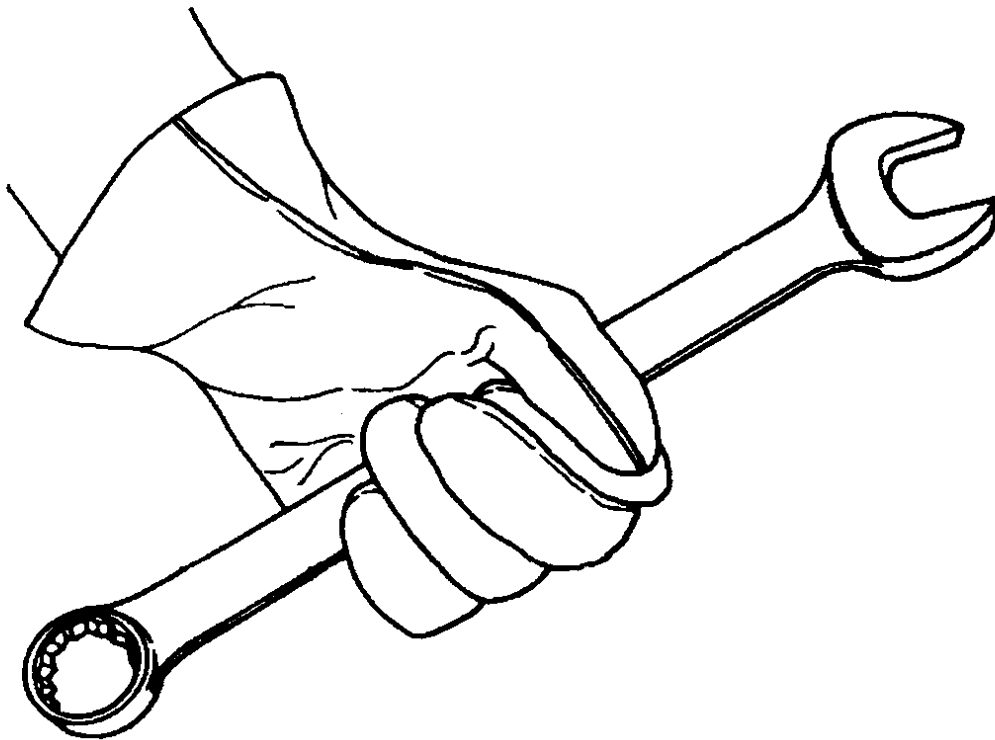




MELROE HYDRAULIC CONTROL VALVE

COMPONENT REPAIR MANUAL



MELROE
INGERSOLL-RAND

6570041 (6-89)



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INTRODUCTION

Melroe recommends that all service technicians attend either field or factory Bobcat Service Workshops for necessary information and education.

Workshops are held many times a year at various locations throughout the U.S. and Canada. Contact your District Service Manager or Melroe Service Office Gwinner, N.D. (701) 678-6165 for schedule.

This Component Repair Manual provides the Service Technician with information for servicing Hydraulic Control Valve.

Make reference to the SERVICE MANUAL for your MODEL Loader to troubleshoot, test, remove and install the control valve.

See the INDEX Page to find your MODEL Loader, S/N listing, Tab #.

SAFETY INSTRUCTIONS

We Care About Your Safety.

| | |
|---|---|
|  WARNING | <p>Wear safety glasses to prevent eye injury when any of the following conditions exist:</p> <ul style="list-style-type: none">• When fluids are under pressure.• Flying debris or loose material is present.• Engine is running.• Tools are being used. <p>W-2019-1285</p> |
|---|---|

BEFORE YOU WORK ON THE HYDRAULIC CONTROL VALVE

Read the complete sequence so you know the complete disassembly or assembly procedure before the work is actually started.

| |
|--|
|  WARNING |
| <p>Warnings on the machine and in the manuals are for your safety. Failure to obey warnings can cause injury or death.</p> <p>W-2044-1285</p> |

| |
|---|
| IMPORTANT |
| <p>This notice identifies procedures which must be followed to avoid damage to the machine.</p> <p>I-2019-0284</p> |

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| MODELS | S/N | TAB | SECTION | MANUFACTURER |
|-----------------------|---------------|-----|---------|--------------|
| 443 | All | 1 | A | Melroe |
| 540, 640 | 13001 & Above | 1 | A | Melroe |
| 740, 843 | 15001 & Above | 1 | A | Melroe |
| 750 Series | All | 5 | A | Melroe |
| 853 | All | 5 | A | Melroe |
| 1213 | All | 4 | A | Melroe |
| 1600 | 12001 & Above | 1 | A | Melroe |
| 2000 | 13001 & Above | 1 | A | Melroe |
| 2000 RTF | All | 1 | A | Melroe |
| 2400 | All | 2 | A | Melroe |
| 2400 Series Rear Aux. | All | 3 | A | Gresen |
| 2410 | All | 5 | A | Melroe |
| Glossary of Terms | TAB #6 | | | |

HYDRAULIC CONTROL VALVE

CONTROL VALVE

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| Installation of the Centering Spring..... | 12 |
| Orifice | 11 |
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| Short Chamfer..... | 15 |
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MELROE

INGERSOLL-RAND

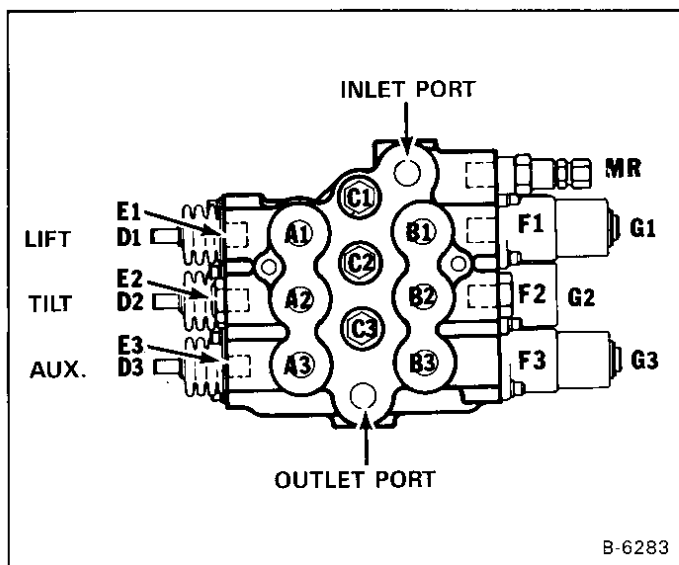


Fig. 1 Melroe Valve for Farmboy, 443, 540 and 640 Series Loaders

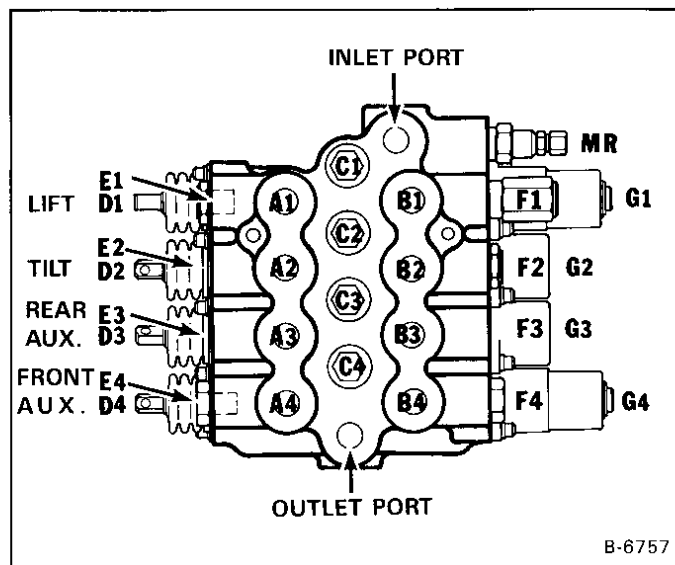


Fig. 2 Melroe Valve for 740 and 843 Series Loaders

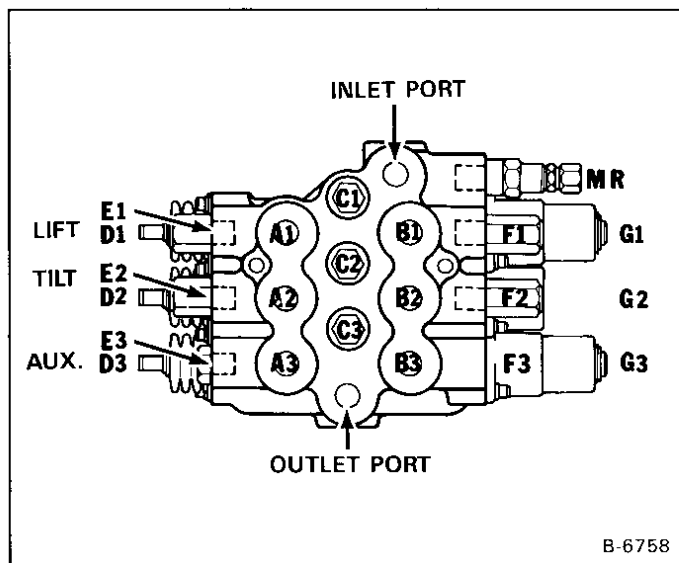
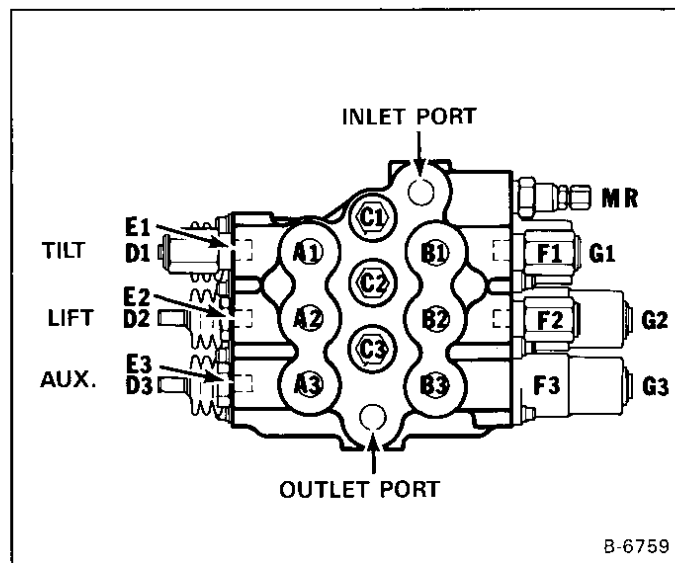


Fig. 3 Melroe Valve for 1600 Series Loaders



* Fig. 4 Melroe Valve for 2000 Series Loaders

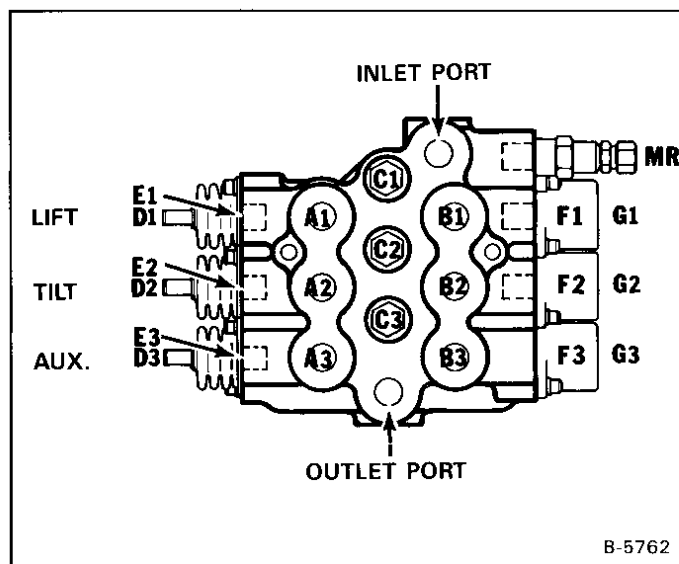
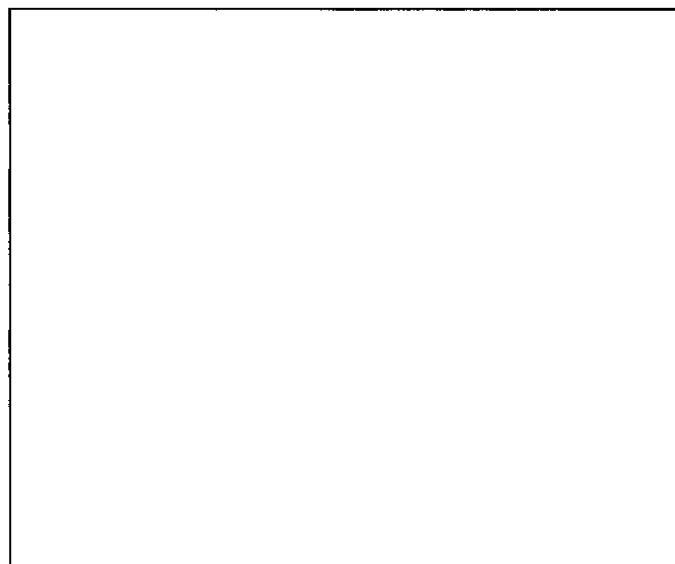


Fig. 5 Melroe Valve for 2000 RTF



CONTROL VALVE IDENTIFICATION (Cont'd)

| | BOBCAT MODEL | | | | | | |
|------|---|-------------------------|---------------------------|---|---|-----------------------------------|---------------------------|
| Item | farmboy Fig. 1 | 440 Fig. 1 | 540, 640 Fig. 1 | 740,843 Fig. 2 | 1600 Fig. 3 | 2000 Fig. 4 | 2000 RTF Fig. 5 |
| A-1 | Lift Cylinder Rod End | | | | | Tilt Cylinder Rod End | |
| A-2 | Tilt Cylinder Base End | | Tilt Cylinder Rod End | | Tilt Cylinder Base End | Lift Cylinder Rod End | |
| A-3 | Auxiliary Hydraulics (Optional) | Auxiliary Hydraulics | | Rear Auxiliary Hydraulics | Auxiliary Hydraulics | | |
| A-4 | | | | Front Auxiliary Hydraulics | | | |
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| B-2 | Tilt Cylinder Rod End | | Tilt Cylinder Base End | | Tilt Cylinder Rod End | Lift Cylinder Base End | |
| B-3 | Auxiliary Hydraulics (Optional) | Auxiliary Hydraulics | | Rear Auxiliary Hydraulics | Auxiliary Hydraulics | | |
| B-4 | | | | Front Auxiliary Hydraulics | | | |
| C-1 | Load Check Valve Lift Function | | | | | Load Check Valve Tilt Function | |
| C-2 | Load Check Valve Tilt Function | | | | | Load Check Valve Lift Function | |
| C-3 | Load Check Valve Auxiliary Function | | | Loader Check Valve Rear Auxiliary | Load Check Valve Auxiliary Function | | |
| C-4 | | | | Load Check Valve Front Auxiliary | | | |
| D-1 | Lift Spool | | | | | Tilt Spool | |
| D-2 | Tilt Spool | | | | | Lift Spool | |
| D-3 | Auxiliary Spool (Optional) | Auxiliary Spool | | Rear Auxiliary Spool | Auxiliary Spool | | |
| D-4 | | | | Front Auxiliary Spool | | | |

CONTROL VALVE IDENTIFICATION (Cont'd)

| | BOBCAT MODEL | | | | | | |
|------|------------------------------------|-------------------------|--------------------------|--|--------------------------|--------------------------------|--|
| Item | farmboy Fig. 1 | 440 Fig. 1 | 540, 640 Fig. 1 | 740,843 Fig. 2 | 1600 Fig. 3 | 2000 Fig. 4 | 2000 RTF Fig. 5 |
| E-1 | | | | Anti-Cavitation Valve | Port Relief Valve | | |
| E-2 | Anti-Cavitation Valve | | Plug | | Anti-Cavitation Valve | | Plug |
| E-3 | | | | | Plug | | |
| E-4 | | | | Plug | | | |
| MR | Main Relief Valve | | | | | | |
| F-1 | | | Plug | Port Relief Valve | | | |
| F-2 | Plug | | Anti-Cavitation Valve | | Port Relief Valve | | Plug |
| F-3 | | | | | | | |
| F-4 | | | | Plug | | | |
| G-1 | Centering Spring Lift Spool | Detent, Lift Spool | | | | Centering Spring Tilt Spool | |
| G-2 | Centering Spring Tilt Spool | | | | | Detent Lift Spool | Centering Spring Lift Spool |
| G-3 | Centering Spring Aux. (Opt.) | Detent, Auxiliary Spool | | Centering Spring Auxiliary Spool | Detent, Auxiliary Spool | | Centering Spring Auxiliary Spool |
| G-4 | | | | Detent Spool | | | |

CONTROL VALVE

Disassembly and Assembly

See the Service Manual for your Model loader for removal and installation of the control valve.

The 3-spool and 4-spool valves are used in different Model loaders. The port relief valves, anti-cavitation valves and plugs are at different locations in the control valve. Lift and tilt spools can also be in different bores. Refer to pages 2 and 3 for the correct locations of the parts for each control valve.

NOTE: THE ILLUSTRATIONS MAY NOT SHOW THE EXACT LOCATION FOR THE PART YOU ARE REMOVING OR INSTALLING ON THE CONTROL VALVE, BUT THE PROCEDURE IS THE SAME.

IMPORTANT

When making repairs on 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.

1-2003-0284

Mark each valve section and spool so that the parts will be returned to its original bore during assembly. Use bolts to fasten the control valve to a work bench for easier disassembly and assembly.

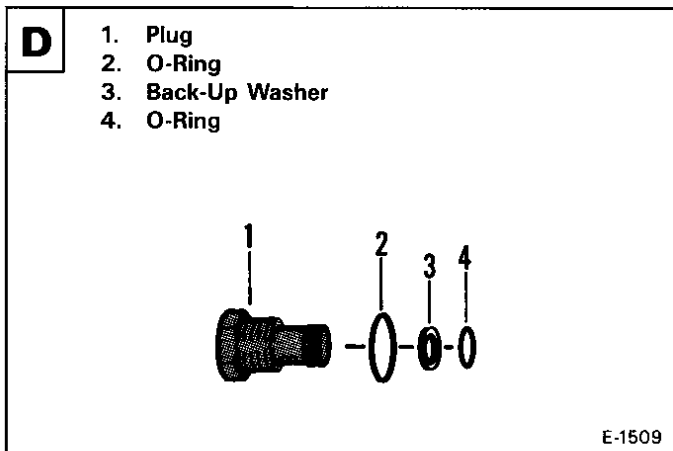
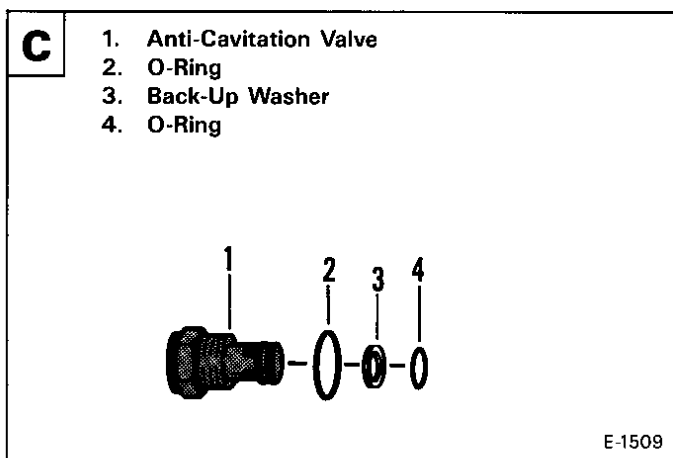
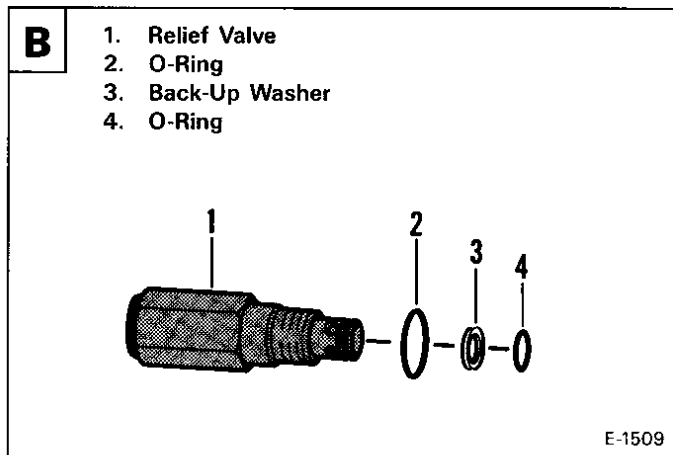
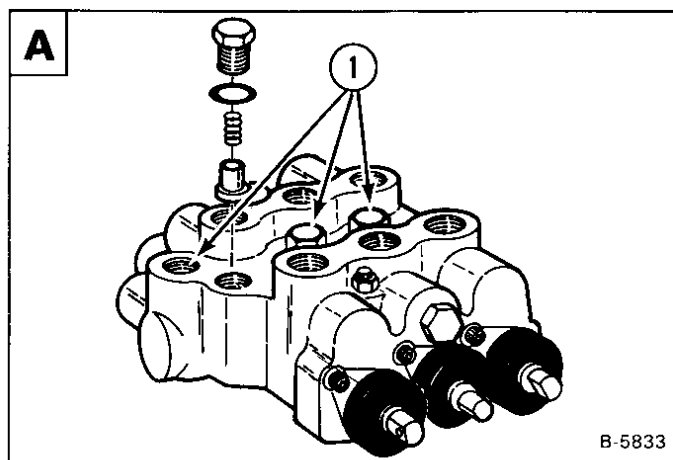
Remove the load check valves (Item 1) from the top of the valve ("C" Ports) **A**.

Remove the following parts from the detent and spool linkage sides of the control valve ("F" & "E" Ports):

1. Port Relief Valve **B**.
2. Anti-Cavitation Valve **C**.
3. Plug **D**.

Remove the O-rings and back-up washers.

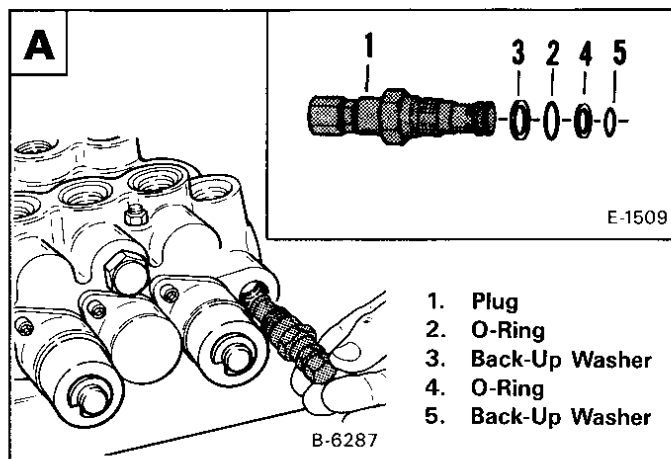
Assembly: Always use NEW O-rings and back-up washers. Tighten to 35-40 ft.-lbs. (47-54 Nm) torque.



CONTROL VALVE (Cont'd)

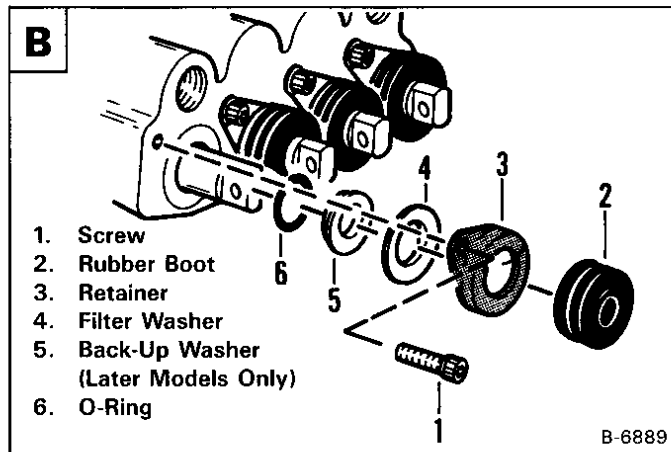
Remove the main relief valve from the control valve **A**.

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



Remove the screws (Item 1), rubber boots (Item 2), boot retainer (Item 3) and filter (Item 4) from each spool **B**.

Assembly: Tighten the screws to 90-100 in.-lbs. (10-11 Nm) torque.



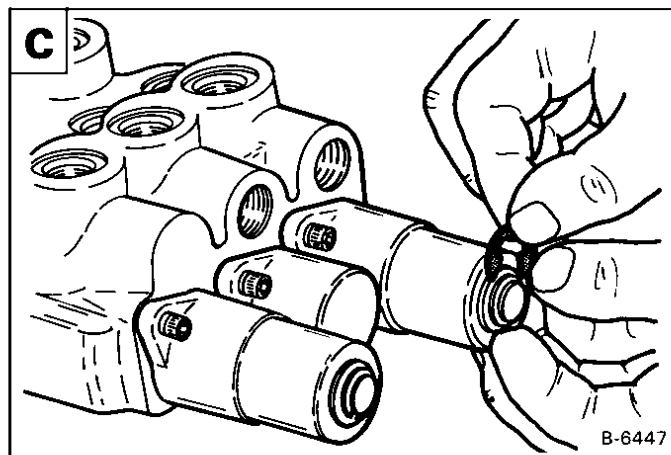
Detent Assembly

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

MEL-1278 — Detent Tool

Use the following procedure to remove and disassemble the detent assembly.

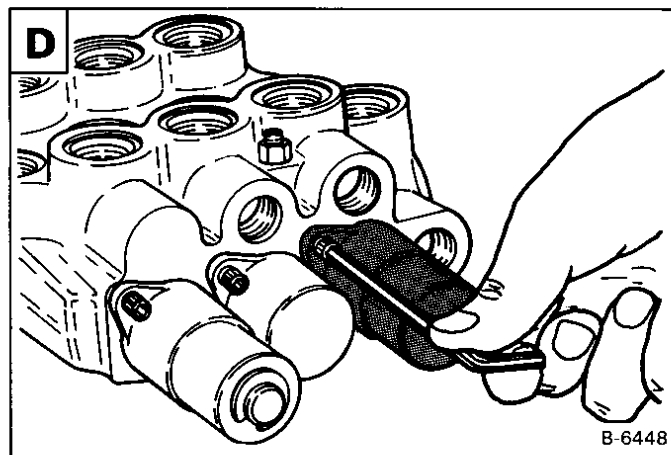
Remove the snap ring and washer **C**.



Remove the screws for the detent cap **D**.

Assembly: Tighten the screws to 90-100 in.-lbs. (10-11 Nm) torque.

Remove the detent cap.



IMPORTANT

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

I-2012-0284

Remove the detent sleeve, detent balls and springs.

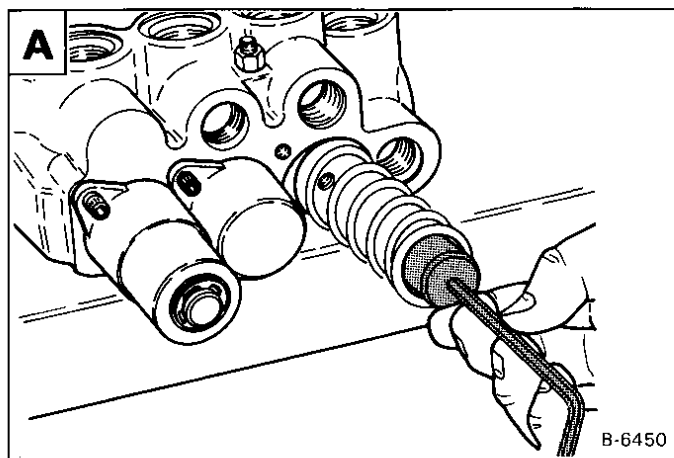
CONTROL VALVE (Cont'd)

Remove the centering spring bolt **A**.

NOTE: Carefully remove the centering spring bolt, because there is spring pressure.

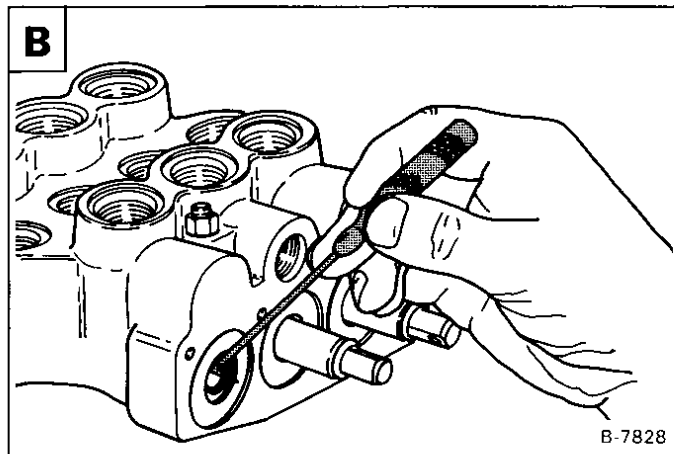
Remove the spool from the bore.

Assembly: For installation of the centering spring (See Page 12 for the correct procedure).



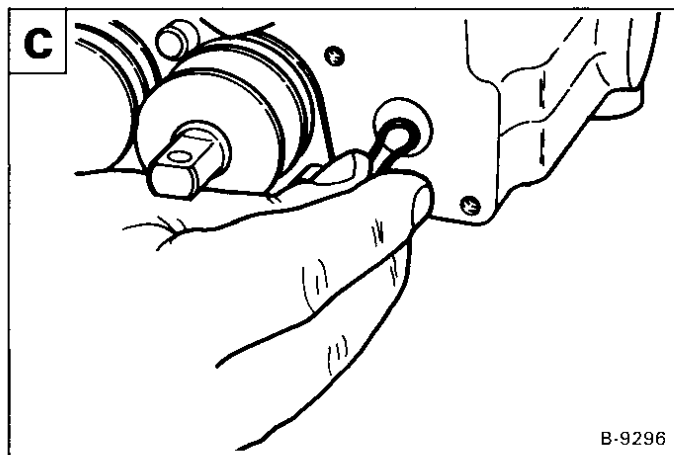
Remove the front and rear quad rings **B**.

Use the following procedure to assemble the detent assembly.

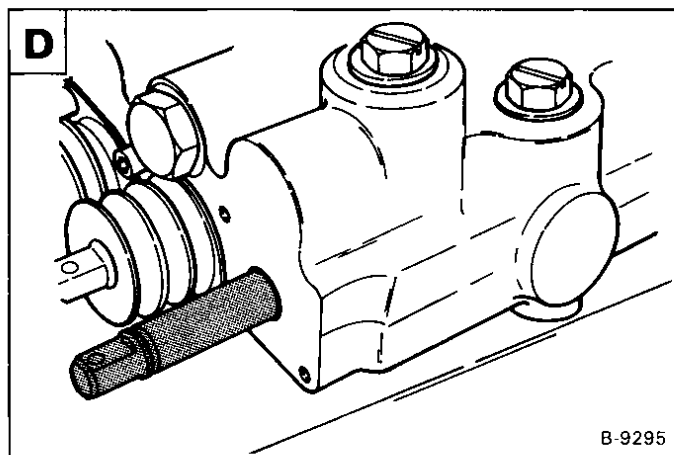


Install a NEW quad ring into the groove in the front of the control valve **C**.

NOTE: SEE PAGES 13, 14, 15 or 16 for seal and valve identification.



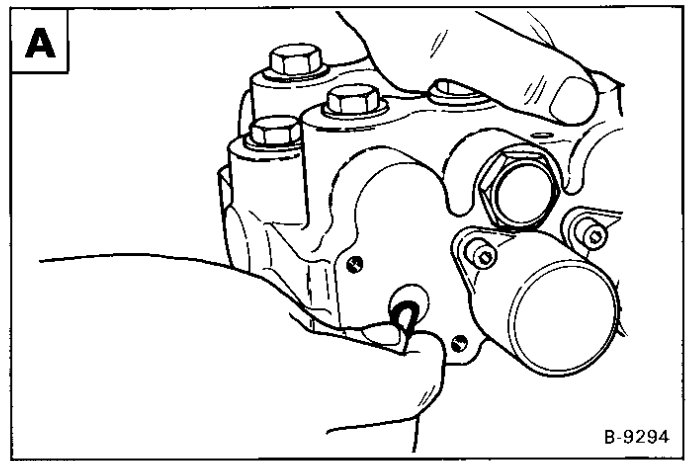
Install the valve spool into the control valve from the rear of the control valve. Push the spool into the valve just far enough so that the rear quad ring can be installed **D**.



CONTROL VALVE (Cont'd)

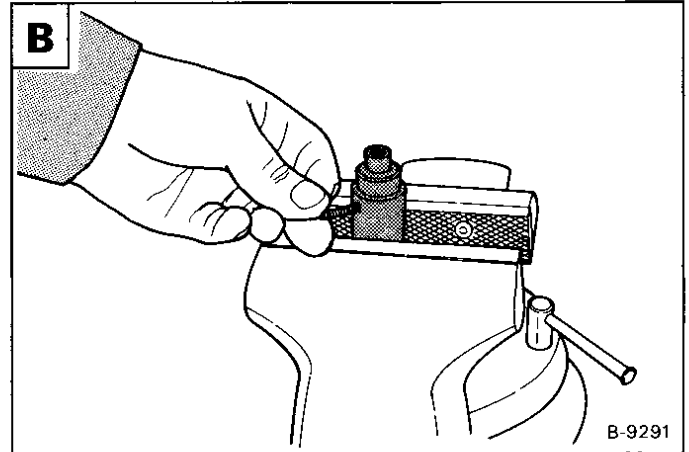
Install a NEW quad ring in the rear of the control valve **A**.

Push the valve spool back into the control valve until it is even with the rear machined surface of the control valve.

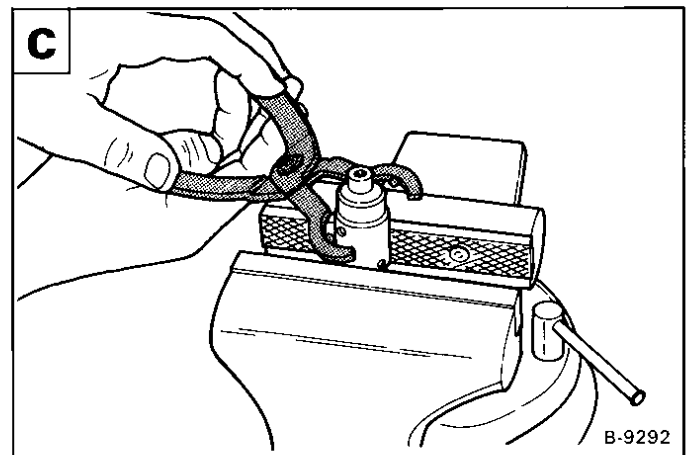


Put the detent adapter into a vise.

Install the detent spring **B**.



Put grease on the jaws of the detent tool. Put the detent balls on the jaws of the detent tool **C**.

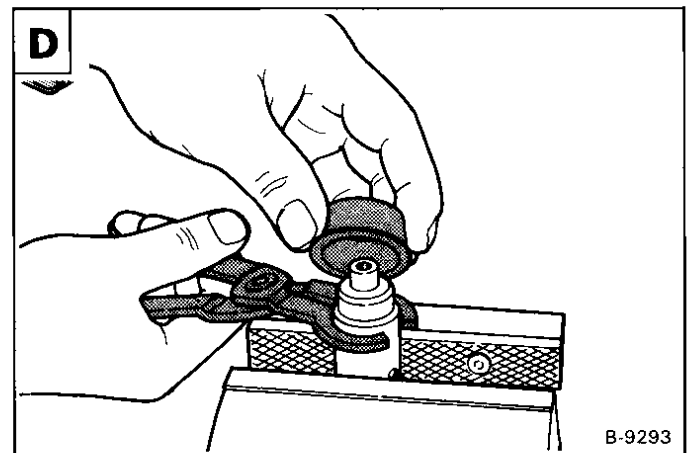


Hold the detent balls in position. Install the spring end cap over the detent adapter **D**.

Remove the detent adapter and spring cap assembly from the vise.

Install the centering spring and the other spring cap on the spool and tighten the bolt to 90-100 in.-lbs. (10-11 Nm) torque.

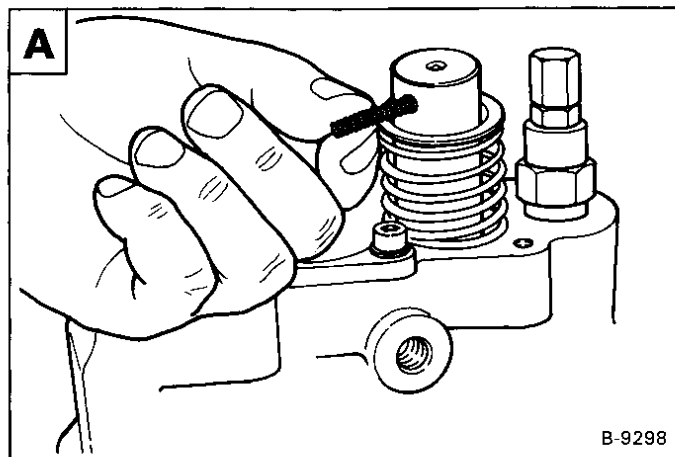
NOTE: To replace the valve spool stud (See Page 12 for the correct procedure).



CONTROL VALVE (Cont'd)

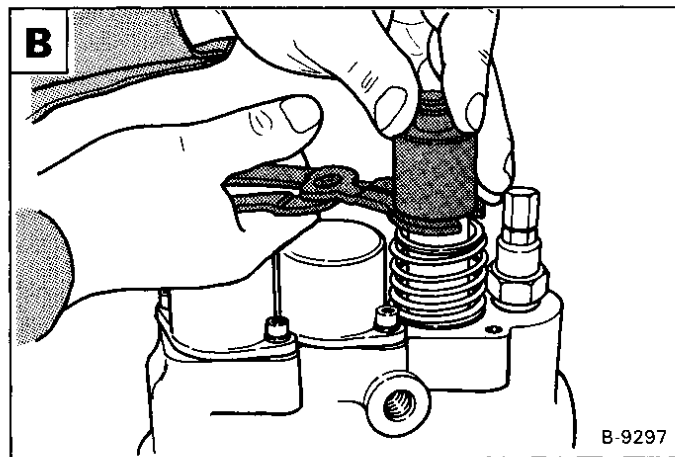
NOTE: Lift and Auxiliary Detent Sleeves are different:
Lift Detent Sleeve Bore Depth is 1.160" (29,5 mm).
Auxiliary Detent Sleeve Bore Depth is 1.061" (26,9 mm).

Install the detent spring into the detent adapter **A**.

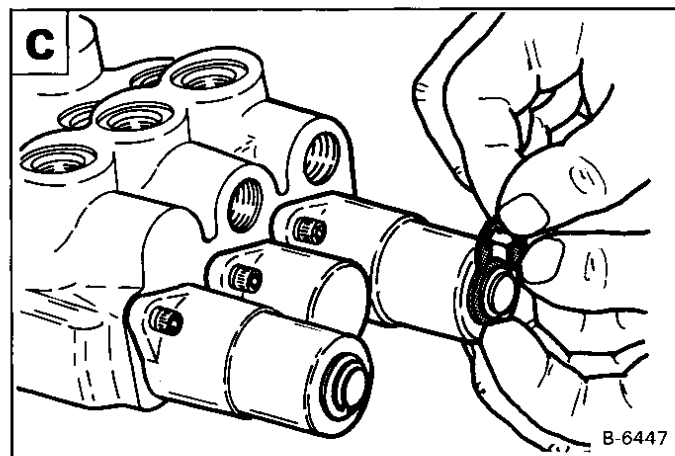


Hold the detent balls in position with the detent tool and slide the sleeve into position **B**.

Install the detent cap. Tighten the screws to 90-100 in.-lbs. (10-11 Nm) torque.



Install the washer and snap ring **C**.



CONTROL VALVE (Cont'd)

Centering Mechanism

Use the following procedure to disassemble and assemble the centering mechanism.

Remove the screws from the cap **A**.

Assembly: Tighten the screws to 90-100 in.-lbs. (10-11 Nm) torque.



WARNING

Wear safety glasses to prevent eye injury when any of the following conditions exist:

- When fluids are under pressure.
- Flying debris or loose material is present.
- Engine is running.
- Tools are being used.

W-2019-1285

Remove the cap. Remove the centering spring bolt **B**.

Assembly: Tighten the centering spring bolt to 90-100 in.-lbs. (10-11 Nm) torque.

NOTE: Carefully remove the centering spring bolt, because there is spring pressure.

Remove the spring caps, spring and adapter **C**.

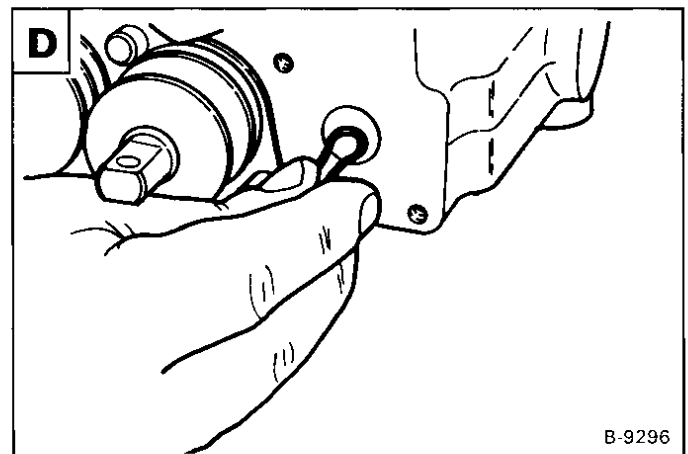
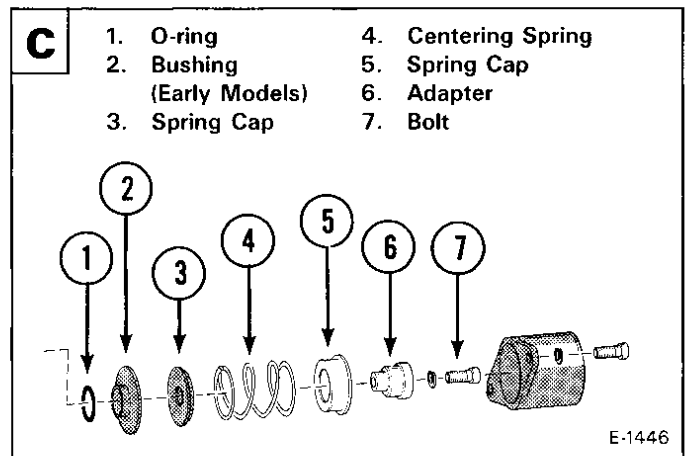
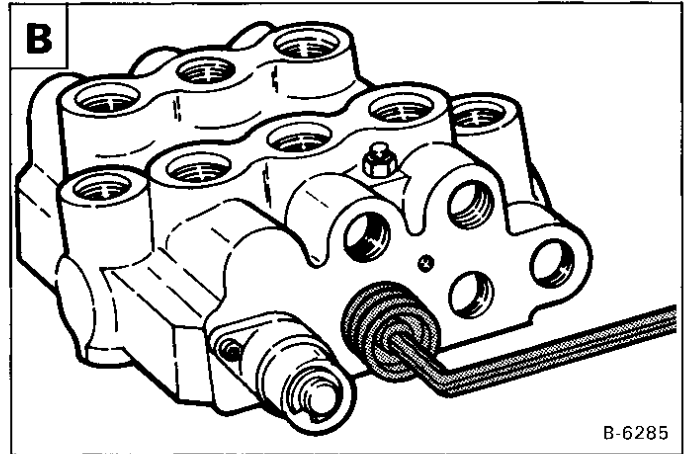
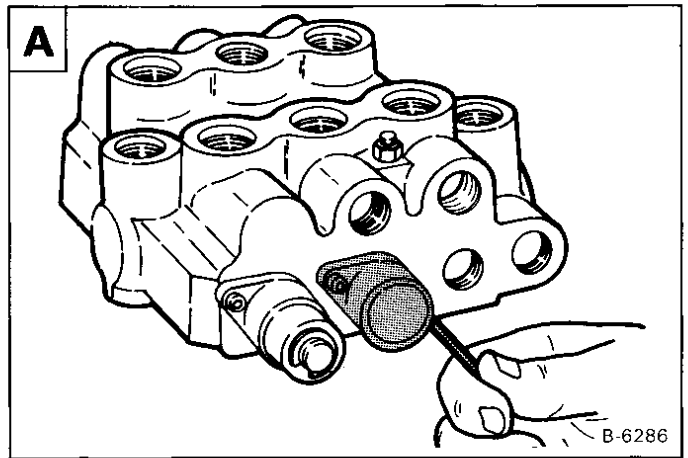
Assembly: For correct installation of the centering spring (See Page 12 for the correct procedure).

Remove the spool from the bore.

Remove the front and rear O-rings.

Install the front quad ring into the groove **D**.

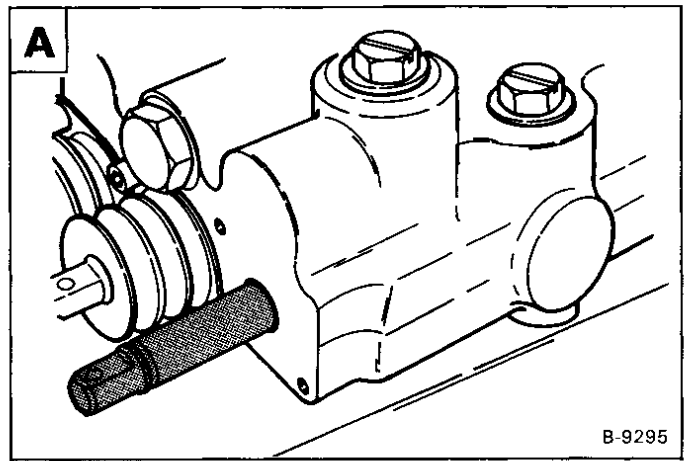
NOTE: See Pages 13, 14, 15 or 16 for seal and valve identification.



CONTROL VALVE (Cont'd)

Install the valve spool into the valve from the rear of the control valve **A**.

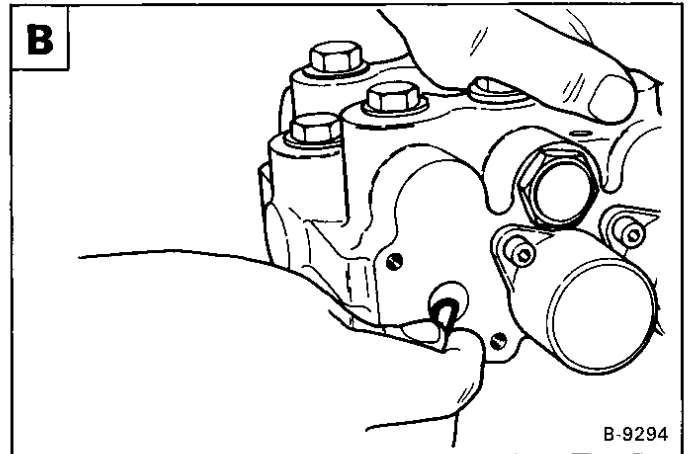
Push the spool into the valve just far enough so the rear quad ring can be installed.



Install the rear quad ring **B**.

Push the spool back into the control valve until it is even with the rear machined surface of the valve.

Install the centering mechanism.

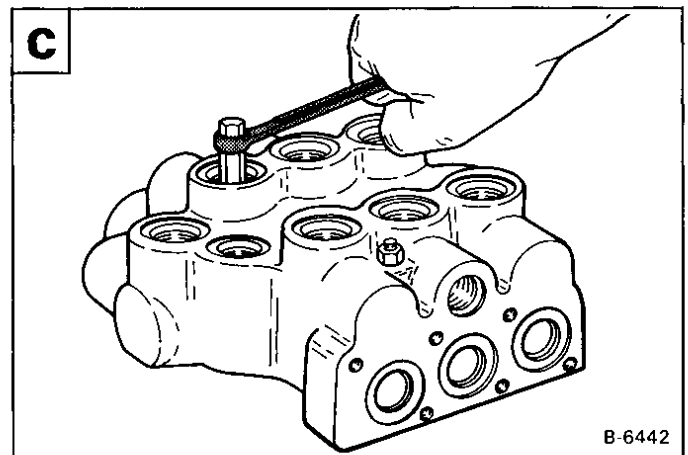


Orifice

Some Model loaders use an orifice in a top port. Use the following procedure to remove and install the orifice (See Page 2 and 3 for the correct location).

Loosen the orifice hex nut **C**.

Installation: Tighten the orifice hex nut to 90-100 in.-lbs. (10-11 Nm) torque.



Remove the hex nut and orifice **D**.

Inspection

Check the spools for scratches or wear.

Check that the spools are not loose in their bores.

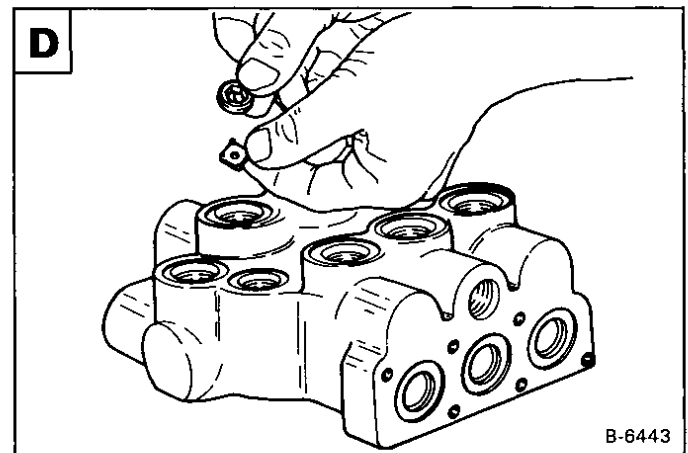
Check that the centering springs are not broken.

Check that the load check valve seats are not worn.

Check the load check poppets for damage.

Check the rubber boots, boot retainers and filters that they are not worn or damaged.

Replace the parts as needed.



CONTROL VALVE (Cont'd)

Installation of the Centering Spring

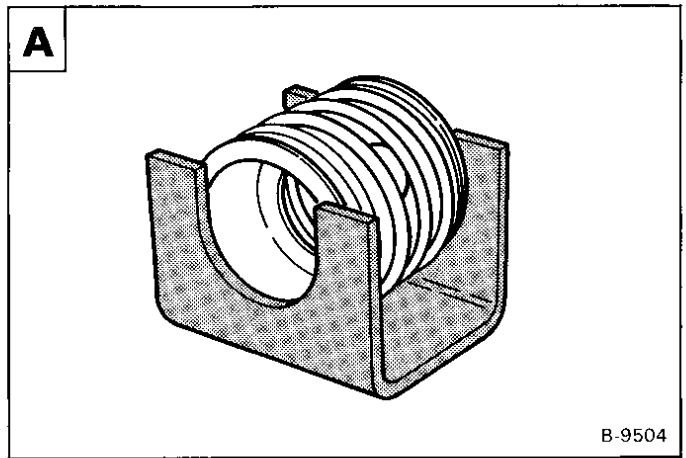
The tool listed will be needed to do the following procedure:

MEL-1285 — Valve Spring Holding Tool

Put the washer and collar in the ends of the spring.

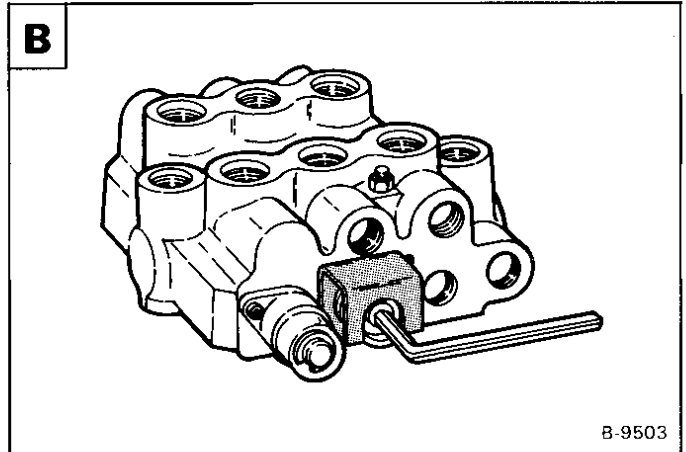
Compress the spring assembly and install it into the holding tool

A.



With the tool in position over the spring, assemble the spring to the spool using an allen wrench **B**.

When assembly is completed, remove the tool.



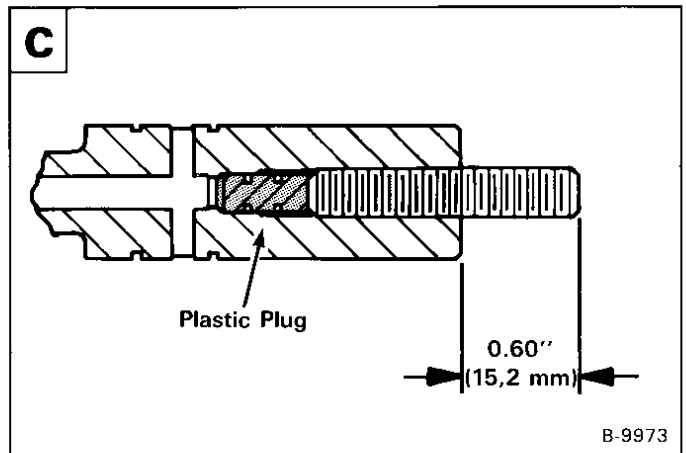
Valve Spool Stud

Install the plastic plug (lift spool only).

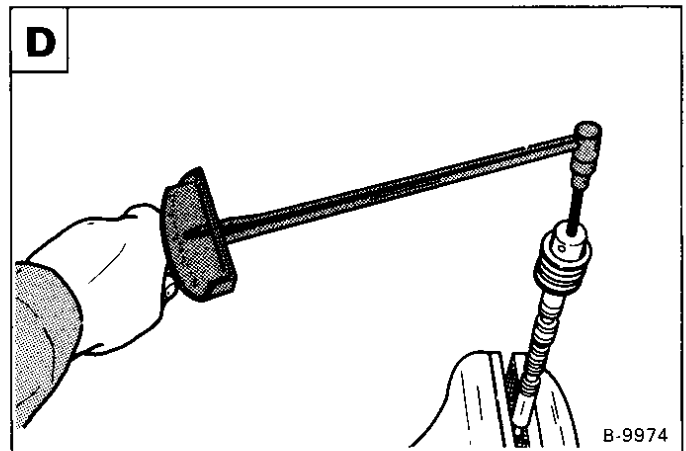
Install the stud and leave about 0.60" (15,2 mm) of the stud sticking out **C**.

NOTE: DO NOT use loctite on the threads.

Assemble the centering spring and washers and install detent adapter.



Tighten the adapter to 90-100 in.-lbs. (10-11 Nm) torque **D**.



IDENTIFICATION & INSTALLATION OF SPOOL SEAL

There are two types of seals for the control valve, a quad-ring seal and a lip seal. First identify the control valve (See Page 13, 14, 15 or 16) to find which seal is used. See the Parts Micro-Fiche for your model loader for the part number of the quad-ring seal or the lip seal used. Use the following procedure to install the seals into the control valve.

NO CHAMFER

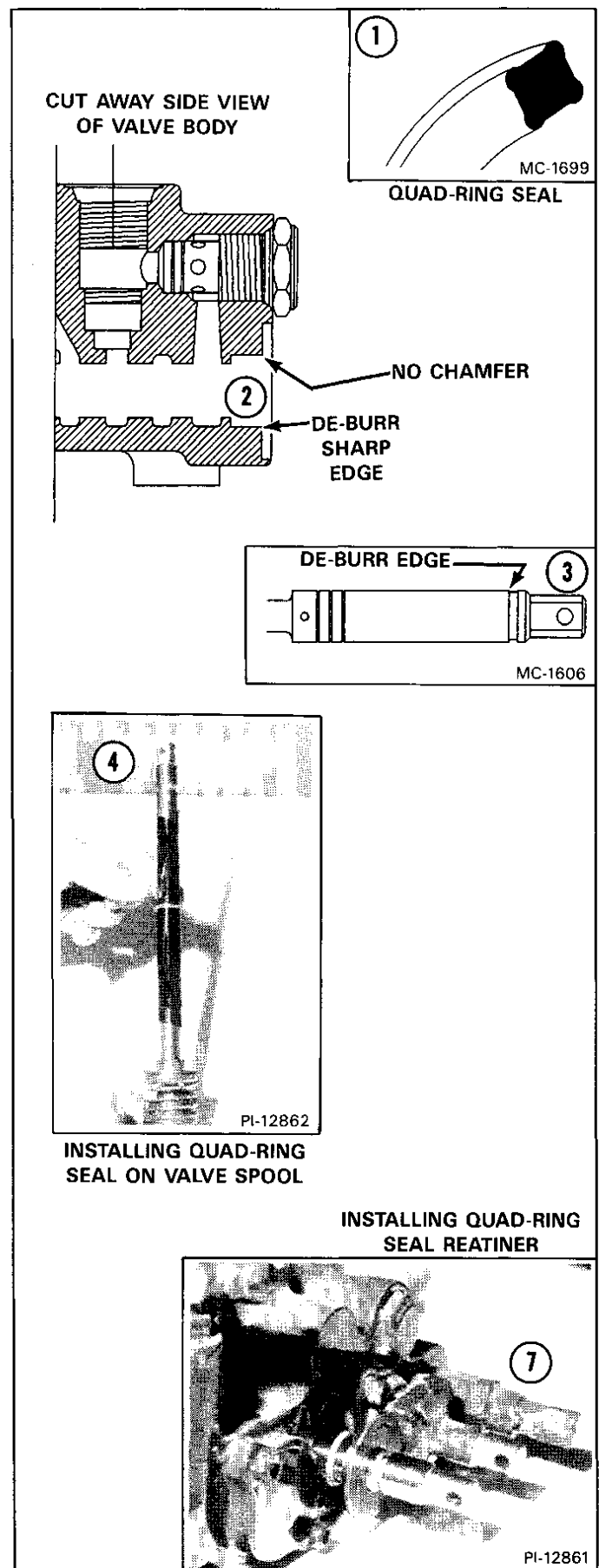
1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing. De-burr the sharp edge at the seal area (both ends).
3. At the linkage end of the spool, de-burr the groove for the rubber boot as needed.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

4. Put clean oil on the valve spool. Install the quad-ring seal over the valve spool. Be Careful not to damage the quad-ring seal on the valve spool edges.

NOTE: An alternate method to protect the quad-ring seal by putting plastic material (Example: Discarded microfiche card) over the spool to protect the seal.

5. Install spool into the valve bore.
6. Slide the linkage end quad-ring seal over the rubber boot groove. Be Careful not to damage the seal.
7. Install the quad-ring seal retainer.
8. Continue with assembling the control valve.

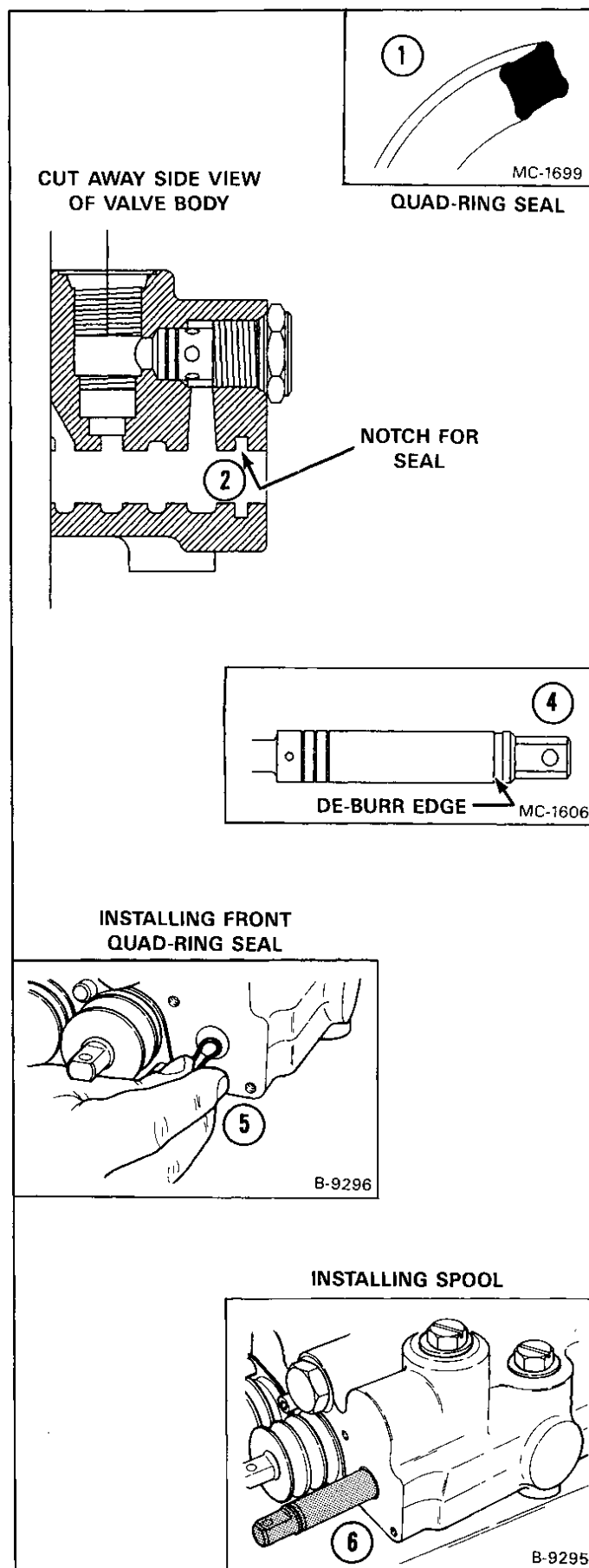


IDENTIFICATION & INSTALLATION OF SPOOL SEAL (Cont'd)

NOTCH FOR SEAL

NOTE: This control valve (with the notch for seal) must be removed from the loader for the quad-ring seal installation.

1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing.
3. The detent mechanism or centering spring must be removed from the valve spool.
4. At the linkage end of the spool, de-burr the groove for the rubber boot as needed.
5. Install the quad-ring seal into the notch in the linkage end of the control valve.
6. Put clean oil on the valve spool. Install the spool into the valve from the rear end (centering spring or detent mechanism side). Be Careful not to damage the quad-ring seal, already installed, when going over the groove for the rubber boot. Push the spool into the valve just far enough so that the rear quad-ring seal can be installed.
7. Install the quad-ring seal in the rear groove of the valve.
8. Push the valve spool back into the control valve until it is even with the rear machined surface of the valve.
9. Continue with assembling the control valve.



IDENTIFICATION & INSTALLATION OF SPOOL SEAL (Cont'd)

SHORT CHAMFER

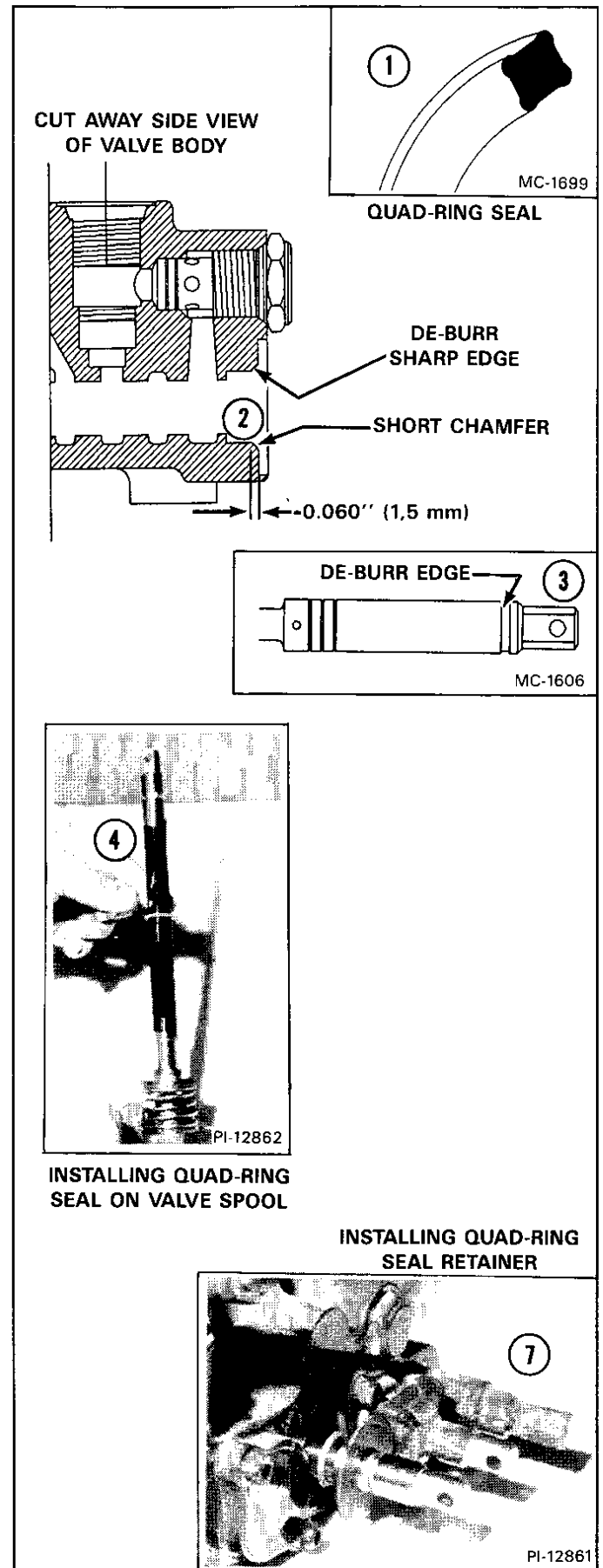
1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing. De-burr the sharp edge at the seal area (both ends).
3. At the linkage end of the spool, de-burr the groove for the rubber boot as needed.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

4. Put clean oil on the valve spool. Install the quad-ring seal over the valve spool. Be Careful not to damage the quad-ring seal on the valve spool edges.

NOTE: An alternate method to protect the quad-ring seal by putting plastic material (Example: Discarded microfiche card) over the spool to protect the seal.

5. Install spool into the valve bore.
6. Slide the linkage end quad-ring seal over the rubber boot groove. Be Careful not to damage the seal.
7. Install the quad-ring seal retainer.
8. Continue with assembling the control valve.



IDENTIFICATION & INSTALLATION OF SPOOL SEAL (Cont'd)

LONG CHAMFER

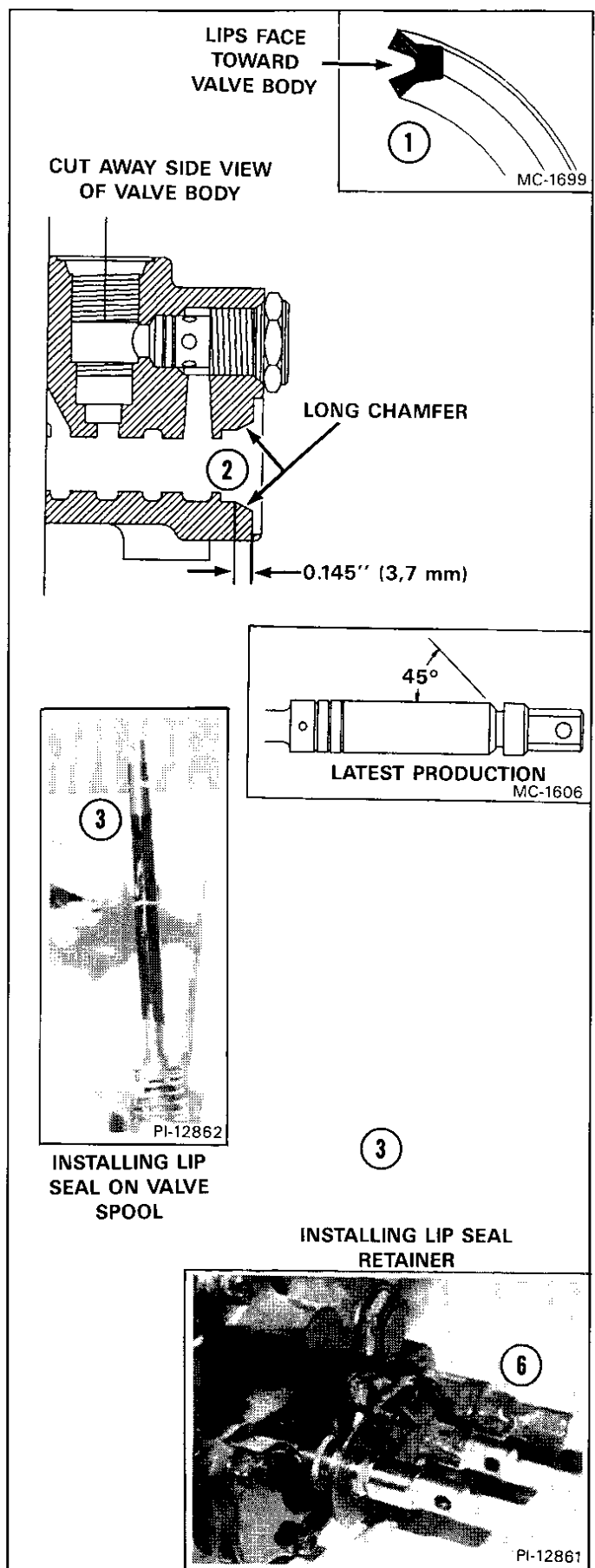
1. Uses only lip seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing.
3. Put clean oil on the valve spool. Install the lip seal over the valve spool. Be Careful not to damage the lip seal on the valve spool edges.

NOTE: An alternate method is to protect the lip seal by putting plastic material (Example: Discarded micro-fiche card) over the spool to protect the seal.

4. Install spool into the valve bore.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

5. Slide the linkage end lip seal over the rubber boot groove. Be Careful not to damage the seal.
6. Install the seal retainer.
7. Continue with assembling the control valve.



CONTROL VALVE INDEX 2400

CONTROL VALVE

| | |
|--|---|
| Auxiliary Section | 3 |
| Disassembly and Assembly | 2 |
| Inspection | 8 |
| Installation of the Centering Spring | 8 |
| Lift Section Detent Disassembly and Assembly | 5 |
| Tilt Section | 7 |
| Valve Spool Stud | 8 |

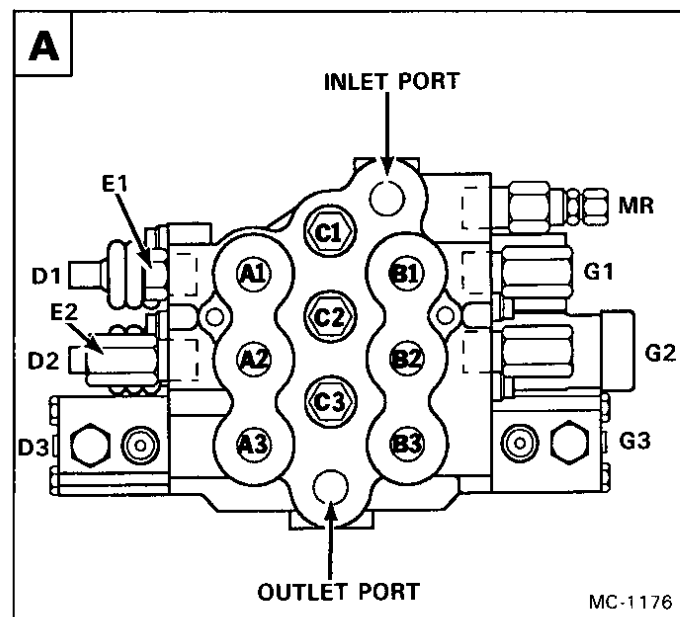
CONTROL VALVE IDENTIFICATION

| | |
|-----------------|---|
| Chart | 1 |
|-----------------|---|

IDENTIFICATION & INSTALLATION OF SPOOL SEALS

| | |
|-------------------------|----|
| Short Chamfer | 9 |
| Long Chamfer | 10 |

| 2400 | |
|------|-------------------------------|
| ITEM | FUNCTION |
| A1 | Tilt Cylinder Rod End |
| A2 | Lift Cylinder Rod End |
| A3 | Auxiliary Hydraulics |
| B1 | Tilt Cylinder Base End |
| B2 | Lift Cylinder Base End |
| B3 | Auxiliary Hydraulics |
| C1 | Load Check Valve - Tilt |
| C2 | Load Check Valve - Lift |
| C3 | Load Check Valve - Auxiliary |
| D1 | Tilt Spool |
| D2 | Lift Spool |
| D3 | Auxiliary Spool - Solenoid |
| E1 | Port Relief - Tilt |
| E2 | Port Relief - Lift |
| F1 | Anti-Cavitation - Port Relief |
| F2 | Port Relief |
| G1 | Centering Spring - Tilt Spool |
| G2 | Centering Spring - Lift Spool |
| G3 | Centering Spring - Solenoid |
| MR | Main Relief Valve |



CONTROL VALVE

Disassembly and Assembly

See the Service Manual for your Model loader for removal and installation of the control valve.

The port relief valves, anti-cavitation valves and plugs are at different locations in the control valve. Lift and tilt spools can also be in different bores. Refer to Page 1 for the correct locations of the parts for each control valve.

IMPORTANT

When making repairs on 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-2003-0284

Mark each valve, plug and spool location so that the parts will be returned to its original bore during assembly. Use a vise or bolts to fasten the control valve to a work bench for easier disassembly and assembly.

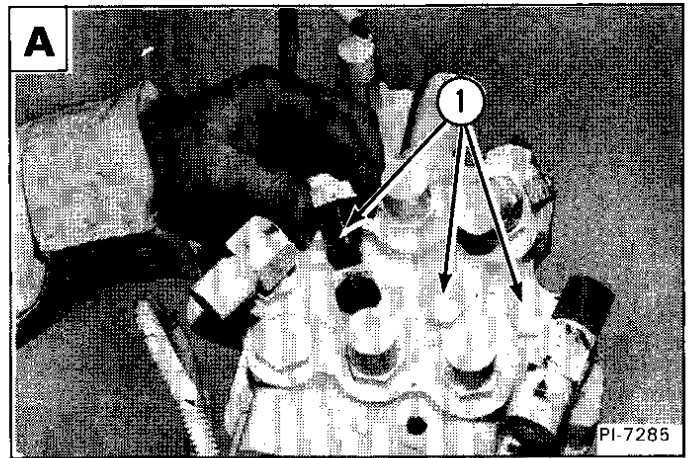
Remove the load check valves (Item 1) from the top of the valve ("C" Ports) **A**.

Remove the following parts from the detent and spool linkage sides of the control valve ("F" & "E" Ports):

1. Port Relief Valve **B**.
2. Anti-Cavitation Valve **C**.
3. Main Relief Valve **D**.

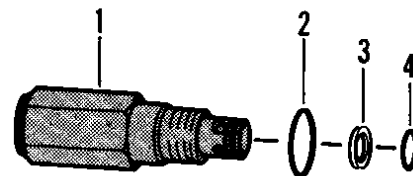
Remove the O-rings and back-up washers.

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



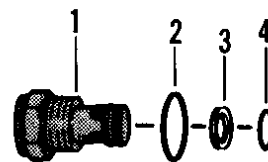
B

1. Relief Valve
2. O-Ring
3. Back-Up Washer
4. O-Ring

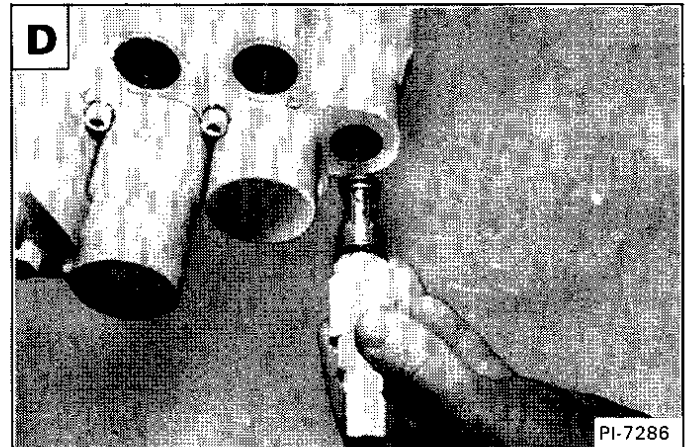


C

1. Anti-Cavitation Valve
2. O-Ring
3. Back-Up Washer
4. O-Ring



D

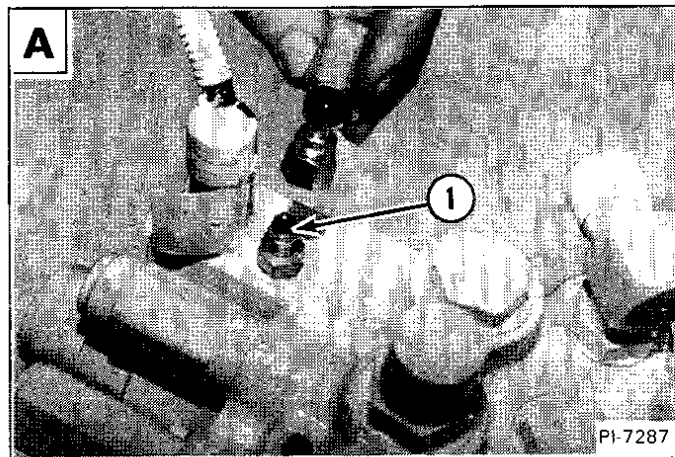


CONTROL VALVE (Cont'd)

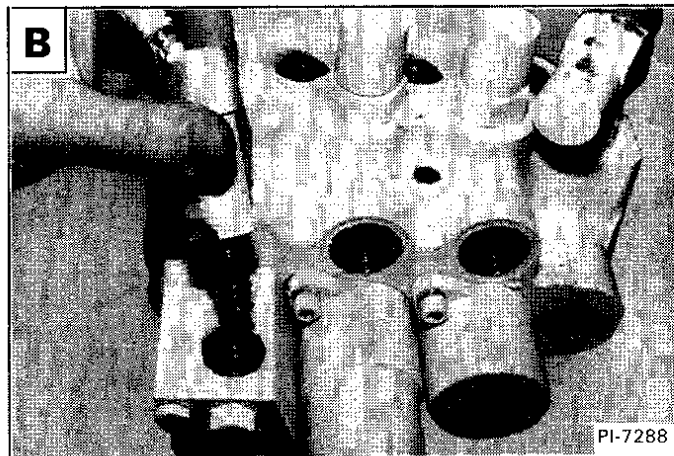
Auxiliary Section

Remove the jumper line from the solenoid block fitting **A**.

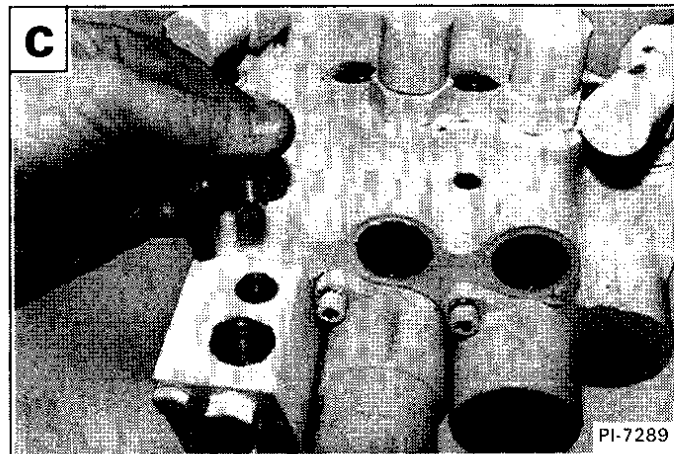
NOTE: Be sure the restrictor (Item 1) is located at the fitting (both solenoid blocks) **A**.



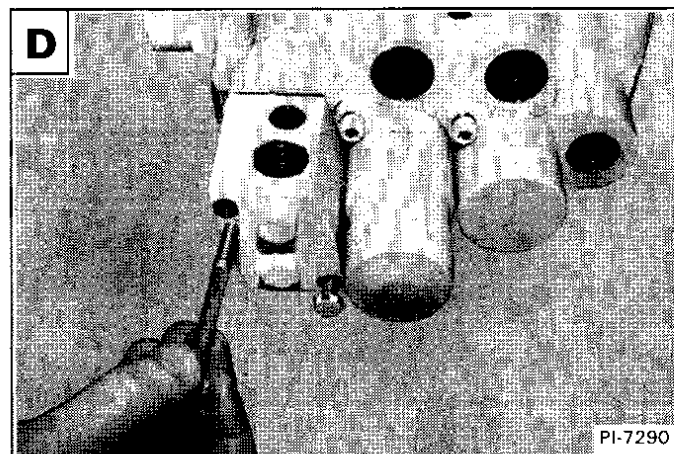
Remove the solenoid from the block **B**.



Remove the restrictor fitting from the block **C**.

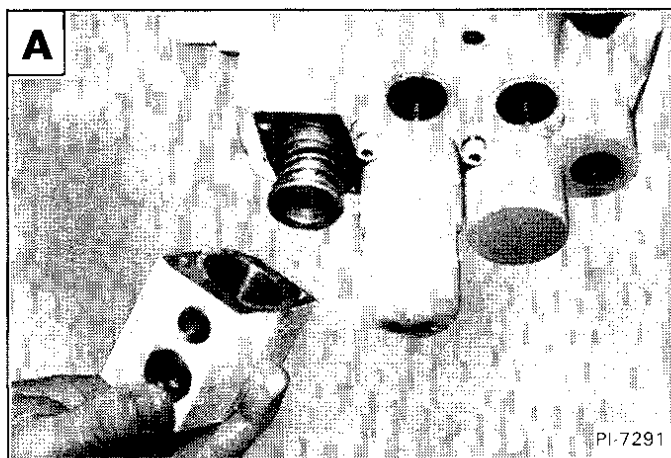


Remove the solenoid block bolts (front and rear) **D**.



CONTROL VALVE (Cont'd)

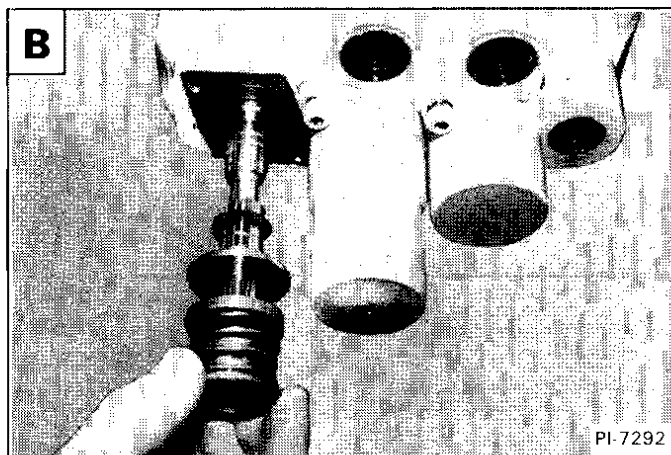
Remove the solenoid blocks (front and rear) **A**.



Remove the spool **B**.

Install NEW quad rings at assembly.

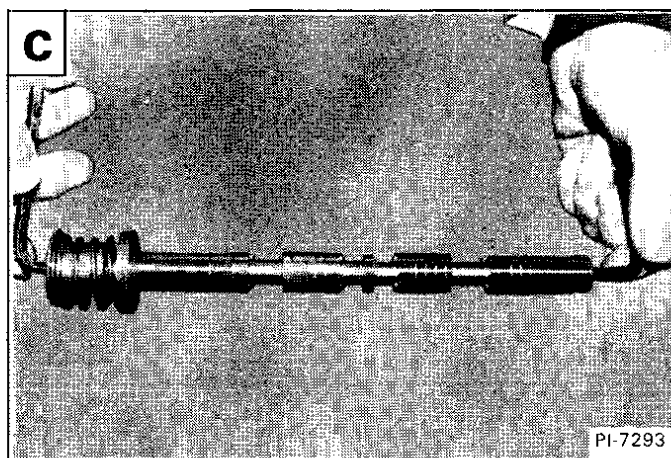
NOTE: See Pages 9 & 10 for seal and valve identification.



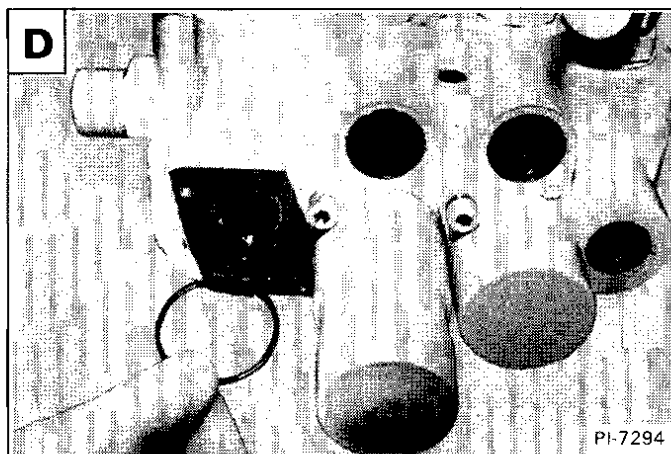
Remove the centering spring bolts **C**.

NOTE: Carefully remove the centering spring bolt which is under spring tension.

Assembly: For correct installation of the centering spring (See Page 8 for the procedure).



Remove the back-up washer, quad ring and o-ring from front and rear of the control valve **D**.



CONTROL VALVE (Cont'd)

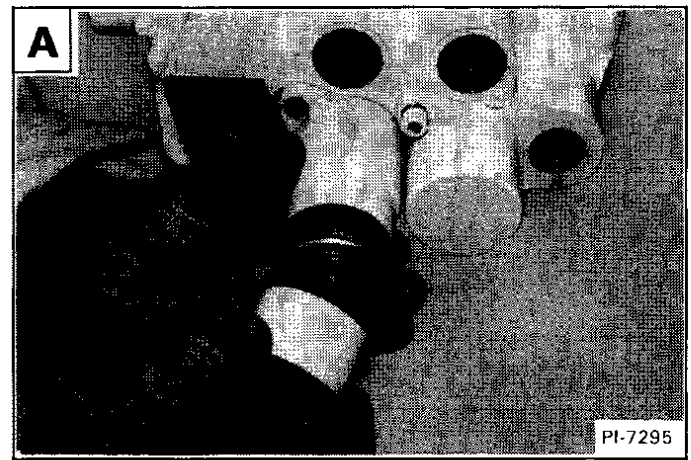
Lift Section Detent Disassembly and Assembly

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

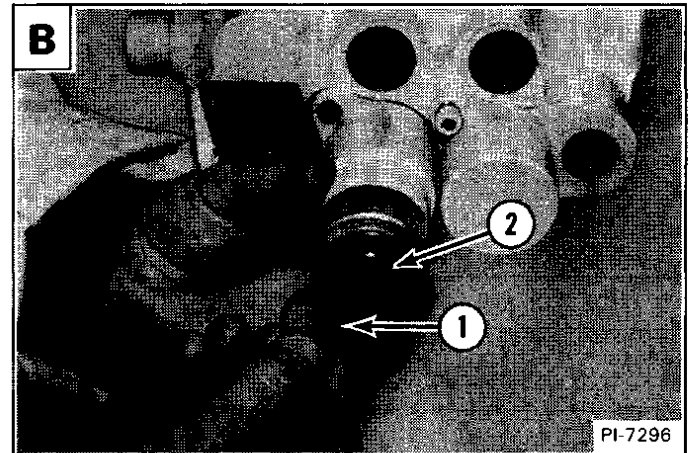
MEL-1278 — Detent Tool

Use the following procedure to remove and disassemble the detent assembly.

Remove the detent dust cap **A**.

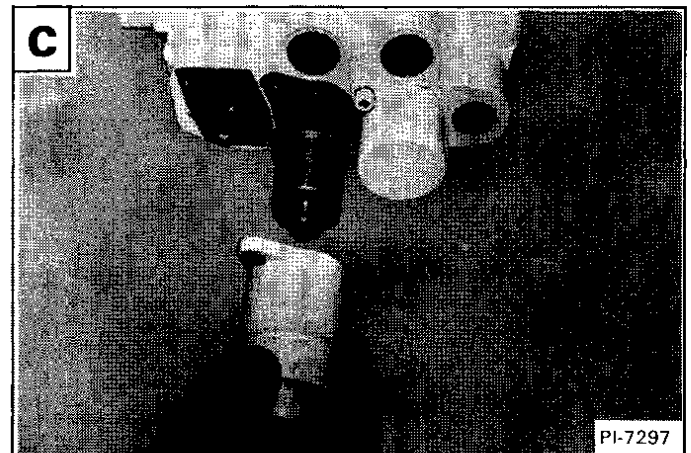


Remove the snap ring (Item 1) and washer (Item 2) **B**.



Remove the screws for the detent cap.

Remove the cap **C**.



IMPORTANT

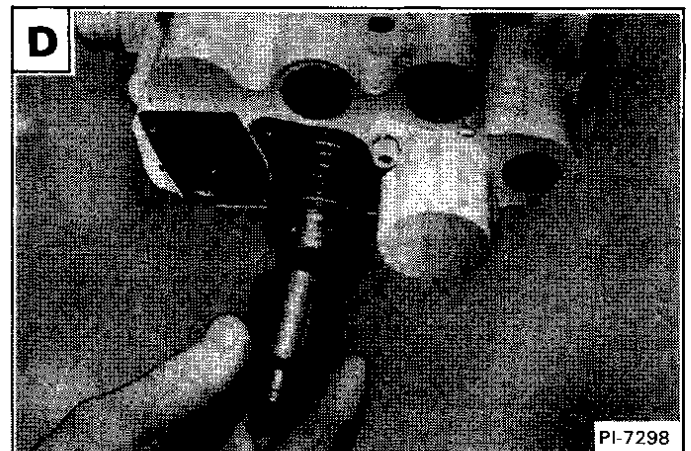
The detent assembly has small springs and balls. Do not loose these parts during disassembly and assembly.

I-2012-0284

Remove the detent sleeve, detent balls and spring **D**.

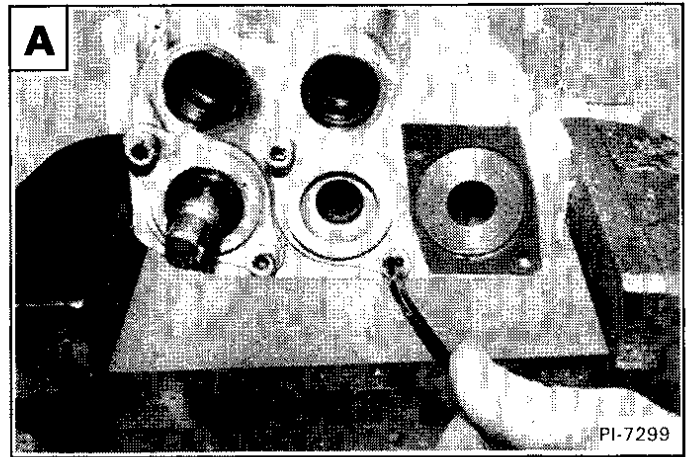
Remove the spool from the bore.

Install NEW quad rings at assembly.



CONTROL VALVE (Cont'd)

Remove the retainer screws and retainer **A**.



Remove the back-up washer and quad rings from the front and rear of the control valve **B**.



WARNING

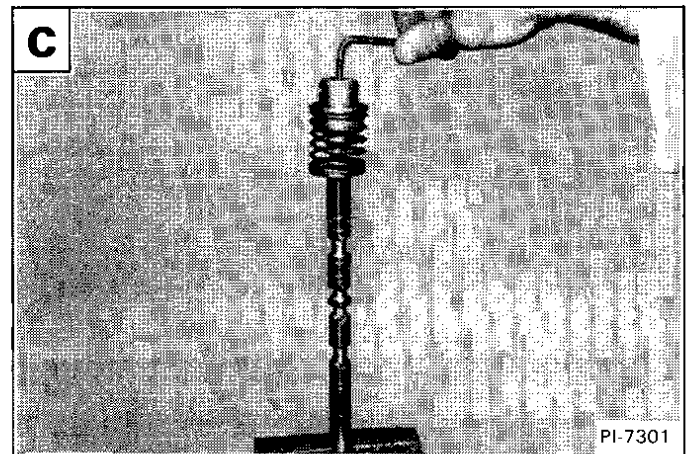
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- When fluids are under pressure.
- Flying debris or loose material is present.
- Engine is running.
- Tools are being used.

W-2019-1285

Clamp the spool yoke in a vise and remove the centering spring bolt **C**.

NOTE: Remove the bolt carefully, it is under spring tension.



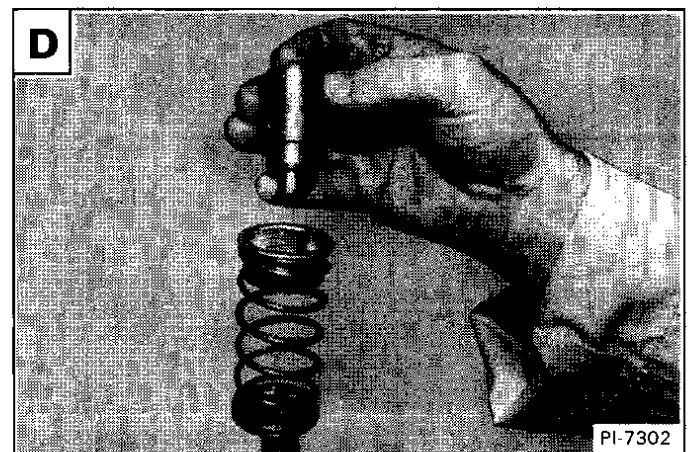
IMPORTANT

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

I-2012-0284

Remove the adaptor, detent balls and spring from the centering spring **D**.

Remove the centering spring assembly from the spool.

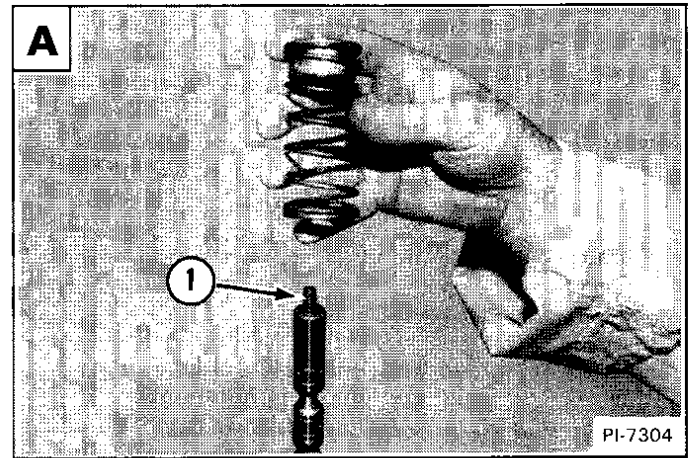


CONTROL VALVE (Cont'd)

Remove the centering spring assembly **A**.

Remove the valve spool stud (Item 1) **A**.

See Page 8 for the valve spool stud setting.



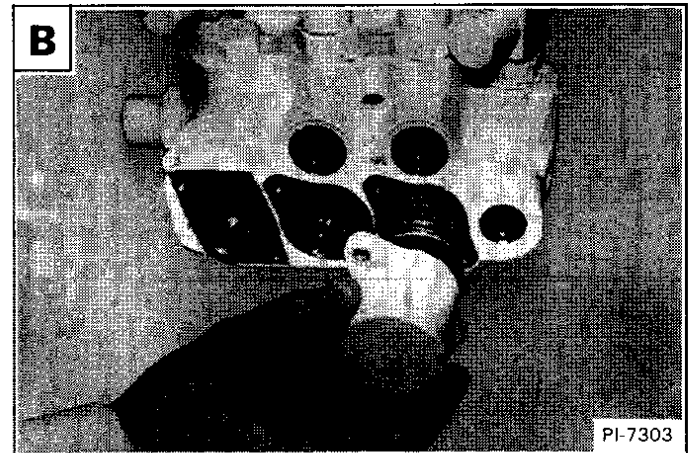
Tilt Section

Remove the cap from the centering spring **B**.

IMPORTANT

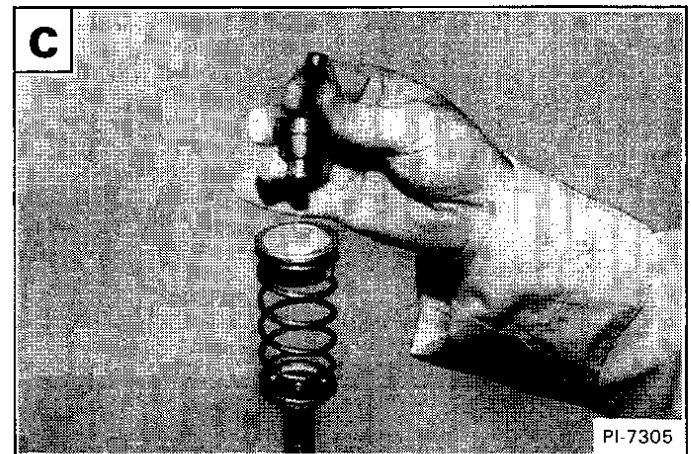
The detent assembly has small springs and balls. Do not loose these parts during disassembly and assembly.

I-2012-0284

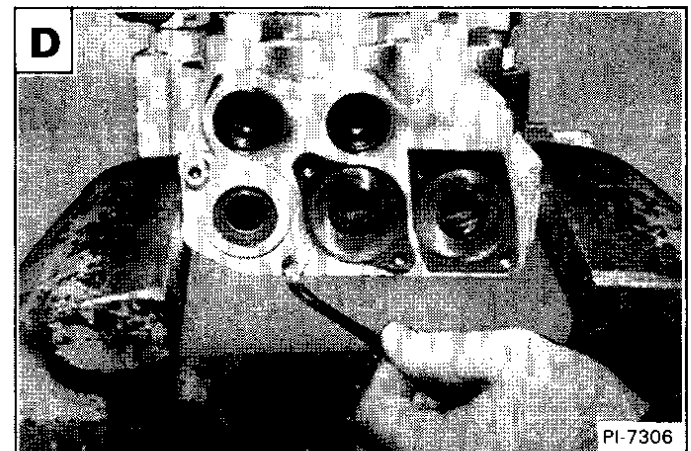


Clamp the spool yoke in a vise and loosen the centering spring bolt.

Remove the bolt, spring retainer and spring assembly **C**.



Remove the screws and the retaining plate **D**.



CONTROL VALVE (Cont'd)

Remove the back-up washer and the quad ring **A**.

Inspection

Check spools for scratches or wear.

Check that spools are not loose in their bores.

Check for broken centering springs.

Check that the load check valves seats are not worn.

Check the load check poppets for damage.

Check the seal retainers and back-up washers for damage.

Replace the parts as needed.

Installation of the Centering Spring

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

MEL-1285 — Valve Spring Holding Tool

Put the washer and collar into the ends of the spring.

Compress the spring assembly and install it into the holding tool **B**.

With the tool in position over the spring, assemble the spring to the spool using an allen wrench.

When assembly is complete, remove the tool.

Valve Spool Stud

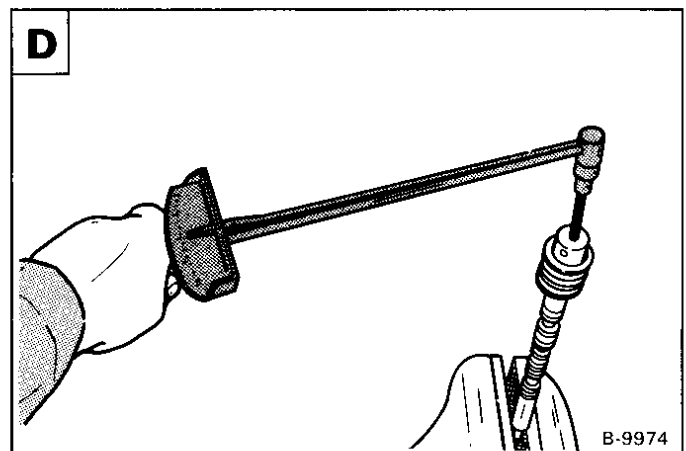
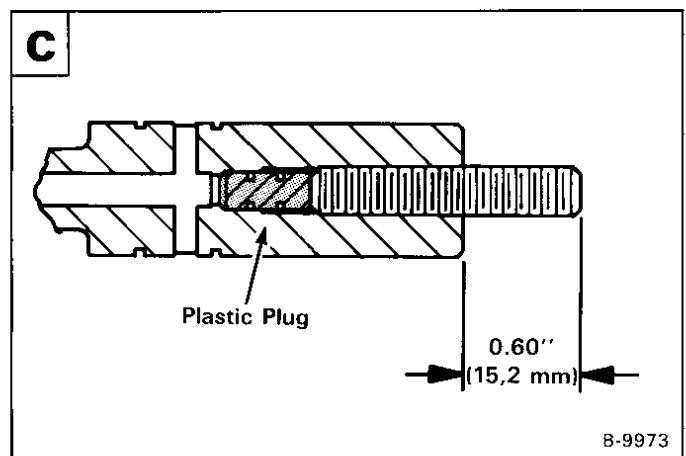
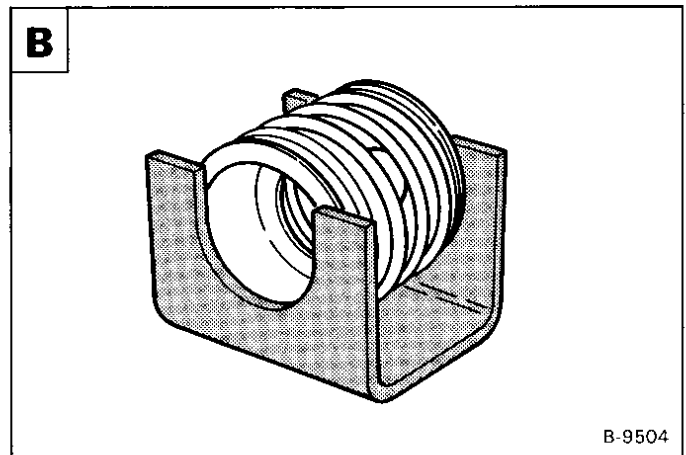
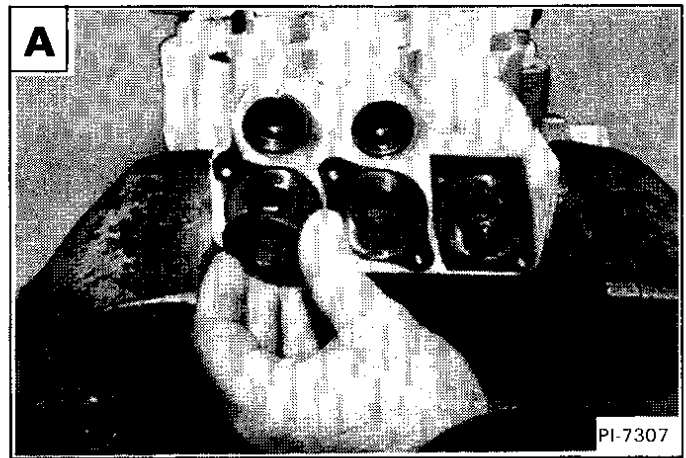
Install the plastic plug (lift spool only).

Install the stud and leave about 0.60" (15.2 mm) of the stud sticking out **C**.

NOTE: DO NOT use loctite on the threads.

Assemble the centering spring and washer and install detent adapter.

Tighten the adapter to 90-100 in.-lbs. (10-11 Nm) torque **D**.



IDENTIFICATION & INSTALLATION OF SPOOL SEAL

There are two types of seals for the control valve, a quad-ring seal and a lip seal. First identify the control valve (See Page 9 or 10) to find which seal is used. See the Parts Micro-Fiche for your model loader for the part number of the quad-ring seal or the lip seal used. Use the following procedure to install the seals into the control valve.

SHORT CHAMFER

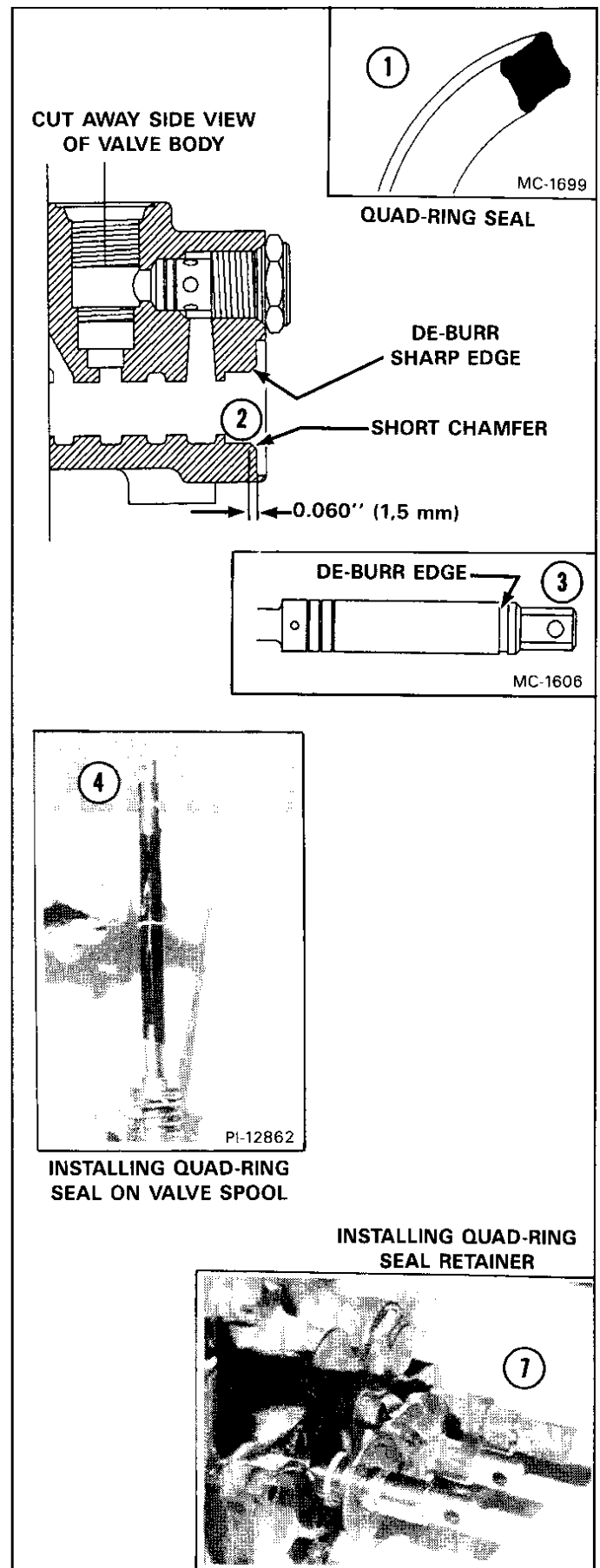
1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing. De-burr the sharp edge at the seal area with a file or de-burring tool (both ends).
3. At the linkage end of the spool, de-burr the rubber boot groove as needed.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

4. Put clean oil on the valve spool. Install the quad-ring seal over the valve spool. Be Careful not to damage the quad-ring seal on the valve spool edges.

NOTE: An alternate method to protect the quad-ring seal by putting plastic material (Example: Discarded micro-fiche card) over the spool to protect the seal.

5. Install spool into the valve bore.
6. Slide the linkage end quad-ring seal over the rubber boot groove. Be Careful not to damage the seal.
7. Install the quad-ring seal retainer.
8. Continue with assembling the control valve.



PI-12861

IDENTIFICATION & INSTALLATION OF SPOOL SEAL (Cont'd)

LONG CHAMFER

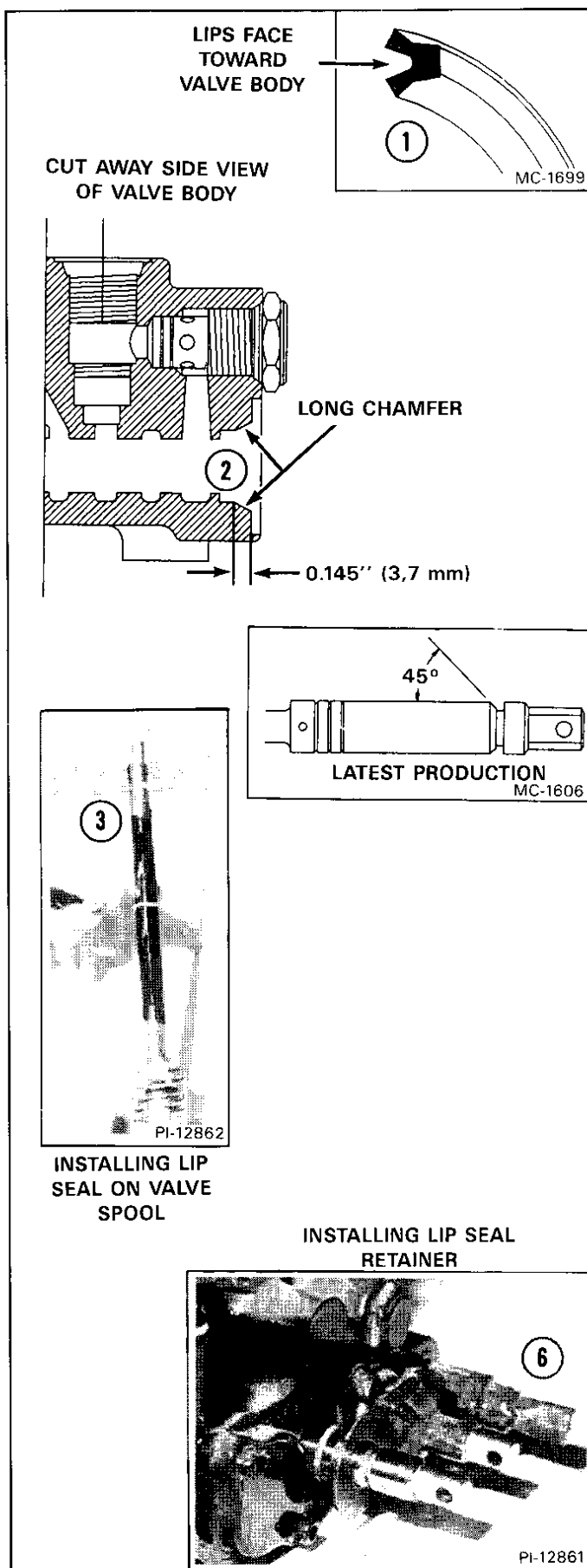
1. Uses only lip seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

3. Put clean oil on the valve spool. Install the lip seal over the valve spool. Be Careful not to damage the lip seal on the valve spool edges.

NOTE: An alternate method to protect the lip seal by putting plastic material (Example: Discarded micro-fiche card) over the spool to protect the seal.

4. Install spool into the valve bore.
5. Slide the linkage end lip seal over the rubber boot groove. Be Careful not to damage the seal.
6. Install the seal retainer.
7. Continue with assembling the control valve.



REAR AUXILIARY CONTROL VALVE INDEX 2400

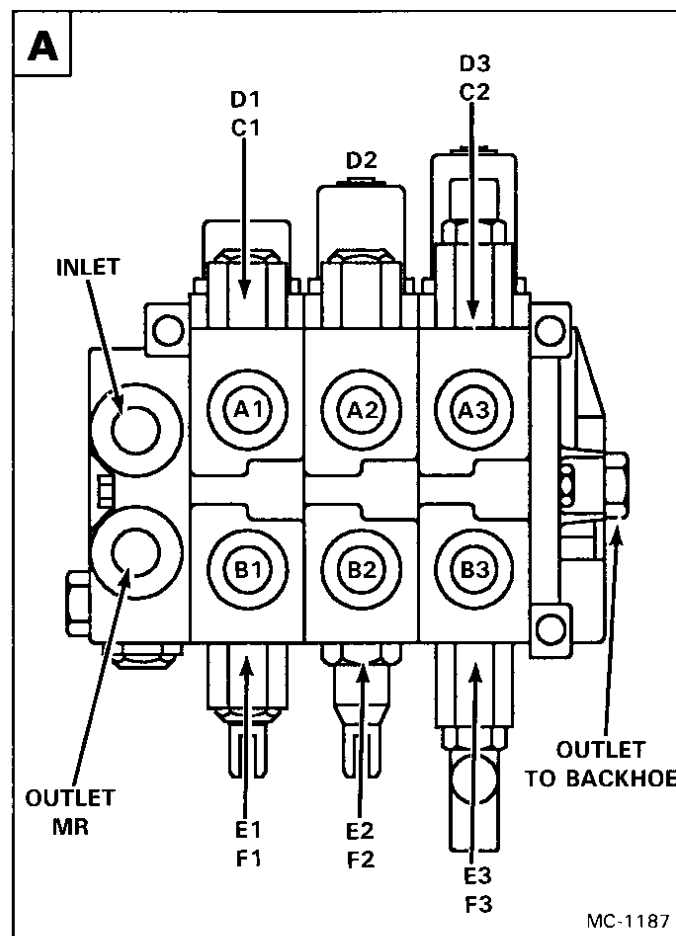
CONTROL VALVE

| | |
|---------------------------------------|---|
| Auxiliary Detent Adjustment | 9 |
| Auxiliary Section | 8 |
| Disassembly and Assembly | 2 |
| Inlet Section | 3 |
| Lift Section | 5 |
| Lock Section | 3 |

CONTROL VALVE IDENTIFICATION

| | |
|-----------------|---|
| Chart | 1 |
|-----------------|---|

| 2400 REAR AUXILIARY VALVE | |
|---------------------------|--------------------------------|
| ITEM | FUNCTION |
| A1 | Lock Pin Cylinder (Locked) |
| A2 | Cylinder, Rod End |
| A3 | Auxiliary Attachment |
| B1 | Locking Cylinder |
| B2 | Cylinder, Base End |
| B3 | Auxiliary Attachment |
| C1 | Port Relief (1500 PSI) |
| C2 | Inlet Port |
| D1 | Centering Spring Locking Spool |
| D2 | Centering Spring Lift Spool |
| D3 | Auxiliary Detent |
| E1 | Port Relief (1500 PSI) |
| E2 | Port Relief (1500 PSI) |
| E3 | Inlet Port |
| F1 | Locking Cylinder Spool |
| F2 | Lift Cylinder Spool |
| F3 | Auxiliary Spool |
| MR | Main Relief (2700 PSI) |



CONTROL VALVE

Disassembly and Assembly

Mark each section of the control valve for assembly.

NOTE: Always use new o-rings during assembly of control valve.

NOTE: The port relief valves are all set at 1500 PSI and have the same function but different appearance. The removal and installation procedure will be the same.

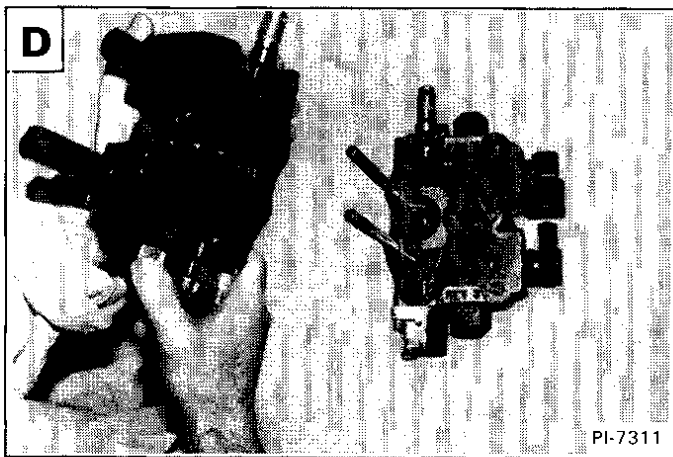
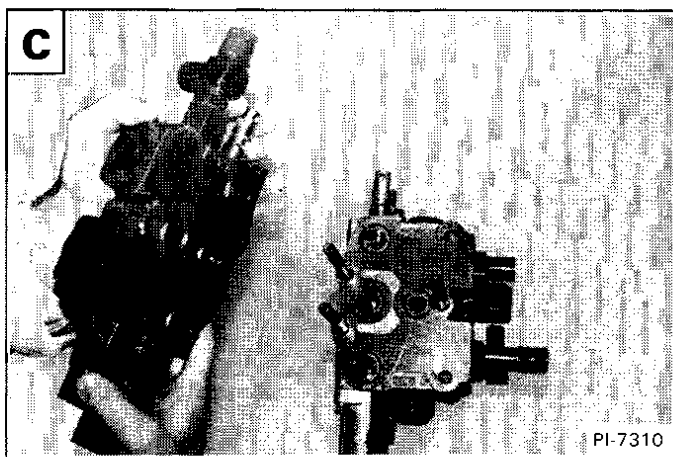
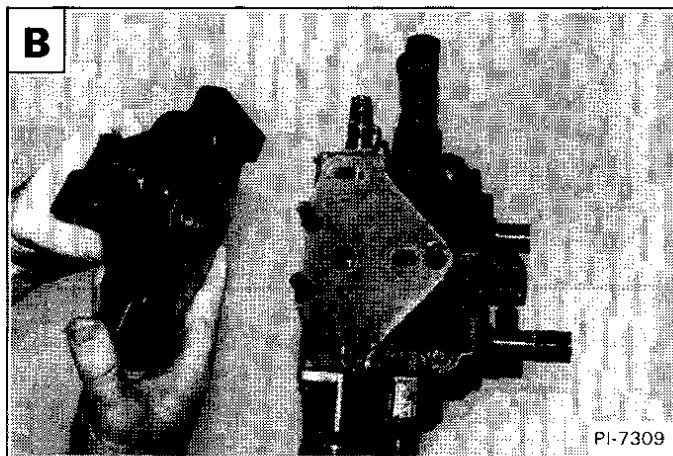
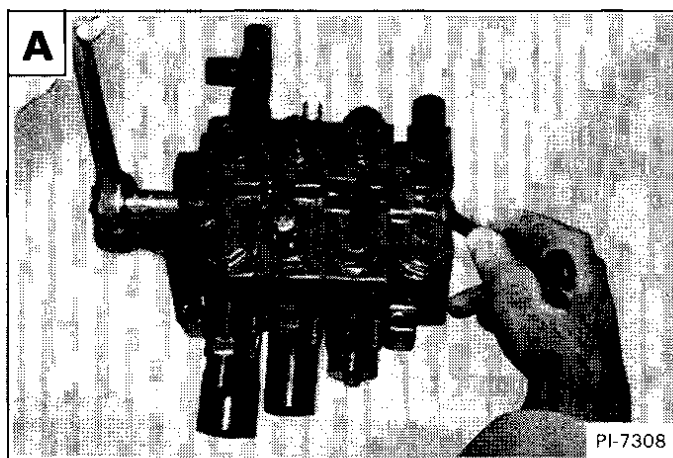
Loosen and remove the nuts on the thru bolts of the control valve **A**.

Installation: Tighten the nuts to 32 ft.-lbs. (43 Nm) torque.

Position the valve on it's end to remove the sections **B**.

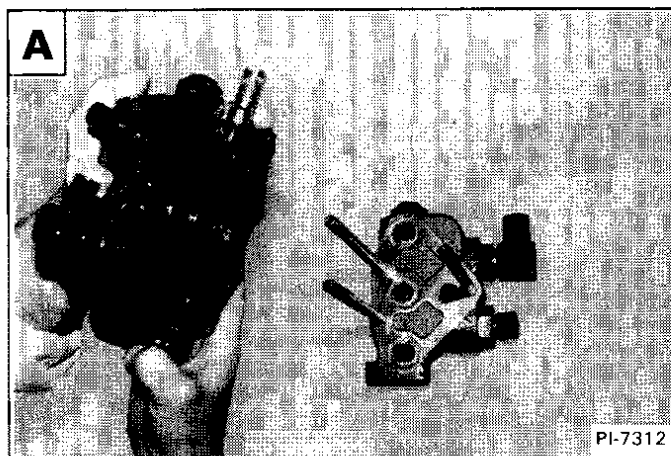
Remove the auxiliary section **C**.

Remove the lift cylinder section **D**.



CONTROL VALVE (Cont'd)

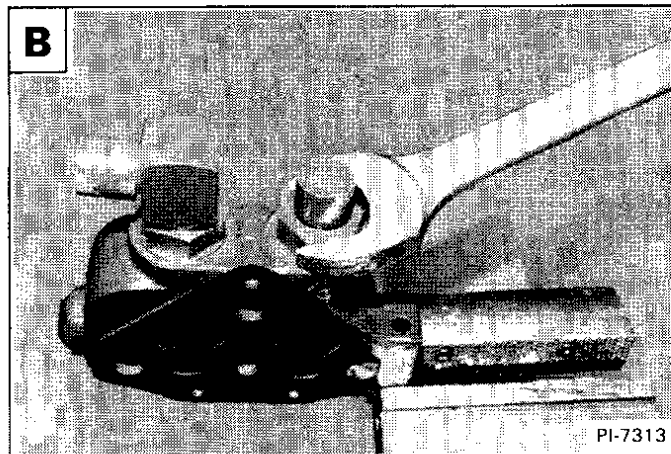
Remove the locking cylinder section **A**.



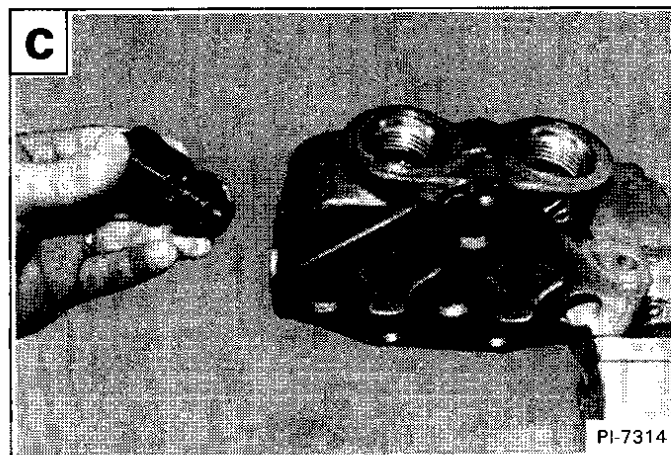
Use a soft jaw vise or wood blocks in the vise to hold the sections for repair.

Inlet Section

Remove the inlet and outlet fittings **B**.



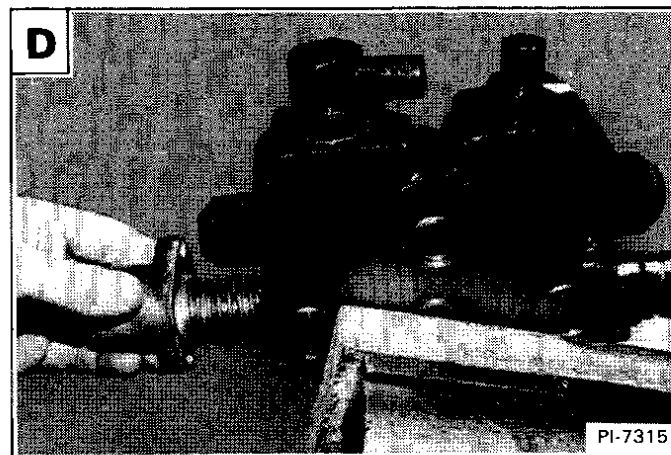
Loosen and remove the main relief valve **C**.



Lock Section

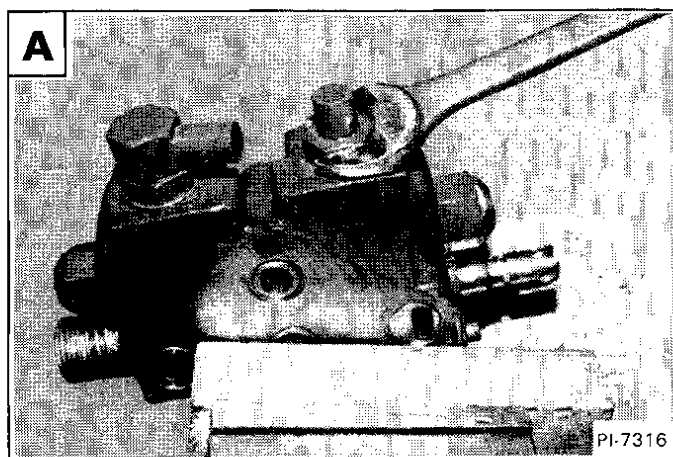
Remove the screws from the centering spring cap.

Remove the cap **D**.

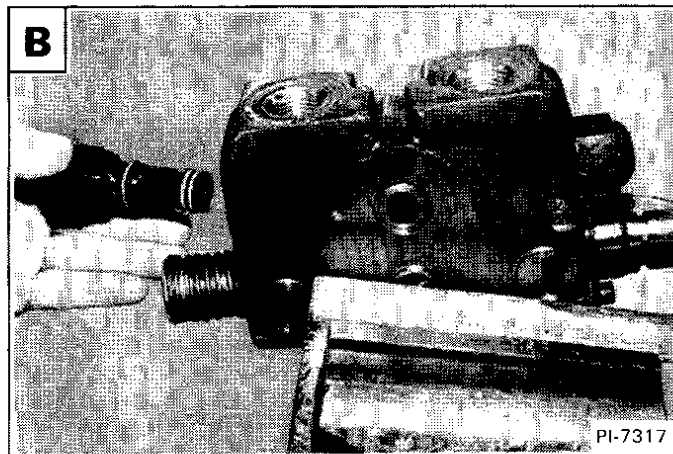


CONTROL VALVE (Cont'd)

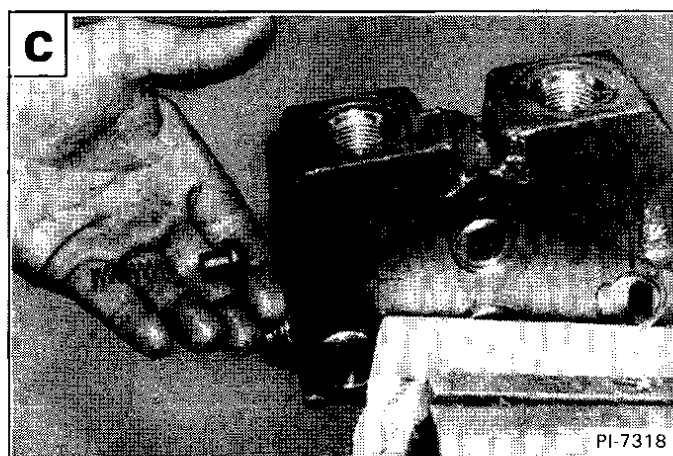
Remove the fittings from the section **A**.



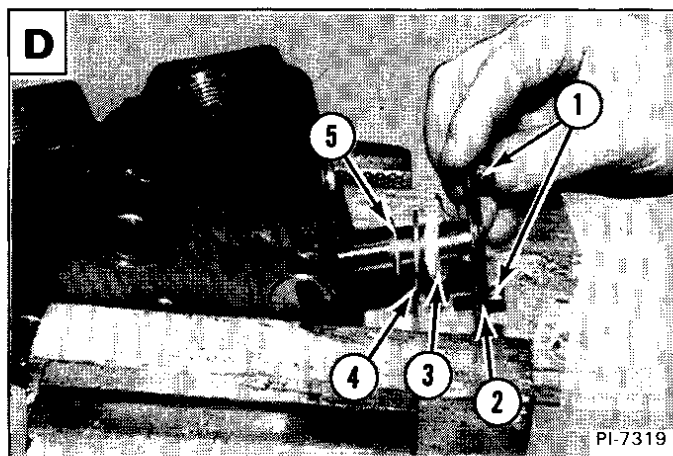
Loosen and remove the port relief valve **B**.



Remove the spring and poppet **C**.

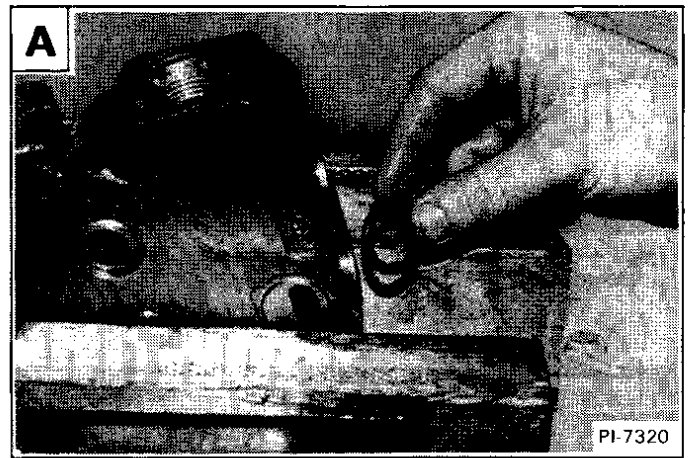


Remove the seal plate screws (Item 1), seal plates (Item 2), seal (Item 2), retainer (Item 4) and back-up washer (Item 5) **D**.

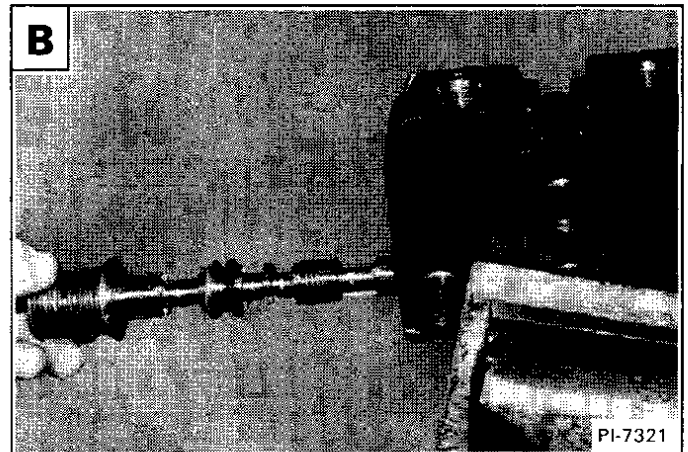


CONTROL VALVE (Cont'd)

Remove the spool o-ring **A**.

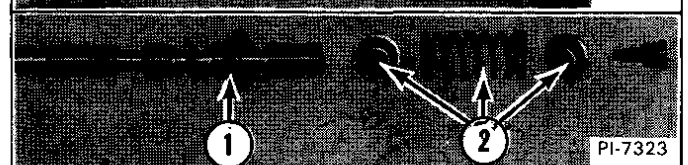
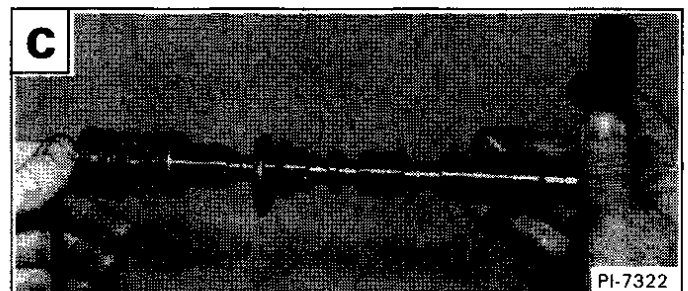


Remove the spool **B**.



Hold the spool at the yoke end to remove the screw **C**.

Remove the spring positioner assembly (Item 1) the back-up washer and O-ring (Item 2) (See Inset) **C**.



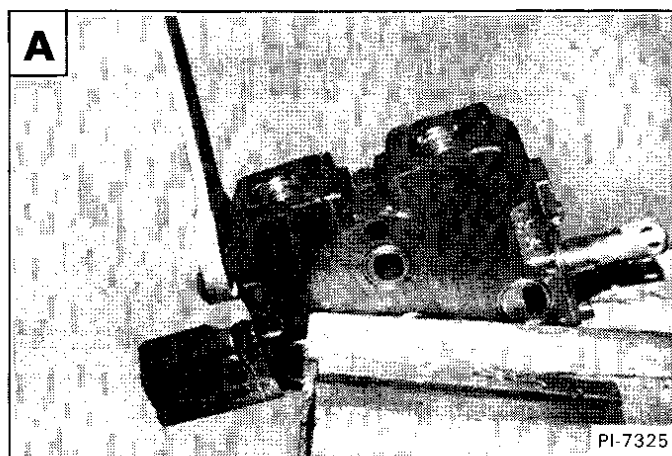
Lift Section

Remove the fittings from the section **D**.

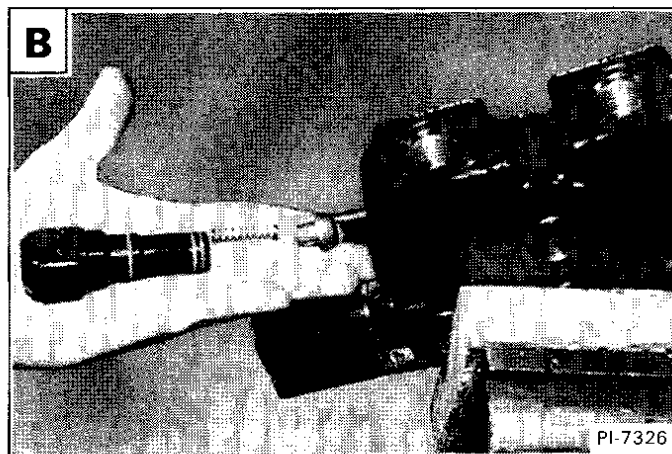


CONTROL VALVE (Cont'd)

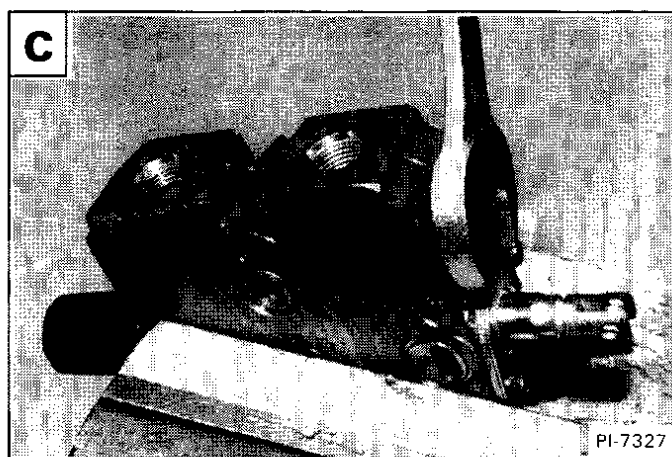
Loosen the port relief valve **A**.



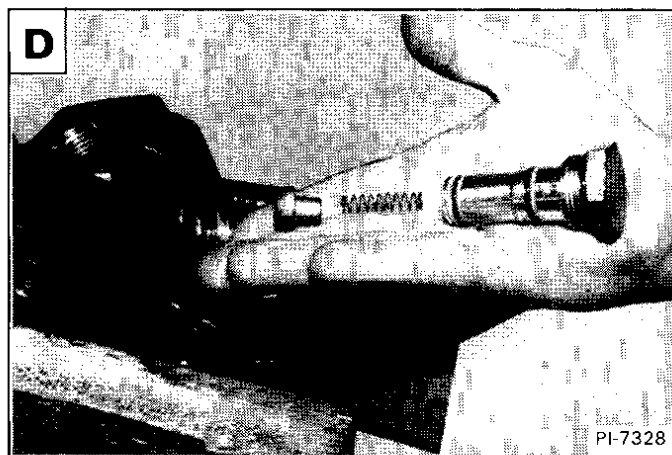
Remove the port relief valve, spring and poppet **B**.



Loosen the anti-cavitation valve **C**.

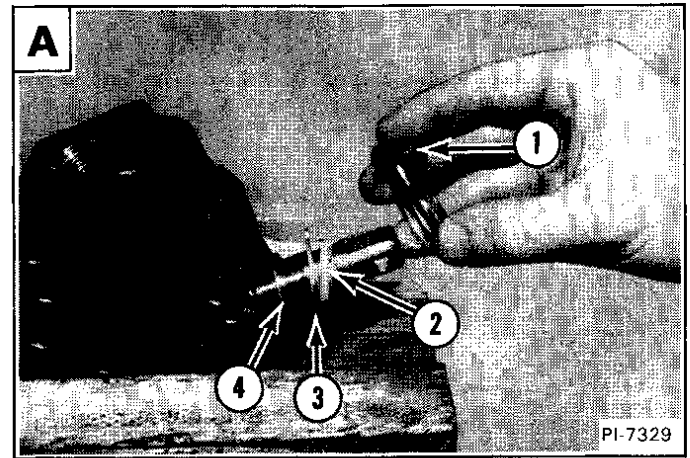


Remove the anti-cavitation valve, spring and poppet **D**.

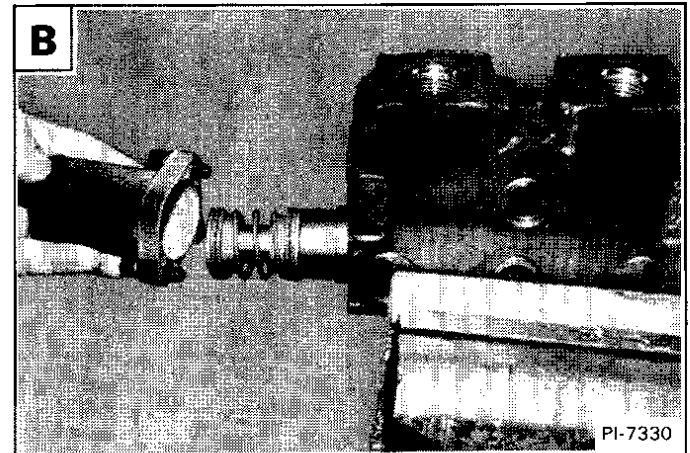


CONTROL VALVE (Cont'd)

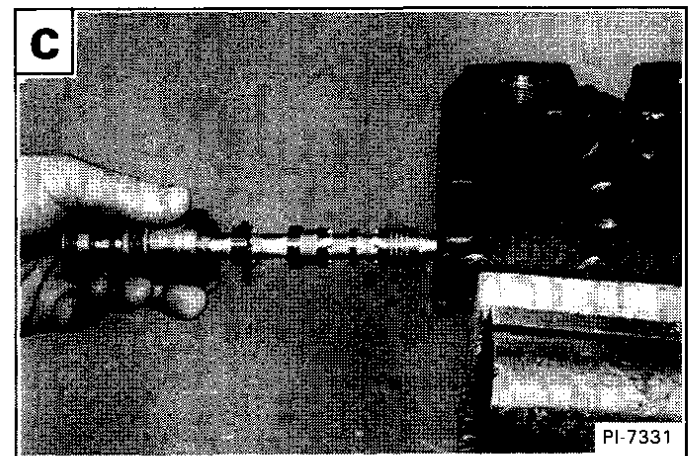
Remove the seal plates (Item 1), seal (Item 2), back-up washer (Item 3) and spacer (Item 4) **A**.



Remove the centering spring cap **B**.



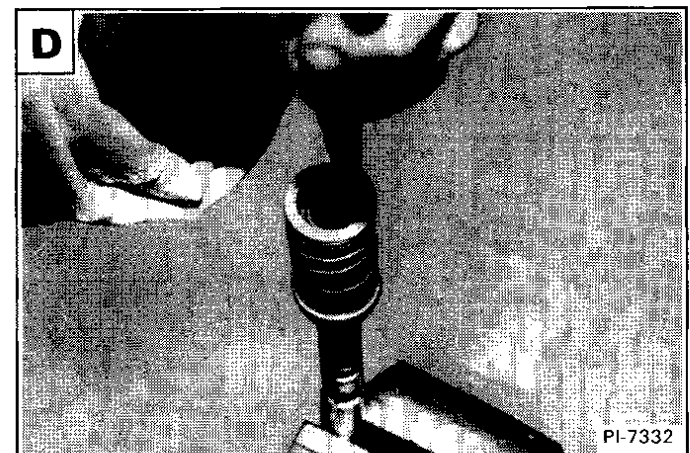
Remove the spool **C**.



Put the spool yoke in a vise.

NOTE: The centering spring is under tension, hold spring when removing snap ring.

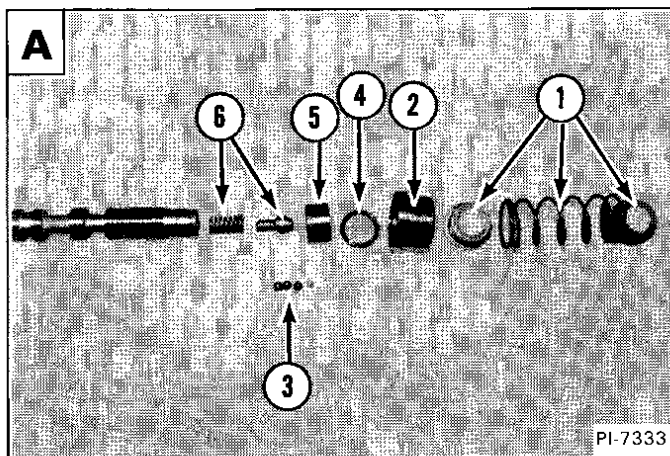
Remove the external snap ring **D**.



CONTROL VALVE (Cont'd)

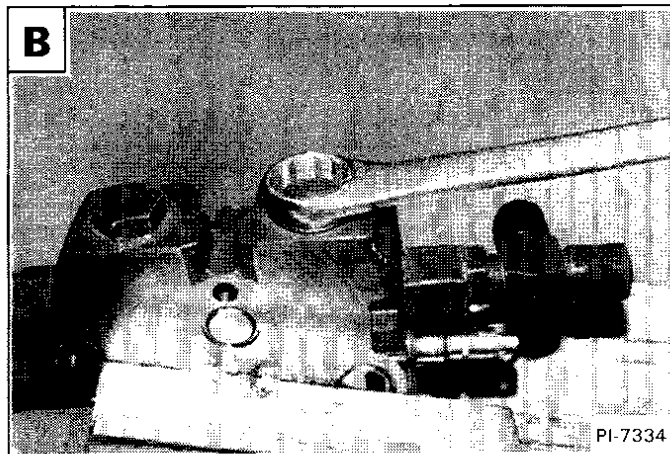
Remove the spring assembly (Item 1), detent cap (Item 2), balls (Item 3), quad ring (Item 4), spacer (Item 5), poppet and spring (Item 6) **A**.

Installation: Grease the spring, poppet and balls. Push the poppet against the spring when installing the detent cap over the balls.

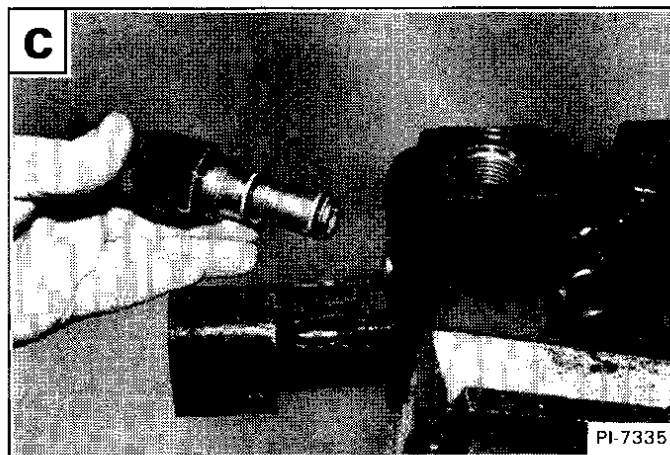


Auxiliary Section

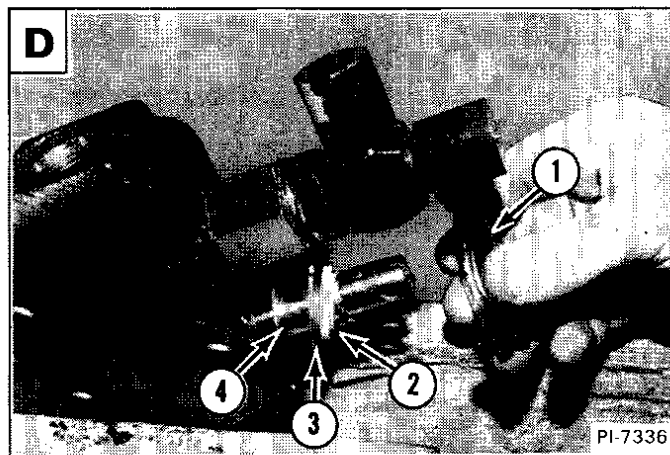
Remove the plugs **B**.



Remove the fitting **C**.

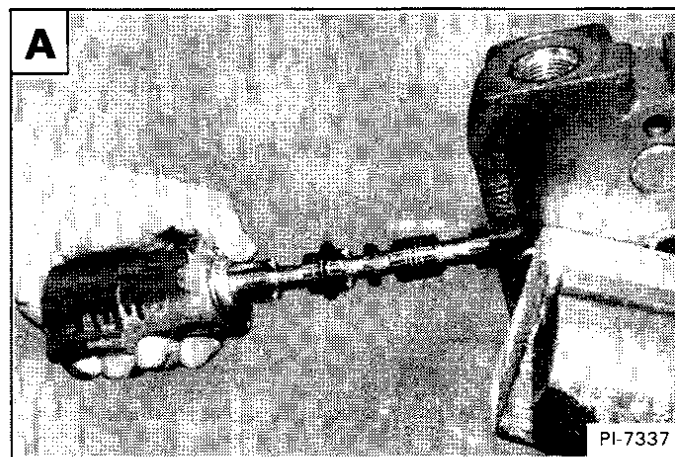


Remove the screws and seal plate (Item 1), seal (Item 2), back-up washer (Item 3) and washer (Item 4) **D**.



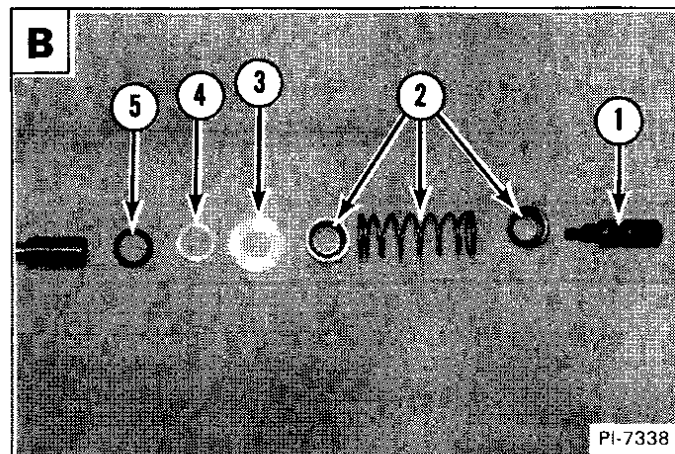
CONTROL VALVE (Cont'd)

Remove the spool, back-up washer and O-ring **A**.

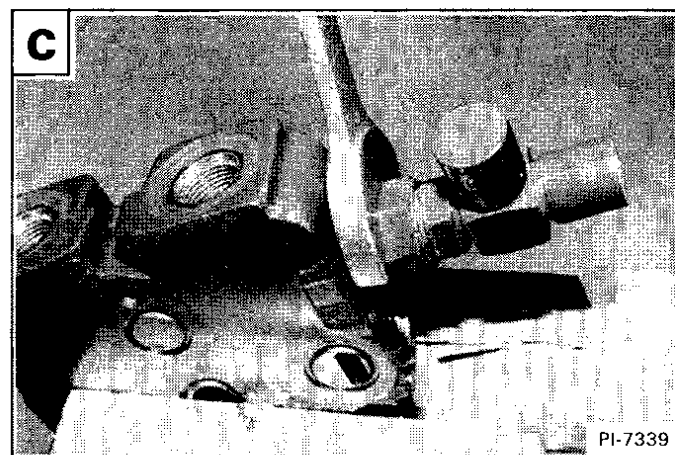


Remove the detent assembly first to remove the centering spring assembly (See Page 10).

Remove the spool bolt (Item 1), spring assembly (Item 2), back-up washer (Item 3), washer (Item 4) and O-ring (Item 5) **B**.



Remove the fitting **C**.



Auxiliary Detent Adjustment

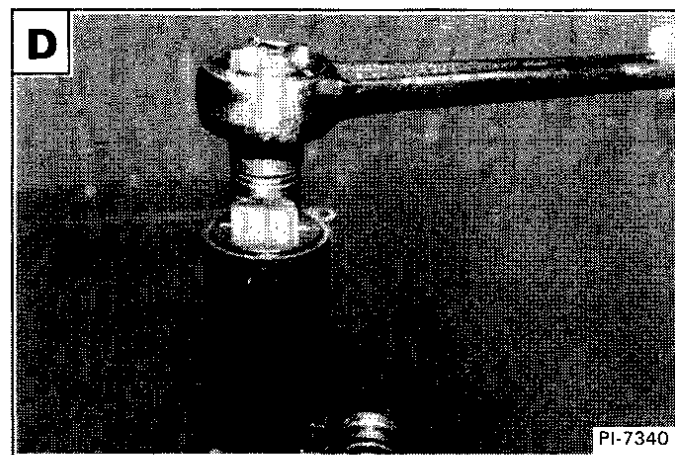
The auxiliary detent spring tension can be adjusted on the control valve.

Turn the cap clockwise to increase tension and counter clockwise to decrease tension **D**.

Disassemble the detent as follows:

The cap is under spring tension, hold cap with one hand as cap is removed.

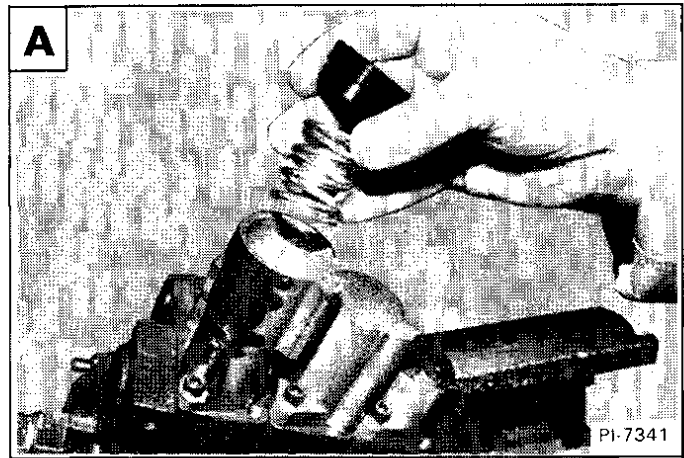
Use a straight slotted tool to loosen the detent cap **D**.



CONTROL VALVE (Cont'd)

Remove the cap and spring **A**.

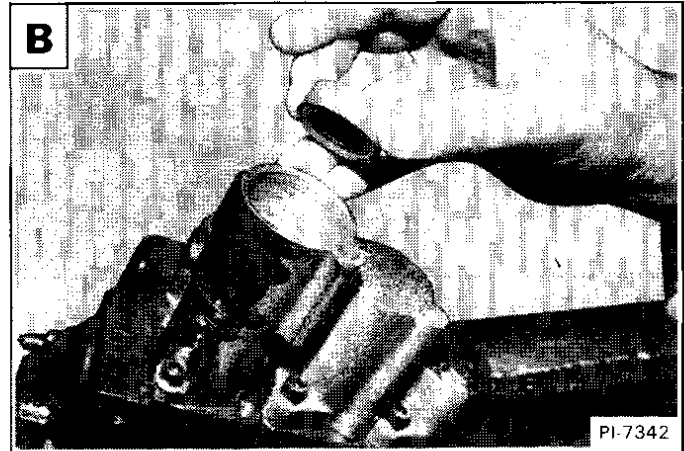
NOTE: Grease spring before assembly.



Remove the detent ball positioner **B**.

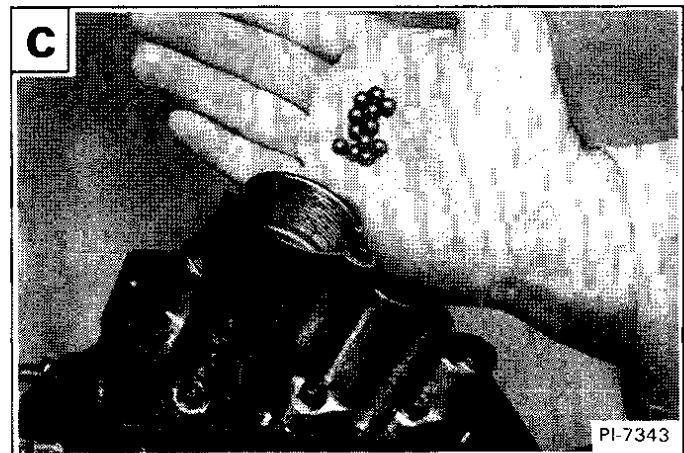
NOTE: Grease the positioner before assembly.

NOTE: Be sure the positioner is installed with concave side down.

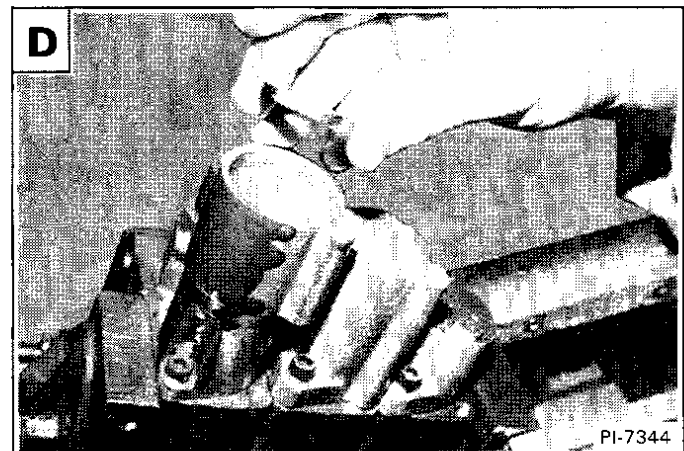


Remove the twelve (12) detent balls **C**.

NOTE: Grease the balls before assembly.



Remove the detent washer **D**.



CONTROL VALVE INDEX 1213

CONTROL VALVE

| | |
|-------------------------------------|---|
| Anti-Cavitation Valve | 8 |
| By-Pass Valve 240 PSI | 7 |
| Centering Mechanism | 6 |
| Disassembly and Assembly | 2 |
| Lift Section Orifice | 9 |
| Load Check Valves | 9 |
| Port Relief Valve | 8 |
| Spool Electrical Solenoid | 2 |

CONTROL VALVE IDENTIFICATION

| | |
|-----------------|---|
| Chart | 1 |
|-----------------|---|

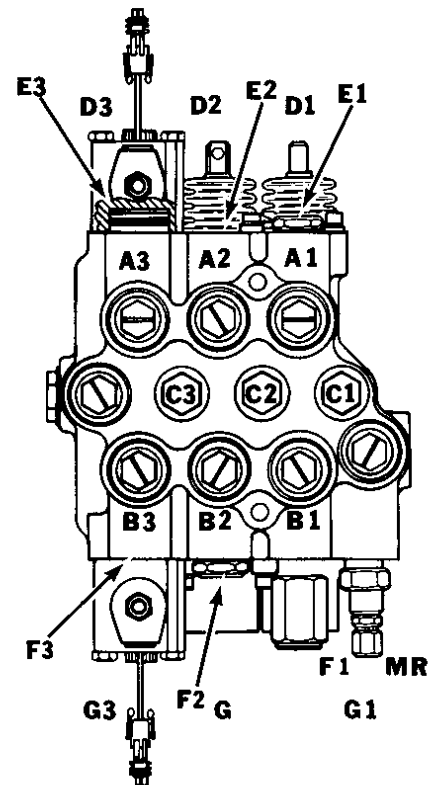
IDENTIFICATION & INSTALLATION OF SPOOL SEAL

| | |
|--------------------------|----|
| No Chamfer | 10 |
| Notch for Seal | 11 |
| Short Chamfer | 12 |
| Long Chamfer | 13 |

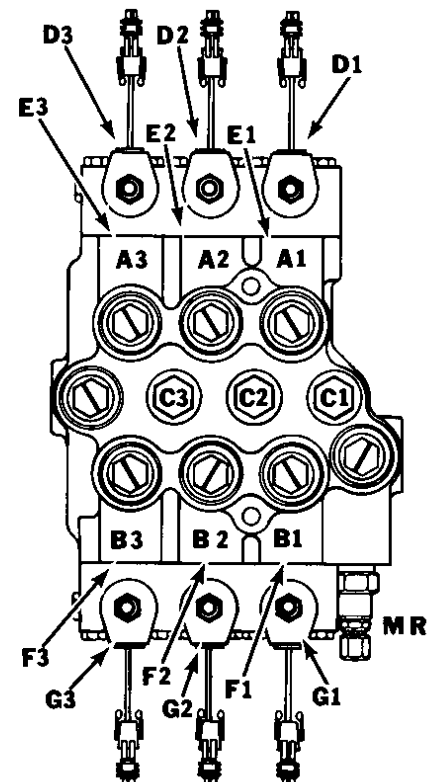
CONTROL VALVE IDENTIFICATION

| I T E M | 1213 | |
|------------------|---------------------------------|-------------------------------------|
| | FRONT VALVE | REAR VALVE |
| A-1 | Lift Cylinder— Rod End | Accumulator— Opens |
| A-2 | Tilt Cylinder— Rod End | Bogie Wheels— Lowers |
| A-3 | Shear—Opens | Shear—Opens |
| B-1 | Lift Cylinder— Base End | Accumulator— Closes |
| B-2 | Tilt Cylinder— Base End | Bogie Wheels— Raises |
| B-3 | Shear—Closes | Shear—Closes |
| C-1 | Load Check—Lift Function | Load Check—Acc. Function |
| C-2 | Load Check—Tilt Function | Load Check—Bogie Wheels Function |
| C-3 | Load Check—Shear Function | Load Check—Shear Function |
| D-1 | Lift Spool | Accumulator Solenoid |
| D-2 | Tilt Spool | Bogie Wheels Solenoid |
| D-3 | Shear Solenoid | Shear Solenoid |
| E-1 | Anti-Cavitation Valve | |
| E-2 | | Control Fluid Passage Plug |
| E-3 | Control Fluid Passage Plug | |
| F-1 | Port Relief Valve | |
| F-2 | Anti-Cavitation Valve | Control Fluid Passage Plug |
| F-3 | Control Fluid Passage Plug | |
| G-1 | Centering Spring— Lift Spool | Accumulator— Solenoid |
| G-2 | Centering Spring— Tilt Spool | Bogie Wheels— Solenoid |
| G-3 | Shear—Solenoid | Shear—Solenoid |
| MR | Main Relief Valve | Main Relief Valve |

FRONT VALVE



REAR VALVE



B-9243

B-6581

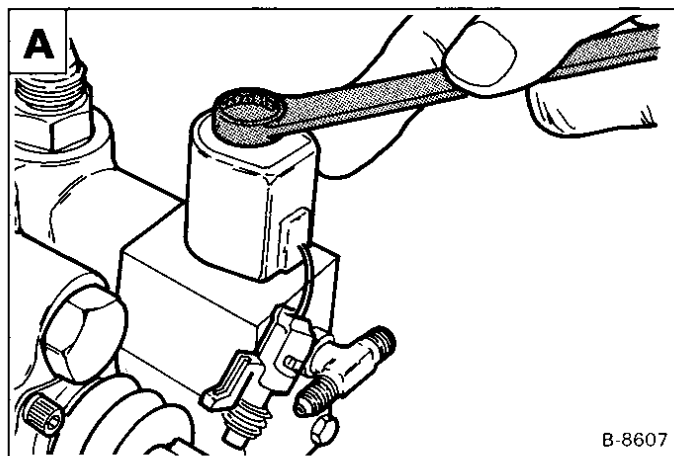
CONTROL VALVE

Spool Electrical Solenoid

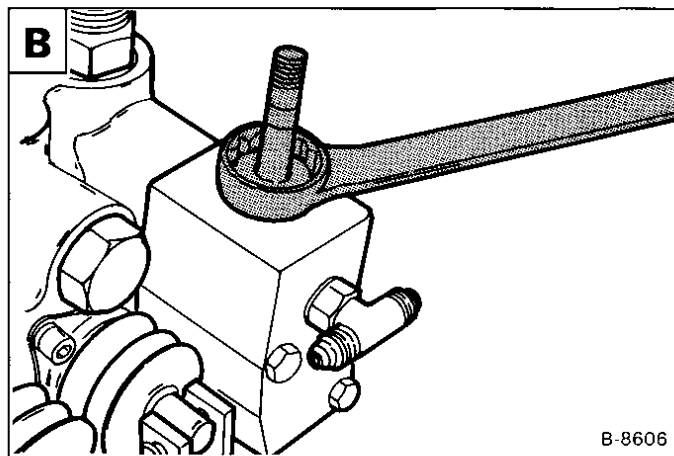
THE FRONT AND REAR CONTROL VALVE USE THE SAME PROCEDURE FOR REMOVAL AND INSTALLATION OF THE ELECTRICAL SOLENOID.

#* Remove the nut at the top of the solenoid **A**.

#* Remove the cover and the solenoid coil.



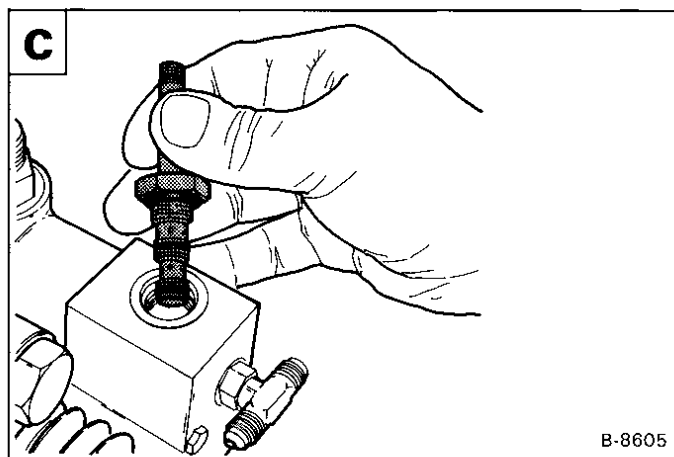
#* Loosen the solenoid valve **B**.



#* Remove the solenoid valve **C**.

#* Remove the O-rings and back-up washers.

#* Installation: Always use NEW O-rings and back-up washers when installing the solenoid valves.



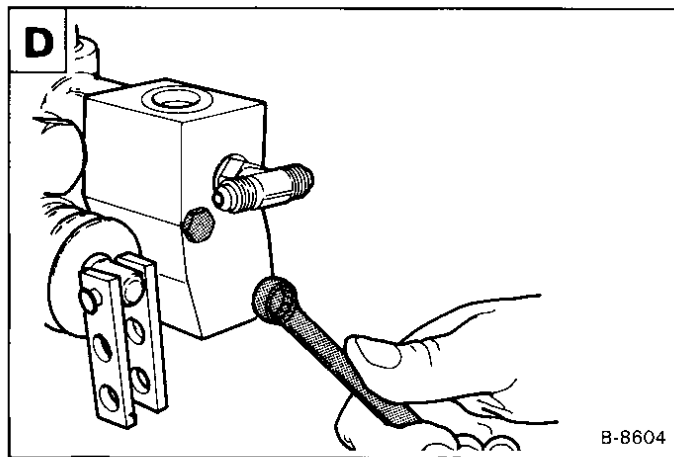
Disassembly and Assembly

NOTE: The procedure will list the difference between the front and rear control valve.

Disconnect the tubeline from the front and rear port block. Remove the bolts from the port block **D**.

Installation: Tighten the bolts to 90-100 in.-lbs. (10-11 Nm) torque.

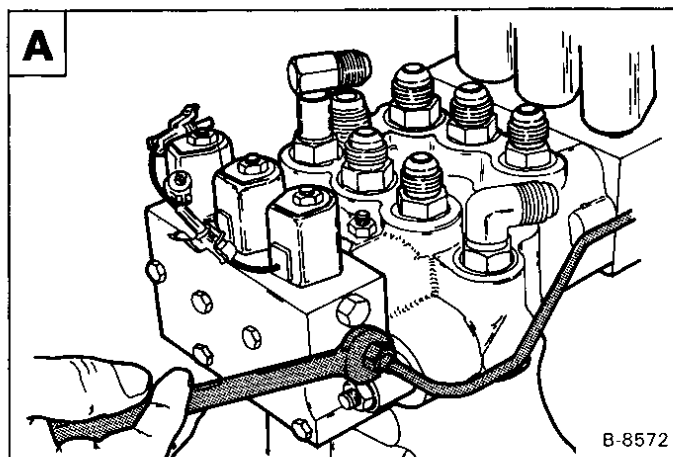
Front Control Valve
* Rear Control Valve



CONTROL VALVE (Cont'd)

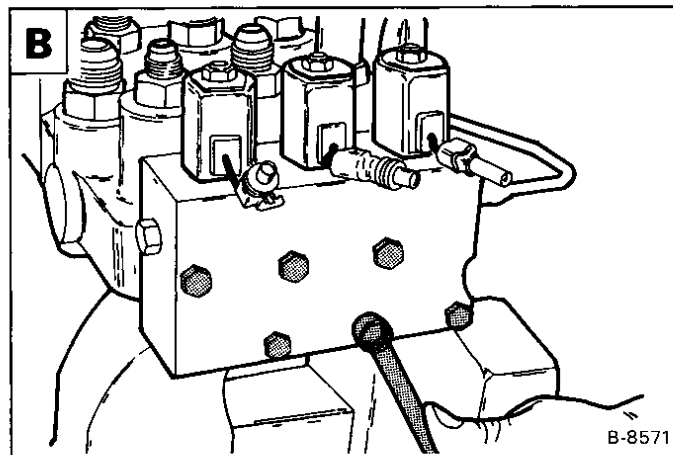
* Disconnect the tubeline between the front and rear port block

A.

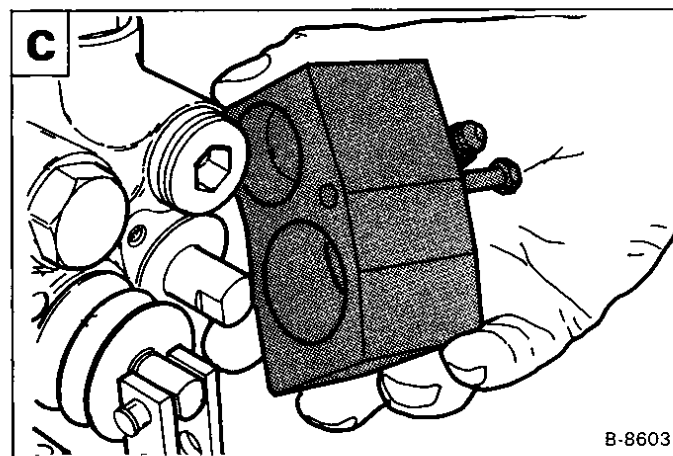


* Remove the bolts from the port block **B**.

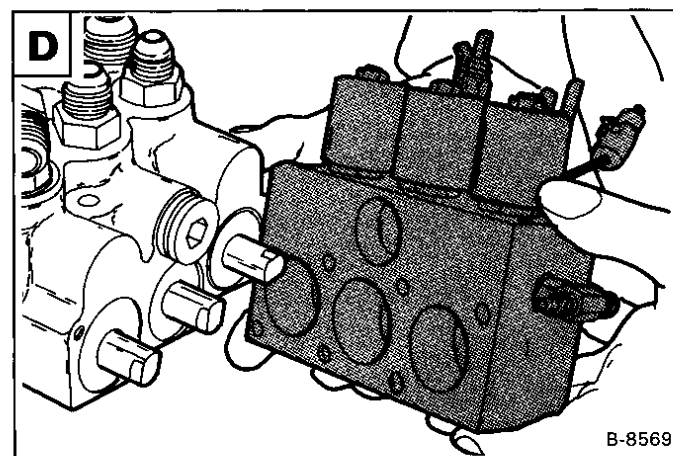
* Installation: Tighten the bolts to 90-100 in.-lbs. (10-11 Nm) torque.



Remove the front port block **C**.



* Remove the front port block **D**.

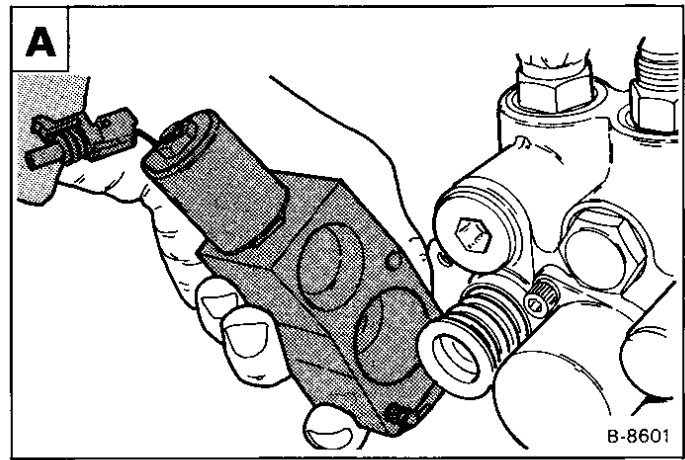


Front Control Valve

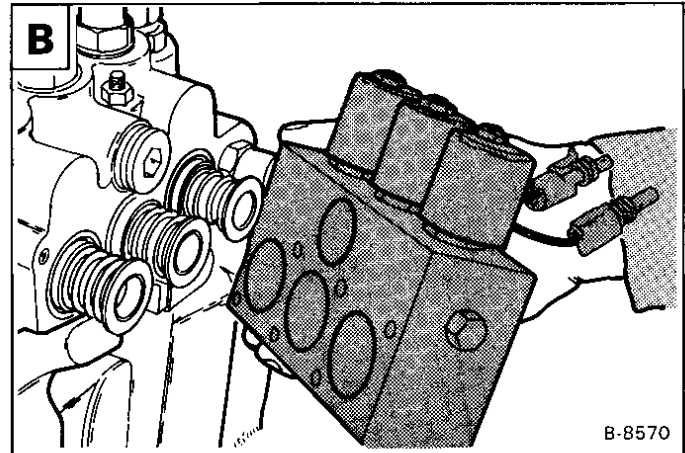
* Rear Control Valve

CONTROL VALVE (Cont'd)

Remove the bolts and rear port block **A**.

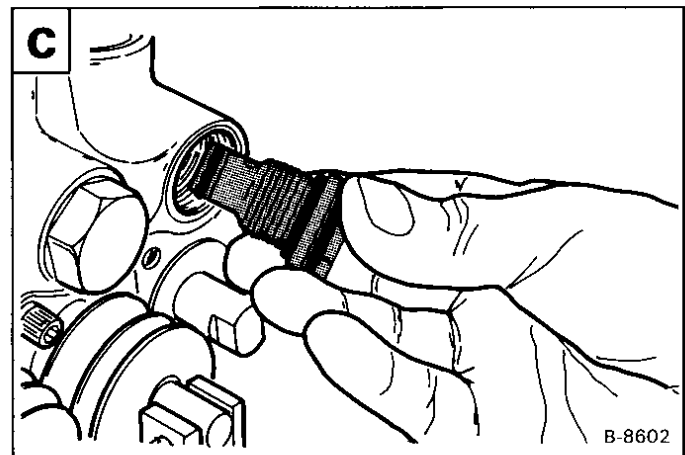


* Remove the bolts and rear port block **B**.

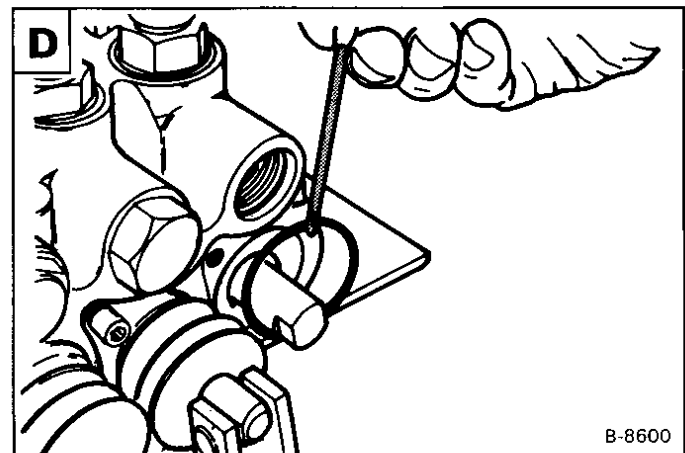


#* Remove the orifice plug **C**.

NOTE: In the rear control valve the orifice plug is located in the center section of the control valve.



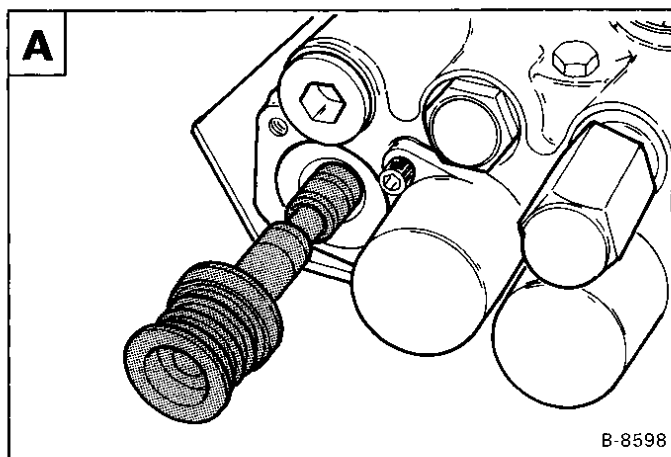
#* Remove the large O-ring **D**.



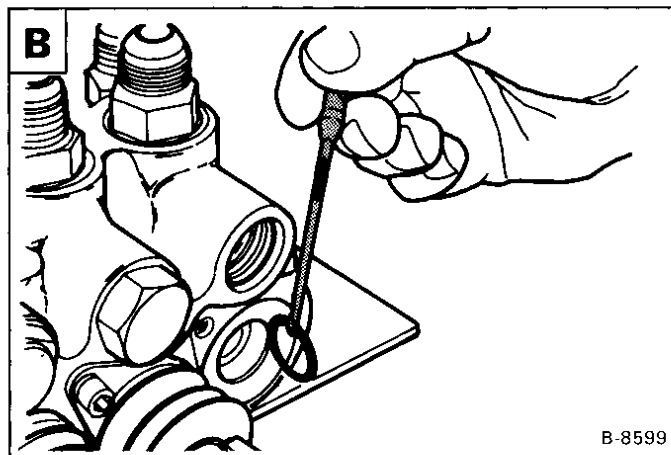
Front Control Valve
* Rear Control Valve

CONTROL VALVE (Cont'd)

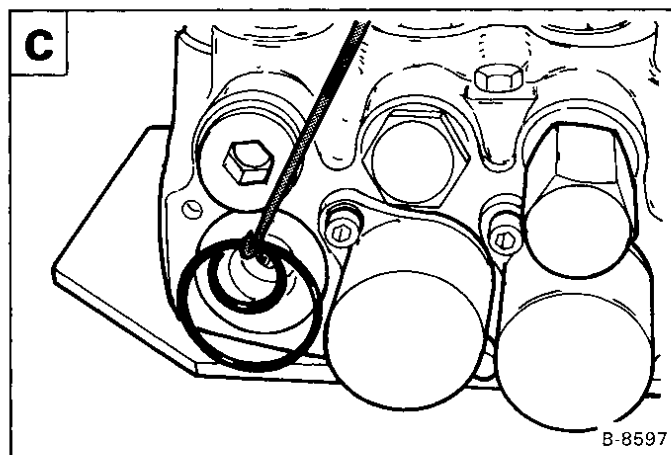
#* Remove the spool(s) from the control valve **A**.



#* Remove the quad ring(s) from the front side of the control valve **B**.



#* Remove the quad rings from the rear side of the control valve **C**.

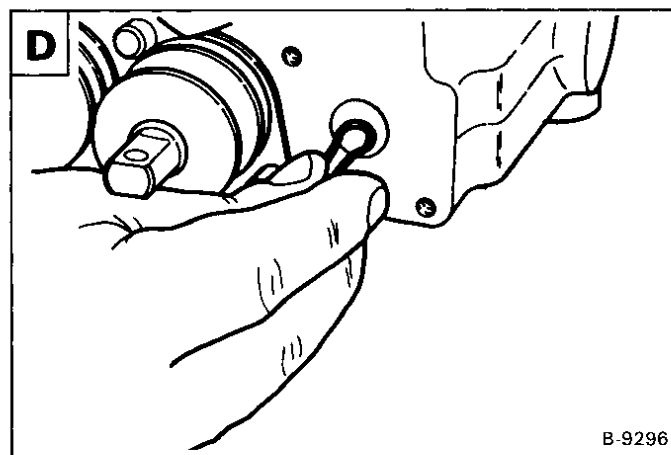


#* Use the following steps for correct installation of the valve spool(s) and quad rings:

1. Install the NEW quad ring into the groove in the front side of the control valve **D**.

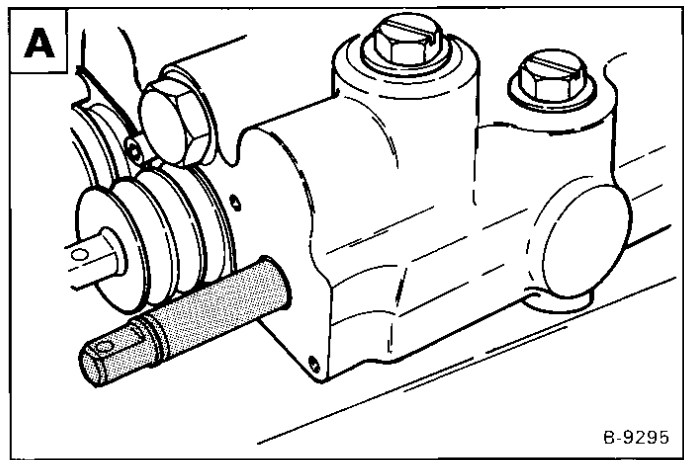
NOTE: See Pages 10, 11, 12 & 13 for seal and valve identification.

Front Control Valve
* Rear Control Valve



CONTROL VALVE (Cont'd)

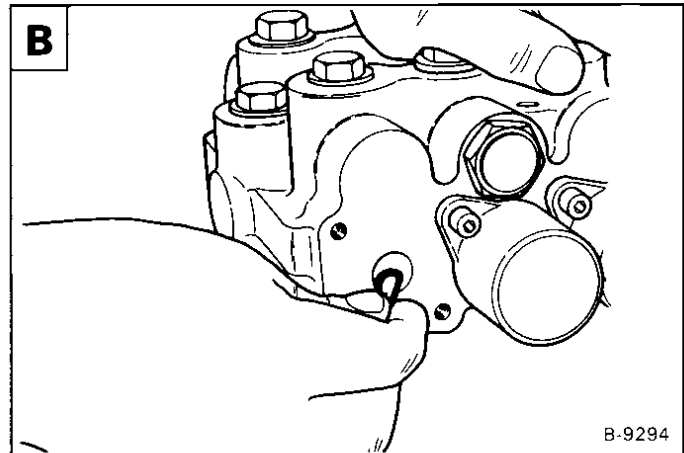
2. Install the valve spool into the control valve from the rear side of the valve.
3. Push the spool into the control valve just far enough so that the rear side quad ring can be installed **A**.



4. Install a NEW quad ring **B**.

NOTE: See Pages 10, 11, 12 & 13 for seal and valve identification.

5. Push the valve spool back into the control valve until it is even with the rear side machined surface of the valve.
6. Install the centering spring.



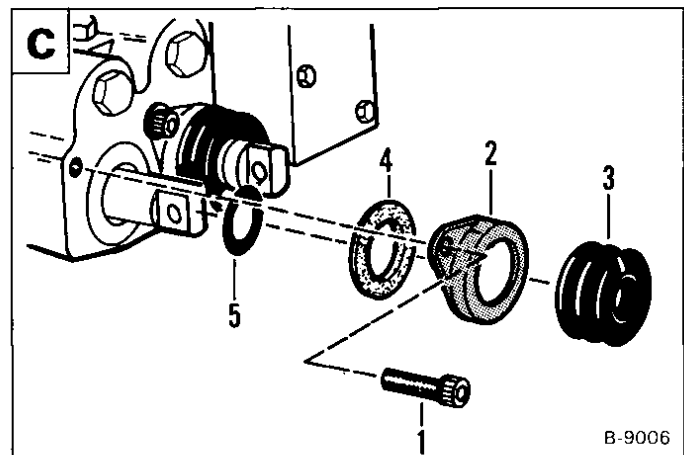
Rubber Boots and Retainer

The procedure is the same for the lift and tilt spool.

Remove the screws (Item 1) and rubber boot retainer (Item 2) **C**.

Remove the rubber boot (Item 3), filter (Item 4) and O-ring (Item 5) **C**.

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



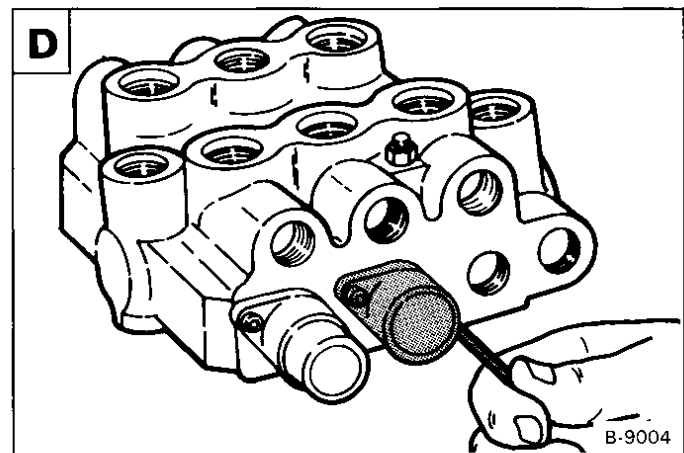
Centering Spring Mechanism

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

MEL-1285 — Spring Holding Tool

Remove the cap screws **D**.

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



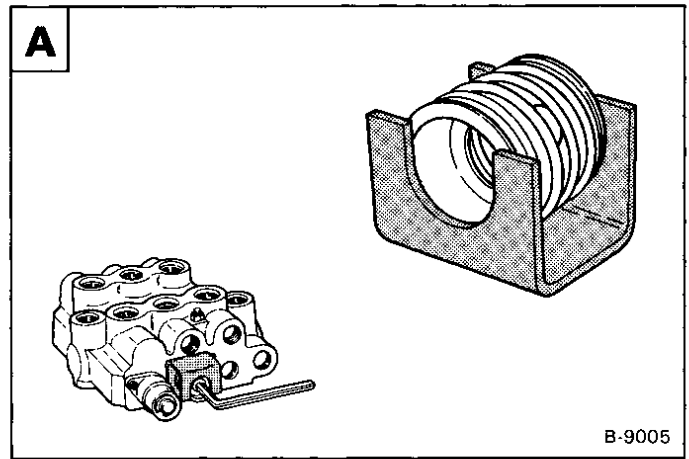
Front Control Valve
* Rear Control Valve

CONTROL VALVE (Cont'd)

#* Remove the center spring bolt.

NOTE: Carefully remove the bolt because there is spring pressure.

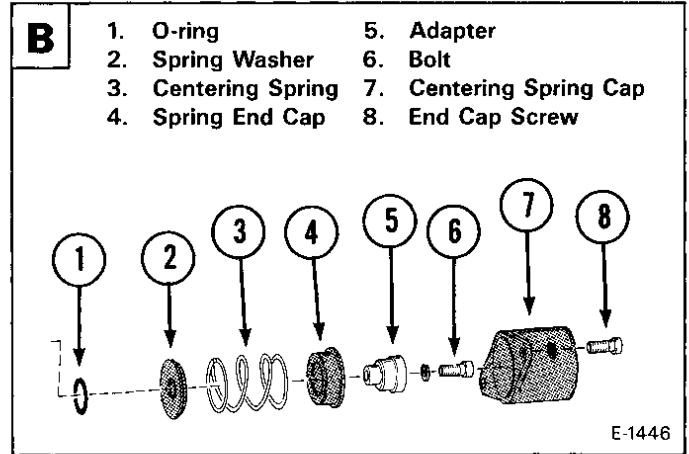
#* Installation: Put the washer and collar into the ends of the spring. Compress the spring assembly and install it into the hold tool **A**. Put Loctite on the bolt and tighten to 90-100 in.-lbs. (10-11 Nm) torque.



#* Disassemble the centering spring mechanism as shown **B**.

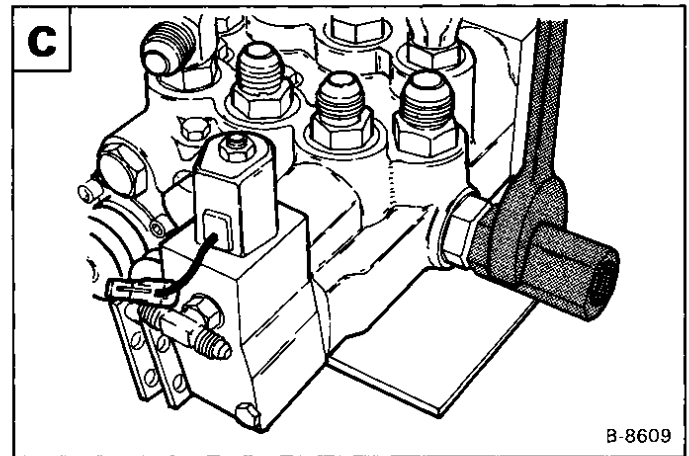
Check all the parts and replace the parts that are worn or broken.

Always use NEW O-rings and back-up washers when assembling the control valve.



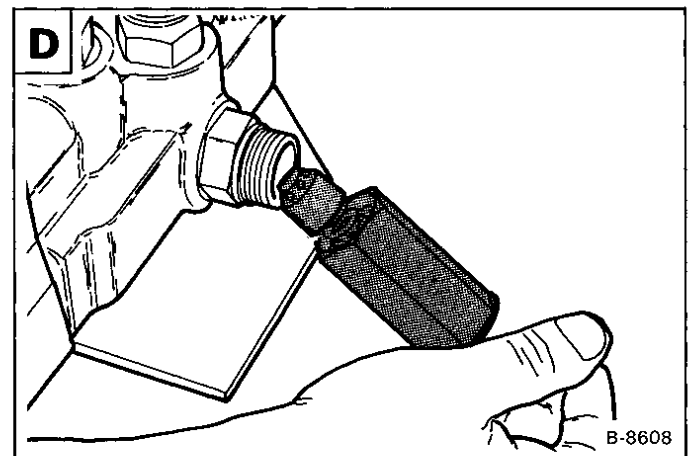
240 PSI By-Pass Valve

Loosen the by-pass valve **C**.



Remove the housing, spring and poppet **D**.

Clean the parts. Inspect and replace as needed.

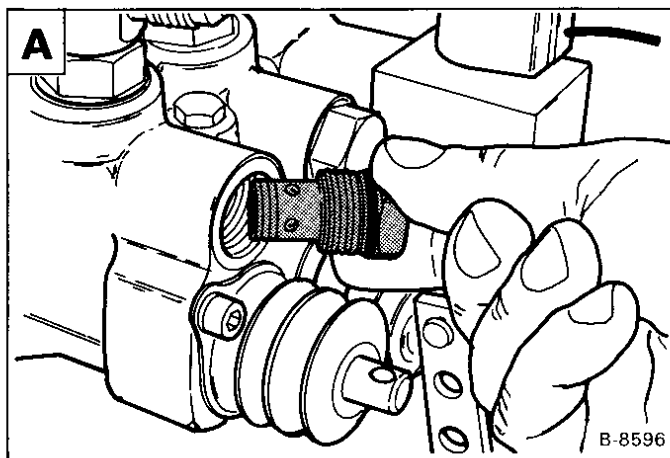


Front Control Valve
* Rear Control Valve

CONTROL VALVE (Cont'd)

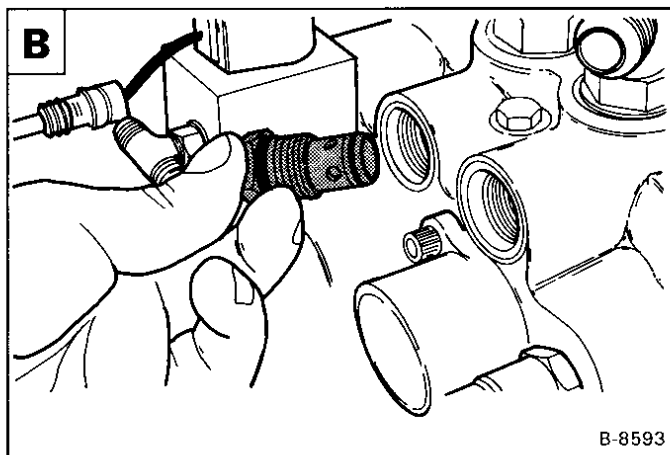
Anti-Cavitation Valve

Remove the anti-cavitation valve from the lift section **A**.

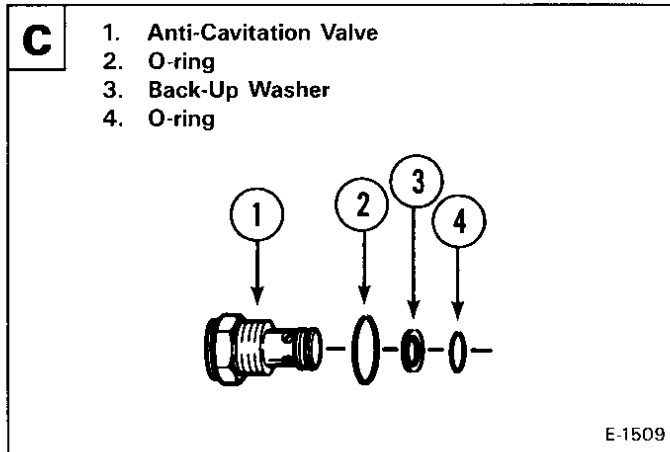


Remove the anti-cavitation valve from the tilt section **B**.

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



Clean and inspect the valve. Install NEW O-rings and back-up washers before installation **C**.

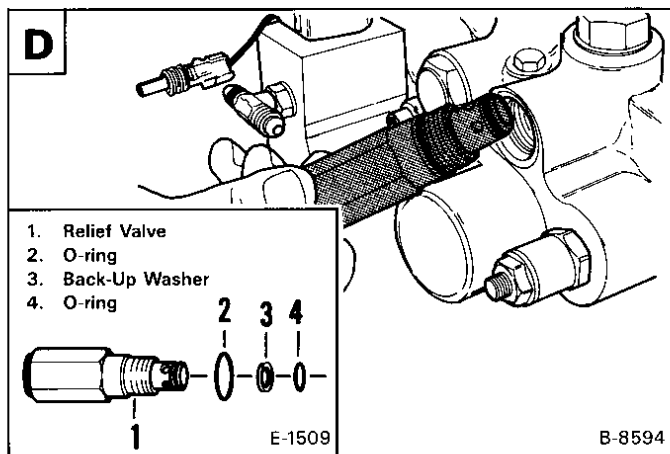


Port Relief Valve

Remove the port relief valve from the control valve **D**.

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

Clean and inspect the valve. Install NEW O-rings and back-up washers before installation **D**.



Front Control Valve
* Rear Control Valve

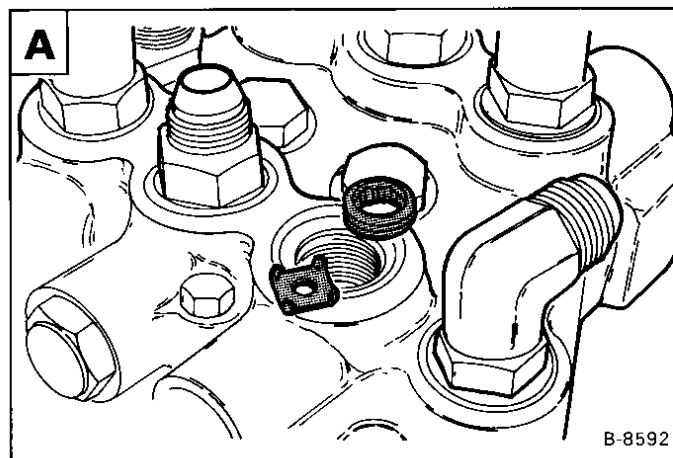
CONTROL VALVE (Cont'd)

Lift Section Orifice

Use an allen wrench and remove the retaining nut.

Remove the orifice **A**.

Clean and inspect the orifice.



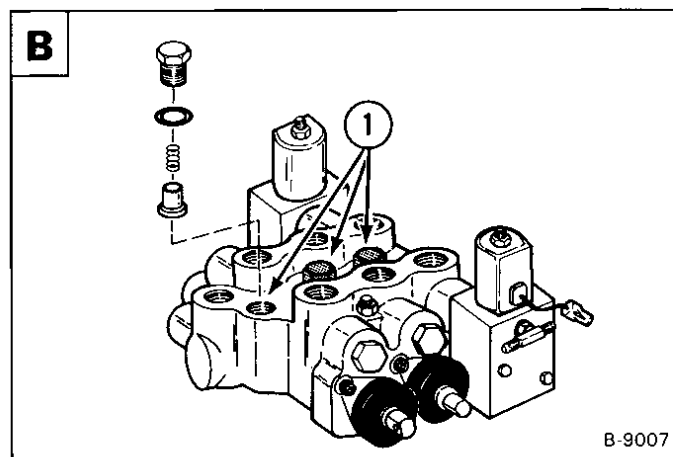
Load Check Valves

#* Remove the load check plug (Item 1) at the top of the control valve **B**.

#* Remove the spring and poppet **B**.

#* Remove the O-ring. Clean and inspect the poppet for wear.

#* Installation: Tighten the plug to 35-40 ft.-lbs. (47-54 Nm) torque.



Front Control Valve
* Rear Control Valve

IDENTIFICATION & INSTALLATION OF SPOOL SEAL

There are two types of seals for the control valve, a quad-ring seal and a lip seal. First identify the control valve (See Page 10, 11, 12 & 13) to find which seal is used. See the Parts Micro-Fiche for your model loader for the part number of the quad-ring seal or the lip seal used. Use the following procedure to install the seals into the control valve.

NO CHAMFER

1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing. De-burr the sharp edge at the seal area with a file or de-burring tool (both ends).
3. At the linkage end of the spool, de-burr the rubber boot groove as needed.

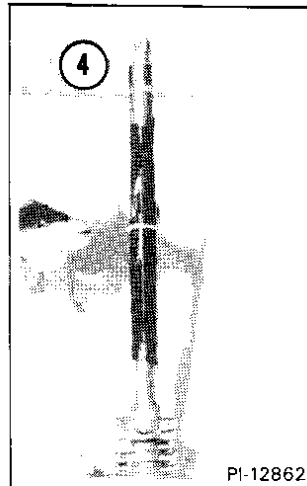
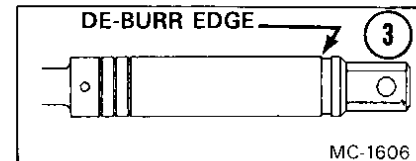
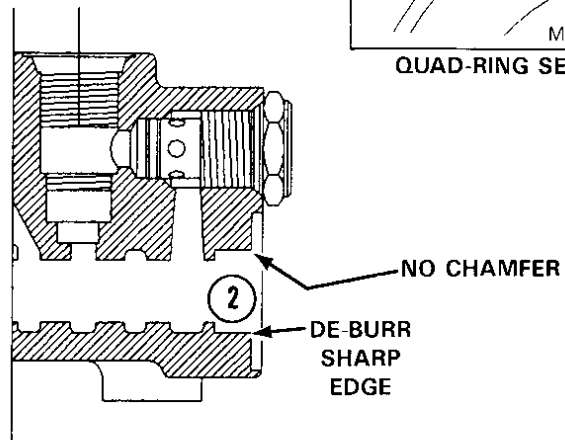
NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

4. Put clean oil on the valve spool. Install the quad-ring seal over the valve spool. Be Careful not to damage the quad-ring seal on the valve spool edges.

NOTE: An alternate method to protect the quad-ring seal by putting plastic material (Example: Discarded microfiche card) over the spool to protect the seal.

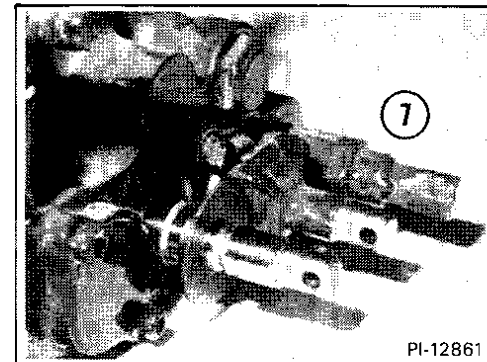
5. Install spool into the valve bore.
6. Slide the linkage end quad-ring seal over the rubber boot groove. Be Careful not to damage the seal.
7. Install the quad-ring seal retainer.
8. Continue with assembling the control valve.

CUT AWAY SIDE VIEW
OF VALVE BODY



INSTALLING QUAD-RING
SEAL ON VALVE SPOOL

INSTALLING QUAD-RING
SEAL REATINER

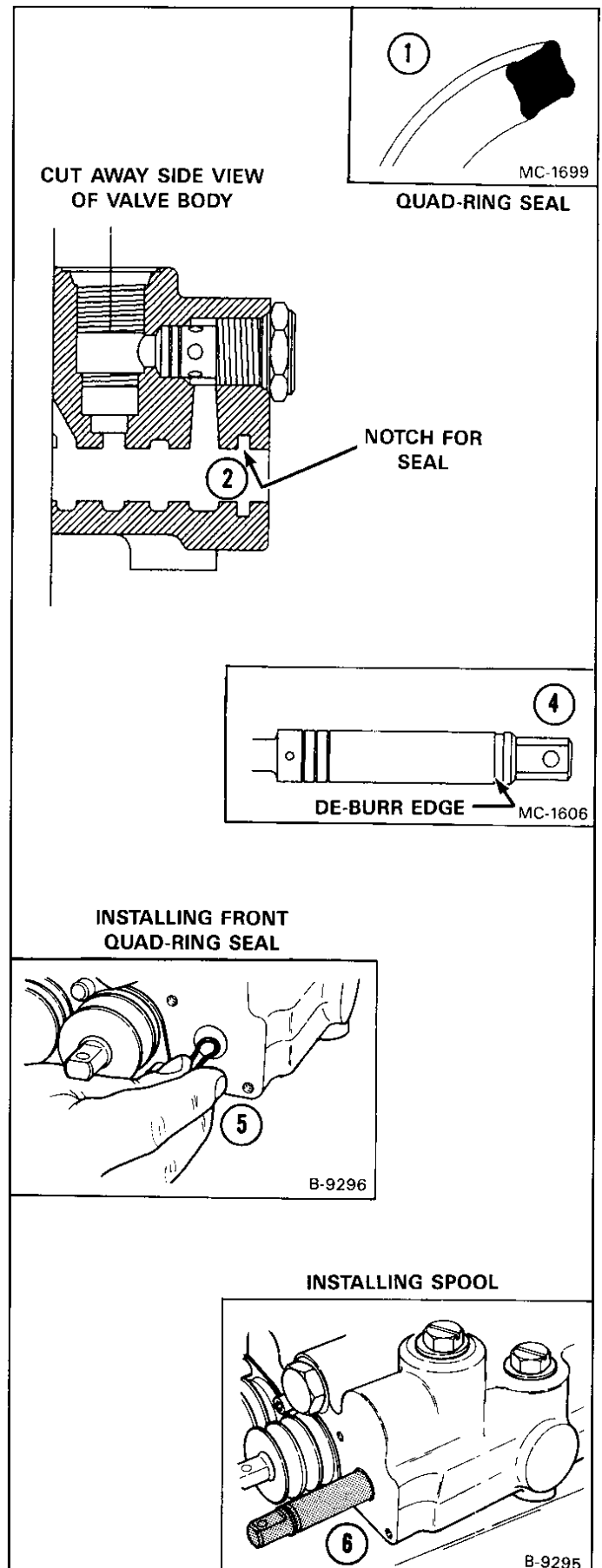


IDENTIFICATION & INSTALLATION OF SPOOL SEAL (Cont'd)

NOTCH FOR SEAL

NOTE: This control valve (with the notch for seal) must be removed from the loader for the quad-ring seal installation.

1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing.
3. The detent mechanism or centering spring must be removed from the valve spool.
4. At the linkage end of the spool, de-burr the rubber boot groove as needed.
5. Install the quad-ring seal into the notch in the linkage end of the control valve.
6. Put clean oil on the valve spool. Install the spool into the valve from the rear end (centering spring or detent mechanism side). Be Careful not to damage the quad-ring seal, already installed, when going over the groove for the rubber boot. Push the spool into the valve just far enough so that the rear quad-ring seal can be installed.
7. Install the quad-ring seal in the rear groove of the valve.
8. Push the valve spool back into the control valve until it is even with the rear machined surface of the valve.
9. Continue with assembling the control valve.



IDENTIFICATION & INSTALLATION OF SPOOL SEAL

SHORT CHAMFER

1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing. De-burr the sharp edge at the seal area with a file or de-burring tool (both ends).
3. At the linkage end of the spool, de-burr the rubber boot groove as needed.

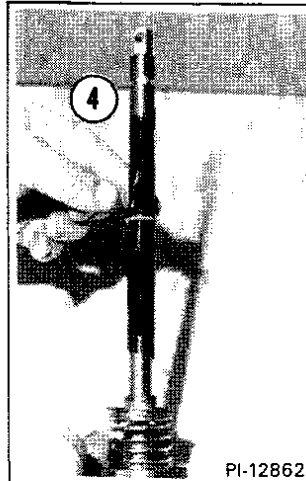
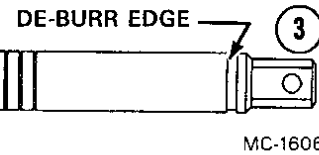
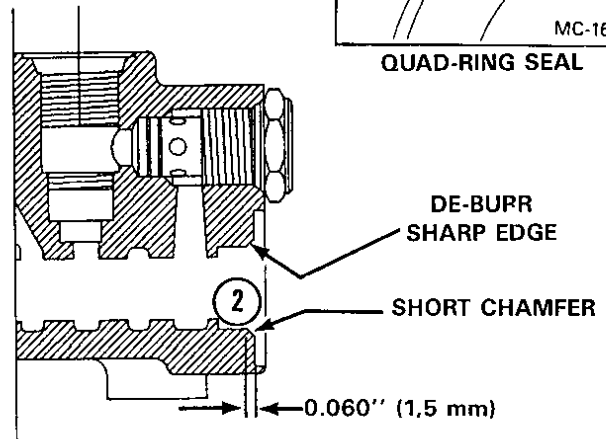
NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

4. Put clean oil on the valve spool. Install the quad-ring seal over the valve spool. Be Careful not to damage the quad-ring seal on the valve spool edges.

NOTE: An alternate method to protect the quad-ring seal by putting plastic material (Example: Discarded microfiche card) over the spool to protect the seal.

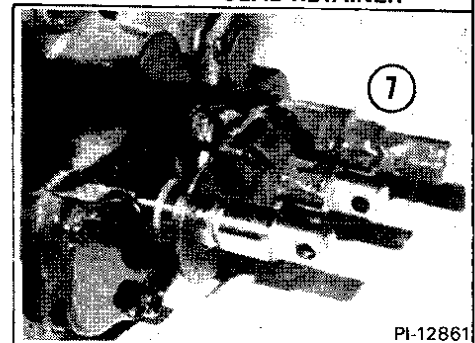
5. Install spool into the valve bore.
6. Slide the linkage end quad-ring seal over the rubber boot groove. Be Careful not to damage the seal.
7. Install the quad-ring seal retainer.
8. Continue with assembling the control valve.

CUT AWAY SIDE VIEW
OF VALVE BODY



INSTALLING QUAD-RING
SEAL ON VALVE SPOOL

INSTALLING QUAD-RING
SEAL RETAINER



IDENTIFICATION & INSTALLATION OF SPOOL SEAL (Cont'd)

LONG CHAMFER

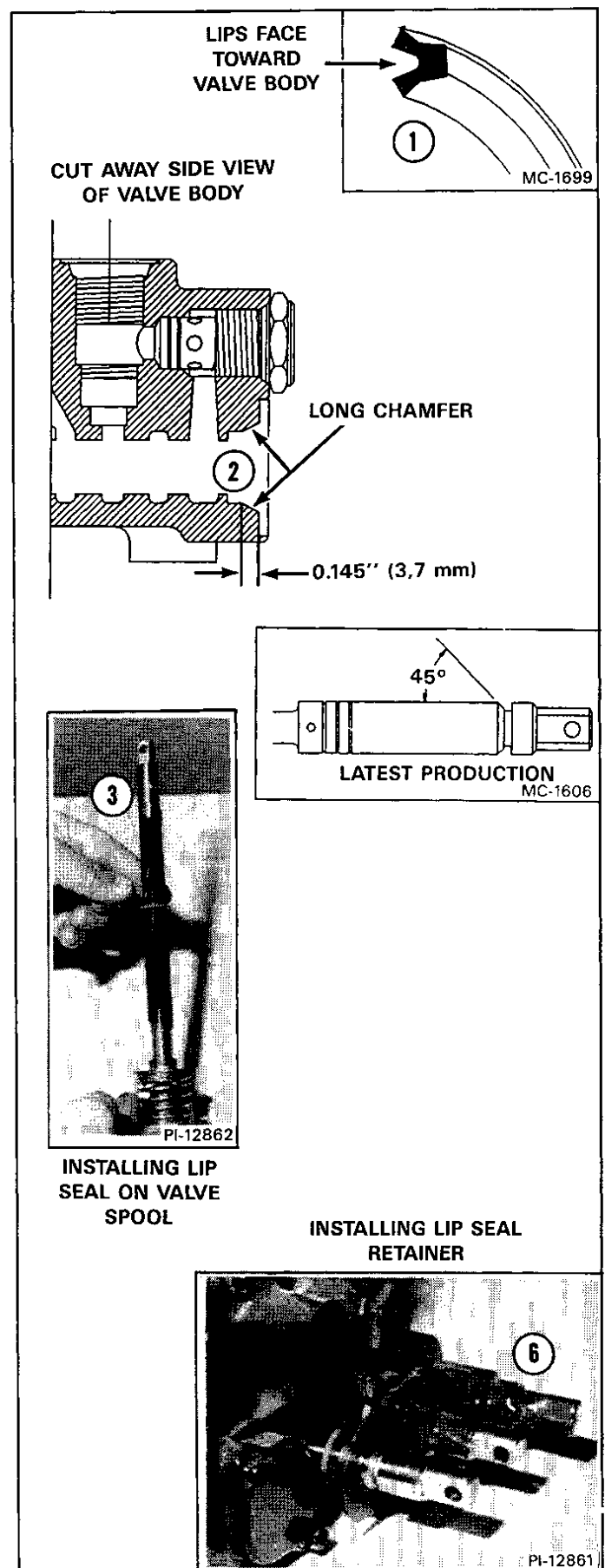
1. Uses only lip seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

3. Put clean oil on the valve spool. Install the lip seal over the valve spool. Be Careful not to damage the lip seal on the valve spool edges.

NOTE: An alternate method to protect the lip seal by putting plastic material (Example: Discarded micro-fiche card) over the spool to protect the seal.

4. Install spool into the valve bore.
5. Slide the linkage end lip seal over the rubber boot groove. Be Careful not to damage the seal.
6. Install the seal retainer.
7. Continue with assembling the control valve.



HYDRAULIC CONTROL VALVE

CONTROL VALVE

| | |
|---|----|
| Anti-Cavitation Valve | 4 |
| Auxiliary Electrical Solenoid | 12 |
| Auxiliary Spool | 11 |
| Disassembly and Assembly | 2 |
| Inspection | 13 |
| Lift Spool Detent | 6 |
| Load Check Valve | 2 |
| Main Relief Valve | 3 |
| Port Relief Valve | 3 |
| Rubber Boot | 5 |
| Tilt Centering Spring | 10 |

CONTROL VALVE IDENTIFICATION

| | |
|-----------------|---|
| Chart | 1 |
|-----------------|---|

IDENTIFICATION & INSTALLATION OF SPOOL SEAL

| | |
|-------------------------|----|
| Short Chamfer | 14 |
| Long Chamfer | 15 |

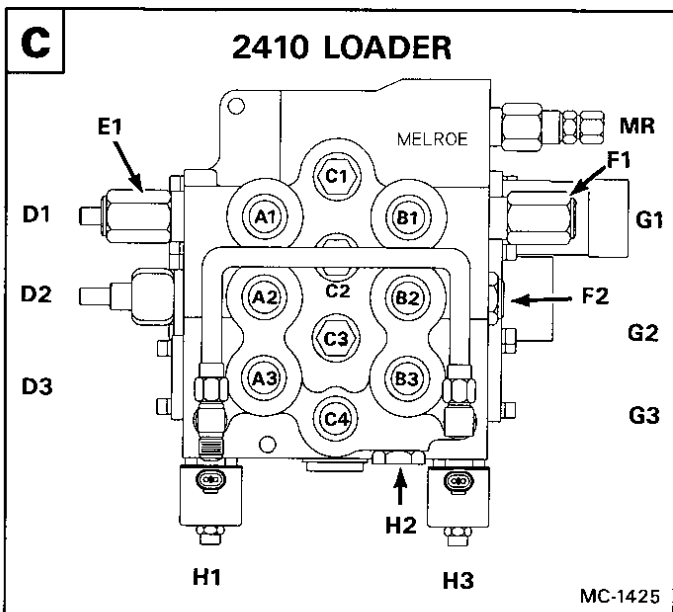
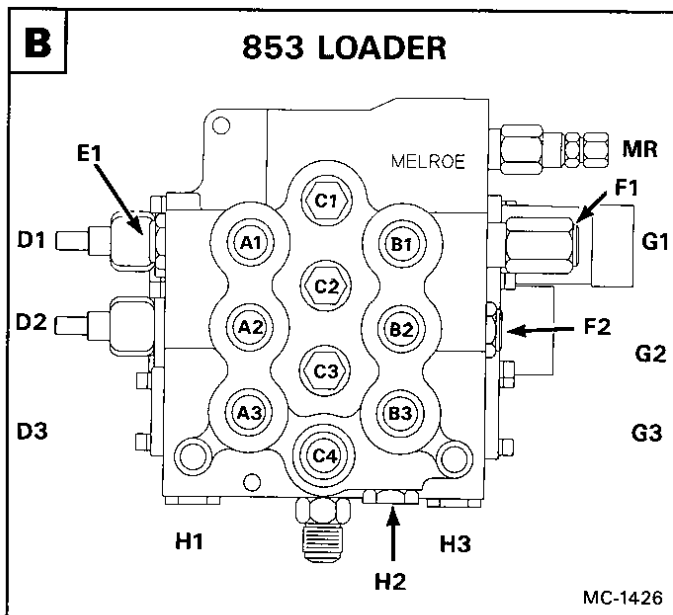
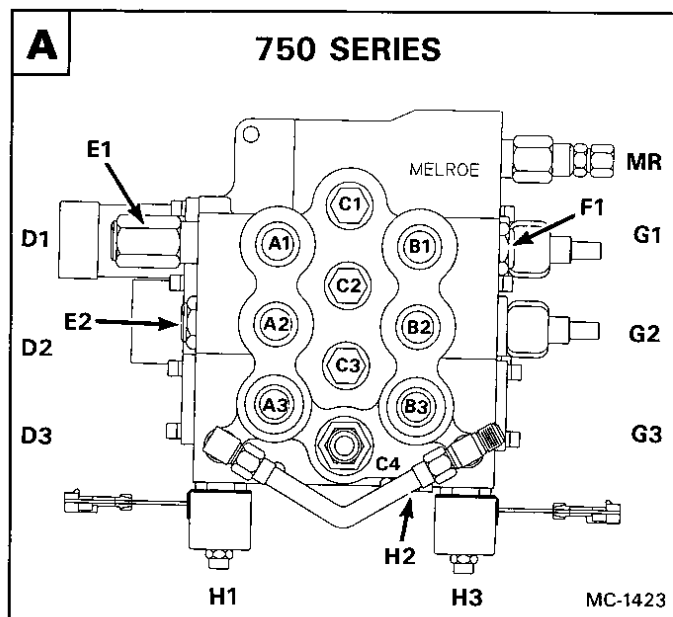


bobcat

CONTROL VALVE IDENTIFICATION

Chart

| Item | 750 Series | 853 Loader | 2410 Loader |
|------|--|----------------------------------|-----------------------------|
| A1 | Lift Cyl. Base End Restrictor | Lift Cyl. - Rod End | |
| A2 | Tilt Cyl. Base End | Tilt Cyl. - Rod End | |
| A3 | Auxiliary Hydraulics | | |
| B1 | Lift Cyl. Rod End | Lift Cyl. - Base End Resitrictor | |
| B2 | Tilt Cyl. Rod End | Tilt Cyl. - Base End | |
| B3 | Auxiliary Hydraulics | | |
| C1 | Load Check Valve/Lift Function | | |
| C2 | Load Check Valve/Tilt Function | | |
| C3 | NO Load Check Valve Auxiliary Function | | |
| C4 | Oil Cooler By-Pass | Outlet Fluid Flow | |
| D1 | Lift Spool Detent | Lift Spool | |
| D2 | Centering Spring Tilt Spool | Tilt Spool | |
| D3 | Auxiliary Spool | | |
| E1 | Port Relief | Anti-Cav. Valve | Port Relief |
| E2 | Anti-Cav. Valve | | |
| F1 | Anti-Cav. Valve | Port Relief | |
| F2 | | Anti-Cav. Valve | |
| G1 | Lift Spool | Lift Spool Detent | |
| G2 | Tilt Spool | Tilt Spool Centering Spring | |
| G3 | Auxiliary Spool | | |
| H1 | Auxiliary Electric Solenoid | Plug | Auxiliary Electric Solenoid |
| H2 | Plug/Port Relief (Optional) | | |
| H3 | Auxiliary Electric Solenoid | Plug | Auxiliary Electric Solenoid |
| MR | Main Relief Valve | | |



CONTROL VALVE

Disassembly and Assembly

See the Service Manual for your Model loader for removal and installation of the control valve.

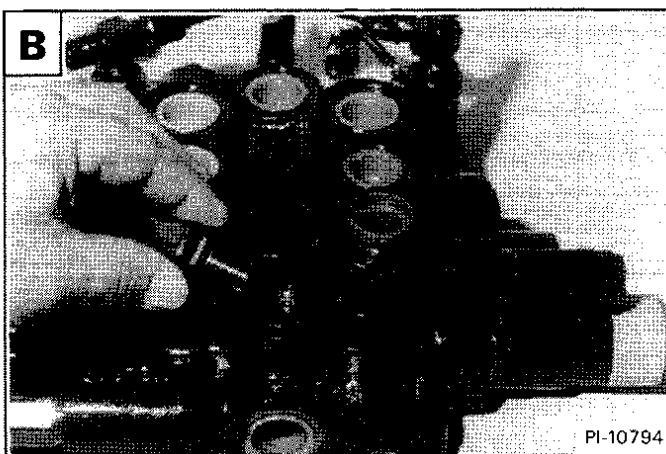
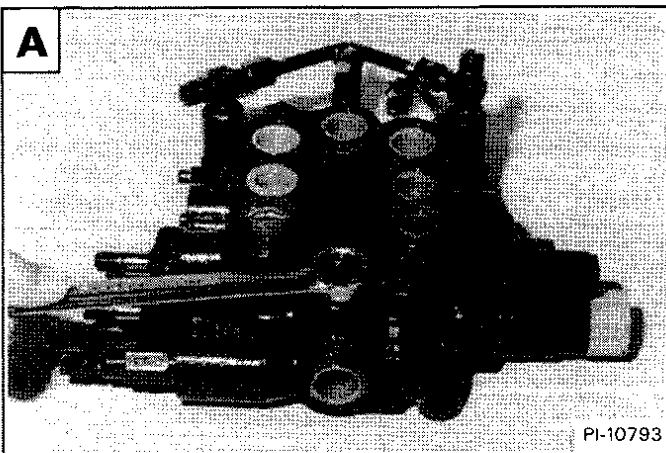
The anti-cavitation valve, port relief valves and plugs are at different locations in the control valve. Refer to Page 1 (Control Valve Identification Chart) for the correct location of the parts for each Model control valve.

NOTE: THE PHOTO'S MAY NOT SHOW THE EXACT LOCATION FOR THE PART BEING REMOVED OR INSTALLED ON THE CONTROL VALVE, BUT THE PROCEDURE IS THE SAME.

IMPORTANT

When making repairs on 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-2003-0284



Mark each valve section and spool so that the parts will be returned to its original bore during assemble.

Use bolts to fasten the control valve to a work bench for easier disassemble and assemble.

Load Check Valve

Loosen the load check plug ("C" port; Page 1) **A**.

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

Remove the load check plug **B**.

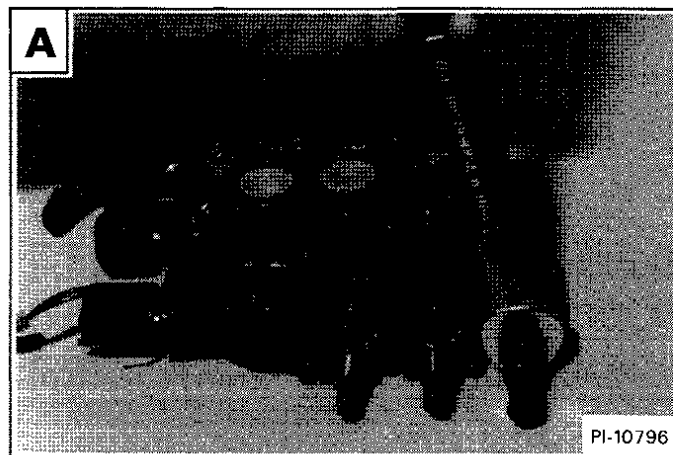
Remove the spring and poppet **C**.

CONTROL VALVE (Cont'd)

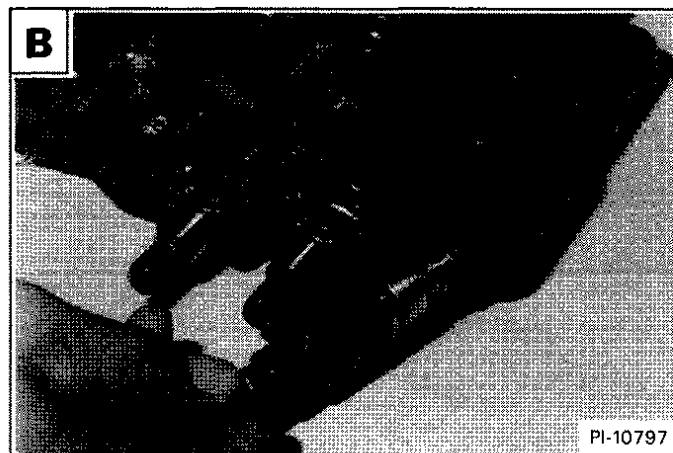
Main Relief Valve

Loosen the main relief valve **A**.

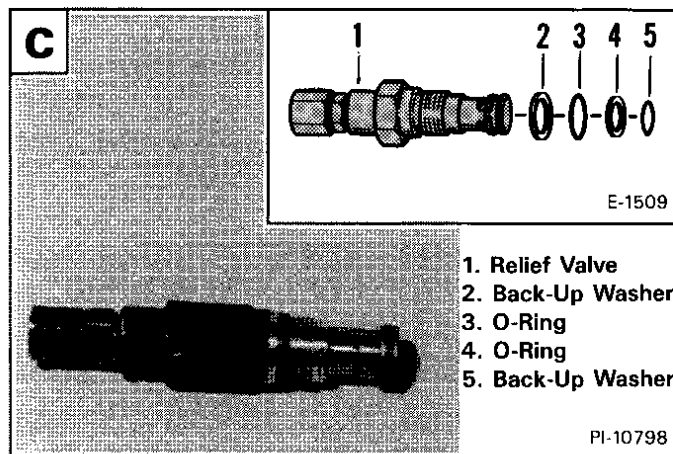
Assemble: Always use new O-rings and back-up washers. Tighten to 35-40 ft.lbs. (47-54 Nm) torque.



Remove the main relief valve **B**.



Remove the O-rings and back-up washers from the main relief valve **C**.

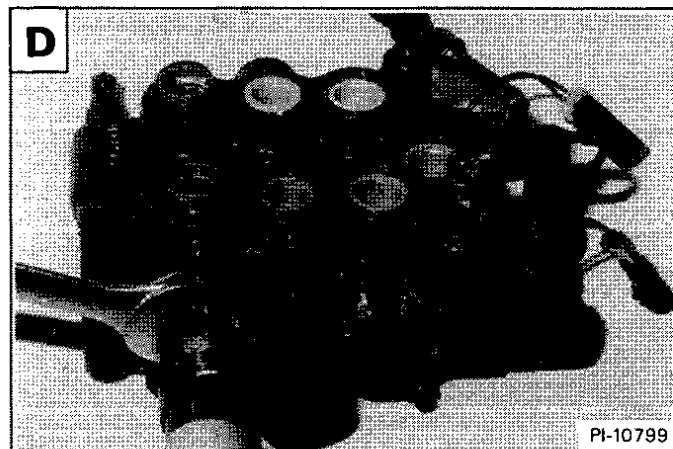


Port Relief Valve

Loosen the port relief valve **D**.

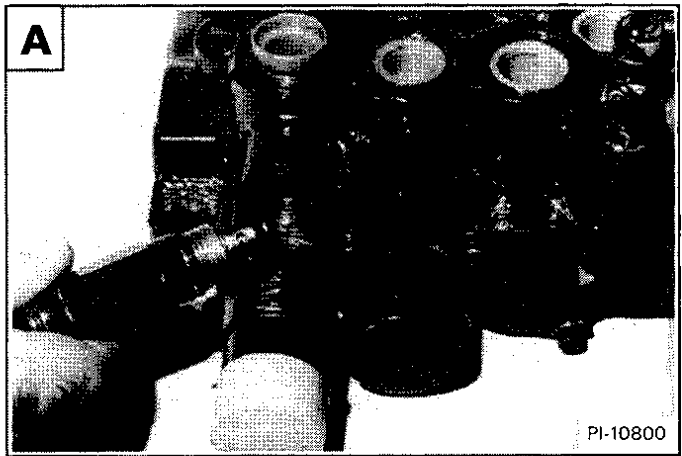
Assemble: Always use new O-rings and back-up washers. Tighten to 35-40 ft.lbs. (47-54 Nm) torque.

NOTE: The port relief valve can be located on either side of the control valve ("E" or "F" ports; Page 1).

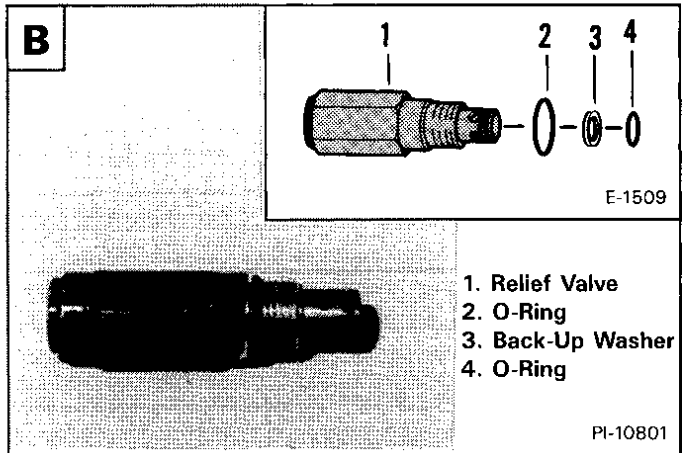


CONTROL VALVE (Cont'd)

Remove the port relief valve **A**.



Remove the O-rings and back-up washer from the port relief valve **B**.

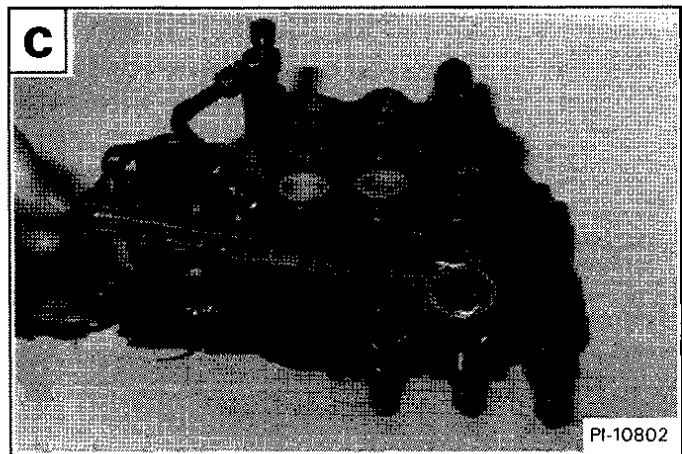


Anti-Cavitation Valve

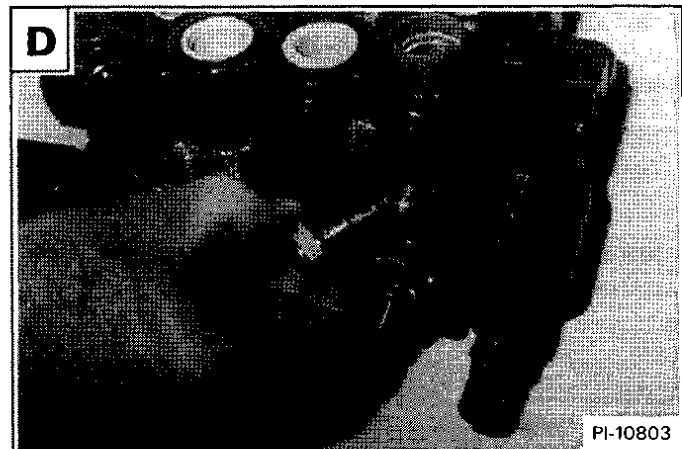
Loosen the anti-cavitation valve **C**.

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

NOTE: The anti-cavitation valve can be located on either side of the control valve ("E" or "F" ports; Page 1).

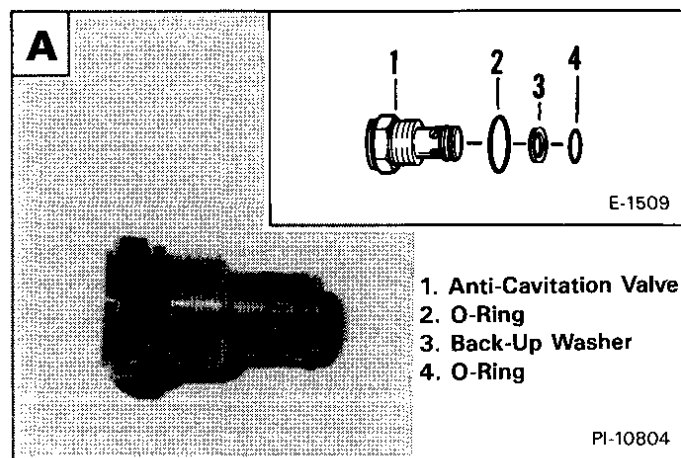


Remove the anti-cavitation valve from the control valve **D**.



CONTROL VALVE (Cont'd)

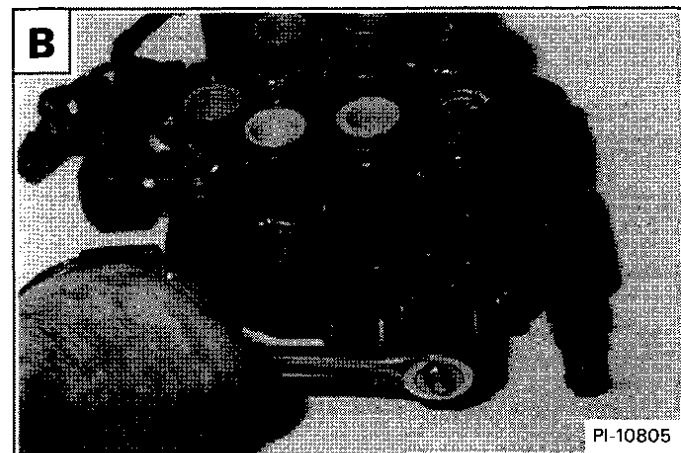
Remove the O-rings and back-up washer from the anti-cavitation valve **A**.



Rubber Boot

Loosen the two screws on the rubber boot retainer **B**.

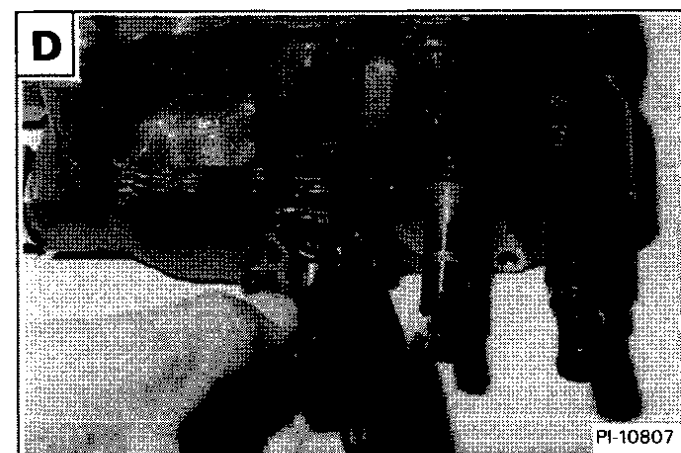
Assemble: Tighten the screws to 90-100 in.lbs. (10,2-11,3 Nm) torque.



Remove the screws **C**.

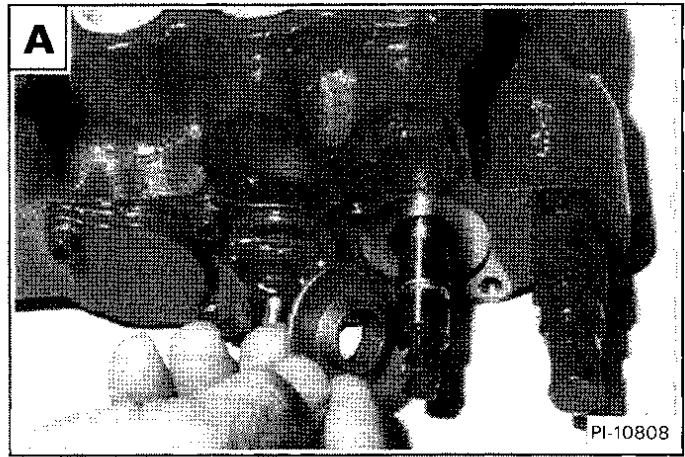


Remove the rubber boot and retainer **D**.



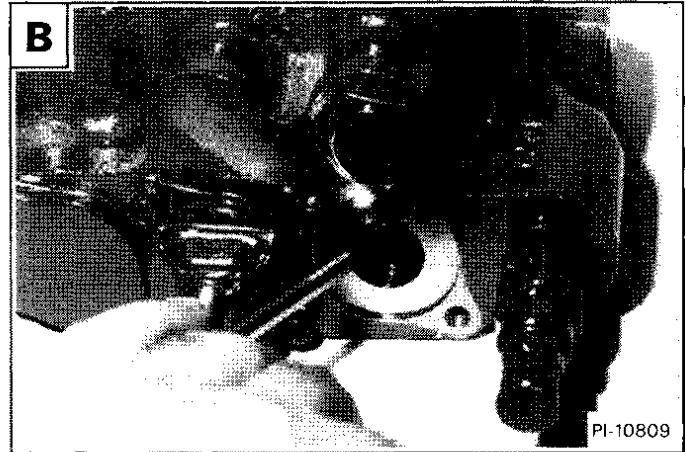
CONTROL VALVE (Cont'd)

Remove the back-up washer **A**.



After the spool is removed, use a O-ring pick and remove the spool seal from the spool bore **B**.

NOTE: See Pages 14 & 15 for seal and valve identification.

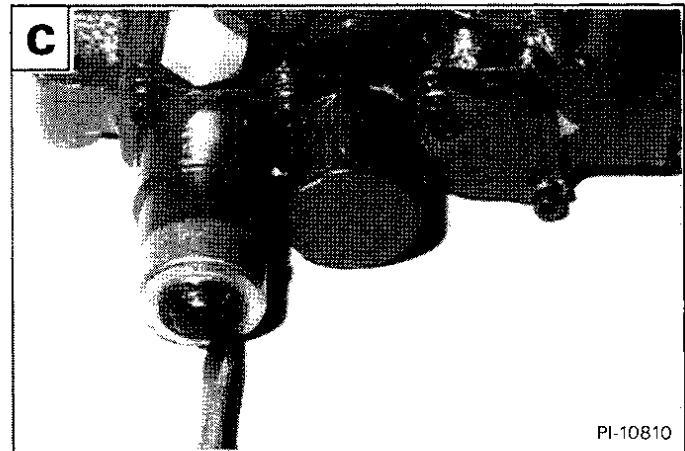


Lift Spool Detent

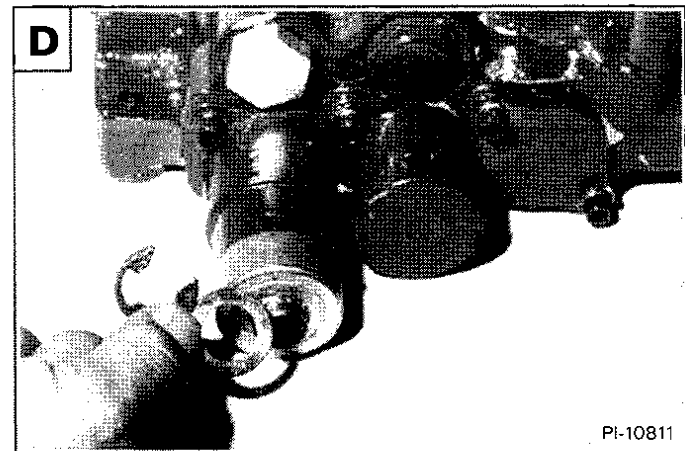
The tool listed will be needed to do the following procedure:

MEL-1278 - Detent Tool

Remove the snap ring with a screwdriver **C**.



Remove the snap ring and washer **D**.



CONTROL VALVE (Cont'd)

Remove the screws from the detent cap **A** .

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

Remove the detent cap **B** .

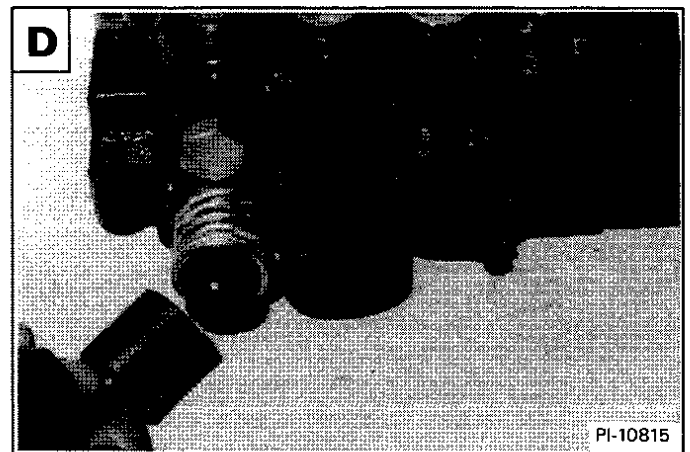
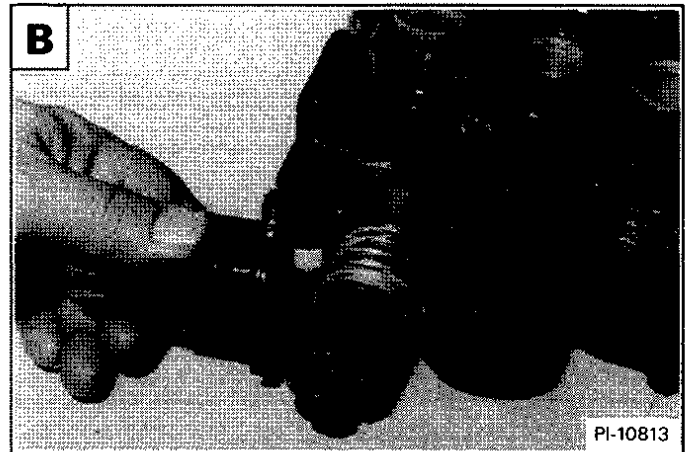
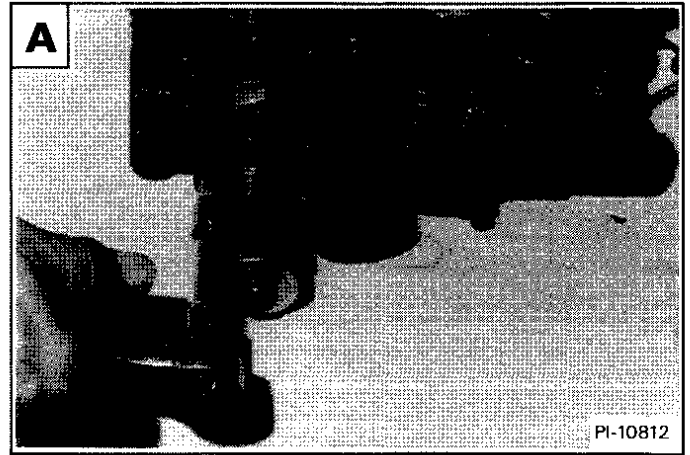
IMPORTANT

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

I-2012-0284

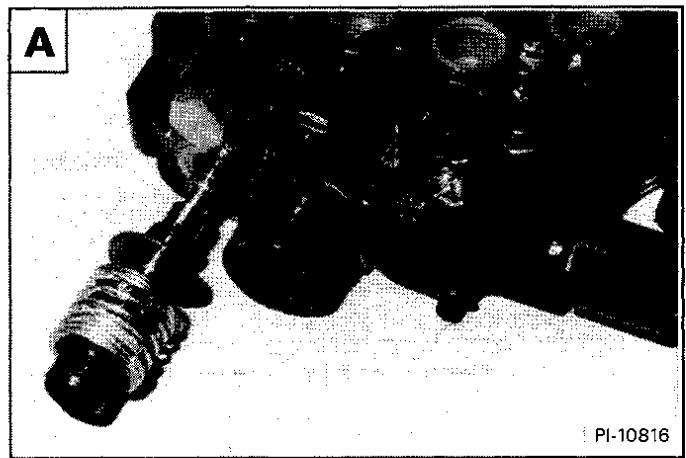
Put a rag around the detent sleeve **C** .

Remove the detent sleeve, detent balls and spring **D** .



CONTROL VALVE (Cont'd)

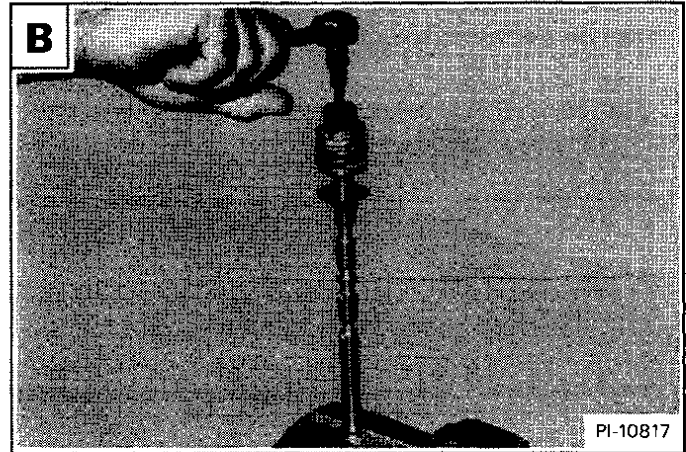
Remove the spool, centering spring, back-up washer and spool seal assembly from the control valve **A**.



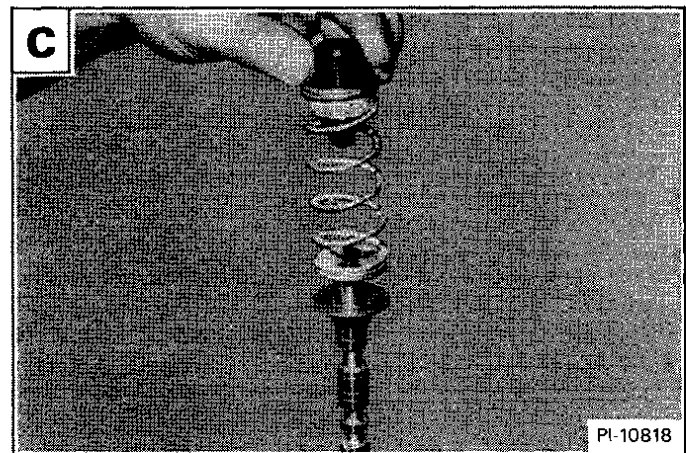
Put the linkage end of the spool in a vise.

NOTE: BE CAREFUL when removing the detent adapter, because there is spring pressure.

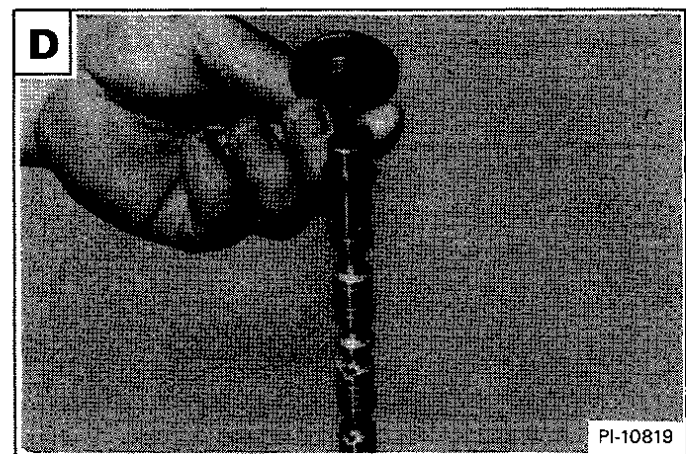
Loosen the detent adapter **B**.



Remove the detent adapter, end cap and centering spring **C**.



Remove the back-up washer and spool seal **D**.



CONTROL VALVE (Cont'd)

Lift Spool Only: Remove the stud from the end of the spool **A**.

Removal of the plastic plug:

- Make a center point in the plug using a 3/16" drill.
- Drill a hole all the way through the plug using a 7/64" tap drill.
- Turn a 6-32 tap into the plug. Pull the tap and plug out of the spool. BE CAREFUL, do not break the tap.
- Clean all the debris from the inside of the spool bore.

Assemble: Install the new plastic plug. Install the stud and leave about 0.60" (15,2 mm) sticking out **B**.

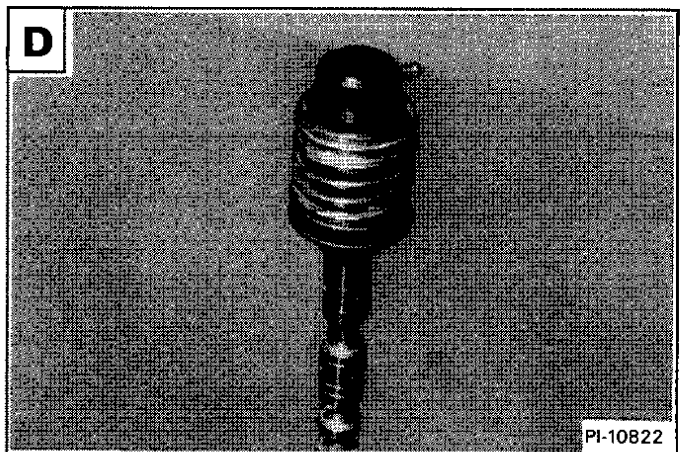
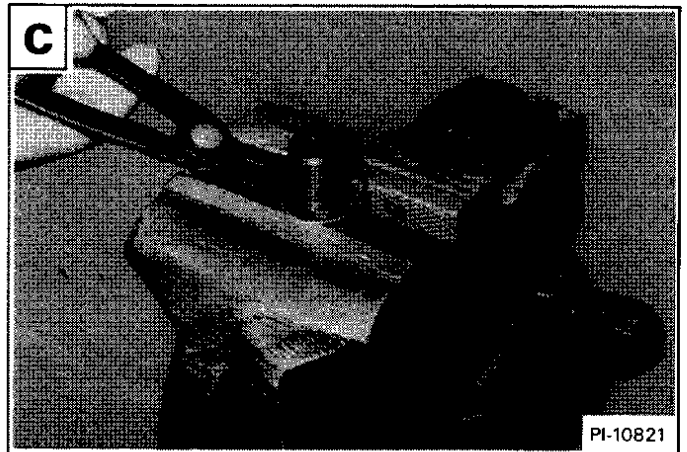
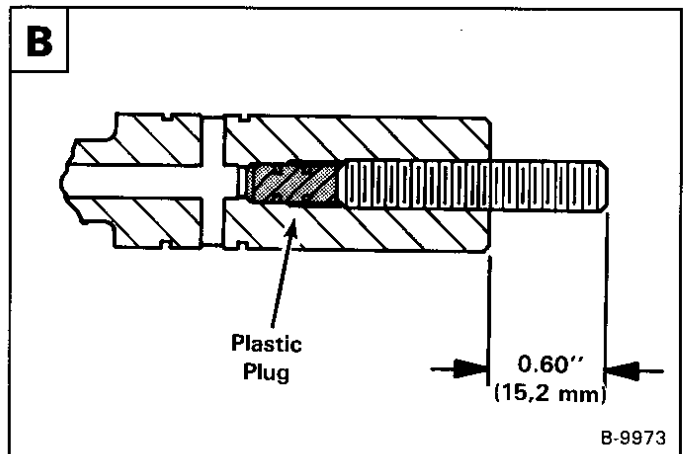
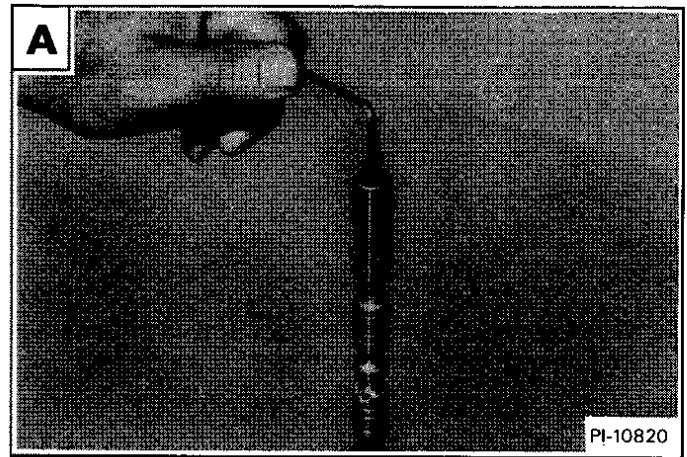
NOTE: DO NOT USE LOCTITE ON THE STUD THREADS.

NOTE: Put grease on all detent components surfaces before assembly.

Install the detent balls and spring into the detent adapter. Hold the detent balls in position with the tool and install the detent adapter into the end cap **C**.

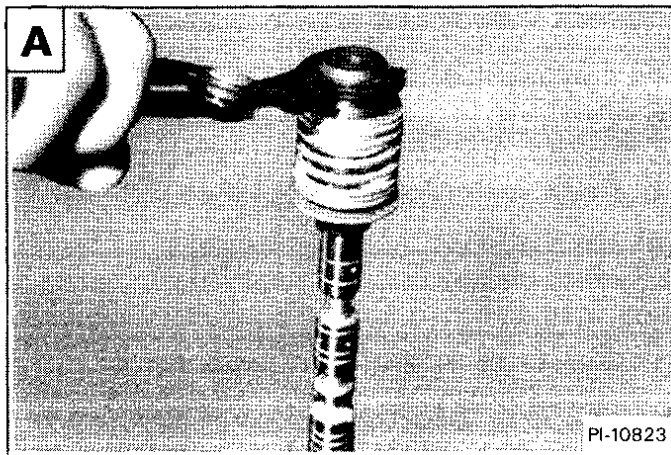
Install the spool seal, back-up washer, centering spring, end cap/detent adapter on the valve spool. Tighten the detent adapter to 90-100 in.lbs. (10,2-11,3 Nm) torque.

Install the detent balls and spring **D**.

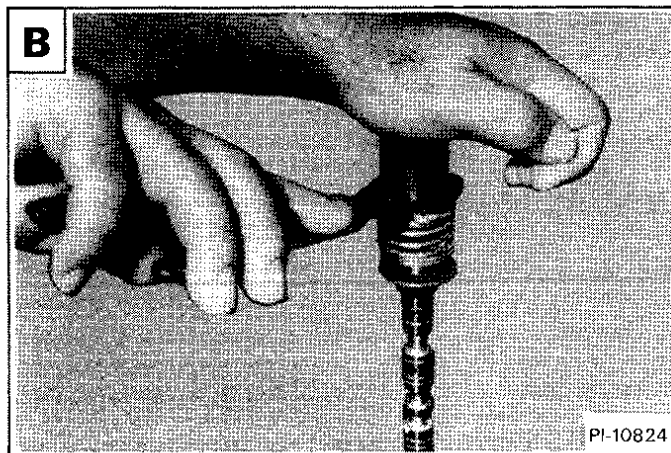


CONTROL VALVE (Cont'd)

Hold the detent balls and spring in position with the tool **A**.



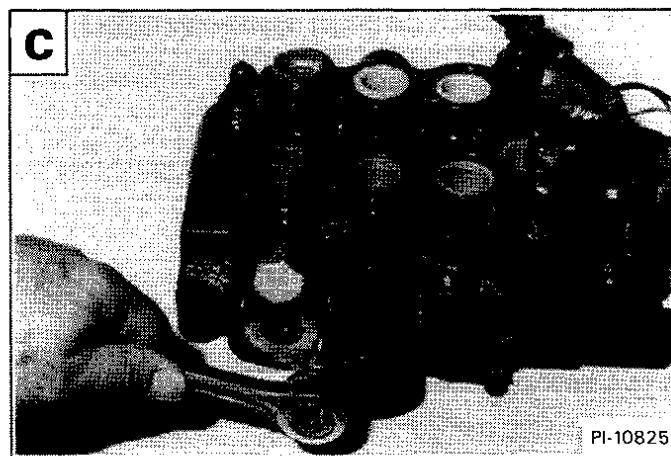
Install the detent sleeve over the balls and into position **B**.



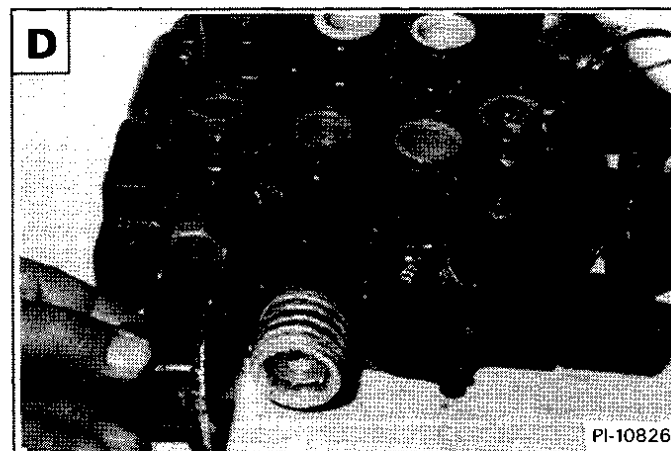
Tilt Centering Spring

Remove the end cap screws **C**.

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



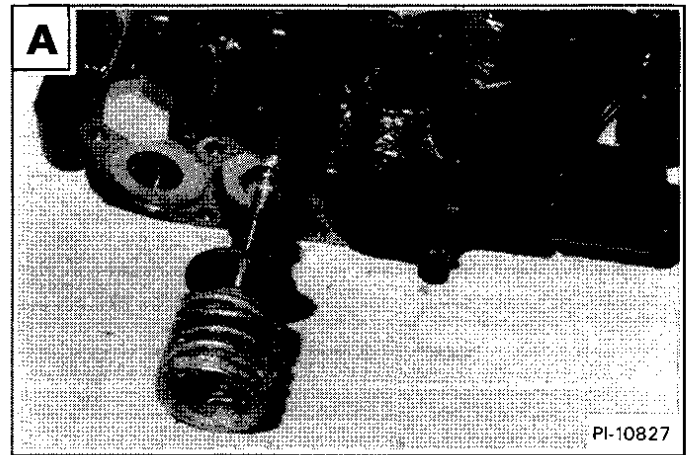
Remove the end cap **D**.



CONTROL VALVE (Cont'd)

Remove the spool, centering spring, back-up washer and spool seal **A**.

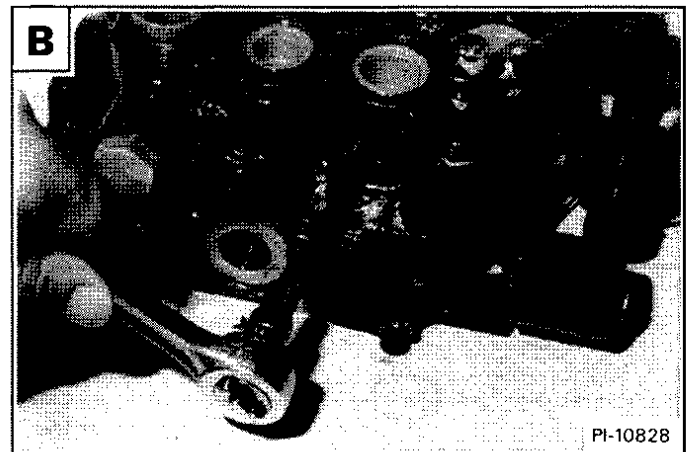
Assemble: If the centering spring bolt is removed, tighten to 90-100 in.lbs. (10,2-11,3 Nm) torque. Put grease on all the centering spring component parts. Always use new spool seal.



Auxiliary Spool

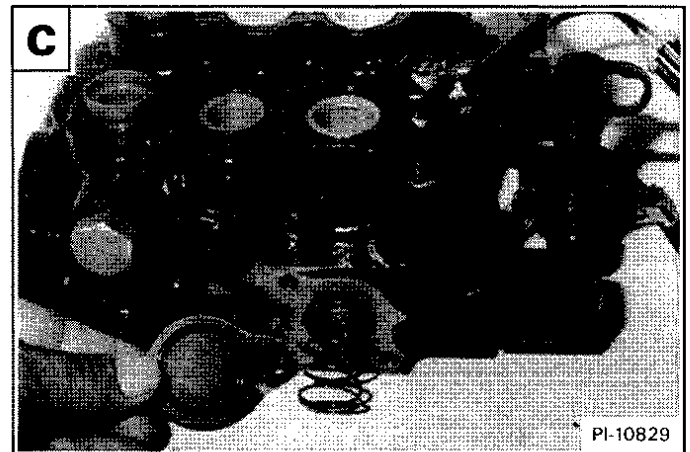
Remove the end plate screws **B**.

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

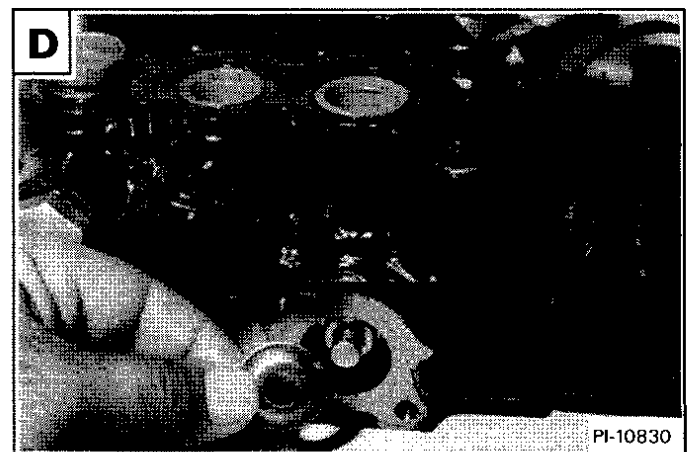


Remove the end plate, O-ring and spring **C**.

Remove the end plate, O-ring and spring from the other side.

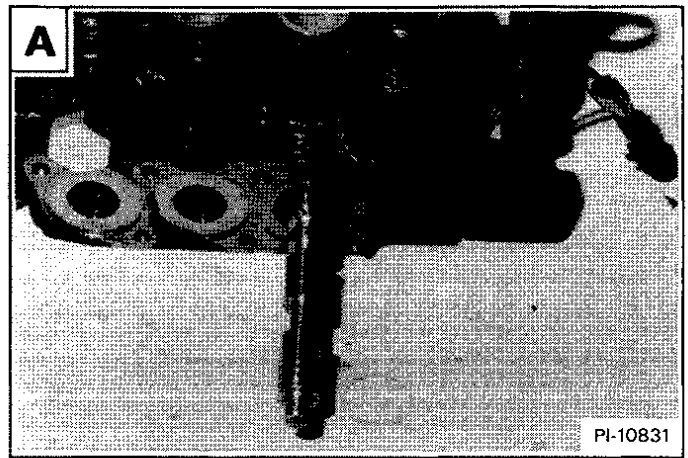


Remove the washer (both sides) **D**.



CONTROL VALVE (Cont'd)

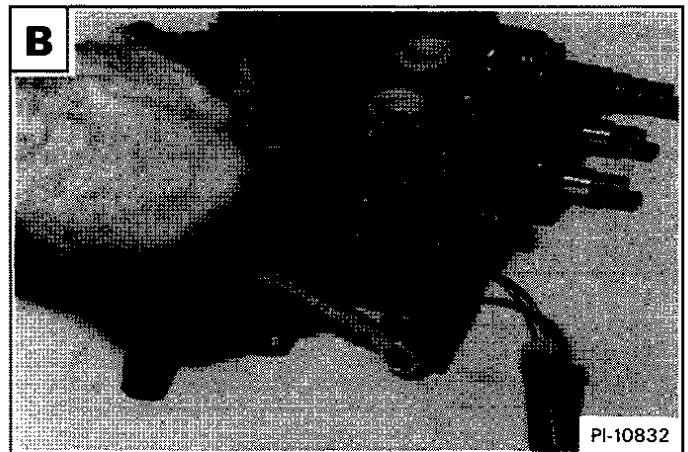
Remove the auxiliary section spool from the control valve **A**.



Auxiliary Electric Solenoid

Remove the nut from the end of the solenoid **B**.

Assemble: Tighten the nut to 9-12 in.lbs. (1,02-1,36 Nm) torque.

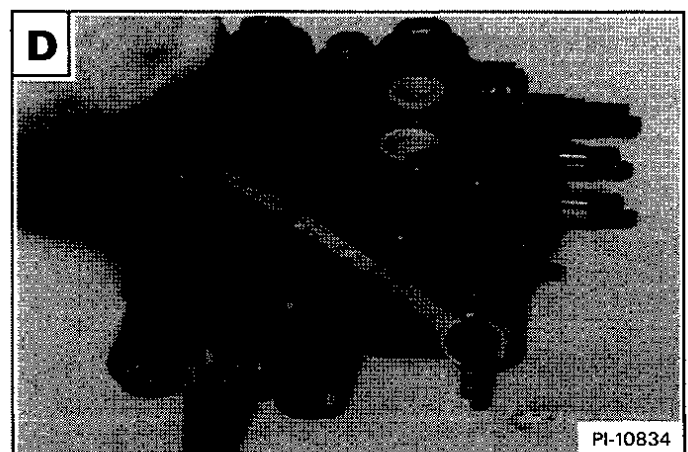


Remove the solenoid coil and end plate **C**.



Loosen the electric solenoid valve **D**.

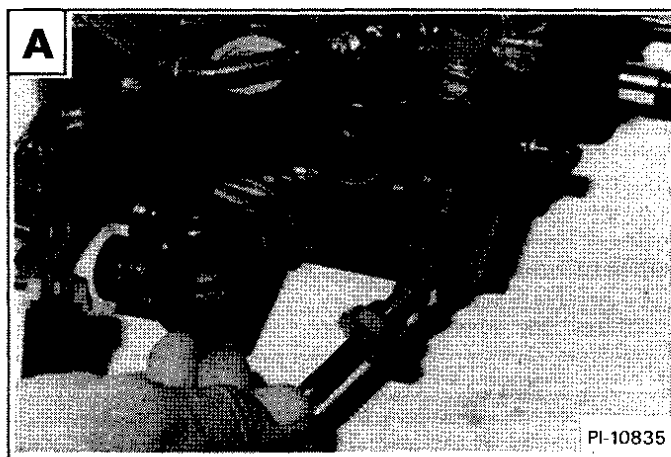
Assemble: Tighten the electric solenoid valve to 96-144 in.lbs. (10,8-16 Nm) torque.



CONTROL VALVE (Cont'd)

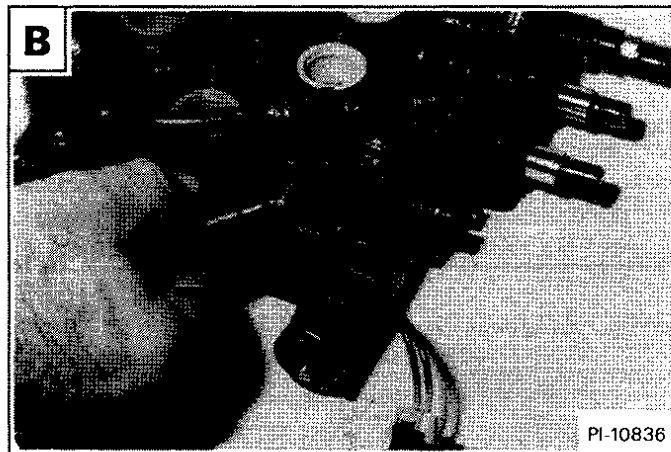
Remove the electric solenoid valve from the control valve **A**.

NOTE: Always use new O-rings and back-up washers when assembling.



Remove the plug from the control valve ("H" port; Page 1) **B**.

Replace the O-ring.



Depending on the application of the auxiliaries, the control valve may be equipped with a port relief valve ("H" port; Page 1) **C**.

Remove the port relief valve and replace the O-rings and back-up washers (Page 3).

Inspection

Check the spools for wear or scratches.

Check that the spools are not loose in their bore.

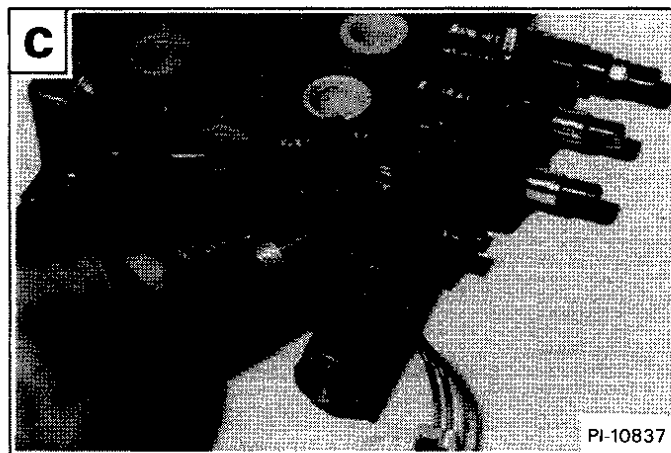
Check that the centering springs are not broken.

Check that the load check valve seats are not worn.

Check the load check poppets for damage.

Check the rubber boots and retainers that they are not worn or damaged.

Replace the parts as needed.



IDENTIFICATION & INSTALLATION OF SPOOL SEAL

There are two types of seals for the control valve, a quad-ring seal and a lip seal. First identify the control valve (See Page 14 or 15) to find which seal is used. See the Parts Micro-Fiche for your model loader for the part number of the quad-ring seal or the lip seal used. Use the following procedure to install the seals into the control valve.

SHORT CHAMFER

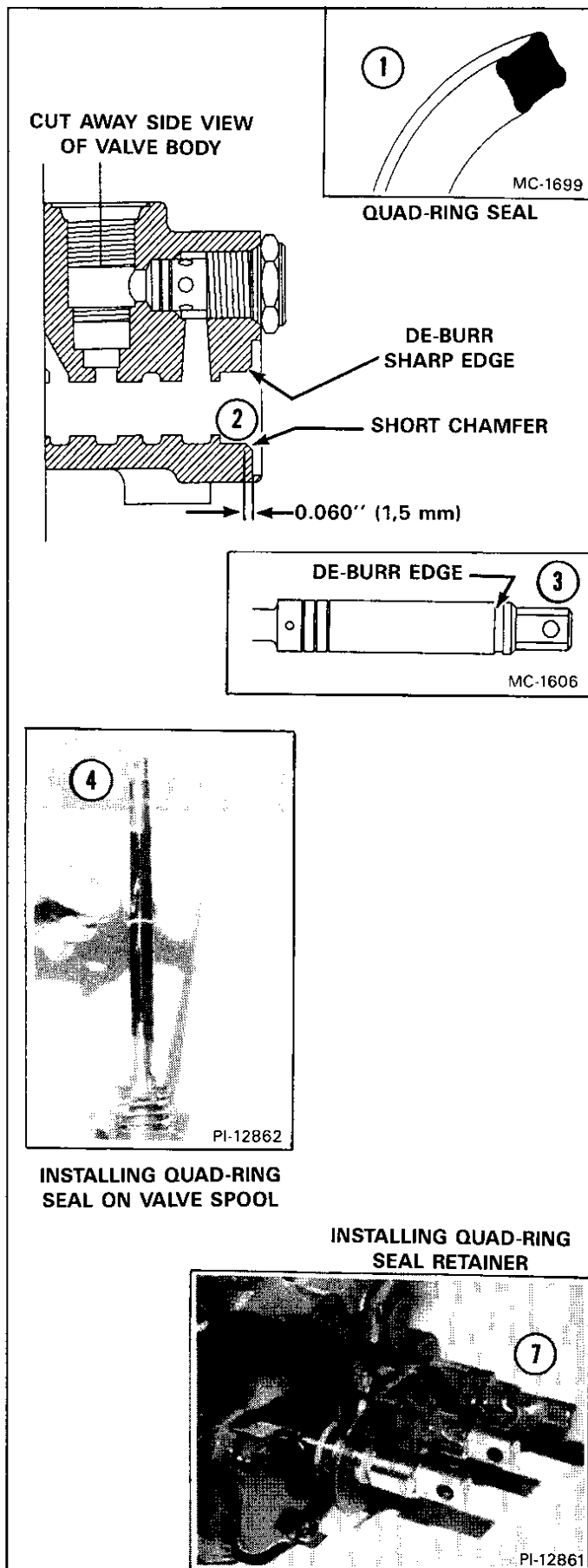
1. Uses only quad-ring seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing. De-burr the sharp edge at the seal area with a file or de-burring tool (both ends).
3. At the linkage end of the spool, de-burr the rubber boot groove as needed.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

4. Put clean oil on the valve spool. Install the quad-ring seal over the valve spool. Be Careful not to damage the quad-ring seal on the valve spool edges.

NOTE: An alternate method to protect the quad-ring seal by putting plastic material (Example: Discarded micro-fiche card) over the spool to protect the seal.

5. Install spool into the valve bore.
6. Slide the linkage end quad-ring seal over the rubber boot groove. Be Careful not to damage the seal.
7. Install the quad-ring seal retainer.
8. Continue with assembling the control valve.



IDENTIFICATION & INSTALLATION OF SPOOL SEAL (Cont'd)

LONG CHAMFER

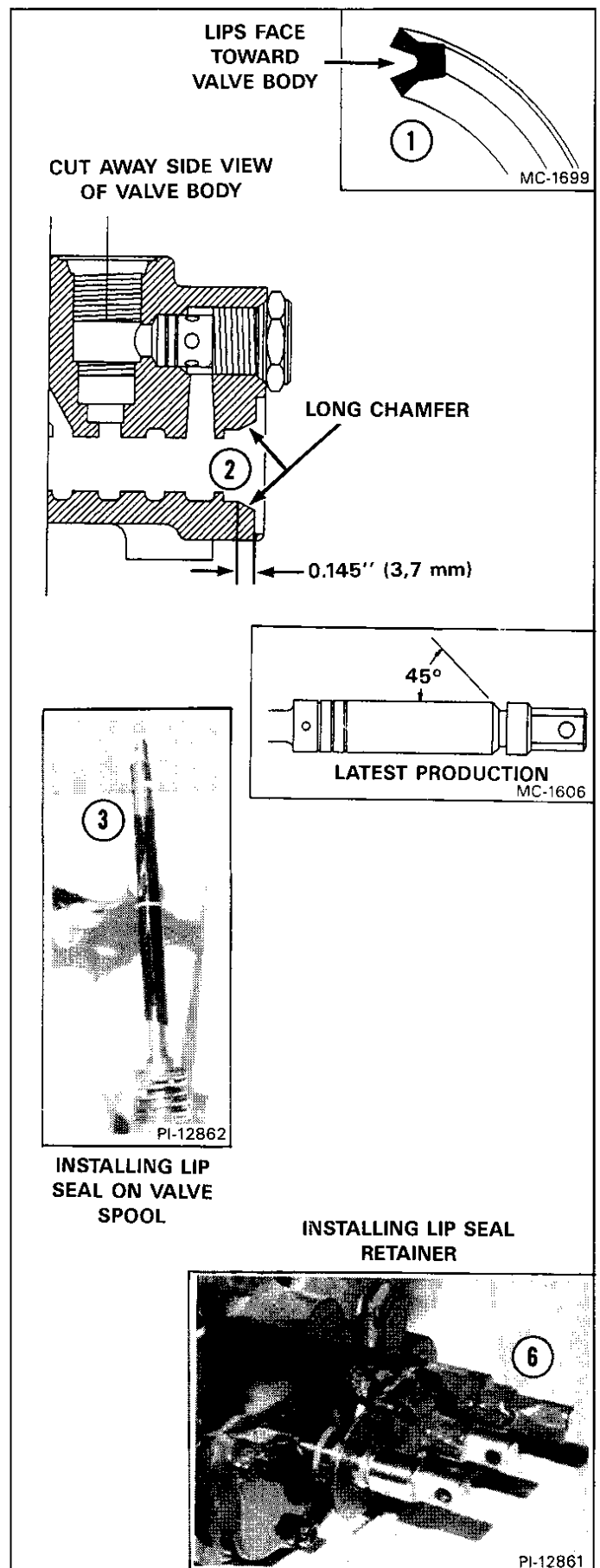
1. Uses only lip seal.
2. Check the seal surface area for rust, corrosion, scratches, etc. Correct any irregularities before continuing.

NOTE: Lubricate with grease between the seal and retainer before installation (both ends).

3. Put clean oil on the valve spool. Install the lip seal over the valve spool. Be Careful not to damage the lip seal on the valve spool edges.

NOTE: An alternate method to protect the lip seal by putting plastic material (Example: Discarded micro-fiche card) over the spool to protect the seal.

4. Install spool into the valve bore.
5. Slide the linkage end lip seal over the rubber boot groove. Be Careful not to damage the seal.
6. Install the seal retainer.
7. Continue with assembling the control valve.



HYDRAULIC CONTROL VALVE

CONTROL VALVE

Anti-Cavitation Valve

| | |
|-----------------------|----|
| Assembly | 16 |
| Disassembly | 4 |

Auxiliary Electrical Solenoid

| | |
|-----------------------|----|
| Assembly | 15 |
| Disassembly | 4 |

Auxiliary Spool

| | |
|-----------------------|----|
| Assembly | 11 |
| Disassembly | 10 |

Lift Spool and Detent

| | |
|-----------------------|----|
| Assembly | 11 |
| Disassembly | 6 |

Load Check Valve

| | |
|-----------------------|----|
| Assembly | 18 |
| Disassembly | 2 |

Main Relief Valve

| | |
|-----------------------|----|
| Assembly | 17 |
| Disassembly | 3 |

Plug

| | |
|-----------------------|----|
| Assembly | 16 |
| Disassembly | 4 |

Port Relief Valve

| | |
|-----------------------|----|
| Assembly | 17 |
| Disassembly | 3 |

Rubber Boot

| | |
|-----------------------|----|
| Assembly | 15 |
| Disassembly | 5 |

Tilt Spool and Centering Spring

| | |
|-----------------------|----|
| Assembly | 11 |
| Disassembly | 10 |

SPOOL SEAL REPLACEMENT 19

CONTROL VALVE IDENTIFICATION

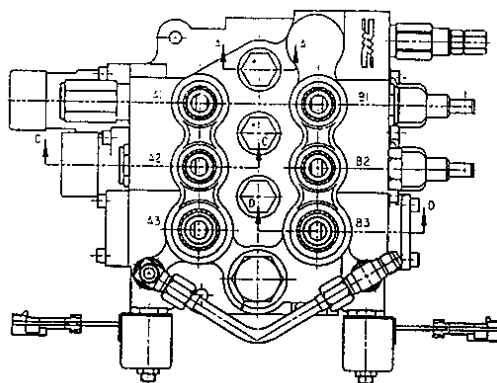
| | |
|-----------------|---|
| Chart | 1 |
|-----------------|---|

CONTROL VALVE IDENTIFICATION

Chart

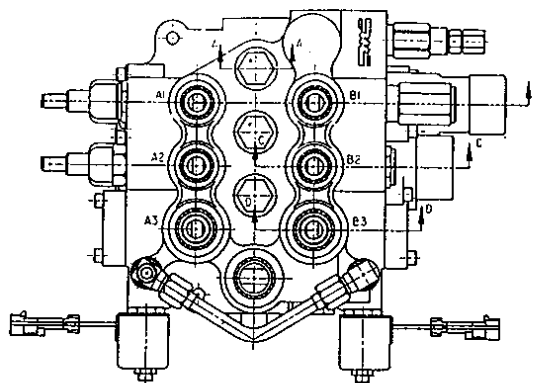
| Item | 750 Series | 853 Series | 2410 Loader |
|------|--|---------------------------------------|--------------------|
| A1 | Lift Cyl. Base End (Restrictor) | Lift Cyl. - Rod End | |
| A2 | Tilt Cyl. Base End | Tilt Cyl. - Rod End | |
| A3 | Auxiliary Hydraulics | | |
| B1 | Lift Cyl. Rod End | Lift Cy. Base End (Resitrictor) | Lift Cyl. Base End |
| B2 | Tilt Cyl. Rod End | Tilt Cyl. - Base End | |
| B3 | Auxiliary Hydraulics | | |
| C1 | Load Check Valve/Lift Function | | |
| C2 | Load Check Valve/Tilt Function | | |
| C3 | NO Load Check Valve Auxiliary Function | | |
| C4 | Oil Cooler By-Pass | Outlet Fluid Flow | |
| D1 | Lift Spool Detent | Lift Spool | |
| D2 | Centering Spring Tilt Spool | Tilt Spool | |
| D3 | Auxiliary Spool | | |
| E1 | Port Relief | Anti-Cav. Valve | Port Relief for A1 |
| E2 | Anti-Cav. Valve | Plug | |
| F1 | Anti-Cav. Valve | Port Relief for B1 | |
| F2 | Plug | Anti-Cav. Valve or Port Relief for B2 | |
| G1 | Lift Spool | Lift Spool Detent | |
| G2 | Tilt Spool | Tilt Spool Centering Spring | |
| G3 | Auxiliary Spool | | |
| H1 | Auxiliary Electric Solenoid | | |
| H2 | Plug/Port Relief (Optional) for B3 | | |
| H3 | Auxiliary Electric Solenoid | | |
| MR | Main Relief Valve | | |

750 SERIES



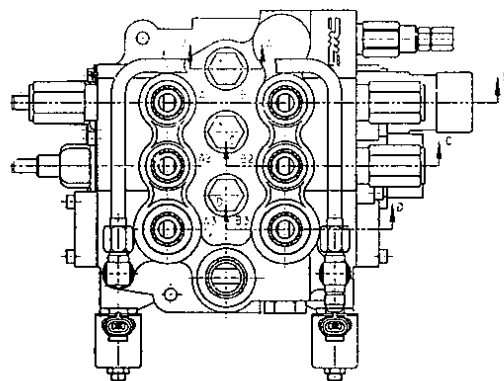
6588142

853 SERIES



6588236

2410 LOADER



6588772

CONTROL VALVE

The following tool is needed for reassembly of the Lift Spool Detent:

MEL1278 — Detent Tool (See Page 13)

See the Service Manual for your Model loader for removal and installation of the control valve.

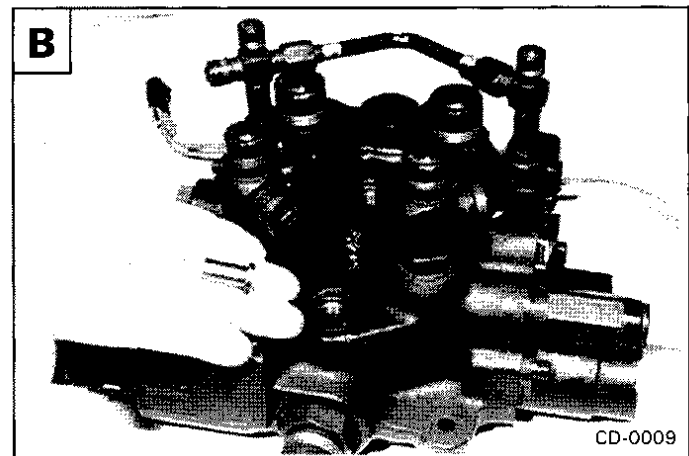
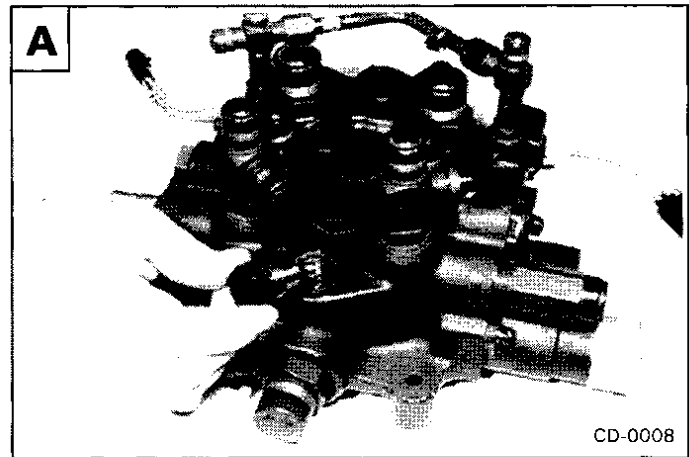
The anti-cavitation valves, port relief valves and plugs are at different locations in the control valve. Refer to Page 1 (Control Valve Identification Chart) for the correct location of the parts for each Model control valve.

NOTE: THE PHOTO'S MAY NOT SHOW THE EXACT LOCATION FOR THE PART BEING REMOVED FROM OR INSTALLED ON THE CONTROL VALVE, BUT THE PROCEDURE IS THE SAME.

IMPORTANT

When making repairs on 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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Mark each valve section and spool so that the parts will be returned to its original bore during assembly.

Load Check Valve Disassembly

Remove the load check plugs (Item 1) and plug (Item 2) **A**.

Remove the O-ring from each plug.

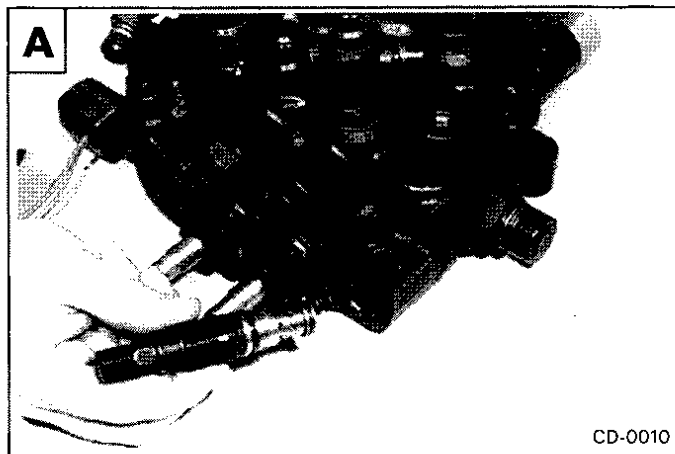
Remove the spring and poppet from both load check valves **B**.

Check the load check valve seats and load check poppets for wear or damage. Replace the parts as needed.

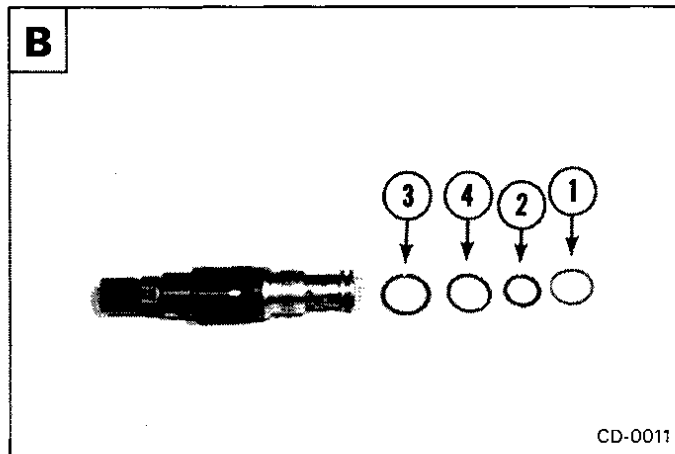
CONTROL VALVE (Cont'd)

Main Relief Valve Disassembly

Remove the main relief valve **A**.



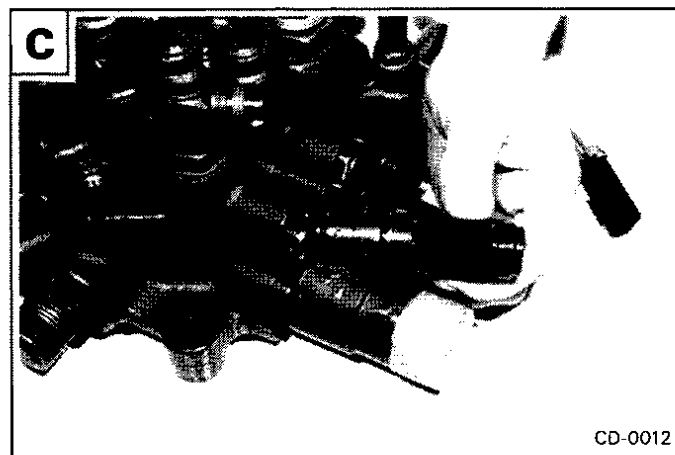
Remove the glide ring (Item 1), two (2) O-rings (Items 2 & 3) and back-up washer (Item 4) from the main relief valve **B**.



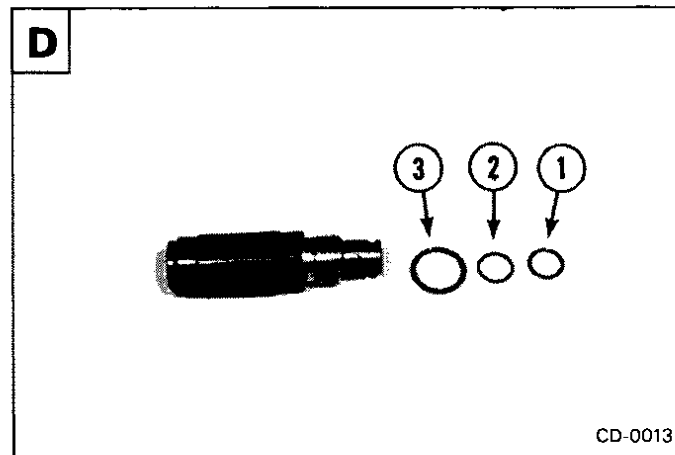
Port Relief Valve Disassembly

Remove the port relief valve **C**.

NOTE: The port relief valve can be located in the "E", "F" or "H2" (If equipped with optional auxiliary port relief valve) ports depending on model. Refer to Page 1 for the correct location and quantity.



Remove the two (2) O-rings (Items 1 & 3) and back-up washer (Item 2) from the port relief valve **D**.

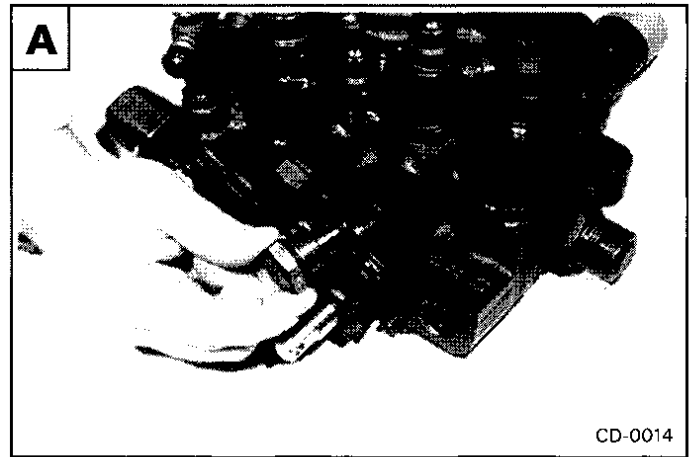


CONTROL VALVE (Cont'd)

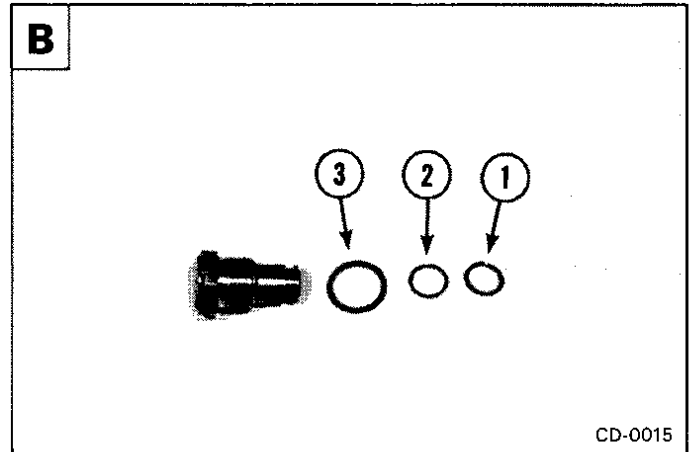
Anti-Cavitation Valve Disassembly

Remove the anti-cavitation valve **A**.

NOTE: Anti-cavitation valves can be located in "E" and "F" ports depending on model. Refer to Page 1 for the correct location and quantity.



Remove the two (2) O-rings (Items 1 & 3) and back-up washer (Item 2) from the anti-cavitation valve **B**.



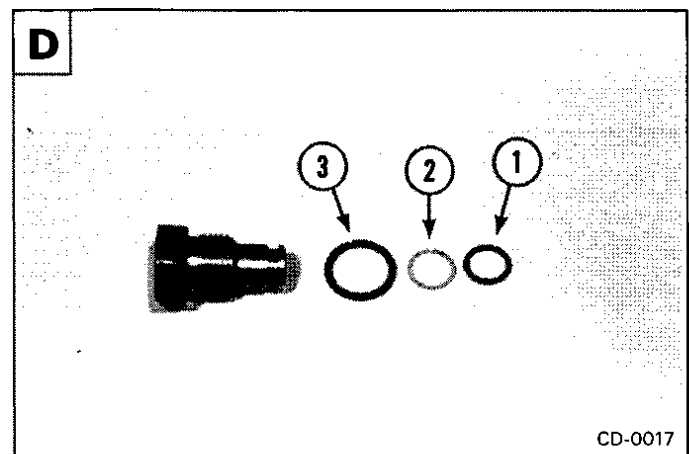
Plug Disassembly

Remove the plug **C**.

NOTE: The anti-cavitation valve can be located in the "E", "F" and "H2" ports depending on model. Refer to Page 1 for the correct location and quantity.



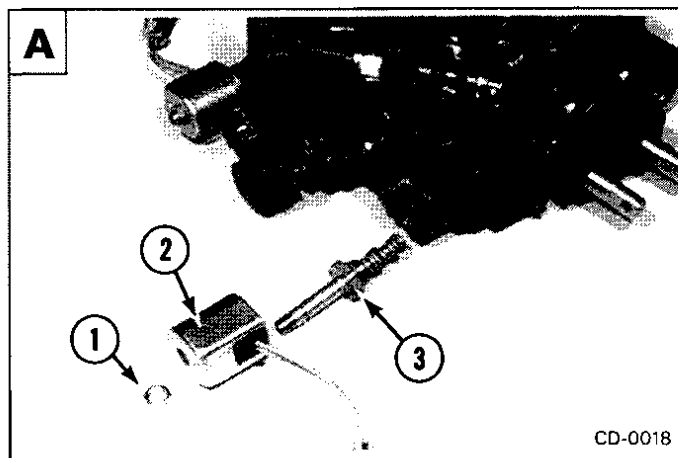
Remove the two (2) O-ring (Items 1 & 3) and back-up washer (Item 2) from the plug **D**.



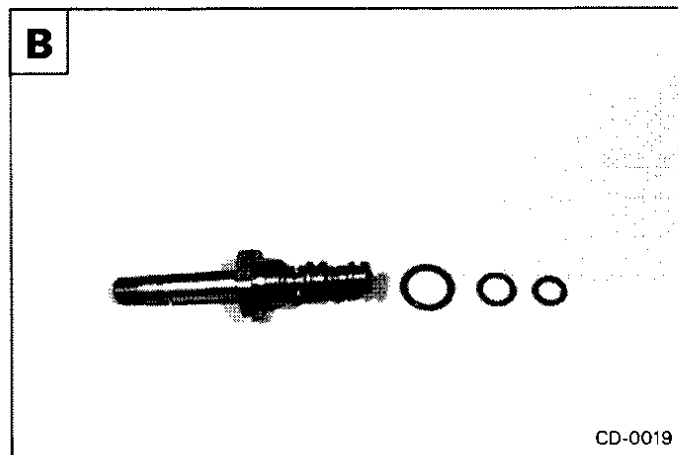
CONTROL VALVE (Cont'd)

Auxiliary Electric Solenoid Disassembly

Remove the nut (Item 1), solenoid coil (Item 2) and solenoid valve (Item 3) from the valve body **A**.



Remove the three (3) O-rings from the solenoid valve **B**.



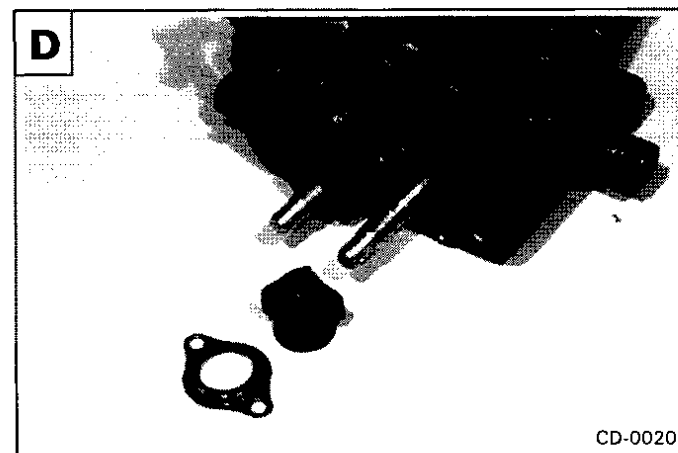
Rubber Boot Disassembly

Remove the two (2) screws from the rubber boot retainer **C**.



Remove the rubber boot and retainer **D**.

Check the rubber boot for wear or damage. Replace as necessary.



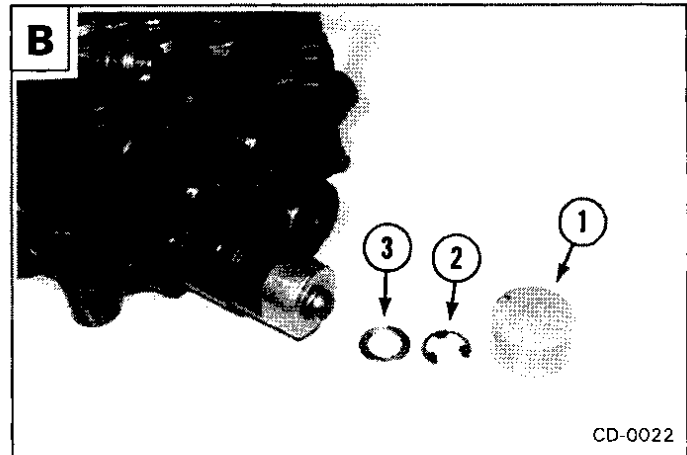
CONTROL VALVE (Cont'd)

Lift Spool and Detent Disassembly

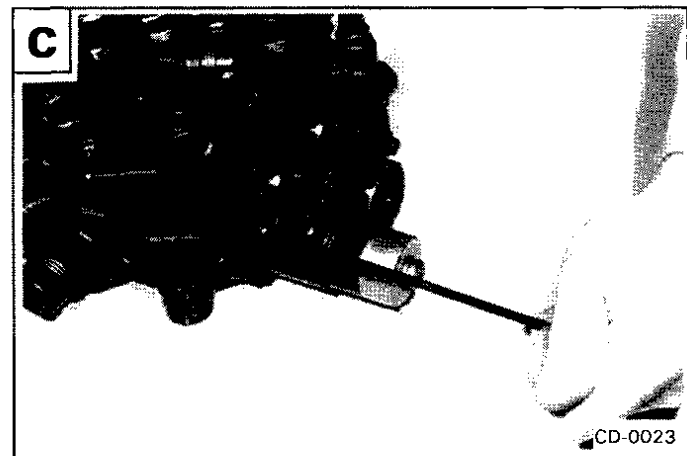
Remove the back-up washer **A**.



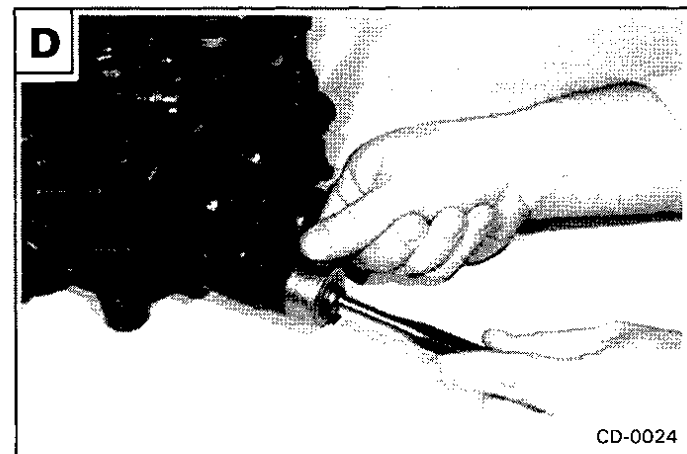
Remove the cap (Item 1), snap ring (Item 2) and washer (Item 3) **B**.



Remove the two (2) screws and two (2) lock washers from the detent cap **C**.



While holding the detent sleeve in position with a punch, remove the detent cap **D**.



IMPORTANT

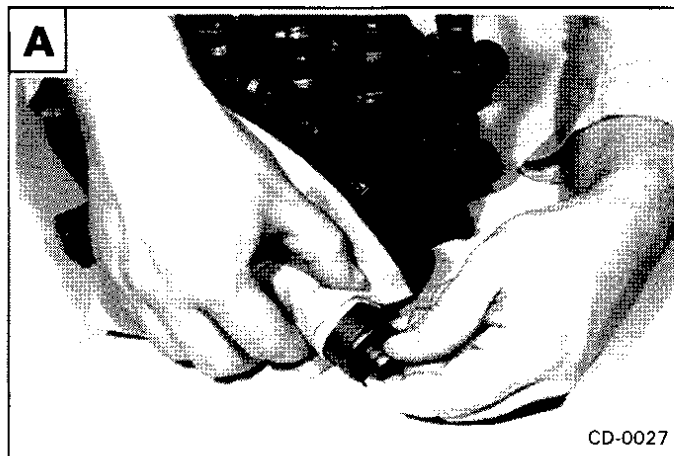
The detent assembly has small springs and balls. Do not loose these parts during disassembly and assembly.

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CONTROL VALVE (Cont'd)

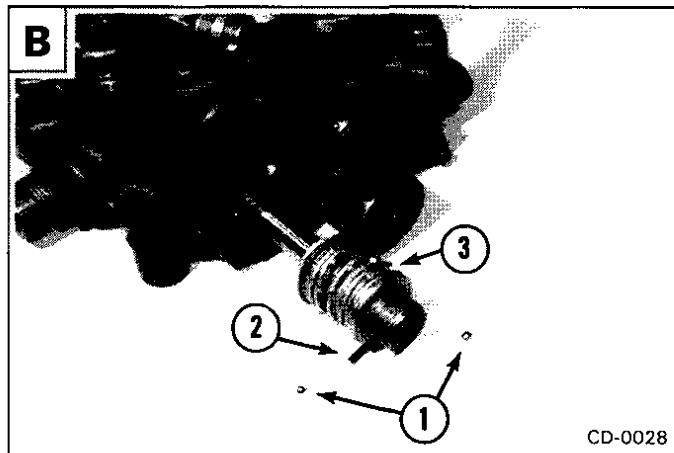
Lift Spool and Detent Disassembly (Cont'd)

Put a clean cloth around the detent sleeve and spring to catch the detent balls. Remove the detent sleeve **A**.

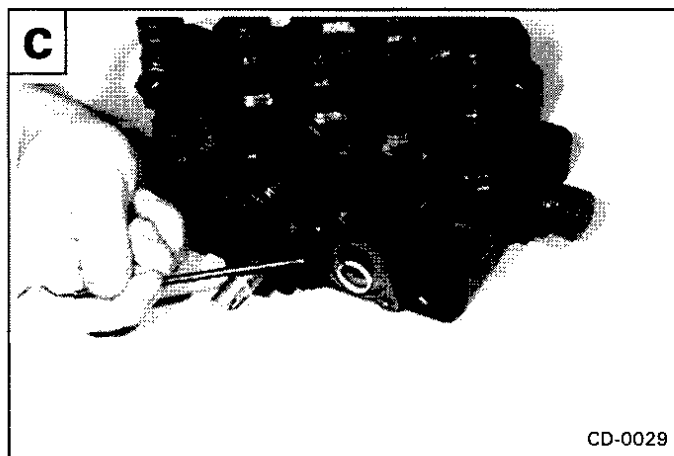


Remove the two (2) detent balls (Item 1) and spring (Item 2) from the detent adapter **B**.

Remove the spool assembly (Item 3) from the valve body **B**.



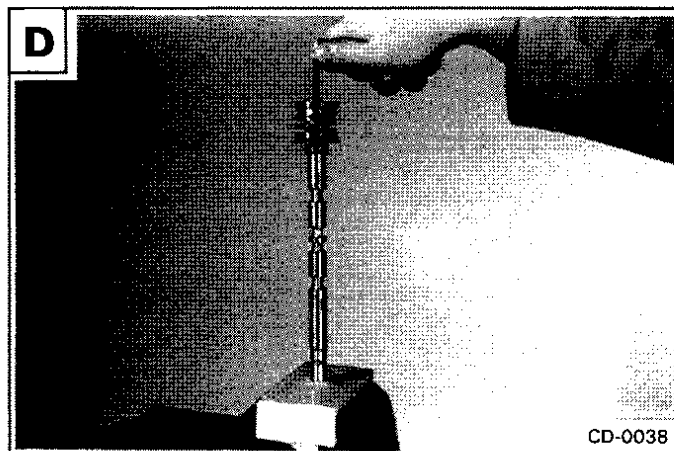
Use an O-ring pick to remove the spool seal from the linkage end of the spool bore **C**.



Put the linkage end of the spool in a vise **D**.

Loosen the detent adapter **D**.

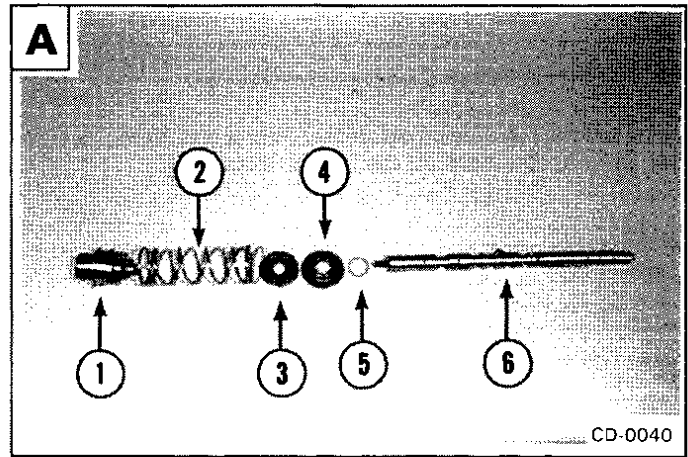
NOTE: The detent adapter is under spring pressure. BE CAREFUL when removing the detent adapter.



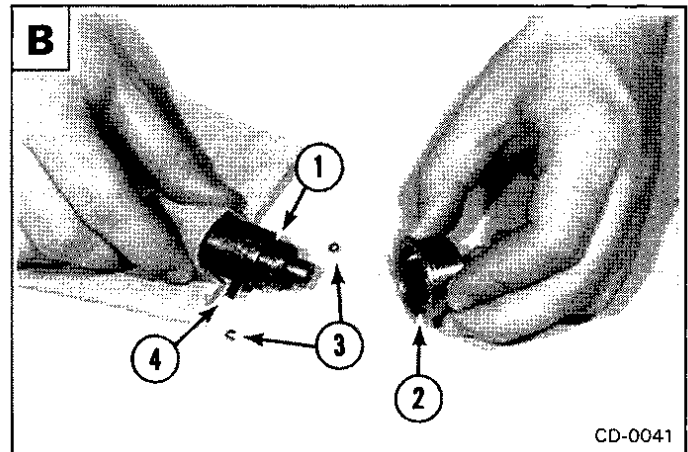
CONTROL VALVE (Cont'd)

Lift Spool and Detent Disassembly (Cont'd)

Remove the detent adapter and spring centering collar assembly (Item 1), spring (Item 2), spring centering washer (Item 3), back-up washer (Item 4) and spool seal (Item 5) from the spool (Item 6) **A**.



Hold a clean cloth around the detent adapter (Item 1) and spring centering collar (Item 2) to catch the detent balls. Remove the detent adapter **B**.



IMPORTANT

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

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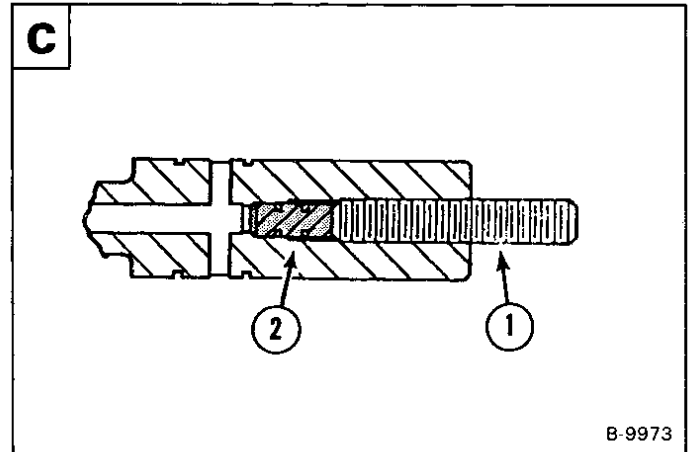
Remove the two (2) detent balls (Item 3) and spring (Item 4) from the detent adapter (Item 1) **B**.

Remove the stud (Item 1) and plastic plug (Item 2) from the spool **C**.

Removal of the plastic plug:

1. Make a center point in the plug using a 3/16" drill.
2. Drill a hole all the way through the plug using a 7/64" drill.
3. Turn a 6-32 UNC tap into the plug. Pull the tap and plug out of the spool. BE CAREFUL not to break the tap.
4. Clean all the debris from the inside of the spool bore.

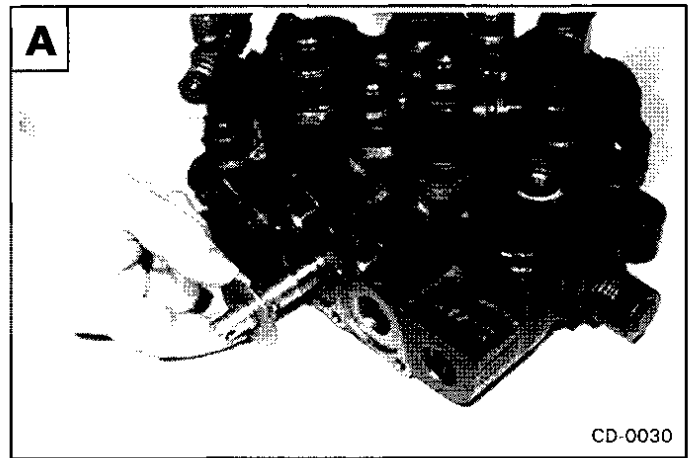
Clean and dry all lift spool and detent parts. Check the parts and valve body bore for wear or damage. Replace parts as needed.



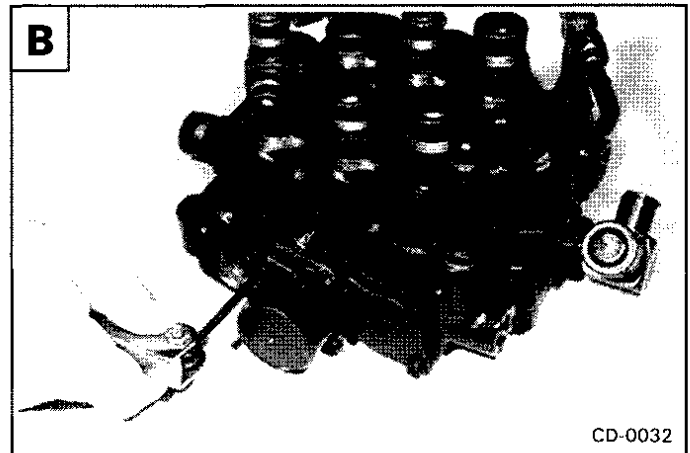
CONTROL VALVE (Cont'd)

Tilt Spool and Centering Spring

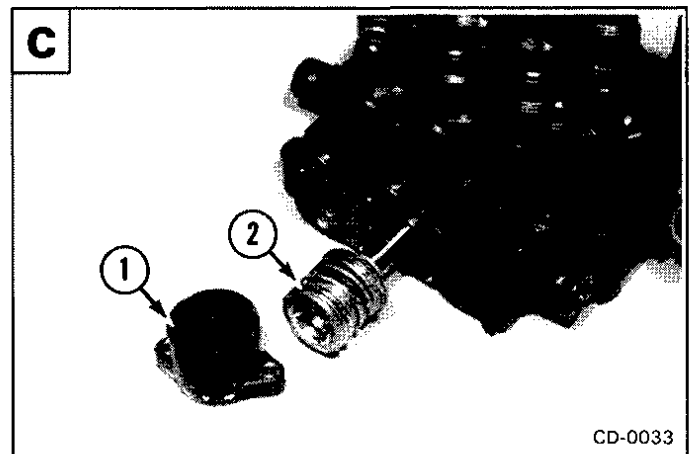
Remove the back-up washer **A**.



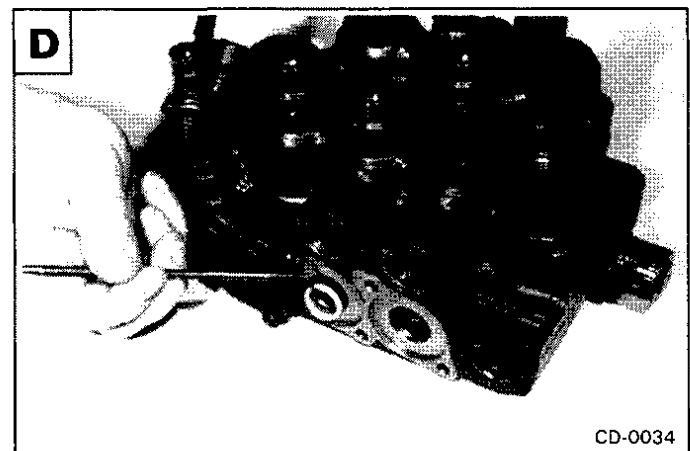
Remove the screws from the end cap **B**.



Remove the end cap (Item 1) and spool assembly (Item 2) from the valve body **C**.



Use an O-ring pick to remove the spool seal from the linkage end of the spool bore **D**.



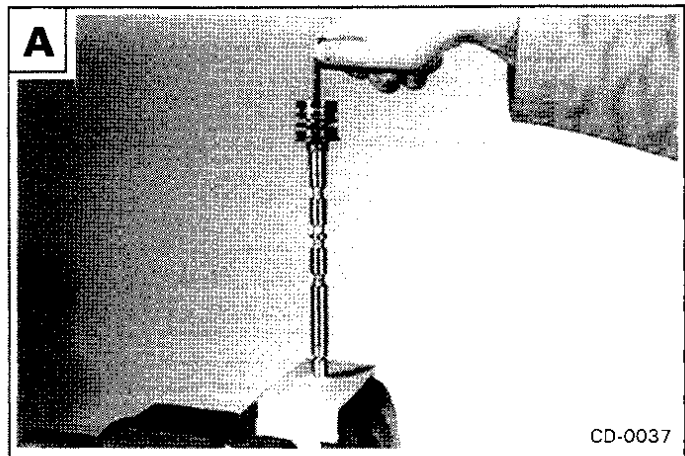
CONTROL VALVE (Cont'd)

Tilt Spool and Centering Spring (Cont'd)

Put the linkage end of the spool in a vise **A**.

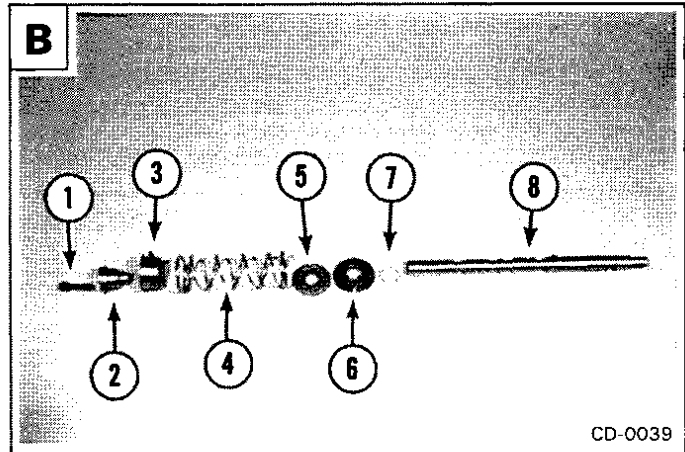
Loosen the screw **A**.

NOTE: BE CAREFUL when removing the screw. The screw is under spring pressure.



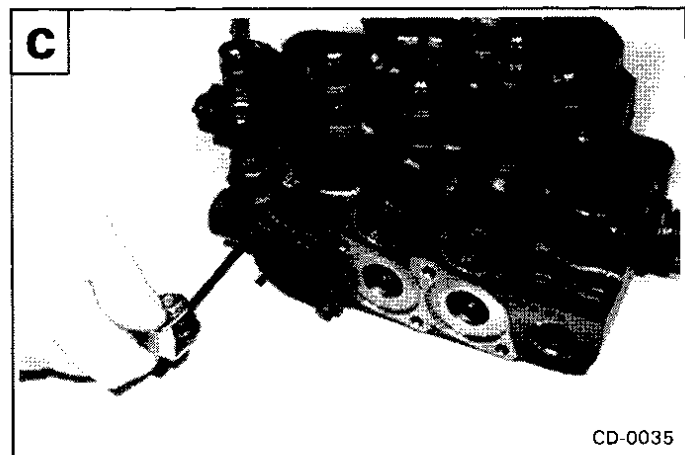
Remove the screw and lock washer (Item 1), adapter (Item 2), spring centering collar (Item 3), spring (Item 4), spring centering washer (Item 5), back-up washer (Item 6) and spool seal (Item 7) from the spool (Item 8) **B**.

Clean and dry all tilt spool and centering spring parts. Check the parts and valve body bore for wear or damage. Replace parts as needed.



Auxiliary Spool Disassembly

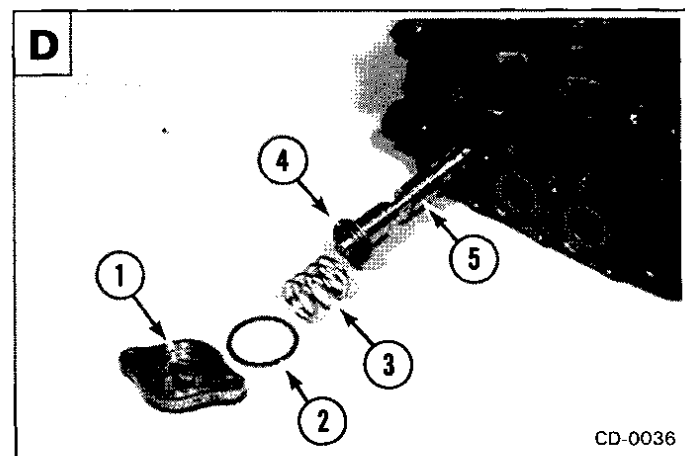
Remove the two (2) screws from both end plates **C**.



Remove the end plate (Item 1) O-ring (Item 2), spring (Item 3) and spring centering washer (Item 4) from both ends of the valve body **D**.

Remove the spool (Item 5) from the valve body **D**.

Clean and dry all auxiliary spool parts. Check the parts and valve body bore for wear or damage. Replace parts as needed.



CONTROL VALVE (Cont'd)

All parts must be clean before assembly. Clean parts in solvent as needed and allow to air dry.

The anti-cavitation valves, port relief valves and plugs are at different locations in the control valve. Refer to Page 1 (Control Valve Identification Chart) for the correct location of the parts for each Model control valve.

NOTE: THE PHOTO'S MAY NOT SHOW THE EXACT LOCATION FOR THE PART BEING INSTALLED ON THE CONTROL VALVE, BUT THE PROCEDURE IS THE SAME.

Auxiliary Spool Assembly

Apply oil to the spool (Item 5) and install the spool into the valve body **A**.

Apply a light coating of petroleum jelly to the two (2) new O-rings (Item 2). Install the O-rings into the end plates (Item 1) **A**.

Install a spring centering washer (Item 4), spring (Item 3) and end plate (Item 1) on each end of the valve body **A**.

Install two (2) new screws into each end plate **B**.

Tighten the screws to 90-100 in.-lbs. (10,0-11,5 Nm) torque.

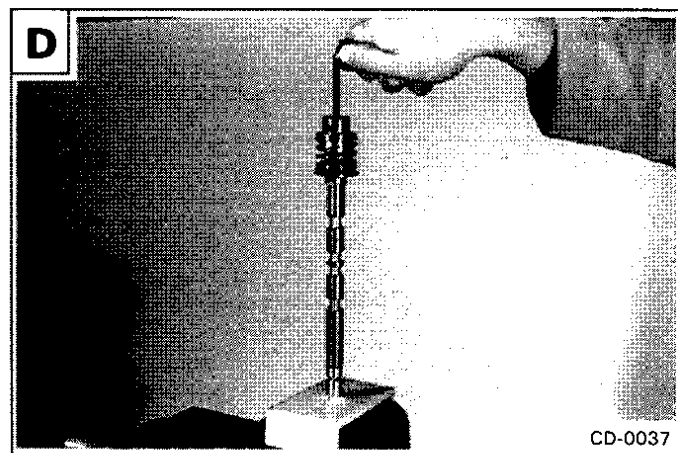
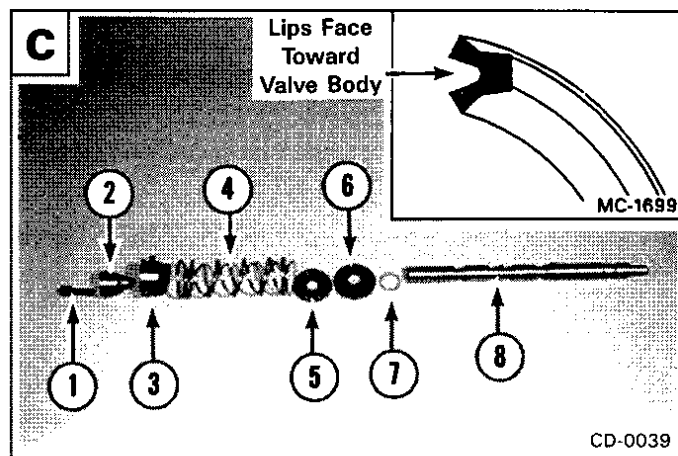
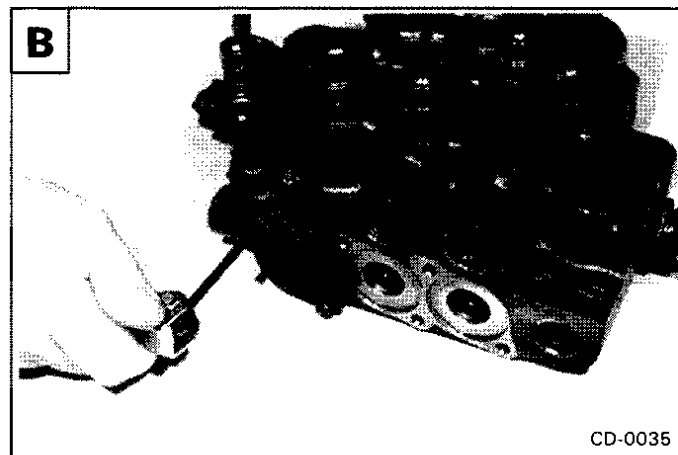
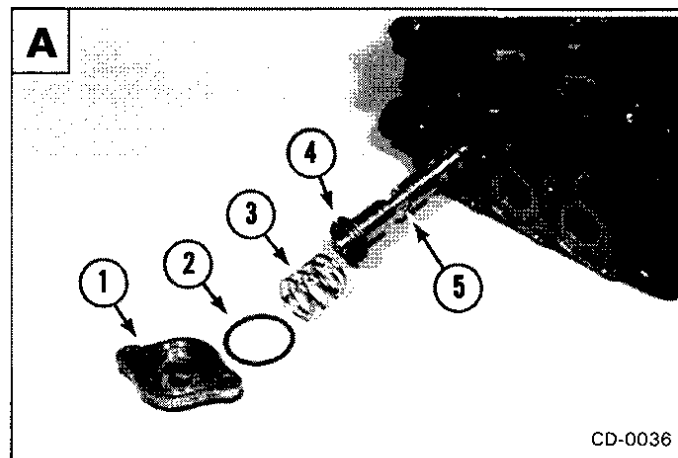
Tilt Spool and Centering Spring Assembly

Apply a light coating of petroleum jelly to a new spool seal (Item 7). Install the spool seal with lips toward the valve body, over the spool (Item 8) **C**.

Apply a light coating of grease to the centering spring parts (Items 2-6). Install the back-up washer (Item 6), spring centering washer (Item 5), spring (Item 4), spring centering collar (Item 3) and adapter (Item 2) onto the spool (Item 8) **C**.

With the linkage end of the spool in a vise, install a screw and lock washer into the adapter **D**.

Tighten the screw to 90-100 in.-lbs. (10,0-11,5 Nm) torque.



Tilt Spool and Centering Spring Assembly (Cont'd)

Install two (2) screws in the end cap **B**.

Apply a light coating of petroleum jelly to a new spool seal (Item 1). Install the spool seal, with lips toward the valve body over the spool **C**.

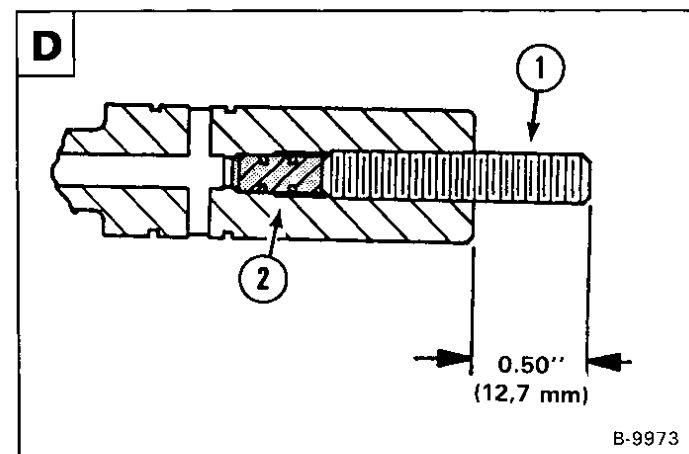
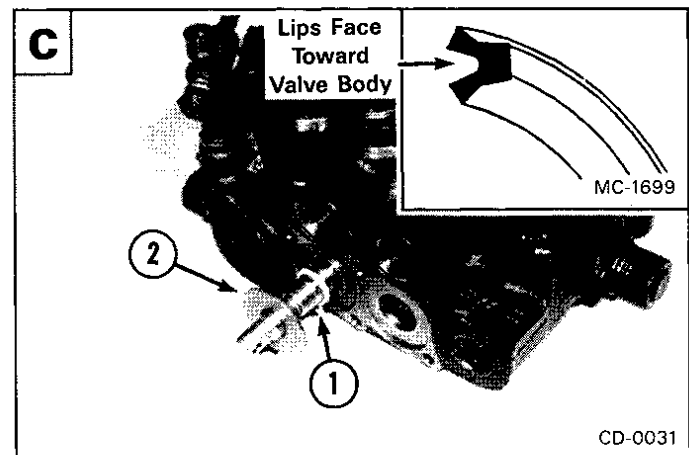
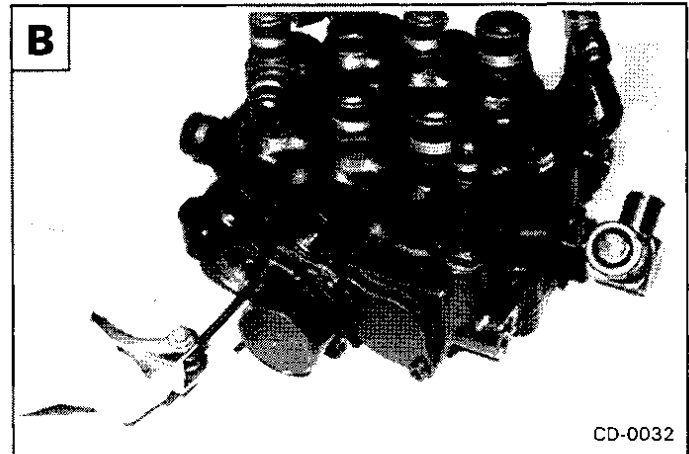
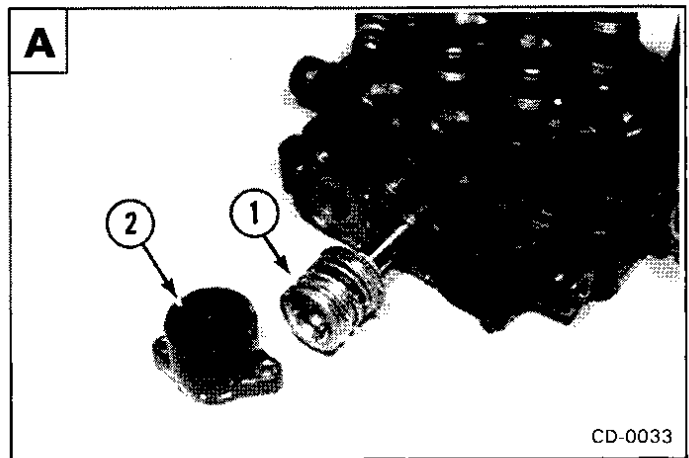
Apply a light coating of grease to the back-up washer (Item 2).
Install the back-up washer on the spool **C**.

Carefully push the back-up washer and spool seal into the valve body.

Lift Spool and Detent Assembly

Install a new plastic plug (Item 2) and the stud (Item 1) into the lift spool **D**.

Turn the stud in until approximately 0.50" (12,7 mm) can be seen.



CONTROL VALVE (Cont'd)

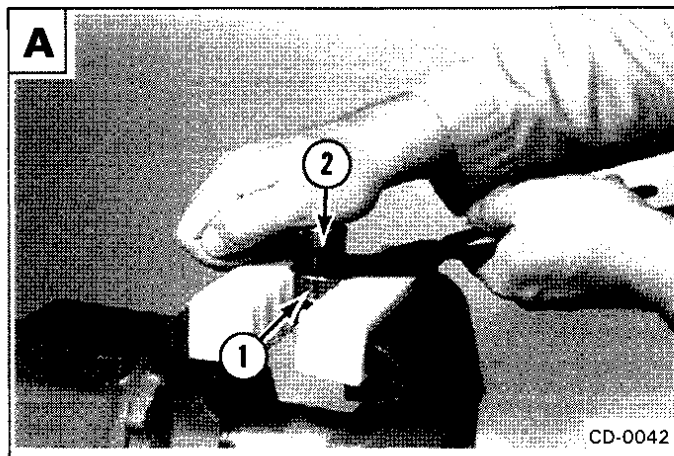
Lift Spool and Detent Assembly (Cont'd)

Apply a light coating of grease to all of the detent components before assembly.

Put the spring centering collar (Item 1) into a vise **A**.

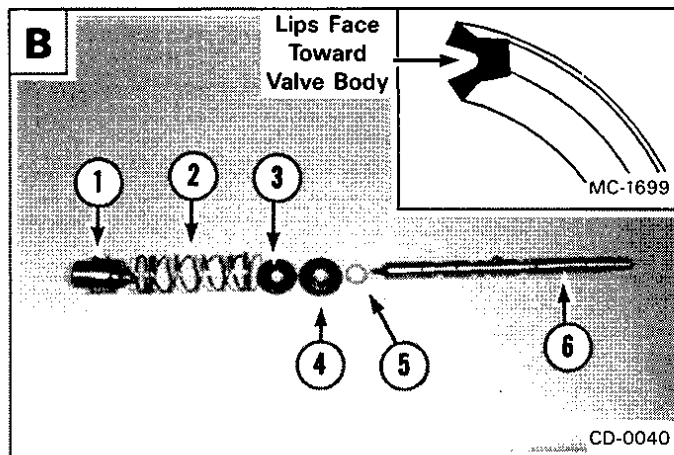
Install a spring and two (2) detent balls into the detent adapter (Item 2).

Holding the detent balls in position with the detent tool (MEL-1278), install the detent adapter (Item 2) into the spring centering collar (Item 1) **A**.

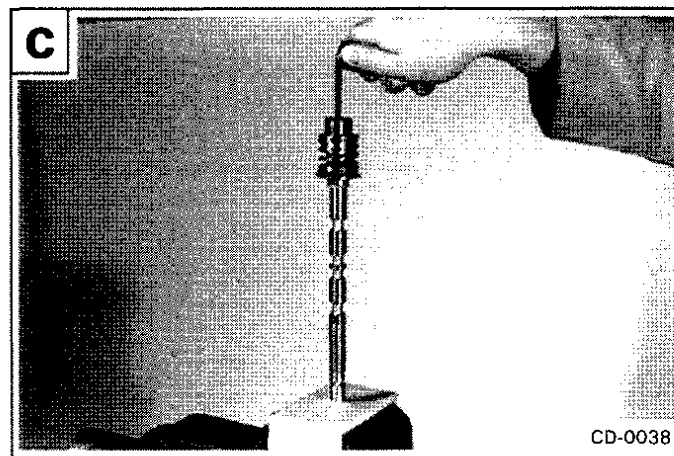


Apply a light coating of petroleum jelly to a new spool seal (Item 5). Install the spool seal, with lips toward the valve body, over the spool (Item 6) **B**.

Apply a light coating of grease and install the back-up washer (Item 4), spring centering washer (Item 3), spring (Item 2) and detent adapter assembly (Item 1) onto the spool (Item 6) **B**.



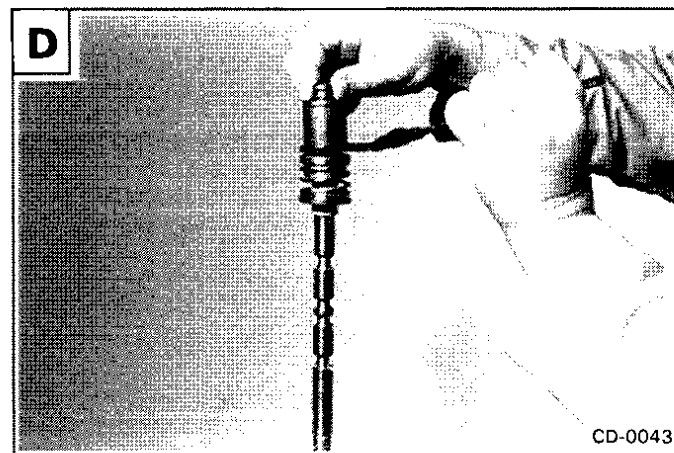
With the linkage end of the spool in a vise, tighten the detent adapter to 90-100 in.-lbs. (10,0-11,5 Nm) torque **C**.



Apply a light coating of grease to the detent balls, spring and detent sleeve before assembly.

Install a spring and two (2) detent balls into the detent adapter (Item 1).

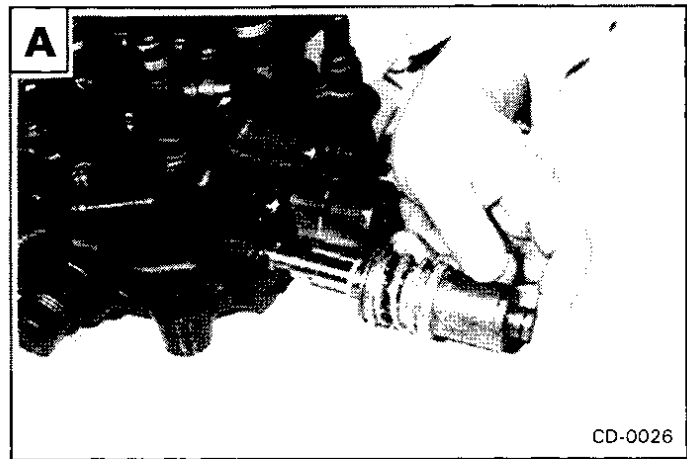
Holding the detent balls in position with the detent tool (MEL-1278), install the detent sleeve (Item 2) over the detent adapter (Item 1) **D**.



CONTROL VALVE (Cont'd)

Lift Spool and Detent Assembly (Cont'd)

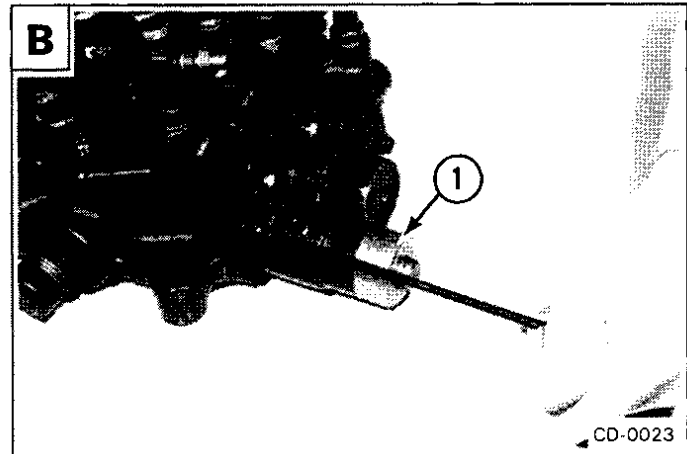
Apply oil to the spool assembly. Install the spool assembly into the valve body **A**.



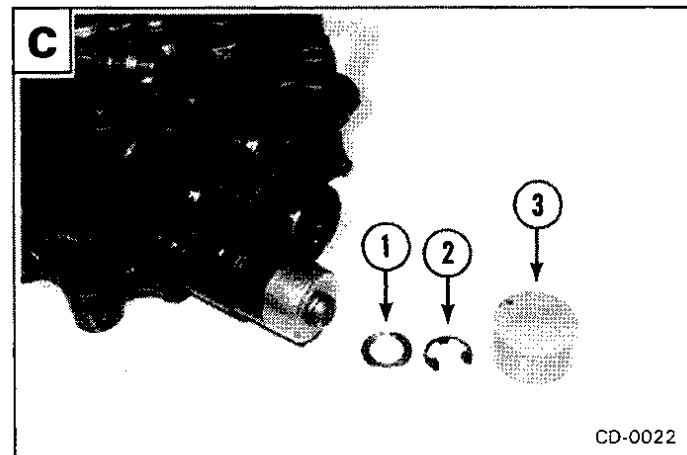
Install the detent cap (Item 1) over the detent sleeve **B**.

Install two (2) screws and lock washers to retain the detent cap **B**.

Tighten the screws to 90-100 in.-lbs. (10,0-11,5 Nm) torque.



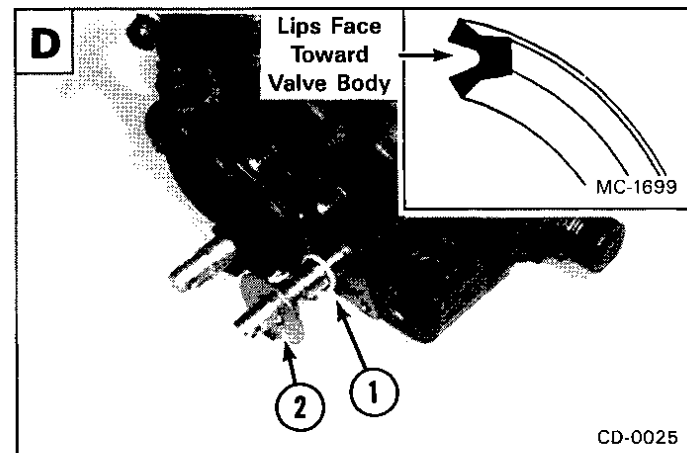
Install the washer (Item 1) snap ring (Item 2) and cap (Item 3) **C**.



Apply a light coating of petroleum jelly on a new spool seal (Item 1). Install the spool seal, with lips toward the valve body, over the spool **D**.

Apply a light coating of grease to the back-up washer (Item 2). Install the back-up washer on the spool **D**.

Carefully push the back-up washer and spool seal into the valve body.

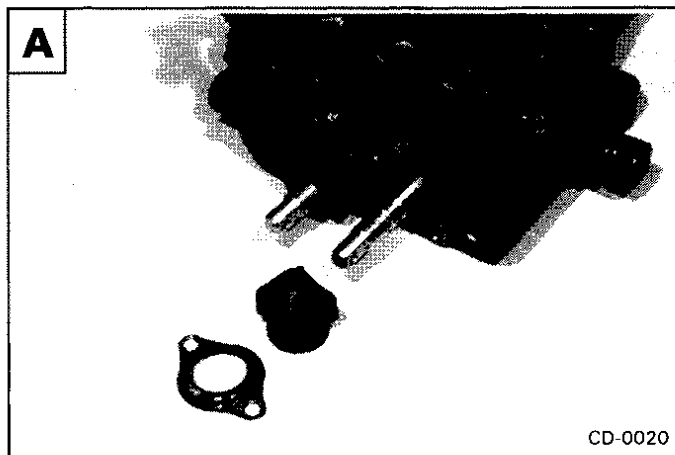


CONTROL VALVE (Cont'd)

Rubber Boot Assembly

Install a new rubber boot in the retainer. Install the rubber boot and retainer onto the valve body **A**.

Push the rubber boot toward the valve body to seat the rubber boot in the spool groove **A**.



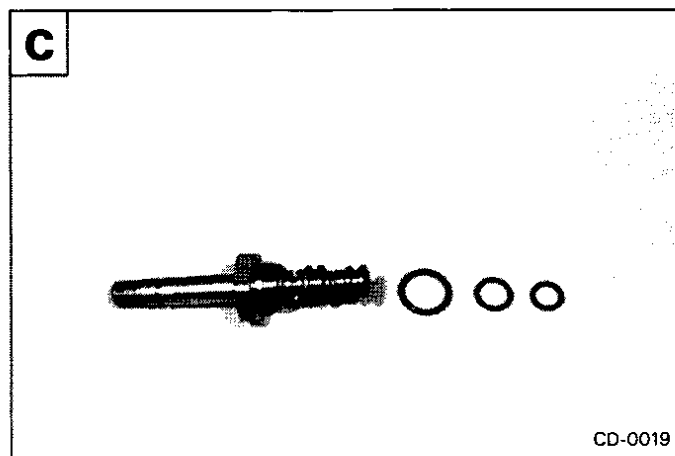
Install the two (2) screws through the rubber boot retainer **B**.

Tighten the screws to 90-100 in.-lbs. (10,0-11,5 Nm) torque.



Auxiliary Electric Solenoid Assembly

Apply a light coating of petroleum jelly to three (3) new O-rings. Install the O-rings on the solenoid valve **C**.

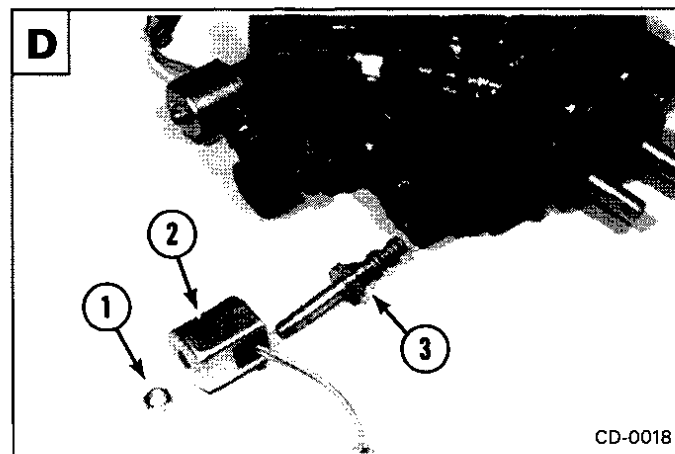


Install the solenoid valve (Item 3) into the valve body **D**.

Tighten the solenoid valve to 8-12 ft.-lbs. (11-16 Nm) torque.

Install the solenoid coil (Item 2) and nut (Item 1) on the solenoid valve **D**.

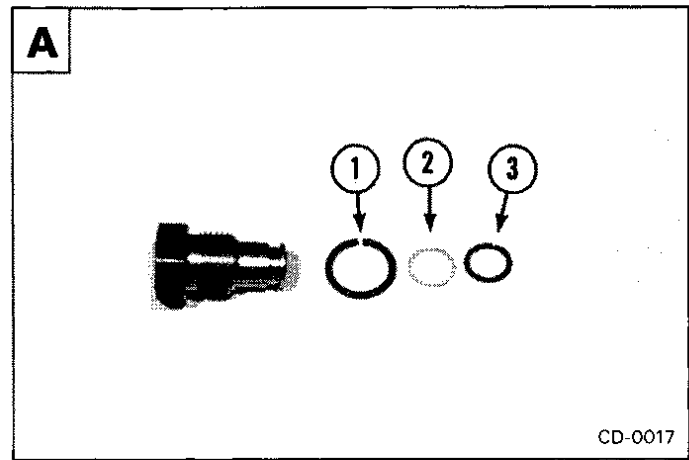
Tighten the nut to 9-12 in.-lbs. (1,0-1,4 Nm) torque.



CONTROL VALVE (Cont'd)

Plug Assembly

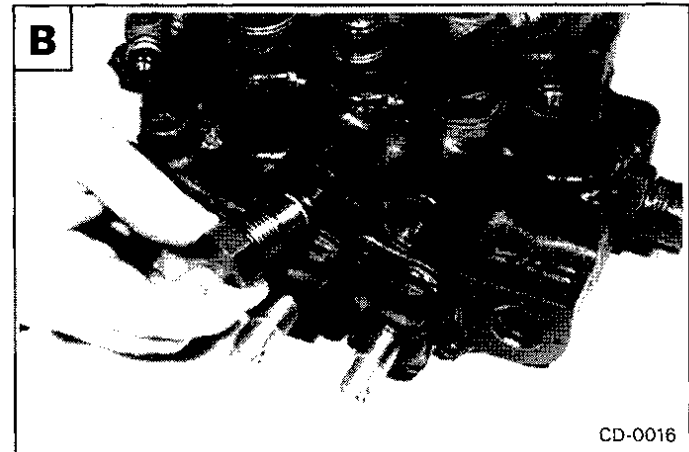
Apply a light coating of petroleum jelly to two (2) new O-rings and a new back-up washer. Install the new back-up washer (Item 2) and two (2) O-rings (Items 1 & 3) on the plug **A**.



Install the plug into the valve body **B**.

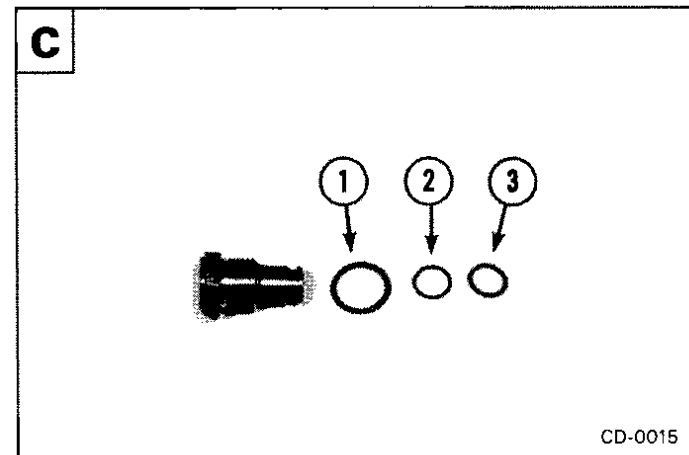
Tighten the plug to 35-40 ft.-lbs. (47-54 Nm) torque.

NOTE: Plugs can be located in the "E", "F" and "H2" ports depending on model. Refer to Page 1 for the correct location and quantity.



Anti-Cavitation Valve Assembly

Apply a light coating of petroleum jelly to two (2) new O-rings and a new back-up washer. Install the new back-up washer (Item 2) and two (2) O-rings (Items 1 & 3) on the anti-cavitation valve **C**.



Install the anti-cavitation valve into the valve body **C**.

Tighten the anti-cavitation valve to 35-40 ft.-lbs. (47-54 Nm) torque.

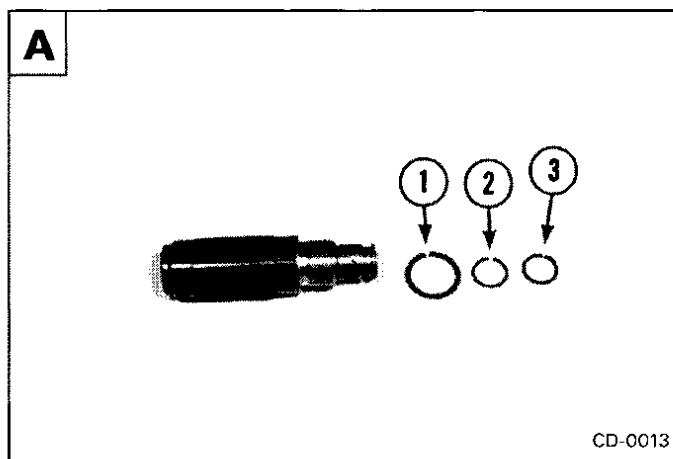
NOTE: Anti-cavitation valves can be located in "E" and "F" ports depending on model. Refer to Page 1 for the correct location and quantity.



CONTROL VALVE (Cont'd)

Port Relief Valve Assembly

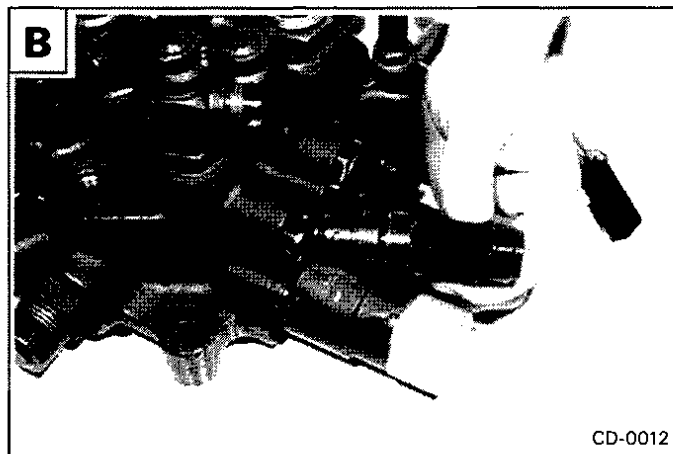
Apply a light coating of petroleum jelly to two (2) new O-rings and a new back-up washer. Install the new back-up washer (Item 2) and two (2) new O-rings (Items 1 & 3) on the port relief valve **A**.



Install the port relief valve into the valve body **B**.

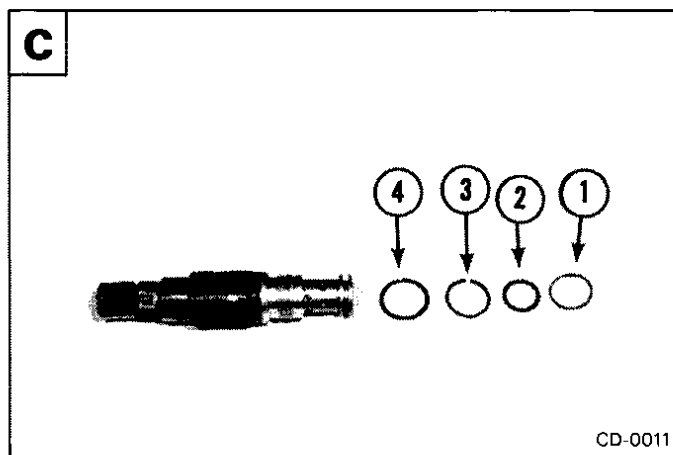
Tighten the plug to 35-40 ft.-lbs. (47-54 Nm) torque.

NOTE: The port relief valve can be located in the "E", "F" and "H2" (If equipped with optional auxiliary port relief valve) ports depending on model. Refer to Page 1 for the correct location and quantity.



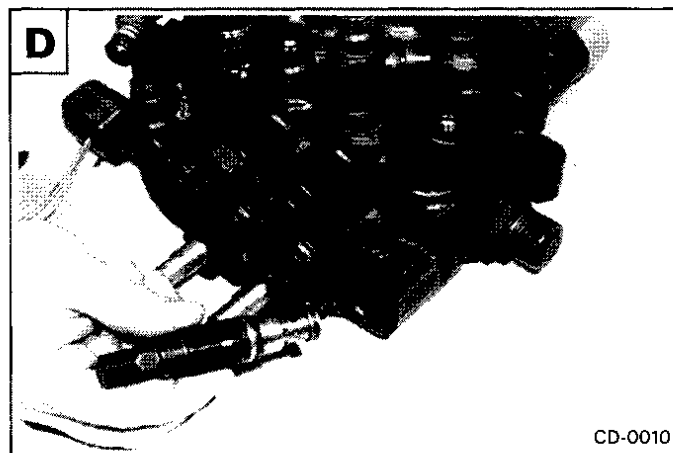
Main Relief Valve Assembly

Apply a light coating of petroleum jelly to a new glide ring, two (2) new O-rings and a new back-up washer. Install the two (2) new O-rings (Items 2 & 4), back-up washer (Item 3) and glide ring (Item 1) on the main relief valve **C**.



Install the main relief valve into the valve body **D**.

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



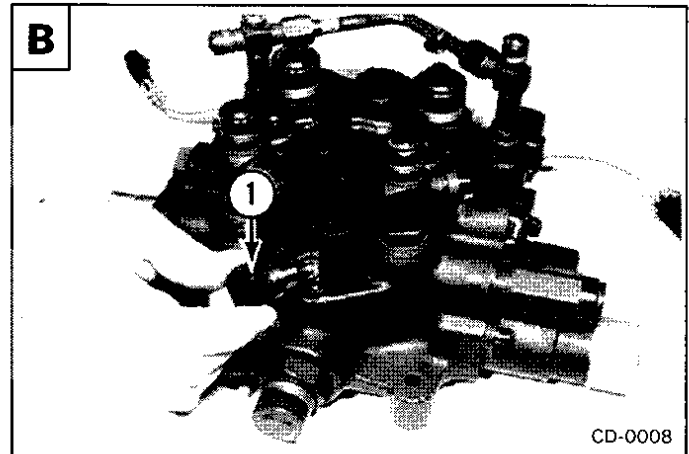
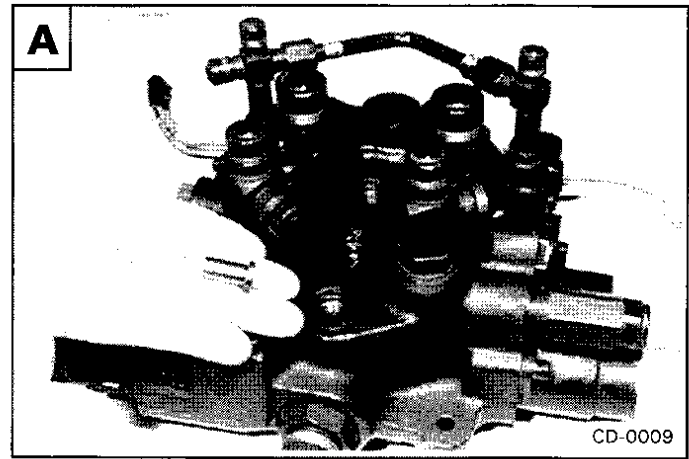
CONTROL VALVE (Cont'd)

Load Check Valve Assembly

Apply oil to each spring and poppet. Install a poppet and spring into ports 1 and 2.

Apply a light coating of petroleum jelly to three (3) new O-rings. Install a new O-ring on both load check plugs and the plug. Install the load check plugs (Item 1) and plug (Item 2) **B**.

Tighten each plug to 35-40 ft.-lbs. (47-54 Nm) torque.



Spool Seal Replacement Assembly

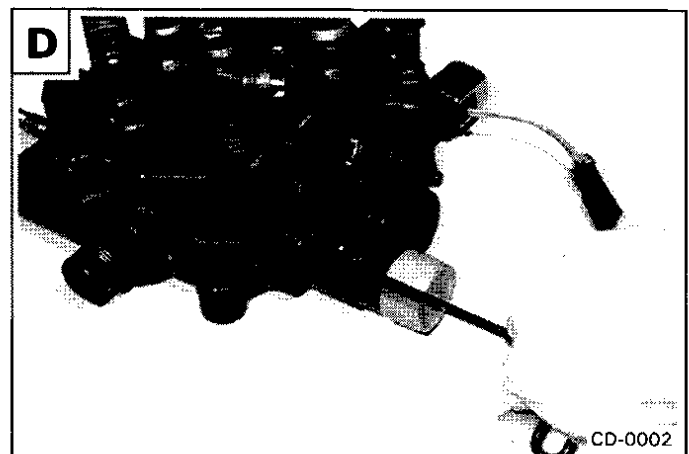
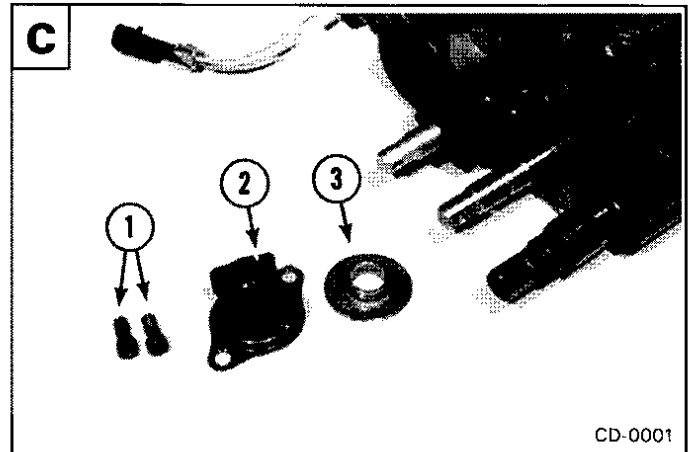
IMPORTANT

When making repairs on 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-2003-0284

Remove the two (2) screws (Item 1), rubber boot (Item 2) and back-up washer (Item 3) **C**.

Remove the two (2) screws **D**.



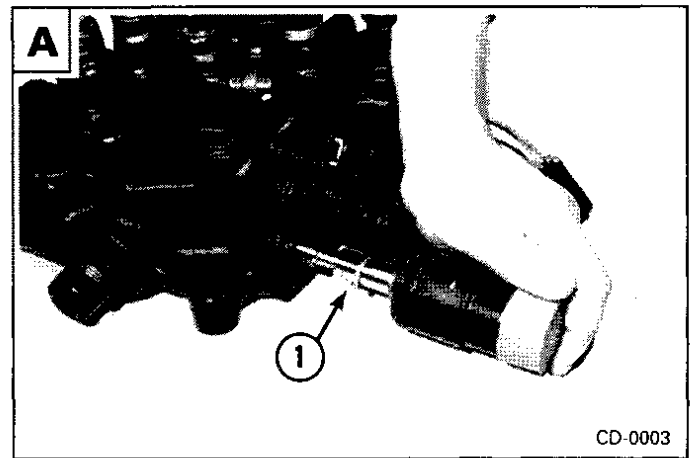
CONTROL VALVE (Cont'd)

Spool Seal Replacement Assembly (Cont'd)

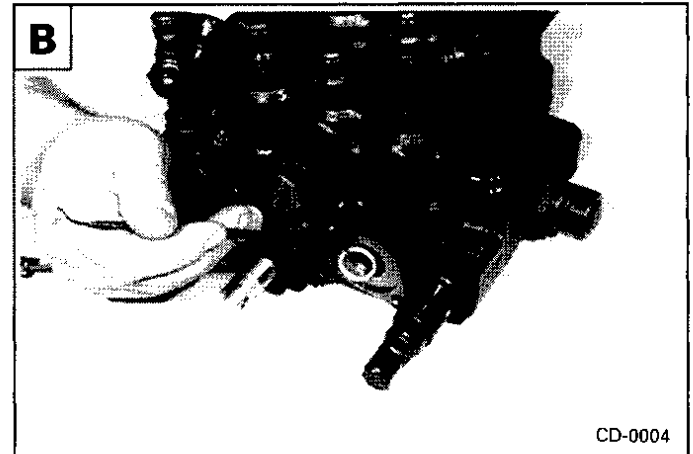
Remove the spool assembly from the bore by pushing on the linkage end of the spool **A**.

NOTE: When servicing the lift spool, the detent end cap must not be removed from the spool or reassembly of the detent will be required. When servicing the tilt spool, the end cap can be removed.

Remove the spool seal (Item 1) over the spool **A**.

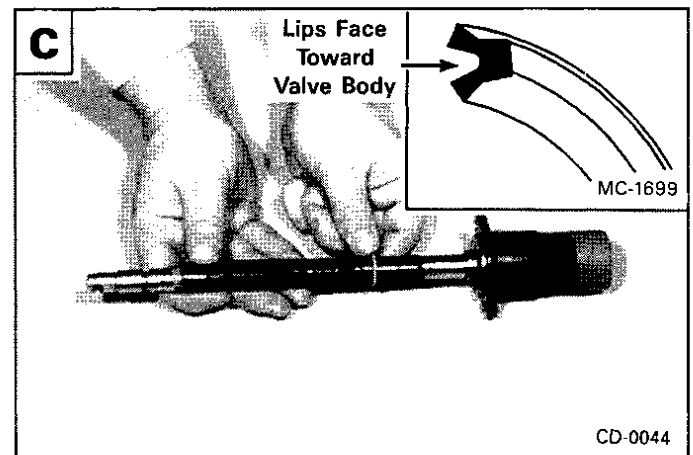


Remove the spool seal from the spool bore **B**.

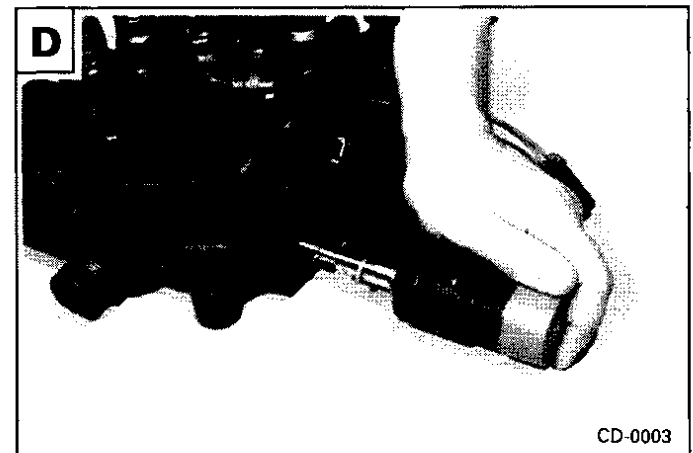


Apply a light coating of petroleum jelly to a new spool seal. Install the spool seal, with lips toward the valve body, over the spool **C**.

NOTE: To protect the spool seal from damage during installation, put plastic material (example: discarded microfiche card) over the spool while installing the spool seal.



Apply oil to the spool. Install the spool into the valve body **D**.

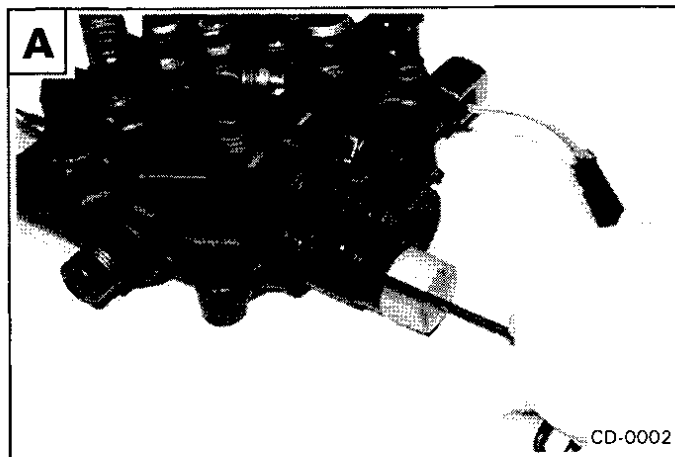


CONTROL VALVE (Cont'd)

Spool Seal Replacement Assembly (Cont'd)

Install the two (2) screws to retain the end cap **A**.

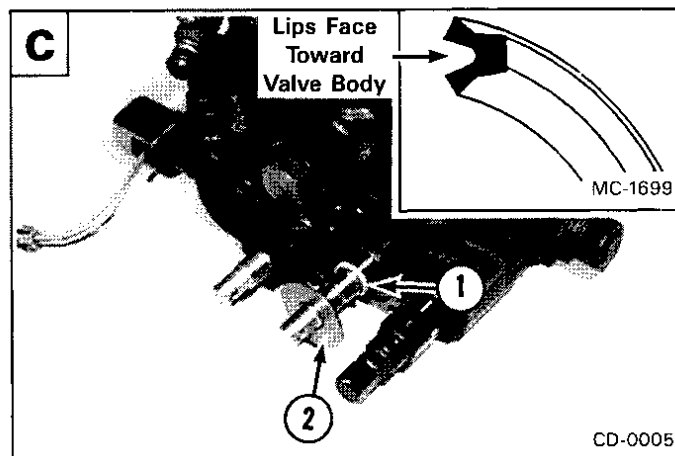
Tighten the screws to 90-100 in.-lbs. (10,0-11,5 Nm) torque.



Apply a light coating of petroleum jelly to a new spool seal (Item 1). Install the spool seal, with lips toward the valve body, over the spool **B**.

Apply a light coating of grease to the back-up washer (Item 2). Install the back-up washer on the spool **B**.

Carefully push the back-up washer and spool seal into the valve body.



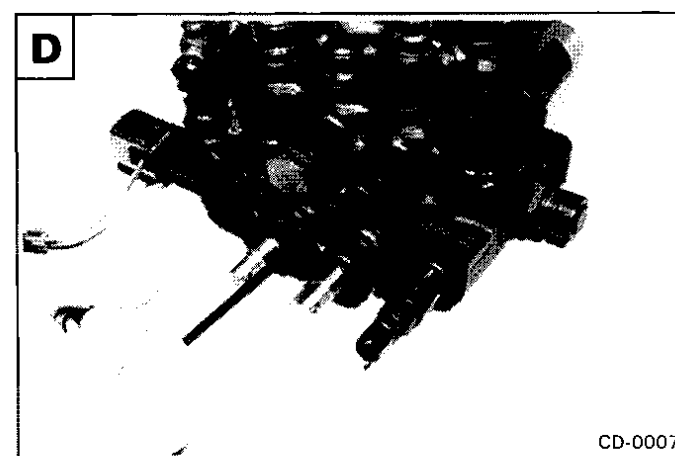
Install the rubber boot onto the valve body **C**.

Push the rubber boot toward the valve body to seat the rubber boot in the spool groove.



Install the two (2) screws through the rubber boot retainer **D**.

Tighten the screws to 90-100 in.-lbs. (10,0-11,5 Nm) torque.



For Hydraulic and Hydrostatic Systems

System Relief Pressure — The pressure at which the system relief valve is set and will return oil back to tank.

NOTES _____

[illegible]

For Hydraulic and Hydrostatic Systems

VANES — Any plate, blade or similiar device attached to an axis and moved by air or liquid.

[illegible]

For Hydraulic and Hydrostatic Systems

NOTES _____

[illegible]



HYDRAULIC CONTROL VALVE COMPONENT REPAIR MANUAL REVISION

AFFECTING:

Product BOBCAT LOADER
Model AS LISTED IN MANUAL INDEX
Manual No. 6570041 (4-86)

This is an update for the Component Repair Manual for the Melroe Hydraulic Control Valve (P/N 6570941).

Remove the Hydraulic Control Valve Index Page & 2 and put in the revised page.

| |
|-----------------|
| 001 |
| Revision Number |
| 14 October 1987 |
| Date |

| ROUTE TO ATTENTION | |
|-----------------------|-------------------------------------|
| PARTS MANAGER | <input type="checkbox"/> |
| SERVICE MANAGER | <input checked="" type="checkbox"/> |
| SALES MANAGER | <input type="checkbox"/> |



COMPONENT REPAIR MANUAL REVISION

| |
|-----------------|
| 002 |
| Revision Number |
| 31 January 1991 |
| Date |

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570041 (6-89)

| ROUTE TO ATTENTION | |
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| SALES MANAGER | <input type="checkbox"/> |
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This is an up-date to the Component Repair Manual for the Melroe Hydraulic Control Valve (P/N 6570041).

Take out and put in the pages as listed below:

TAKE OUT
INDEX

PUT IN
INDEX (Revised Jan. 91)

AFTER TAB 5

GLOSSARY OF TERMS AND COMPONENTS

HYDRAULIC CONTROL VALVE
TAB 5 (For Models 750 Series, 853 & 2410 Loaders)
(Added Jan. 91)

TAB 6 PAGE

GLOSSARY OF TERMS AND COMPONENTS



COMPONENT REPAIR MANUAL REVISION

| |
|-----------------|
| 003 |
| Revision Number |
| 31 August 1992 |
| Date |

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570041 (6-89)

| ROUTE TO ATTENTION | |
|-----------------------|-------------------------------------|
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| SALES MANAGER | <input type="checkbox"/> |
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This is an up-date to the Component Repair Manual for the Melroe Hydraulic Control Valve (P/N 6570041).

TAKE OUT

TAB 1

HYDRAULIC CONTROL VALVE—INDEX PAGE

7, 8
9, 10

TAB 2

CONTROL VALVE INDEX 2400

3, 4

TAB 4

CONTROL VALVE INDEX 1213

5, 6
9

TAB 5

HYDRAULIC CONTROL VALVE—INDEX PAGE

5 (Rev. Jan. 91), 6 (Rev. Jan. 91)
13 (Rev. Jan. 91)

PUT IN

HYDRAULIC CONTROL VALVE—INDEX PAGE

(Rev. Aug. 92)
7 (Rev. Aug. 92), 8
9, 10 (Rev. Aug. 92)
13 (Added Aug. 92), 14 (Added Aug. 92)
15 (Added Aug. 92), 16 (Added Aug. 92)

CONTROL VALVE INDEX 2400

(Rev. Aug. 92)
3, 4 (Rev. Aug. 92)
9 (Added Aug. 92), 10 (Added Aug. 92)

CONTROL VALVE INDEX 1213

(Rev. Aug. 92)
5 (Rev. Aug. 92), 6 (Rev. Aug. 92)
9, 10 (Added Aug. 92)
11 (Added Aug. 92), 12 (Added Aug. 92)
13 (Added Aug. 92)

HYDRAULIC CONTROL VALVE—INDEX PAGE

(Rev. Aug. 92)
5 (Rev. Jan. 91), 6 (Rev. Aug. 92)
13 (Rev. Jan. 91), 14 (Added Aug. 92)
15 (Added Aug. 92)



COMPONENT REPAIR MANUAL REVISION

| |
|-----------------|
| 004 |
| Revision Number |
| 26 May 1994 |
| Date |

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570041 (6-89)

| ROUTE TO ATTENTION | |
|-----------------------|-------------------------------------|
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| SALES MANAGER | <input type="checkbox"/> |

NOTICE

Insert This Sheet With The Appropriate Manual For Future Reference.

This is an up-date to the Component Repair Manual for the Melroe Hydraulic Control Valve (P/N 6570041).

Take out the pages shown and put in the revised pages as follows:

TAKE OUT

INDEX (Revised Jan. 91)

TAB 6

GLOSSARY OF TERMS AND COMPONENTS
(Added Jan. 91)

TAB 7

PUT IN

INDEX (Revised May 94)

HYDRAULIC CONTROL VALVE
TAB 6 (For Models 750 Series, 853 & 2410 Loaders)
Pages 1 Thru 20 (Added May 94)

GLOSSARY OF TERMS AND COMPONENTS
(Added Jan. 91)