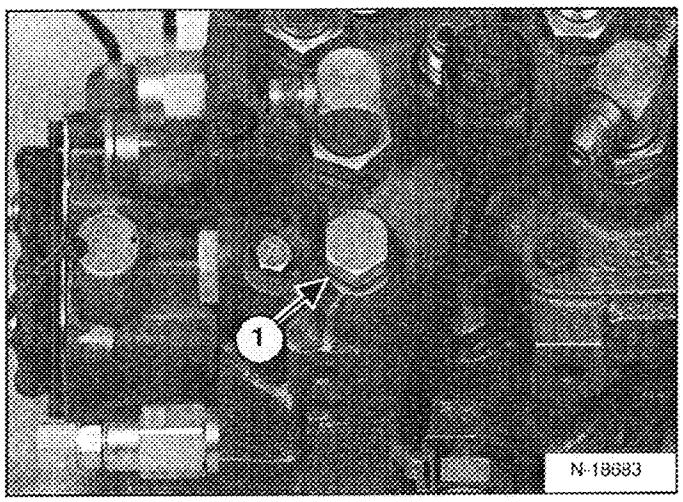
Orifice size is 0.078 inch.

Reverse the removal procedure to install the lift arm by-pass orifice.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

BICS™ Valve, Check Valve Removal And Installation

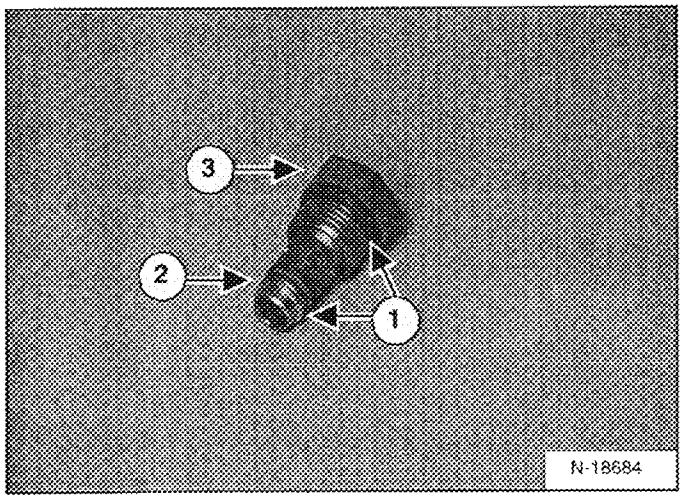
Figure 20-40-32



Remove the check valve (Item 1) **[Figure 20-40-32]**.

Installation: Tighten the valve to 20 ft.-lbs. (27 Nm) torque.

Figure 20-40-33

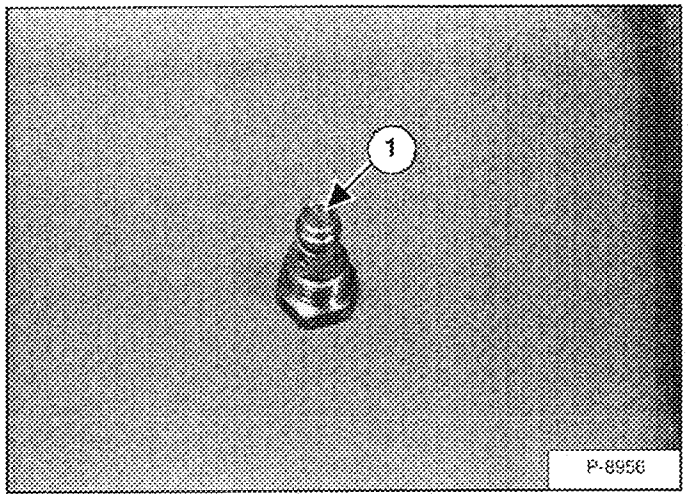


Remove the O-rings (Item 1) **[Figure 20-40-33]** and back-up ring (Item 2) **[Figure 20-40-33]**.

Installation: Install new O-rings (Item 1) **[Figure 20-40-33]** and back-up ring (Item 2) **[Figure 20-40-33]** on the check valve.

Check valve (Item 3) **[Figure 20-40-33]** has a rating of 5-10 PSI.

Figure 20-40-34



Clean and inspect the screen (Item 1) **[Figure 20-40-34]** on the end of the valve.

Reverse the removal procedure to install the BICS™ check valve.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

BICS™ Valve, Lock Valve Removal And Installation

Figure 20-40-35

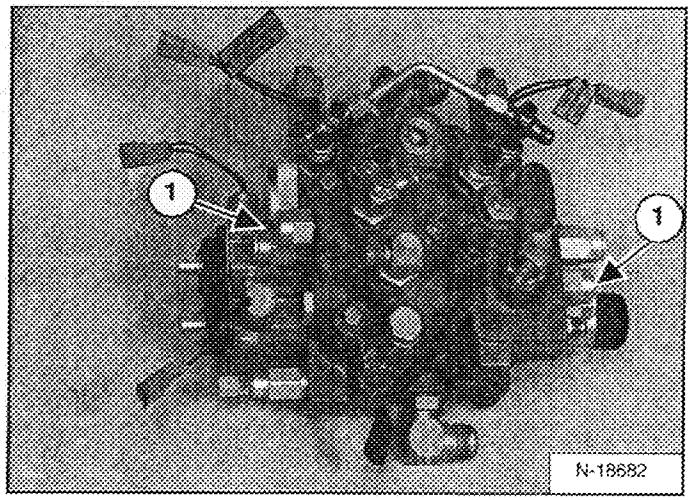


Figure 20-40-36

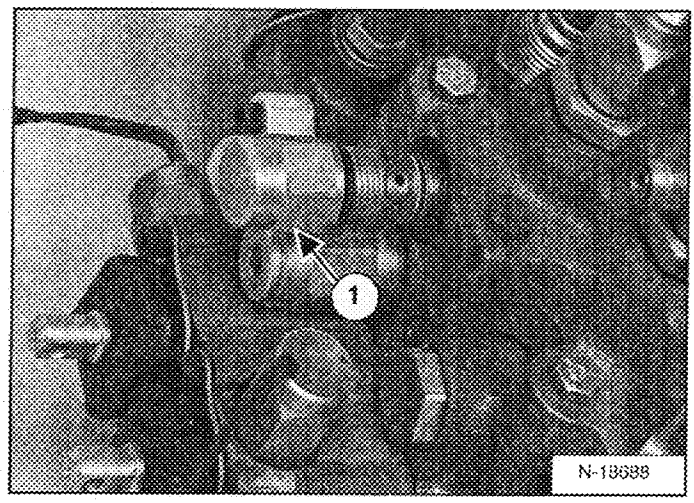
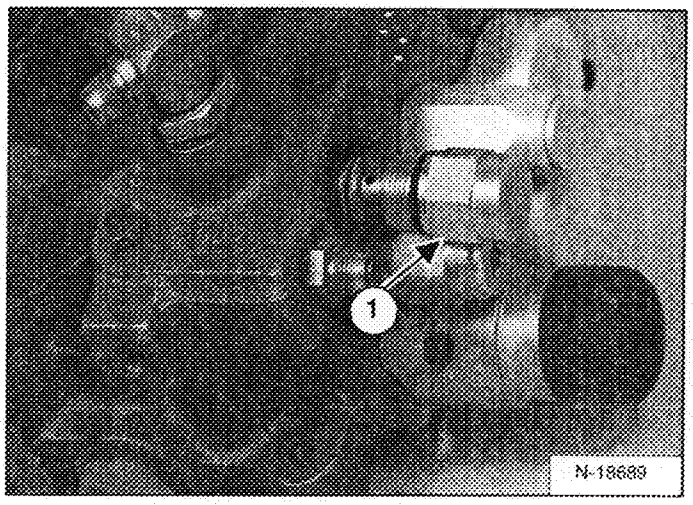


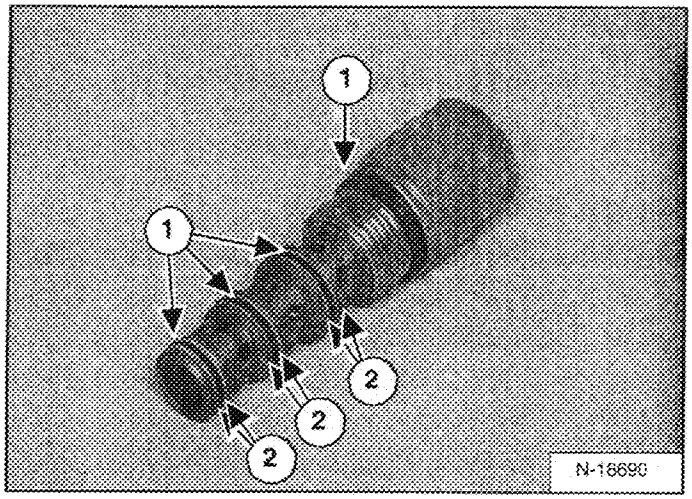
Figure 20-40-37



Remove the lock valves (Item 1)**[Figure 20-40-35]**, **[Figure 20-40-36]** & **[Figure 20-40-37]** from the BICS™ valve.

Installation: Tighten the lock valves to 25 ft.-lbs. (34 Nm) torque.

Figure 20-40-38



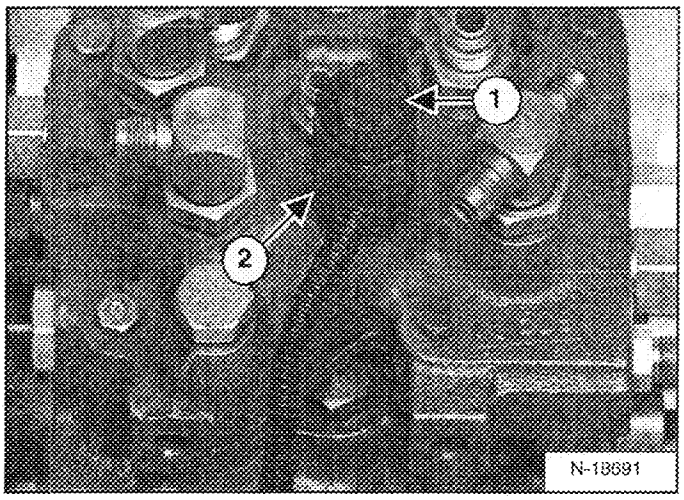
Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-40-38]** from both the tilt and lift lock valves.

Installation: Install new O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-40-38]** on the tilt and lift lock valves.

Reverse the removal procedure to install the lock valve.

BICS™ Valve, Solenoid Removal And Installation

Figure 20-40-39



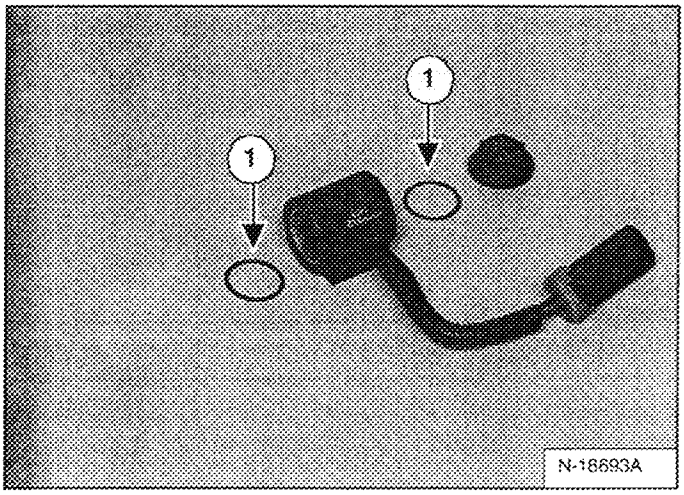
Remove the mounting nut (Item 1) **[Figure 20-40-39]** from the solenoid cartridge.

Installation: Tighten the mounting nut to 53 in.-lbs. (6 Nm) torque.

Remove the solenoid (Item 2) **[Figure 20-40-39]**.

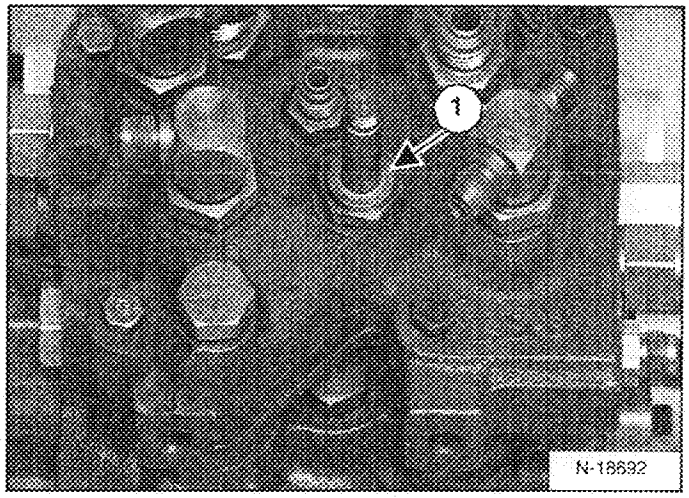
NOTE: The solenoid resistance valve is (8-10 ohms).

Figure 20-40-40



Remove the O-rings (Item 1) **[Figure 20-40-40]** from both ends of the solenoid.

Figure 20-40-41

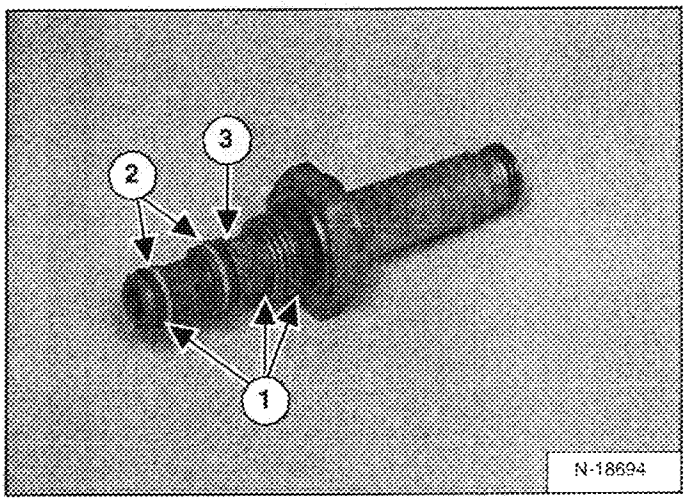


Remove the solenoid cartridge (Item 1) **[Figure 20-40-41]**.

Installation: Tighten the cartridge to 20 ft.-lbs. (27 Nm) torque.

BICS™ Valve, Solenoid Removal And Installation (Cont'd)

Figure 20-40-42



Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-40-42]** from the cartridge.

Clean all parts in solvent and dry with compressed air.

Inspect all parts for wear and replace any showing excessive wear.

NOTE: The screen (Item 3) [Figure 20-40-42] may be cleaned with solvent. If it is torn or worn it needs to be replaced.

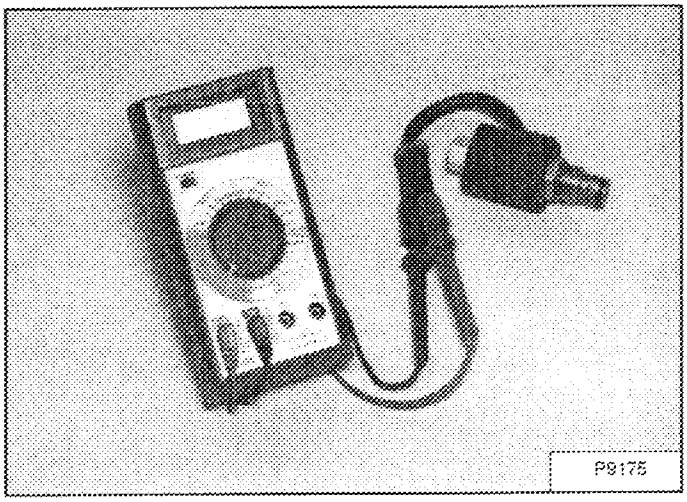
Use only new O-rings and apply oil to all O-rings and back-up rings before installation.

Install new O-rings (Item 1) **[Figure 20-40-40]** & **[Figure 20-40-42]** and new back-up rings (Item 2) **[Figure 20-40-42]** on the solenoid cartridge.

Reverse the removal procedure to install BICS™ Valve.

BICS™ Valve, Solenoid Testing

Figure 20-40-43



Use an Ohm meter to measure coil resistance **[Figure 20-40-43]**.

Coil wires do not have polarity.

Correct resistance for the auxiliary, lift and tilt lock coils are 7.7 ohms

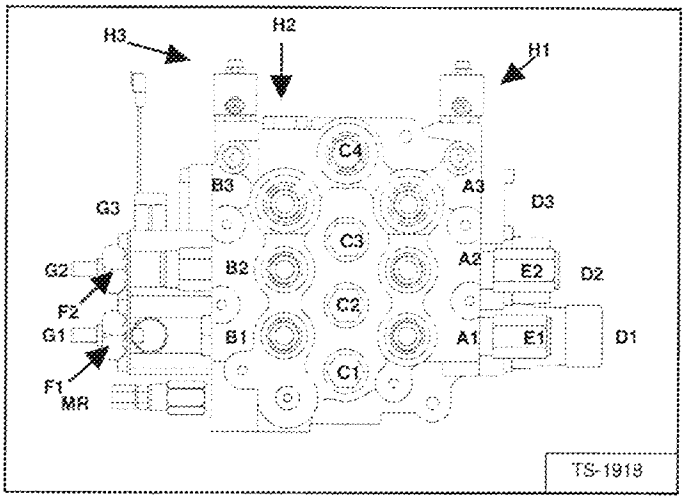
The other coils (BICS, diverter, select valve) are 7.5 ohms.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Identification Chart

Item	763 LOADER
A1	Lift Cylinder Base End/Restrictor
A2	Tilt Cylinder Base End
A3	Auxiliary Hydraulics
B1	Lift Cylinder Rod End
B2	Tilt Cylinder Rod End
B3	Auxiliary Hydraulics
C1	Load Check Valve/Lift Function
C2	Load Check Valve/Tilt Function
C3	Orificed Load Check Valve/Auxiliary Function
C4	Outlet Fluid Flow
D1	Lift Spool Detent
D2	Tilt Spool Centering Spring
D3	Auxiliary Spool/Centering Springs
E1	Port Relief Valve-3500 PSI
E2	Anti-Cavitation/Port Relief Valve-3500 PSI
F1	Anti-Cavitation Valve
F2	Port Relief Valve-3500 PSI
G1	Lift Spool End
G2	Tilt Spool End
G3	Auxiliary Spool/Centering Springs
H1	Auxiliary Electric Solenoid
H2	Plug/Port Relief (Optional)-3500 PSI
H3	Auxiliary Electric Solenoid
MR	Main Relief Valve-3000 PSI

Figure 20-40-44



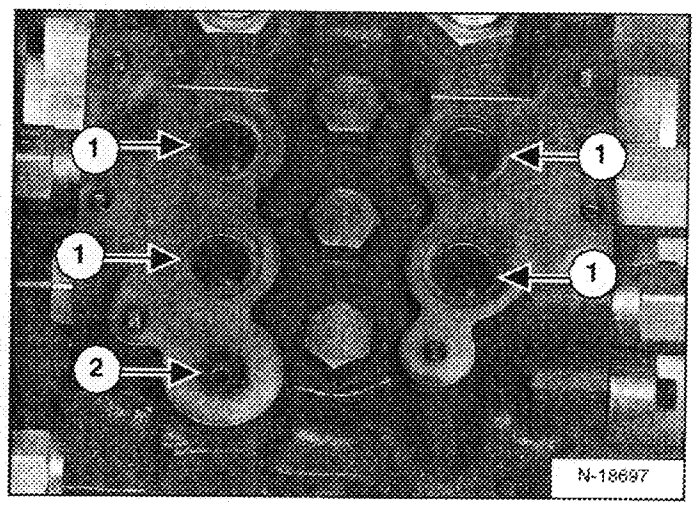
Load Check Valve

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

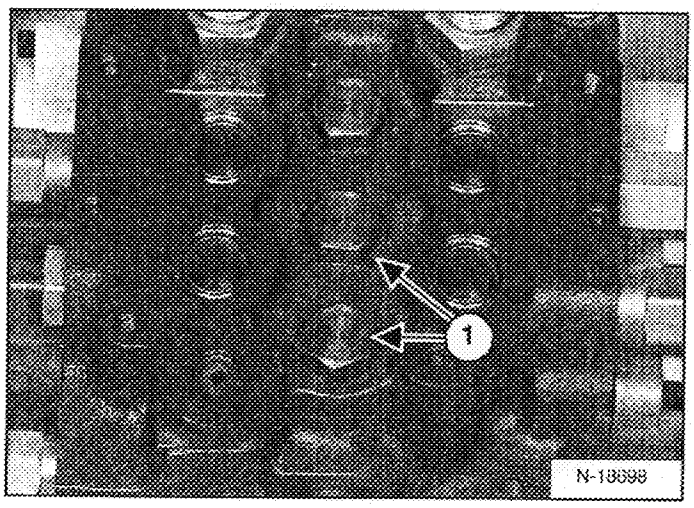
Figure 20-40-45



Remove the BICS valve assembly from the control valve. (See BICS™ Valve, Lift Arm By-Pass Orifice Removal And Installation on Page 20-40-11.)

Remove the four large O-rings (Item 1) and small O-ring (Item 2) **[Figure 20-40-45]**. Always replace these O-rings before installing the BICS valve assembly.

Figure 20-40-46



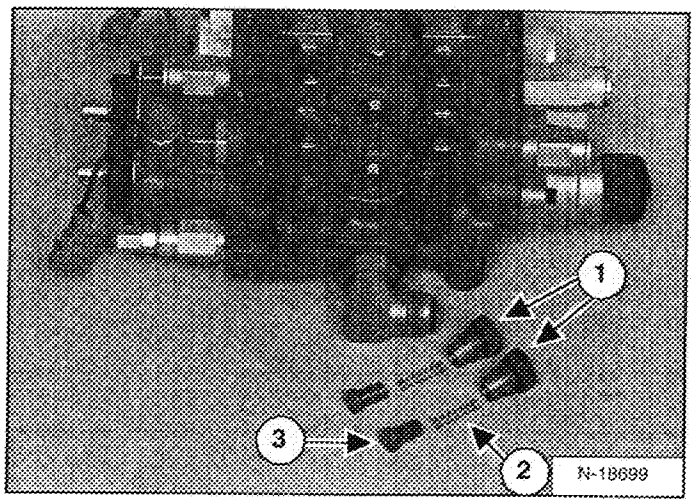
Mark each valve section, spool and related parts so that they will be returned to its original valve section during assembly.

Use bolts to fasten the control valve to a work bench for easier disassembly and assembly procedures.

Loosen the load check valve plugs (Item 1) **[Figure 20-40-46]**.

Installation: Always use new O-ring, tighten the plug to 35-40 ft.-lbs. (47-54 Nm) torque.

Figure 20-40-47



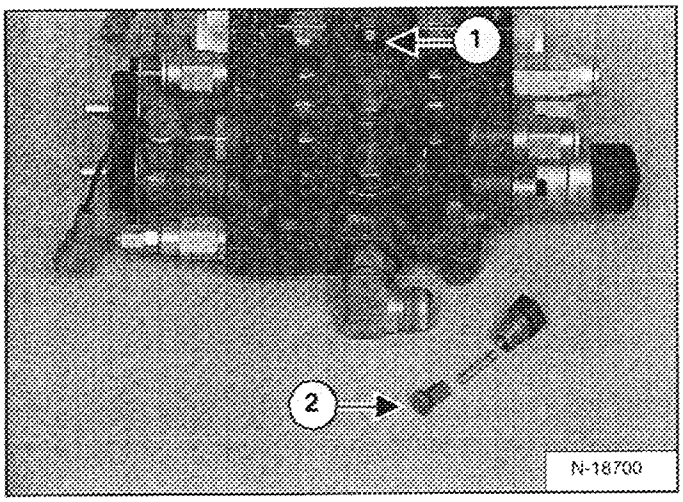
Remove the load check plugs (Item 1) **[Figure 20-40-47]**.

Remove the spring (Item 2) and poppet (Item 3) **[Figure 20-40-47]**.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Load Check Valve (Cont'd)

Figure 20-40-48

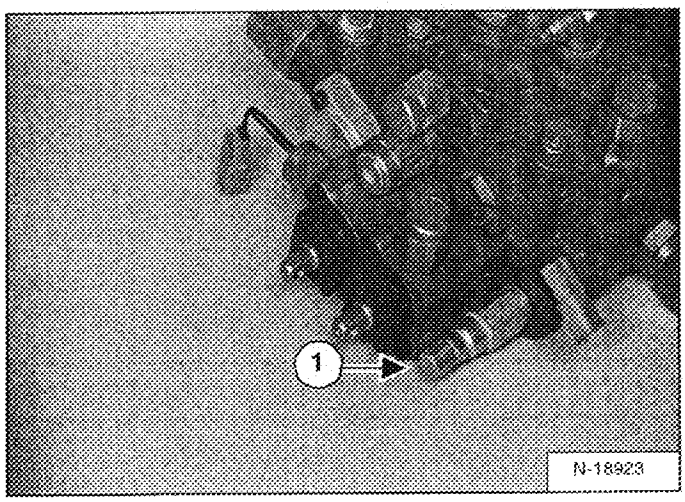


The auxiliary section (item 1) uses an orifice load check poppet (item 2) **[Figure 20-40-48]**.

NOTE: For correct port locations and valve component values. (See Identification Chart on Page 20-40-16.)

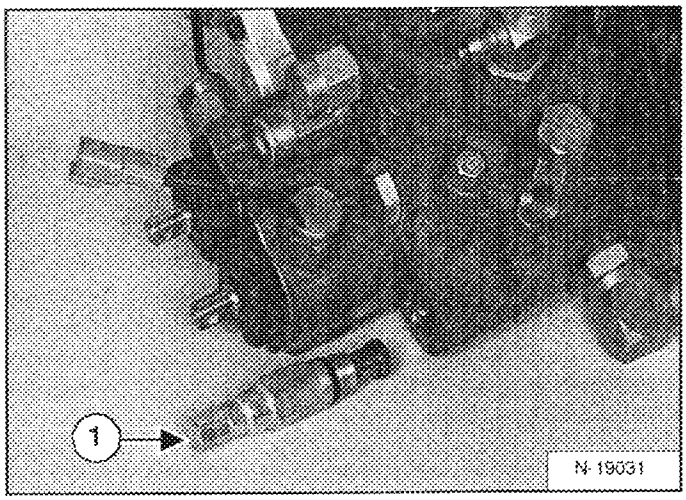
Main Relief Valve

Figure 20-40-49



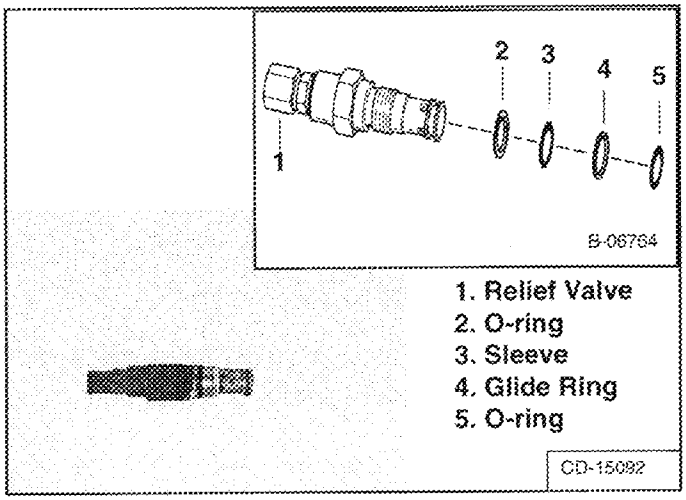
Loosen the main relief valve (item 1) **[Figure 20-40-49]**.

Figure 20-40-50



Remove the main relief valve (item 1) **[Figure 20-40-50]**.

Figure 20-40-51



Remove the O-rings, sleeve, and glide ring from the main relief valve **[Figure 20-40-51]**.

Installation: Always use new O-rings, sleeve, and glide ring. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Port Relief Valve

Figure 20-40-52

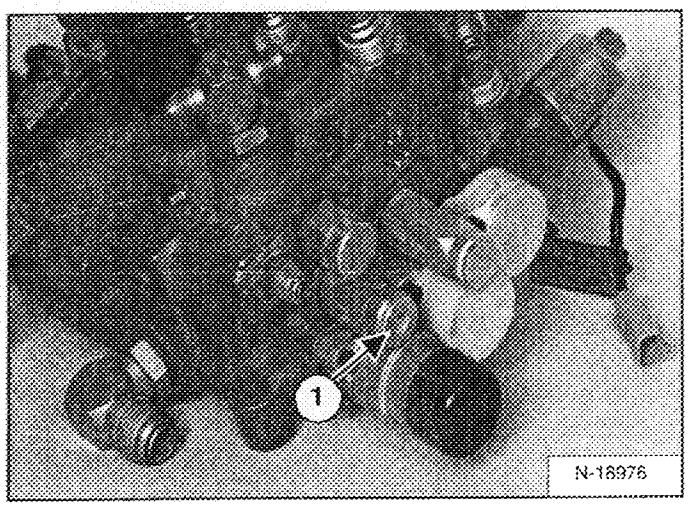
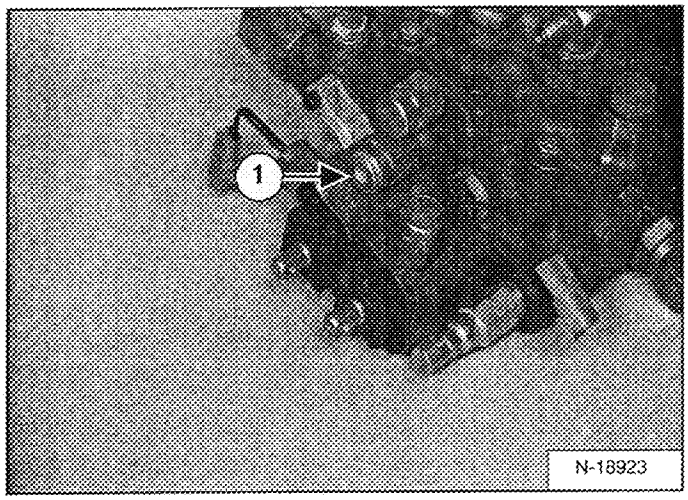


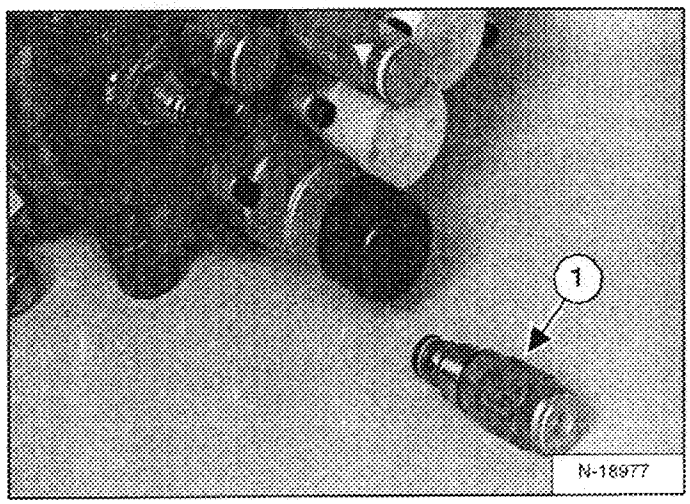
Figure 20-40-53



Loosen the port relief valve (item 1) **[Figure 20-40-52]** & **[Figure 20-40-53]** *(Port E1 or F2)*.

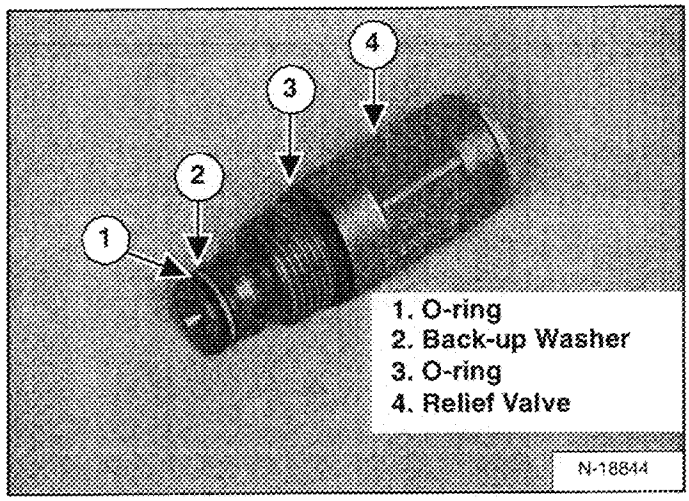
Installation: Always use new O-rings and back-up washers. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.

Figure 20-40-54



Remove the port relief valve (item 1) **[Figure 20-40-54]**.

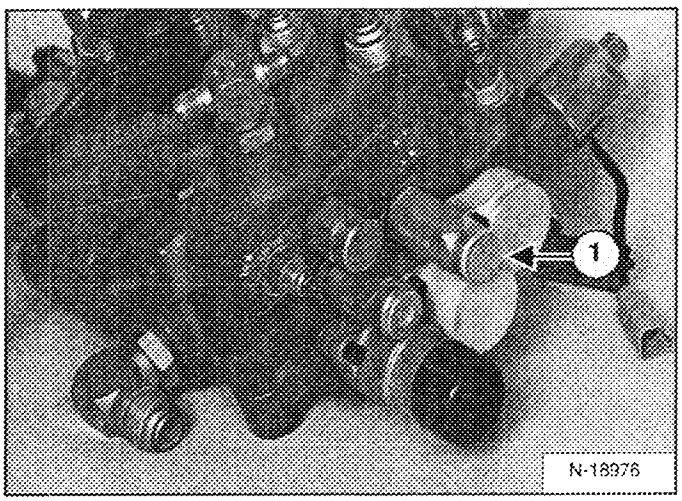
Figure 20-40-55



Remove the O-rings and back-up washer from the port relief valve **[Figure 20-40-55]**.

Anti-Cavitation Valve/Port Relief Valve

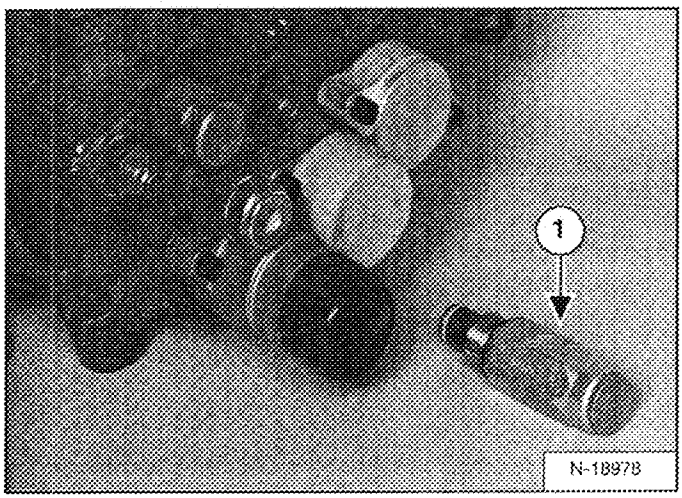
Figure 20-40-56



Loosen the anti-cavitation valve (Item 1) **[Figure 20-40-56]**.

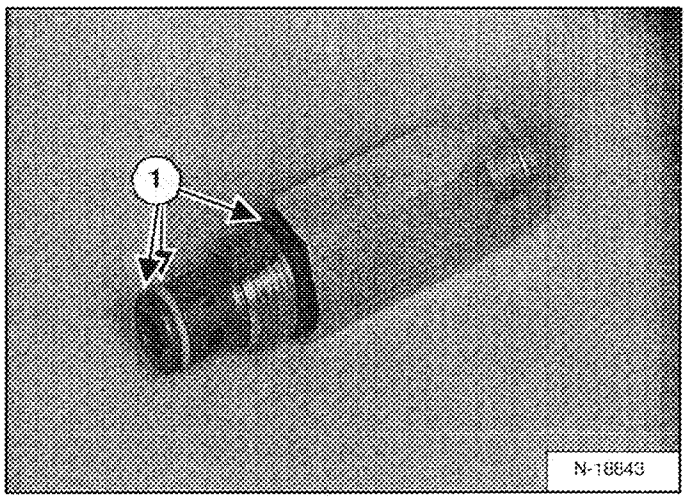
Installation: Always use new O-rings and back-up washers. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.

Figure 20-40-57



Remove the anti-cavitation/port relief valve (Item 1) **[Figure 20-40-57]** from the control valve for the tilt section.

Figure 20-40-58



Remove the O-rings (Item 1) **[Figure 20-40-58]** from the anti-cavitation/port relief valve.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Anti-Cavitation Valve

Figure 20-40-59

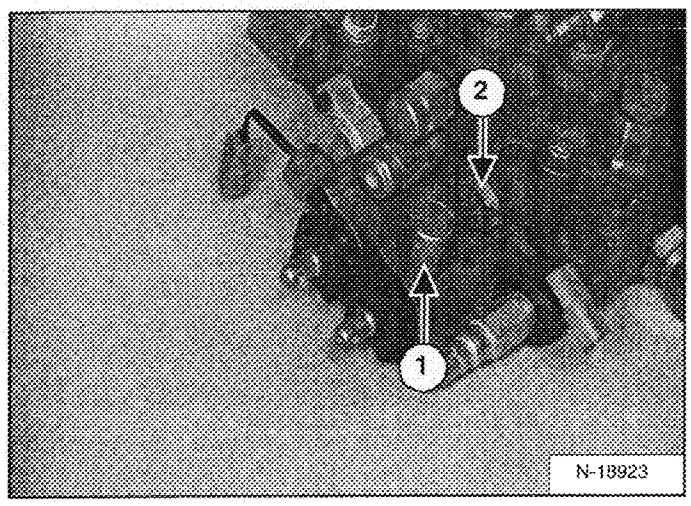
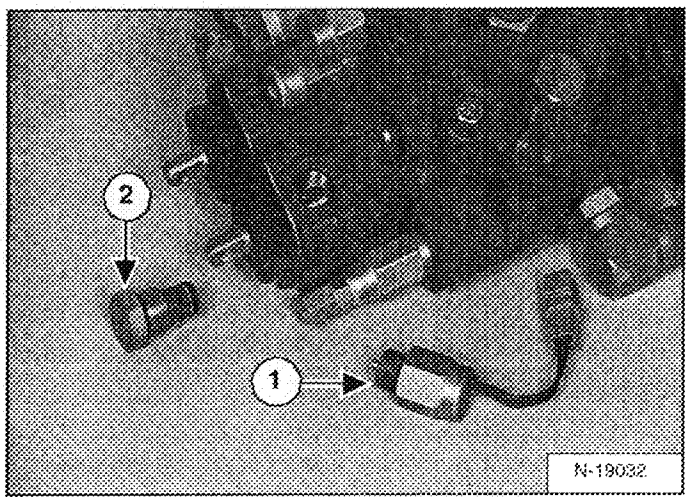


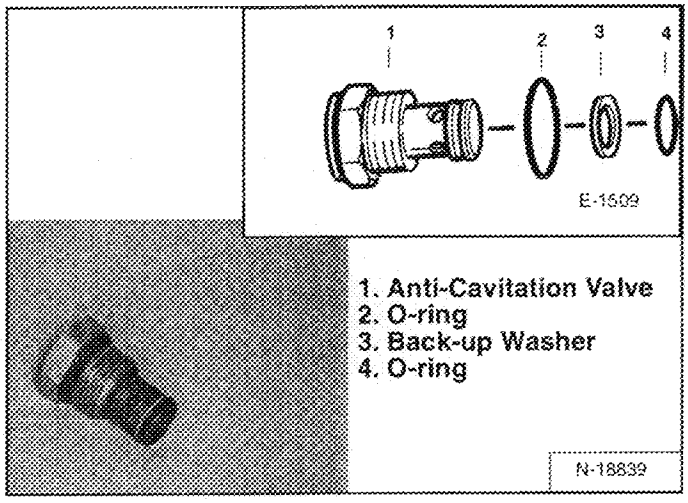
Figure 20-40-60



Remove the lift lock solenoid (Item 1) **[Figure 20-40-59]** & **[Figure 20-40-60]**.

Remove the anti-cavitation valve (Item 2) **[Figure 20-40-59]** & **[Figure 20-40-60]** from the control valve for the lift section.

Figure 20-40-61

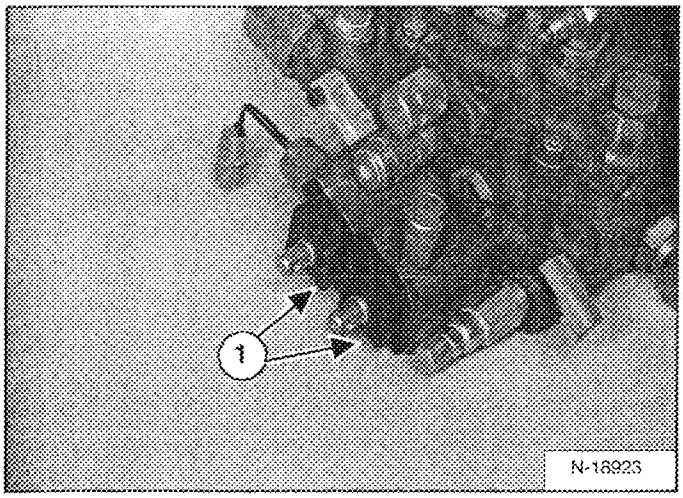


Remove the O-rings and back-up washer from the anti-cavitation valve **[Figure 20-40-61]**.

Installation: Always use new O-rings, sleeve, and glide ring. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.

Rubber Boot

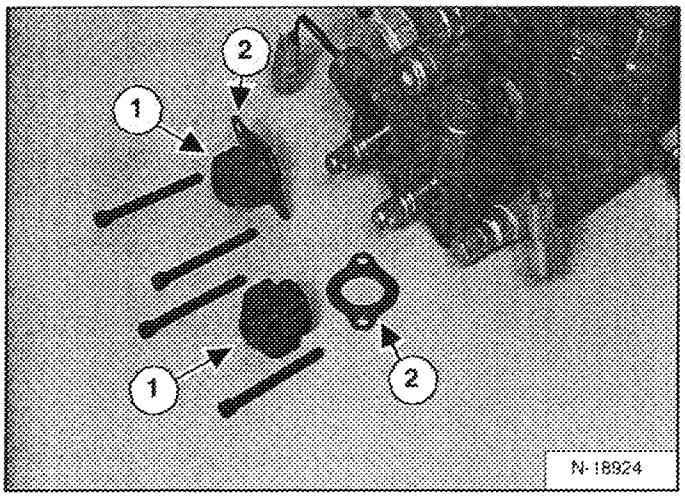
Figure 20-40-62



Remove the two screws (Item 1) **[Figure 20-40-62]** on the rubber boot retainer.

Installation: Tighten the screws to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

Figure 20-40-63



Remove the rubber boot (Item 1) and retainer (Item 2) **[Figure 20-40-63]**.

Lift And Tilt Lock Block Removal And Installation

Figure 20-40-64

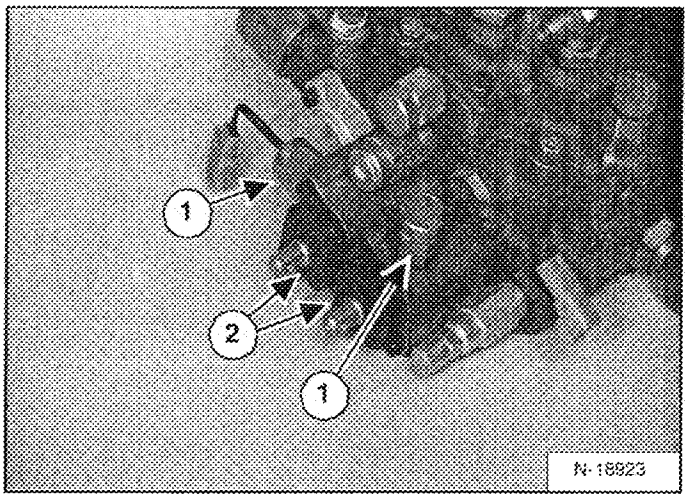
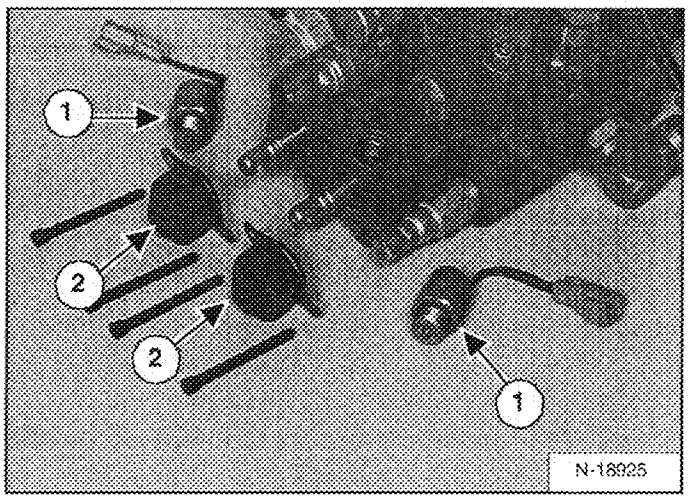


Figure 20-40-65

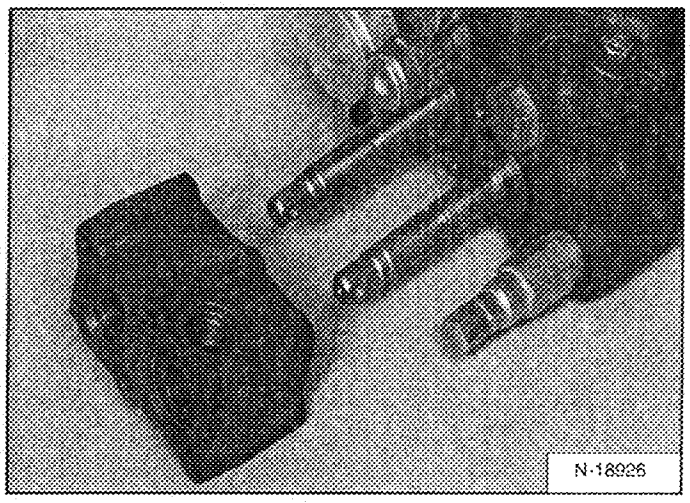


Remove the lock solenoids (Item 1) **[Figure 20-40-64]** & **[Figure 20-40-65]** from the lock block.

Remove the rubber Boot (Item 2) **[Figure 20-40-64]** & **[Figure 20-40-65]**. (See Rubber Boot on Page 20-40-22.)

Lift And Tilt Lock Block Removal and Installation (Cont'd)

Figure 20-40-66

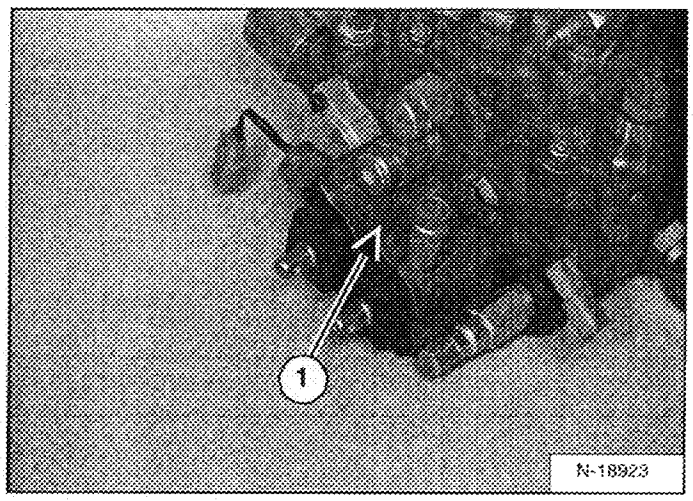


Remove the block **[Figure 20-40-66]**.

NOTE: The lock block must be clean and oil free. (Oil can cause the solenoids not to function properly.)

Lift Spool And Detent

Figure 20-40-67

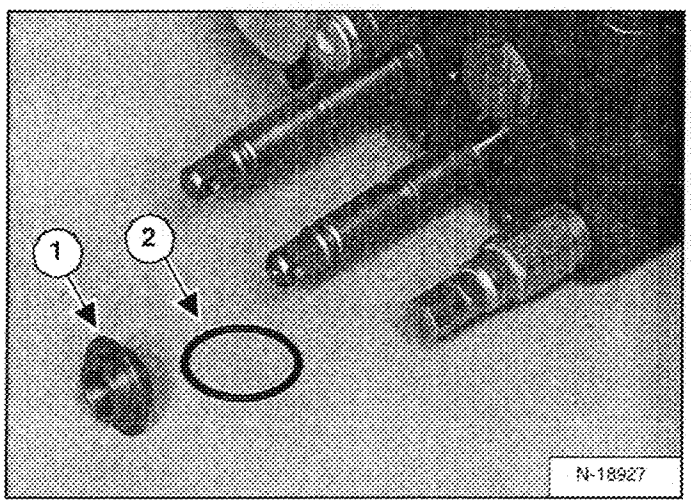


The tool listed will be needed to do the following procedure:

MEL1278 - Detent Tool
MEL1285 - Detent Spring Tool

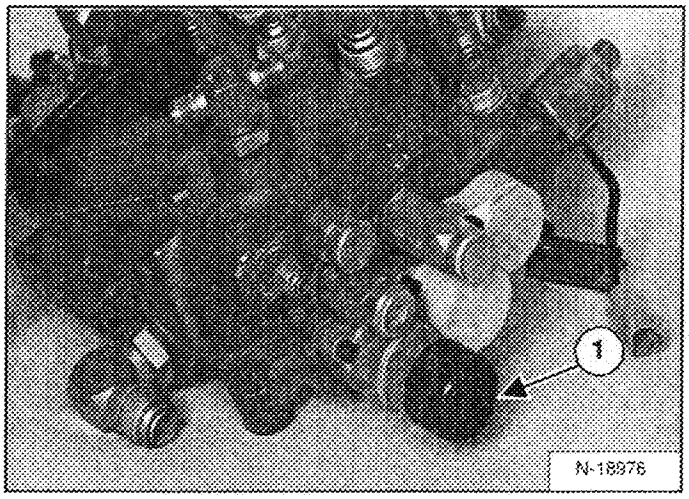
Remove the lift and tilt lock block (Item 1) **[Figure 20-40-67]** from the control valve. (See Lift And Tilt Lock Block Removal And Installation on Page 20-40-22.)

Figure 20-40-68



Remove the spacer (Item 1) and O-ring (Item 2) **[Figure 20-40-68]** from the lift spool.

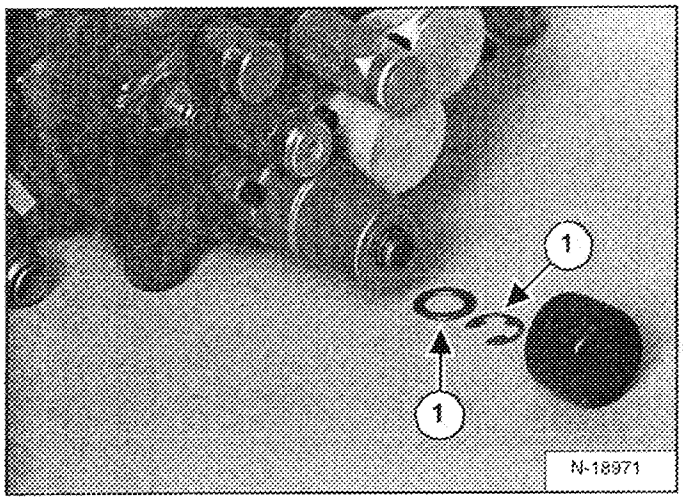
Figure 20-40-69



Remove the end cap (Item 1) **[Figure 20-40-69]**.

Lift Spool And Detent (Cont'd)

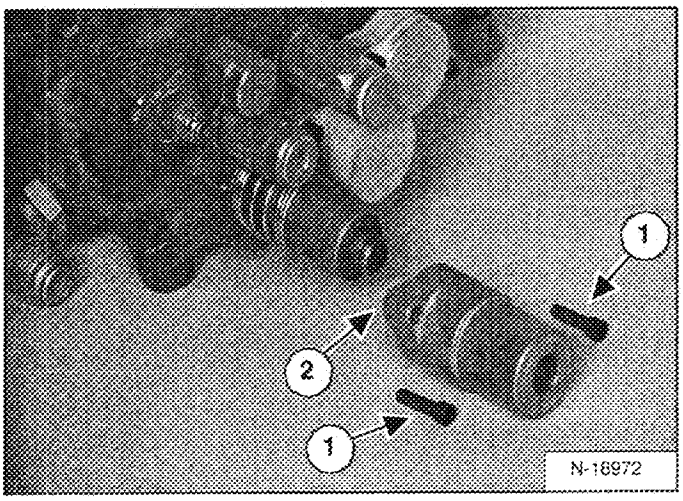
Figure 20-40-70



Use a screwdriver to remove the snap ring (Item 1) **[Figure 20-40-70]**.

Remove the washer (Item 2) **[Figure 20-40-70]**.

Figure 20-40-71



Remove the screws (Item 1) **[Figure 20-40-71]** from the detent bonnet.

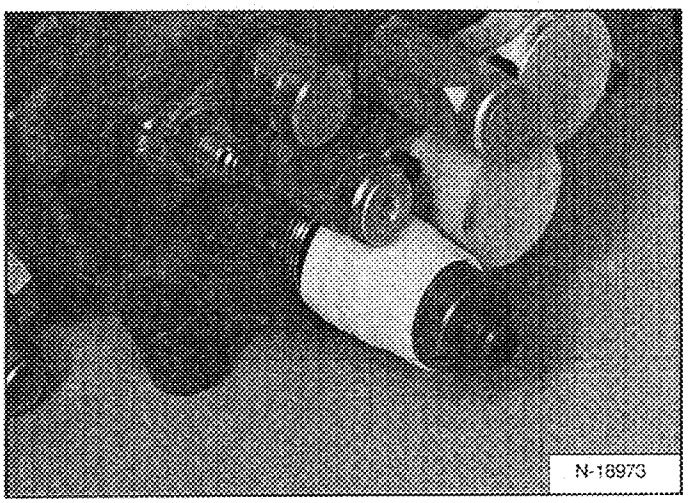
Remove the detent bonnet (Item 2) **[Figure 20-40-71]**.

IMPORTANT

The detent assembly has small springs and balls. Do not lose these parts during disassembly and assembly.

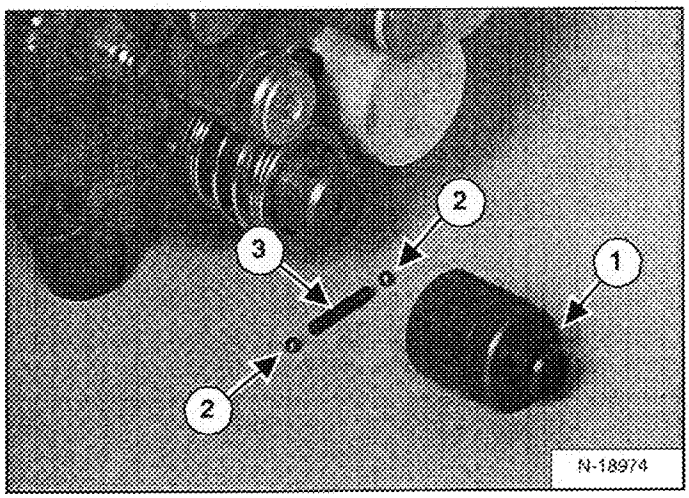
I-2012-0284

Figure 20-40-72



Put a rag around the detent assembly **[Figure 20-40-72]**. This will prevent the detent balls and spring from being lost when the detent sleeve is removed.

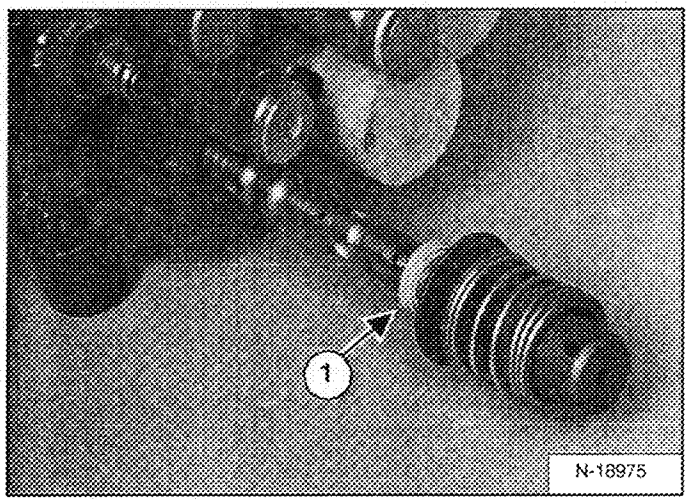
Figure 20-40-73



Remove the detent sleeve (Item 1), detent balls (Item 2) and spring (Item 3) **[Figure 20-40-73]**.

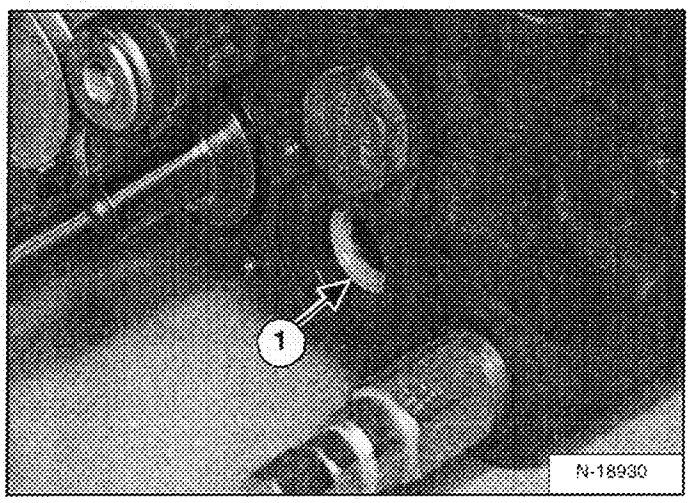
Lift Spool And Detent (Cont'd)

Figure 20-40-74



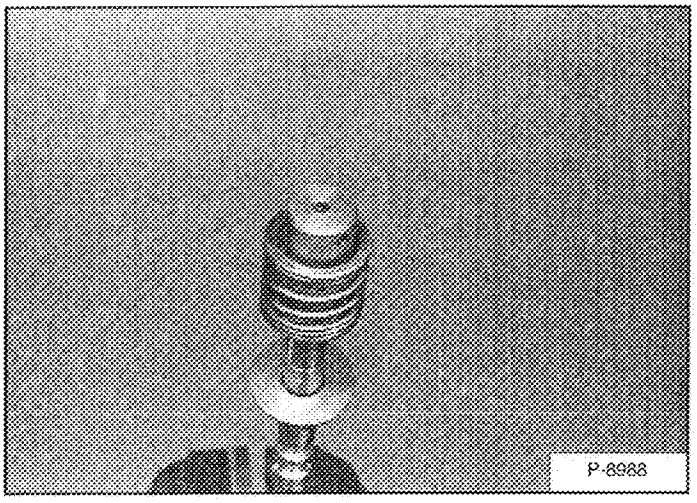
Remove the spool assembly and seal (Item 1) **[Figure 20-40-74]** from the control valve.

Figure 20-40-75



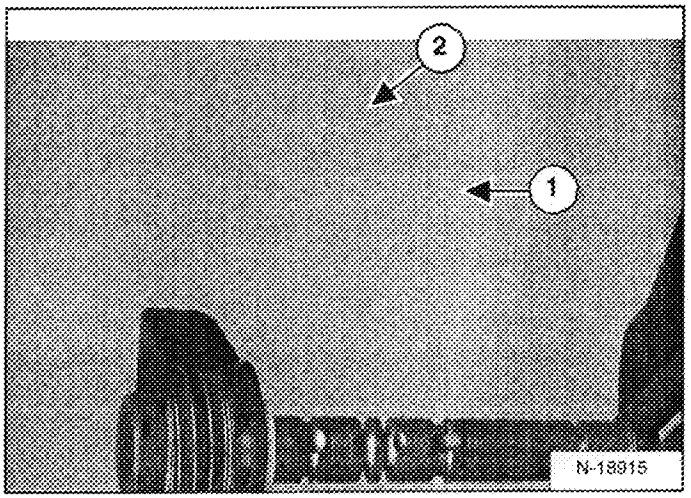
Remove the spool seal (Item 1) **[Figure 20-40-75]** from the linkage end of the valve.

Figure 20-40-76



Clamp the linkage end of the spool in a vise **[Figure 20-40-76]**.

Figure 20-40-77

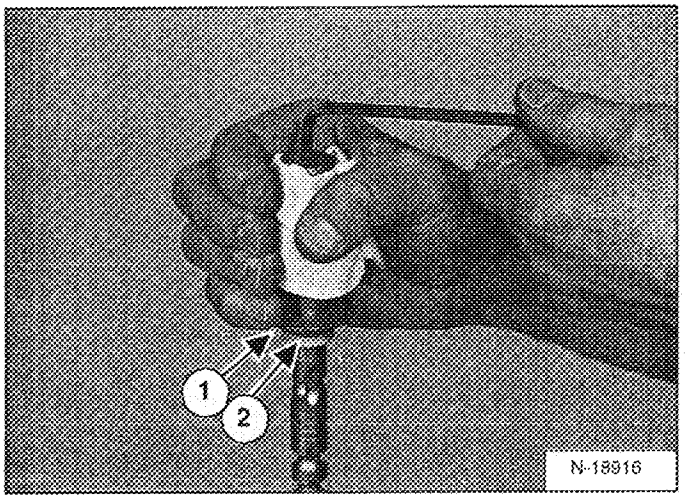


Install the spring tool (Item 1) **[Figure 20-40-77]** over the centering spring.

NOTE: Be careful when removing the detent adapter (Item 2) [Figure 20-40-77] from the centering spring, as it is under spring pressure.

Lift Spool And Detent (Cont'd)

Figure 20-40-78

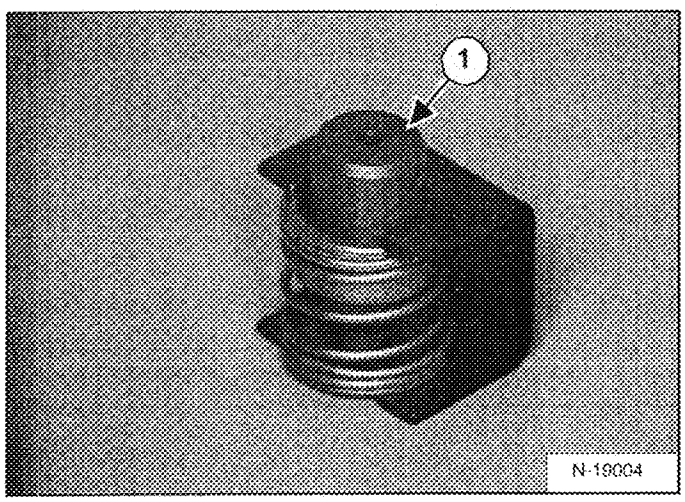


Put a rag around the detent assembly **[Figure 20-40-78]**. This will prevent the detent balls and spring from being lost when the detent adapter is removed.

Remove the detent adapter with an allen wrench.

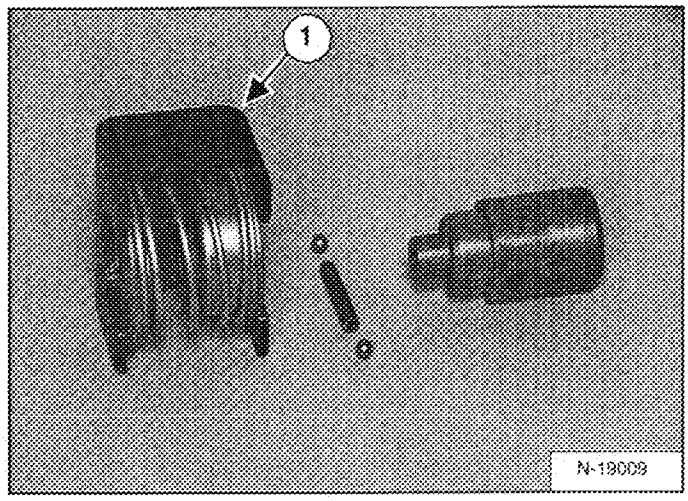
Remove the back-up washer (Item 1) and spool seal (Item 2) **[Figure 20-40-78]**.

Figure 20-40-79



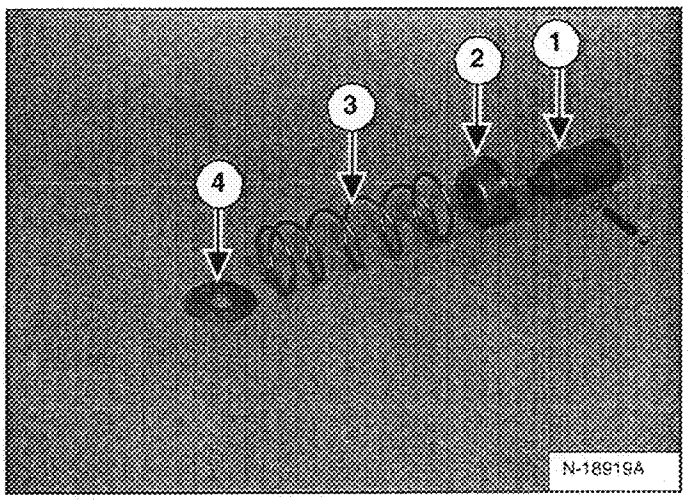
Remove the detent adapter (Item 1) **[Figure 20-40-79]** from the spring assembly.

Figure 20-40-80



Remove spring tool (Item 1) **[Figure 20-40-80]** from the spring assembly.

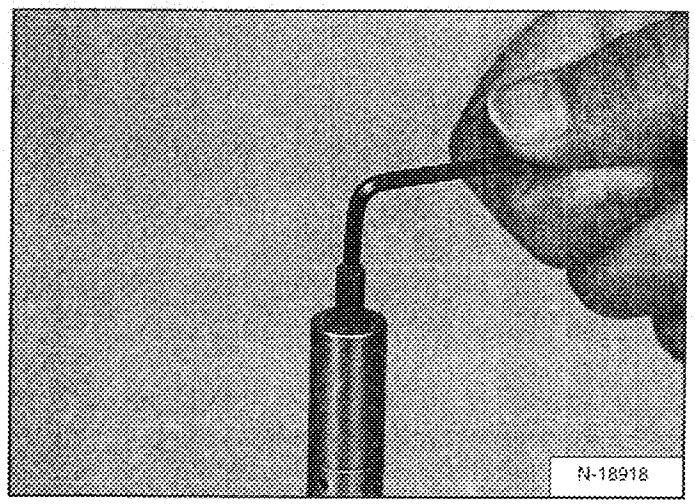
Figure 20-40-81



Inspect the adapter (Item 1), collar (Item 2), spring (Item 3) and washer (Item 4) **[Figure 20-40-81]**.

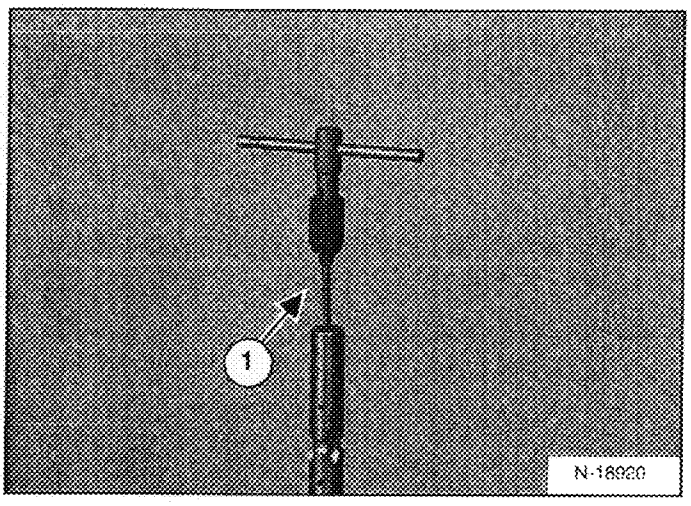
Lift Spool And Detent (Cont'd)

Figure 20-40-82



Remove the stud from the end of the spool **[Figure 20-40-82]**.

Figure 20-40-83



Removal of the plastic plug:

Make a center point in the plug using a 1/16 inch drill.

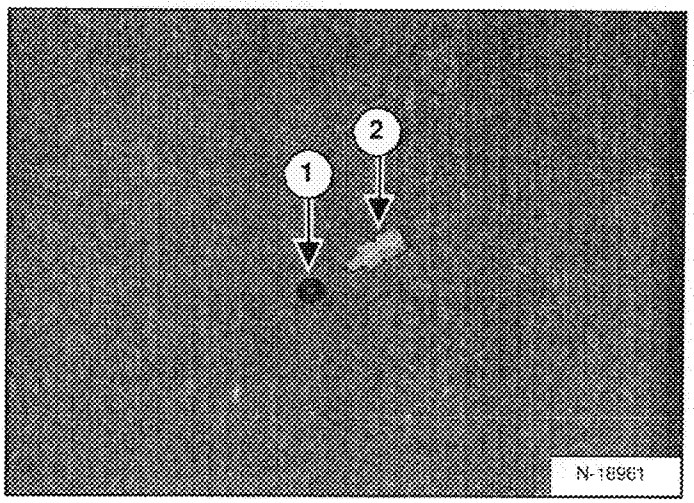
Drill a hole all the way through the plug using a 7/64 inch tap drill

Turn a 6-32 tap (Item 1) **[Figure 20-40-83]** into the plug. Pull the tap and plug out of the spool. Be careful, do not break the tap.

Clean all the debris from inside the spool bore.

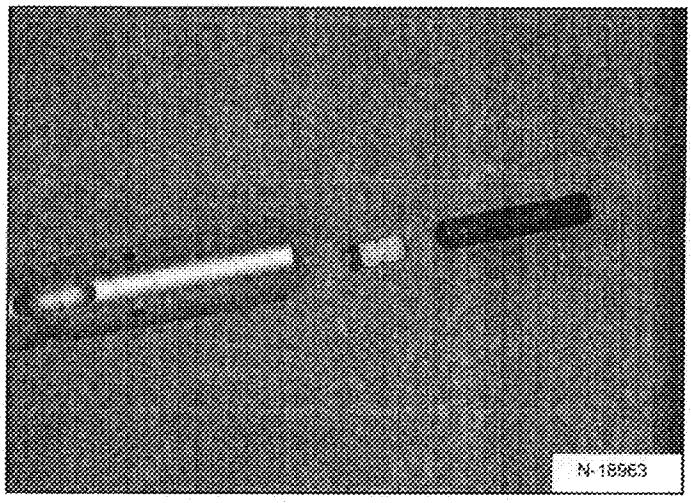
NOTE: DO NOT USE LOCTITE ON THE STUD THREADS.

Figure 20-40-84



Install the new O-ring (Item 1) over the nipple on the plastic plug (Item 2) **[Figure 20-40-84]**.

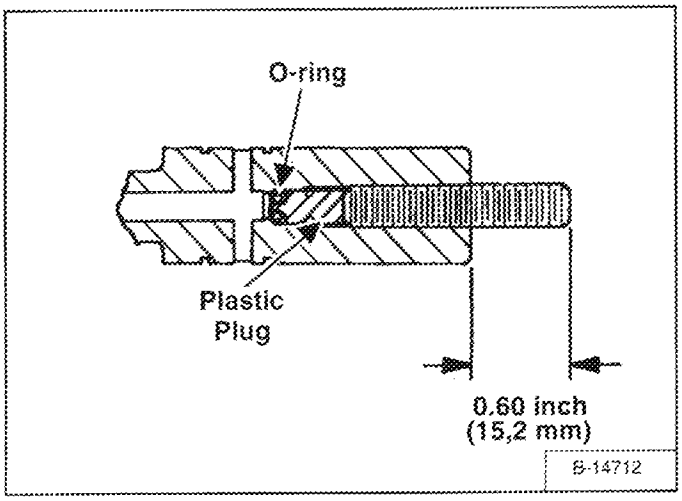
Figure 20-40-85



Install the plastic plug and O-ring in the spool **[Figure 20-40-85]**.

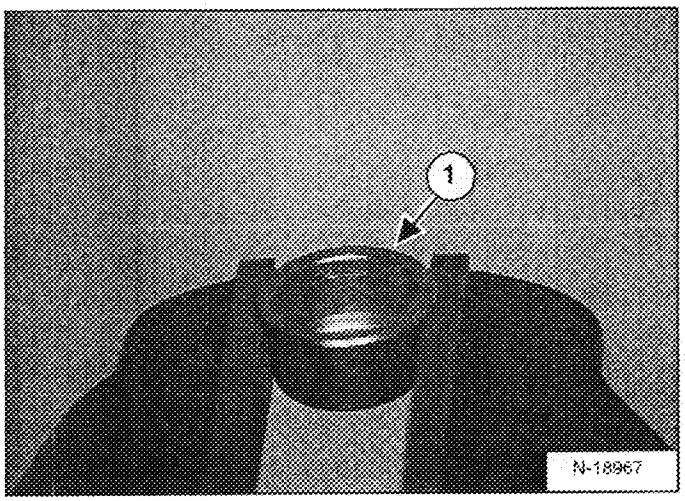
Lift Spool And Detent (Cont'd)

Figure 20-40-86



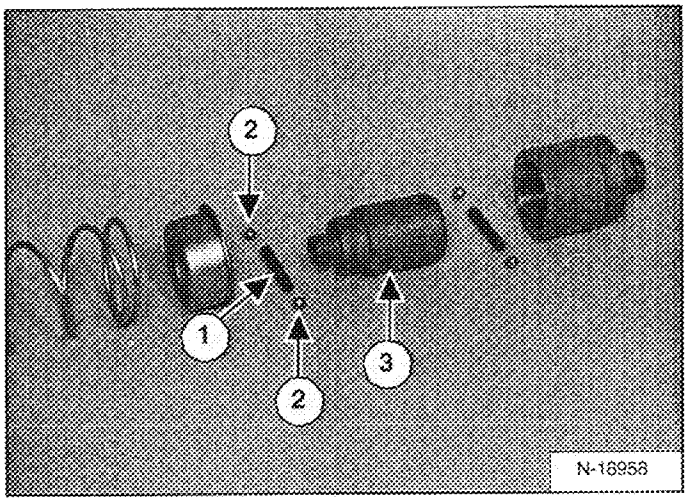
Install the stud and tighten until the other end of the stud is out about 0.600 inch (15,2 mm) from the spool**[Figure 20-40-86]**.

Figure 20-40-87



Clamp the collar (Item 1) **[Figure 20-40-87]** in a vice.

Figure 20-40-88

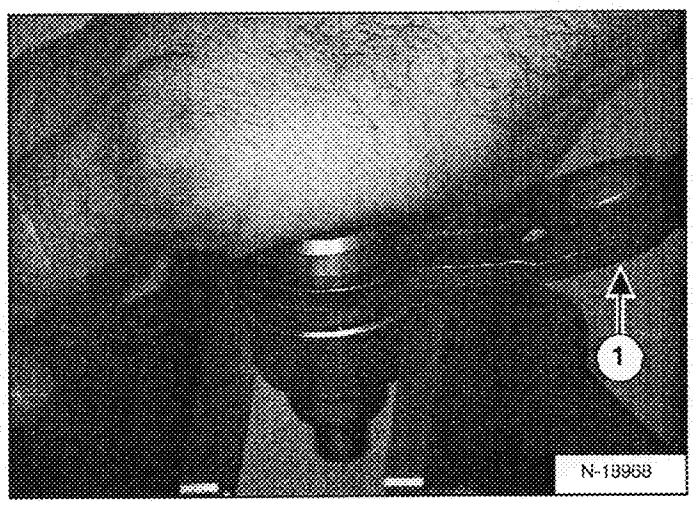


Apply grease on all the detent component surfaces before assembly **[Figure 20-40-88]**.

Install the spring (Item 1) and detent balls (Item 2) into the adapter (Item 3) **[Figure 20-40-88]**.

Compress with the detent pliers (Item 1) **[Figure 20-40-89]**.

Figure 20-40-89

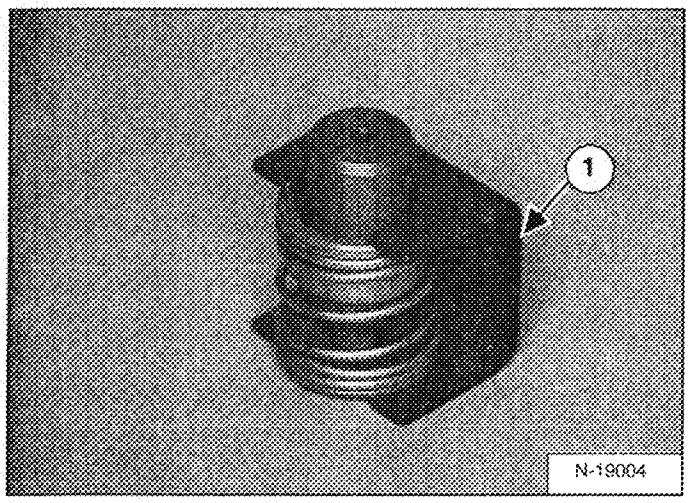


Install the detent adapter to the collar **[Figure 20-40-89]**.

NOTE: The collar and the detent adapter are held together by spring pressure when assembled to the lift spool not the detent balls. Hold the detent adapter and collar together to prevent the detent balls and spring from falling out.

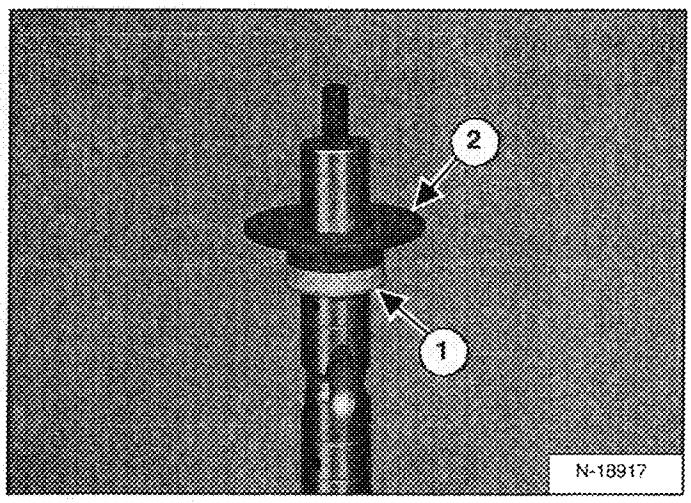
Lift Spool And Detent (Cont'd)

Figure 20-40-90



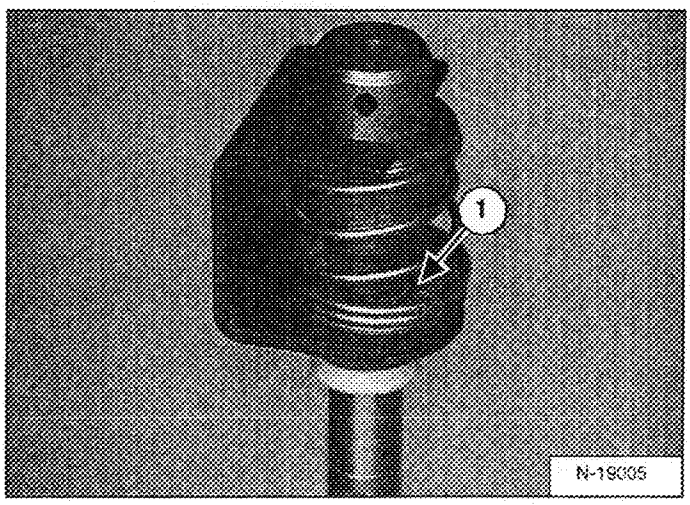
Install the spring tool (Item 1) **[Figure 20-40-90]** over the washer, spring, collar and detent adapter.

Figure 20-40-91



Install the spool seal (Item 1) **[Figure 20-40-91]** and back-up washer (Item 2) **[Figure 20-40-91]**.

Figure 20-40-92



Install the spring assembly to the lift spool hand tight **[Figure 20-40-92]**.

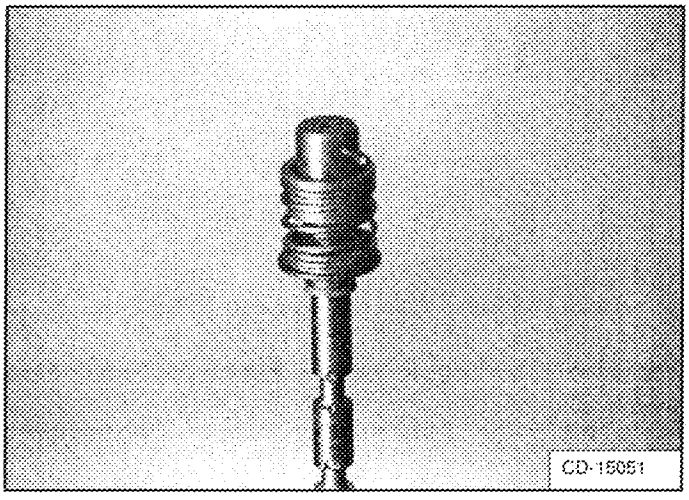
Remove the spring tool.

Check the alignment of the detent adapter and the washer.

Tighten the adapter to 90-100 in.-lbs. (10,2-11,3 Nm).

NOTE: The adapter must fit in the center of the washer (Item 1) [Figure 20-40-92].

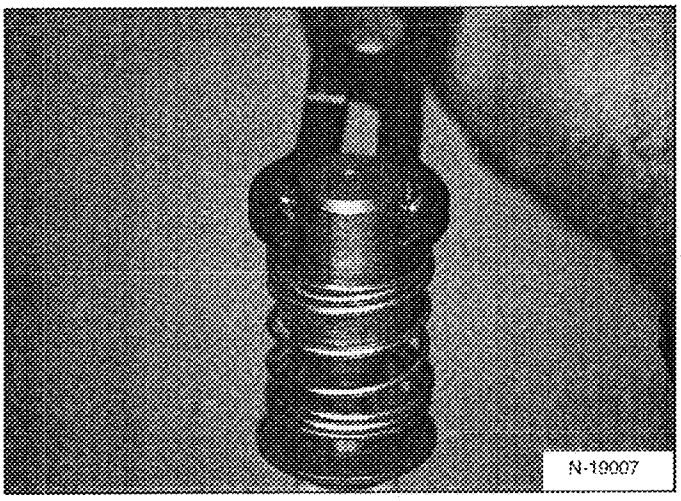
Figure 20-40-93



Install the detent balls and spring **[Figure 20-40-93]**.

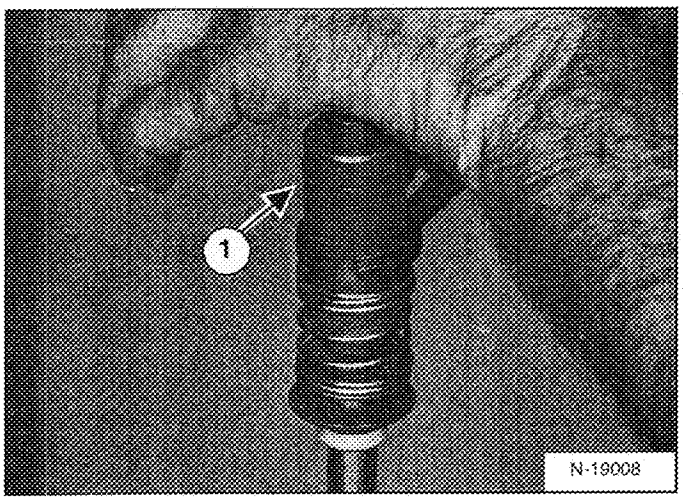
Lift Spool And Detent (Cont'd)

Figure 20-40-94



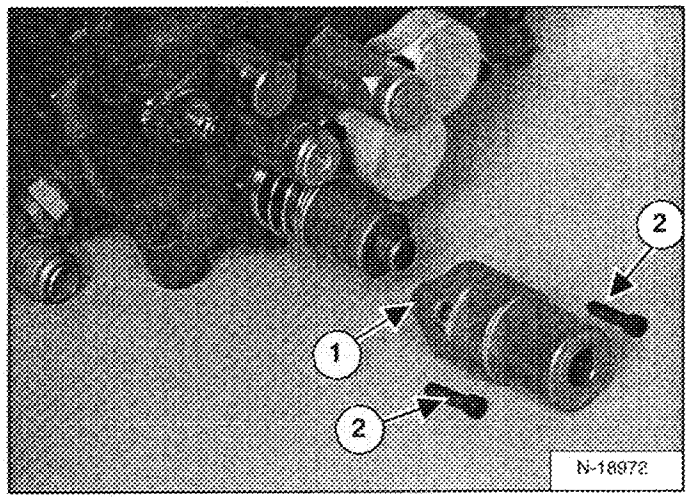
Hold the detent balls in place with the detent pliers **[Figure 20-40-94]**.

Figure 20-40-95



Install the detent sleeve (Item 1) **[Figure 20-40-95]** to the detent adapter.

Figure 20-40-96



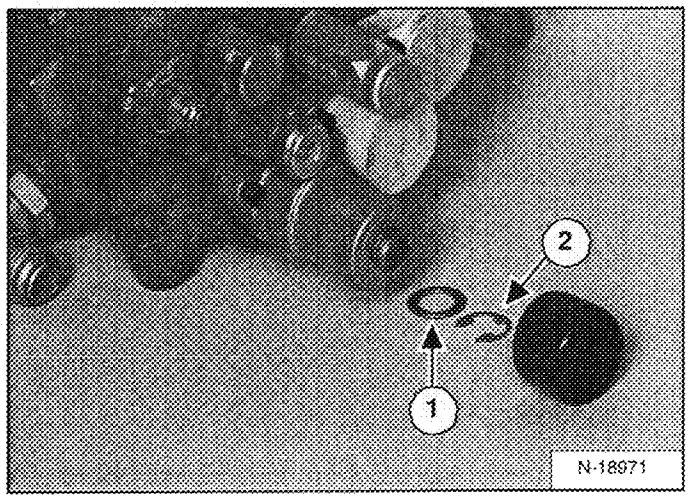
Install the lift spool assembly in the spool bore **[Figure 20-40-96]**.

Install the detent bonnet (Item 1) **[Figure 20-40-96]**.

Install the mounting screws (Item 2) **[Figure 20-40-96]**.

Installation: Tighten the screws to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

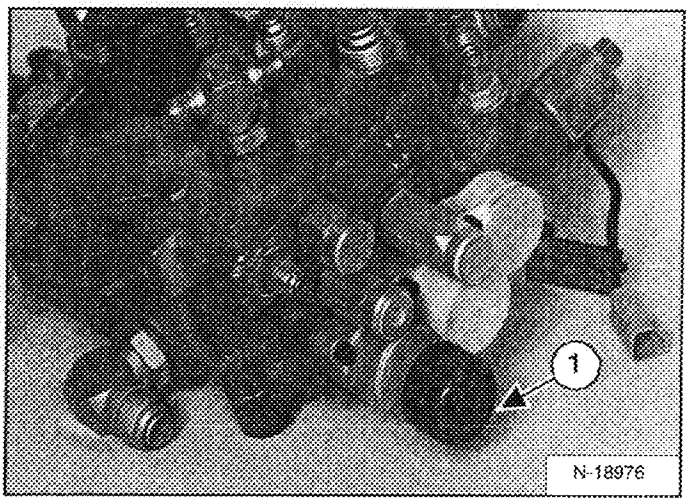
Figure 20-40-97



Install the washer (Item 1) **[Figure 20-40-97]** and snap ring (Item 2) **[Figure 20-40-97]**.

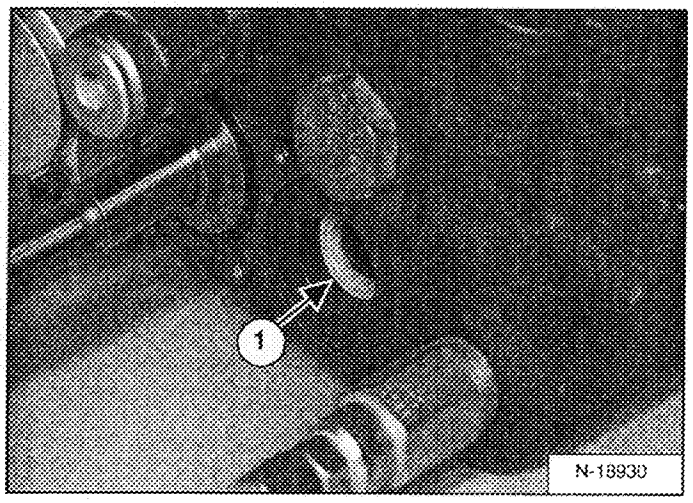
Lift Spool And Detent (Cont'd)

Figure 20-40-98



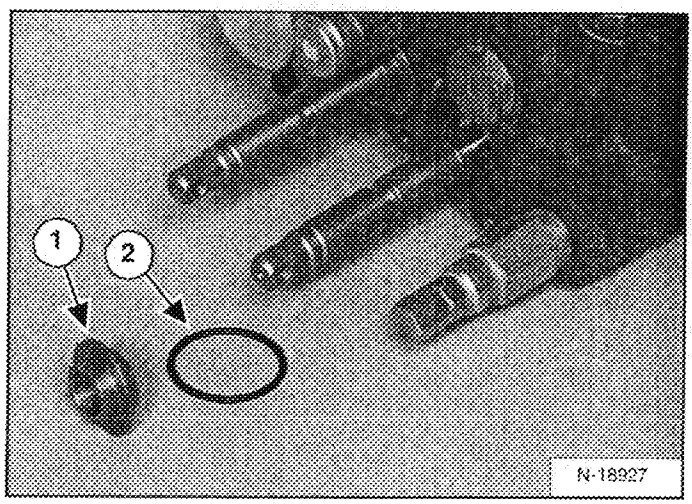
Install the end cap (Item 1) **[Figure 20-40-98]**.

Figure 20-40-99



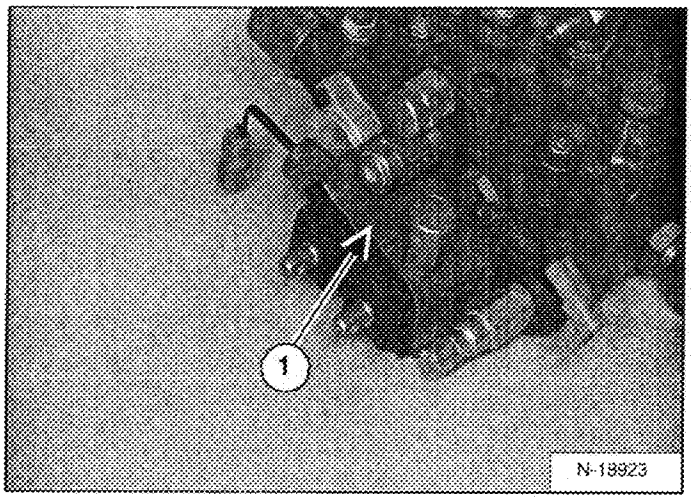
Install the spool seal (Item 1) **[Figure 20-40-99]** on the linkage end of the valve.

Figure 20-40-100



Install the spacer (Item 1) **[Figure 20-40-100]** and new O-ring (Item 2) **[Figure 20-40-100]** on the linkage end of the lift spool.

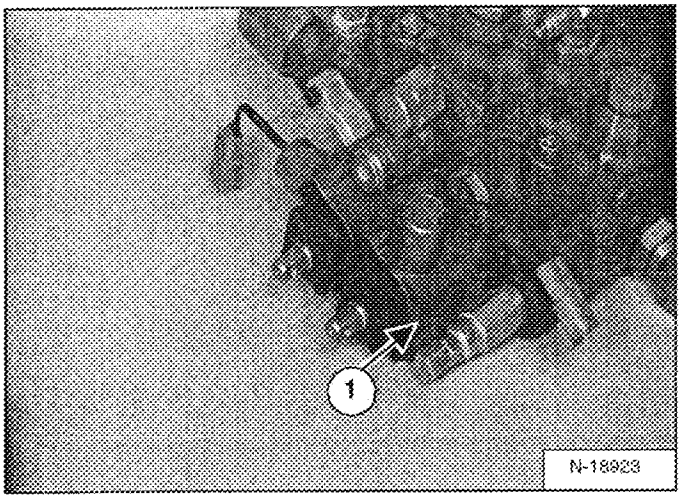
Figure 20-40-101



Install the lift and tilt lock block (Item 1) **[Figure 20-40-101]**. (See Contents Page 20-50-10.)

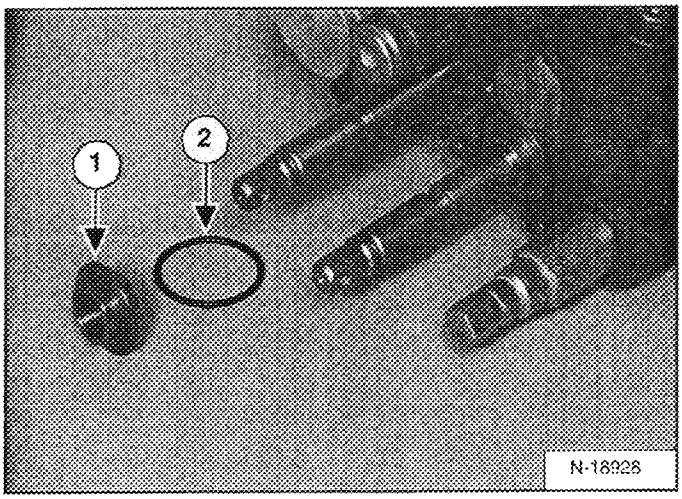
Tilt Spool Removal And Installation

Figure 20-40-102



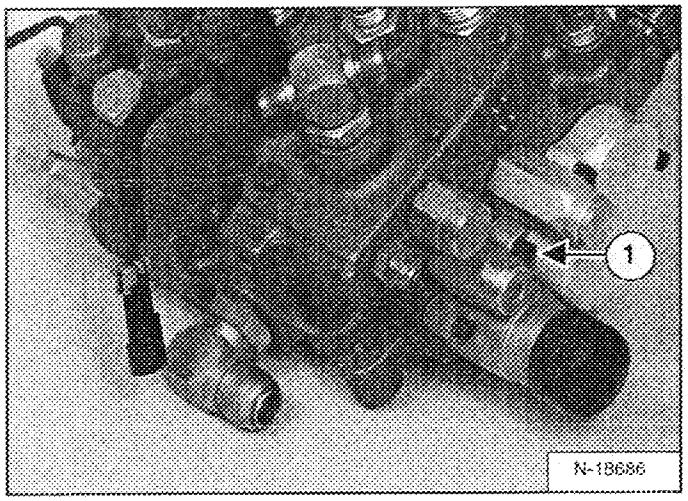
Remove the lift and tilt lock block (Item 1) **[Figure 20-40-102]** from the control valve. (See Lift And Tilt Lock Block Removal And Installation on Page 20-40-22.)

Figure 20-40-103



Remove the spacer (Item 1) and O-ring (Item 2) **[Figure 20-40-103]** from the tilt spool.

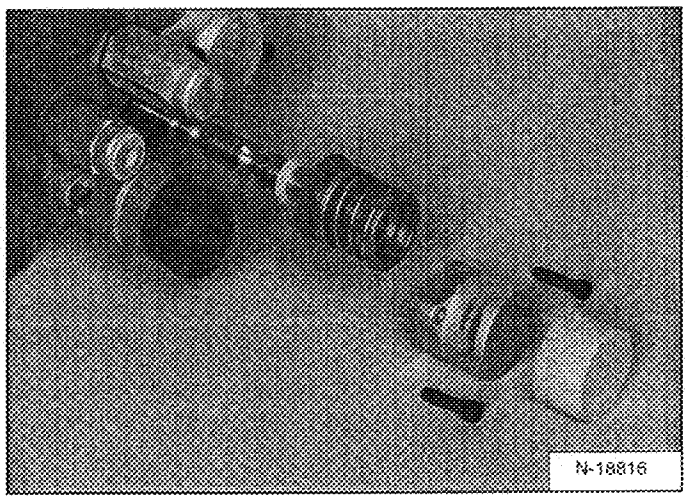
Figure 20-40-104



Remove the screws (Item 1) **[Figure 20-40-104]** from the end cap.

Installation: Tighten the bolt to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

Figure 20-40-105

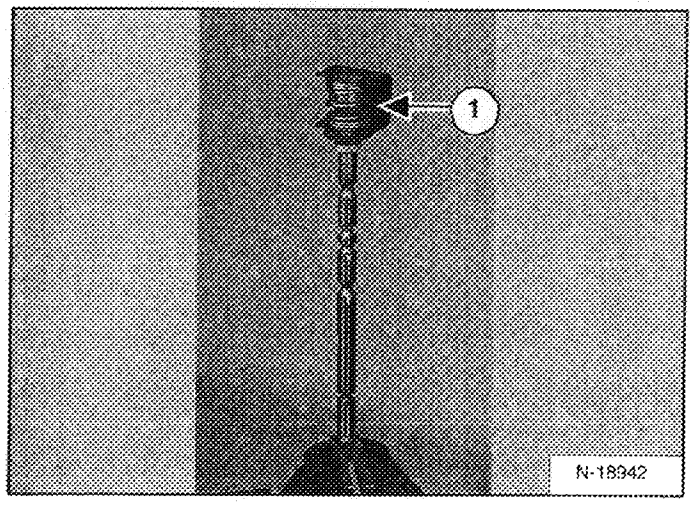


Remove the spool, centering spring, back-up washer and spool seal **[Figure 20-40-105]**.

Assembly: Always use a new spool seal.

Tilt Spool Removal And Installation (Cont'd)

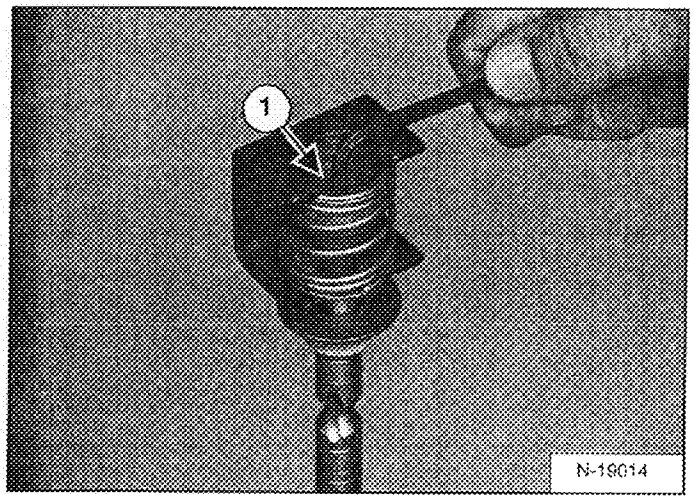
Figure 20-40-106



Put the linkage end of the spool in the vice **[Figure 20-40-106]**.

Install the spool tool (Item 1) **[Figure 20-40-106]** over the centering spring.

Figure 20-40-107

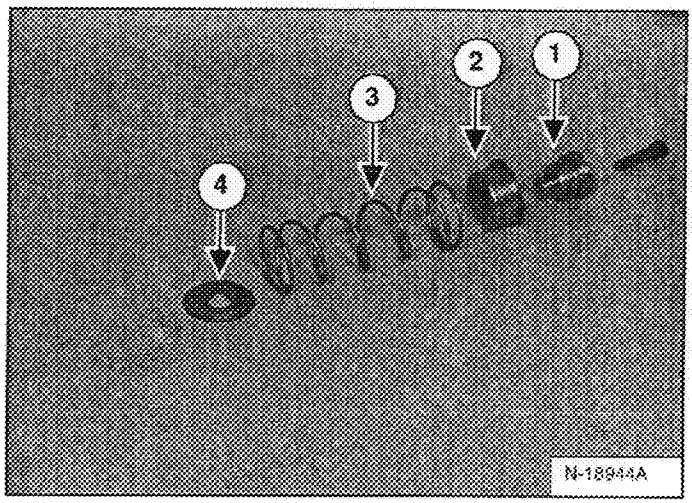


Remove the bolt (Item 1) **[Figure 20-40-107]** holding the centering spring to the spool.

Installation: Tighten the bolt to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

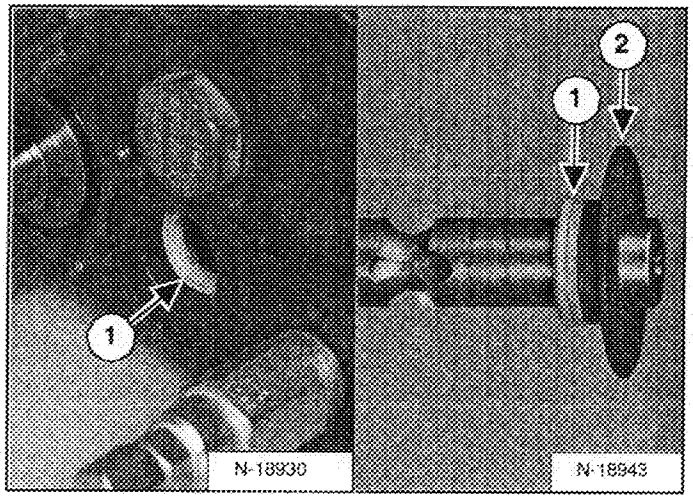
Remove spring tool from the spring assembly.

Figure 20-40-108



Inspect the adapter (Item 1), collar (Item 2), spring (Item 3) and washer (Item 4) **[Figure 20-40-108]**.

Figure 20-40-109



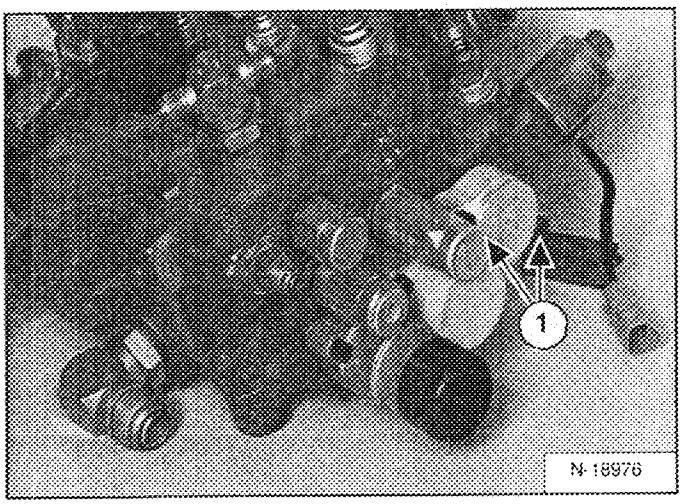
Remove the spool seal(s) (Item 1) and the back-up washer (Item 2) **[Figure 20-40-109]**.

Assembly: Always use a new spool seal.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Auxiliary Spool Removal And Installation

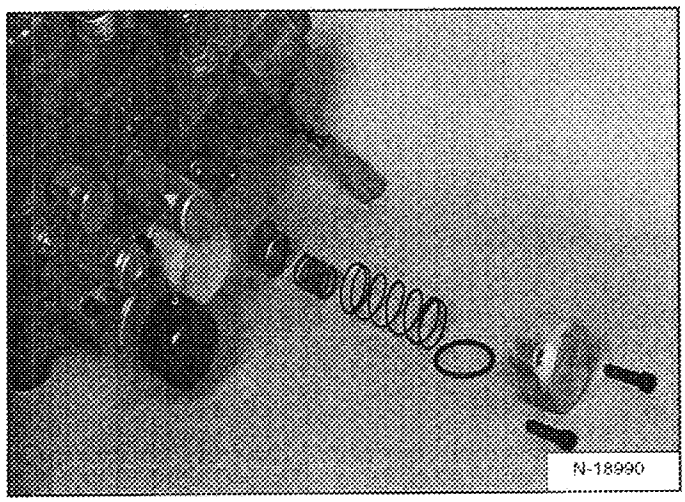
Figure 20-40-110



Remove the screws (Item 1) **[Figure 20-40-110]** from the end cap (both sides).

Installation: Tighten the bolt to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

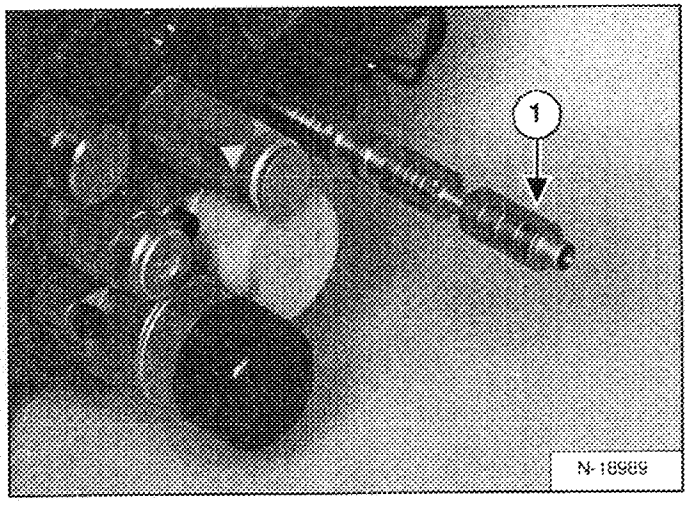
Figure 20-40-111



Remove the end cap, O-ring, springs and washer (both sides) **[Figure 20-40-111]**.

Installation: Always use a new spool seal.

Figure 20-40-112



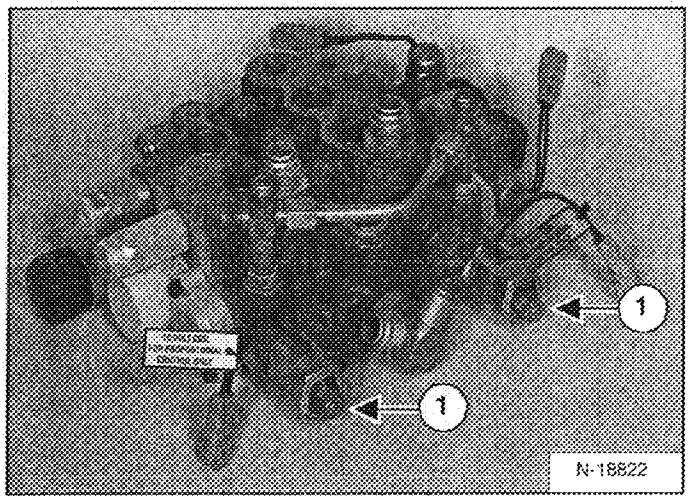
Remove the spool (Item 1) **[Figure 20-40-112]**.

Installation: Put grease on all the centering spring component parts.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Auxiliary Electric Solenoid

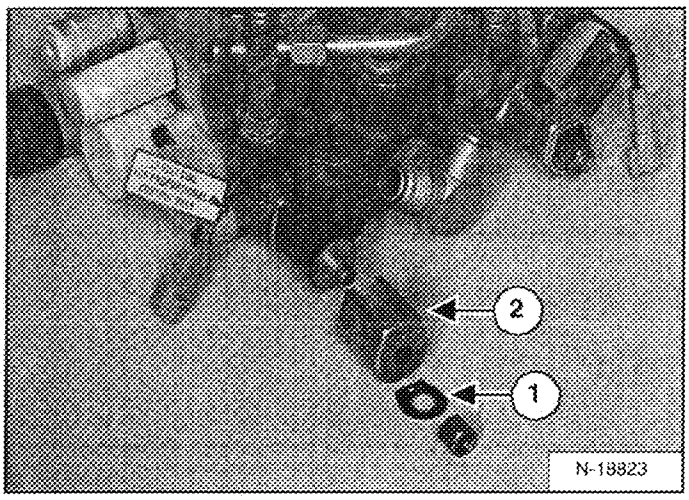
Figure 20-40-113



Remove the nut (Item 1)**[Figure 20-40-113]** from both solenoids.

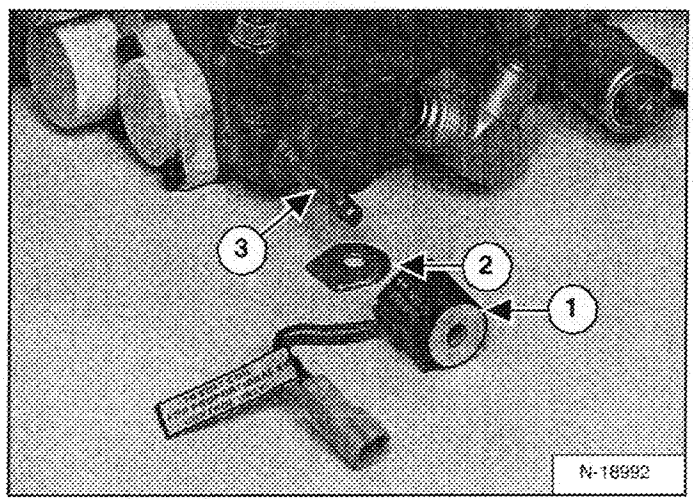
Installation: Tighten the nut to 8-12 ft.-lbs. (11-16 Nm) torque.

Figure 20-40-114



Remove the end plate (Item 1) and housing (Item 2) **[Figure 20-40-114]**.

Figure 20-40-115

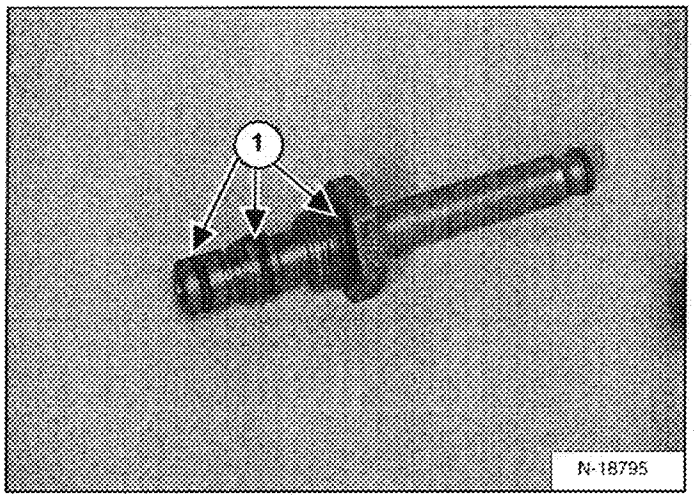


Remove the coil (Item 1) and end plate (Item 2) **[Figure 20-40-115]**.

Remove the solenoid valve (Item 3) **[Figure 20-40-115]**.

Installation: Tighten valve to 8-12 ft.-lbs. (11-16 Nm) torque.

Figure 20-40-116



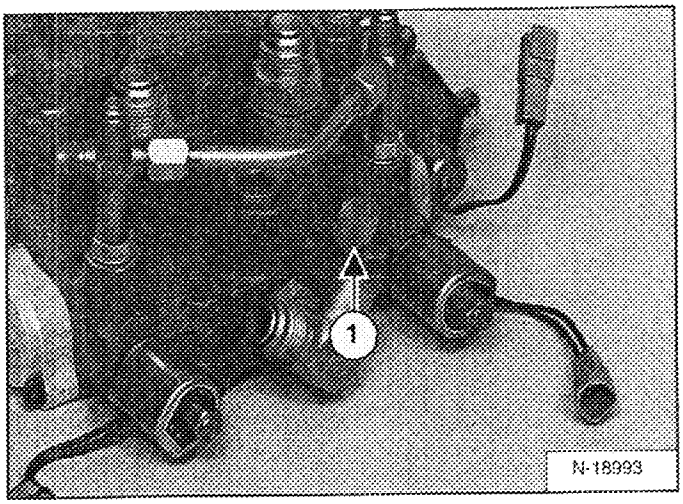
Remove and install new O-rings (Item 1) **[Figure 20-40-116]** on the solenoid valves.

Reverse the procedure for installation.

HYDRAULIC CONTROL VALVE (FOOT CONTROL) (CONT'D)

Port-Auxiliary Section

Figure 20-40-117



Remove the plug (Item 1) **[Figure 20-40-117]** or optional port relief valve from the control valve.

NOTE: Optional port relief (Item 1) [Figure 20-40-117] is 3500 PSI.

Figure 20-40-118

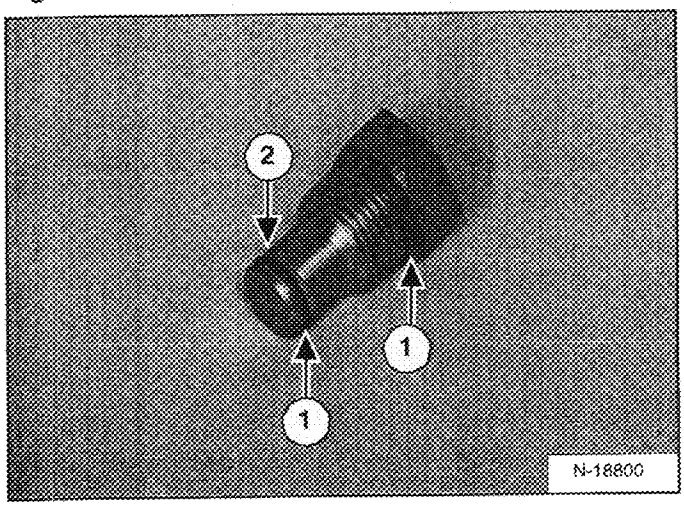
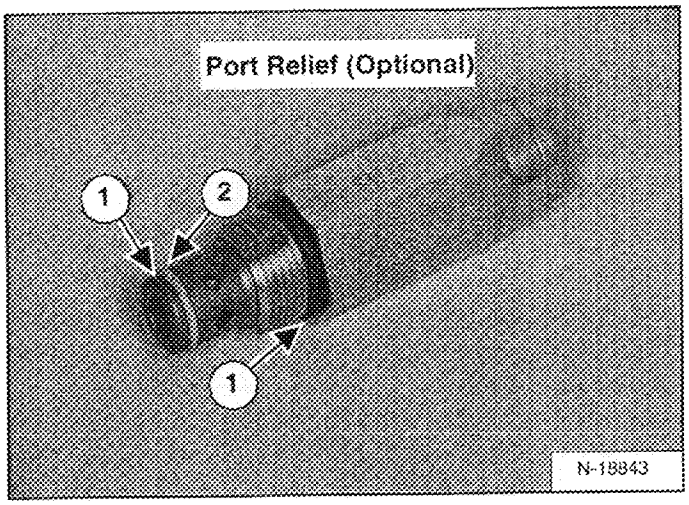


Figure 20-40-119



Remove the O-rings (Item 1) **[Figure 20-40-118]** & **[Figure 20-40-119]** and back-up ring (Item 2) **[Figure 20-40-118]** & **[Figure 20-40-119]** from the plug.

Cleaning And Inspection

Clean all components with clean solvent and dry with compressed air.

Check the spools for wear or scratches.

Check that the spools are not loose in their bore.

Check that the centering springs are not broken.

Check that the load check valve seats are not worn.

Check the rubber boots and retainers.

Check the load check poppets for damage.

Replace the parts as needed.

Use new O-rings and back-up rings.

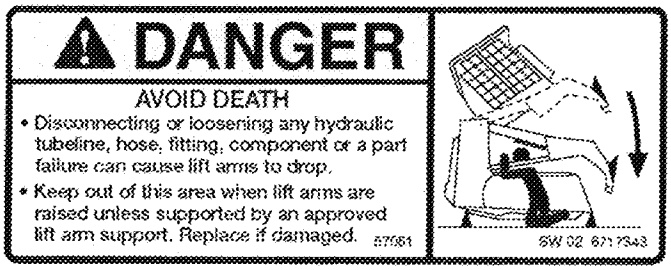
Apply oil to all new O-rings and back-up rings before installation.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS)

Description

The Advanced Control System (ACS) includes the Advanced Hand Controls (AHC) and/or the Selectable Hand/Foot Control.

Removal And Installation (S/N 512262999 & Below)



WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2058-0598

Lift and block the loader. (See Contents, Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Stop the engine. Raise the seat bar.

Raise the operator cab. (See Contents, Page 10-01.)

Clean the area around the control valve.

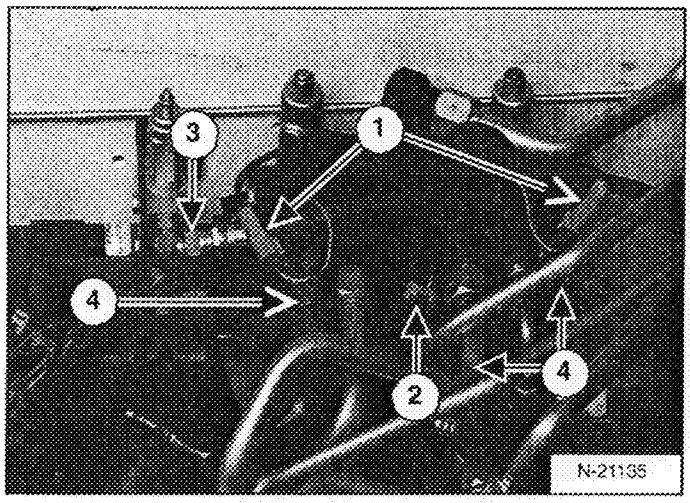
Drain the hydraulic reservoir. (See Contents, Page 20-01.)

Mark all tubelines for correct installation.

Cap and plug all hoses, tubelines, and fittings.

Remove the control panel. (See Contents, Page 50-01.)

Figure 20-41-1



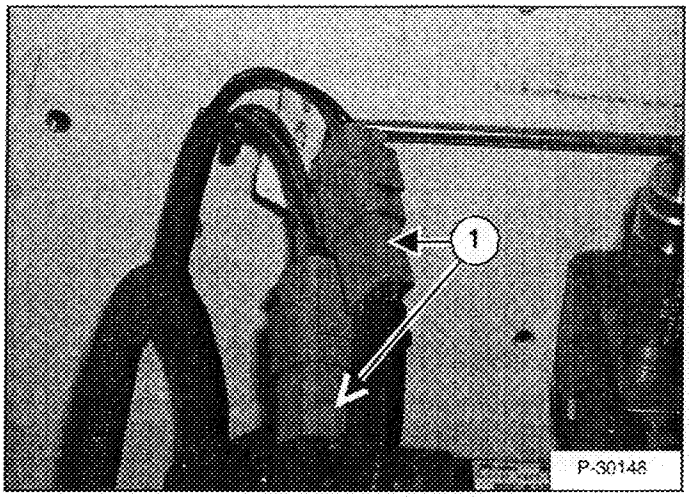
Disconnect the wire harness connectors (Item 1) **[Figure 20-41-1]** from the auxiliary solenoids connectors.

Disconnect the wire harness connector (Item 2) **[Figure 20-41-1]** from the BICS™ valve solenoid connector.

Disconnect the hose (Item 3) **[Figure 20-41-1]** from the lift arm by-pass control valve.

Disconnect the drain hoses (Item 4) **[Figure 20-41-1]** from the main control valve.

Figure 20-41-2

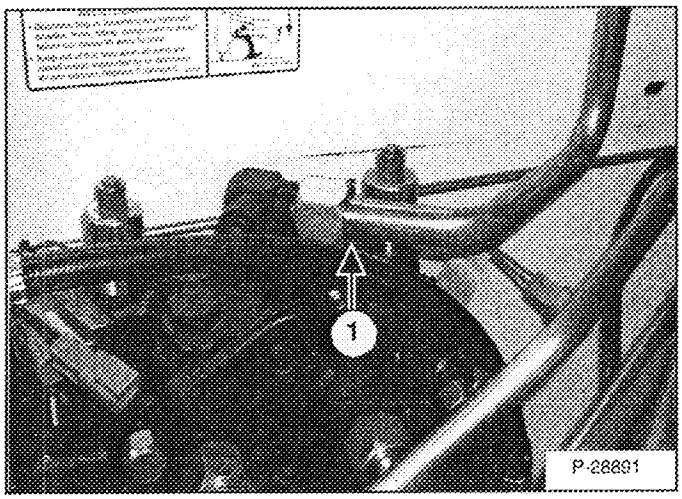


Disconnect the wire harness connector (Item 1) **[Figure 20-41-2]** from the control valve actuators.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

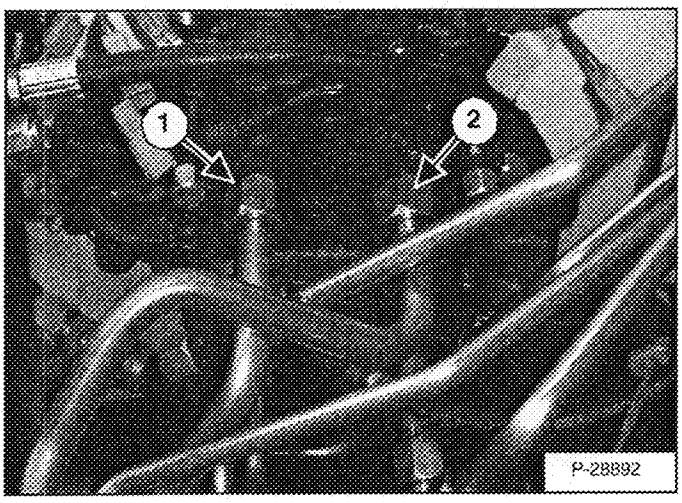
Removal And Installation (Cont'd)(S/N 512262999 & Below)

Figure 20-41-3



Disconnect the outlet tubeline (Item 1) **[Figure 20-41-3]** from the control valve.

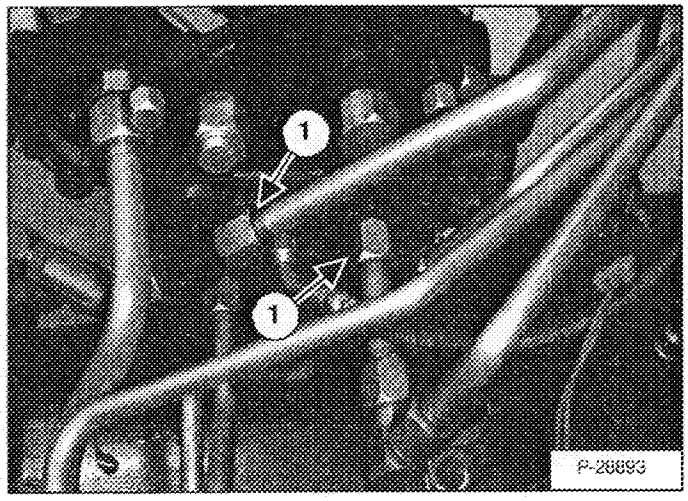
Figure 20-41-4



Disconnect the tubeline (Item 1) **[Figure 20-41-4]** from the auxiliary section of the control valve.

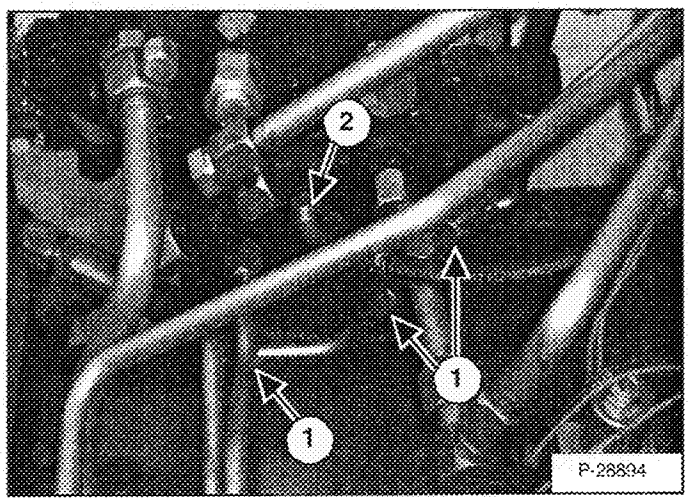
Disconnect and remove the tubeline (Item 2) **[Figure 20-41-4]** from the auxiliary section of the control valve.

Figure 20-41-5



Disconnect the tilt tubelines (Item 1) **[Figure 20-41-5]**.

Figure 20-41-6

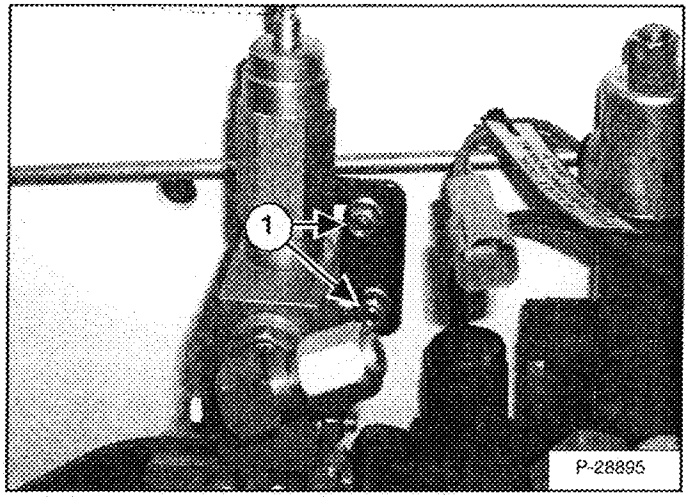


Disconnect the three tubelines (Item 1) **[Figure 20-41-6]** from the lift section of the control valve.

Disconnect the drain hose (Item 2) **[Figure 20-41-6]**.

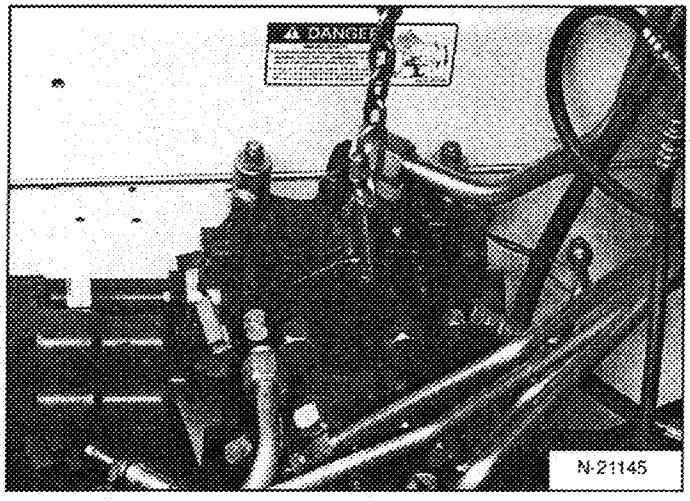
Removal And Installation (Cont'd)(S/N 512262999 & Below)

Figure 20-41-7



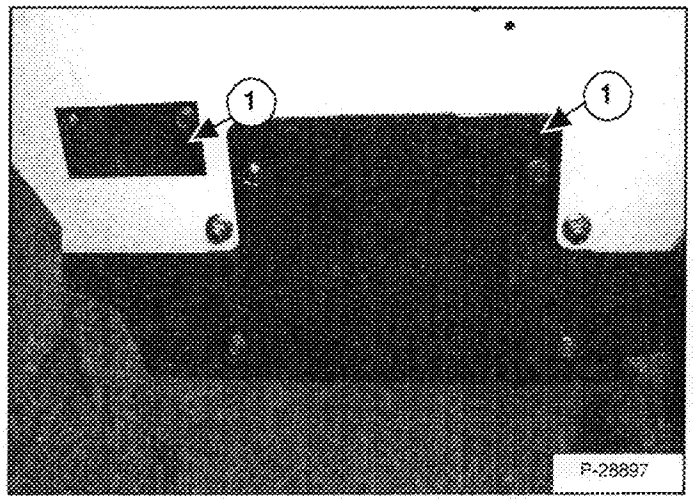
Remove the two mounting bolts (Item 1 **[Figure 20-41-7]** from the lift arm by-pass control bracket.

Figure 20-41-8



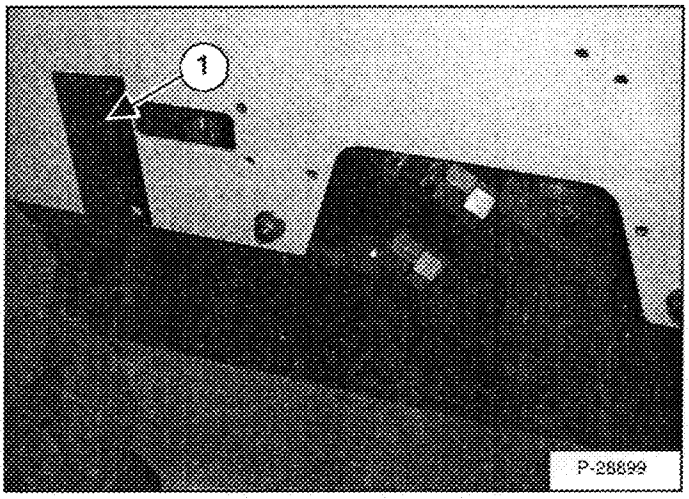
Connect a hoist to the control valve **[Figure 20-41-8]**.

Figure 20-41-9



Locate the access covers (Item 1)**[Figure 20-41-9]** on the right side of the loader frame.

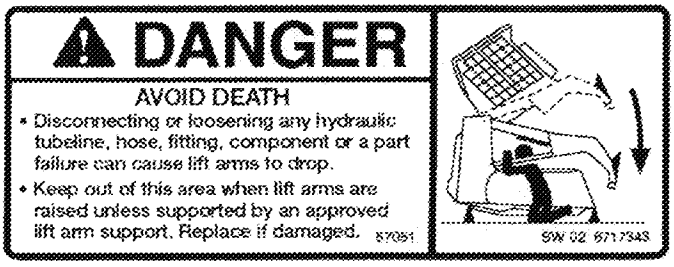
Figure 20-41-10



Remove the drive motor cover **[Figure 20-41-10]**.

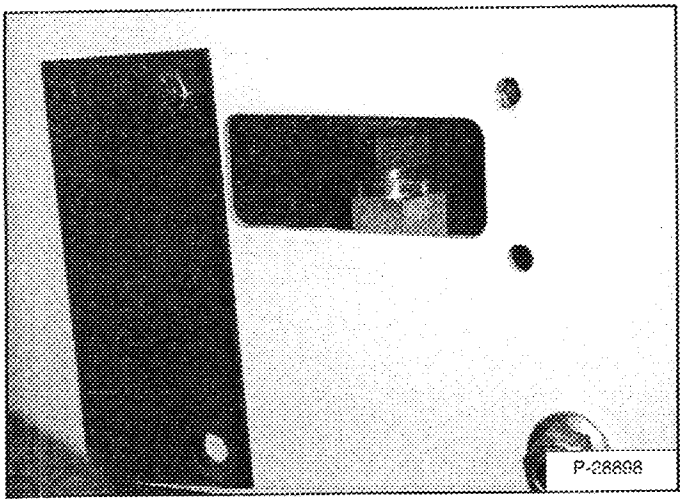
Loosen the rear mounting bolt and remove the front mounting bolt from the rectangular access cover (Item 1) **[Figure 20-41-10]**.

Rotate the cover to expose the access slot in the loader **[Figure 20-41-10]**.



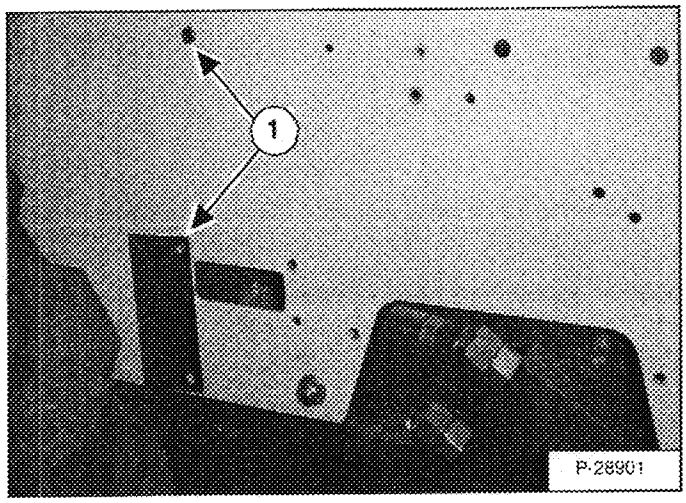
Removal And Installation (Cont'd)(S/N 512262999 & Below)

Figure 20-41-11



Disconnect the inlet hose from the control valve through the access slot **[Figure 20-41-11]**.

Figure 20-41-12



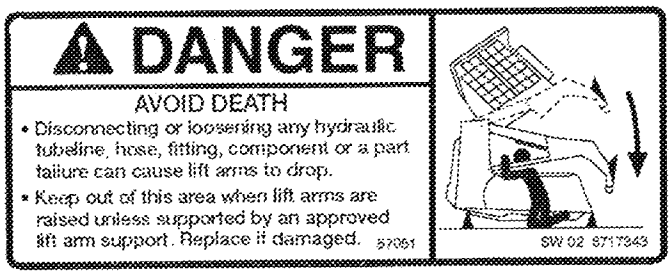
Remove the two control valve mounting bolts/nuts (Item 1) **[Figure 20-41-12]** from the loader frame.

Remove the control valve from the loader.

Installation: Tighten the mounting bolt & nut to 18-20 ft.-lbs. (24-27 Nm) torque.

Reverse the removal procedure to install the control valve.

Removal And Installation (S/N 512263000 & Above)



WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0698

Lift and block the loader. (See Contents, Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Stop the engine. Raise the seat bar.

Raise the operator cab. (See Contents, Page 10-01.)

Clean the area around the control valve.

Drain the hydraulic reservoir. (See Contents, Page 20-01.)

Mark all tubelines for correct installation.

Cap and plug all hoses, tubelines, and fittings.

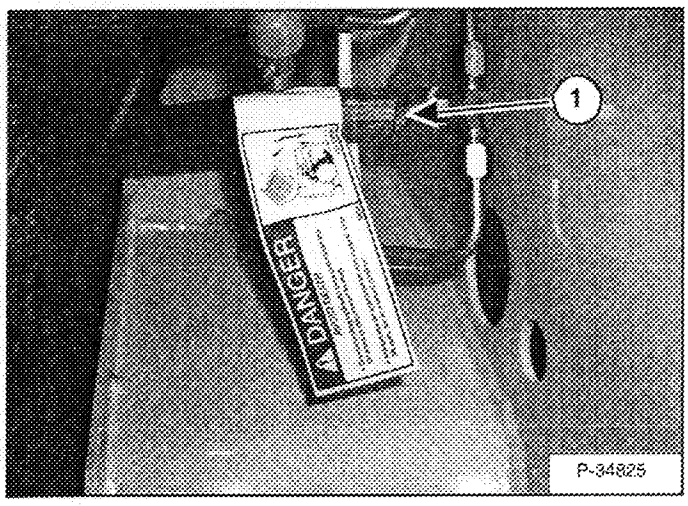
Remove the control panel. (See Contents, Page 50-01.)

Open the rear door.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Removal And Installation (S/N 512263000 & Above)

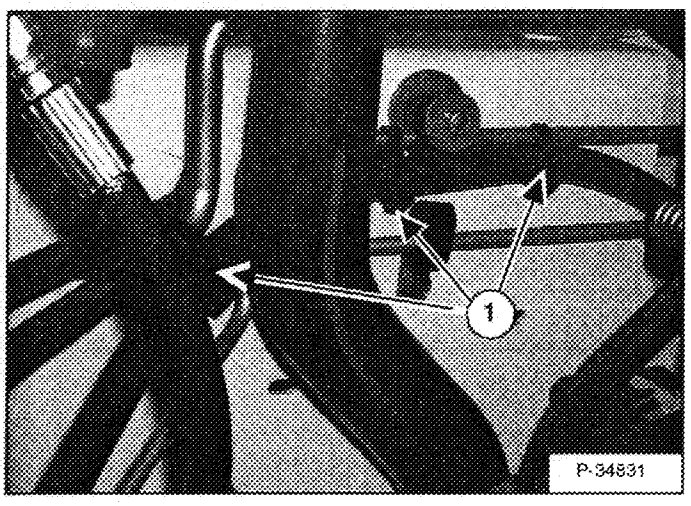
Figure 20-41-13



The fixed end main valve hose assembly (Item 1) **[Figure 20-41-13]** is connected to a fixed end fitting on the control valve. The hose is routed to the back upright where the hose is connected to a tee fitting that feeds the base end of both lift cylinders. The hose must be removed at the back tee fitting, located in the right side upright.

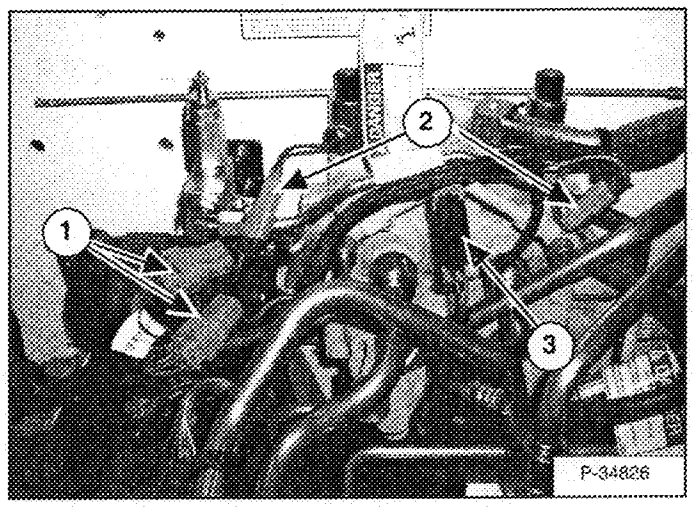
NOTE: Remember the hose routing for ease of control valve installation.

Figure 20-41-14



Remove the tie - straps (Item 1) **[Figure 20-41-14]** from the fixed end main valve hose.

Figure 20-41-15

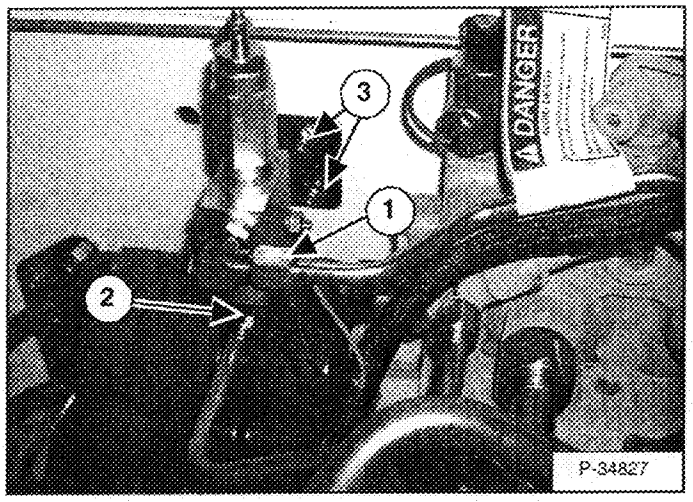


Label and disconnect the actuator electrical connectors (Item 1) **[Figure 20-41-15]**.

Label and disconnect the electrical connectors (Item 2) **[Figure 20-41-15]**.

Label and disconnect the BICS™ electrical connector (Item 3) **[Figure 20-41-15]**.

Figure 20-41-16



Disconnect the tubeline (Item 1) **[Figure 20-41-16]** from the lift arm by-pass valve.

Remove the drain tubeline (Item 2) **[Figure 20-41-16]** from the lift arm by-pass valve.

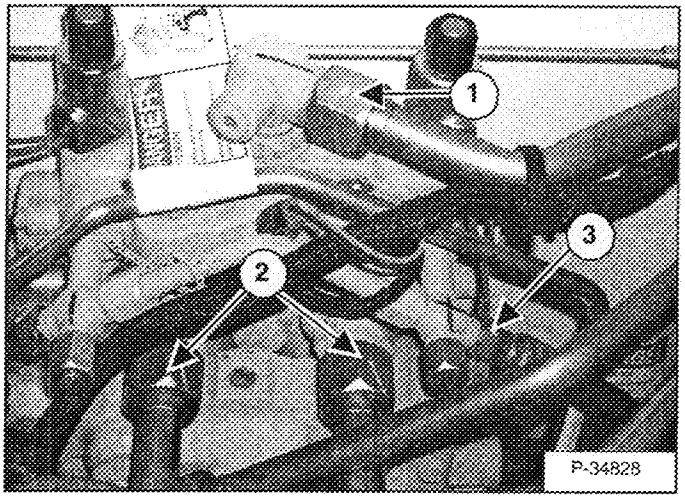
Remove the bolts (Item 3) **[Figure 20-41-16]** from the lift arm by-pass control valve bracket.

Remove the lift arm by-pass control valve from the loader.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Removal And Installation (Cont'd)(S/N 512263000 & Above)

Figure 20-41-17

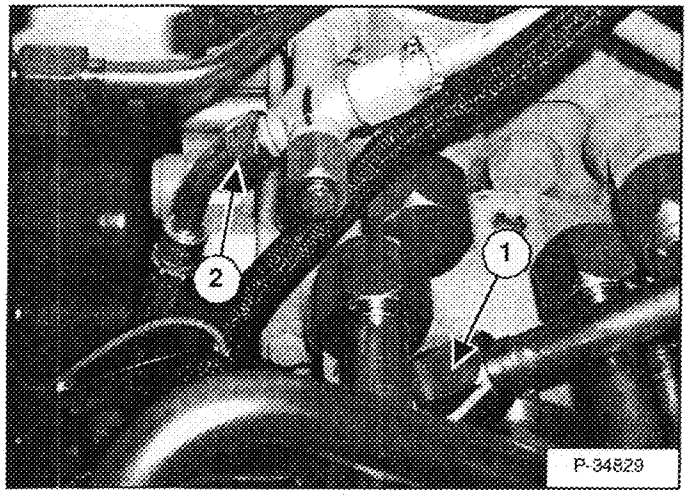


Disconnect the outlet tubeline (Item 1) **[Figure 20-41-17]** from the control valve.

Disconnect the tubeline (Item 2) **[Figure 20-41-17]** from the auxiliary section of the control valve.

Disconnect the drain hose (Item 3) **[Figure 20-41-17]** from the control valve.

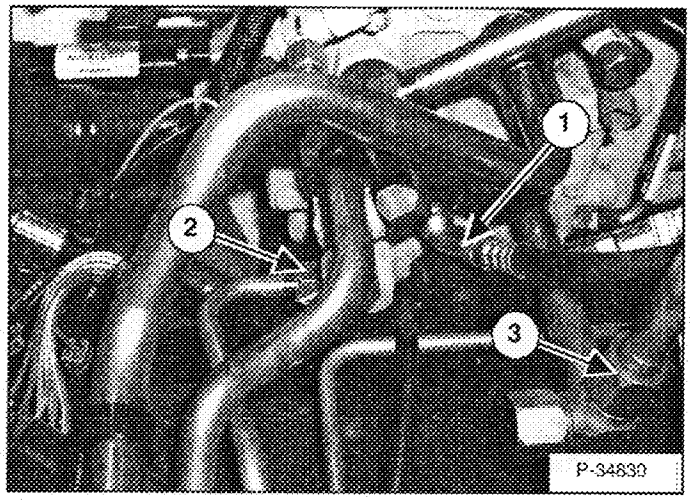
Figure 20-41-18



Disconnect the tilt tubeline (Item 1) **[Figure 20-41-18]** from the control valve.

Disconnect the drain hose (Item 2) **[Figure 20-41-18]** from the control valve.

Figure 20-41-19

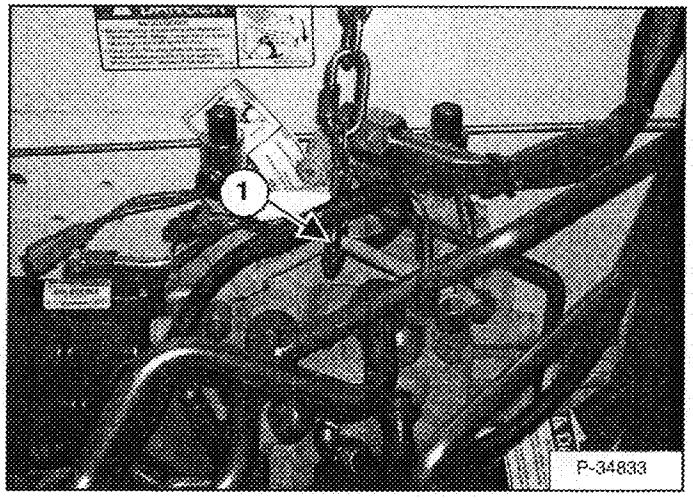


Disconnect the drain hose (Item 1) **[Figure 20-41-19]** from the control valve.

Disconnect the lift tubeline (Item 2) **[Figure 20-41-19]** from the control valve.

Disconnect the tilt tubeline (Item 3) **[Figure 20-41-19]** from the control valve.

Figure 20-41-20

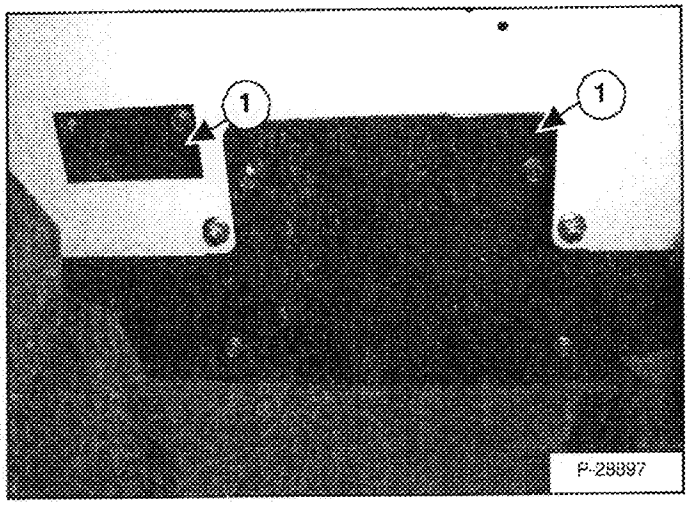


Connect a hoist to the control valve (Item 1) **[Figure 20-41-20]**.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

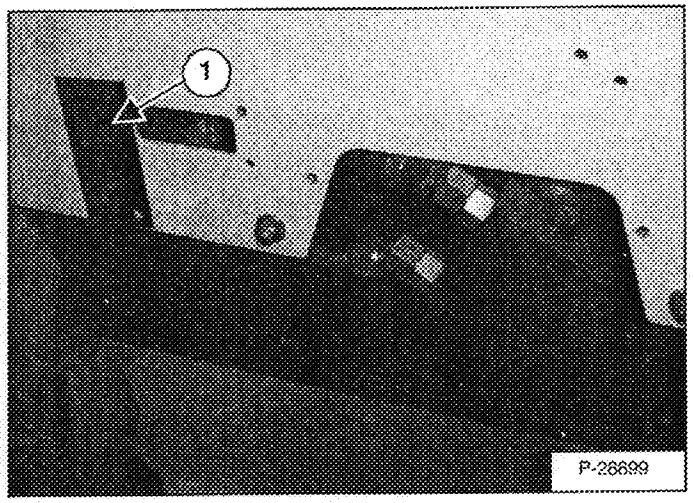
Removal And Installation (Cont'd)(S/N 512263000 & Above)

Figure 20-41-21



Locate the access covers (Item 1)**[Figure 20-41-21]** on the right side of the loader frame.

Figure 20-41-22

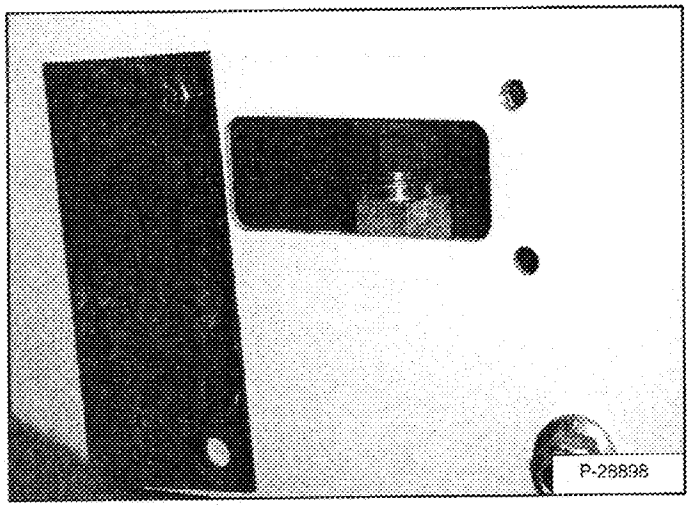


Remove the drive motor cover.

Loosen the rear mounting bolt and remove the front mounting bolt from the rectangular access cover (Item 1) **[Figure 20-41-22]**.

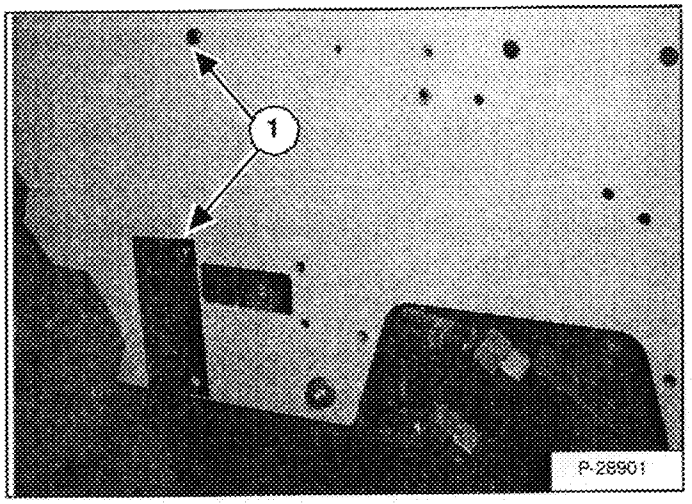
Rotate the cover to expose the access slot in the loader **[Figure 20-41-22]**.

Figure 20-41-23



Disconnect the inlet hose from the control valve through the access slot **[Figure 20-41-23]**.

Figure 20-41-24



Remove the two control valve mounting bolts/nuts (Item 1) **[Figure 20-41-24]** from the loader frame.

Remove the control valve from the loader.

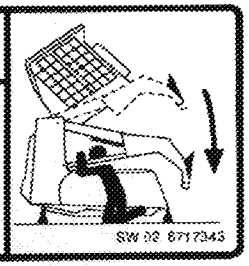
Installation: Tighten the mounting bolt & nut to 18-20 ft.-lbs. (24-27 Nm) torque.

Reverse the removal procedure to install the control valve.

⚠ DANGER

AVOID DEATH

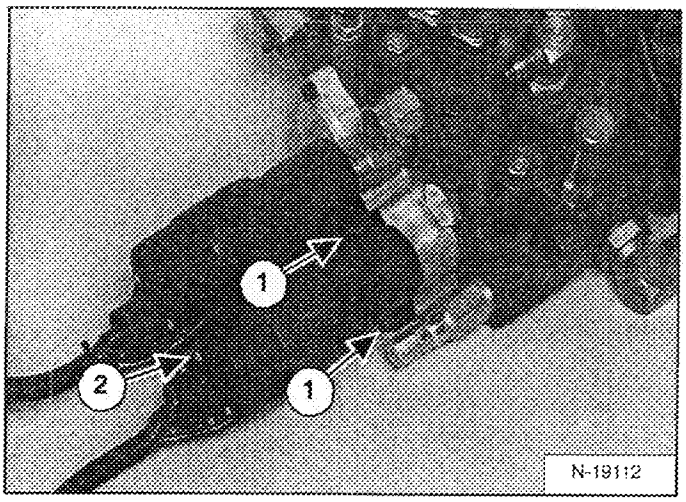
- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 87051



HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Actuator Removal And Installation

Figure 20-41-25

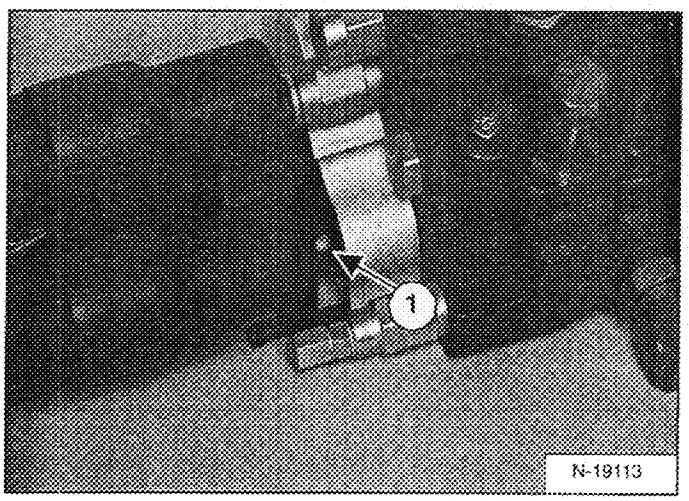


Remove the two screws (Item 1) **[Figure 20-41-25]** on the actuator retainer.

Installation: Tighten the bolt and nut to 90-100 in.-lbs. (10.2-11.3 Nm) torque.

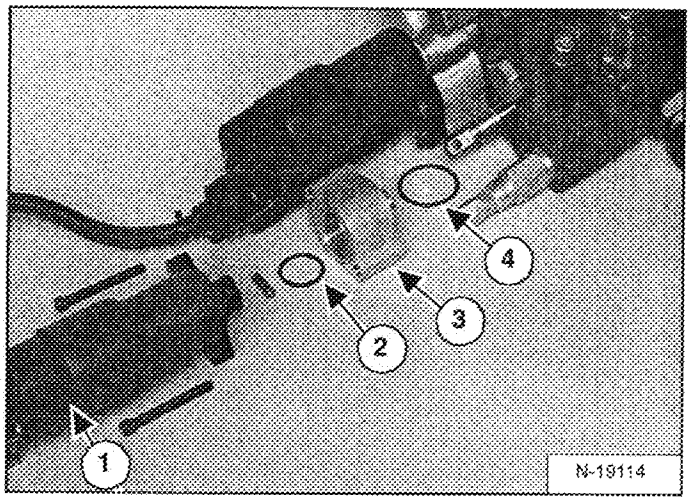
Pull the actuator (Item 2) **[Figure 20-41-25]** away from the control valve.

Figure 20-41-26



Use a drift pin and hammer to remove the actuator pin (Item 1) **[Figure 20-41-26]** from the actuator and the lift or tilt spool.

Figure 20-41-27



Remove the actuator (Item 1) **[Figure 20-41-27]**.

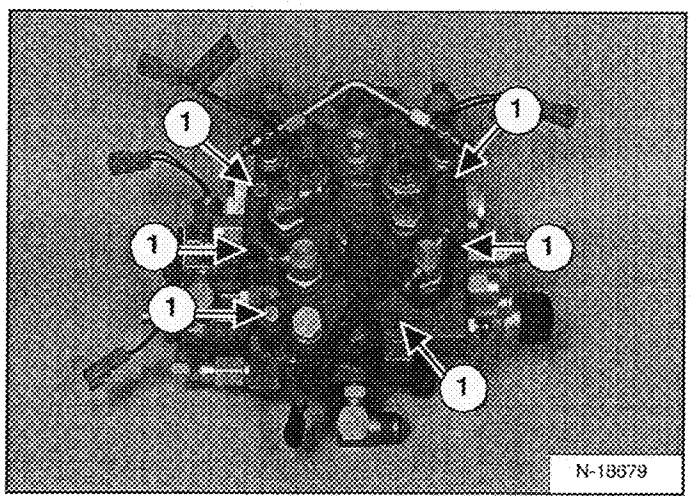
Remove and replace the O-ring (Item 2) **[Figure 20-41-27]**.

Remove the spacer block (Item 3) **[Figure 20-41-27]**.

Remove and replace the O-ring (Item 4) **[Figure 20-41-27]**.

BICS™ Valve, Removal And Installation

Figure 20-41-28

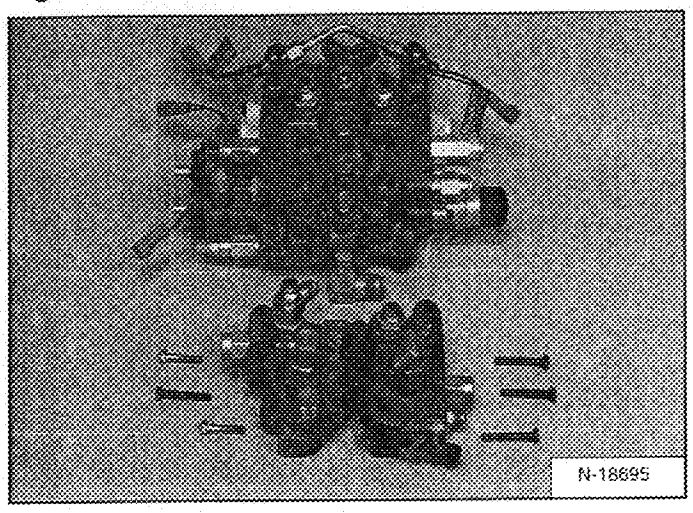


Remove the hydraulic control valve. (See Contents, Page 20-01.)

To remove the BICS™ from the control valve loosen and remove the six mounting bolts (Item 1) **[Figure 20-41-28]**.

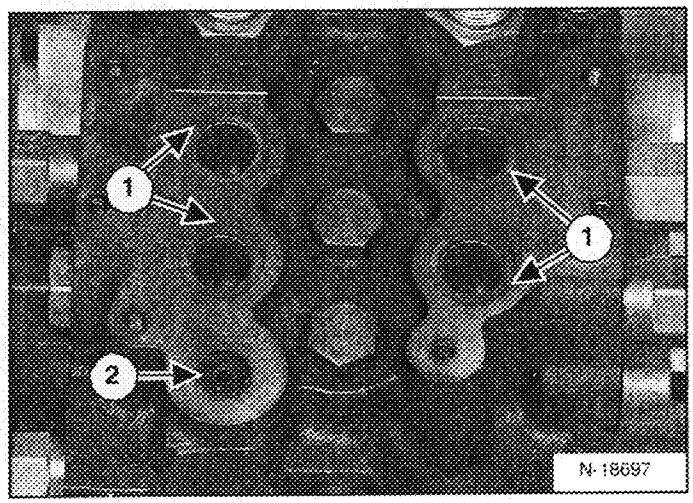
BICS™ Valve, Removal And Installation (Cont'd)

Figure 20-41-29



Remove the BICS™ valve assembly from the top of the control valve **[Figure 20-41-29]**.

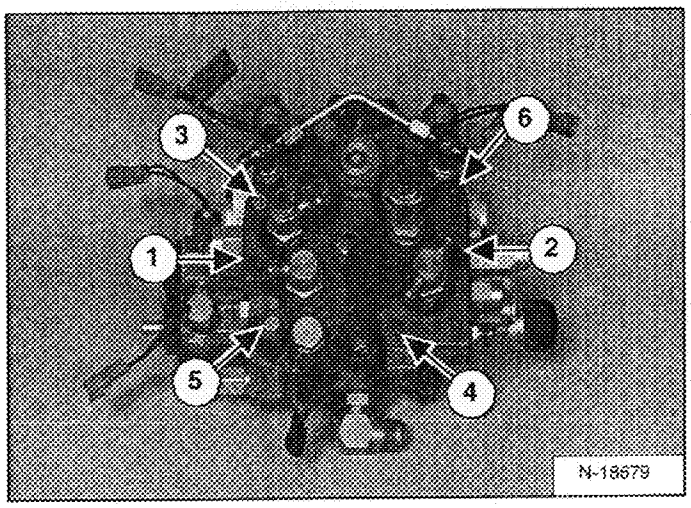
Figure 20-41-30



Remove the four large O-rings (Item 1) **[Figure 20-41-30]** and the small O-ring (Item 2) **[Figure 20-41-30]** from the top of the control valve.

Installation: Install the four new large O-rings (Item 1) **[Figure 20-41-30]** and the new small O-ring (Item 2) **[Figure 20-41-30]** on the top of the control valve.

Figure 20-41-31



Install the six mounting bolts **[Figure 20-41-31]**.

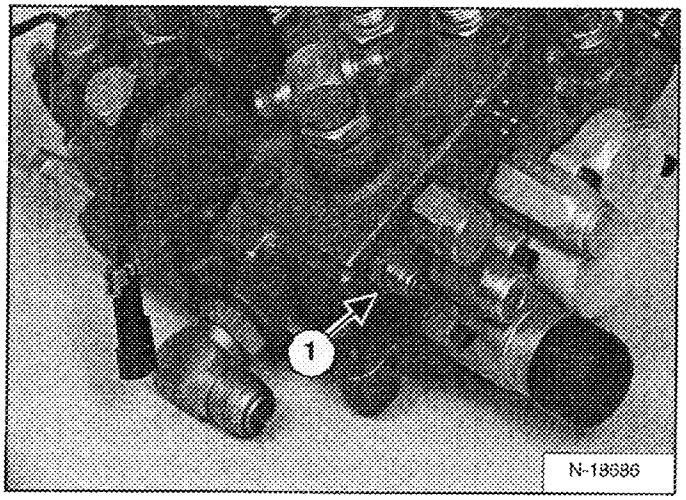
The chart below lists the correct torque specifications and tightening sequence when reinstalling the BICS™] valve assembly to the control valve. Thoroughly clean and dry bolts and threads in valve. Use liquid adhesive LOCTITE #242 or equivalent.

STEP	TORQUE	SEQUENCE
1	110-130 in.-lbs. (12,4-14,7 Nm)	1,2,3,4,5,&6
2	190-210 in.-lbs. (21,5-23,7 Nm)	
3*	190-210 in.-lbs. (21,5-23,7 Nm)	

*Torque must be 190-210 in.-lbs. (21,5-23,7 Nm) for every bolt or repeat step 3.

BICS™ Valve, Lift Arm By-Pass Orifice Removal and Installation

Figure 20-41-32



Remove the fitting (Item 1) **[Figure 20-41-32]** from the valve.

Figure 20-41-33

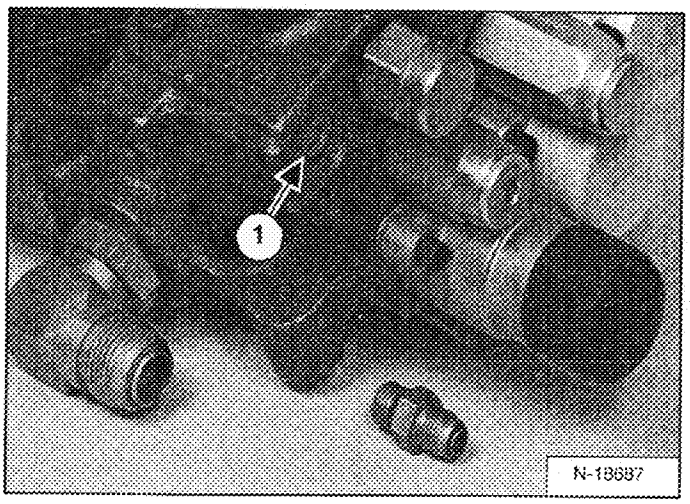
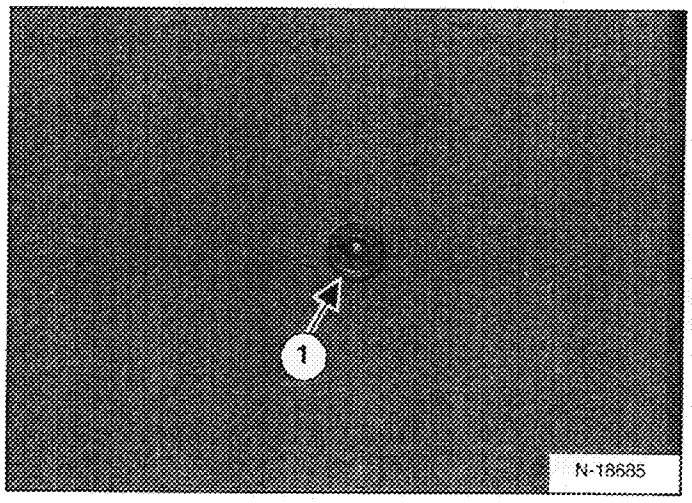


Figure 20-41-34



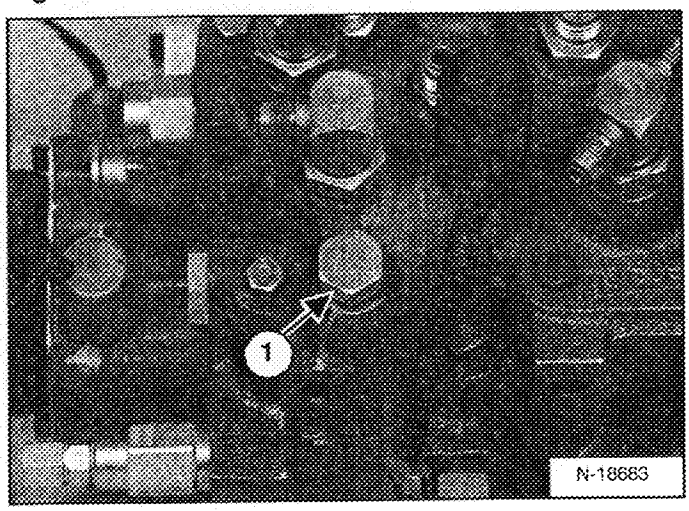
Using a flat blade screw driver, remove the lift arm by-pass orifice (Item 1) **[Figure 20-41-33]** & **[Figure 20-41-34]**.

Orifice size is 0.078 inch.

Reverse the removal procedure to install the lift arm by-pass orifice.

BICS™ Valve, Check Valve Removal and Installation

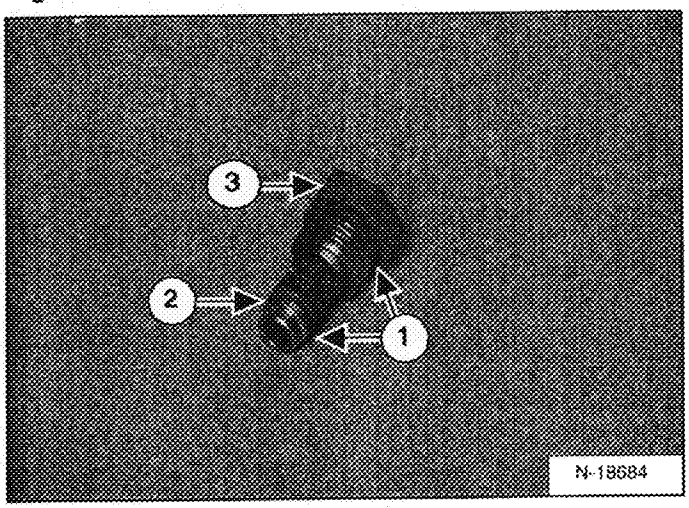
Figure 20-41-35



Remove the check valve (Item 1)**[Figure 20-41-35]**.

Installation: Tighten the valve to 20 ft.-lbs. (27 Nm) torque.

Figure 20-41-36

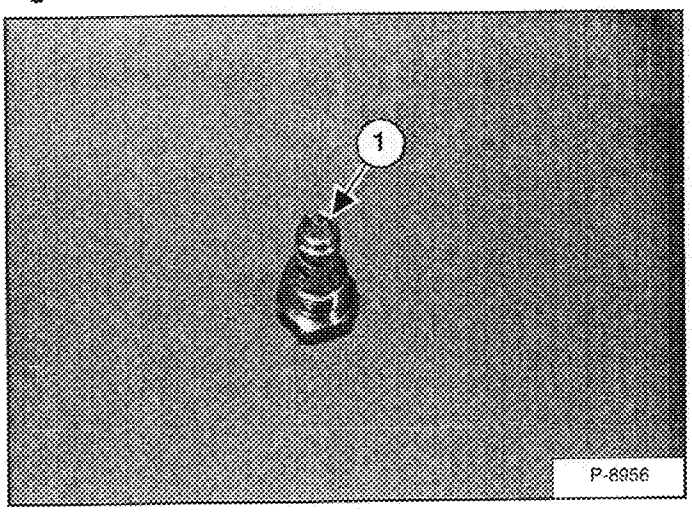


Remove the O-rings (Item 1) **[Figure 20-41-36]** and back-up ring (Item 2) **[Figure 20-41-36]**.

Install new O-rings (Item 1) **[Figure 20-41-36]** and back-up ring (Item 2) **[Figure 20-41-37]** on the check valve.

Check valve (Item 3) **[Figure 20-41-36]** has a rating of 5-10 PSI.

Figure 20-41-37



Clean and inspect the screen (Item 1) **[Figure 20-41-37]** on the end of the valve.

Reverse the removal procedure to install the BICS™check valve.

BICS™ Valve, Lock Valve Removal and Installation

Figure 20-41-38

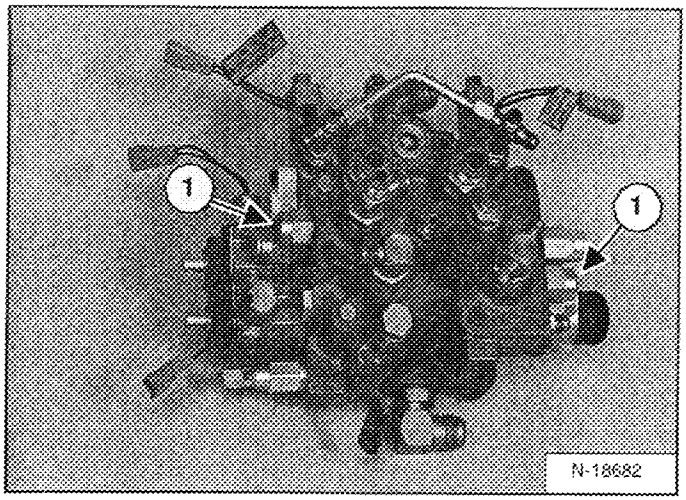


Figure 20-41-39

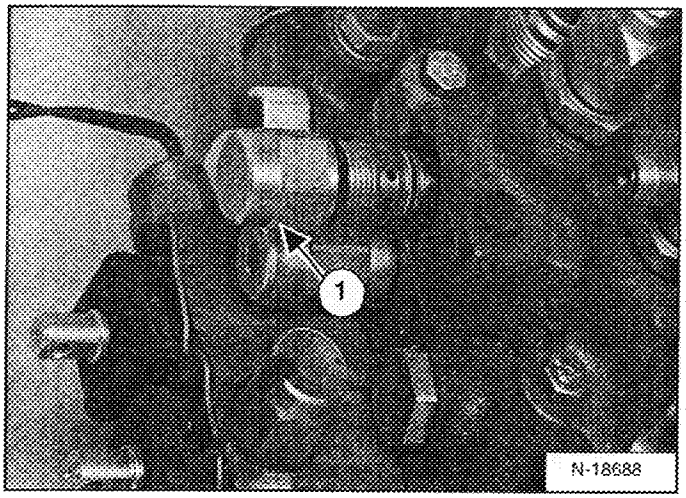
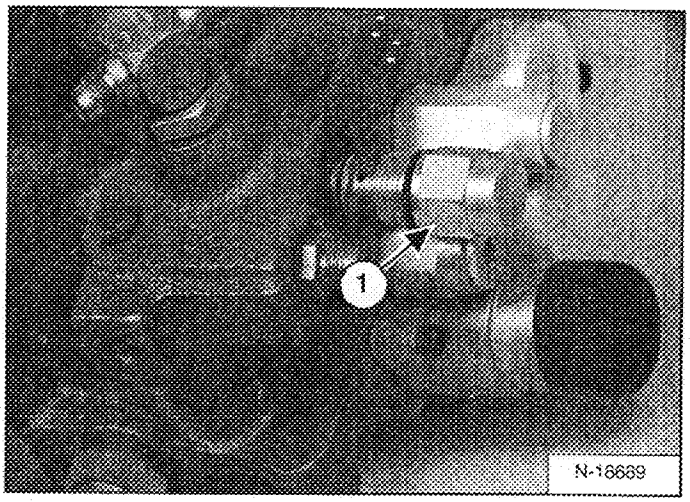


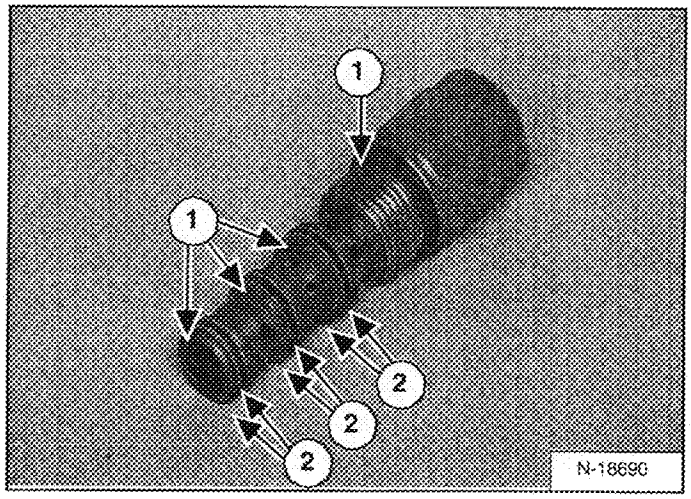
Figure 20-41-40



Remove the lock valves (Item 1)**[Figure 20-41-38]**, **[Figure 20-41-39]** & **[Figure 20-41-40]** from the BICS] valve.

Installation: Tighten the lock valves to 25 ft.-lbs. (34 Nm) torque.

Figure 20-41-41



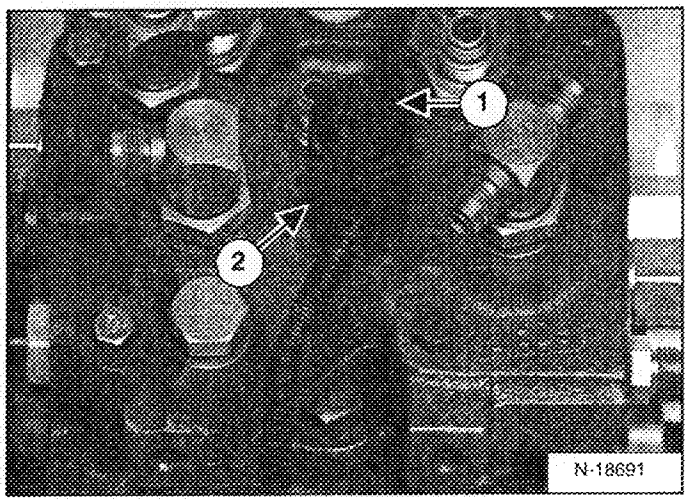
Remove the O-rings (Item 1) **[Figure 20-41-41]** and back-up rings (Item 2) **[Figure 20-41-41]** from both the tilt and lift lock valves.

Install new O-rings (Item 1) **[Figure 20-41-41]** and back-up rings (Item 2) **[Figure 20-41-41]** on the tilt and lift lock valves.

Reverse the removal procedure to install the lock valve.

BICS™ Valve, Solenoid Removal and Installation

Figure 20-41-42



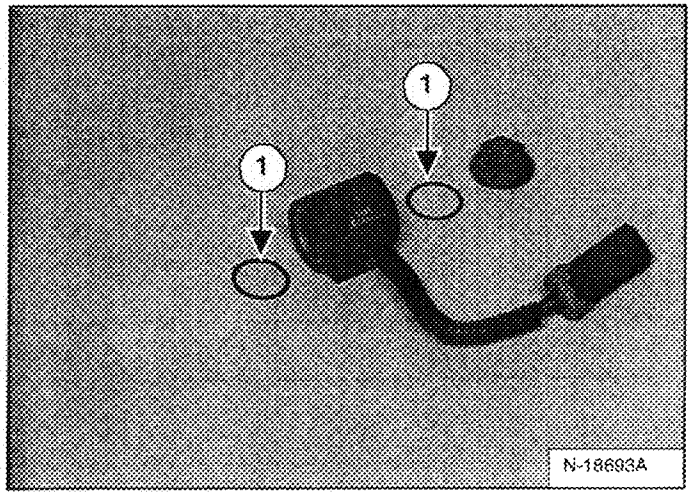
Remove the mounting nut (Item 1) **[Figure 20-41-42]** from the solenoid cartridge.

Installation: Tighten the mounting nut to 53 in.-lbs. (6 Nm) torque.

Remove the solenoid (Item 2) **[Figure 20-41-42]**.

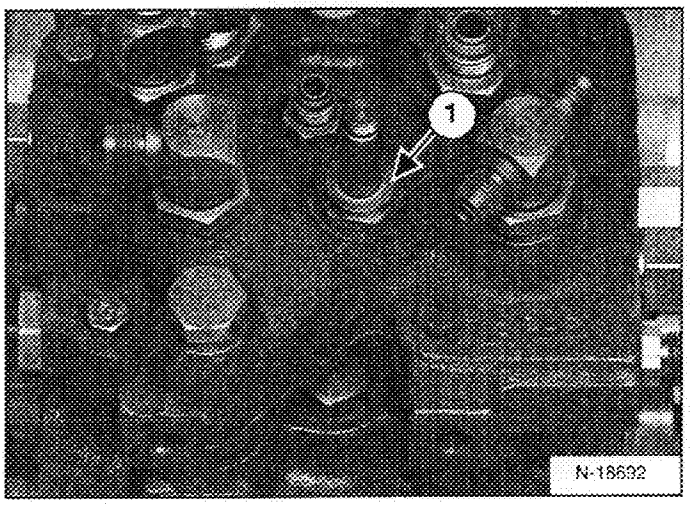
NOTE: The solenoid resistance valve is (8-10 ohms).

Figure 20-41-43



Remove the O-rings (Item 1) **[Figure 20-41-43]** from both ends of the solenoid.

Figure 20-41-44

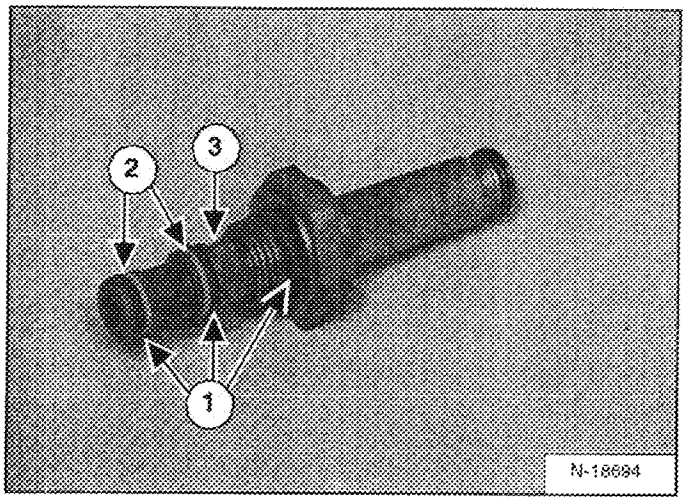


Remove the solenoid cartridge (Item 1) **[Figure 20-41-44]**.

Installation: Tighten the cartridge to 20 ft.-lbs. (27 Nm) torque.

BICS™ Valve, Solenoid Removal and Installation (Cont'd)

Figure 20-41-45



Remove the O-rings (Item 1) **[Figure 20-41-45]** and back-up rings (Item 2) **[Figure 20-41-45]** from the cartridge.

Clean all parts in solvent and dry with compressed air.

Inspect all parts for wear and replace any showing excessive wear.

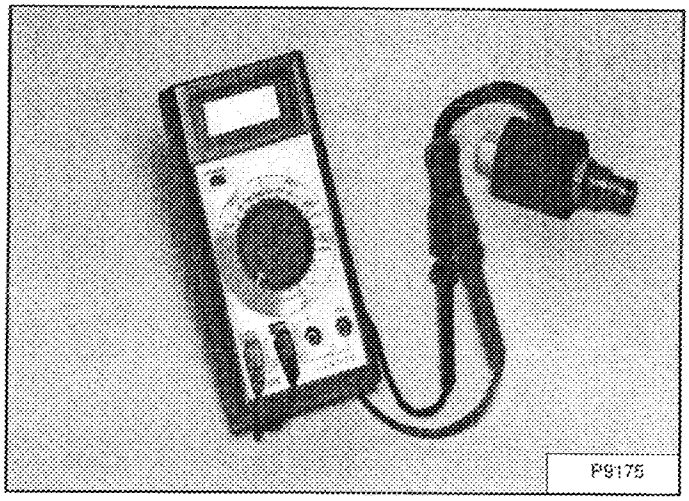
NOTE: The screen (Item 3) [Figure 20-41-45] may be cleaned with solvent. If it is torn or worn it needs to be replaced.

Use only new O-rings and apply oil to all O-rings and back-up rings before installation.

Install new O-rings (Item 1) **[Figure 20-41-43]** & **[Figure 20-41-45]** and new back-up rings (Item 2) **[Figure 20-41-45]** on the solenoid cartridge.

BICS™ Valve, Solenoid Testing

Figure 20-41-46



Use an Ohm meter to measure coil resistance **[Figure 20-41-46]**.

Coil wires do not have polarity.

Correct resistance for the auxiliary, lift and tilt lock coils are 7.7 ohms

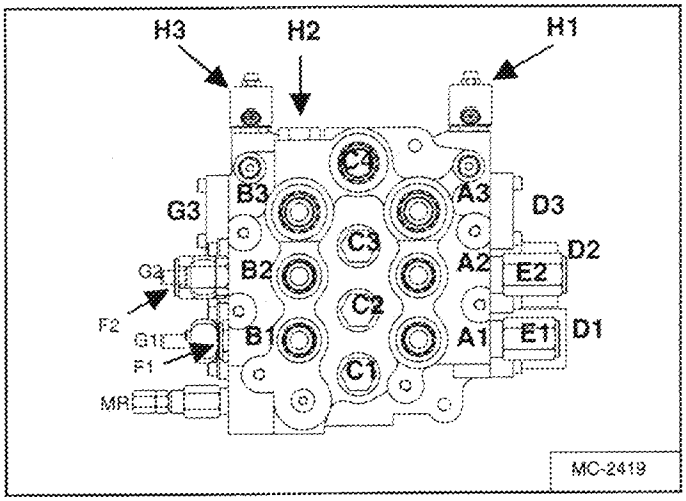
The other coils (BICS, diverter, select valve) are 7.5 ohms.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Identification Chart (AHC)

ITEM	763 AHC LOADER
A1	Lift Cylinder Base End/Restrictor
A2	Tilt Cylinder Base End
A3	Auxiliary Hydraulics
B1	Lift Cylinder Rod End
B2	Tilt Cylinder Rod End
B3	Auxiliary Hydraulics
C1	Load Check Valve/Lift Function
C2	Load Check Valve/Tilt Function
C3	Orificed Load Check Valve/Auxiliary Function
C4	Outlet Fluid Flow
D1	Lift Spool Centering Spring
D2	Tilt Spool Centering Spring
D3	Auxiliary Spool/Centering Springs
E1	Port Relief Valve-3500 PSI
E2	Anti-Cavitation/Port Relief Valve-3500 PSI
F1	Anti-Cavitation Valve
F2	Port Relief Valve-3500 PSI
G1	Lift Spool End
G2	Tilt Spool End
G3	Auxiliary Spool/Centering Springs
H1	Auxiliary Electric Solenoid
H2	Plug/Port Relief (Optional)-3500 PSI
H3	Auxiliary Electric Solenoid
MR	Main Relief Valve-3000 PSI

Figure 20-41-47

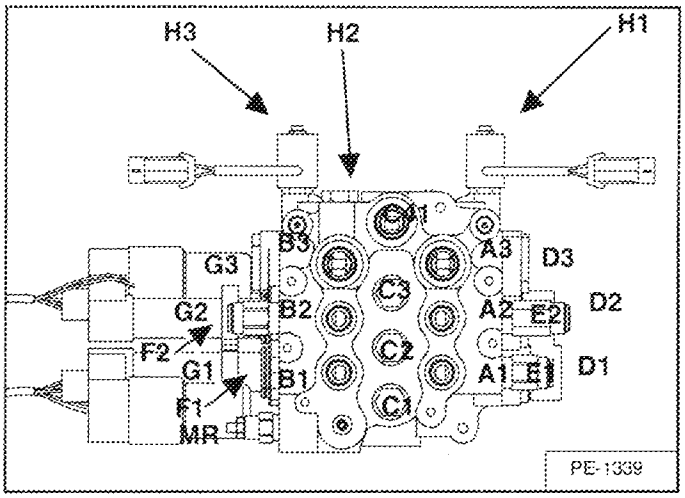


HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Identification Chart (ACS)

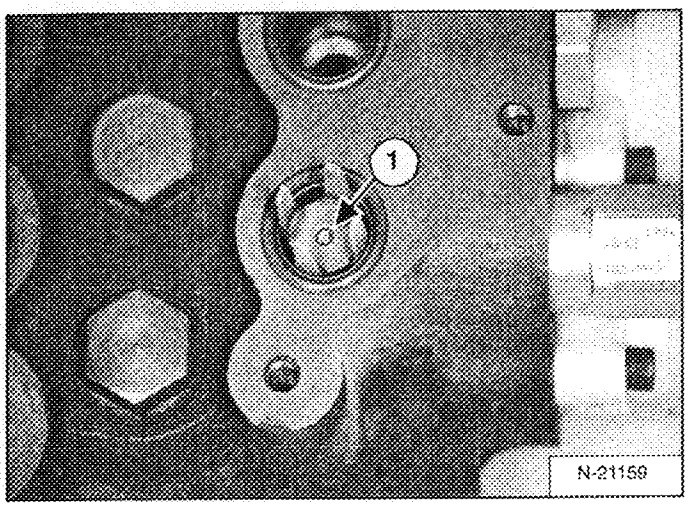
ITEM	763 ACS LOADER
A1	Lift Cylinder Base End/Restrictor
A2	Tilt Cylinder Base End
A3	Auxiliary Hydraulics
B1	Lift Cylinder Rod End
B2	Tilt Cylinder Rod End
B3	Auxiliary Hydraulics
C1	Load Check Valve/Lift Function
C2	Load Check Valve/Tilt Function
C3	Orificed Load Check Valve/Auxiliary Function
C4	Outlet Fluid Flow
D1	Lift Spool Centering Spring
D2	Tilt Spool Centering Spring
D3	Auxiliary Spool/Centering Springs
E1	Port Relief Valve-3500 PSI
E2	Anti-Cavitation/Port Relief Valve-3500 PSI
F1	Anti-Cavitation Valve
F2	Port Relief Valve-3500 PSI
G1	Lift Spool End
G2	Tilt Spool End
G3	Auxiliary Spool/Centering Springs
H1	Auxiliary Electric Solenoid
H2	Plug/Port Relief (Optional)-3500 PSI
H3	Auxiliary Electric Solenoid
MR	Main Relief Valve-3000 PSI

Figure 20-41-48



Lift Base End Restrictor

Figure 20-41-49

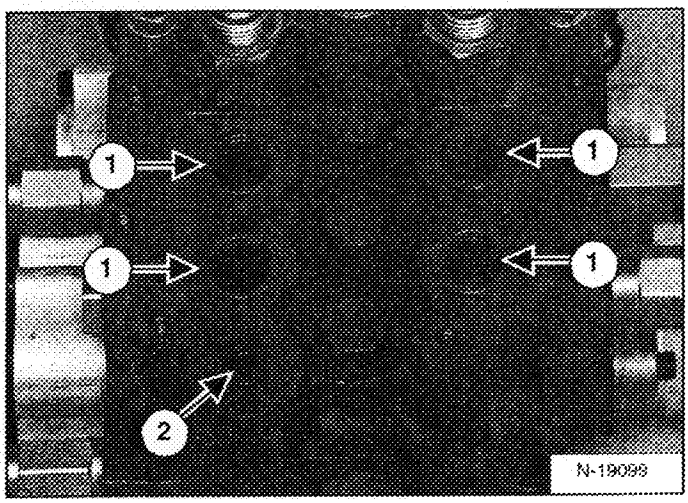


Remove the BICS valve assembly from the control valve. (See Contents, Page 20-01.)

Remove the restrictor (Item 1) **[Figure 20-41-49]** from the lift section base end port.

Load Check Valve

Figure 20-41-50



Remove the BICS valve assembly from the control valve. (See Contents, Page 20-01.)

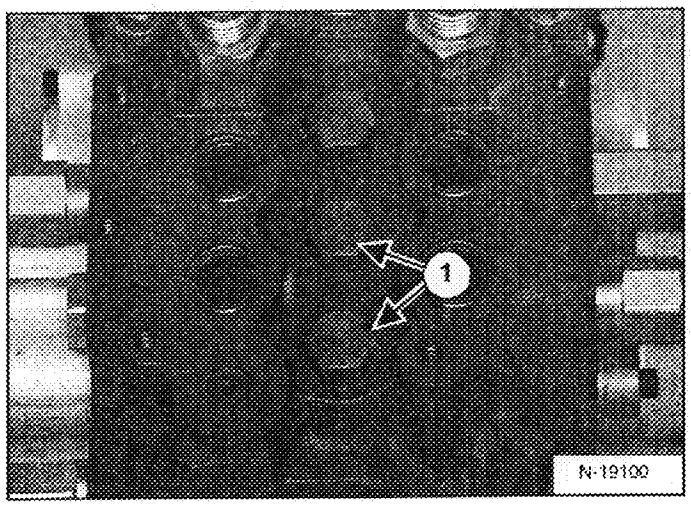
Remove the four large O-rings (Item 1) **[Figure 20-41-50]** and small O-ring (Item 2)**[Figure 20-41-50]**. Always replace these O-rings before installing the BICS valve assembly

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

Figure 20-41-51



Mark each valve section, spool and related parts so that they will be returned to their original valve section during assembly.

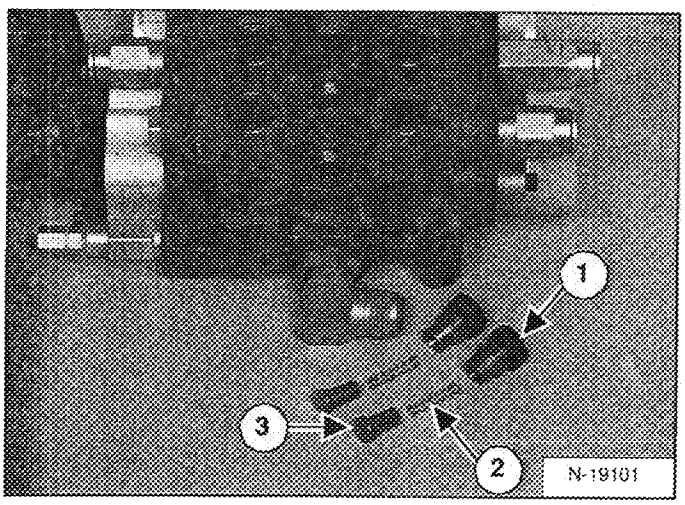
Use bolts to fasten the control valve to a work bench for easier disassembly and assembly procedures.

Loosen the load check valve plugs (Item 1) **[Figure 20-41-51]**.

Installation: Always use new O-ring. tighten the plug to 35-40 ft.-lbs. (47-54 Nm) torque.

Load Check Valve (Cont'd)

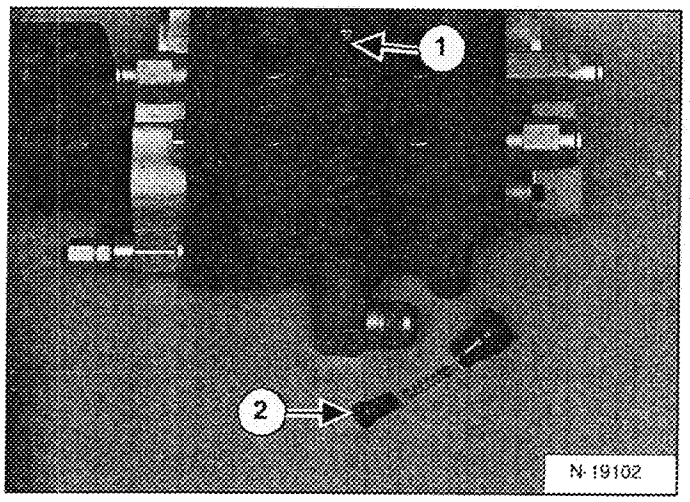
Figure 20-41-52



Remove the load check plugs (Item 1) **[Figure 20-41-52]**.

Remove the spring (Item 2) **[Figure 20-41-52]** and poppet (Item 3) **[Figure 20-41-52]**.

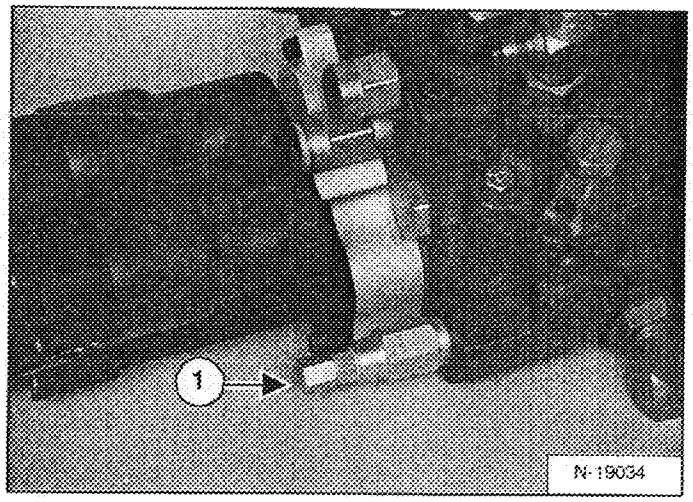
Figure 20-41-53



The auxiliary section (Item 1) **[Figure 20-41-53]** uses an orifice load check poppet (Item 2)**[Figure 20-41-53]**.

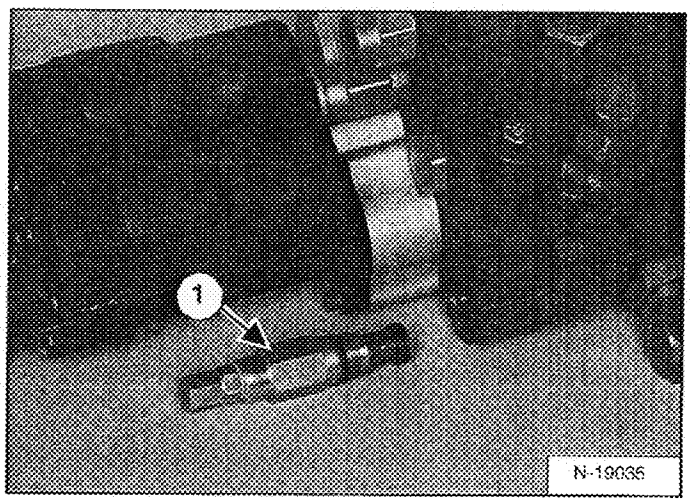
Main Relief Valve

Figure 20-41-54



Loosen the main relief valve (Item 1) **[Figure 20-41-54]**.

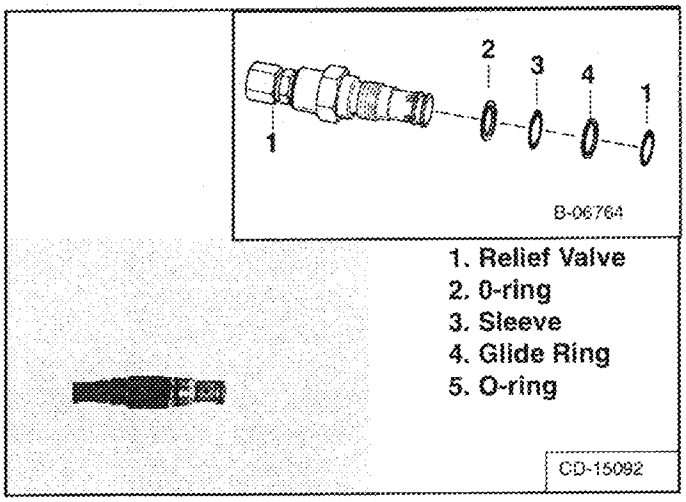
Figure 20-41-55



Remove the main relief valve (Item 1) **[Figure 20-41-55]**.

Main Relief Valve (Cont'd)

Figure 20-41-56



Remove the O-rings, sleeve, and glide ring from the main relief valve **[Figure 20-41-56]**.

Installation: Always use new O-rings, sleeve, and glide ring. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.

Port Relief Valve

Figure 20-41-57

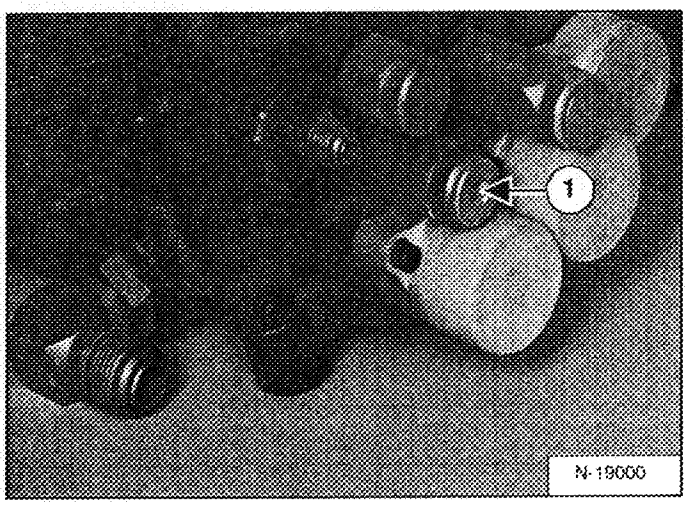
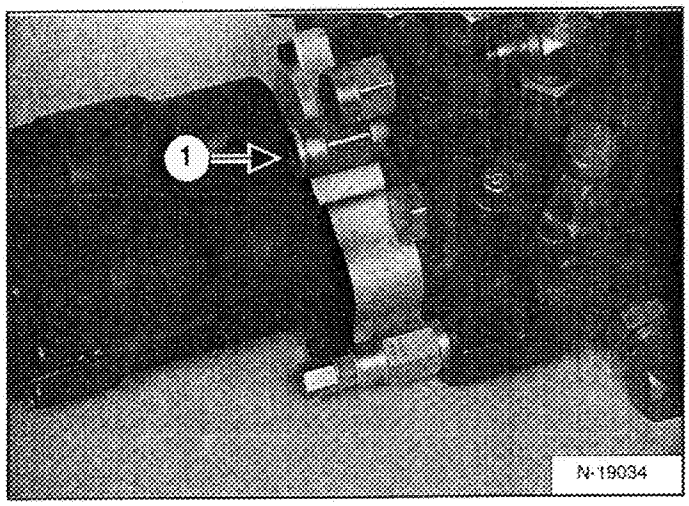


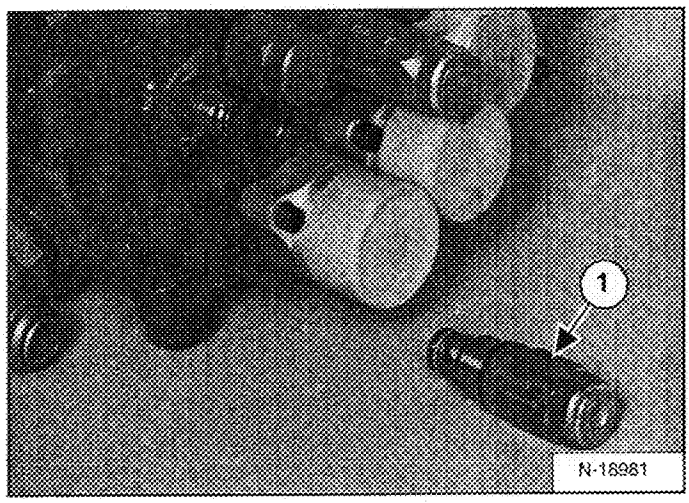
Figure 20-41-58



Loosen the port relief valve (Item 1) **[Figure 20-41-57]** & **[Figure 20-41-58]** *(Port E1 or F2)*. (See Contents, Page 20-01.)

Installation: Always use new O-rings and back-up washers. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.

Figure 20-41-59

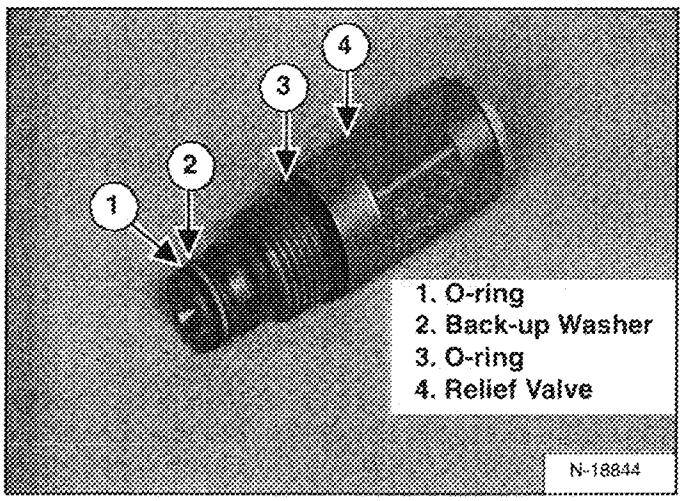


Remove the port relief valve (Item 1) **[Figure 20-41-59]**.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Port Relief Valve (Cont'd)

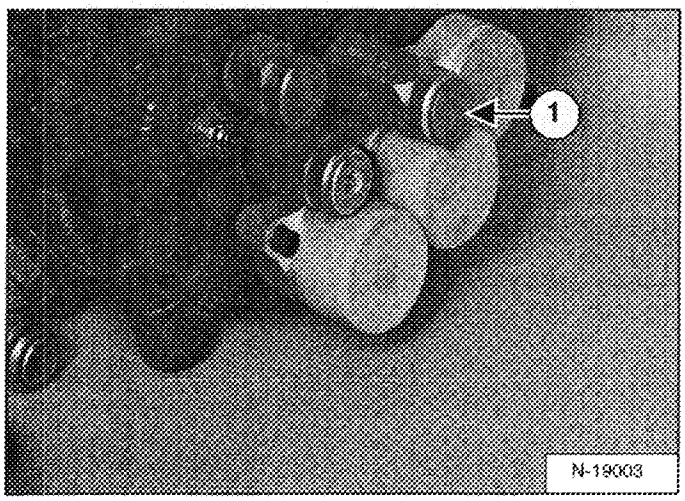
Figure 20-41-60



Remove and install new O-rings and check back-up washer from the port relief valve **[Figure 20-41-60]**.

Anti-Cavitation Valve/Port Relief Valve

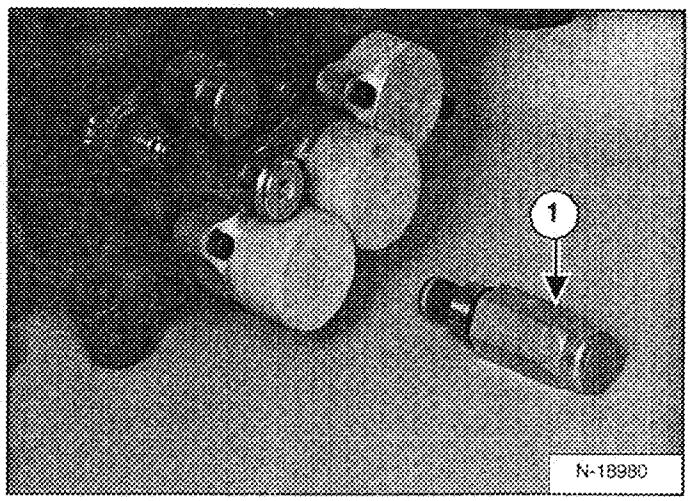
Figure 20-41-61



Loosen the anti-cavitation valve (Item 1) **[Figure 20-41-61]**.

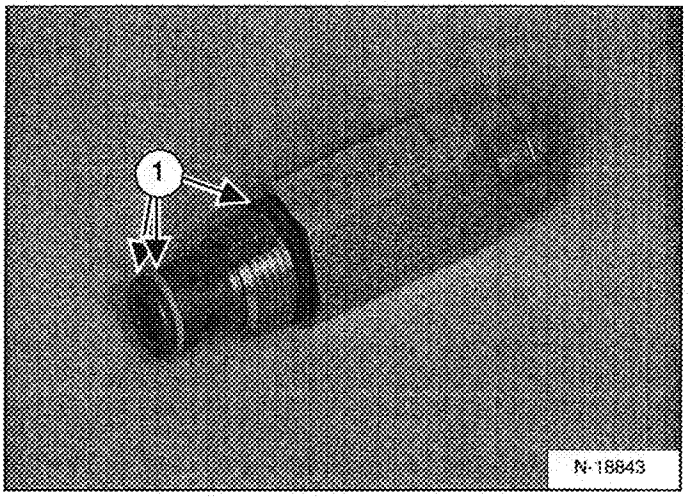
Installation: Always use new O-rings and back-up washers. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.

Figure 20-41-62



Remove the anti-cavitation/port relief valve (Item 1) **[Figure 20-41-62]** from the control valve for the tilt section.

Figure 20-41-63



Remove and install new O-rings (Item 1) **[Figure 20-41-63]** from the anti-cavitation/port relief valve.

Anti-Cavitation Valve

Figure 20-41-64

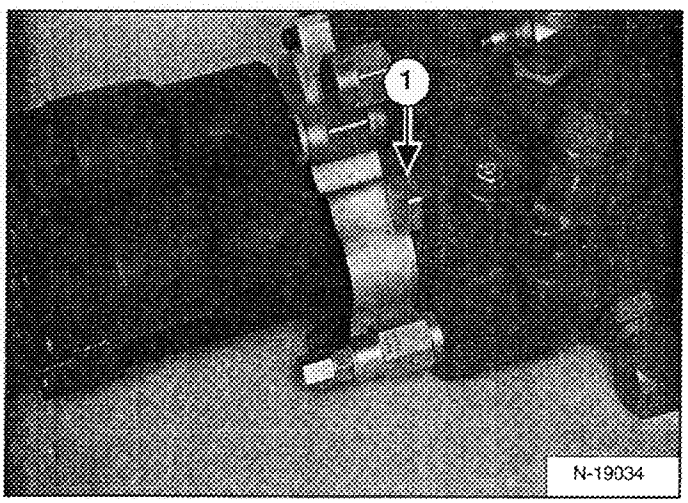
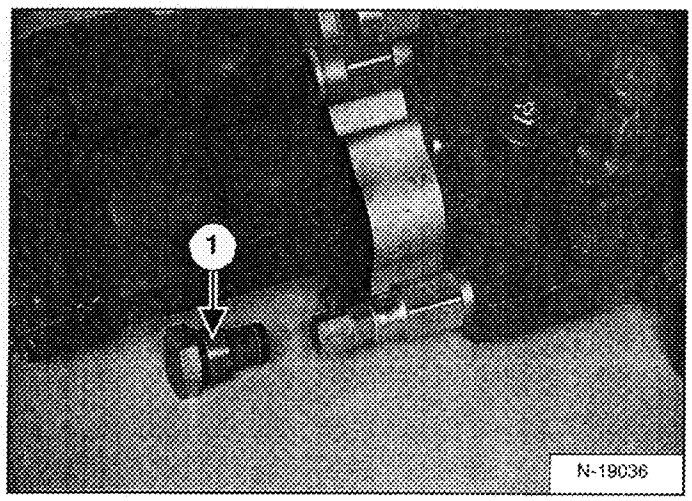
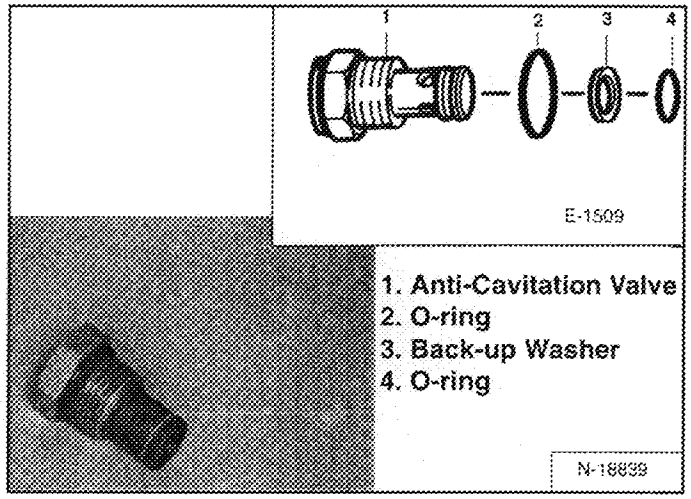


Figure 20-41-65



Remove the anti-cavitation valve (Item 1) and (Item 1) **[Figure 20-41-65]** from the control valve.

Figure 20-41-66

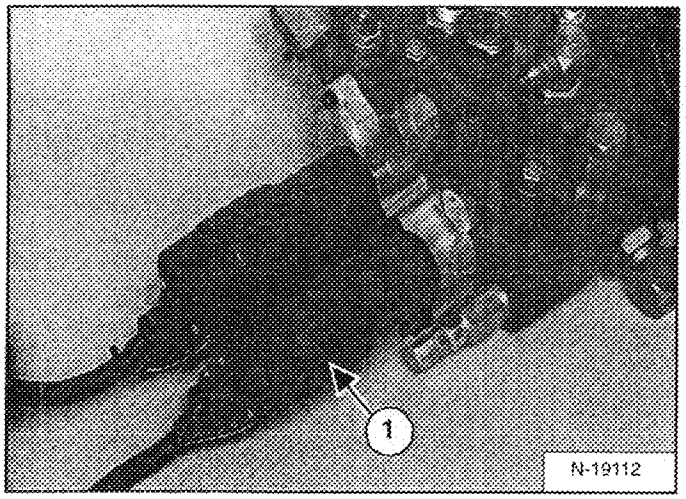


Remove and install new O-rings and check back-up washer from the anti-cavitation valve **[Figure 20-41-66]**.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

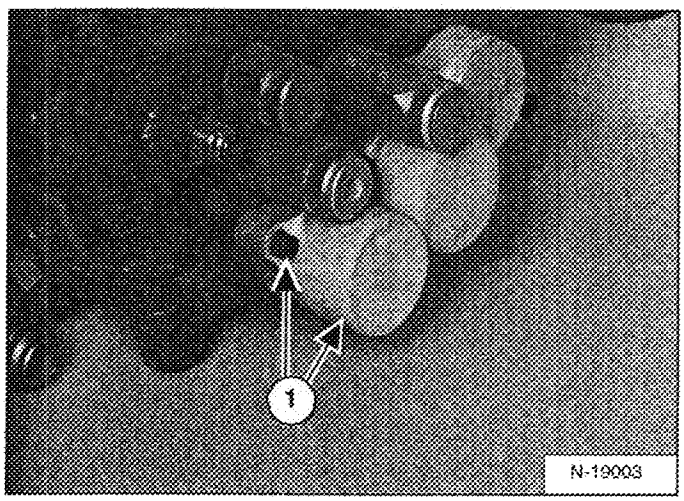
Lift Spool Removal And Installation

Figure 20-41-67



Remove the actuator (Item 1) **[Figure 20-41-67]** from the control valve. (See Contents, Page 20-01.)

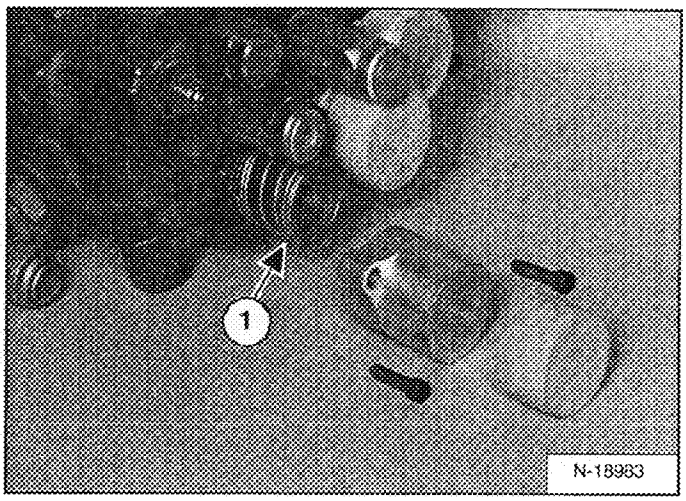
Figure 20-41-68



Remove the screws (Item 1) **[Figure 20-41-68]** from the cap.

Installation: Tighten the bolt to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

Figure 20-41-69

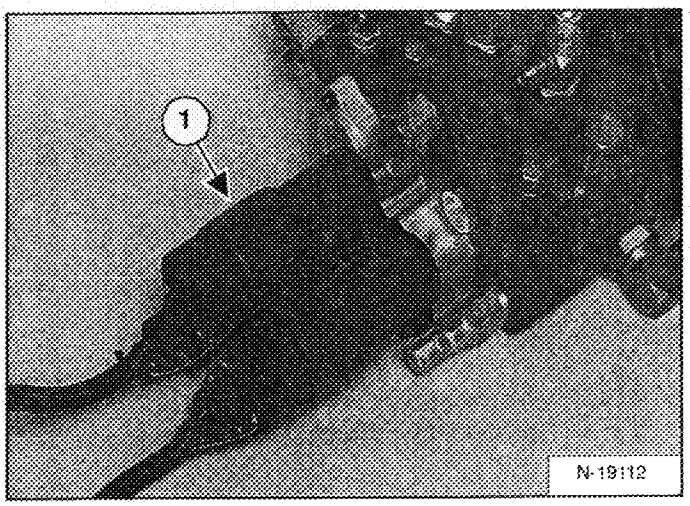


Remove the spool assembly (Item 1)**[Figure 20-41-69]** and seal from the control valve.

Assembly: Always use a new spool seal and new O-rings.

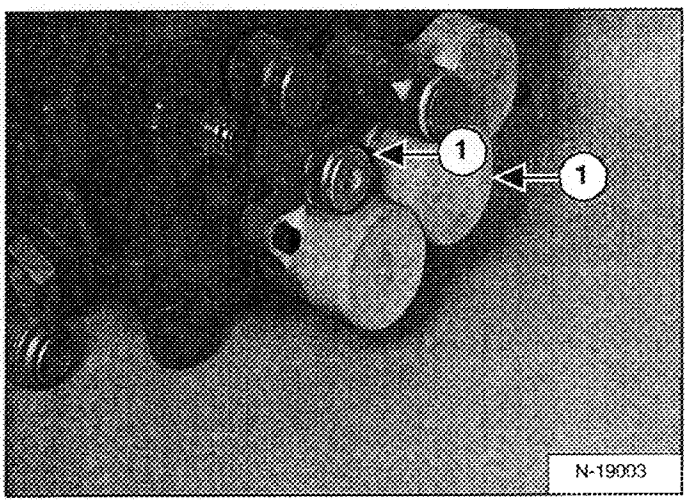
Tilt Spool Removal And Installation

Figure 20-41-70



Remove the actuators (Item 1) **[Figure 20-41-70]** from the control valve. (See Contents, Page 20-01.)

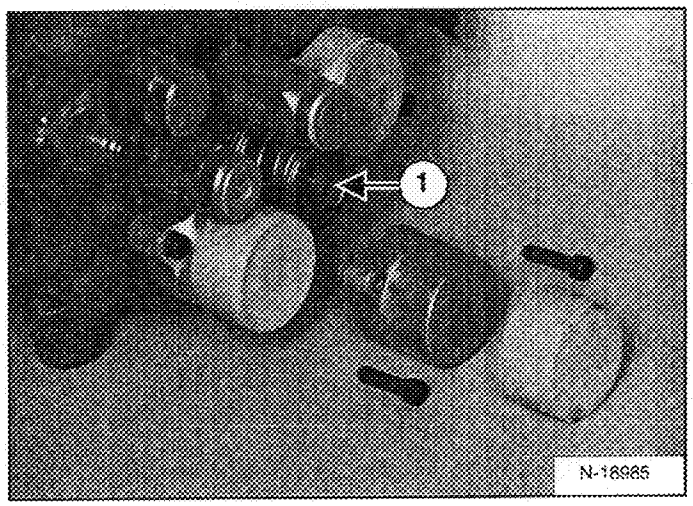
Figure 20-41-71



Remove the screws (Item 1) **[Figure 20-41-71]** from the end cap.

Installation: Tighten the bolt to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

Figure 20-41-72



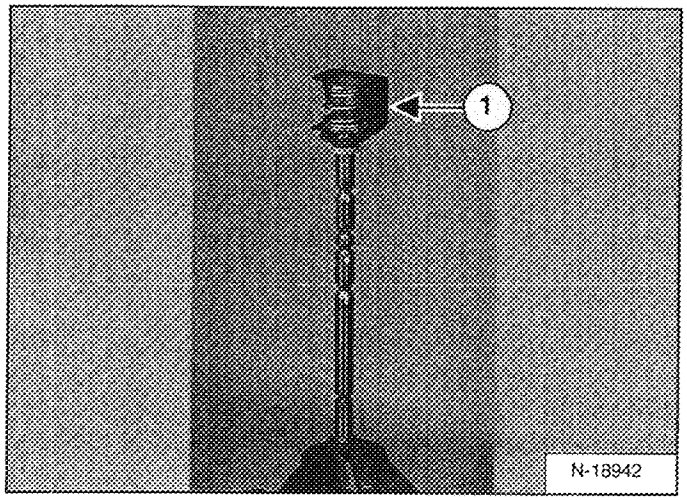
Remove the spool assembly (Item 1) **[Figure 20-41-72]** and seal from the control valve.

Assembly: Always use a new spool seal and new O-rings.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Lift And Tilt Spool Disassembly And Assembly

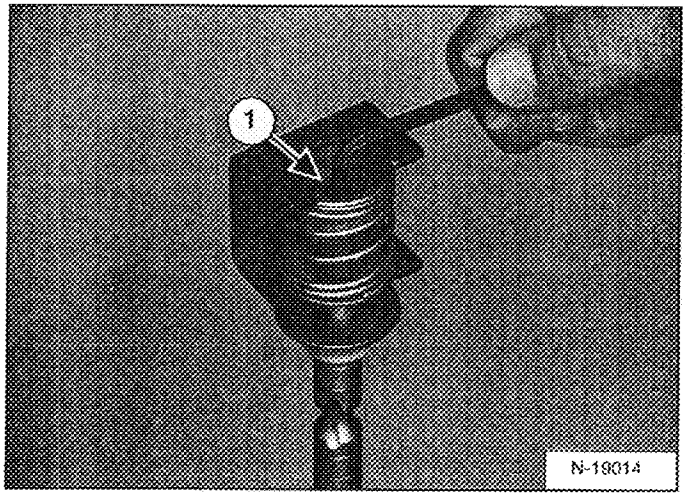
Figure 20-41-73



Put the linkage end of the spool in the vice **[Figure 20-41-73]**.

Install the spool tool (Item 1) **[Figure 20-41-73]** over the centering spring.

Figure 20-41-74

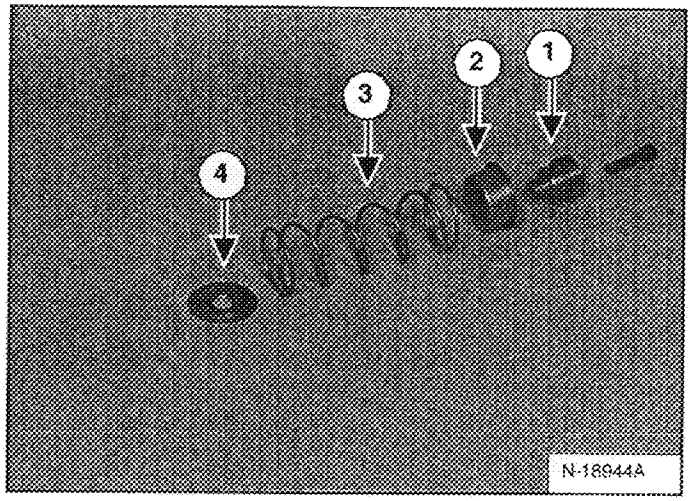


Remove the bolt (Item 1) **[Figure 20-41-74]** holding the centering spring to the spool.

Installation: Tighten the bolt to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

Remove spring tool from the spring assembly.

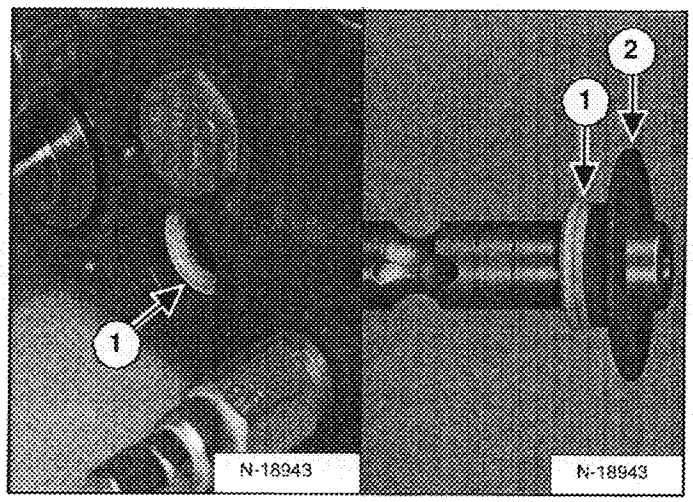
Figure 20-41-75



NOTE: The centering spring (Item 3) [Figure 20-41-75] is white on all 700 series loaders.

Inspect the adapter (Item 1), collar (Item 2), spring (Item 3), and washer (Item 4) **[Figure 20-41-75]**.

Figure 20-41-76

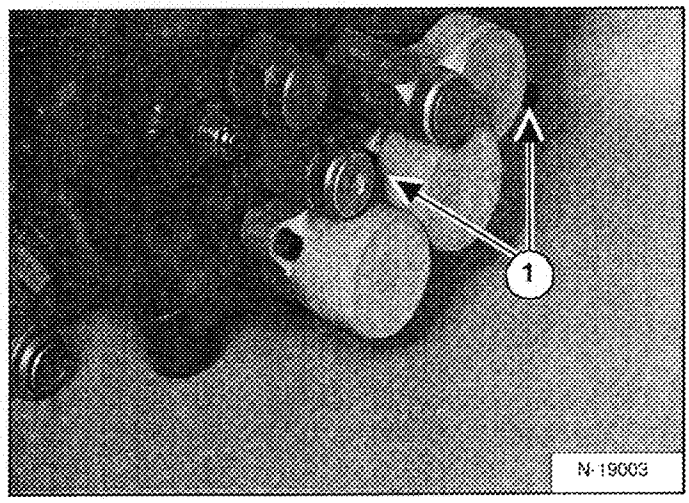


Remove the spool seal (Item 1) and the back-up washer (Item 2) **[Figure 20-41-76]**.

Assembly: Always use a new spool seal.

Auxiliary Spool Removal And Installation

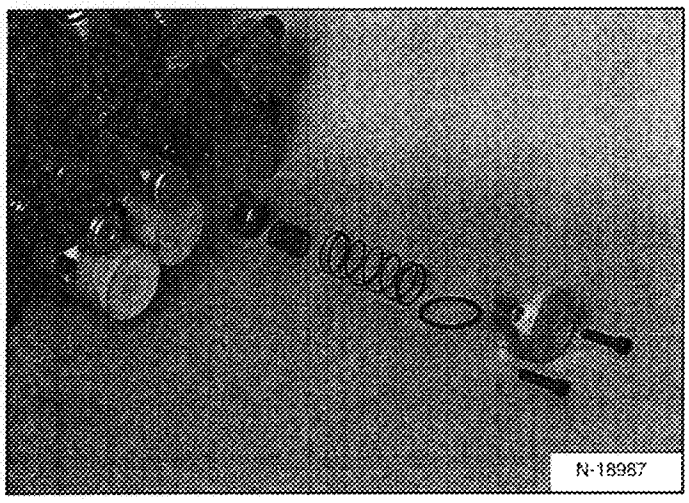
Figure 20-41-77



Remove the screws (Item 1) **[Figure 20-41-77]** from the end cap (both sides).

Installation: Tighten the bolt to 90-100 in.-lbs. (10,2-11,3 Nm) torque.

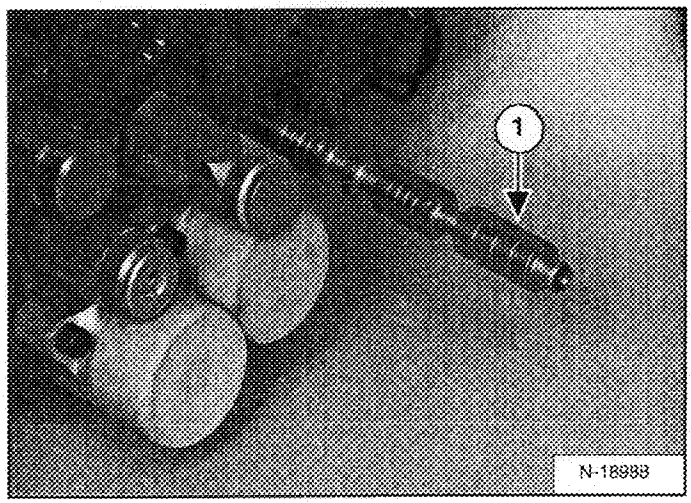
Figure 20-41-78



Remove the end cap, O-ring, springs and washer (both sides) **[Figure 20-41-78]**.

Assembly: Always use a new spool seal and new O-rings

Figure 20-41-79



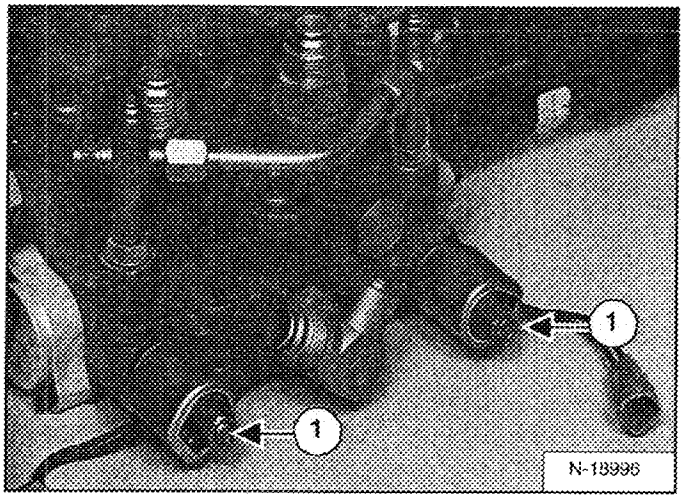
Remove the spool (Item 1) **[Figure 20-41-79]**.

Assembly: Put grease on all the centering spring component parts.

HYDRAULIC CONTROL VALVE (ADVANCED CONTROL SYSTEM) (ACS) (CONT'D)

Auxiliary Electric Solenoid

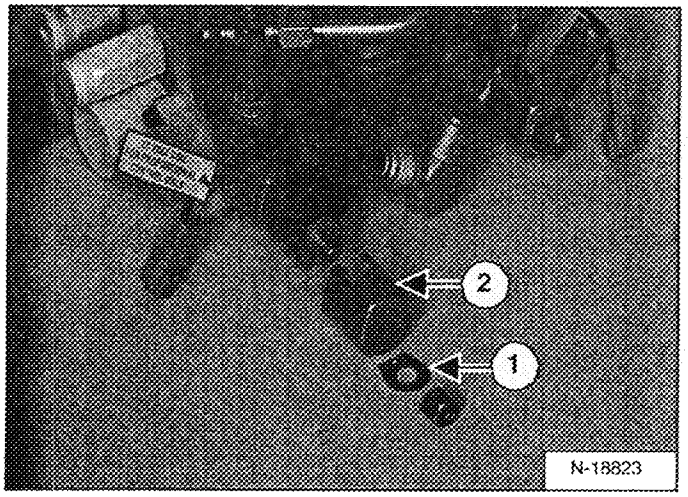
Figure 20-41-80



Remove the nut (item 1) **[Figure 20-41-80]** from both solenoids.

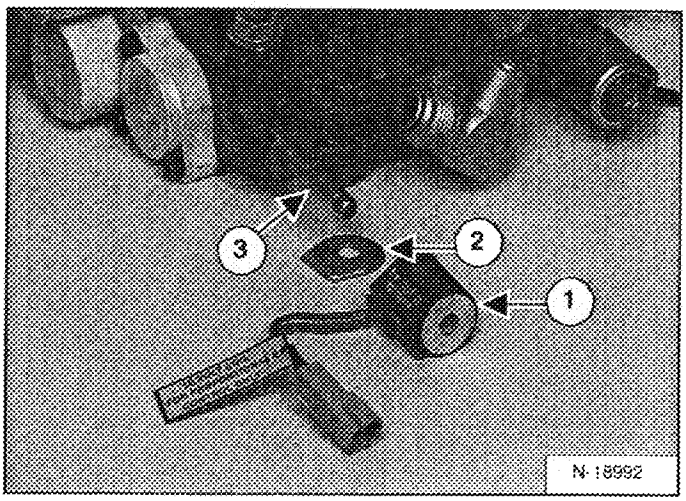
Installation: Tighten the nut to 8-12 ft.-lbs. (11-16 Nm) torque.

Figure 20-41-81



Remove the end plate (item 1) **[Figure 20-41-81]** and housing (item 2) **[Figure 20-41-81]**.

Figure 20-41-82

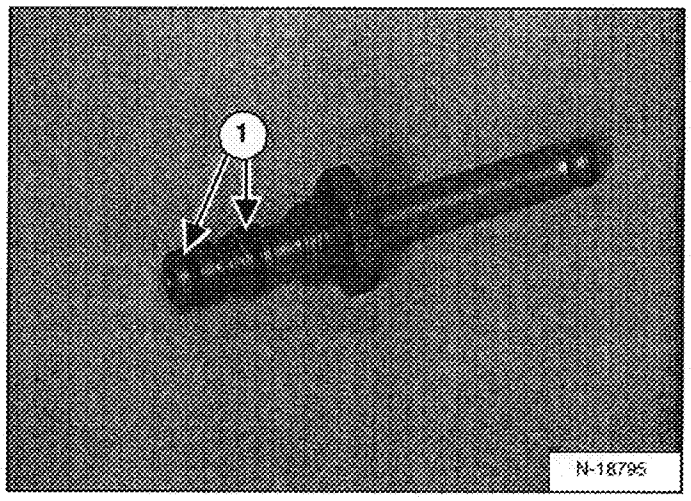


Remove the coil (item 1)**[Figure 20-41-82]** and end plate (item 2) **[Figure 20-41-82]**.

Remove the solenoid valve (item 3) **[Figure 20-41-82]**.

Installation: Tighten valve to 8-12 ft.-lbs. (11-16 Nm) torque.

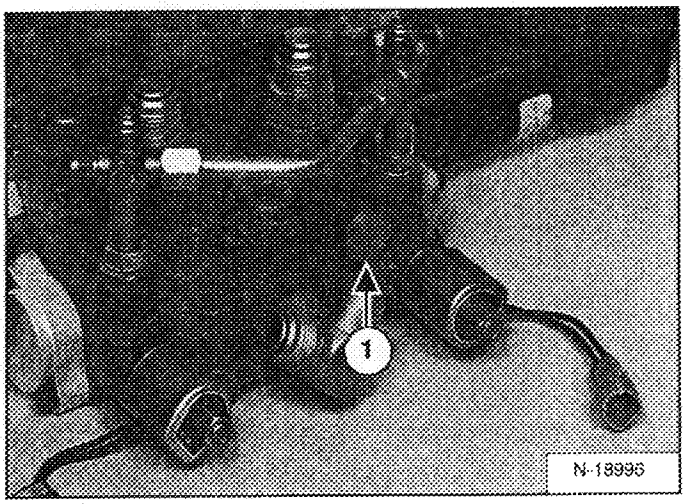
Figure 20-41-83



Remove and install new O-rings (Item 1) **[Figure 20-41-83]** on the solenoid valves.

Port-Auxiliary Section

Figure 20-41-84



Remove the plug (Item 1) **[Figure 20-41-84]** or optional port relief valve from the control valve.

NOTE: Optional port relief (Item 1) [Figure 20-41-84] is 3500 PSI.

Figure 20-41-85

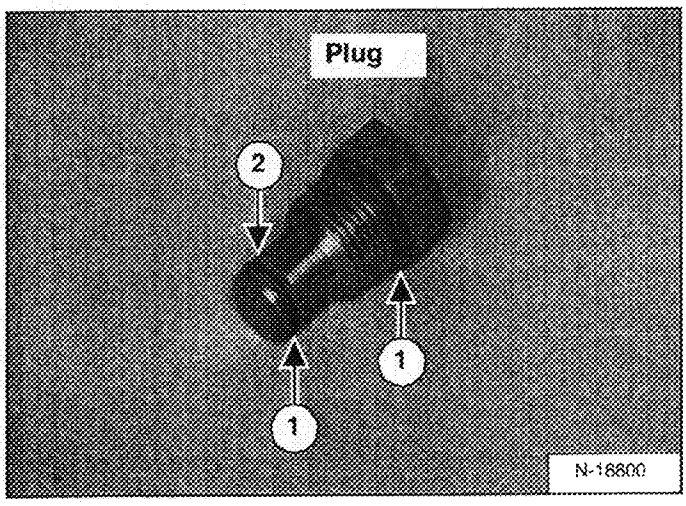
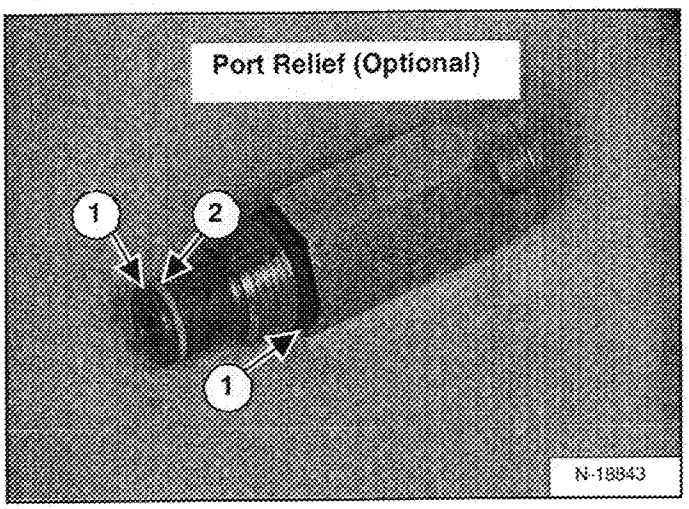


Figure 20-41-86



Remove the O-rings (Item 1) **[Figure 20-41-85]** & **[Figure 20-41-86]** and back-up ring (Item 2) **[Figure 20-41-85]** & **[Figure 20-41-86]** from the plug.

Cleaning And Inspection

Clean all components with clean solvent and dry with compressed air.

Check the spools for wear or scratches.

Check that the spools are not loose in their bore.

Check that the centering springs are not broken.

Check that the load check valve seats are not worn.

Check the load check poppets for damage.

Check the rubber boots and retainers.

Replace the parts as needed.

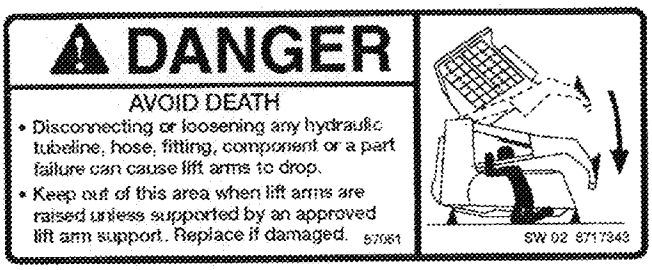
Use new O-rings and back-up rings.

Apply oil to all new O-rings and back-up rings before installation.

Bobcat®

LIFT ARM BY-PASS CONTROL VALVE

Inspecting



WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Raise the lift arms 6 feet (2 m) off the ground. Stop the engine. Turn the Lift Arm By-Pass Control Knob clockwise 1/4 turn. Then pull up and hold the Lift Arm By-Pass Control Knob until the lift arms slowly lower.

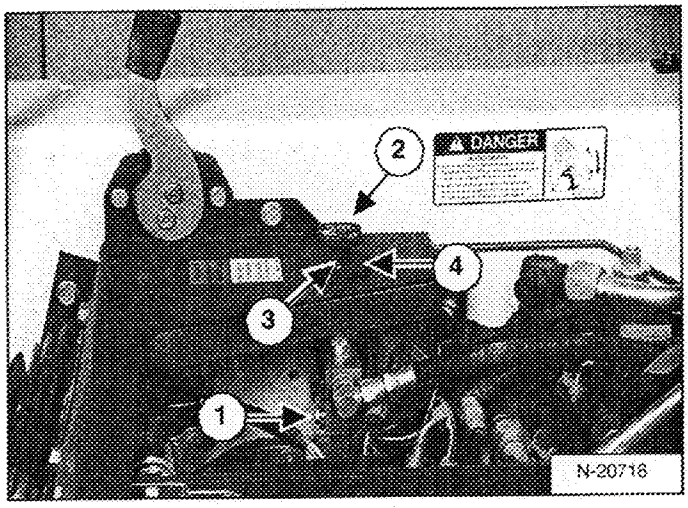
Removal And Installation

Lift and block the rear corners of the loader. (See Contents Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Raise the operator cab. (See Contents Page 10-01.)

Figure 20-50-1



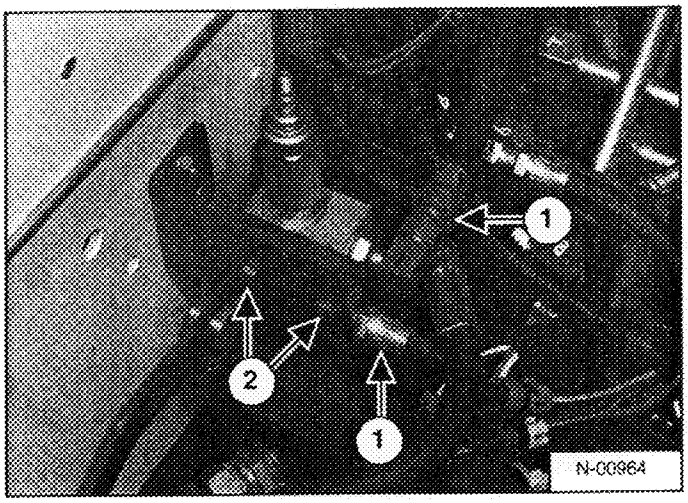
The lift lock by-pass valve (Item 1)**[Figure 20-50-1]** is located under the right side of the control panel.

Hold the by-pass control knob (Item 2) and loosen the jam nut (Item 3) **[Figure 20-50-1]** on the by-pass valve shaft.

Remove the by-pass control knob and jam nut from the valve shaft **[Figure 20-50-2]**.

Remove the rubber washer (Item 4) **[Figure 20-50-1]**.

Figure 20-50-2



Disconnect the two hoses (Item 1) **[Figure 20-50-2]** from the lift lock by-pass valve.

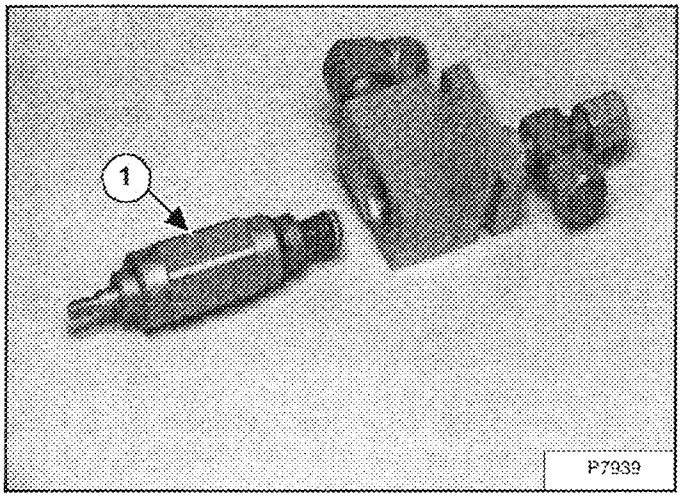
Remove the two mounting bolts (Item 2) **[Figure 20-50-2]**.

Installation: Tighten the mounting bolts to 180-200 in.-lbs. (21-23 Nm) torque.

Remove the lift arm by-pass valve.

Disassembly And Assembly

Figure 20-50-3



Remove the by-pass valve (item 1) **[Figure 20-50-3]** from the valve block. Inspect the by-pass valve for damage and replace if necessary.

Installation: Tighten the valve to 33-37 ft.-lbs. (45-50 Nm) torque.

Inspect the hydraulic fittings on the valve block for damage and replace if necessary.

HYDRAULIC PUMP (ALUMINUM)

Checking The Output Of The Hydraulic Pump

⚠ 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

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

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

MEL1563 - Remote Start Tool
MEL10103 - Hydraulic Tester
MEL10106 - Hydraulic Test Kit

Lift and block the loader. (See Contents, Page 10-01.)

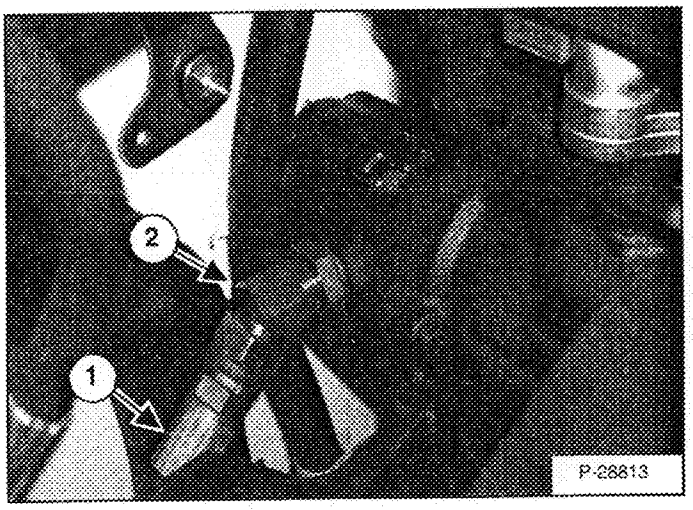
Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

Raise the operator cab. (See Contents, Page 10-01.)

Open the rear door of the loader.

Connect the remote start switch. (See Contents, Page 10-01.)

Figure 20-60-1



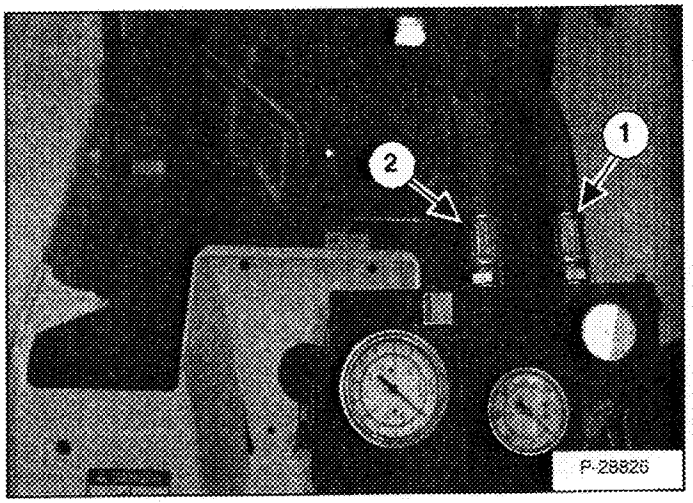
Disconnect the OUTLET hose (Item 1) **[Figure 20-60-1]** from the pump.

IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

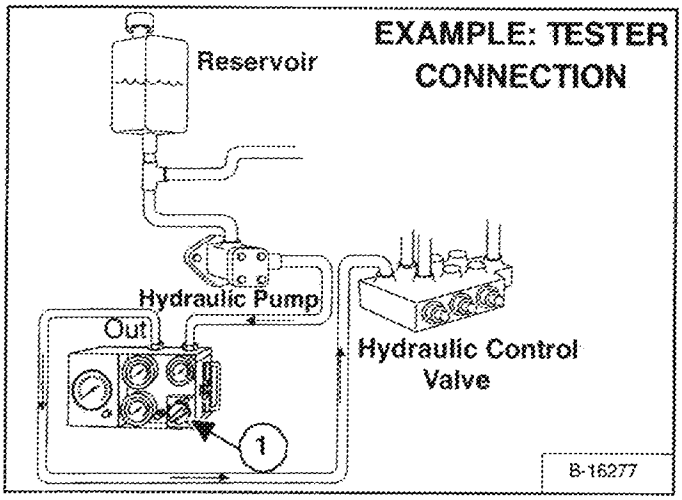
Figure 20-60-2



Connect the INLET hose (Item 1) **[Figure 20-60-2]** from the tester to the OUTLET fitting (Item 2) **[Figure 20-60-1]** of the pump. Connect the OUTLET hose (Item 2) **[Figure 20-60-2]** from the tester to the hose (Item 2) **[Figure 20-60-1]** which was disconnected from the pump.

Check The Output Of The Hydraulic Pump (Cont'd)

Figure 20-60-3



Sample tester connection shown **[Figure 20-60-3]**.

Start the engine and run at low idle RPM. Make sure the tester is connected correctly. If no flow is indicated on the tester, the hoses are connected wrong. With the hoses connected correctly, increase the engine speed to full RPM*.

Warm the fluid to 140°F. (60°C.) by turning the restrictor control (item 1) **[Figure 20-60-3]** on the tester to about 1000 PSI (6895 kPa). DO NOT exceed system relief pressure. Open the restrictor control and record the free flow (GPM) at full RPM.

Push the maximum/variable flow switch (on the remote start tool) to engage the front auxiliary hydraulics, the light will come ON. Push the button (on the right control lever) for fluid flow to the quick coupler (fluid pressure will go over main relief). Record the highest pressure (PSI) and flow (GPM). The high pressure flow must be at least 80% of free flow.

$$\% = \frac{\text{High Pressure Flow (GPM)}}{\text{Free Flow (GPM)}} \times 100$$

A low percentage may indicate a failed pump.

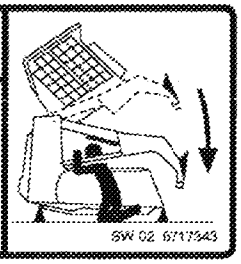
*See *SPECIFICATIONS*, Contents Section SPEC-01 for system relief pressure and full RPM.

Removal And Installation

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 57061



⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Raise the lift arms and install an approved lift arm support device. (See Contents, Page 10-01.)

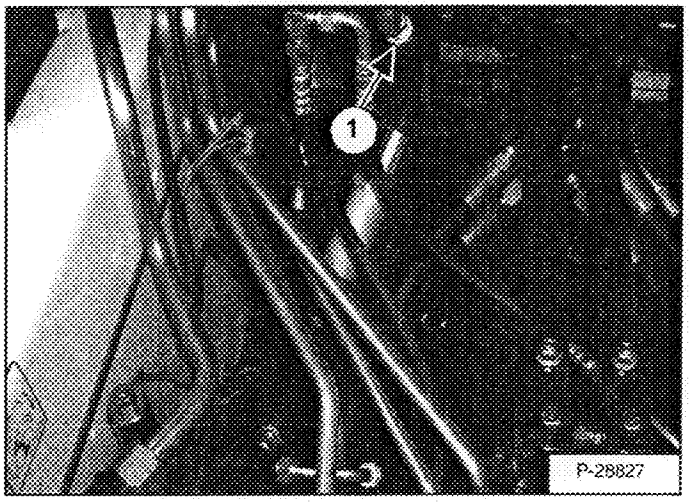
Stop the engine. Move the hydraulic controls to release the hydraulic pressure.

Raise the seat bar.

Lift and block the rear of the loader. (See Contents, Page 10-01.)

Raise the operator cab. (See Contents, Page 10-01.)

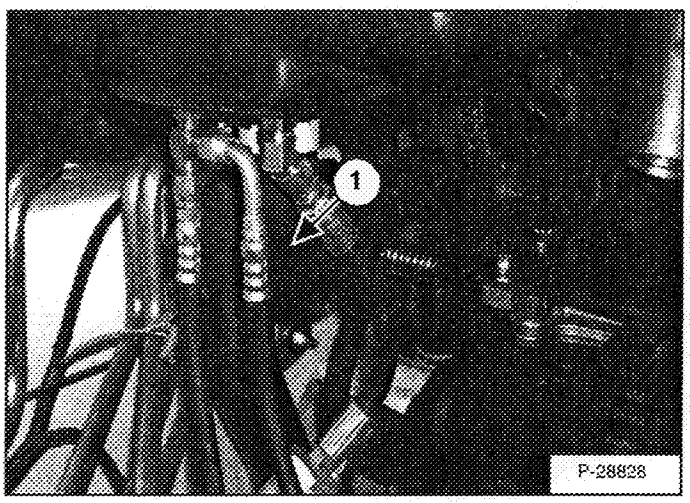
Figure 20-60-4



Disconnect the case drain hose (Item 1) **[Figure 20-60-4]** from the right drive motor.

Drain the hydraulic fluid (using the case drain hose) from the reservoir.

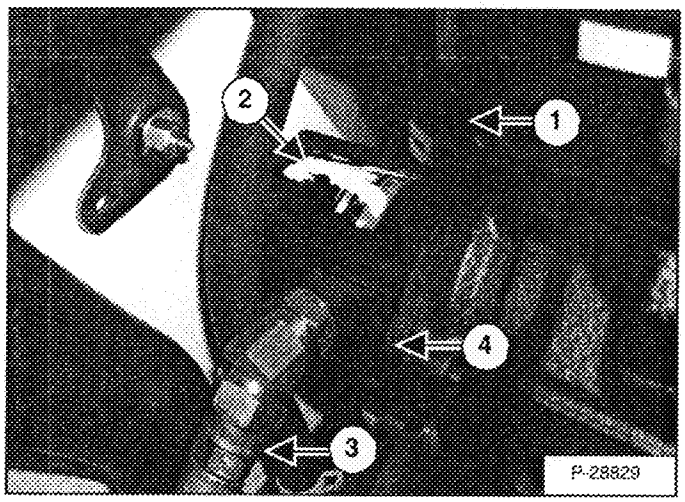
Figure 20-60-5



Disconnect the hydraulic pump inlet hose (Item 1) **[Figure 20-60-5]** from the reservoir and drain as much fluid from the hose as possible. Reconnect the hose to the reservoir.

Removal And Installation (Cont'd)

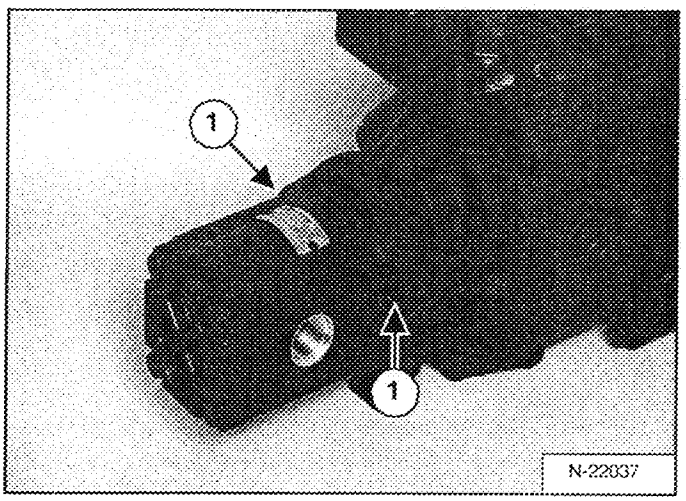
Figure 20-60-6



Disconnect the inlet hose (Item 1) **[Figure 20-60-6]** from the hydraulic pump (Item 2) **[Figure 20-60-6]**.

Disconnect the hydraulic pump outlet hose (Item 3) **[Figure 20-60-6]** from the outlet fitting.

Figure 20-60-7



Remove the two mounting bolts (Item 4) **[Figure 20-60-6]**& (Item 1) **[Figure 20-60-7]** from the hydraulic pump with a 5/16 inch allen wrench.

NOTE: The allen wrench will need to be modified for the procedure.

Installation: Tighten the mounting bolts to 51-62 ft.-lbs. (69,2-84,1Nm) torque.

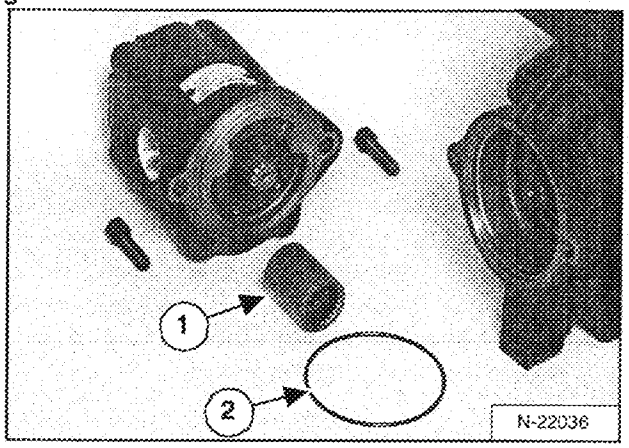
Remove the hydraulic pump from the hydrostatic pump.

⚠ WARNING

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

Figure 20-60-8



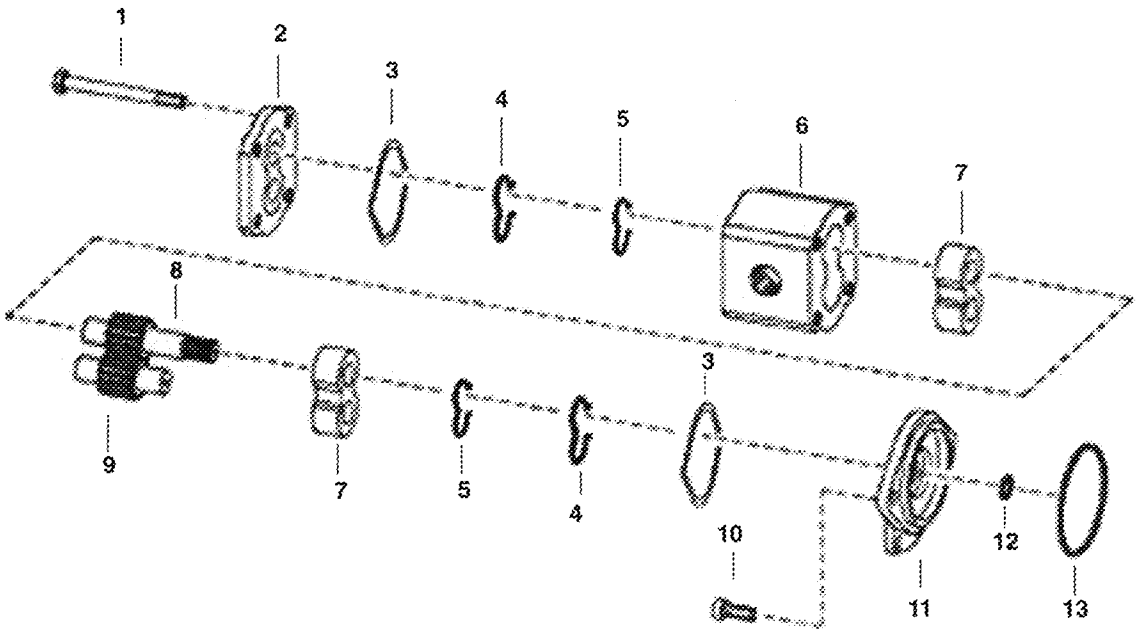
Remove the coupler (Item 1) **[Figure 20-60-8]** from the hydraulic pump shaft.

Remove the large O-ring (Item 2)**[Figure 20-60-8]**.

Installation: Use a new O-ring when installing the hydraulic pump.

Parts Identification

1. BOLT
2. END HOUSING
3. O-RING SEAL
4. SEAL
5. RING
6. BODY
7. BEARING HOUSING
8. DRIVE GEAR
9. IDLER GEAR
10. DOWEL
11. END HOUSING
12. RETAINER RING
13. O-RING



TS-2046

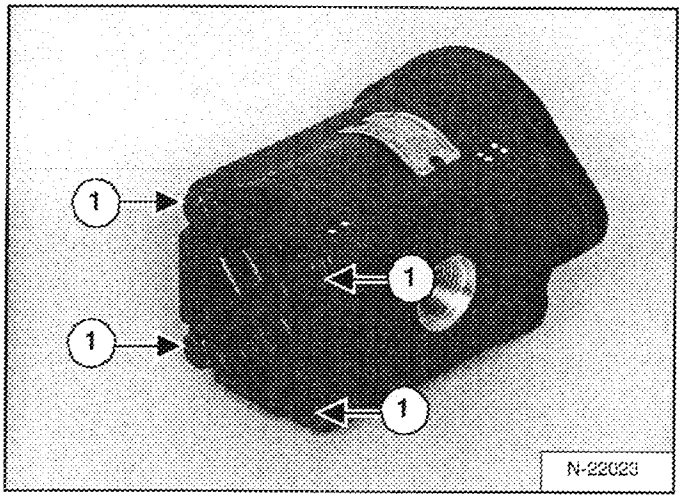
Disassembly And Assembly

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-2003-0868

Figure 20-60-9

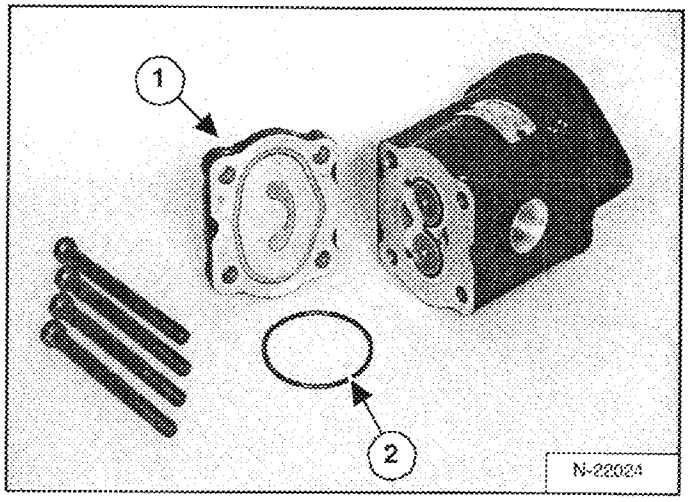


Mark the pump sections for correct assembly**[Figure 20-60-9]**.

Remove the pump housing bolts (Item 1) **[Figure 20-60-9]**.

Installation: Tighten bolts to 35 ft.-lbs. (47,5 Nm) torque.

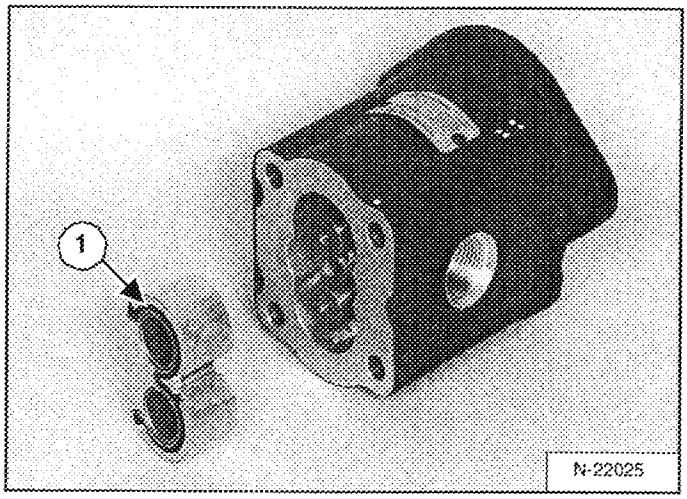
Figure 20-60-10



Remove the end housing (Item 1) **[Figure 20-60-10]**.

Remove the O-ring (Item 1)**[Figure 20-60-10]**.

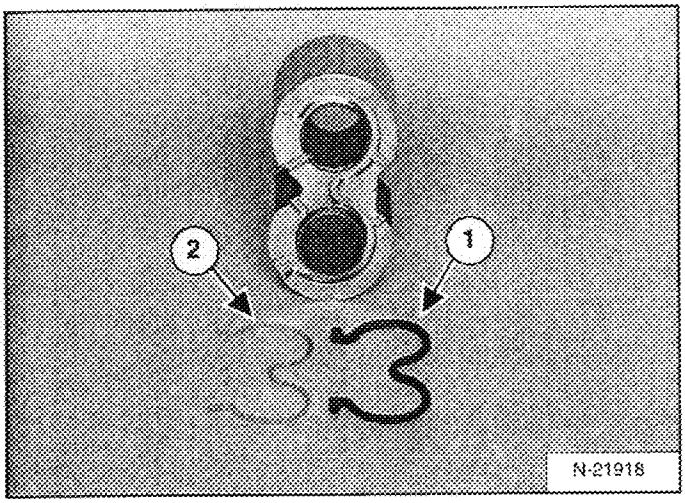
Figure 20-60-11



Remove the bearing housing (Item 1) **[Figure 20-60-11]** from the pump body.

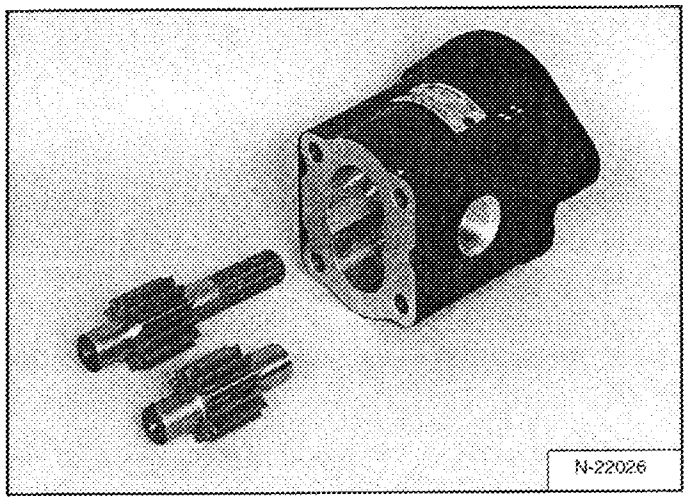
Disassembly And Assembly (Cont'd)

Figure 20-60-12



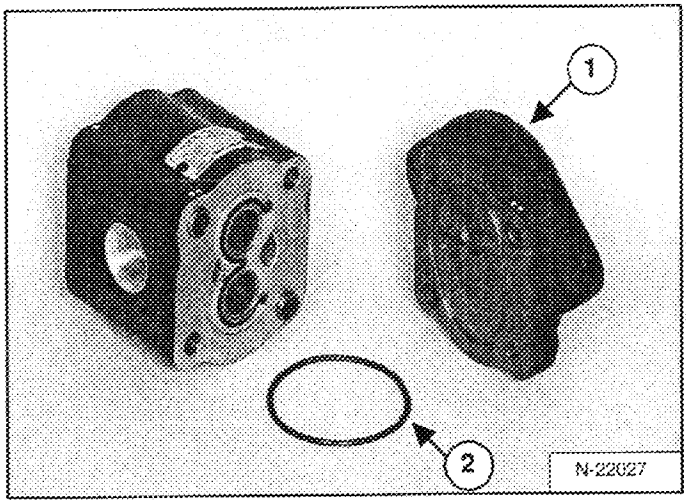
Remove the seal (Item 1) **[Figure 20-60-12]** and back-up seal (Item 2) **[Figure 20-60-12]** from the bearing housing.

Figure 20-60-13



Remove the drive gear and idler gear **[Figure 20-60-13]**.

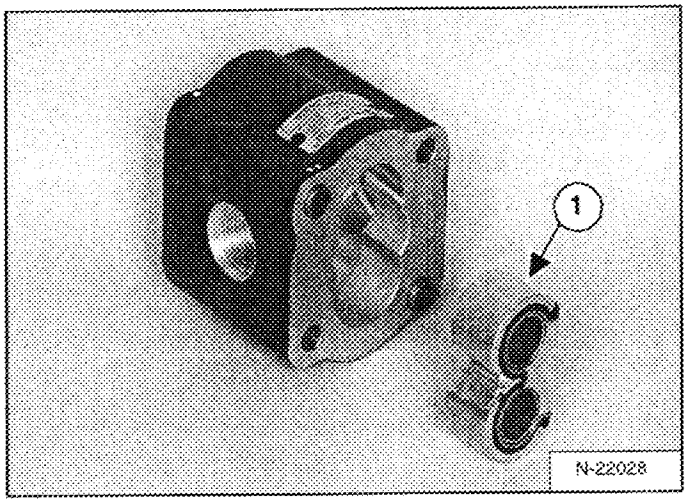
Figure 20-60-14



Remove the other end bearing housing (Item 1) **[Figure 20-60-14]**.

Remove the O-ring (Item 2)**[Figure 20-60-14]**.

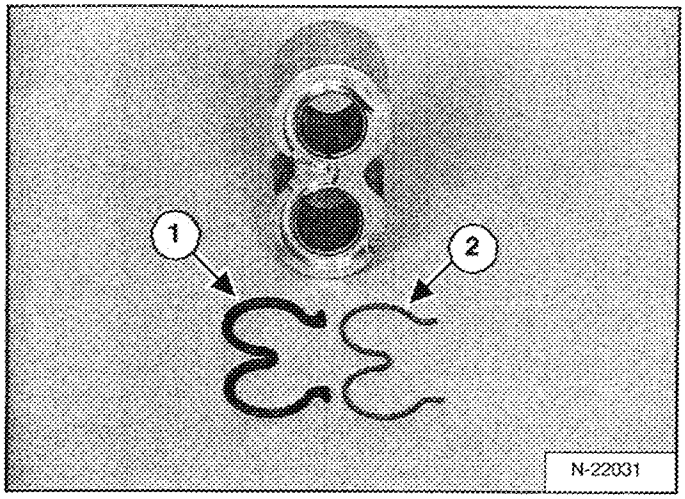
Figure 20-60-15



Remove the bearing housing (Item 1) **[Figure 20-60-15]** from the pump body.

Disassembly And Assembly (Cont'd)

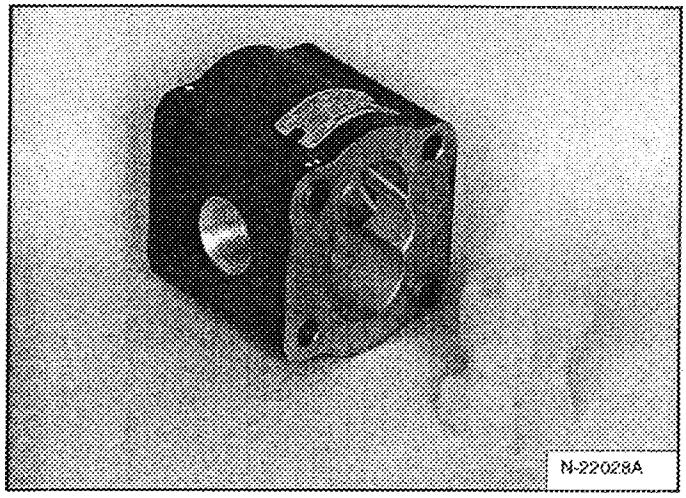
Figure 20-60-16



Remove the seal (Item 1) **[Figure 20-60-16]** and back-up seal (Item 2) **[Figure 20-60-16]** from the bearing housing.

Inspection

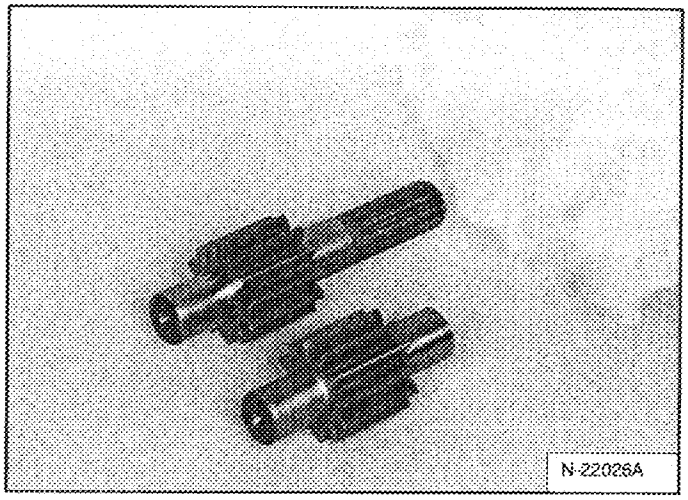
Figure 20-60-17



Wash all parts in clean solvent and use air pressure to dry them

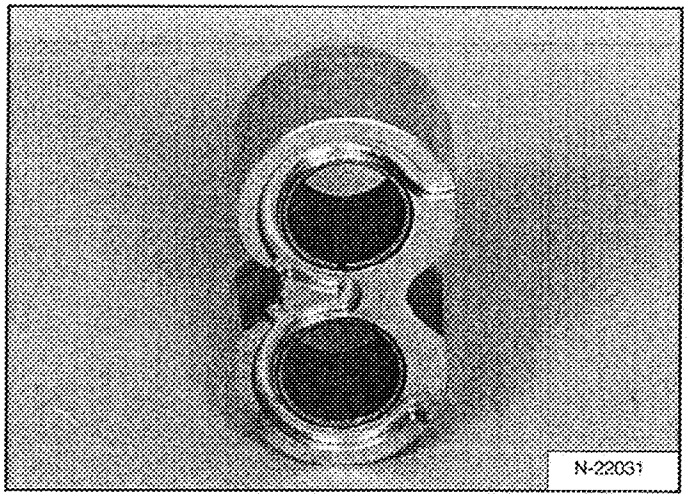
Check the body**[Figure 20-60-17]**.

Figure 20-60-18



Check the gear(s) **[Figure 20-60-18]**.

Figure 20-60-19



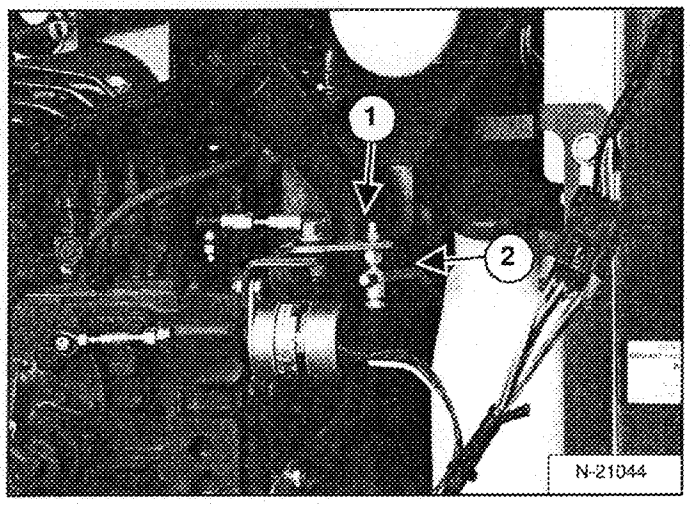
Check the bushings in the bearing housing**[Figure 20-60-19]**.

If excessive wear or damage is visible on any of the parts, the pump must be replaced.

HYDRAULIC PUMP (ALUMINUM HIGH-FLOW)

Removal And Installation

Figure 20-61-1



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

MEL6540410 - Adhesive

Drain the hydraulic reservoir. (See Contents, Page 10-01.)

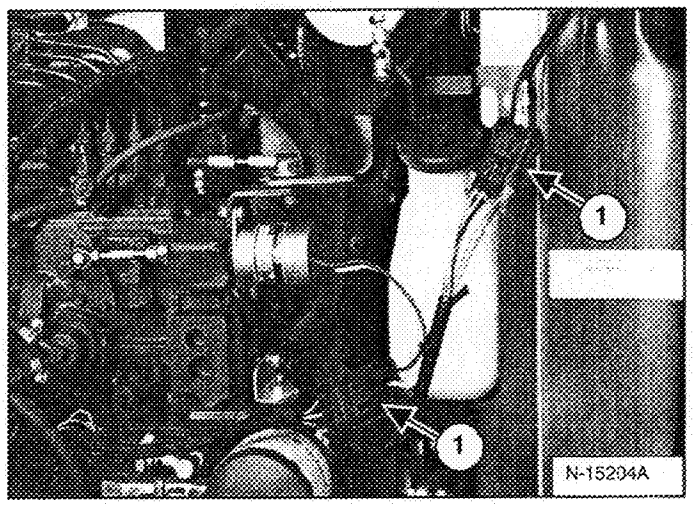
Loosen the bolt (Item 1) **[Figure 20-61-1]** and remove the engine speed control rod (Item 2) **[Figure 20-61-1]**.

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.

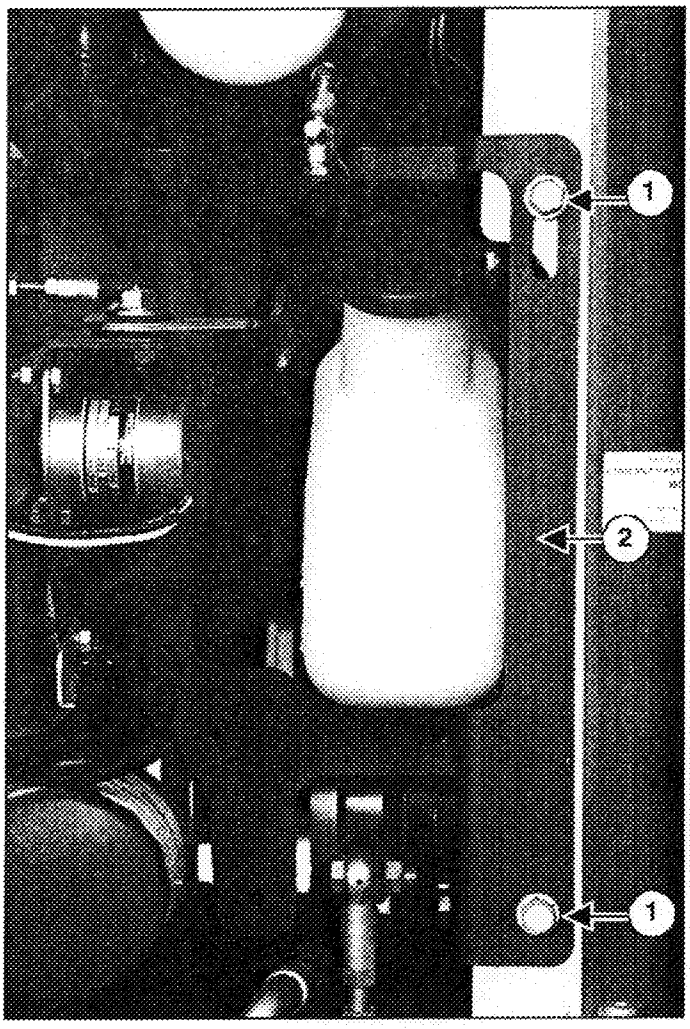
I-2003-0888

Figure 20-61-2



Disconnect the two electrical connectors (Item 1) **[Figure 20-61-2]**.

Figure 20-61-3

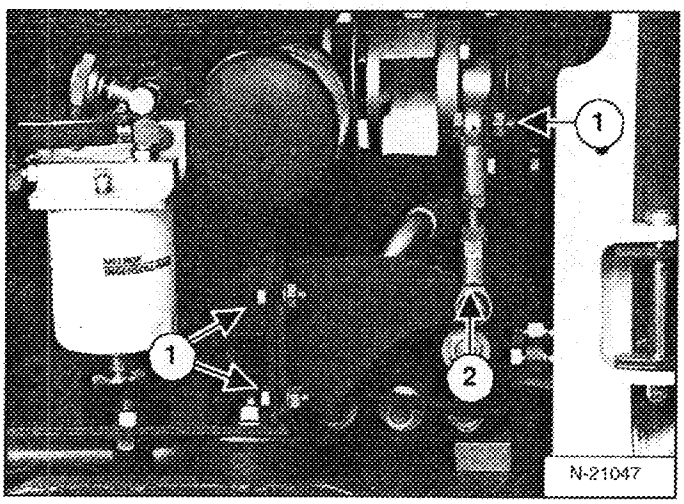


Remove the two bolts and nuts (Item 1)**[Figure 20-61-3]** and remove the belt shield (Item 2) **[Figure 20-61-3]**.

HYDRAULIC PUMP (ALUMINUM HIGH-FLOW) (CONT'D)

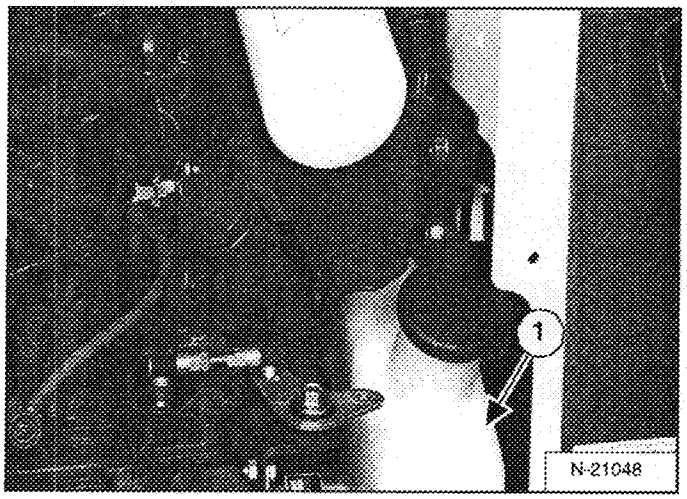
Removal And Installation (Cont'd)

Figure 20-61-4



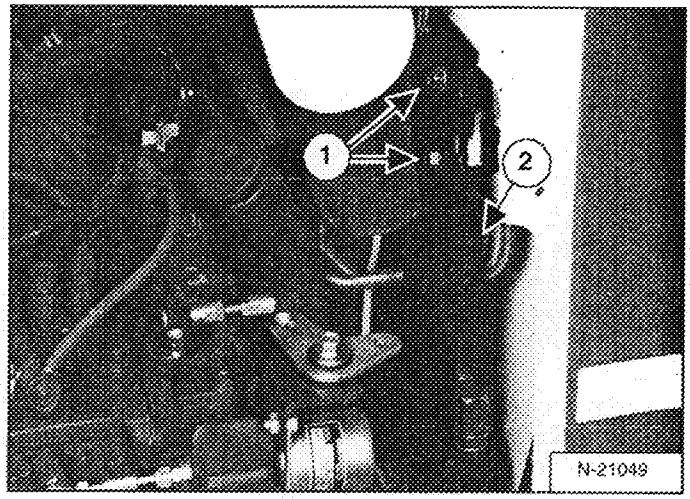
Remove the three bolts and nuts (Item 1) **[Figure 20-61-4]** and remove the tie rod assembly (Item 2) **[Figure 20-61-4]**.

Figure 20-61-5



Remove and reposition the radiator overflow tank (Item 1) **[Figure 20-61-5]**.

Figure 20-61-6



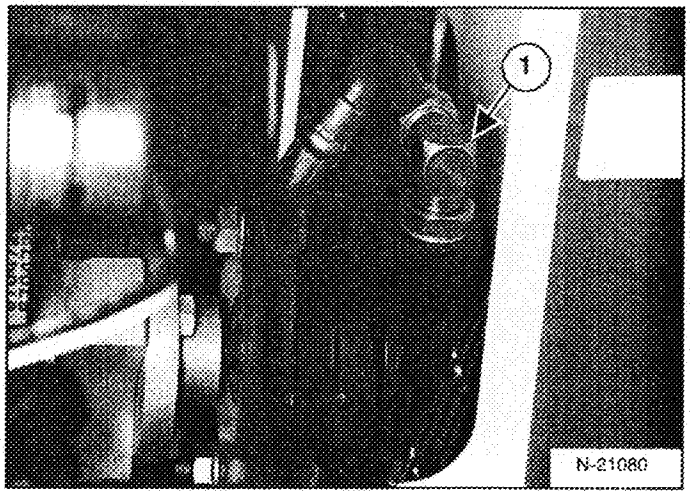
Remove the two bolts (Item 1) **[Figure 20-61-6]** and remove the radiator overflow tank mounting bracket (Item 2) **[Figure 20-61-6]**.

⚠ WARNING

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

Figure 20-61-7

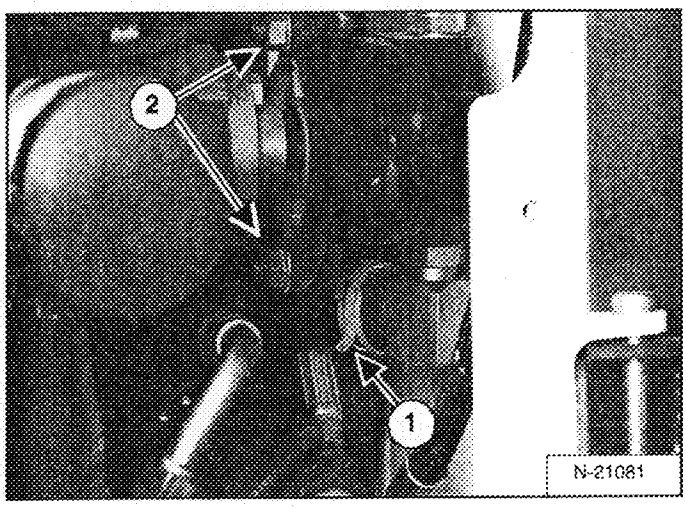


Loosen and remove the hose (Item 1) **[Figure 20-61-7]** from the pump.

HYDRAULIC PUMP (ALUMINUM HIGH-FLOW) (CONT'D)

Removal And Installation (Cont'd)

Figure 20-61-8

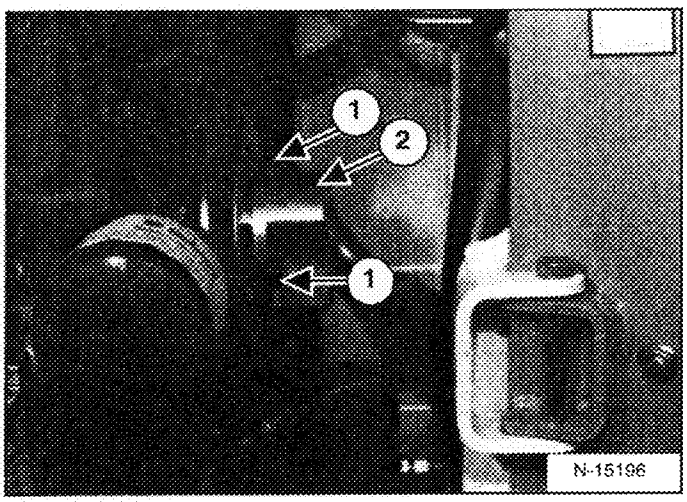


Loosen the hose clamp (Item 1) **[Figure 20-61-8]** and remove the hose from the pump.

Remove the three pump mounting bolts (Item 2) **[Figure 20-61-8]** and remove the pump.

Installation: Apply adhesive MEL6540410 and tighten the mounting bolts to 45 ft.-lbs. (61 Nm) torque.

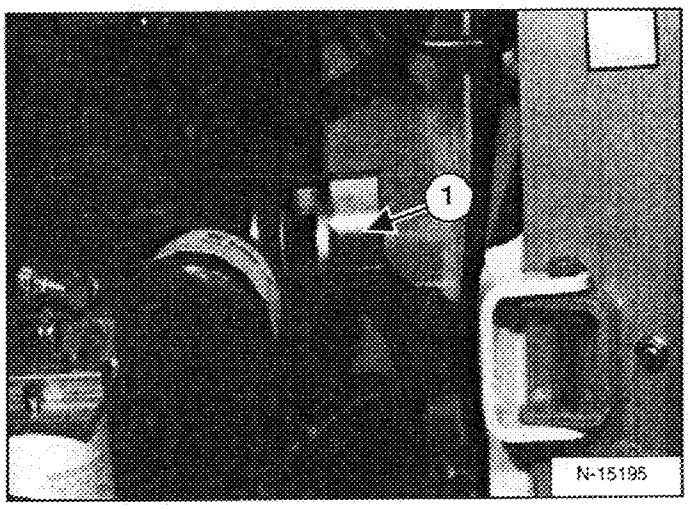
Figure 20-61-9



Remove the three bolts (Item 1) **[Figure 20-61-9]** from the coupler (Item 2) **[Figure 20-61-9]**.

Installation: Apply adhesive MEL6540410 and tighten the mounting bolts to 200 in-lbs. (23 Nm) torque.

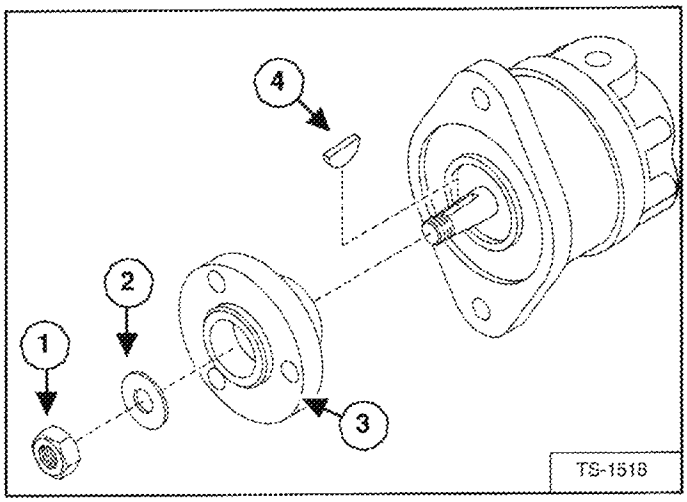
Figure 20-61-10



Slide the coupler (Item 1) **[Figure 20-61-10]** from the splinned shaft.

NOTE: The coupler (Item 1) [Figure 20-61-10] is on a splinned shaft and should be marked for ease of installation.

Figure 20-61-11

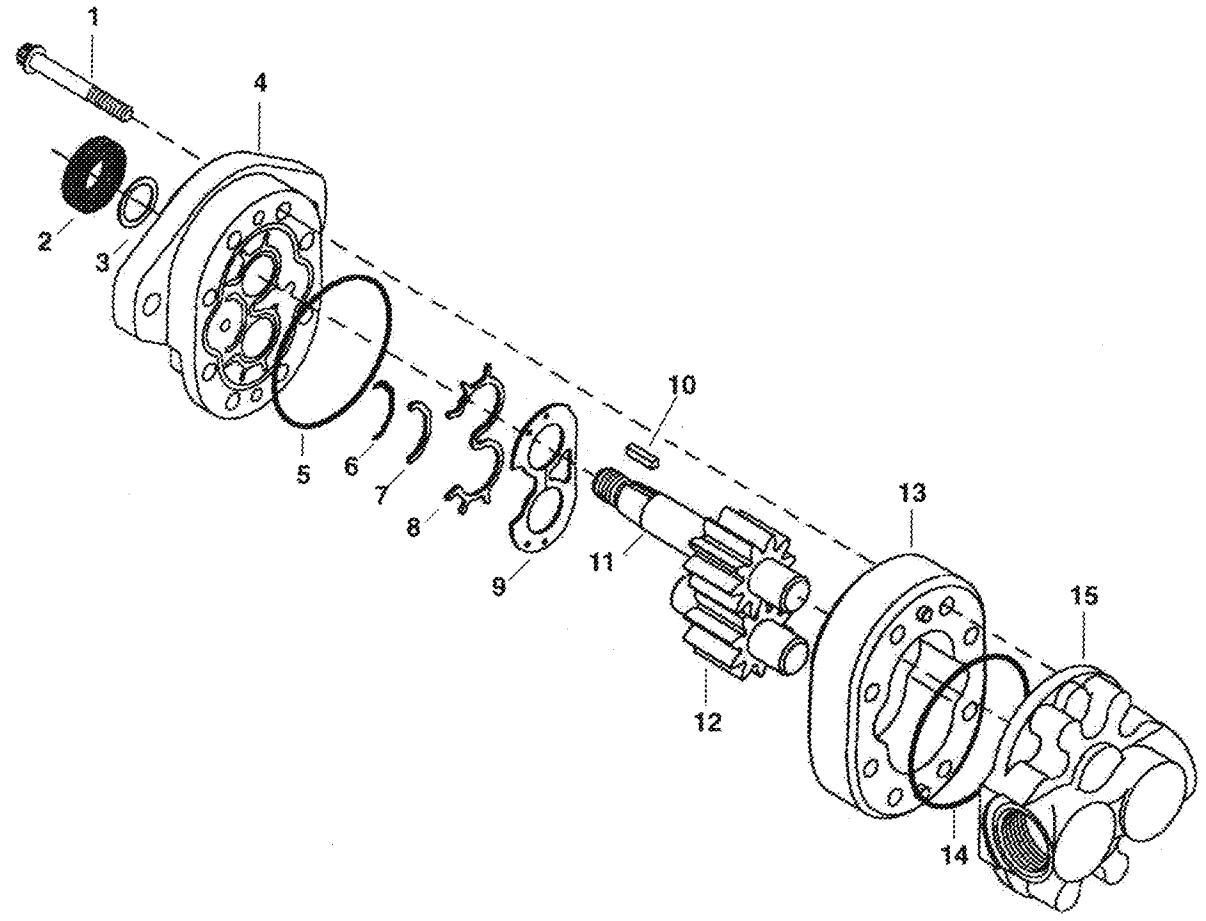


Remove the nut (Item 1) **[Figure 20-61-11]** the washer (Item 2) **[Figure 20-61-11]** and the coupler (Item 3) **[Figure 20-61-11]** from the pump shaft.

Installation: Install the half moon key (Item 4) **[Figure 20-61-11]** in the key way. Apply adhesive MEL 6540410 and tighten the mounting nut to 65 ft.-lbs. (88 Nm) torque.

Parts Identification

1. Bolt
2. Seal
3. Washer
4. Cover
5. O-ring
6. O-ring
7. Seal
8. Seal
9. Plate
10. Key
11. Gear
12. Gear
13. Body
14. O-ring
15. Cover



B-13927

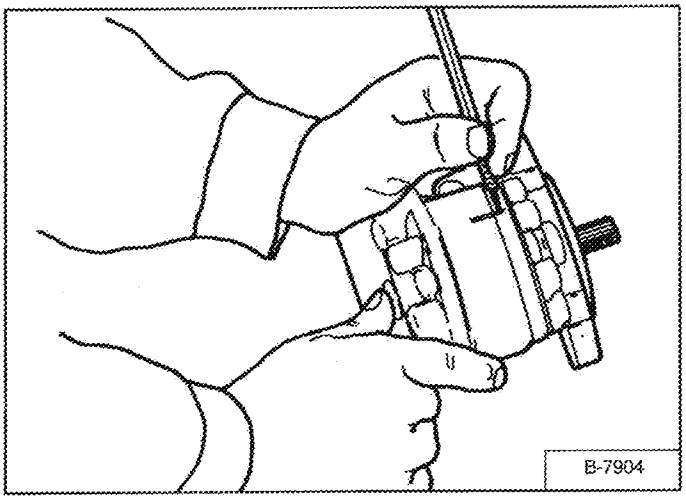
Disassembly And Assembly

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.

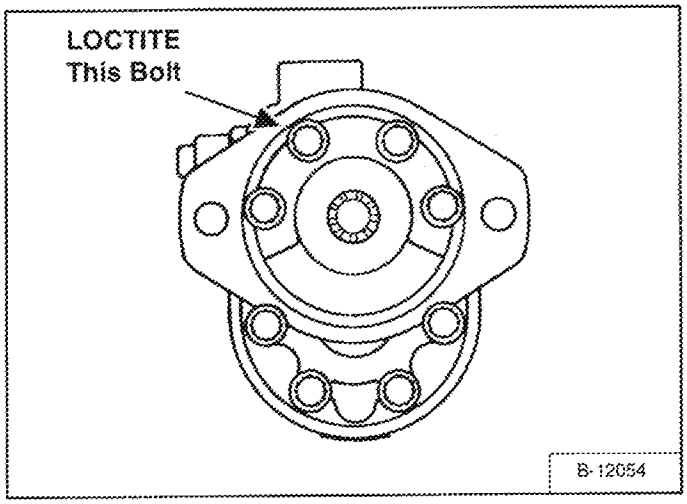
I-2003-0888

Figure 20-61-12



Mark the hydraulic pump housing for correct assembly **[Figure 20-61-12]**.

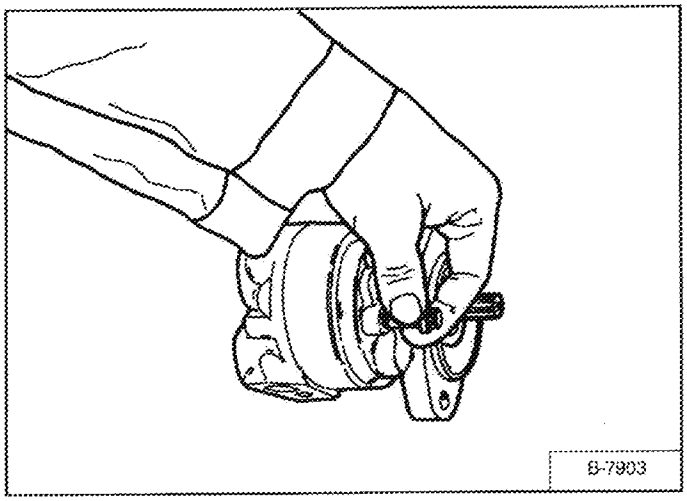
Figure 20-61-13



Loosen the bolts at the pump housing **[Figure 20-61-13]**.

Assembly: Put LOCTITE on the bolt shown. Tighten the bolts to 22-25 ft.-lbs. (30-34 Nm) torque.

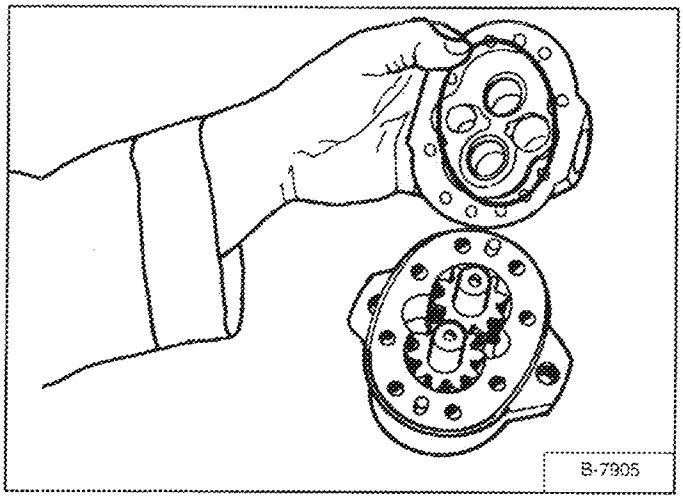
Figure 20-61-14



Remove the bolts from the pump **[Figure 20-61-14]**.

Disassembly And Assembly (Cont'd)

Figure 20-61-15

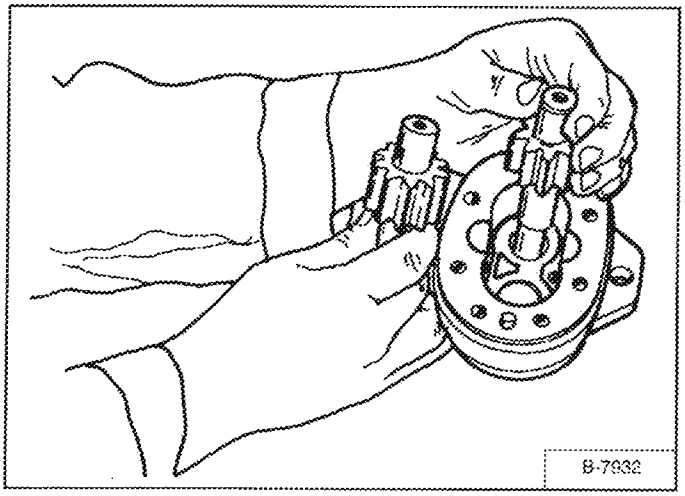


Remove the pump end housing **[Figure 20-61-15]**.

To remove the relief valve assembly. (See Contents, Page 20-01.)

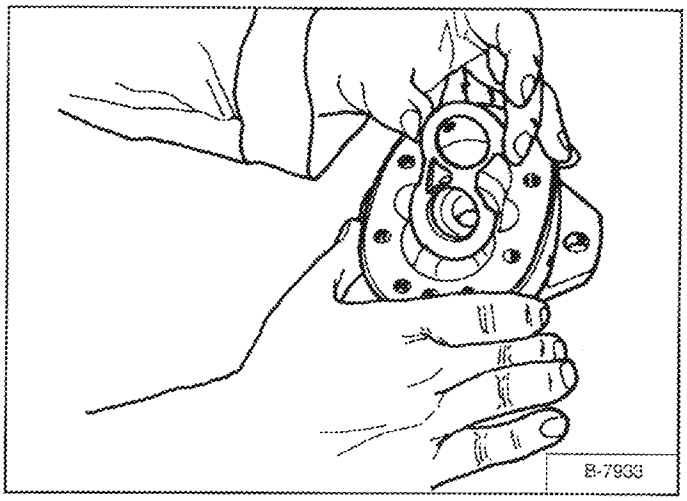
Do not remove the seat.

Figure 20-61-16



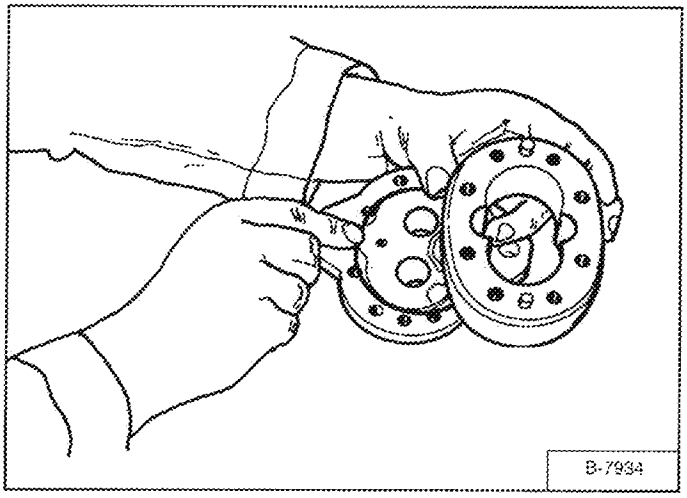
Remove the pump gears **[Figure 20-61-16]**.

Figure 20-61-17



Remove the wear plate for the gears **[Figure 20-61-17]**.

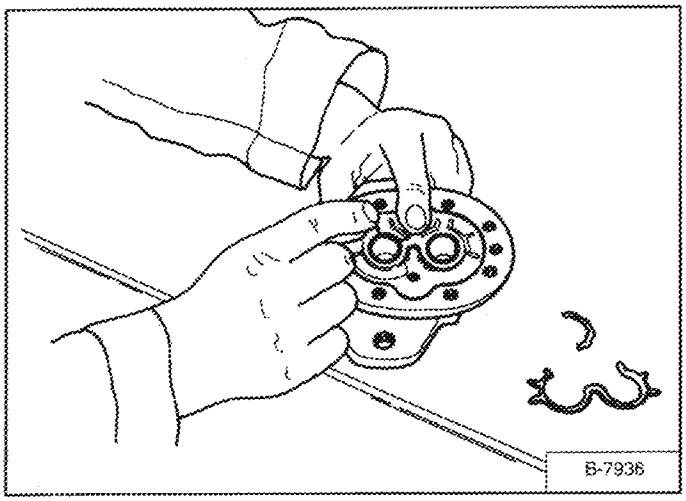
Figure 20-61-18



Remove the center section body and O-ring**[Figure 20-61-18]**.

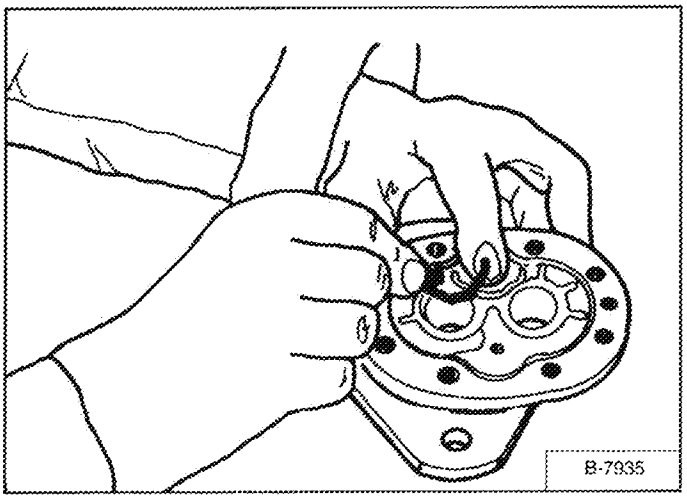
Disassembly And Assembly (Cont'd)

Figure 20-61-19



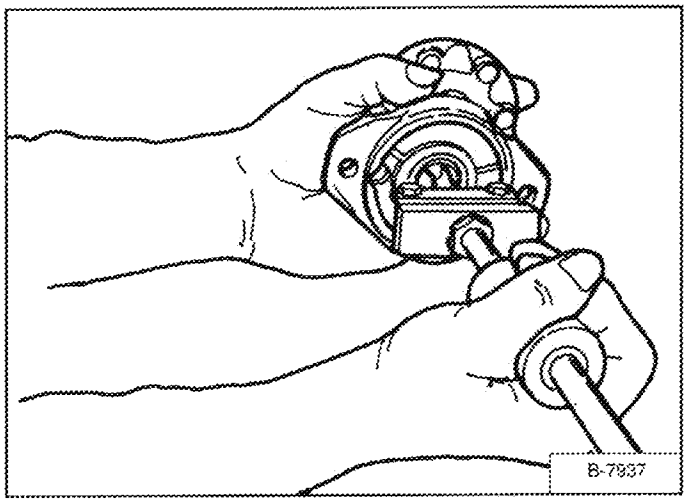
Remove the seals at the end housing **[Figure 20-61-19]**.

Figure 20-61-20



Remove the small rubber seal from the housing **[Figure 20-61-20]**.

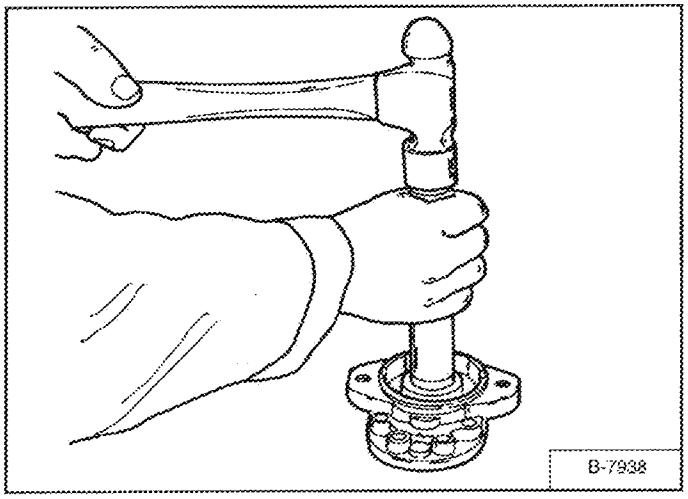
Figure 20-61-21



Remove the shaft seal from the end housing **[Figure 20-61-21]**.

Assembly: Always use new O-rings, gaskets and seals when assembling the hydraulic pump.

Figure 20-61-22



Install the shaft seal using the correct size drive **[Figure 20-61-22]**.

Bobcat®

HYDRAULIC PUMP (Cast Iron)

Check The Output Of The Hydraulic Pump Without Power Bob-Tach

⚠ 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

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

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

MEL1563 - Remote Start Tool
MEL10103 - Hydraulic Tester
MEL10106 - Hydraulic Test Kit

Lift and block the loader. (See Contents Page 10-01.)

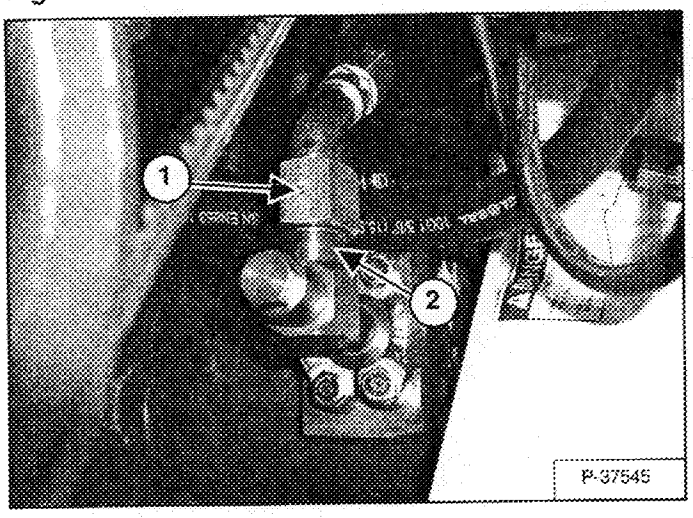
Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Raise the operator cab. (See Contents Page 10-01.)

Open the rear door of the loader.

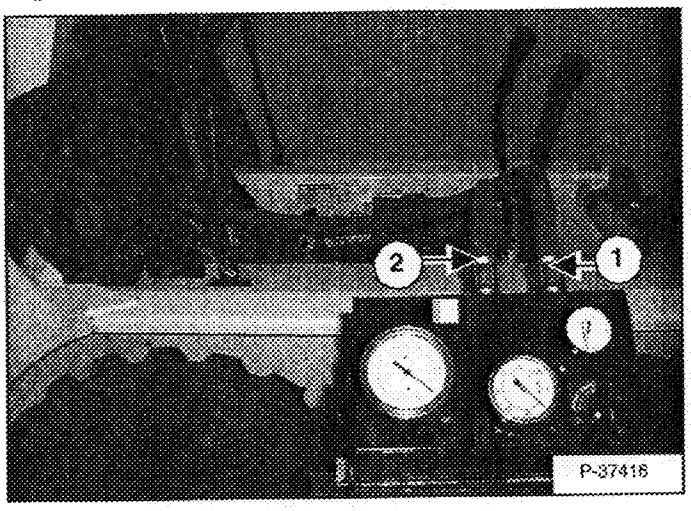
Connect the remote start tool. (See Contents Page 10-01.)

Figure 20-62-1



Disconnect the OUTLET hose (Item 1) from the fitting (Item 2) **[Figure 20-62-1]**.

Figure 20-62-2

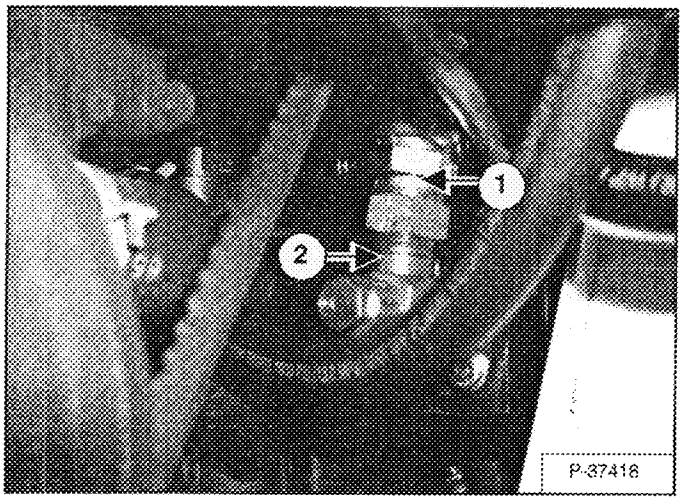


Place the hydraulic tester as shown in **[Figure 20-62-2]**.

Route the inlet hose (Item 1) **[Figure 20-62-2]** from the tester, between the hydraulic reservoir and the blower housing to the gear pump.

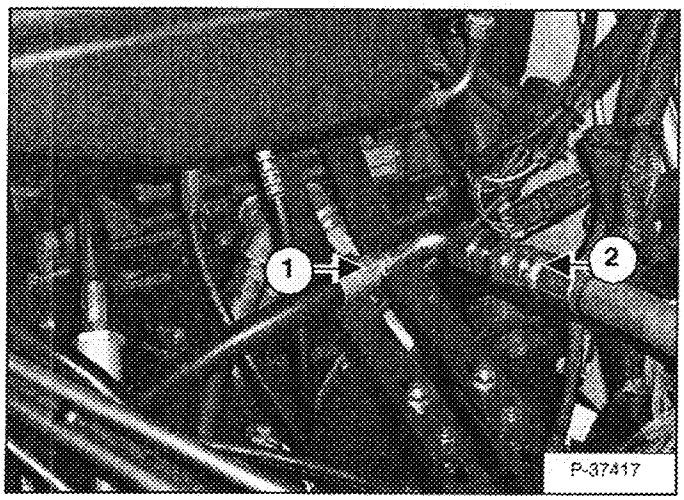
Check The Output Of The Hydraulic Pump Without Power Bob-Tach (Cont'd)

Figure 20-62-3



Connect the INLET hose (Item 1) **[Figure 20-62-2]** & **[Figure 20-62-3]** from the tester to the OUTLET fitting (Item 2) **[Figure 20-62-3]** on the pump.

Figure 20-62-4



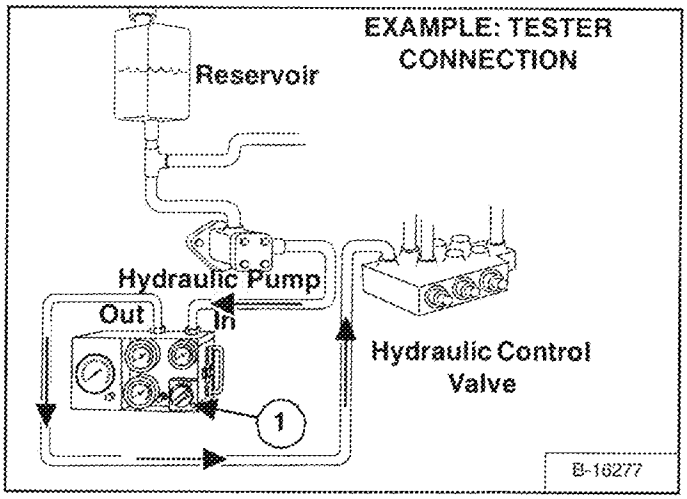
Connect the OUTLET hose (Item 2) **[Figure 20-62-2]** & **[Figure 20-62-4]** from the tester to the hose (Item 1) **[Figure 20-62-4]** which was disconnected from the gear pump.

IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

Figure 20-62-5



Sample tester connection shown **[Figure 20-62-5]**.

Start the engine and run at low idle RPM. Make sure the tester is connected correctly. If no flow is indicated on the tester, the hoses are connected wrong. With the hoses connected correctly, increase the engine speed to full RPM*.

Warm the fluid to 140°F. (60°C.) by turning the restrictor control (Item 1) **[Figure 20-62-5]** on the tester to about 1000 PSI (6895 kPa). DO NOT exceed system relief pressure. Open the restrictor control and record the free flow (GPM) at full RPM.

Turn the restrictor control (Item 1) **[Figure 20-62-10]** on the tester to the system relief pressure.

NOTE: Do not exceed system relief pressure, damage to the hydraulic system may occur if pressure is exceeded.

Record the flow (GPM) at system relief pressure. The high pressure flow must be at least 80% of free flow.

$$\% = \frac{\text{HIGH PRESSURE FLOW (GPM)}}{\text{FREE FLOW (GPM)}} \times 100$$

A low percentage may indicate a failed pump.

*Refer to *SPECIFICATIONS* Section SPEC-01 for system relief pressure and full RPM.

Check The Output Of The Hydraulic Pump With Power Bob-Tach.

⚠ 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

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

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

MEL1563 - Remote Start Tool
MEL10103 - Hydraulic Tester
MEL10106 - Hydraulic Test Kit

Lift and block the loader. (See Contents Page 10-01.)

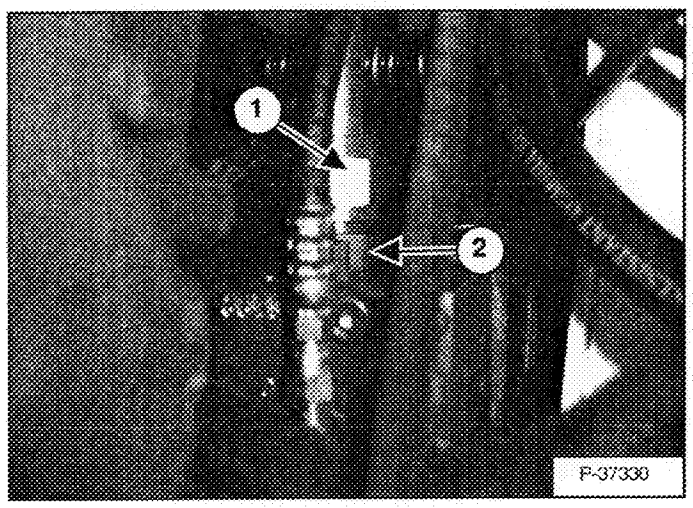
Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Raise the operator cab. (See Contents Page 10-01.)

Open the rear door of the loader.

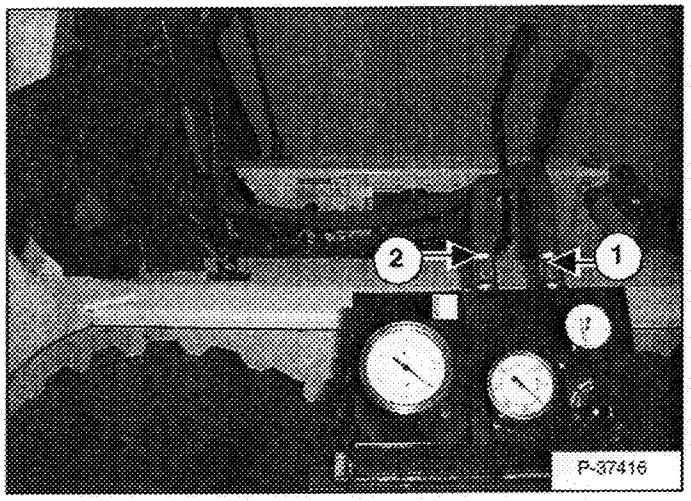
Connect the remote start tool. (See Contents Page 10-01.)

Figure 20-62-6



Disconnect the OUTLET hose (Item 1) from the fitting (Item 2).**[Figure 20-62-6]**

Figure 20-62-7

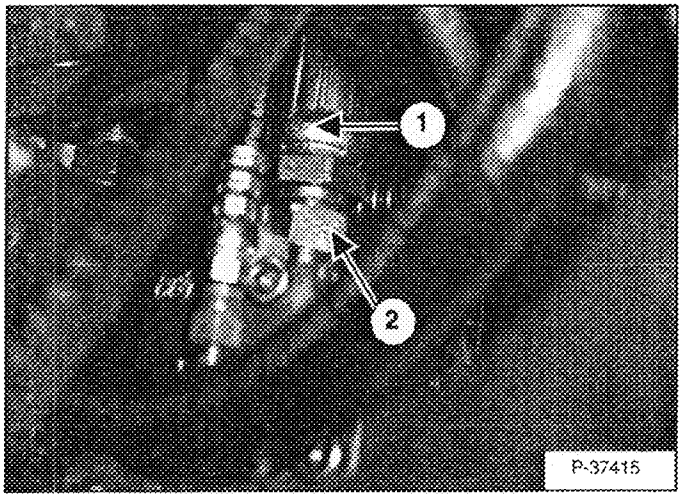


Place the hydraulic tester as shown in **[Figure 20-62-7]**.

Route the inlet hose (Item 1) **[Figure 20-62-7]** from the tester, between the hydraulic reservoir and the blower housing to the gear pump.

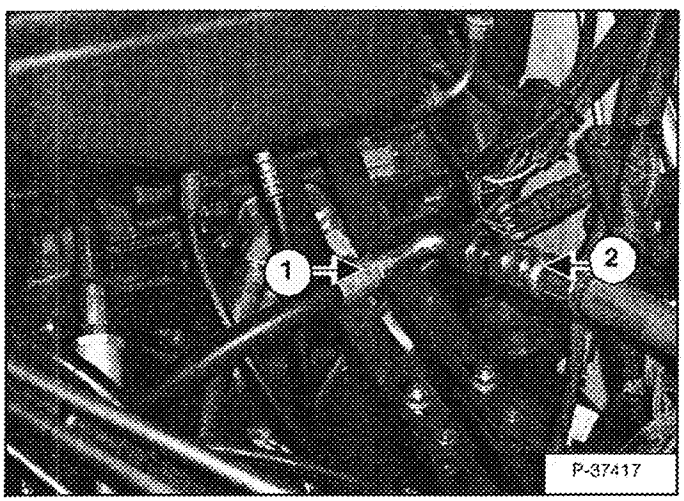
Check The Output Of The Hydraulic Pump With Power Bob-Tach. (Cont'd)

Figure 20-62-8



Connect the INLET hose (Item 1) **[Figure 20-62-7]** & **[Figure 20-62-8]** from the tester to the OUTLET fitting (Item 2) **[Figure 20-62-8]** on the Power Bob-tach block.

Figure 20-62-9



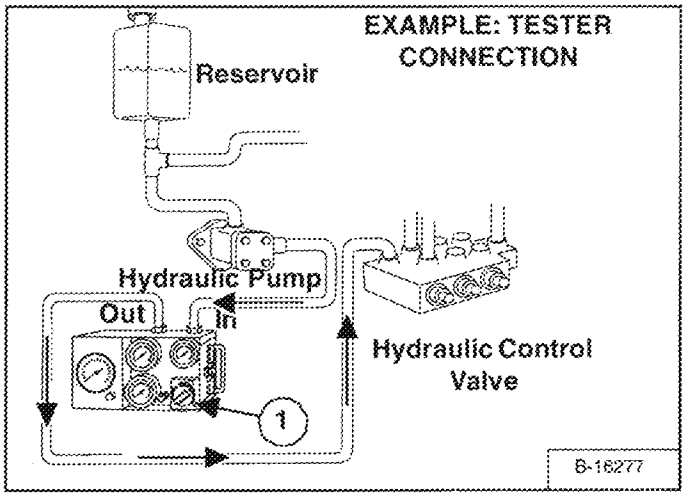
Connect the OUTLET hose (Item 2) **[Figure 20-62-7]** & **[Figure 20-62-9]** from the tester to the hose (Item 1) **[Figure 20-62-9]** which was disconnected from the Power Bob-tach block.

IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

Figure 20-62-10



Sample tester connection shown **[Figure 20-62-10]**.

Start the engine and run at low idle RPM. Make sure the tester is connected correctly. If no flow is indicated on the tester, the hoses are connected wrong. With the hoses connected correctly, increase the engine speed to full RPM*.

Warm the fluid to 140°F. (60°C.) by turning the restrictor control (Item 1) **[Figure 20-62-10]** on the tester to about 1000 PSI (6895 kPa). DO NOT exceed system relief pressure. Open the restrictor control and record the free flow (GPM) at full RPM.

Turn the restrictor control (Item 1) **[Figure 20-62-10]** on the tester to the system relief pressure.

NOTE: Do not exceed system relief pressure, damage to the hydraulic system may occur if pressure is exceeded.

Record the flow (GPM) at system relief pressure. The high pressure flow must be at least 80% of free flow.

$$\% = \frac{\text{HIGH PRESSURE FLOW (GPM)}}{\text{FREE FLOW (GPM)}} \times 100$$

A low percentage may indicate a failed pump.

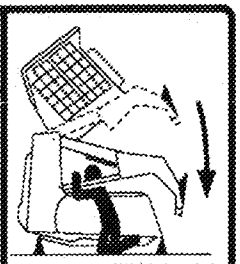
*Refer to *SPECIFICATIONS* Section SPEC-01 for system relief pressure and full RPM.

Removal And Installation

DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 57031



SW 02 671343

WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Stop the engine. Raise the seat bar.

Lift and block the loader. (See Contents Page 10-01.)

Raise the operator cab. (See Contents Page 10-01.)

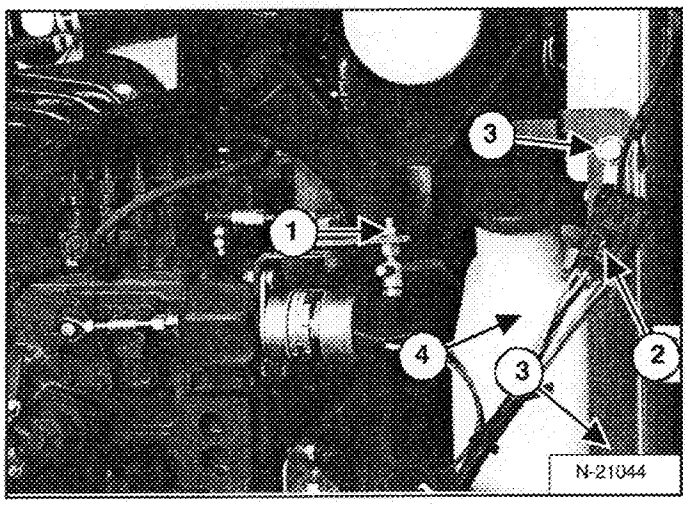
Drain the hydraulic fluid from the reservoir. (See Contents Page 20-01.)

Remove the hydraulic fluid reservoir from the loader. (See Contents Page 20-01.)

Open the rear door of the loader.

Remove the Power Bob-Tach block if so equipped. (See Contents Page 20-01.)

Figure 20-62-11



Remove the nut from the speed control linkage (Item 1) **[Figure 20-62-11]**.

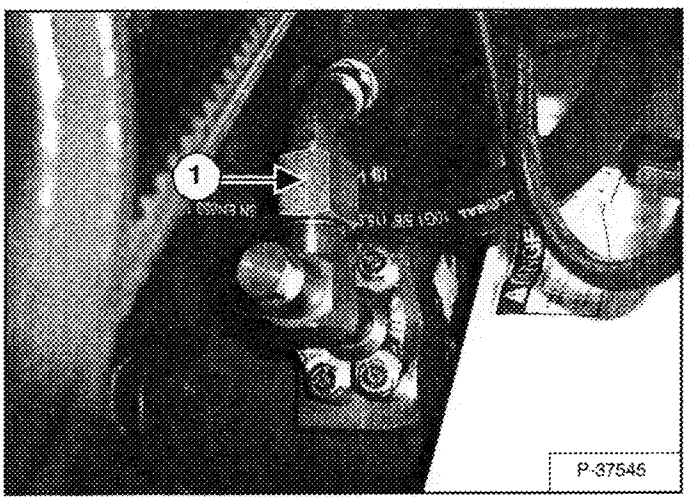
Unplug the rear lights electrical connector (Item 2) **[Figure 20-62-11]**.

Remove the belt shield mounting bolts (Item 3) **[Figure 20-62-11]**.

Remove the belt shield.

Remove the coolant recover tank and mount (Item 4) **[Figure 20-62-11]**.

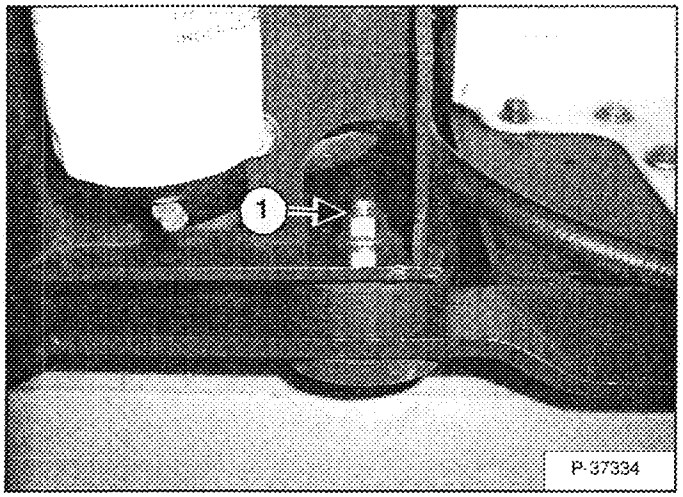
Figure 20-62-12



Disconnect and cap the outlet hose (Item 1) **[Figure 20-62-12]** from the back of the hydraulic pump.

Removal And Installation (Cont'd)

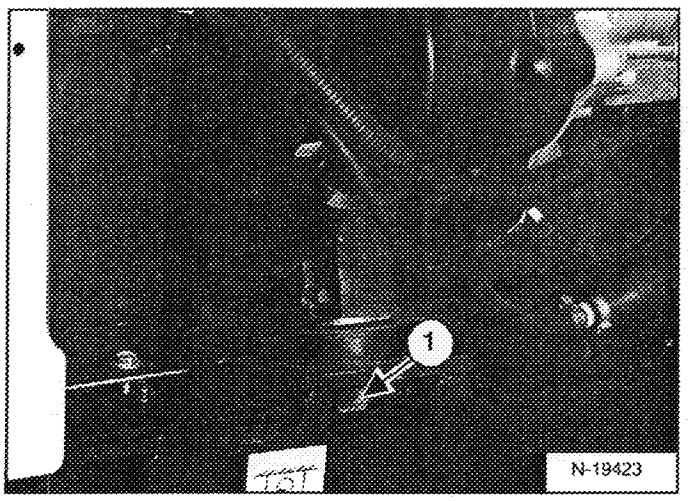
Figure 20-62-13



Remove the right rear engine mount (Item 1) **[Figure 20-62-13]**.

Installation: Tighten the engine mount bolt to 70 ft.-lbs. (95 Nm) torque.

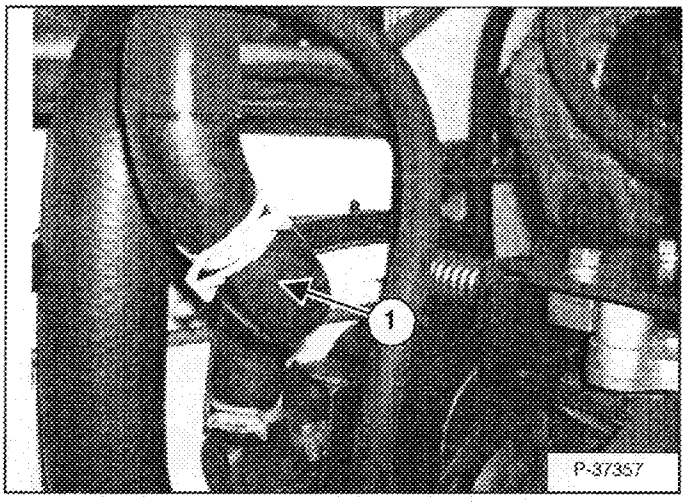
Figure 20-62-14



Remove the left rear engine mount (Item 1) **[Figure 20-62-14]**.

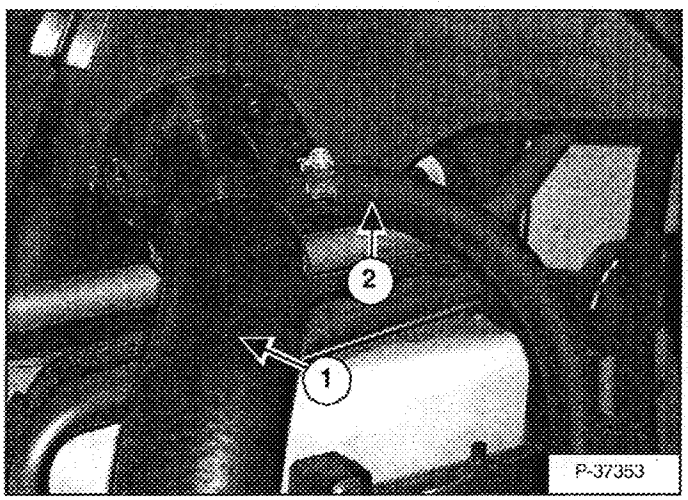
Installation: Tighten the engine mount bolt to 70 ft.-lbs. (95 Nm) torque.

Figure 20-62-15



Remove the inlet hose (Item 1) **[Figure 20-62-15]** from the front of the hydraulic pump.

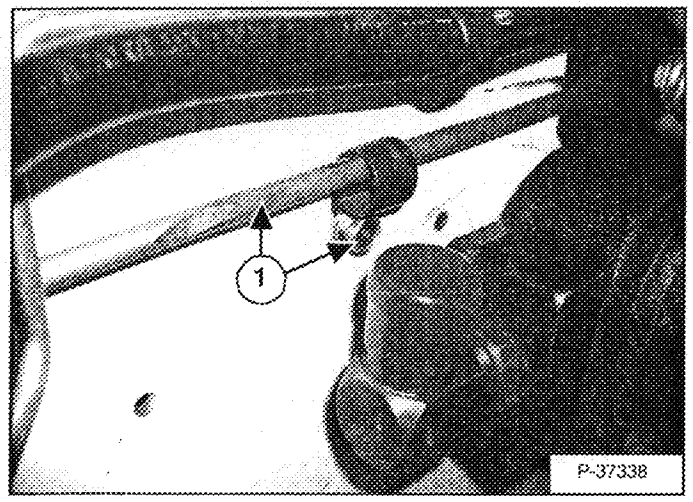
Figure 20-62-16



Loosen the hose clamps and remove the fuel fill hose (Item 1) and the fuel vent hose (Item 2) from the loader. **[Figure 20-62-16]**

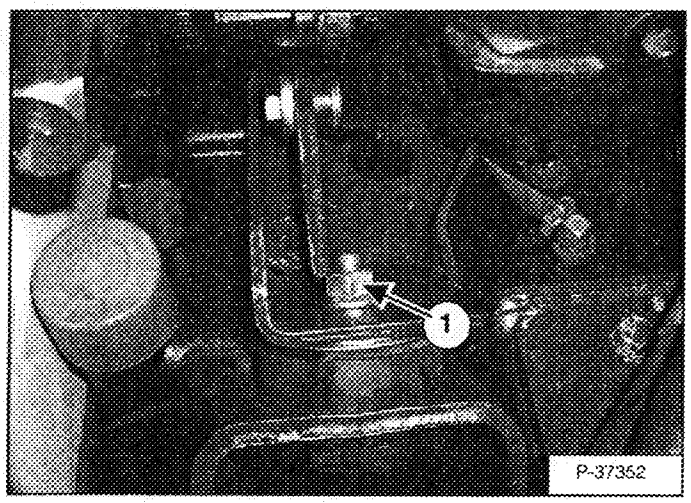
Removal And Installation (Cont'd)

Figure 20-62-17



Remove the engine speed control rod and the rod guide (Item 1) **[Figure 20-62-17]**.

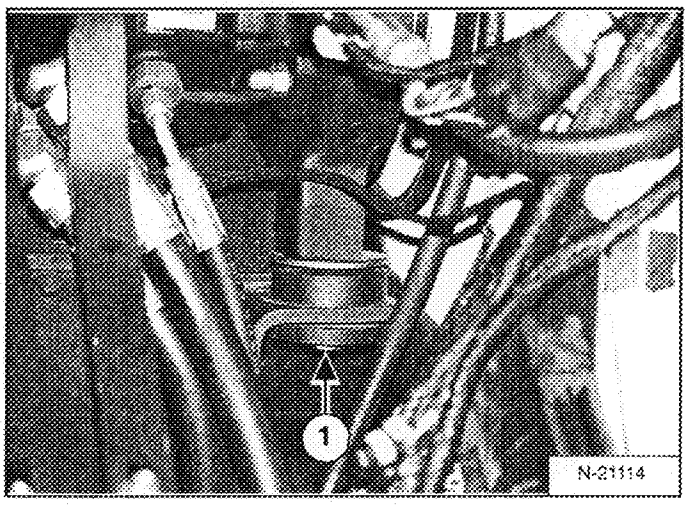
Figure 20-62-18



Remove the right front engine mount (Item 1) **[Figure 20-62-18]**.

Installation: Tighten the engine mount bolt to 70 ft.-lbs. (95 Nm) torque.

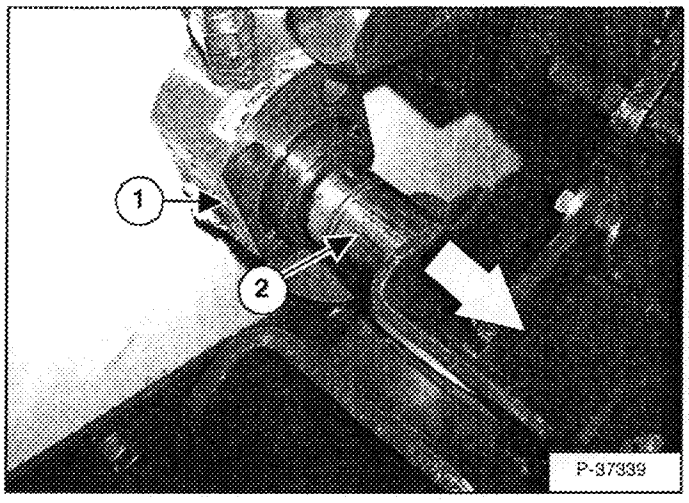
Figure 20-62-19



Loosen the left front engine mount (Item 1) **[Figure 20-62-19]** but do not remove.

Installation: Tighten the engine mount bolt to 70 ft.-lbs. (95 Nm) torque.

Figure 20-62-20



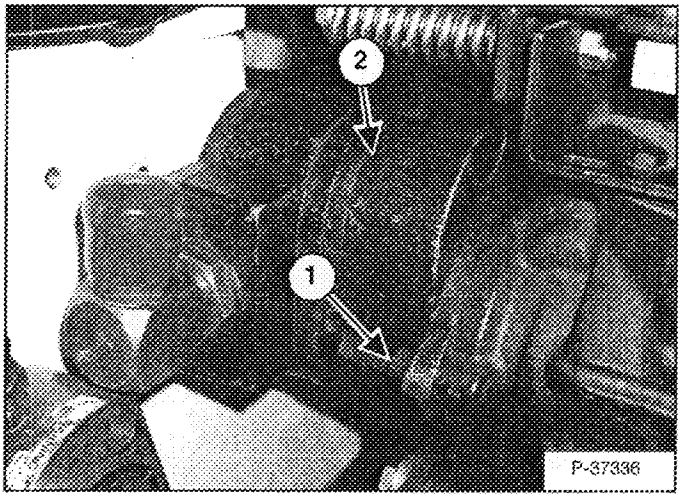
Use a port-a-power (Item 1) **[Figure 20-62-20]** to push the engine/hydrostatic pump assembly away from the mainframe.

NOTE: A shaft (Item 2) [Figure 20-62-20] with the dimensions of 1.5" diameter by 2.125" long will be needed to push the engine/hydrostatic pump assembly.

NOTE: Push the engine/hydrostatic pump assembly only as far as needed to remove the gear pump.

Removal And Installation (Cont'd)

Figure 20-62-21

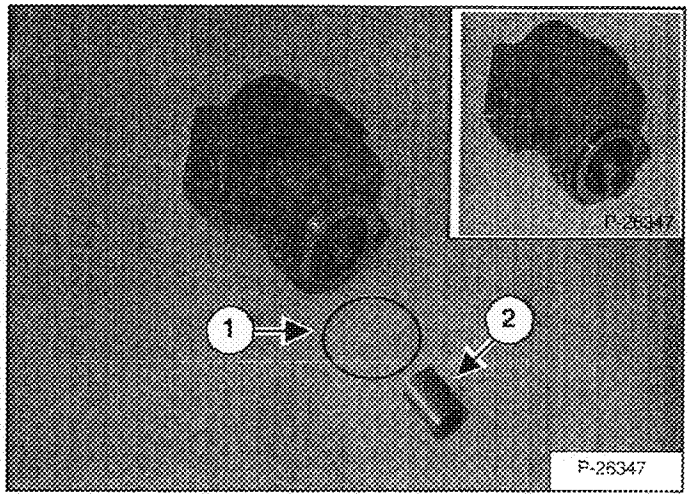


Remove the two mounting bolts (Item 1) **[Figure 20-62-21]** from the hydraulic pump.

Installation: Tighten the mounting bolts to 27-37 in.-lbs. (37-50 Nm) torque.

Remove the hydraulic pump (Item 2) **[Figure 20-62-21]** from the loader.

Figure 20-62-22



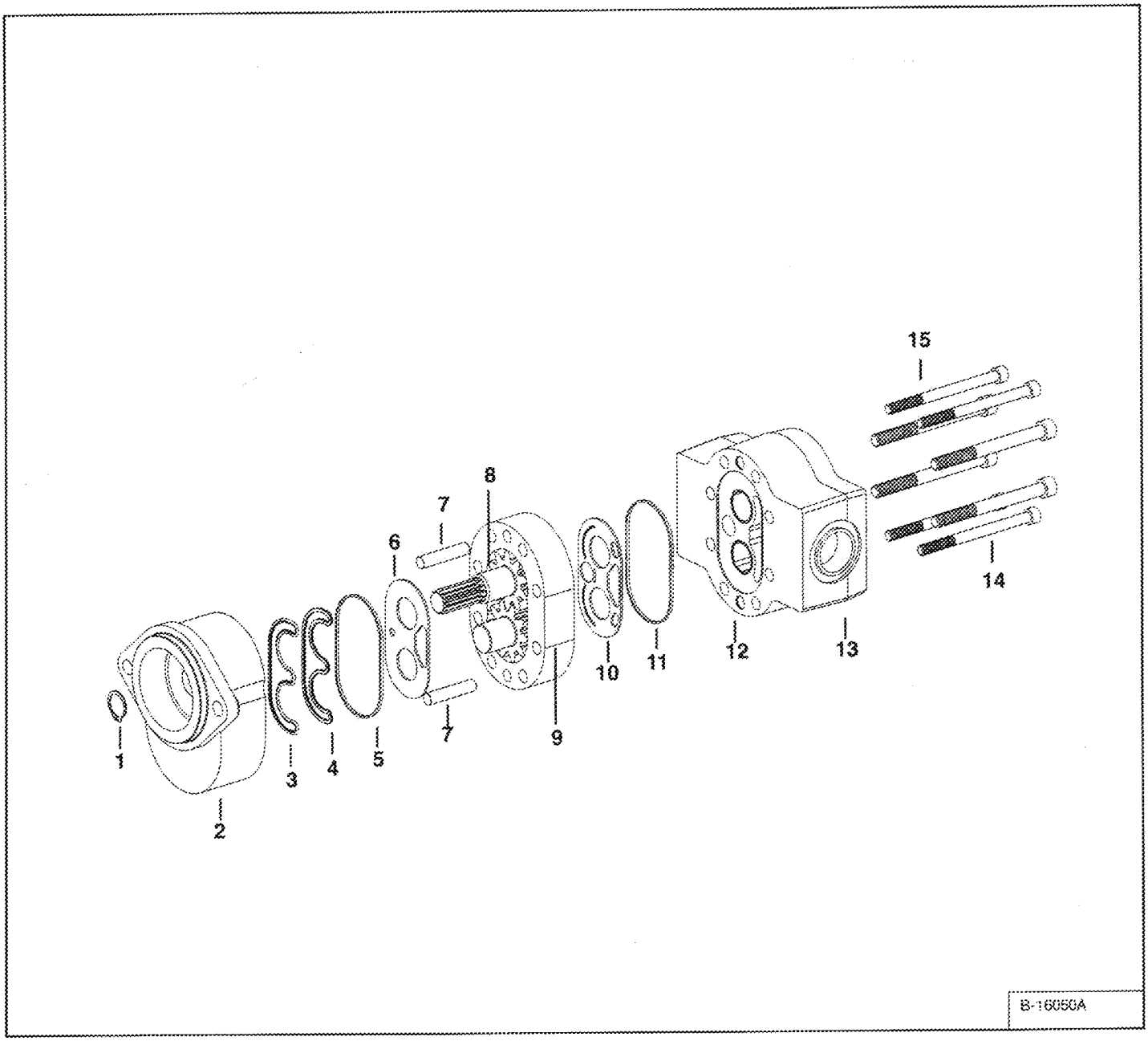
Remove the O-ring (Item 1) **[Figure 20-62-22]**.

Remove the coupler (Item 2) **[Figure 20-62-22]** from the hydraulic pump shaft.

Reverse the removal procedure to install the hydraulic pump.

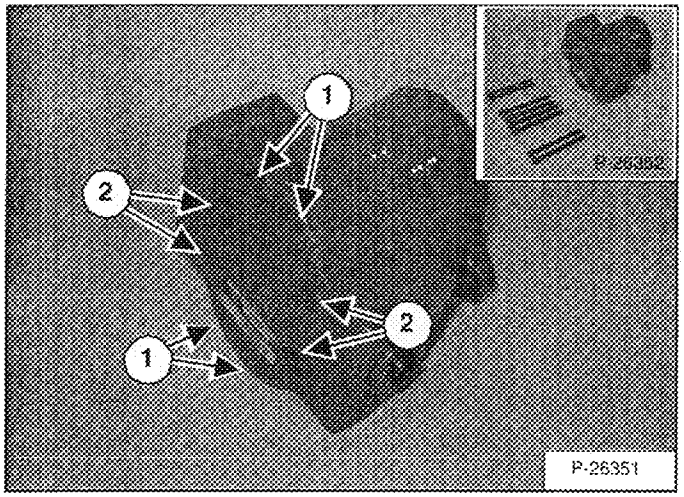
Installation: Use a new O-ring (Item 1) **[Figure 20-62-22]** when installing the hydraulic pump.

Identification



Disassembly And Assembly

Figure 20-62-23



Mark the pump sections for correct assembly **[Figure 20-62-23]**.

Remove the four smaller pump housing bolts (Item 1) **[Figure 20-62-23]**.

Remove the four larger pump housing bolts (Item 2) **[Figure 20-62-23]**.

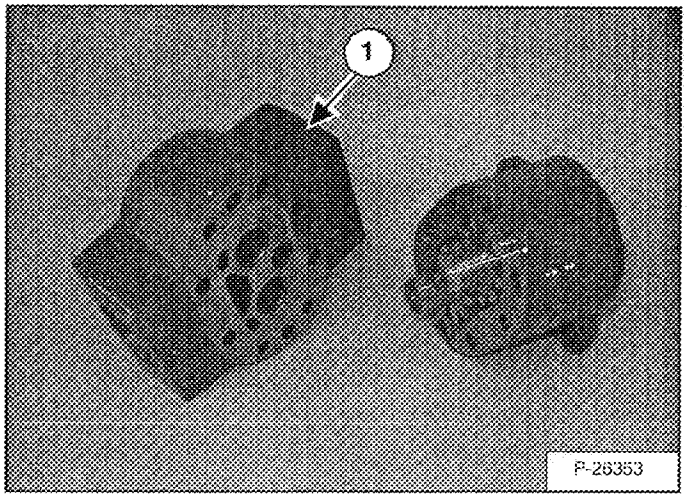
Installation: Tighten the four smaller bolts (Item 1) **[Figure 20-62-23]** to 30 ft.-lbs. (40,7 Nm) torque. Tighten the four larger bolts (Item 2) **[Figure 20-62-23]** to 54 ft.-lbs. (73,2 Nm) torque.

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

Figure 20-62-24



Remove the pump end section (Item 1) **[Figure 20-62-24]**.

Disassembly And Assembly (Cont'd)

Figure 20-62-25

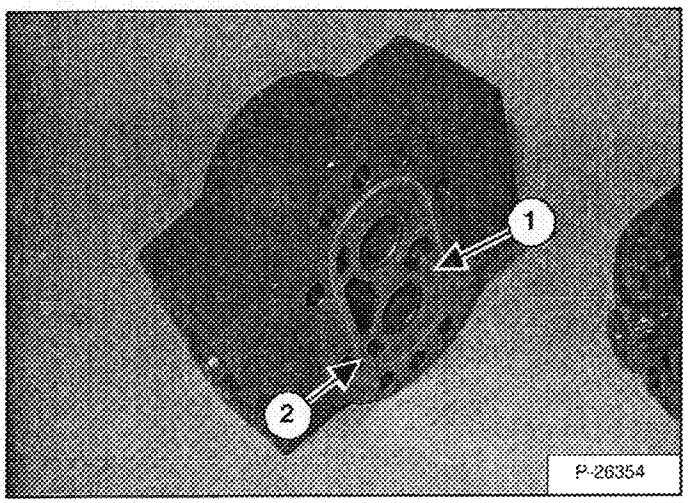
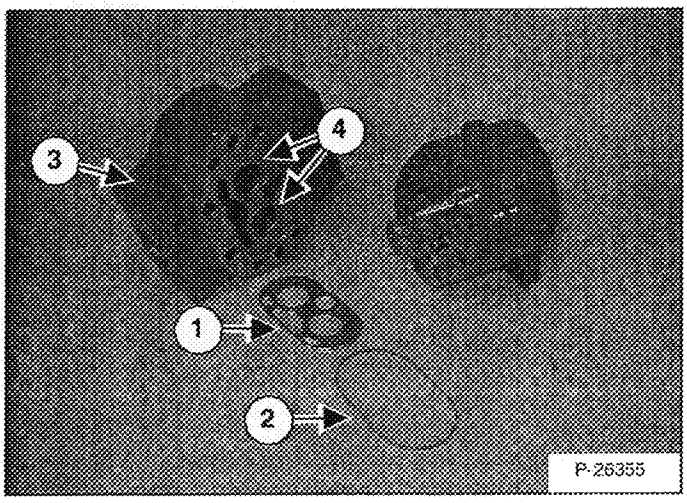


Figure 20-62-26



Remove the wear plate (Item 1) **[Figure 20-62-25]** & **[Figure 20-62-26]** and section seal (Item 2) **[Figure 20-62-25]** & **[Figure 20-62-26]** from the pump end section.

NOTE: Position wear plate (Item 1) [Figure 20-62-26] inlets and traps as shown with bronze side toward gears.

NOTE: Inspect the pump end section (Item 3) [Figure 20-62-26] and bushings (Item 4) [Figure 20-62-26]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-62-27

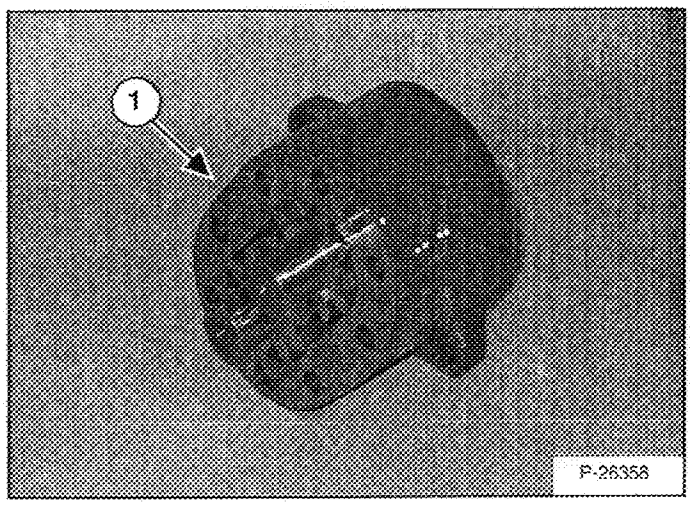
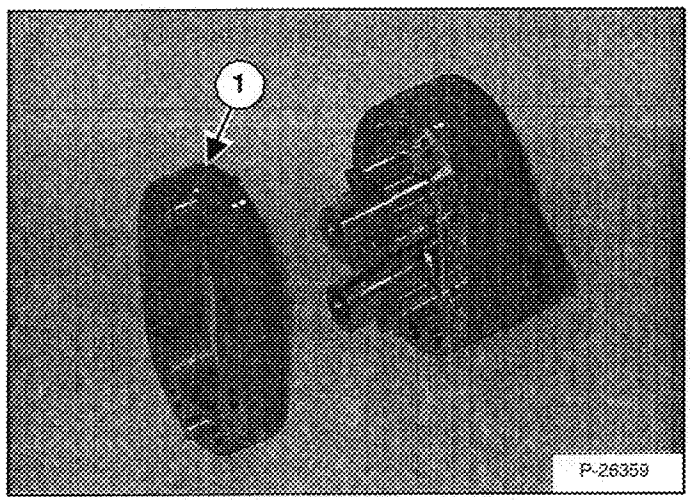


Figure 20-62-28



Remove the pump center section (Item 1) **[Figure 20-62-27]** & **[Figure 20-62-28]** from the pump end section.

NOTE: Inspect the pump center section (Item 1) [Figure 20-62-28]. If excessive wear or damage is visible, the pump must be replaced.

Disassembly And Assembly (Cont'd)

Figure 20-62-29

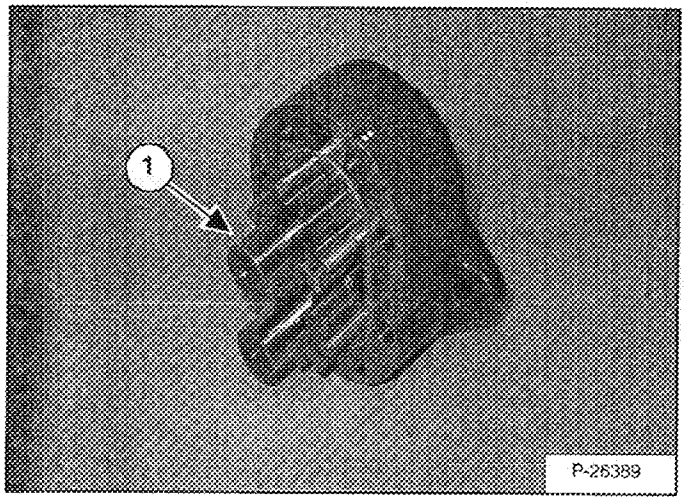
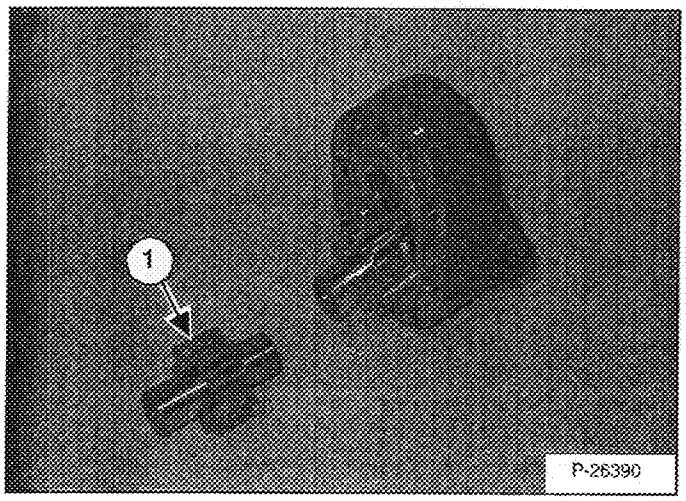


Figure 20-62-30



Remove the idler gear (Item 1) **[Figure 20-62-29]** & **[Figure 20-62-30]**.

NOTE: Inspect the idler gear (Item 1) [Figure 20-62-30]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-62-31

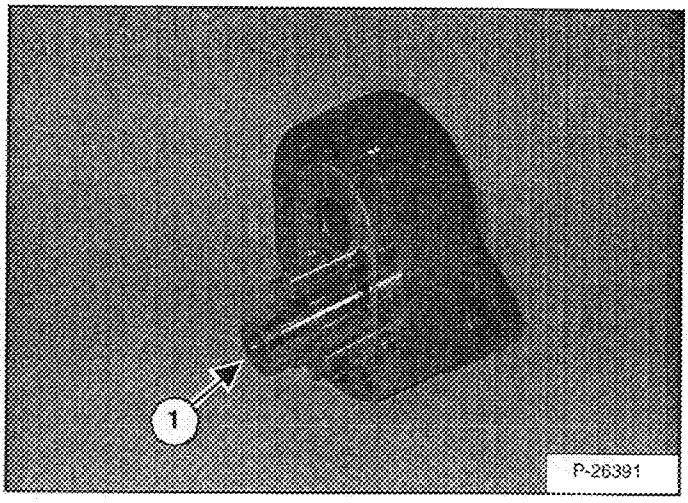
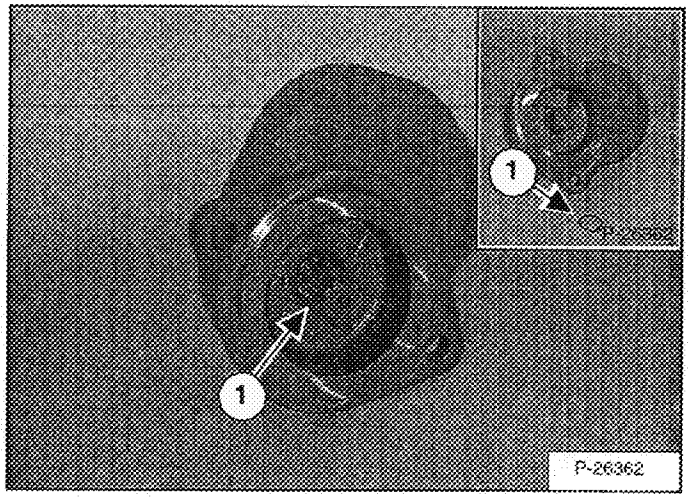


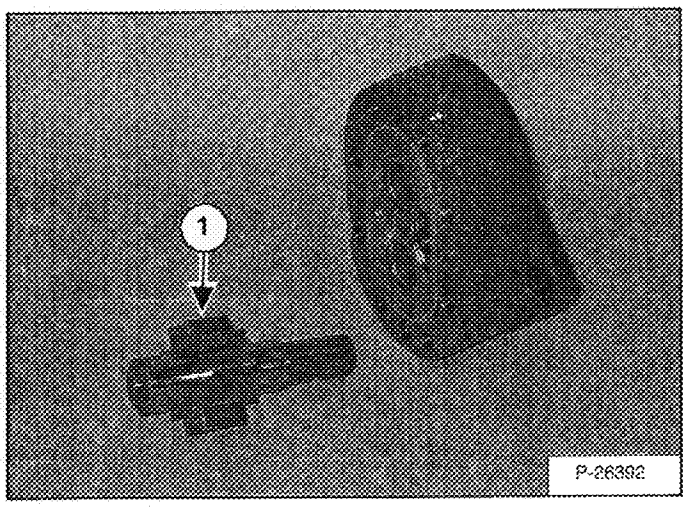
Figure 20-62-32



To remove the drive gear (Item 1) **[Figure 20-62-31]** from the pump end section, locate and remove the retaining ring (Item 1) **[Figure 20-62-32]** from the spline end of the drive gear.

Disassembly And Assembly (Cont'd)

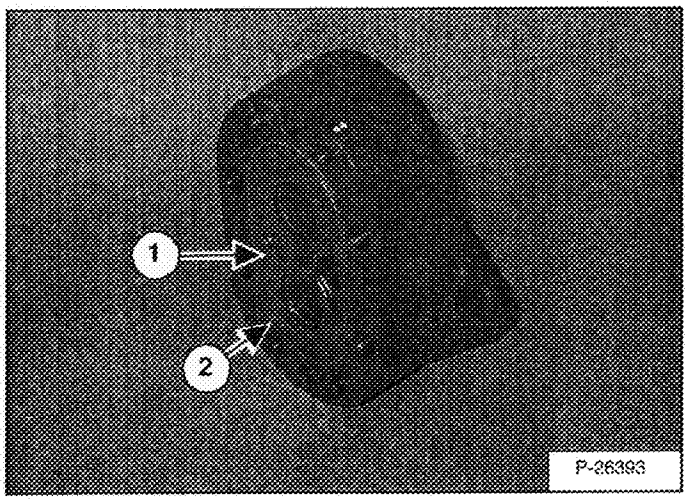
Figure 20-62-33



Remove the drive gear (Item 1) **[Figure 20-62-33]** from the pump end section.

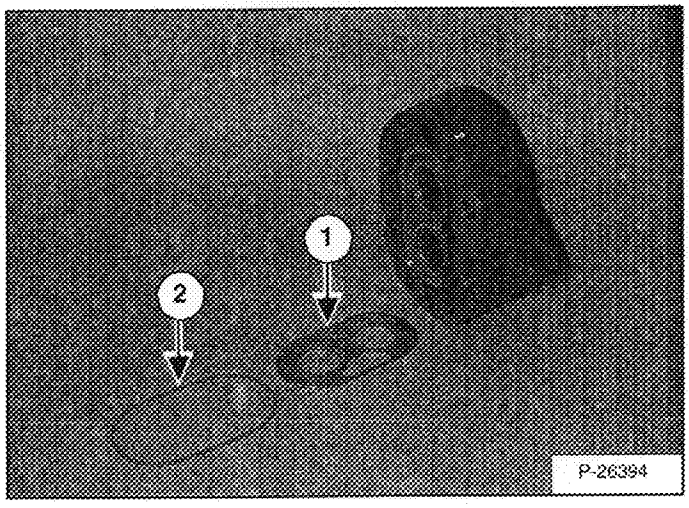
NOTE: Inspect the drive gear (Item 1) [Figure 20-62-33]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-62-34



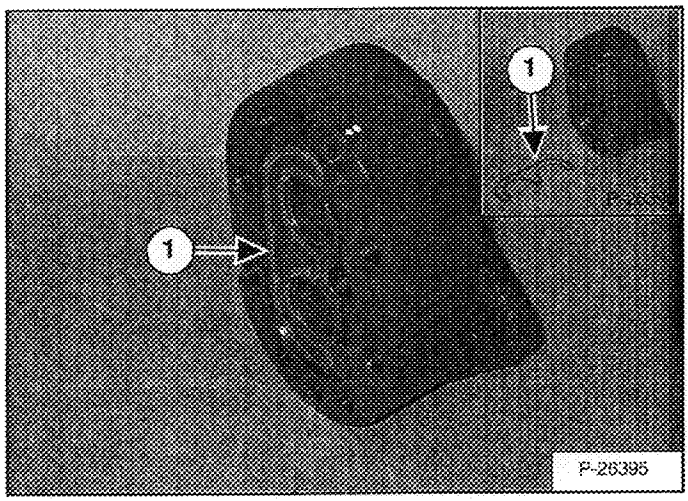
Remove the wear plate (Item 1) **[Figure 20-62-34]** & **[Figure 20-62-35]** and section seal (Item 2) **[Figure 20-62-34]** & **[Figure 20-62-35]** from the pump end section.

Figure 20-62-35



NOTE: Position wear plate (Item 1) [Figure 20-62-35] inlets and traps as shown with bronze side toward gears.

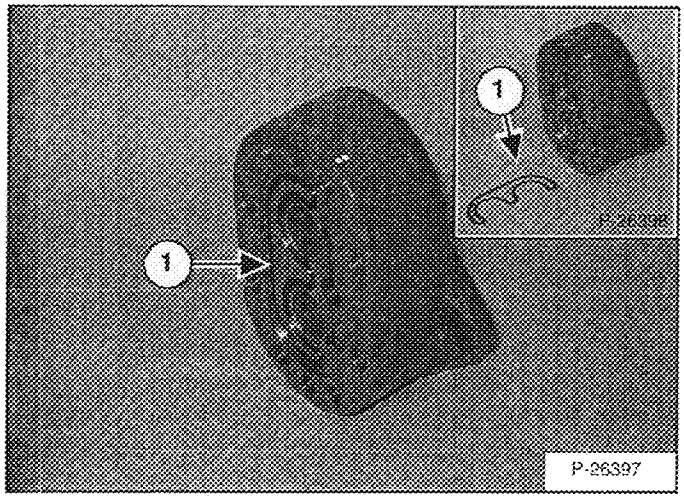
Figure 20-62-36



Remove the load seal (Item 1) **[Figure 20-62-36]**.

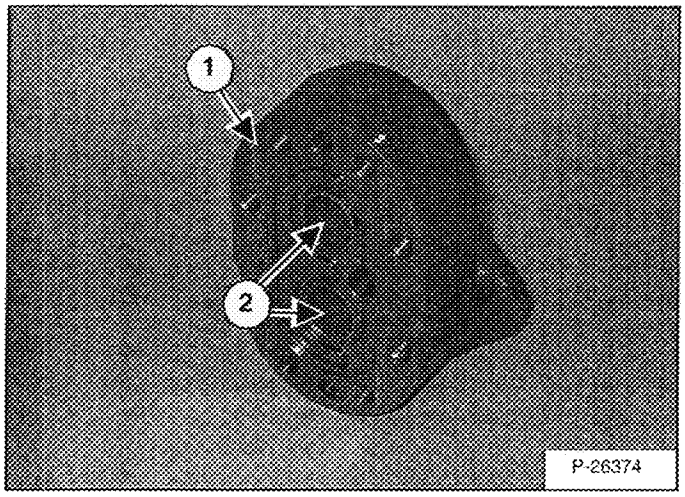
Disassembly And Assembly (Cont'd)

Figure 20-62-37



Remove the pre-load seal (Item 1) **[Figure 20-62-37]**.

Figure 20-62-38



NOTE: Inspect the pump end section (Item 1) [Figure 20-62-38] and bushings (Item 2) [Figure 20-62-38] . If excessive wear or damage is visible, the pump must be replaced.

HYDRAULIC/HYDROSTATIC FILTER

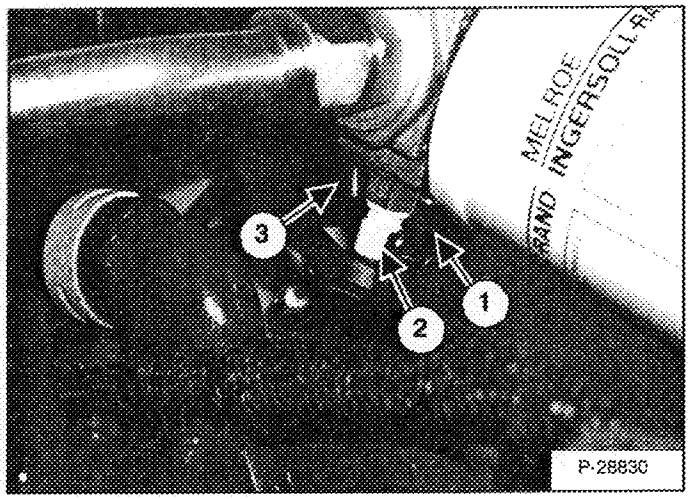
Housing Removal And Installation

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

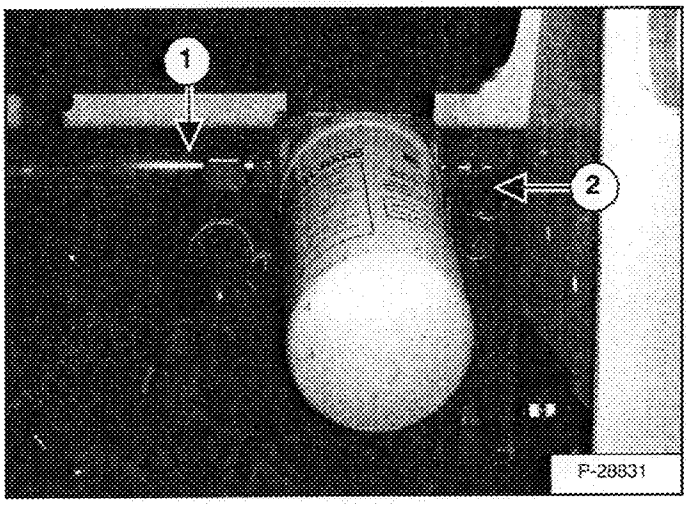
Figure 20-70-1



Stop the engine and open the rear door.

Disconnect the charge pressure sender connector (Item 1) **[Figure 20-70-1]**, temperature sender connector (Item 2) **[Figure 20-70-1]** and differential pressure switch connector (Item 3) **[Figure 20-70-1]** from the filter housing.

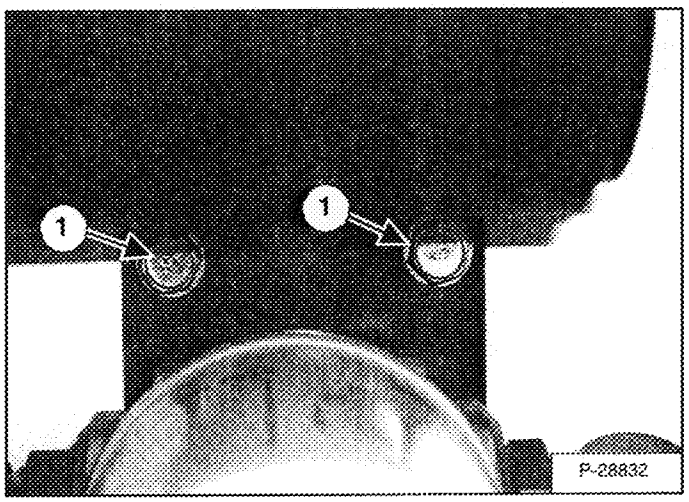
Figure 20-70-2



Disconnect the oil cooler tubeline (Item 1) **[Figure 20-70-2]** from the filter housing.

Disconnect the hose (Item 2) **[Figure 20-70-2]** from the filter housing outlet.

Figure 20-70-3

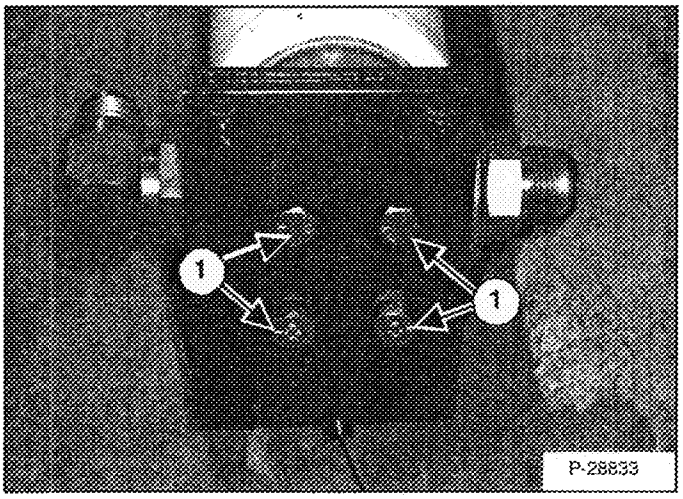


Remove the two mounting bolts (Item 1) **[Figure 20-70-3]** from the filter housing mounting bracket.

Installation: Tighten the mounting bolts to 190-240 ins.-lbs. (29,2-36,7 Nm) torque.

Housing Removal And Installation (Cont'd)

Figure 20-70-4



Remove the hydraulic filter housing (Item 1) **[Figure 20-70-4]** from the mounting brackets.

Installation: Tighten the mounting bolts to 375-400 ins.-lbs. (42,4-45,2 Nm) torque.

Remove the filter from the hydraulic filter housing.

Reverse the removal procedure to install the filter housing and filter.

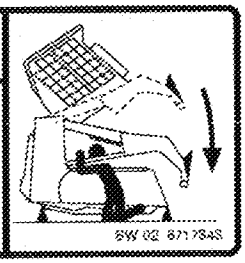
HYDRAULIC FLUID RESERVOIR

Fluid Removal

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 67051



⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

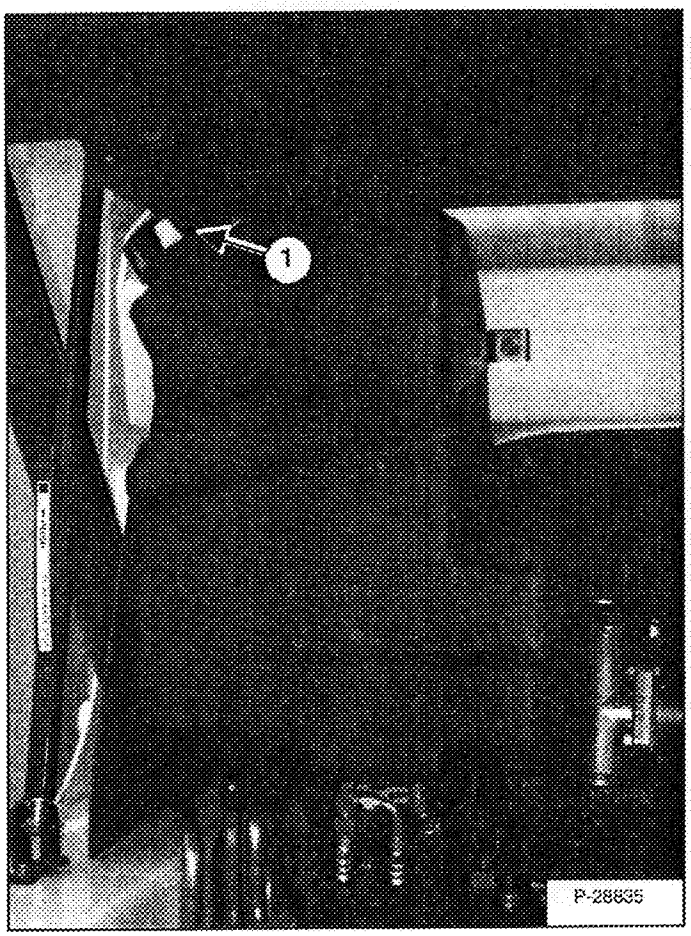
W-2059-0598

Start the engine. Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-1.)

Stop the engine.

Raise the operator cab. (See Contents Page 10-01.)

Figure 20-80-1



Remove the cap (Item 1) **[Figure 20-80-1]** from the hydraulic tank.

Remove the fluid from the tank with a pump.

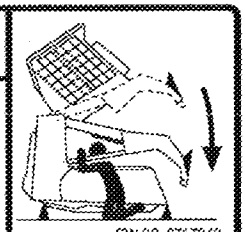
Removal And Installation (S/N 512264899 & Below)

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged.

5705



SW 02 6717349

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

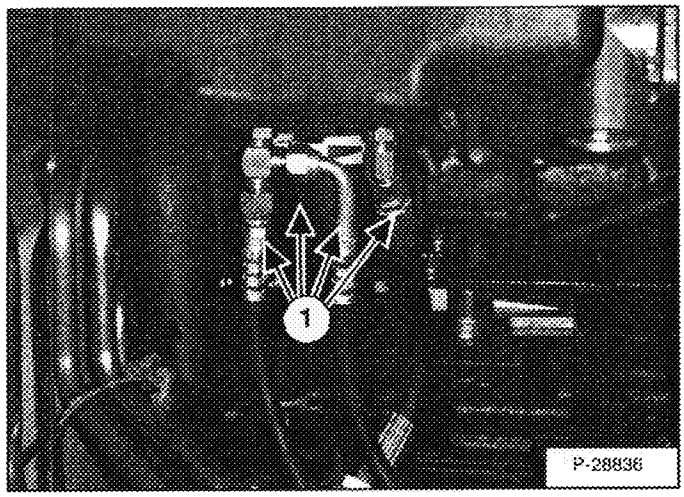
Start the engine. Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-1.)

Stop the engine.

Raise the operator cab. (See Contents Page 10-01.)

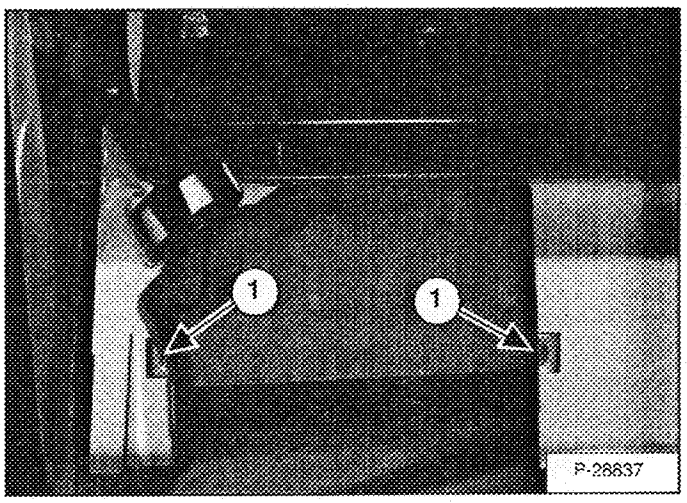
Drain the hydraulic fluid reservoir. (See Page 20-80-1.)

Figure 20-80-2



Mark and disconnect all the hoses (Item 1) **[Figure 20-80-2]** from the hydraulic fluid reservoir.

Figure 20-80-3

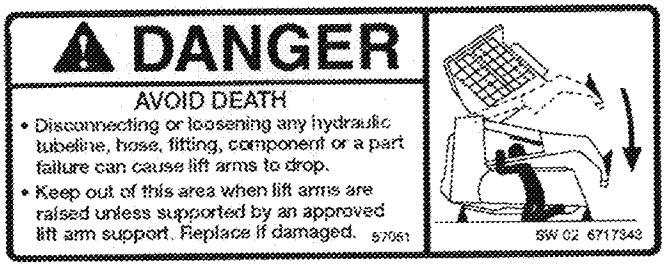


Remove the hydraulic reservoir bolts (Item 1) **[Figure 20-80-3]** and bracket (Item 1) **[Figure 20-80-3]**.

Remove the reservoir.

HYDRAULIC FLUID RESERVOIR (CONT'D)

Removal And Installation (S/N 512264900 & Above)



WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

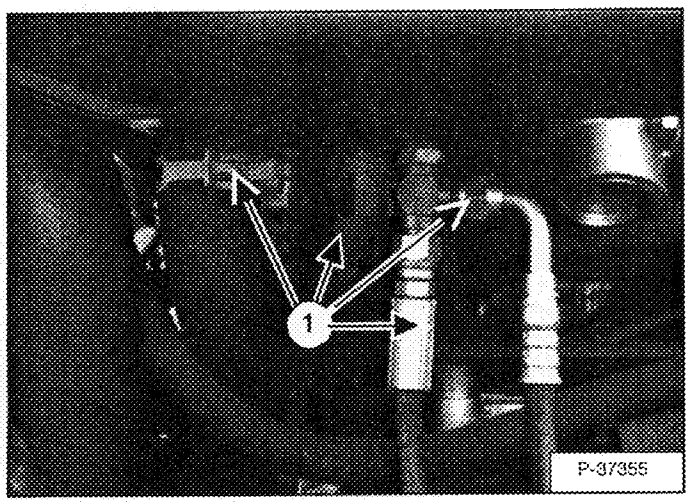
Start the engine. Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-1.)

Stop the engine.

Raise the operator cab. (See Contents Page 10-01.)

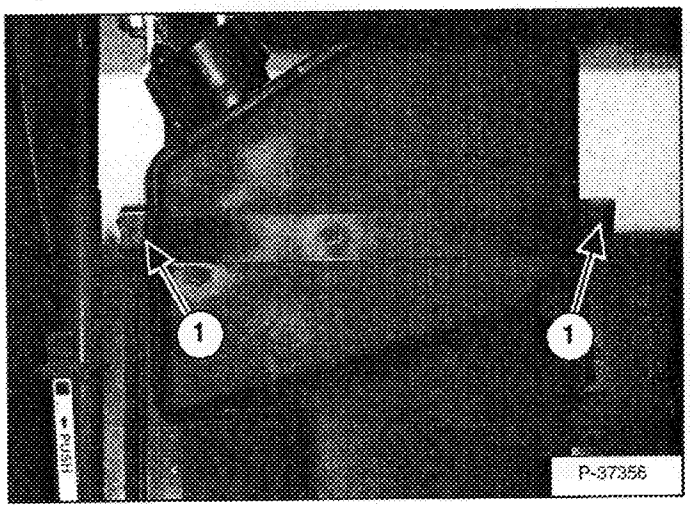
Drain the hydraulic fluid reservoir. (See Page 20-80-1.)

Figure 20-80-4



Mark and disconnect all the hoses (Item 1) **[Figure 20-80-4]** from the hydraulic fluid reservoir.

Figure 20-80-5



Remove the hydraulic reservoir bolts (Item 1) **[Figure 20-80-3]** and bracket.

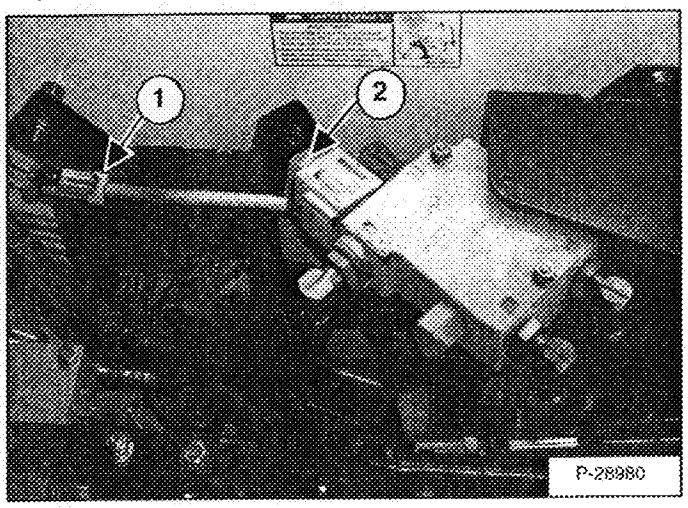
Remove the reservoir.

Bobcat®

BUCKET POSITION VALVE

Solenoid Removal And Installation

Figure 20-90-1



Raise the operator cab. (See Contents, Page 10-01.)

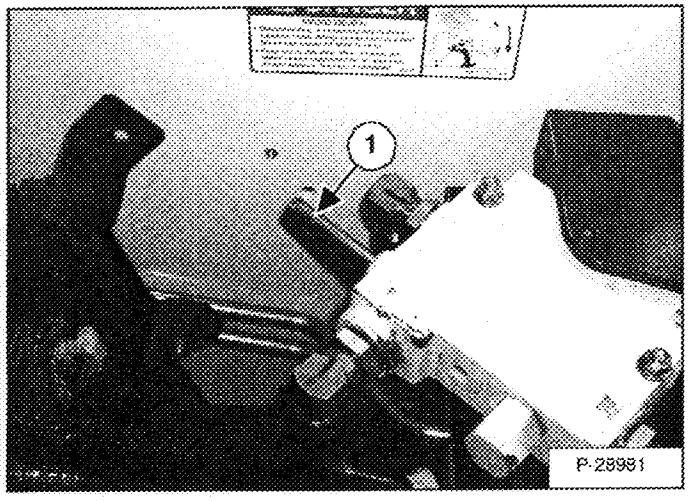
Remove the Bobcat controller mount from the frame. (See Contents, Page 60-01.)

Disconnect the wire harness connector (Item 1) **[Figure 20-90-1]** from the bucket position shutoff solenoid.

Remove the solenoid nut (Item 2) **[Figure 20-90-1]**.

Installation: Tighten the solenoid nut to 4-6 ft.-lbs. (5-8 Nm) torque.

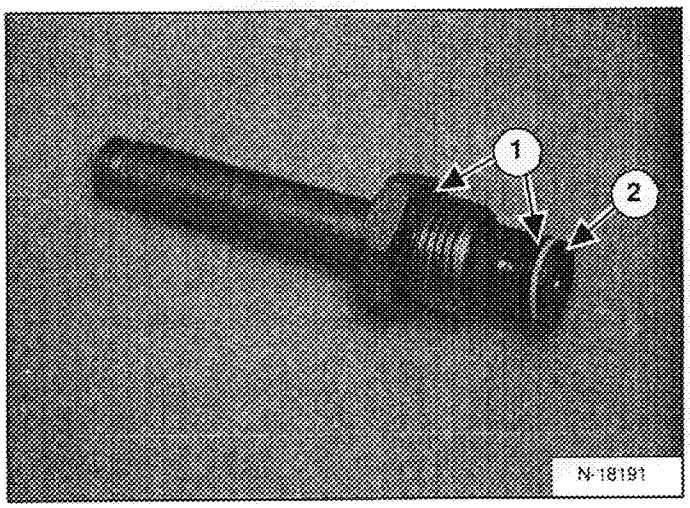
Figure 20-90-2



Remove the solenoid stem (Item 1) **[Figure 20-90-2]** from the bucket position valve.

Installation: Put oil on new O-rings and back-up washers and tighten the solenoid stem to 30-35 ft.-lbs. (40,8-47,6 Nm) torque.

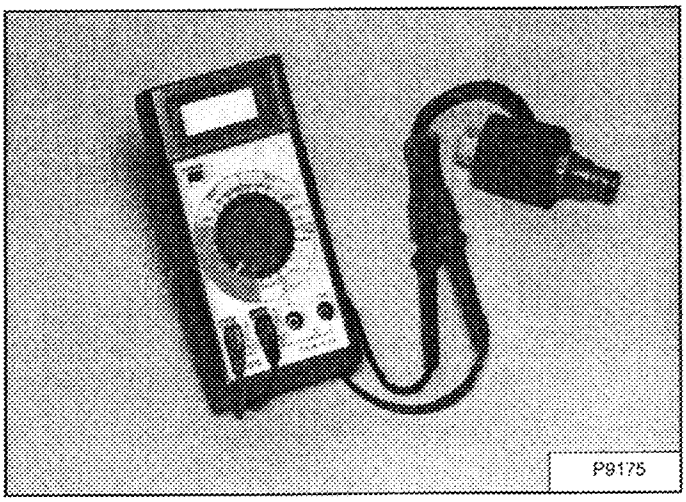
Figure 20-90-3



Inspect the solenoid stem and replace the O-rings (Item 1) and the back-up washer (Item 2) **[Figure 20-90-3]**.

Solenoid Testing

Figure 20-90-4



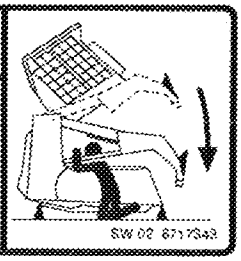
Use a test meter to measure coil resistance **[Figure 20-90-4]**. Coil wires do not have polarity. Correct resistance for the coil is 9.8 ohms.

Removal And Installation

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged.

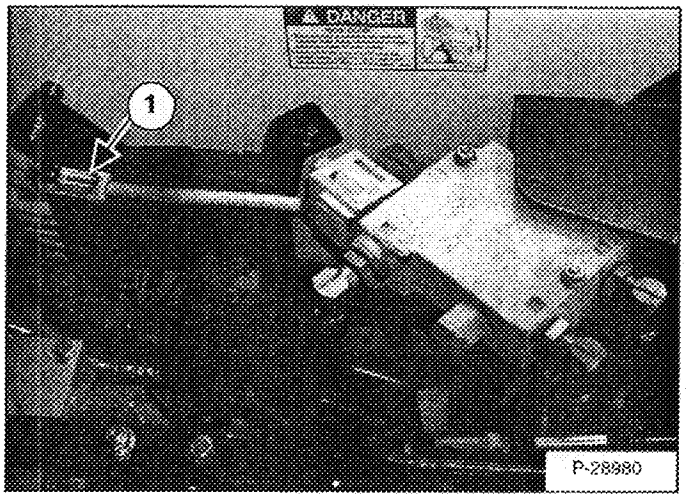


⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Figure 20-90-5



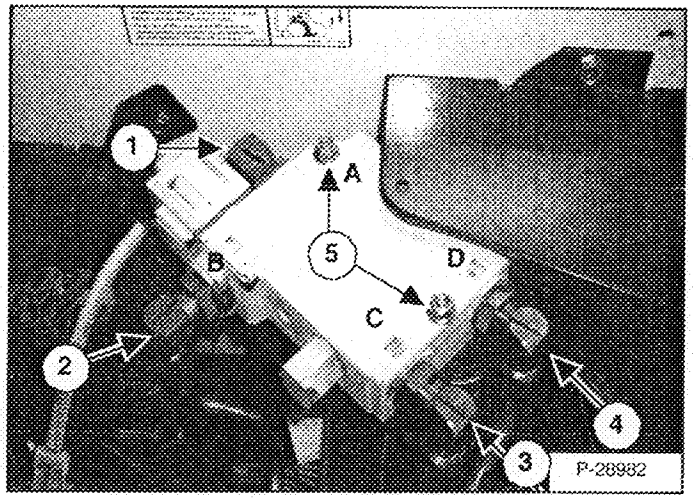
Start the engine. Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Stop the engine.

Raise the operator cab. (See Contents Page 10-01.)

Disconnect solenoid wire connector (Item 1) **[Figure 20-90-5]**.

Figure 20-90-6



Disconnect tubeline (Item 1) **[Figure 20-90-6]** from Port A.

Disconnect tubeline (Item 2) **[Figure 20-90-6]** from Port B.

Disconnect tubeline (Item 3) **[Figure 20-90-6]** from Port C.

Disconnect tubeline (Item 4) **[Figure 20-90-6]** from Port D.

Remove the two mounting nuts (Item 5) **[Figure 20-90-6]** from the valve.

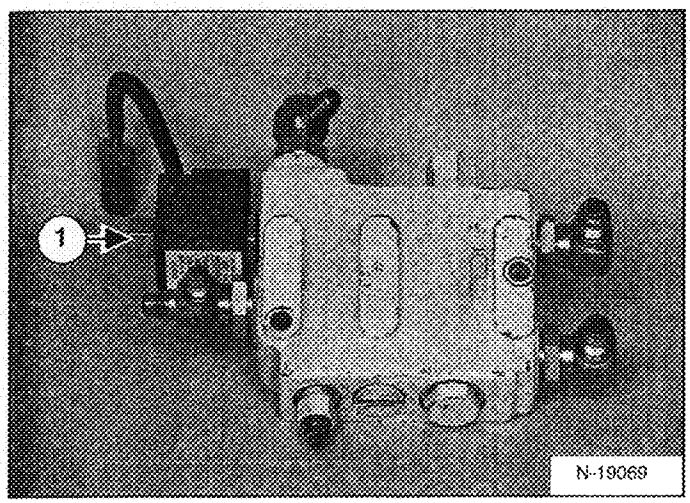
Installation: Tighten the mounting bolts and nuts (Item 5) **[Figure 20-90-6]** to 15 ft.-lbs. (20 Nm) torque.

Remove the valve from the loader.

BUCKET POSITION VALVE (CONT'D)

Disassembly And Assembly

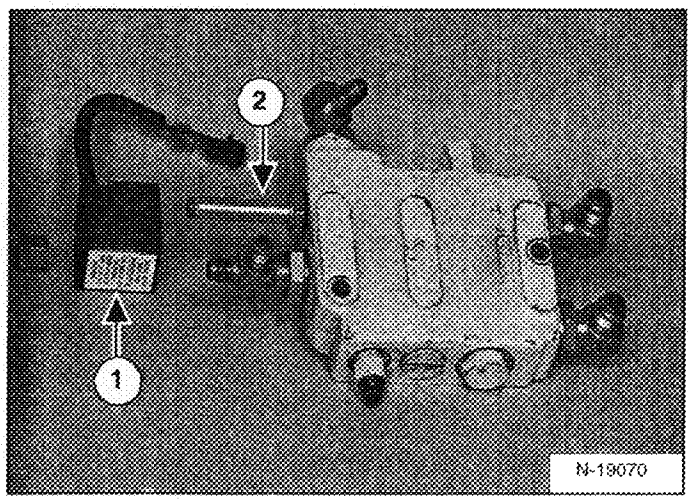
Figure 20-90-7



Remove the solenoid nut (Item 1) **[Figure 20-90-7]**.

Installation: Tighten the nut to 4-6 ft.-lbs. (5-8 Nm Max.) torque.

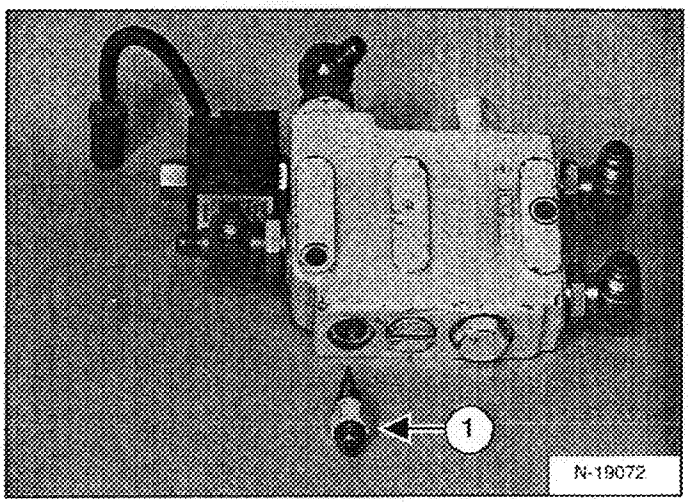
Figure 20-90-8



Remove the solenoid (Item 1) and the solenoid stem (Item 2) **[Figure 20-90-8]**.

Installation: Tighten the solenoid stem to 30-35 ft.-lbs. (40,8-47,6 Nm) torque.

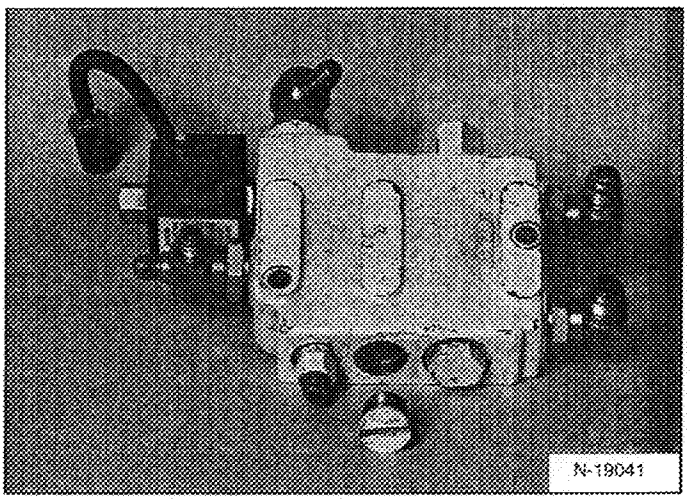
Figure 20-90-9



Remove the flow adjustment valve and O-ring (Item 1) **[Figure 20-90-9]**

NOTE: Always install new O-rings before any parts are installed into the valve. Check the parts for wear or damage and replace as needed.

Figure 20-90-10

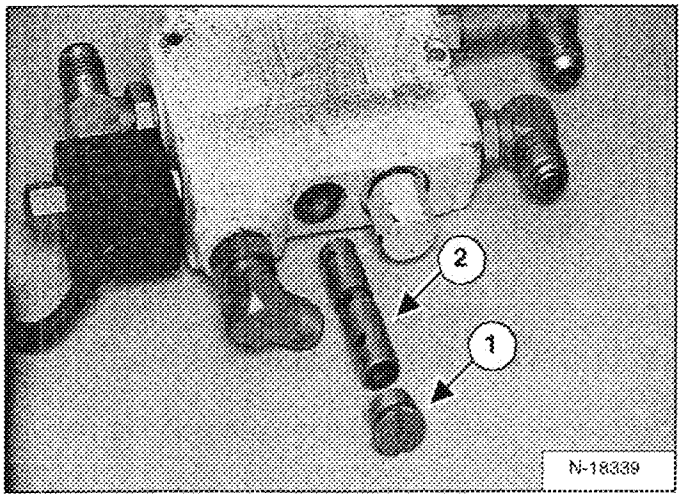


Remove the plug **[Figure 20-90-10]**.

BUCKET POSITION VALVE (CONT'D)

Disassembly And Assembly (Cont'd)

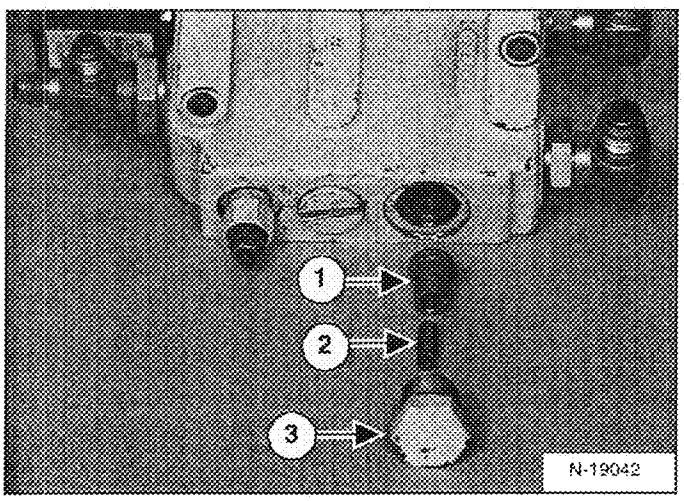
Figure 20-90-11



Remove the plug (Item 1) and flow control spool (Item 2) **[Figure 20-90-11]**.

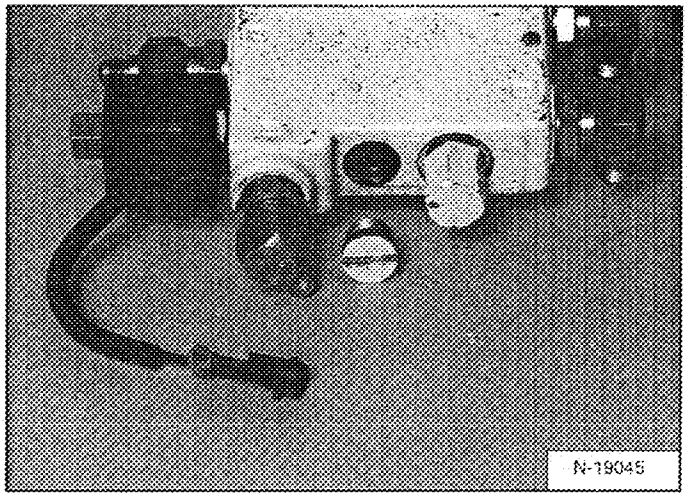
Check the flow control spool for wear, check the O-ring on the plug and replace as needed.

Figure 20-90-12



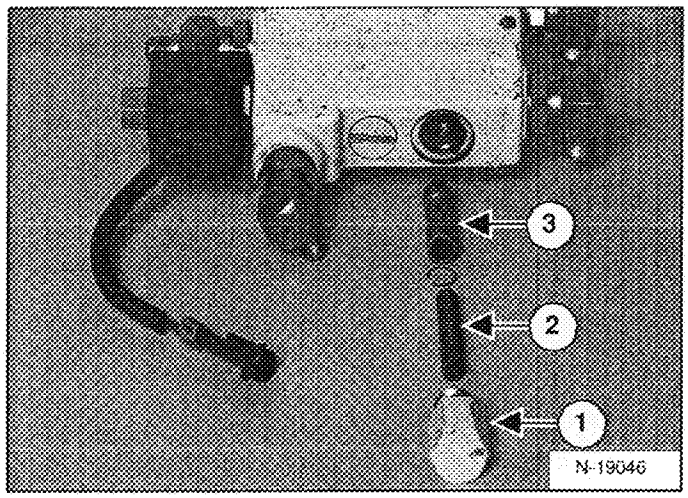
Remove the tilt cylinder check valve (Item 1), spring (Item 2) and plug (Item 3) **[Figure 20-90-12]**. Check for wear, check the O-ring and replace as needed.

Figure 20-90-13



Remove the plug **[Figure 20-90-13]**.

Figure 20-90-14



Remove the plug (Item 1), spring (Item 2) and unloading spool (Item 3) **[Figure 20-90-14]**.

Check all parts and replace as needed. Install a new O-ring on the plug before installing.

SELECT VALVE

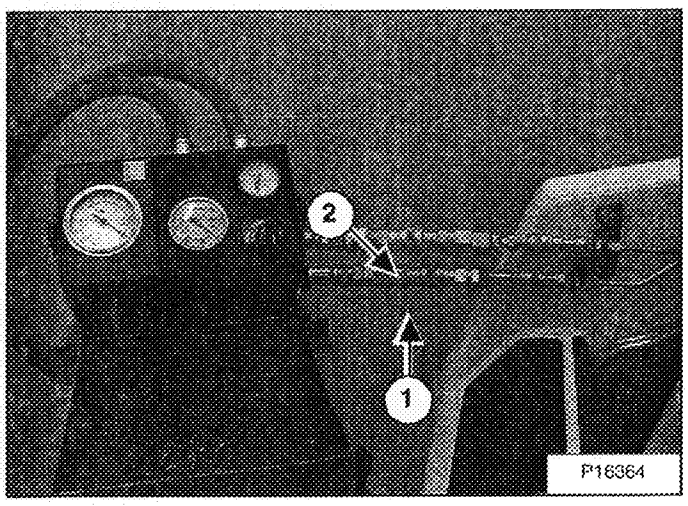
Checking The High Flow Pump Relief Valve

⚠ 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

Figure 20-100-1



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

MEL10003 - Hydraulic Tester
MEL10006 - Hydraulic Test Kit

Lift and block the loader. (See Contents Page 10-01.)

Connect the IN port of the hydraulic tester to the female quick couplers (Item 1)**[Figure 20-100-1]** on the loader.

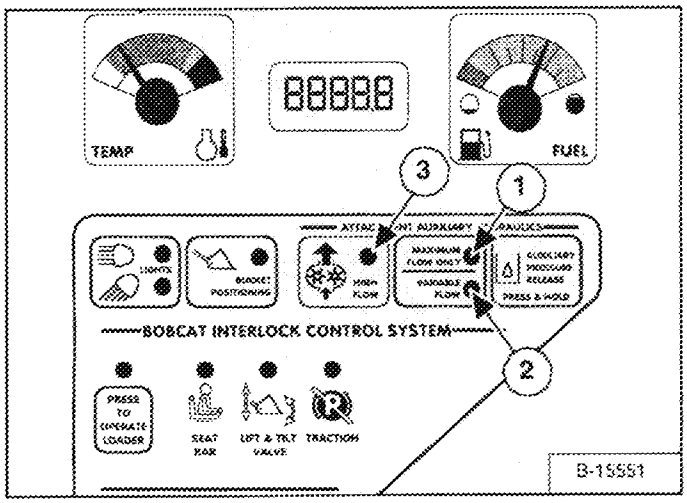
Connect the OUT port of the hydraulic tester to the male quick coupler (Item 2)**[Figure 20-100-1]** on the loader.

IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

Figure 20-100-2



Start the engine and run at low idle RPM. Push the flow switch (Item 1) once (on the instrument panel) to engage the front auxiliary hydraulics variable flow, the light (Item 2) **[Figure 20-100-2]** will come ON.

Push the high flow switch (Item 3) **[Figure 20-100-2]** for fluid pressure to the secondary quick couplers.

Push the left handle rocker switch to engage the flow to the secondary quick couplers.

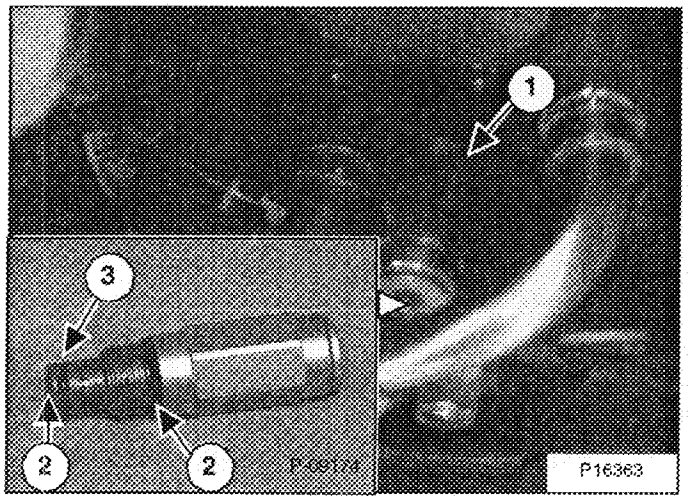
Watch the flow meter on the hydraulic tester to make sure the flow is correct. Increase the engine speed to full RPM.

The free flow should be approximately 10.0 GPM (37,85 L/min.). Turn the restrictor control, on the tester, until the relief valve opens. The correct pressure for the relief valve is approximately 3000 PSI (20685 kPa).

Release the rocker switch to disengage the flow to the secondary quick couplers.

Checking The High Flow Pump Relief Valve (Cont'd)

Figure 20-100-3

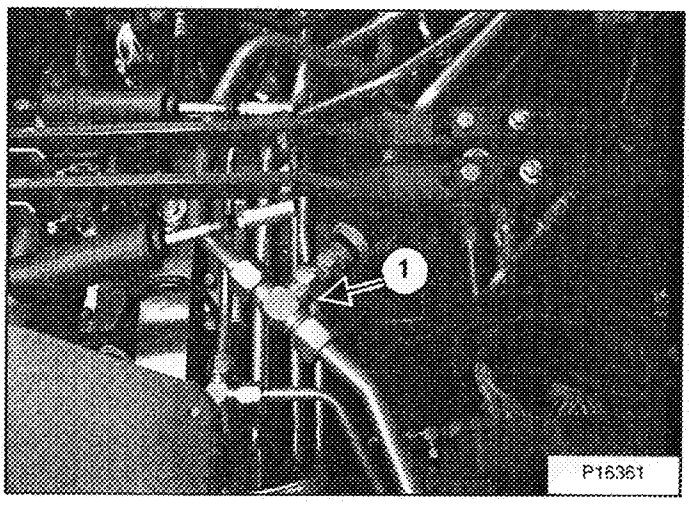


If the relief pressure is not correct, stop the engine. Remove and inspect the relief valve (Item 1). Inspect the O-rings (Item 2) and back-up ring (Item 3) **[Figure 20-100-3]** for damage.

Replace the relief valve if required. This relief valve is not adjustable.

Removal And Installation

Figure 20-100-4



Stop the engine. Raise the seat bar.

Raise the operator cab. (See Contents, Page 10-01.)

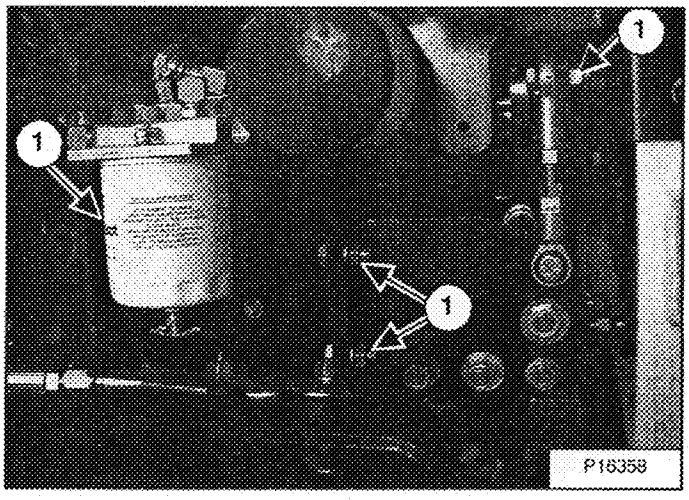
Drain the hydraulic fluid from the reservoir. (See Contents, Page 20-01.)

Disconnect the hose (Item 1) **[Figure 20-100-4]**.

Install caps and plugs on open connections.

Open the rear door.

Figure 20-100-5



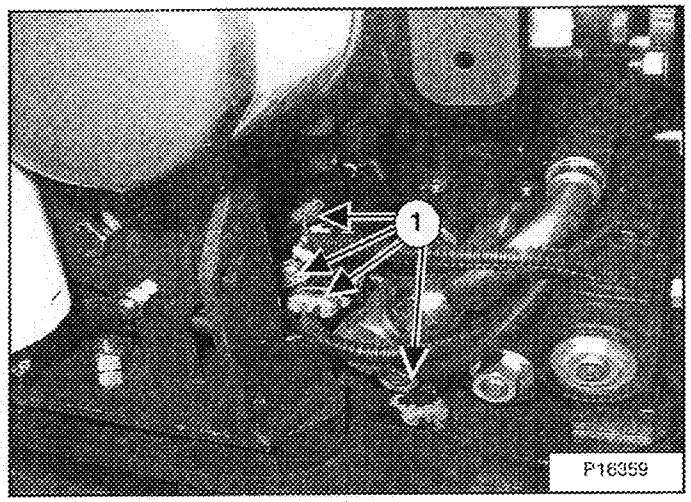
Remove the bolt(s) (Item 1) **[Figure 20-100-5]** and remove the bracket.

Installation: Tighten bolts to 34 ft.-lbs. (46 Nm) torque.

SELECT VALVE (CONT'D)

Removal And Installation (Cont'd)

Figure 20-100-6

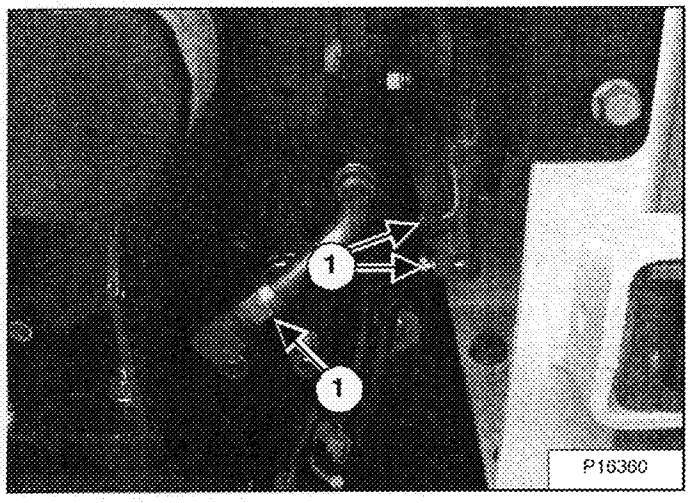


Disconnect the connectors (Item 1) **[Figure 20-100-6]** from the select valve solenoid.

NOTE: The tie strap colors are listed below for identification during select valve installation.

Second Aux. Rear Rod (Male coupler)-Brown
Second Aux. Rear Base (Female coupler) - White
Second Aux. Rear Aux. Relief-Green
High Flow-Blue
Diverter-Yellow

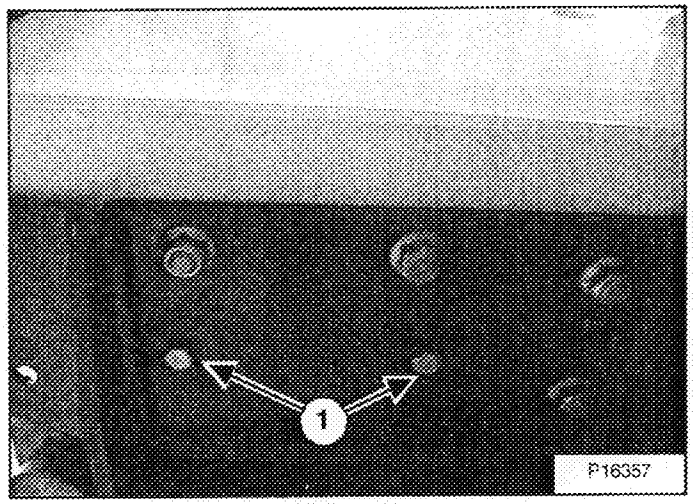
Figure 20-100-7



Mark all hoses for correct installation.

Remove the hoses (Item 1) **[Figure 20-100-7]** from the select valve.

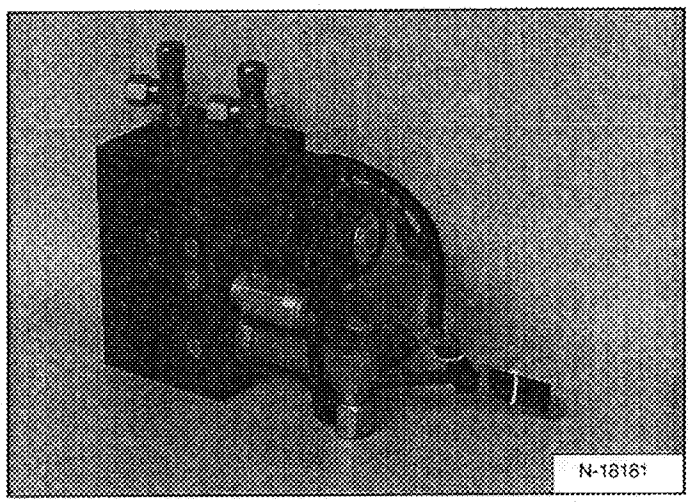
Figure 20-100-8



Remove the two mounting bolts (Item 1) **[Figure 20-100-8]**.

Installation: Tighten bolts to 34 ft.-lbs. (46 Nm) torque.

Figure 20-100-9

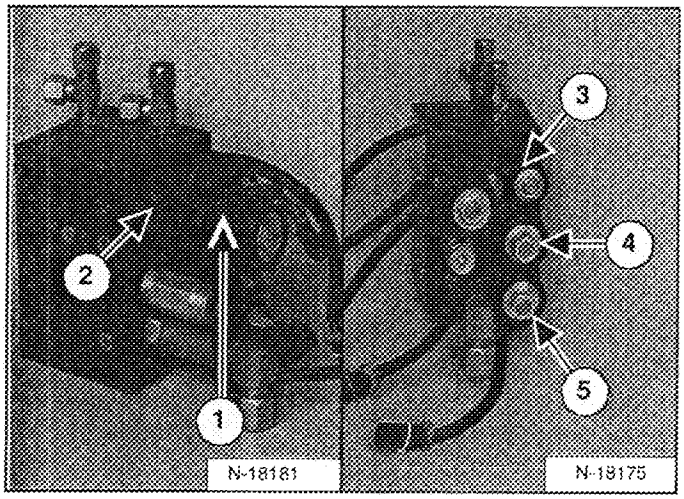


Remove the valve **[Figure 20-100-9]**.

SELECT VALVE (CONT'D)

Disassembly And Assembly

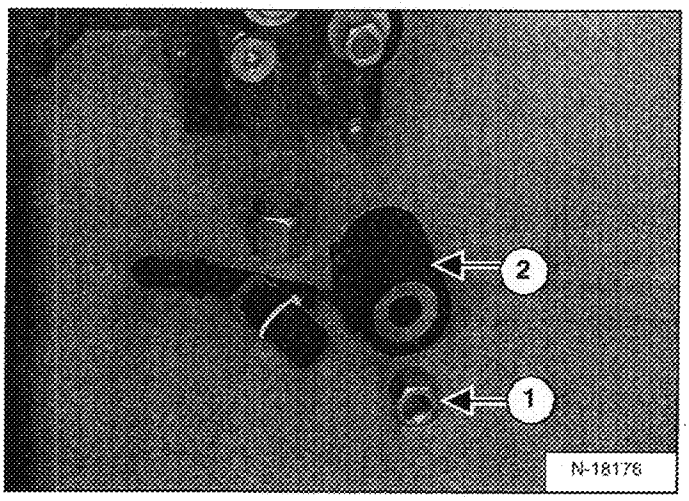
Figure 20-100-10



NOTE: The controls wiring harness colors are listed below for identification during select valve assembly installation.

Rear Rod male coupler (Item 1) **[Figure 20-100-10]** Brown
Rear Base female coupler (Item 2) **[Figure 20-100-10]** White
Rear Aux. pressure relief (Item 3) **[Figure 20-100-10]** Green
High Flow (Item 4) **[Figure 20-100-10]** Blue
Diverter (Item 5) **[Figure 20-100-10]** Yellow

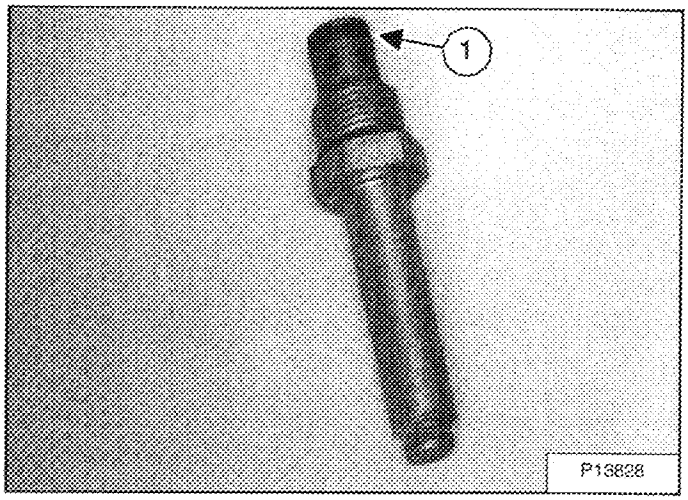
Figure 20-100-11



Remove the solenoid nut (Item 1) and solenoid (Item 2) **[Figure 20-100-11]** from secondary auxiliary diverter stem.

Installation: Tighten nut to 5 ft.-lbs. (6,7 Nm) torque.

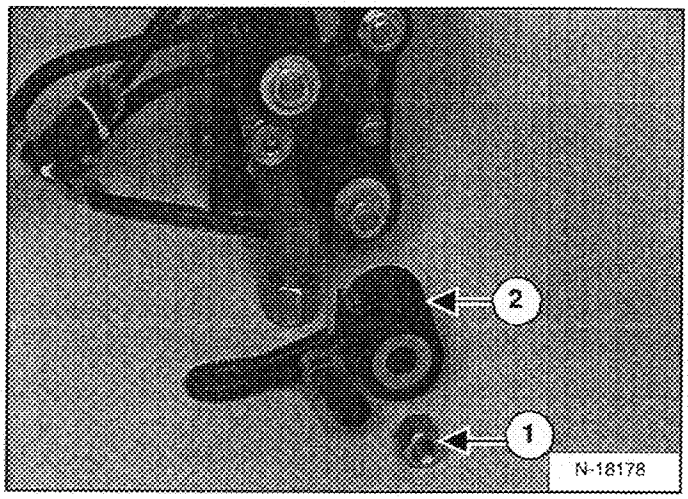
Figure 20-100-12



Install new O-rings (Item 1) **[Figure 20-100-12]** and back-up washer on the secondary auxiliary diverter stem.

Installation: Put oil on O-rings and back-up washer, install and tighten to 25 ft.-lbs. (39,9 Nm) torque.

Figure 20-100-13

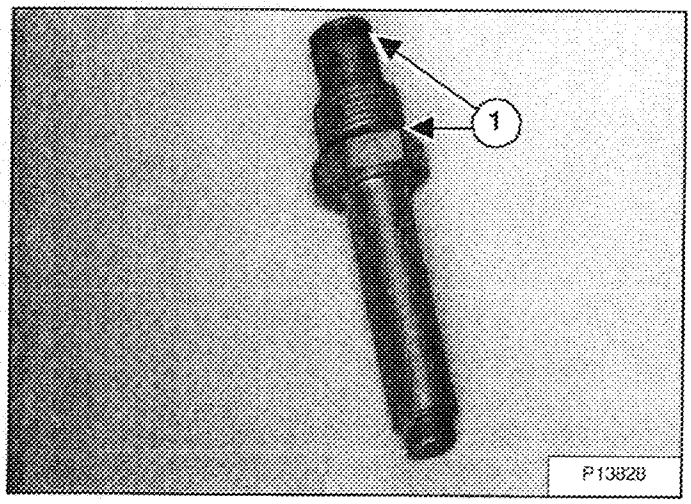


Remove the solenoid nut (Item 1) and solenoid (Item 2) **[Figure 20-100-13]** from the hi-flow solenoid stem.

Installation: Tighten nut to 5 ft.-lbs. (6,7 Nm) torque.

Disassembly And Assembly (Cont'd)

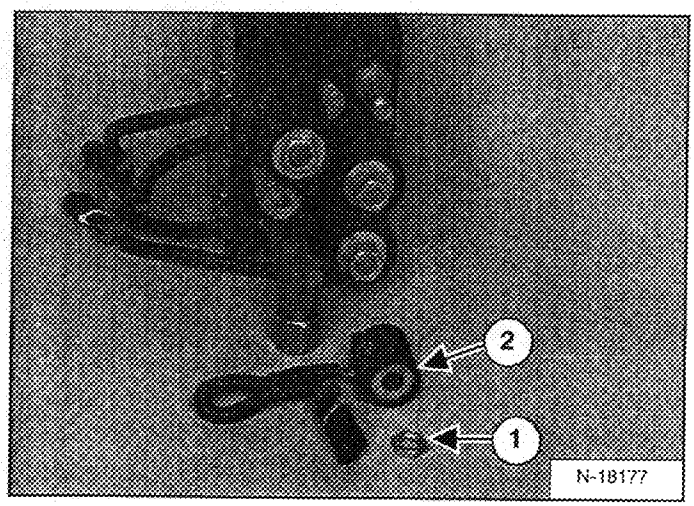
Figure 20-100-14



Install new O-rings (Item 1) **[Figure 20-100-14]** and back-up washer on the hi-flow solenoid stem.

Installation: Put oil on O-rings and back-up washers and install and tighten to 25 ft.-lbs. (33,9 Nm) torque.

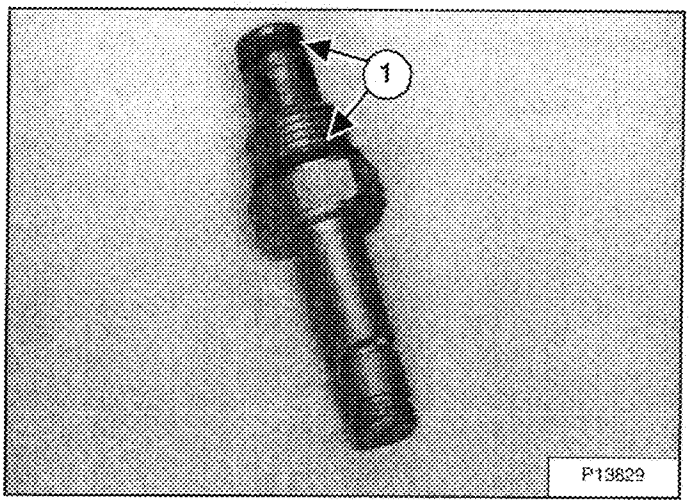
Figure 20-100-15



Remove the solenoid nut (Item 1) and solenoid (Item 2) **[Figure 20-100-15]** from the second auxiliary relief solenoid.

Installation: Tighten nut to 5 ft.-lbs. (6,7 Nm) torque.

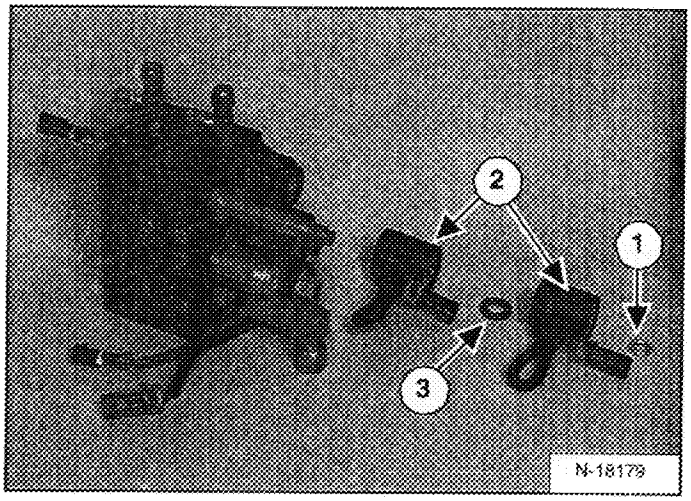
Figure 20-100-16



Install new O-rings (Item 1) **[Figure 20-100-16]** and back-up washer on the solenoid stem.

Installation: Put oil on O-rings and back-up washers, install and tighten to 20 ft.-lbs. (27,1 Nm) torque.

Figure 20-100-17

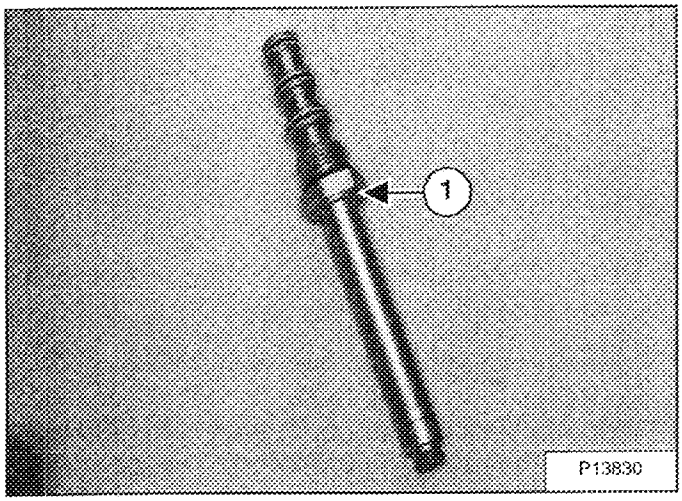


Remove the solenoid nut (Item 1) and solenoids (Item 2) **[Figure 20-100-17]** from the rear auxiliary and secondary front auxiliary selector valve solenoid stem.

Installation: Tighten nut to 5 ft.-lbs. (6,7 Nm) torque.

Disassembly And Assembly (Cont'd)

Figure 20-100-18

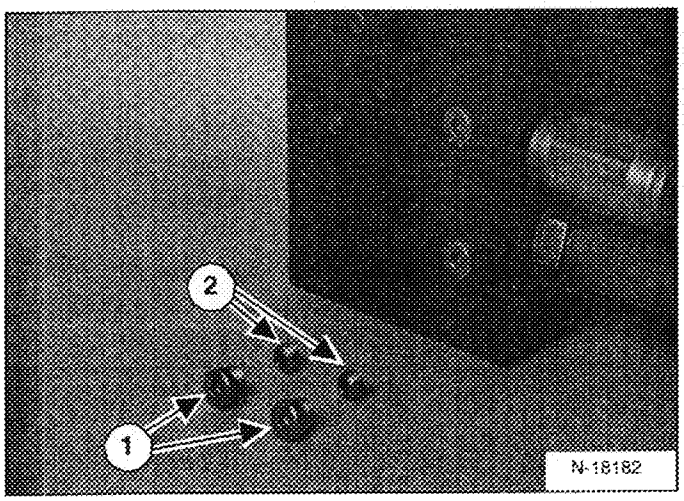


Assembly: The coils largest opening must position on the valve shoulder (Item 1) **[Figure 20-100-18]**. Install the washer (Item 3) **[Figure 20-100-17]** between the coils. Tighten all coil nuts to 5 ft.-lbs. (6,7 Nm) torque.

Install new O-rings and back-up washers on the solenoid stem **[Figure 20-100-18]**.

Installation: Put oil on O-rings and back-up washers, install and tighten to 25 ft.-lbs. (33,9 Nm) torque.

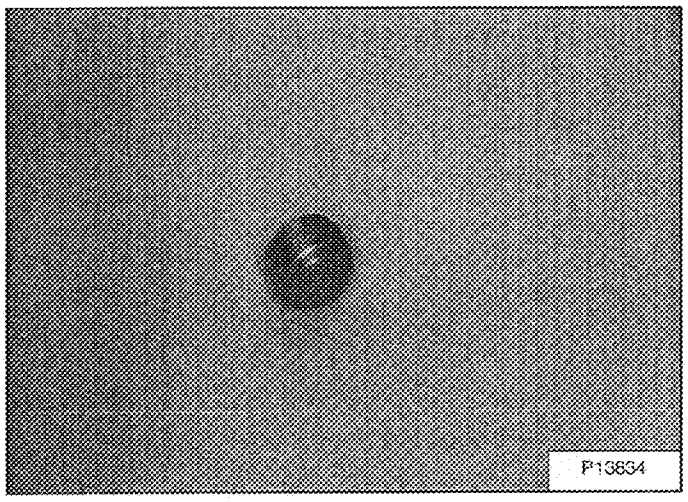
Figure 20-100-19



Remove the two plugs (Item 1) **[Figure 20-100-19]** from the select valve.

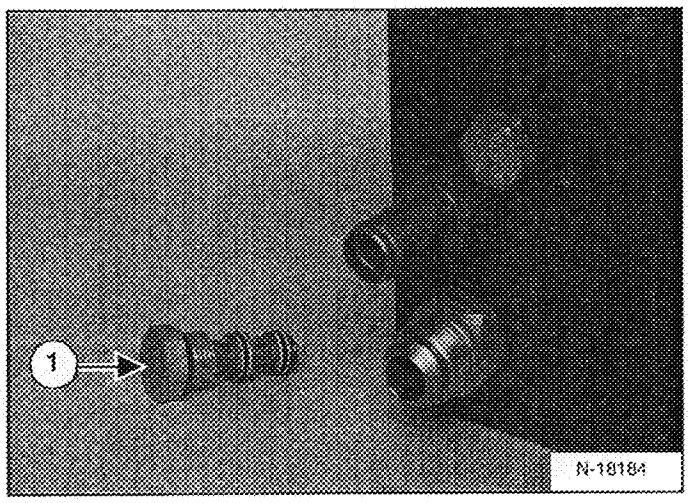
Remove the two orifices (Item 2) **[Figure 20-100-19]** from the select valve.

Figure 20-100-20



Check the high pressure relief orifices **[Figure 20-100-20]** for contamination or damage. Wash in clean solvent and dry with air pressure. If damaged replace with new parts.

Figure 20-100-21

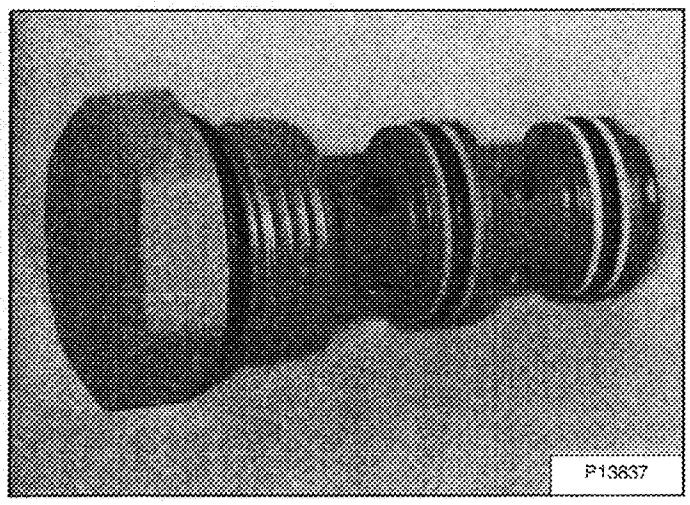


Remove the load Shuttle (Item 1) **[Figure 20-100-21]** from the select valve.

SELECT VALVE (CONT'D)

Disassembly And Assembly (Cont'd)

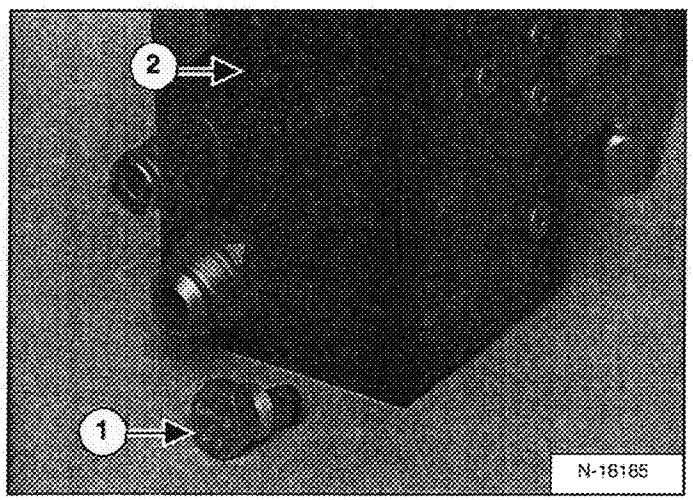
Figure 20-100-22



Check the load shuttle, O-rings & back-up washers for wear and replace as needed **[Figure 20-100-22]**.

Installation: Tighten to 20 ft.-lbs. (27,1 Nm) torque.

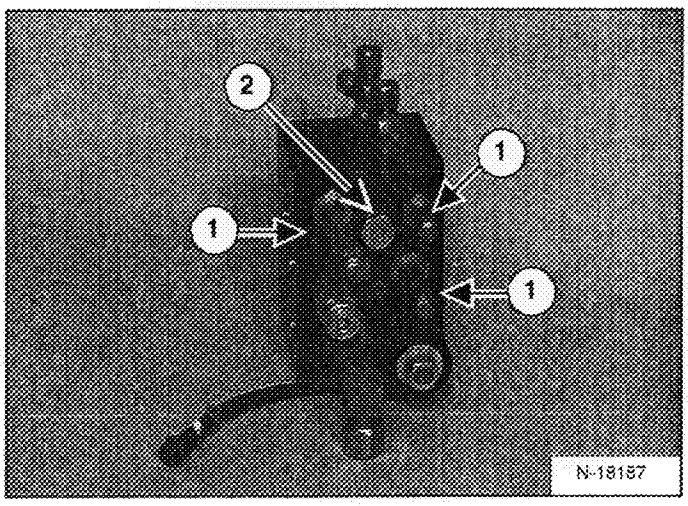
Figure 20-100-23



Remove the shuttle plug (Item 1) **[Figure 20-100-23]** from the select valve.

NOTE: The shuttle cannot be removed through port (Item 2) [Figure 20-100-23].

Figure 20-100-24

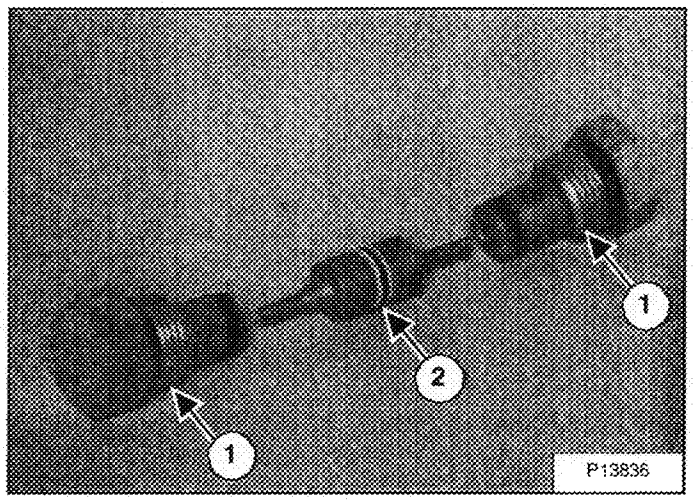


Remove the solenoids (Item 1) **[Figure 20-100-24]** from the solenoid stems.

Remove the shuttle plug (Item 2) **[Figure 20-100-24]** from the select valve.

Remove the shuttle from the select valve.

Figure 20-100-25



Install new O-rings and check back-up washers on both shuttle plugs (Item 1) and the shuttle (Item 2) **[Figure 20-100-25]** and replace as needed.

Installation: Tighten the shuttle plugs to 25 ft.-lbs. (33,9 Nm) torque.

SELECT VALVE (CONT'D)

Disassembly And Assembly (Cont'd)

Figure 20-100-26

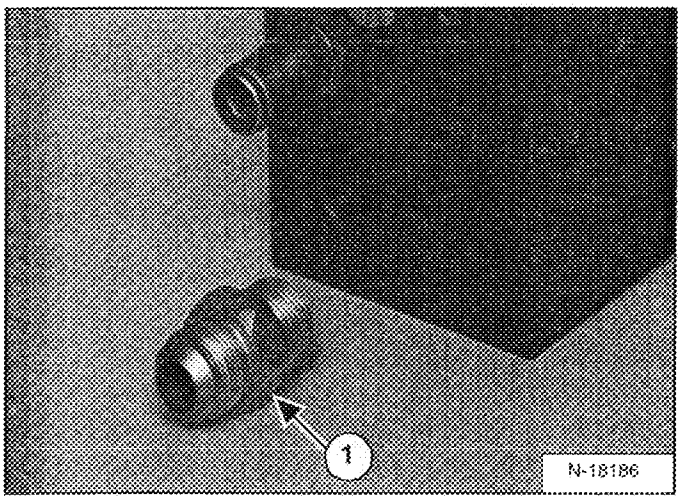
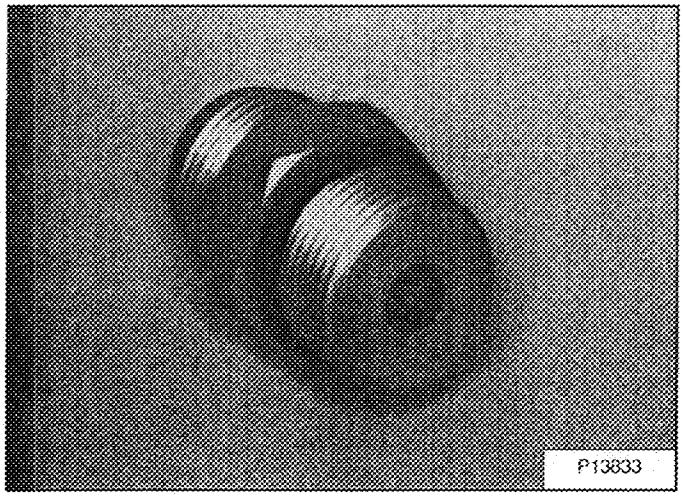


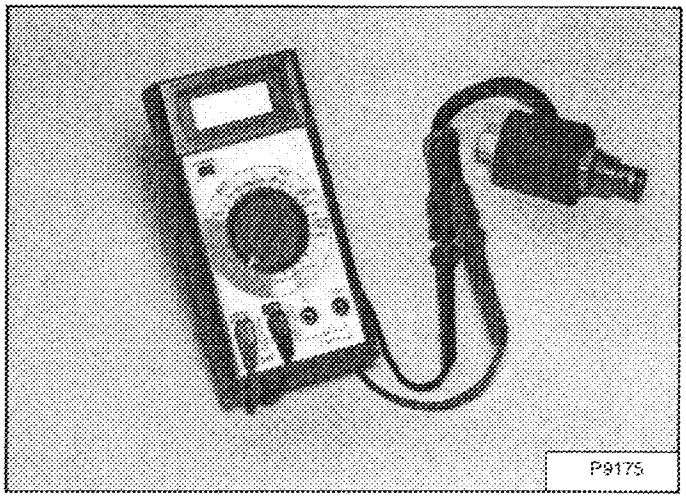
Figure 20-100-27



The fitting (item 1) **[Figure 20-100-26]** and **[Figure 20-100-27]** has a poppet valve. The poppet valve allows flow out of the select valve only. Inspect the poppet for smooth opening and closing.

Solenoid Testing

Figure 20-100-28



Use a test meter to measure coil resistance **[Figure 20-100-28]**. Coil wires do not have polarity. Correct resistance for the pressure relief (small) coil is 7-10 ohms and the other coils 5-8 ohms.

Replace the test meter with 12 volt power. You can see and hear the spool shift.

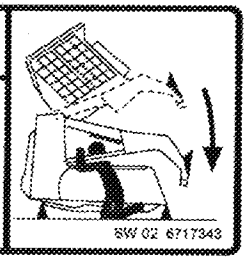
REAR AUXILIARY DIVERTER VALVE (SINGLE SHUTTLE)

Removal And Installation

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 67951



SW 02 6717343

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

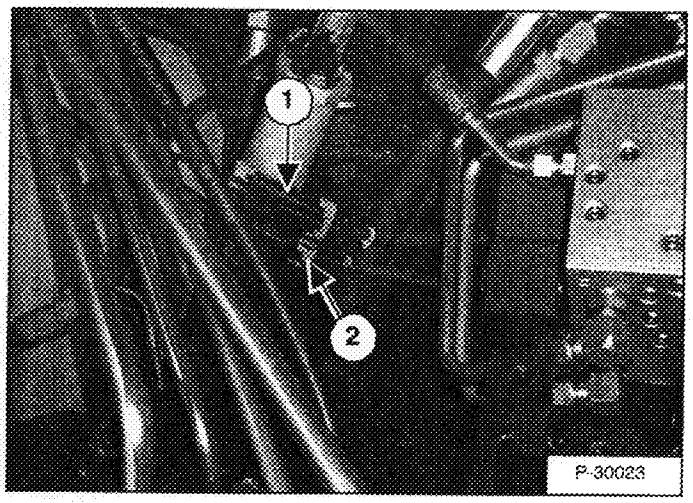
W-2059-0598

Lift and block the loader. (See Contents Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Raise the operator cab. (See Contents Page 10-01.)

Figure 20-110-1

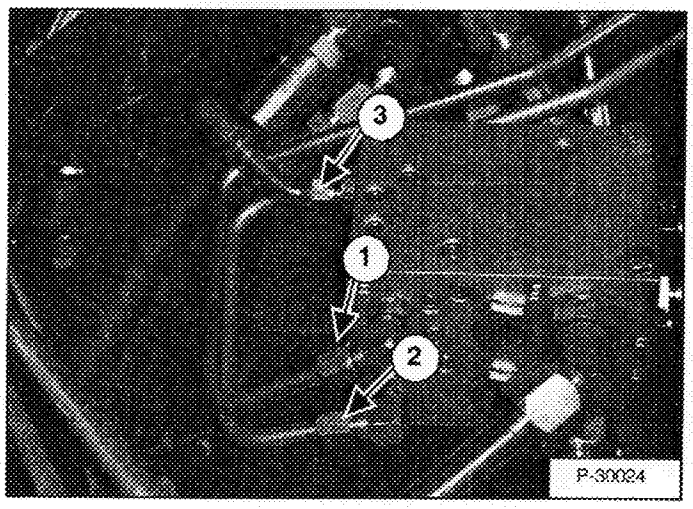


NOTE: The single shuttle rear auxiliary diverter valve is a silver color block.

Disconnect the yellow marked mainframe harness to the diverter harness (Item 1) **[Figure 20-110-1]**.

Disconnect the green marked mainframe harness to the bleed harness (Item 2) **[Figure 20-110-1]**.

Figure 20-110-2

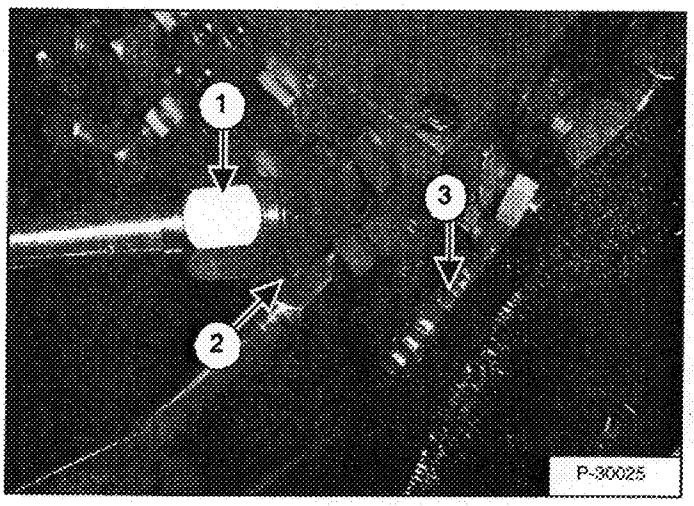


Disconnect and cap the tubeline from "F1" port (Item 1) **[Figure 20-110-2]**.

Disconnect and cap the tubeline from "F2" port (Item 2) **[Figure 20-110-2]**.

Disconnect and cap the pilot hose (Item 3) **[Figure 20-110-2]**.

Figure 20-110-3



Disconnect and cap the tubeline (Item 1) **[Figure 20-110-3]** on the "P1" port, loosen the other end of the tubeline on the control valve and rotate the tubeline to allow for removal of diverter valve.

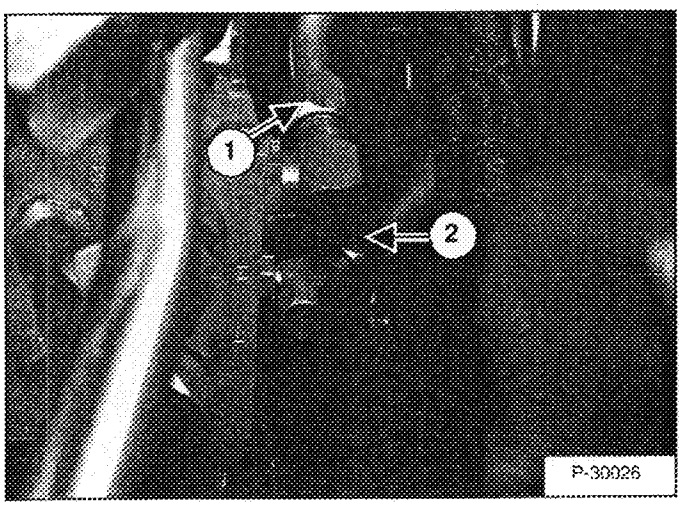
Disconnect and cap the tubeline (Item 2) **[Figure 20-110-3]** on the "P2" port, loosen the other end of the tubeline on the control valve and rotate the tubeline to allow for removal of diverter valve.

Disconnect and cap the hose on the drain fitting (Item 3) **[Figure 20-110-3]**.

REAR AUXILIARY DIVERTER VALVE (SINGLE SHUTTLE) (CONT'D)

Removal And Installation (Cont'd)

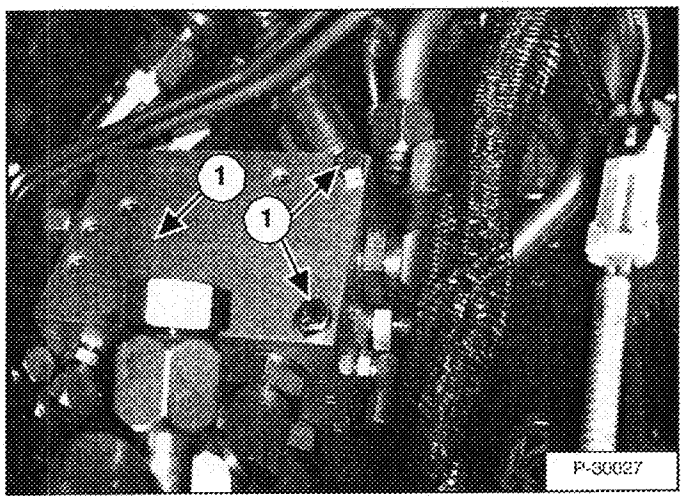
Figure 20-110-4



Disconnect and cap the tubeline on the "D1" port (Item 1) **[Figure 20-110-4]** of the diverter valve.

Disconnect and cap the tubeline on the "D2" port (Item 2) **[Figure 20-110-4]** of the diverter valve.

Figure 20-110-5



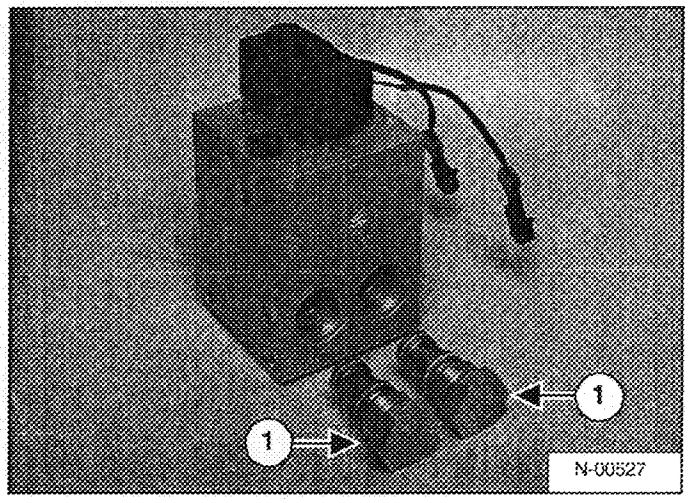
Remove the mounting nuts and bolts (Item 1) **[Figure 20-110-5]**.

Installation: Tighten the mounting bolts to 25 ft.-lbs. (34 Nm) torque.

Remove the diverter valve (Item 2) **[Figure 20-110-5]** from the loader.

Disassembly

Figure 20-110-6



Clean the diverter block to remove dirt before disassembly. Block ports are labeled for correct assembly.

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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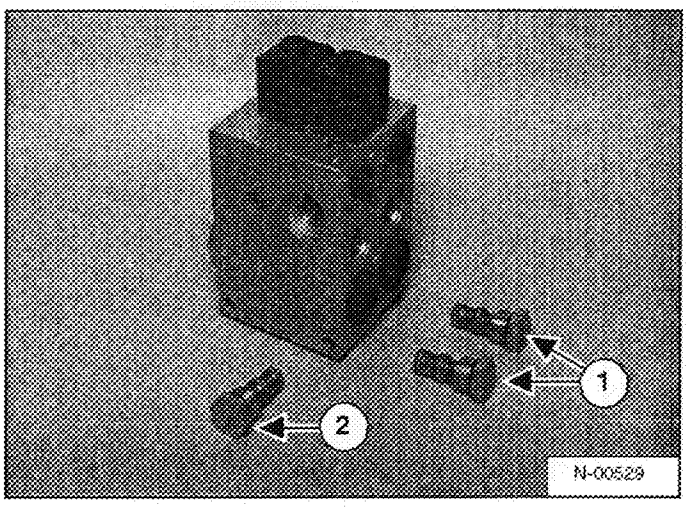
Remove the logic cartridge valves from block ports LC1 and LC2 (Item 1) **[Figure 20-110-6]**.

Figure 20-110-7



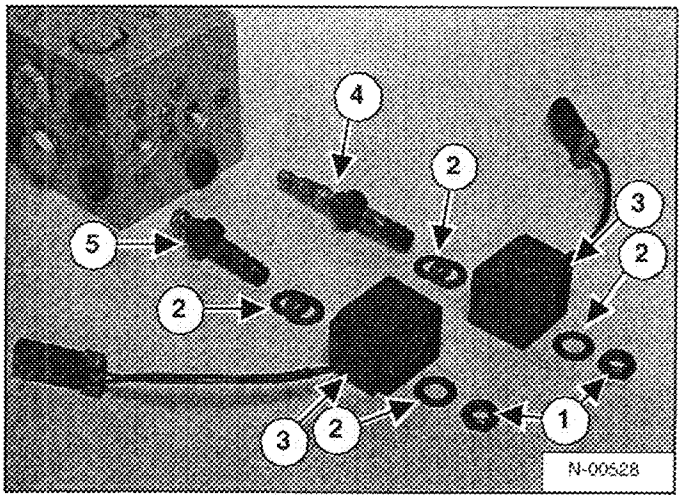
Remove the pilot check valves from block ports PC1 and PC2 (Item 1) **[Figure 20-110-7]**.

Remove the shuttle check valve from block port SH1 (Item 2) **[Figure 20-110-7]**.

REAR AUXILIARY DIVERTER VALVE (SINGLE SHUTTLE) (CONT'D)

Disassembly (Cont'd)

Figure 20-110-8



Remove the nuts (Item 1), seal washers (Item 2) and solenoid valve coils (Item 3) **[Figure 20-110-8]**.

Remove the diverter control solenoid valve (Item 4) from port SV1. Remove the pressure relieving solenoid valve (Item 5) **[Figure 20-110-8]** from block port SV2.

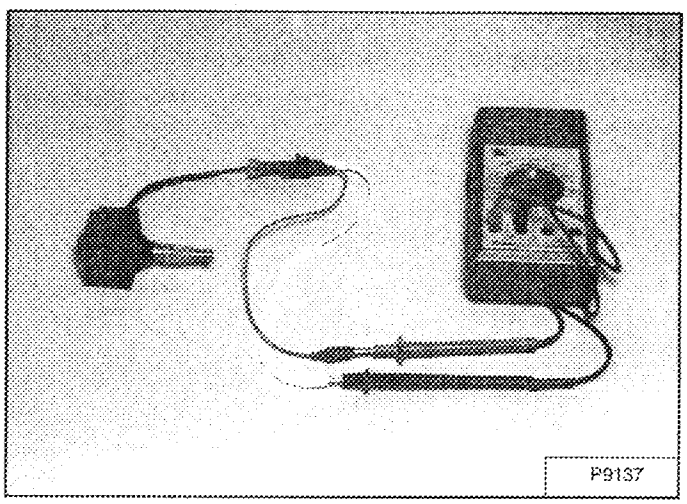
Inspection

Inspect cartridges, check valves, solenoid valves and sealing washers for contamination or damage. Wash all parts in clean solvent. Use air pressure for drying them. Install new O-rings and back-up washers.

Inspect diverter block cavities for contamination. Wash block in clean solvent. Use air pressure to dry.

Solenoid Testing

Figure 20-110-9



Use a test meter to measure coil resistance **[Figure 20-110-9]**. Coil wires do not have polarity. Correct resistance is 6-9 ohms.

Replace the test meter with 12 volt power. You can see and hear the spool shift.

Assembly

Put oil on O-rings and back-up washers.

Tighten the Logic cartridge valves (Item 1) **[Figure 20-110-6]** to 65 ft. lbs. (88 Nm) torque.

Tighten the pilot check valves (Item 1) and shuttle check valve (Item 2) **[Figure 20-110-7]** to 35 ft. lbs. (47 Nm) torque.

Tighten the solenoid valves (Items 4 and 5) to 12 ft. lbs. (16,3 Nm) torque. Install the sealing washers (Item 2) and coils (Item 3). Tighten the nuts (Item 1) **[Figure 20-110-8]** to 10 in. lbs. (1,13 Nm) torque.

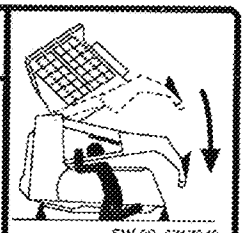
REAR AUXILIARY DIVERTER VALVE (DUAL SHUTTLE)

Removal And Installation

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 57051



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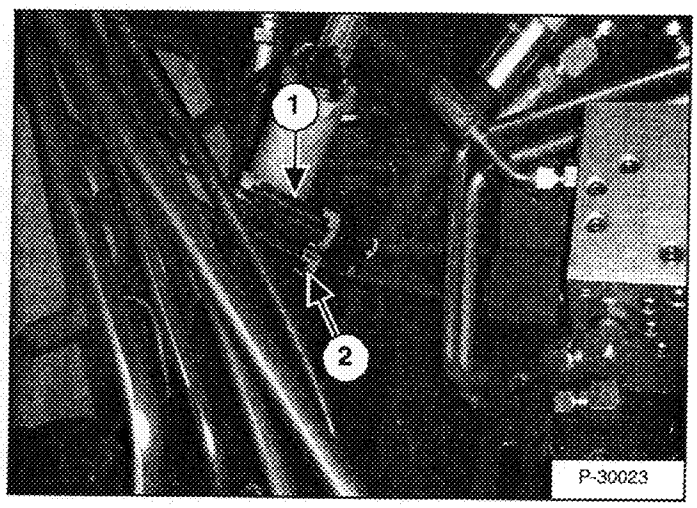
⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Figure 20-111-1



Lift and block the loader. (See Contents Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

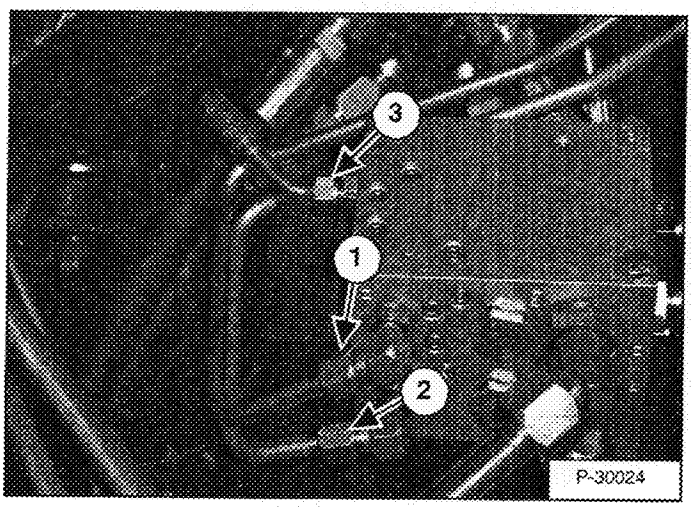
NOTE: The dual shuttle rear auxiliary diverter valve is a gold color block.

Raise the operator cab. (See Contents, Page 10-01.)

Disconnect the yellow marked mainframe harness to the diverter harness (Item 1)**[Figure 20-111-1]**.

Disconnect the green marked mainframe harness to the bleed harness (Item 2) **[Figure 20-111-1]**.

Figure 20-111-2



Disconnect and cap the tubeline from "F1" port (Item 1) **[Figure 20-111-2]**.

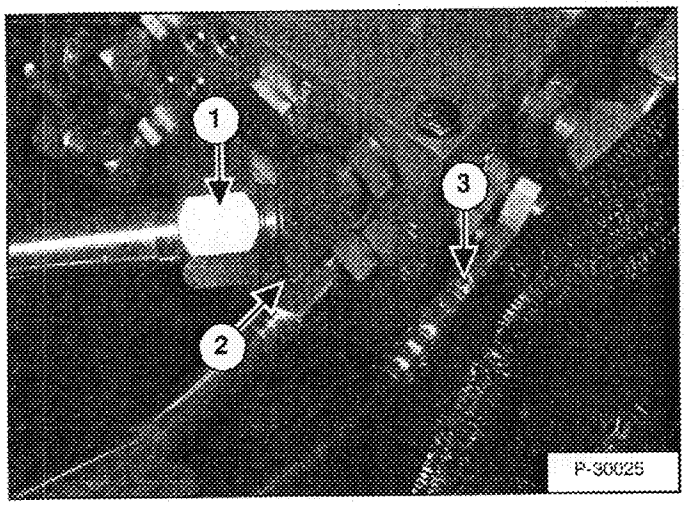
Disconnect and cap the tubeline from "F2" port (Item 2) **[Figure 20-111-2]**.

Disconnect and cap the pilot hose (Item 3) **[Figure 20-111-2]**.

REAR AUXILIARY DIVERTER VALVE (DUAL SHUTTLE) (CONT'D)

Removal And Installation (Cont'd)

Figure 20-111-3

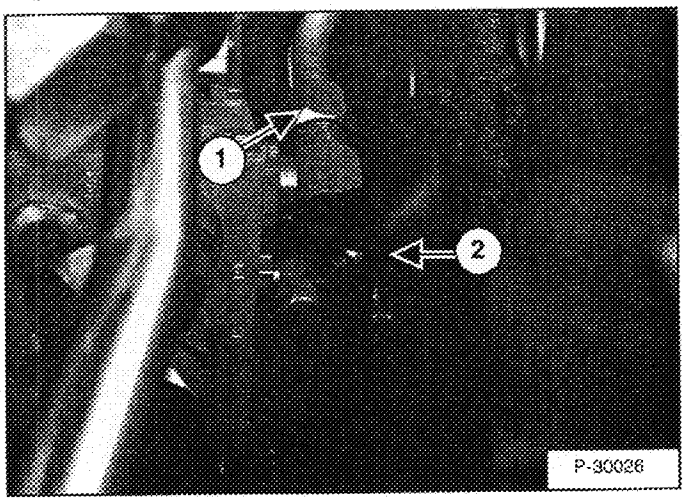


Disconnect and cap the tubeline (Item 1) **[Figure 20-111-3]** on the "P1" port, loosen the other end of the tubeline on the control valve and rotate the tubeline to allow for removal of diverter valve.

Disconnect and cap the tubeline (Item 2) **[Figure 20-111-3]** on the "P2" port, loosen the other end of the tubeline on the control valve and rotate the tubeline to allow for removal of diverter valve.

Disconnect and cap the hose on the drain fitting (Item 3) **[Figure 20-111-3]**.

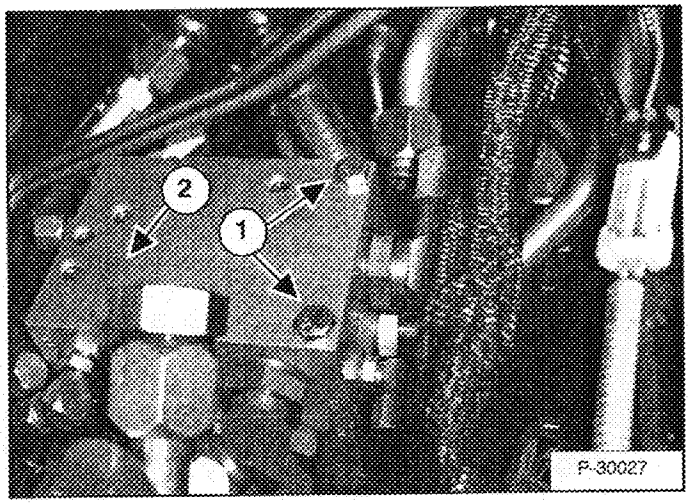
Figure 20-111-4



Disconnect and cap the tubeline on the "D1" port (Item 1) **[Figure 20-111-4]** of the diverter valve.

Disconnect and cap the tubeline on the "D2" port (Item 2) **[Figure 20-111-4]** of the diverter valve.

Figure 20-111-5



Remove the mounting bolts and nuts (Item 1) **[Figure 20-111-5]**.

Installation: Tighten the mounting bolts to 25 ft.-lbs. (34 Nm) torque.

Remove the diverter valve (Item 2) **[Figure 20-111-5]** from loader.

REAR AUXILIARY DIVERTER VALVE (DUAL SHUTTLE) (CONT'D)

Disassembly And Assembly

Figure 20-111-6

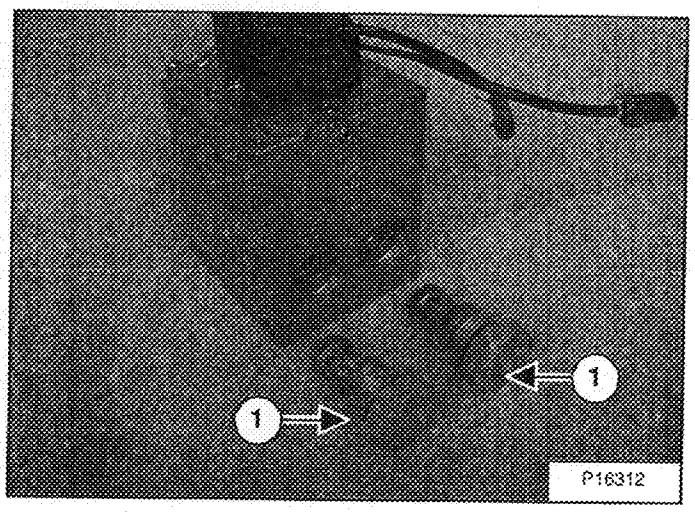
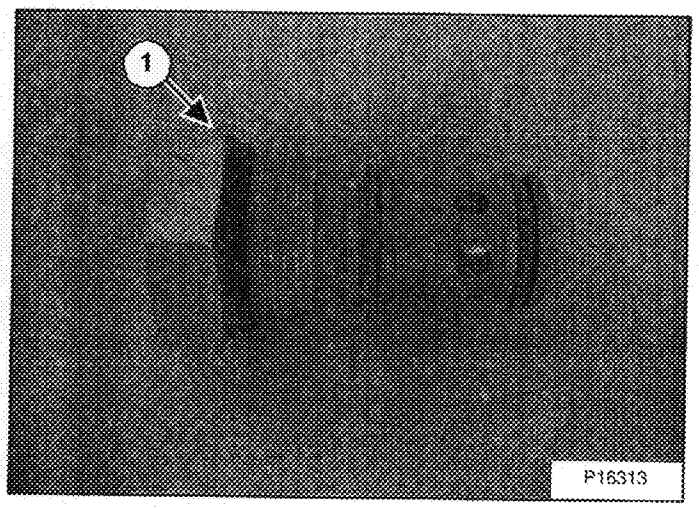


Figure 20-111-7



Clean the diverter block to remove dirt before disassembly. Block ports are labeled for correct assembly.

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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Remove the logic cartridge valves (Item 1) **[Figure 20-111-6]** & **[Figure 20-111-7]** from block ports LC1 and LC2.

Installation: Put oil on O-rings and back-up washers.Tighten to 60-65 ft.-lbs. (81,4-88 Nm) torque.

Figure 20-111-8

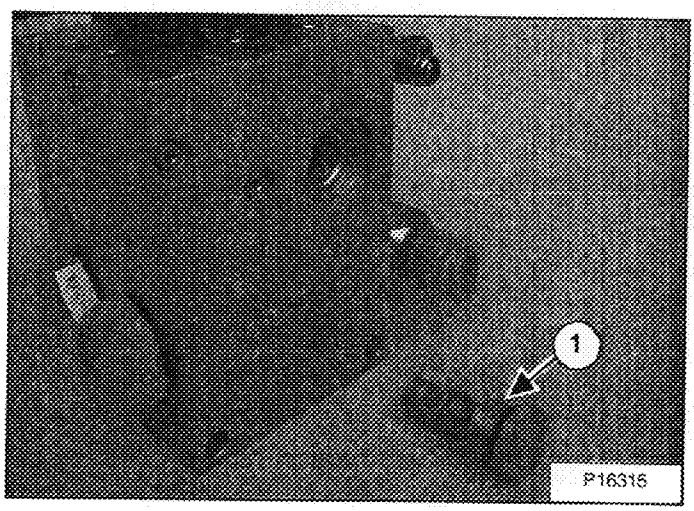
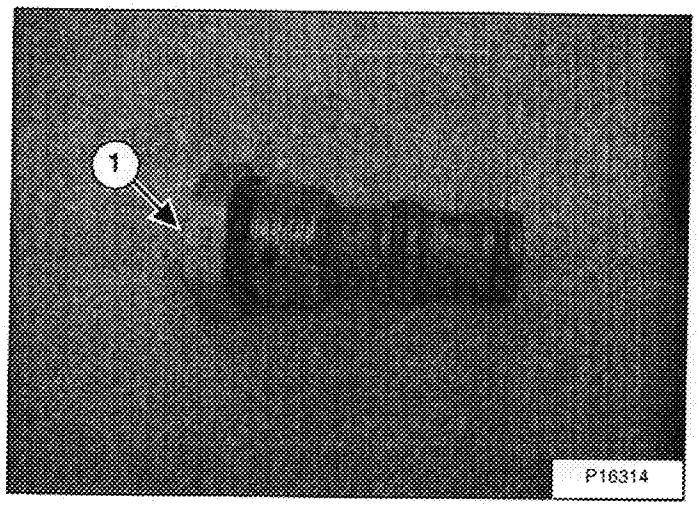


Figure 20-111-9



Remove the shuttle check valve (Item 1) **[Figure 20-111-8]** & **[Figure 20-111-9]** from SH1 port.

Installation: Put oil on O-rings and back-up washers. Tighten to 30-35 ft.-lbs. (40,7-47,5 Nm) torque.

REAR AUXILIARY DIVERTER (DUAL SHUTTLE) (CONT'D)

Disassembly And Assembly (Cont'd)

Figure 20-111-10

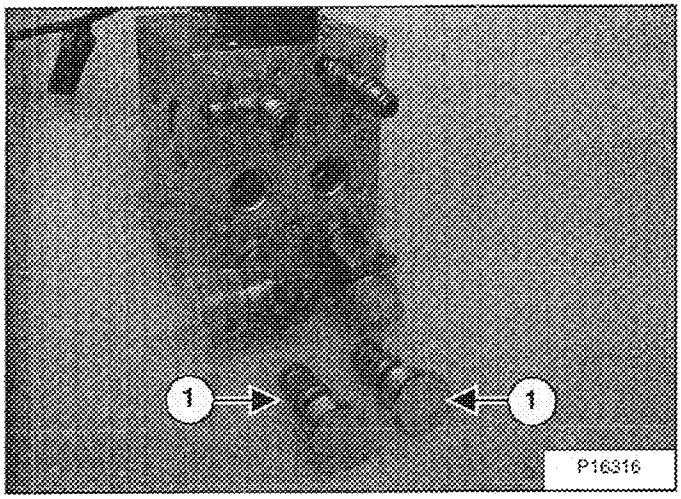
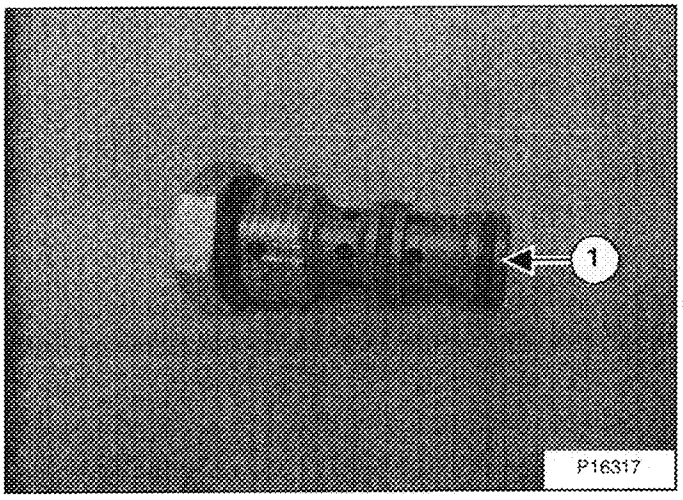


Figure 20-111-11



Remove the pilot check valves (Item 1) **[Figure 20-111-10]** & **[Figure 20-111-11]** from block ports PC1 and PC2.

Installation: Put oil on O-ring and back-up washers. Tighten to 30-35 ft.-lbs. (40,7-47,5 Nm) torque.

Figure 20-111-12

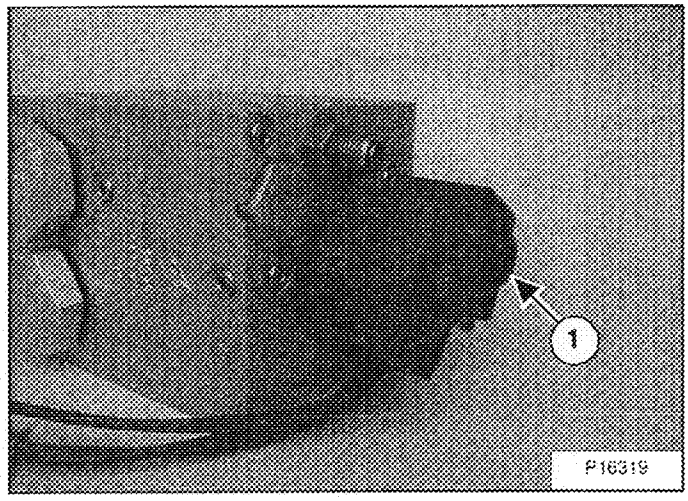
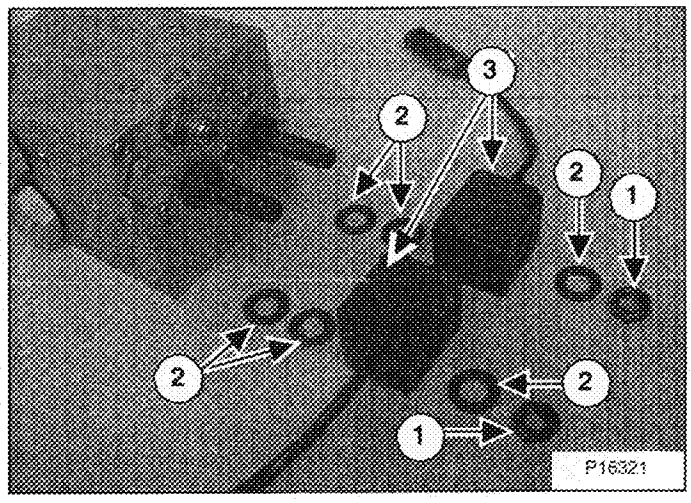


Figure 20-111-13



Remove the nuts (Item 1) **[Figure 20-111-12]** & **[Figure 20-111-13]** from the solenoid valve.

Installation: Tighten the nuts to 50-55 in.-lbs. (5,6-6,2 Nm) torque.

Remove the seal washers (Item 2) **[Figure 20-111-13]** and solenoid valve coils (Item 3) **[Figure 20-111-13]**.

Disassembly And Assembly (Cont'd)

Figure 20-111-14

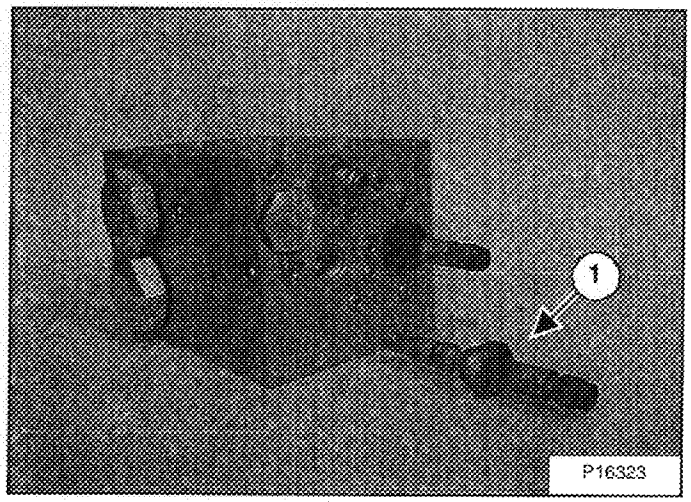
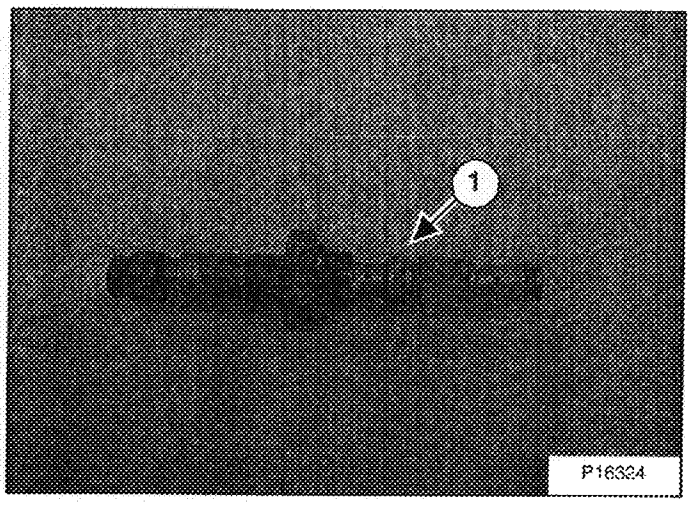


Figure 20-111-15



Remove the diverter control solenoid valve (Item 1) **[Figure 20-111-14]** & **[Figure 20-111-15]** from the SV1 port.

Installation: Put oil on O-rings and back-up washers. Tighten to 12-15 ft.-lbs. (16,3-20,3 Nm) torque.

Figure 20-111-16

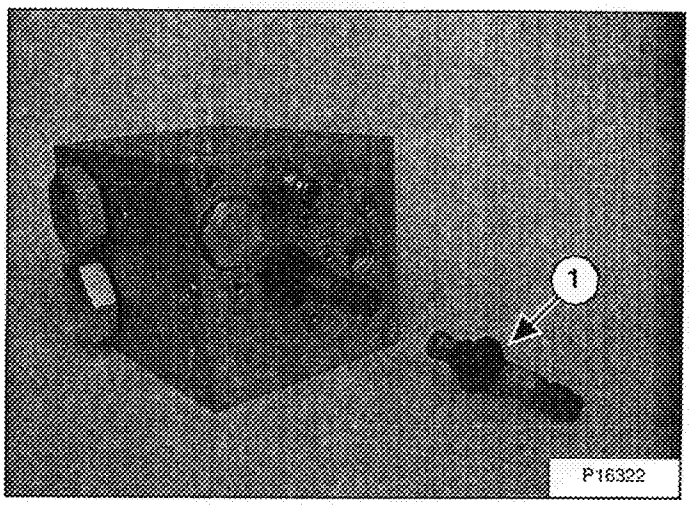
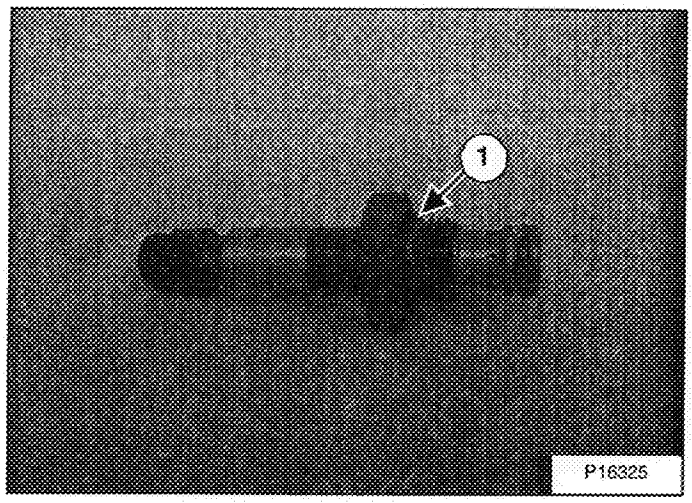


Figure 20-111-17



Remove the pressure relieving solenoid valve (Item 1) **[Figure 20-111-16]** & **[Figure 20-111-17]** from the SV2 port.

Installation: Put oil on O-rings and back-up washers. Tighten to 12-15 ft.-lbs. (16,3-20,3 Nm) torque.

REAR AUXILIARY DIVERTER (DUAL SHUTTLE) (CONT'D)

Disassembly And Assembly (Cont'd)

Figure 20-111-18

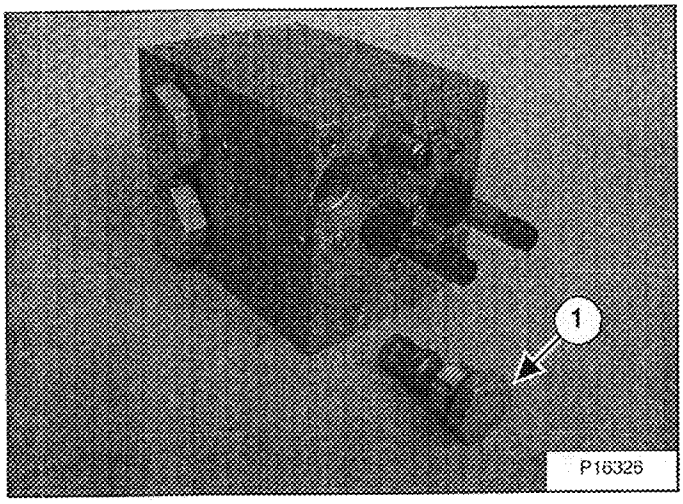
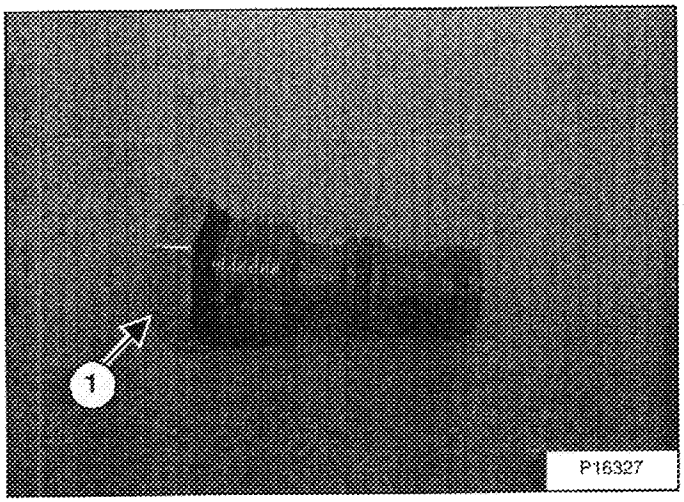


Figure 20-111-19

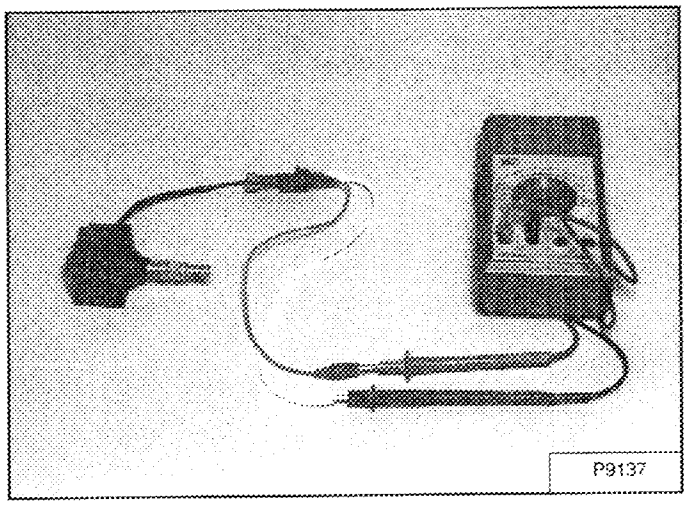


Remove the shuttle check valve (Item 1) **[Figure 20-111-18]** & **[Figure 20-111-19]** from the SH2 port.

Installation: Put oil on O-ring and back-up washers. Tighten to 30-35 ft.-lbs. (40,7-47,5 Nm) torque.

Solenoid Testing

Figure 20-111-20



Use a test meter to measure coil resistance **[Figure 20-111-20]**. Coil wires do not have polarity. Correct resistance is 6-9 ohms.

Replace the test meter with 12 volt power. You can see and hear the spool shift.

Inspection

Inspect cartridges, check valves, solenoid valves and sealing washers for contamination or damage. Wash all parts in clean solvent. Use air pressure for drying them. Install new O-rings and back-up washers.

Inspect diverter block cavities for contamination. Wash block in clean solvent. Use air pressure to dry.

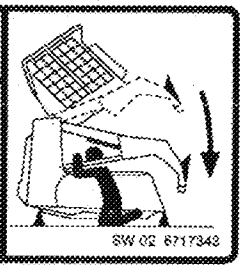
POWER BOB-TACH BLOCK

Removal And Installation

DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 57051



WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

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

Lift and block the loader. (See Contents Page 10-01.)

Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

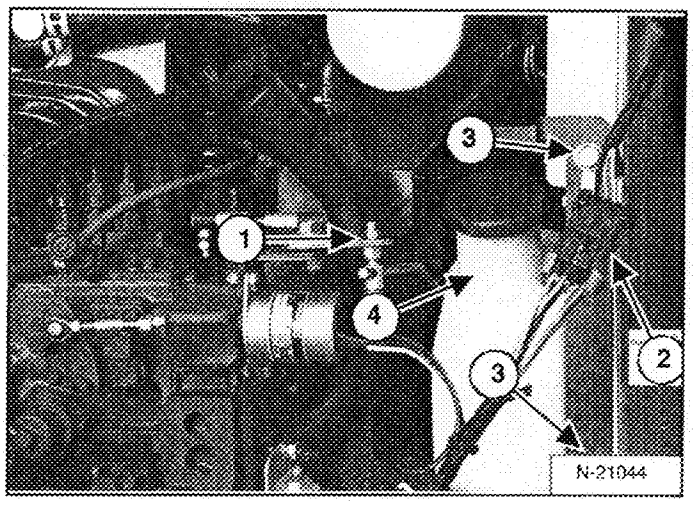
Raise the operator cab. (See Contents Page 10-01.)

Open the rear door. (See Contents Page 50-01.)

Drain the hydraulic reservoir. (See Contents Page 20-01.)

Remove the engine speed control. (See Contents Page 70-01.)

Figure 20-120-1



Remove the nut from the speed control linkage (Item 1) **[Figure 20-120-1]**.

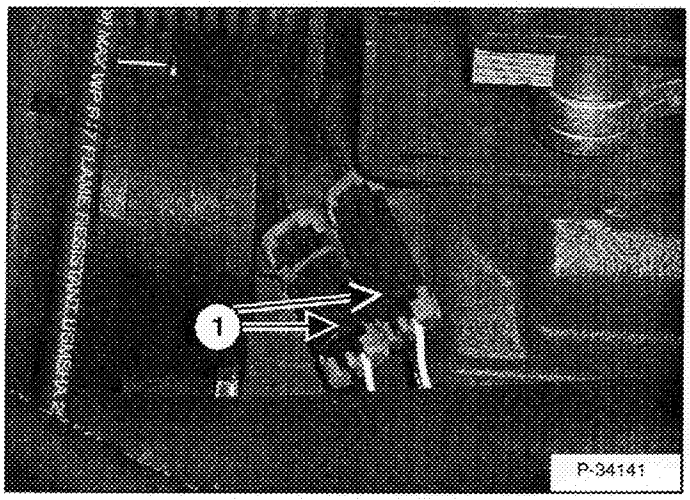
Unplug the rear lights electrical connector (Item 2) **[Figure 20-120-1]**.

Remove the belt shield mounting bolts (Item 3) **[Figure 20-120-1]**.

Remove the belt shield.

Remove the coolant recover tank and mount (Item 4) **[Figure 20-120-1]**

Figure 20-120-2

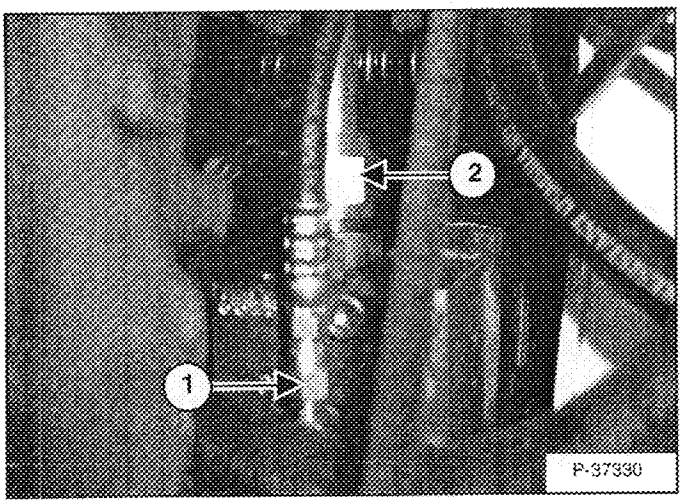


Disconnect the wire harness connectors (Item 1) **[Figure 20-120-2]**.

POWER BOB-TACH BLOCK (CONT'D)

Removal and Installation (Cont'd)

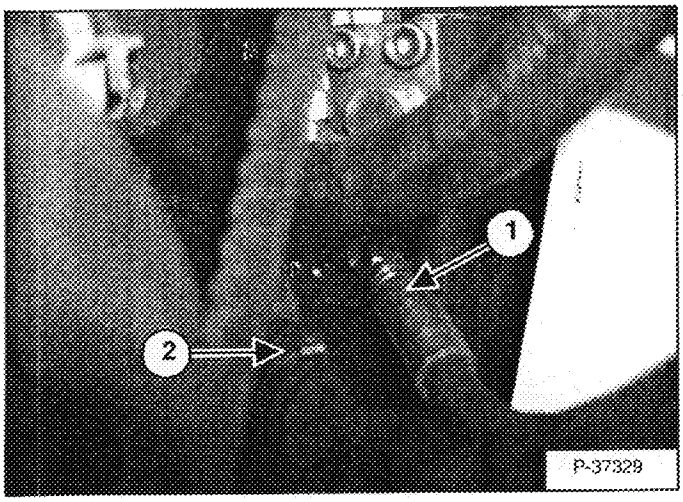
Figure 20-120-3



Disconnect the hose (Item 1) **[Figure 20-120-3]** from the "DR" port on the Power Bob-tach block.

Disconnect the outlet hose (Item 2) **[Figure 20-120-3]** from the top of the Power Bob-tach block.

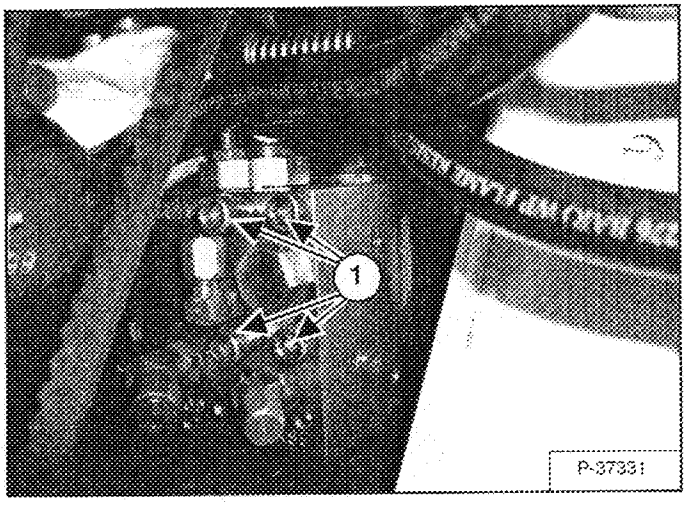
Figure 20-120-4



Disconnect the hose (Item 1) **[Figure 20-120-4]** from the "BASE" port on the Power Bob-tach block.

Disconnect the hose (Item 2) **[Figure 20-120-4]** from the "ROD" port on the Power Bob-tach block.

Figure 20-120-5



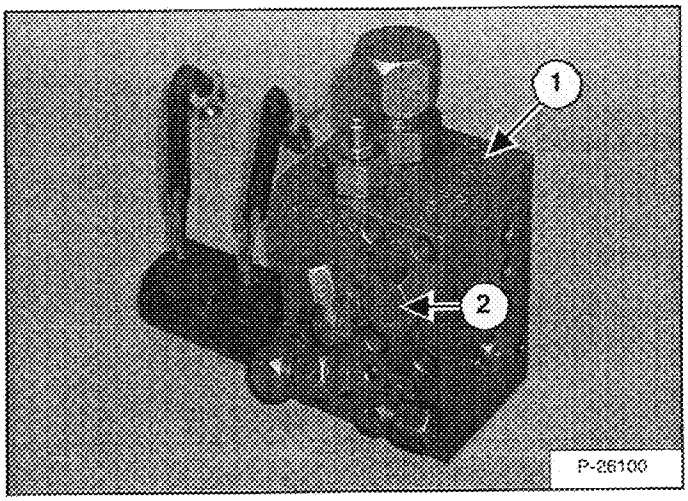
Remove the four mounting bolts (Item 1) **[Figure 20-120-5]** holding the Power Bob-tach block.

Installation: Replace the O-ring and tighten the mounting bolts (Item 1) **[Figure 20-120-5]** to 25-28 ft.-lbs. (34-38 Nm) torque.

Remove the Power Bob-tach block.

Disassembly And Assembly

Figure 20-120-6



Clean the block (Item 1) **[Figure 20-120-6]** to remove dirt before disassembly. Block ports are labeled for correct assembly.

Remove the plug (Item 2) **[Figure 20-120-6]**.

Installation: Tighten the plug to 46 ft.-lbs. (62,4 Nm) torque.

Disassembly And Assembly (Cont'd)

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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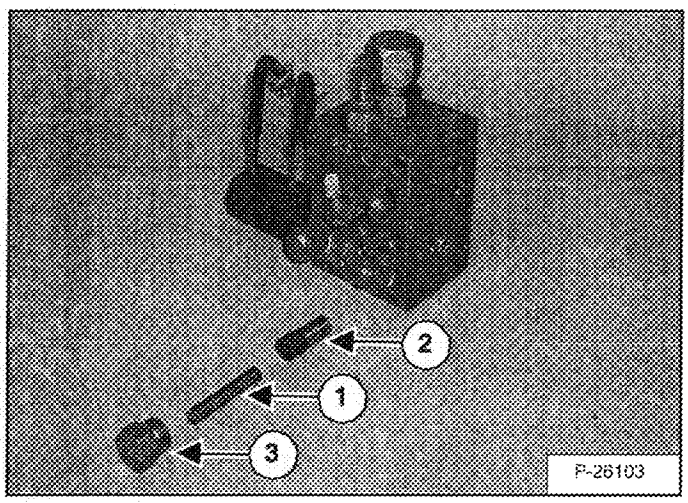
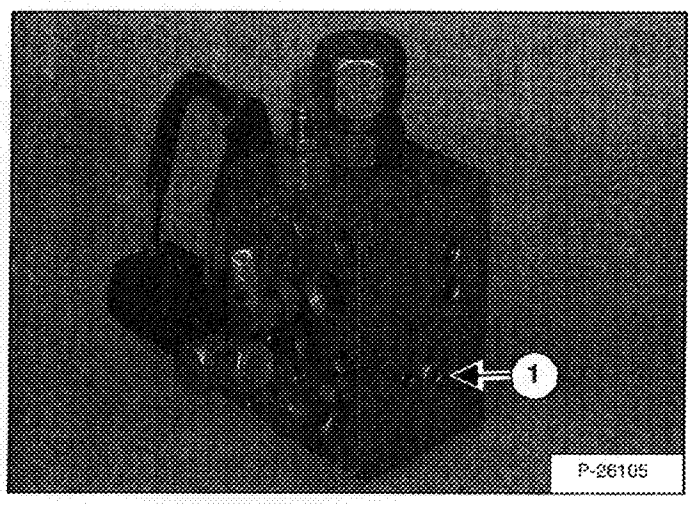
Figure 20-120-7



Remove the spring (Item 1) **[Figure 20-120-7]** and compensator (Item 2) **[Figure 20-120-7]**.

Check the O-ring (Item 3) **[Figure 20-120-7]** on the plug and replace as needed.

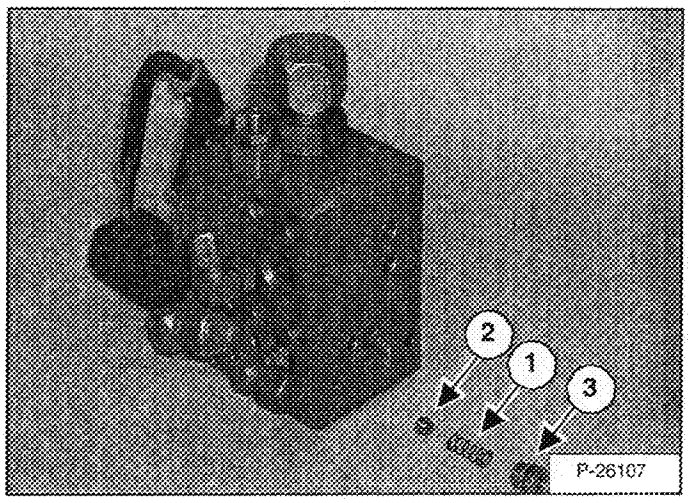
Figure 20-120-8



Remove the plug (Item 1) **[Figure 20-120-8]**.

Installation: Tighten the plug to 120 in.-lbs. (13,6 Nm) torque.

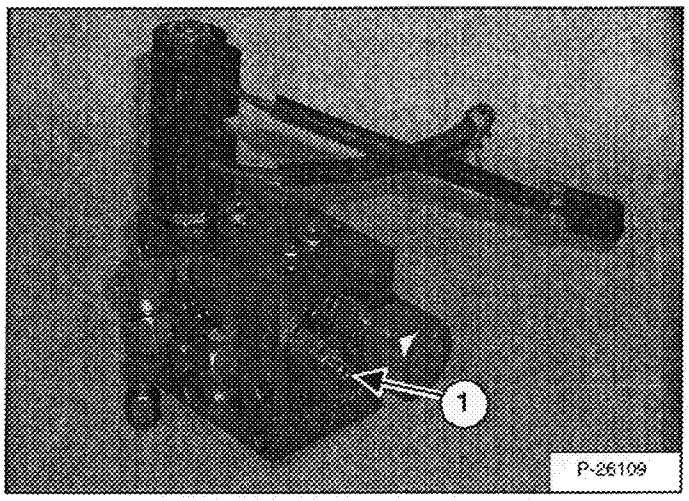
Figure 20-120-9



Remove the spring (Item 1) and check ball (Item 2) **[Figure 20-120-9]**.

Check the O-ring (Item 3) **[Figure 20-120-9]** on the plug and replace as needed.

Figure 20-120-10

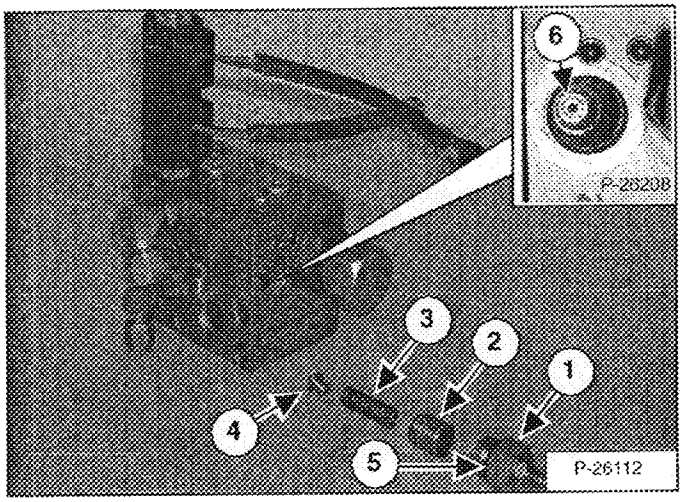


Remove the pressure reducing valve plug (Item 1) **[Figure 20-120-10]** & **[Figure 20-120-11]**.

Installation: Tighten the pressure reducing valve plug to to 46 ft.-lbs. (62,4 Nm) torque.

Disassembly And Assembly (Cont'd)

Figure 20-120-11



Remove the relief piston (Item 2), spring (Item 3), ball seat spring guide (Item 4) **[Figure 20-120-11]**.

Check the O-ring (Item 5) **[Figure 20-120-11]** on the pressure reducing valve plug and replace as needed.

NOTE: The relief valve seat (Item 6) [Figure 20-120-11] is a non-serviceable part. If seat is damaged, order a new power Bob-Tach block from Bobcat parts.

Figure 20-120-12

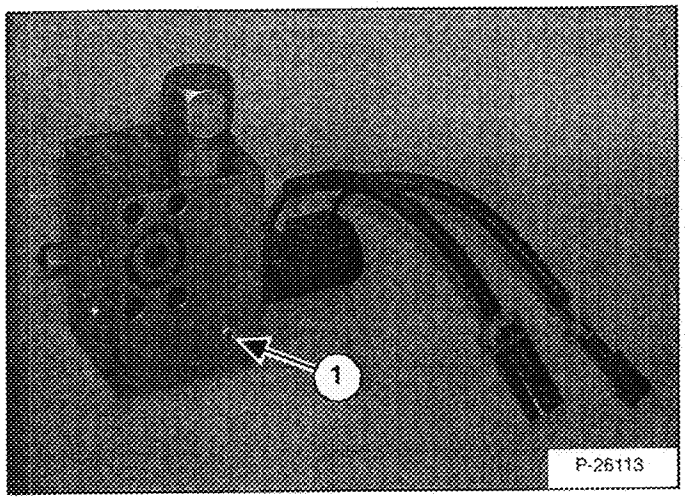
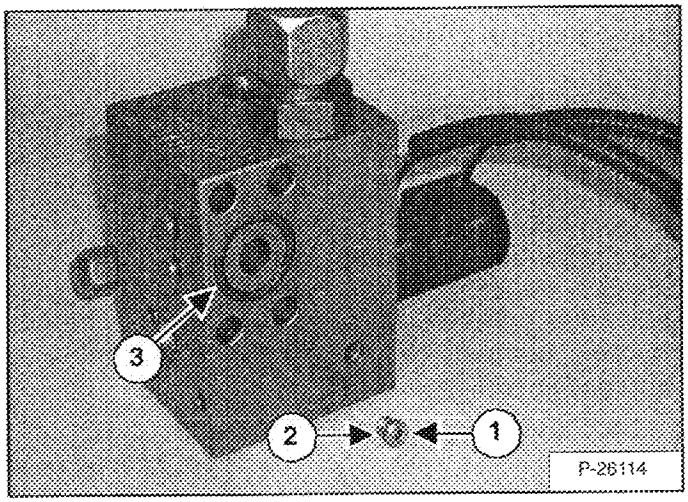


Figure 20-120-13



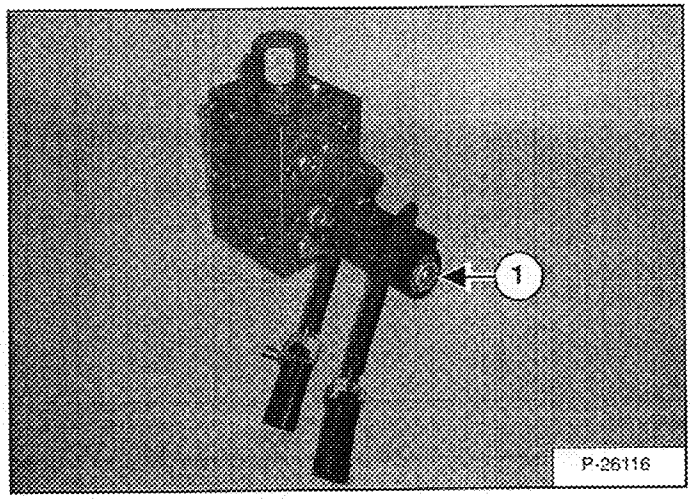
Remove the plug (Item 1) **[Figure 20-120-12]** & **[Figure 20-120-13]**.

Installation: Tighten the plug to 32 in.-lbs. (3,6 Nm) torque.

Check the O-ring (Item 2) **[Figure 20-120-13]** on the plug and replace as needed.

Check the O-ring (Item 3) **[Figure 20-120-13]** and replace as needed.

Figure 20-120-14

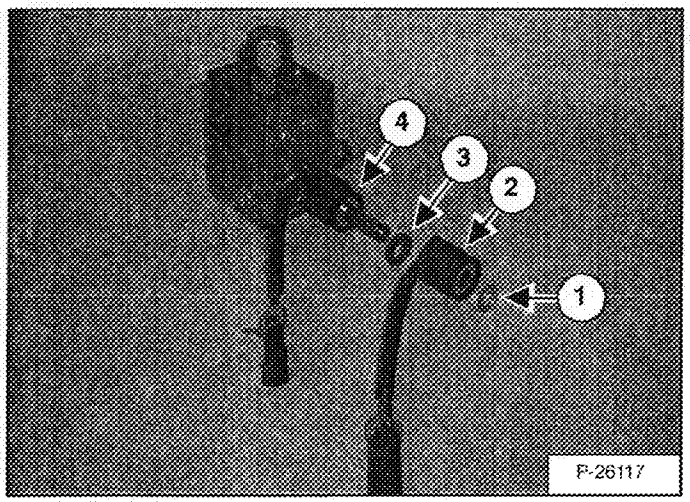


Remove the nut (Item 1) **[Figure 20-120-14]** & **[Figure 20-120-15]**.

Installation: Tighten the nut to 5 ft.-lbs. (6,8 Nm) torque.

Disassembly And Assembly (Cont'd)

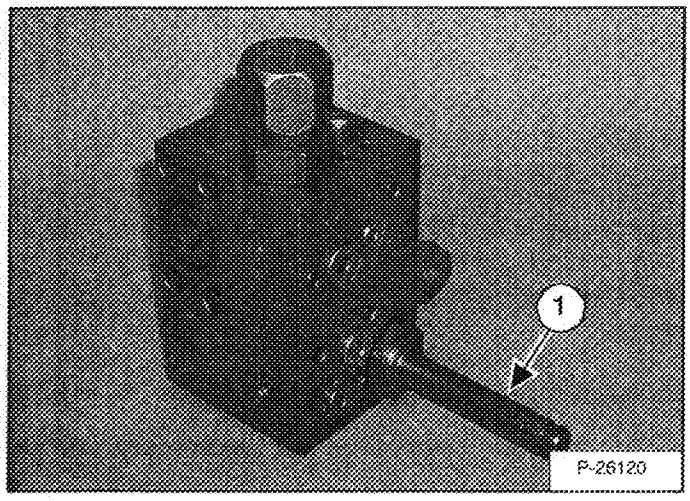
Figure 20-120-15



Remove the first solenoid coil (Item 2), spacer (Item 3) and the second solenoid coil (Item 4) **[Figure 20-120-15]**.

NOTE: Remember the solenoid coil orientation for ease of installation.

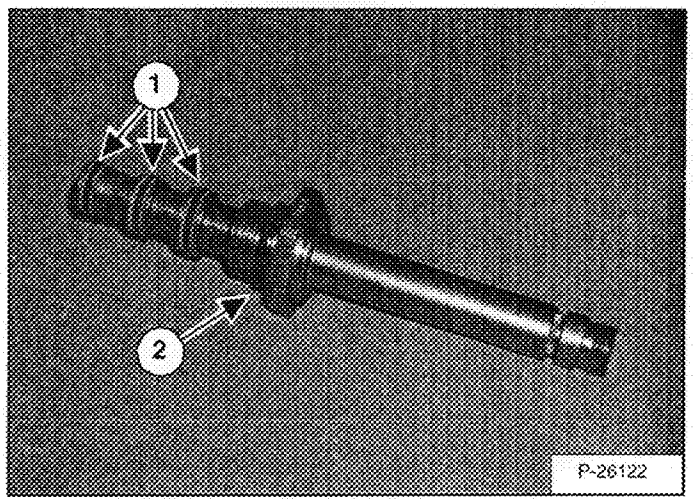
Figure 20-120-16



Remove the solenoid valve stem (Item 1) **[Figure 20-120-16]**.

Installation: Tighten the solenoid valve stem to 20 ft.-lbs. (27.1 Nm) torque.

Figure 20-120-17



Check the O-rings and back-up washers (Item 1) **[Figure 20-120-17]** and replace as needed.

Installation: Put oil on O-rings and back-up washers.

Check the O-ring (Item 2) **[Figure 20-120-17]** and replace as needed.

Disassembly And Assembly (Cont'd)

Figure 20-120-18

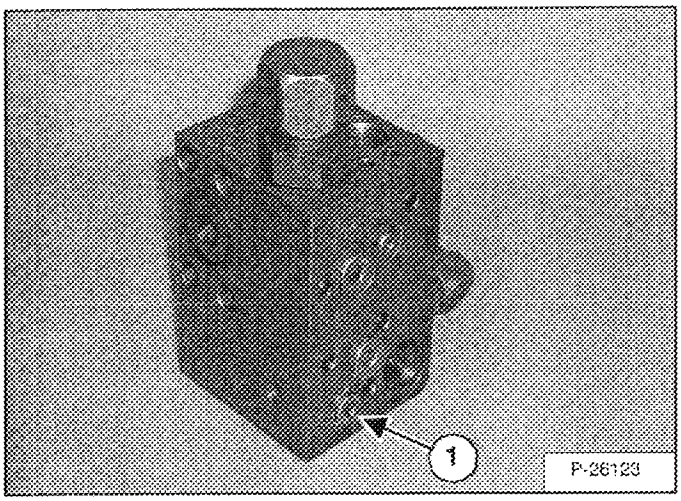
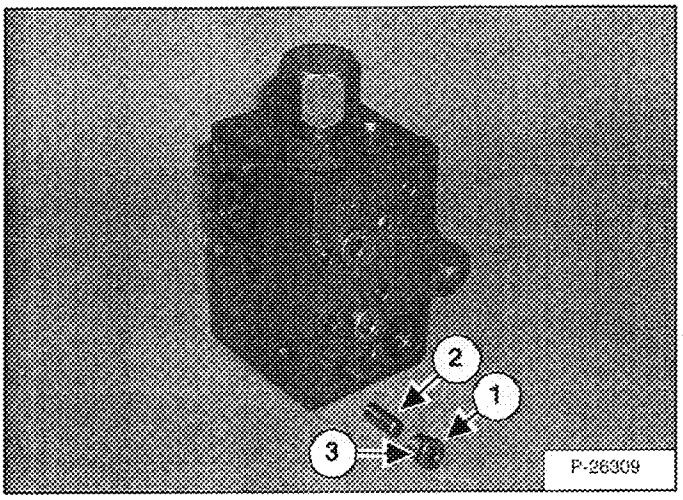


Figure 20-120-19



Remove the plug (Item 1) **[Figure 20-120-18]** & **[Figure 20-120-19]**.

Installation: Tighten the plug to 120 in.-lbs. (13,6 Nm) torque.

Remove the dowel pin shuttle (Item 2) **[Figure 20-120-19]**.

Check the O-ring (Item 3) **[Figure 20-120-19]** and replace as needed.

Figure 20-120-20

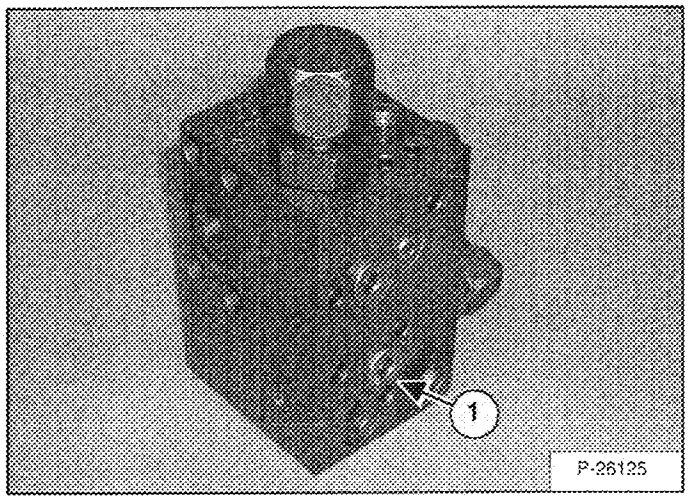
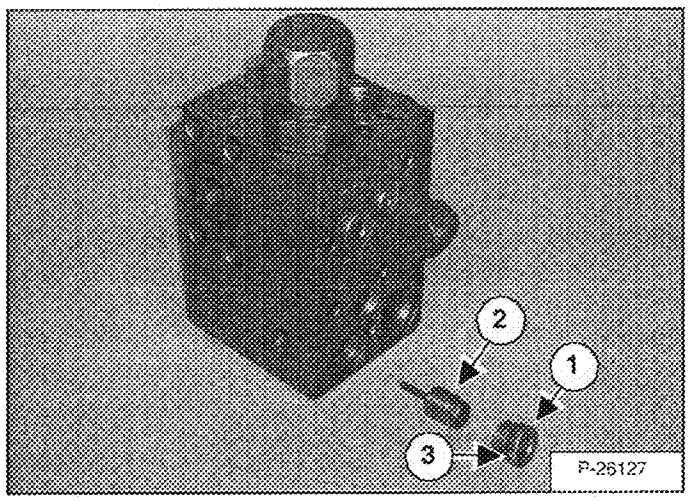


Figure 20-120-21



Remove the plug (Item 1) **[Figure 20-120-20]** & **[Figure 20-120-21]**.

Installation: Tighten the plug to 198 in.-lbs. (22,4 Nm) torque.

Remove the pilot piston (Item 2) **[Figure 20-120-21]**.

Check the O-ring (Item 3) **[Figure 20-120-21]** and replace as needed.

Disassembly And Assembly (Cont'd)

Figure 20-120-22

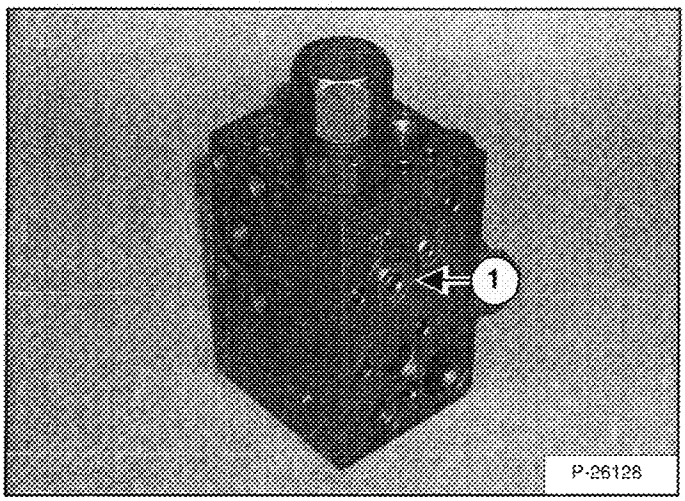
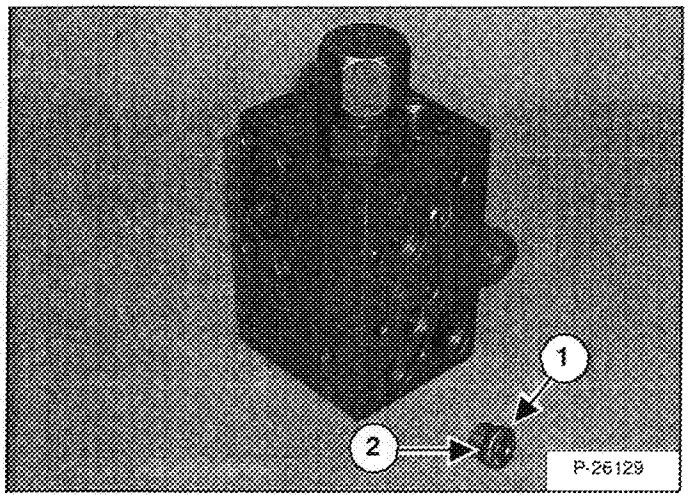


Figure 20-120-23



Remove the plug (Item 1) **[Figure 20-120-22]** & **[Figure 20-120-23]**.

Installation: Tighten the plug to 198 in.-lbs. (22,4 Nm) torque.

Check the O-ring (Item 2) **[Figure 20-120-23]** and replace as needed.

Figure 20-120-24

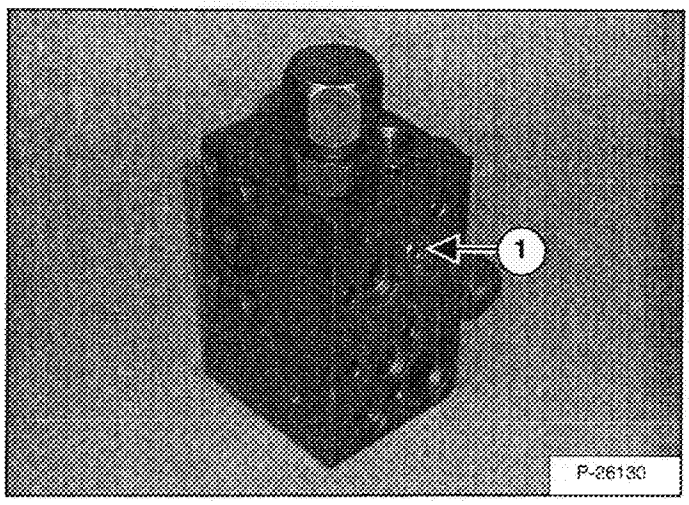
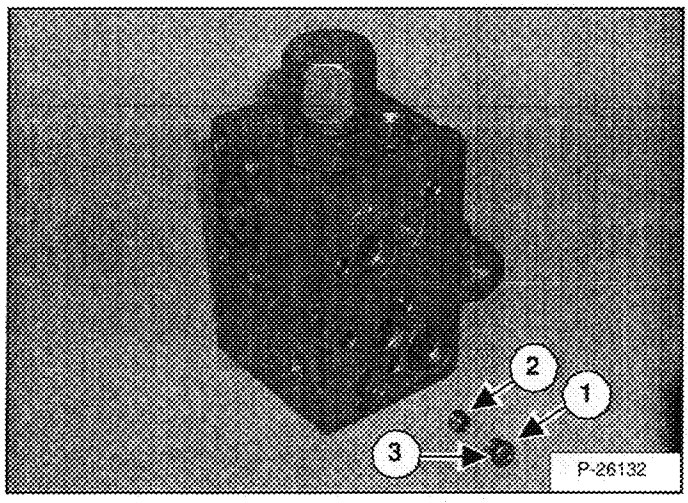


Figure 20-120-25



Remove the plug (Item 1) **[Figure 20-120-24]** & **[Figure 20-120-25]**.

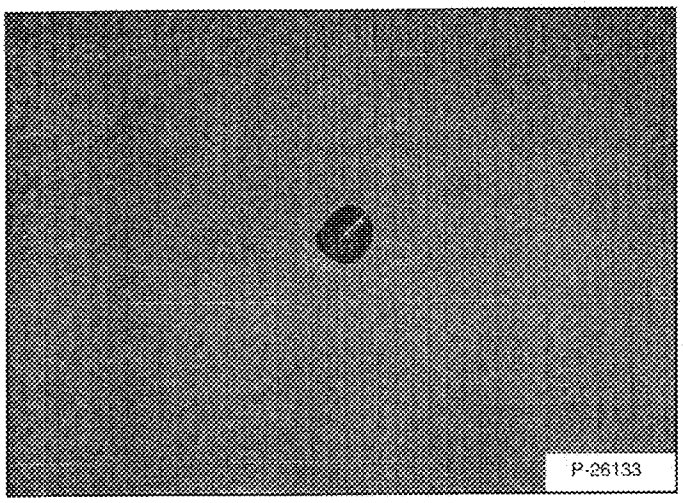
Installation: Tighten the plug to 32 in.-lbs. (3,6 Nm) torque.

Remove the orifice (Item 2) **[Figure 20-120-25]** with a 5/32 inch allen wrench.

Installation: Tighten the orifice to 5 ft.-lbs. (6,8 Nm) torque.

Disassembly And Assembly (Cont'd)

Figure 20-120-26



Make sure orifice is clean and not plugged **[Figure 20-120-26]**.

Figure 20-120-27

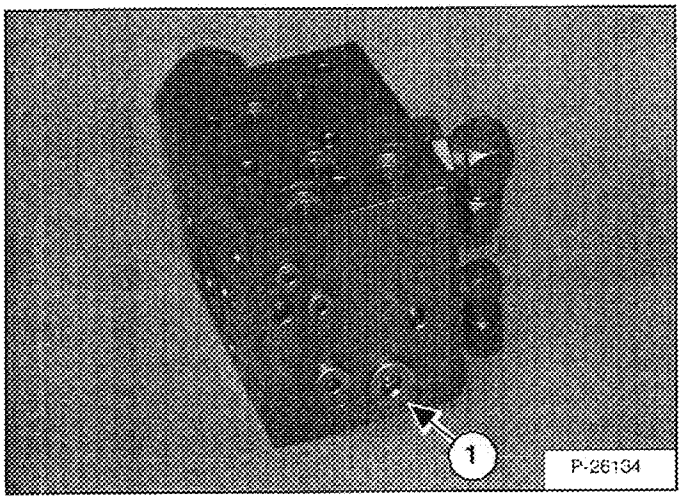
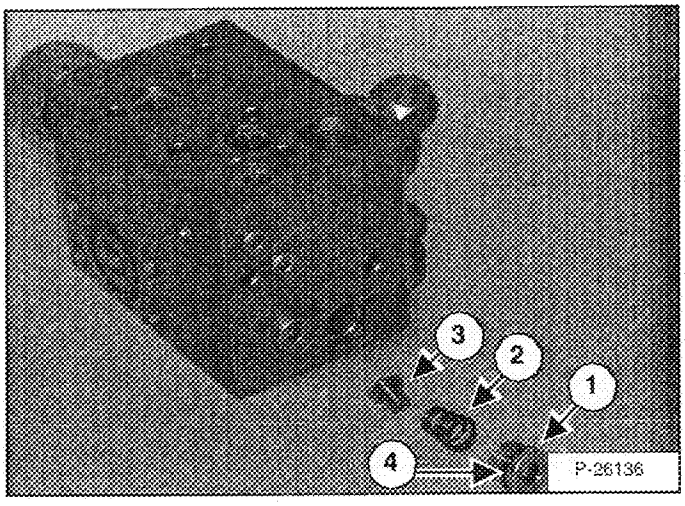


Figure 20-120-28



Remove the plug (Item 1) **[Figure 20-120-27]** & **[Figure 20-120-28]**.

Installation: Tighten the plug to 198 in.-lbs. (22,4 Nm) torque.

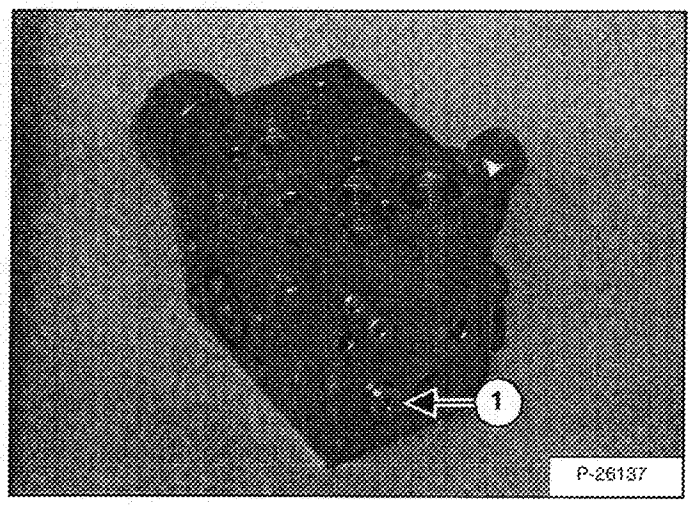
Remove the relief spring (Item 2) **[Figure 20-120-28]**.

Remove the ball seat spring guide (Item 3) **[Figure 20-120-28]**.

Check the O-ring (Item 4) **[Figure 20-120-28]** and replace as needed.

Disassembly And Assembly (Cont'd)

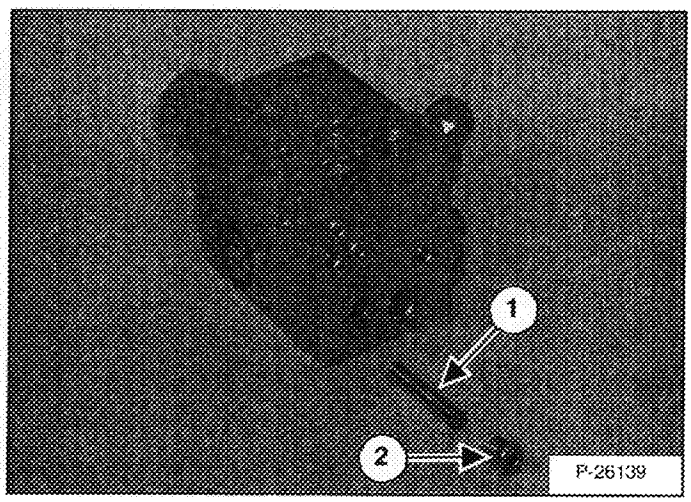
Figure 20-120-29



Remove the plug (Item 1) **[Figure 20-120-29]**.

Installation: Tighten the plug to 120 in.-lbs. (13,6 Nm) torque.

Figure 20-120-30



Remove the dowel pin orifice (Item 1) **[Figure 20-120-30]**.

Check the O-ring (Item 2) **[Figure 20-120-30]** and replace as needed.

Figure 20-120-31

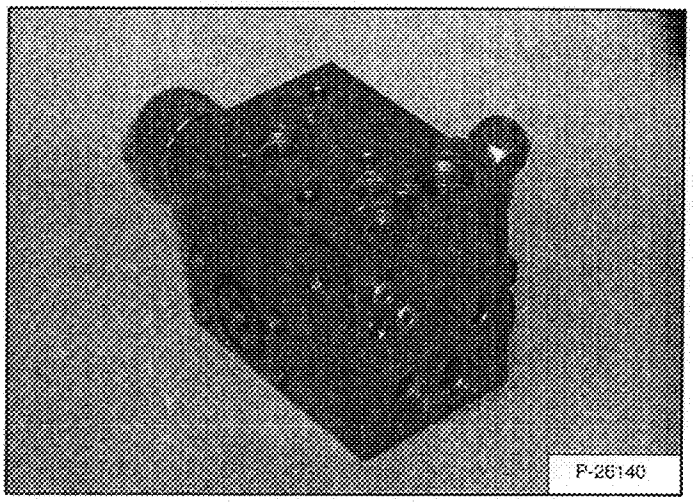
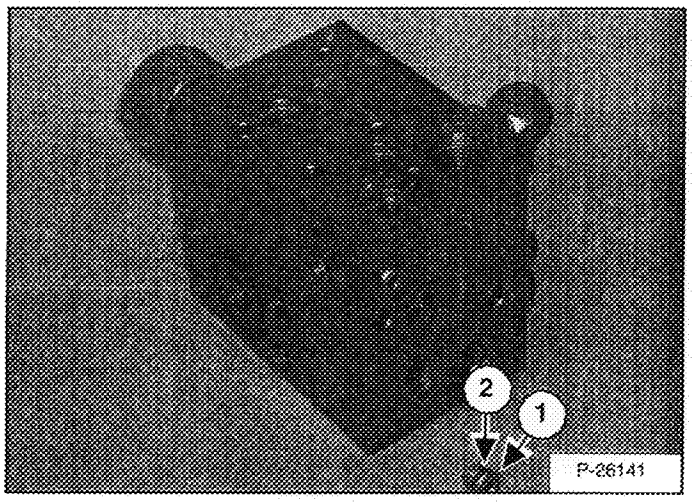


Figure 20-120-32



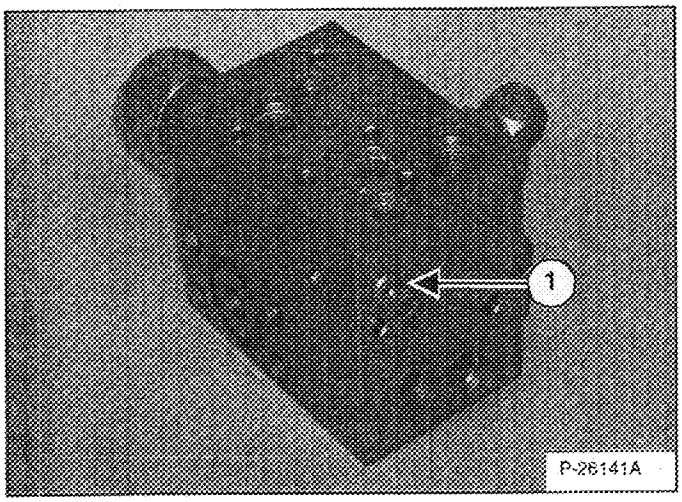
Remove the plug (Item 1) **[Figure 20-120-31]** & **[Figure 20-120-32]**.

Installation: Tighten the plug to 32 in.-lbs. (3,6 Nm) torque.

Check the O-ring (Item 2) **[Figure 20-120-32]** and replace as needed.

Disassembly And Assembly (Cont'd)

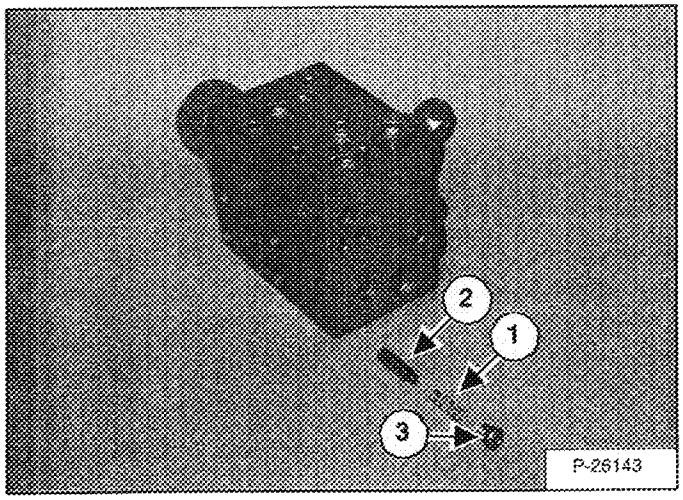
Figure 20-120-33



Remove the plug (Item 1) **[Figure 20-120-33]**.

Installation: Tighten the plug to 32 in.-lbs. (3,6 Nm) torque.

Figure 20-120-34



Remove the flow control spring (Item 1) **[Figure 20-120-34]**.

Remove the flow control (Item 2) **[Figure 20-120-34]**.

Check the O-ring (Item 3) **[Figure 20-120-34]** and replace as needed.

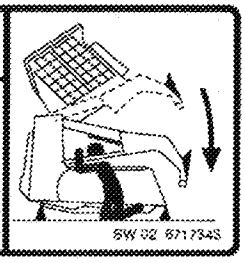
FRONT AUXILIARY PRESSURE RELIEF BLOCK

Removal And Installation

⚠ DANGER

AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.
- Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged. 57061



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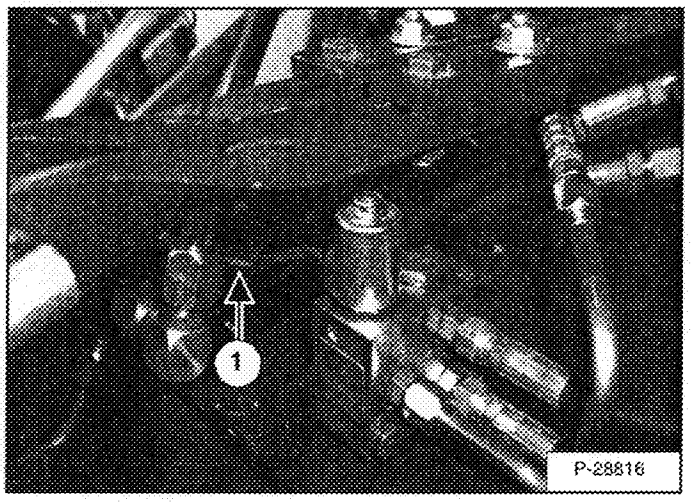
⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Figure 20-130-1



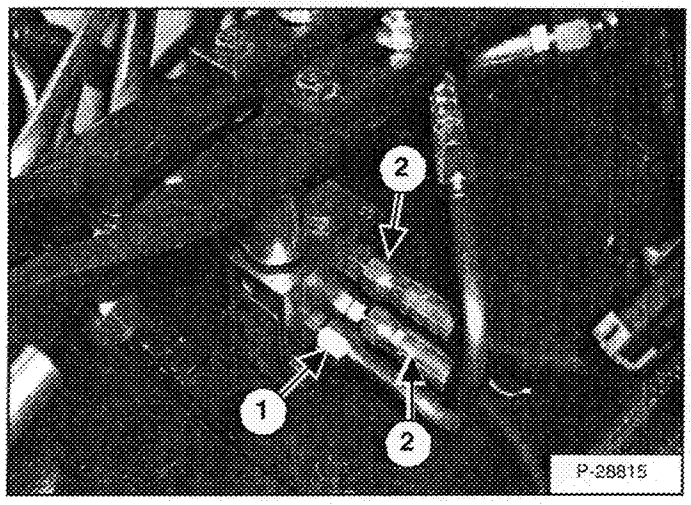
Raise the lift arms and install an approved lift arm support device. (See Contents Page 10-01.)

Raise the operator cab. (See Contents Page 10-01.)

Drain the hydraulic reservoir. (See Contents Page 20-01.)

Disconnect the electrical wire harness connector (Item 1) **[Figure 20-130-1]**.

Figure 20-130-2

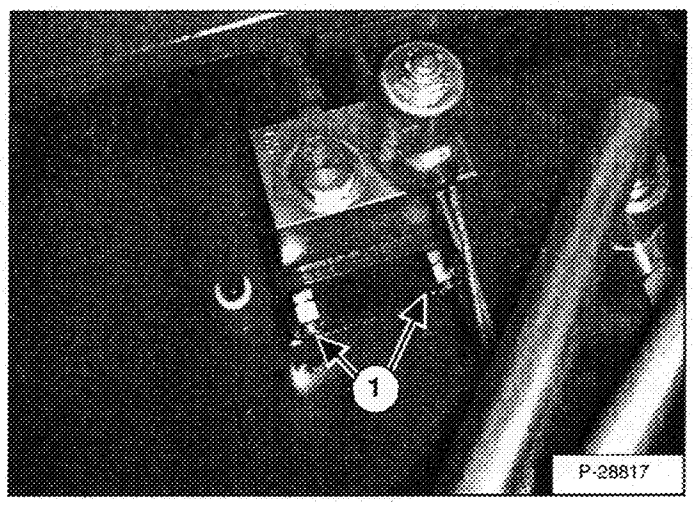


Mark the hydraulic hoses on the front auxiliary pressure relief block for proper installation.

Remove and cap the hydraulic hose (Item 1) **[Figure 20-130-2]** that goes from the hydraulic reservoir to the front auxiliary pressure relief block.

Remove and cap the two hydraulic hoses (Item 2) **[Figure 20-130-2]** that go from the front auxiliary pressure relief block to the front auxiliary tubelines.

Figure 20-130-3



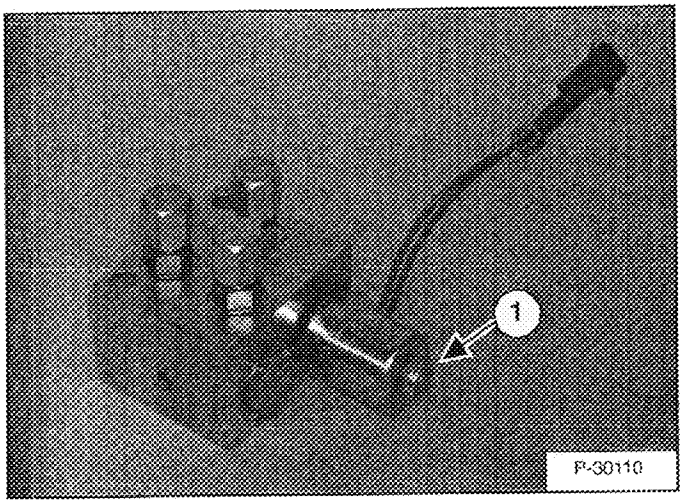
Remove the two mounting bolts (Item 1) **[Figure 20-130-3]** fastening the front auxiliary pressure relief block to the bracket.

Remove the front auxiliary pressure relief block from the loader.

FRONT AUXILIARY PRESSURE RELIEF BLOCK (CONT'D)

Disassembly And Assembly

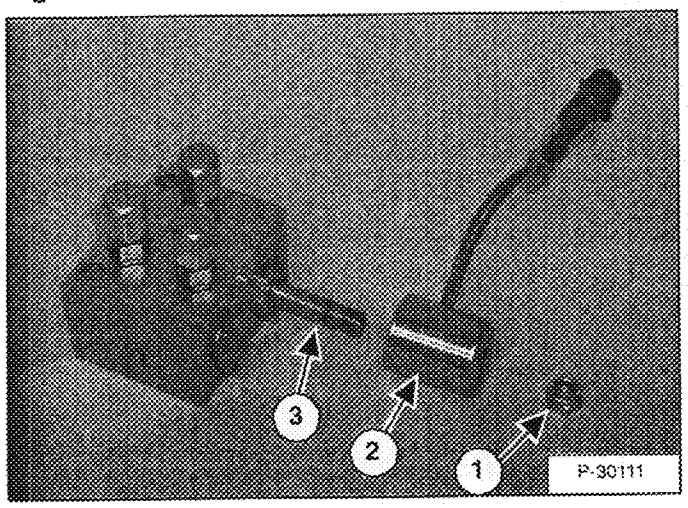
Figure 20-130-4



Loosen the electrical brake solenoid nut (Item 1) **[Figure 20-130-4]**.

Assembly: Tighten the solenoid nut to 15-45 in.-lbs. (1,7-5,1 Nm) torque.

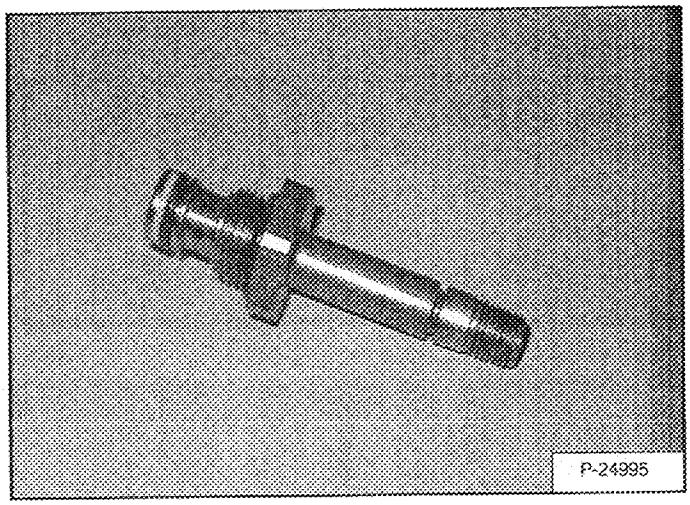
Figure 20-130-5



Remove the solenoid nut (Item 1) **[Figure 20-130-5]** and solenoid coil (Item 2) **[Figure 20-130-5]**.

Remove the solenoid valve (Item 3) **[Figure 20-130-5]** from the block.

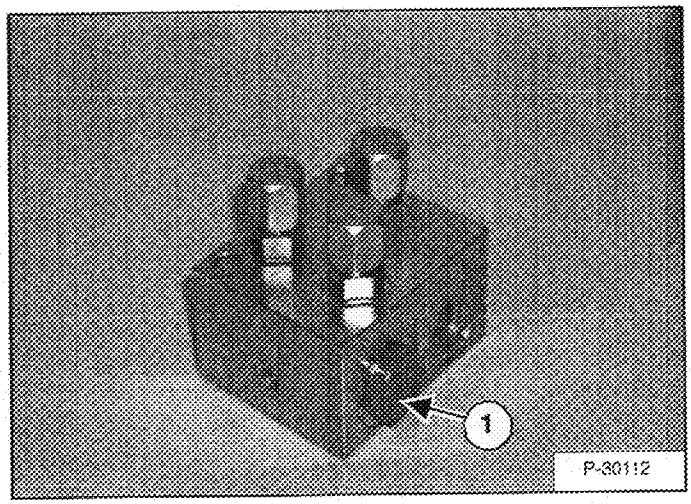
Figure 20-130-6



Inspect the O-rings and back-up washer on the solenoid valve and replace as needed **[Figure 20-130-6]**.

Assembly: Tighten the solenoid valve to 120-144 in.-lbs. (13,6-16,3 Nm) torque.

Figure 20-130-7



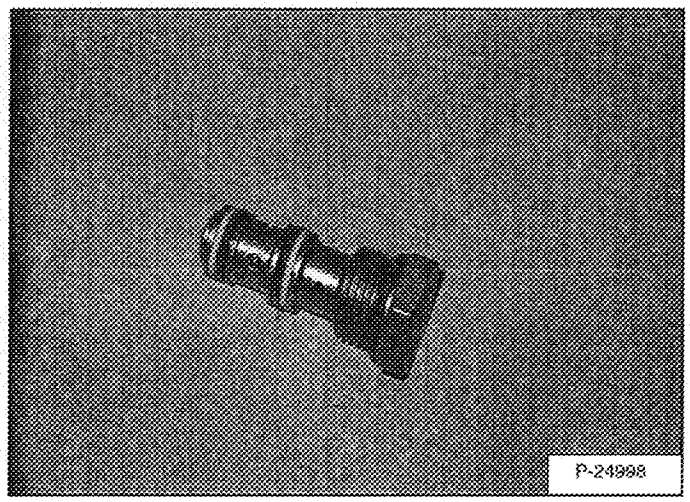
Remove the shuttle valve (Item 1) **[Figure 20-130-7]** from the block.

Assembly: Tighten the shuttle valve to 30 ft.-lbs. (40,7 Nm) torque.

FRONT AUXILIARY PRESSURE RELIEF BLOCK (CONT'D)

Disassembly And Assembly (Cont'd)

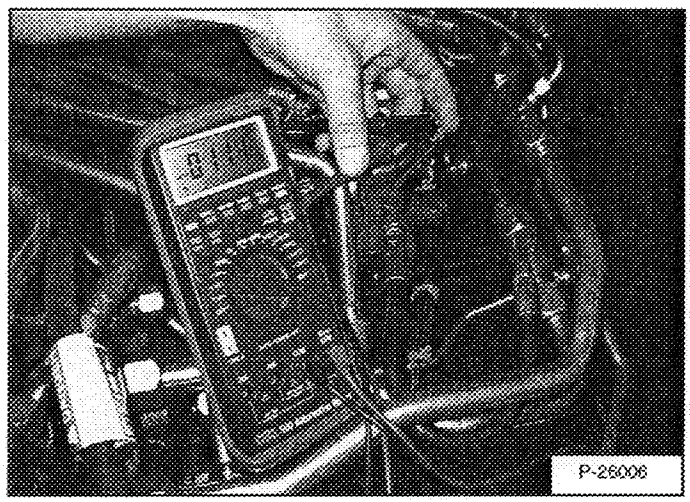
Figure 20-130-8



Inspect the O-rings and back-up washers on the shuttle valve and replace as needed **[Figure 20-130-8]**.

Solenoid Testing

Figure 20-130-9



Use a test meter to measure coil resistance **[Figure 20-130-9]**. Coil wires do not have polarity. Correct resistance is 11 ± 1 ohms.

Replace the test meter with 12 volt power. You can see and hear the spool shift.

Solenoid Inspection

Inspect cartridges, check valves, solenoid valves and sealing washers for contamination or damage. Wash all parts in clean solvent. Use air pressure for drying them. Install new O-rings and back-up washers.

Inspect the diverter block cavities for contamination. Wash the block in clean solvent. Use air pressure to dry.

Bobcat®

FRONT AUXILIARY HYDRAULIC COUPLER BLOCK

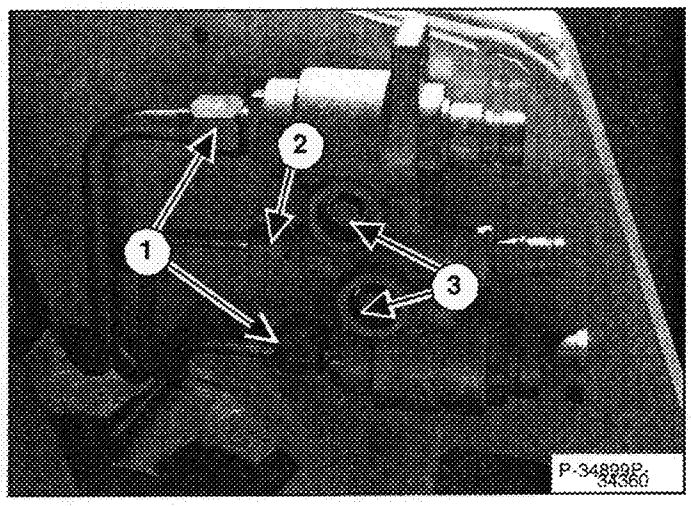
Removal and Installation

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

Figure 20-131-1



Disconnect the auxiliary tubelines (Item 1) and drain tubeline (Item 2) **[Figure 20-131-1]** from the coupler block.

Remove the two mounting bolts (Item 3) **[Figure 20-131-1]**.

Disassembly And Assembly

Figure 20-131-2

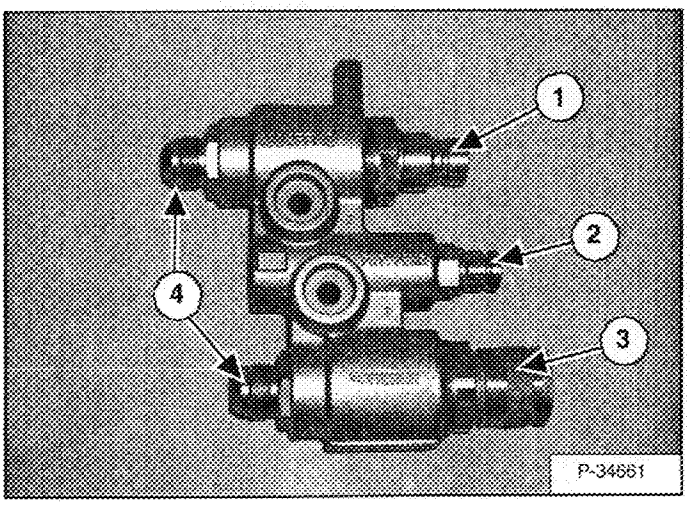
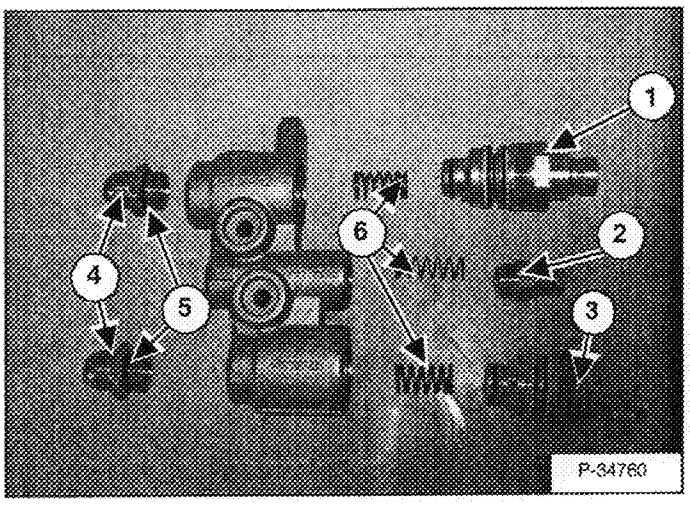


Figure 20-131-3



Remove the male coupler (Item 1) **[Figure 20-131-2]** & **[Figure 20-131-3]**.

Installation: Tighten the male coupler (Item 1) **[Figure 20-131-2]** & **[Figure 20-131-3]** to 59 ft.lbs. (80 Nm)

Remove the drain coupler (Item 2) **[Figure 20-131-2]** & **[Figure 20-131-3]**.

Installation: Tighten the drain coupler (Item 2) **[Figure 20-131-2]** & **[Figure 20-131-3]** to 37 ft.lbs. (50 Nm)

Remove the female coupler (Item 3) **[Figure 20-131-2]** & **[Figure 20-131-3]**.

Installation: Tighten the female coupler (Item 3) **[Figure 20-131-2]** & **[Figure 20-131-3]** to 59 ft.lbs. (80 Nm)

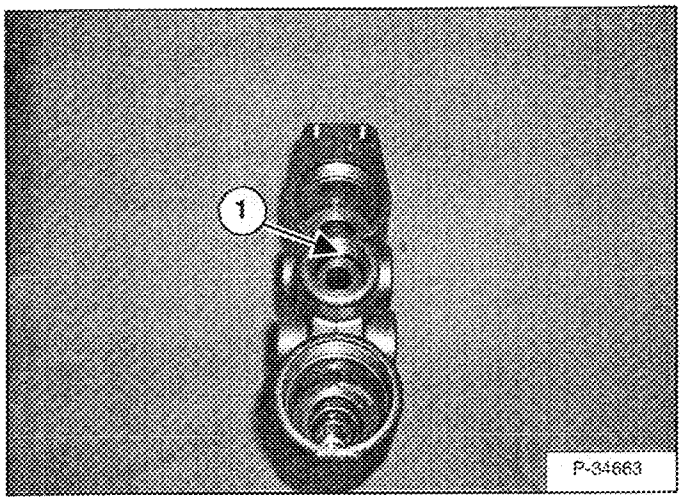
Remove the fittings (Item 4) **[Figure 20-131-2]** & **[Figure 20-131-3]** check the O-rings (Item 5) **[Figure 20-131-3]** and replace as needed.

Remove the springs (Item 6) **[Figure 20-131-3]**.

FRONT AUXILIARY HYDRAULIC COUPLER BLOCK (CONT'D)

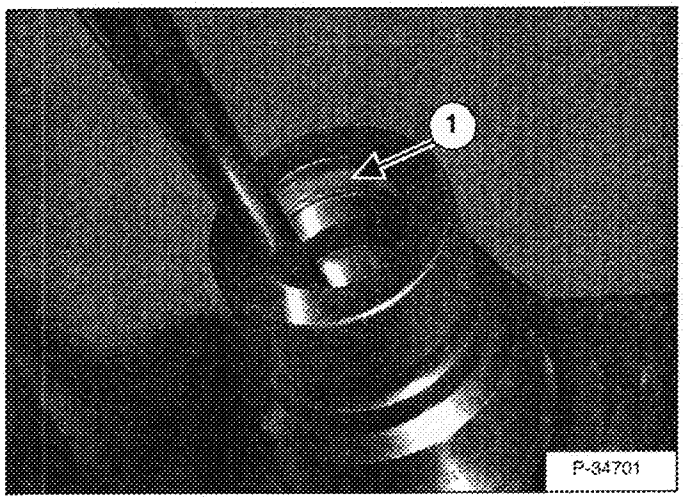
Disassembly And Assembly (Cont'd)

Figure 20-131-4



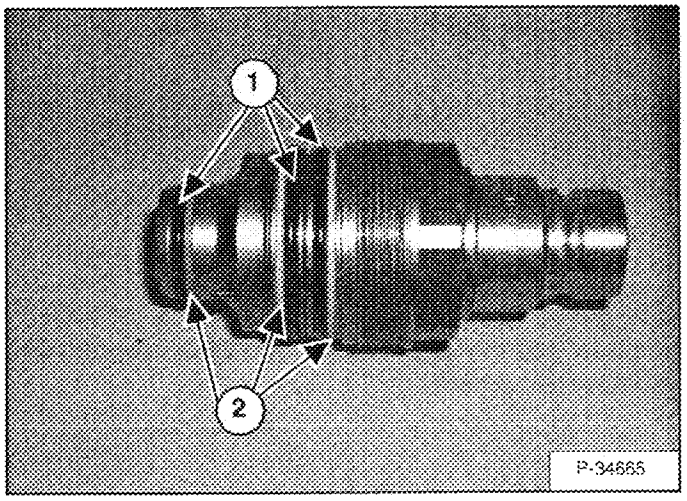
Check the O-ring (Item 1) **[Figure 20-131-4]** for damage and replace as needed.

Figure 20-131-5



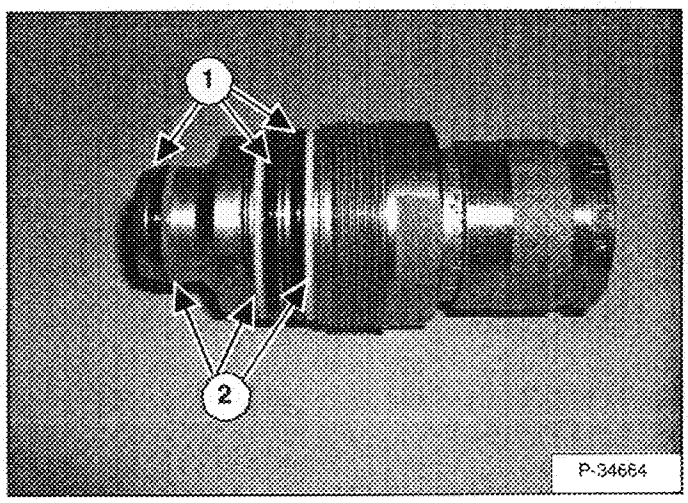
Press center of male couplers down and check the O-ring (Item 1) **[Figure 20-131-5]** for damage and replace as needed.

Figure 20-131-6



Check the O-rings (Item 1) backup O-rings (Item 2) **[Figure 20-131-6]** for damage and replace as needed.

Figure 20-131-7



Check the O-rings (Item 1) backup O-rings (Item 2) **[Figure 20-131-7]** for damage and replace as needed.