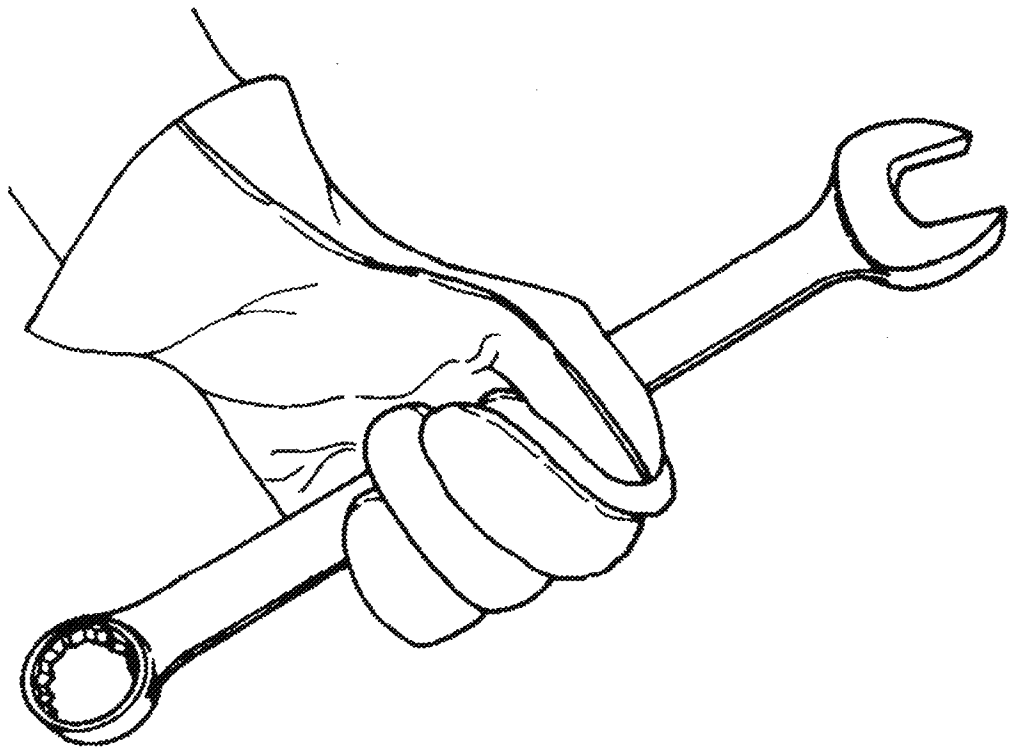
bobcat®

HYDRAULIC MOTOR

COMPONENT REPAIR MANUAL



MELROE COMPANY

6570270 (3-86)

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 Hydrostatic Motors.

Make reference to the SERVICE MANUAL for your MODEL Loader to troubleshoot, test, remove and installation of the hydrostatic motor.

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

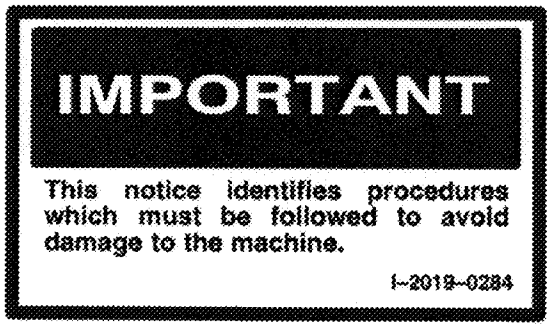
SAFETY INSTRUCTIONS

We Care About Your Safety.

The Bobcat loader is designed to give maximum operator safety; but no machine design can prevent operator error or carelessness.

BEFORE YOU WORK ON THE HYDROSTATIC MOTOR

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

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HYDROSTATIC MOTOR MANUAL CONTENTS

MODELS	S/N	TAB	SECTION	MANUFACTURER
farmboy, 440, 443	All	1	A	Char-Lynn
540, 543	12001 & Above	1	B	Char-Lynn
630	15376 & Above	1	B	Char-Lynn
631	All	1	B	Char-Lynn
632	15320 & Above	1	B	Char-Lynn
641, 642, 642B, 643	All	1	B	Char-Lynn
720, 721, 722	All	2	A	Vickers
730, 731, 732	All	1	C	Char-Lynn
741, 742, 743	17999 & Above	1	C	Char-Lynn
742B, 743B	18000 & Above	1	D	Char-Lynn
750 Series	All	1	D	Char-Lynn
7753	Early Models	1	C	Char-Lynn
7753	Later Models	1	D	Char-Lynn
753L	All	1	D	Char-Lynn
825	All	3	A	Cessna
843	All	1	C	Char-Lynn
853	All	1	C	Char-Lynn
943	All	4	A	Sundstrand
974, 975	All	4	B	Sundstrand
1213	All	1	C	Char-Lynn
1600	11999 & Below	3	B	Cessna
1600	12001 thru 12312	4	C	Sundstrand
1600	12313 & Above	4	D	Sundstrand
2000	All	3	B	Cessna
2400 Series	12999 & Above	4	C	Sundstrand
2410	13000 & Above	4	D	Sundstrand
Glossary of Terms	TAB #5			


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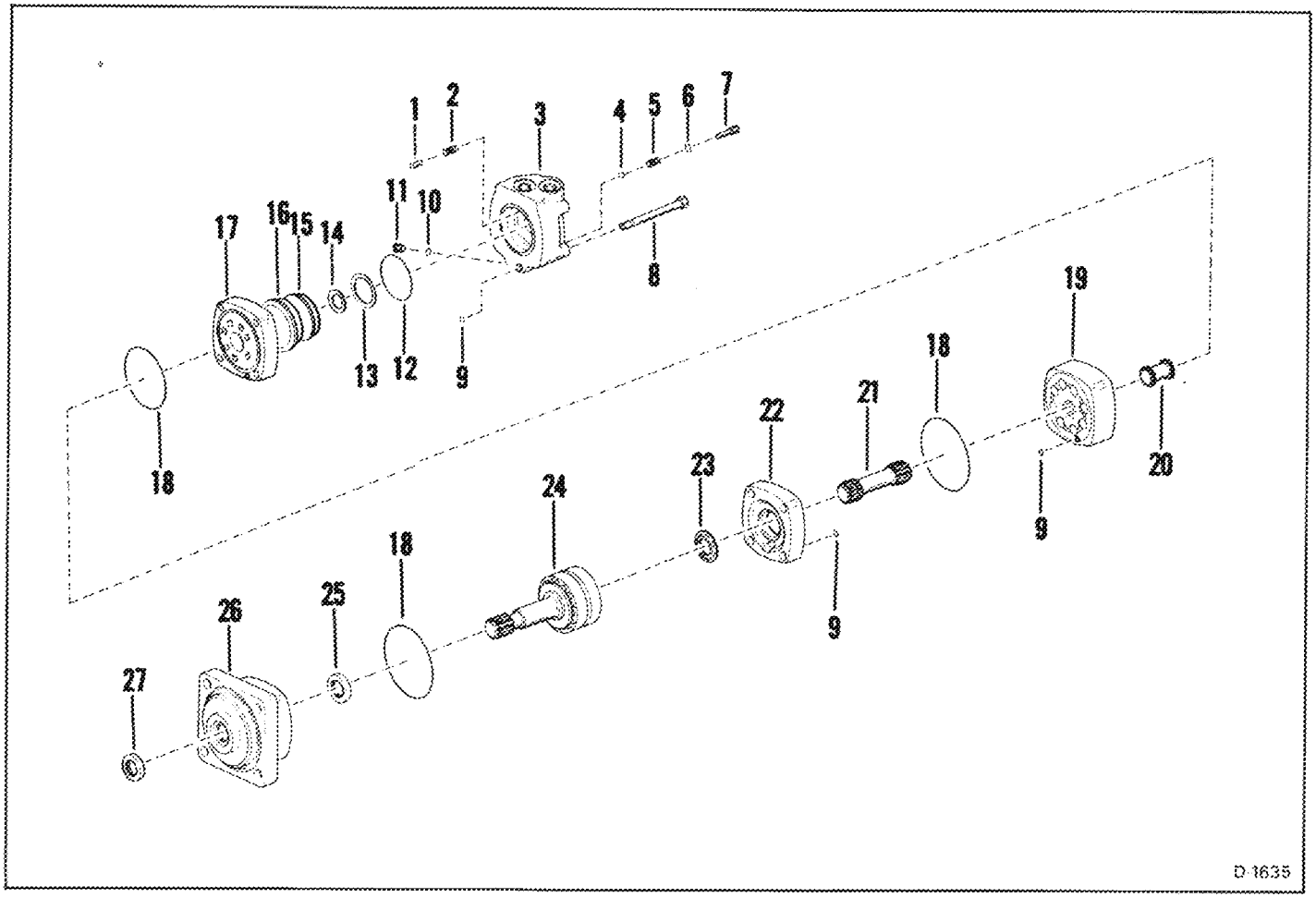
PARTS IDENTIFICATION



MODEL: farmboy, 440, 443

Ref.	Description
1.	PIN
2.	*SPRING
3.	HOUSING
4.	*BALL
5.	*SPRING
6.	O-RING
7.	PLUG
8.	BOLT
9.	O-RING
10.	O-RING
11.	PLUG
12.	O-RING
13.	SEAL, outer
14.	SEAL, inner
15.	PLATE, balancing
16.	VALVE
17.	PLATE, valve
18.	O-RING
19.	GEROLER
20.	SHAFT
21.	SHAFT
22.	PLATE, wear
23.	SEAL
24.	SHAFT & BEARING ASSY
25.	SEAL
26.	HOUSING
27.	SEAL

*** These parts will not be found on serial number loaders listed below.**

farmboy (S/N 13098 & Above)
443 (S/N 11973 & Above)

HYDROSTATIC MOTOR

Disassembly and Assembly

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

MEL-1015 – Seal Tool

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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Remove the four bolts from the motor [A].

Assembly: Tighten the bolts to 37 ft.lbs. (50 Nm) torque.

Lift the valve housing straight up. If done carefully, the springs and balance plate will stay on the valve [B].

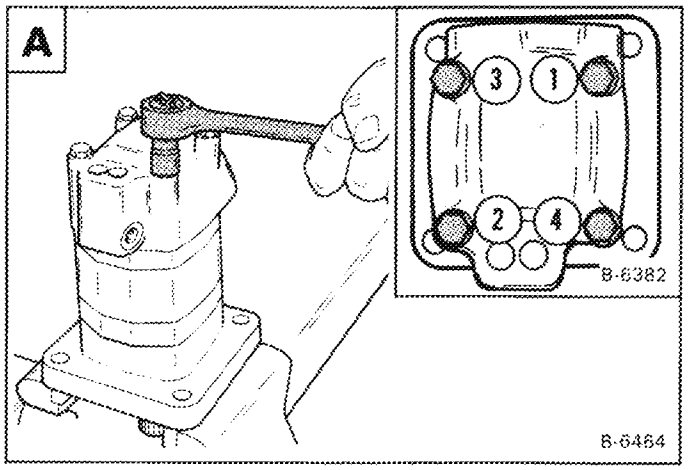
Remove the O-rings.

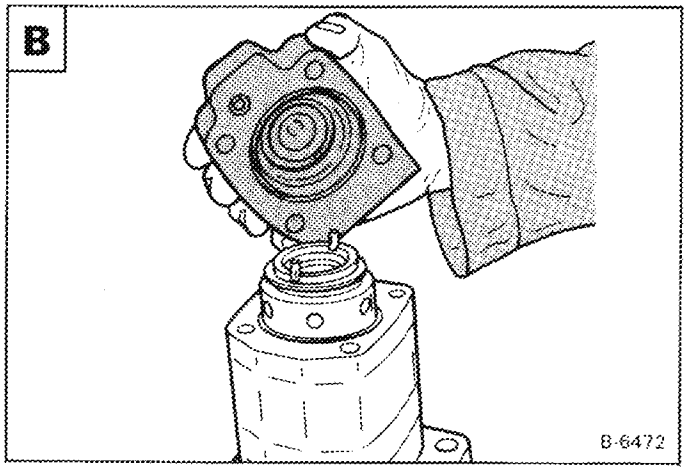
NOTE: **See Page A–1 - Tab 1 for the serial number to see if your motor has the check balls installed.**

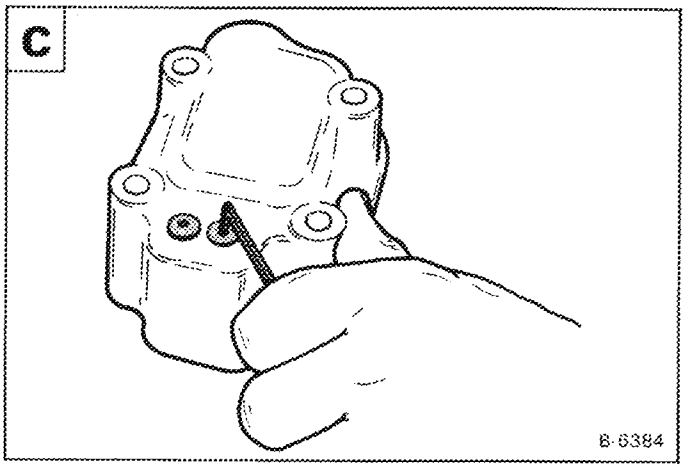
Remove the two check plugs [C].

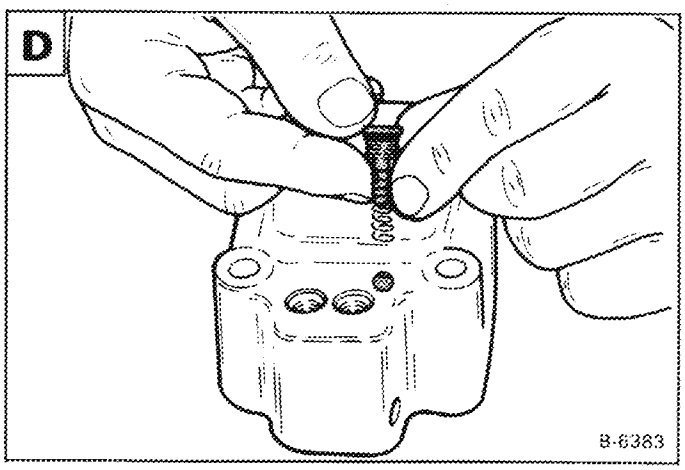
Remove the two springs and balls from the housing [D].

Check the balls and spring and replace as needed.

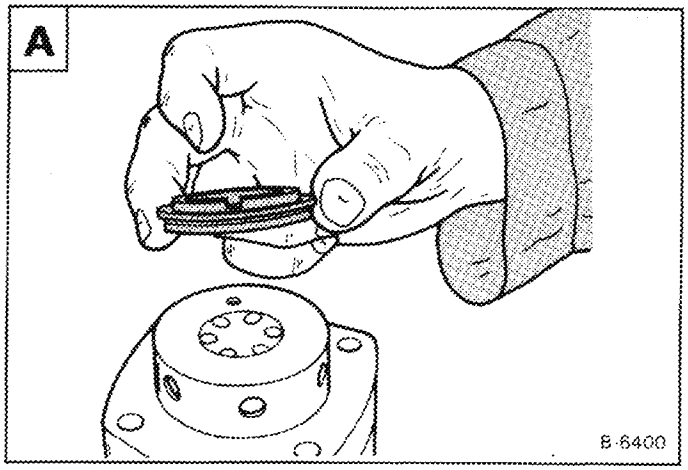






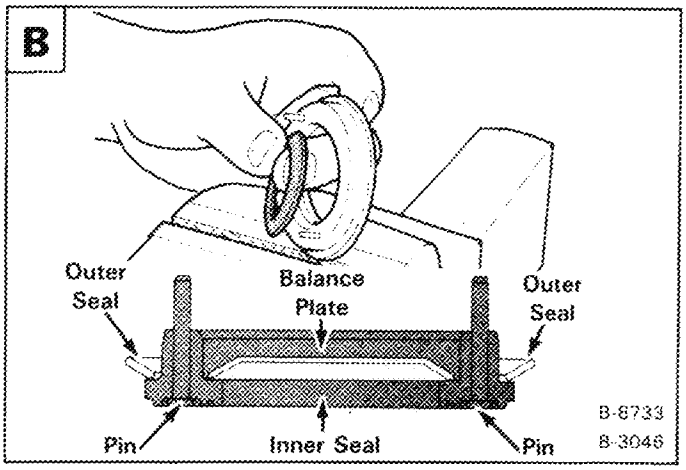


Remove the balance plate [A].



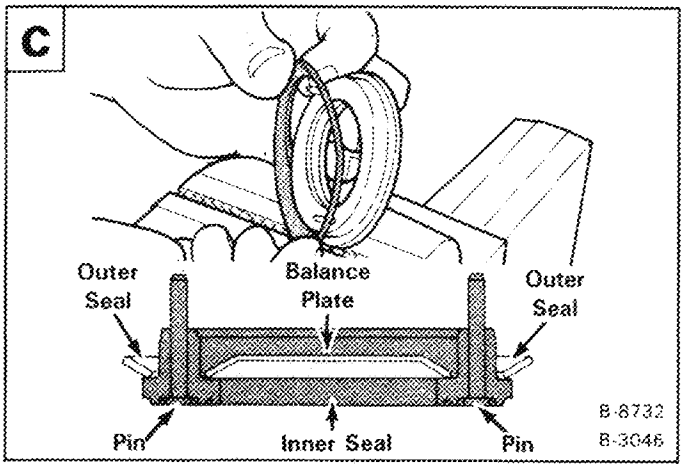
Remove the inner seal from the balance plate [B].

Assembly: Put grease on the inner seal and install as shown [B].

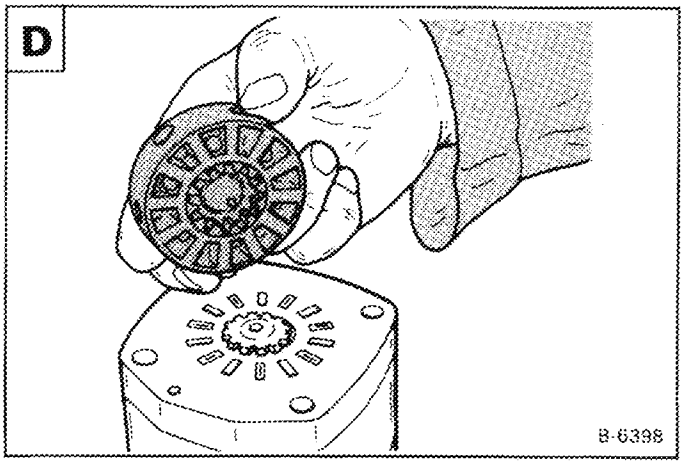


Remove the outer seal from the balance plate [C].

Assembly: Put grease on the outer seal and install as shown [C].



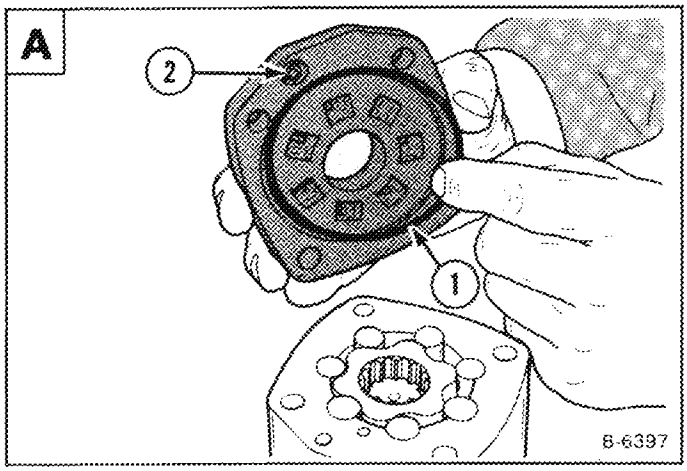
Remove the valve [D].



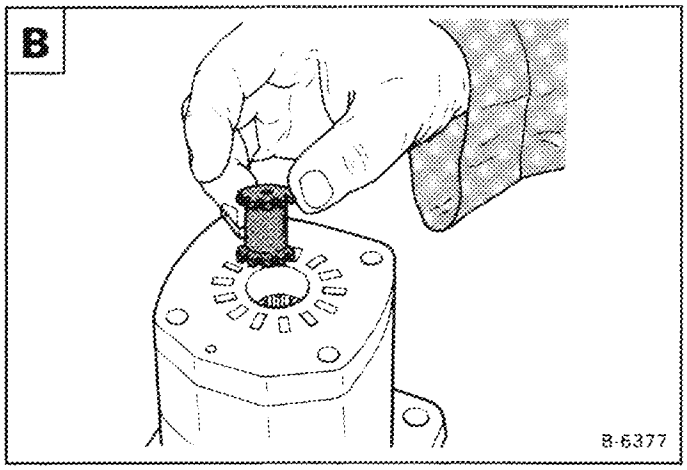
NOTE: See Page A—7 - TAB 1 for timing the motor when installing the valve, valve drive and geroller.

Remove the valve plate [A].

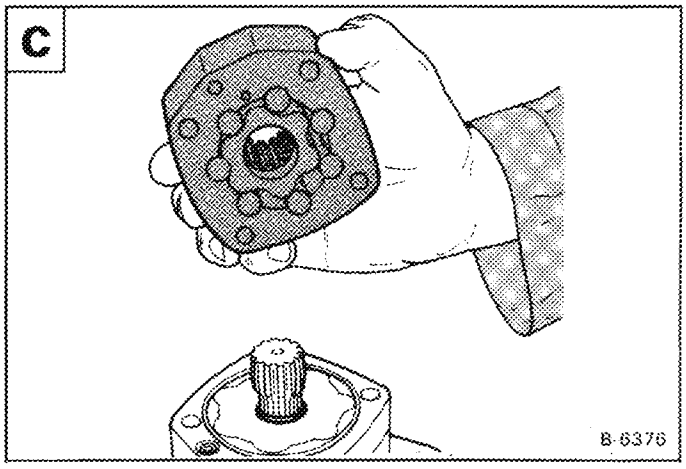
Remove the large O-ring (Item 1) and small O-ring (Item 2) [A].



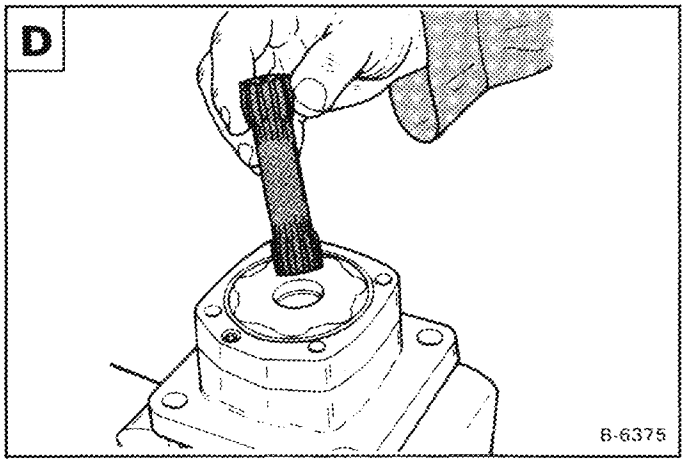
Remove the valve drive [B].



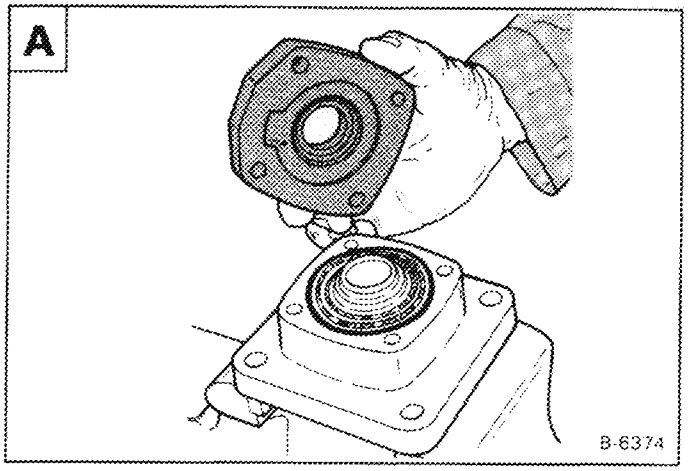
Remove the geroler [C].



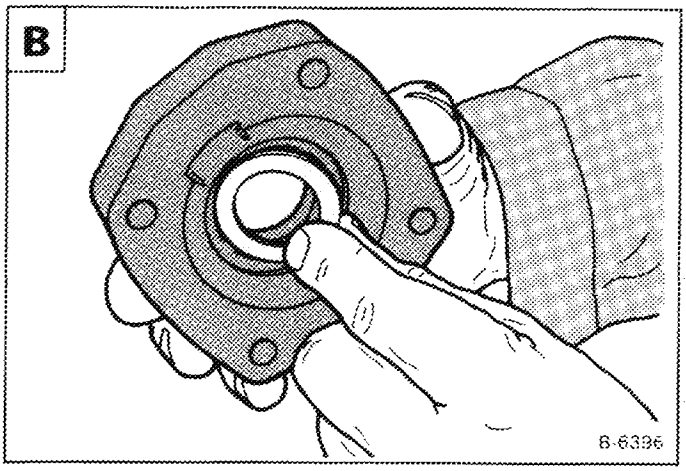
Remove the drive shaft [D].



Remove the wear plate [A].

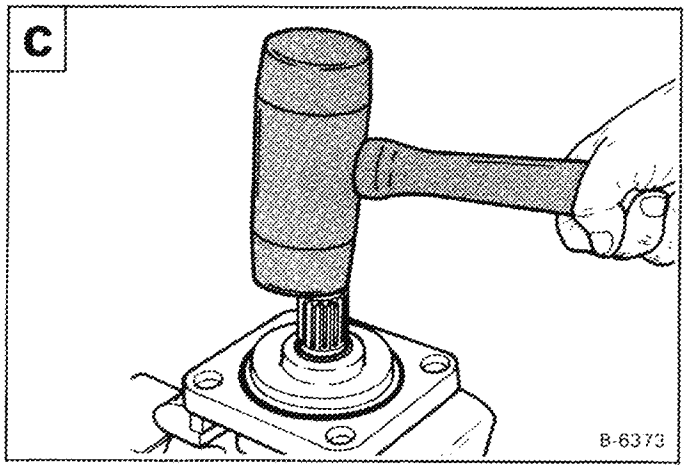


Remove the shaft face seal from the wear plate [B].



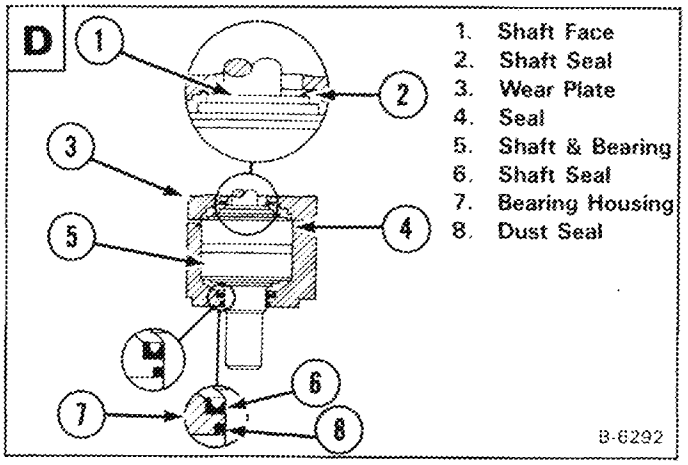
Remove the shaft and bearing assembly from the housing [C].

NOTE: The shaft and bearing assembly are not sold as individual parts. Replace as a complete unit.



Remove the dust seal and shaft seal from the housing [D].

Assembly: Install a new shaft seal and dust seal as shown [D]. Use a press to install the bearing and shaft assembly.



HYDROSTATIC MOTOR (Cont'd)

Assembly: When installing the balance plate in the end housing, put your finger through the hole and hold it in position until the housing is in position [A].

NOTE: **Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.**

Inspection

Clean all the parts in solvent and use air pressure to dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

Before the motor is assembled, check the following items:

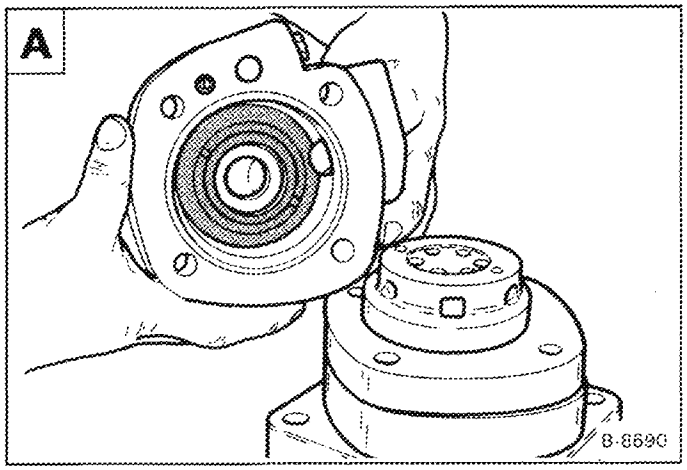
Check the geroler roller and rotor for wear and scratches [B].

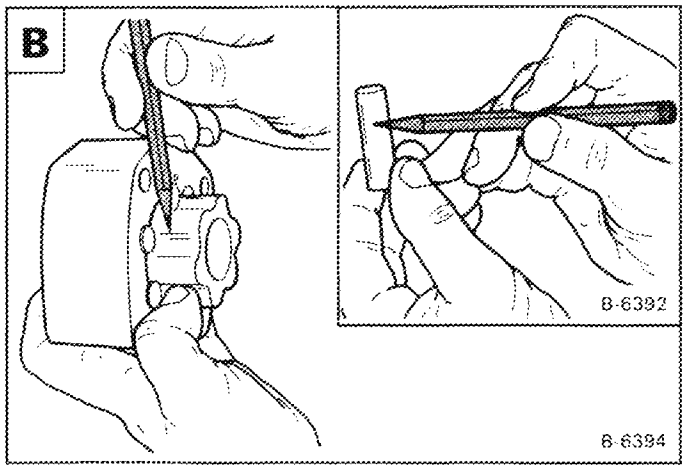
NOTE: **Put all the rollers back in their original position.**

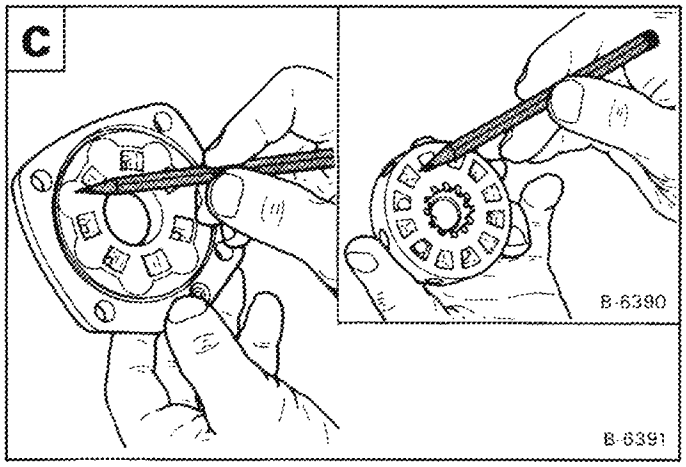
Check the valve plate for scratches [C].

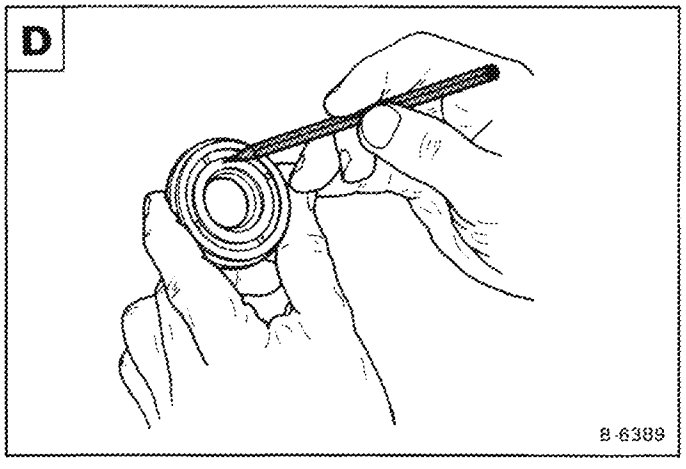
Check the balance plate for scratches [D].

Check the valve drive and main drive for wear.

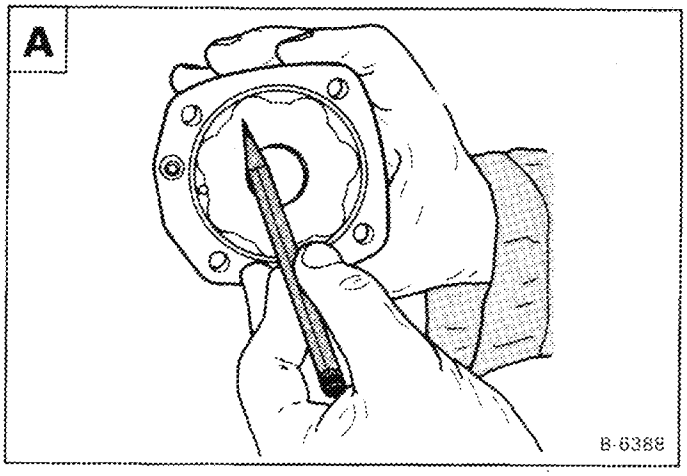








Check the end plate surface for scratches [A].



Timing the Hydrostatic Motor

The timing of the motor controls the direction of rotation of the drive shaft of the motor. The timing parts are as follows:

1. Geroller (Item 1) [B].
2. Valve Drive (Item 2) [B].
3. Valve Plate (Item 3) [B].
4. Valve (Item 4) [B].

Find the largest opening between the geroler star and the geroler ring. Mark the outside of the geroler ring at that point [B].

Align the two drain holes and the three pressure holes in the geroler ring with the same holes in the mounting flange. Then install the geroler assembly.

Install new O-rings.

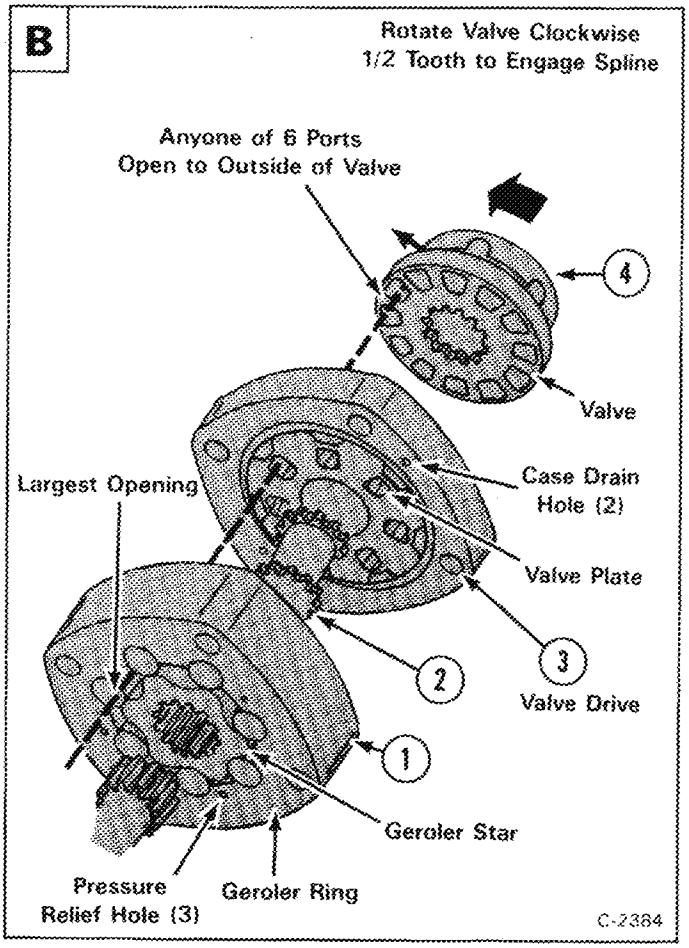
Install the valve drive [B].

Align the drain hole in the valve plate with the drain hole in the geroler. Install valve plate with the O-ring toward the geroler. Make sure the slot opening of the valve plate is in alignment with the largest opening of the geroler.

Install the valve plate.

Install the valve on the valve plate. Make alignment with one of the side openings with the mark on the geroler. Turn the valve **clockwise** a small amount until the teeth on the valve drive engage.

Continue with the rest of the assembly procedure.

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Section B


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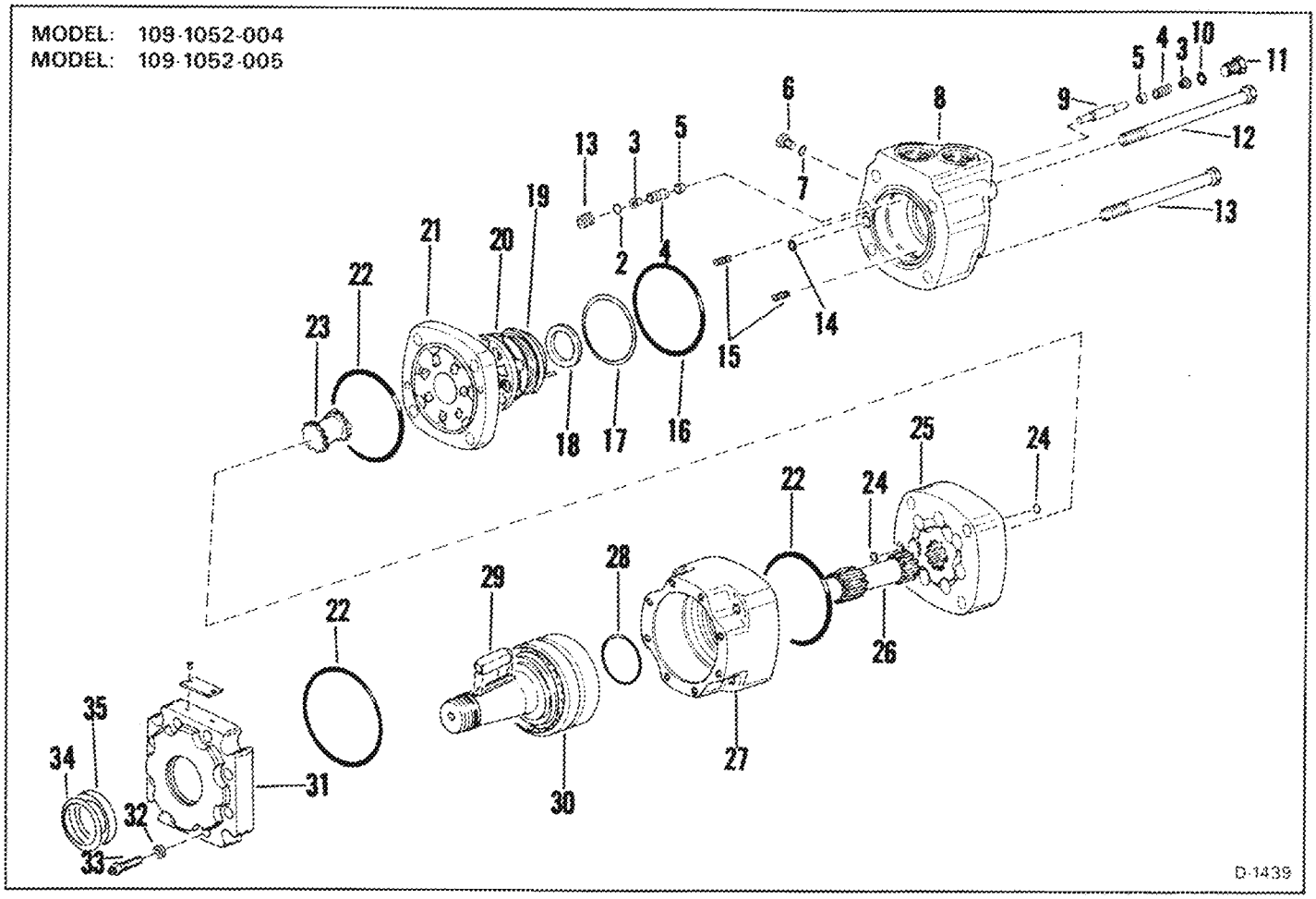
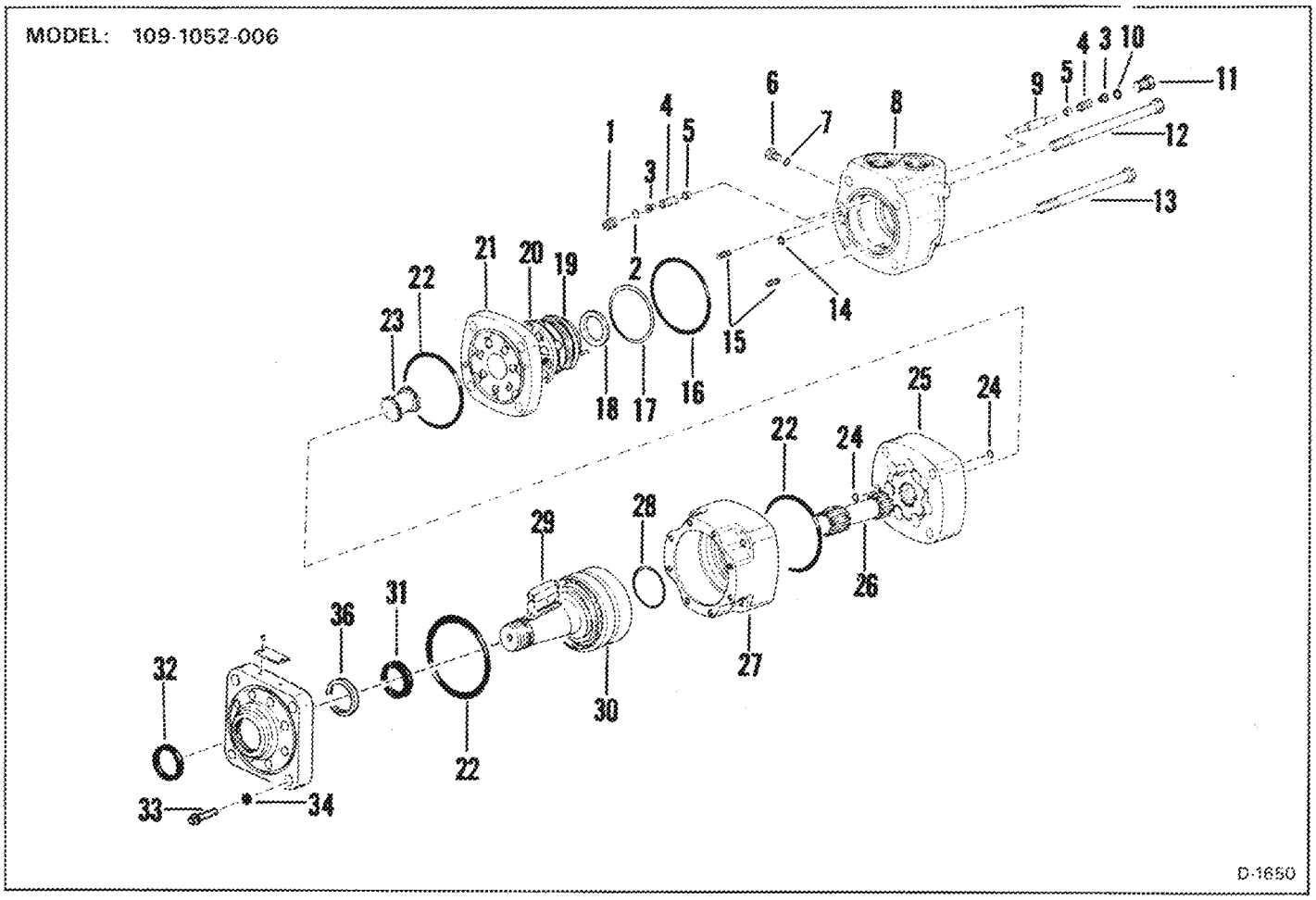
PARTS IDENTIFICATION



MODEL:
540, 543 (S/N 12001 & Above)
630 (S/N 15376 & Above)
631 (S/N All)
632 (S/N 15320 & Above)
641, 642, 643

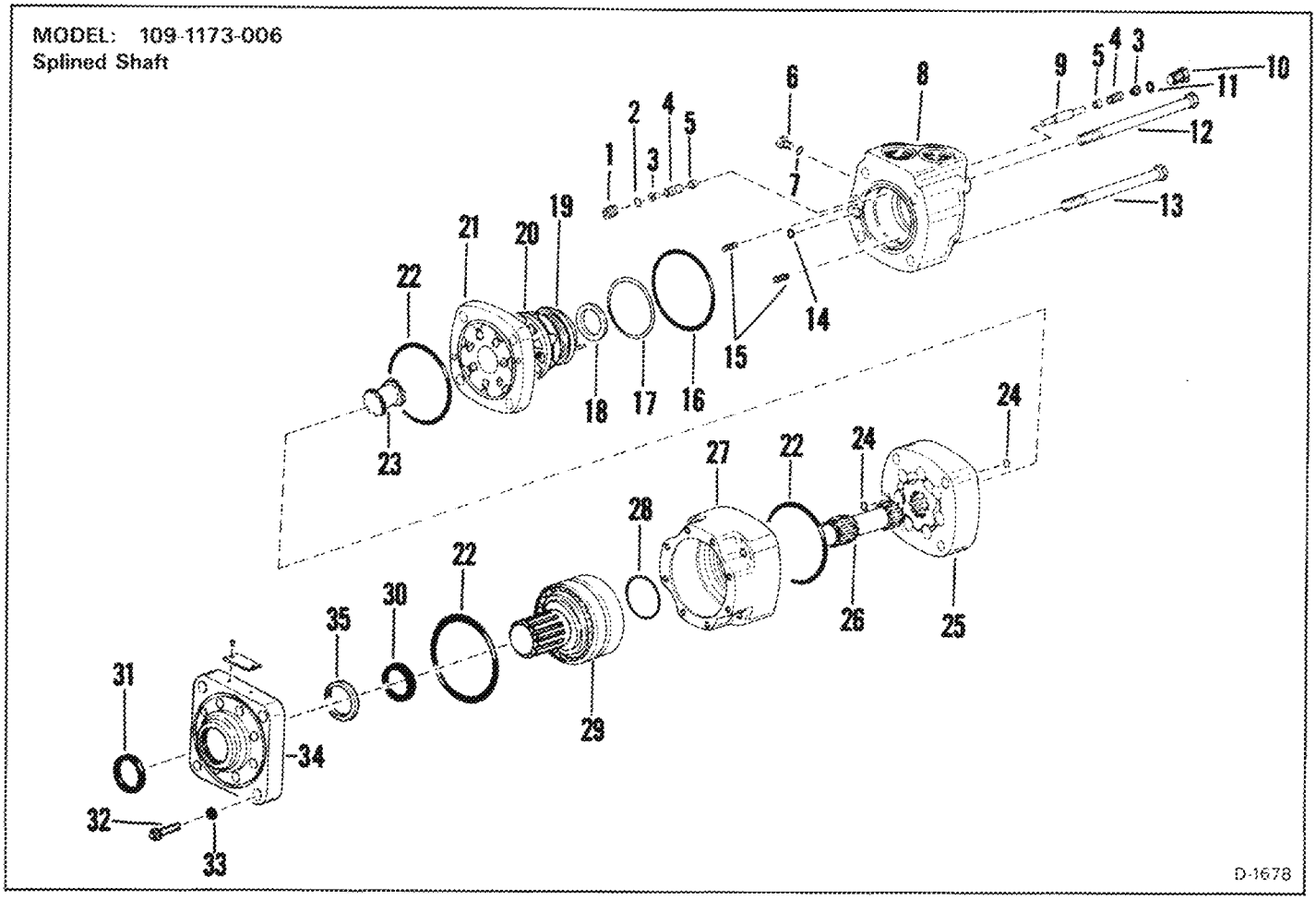
Ref.	Description
1.	PLUG
2.	O-RING
3.	SHUTTLE
4.	SPRING
5.	POPPET
6.	PLUG
7.	O-RING
8.	HOUSING
9.	PISTON
10.	O-RING
11.	PLUG
12.	BOLT
13.	BOLT
14.	O-RING
15.	SPRING
16.	O-RING
17.	SEAL, outer
18.	SEAL, inner
19.	PLATE, balancing
20.	VALVE
21.	PLATE, valve
22.	O-RING
23.	SHAFT
24.	O-RING
25.	GEROLER
26.	SHAFT
27.	HOUSING, bearing
28.	SEAL
29.	KEY
30.	SHAFT & BEARING
31.	COVER, front
32.	WASHER
33.	BOLT
34.	WASHER
35.	RING, quad



MODEL:
540, 543 (S/N 12001 & Above)
630 (S/N 15376 & Above)
631 (S/N All)
632 (S/N 15320 & Above)
641, 642, 643

Ref.	Description	Ref.	Description
1.	PLUG	19.	PLATE, balancing
2.	O-RING	20.	VALVE
3.	SHUTTLE	21.	PLATE, valve
4.	SPRING	22.	O-RING
5.	POPPET	23.	SHAFT
6.	PLUG	24.	O-RING
7.	O-RING	25.	GEROLER
8.	HOUSING	26.	SHAFT
9.	PISTON	27.	HOUSING, bearing
10.	O-RING	28.	SEAL
11.	PLUG	29.	KEY
12.	BOLT	30.	SHAFT & BEARING
13.	BOLT	31.	SEAL, shaft
14.	O-RING	32.	SEAL, dust
15.	SPRING	33.	BOLT
16.	O-RING	34.	WASHER
17.	SEAL, outer	35.	COVER, front
18.	SEAL, inner	36.	RING, brass

MODEL: 109-1173-006
Splined Shaft



MODEL:
540 (S/N 13072 & Above)
543 (S/N 13082 & Above)
641 (S/N 13346 & Above)
642 (S/N 13941 & Above)
643 (S/N 13620 & Above)

Ref.	Description
1.	PLUG
2.	O-RING
3.	SHUTTLE
4.	SPRING
5.	POPPET
6.	PLUG
7.	O-RING
8.	HOUSING
9.	PISTON
10.	PLUG
11.	O-RING
12.	BOLT
13.	BOLT
14.	O-RING
15.	SPRING
16.	O-RING
17.	SEAL, outer
18.	SEAL, inner
19.	PLATE, balancing
20.	VALVE
21.	PLATE, valve
22.	O-RING
23.	SHAFT
24.	O-RING
25.	GEROLER
26.	SHAFT
27.	HOUSING, bearing
28.	SEAL
29.	SHAFT & BEARING
30.	SEAL, shaft
31.	SEAL, dust
32.	BOLT
33.	WASHER
34.	COVER, front
35.	RING, brass

HYDROSTATIC MOTOR

THE ILLUSTRATIONS MAY NOT SHOW EXACTLY THE SAME MOTOR THAT YOU ARE WORKING ON, BUT THE PROCEDURE IS THE SAME.

Disassembly and Assembly

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

MEL-1187 — Socket
MEL-1015 — Seal Tool

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

NOTE: Before you begin to disassembly the motor, use a puller and remove the sprocket from the tapered shaft.

Put a mark across the motor sections for correct assembly [A].

Remove the four bolts from the motor [B].

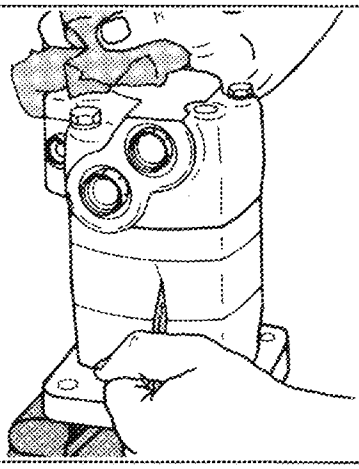
Assembly: Tighten the bolts to 50 ft.lbs. (68 Nm) torque.

Lift the valve housing straight up [C]. If done carefully, the springs and balance plate will stay on the valve.

NOTE: See Page B—12 - TAB 1 for the correct installation of the housing and the balance plate.

Remove the large and small O-rings [D].

A



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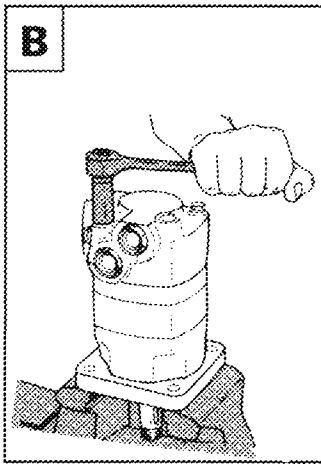
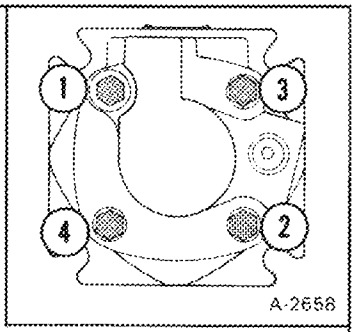
B





A-2658

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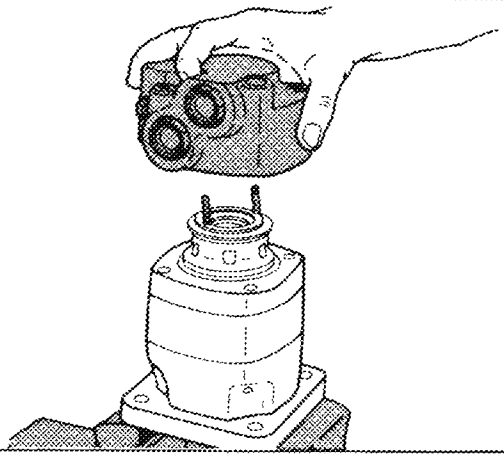
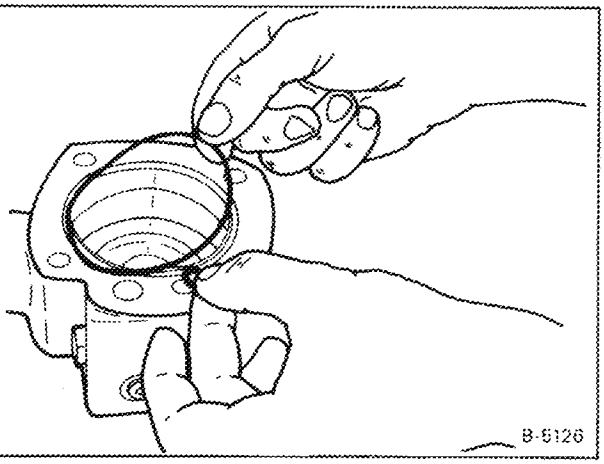
C



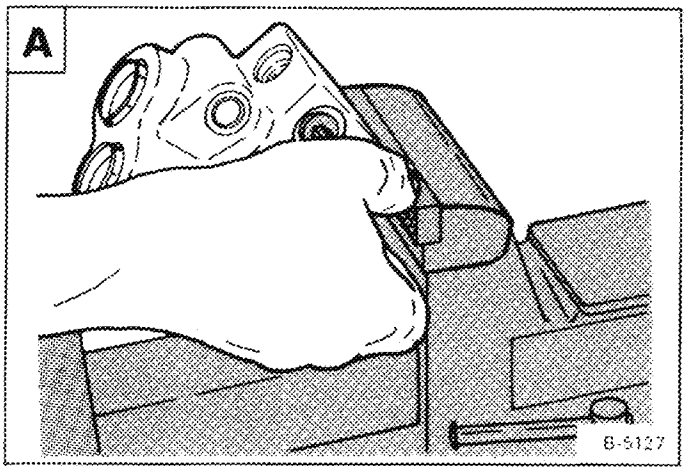
B-5120

D

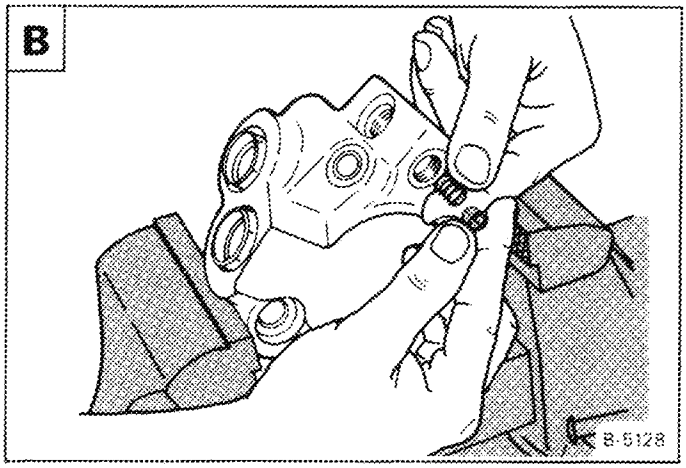


B-5126

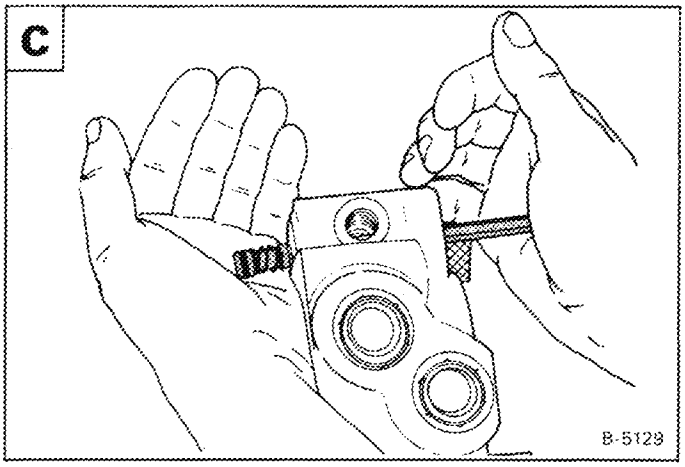
Remove the plug at the valve housing [A].



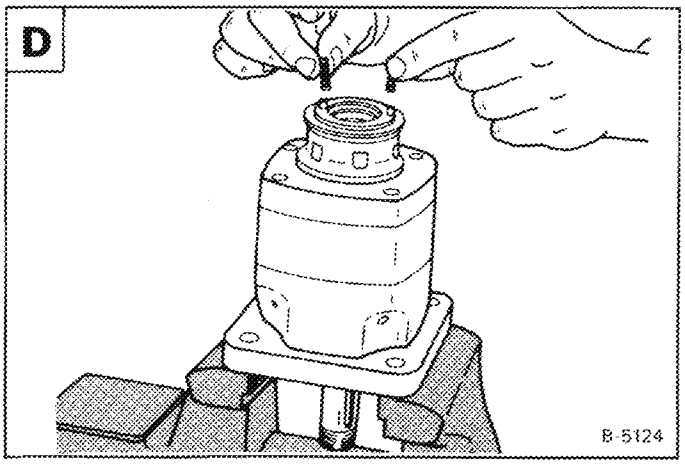
Remove the spring, shuttle and poppet [B].



Use a punch, remove the poppet, spring, O-ring, shuttle and plug [C].



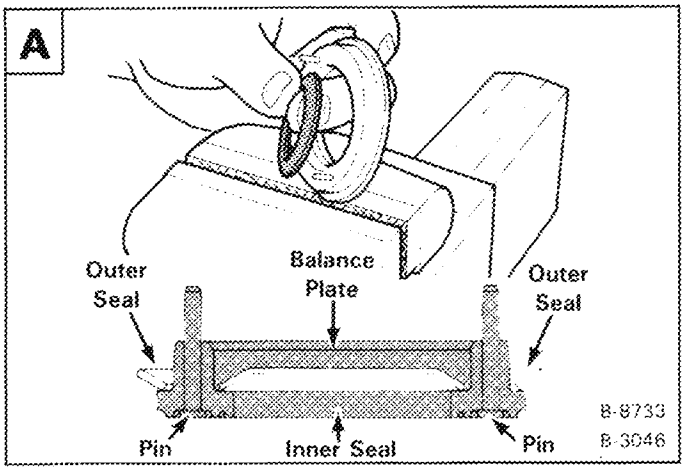
Remove the two springs from the balance plate [D].



HYDROSTATIC MOTOR (Cont'd)

Remove the inner seal from the balance plate [A].

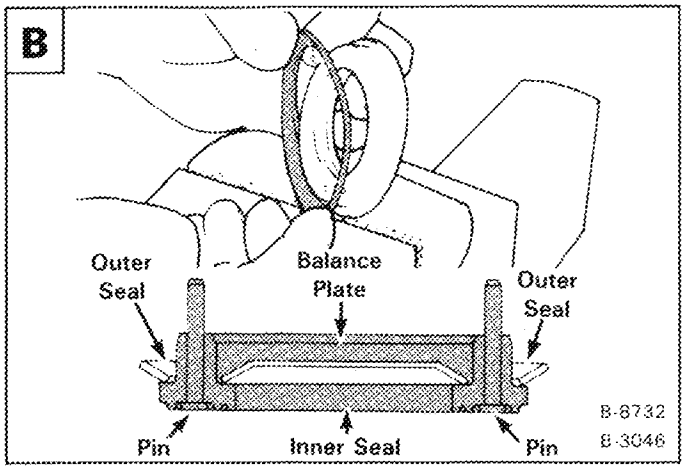
Assembly: Put grease on the inner seal and install as shown [A].



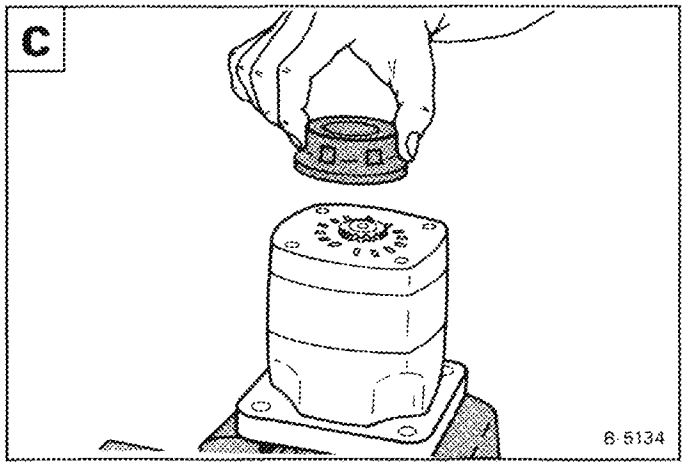
Remove the outer seal from the balance plate [B].

Assembly: Put grease on the outer seal and install as shown [B].

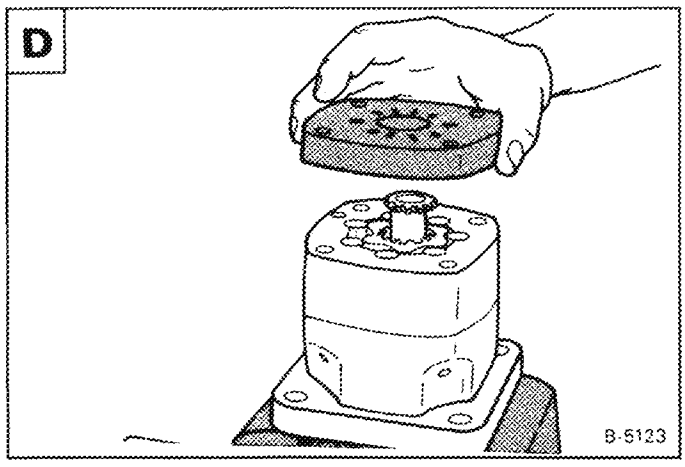
NOTE: See Page 8—12 - TAB 1 for timing the motor when installing the valve, valve drive and geroler.



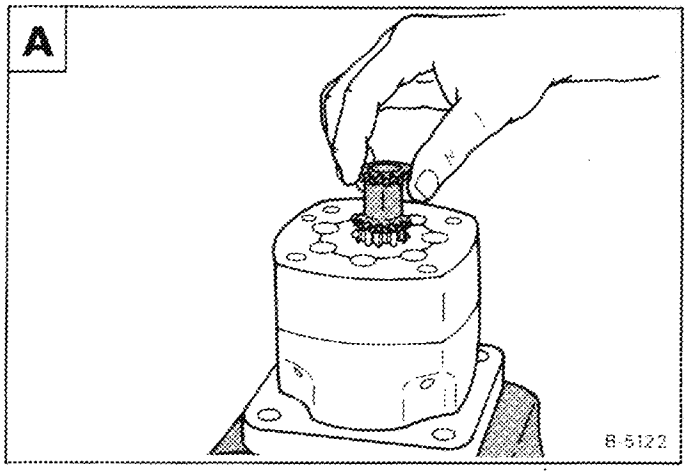
Remove the valve [C].



Remove the valve plate [D].

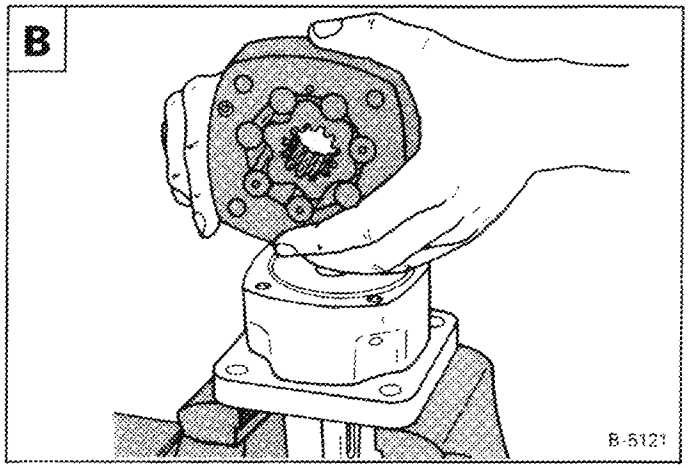


Remove the valve drive [A].

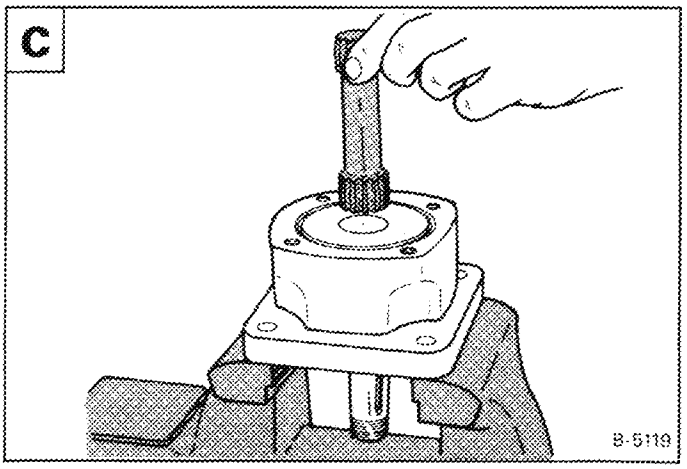


Remove the geroler [B].

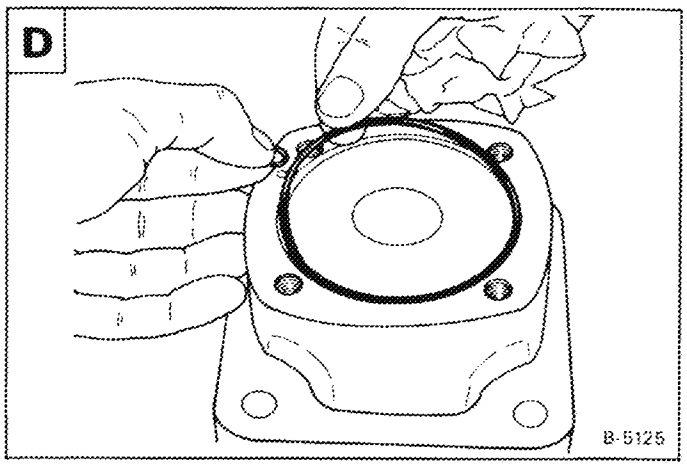
Make sure the rollers are kept in the geroler.



Remove the drive shaft [C].

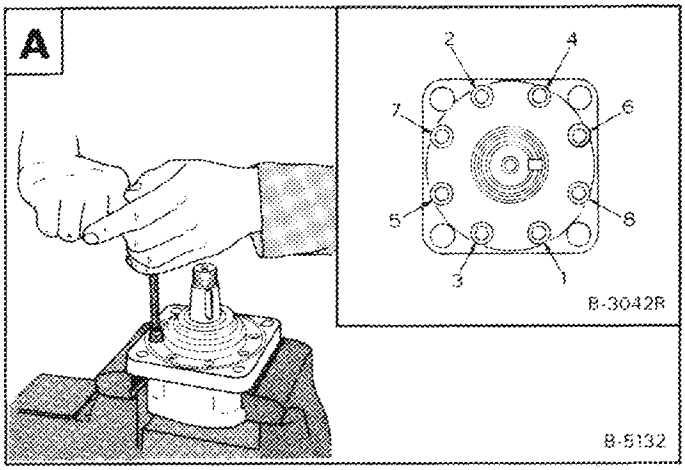


Remove the O-rings (large and small) from the bearing housing [D].

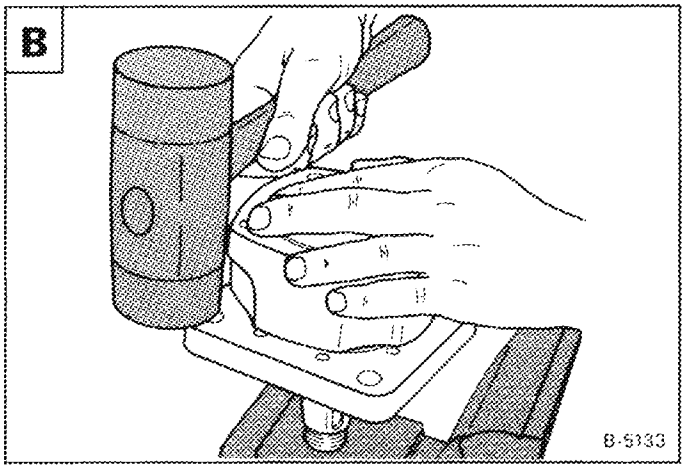


Remove the eight bolts at the bearing housing [A].

Assembly: Tighten the bolts to 20 ft.lbs. (27 Nm) torque.

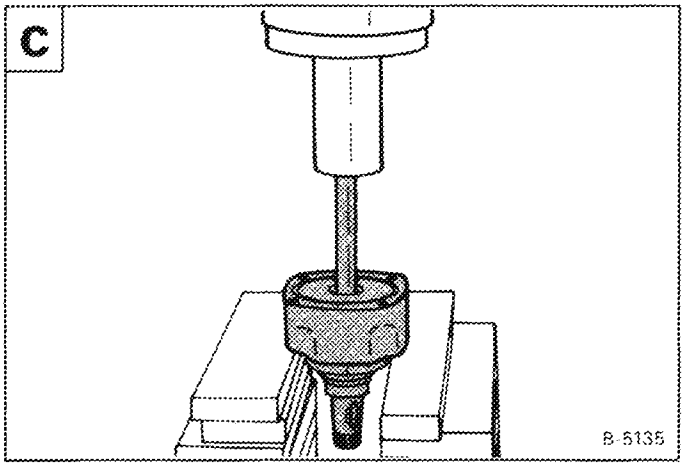


Remove the mounting flange from the housing [B].

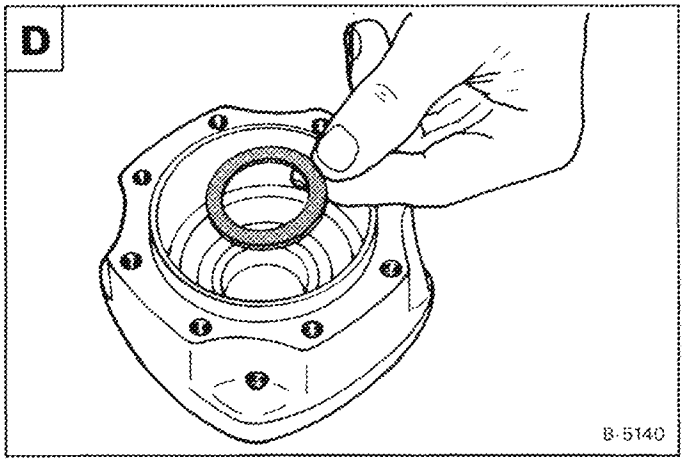


Use a press, remove the shaft and bearing assembly [C].

NOTE: If there is any wear or damage to the shaft or bearing assembly, you must replace the complete unit.



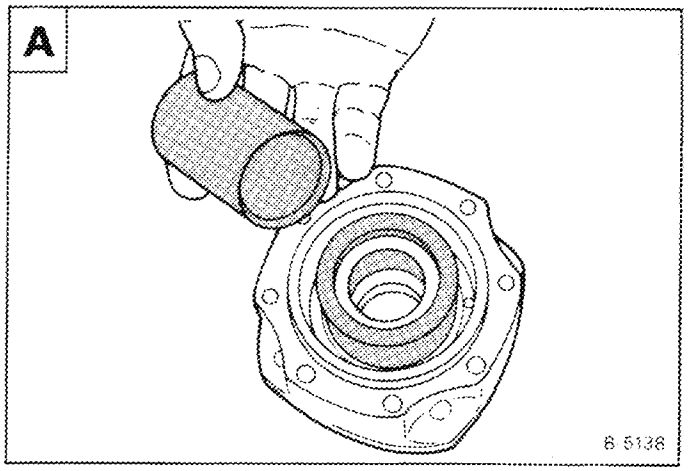
Remove the seal from the bearing housing [D].



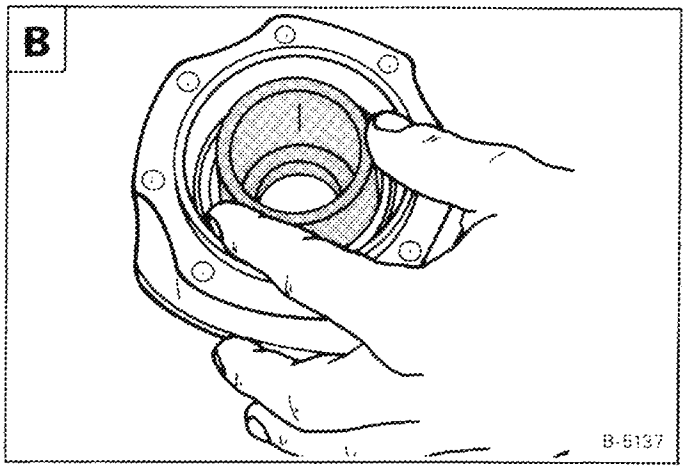
Assembly: Put the bearing housing on a smooth surface with the largest opening up [A]. Take the largest diameter half of the seal tool and lubricate the inside.

Install the seal tool into the bearing housing [A].

Install the shaft face seal (with the inside edge up) into the seal tool.

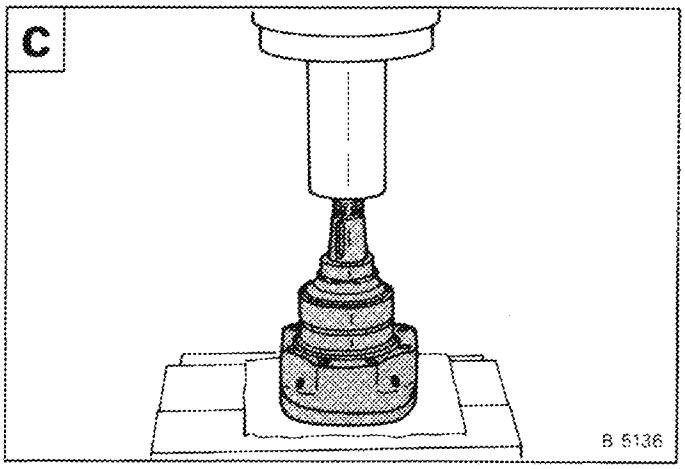


Install the small diameter of the seal tool and push the seal into position [B].



Press the shaft and bearing assembly into the bearing housing [C].

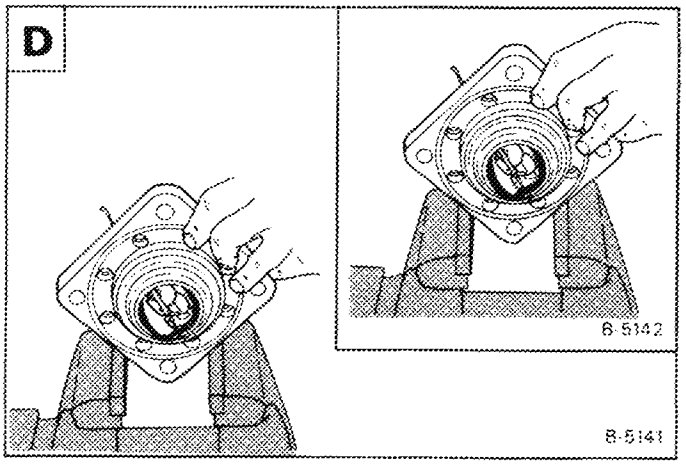
Be careful not to damage the shaft seal. Turn the shaft several times to make sure that the shaft turns freely.



MODEL: 109-1052-005

Remove the back-up washer and seal from the mounting flange [D].

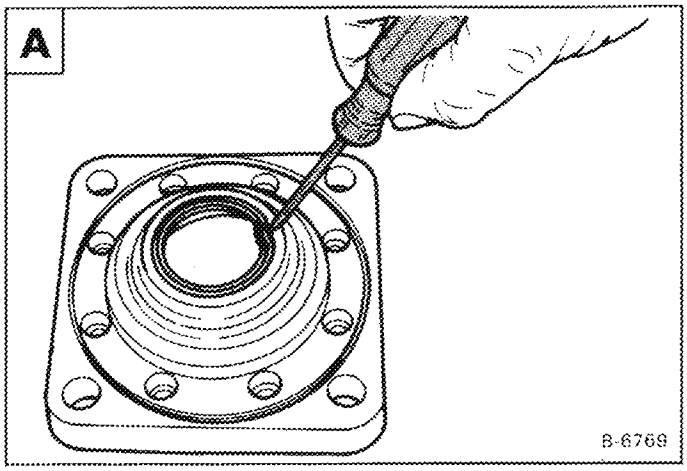
Assembly: Use the correct size seal driver tool and install the back-up washer and seal.



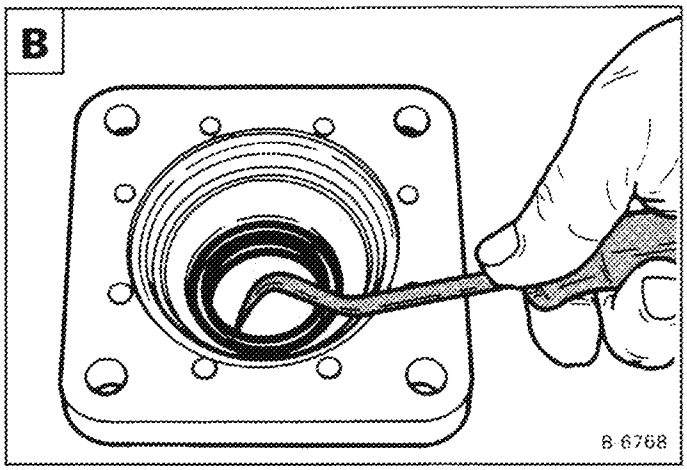
HYDROSTATIC MOTOR (Cont'd)

MODEL: 109-1052-006 & Above

Remove the dust seal from the mounting flange [A].

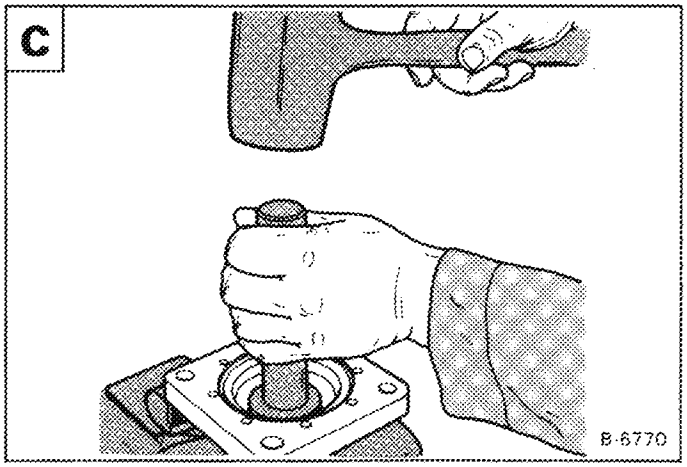


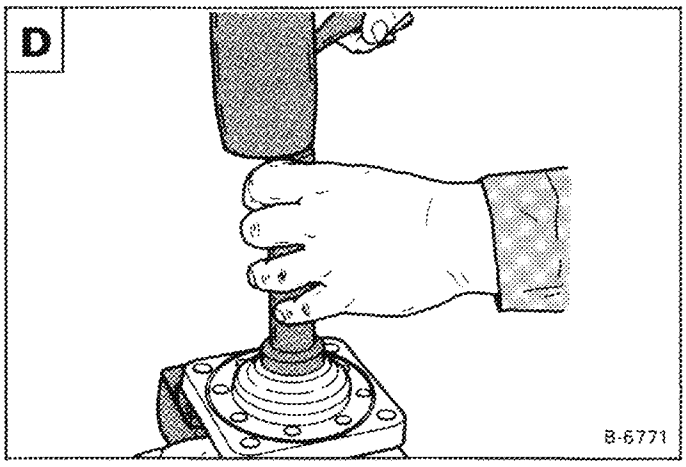
Remove the shaft seal and brass back-up ring [B].



Assembly: Use the correct size seal driver tool and install the shaft seal and the dust seal [C] [D].

NOTE: **Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.**





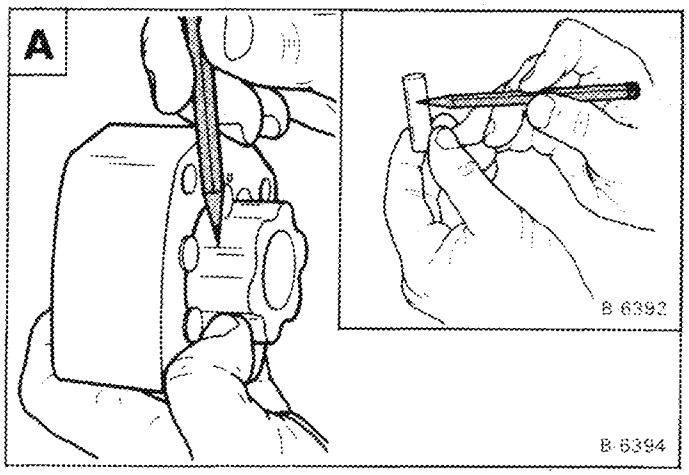
Inspection

Clean all the parts in solvent and use air pressure to dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

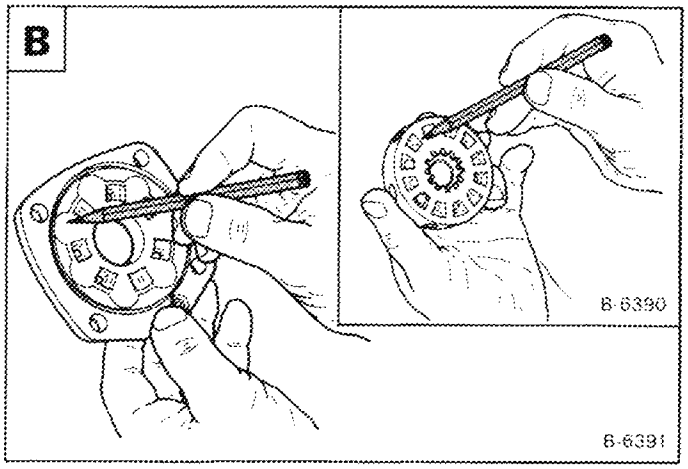
Before the motor is assembled, check the following items:

Check the geroler roller and rotor for wear and scratches [A].

NOTE: Put all the rollers back in their position.

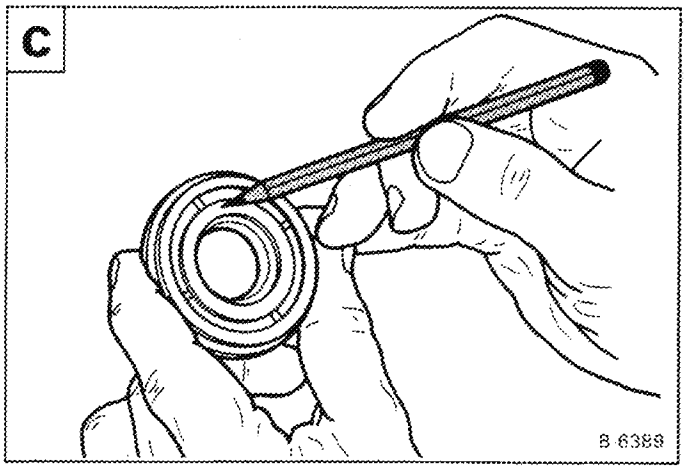


Check the valve plate for scratches [B].

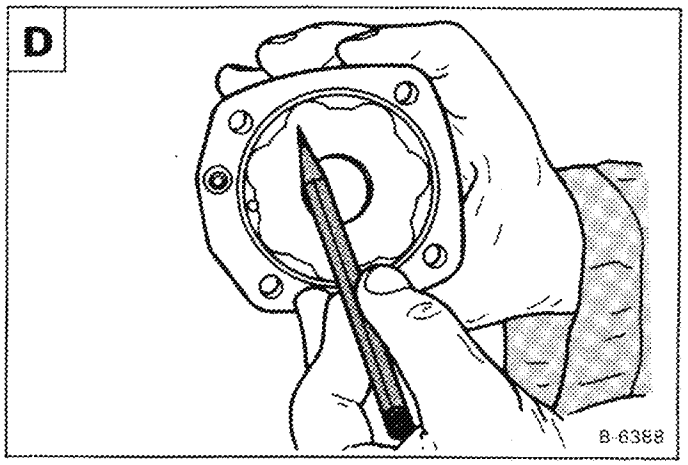


Check the balance plate for scratches [C].

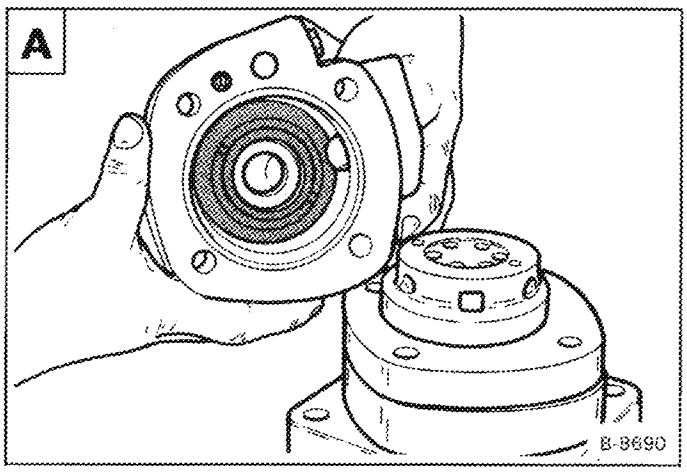
Check the valve drive and main drive for wear.



Check the end plate surface for scratches [D].



Assembly: When installing the balance plate in the end housing, put your finger through the hole and hold it in position until the housing is in position [A].



Timing the Hydrostatic Motor

The timing of the motor controls the direction of rotation of the drive shaft of the motor. The timing parts are as follows:

1. Geroler (Item 1) [B].
2. Valve Drive (Item 2) [B].
3. Valve Plate (Item 3) [B].
4. Valve (Item 4) [B].

Find the largest opening between the geroler star and the geroler ring. Mark the outside of the geroler ring at that point [B].

Align the two drain holes and the three pressure holes in the geroler ring with the same holes in the mounting flange. Then install the geroler assembly.

Install all the new O-rings.

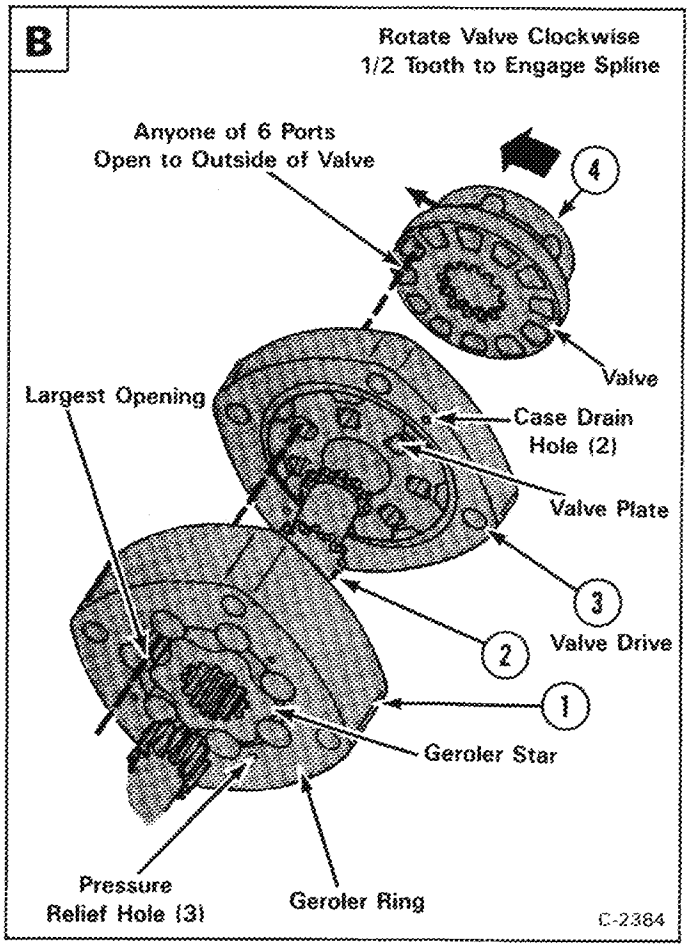
Install the valve drive [B].

Align the drain hole in the valve plate with the drain hole in the geroler. Install the valve plate with the O-ring toward the geroler. Make sure the slot opening of the valve plate is in alignment with the largest opening of the geroler.

Install the valve plate [B].

Install the valve on the valve plate. Make alignment with one of the side openings with the mark on the geroler. Turn the valve **clockwise** a small amount until the teeth on the valve drive engage.

Continue with the rest of the assembly procedure.

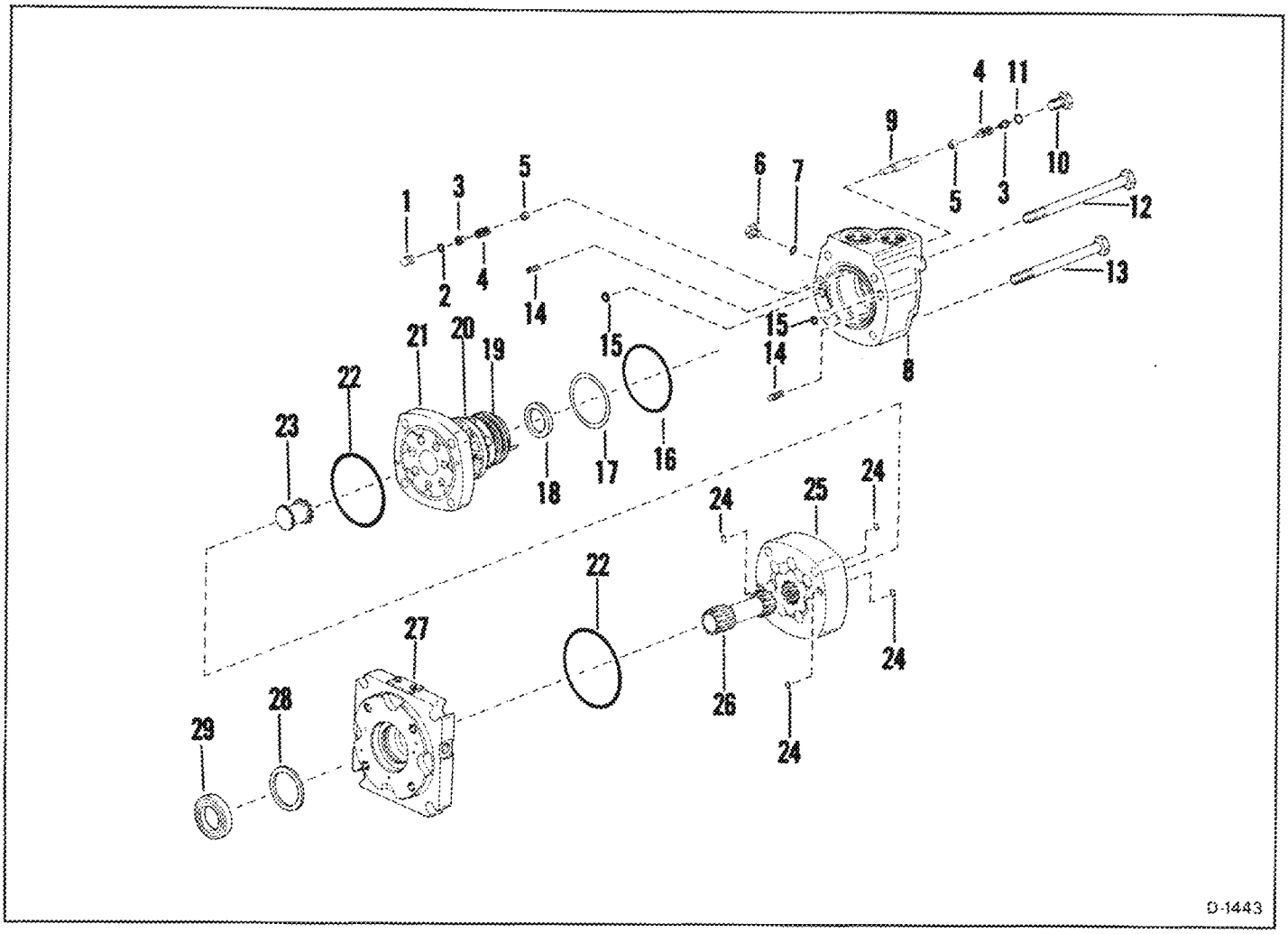


CHAR-LYNN MOTOR

Section C


bobcat

PARTS IDENTIFICATION



MODEL:
730, 731, 732
741, 742, 743
742 B & 743B (S/N 17999 & Below)
7753 (Early Models)
843, 853, 1213

Ref.	Description	Ref.	Description
1.	PLUG	16.	O-RING
2.	O-RING	17.	SEAL, outer
3.	SHUTTLE	18.	SEAL, inner
4.	SPRING	19.	PLATE, balancing
5.	POPPET	20.	VALVE
6.	PLUG	21.	PLATE, valve
7.	O-RING	22.	O-RING
8.	HOUSING	23.	SHAFT
9.	PISTON	24.	O-RING
10.	PLUG	25.	GEROLER
11.	O-RING	26.	SHAFT
12.	BOLT	27.	FLANGE
13.	BOLT	28.	SEAL
14.	SPRING	29.	BUSHING, bronze
15.	O-RING		

THE ILLUSTRATIONS MAY NOT EXACTLY SHOW THE SAME MOTOR YOU ARE WORKING ON, BUT THE PROCEDURE IS THE SAME.

Disassembly and 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

Put a mark across the sections for correct assembly.

Remove the four bolts from the motor [A].

Assembly: Tighten the bolts as follows:

730-740 Series — 50 ft.-lbs. (68 Nm) torque
843, 853, 1213 & 7753 — 63 ft.-lbs. (85 Nm) torque

Lift the valve housing straight up [B]. If done carefully, the springs and balance plate will stay on the valve.

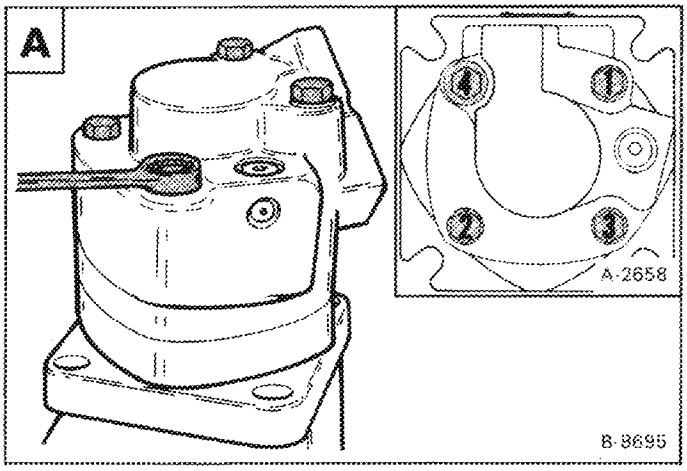
NOTE: See Page C—6 - TAB 1 for the correct installation of the housing and the balance plate.

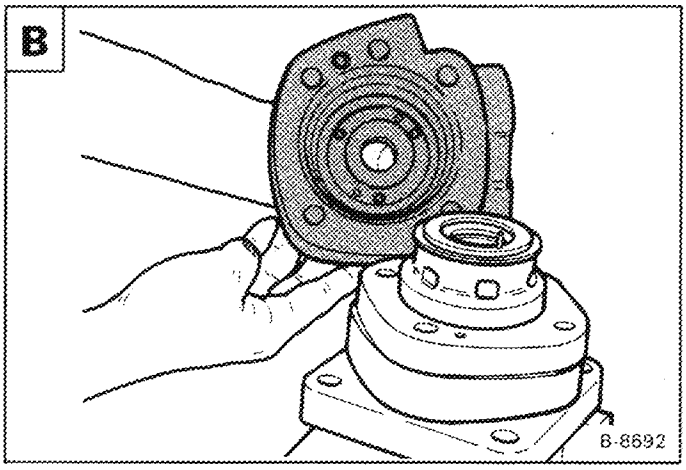
Remove the O-rings.

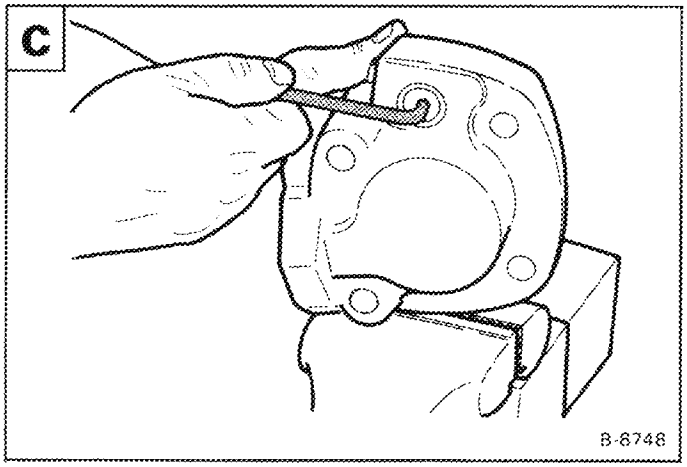
Remove the plug at the shuttle valve [C].

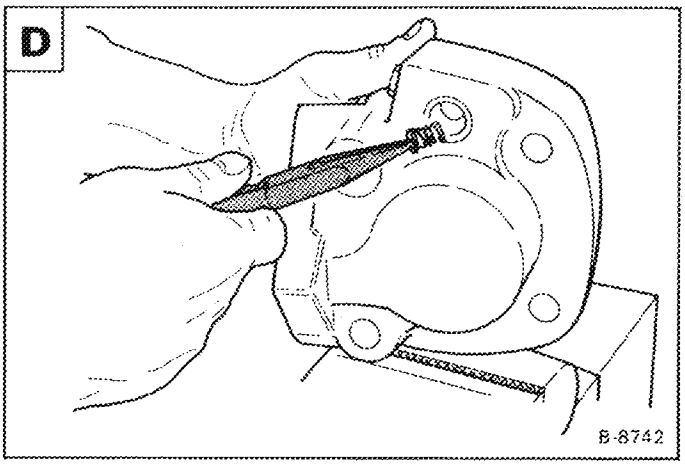
Assembly: Tighten the plug to 200 in.-lbs. (22,6 Nm) torque.

Remove the spring and shuttle [D].

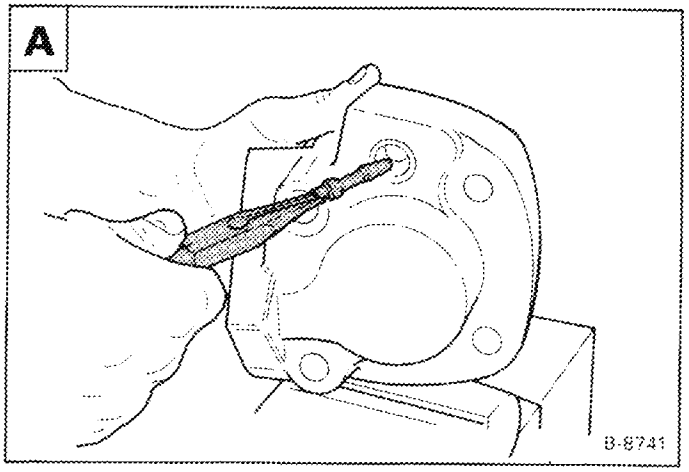




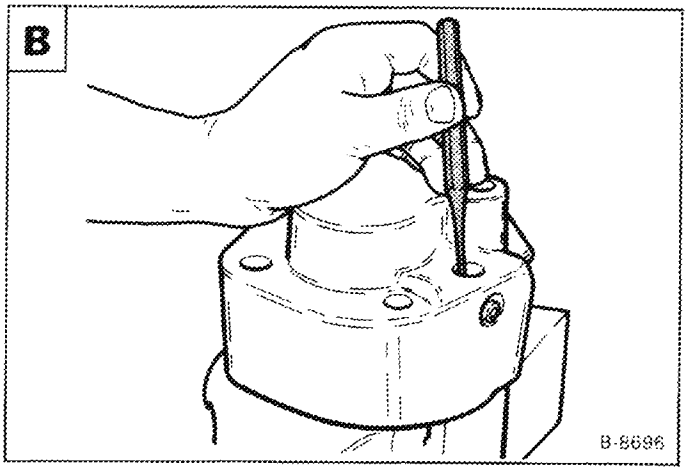




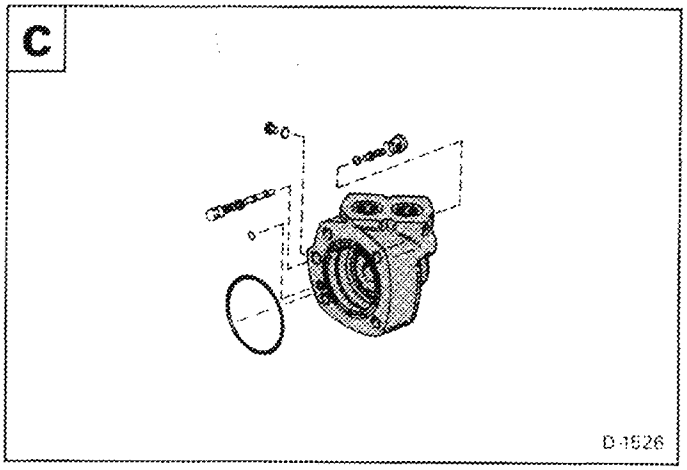
Remove the shuttle valve spool [A].



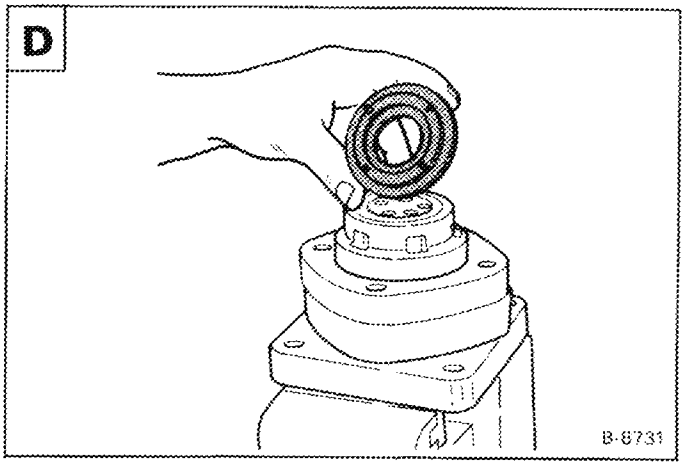
Use a punch, through the housing and remove the poppet, spring, O-ring and plug from the other side [B].



Assembly: Make sure all parts are cleaned and check for wear. Assemble as shown [C].

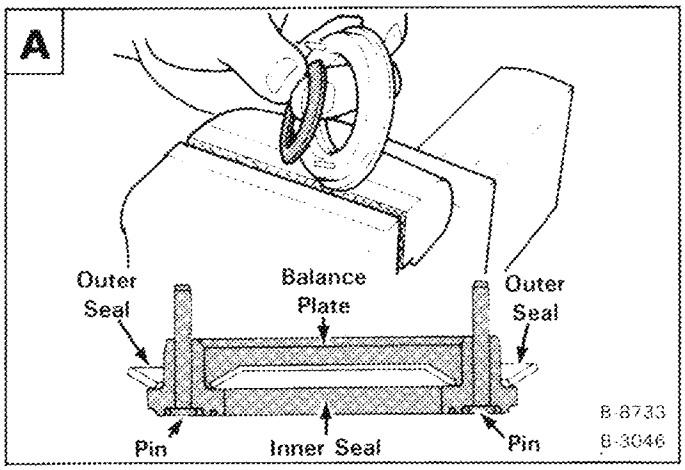


Remove the balance plate [D].



Remove the inner seal from the balance plate [A].

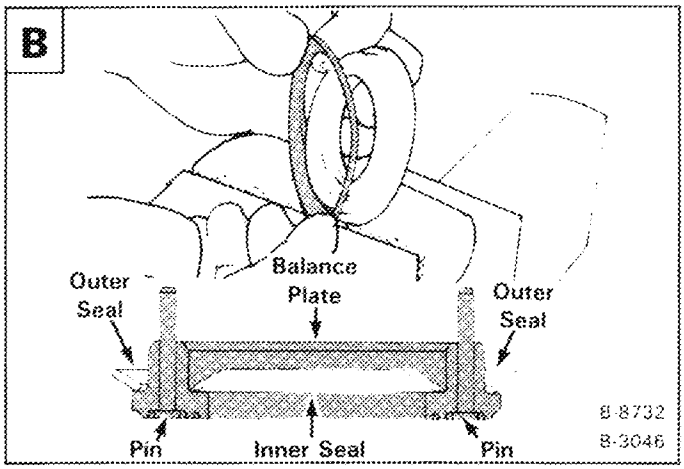
Assembly: Put grease on the seal and install as shown [A].



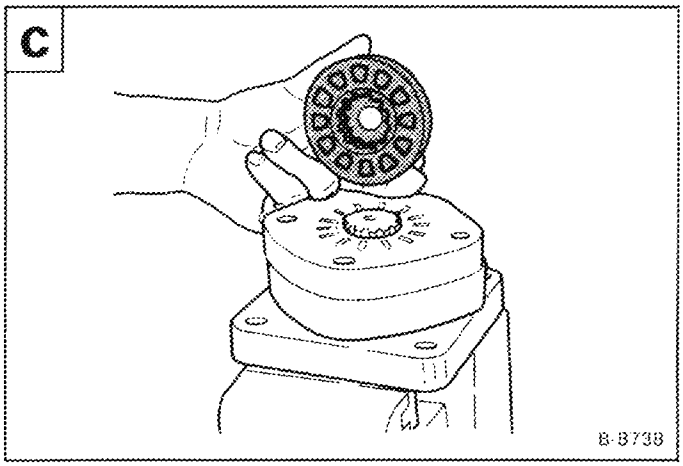
Remove the outer seal from the balance plate [B].

Assembly: Put grease on the seal and install as shown [B].

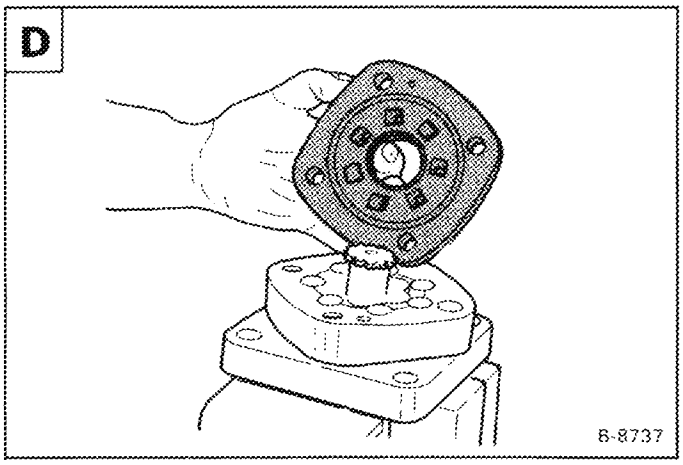
NOTE: When assembling the motor, See Page C—8 - TAB 1 for the timing of the motor when installing the valve, valve drive and geroler.



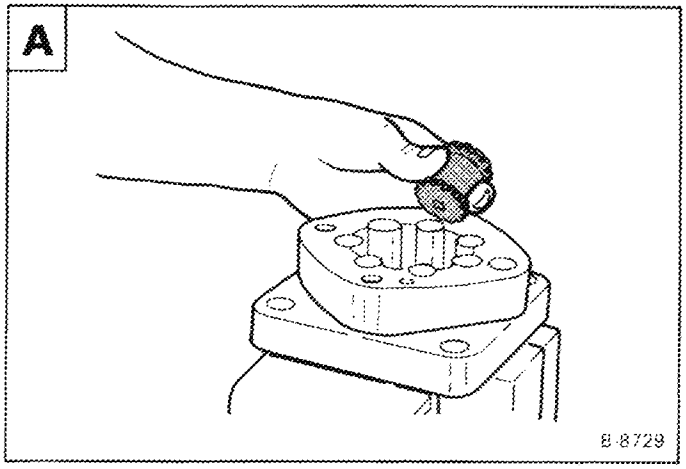
Remove the valve [C].



Remove the valve plate [D].

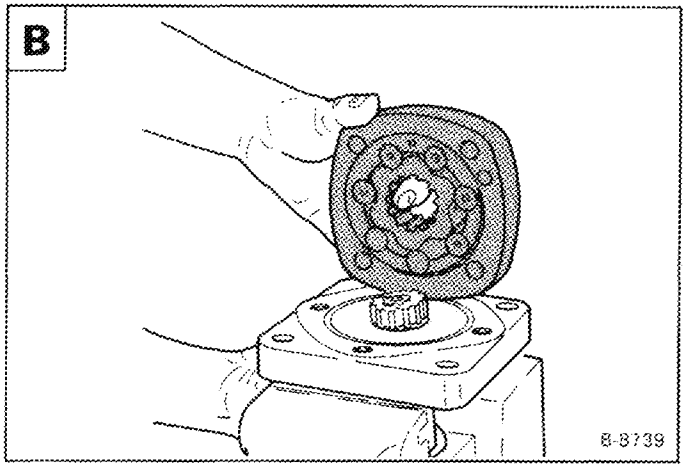


Remove the valve drive [A].

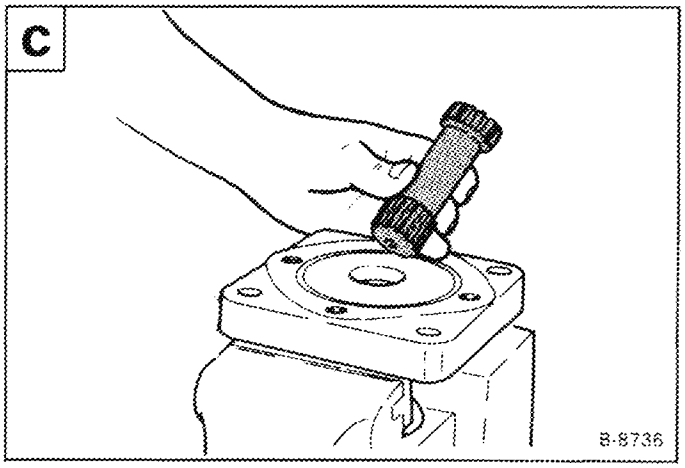


Remove the geroler [B].

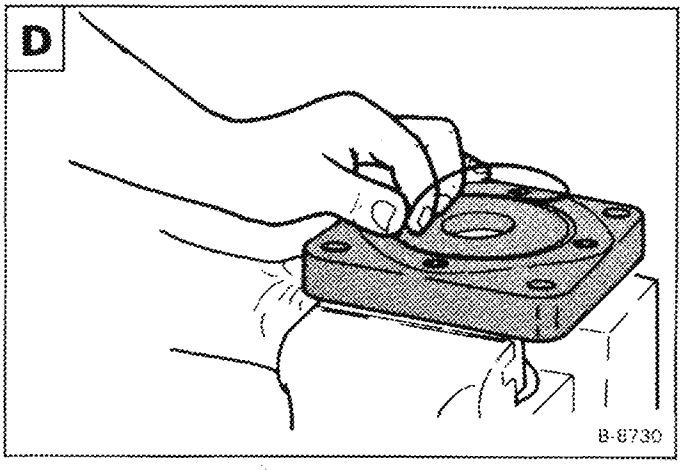
Make sure to kept the rollers in the geroler.



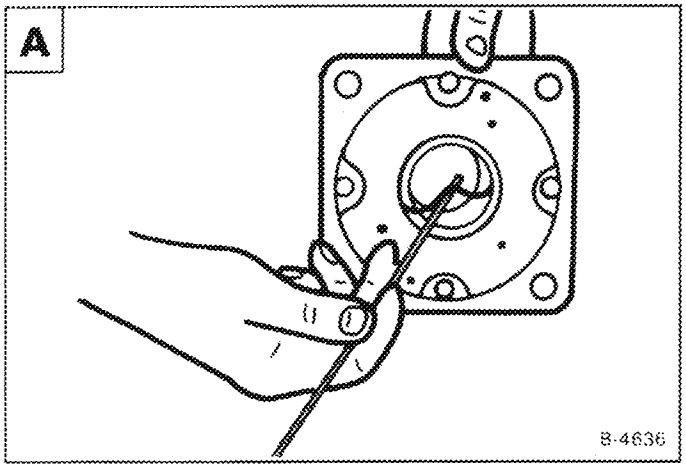
Remove the drive shaft [C].



Remove the O-rings from the housing [D].

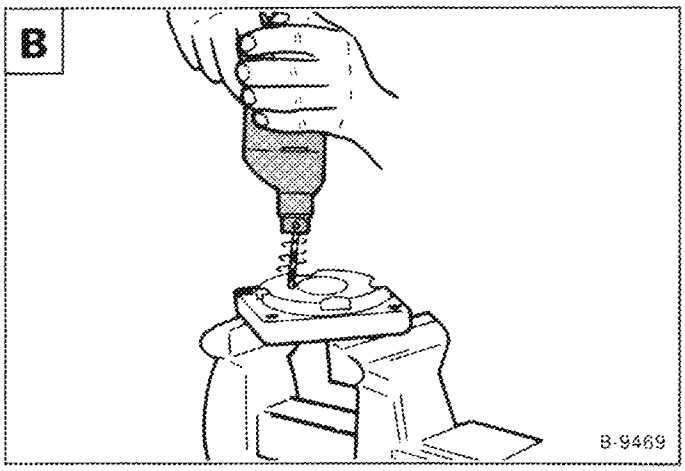


Remove the O-rings inside the bore of the mounting flange [A].



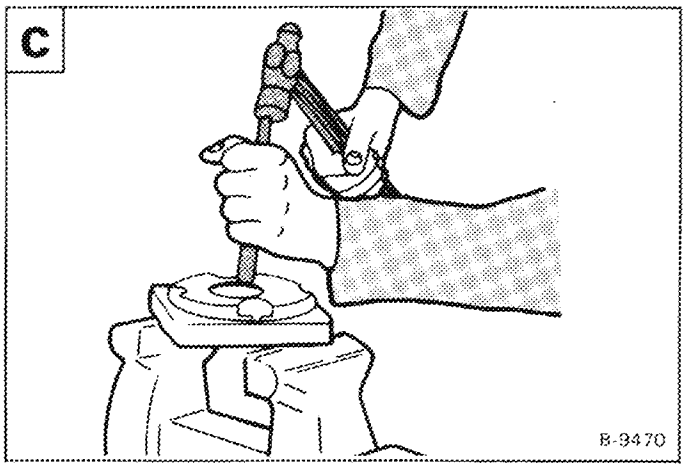
The bushing is a guide to center the motor on the gearcase. If the bushing needs replacing, use the following procedure:

1. Drill several holes in the bushing [B].



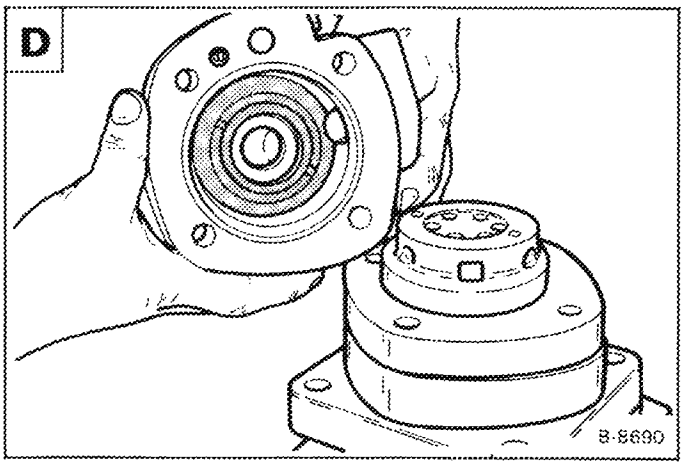
2. Use a chisel and hammer, remove the bushing from the mounting flange [C].

3. Use a hydraulic press to install the new bushing.



Assembly: When installing the balance plate in the end housing, put your finger through the hole and hold it in position until the housing and balance plate is in position [D].

NOTE: Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.



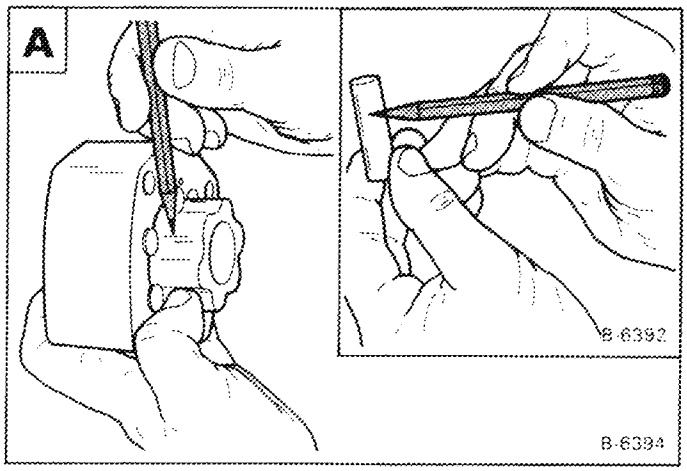
Inspection

Clean all the parts in solvent and use air pressure to dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

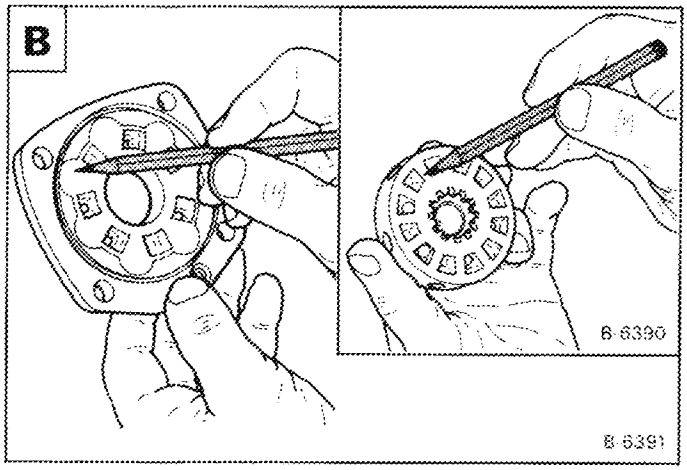
Before the motor is assembled, check the following items:

Check the geroler rollers and rotor for wear and scratches A [A].

NOTE: Put all the rollers back in their original position.

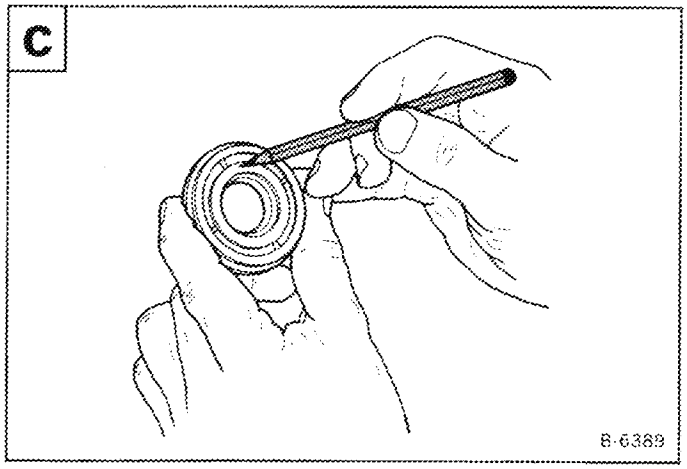


Check the valve plate for scratches [B].

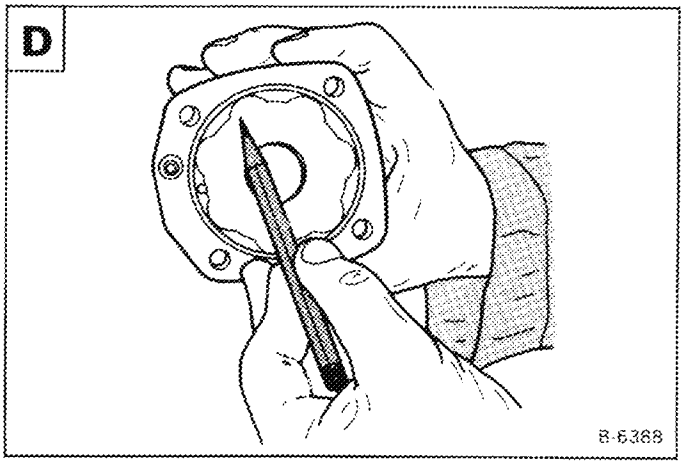


Check the balance plate for scratches [C].

Check the valve drive and the main drive for wear.



Check the end plate surface for scratches [D].



Timing the Hydrostatic Motor

The timing of the motor controls the direction of rotation of the drive shaft of the motor. The timing parts are as follows:

1. Geroler (Item 1) [A].
2. Valve Drive (Item 2) [A].
3. Valve Plate (Item 3) [A].
4. Valve (Item 4) [A].

Find the largest opening between the geroler star and the geroler ring and mark the outside of the geroler ring at that point [A].

Align the two drain holes and the three pressure holes in the geroler ring with the same holes in the mounting flange and install the geroler assembly.

Install new O-rings.

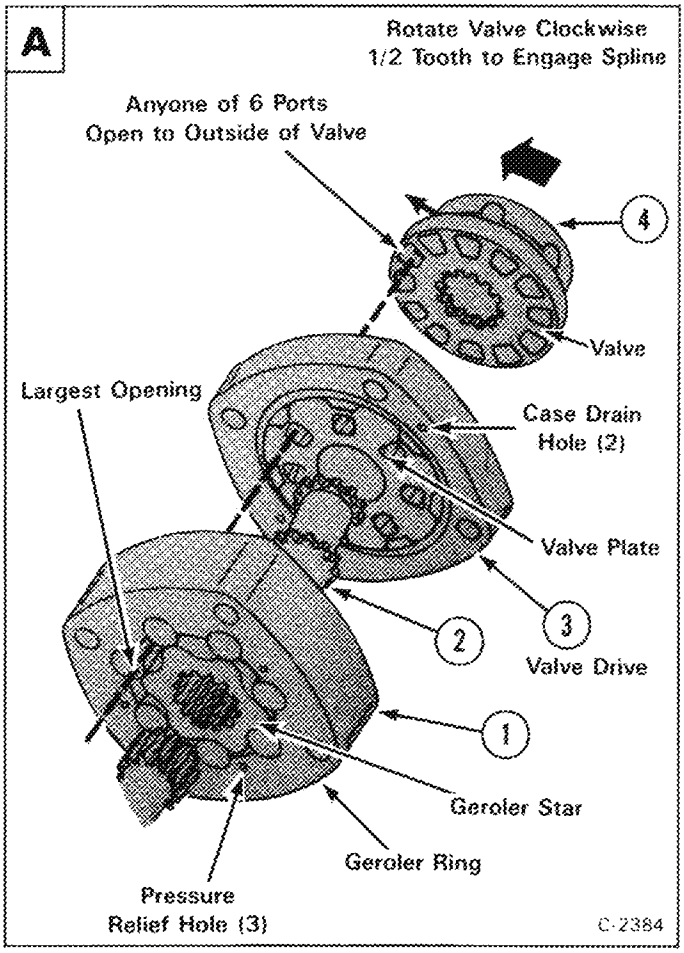
Install the valve drive [A].

Align the drain hole in the valve plate with the drain hole in the geroler. Install the valve plate with the O-ring toward the geroler. Make sure the slot opening of the valve plate is in alignment with the largest opening of the geroler.

Install the valve plate.

Install the valve on the valve plate. Make alignment with one of the side openings with the mark on the geroler. Turn the valve **clockwise** a small amount until the teeth on the valve drive engage.

Continue with the rest of the assembly procedure.

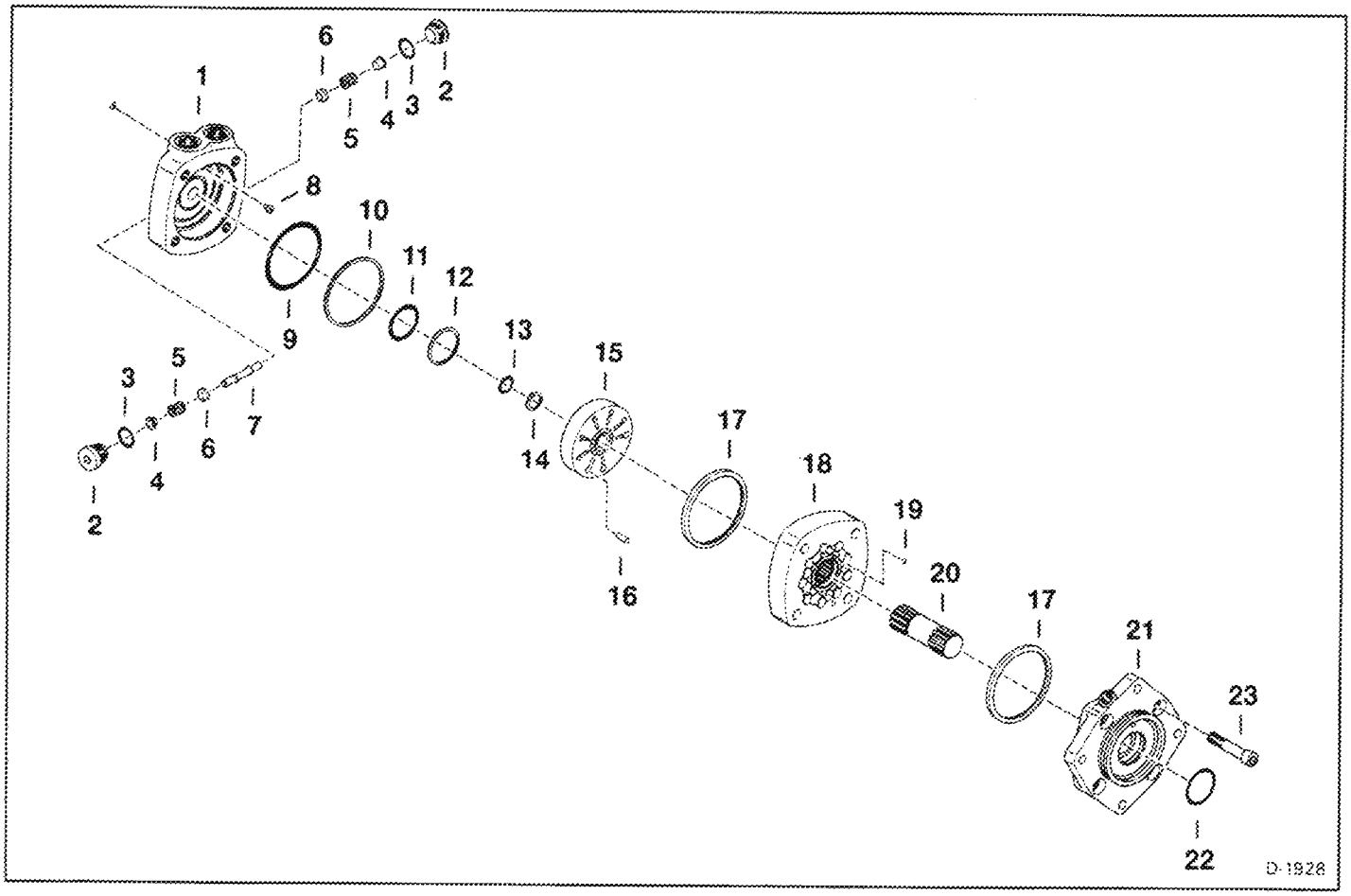


CHAR-LYNN MOTOR

SECTION D


bobcat

PARTS IDENTIFICATION



MODEL: 742B & 743B (S/N 18000 & Above)
750 SERIES
753L
7753 (Later Models)

Ref.	Description
1.	END HOUSING
2.	PLUG
3.	O-RING
4.	SLEEVE
5.	SPRING
6.	POPPET
7.	PISTON
8.	PRESSURE DISC
9.	O-RING
10.	BACK-UP RING
11.	O-RING
12.	BACK-UP RING
13.	BACK-UP RING
14.	O-RING
15.	VALVE PLATE
16.	DOWEL
17.	SEAL
18.	GEROLER
19.	BALL
20.	DRIVE
21.	FLANGE HOUSING
22.	O-RING
23.	BOLT

Disassembly and 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.

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Put a mark across the sections of the motor for correct assembly.

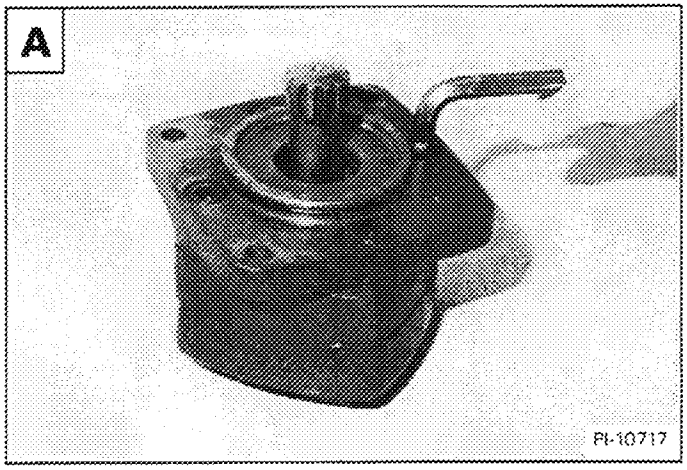
Remove the four bolts from the motor [A].

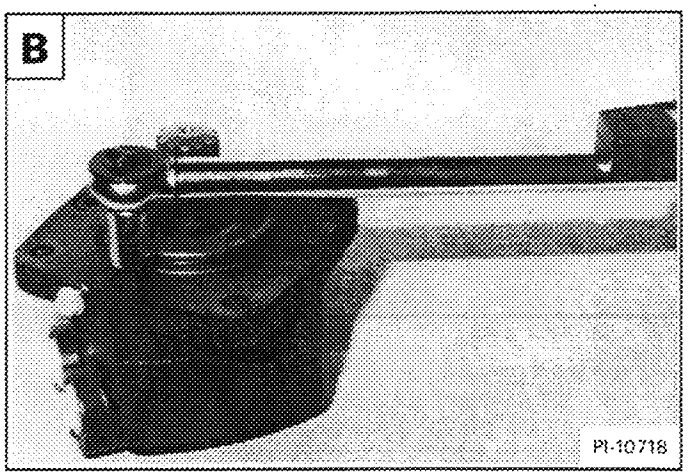
Assemble: Tighten the bolts to 135 ft-lbs. (183 Nm) torque in a alternating pattern [B].

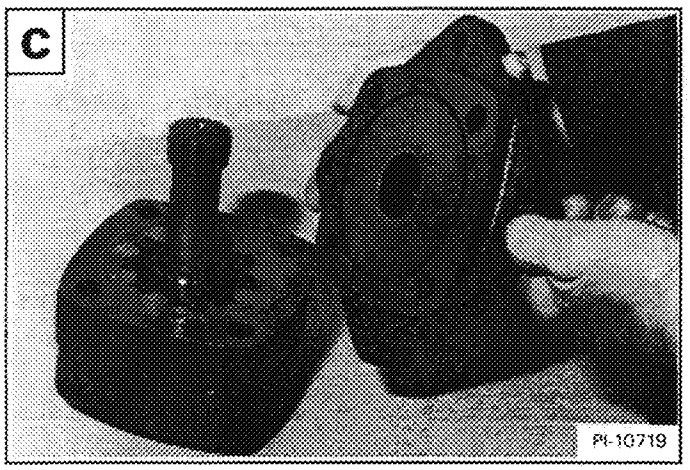
Remove the mounting flange housing [C].

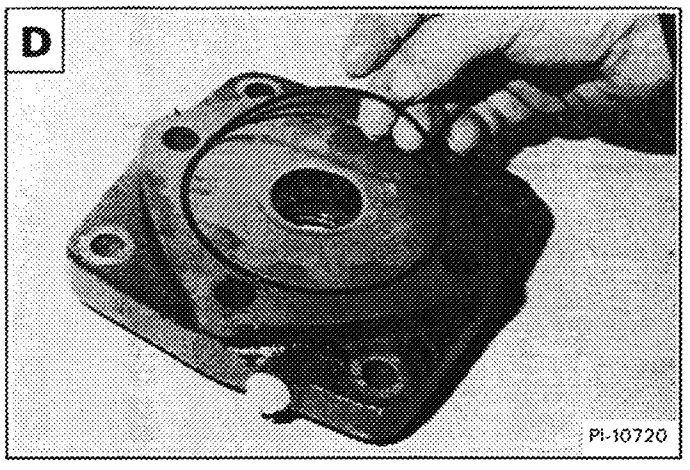
Assemble: Align the hole in the wear surface of the flange housing with the hole in the Geroler case drain hole on the outside surface of the mounting flange housing will be on top or port side of the motor.

Remove the large O-ring [D].

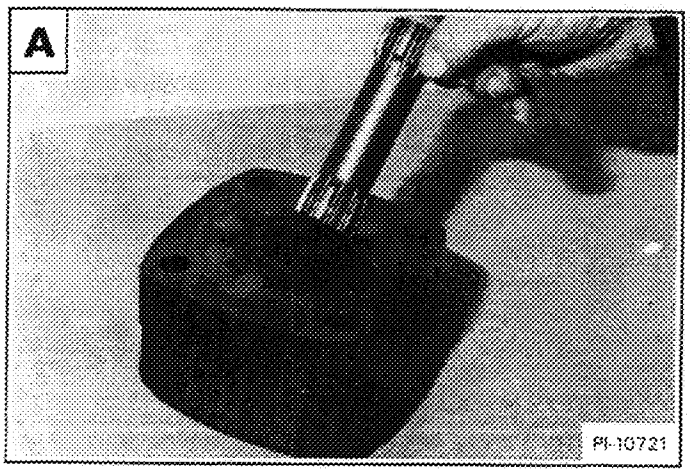






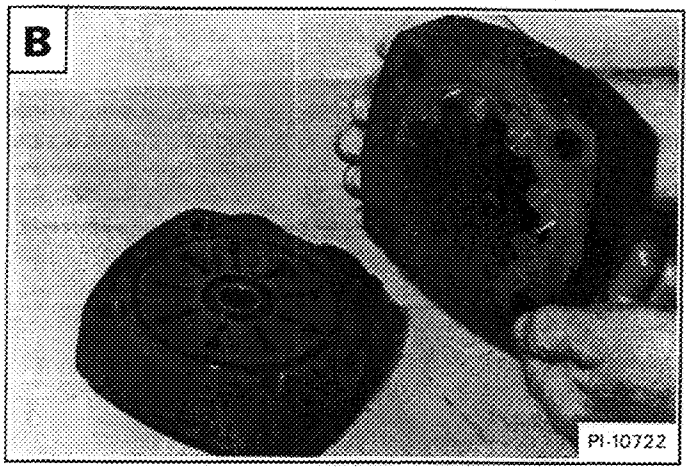


Remove the drive [A].

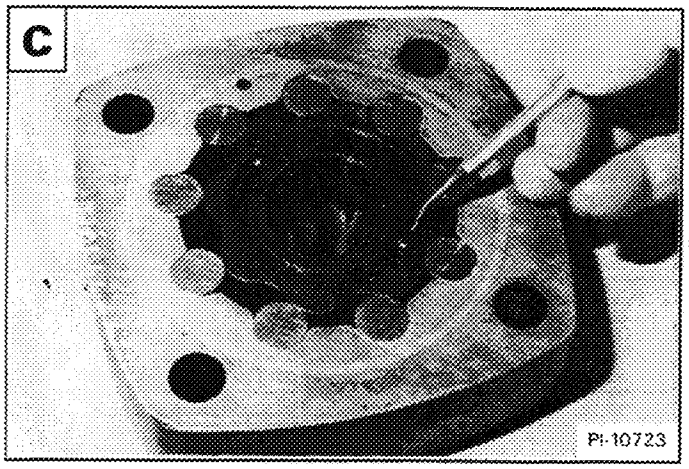


Remove the Geroler [B].

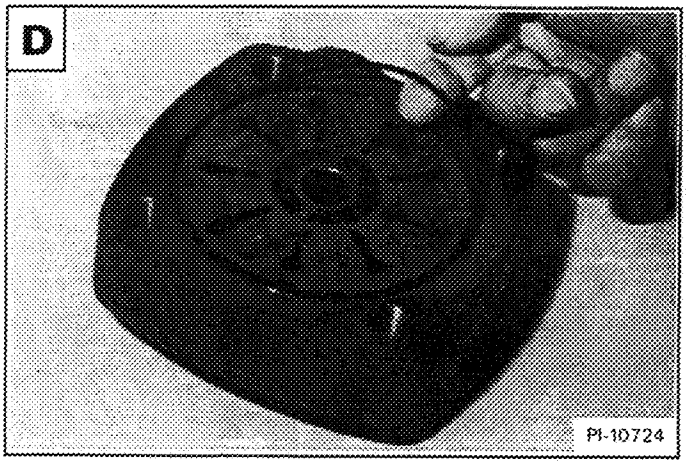
Assemble: Align the hole in the Geroler with the notch in the valve plate. When the Geroler is correctly aligned, dowels will go into their correct position.



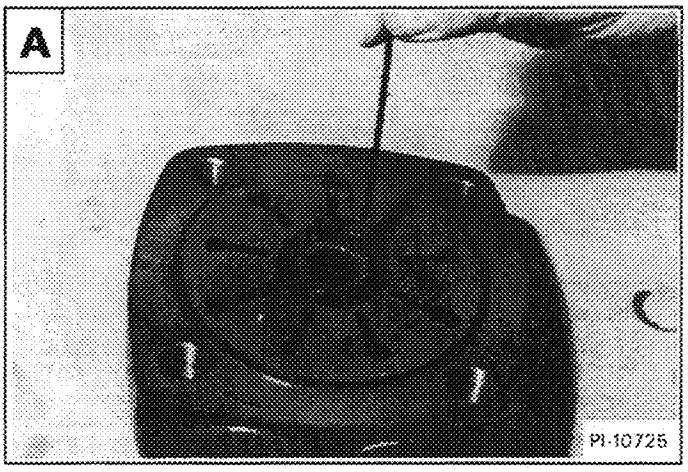
Assemble: Make sure to install the two check balls in the front side of the Geroler rotor star [C].



Remove the large O-ring around the valve plate [D].

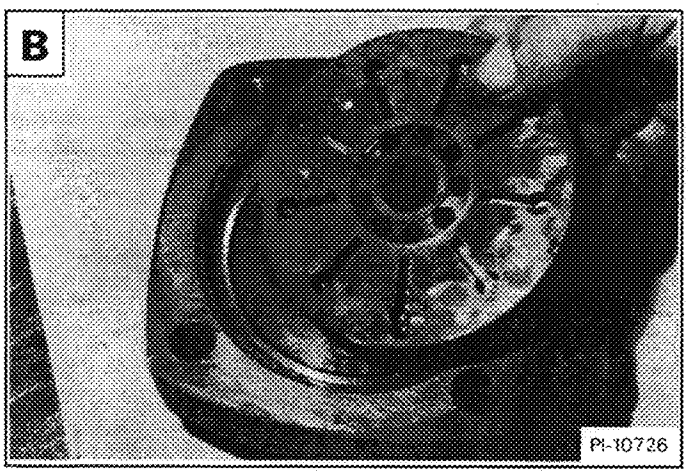


Use a wire hook or allen wrench to remove the valve plate [A].



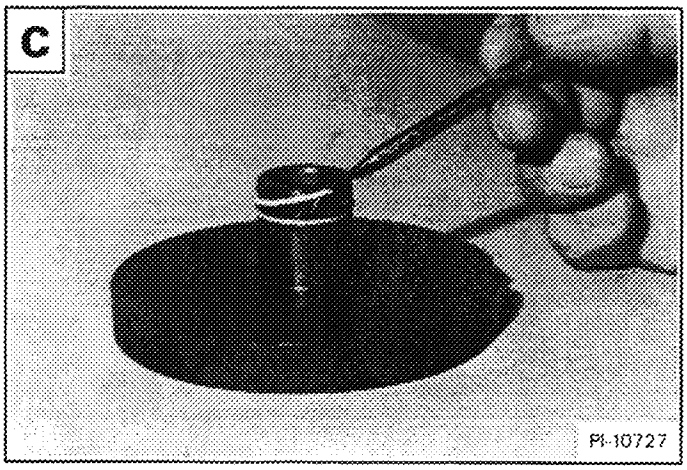
Remove the valve plate [B].

Assemble: Install the valve plate in the end housing and align the notch in the valve plate with the end housing hole outside the large O-ring. Press the valve plate into position and rotate by hand to align the end housing. The end housing hole should be visible through the notch after the valve plate is installed.



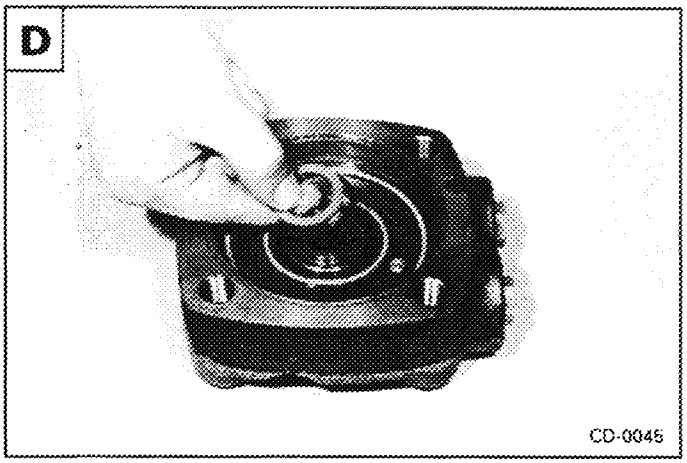
Stem Type Motors

Remove the two small back-up washers and O-ring from the valve plate stem [C].

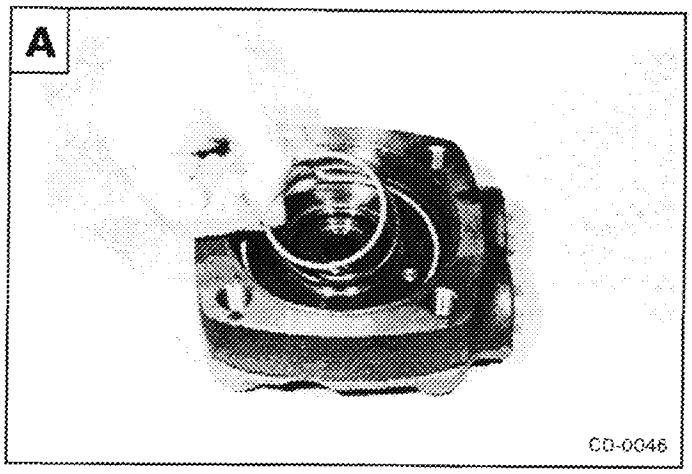


Stemless Type Motors

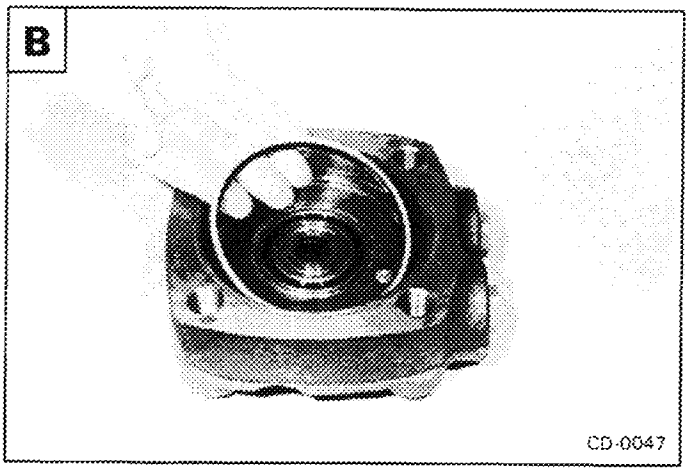
Remove the small back-up ring and O-ring from the valve plate [D].



Remove the medium size back-up washer and O-ring [A].

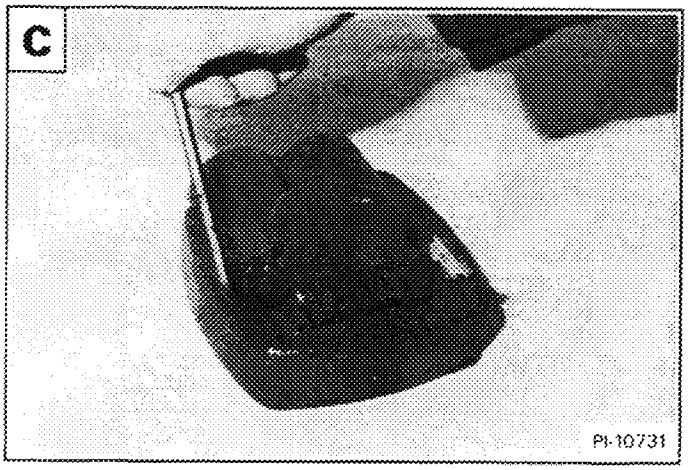


Remove the large washer and O-ring [B]



Remove the plugs from both sides of the end housing [C] & [D].

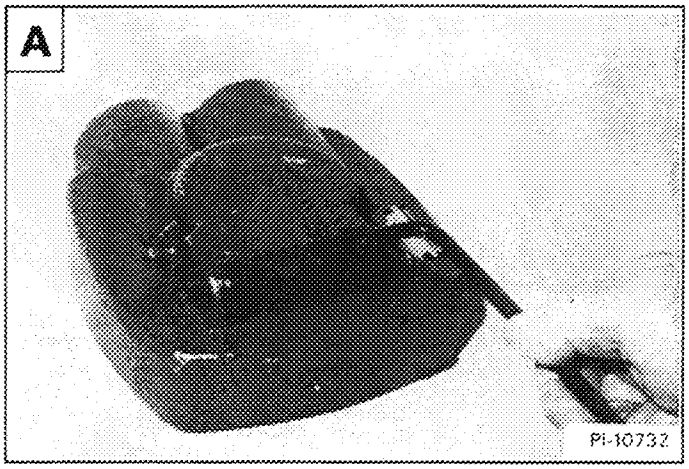
Assemble: Tighten the plug to 200 in.-lbs. (22,6 Nm) torque.



Insert finger in shuttle valve opening and push valve towards opposite side. Remove dash pot sleeve, spring and poppet.

Insert finger in opposite side of valve opening to remove the other dash pot sleeve, spring, poppet and piston [A].

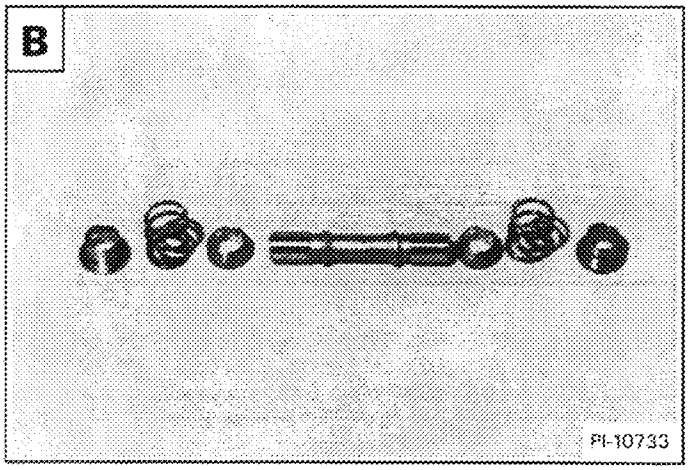
NOTE: **Always use new O-rings, back-up washers and seals when assembling the hydrostatic motor.**



Inspection

Clean all the parts in clean solvent and use air pressure to dry them. DO NOT use cloth or paper towels because small pieces of material can get into the system and cause damage.

Check the shuttle valve parts for wear or damage and replace the parts as needed. Assemble the shuttle valve as shown figure [B].



Check the Gerotor rollers and rotor star for wear and scratches [B].

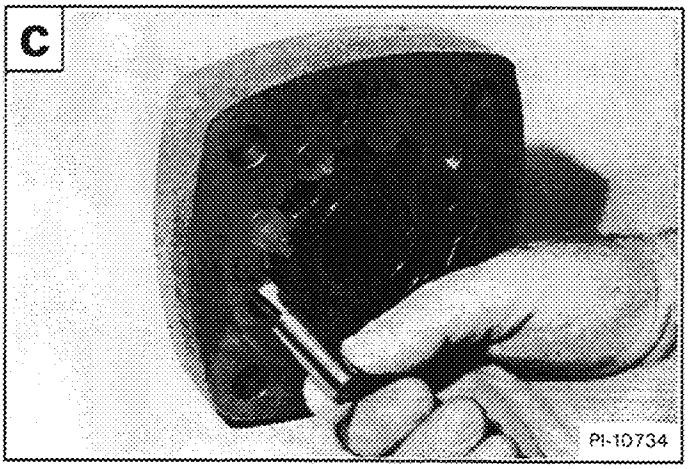
NOTE: **Put all the rollers back in their original position.**

Check the valve plate for scratches.

Check the valve drive for wear.

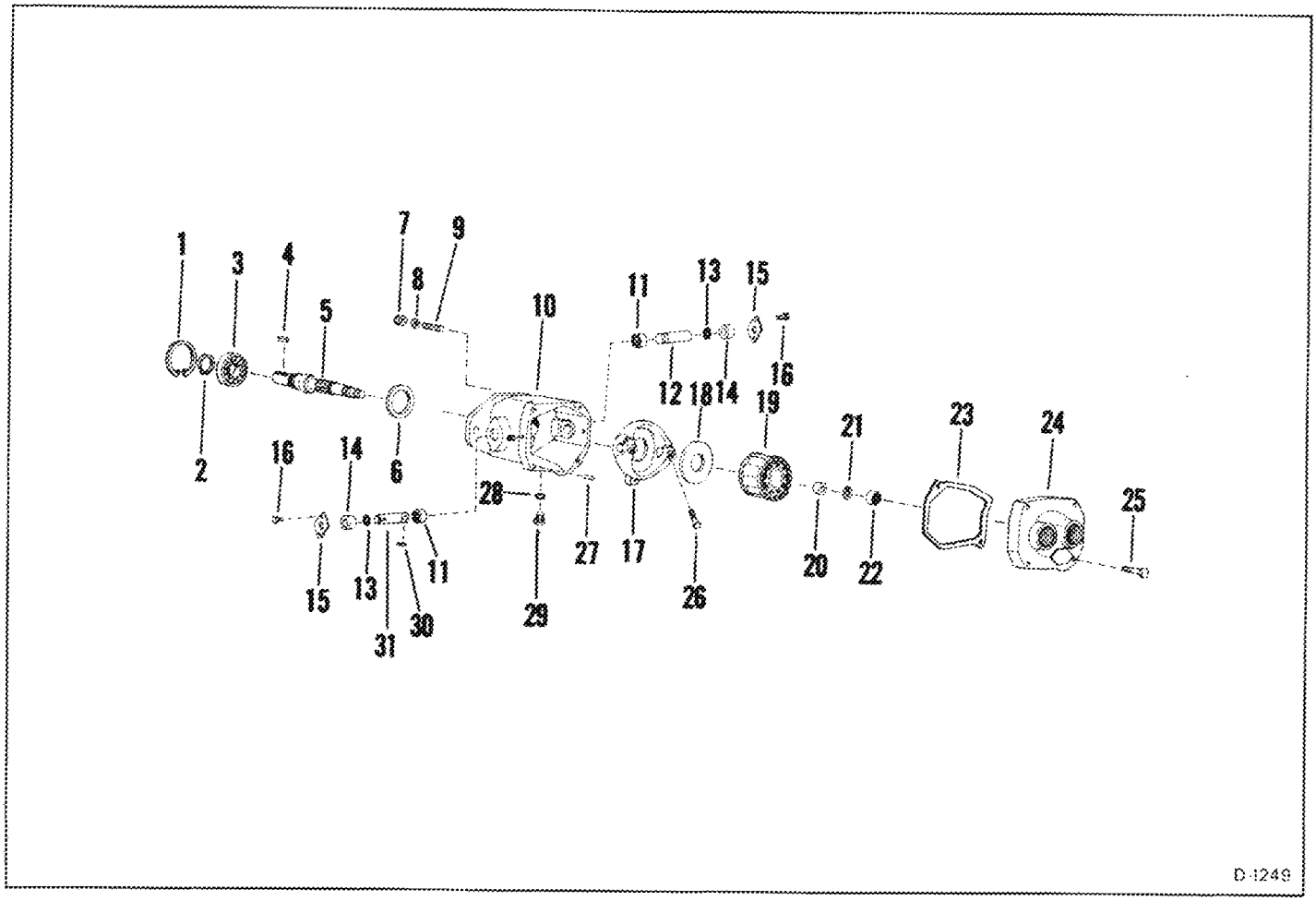
Check the end housing surface for scratches.

Replace the parts as needed.




bobcat

PARTS IDENTIFICATION



MODEL: 720, 721, 722

Ref.	Description
1.	SNAP RING
2.	SNAP RING
3.	BEARING
4.	KEY
5.	SHAFT
6.	WASHER
7.	NUT
8.	WASHER
9.	STUD
10.	HOUSING
11.	BEARING
12.	SHAFT, pintle
13.	O-RING
14.	O-RING
15.	COVER
16.	SCREW
17.	CAMPLATE
18.	PLATE, swash
19.	ROTATING GROUP
20.	SLEEVE
21.	SNAP RING
22.	BEARING
23.	GASKET
24.	PLATE, end
25.	BOLT
26.	BOLT
27.	PIN
28.	O-RING
29.	PLUG
30.	KEY
31.	SHAFT, pintle

HYDROSTATIC MOTOR

Disassembly and 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.

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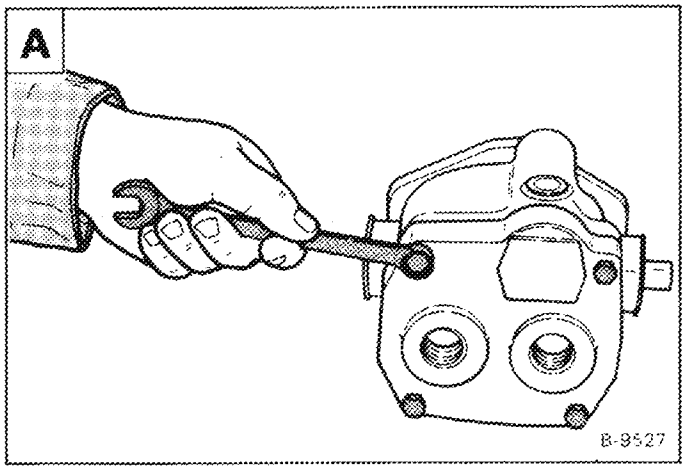
Remove the four bolts from the end plate [A].

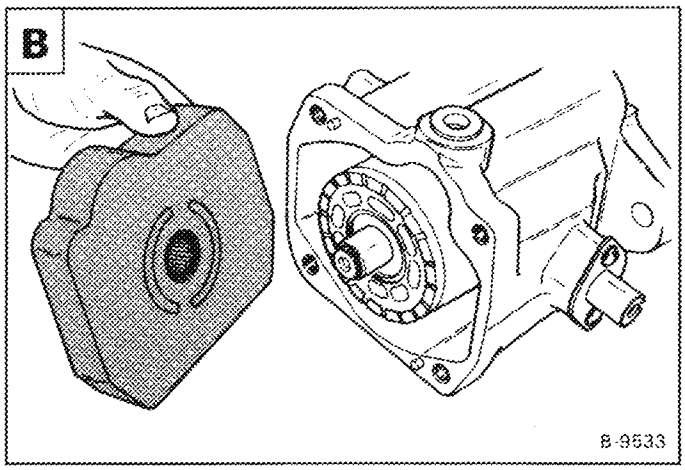
Assembly: Tighten the bolts to 42 ft.lbs. (57 Nm) torque.

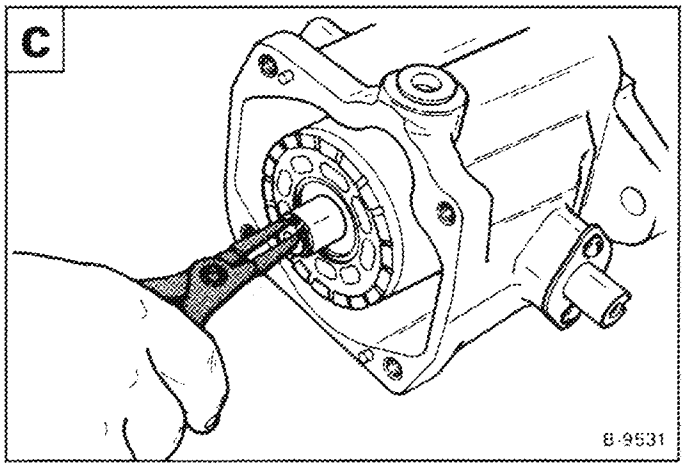
Remove the end plate and gasket [B].

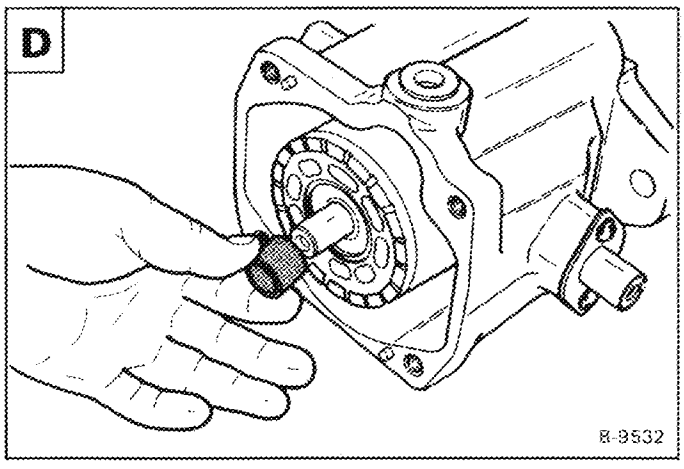
Remove the snap ring at the drive shaft [C].

Remove the bearing sleeve [D].





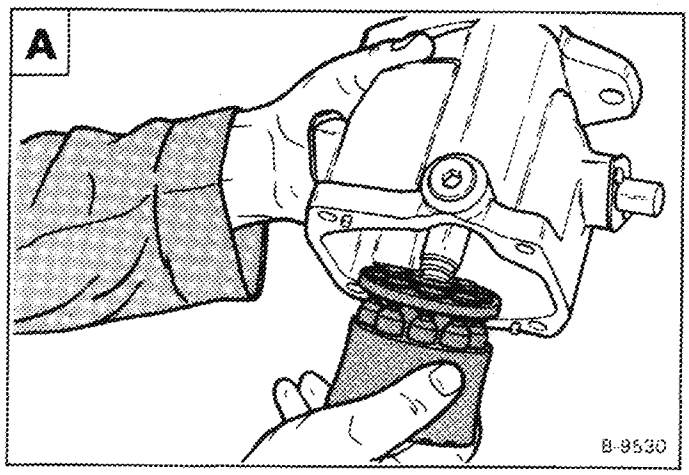




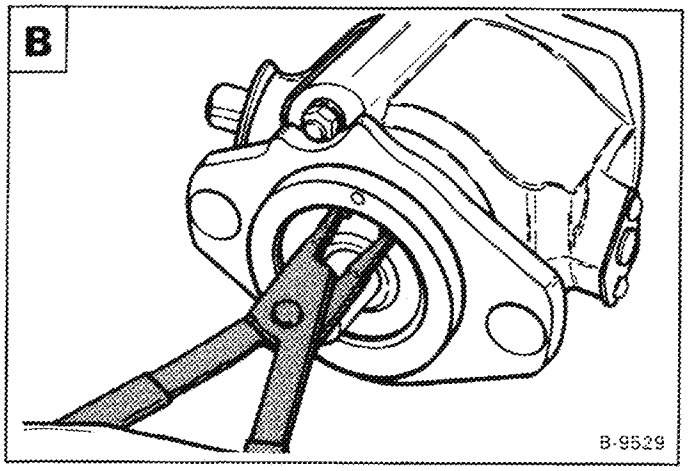
HYDROSTATIC MOTOR (Cont'd)

Remove the rotating group [A].

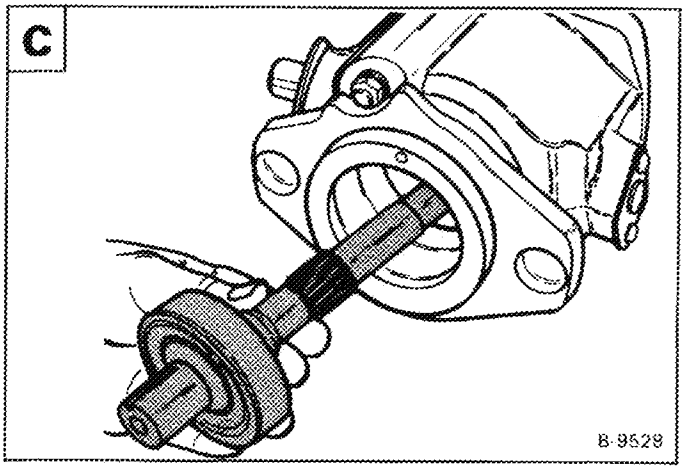
Put your hand over the rotating group and turn the motor housing around, let the rotating group slide into your hand.



Remove the snap ring at the drive shaft [B].

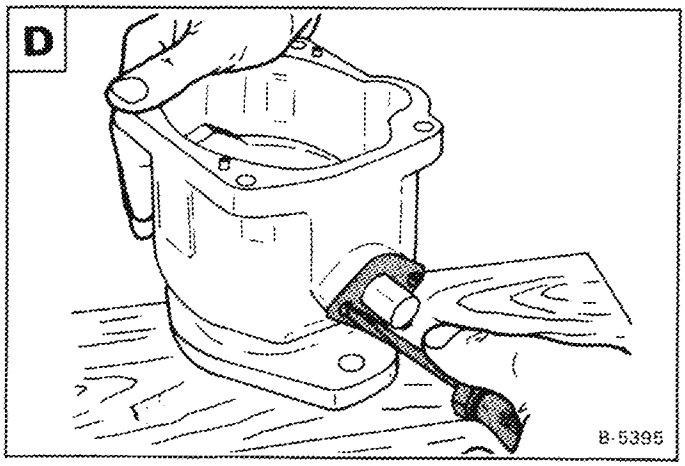


Remove the drive shaft and bearing assembly [C].

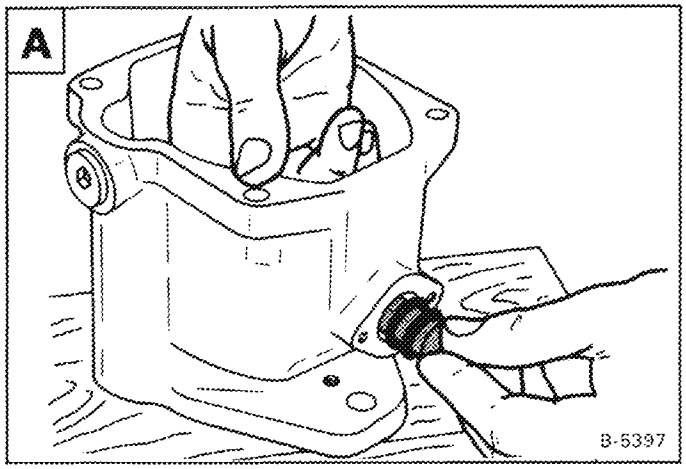


Remove the screws at the cover for the long pintle shaft [D].

Remove the cover.

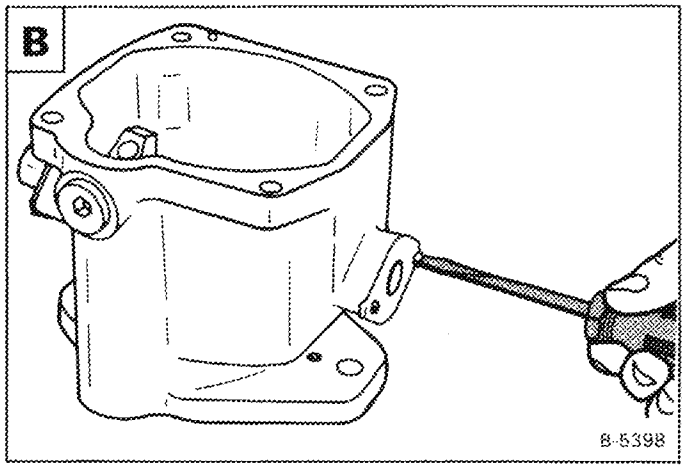


Remove the O-rings [A].

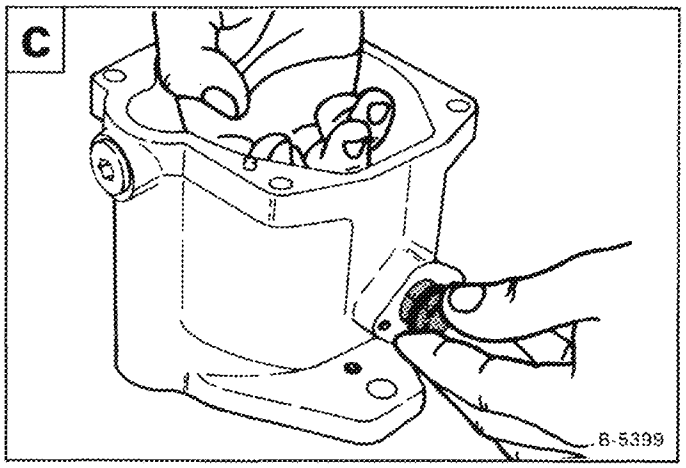


Remove the screws at the cover for the short pintle shaft [B].

Remove the cover.



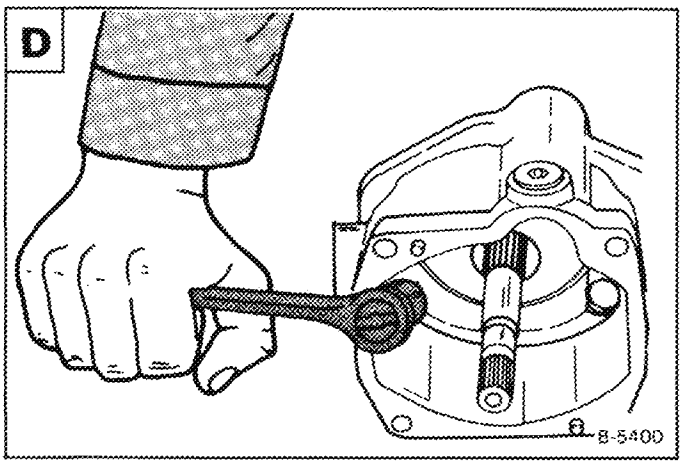
Remove the O-ring [C].



Remove the bolts at the camplate [D].

Assembly: Tighten the bolts to 45 ft.lbs. (61 Nm) torque.

Use a punch and hammer and remove the long and short pintle shafts.



Remove the camplate from the housing [A].

Assembly: Make sure the key is in the camplate before installing the long pintle shaft [A].

NOTE: Always use new O-rings and gaskets when assembling the hydrostatic motor.

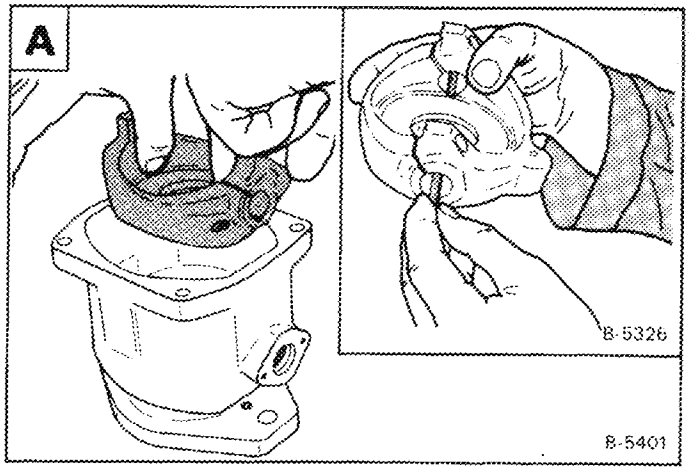
Inspection

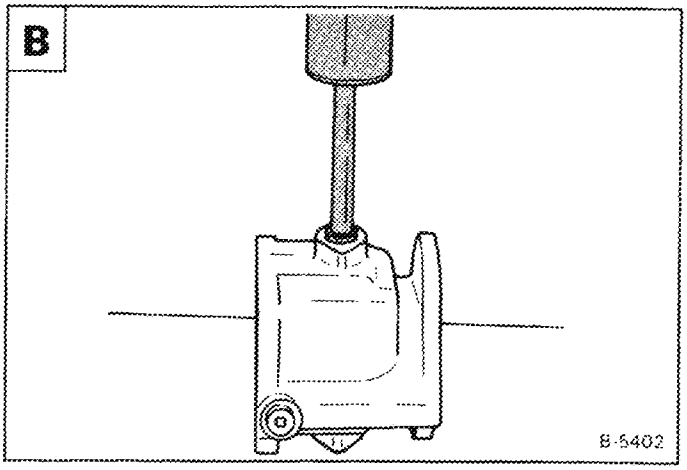
Clean all the parts in solvent and use air pressure to dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

Check the bearings at the pintle shafts, if they need replacing, use a press and bushing driver to remove the bearings [B].

Check the bearing on the end plate, use a puller to remove the bearing.

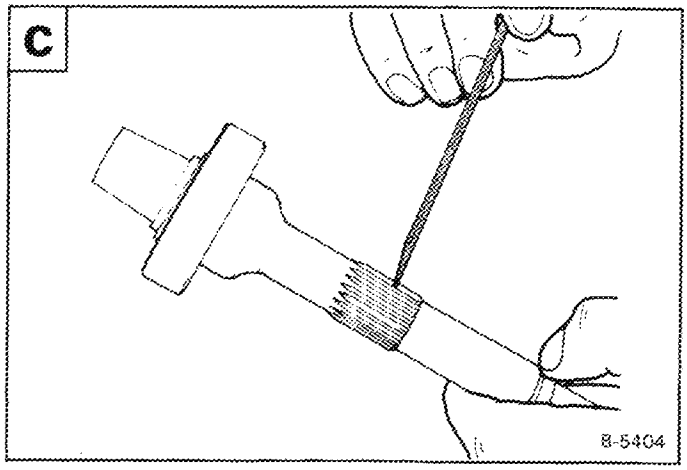
Assembly: Use a press to install the bearing into the end plate.



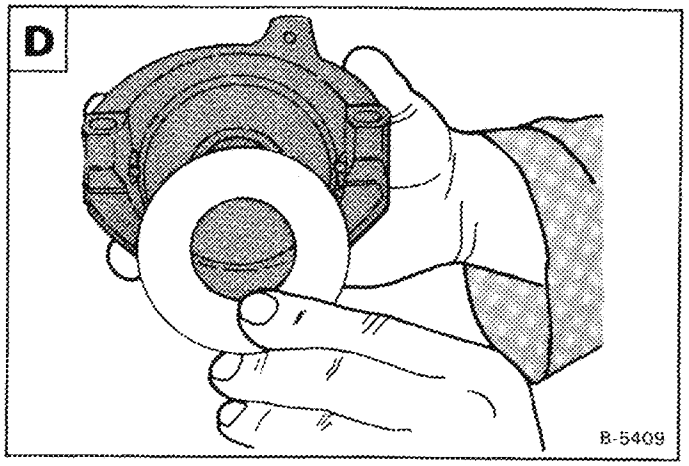


Inspect the drive shaft and bearing for wear and damage to the shaft splines [C].

Inspect the flat surface of the end plate. The finish must be smooth and free of grooves. If the grooves can be felt on the finished surface with a fingernail, replace the end plate.



Inspect the camplate for wear. The finish surface must be smooth and free of scratches. If the scratches can be felt with a fingernail, replace the camplate [D].

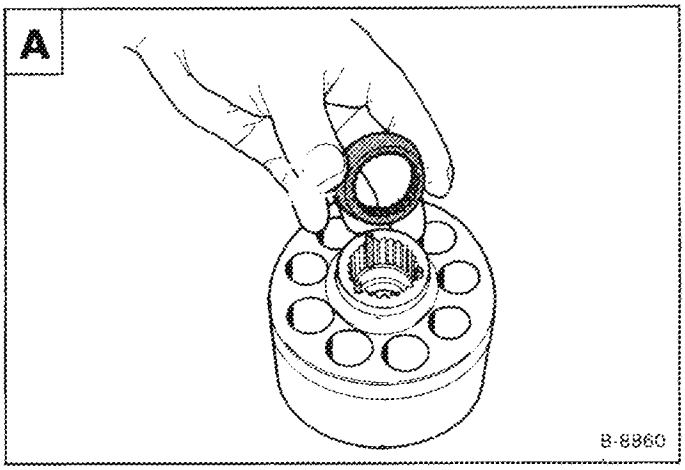


Inspect the rotating group for the following:

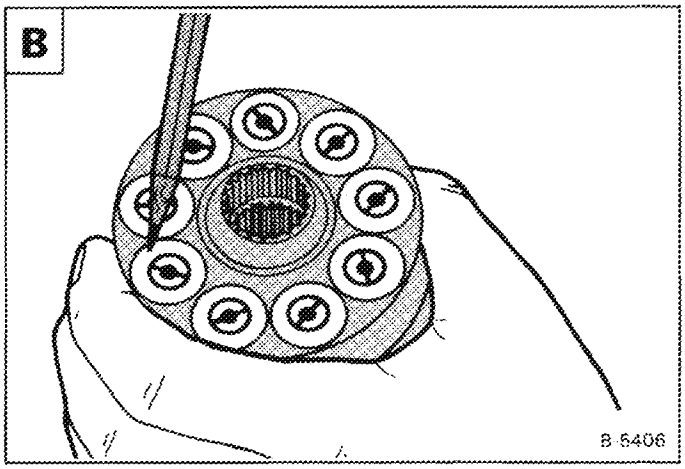
Check each piston in its bore. The piston must move freely.

Check the pins for wear or damage [A]. All the pins must be the same length and must not be bend.

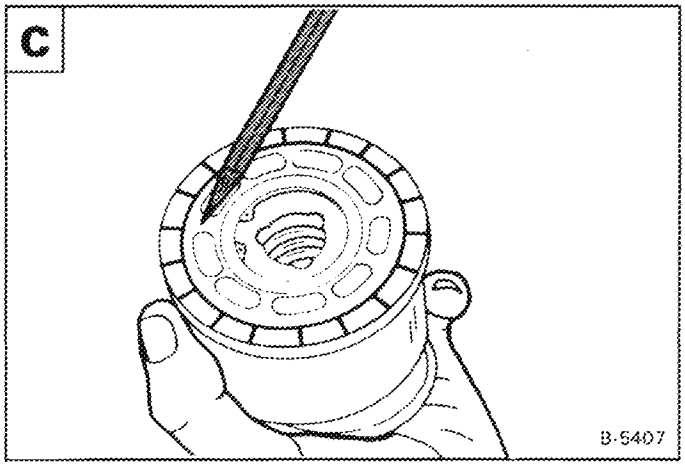
Check the spherical washer for sharp edges, wear or scratches [A].



Check the piston shoe for scratches [B].



Check the flat surface of the piston block for being smooth and free of scratches [C].



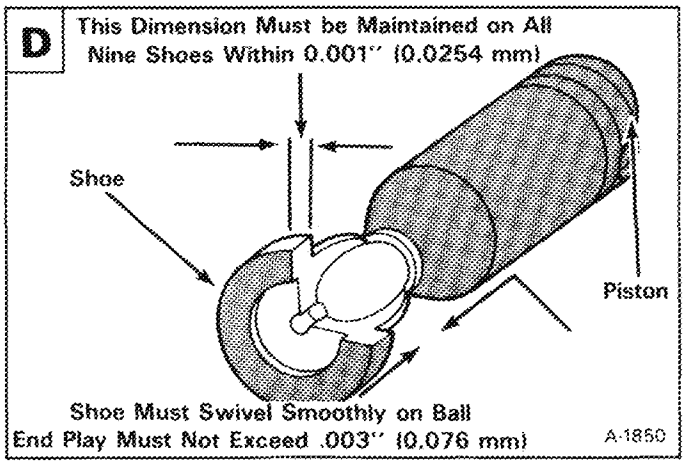
Check the end play of each piston assembly [D].

Measure the thickness of each shoe. All the shoes must be within 0.001" (0.025 mm) of each other [D].

Inspect the shoe plate for wear or cracks.

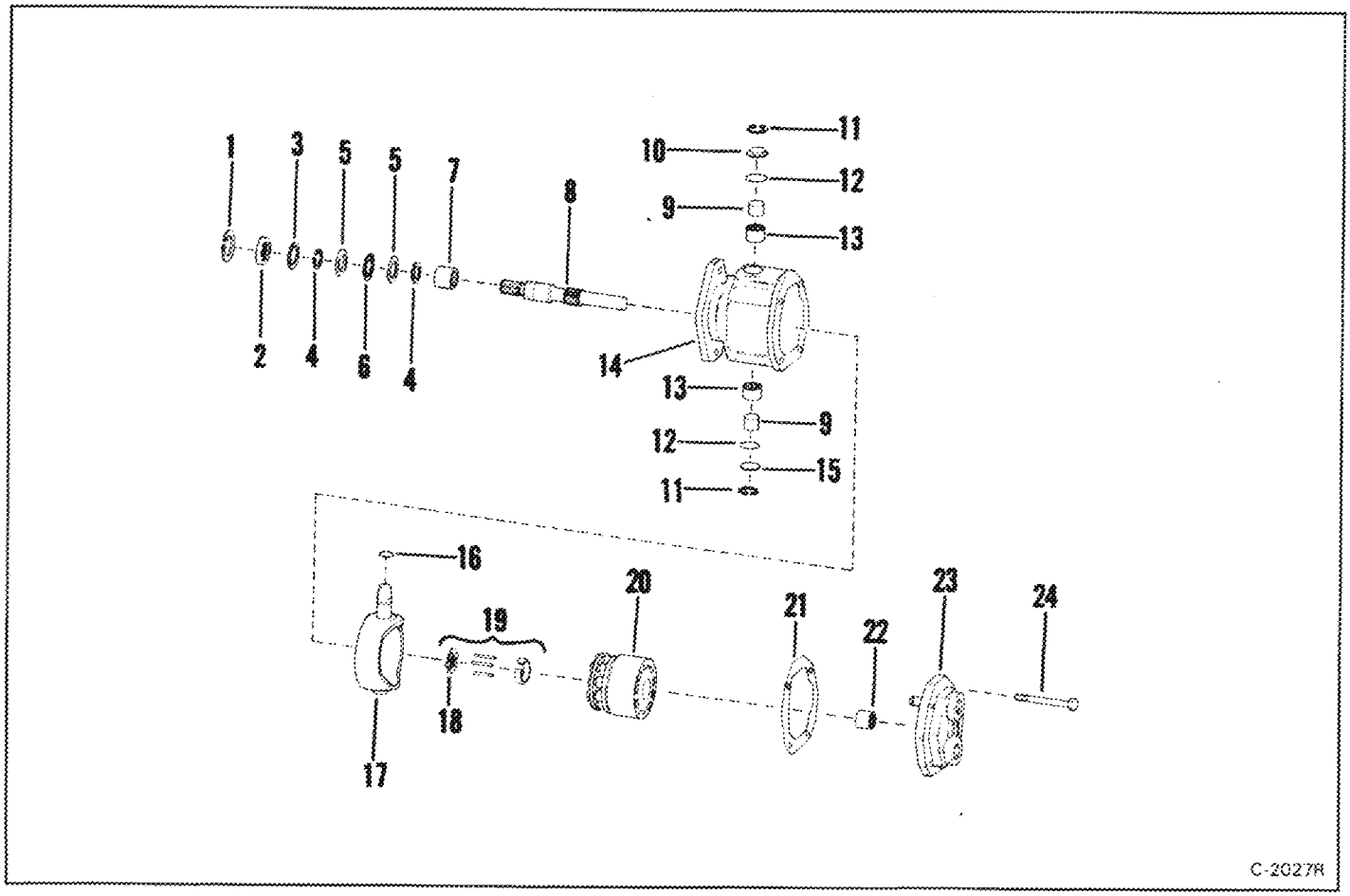
If there is any defect in the rotating group, the complete unit must be replaced.

DO NOT use sandpaper or a file to remove scratches.




bobcat

PARTS IDENTIFICATION



MODEL: 825

Ref.	Description
1.	SNAP RING
2.	SEAL, shaft
3.	WASHER
4.	SNAP RING
5.	WASHER, thrust
6.	BEARING
7.	BEARING
8.	SHAFT
9.	BUSHING
10.	COVER
11.	SNAP RING
12.	O-RING
13.	BEARING
14.	HOUSING
15.	COVER
16.	O-RING
17.	CAMPLATE
18.	WASHER, wave
19.	LOADING PINS
20.	ROTATING GROUP
21.	GASKET
22.	BEARING
23.	BACK PLATE, end
24.	BOLT

Disassembly and 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

NOTE: Before you begin to disassembly the hydrostatic motor, remove the linkage.

Remove the four bolts from the end back plate [A].

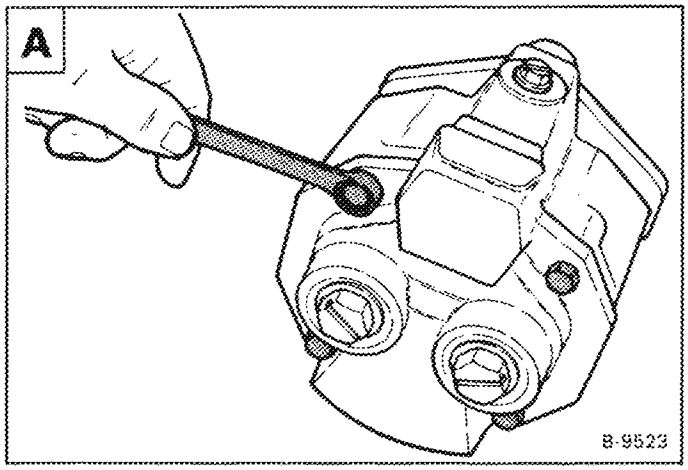
Assembly: Tighten the bolts to 27 - 31 ft.lbs. (37 - 42 Nm) torque.

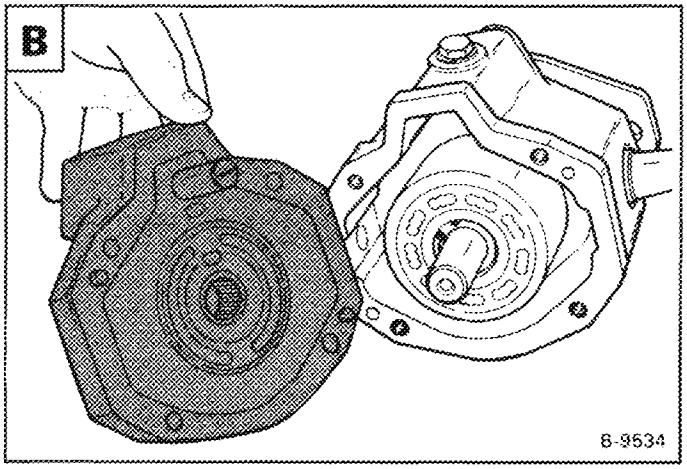
Remove the end back plate from the housing [B].

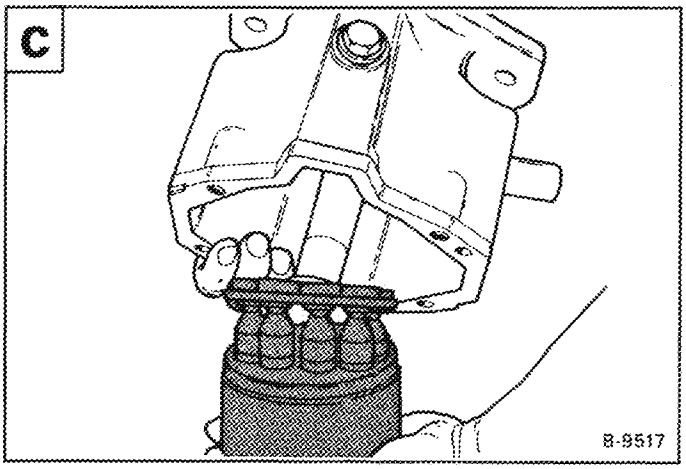
Remove the rotating group [C].

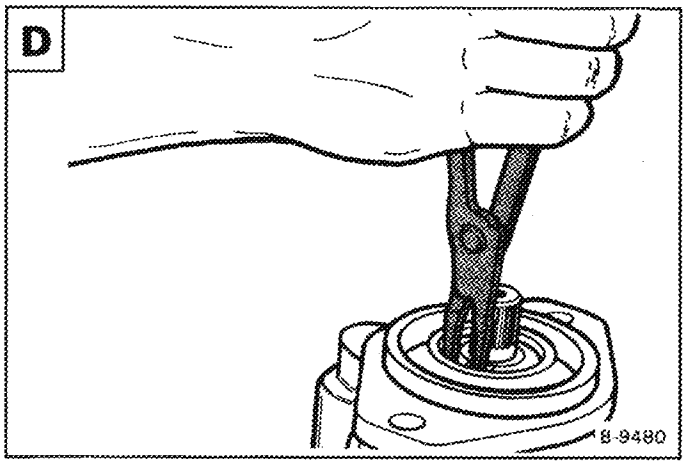
Put your hand under the rotating group and turn the motor housing around so the rotating group will slide into your hand.

Remove the snap ring at the drive shaft [D].



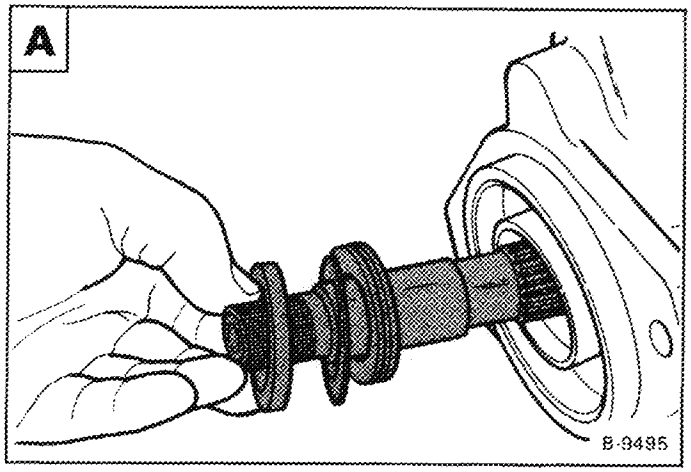




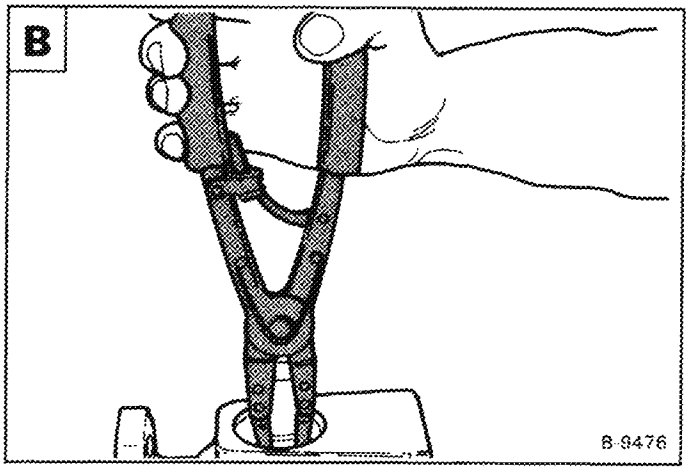


Hit the shaft end on a block of wood to remove it from the housing.

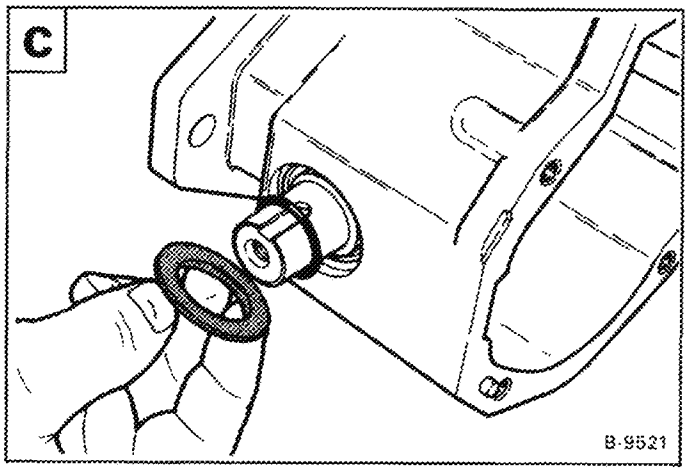
Remove the seal, back-up washer, bearing and shaft assembly [A].



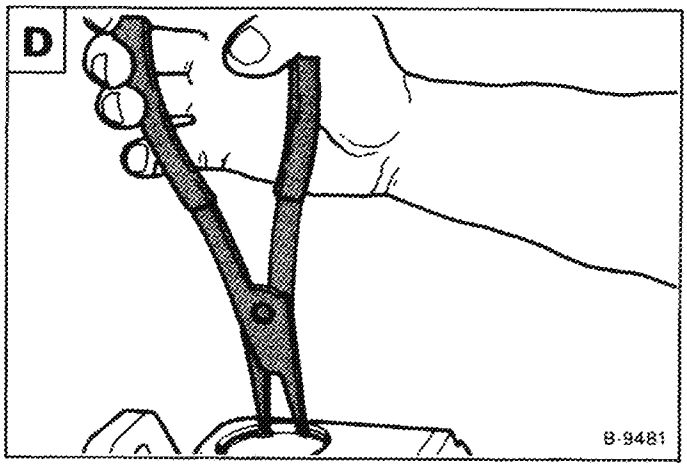
Remove the snap ring at the pintle shaft cover [B].



Remove the pintle shaft cover and O-ring [C].

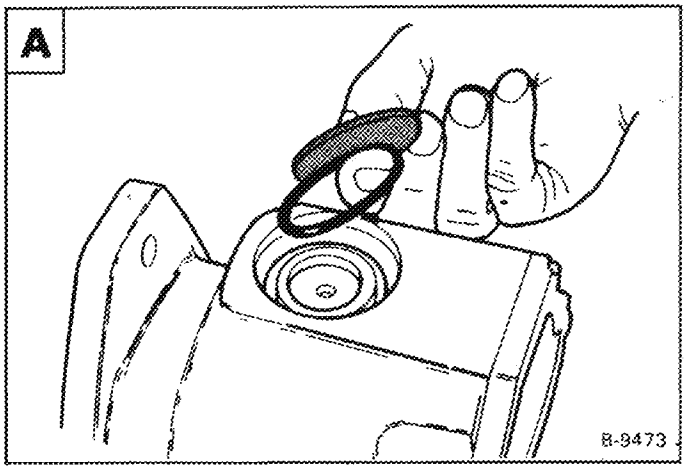


Remove the snap ring from the camplate shaft cover on the other side of the housing [D].



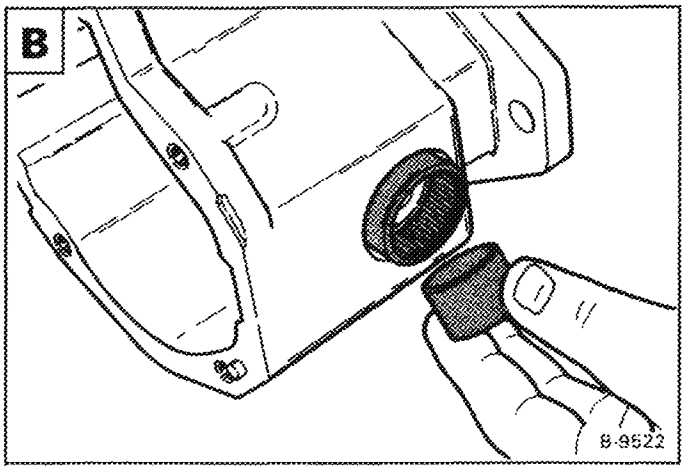
HYDROSTATIC MOTOR (Cont'd)

Remove the cover and O-ring [A].

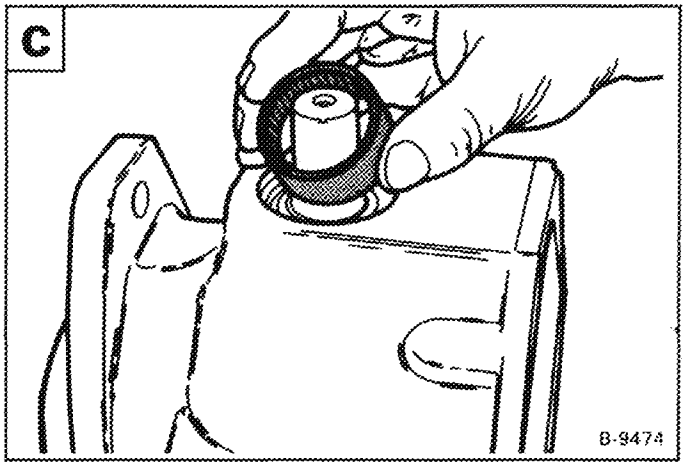


Remove the bearing and race [B].

Assembly: When installing the race the chamfer side is toward the camplate and the number side of the bearing is toward the outside.

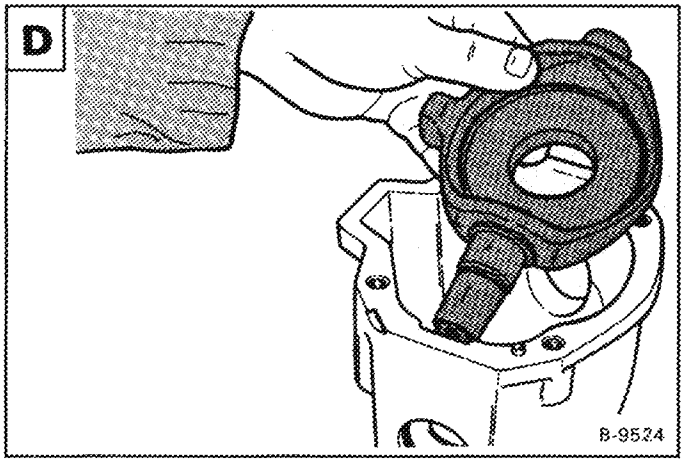


Remove the bearing at the pintle shaft [C].



Remove the camplate [D].

NOTE: Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.



Inspection

Clean all the parts in solvent and use air pressure to dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

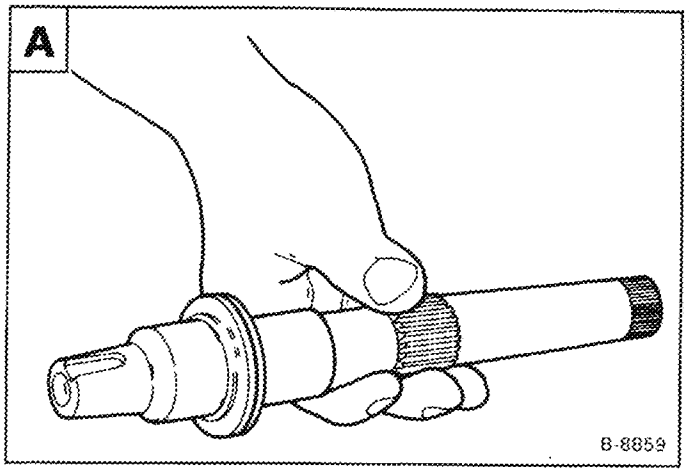
Inspect the output shaft, bearing and races for wear or damage to the shaft splines [A].

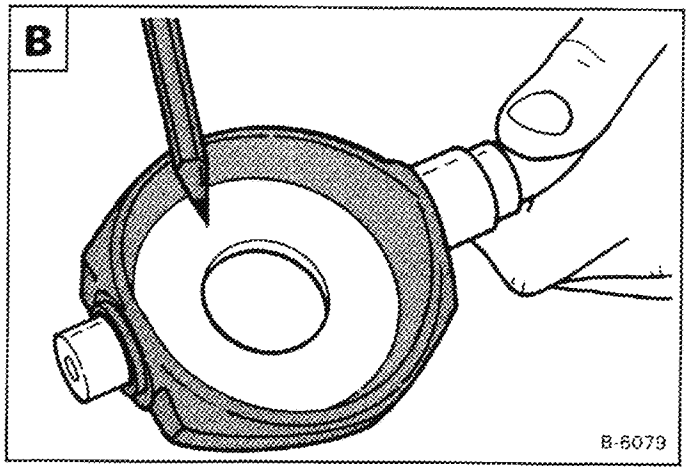
The bearing in the back plate only have to be removed if it is loose and shows wear. Use a puller to remove and a press to install the bearing.

Inspect the camplate for wear. The finish must be smooth and free of grooves. If grooves can be felt with a fingernail, replace the camplate [B].

Inspect the rotating group for the following:

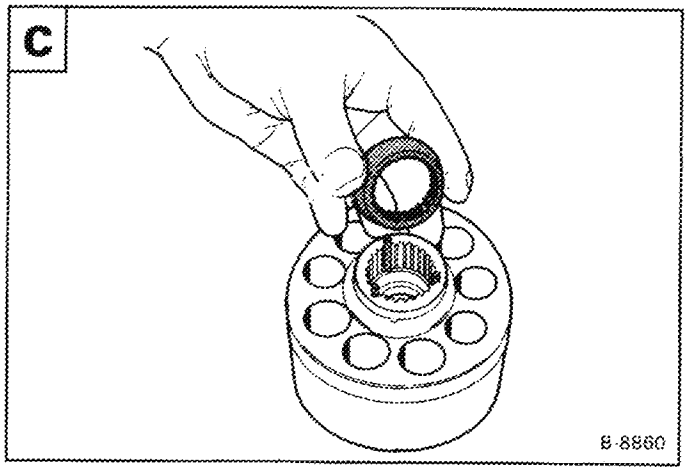
Check each piston in its bore. The piston must move freely.



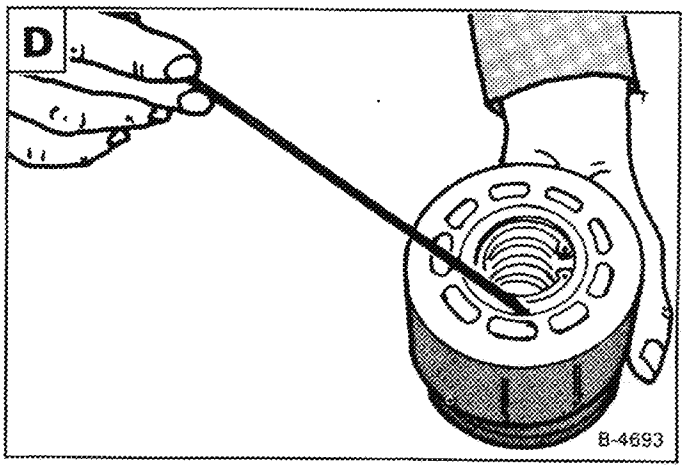


Check the pins for wear or damage [C]. All the pins must be the same length and must not be bend.

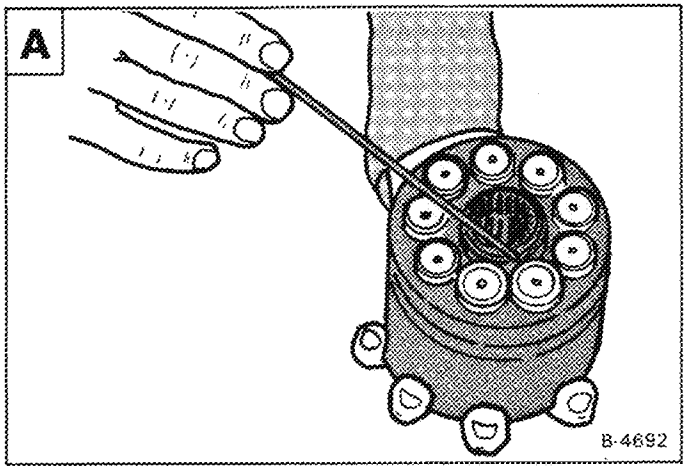
Check the spherical washer for sharp edges, wear or scratches [C]. Check the wave washer, make sure it is not broken.



Check the flat surface of the piston block for being smooth and free of scratches [D].



Check the piston shoe for scratches [A].



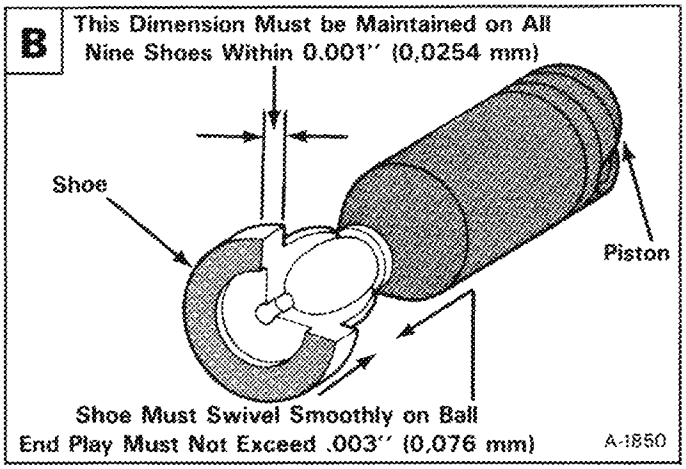
Check the end play of each piston assembly [B].

Measure the thickness of each shoe. All shoes must be within 0.001" (0,025 mm) of each other [B].

Inspect the shoe plate for wear or cracks.

If there is any defect in the rotating group, the complete unit must be replaced.

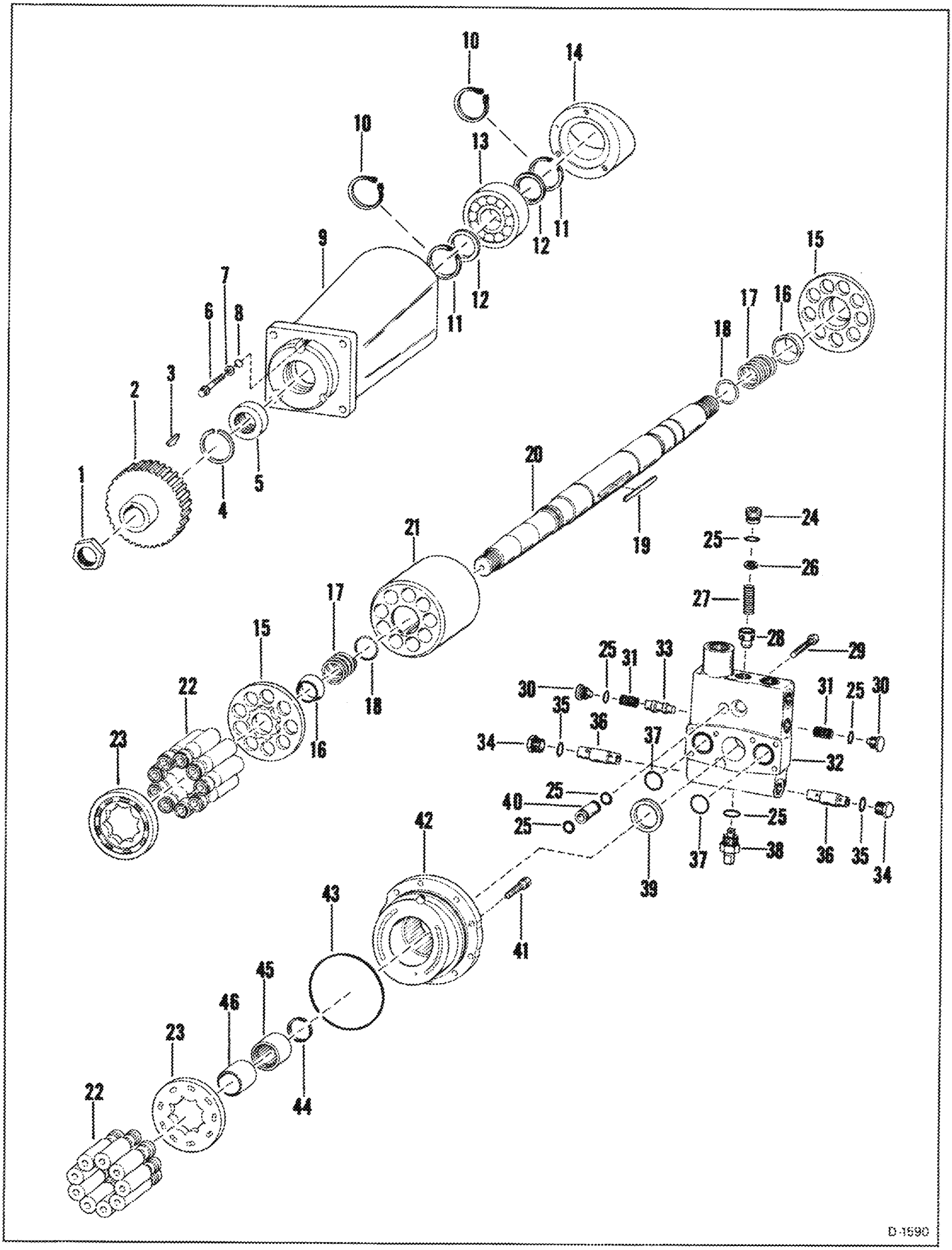
DO NOT use sandpaper or a file to remove scratches.



CESSNA MOTOR

Section B


bobcat


D-1590

MODEL: 1600, 2000

Ref.	Description
1.	NUT
2.	GEAR
3.	KEY
4.	SNAP RING
5.	SEAL, shaft
6.	BOLT
7.	WASHER
8.	O-RING
9.	HOUSING
10.	SNAP RING
11.	RING, retainer (Used W/Ref. 12)
12.	WASHER
13.	BEARING
14.	CAM
15.	SPIDER
16.	PIVOT
17.	SPRING
18.	SNAP RING
19.	KEY
20.	SHAFT
21.	BLOCK, piston
22.	PISTON ASSY
23.	PLATE
24.	RETAINER
25.	O-RING
26.	SHIM(S)
27.	SPRING
28.	POPPET
29.	BOLT
30.	PLUG
31.	SPRING
32.	BODY, valve
33.	SPOOL
34.	PLUG
35.	O-RING
36.	VALVE, relief
37.	O-RING
38.	VALVE, tow
39.	SEAL
40.	TUBE, drain
41.	BOLT
42.	PLATE, back
43.	O-RING
44.	SNAP RING
45.	BEARING
46.	RACE

HYDROSTATIC MOTOR

Disassembly

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

MEL-1198 — Bearing Installation Tool

IMPORTANT

Always keep hydraulic and hydrostatic parts clean. Clean outside of all assemblies before beginning repairs. Use plugs and caps to cover open ports. Dirt can quickly damage the system.

I-2021-0284

NOTE: Before beginning disassembly of the hydrostatic motor, remove the parking brake assembly.

Remove the nut at the gear on the drive end of the motor.

Use a puller, remove the drive gear from the motor shaft [A].

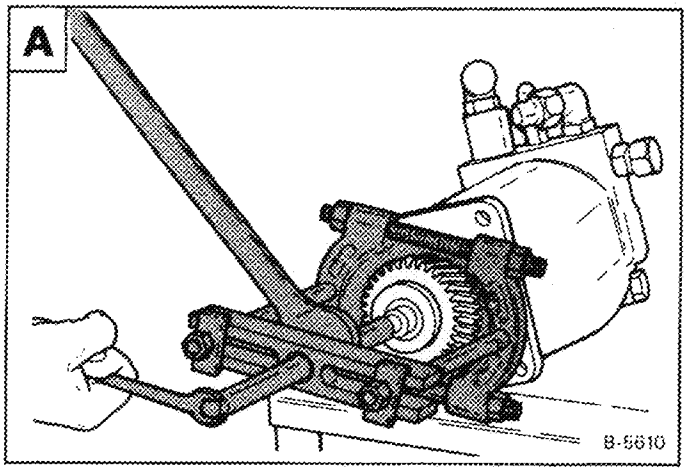
Remove the bolts at the manifold block [B].

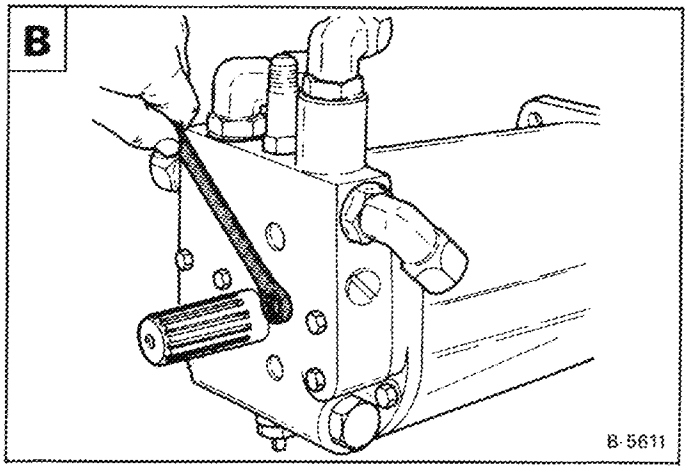
Remove the manifold block [C].

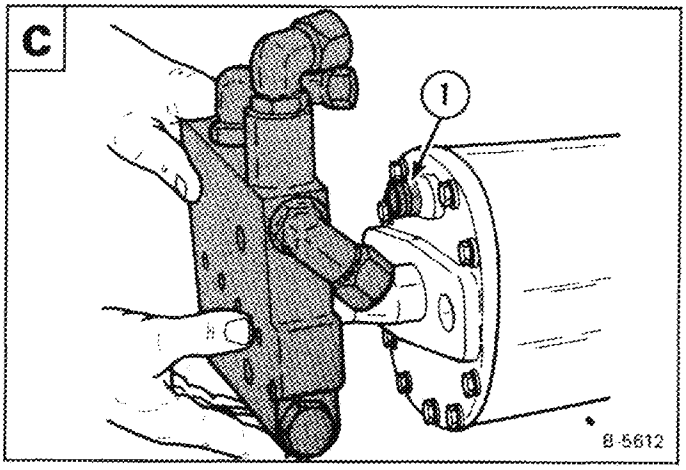
NOTE: See Page B—13 - TAB 3 for disassembly and assembly of the manifold block.

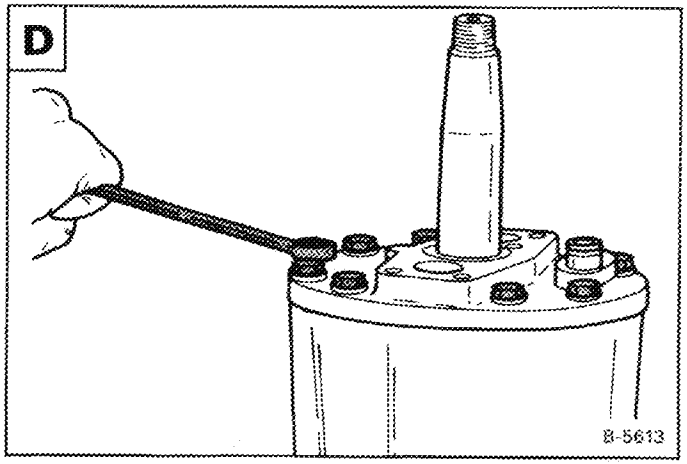
Remove the drain tube (Item 1) from the motor [C].

Remove the bolts at the back plate [D].





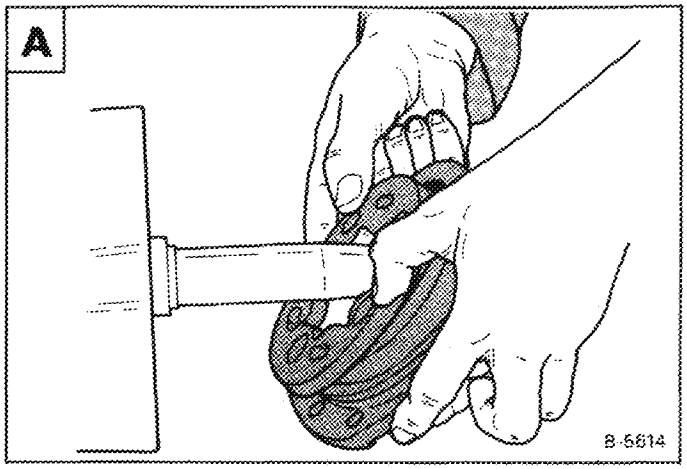




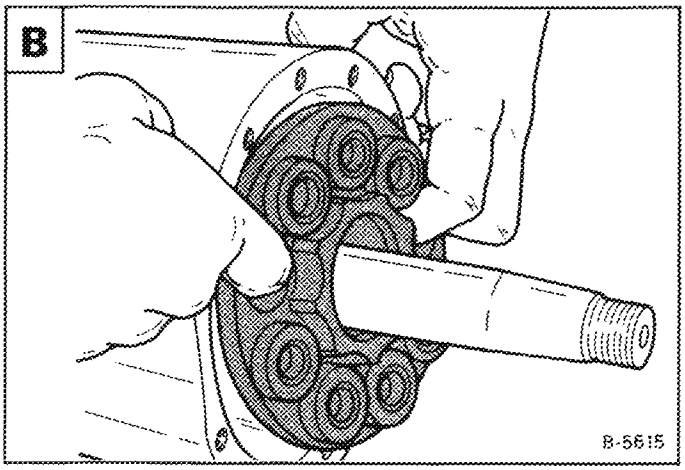
Remove the back plate and connector plate from the housing [A].

Remove two pistons from the rotating group.

NOTE: **Mark the pistons for correct installation into their original bore.**

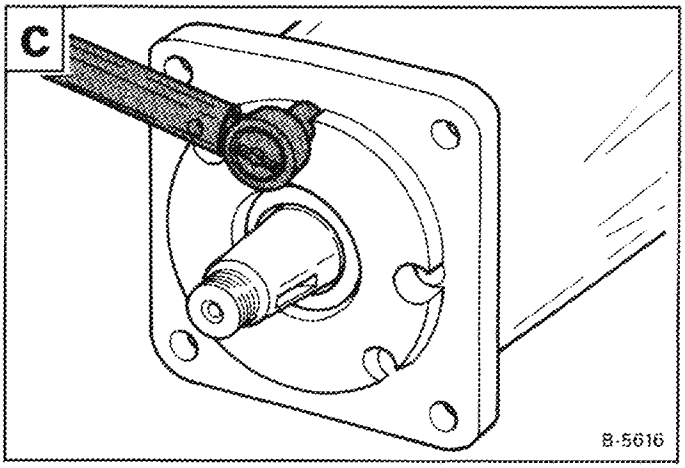


Remove the piston assembly from the housing [B].

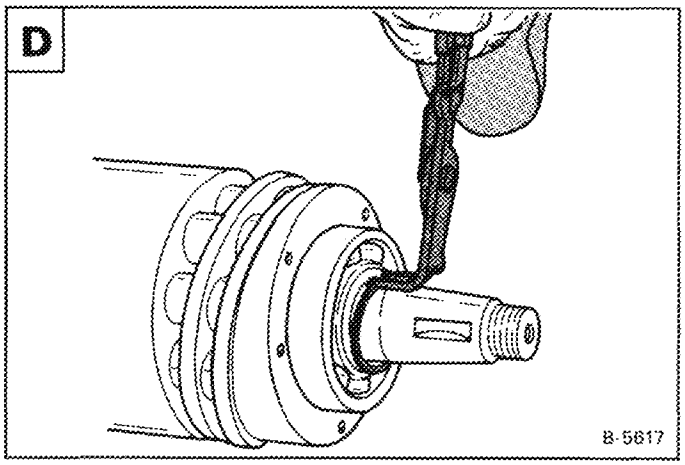


Remove the three bolts at the drive end of the housing [C].

Remove the shaft and rotating group from the housing.



Remove the snap ring at the bearing [D].

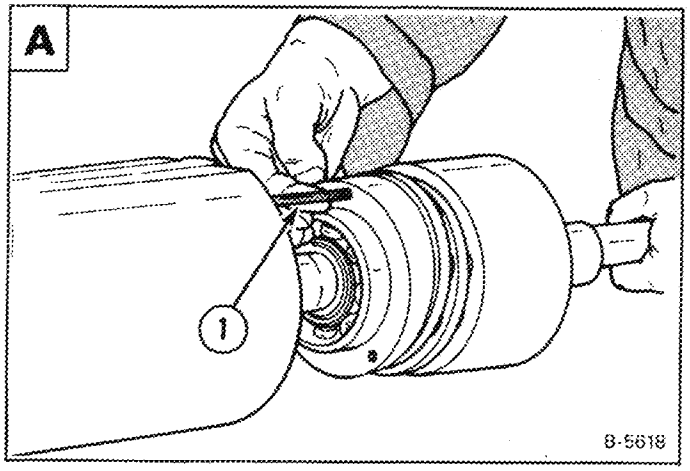


To remove the bearing from the shaft use the following procedure:

1. Install a guide stud (Item 1) into the camplate [A].

2. Install the shaft and rotating group back into the housing [A]. Make sure the holes are in correct alignment.

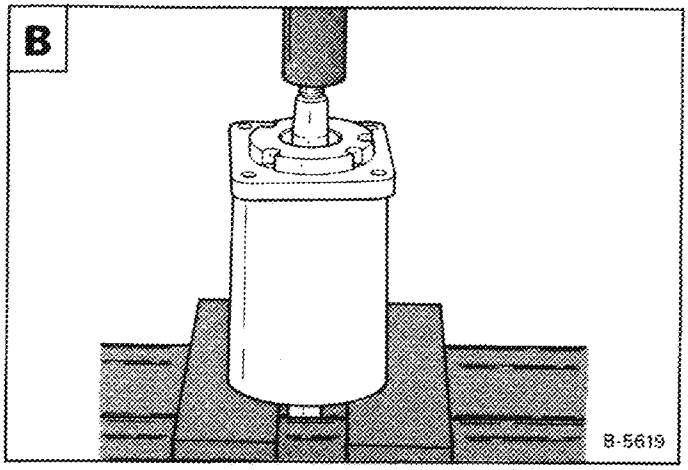
3. Install the three bolts and tighten.



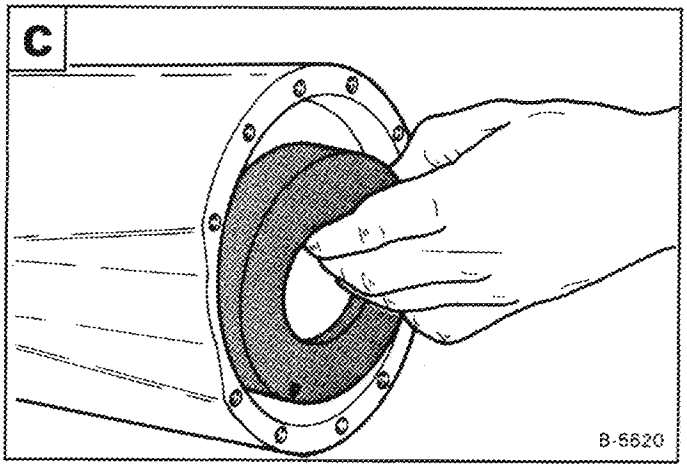
4. Put the motor in a hydraulic press [B]. Remove the shaft and rotating group from the housing.

NOTE: Make sure the motor housing has a good support and support the shaft and rotating group so they do not drop.

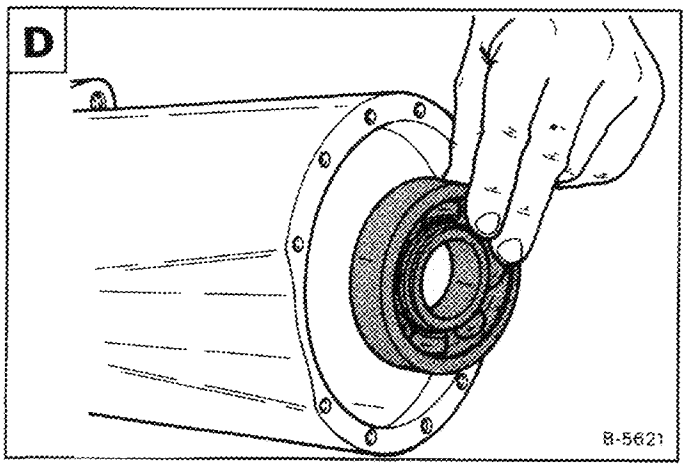
5. Remove the bolts from the housing.



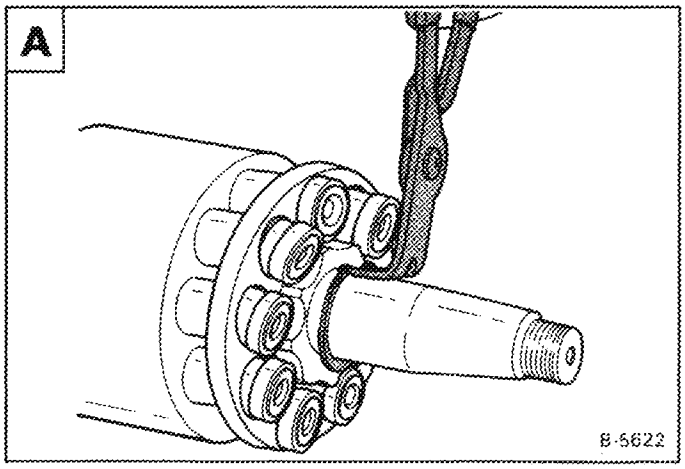
6. Remove the camplate [C].



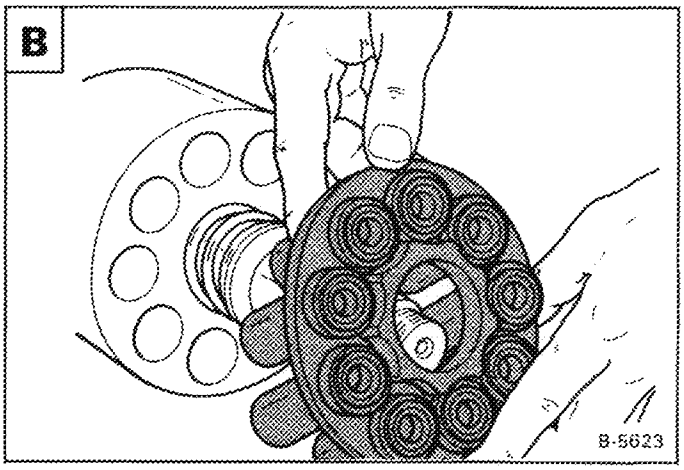
7. Remove the bearing from the housing [D].



Remove the snap ring from the rotating group [A].



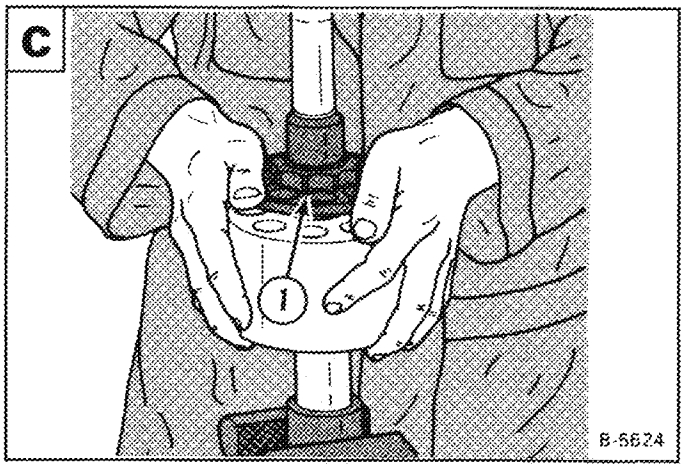
Remove the piston assembly [B].



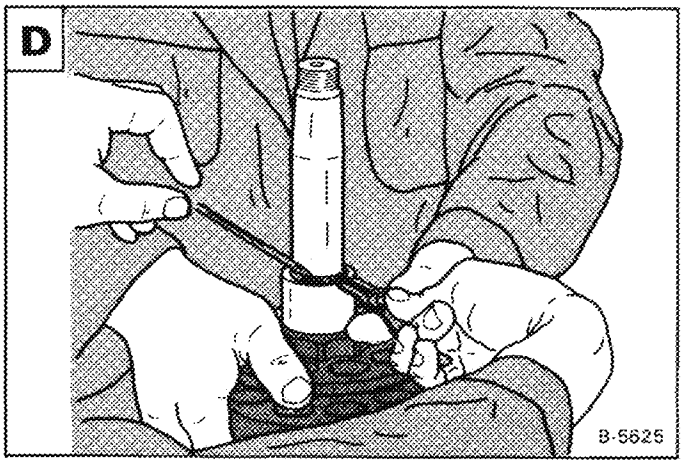
Install the shaft in a vise [C].

NOTE: Use the special tool to support the shaft and piston block assembly.

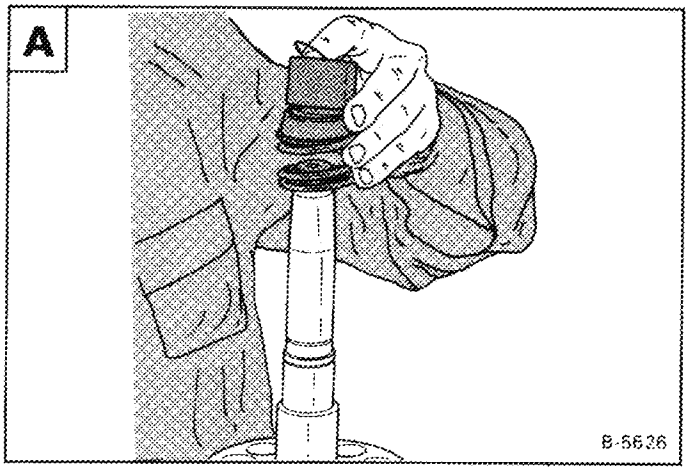
Use a spider (Item 1), push down on the spider pivot and spring [C].



Remove the retainer ring [D].

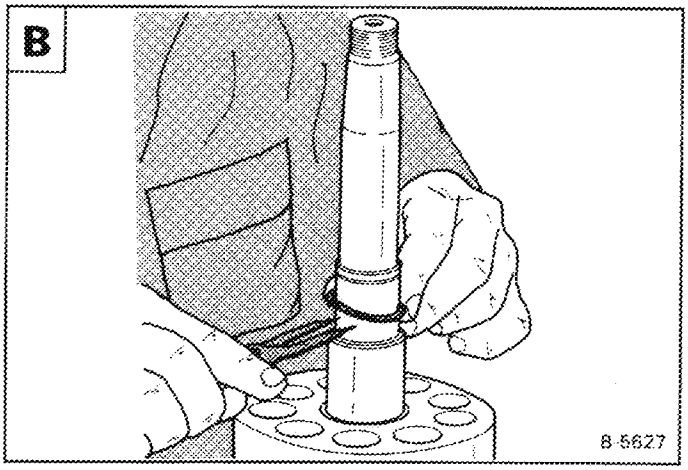


Remove the inner race, spider pivot and spring from the shaft [A].



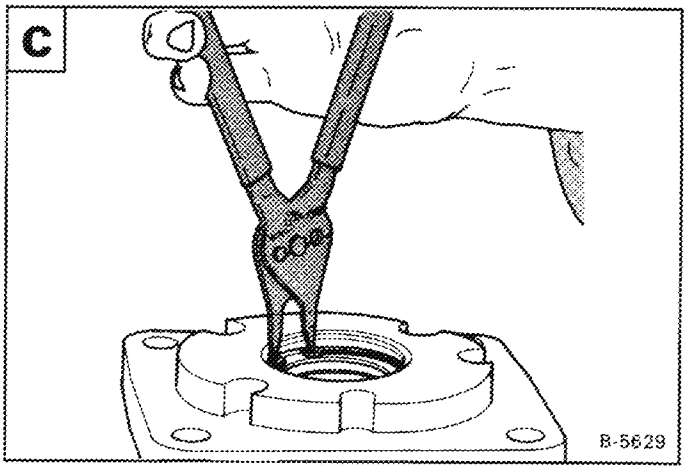
Remove the retainer ring [B].

Remove the piston block from the shaft.



Remove the snap ring from the housing [C].

Remove the shaft seal.



Inspection

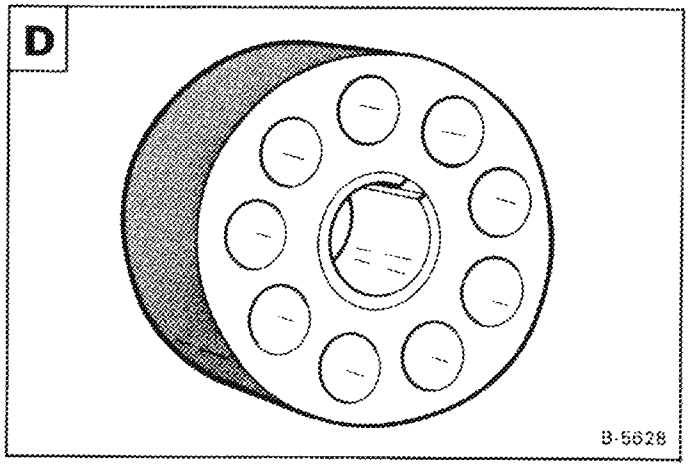
Clean all the parts in solvent and air dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

Check the needle bearing. If the needle bearings do not show excessive wear or damage and stay in the bearing cage, do not replace them.

Check the spider and spider pivots. The conical surface must not show wear or damage.

Check the pistons. The sides of the pistons must be free of wear or damage. The shoe must be flat and free of wear or damage.

NOTE: Do not lap the piston shoes.



Check the piston block [D].

Check the bores and keyway for wear or damage.

HYDROSTATIC MOTOR (Cont'd)

Check the connector plates for wear or damage [A].

NOTE: Do not lap the connector plates.

Check the back plate surface for damage, metal build-up, scoring, galling or scratches [A].

NOTE: Do not lap the back plate.

Inspect the shaft for wear or damage at the threaded ends. Inspect the keyway for wear.

Assembly

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

MEL-1198 - Bearing Installation Tool

NOTE: Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.

Install the shaft in a vise. Use the special tool to support the shaft.

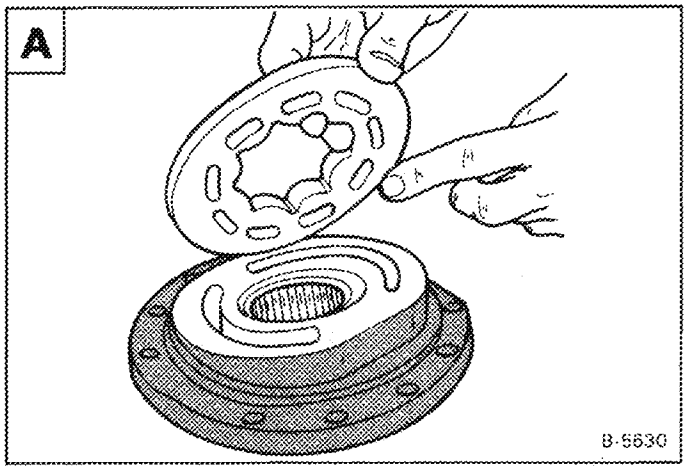
Install the key on the shaft and install the piston block.

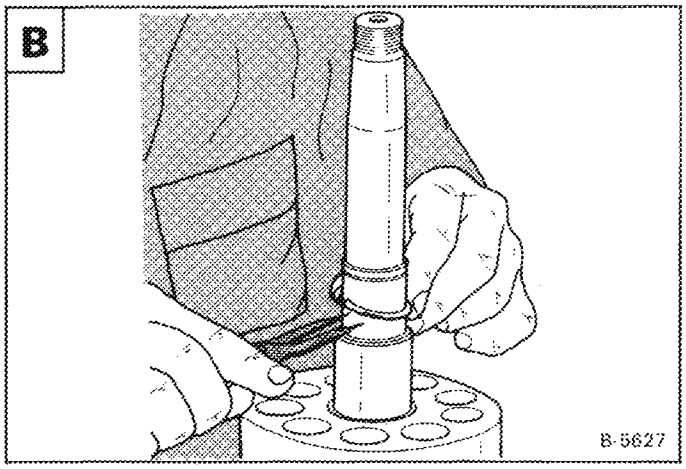
Install the retainer ring on the shaft [B].

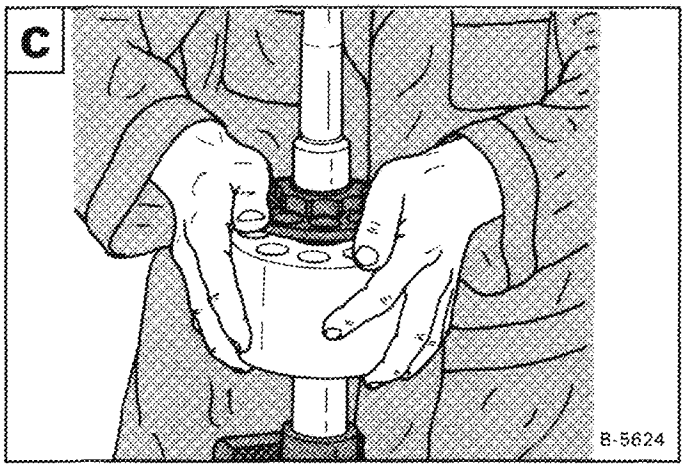
Install the spring and spider pivot on the shaft.

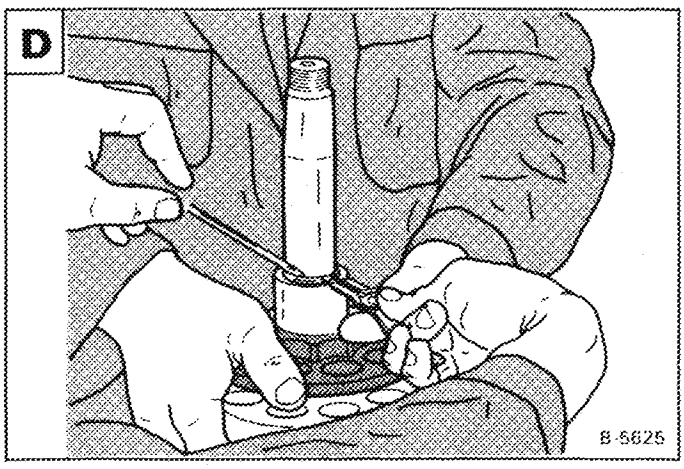
Use a spider plate and push down [C].

Install a new retainer ring [D].





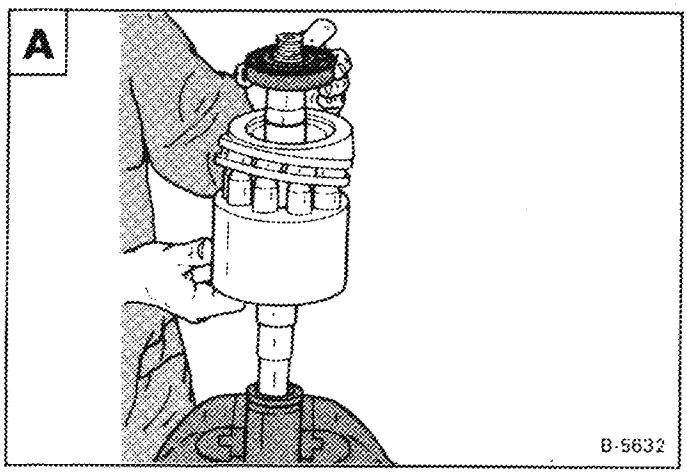




Install the piston assembly and camplate [A].

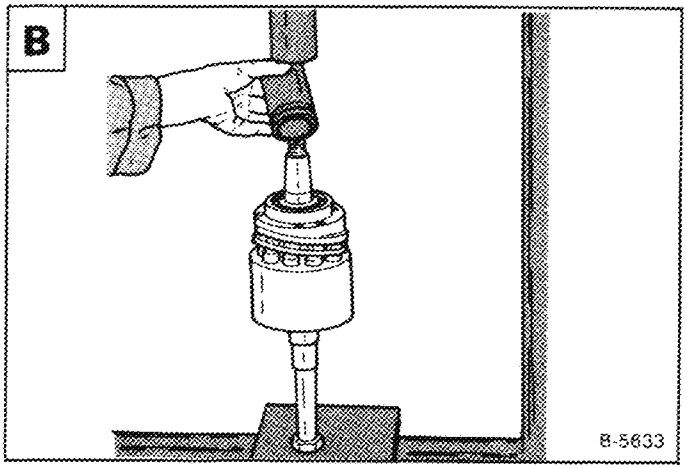
Install the snap ring for the bearing.

Install the bearing on the end of the shaft [A].

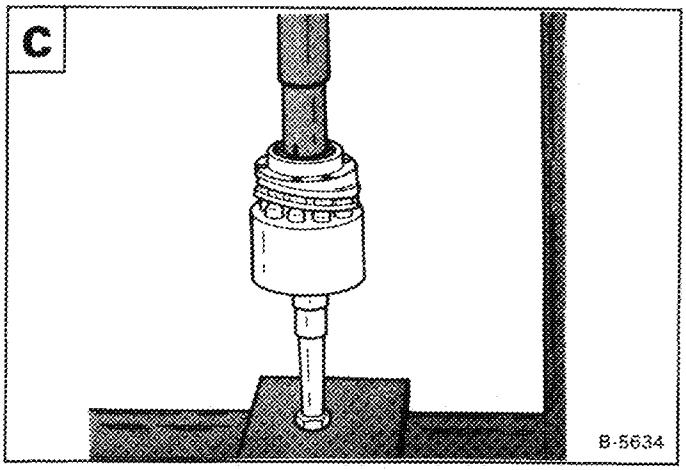


Put the shaft and rotating group in a hydraulic press [B].

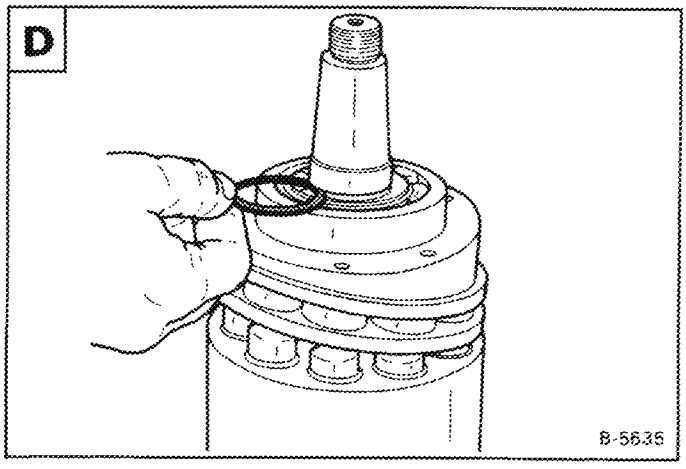
Position the special tool over the bearing [B].



Push the bearing into position [C].



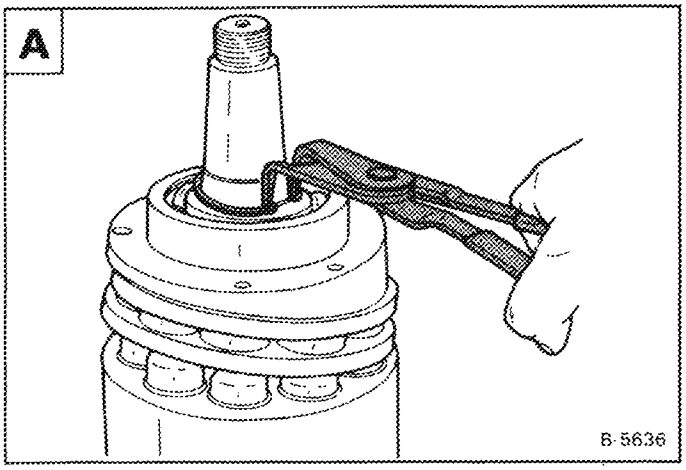
Make sure the bearing is centered in the camplate. Do not push the bearing past the snap ring groove [D].



IMPORTANT

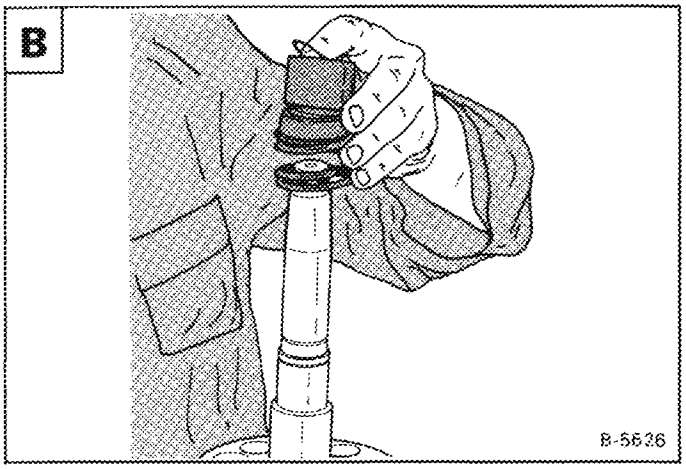
Push down on the bearing just far enough until the snap ring can be installed. The notch in the special tool will show the snap ring groove. DO NOT go past the snap ring groove.

Install the snap ring on the shaft [A].



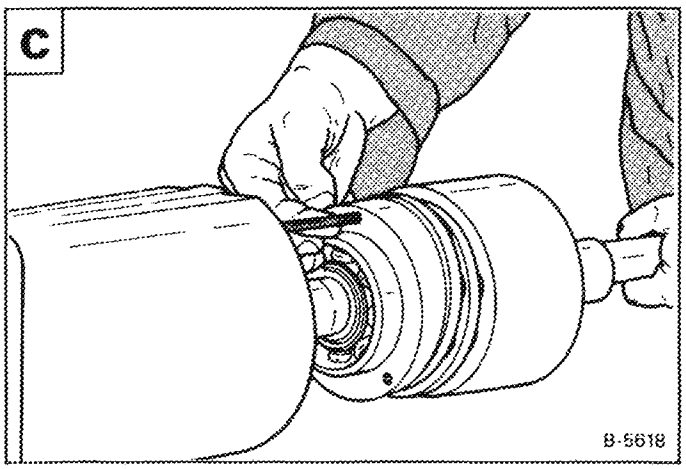
Install the spring, spider pivot and inner race [B].

Install a new retainer ring.

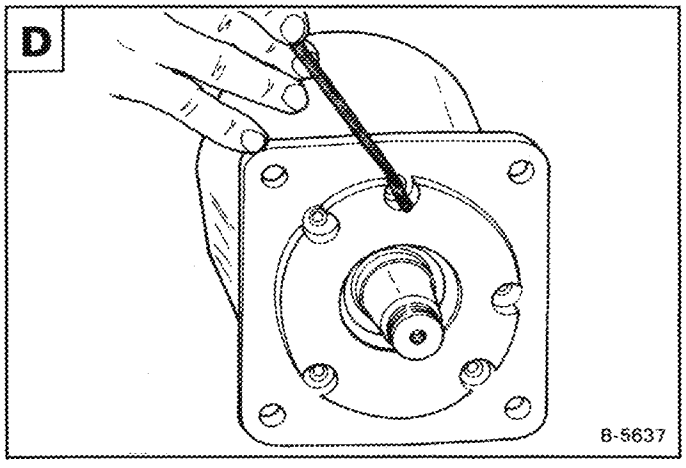


Install a guide stud in the camplate [C].

Install the rotating group and shaft assembly into the housing [C].



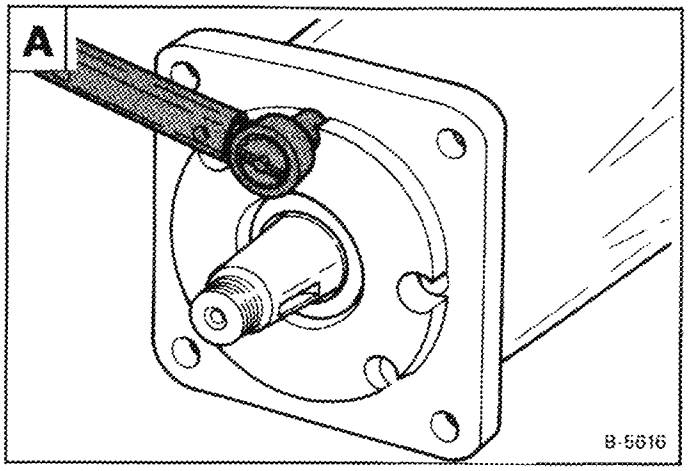
Make sure the holes are in correct alignment [D].



Remove the guide stud.

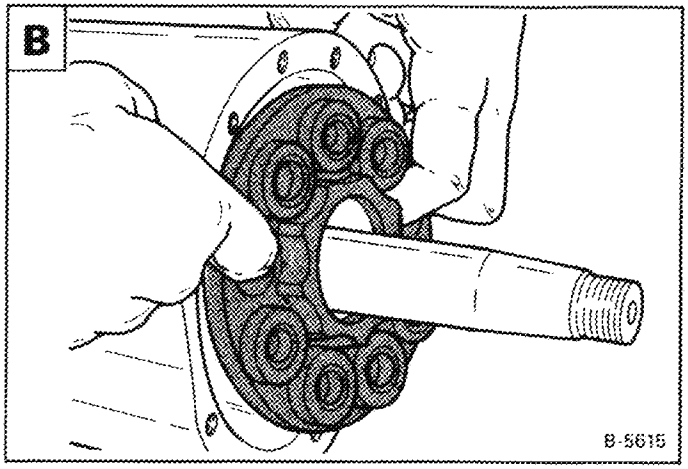
Install the new O-rings on the three bolts.

Tighten the bolts to 8 - 10 ft.lbs. (11 - 14 Nm) torque [A].



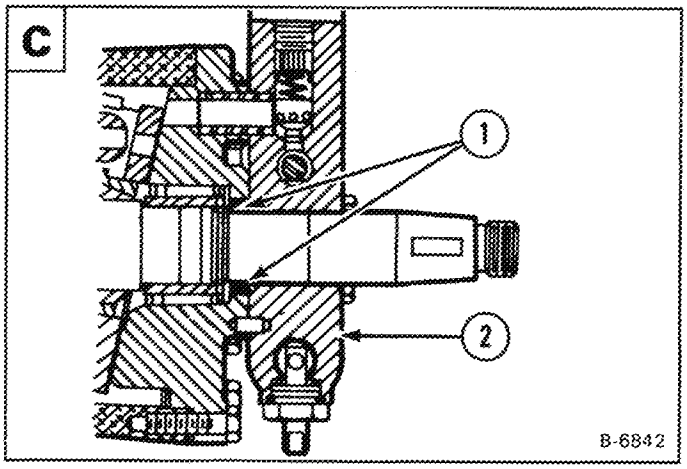
Lubricate and install the pistons in the piston block [B].

Install the last two pistons.

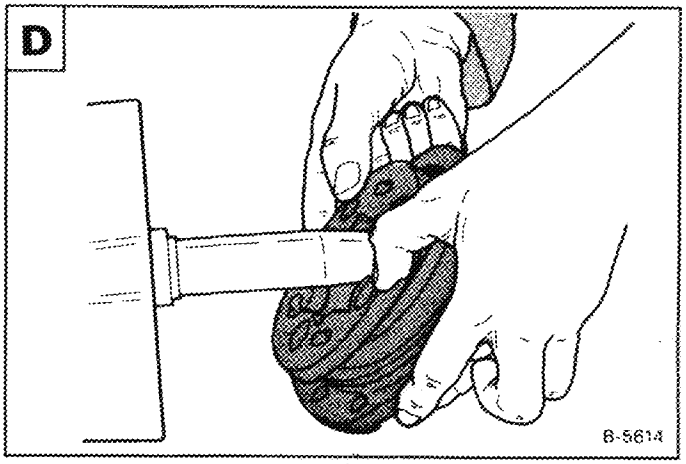


Install the seal (Item 1) in the back plate [C].

DO NOT press the seal beyond the outer face so there will be no interference with the manifold block (Item 2) when it is installed [C].



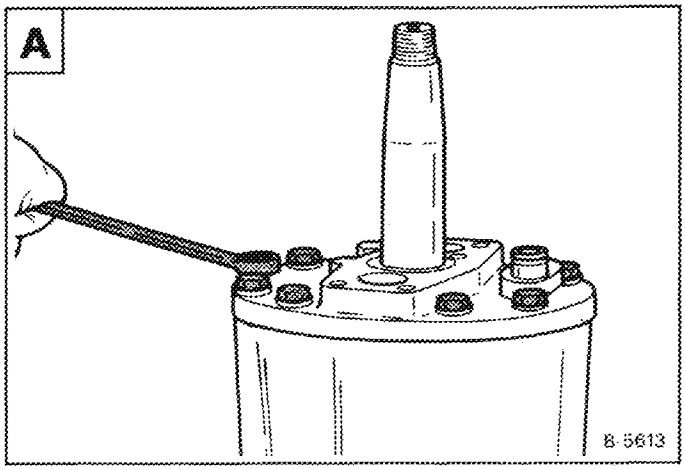
Install a new O-ring on the back plate and install the connector plate and back plate into the housing [D].



Install the back plate bolts.

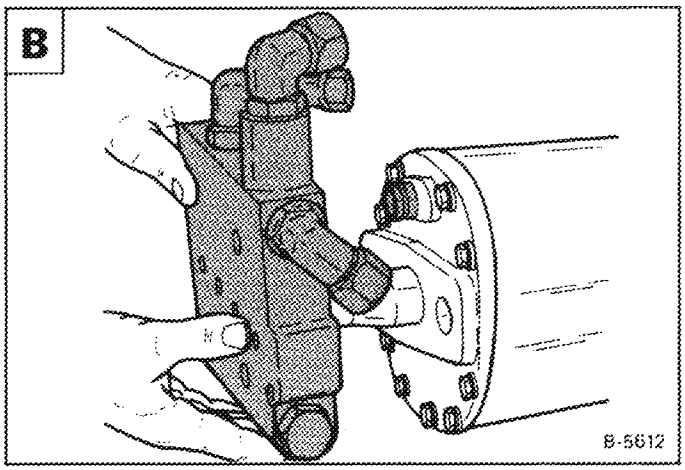
Tighten the bolts to 40 - 45 ft.lbs. (54 - 61 Nm) torque [A].

NOTE: **See page B-13 for disassembly and assembly of the manifold block.**

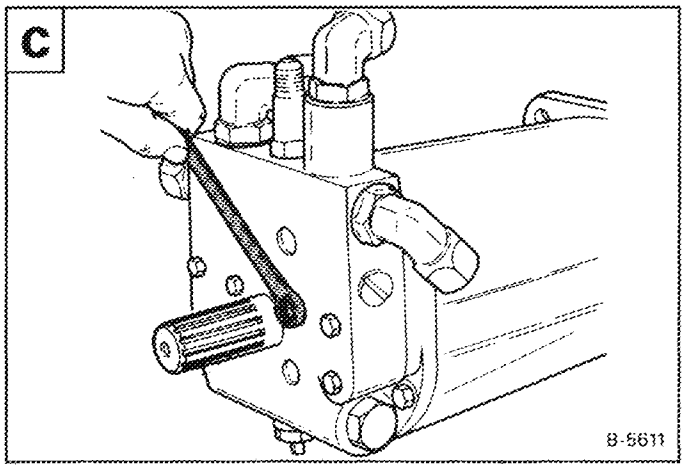


Install the drain tube (Item 1) with a new O-rings [B].

Install the manifold block with new O-rings [B].



Install the bolts and tighten [C].

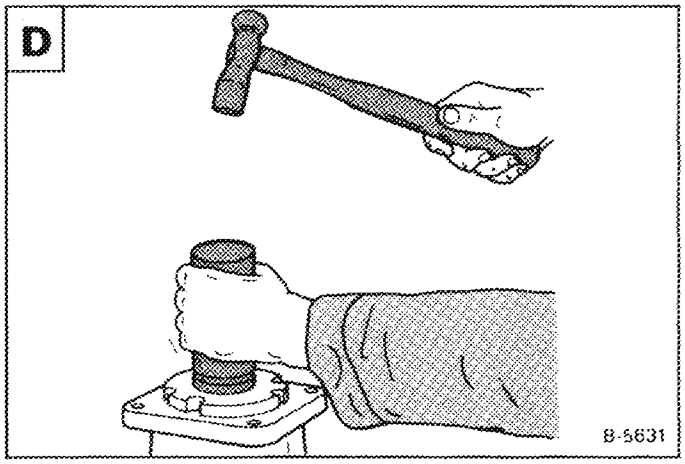


Install the shaft seal using the special tool [D].

Install the snap ring.

Install the key and drive gear.

Tighten the nut at the gear to 250 - 255 ft.lbs. (339 - 346 Nm) torque.



HYDROSTATIC MOTOR (Cont'd)

Manifold Block

Use the following procedure to disassembly and assembly of the manifold block [A]:

Remove the stroked charge relief fitting (Item 13) from the block (Item 11).

Use a allen wrench, remove the retainer (Item 5).

Assembly: Tighten the retainer (Item 5) to 8 - 11 ft.lbs. (11 - 15 Nm) torque.

Remove the poppet (Item 4), spring (Item 6) and shim(s) (Item 8).

NOTE: Make sure to use a drag link socket designed for impact wrench when used in the following procedure.

Use a drag link socket, remove the two shuttle plugs (Item 9).

Assembly: Tighten the shuttle plugs (Item 9) to 65 - 75 ft.lbs. (88 - 102 Nm) torque.

Remove the spring (Item 10) and shuttle valve (Item 7).

Remove the drive relief plugs (Item 2).

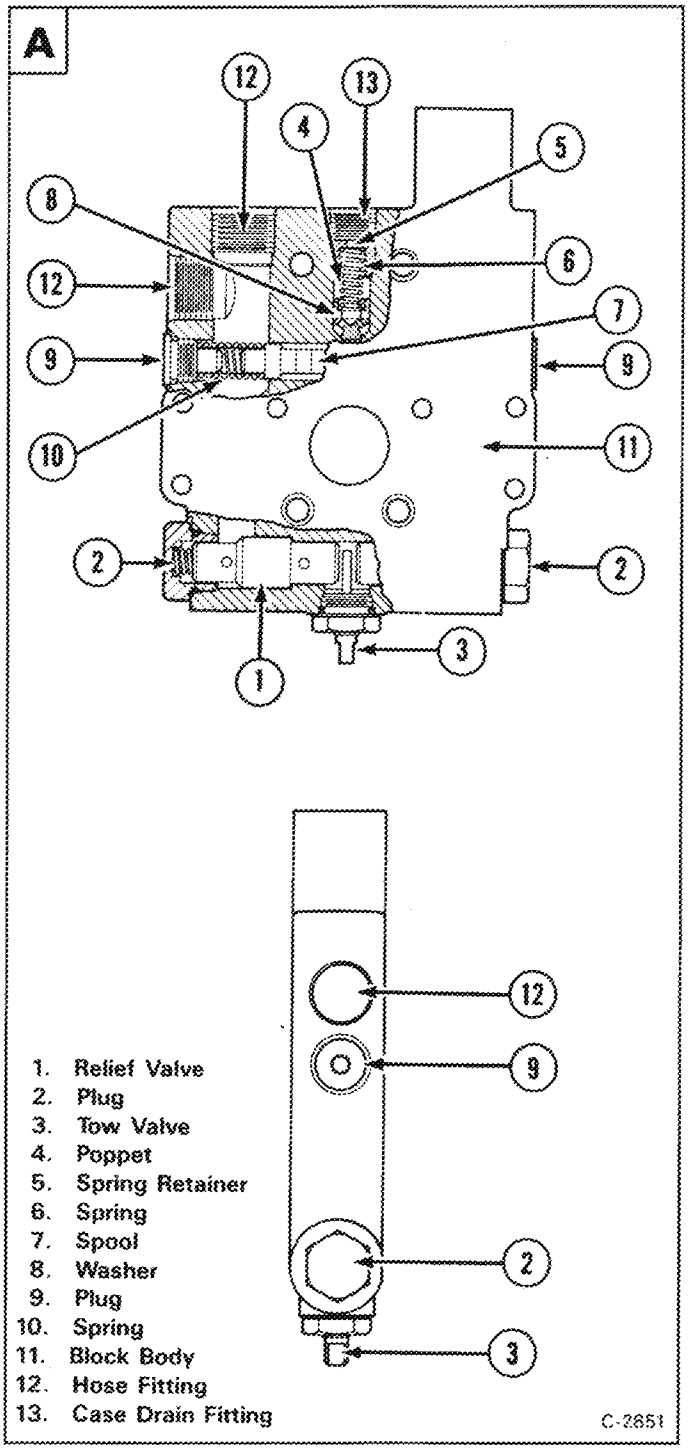
Assembly: Tighten the drive relief plugs (Item 2) to 55 - 65 ft.lbs. (75 - 88 Nm) torque.

Remove the springs and drive relief valves (Item 1).

Remove the tow valve (Item 3).

Check all the parts for wear, scratches or damage. Replace the parts as needed.

NOTE: Always use new O-rings when assembling the manifold block.



1. Relief Valve
2. Plug
3. Tow Valve
4. Poppet
5. Spring Retainer
6. Spring
7. Spool
8. Washer
9. Plug
10. Spring
11. Block Body
12. Hose Fitting
13. Case Drain Fitting

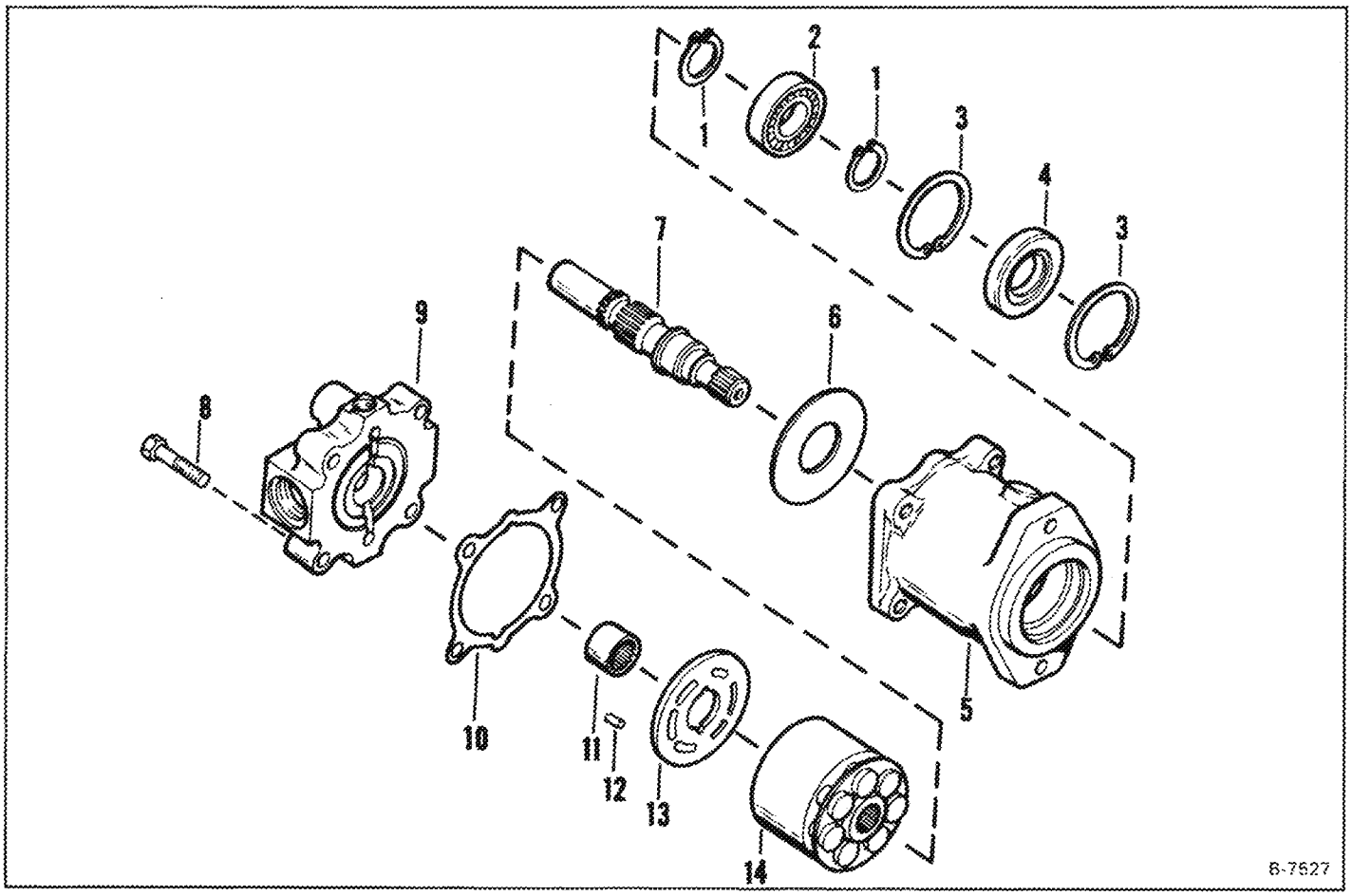
C-2851


bobcat

SUNSTRAND MOTOR

Section A


bobcat



MODEL: 943

Ref.	Description
1.	SNAP RING
2.	BEARING
3.	SNAP RING
4.	SEAL
5.	HOUSING
6.	PLATE, thrust
7.	SHAFT
8.	BOLT
9.	HOUSING, end
10.	GASKET
11.	BEARING
12.	PIN
13.	PLATE
14.	ROTATING GROUP

Disassembly and 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.

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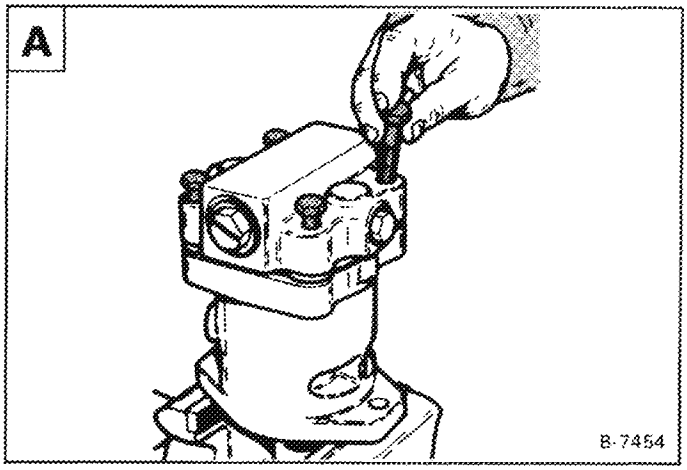
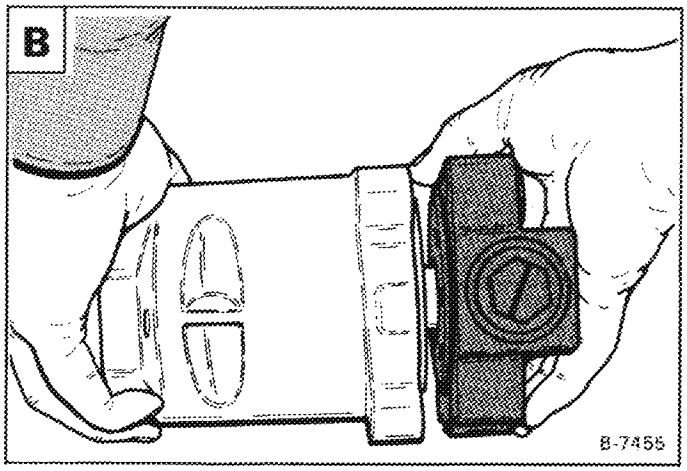


Remove the four bolts [A].

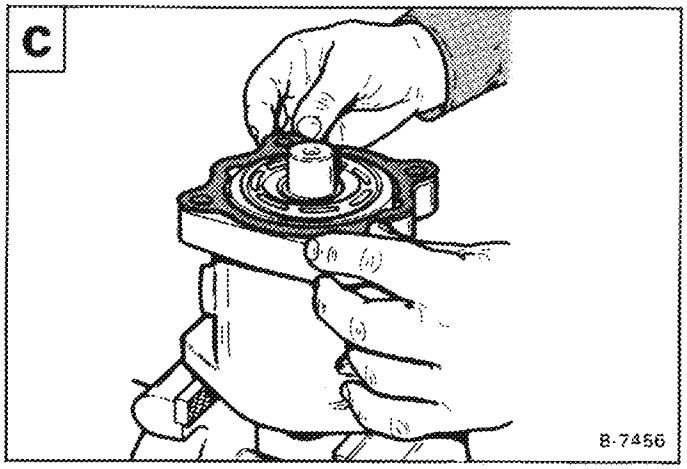
Assembly: Tighten the bolts to 51-62 ft.-lbs. (69-84 Nm) torque.



Remove the end cap [B].

Assembly: Fill the motor case 3/4 to 7/8 full of clean oil through the case drain hole. Do Not over fill the case, this will put *un-filtered oil into the closed loop of the motor.

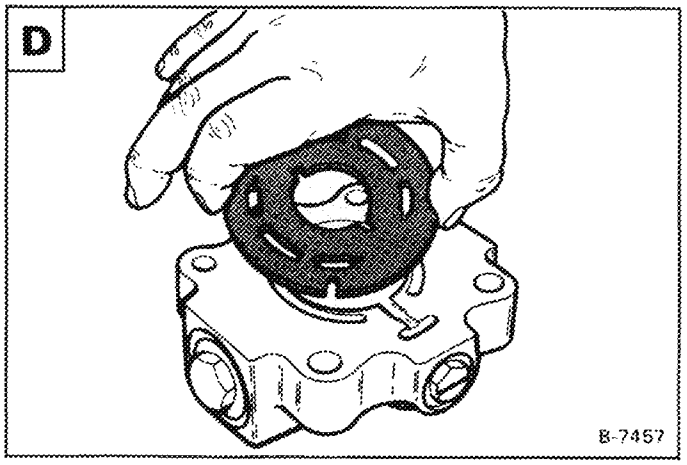
*Un-filtered oil is oil that has not gone through the loader filter.



Remove the gasket [C].

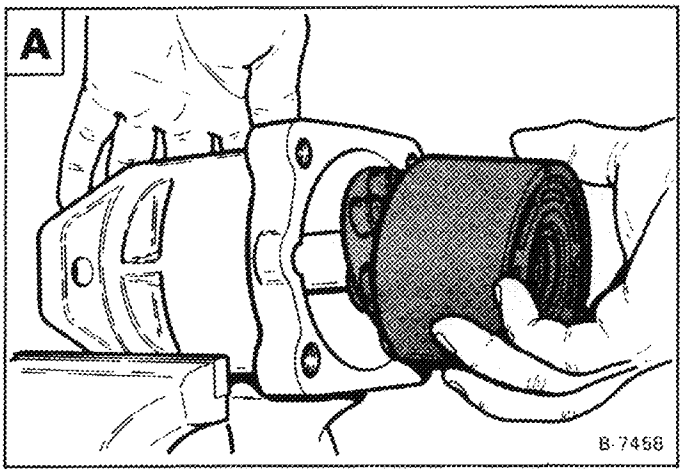
Remove the wafer plate [D].

Assembly: Make sure the dowel pin goes into the notch in the wafer plate.

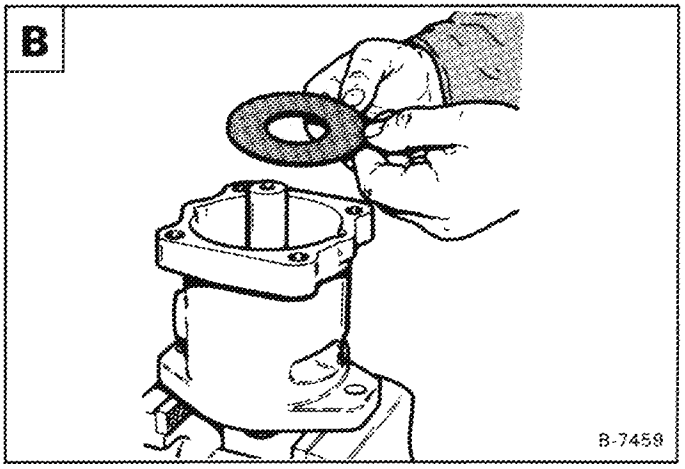


HYDROSTATIC MOTOR (Cont'd)

Remove the rotating group assembly [A].



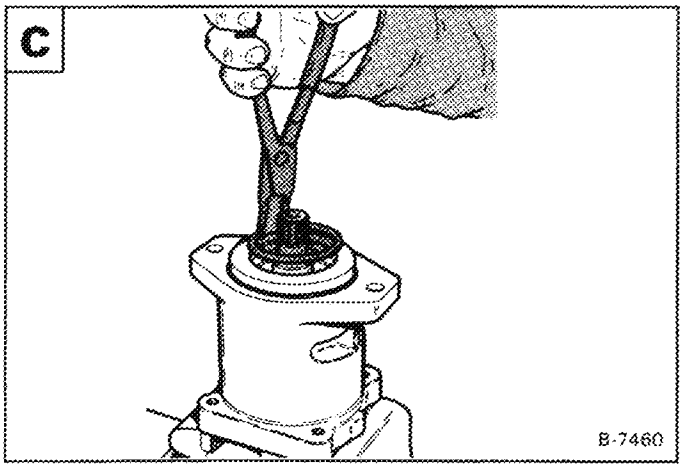
Remove the wear plate [B].



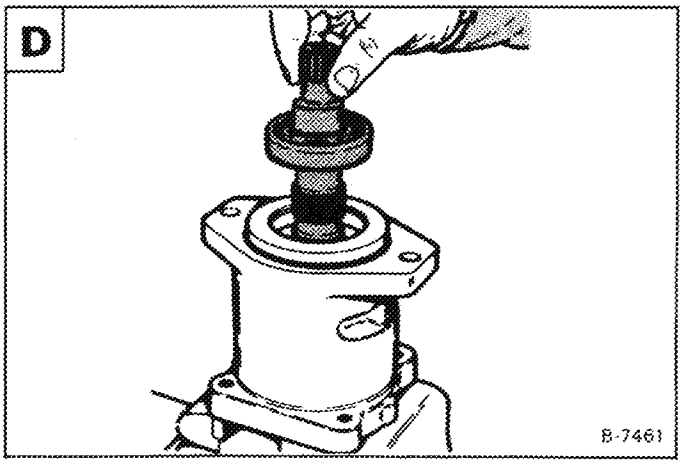
Remove the snap ring [C].

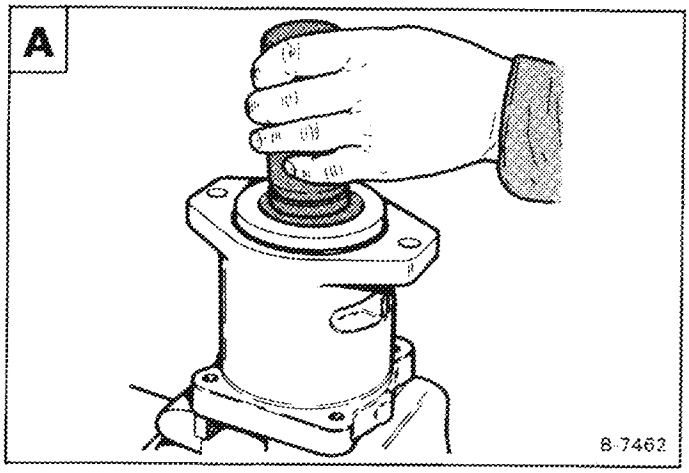
Use a puller, remove the shaft seal.

Remove the snap ring over the bearing.



Remove the shaft and bearing assembly [D].





Inspection

Clean all the parts in solvent and use air pressure to dry the parts. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

Do not use sandpaper or file to remove scratches on any of the parts.

Before the hydrostatic motor is assembled, check the following items:

1. Wafer Plate
2. Rotating Group Pistons
3. Piston Shoes
4. Wear Plate
5. Shaft Bearing and Splines

Check all the contact surfaces. Replace any parts that have scratches or are worn that can cause leakage.

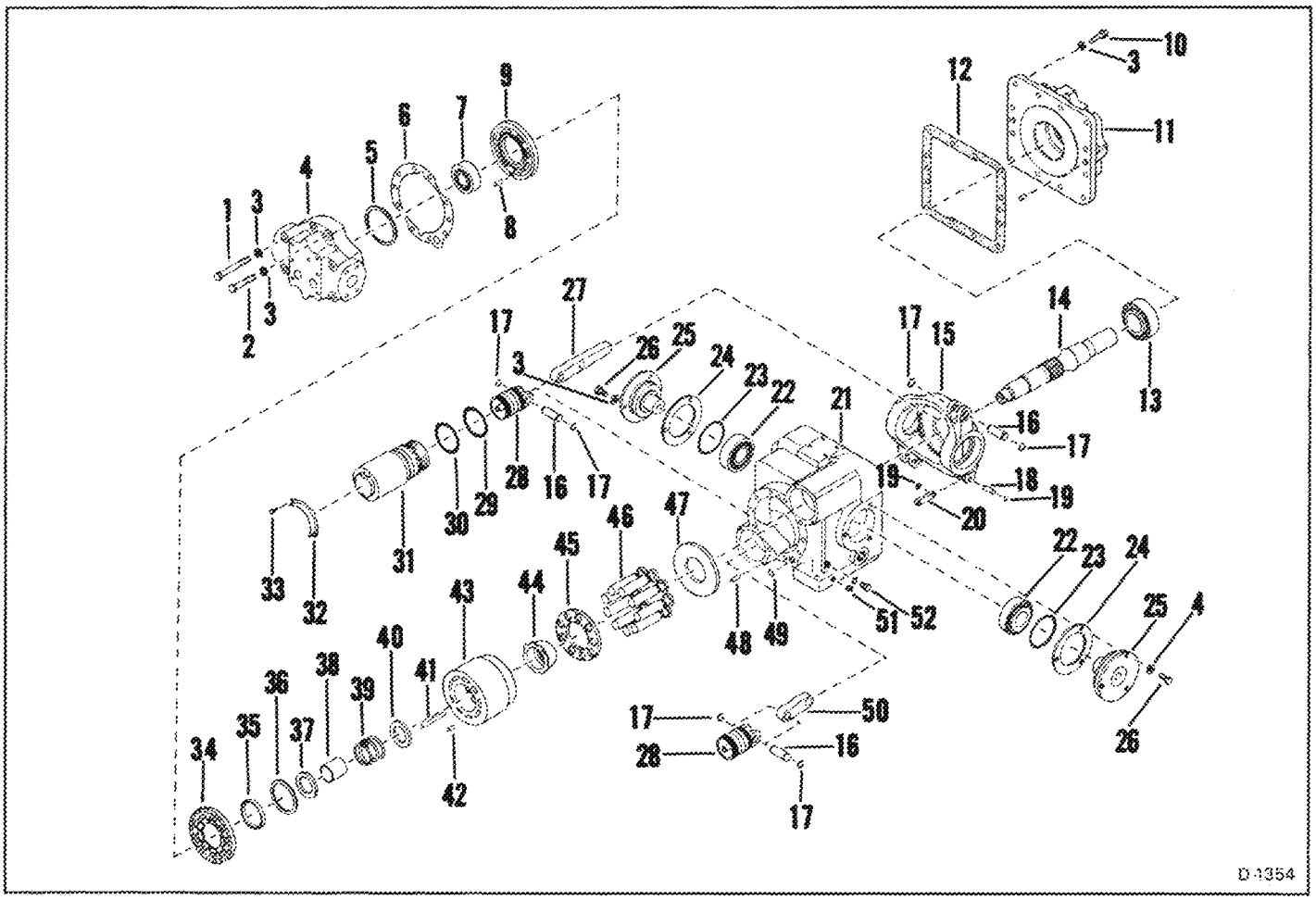
NOTE: **Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.**

Use the correct size seal driver tool and install the shaft seal after the is assembled [A].

Section B


bobcat

PARTS IDENTIFICATION



MODEL: 974, 975

Ref.	Description	Ref.	Description
1.	BOLT	27.	LINK
2.	BOLT	28.	PISTON, servo
3.	WASHER	29.	O-RING
4.	HOUSING, end	30.	O-RING
5.	SHIM	31.	SLEEVE, servo
6.	GASKET	32.	RETAINER, servo
7.	BEARING	33.	SCREW
8.	PIN	34.	PLATE, bearing
9.	PLATE, valve	35.	PILOT
10.	BOLT	36.	SNAP RING
11.	COVER, front	37.	RETAINER
12.	GASKET	38.	GUIDE
13.	BEARING	39.	SPRING
14.	SHAFT	40.	SEAT
15.	PLATE, swash	41.	PIN
16.	PIN	42.	PIN
17.	SNAP RING	43.	BLOCK, cylinder
18.	PIN	44.	GUIDE
19.	SNAP RING	45.	RETAINER
20.	LINK	46.	PISTON
21.	HOUSING	47.	PLATE, thrust
22.	BEARING	48.	PIN
23.	O-RING	49.	O-RING
24.	SHIM	50.	LINK
25.	PIVOT	51.	PLUG
26.	BOLT	52.	PLUG

Disassembly and 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

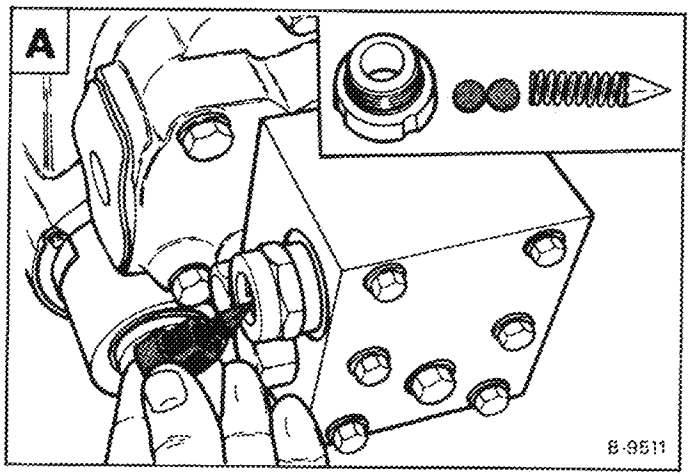
Loosen the center plug at the high pressure relief valve. Remove the plug, spring and poppet [A].

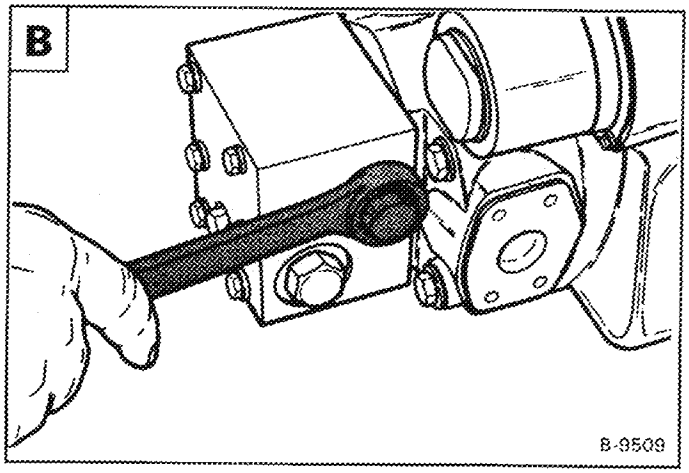
There are shim(s) under the spring and the high pressure relief valve can be adjusted (when installed in the machine) (Inset) [A].

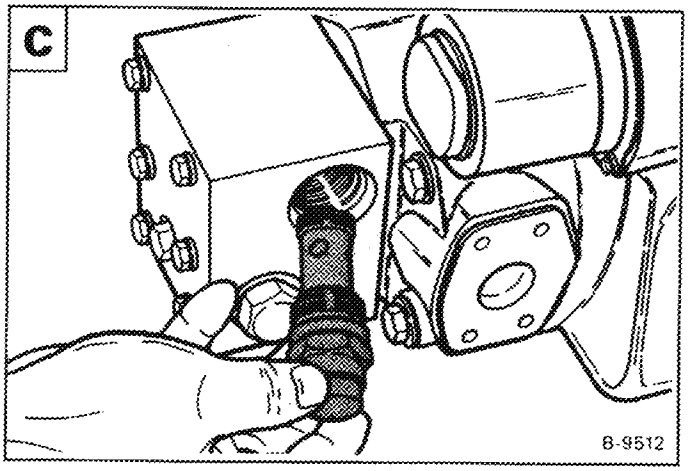
Loosen the high pressure relief valves (both sides) [B].

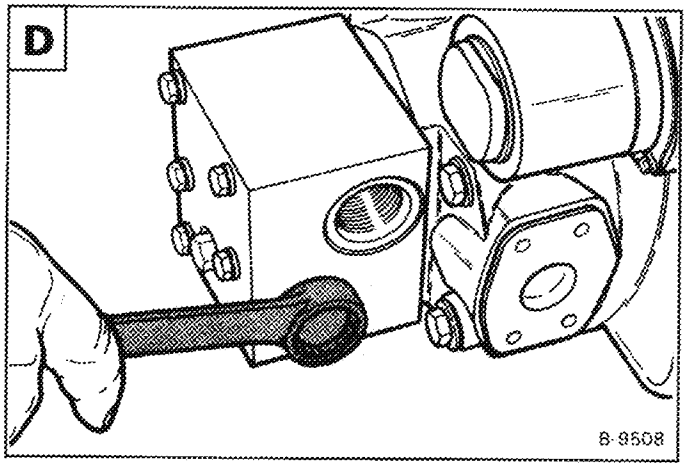
Remove the high pressure relief valve from the manifold block (both sides) [C].

Remove the plugs at the shuttle valve (both sides) [D].

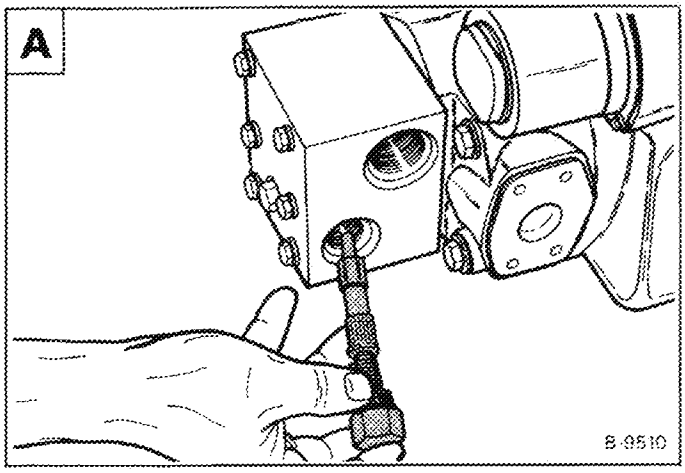




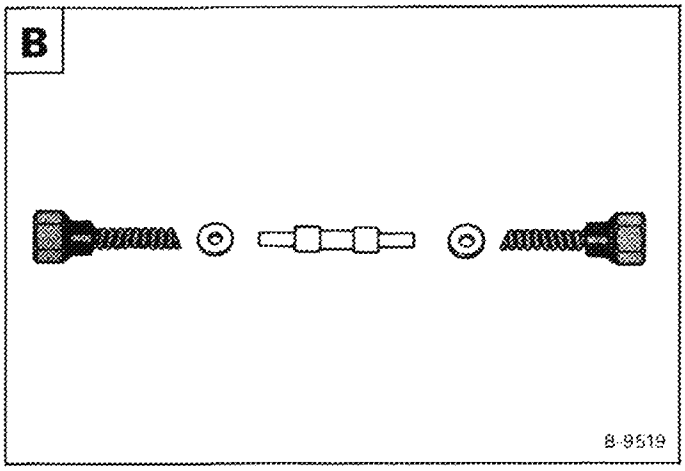




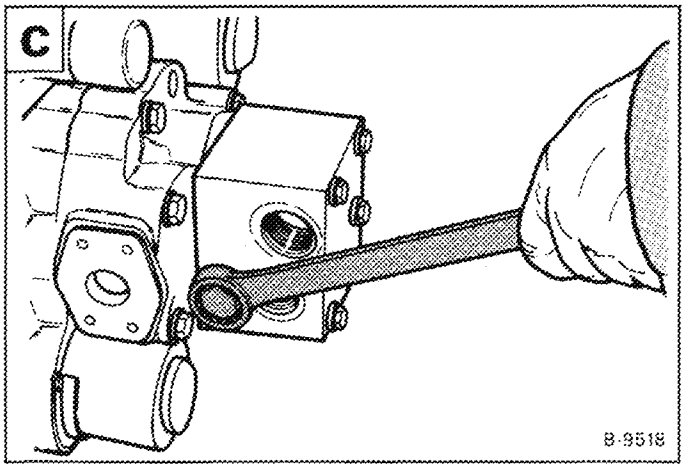
Remove the shuttle spool and spring from the manifold block [A].



Assembly: Install the shuttle spool, washers and springs as shown [B].



Loosen the plug at the charge pressure relief valve [C].



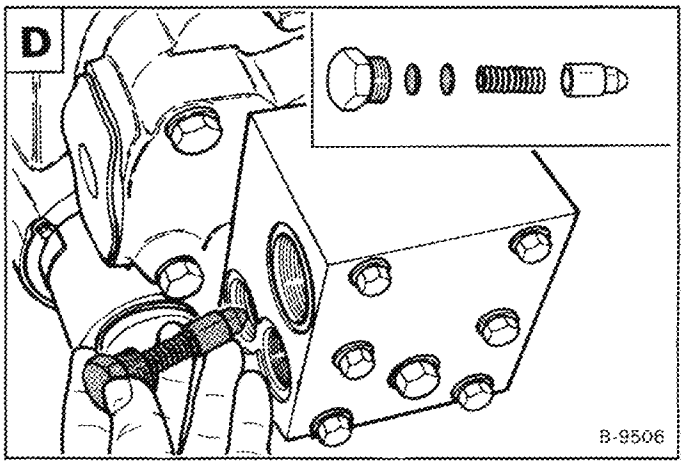
Remove the spring and poppet [D].

There are shim(s) under the spring (Inset) [D]

The charge pressure relief can be adjusted (when installed in the machine) [D].

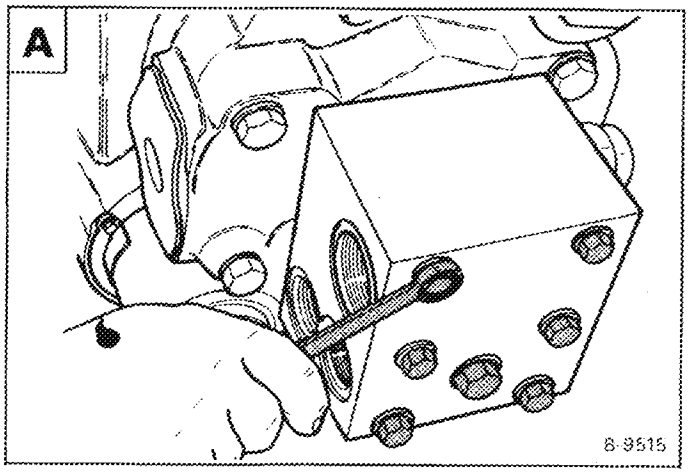
To increase pressure add shims.

To decrease pressure remove shims.

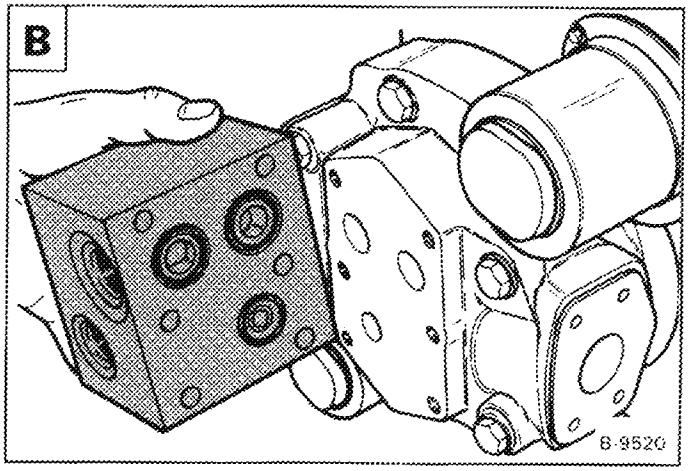


Remove the bolts from the manifold block [A].

Assembly: Tighten the bolts to 19-21 ft.-lbs. (26-28 Nm) torque.

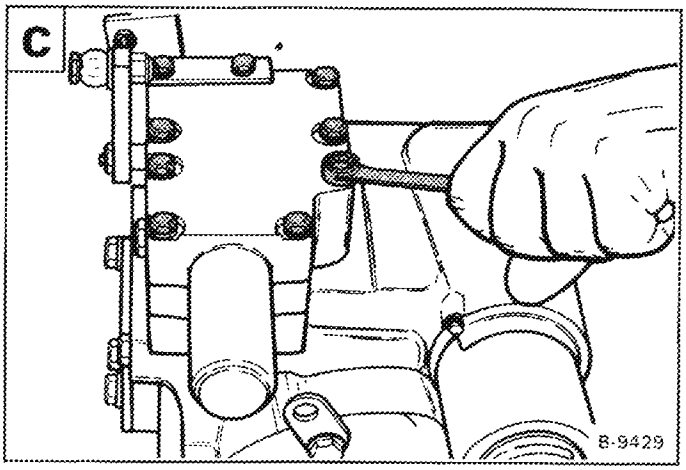


Remove the manifold block from the hydrostatic motor [B].

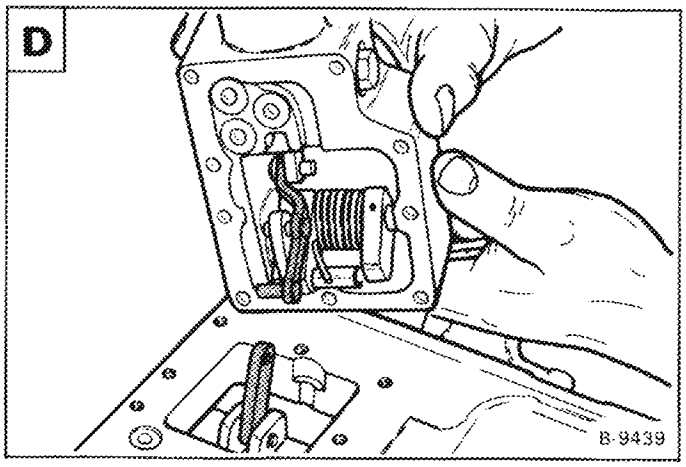


Remove the bolts from the displacement control valve [C].

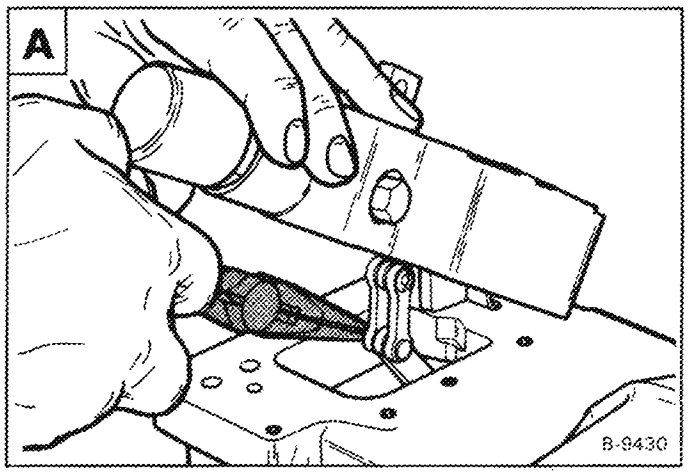
Assembly: Tighten the bolts to 10-11 ft.-lbs. (14-15 Nm) torque.



NEW STYLE displacement control valve, disconnect the linkage at the swashplate link [D].

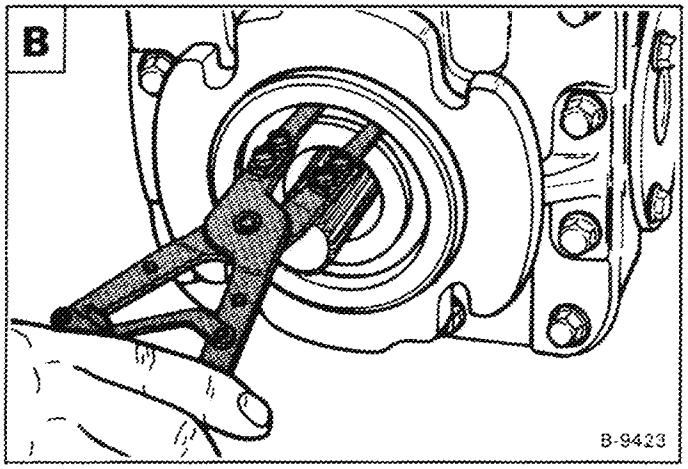


OLD STYLE displacement control valve, remove the cotter pin with a needle nose pliers [A]. Remove the pin from the swashplate link.

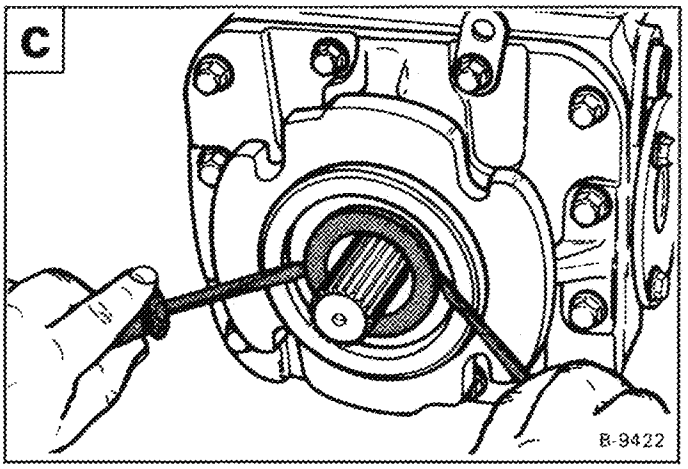


NOTE: Before disassembly or assembly of the linkage, put a rag into the hydrostatic motor housing to prevent the cotter pin or pin from falling into the motor housing.

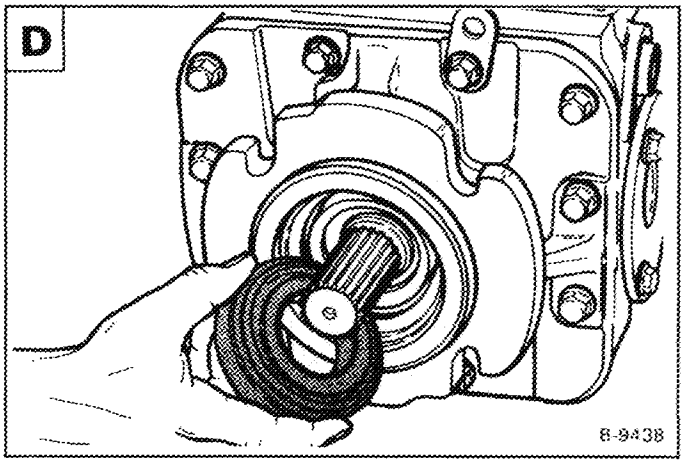
Remove the large snap ring at the drive end of the hydrostatic motor [B].



Use two screwdrivers and pry the seal from the housing [C].

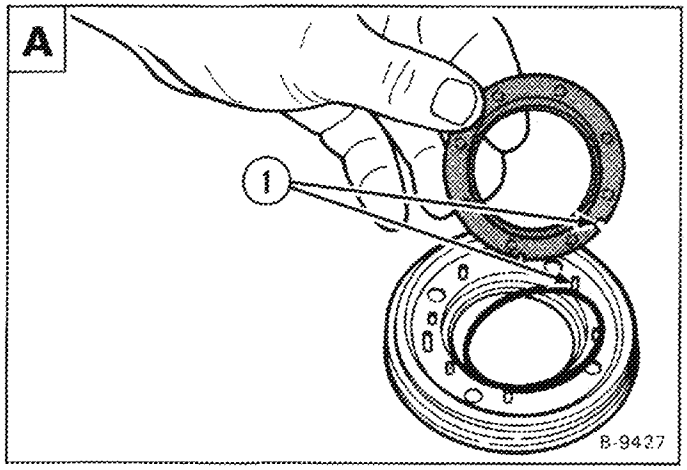


Remove the seal from the shaft [D].

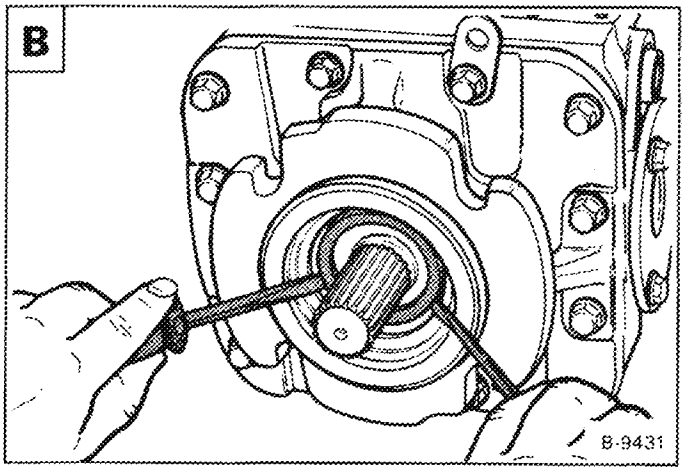


Remove the steel seal. Remove the O-ring [A].

Assembly: Make sure the locating pin and slot (Item 1) are in alignment [A].



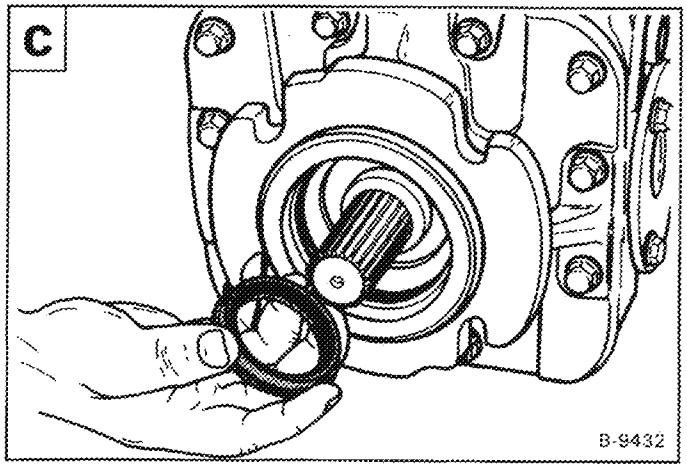
Using two screwdrivers, remove the bronze seal [B].



Remove the O-ring from the inside of the hydrostatic motor housing [C].

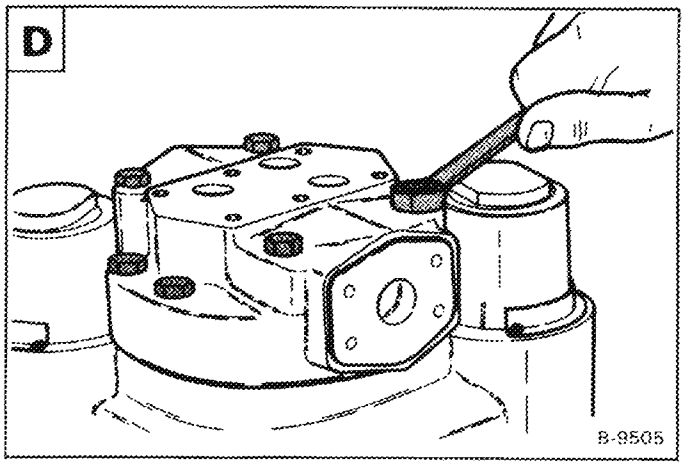
Assembly: Put grease on all the parts before installing the seal assembly into the motor housing.

Put a mark across the end cap for correct assembly.



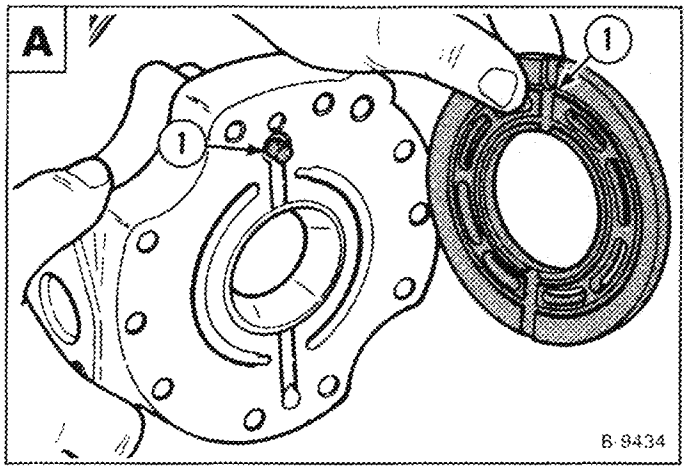
Remove the bolts at the end cap [D].

Assembly: Tighten the bolts to 27 - 30 ft.lbs. (37 - 41 Nm) torque.

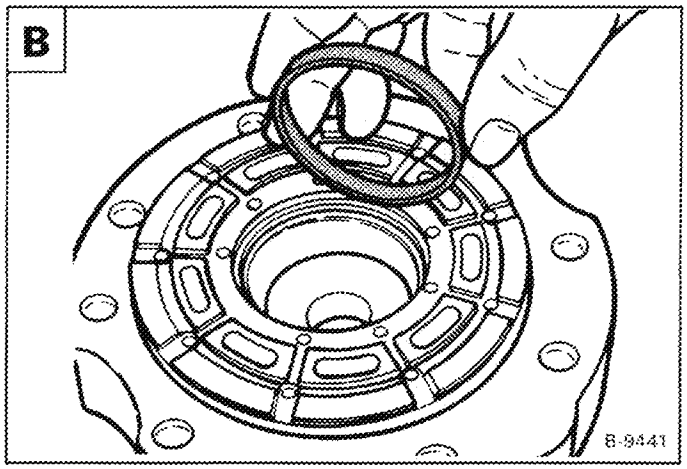


Remove the end cap and the valve plate [A].

NOTE: Make sure the valve plate notch and locating pin (Item 1) are in alignment when assembling the hydrostatic motor [A].

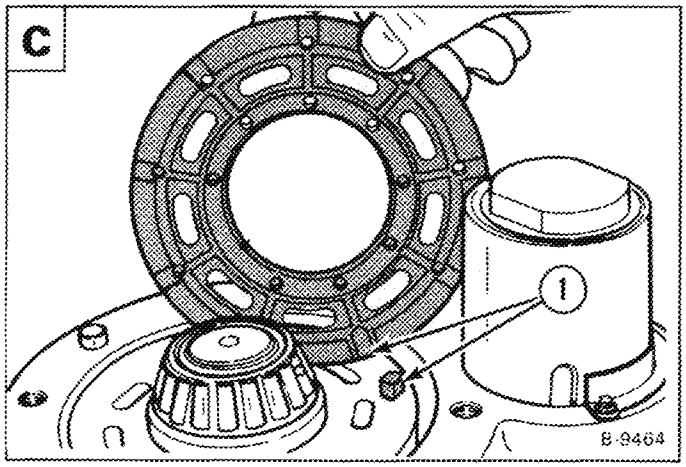


Assembly: Before installation of the valve plate and end cap, check the locating ring for cracks [B].



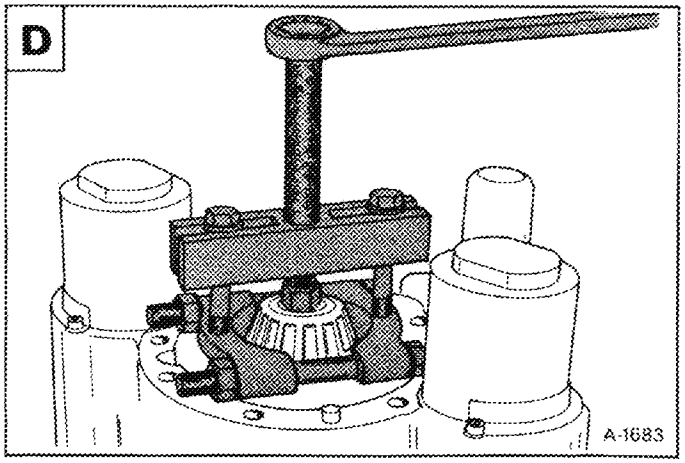
Remove the bearing plate from the cylinder block [C].

NOTE: Make sure the bearing plate notch and the locating pin (Item 1) are in alignment when assembling the hydrostatic motor [C].

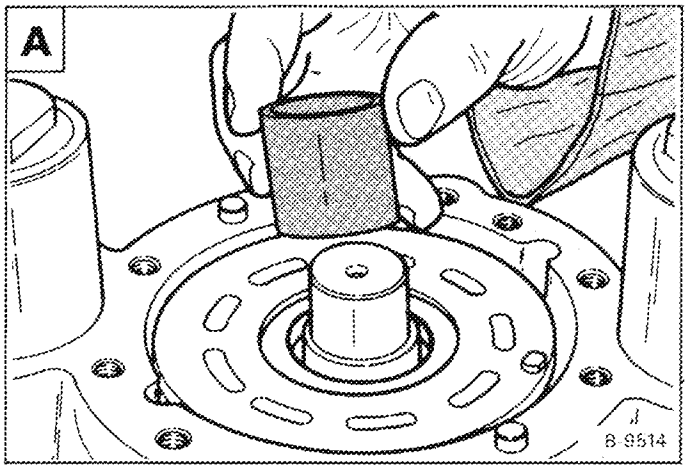


Use a bearing puller, remove the bearing from the end of the shaft [D].

Assembly: Use the correct size bearing driver tool to install the bearing. Make sure to support the drive shaft.

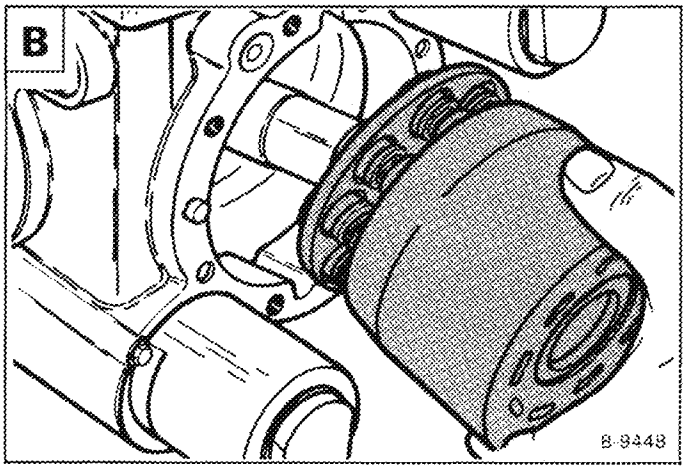


Remove the spring guide [A].

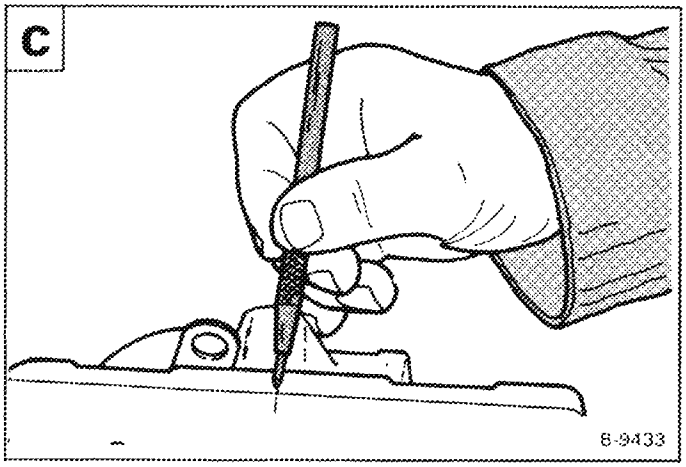


Remove the rotating group [B].

NOTE: **When installing the rotating group, make sure the missing spline on the drive shaft and splines that are close together (in the rotating group) are in correct alignment.**

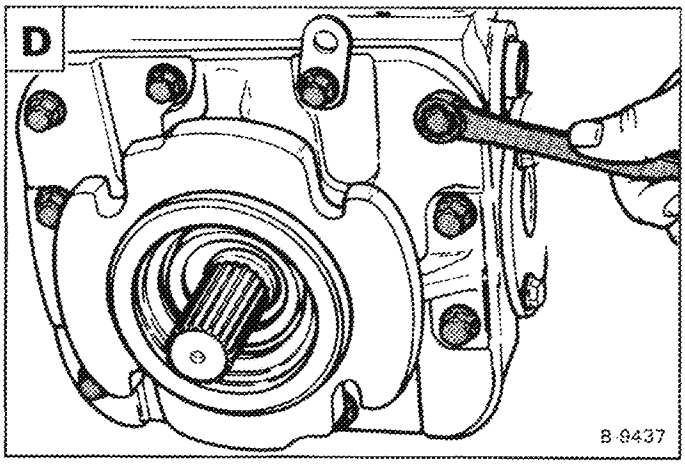


Mark the front cover for correct assembly [C].

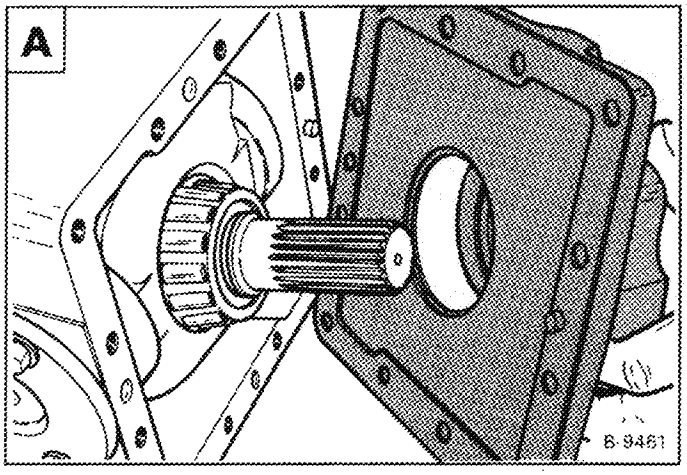


Remove the bolts at the front cover [D].

Assembly: Tighten the bolts to 27 - 30 ft.lbs. (37 - 41 Nm) torque.



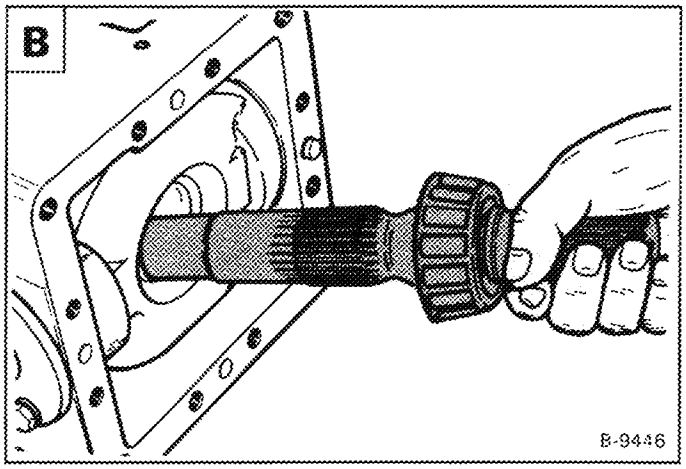
Remove the front cover from the housing [A].

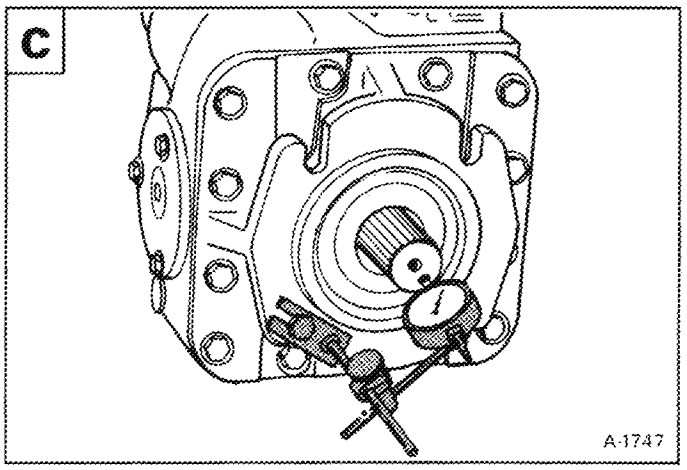


Remove the drive shaft [B].

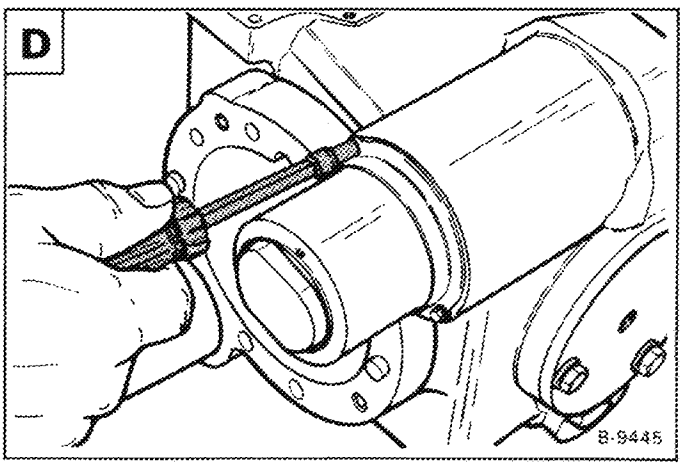
Assembly: If a new drive shaft, end cap, front cover or bearings are installed, the drive shaft end play must be checked. Use the following procedure:

1. Install the end cap and gasket.
2. Tighten two bolts at the end cap to 27 - 30 ft.lbs. (37 - 41 Nm) torque.
3. Install the drive shaft.
4. Install the front cover and gasket [A].
5. Tighten two of the front cover bolts to 27 - 30 ft.lbs. (37 - 41 Nm) torque.
6. Install a dial indicator [C].
7. The end play must be between 0.003 - 0.013" (0,08 - 0.33 mm).
8. If the end play is over 0.013" (0,33 mm), add shims below the end cover bearing race.

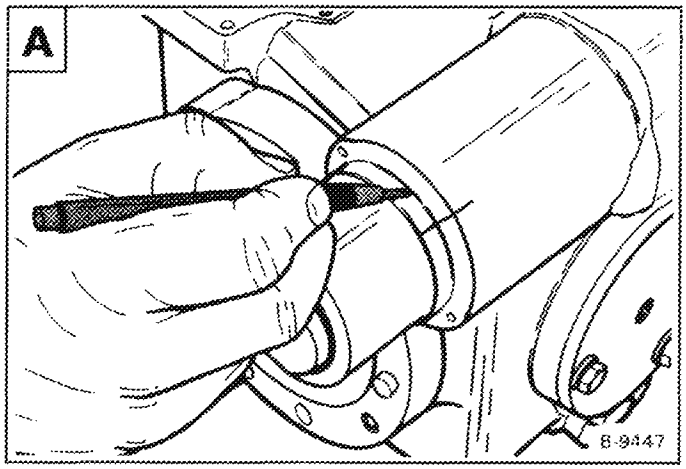




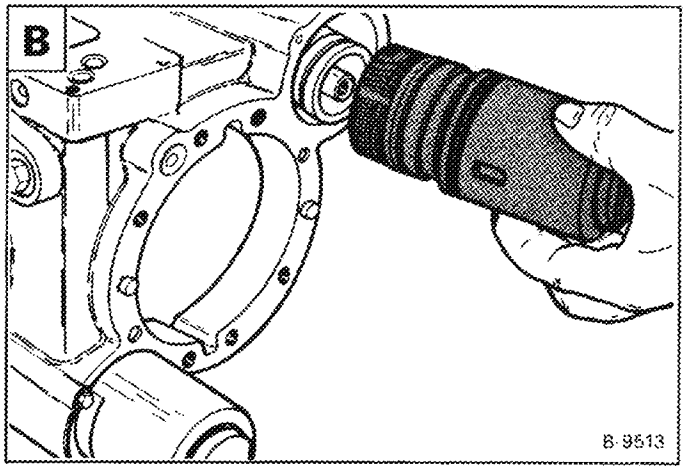
Remove the screws from the servo sleeve retainer [D].



Mark the servo sleeve in two positions for correct assembly [A].

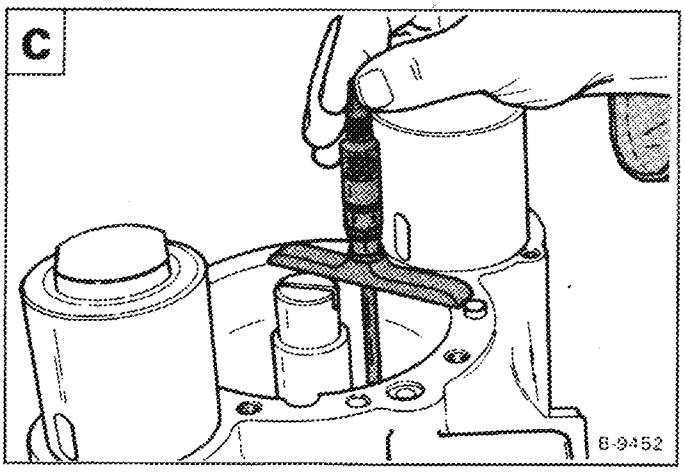


Turn and remove the servo sleeve from the housing and the piston [B].

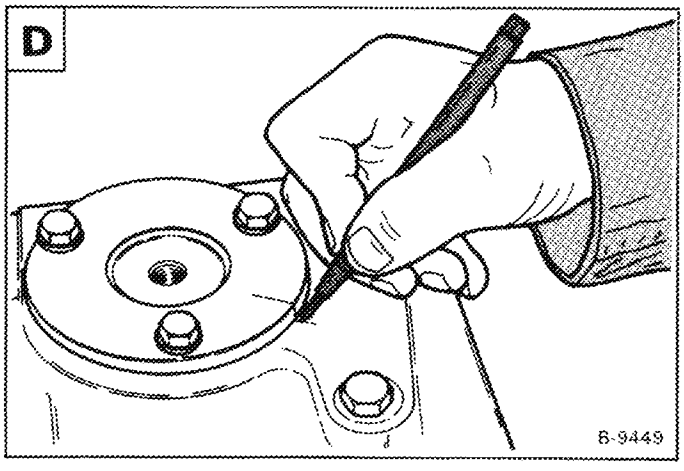


NOTE: **Repeat this procedure to remove the other servo sleeve from the hydrostatic motor.**

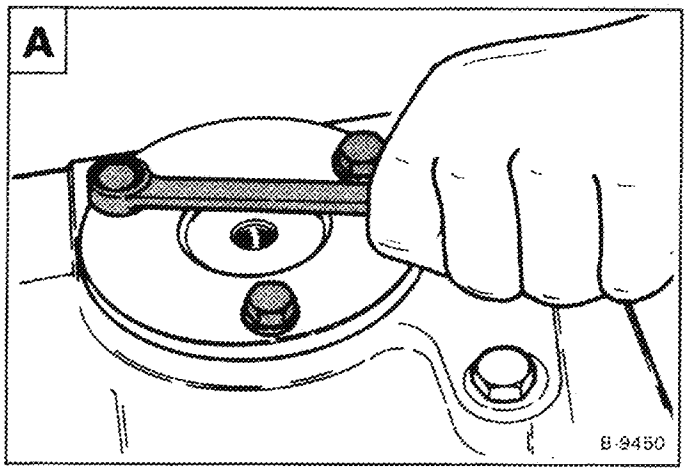
Assembly: When installing the servo sleeve and marks where not present. Use a depth micrometer, measure from the edge of the housing to the swashplate surface at each servo sleeve [C]. Turn the servo sleeve in or out (each side) until there is no more than 0.005" (0,13 mm) difference between the two servo pistons.



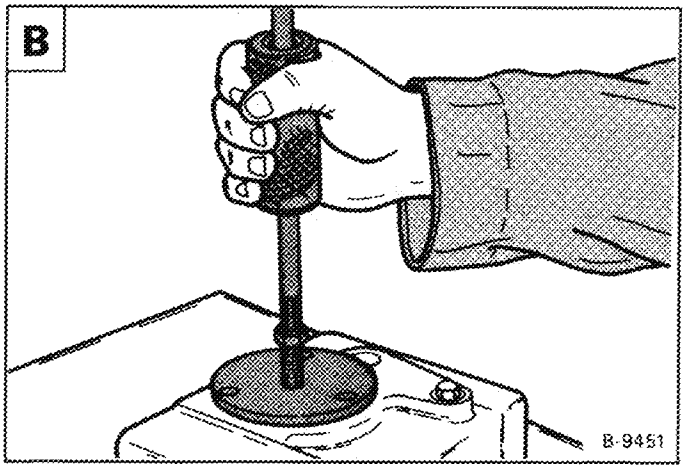
Mark the trunnion cover for correct assembly [D].



Remove the bolts at the trunnion cover [A].



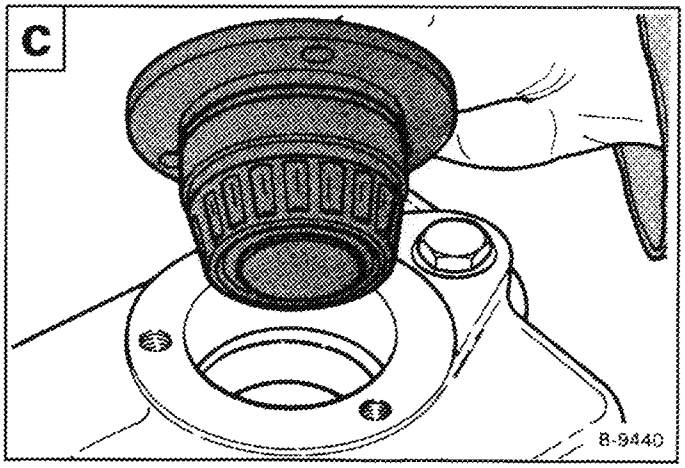
Use a slide hammer puller, remove the trunnion and bearing [B].



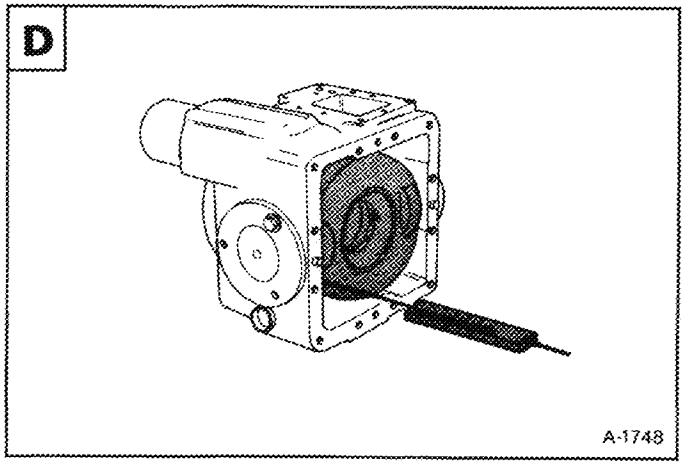
Remove the swashplate trunnion and bearing [C].

Assembly: If the swashplate trunnion, trunnion bearing or plastic trunnion gasket are replaced, you must adjust the pre-load on the trunnion bearings as follows:

1. Put the swashplate into the housing.
2. Remove the O-rings from the trunnions.
3. Use the same size gaskets as was removed. Install the trunnion and bearing.
4. Tighten the bolts at the trunnion.



5. Fasten a spring scale to the swashplate [D].
6. The force needed to move the swashplate is 3 - 4 lbs. (1,4 - 1,8 kg). Add or subtract shims evenly under the trunnions to get the correct specifications. No more than 0.005" (0,13 mm) of shims should be installed under one side of a trunnion.



Remove the swashplate and servo pistons [A].

Assembly. If the swashplate and piston are to be used again, make sure to mark them so they will be returned to their original position.

NOTE: **Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.**

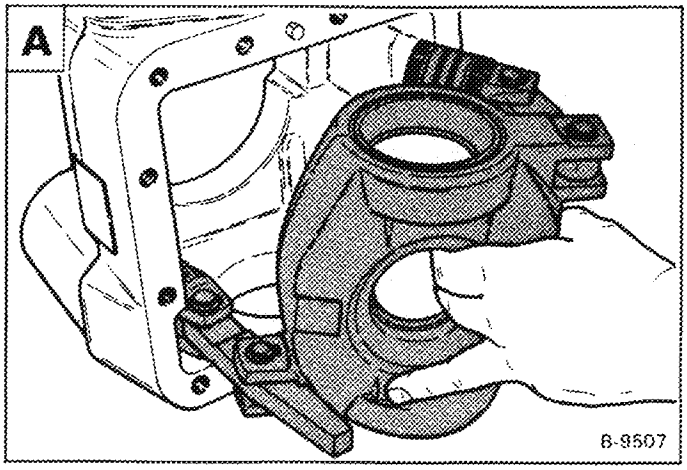
Inspection

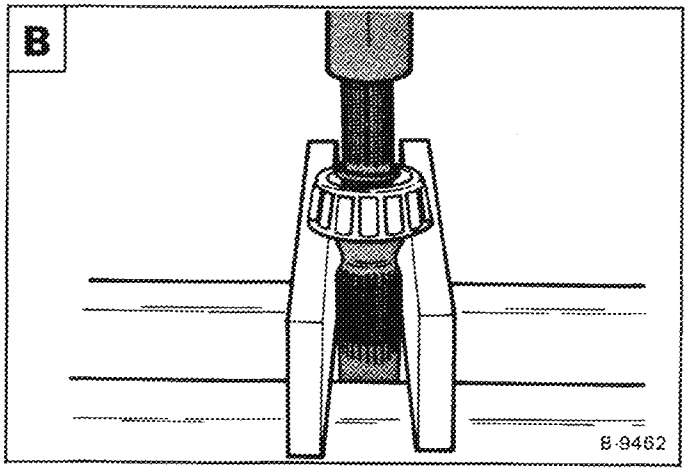
Clean all parts in solvent and use air pressure to dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

Check the drive shaft splines. Check the drive shaft bearings.

Use a press to remove and install the drive shaft bearings [B].

Check the valve, bearing and swashplate plates. The finish must be smooth and free of scratches. If the scratches can be felt with a fingernail, replace the plate(s).

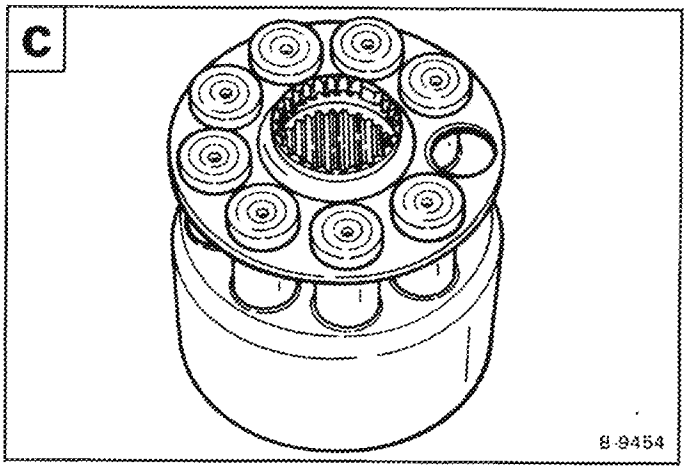




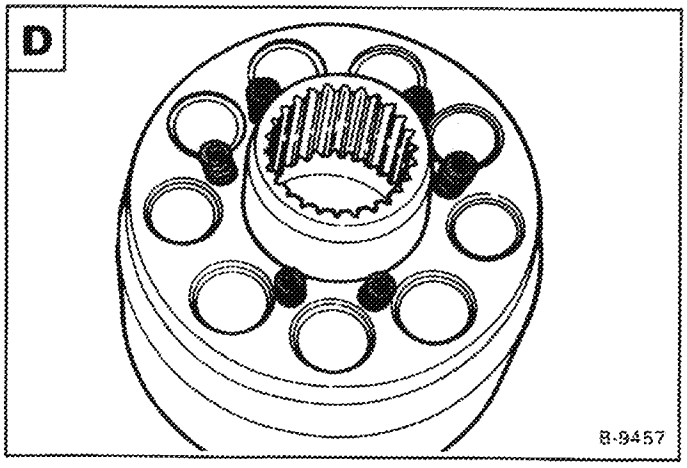
Remove a piston from the cylinder block [C].

Mark this position on the side of the cylinder block.

Remove the piston assembly from the cylinder block.



Remove the retainer guide. Check the springs in the cylinder block [D].



HYDROSTATIC MOTOR (Cont'd)

Check each piston in its bore to make sure it moves freely.

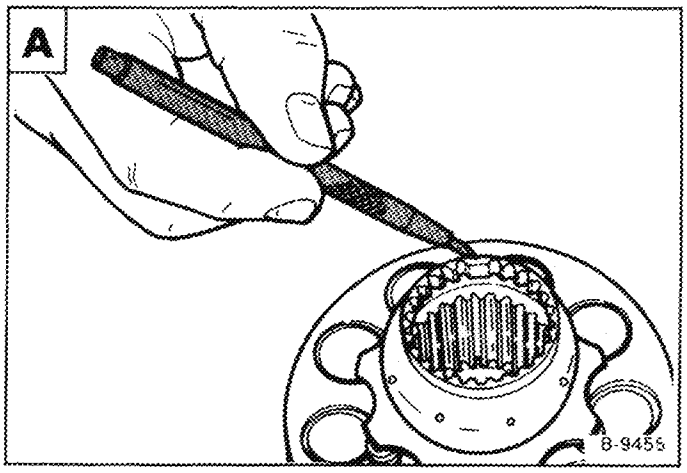
Check each piston shoe for scratches. Check the flat surface of the cylinder block for being smooth and free of scratches.

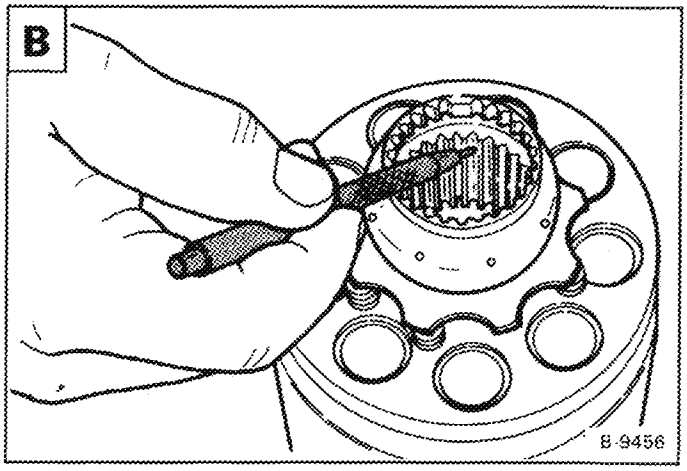
Inspect the shoe plate for wear or cracks. If there is any defect in the rotating group, the complete unit must be replaced.

DO NOT use sandpaper or a file to remove scratches.

When installing the retainer guide, make sure the notch [A] is in alignment with the two closed splines in the cylinder block [B].

The notch and closed splines must make alignment so the rotating group can be installed on the drive shaft with the missing splines.

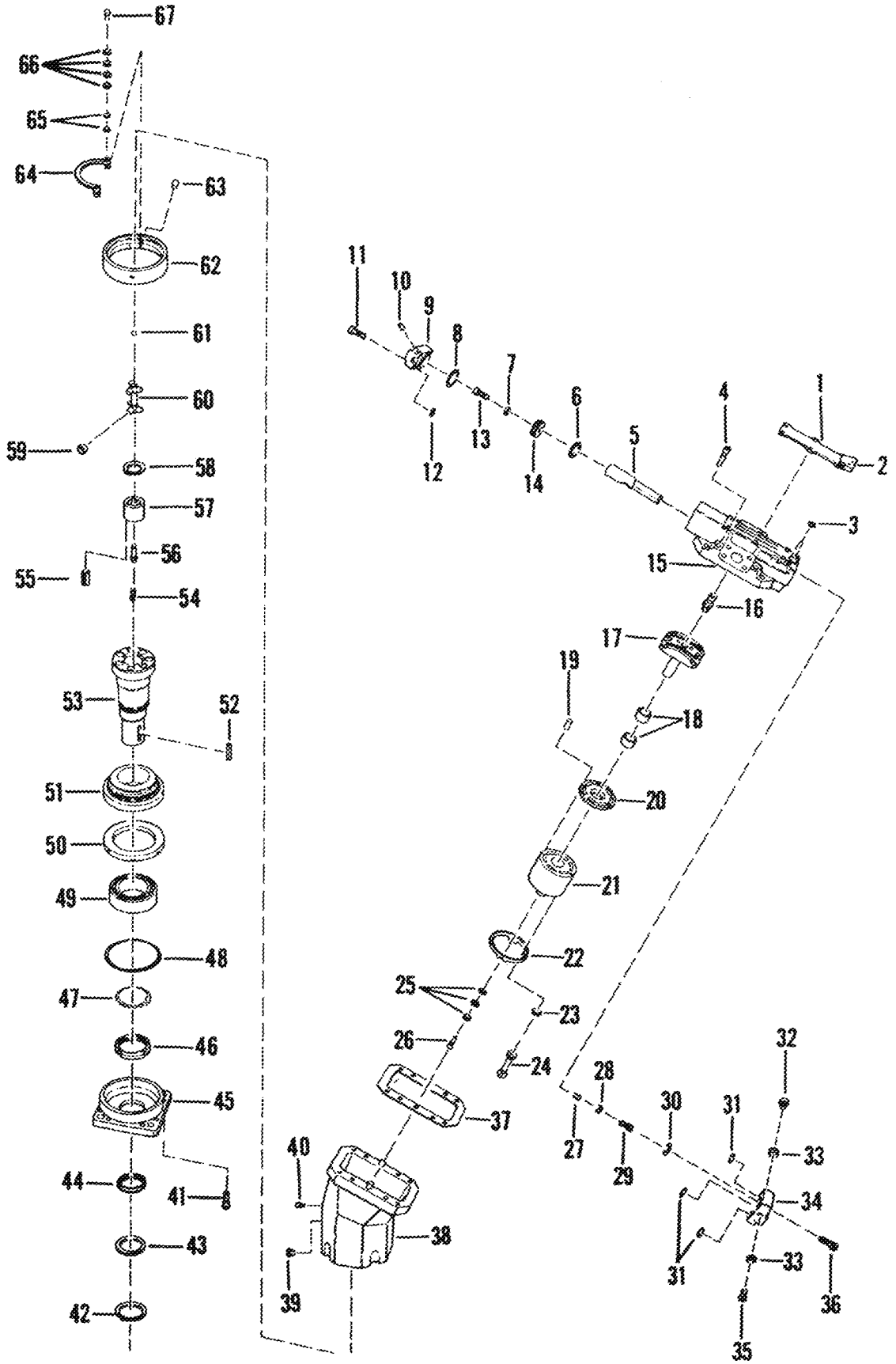





bobcat

SECTION C


bobcat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D-1828

MODEL: 1600, 2400

Ref.	Description
1.	BOLT
2.	COVER
3.	O-RING
4.	BOLT
5.	PISTON
6.	RING, piston
7.	WASHER
8.	O-RING
9.	COVER, end
10.	PLUG
11.	BOLT
12.	O-RING
13.	BOLT
14.	HEAD, piston
15.	CONNECTION BLOCK
16	LEVER, feedback
17.	VALVE SEGMENT
18.	BEARING
19.	PIN, dowel
20.	PLATE, wear
21.	BARREL, cylinder
22.	RING, bearing
23.	RING, piston
24.	PISTON
25.	SPRING, belleville
26.	PIN, support
27.	SCREW
28.	STOP, spacer
29.	BOLT
30.	O-RING
31.	O-RING
32.	BOLT
33.	WASHER, seal
34.	COVER, end
35.	PLUG
36.	BOLT
37.	GASKET
38.	HOUSING
39.	PIN, dowel
40.	PLUG
41.	BOLT
42.	SNAP RING
43.	RING, support
44.	SEAL, shaft
45.	HOUSING, flange
46.	NUT, spanner
47.	RING, locking
48.	O-RING
49.	BEARING & CUP ASSY.
50.	SPACER
51.	BEARING & CUP ASSY.
52.	KEY
53.	SHAFT & BEARING ASSY.
54.	SPRING
55.	PIN, support
56.	PIN, roll
57.	CARRIER
58.	SNAP RING
59.	ROLLER
60.	SHAFT, synchronizing
61.	BALL
62.	SLEEVE, spacer
63.	PIN, dowel
64.	YOKE
65.	WASHER, shim
66.	SPRING, belleville
67.	PIN, support

HYDROSTATIC MOTOR

Disassembly

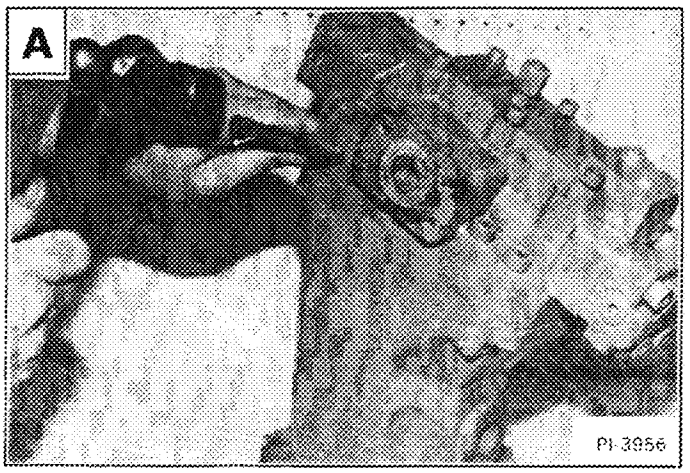
IMPORTANT

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

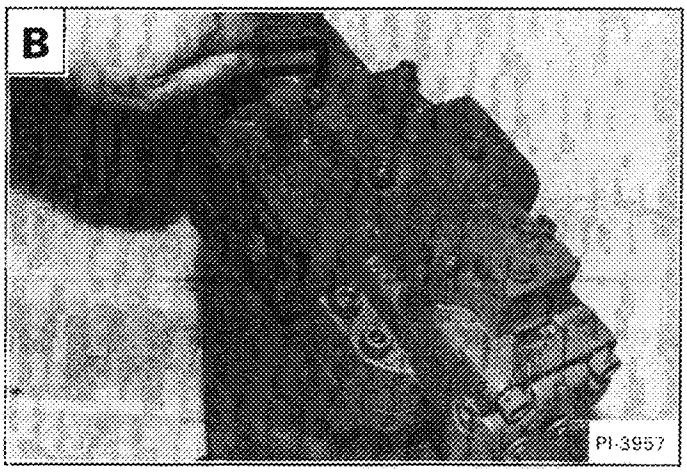
Put the hydrostatic motor on a work bench with a hole for the output shaft or on a support block.

Mark the motor housings for correct assembly [A].

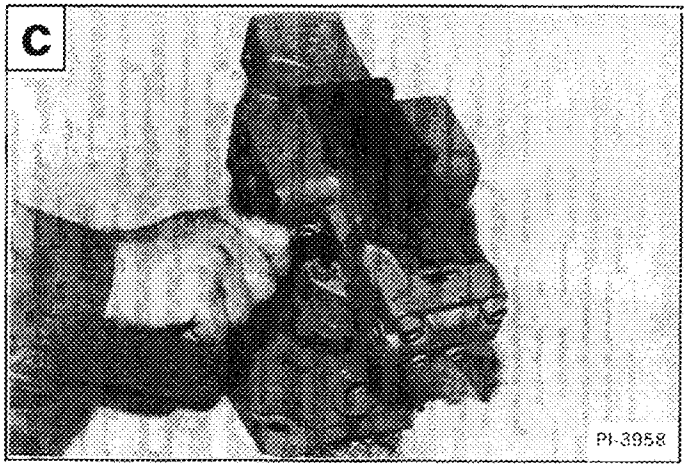


Remove the four bolts at the cover [B].

Remove the cover.



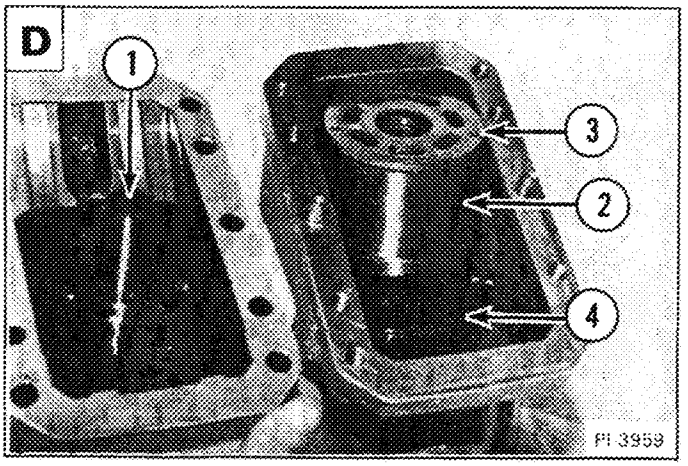
Remove the bolts at the connection block [C].



Remove the connection block [D].

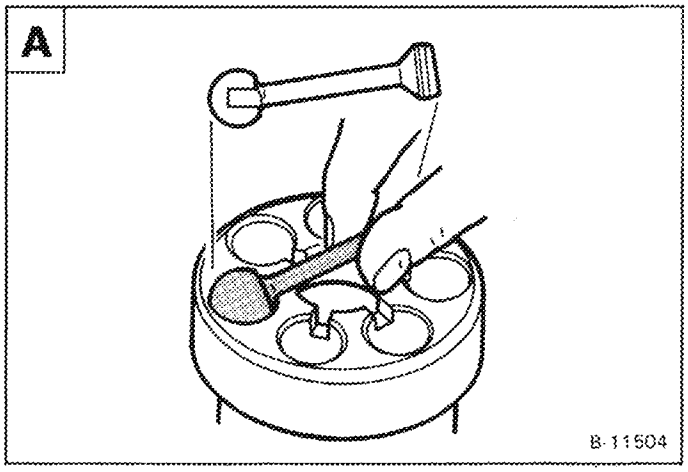
Remove the valve segment (Item 1), cylinder barrel (Item 2), wear plate (Item 3) and yoke with belleville washers (Item 4) [D].

Remove the synchronizing shaft and rollers.



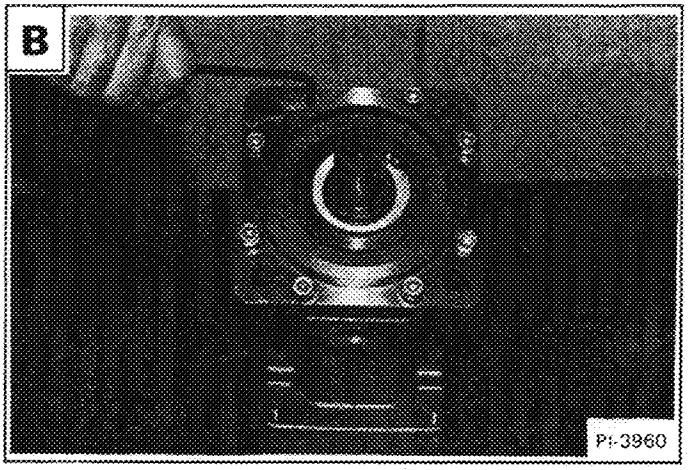
NOTE: **Before removing pistons, mark the pistons so they will be correctly assembled in their ball races.**

Remove the pistons by putting the piston shaft in the cut-out set radially around the drive plate and lift each piston out [A].

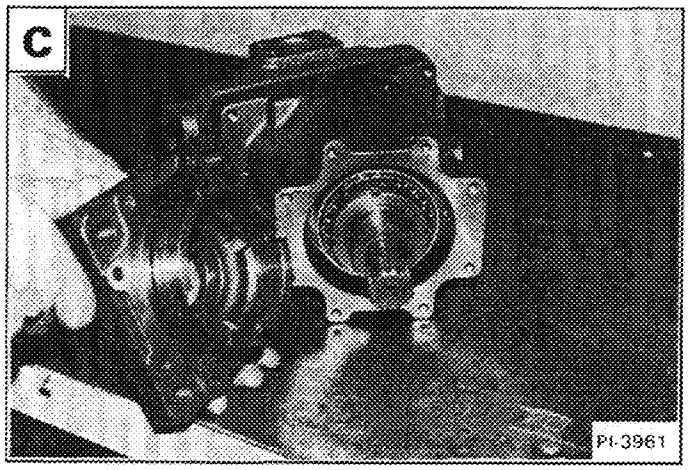


Remove the motor from the support block and turn it over.

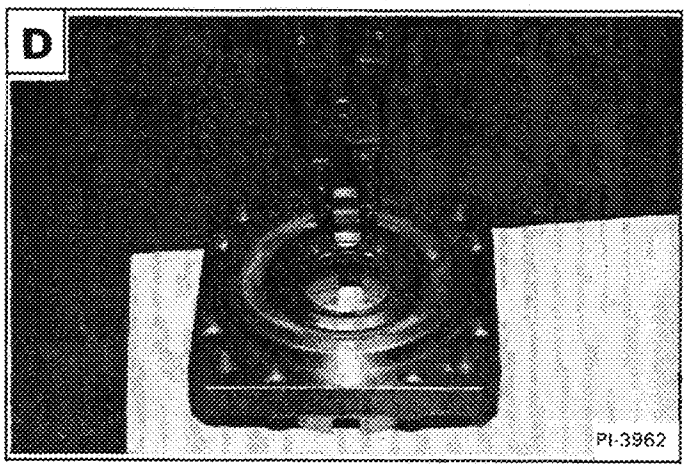
Remove the mounting flange bolts [B].



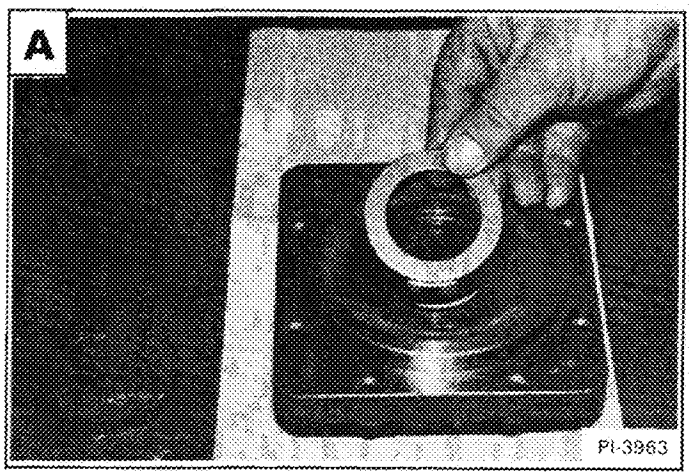
Remove the mounting flange [C].



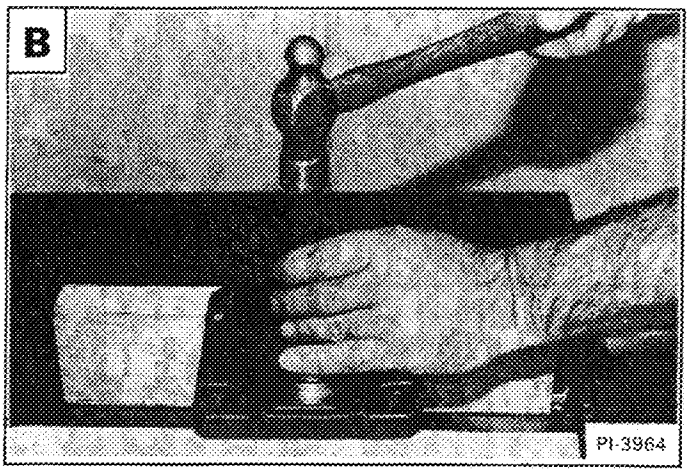
Remove the snap ring at the output shaft seal [D].



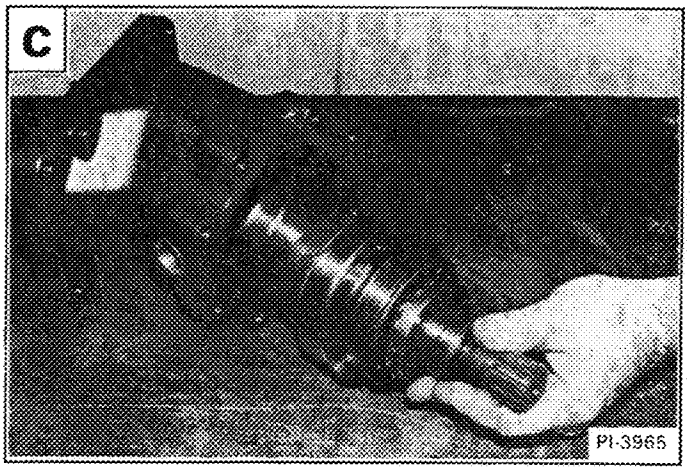
Remove the washer [A].



Remove the shaft seal [B].

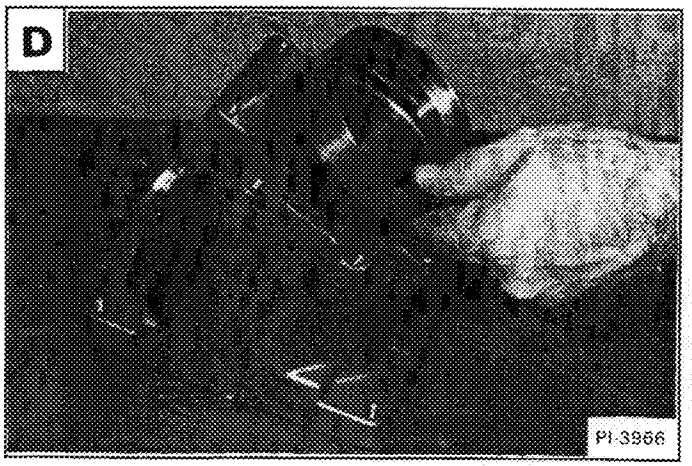


It may be necessary to gently tap the drive plate (output shaft) using a piece of wood and hammer. Remove the shaft and bearing assembly [C].



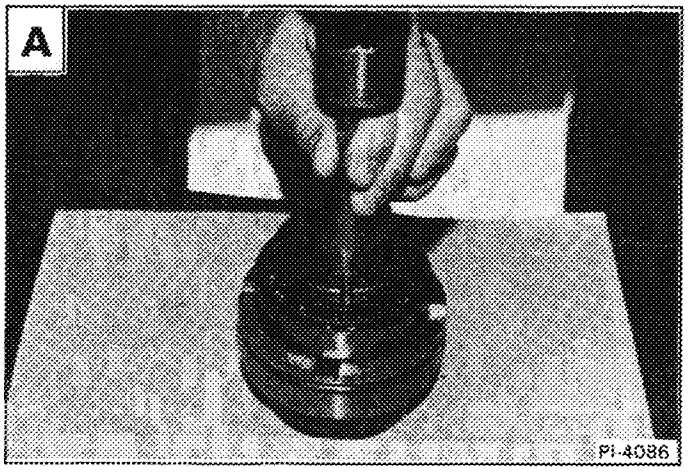
Remove the spacer sleeve [D].

NOTE: The cylinder barrel is pressed against the valve segment with belleville washers. If parts have been replaced or washers mixed-up, the pre-load must be set. See Page C—16 for the correct procedure.

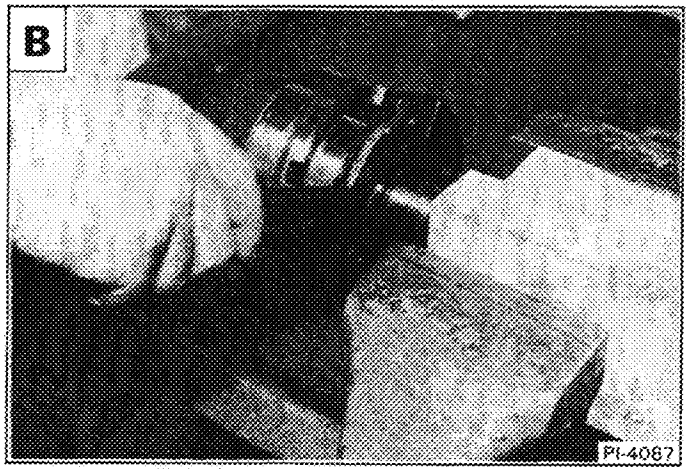


If the bearings and cups at the shaft need replacement, use the following procedure:

1. Bend the locking tabs down at the locking ring [A]

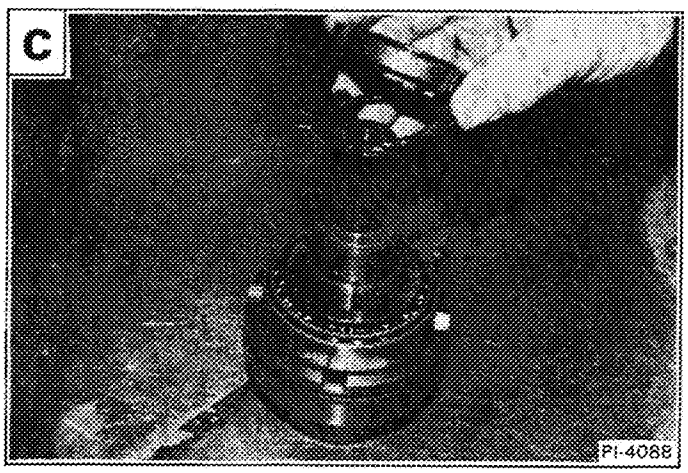


2. Put the shaft in a protected vise jaws. Use a spanner wrencher to loosen the spanner nut [B].



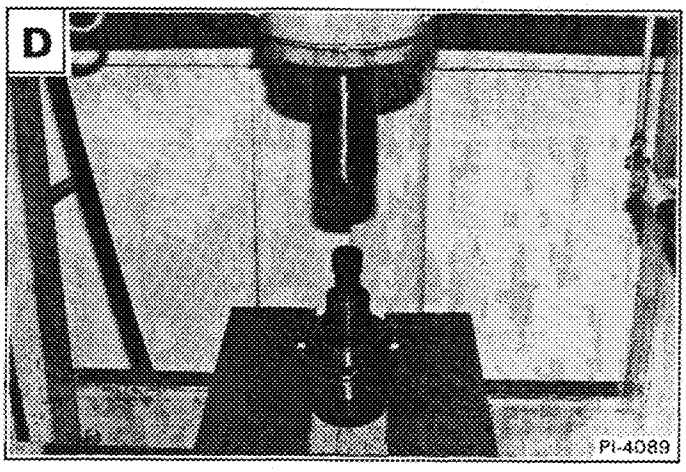
Installation: Adjustment is made by turning the spanner nut until the spacer between the bearings can be moved sideways with firm hand pressure.

3. Remove the shaft end bearing assembly from the vise. Remove the nut and locking ring [C]



4. Put the shaft and bearing assembly in a press [D]. Remove the bearing and cups from the shaft.

5. Make replacement of the bearings and cups as needed.

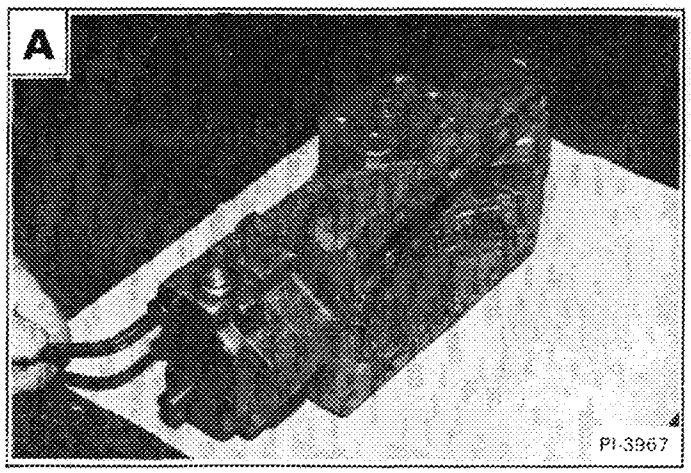


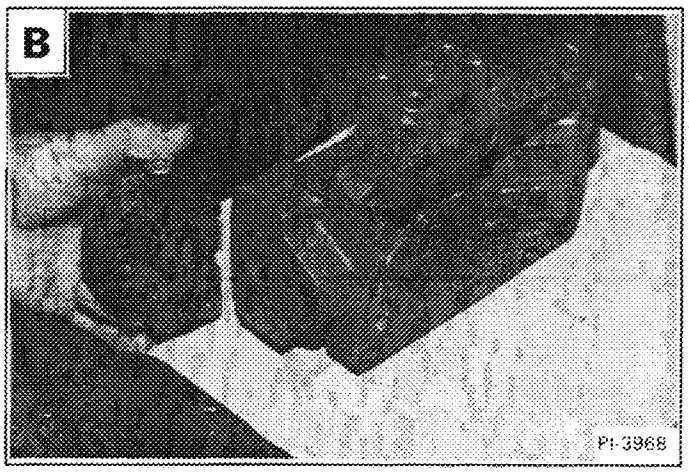
HYDROSTATIC MOTOR (Cont'd)

Disassembly and Assembly of Connection Block

Remove the four bolts and the cover A & B.

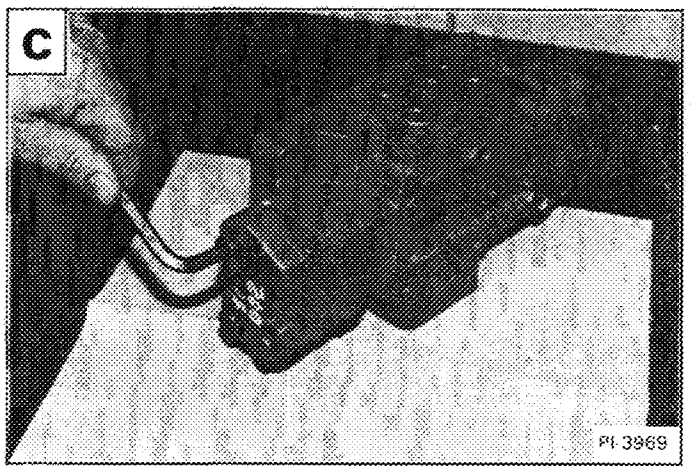
Assembly: Tighten the bolts to 30-37 ft.-lbs. (40-50 Nm) torque.

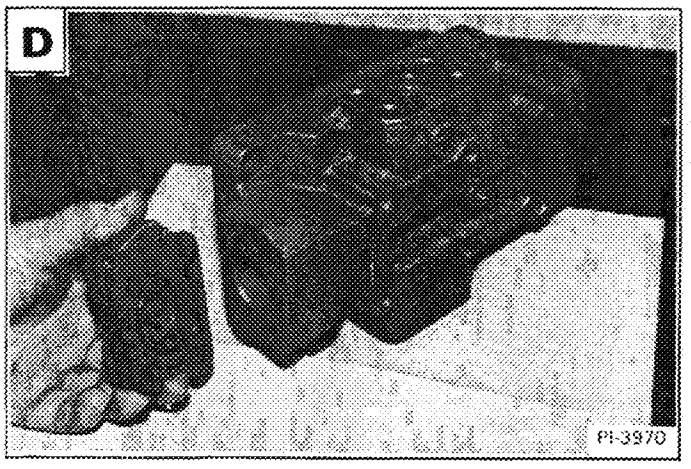




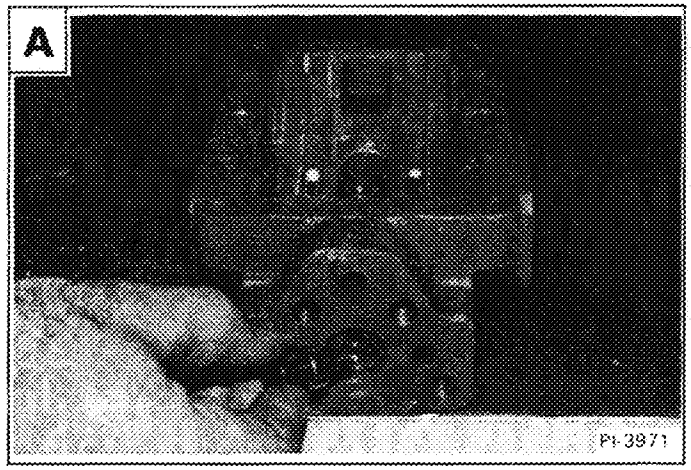
At the other side of the connection block, remove the four bolts and cover C & D.

Assembly: Tighten the bolts to 30-37 ft.-lbs. (40-50 Nm) torque.



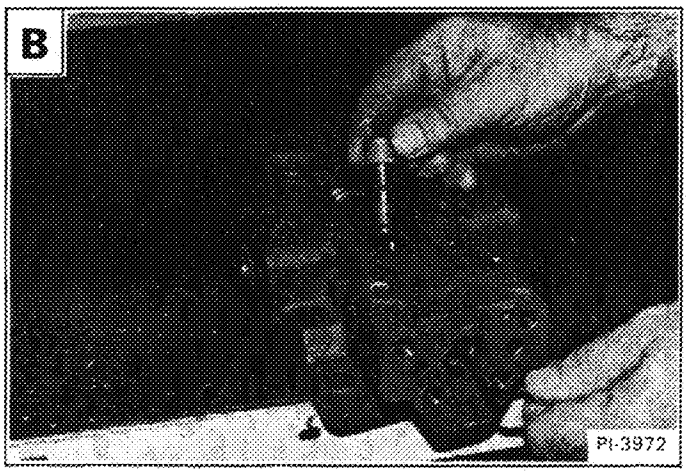


Remove the bolt and stop at the end of the piston rod [A].

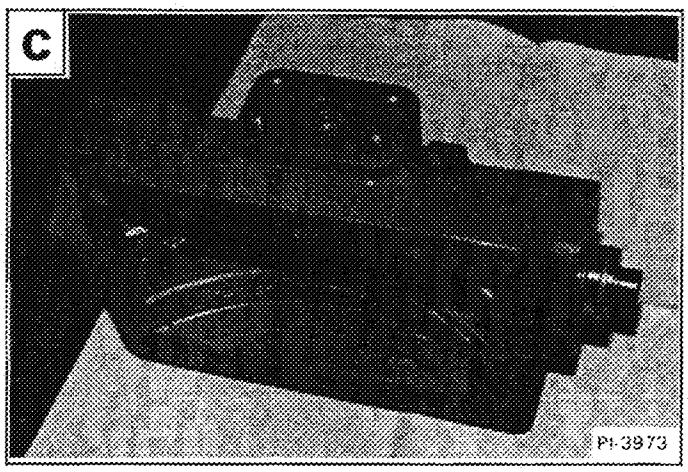


Use an allen wrench to loosen the set screw which holds the feed-back lever [B].

Remove the feed-back lever [B].

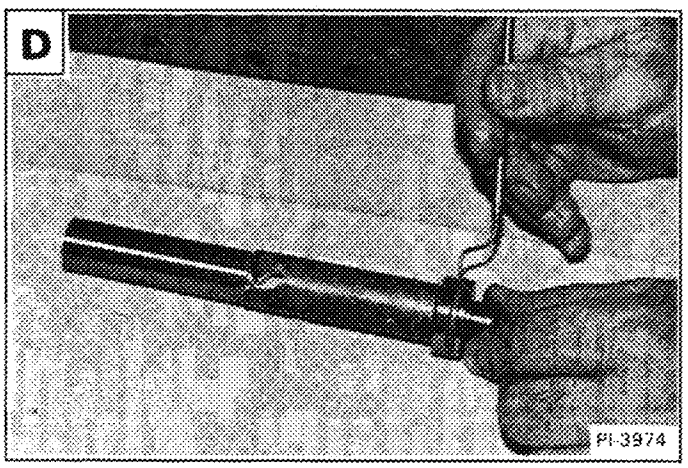


Remove the piston and rod [C].



Remove the piston seal [D].

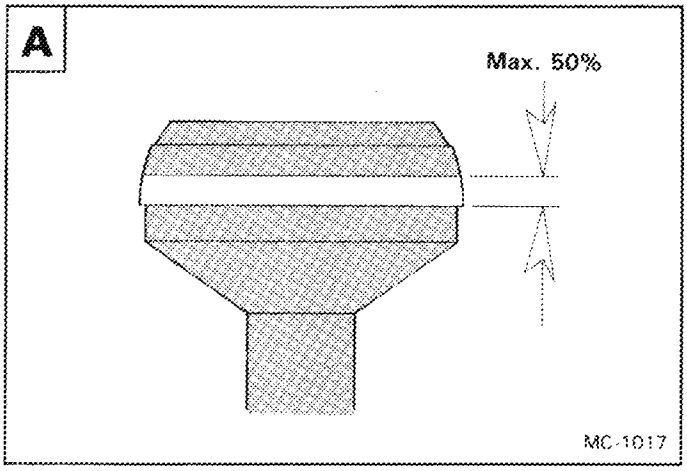
NOTE: Always use new O-rings and seal when assembling the piston and covers on the connection block.



HYDROSTATIC MOTOR (Cont'd)

Inspection

Check the piston rings. A piston ring with surface wear of more than 50% of their original width must be replaced [A].



Use a small snap ring pliers to remove and install the rings.

NOTE: When installing the ring, make sure the spherical surface of the ring matches with the form of the piston head [A].

Check the wear plate and valve segment to be free of scratches.

Check the bearings and spacer at the output shaft. If damaged, replace the shaft and bearing as an assembly.

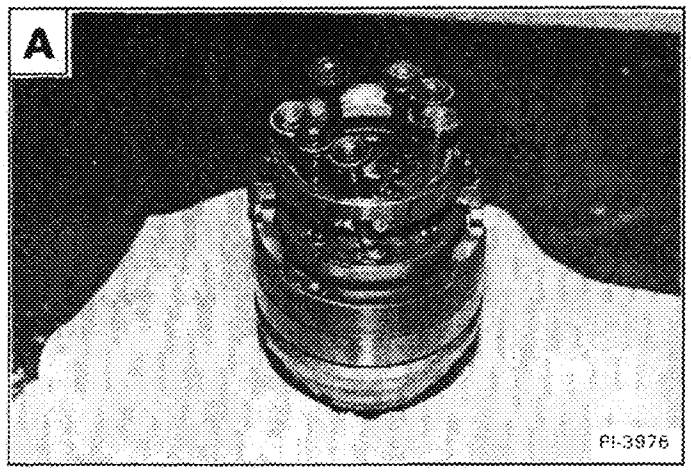
Assembly

NOTE: The cylinder barrel is pressed against the valve segment with belleville washers. If parts have been replaced or washers mixed-up, the pre-load must be set. See Page C—16 for the correct procedure.

All parts should be cleaned. Put oil on all the parts.

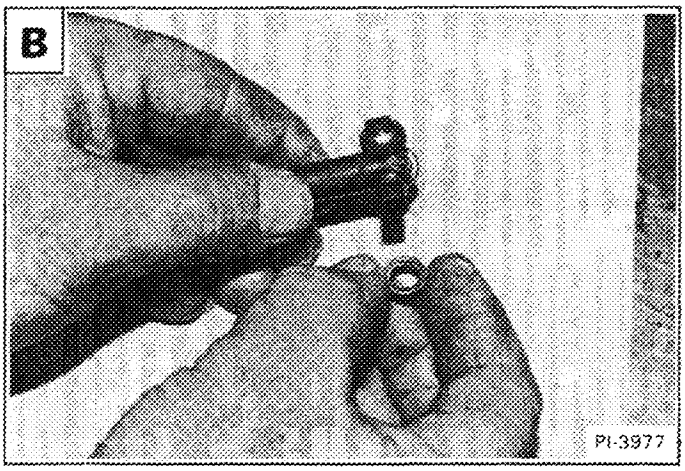
Install the pistons into their original ball races [B].

Install the yoke, belleville washers and pivot pins [A].



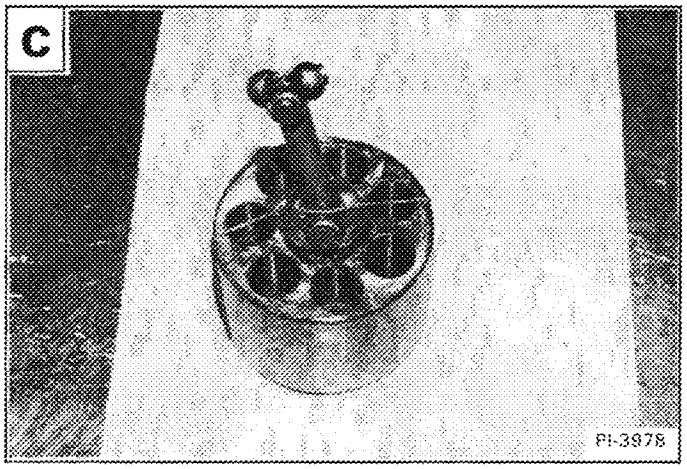
Install the rollers on the synchronizing shaft. Put grease on them to hold them in position during installation [B].

NOTE: **When fitting the synchronizing shaft the rollers could stick in their inner position. It will be necessary to move them outward so they will seat correctly.**

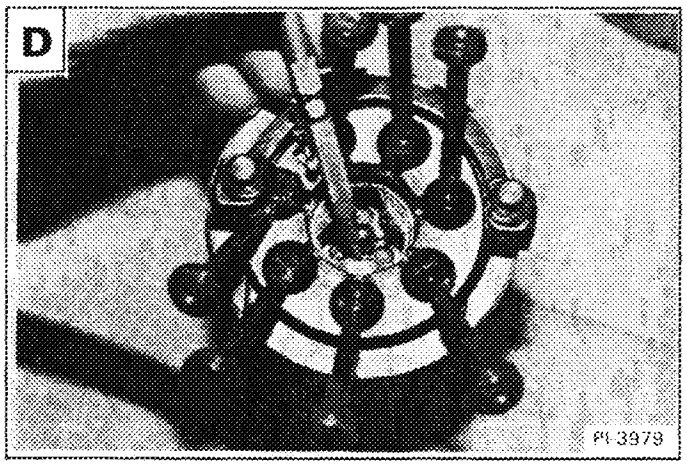


Install the synchronizing shaft and rollers assembly into the cylinder barrel [C].

Put a rubber band around them to hold the shaft in position during installation.

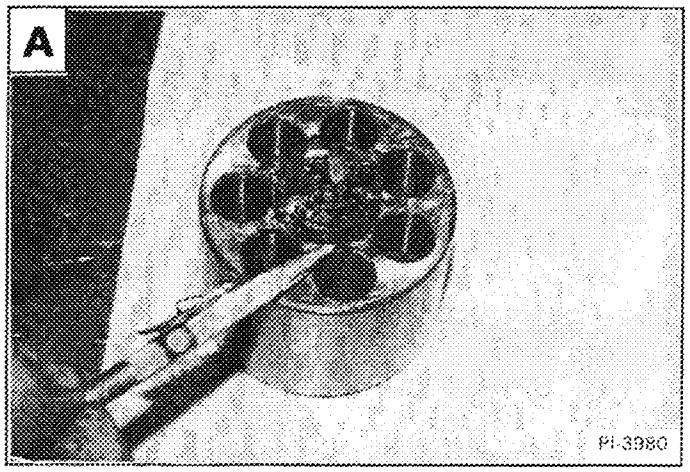


Turn the output shaft so that the ball socket closest to the casting between the ball seats is toward you [D].



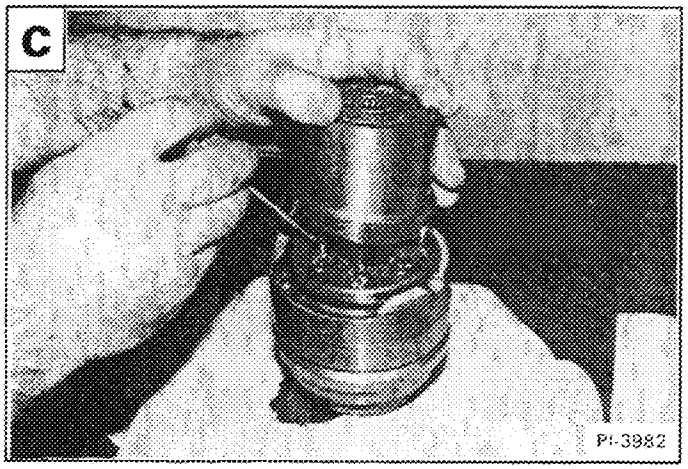
Find the bore in the cylinder barrel that is closest to the casting between the ball seats [A].

Make alignment of the bore with the piston at the same location. Install the cylinder barrel.

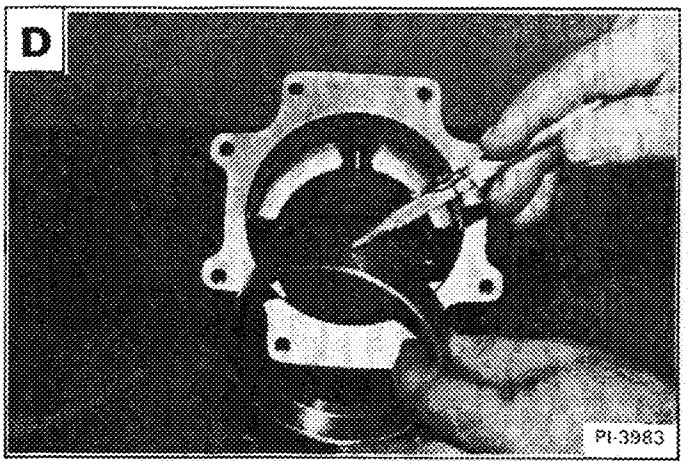


Start pistons into their bores in the cylinder barrel [B].

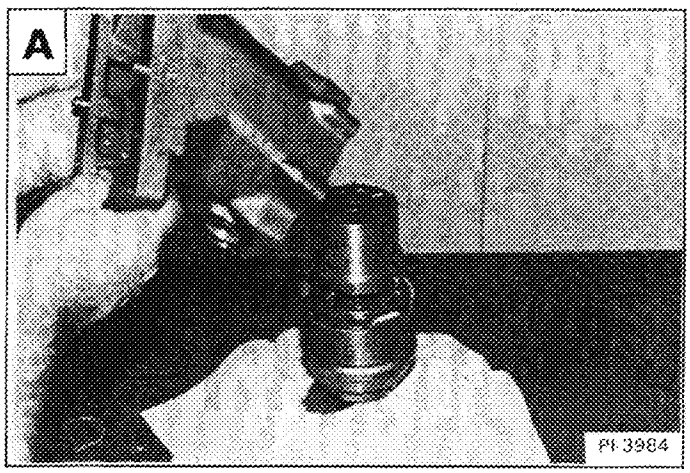
Push the cylinder barrel down until the synchronizing shaft rollers go into their seats. Check to make sure the rollers are seated correctly [C].



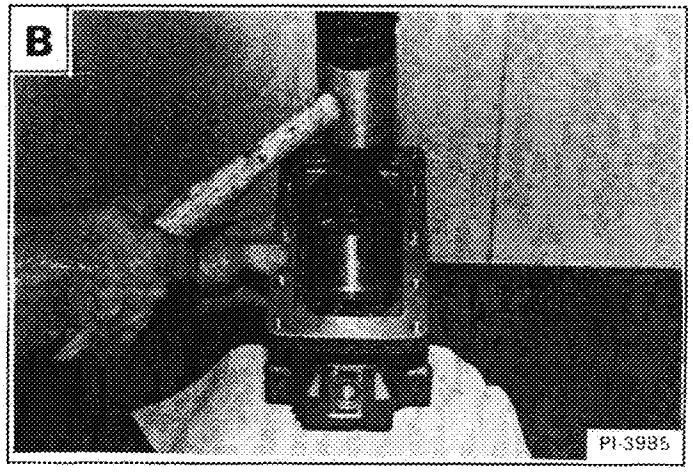
Install the spacer sleeve into the motor housing make sure the notch and the roll pin are in correct alignment [D].



Install the motor housing [A].

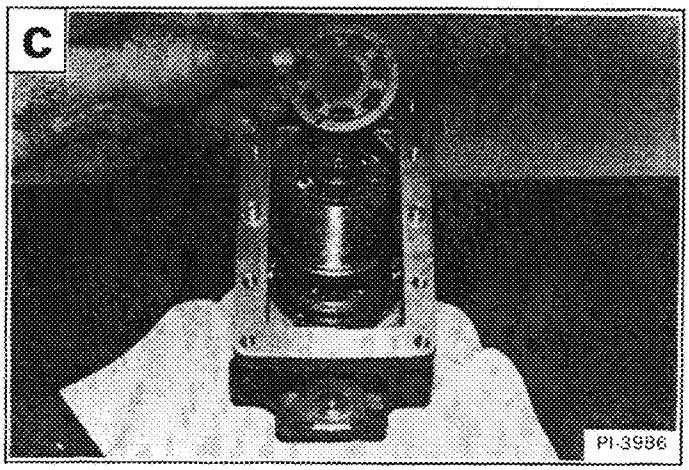


Tap the housing into position [B].

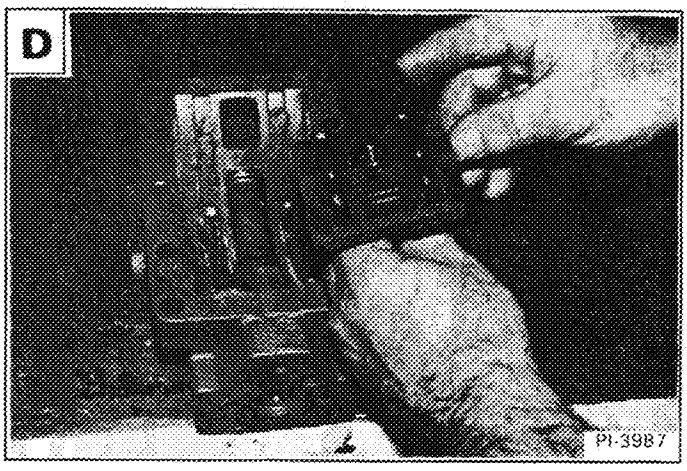


Install the wear plate [C].

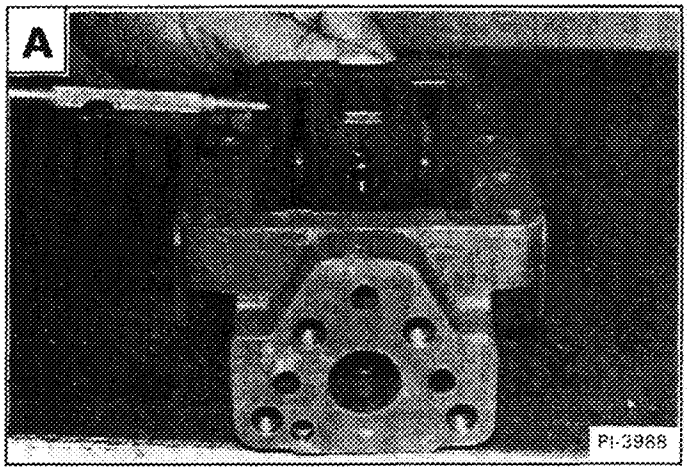
NOTE: Install the brass side of the wearplate away from the cylinder.



Put grease on the valve segment and connection block [D].

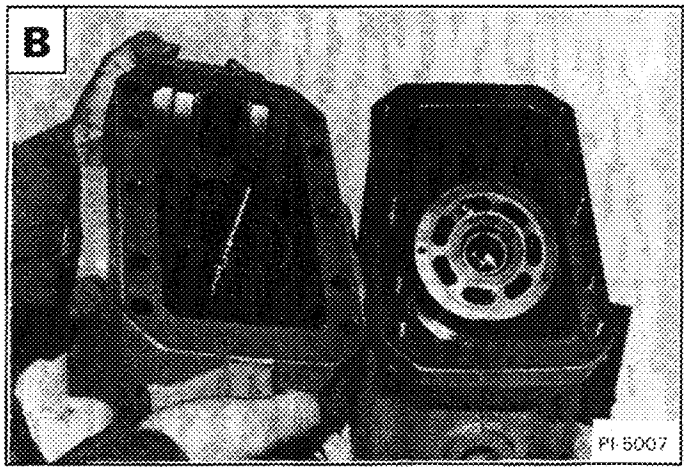


Install the valve segment with the cut-outs positioned on the connection block as shown in figure [A].

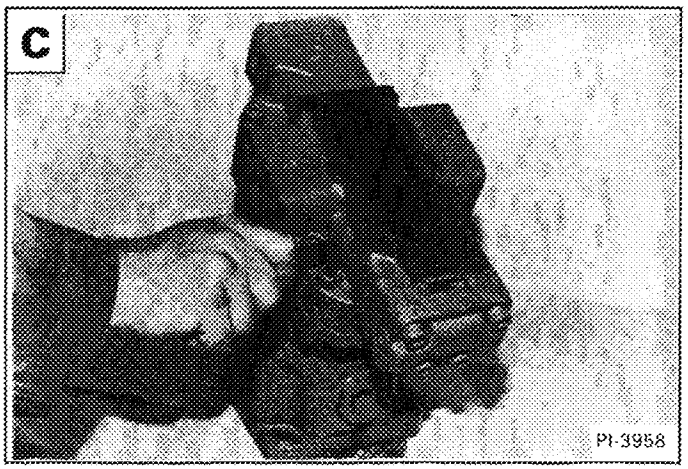


Install the gasket [B].

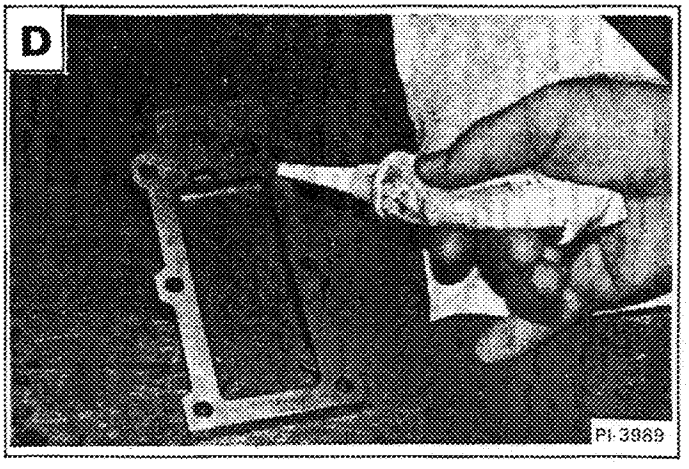
Install the connection block [B].



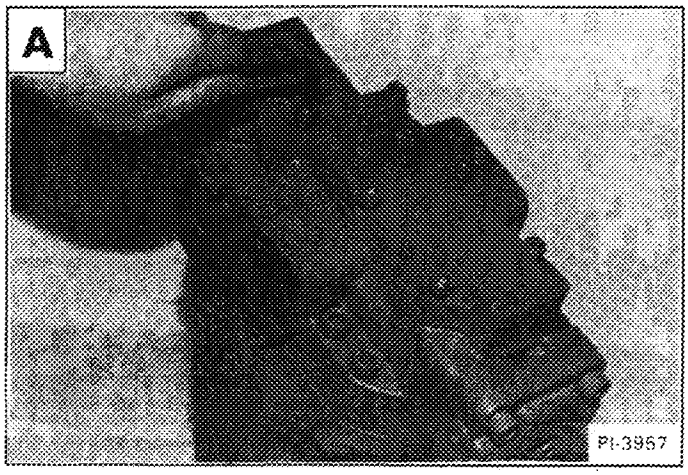
Install and tighten the bolts to 30-37 ft.-lbs. (40-50 Nm) torque [C].



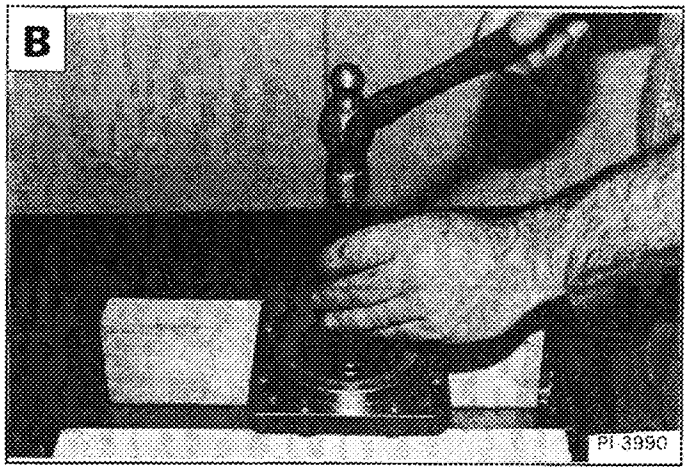
Put a bead of sealant gasket on the cover [D].



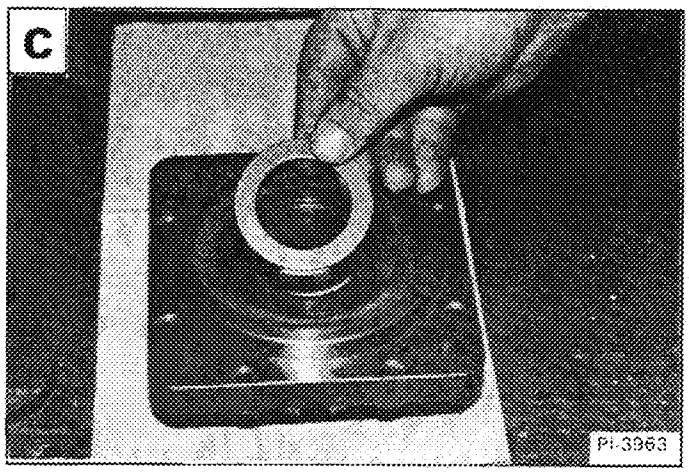
Install the cover. Install the bolts and tighten to 16-21 ft.-lbs. (22-28 Nm) torque [A].



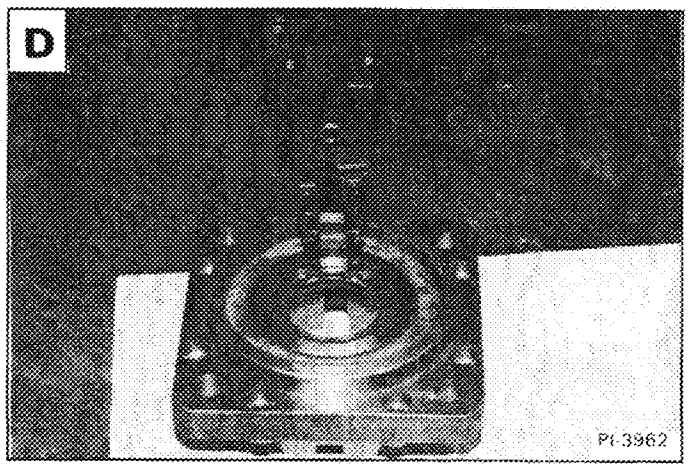
Install the new output shaft seal into the mounting flange [B].



Install the washer [C].

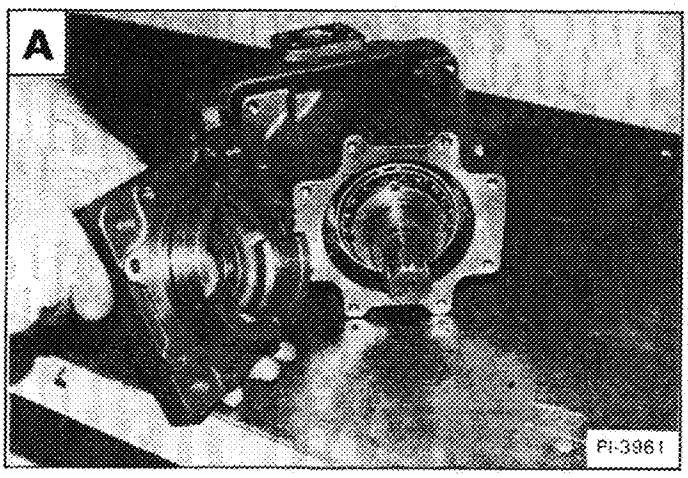


Install the snap ring [D].

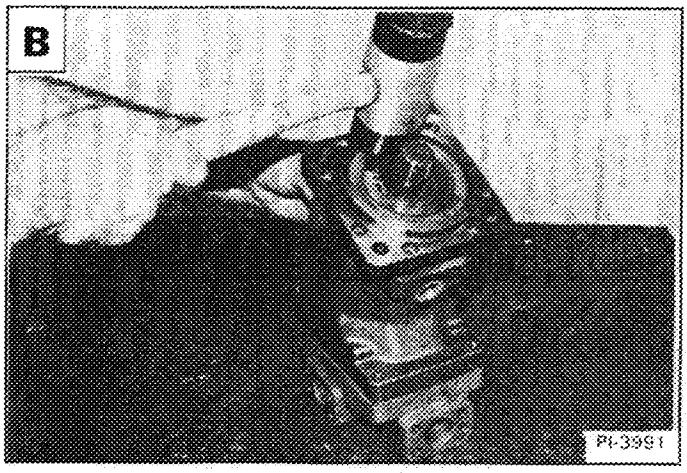


Remove the motor assembly from the support bracket and put it on its side on the work bench.

Install the mounting flange [A].

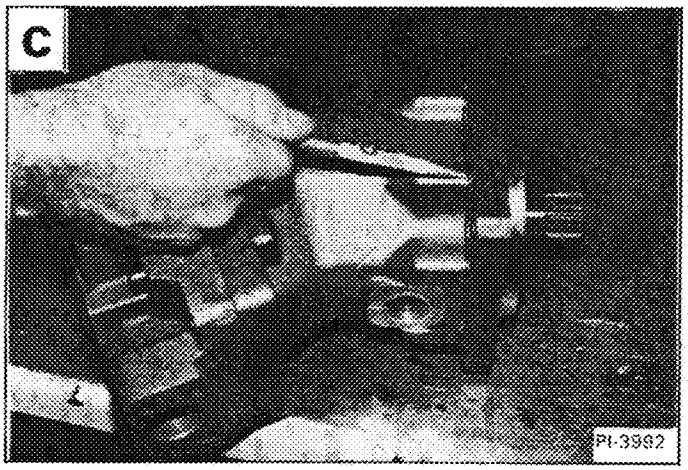


Using a soft hammer, tap the mounting flange into position [B].

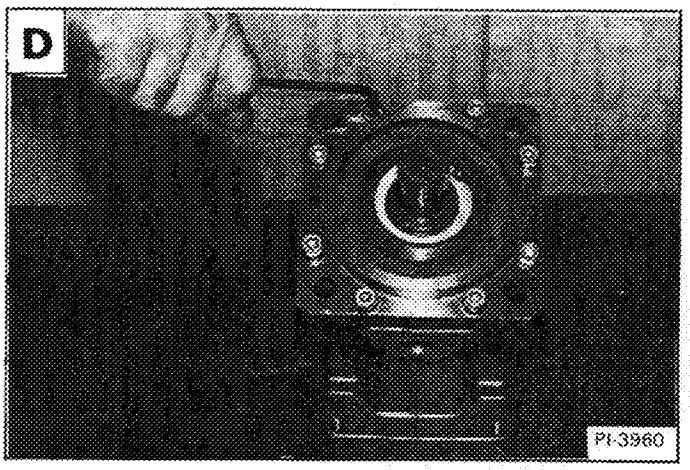


IMPORTANT

There will be a small gap between the mounting flange and motor housing after the bolts are tightened [C].



Put loctite on the mounting flange bolts and tighten to 15-18 ft.-lbs. (20-25 Nm) torque [D].



Checking and Setting Pre-Load

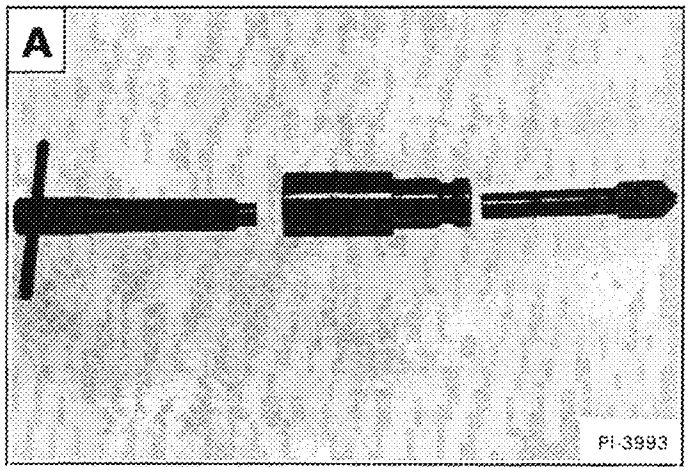
The tool listed will be needed to do the following procedure:

MEL-1366 — Pre-Load Adjusting Tool

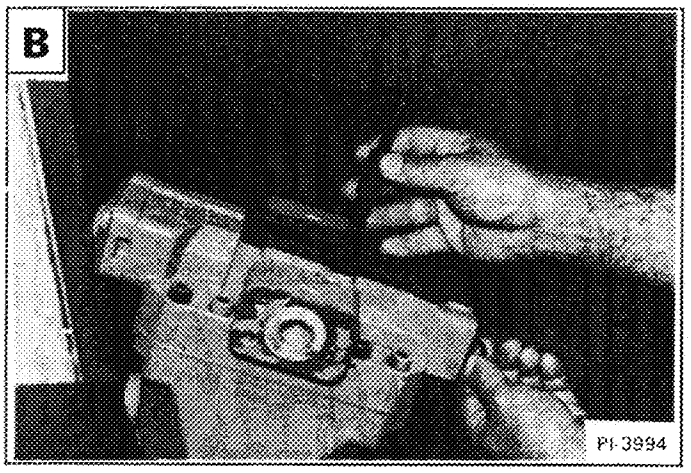
NOTE: To check and set the pre-load it is not necessary to have the pistons and synchronizing shaft installed.

If any parts have been replaced, start with only the belleville washers to prevent damage to the support assembly. Make alignment of the hole in the piston rod and connection block.

Assemble the tool as shown in figure [A].



Install the tool into the piston rod and tighten the set screw [B].



Turn the tool (Item 1) inward until it just touches the center shaft (Item 2) [C].

Turn the tool inward (counting the number of revolutions) until the belleville washers are fully compressed. The thickness of the shim washers is obtained by multiplying the number of revolutions (pitch) by 0.03" (0,75 mm) minus 0.012" (0,30 mm).

EXAMPLE: If the tool turns 2 revolutions, the thickness of the shim washers is as follows:

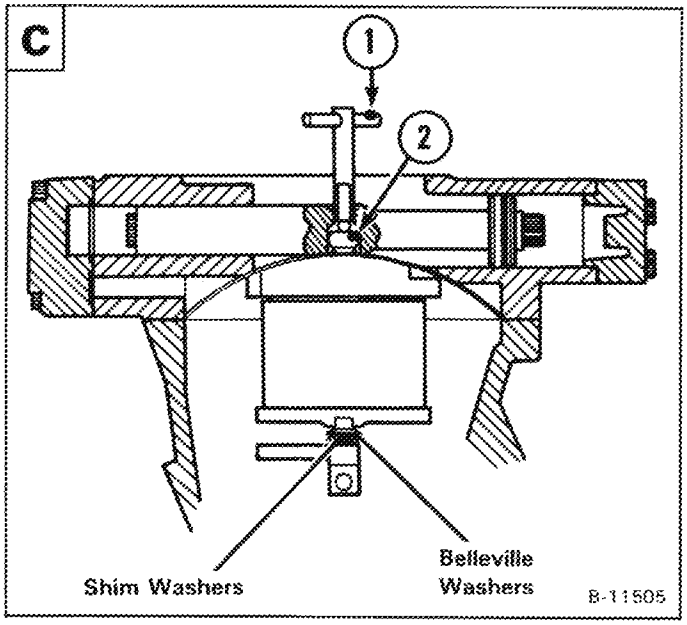
0.03" (0,75 mm)
x 2 revolutions

0.06" (1,50 mm)
- 0.012" (0,30 mm)

0.048" (1,20 mm) shim thickness

The correct pre-load is 1/3 turn of the tool or 0.012 ± 0.002" (0,030 ± 0,05 mm).

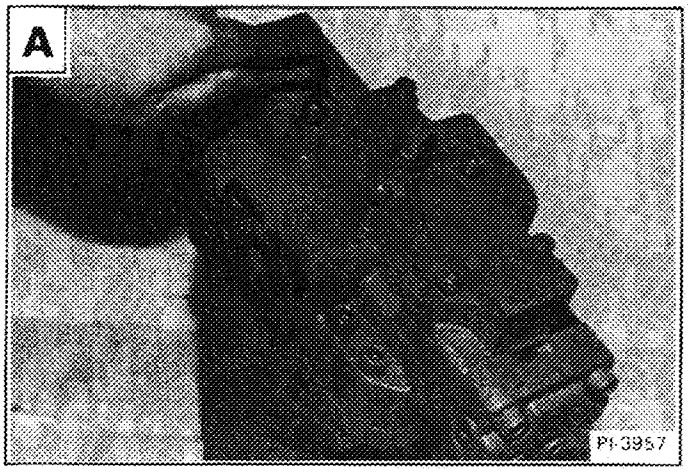
After finding the correct size shim washers needed. Remove the tool and connection block. Install the correct combination of washers as determined. Replace the cylinder barrel, connection block and tool. Check the pre-load again. When pre-load is correct finish the assembly of the motor.



Checking Wear Plate and Valve Segment

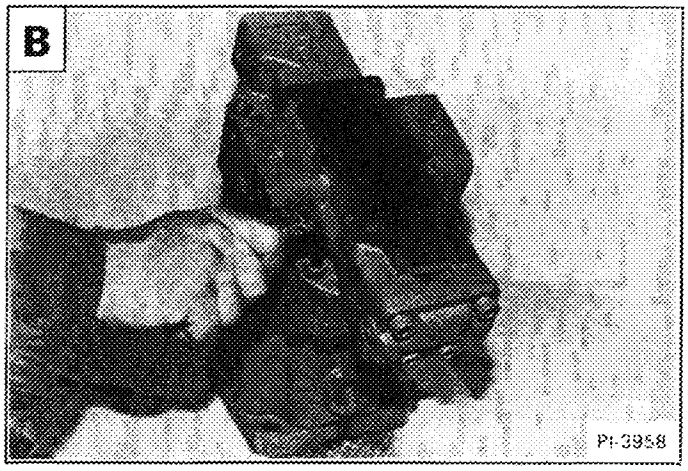
The wear plate and valve segment can be checked for wear and scratches without completely disassembling the motor using the following procedure.

Remove the bolts and cover [A].

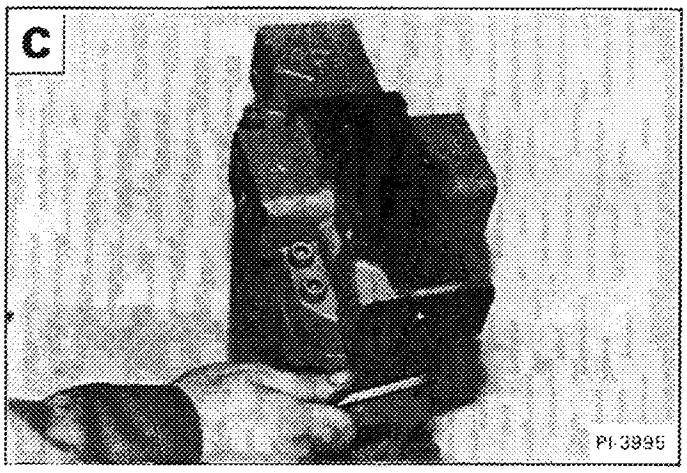


Remove the connection block bolts [B].

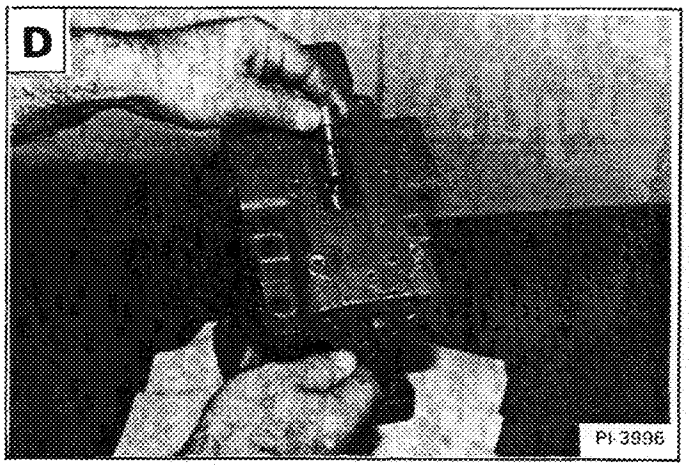
Remove the end cover at the connection block.



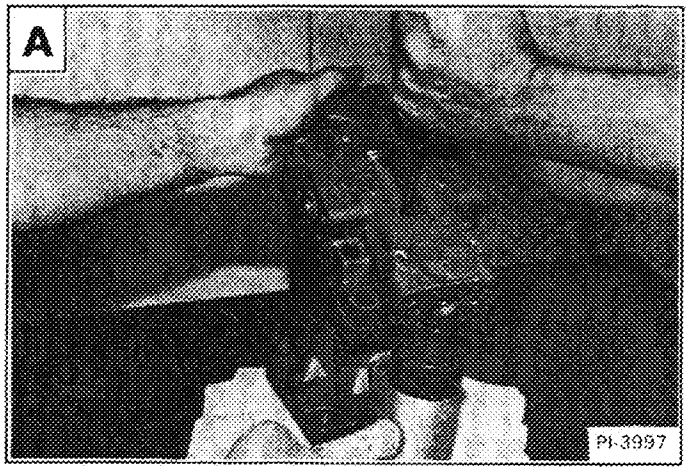
Remove the bolt and stop at the end of the piston rod [C].



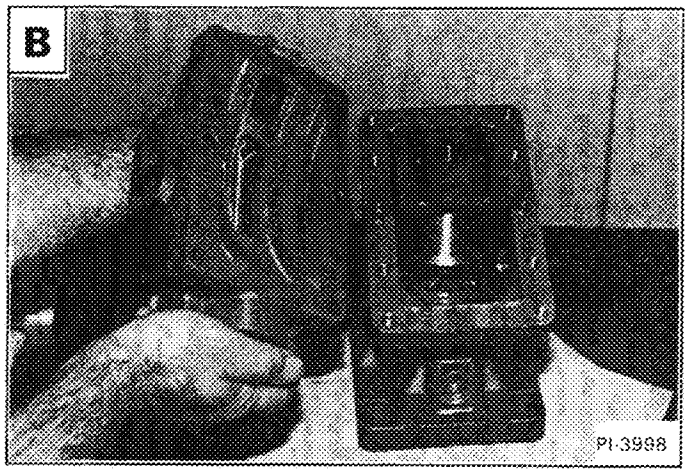
Loosen the set screw and remove the feed-back lever [D].



Have a second person hold a screwdriver against the valve segment to prevent it from pulling the cylinder barrel out of the pistons. Tap the connection block free of the motor housing [A].

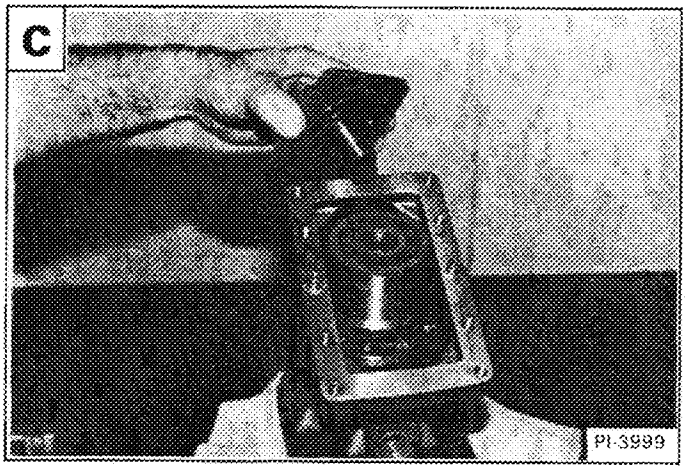


Remove the connection block [B].



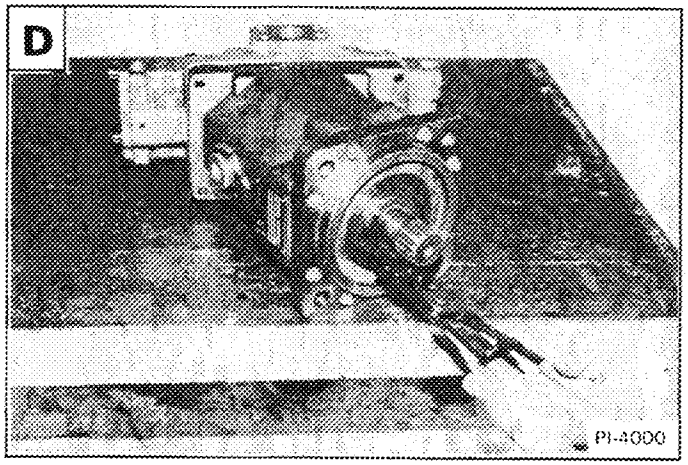
Remove the valve segment still in position on the wear plate [C].

Check the parts and continue with the repair as needed.

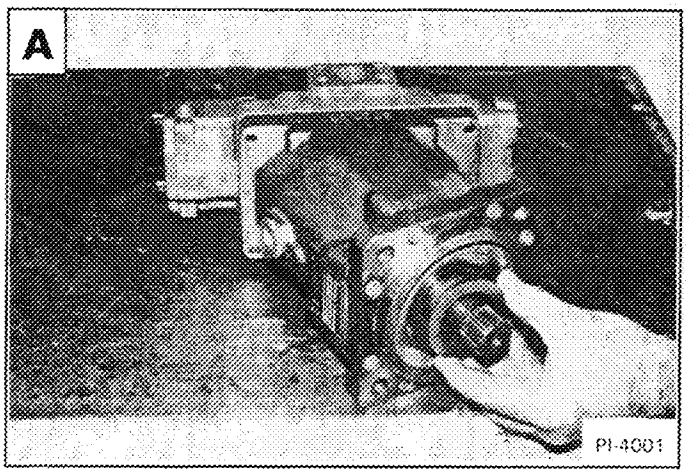


Output Shaft Seal Replacement

Remove the snap ring [D].

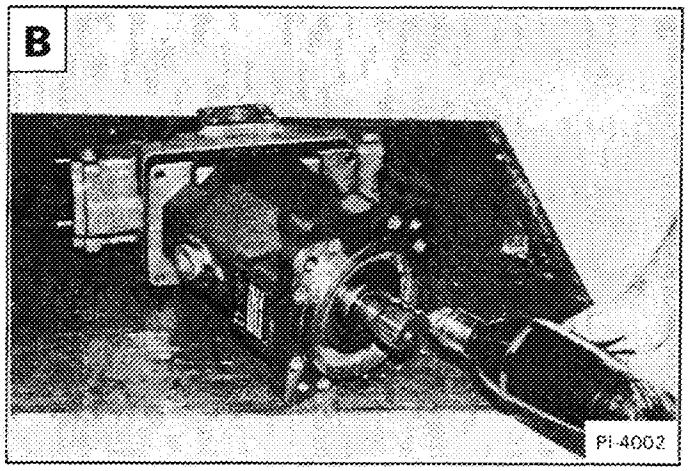


Remove the washer [A].

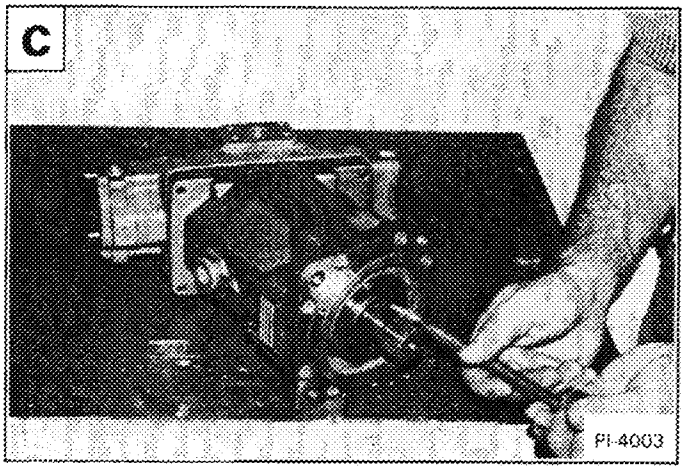


Drill a hole into the seal [B].

Be careful not to drill into the mounting flange housing.

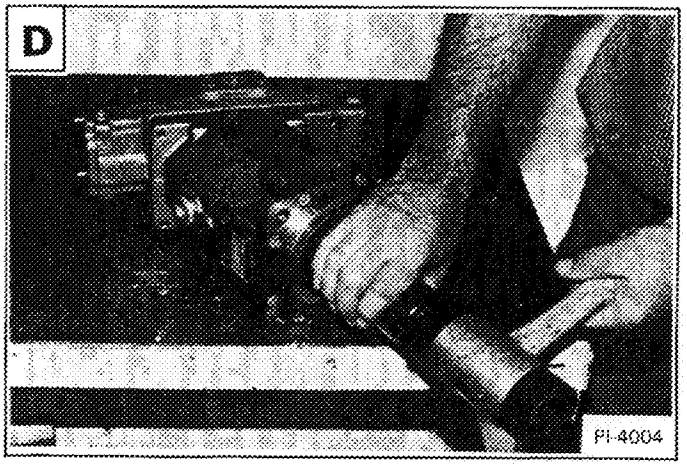


Install a slide hammer puller and remove the seal [C].



Install the new seal using the correct size driver tool [D].

Install the washer and snap ring.

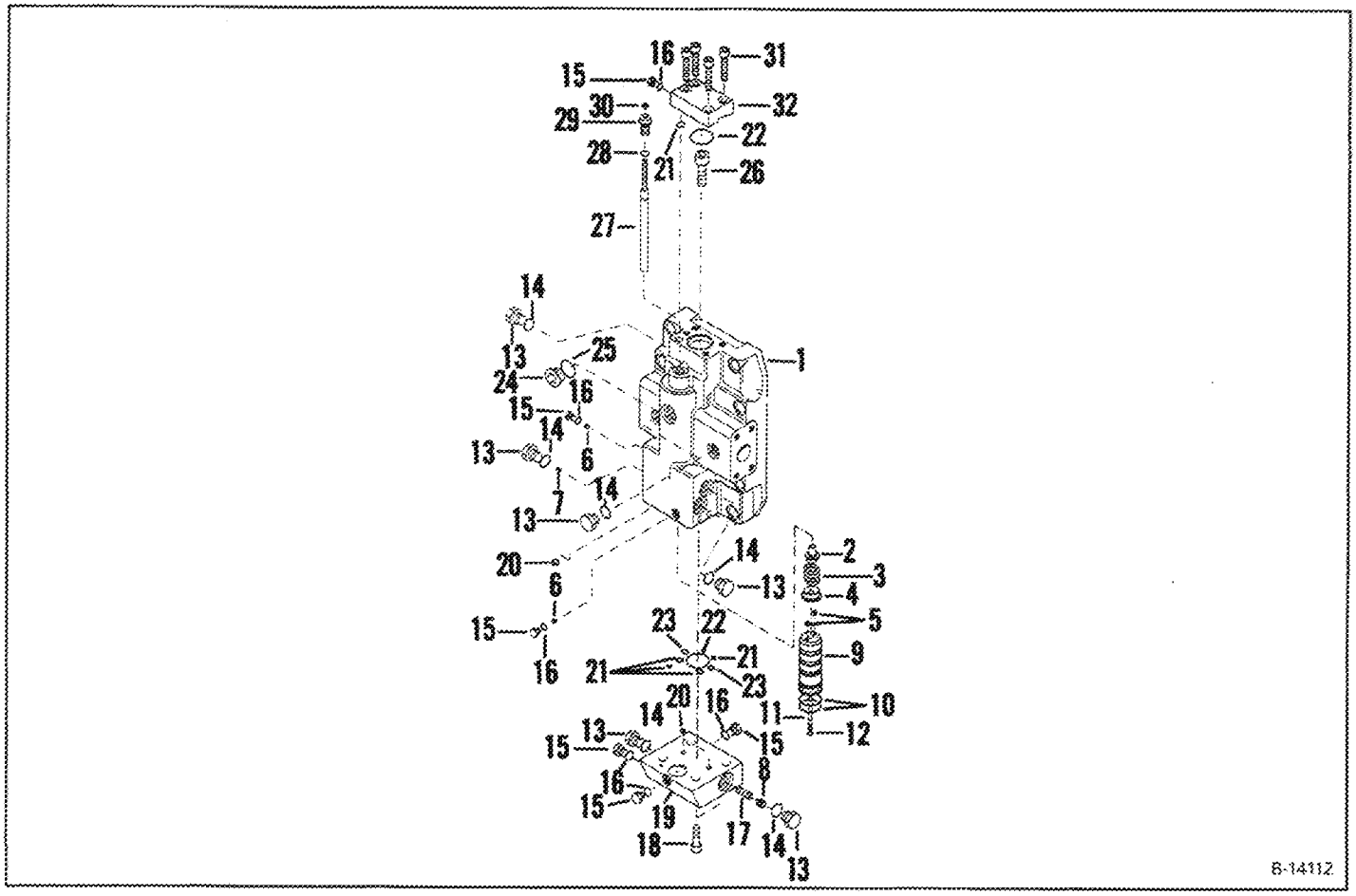



bobcat

SUNSTRAND MOTOR

Section D

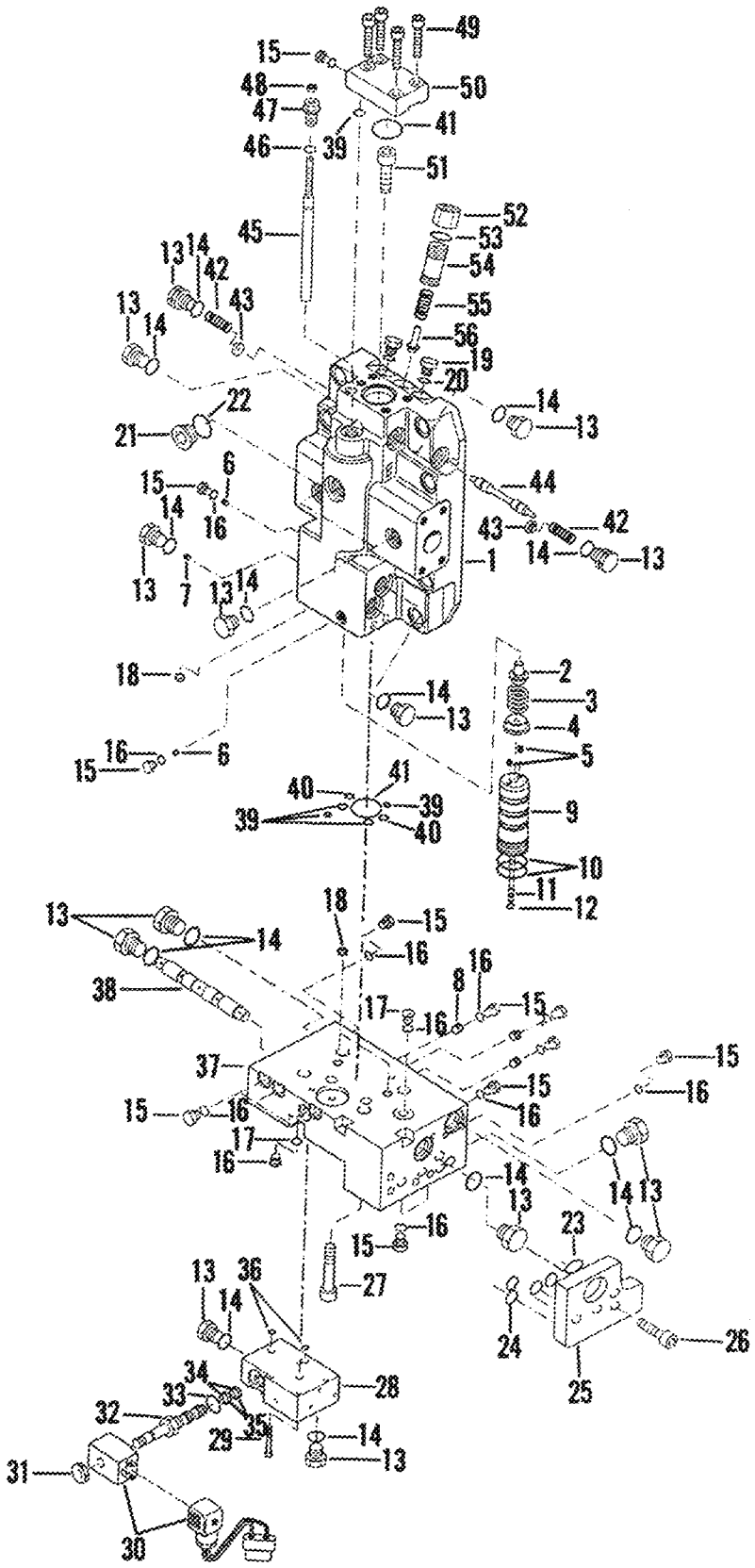
bobcat



MODEL: 1600 (S/N 12313 & Above)

Ref.	Description	Ref.	Description
1.	END CAP	17.	VALVE
2.	SEAT - INNER	18.	SCREW
3.	SPRING	19.	BLOCK - CONTROL
4.	SEAT - OUTER	20.	FILTER - SCREEN
5.	ORIFICE PLUG - 0.6 mm	21.	O-RING
6.	ORIFICE PLUG - 0,8 mm	22.	O-RING
7.	ORIFICE PLUG - 0.5 mm	23.	O-RING
8.	ORIFICE PLUG - 2.5 mm	24.	PLUG
9.	SLEEVE - VALVE	25.	O-RING
10.	O-RING	26.	SCREW
11.	SPOOL	27.	STEM - CONTROL
12.	RING - RETAINING	28.	O-RING
13.	PLUG	29.	NUT - MOUNTING
14.	O-RING	30.	NUT - LOCK
15.	PLUG	31.	SCREW
16.	O-RING	32.	COVER

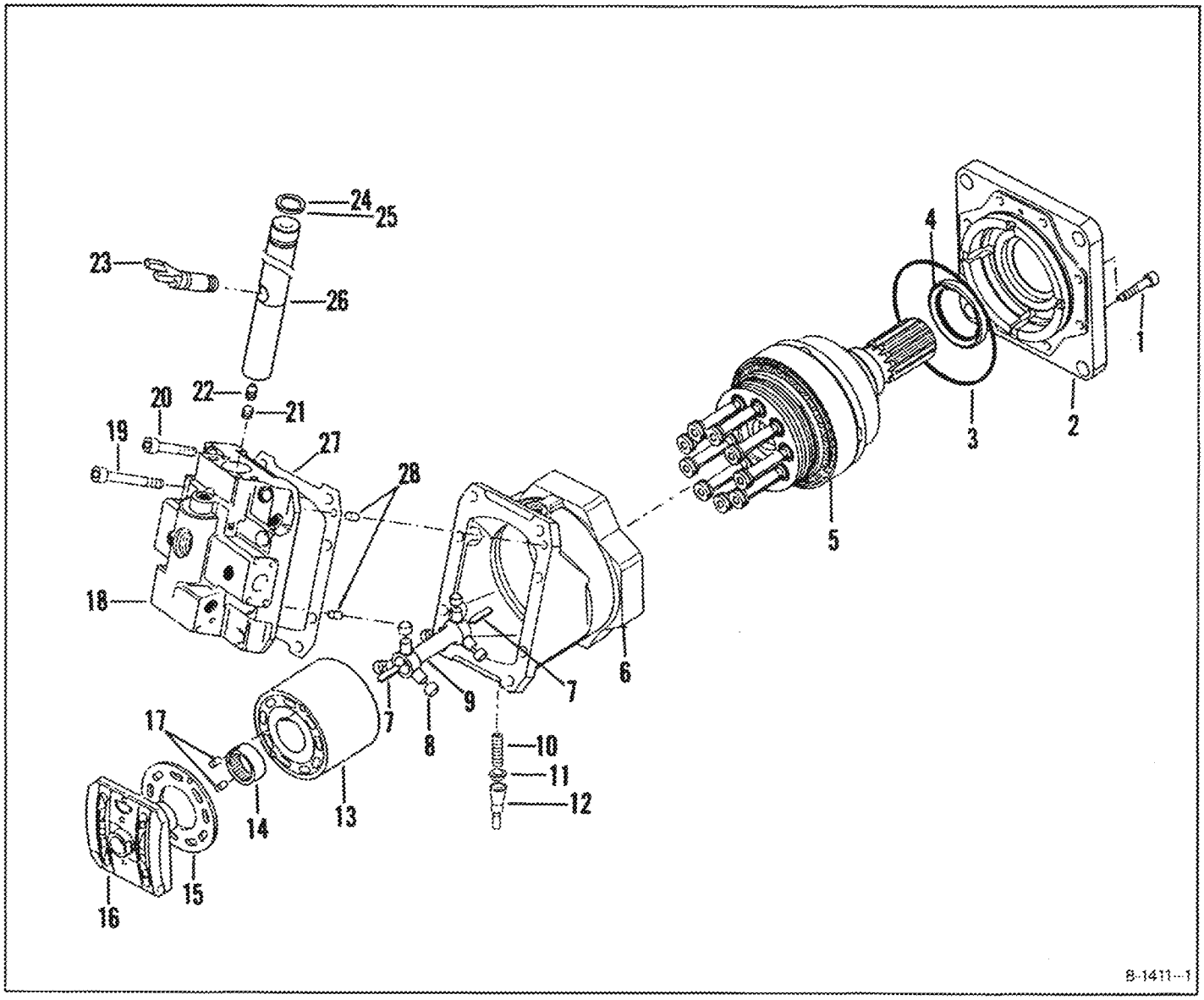
End Cap and Control



MODEL: 2410 (S/N 13000 & Above)

Ref.	Description
1.	END CAP
2.	SEAT - INNER
3.	SPRING
4.	SEAT - OUTER
5.	ORIFICE PLUG - 0.6 mm
6.	ORIFICE PLUG - 0.8 mm
7.	ORIFICE PLUG - 0.5 mm
8.	PLUG
9.	SLEEVE - VALVE
10.	O-RING
11.	SPOOL
12.	RING - RETAINING
13.	PLUG
14.	O-RING
15.	PLUG
16.	O-RING
17.	PLUG
18.	FILTER SCREEN
19.	PLUG
20.	O-RING
21.	PLUG
22.	O-RING
23.	O-RING
24.	O-RING
25.	PLATE - BLOCKING
26.	SCREW
27.	SCREW
28.	BLOCK - CONTROL
29.	SCREW
30.	COIL - SOLENOID
31.	NUT
32.	VALVE - SOLENOID
33.	O-RING
34.	O-RING
35.	BACK-UP WASHER
36.	O-RING
37.	BLOCK - MULTI-FUNCTION
38.	SPOOL
39.	O-RING
40.	O-RING
41.	O-RING
42.	SPRING
43.	GUIDE
44.	SPOOL
45.	STEM - CONTROL
46.	O-RING
47.	NUT - MOUNTING
48.	NUT - LOCK
49.	SCREW
50.	COVER
51.	SCREW
52.	NUT - LOCK
53.	O-RING
54.	PLUG
55.	SPRING
56.	POPPET

PARTS IDENTIFICATION - HYDROSTATIC MOTOR



MODEL: 1600, 2410

Ref.	Description	Ref.	Description
1.	SCREW	15.	PLATE - WEAR
2.	FLANGE - MOUNTING	16.	SEGMENT - VALVE
3.	O-RING	17.	PIN
4.	SEAL	18.	END CAP
5.	SHAFT ASSEMBLY	19.	SCREW
6.	HOUSING	20.	SCREW
7.	PIN	21	LOCK SCREW
8.	ROLLER	22.	SET SCREW - CONE POINT
9.	SHAFT - SYNCOHRONIZING	23.	SETTING LUG
10.	SCREW - ADJUSTING	24.	O-RING
11.	NUT	25.	GLIDE RING
12.	CAP	26.	PISTON - SERVO
13.	BLOCK - CYLINDER	27.	GASKET
14.	BEARING	28.	PIN

End Cap and Control Disassembly

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

Put the hydrostatic motor on a work bench or on a support block with a hole for the output shaft.

Remove the plug (item 1) and orifice plug (item 2) [A].

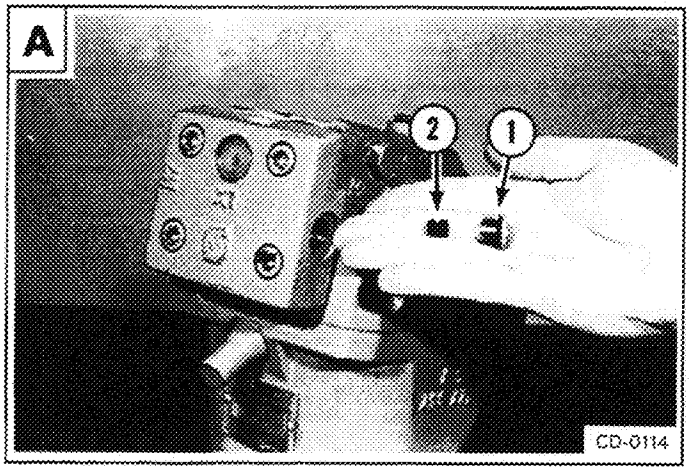
Remove the O-ring from the plug.

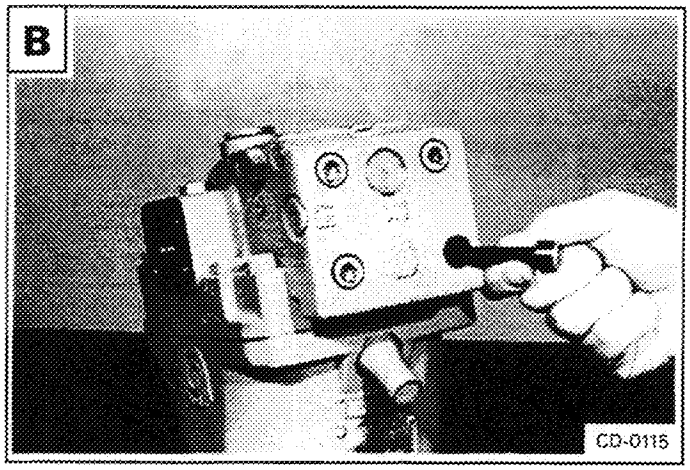
Remove the four (4) screws from the control block [B].

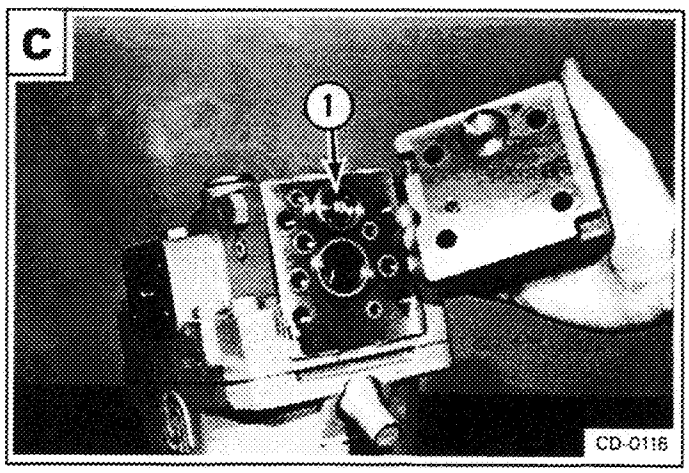
Remove the control block, seven (7) O-rings from the end cap and O-ring (item 1) from the valve sleeve [C].

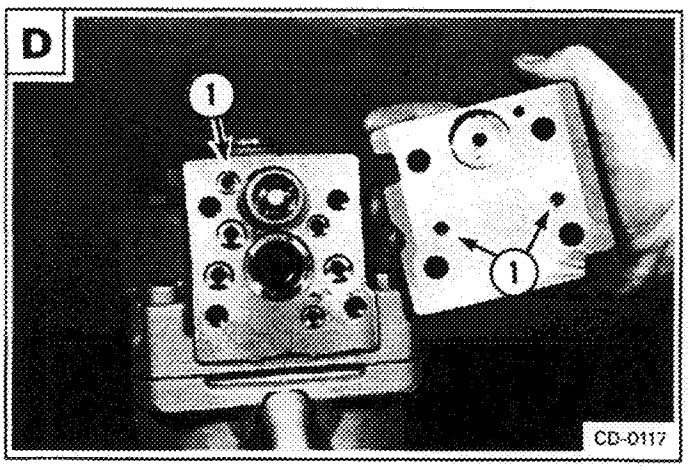
Inspect the three (3) screen filters (item 1) for damage [D].

If replacement is required, use a screwdriver to pull the filter out of the bore. Note the orientation of the filter before removal.

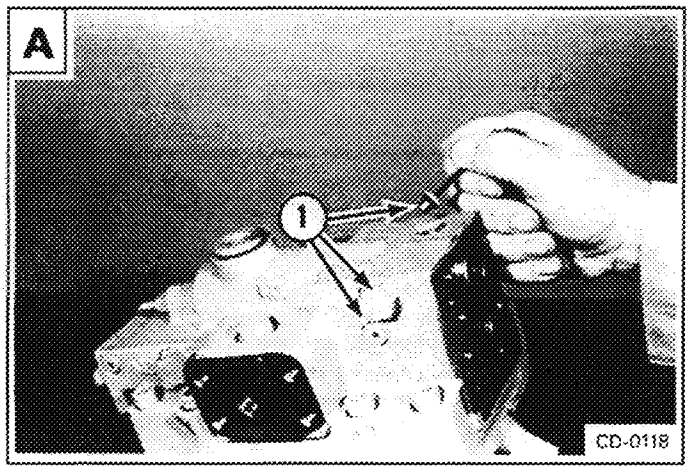






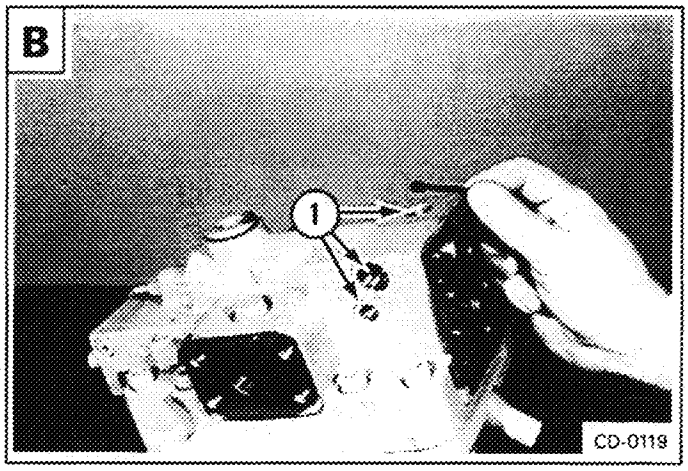


Remove the three (3) plugs (Item 1) [A].

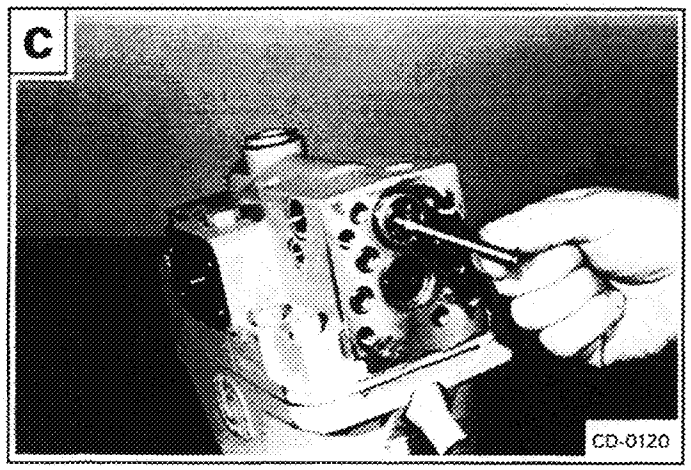


Remove the three (3) orifice plugs (Item 1) [B].

NOTE: The orifice plugs have different size orifices and must be installed in the same location. Put each orifice plug in a marked envelope.



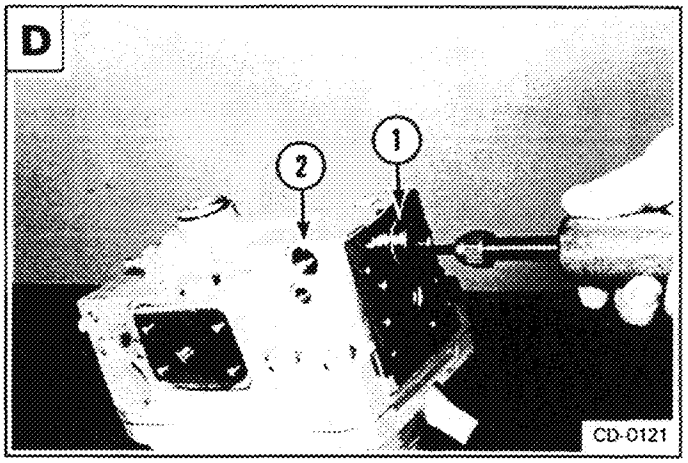
Remove the spool [C].



Using a slide hammer and a M5x0,8x30 (or longer) screw, remove the valve sleeve [D].

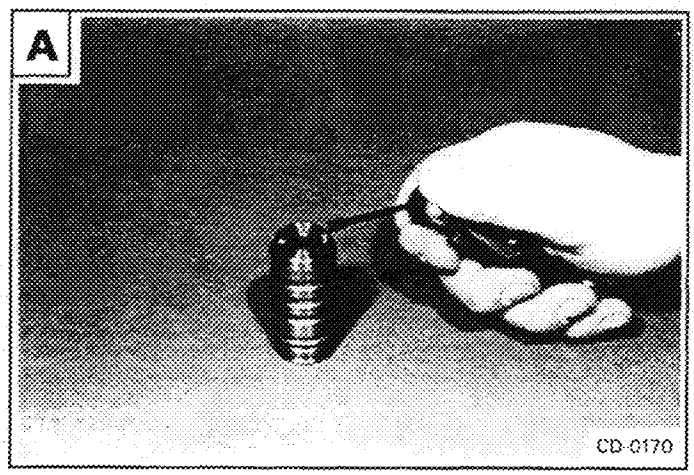
Remove the O-ring (Item 1) from the valve sleeve [D].

NOTE: The orifice plug must be removed from the large port (Item 2) before removing the valve sleeve [D].

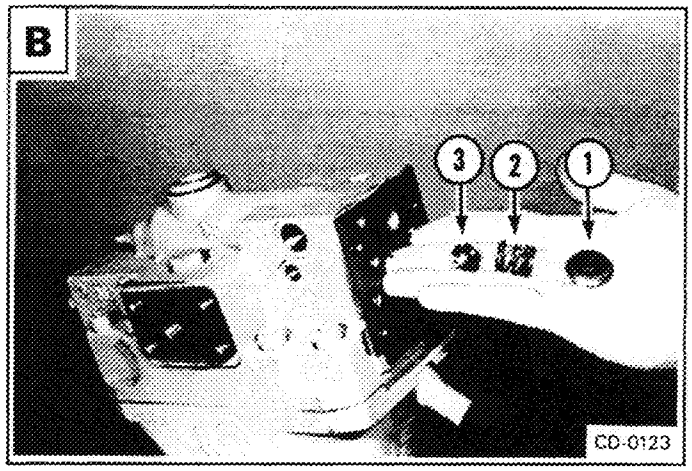


Remove the two (2) orifice plugs from the valve sleeve [A].

NOTE: Put the orifice plugs in a marked envelope to keep the orifice plugs separate from other orifice plugs.



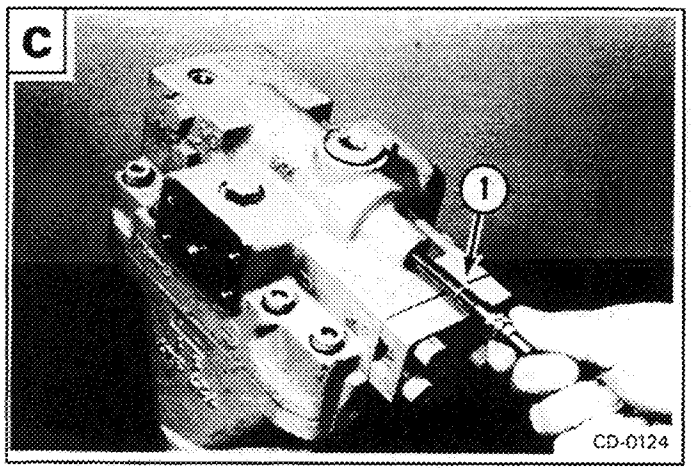
Remove the outer seat (Item 1), spring (Item 2) and inner seat (Item 3) [B].



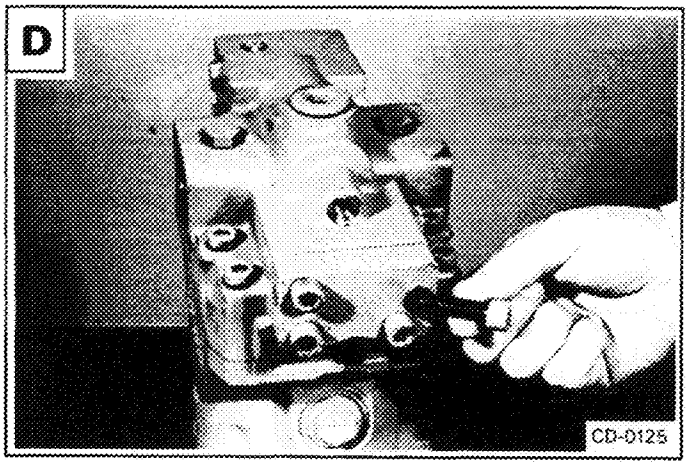
Remove the control stem assembly [C].

Remove the O-ring (Item 1) from the control stem [C].

NOTE: Do not disturb the control stem adjustment.



Remove the four (4) screws [D].



Remove the minimum angle servo cover and two (2) O-rings [A].

End Cap and Control Disassembly (MODEL 2410)

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.

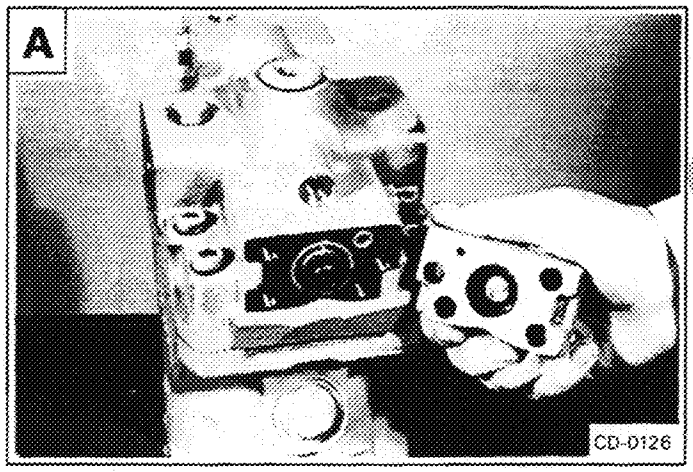
I-2003-0284

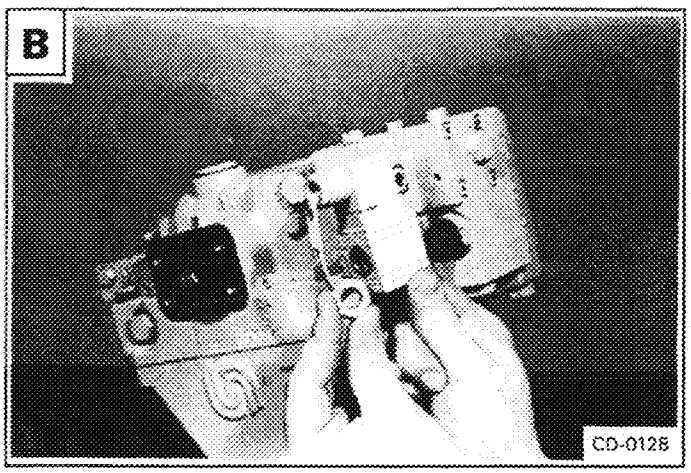
Put the hydrostatic motor on a work bench or on a support block with a hole for the output shaft.

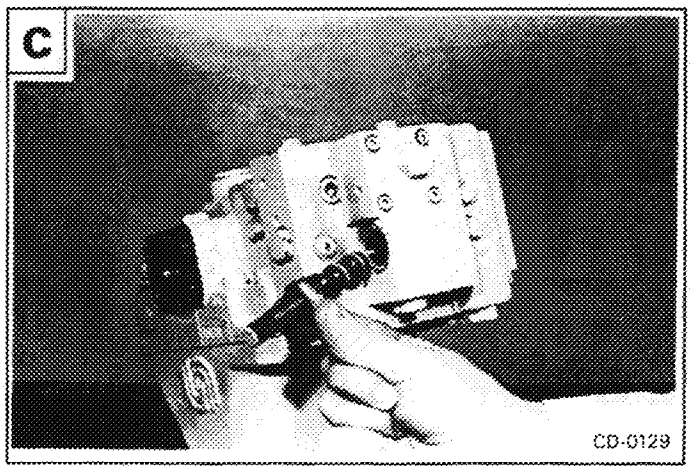
Remove the nut and coil from the solenoid valve [B].

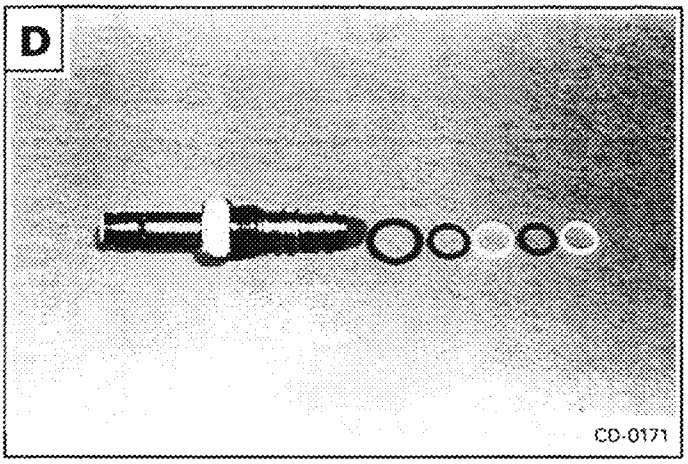
Remove the solenoid valve [C].

Remove the three (3) O-rings and two (2) back-up washers from the solenoid valve [D].

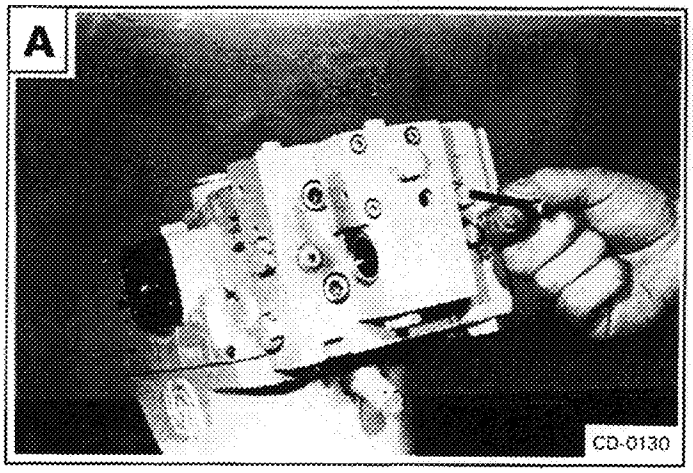




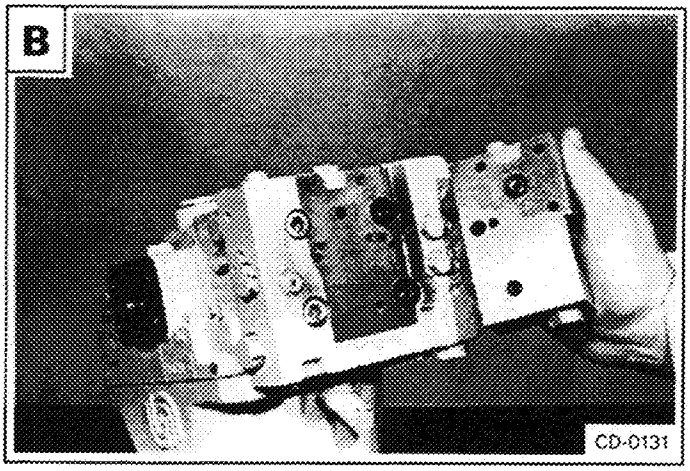




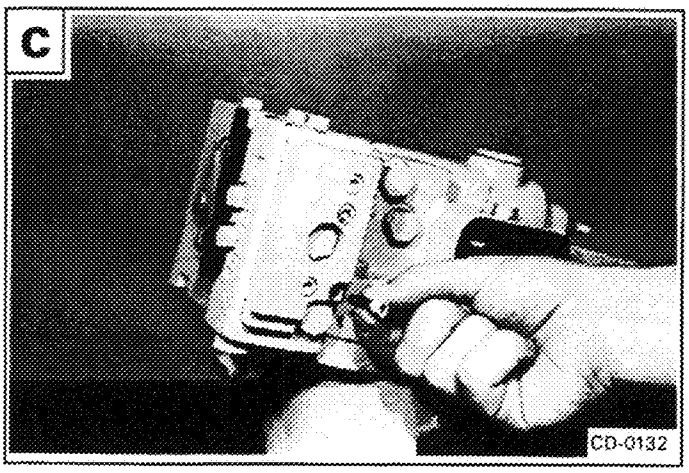
Remove the four (4) screws [A].



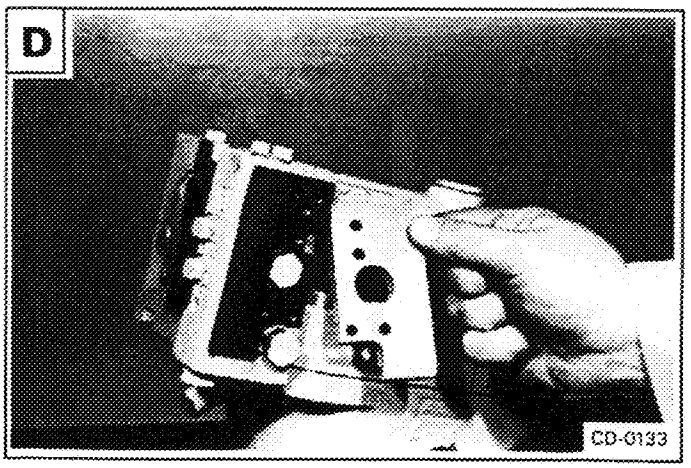
Remove the control block and three (3) O-rings [B].



Remove the four (4) screws [C].

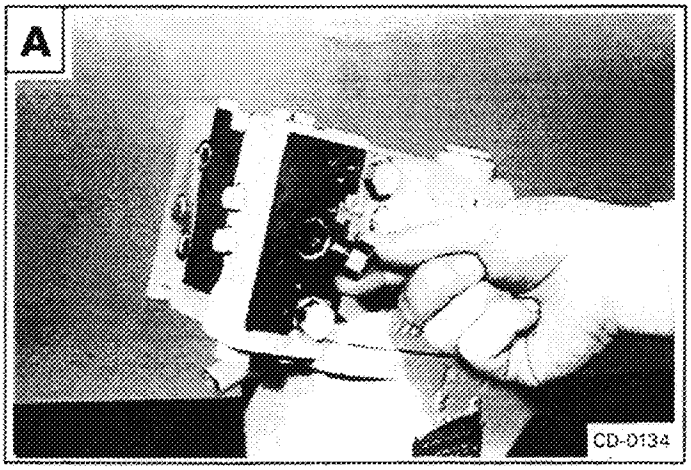


Remove the blocking plate and five (5) O-rings [D].

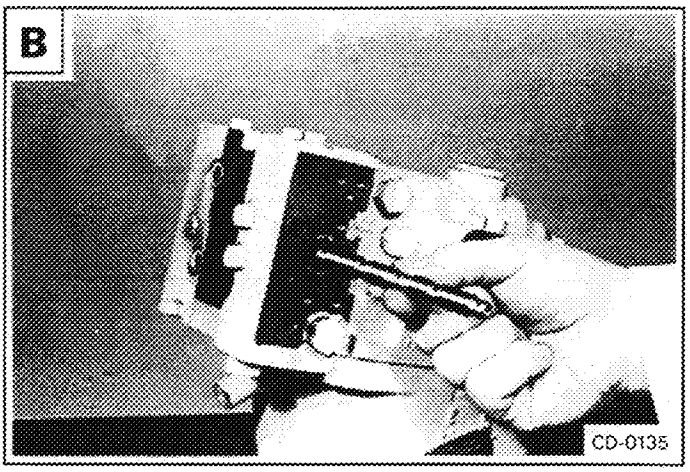


Remove the plug from both ends of the block [A].

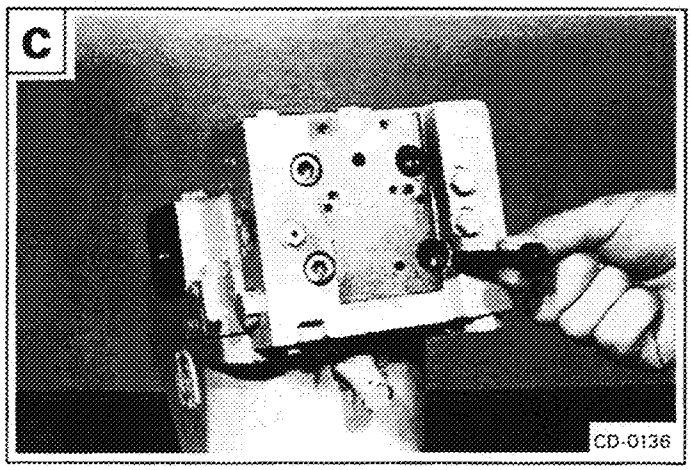
Remove the O-ring from both plugs.



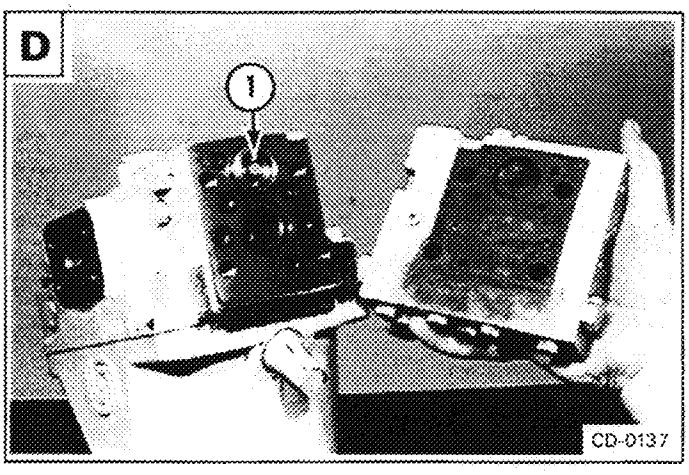
Remove the spool from the multi-function block [B].



Remove the four (4) screws [C].

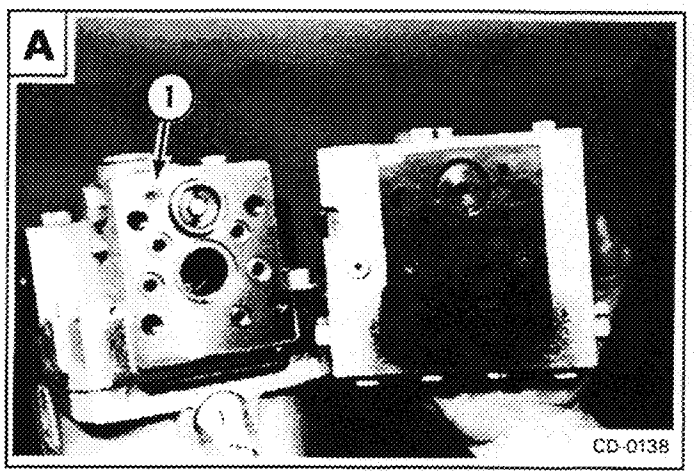


Remove the multi-function block, seven (7) O-rings from the end cap and O-ring (Item 1) from the valve sleeve [D].



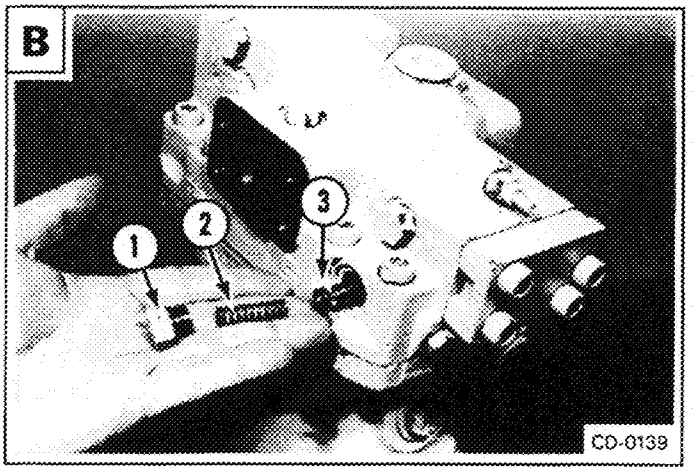
Inspect the three (3) screen filters (Item 1) for damage [A].

If replacement is required, use a screwdriver to pull the filter out of the bore. Note the orientation of the filter before removal.

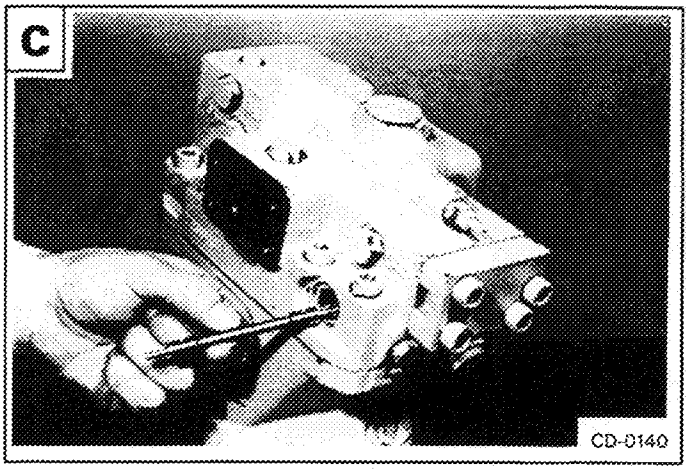


Remove the plug (Item 1), spring (Item 2) and guide (Item 3) from each side of the end cap [B].

Remove the O-ring from each plug.

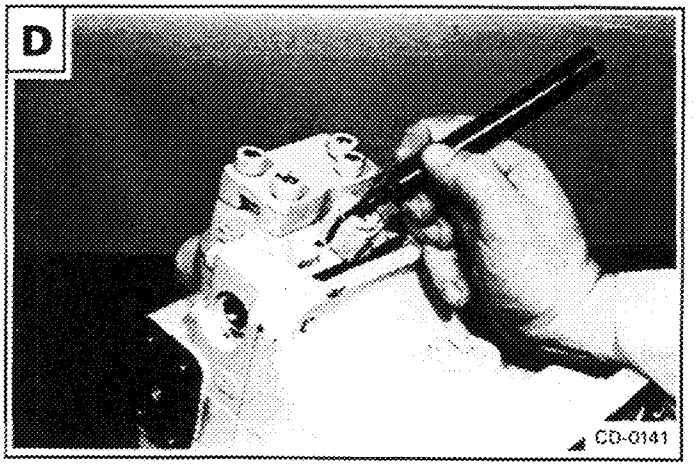


Remove the spool [C].

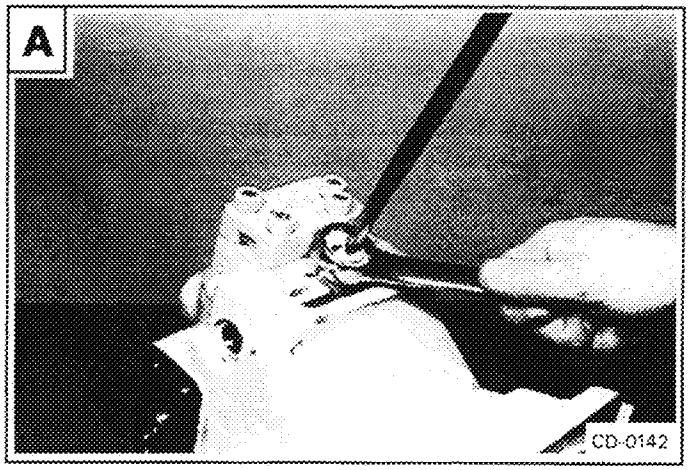


Before removing the charge pressure relief valve, mark the plug, lock nut and end cap for reference during assembly [D].

NOTE: **Removal of the charge pressure relief valve will result in loss of the correct adjustment. Refer to the Service Manual for the correct charge pressure relief valve adjustment procedure. The adjustment procedure must be performed with the motor installed and engine running.**

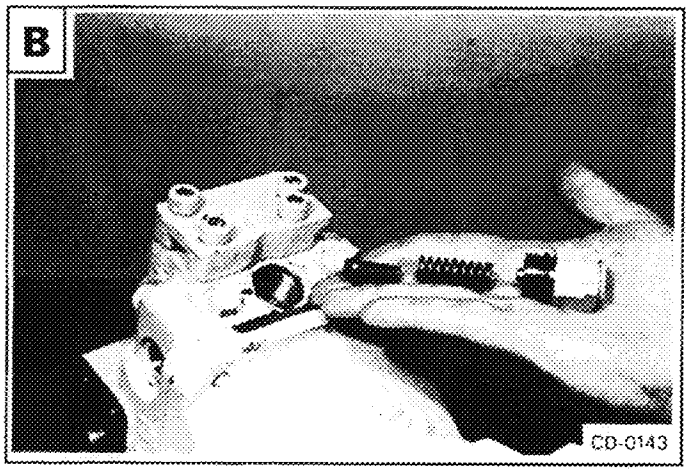


While holding the plug stationary, loosen the lock nut [A].

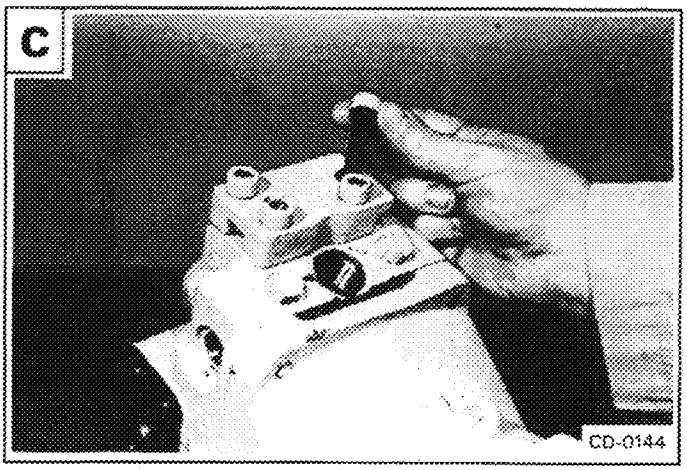


Count and record the number of revolutions it takes to remove the plug and lock nut assembly. Remove the spring and poppet [B].

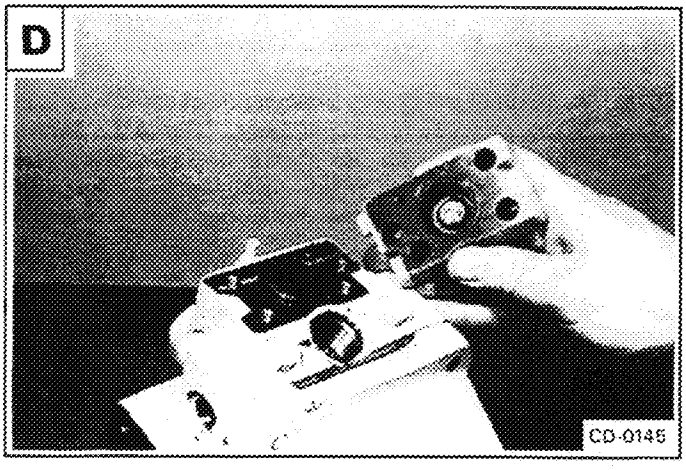
Remove the O-ring from the plug.



Remove the four (4) screws [C].

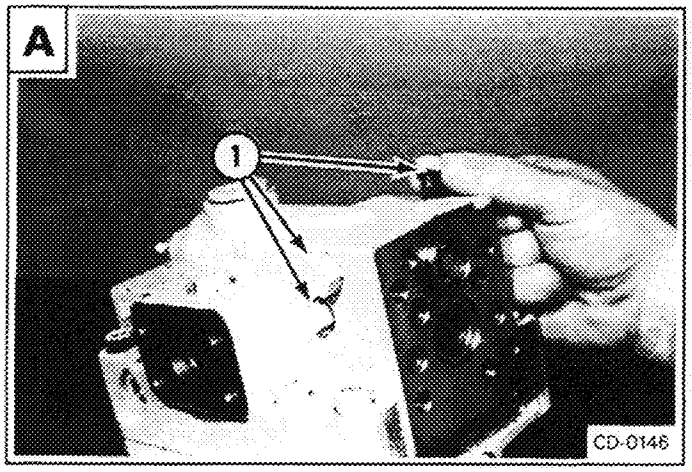


Remove the minimum angle servo cover and two (2) O-rings [D].



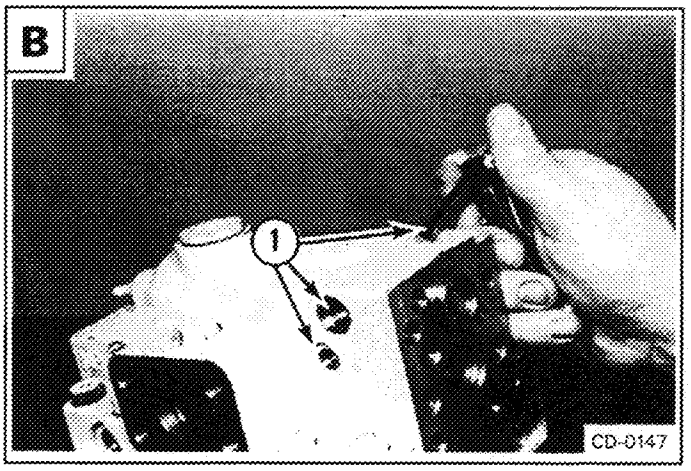
Remove the three (3) plugs (Item 1) [A].

Remove the O-ring from each plug.

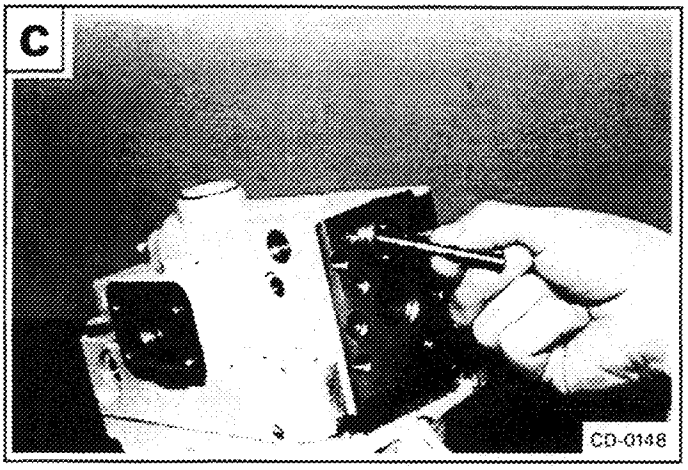


Remove the three (3) orifice plugs (Item 1) [B].

NOTE: The orifice plugs have different size orifices and must be installed in the same location. Put each orifice plug in a marked envelope.



Remove the spool [C].

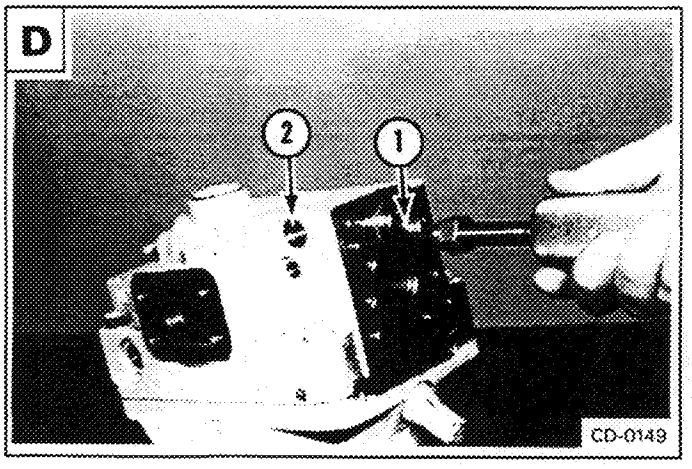


Using a slide hammer and a 5mm screw removed from the control block (Page D—9, Step A).

Remove the valve sleeve [D].

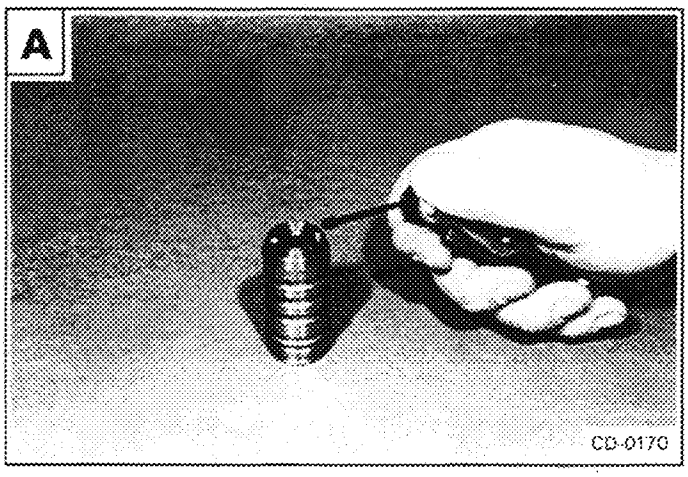
Remove the O-ring (Item 1) from the valve sleeve [D].

NOTE: The orifice plug must be removed from the large port (Item 2) before removing the valve sleeve [D].

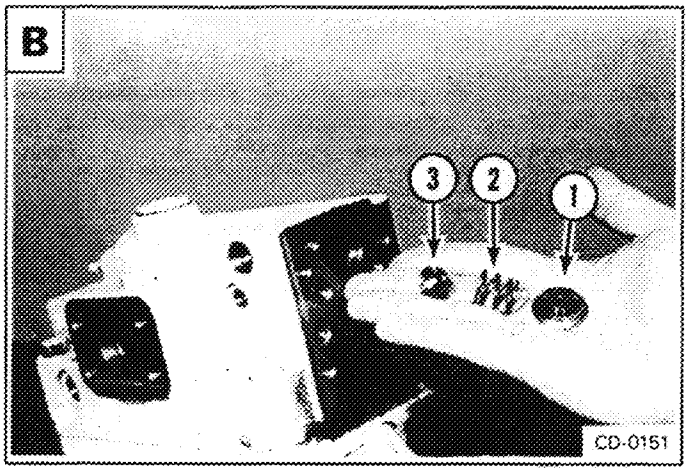


Remove the two (2) orifice plugs from the valve sleeve [A].

NOTE: **Put the orifice plugs in a marked envelope to keep the orifice plugs separate from other orifice plugs.**



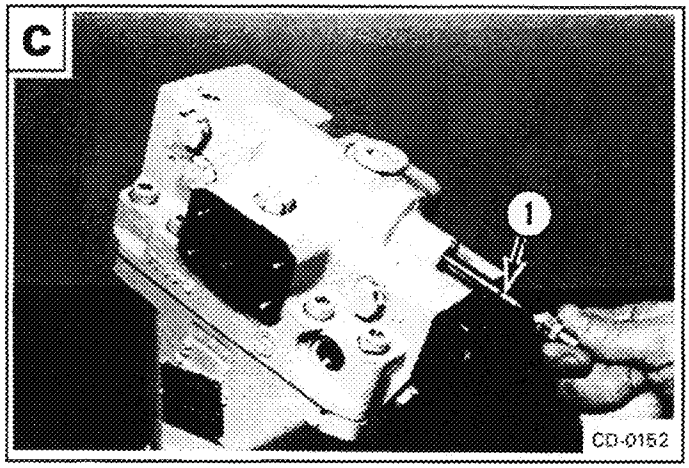
Remove the outer seat (Item 1), spring (Item 2) and inner seat (Item 3) [B].



Remove the control stem assembly [C].

Remove the O-ring (Item 1) from the control stem [C].

NOTE: **Do not disturb the control stem adjustment.**



Motor Disassembly

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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Put the hydrostatic motor on a work bench or on a support block with a hole for the output shaft.

Make a mark on the end cap and housing [A].

If it is necessary to remove the minimum displacement adjustment screw, remove and discard the safety cap (Item 1). Remove the lock nut and adjustment screw. Count and record the number of revolutions required to remove the adjustment screw [A].

NOTE: **Removal of the minimum displacement adjustment screw will result in the loss of the correct adjustment. Refer to the Service Manual for the correct minimum displacement adjustment procedure. The adjustment procedure must be performed with the motor installed and engine running.**

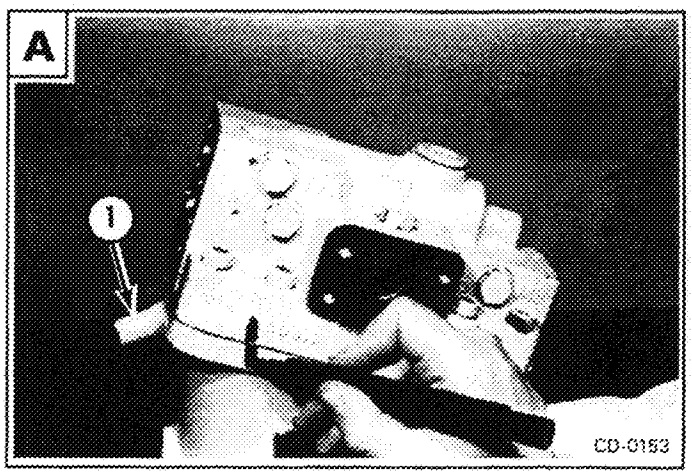
Remove the eight (8) end cap screws [B].

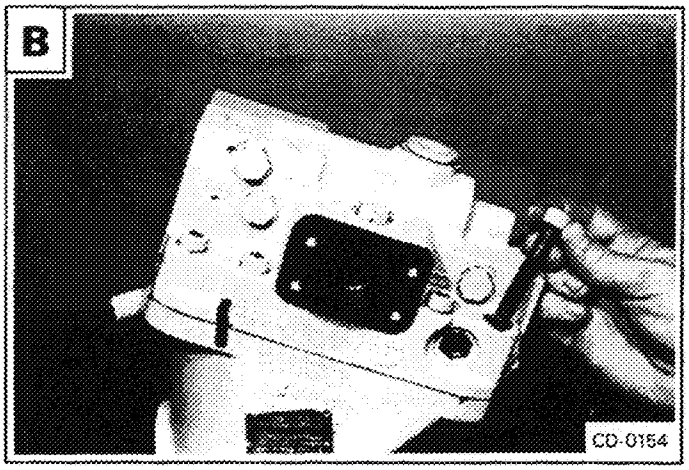
Note the location of the four (4) longer and four (4) shorter screws.

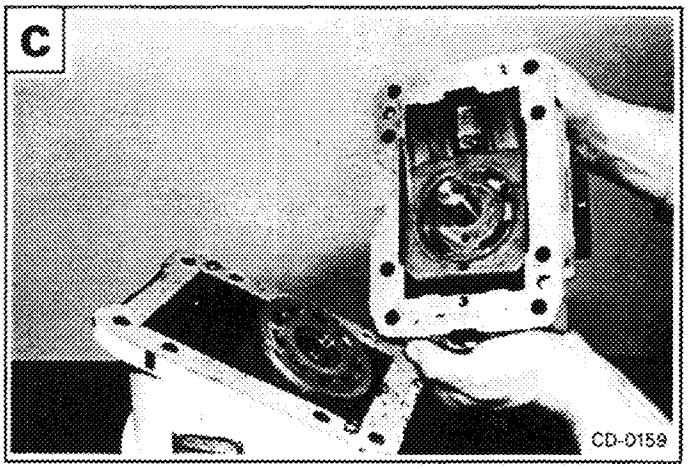
Remove the end cap assembly and gasket [C].

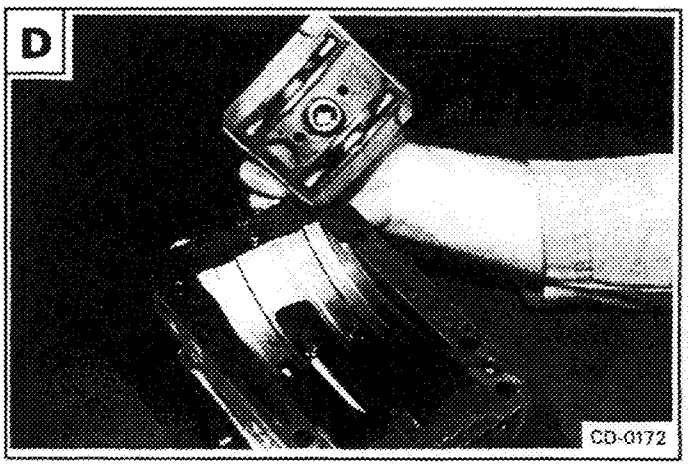
Remove the valve segment from the end cap [D].

Note the orientation of the valve segment with the end cap and motor housing.



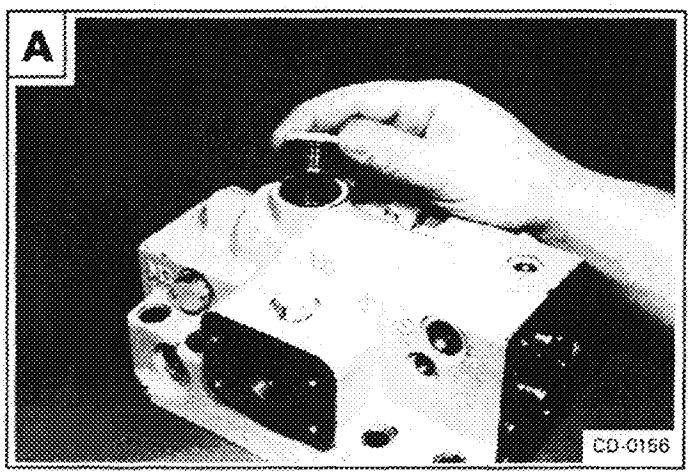




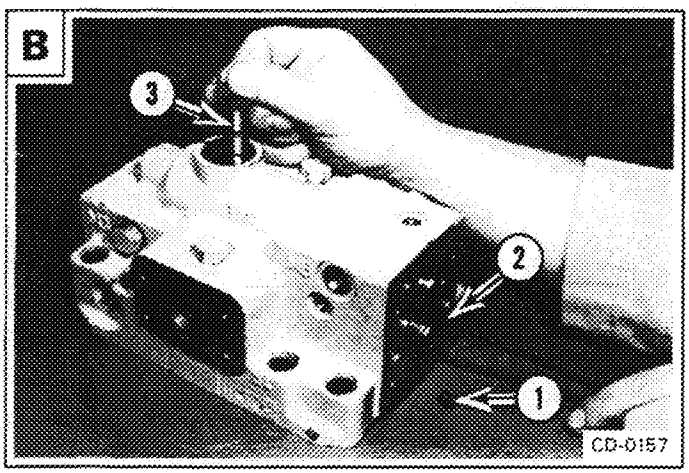


Remove the plug [A].

Remove the O-ring from the plug.

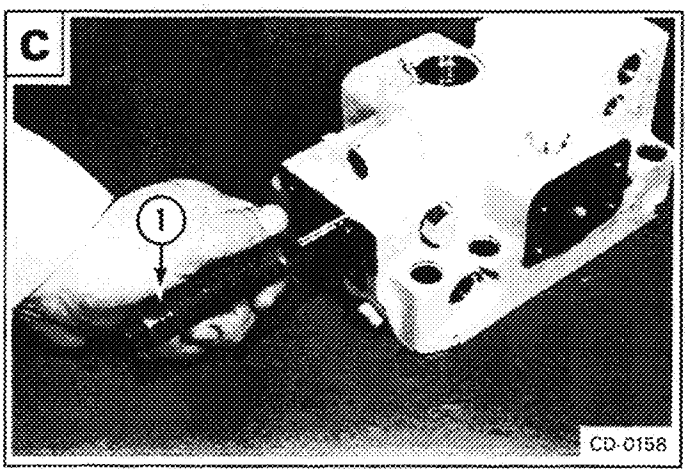


Remove the lock screw (Item 1), cone point set screw (Item 2) and setting lug (Item 3) from the servo piston [B].

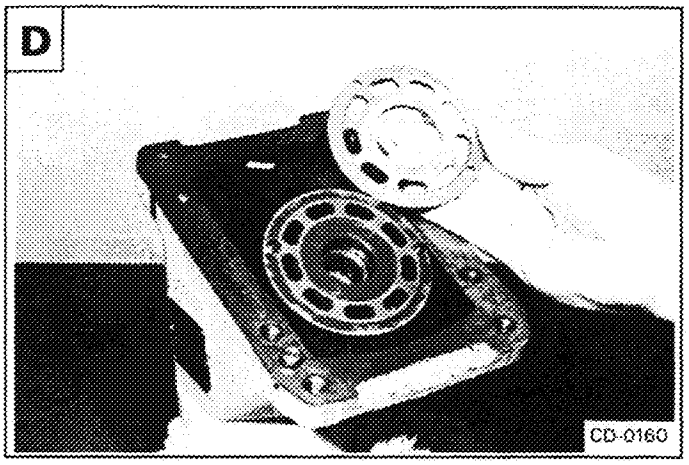


Remove the servo piston from the end cap [C].

Remove the glide ring (Item 1) and O-ring (Below Item 1) from the servo piston [C].

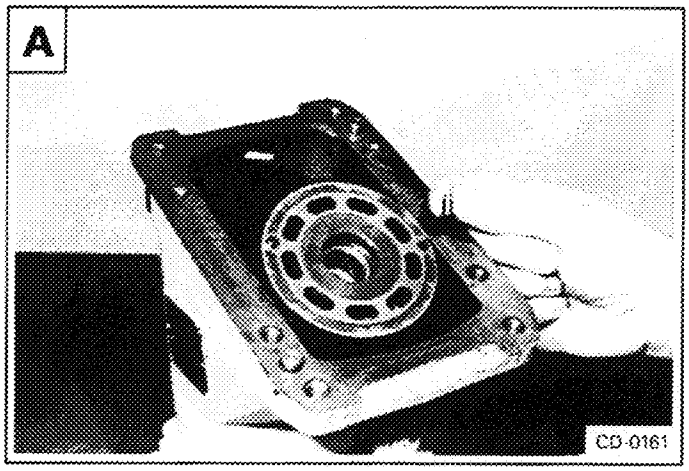


Remove the wear plate from the cylinder block [D].



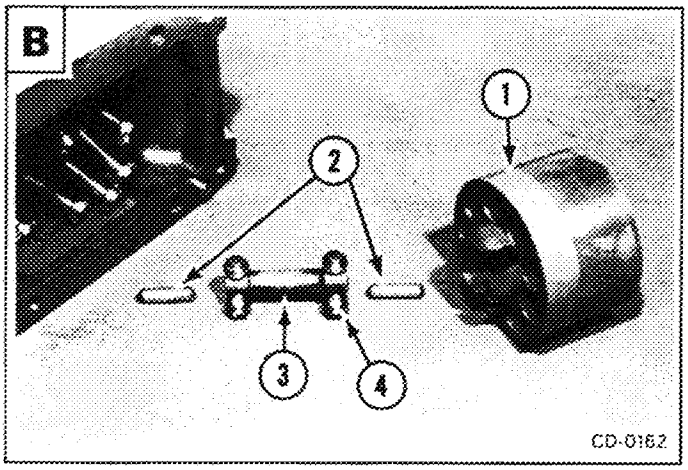
Remove the two (2) locating pins from the cylinder block [A].

Note the orientation of the locating pins from assembly.

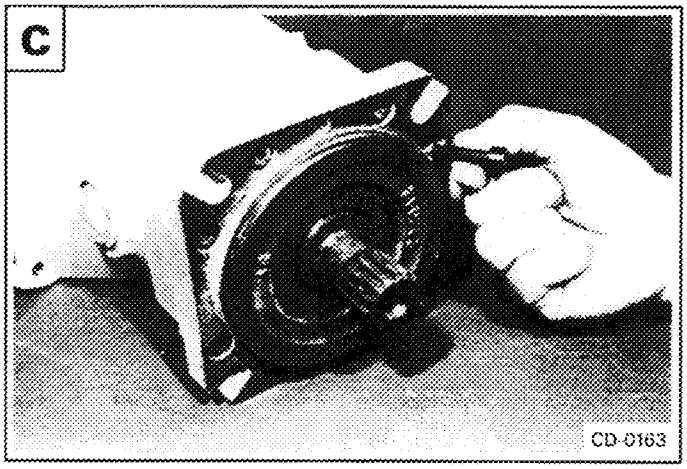


Remove the cylinder block (Item 1), two (2) pins (Item 2) and synchronizing shaft assembly (Item 3) from the housing [B].

Remove the six (6) rollers (Item 4) from the synchronizing shaft [B].

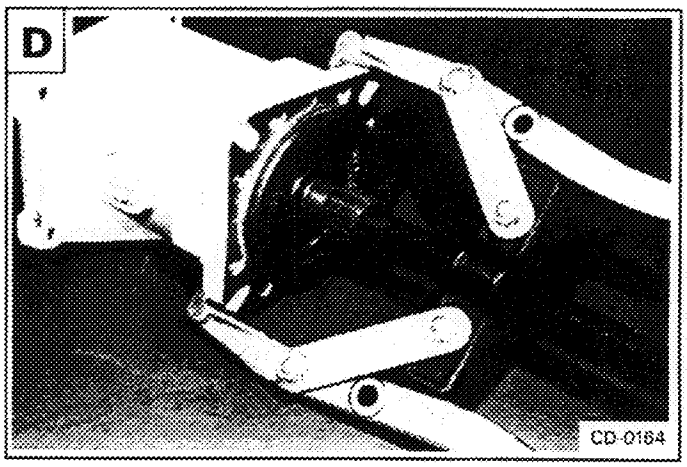


Remove the eight (8) screws from the mounting flange [C].

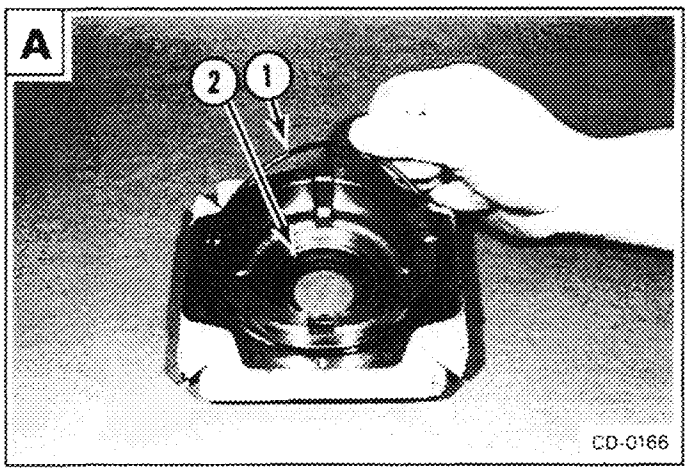


Using a puller, remove the mounting flange [D].

NOTE: The mounting flange can also be removed by installing two (2) 8 mm diameter screws into the threaded holes provided in the mounting flange.

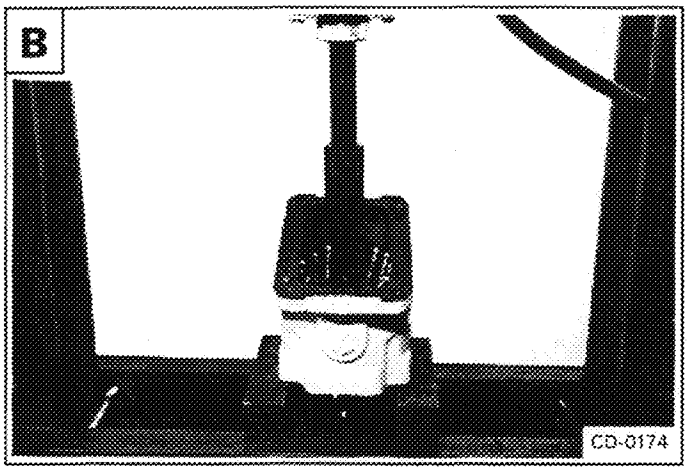


Remove the O-ring (Item 1) and seal (Item 2) from the mounting flange [A].



Put the housing and shaft assembly into a press. Remove the shaft assembly from the housing. Be careful not to damage the shaft assembly [B].

NOTE: **Do Not damage the piston sockets. If any part of the shaft assembly is damaged, a complete new shaft assembly including pistons and bearings must be installed.**

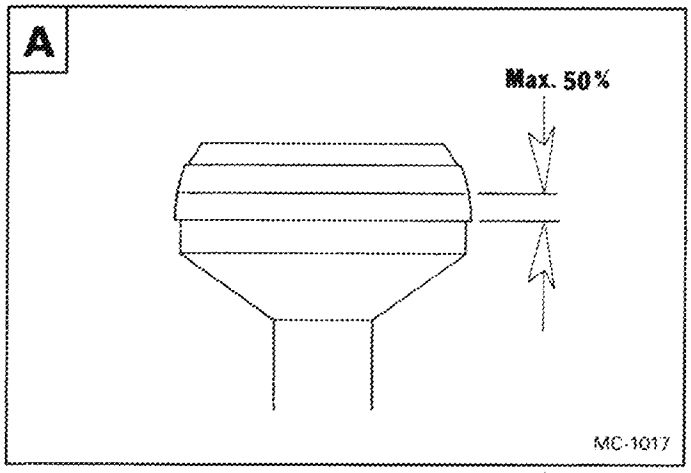


Inspection

Check the piston rings. A piston ring with surface wear of more than 50% of their original width must be replaced [A].

Use a small snap ring pliers to remove and install the rings.

NOTE: When installing the ring, make sure the sherical surface of the ring matches with the form of the piston head [A]. The ends of the piston ring must not overlap each other.



Check the seal area (Item 1) and output splines (Item 2) of the shaft for damage [B].

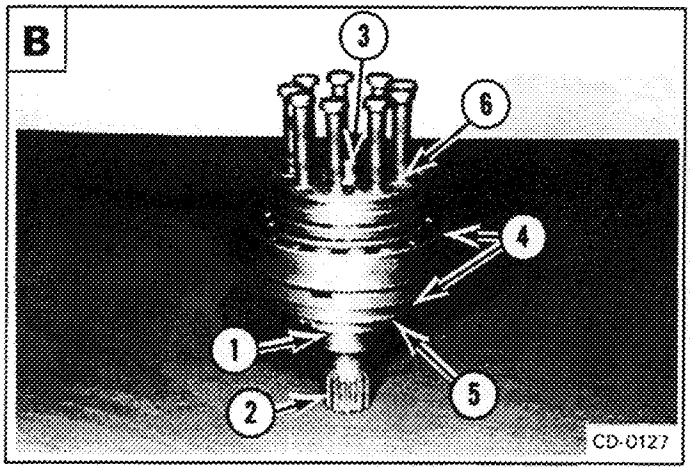
To check if the internal spring is damaged or broken, check for loose components in the center of the shaft (Item 3) [B].

Check the shaft bearings (Item 4) for wear or rough operation [B].

Check that the bearing retaining nut (Item 5) is tight and staked to the output shaft [B].

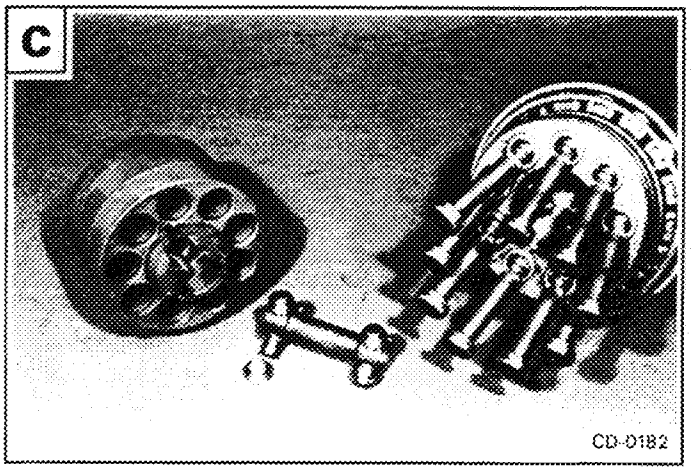
Check the pistons and piston sockets (Item 6) for damage. The piston sockets must be tight in the shaft [B].

NOTE: If any part of the shaft assembly is damaged, a complete new shaft assembly including pistons and bearings must be installed.



Check the syncronizing shaft, rollers and roller races in the cylinder block and shaft assembly for damage [C].

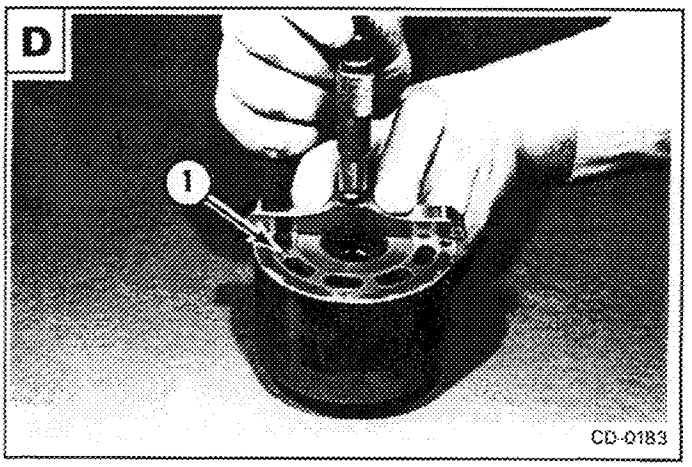
Check the cylinder block for damage. The piston bores must be free from scratches. [C].



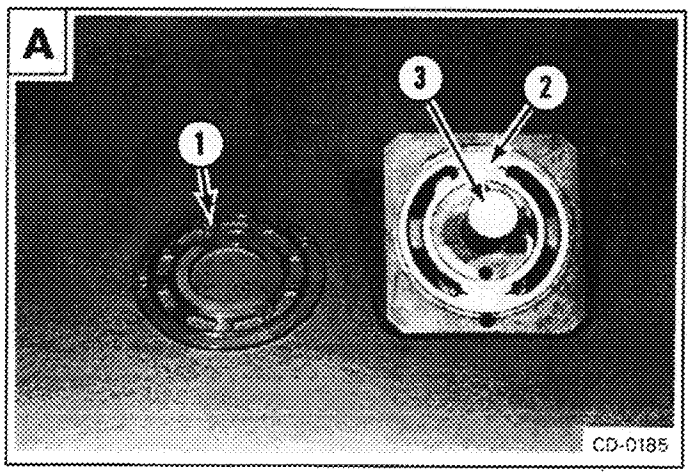
Check that the wear plate surface (Item 1) is free from scratches [D].

Check the cylinder block bearing for wear or rough operation.

If the bearing must be replaced, remove the bearing using a puller. Do Not damage the wear plate surface on the cylinder block. Install a new bearing using the correct press pin. The bearing must be located 0.45 - 0.47 inch (11,5 - 12,0) below the wear plate surface (Item 1) [D].

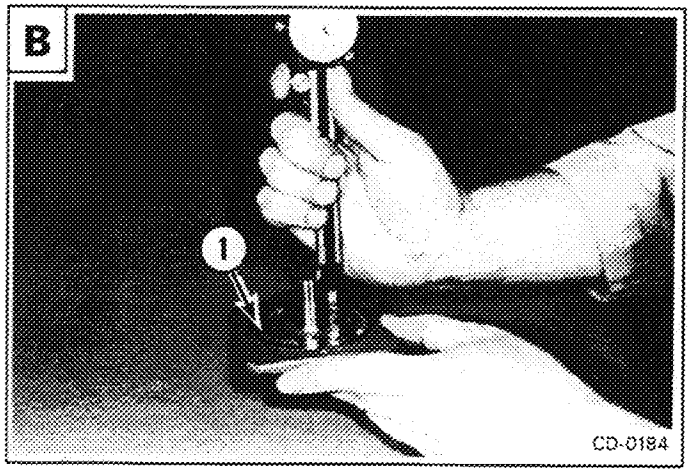


Check that the wear plate (Item 1) wear plate surface on the valve segment (Item 2) and spindle (Item 3) are free from scratches [A].



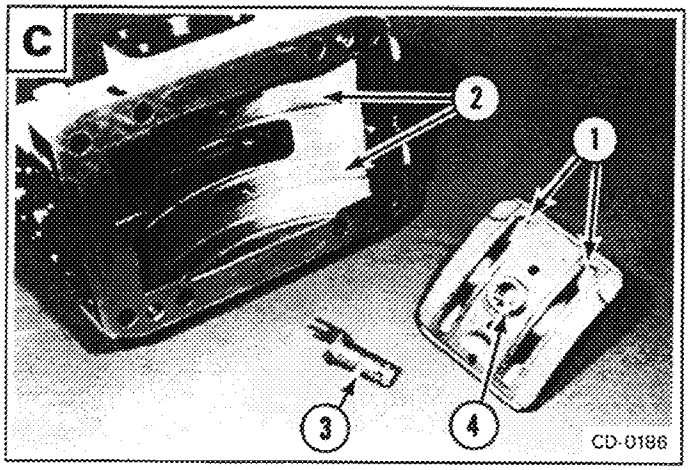
Check that the spindle is correctly located in the valve segment by measuring the distance between the wear plate surface (Item 1) and end of the spindle [B].

If this dimension is not 1.28 - 1.29 inch (32,6 - 32,8 mm) the spindle has moved and the valve segment must be replaced.

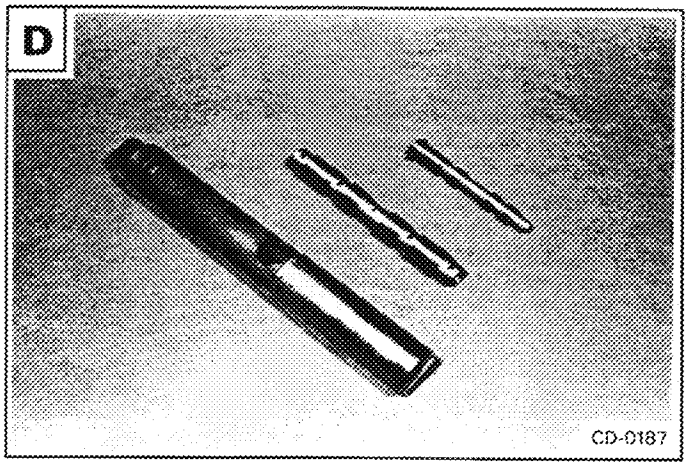


Check that the sealing surfaces of the valve segment (Item 1) and the sealing surfaces of the end cap (Item 2) are free from scratches [C].

Check the setting lug (Item 3) and lug socket (Item 4) for wear or damage [C].



Check all control spools and bores to make sure they are free of damage [D].

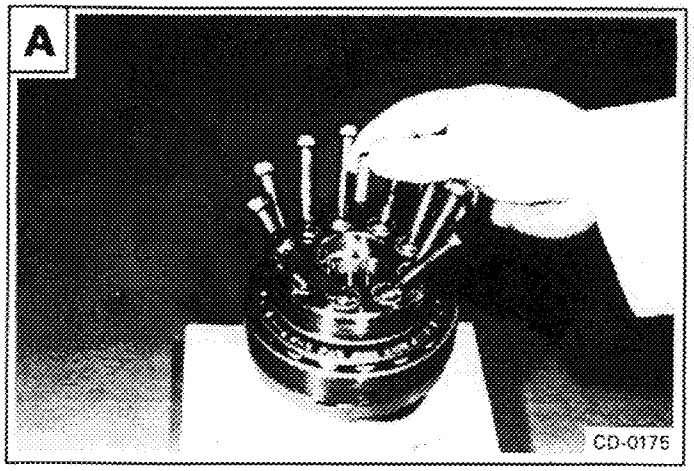


Motor Assembly

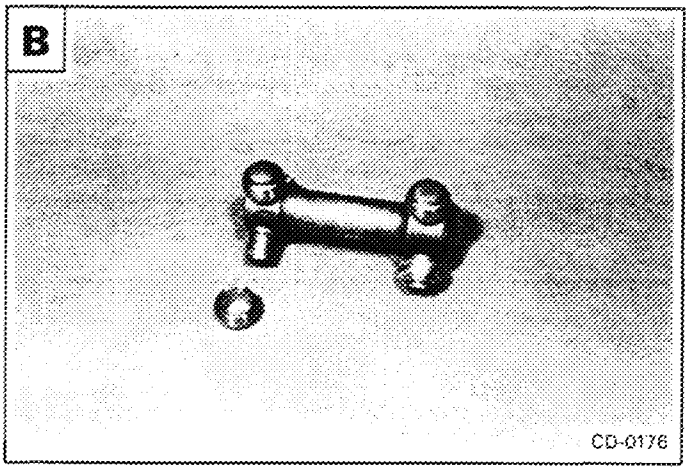
All parts must be clean before assembly. Clean all parts in clean solvent. Do Not use air pressure to dry bearings. Allow all bearings to air dry. Apply clean oil to all internal parts. Only special lubrication points are stated in the procedure.

Apply oil to the two (2) bearings and the piston assemblies on the shaft assembly.

Apply grease to the pin. Install the pin into the shaft assembly [A].



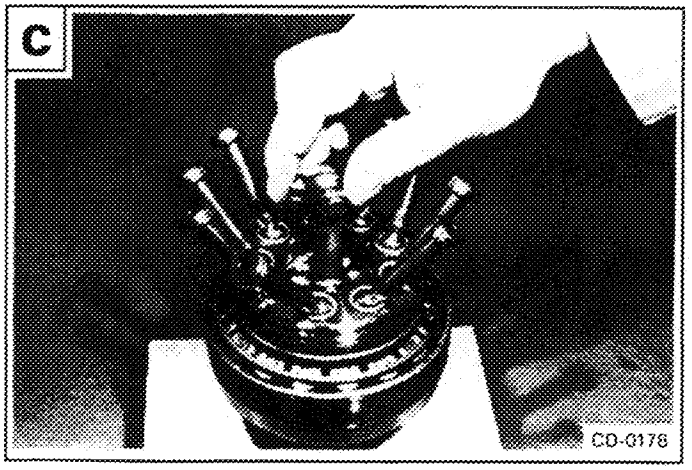
Apply grease to the inside and outside of the six (6) rollers, recessed face inward, on the synchronizing shaft [B].



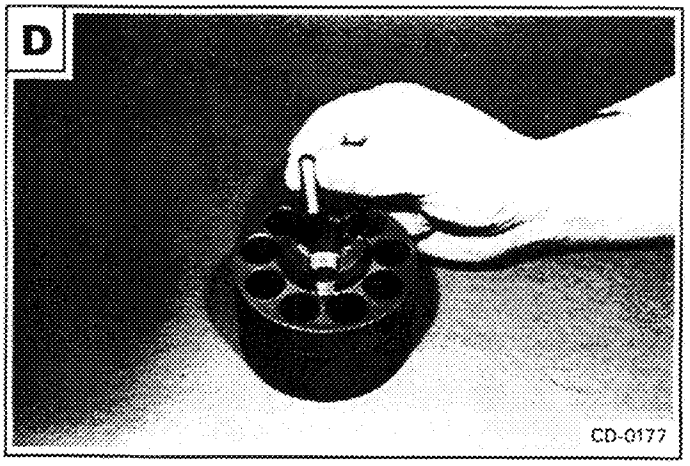
Install the synchronizing shaft and rollers into the shaft assembly [C].

Check that the synchronizing shaft is supported on the pin and that the rollers are correctly positioned in the races.

NOTE: The cylinder block end of the synchronizing shaft is larger and will not fit into the shaft assembly.



Apply grease to the pin. Install the pin into the cylinder block [D].



Apply oil to the cylinder bores in the cylinder block.

Put six (6) pistons facing one direction and three (3) pistons in the opposite direction, as shown [A].

Align the roller races in the cylinder block with the synchronizing shaft. Install the six (6) pistons into the cylinder block [A].

Install the synchronizing shaft and rollers into the cylinder block. Install the remaining three (3) pistons into the cylinder block.

Check that the pin is positioned correctly between the synchronizing shaft and cylinder block. Check that the rollers are positioned correctly in the races.

NOTE: If the synchronizing shaft and rollers are installed properly, there will be very little rotational free-play between the cylinder block and shaft assembly.

Fasten the cylinder block to the shaft assembly by stretching rubber bands over the cylinder block. Fasten each rubber band to the necks of pistons on opposite sides of the cylinder block [B].

NOTE: Hydraulic oil will destroy rubber bands overtime. Do not leave rubber bands on for more than several hours.

Install the shaft and cylinder block assembly into the housing. Put the housing, with bearing bore vertical, into a press. Push the shaft and cylinder block assembly into the housing [C].

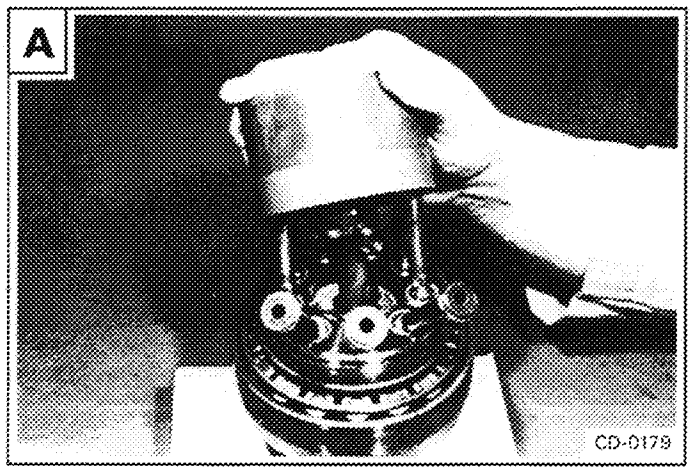
NOTE: When pushing the shaft assembly into the housing, make sure that the cylinder block clears the minimum displacement adjustment screw (Item 1) [C].

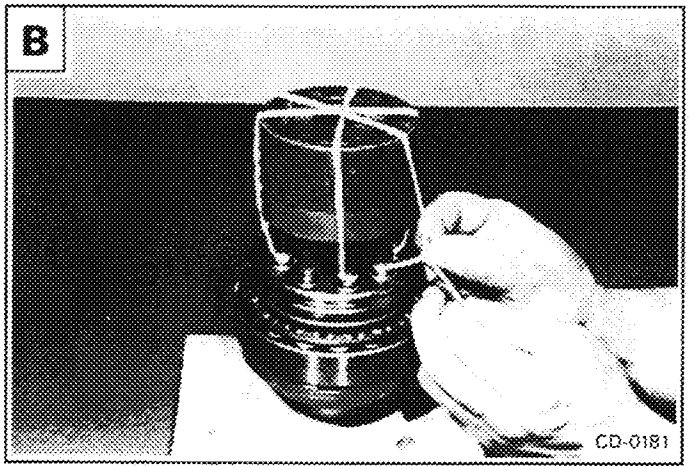
Put the hydrostatic motor on a work bench or on a support block with a hole for the output shaft.

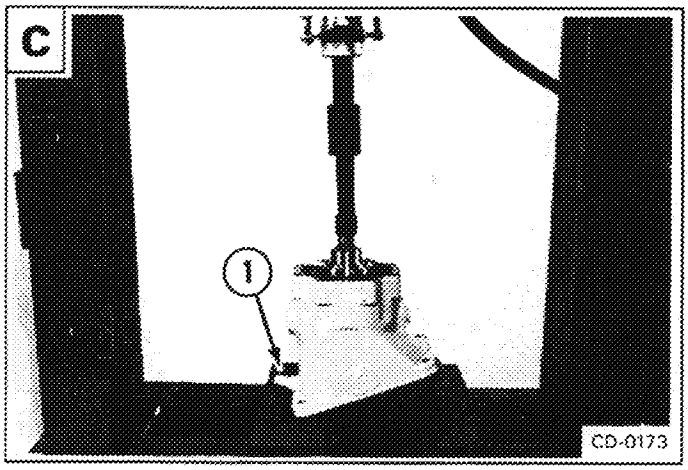
Remove the rubber bands from the cylinder block and pistons. Check that all rubber bands are removed from inside the housing.

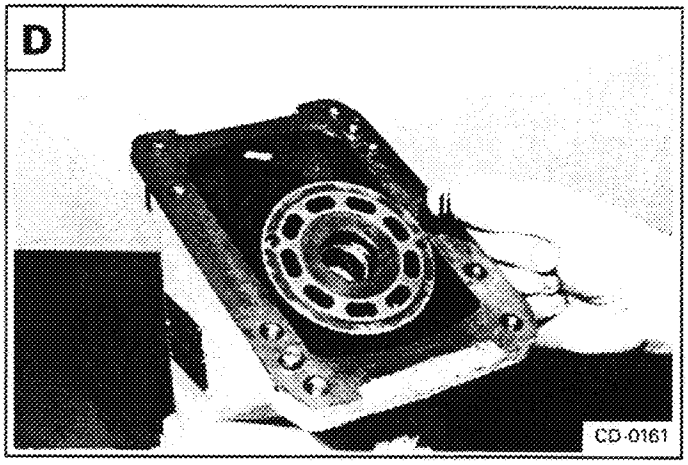
Check that the pins, synchronizing shaft and rollers are all positioned correctly.

Install the two (2) locating pins, with short end facing upward, into the cylinder block [D].

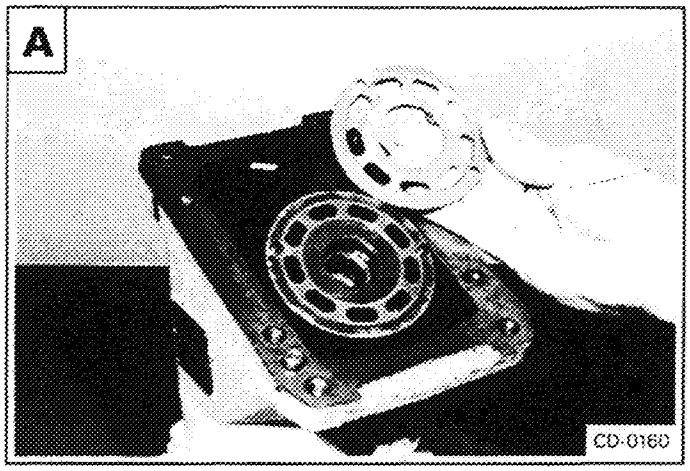






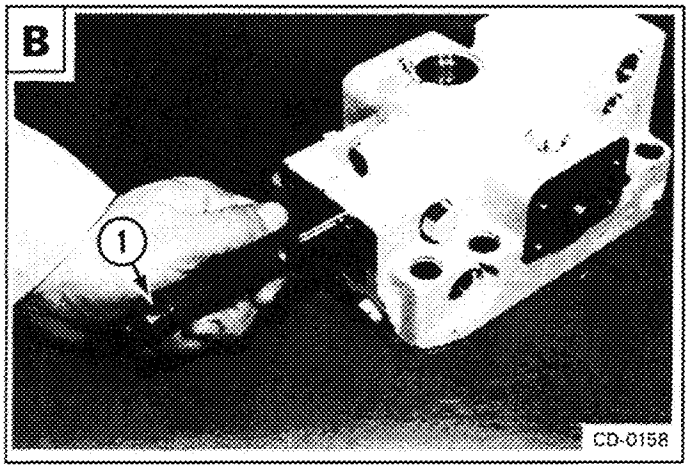


Apply oil to the wear plate. Install the wear plate, with its bronze side up, on the cylinder block [A].



Apply a light coating of petroleum jelly to a new glide ring (Item 1) and O-ring (Below Item 1). Install the O-ring and glide ring on the servo piston [B].

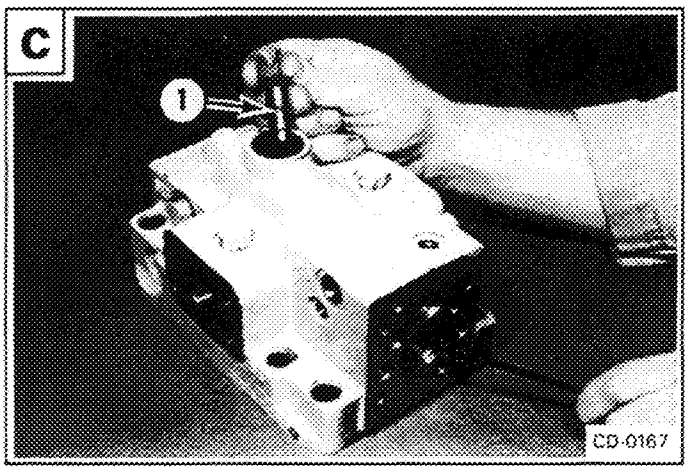
Apply oil to and install the servo piston into the end cap [B].



Install the setting lug and cone point set screw into the servo piston [C].

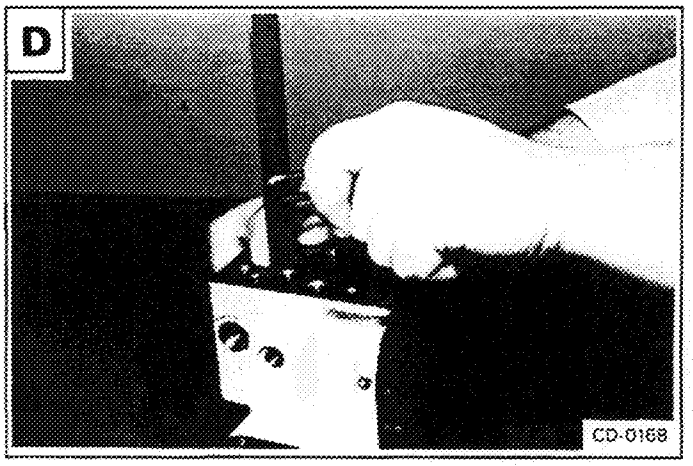
The cone point of the set screw must contact the setting lug in the groove (Item 1) [C].

Do Not tighten the set screw at this time.



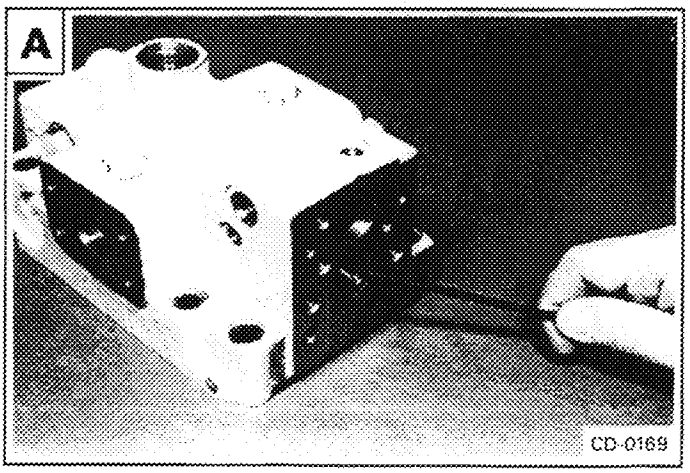
Use a steel ruler, held tightly against the side of the bore as shown, to set the setting lug forks perpendicular to the end cap bores [D].

Tighten the set screw to 44 ft.-lbs. (5 Nm) torque [D].



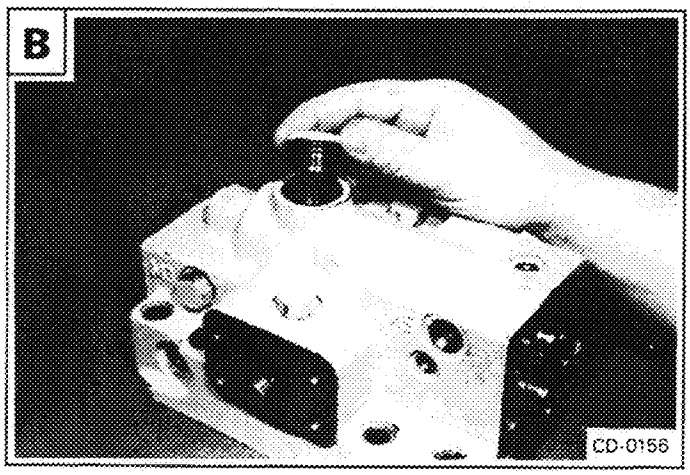
Install the lock screw [A].

Tighten the lock screw to 14 ft.-lbs. (19 Nm).



Apply a light coating of petroleum jelly to a new O-ring. Install the new O-ring on the plug [B].

Install the plug into the end cap [B].

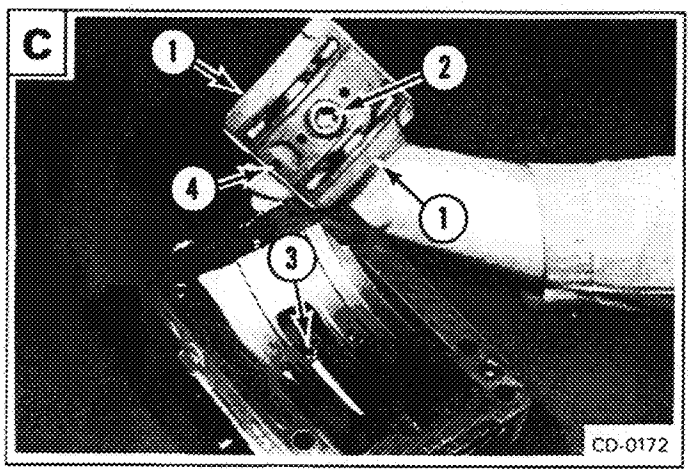


Apply oil to the valve segment.

Apply a light coating of grease to the two (2) sides (Item 1) and lug socket (Item 2) of the valve segment [C].

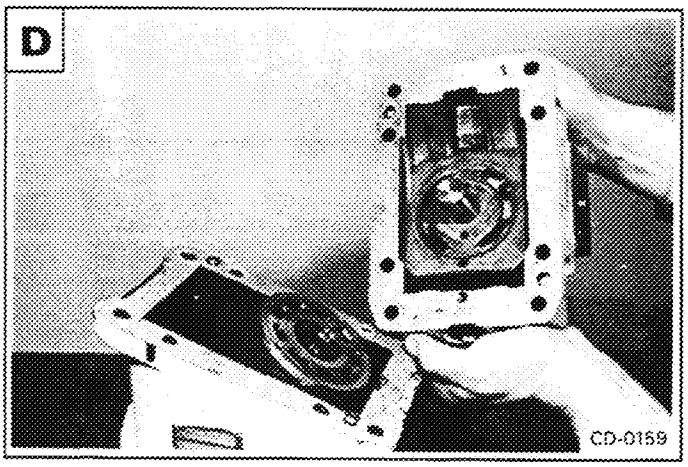
Install the valve segment into the end cap so that the lug socket (Item 2) engages the setting lug (Item 3). The hole (Item 4) in the valve segment must be installed opposite the control end of the end cap [C].

Apply oil to the bearing in the cylinder block.



Install a new gasket and the end cap assembly onto the housing. The valve segment spindle must be installed into the cylinder block. Align the end cap and housing marks made during disassembly [D].

When properly installed, the internal spring in the shaft assembly will hold the end cap away from the housing a short distance.



Install the four (4) long and four (4) short screws in the correct locations [A].

Tighten the screws evenly in a double - X pattern to a final torque of 58 ft.-lbs. (78 Nm).

Rotate the output shaft periodically while tightening the screws to assure the correct motor assembly. Any play between the shaft and cylinder block indicates that the synchronizing shaft rollers are not installed correctly.

If the minimum displacement adjustment screw was removed, install the adjustment screw to the number of revolutions recorded during disassembly. While holding the adjustment screw stationary, install and tighten the lock nut to 38 ft.-lbs. (51 Nm) torque. Do not install the new safety cap (Item 1) at this time [A].

NOTE: Removal of the minimum displacement adjustment screw or installation of new motor internal parts can result in the loss of the correct adjustment. Refer to the Service Manual for the correct minimum displacement adjustment procedure. The adjustment procedure must be performed with the motor installed and engine running.

Apply a light coating of petroleum jelly to and install a new O-ring on the mounting flange [B].

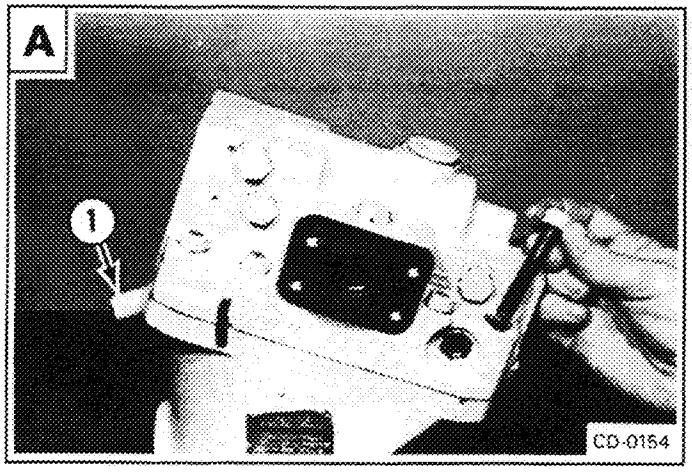
If removed, install a new seal (Item 1) [B].

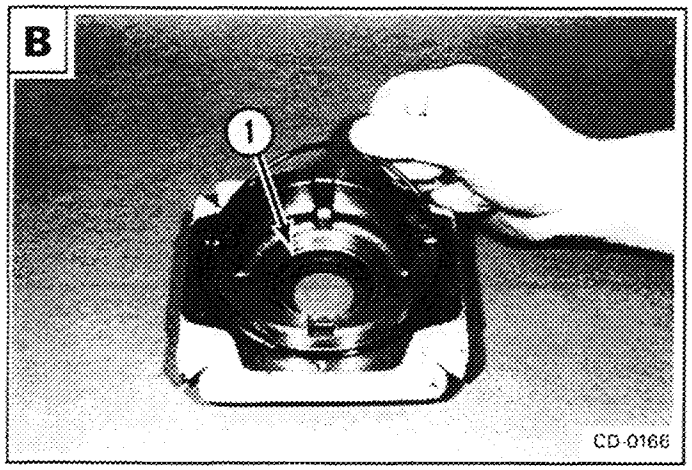
Apply grease to the seal lips.

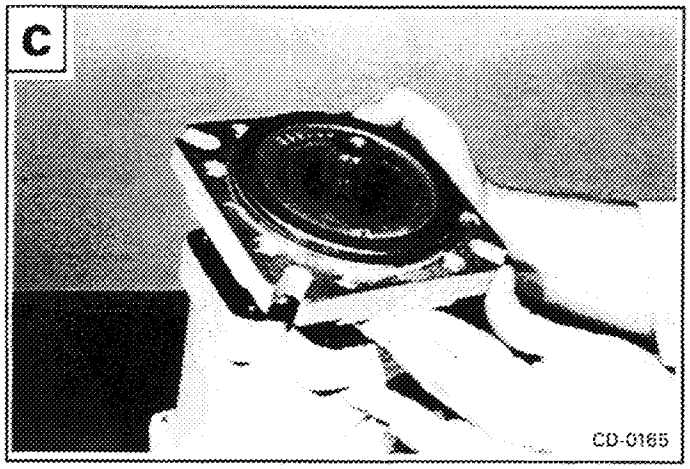
Install the mounting flange onto the housing [C].

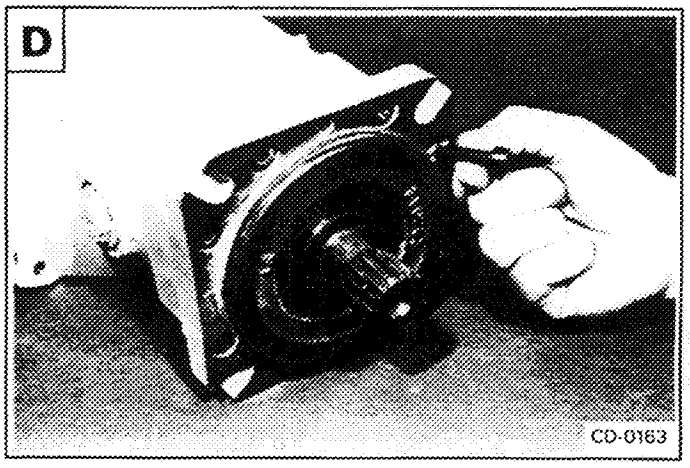
Install the eight (8) screw [D].

Evenly tighten the screws to 24 ft.-lbs. (32 Nm) torque.









End Cap and Control Assembly (Model 2410)

All parts must be clean before assembly. Clean all parts in clean solvent. Use air pressure to dry. Apply clean oil to all internal parts. Very important lubrication points are stated in the procedure.

Put the hydrostatic motor on a work bench or on a support block with a hole for the output shaft.

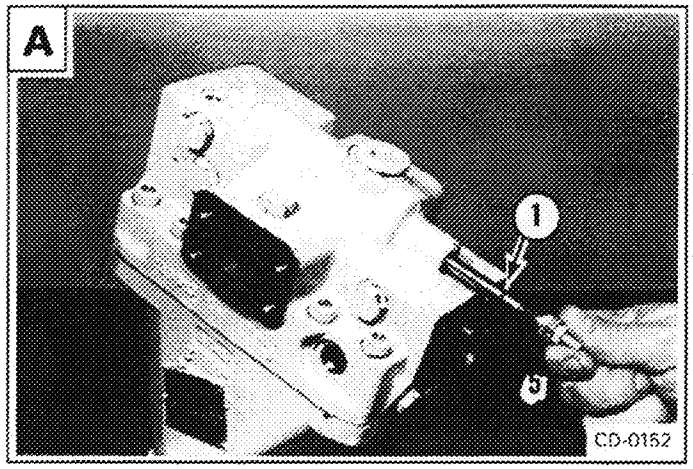
Apply a light coating of petroleum jelly to and install a new O-ring (Item 1) on the control stem [A].

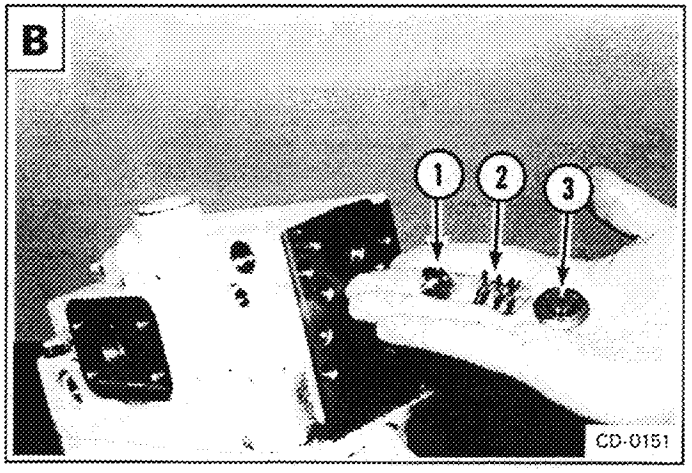
Apply oil ot the control stem. Install the control stem assembly into the end cap [A].

Tighten the control stem assembly to 15 ft.-lbs. (20 Nm) torque.

NOTE: Do not disturb the control stem adjustment.

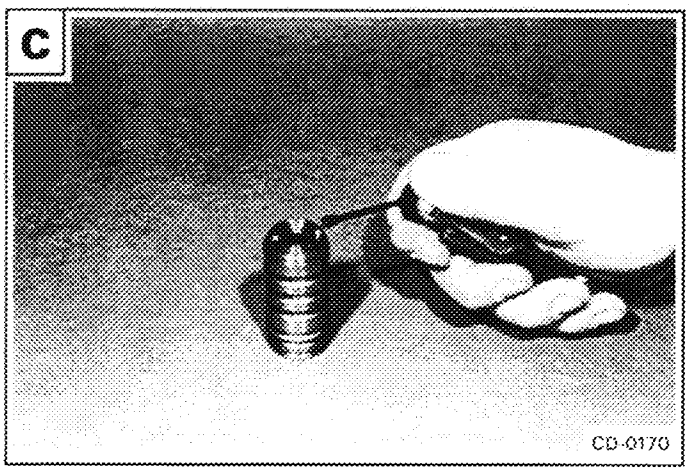
Install the inner seat (Item 1), spring (Item 2) and outer seat (Item 3) into the end cap [B].





Install the two (2) orifice plugs into the valve sleeve [C].

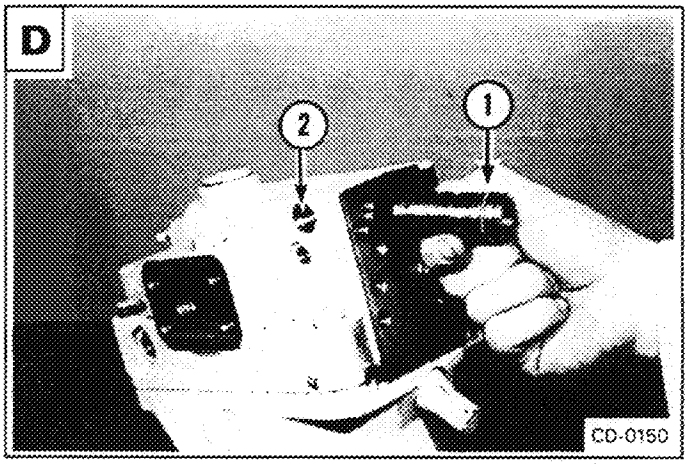
Tighten the orifice plugs to 35 in.-lbs. (4 Nm) torque.



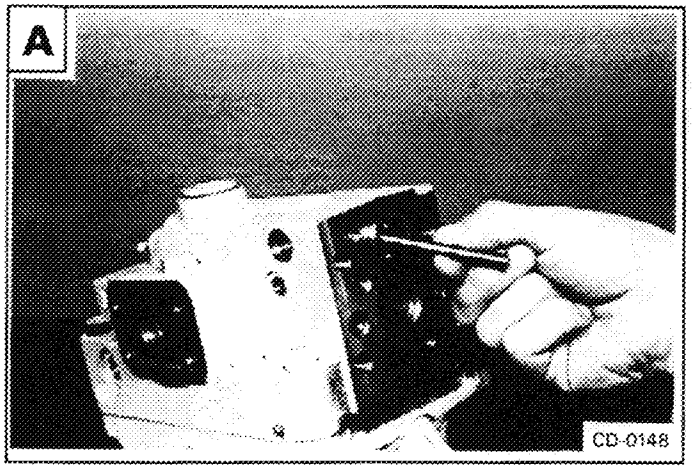
Apply a light coating of petroleum jelly to and install a new O-ring (Item 1) in the second groove on the valve sleeve [D].

Apply oil to the valve sleeve. Install the valve sleeve into the end cap [D].

NOTE: The orifice plug must be removed from the large port (Item 2) before installing the valve sleeve. The valve sleeve to bore fit is a slight interference fit. If the valve sleeve does not enter the bore, Do Not force the valve sleeve and then install into the bore. Hit the end of the valve sleeve with a rubber mallet to make sure the valve sleeve is fully seated.



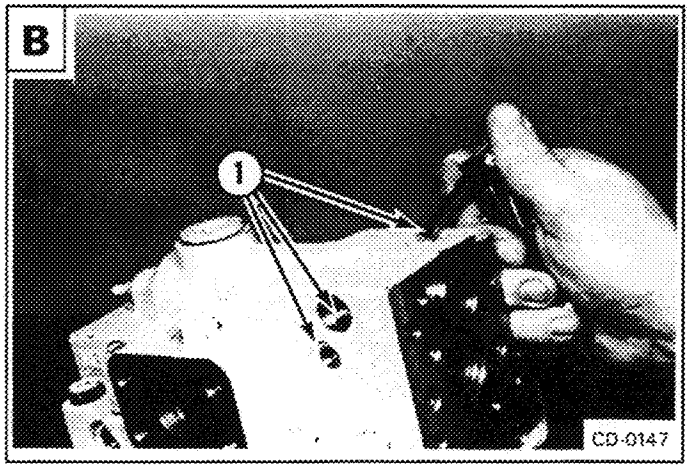
Apply oil to the spool. Install the spool in the valve sleeve [A].



Install the three (3) orifice plugs (Item 1) [B].

Tighten the orifice plugs to 35 ft.-lbs. (4 Nm) torque.

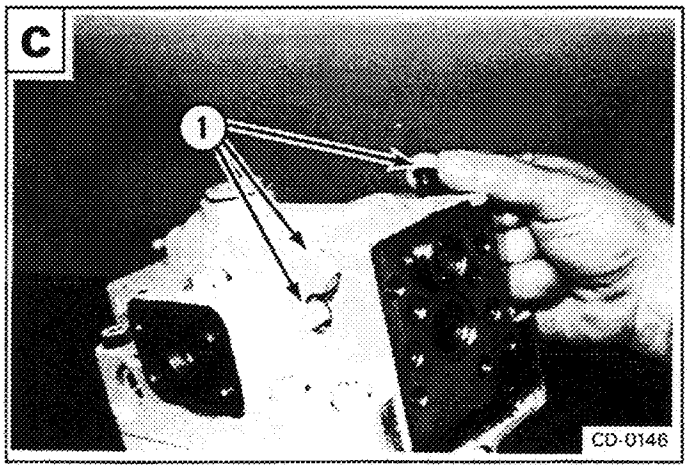
NOTE: **The orifice plugs have different size orifices. Each orifice plug must be installed in the same location as removed.**



Apply a light coating of petroleum jelly to and install a new O-ring on each plug.

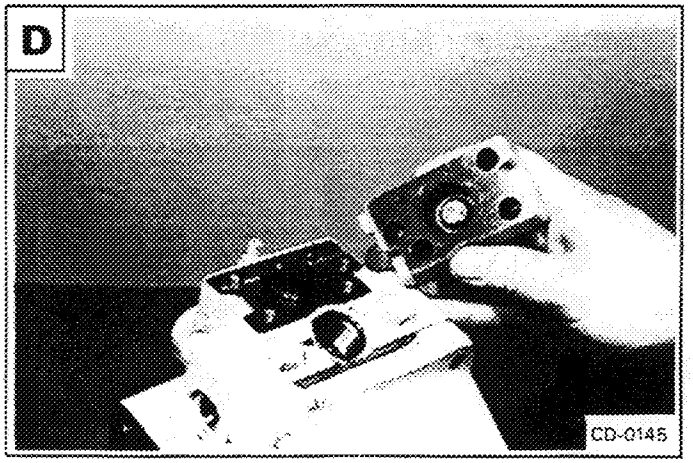
Install the three (3) plugs (Item 1) [C].

Tighten the small plugs to 7 ft.-lbs. (9 Nm) torque and large plug to 27 ft.-lbs. (37 Nm) torque.



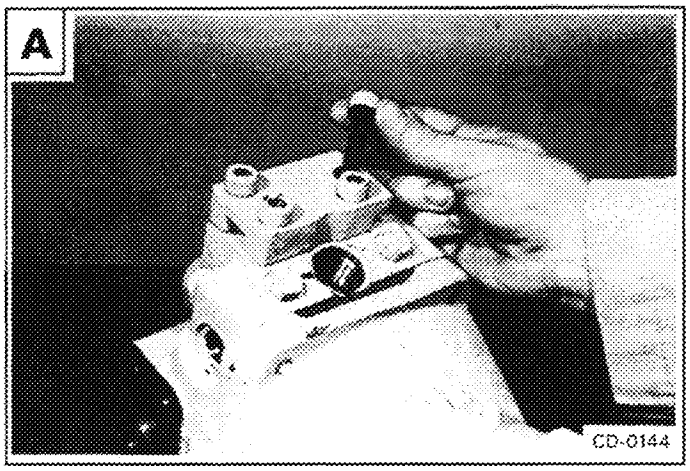
Apply a light coating of petroleum jelly to two (2) new O-rings.

Install the two (2) O-rings and minimum angle servo cover [D].



Install the four screws [A].

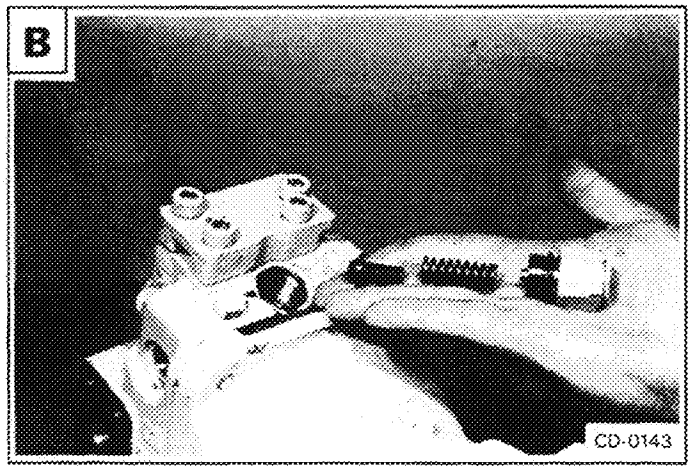
Tighten the screws to 58 ft.-lbs. (78 Nm) torque.



Apply a light coating of petroleum jelly to and install a new O-ring on the plug and lock nut assembly.

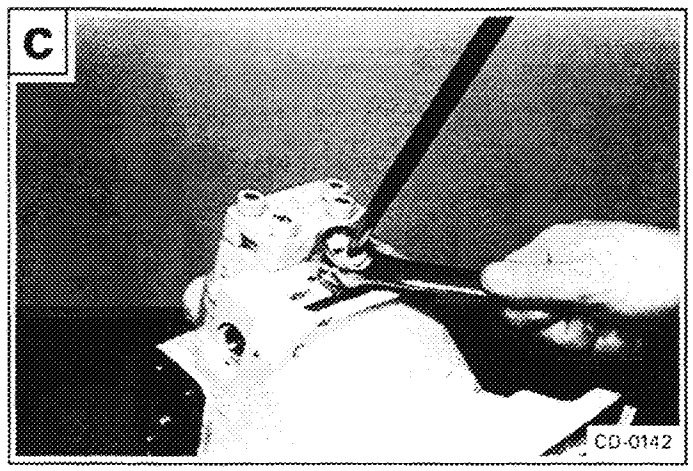
Install the poppet, spring and plug and lock nut assembly into the end cap [B].

Turn the plug and lock nut assembly into the end cap the number of revolutions recorded during disassembly.

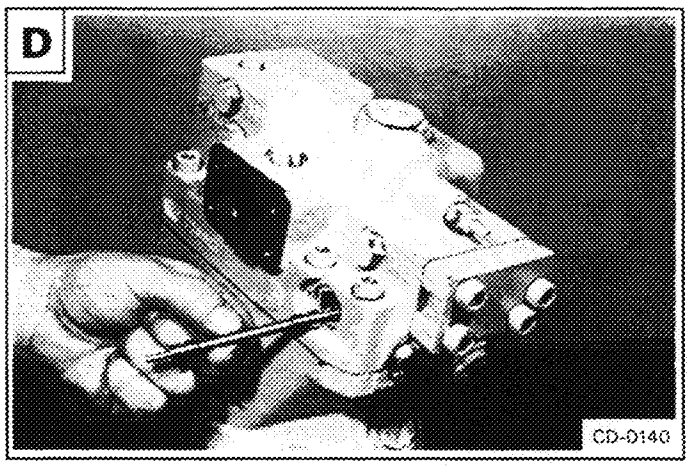


Align the marks on the plug and end cap. Holding the plug stationary, tighten the lock nut [C].

NOTE: **Removal of the charge pressure relief valve will result in loss of the correct adjustment. Refer to the Service Manual for the correct charge pressure relief valve adjustment procedure. The adjustment procedure must be performed with the motor installed and engine running.**



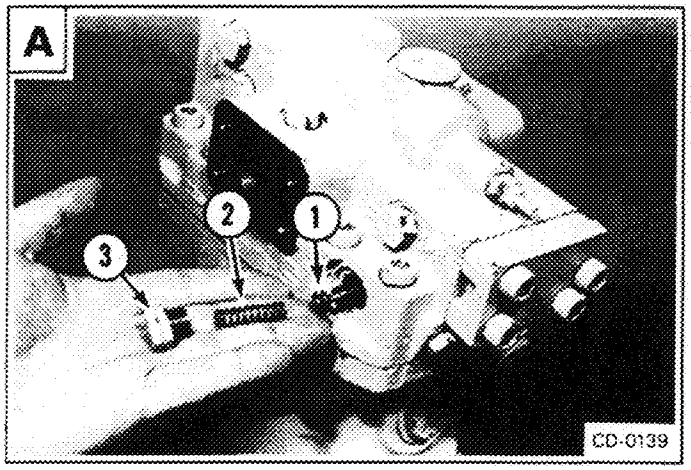
Apply oil to the spool. Install the spool into the bore [D].



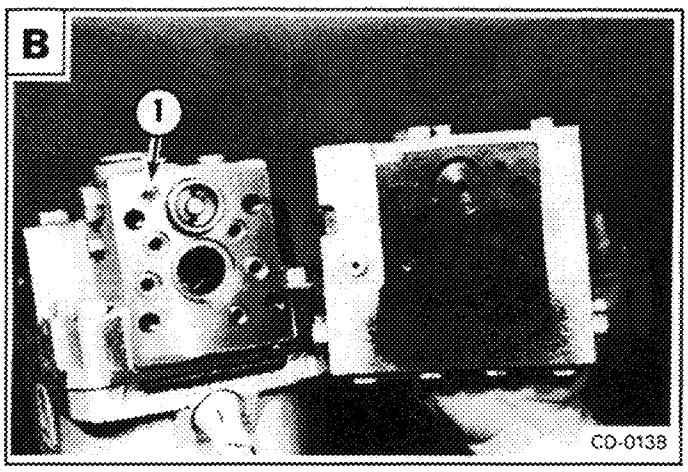
Apply a light coating of petroleum jelly to and install a new O-ring on each plug.

Install a guide (Item 1), spring (Item 2) and plug (Item 3) into each side of the end cap [A].

Tighten the plugs to 30 ft.-lbs. (41 Nm) torque.

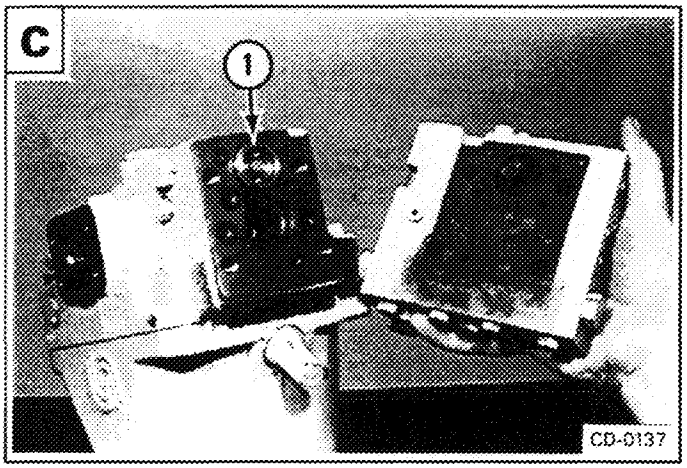


If the three (3) screen filters (Item 1) were removed, install a new screen filter, with the rounded edge of the filter facing into the end cap or multi-function block, into each bore until they are flush to 0.08 inch (2 mm) below the surface [B].



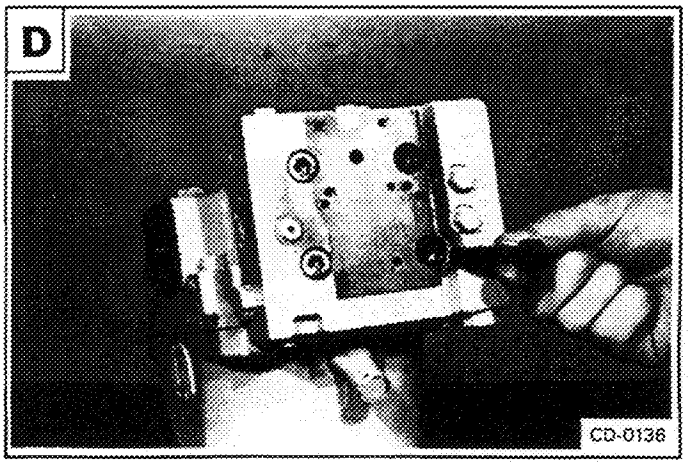
Apply a light coating of petroleum jelly to eight (8) new O-rings. Install seven (7) O-rings on the end cap and one (1) O-ring (Item 1) on the valve sleeve [C].

Install the multi-function block [C].

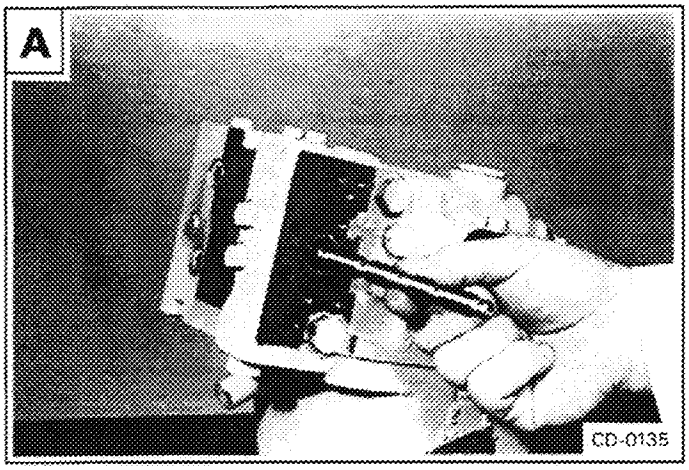


Install the four (4) screws [D].

Tighten the screws to 58 ft.-lbs. (78 Nm) torque.



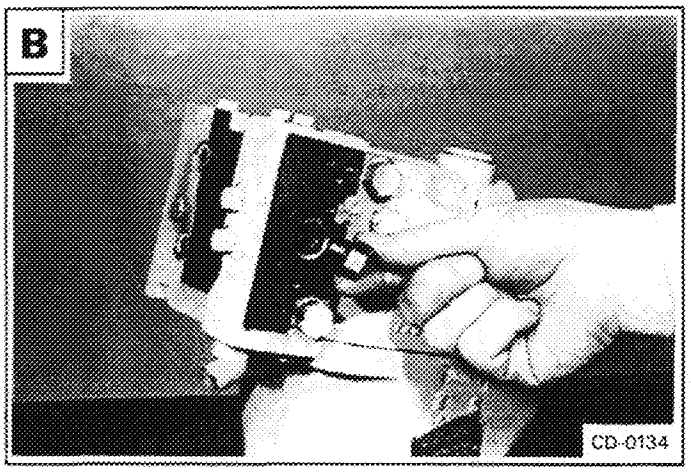
Apply oil to the spool. Install the spool into the multi-function block [A].



Apply a light coating of petroleum jelly to and install a new O-ring on each plug.

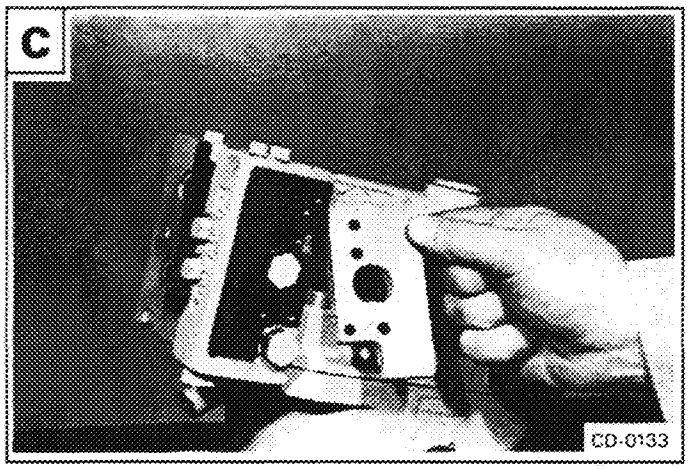
Install a plug into each end of the multi-function block [B].

Tighten the plugs to 27 ft.-lbs. (37 Nm) torque.



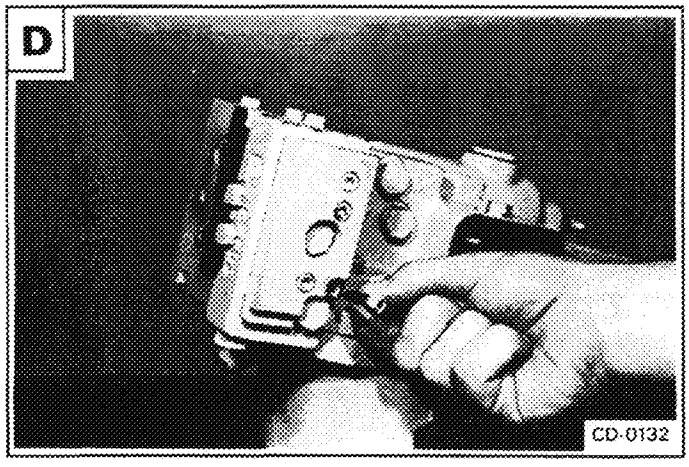
Apply a light coating of petroleum jelly to five (5) new O-rings.

Install the five (5) O-rings and blocking plate onto the multi-function block [C].

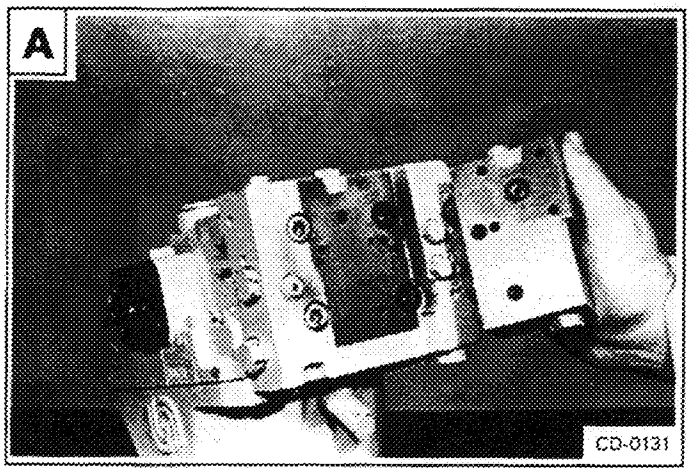


Install the four (4) screws [D].

Tighten the screws to 8 ft.-lbs. (11 Nm) torque.

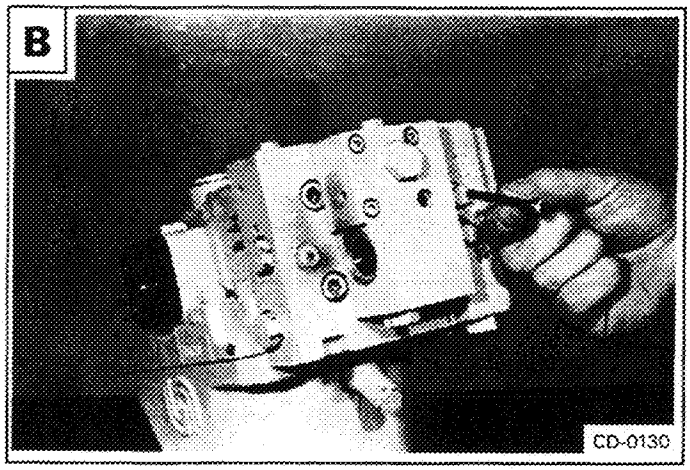


Apply a light coating of petroleum jelly to three (3) new O-rings. Install the O-rings onto the control block [A].



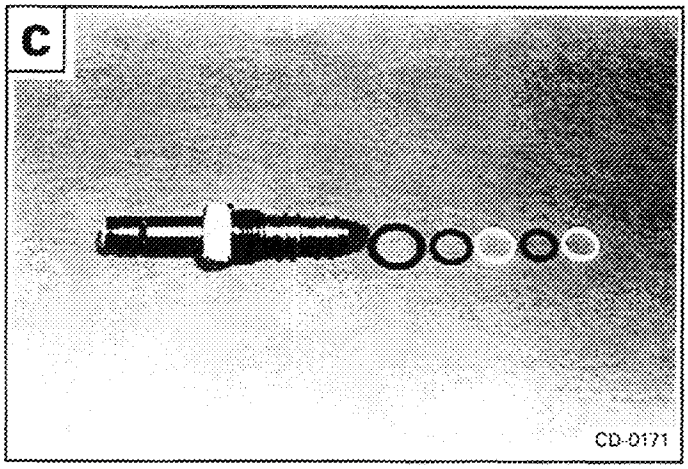
Install the four (4) screws [B].

Tighten the screws to 4.7 ft.-lbs. (6,4 Nm) torque.



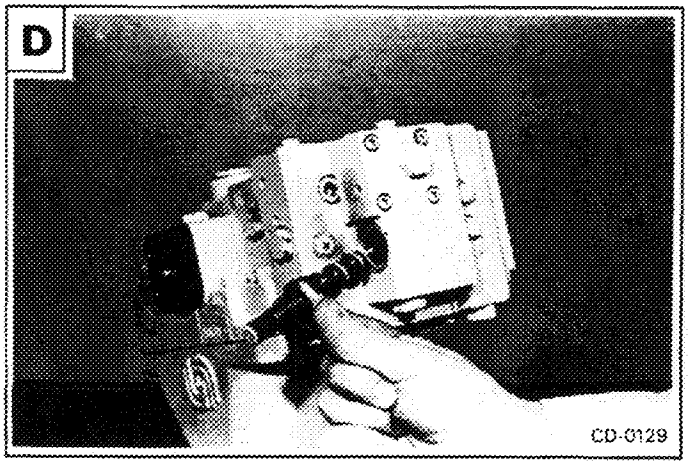
Apply a light coating of petroleum jelly to three (3) new O-rings and two (2) new back-up washers.

Install the O-rings and back-up washers on the solenoid valve [C].



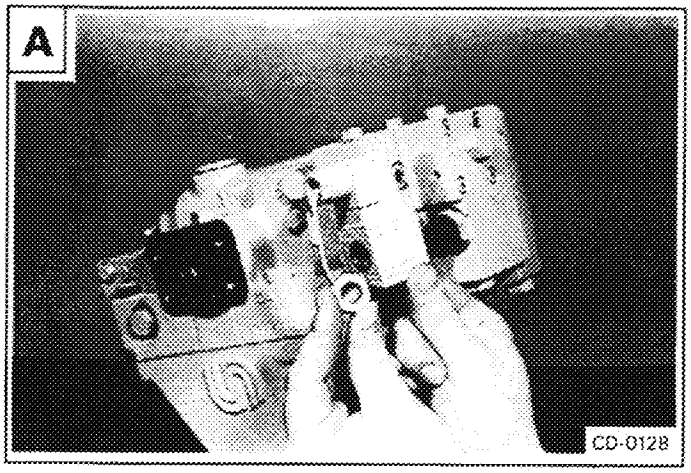
Install the solenoid valve into the control block [D].

Tighten the solenoid valve to 15 ft.-lbs. (20 Nm) torque.



Install the coil and nut onto the solenoid valve [A].

Tighten the nut to 11 ft.-lbs. (15 Nm) torque.



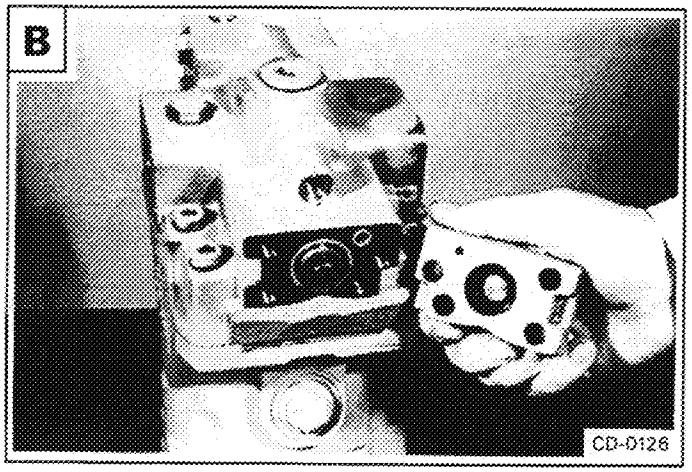
End Cap and Control Assembly (Model 1600)

All parts must be clean before assembly. Clean all parts in clean solvent. Use air pressure to dry. Apply clean oil to all internal parts. Very important lubrication points are stated in the procedure.

Put the hydrostatic motor on a work bench or on a support block with a hole for the output shaft.

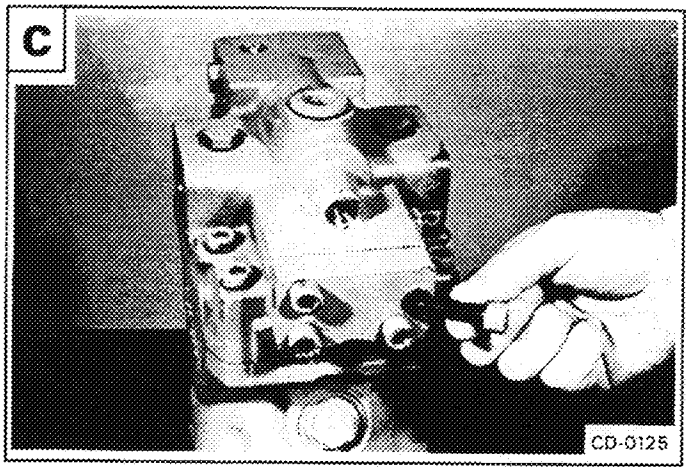
Apply a light coating of petroleum jelly to two (2) new O-rings.

Install the two (2) O-rings and minimum angle servo cover [B].



Install the four screws [C].

Tighten the screws to 58 ft.-lbs. (78 Nm) torque.

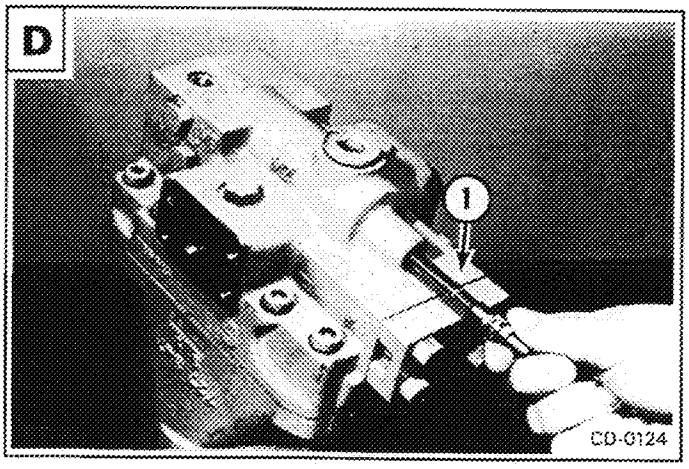


Apply a light coating of petroleum jelly to and install a new O-ring (Item 1) on the control stem [D].

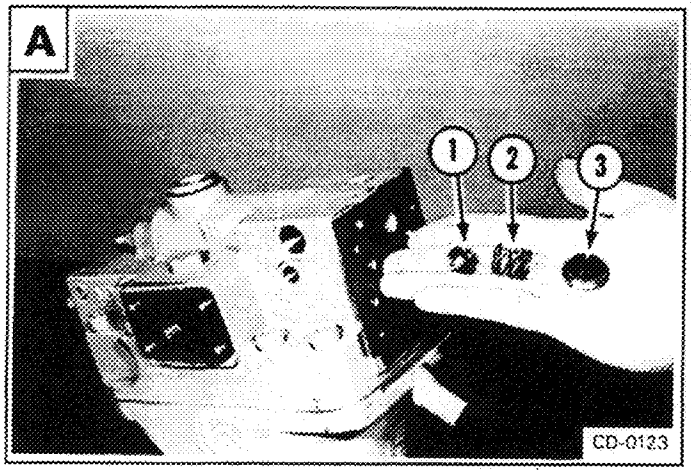
Apply oil to the control stem. Install the control stem assembly into the end cap [D].

Tighten the control stem assembly to 15 ft.-lbs. (20 Nm) torque.

NOTE: Do Not disturb the control stem adjustment.

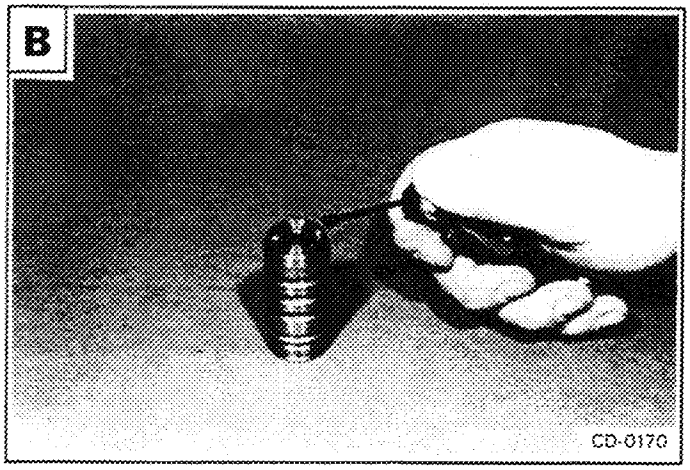


Install the inner seat (Item 1), spring (Item 2) and outer seat (Item 3) into the end cap [A].



Install the two (2) orifice plugs into the valve sleeve [B].

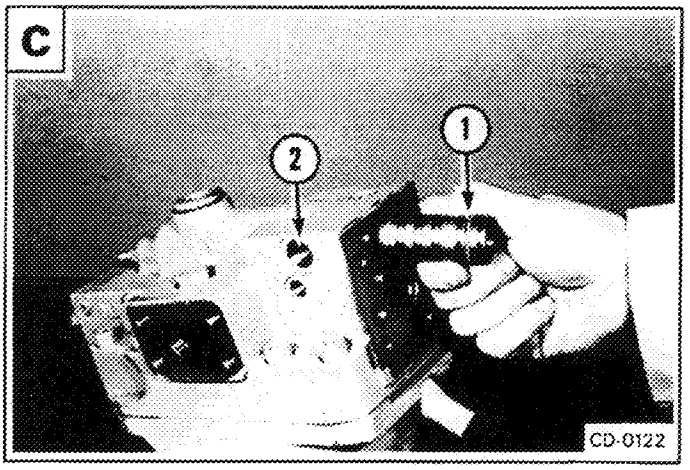
Tighten the orifice plugs to 35 in.-lbs. (4 Nm) torque.



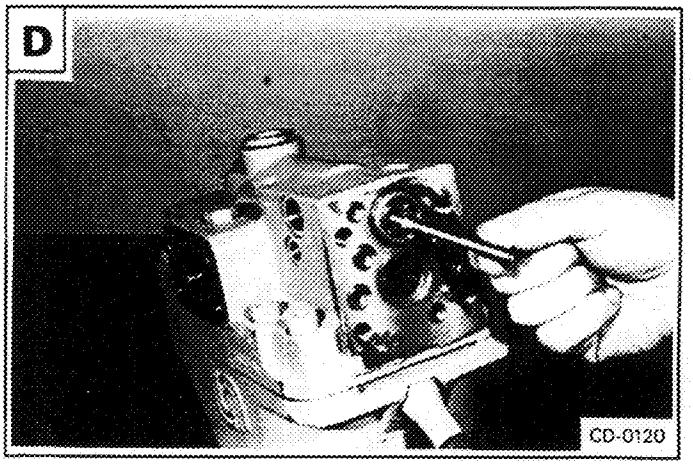
Apply a light coating of petroleum jelly to and install a new O-ring (Item 1) in the second groove on the valve sleeve [C].

Apply oil to the valve sleeve. Install the valve sleeve into the end cap [C].

NOTE: The orifice plug must be removed from the large port (Item 2) before installing the valve sleeve. The valve sleeve to bore fit is a slight interference fit. If the valve sleeve does not enter the bore, Do Not force the valve sleeve in. Freeze the valve sleeve and then install into the bore. Hit the end of the valve sleeve with a rubber mallet to make sure the valve sleeve is fully seated.



Apply oil to the spool. Install the spool in the valve sleeve [D].

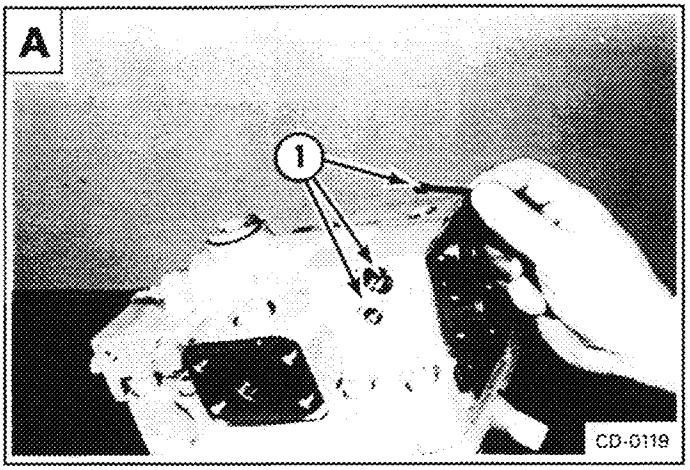


HYDROSTATIC MOTOR (Cont'd)
(Model 1600)

Install the three (3) orifice plugs (Item 1) [A].

Tighten the orifice plugs to 35 in.-lbs.(4 Nm) torque.

NOTE: **The orifice plugs have different size orifices. Each orifice plug must be installed in the same location as removed.**

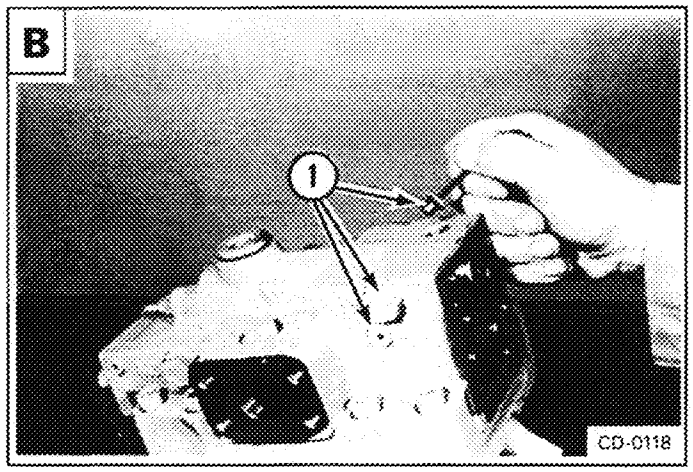


Apply a light coating of petroleum jelly to and install a new O-ring on each plug.

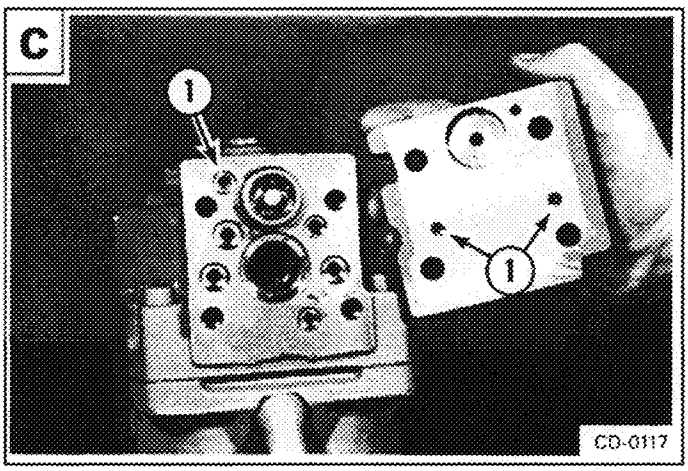
Install the three (3) plugs (Item 1) [B].

Tighten the small plugs (Item 1) [B].

Tighten the small plugs to 7 ft.-lbs. (9 Nm) torque and large plug to 27 ft.-lbs. (37 Nm) torque.

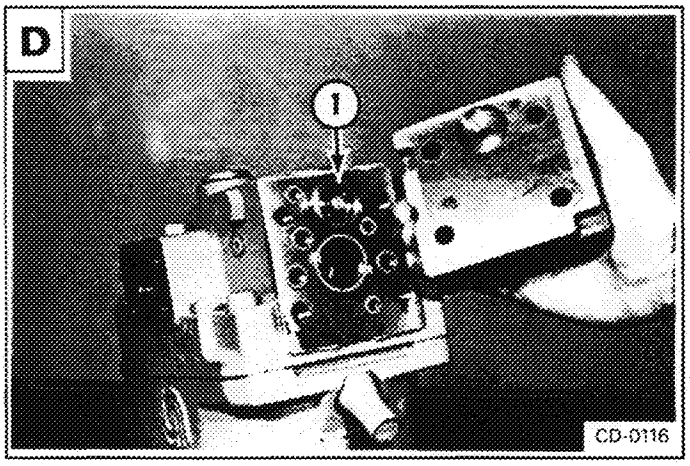


If the three (3) screen filters (Item 1) were removed, install a new screen filter, with the rounded edge of the filter facing into the end cap or control block, into each bore until they are flush to 0.08 inch (2 mm) below the surface [C].



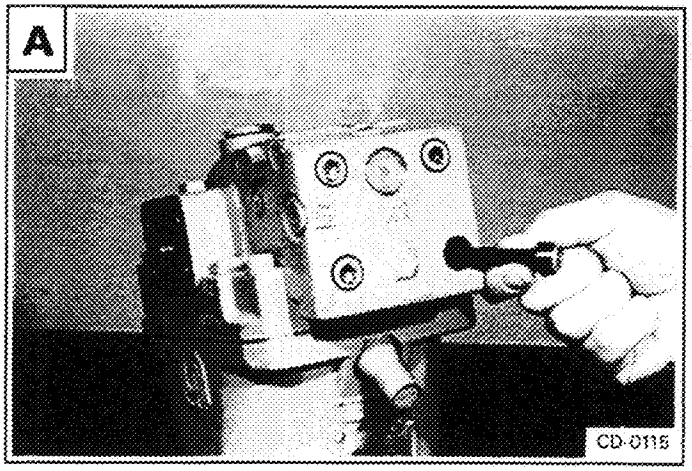
Apply a light coating of petroleum jelly to eight (8) new O-rings. Install seven (7) O-rings on the end cap and one (1) O-ring (Item 1) on the valve sleeve [D].

Install the control block. [D].



Install the four (4) screws [A].

Tighten the screws to 58 ft.-lbs.(78 Nm) torque.

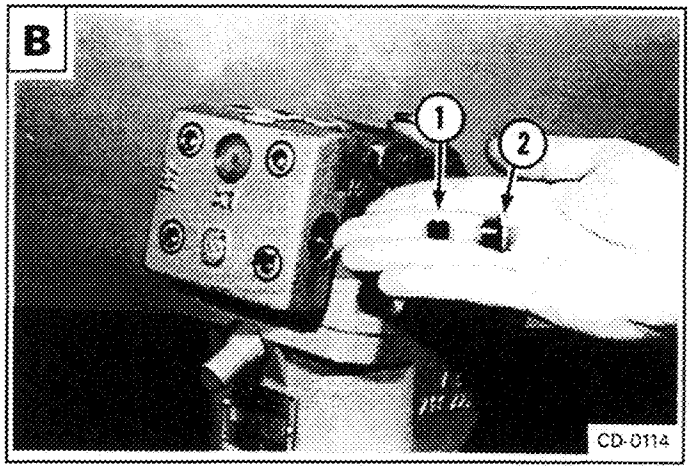


Install the orifice plug (Item 1) into the control block [B].

Apply a light coating of petroleum jelly to and install a new O-ring on the plug (Item 2) [B].

Install the plug (Item 2) into the control block [B].

Tighen the plug to 27 ft.-lbs. (37 Nm) torque.




bobcat

GLOSSARY OF TERMS AND COMPONENTS

For Hydraulic and Hydrostatic Systems

AUXILIARY HYDRAULICS — A set of hydraulic lines, couplers and valve used to operate an attachment.

CAVITATION — A gaseous condition within oil which is caused by a pressure drop due to a restriction.

CYLINDER, HYDRAULIC — A device which converts fluid power into linear mechanical force and motion.

Cylinder, Lift — Used to raise the lift arms and attachment.

Cylinder, Tilt — Used to operate the bucket or attachment.

Base End — The larger end of the hydraulic cylinder. This end has the larger displacement area.

Rod End — The end of a hydraulic cylinder which has the moveable rod. This end has a smaller displacement due to the area of the rod.

DETENT — A device used to hold the spool of a hydraulic valve engaged for continuous flow of fluid.

DRIFT — Motion or lack of motion of a cylinder or motor due to internal leakage past internal components in the hydraulic system.

FLOW METER — A testing device which gauges the flow rate at a given pressure and temperature.

FLOW RATE — The volume of fluid passing a point in a given time, under pressure and temperature.

MICRON — The size of a opening in a hydraulic filter. One micron equals 0.00004 inch.

MOTOR, HYDROSTATIC — A device for converting fluid energy into mechanical force and motion - usually rotary motion. Basic design types are piston and geroller units.

ORIFICE — A restricted passage in a hydraulic circuit. Usually a small hole limiting flow which creates a pressure differential in a circuit.

PISTON DISPLACEMENT — The volume of air or fluid moved or displaced by moving the piston from one end of its stroke to the other.

PRESSURE — Force per unit area, usually given in PSI.

Back Pressure — The pressure encountered on the return side of the system, due to a restriction (tubelines, coolers, filter, etc.).

Charge Pressure — A regulated pressure used to force fluid into the hydrostatic system.

Cracking Pressure — The pressure at which a relief valve, etc. begins to open and pass gas.

Differential Pressure — The difference in pressure between any two points in a system or a component (Also called pressure drop).

Operating Pressure — The pressure at which a system is normally operated.

Rated Pressure — The operating pressure which is recommended for a component or a system by a manufacturer.

System Relief Pressure — The pressure at which the system relief valve is set at and will relieve the excess pressure.

NOTES

GLOSSARY OF TERMS AND COMPONENTS (Cont'd)

For Hydraulic and Hydrostatic Systems

PUMP, HYDRAULIC — A device which converts mechanical force and motion into hydraulic fluid power.

PUMP, HYDROSTATIC — A hydraulic pump, usually a piston type, operating at high pressure (3000 to 5000 PSI).

RESTRICTOR — A device place in a line or passage which normally causes a pressure drop in one direction (Example: floating orifice).

ROTATING GROUP — A cylindrical block with a series of holes and pistons. The rotating group is usually connected to the splined pump shaft and runs at engine speed.

VALVE — A device which controls fluid direction, flow and pressure.

Anti-Cavitation Valve — A valve used to supplement fluid flow from a return passage in the control valve to a cylinder port.

By-Pass Valve — A valve used to direct the normal flow of fluid to another route at a given pressure.

Closed Center Valve — A valve that does not allow fluid flow when it is in neutral.

Load Check Valve — A valve used to hold a load when the spool is initially moved to cause fluid flow to a pressure port.

Directional Control Valve — A valve used to direct fluid flow from a pump to actuators.

Flow Control Valve — A valve used to supply a specific volume of fluid for a specific function.

Open Center Valve — A valve that allows fluid flow when it is in neutral.

Pilot Operated Valve — A two-stage relief valve. A pilot senses system load and opens to allow a larger source of relief ports to open.

Poppet Valve — A spring loader valve which prevents fluid flow when it is closed against a seat.

Pressure Control Valve — A valve which directs fluid flow into a given passage according to the amount of pressure it senses.

Priority Flow Divider Valve — A valve that divides the flow by first satisfying the needs of one circuit and the remainder of the flow is directed to another circuit.

Relief Valve — A pressure limiting valve.

Replenishing Valve — A valve used to add fluid to maintain a full hydraulic or hydrostatic system.

Shuttle Valve — A valve moved by high pressure to open the return pressure side of the hydrostatic drive loop to be returned to the system for cooling.

Shut-Off Valve — A valve used to allow fluid flow or block fluid flow.

Spool Directional Valve — A valve used to direct fluid flow from a pump to a working circuit.

Volume Control Valve — A valve used to regulate the amount of fluid that goes to a circuit.

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

NOTES

GLOSSARY OF TERMS AND COMPONENTS (Cont'd)

For Hydraulic and Hydrostatic Systems

VISCOSITY — The internal resistance of a fluid, caused by molecular attraction, which makes it resist a tendancy to flow.

NOTES

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001
Revision Number
29 May 1987
Date

HYDROSTATIC MOTOR COMPONENT REPAIR MANUAL REVISION

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570270 (3-86)

ROUTE TO ATTENTION

PARTS MANAGER	☐
SERVICE MANAGER	☑
SALES MANAGER	☐
	☐

This is an update for the Component Repair Manual for the Hydrostatic Motor (6570270).

Remove the Manual Index Page and replace it with the revised page (May 87)

At TAB 4 (SUNDSTRAND), and after Page B – 13 add the new section C – 1 thru C – 19.

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002
Revision Number

9 February 1988
Date

HYDROSTATIC MOTOR COMPONENT REPAIR MANUAL REVISION

AFFECTING:

Product	BOBCAT LOADER
Model	AS LISTED IN MANUAL INDEX
Manual No.	6570270 (3-86)

ROUTE TO ATTENTION

PARTS MANAGER	☐
SERVICE MANAGER	☑
SALES MANAGER	☐
	☐

This is an update for the Component Repair Manual for the Hydrostatic Motor (6570270).

Remove the Manual Index Page (Revised May 87) and replace it with the revised page (Feb. 88).

At TAB 1 (CHAR-LYNN), remove Page C 1 and C 2. Put in the new Page C 1 and C 2 (Revised Feb. 88).

At TAB 4 (SUNDSTRAND), remove Index Page and put in the new page (Revised Feb. 88.)

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003
Revision Number

27 January 1989
Date

HYDROSTATIC MOTOR COMPONENT REPAIR MANUAL REVISION

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570270 (3-86)

ROUTE TO ATTENTION

PARTS MANAGER ☐
SERVICE MANAGER ☑
SALES MANAGER ☐
☐

This is an update for the Component Repair Manual for the Hydrostatic Motor (6570270). Remove the following pages and put in the revised pages as shown below.

TAKE OUT	PUT IN
TAB 4: B—3, B—4	B—3, B—4 (Revised 1-89)

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Revision Number
25 January 1991
Date

COMPONENT REPAIR MANUAL REVISION

ROUTE TO ATTENTION	
PARTS MANAGER	☐
SERVICE MANAGER	☑
SALES MANAGER	☐
	☐

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570270 (3-86)

This is an update for the Component Repair Manual for the Hydrostatic Motor (6570270).

Take out and put in the pages as listed below:

TAKE OUT

HYDROSTATIC MOTOR MANUAL INDEX
(Revised Feb. 88)

PUT IN

HYDROSTATIC MOTOR MANUAL INDEX
(Revised Jan. 91)

IN TAB 1 (CHAR-LYNN)

Add SECTION "D" After SECTION "C"

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005
Revision Number

28 June 1991
Date

HYDROSTATIC MOTOR COMPONENT REPAIR MANUAL REVISION

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570270 (3-86)

ROUTE TO ATTENTION

PARTS MANAGER ☐
SERVICE MANAGER ☑
SALES MANAGER ☐
☐

This is an update for the Component Repair Manual for the Hydrostatic Motor (6570270). Remove the following page and put in the revised page as shown below.

	TAKE OUT	PUT IN
TAB 4		
	A—1, A-2	A—1, A—2 (Revised June 91)

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006
Revision Number

6 February 1992
Date

COMPONENT REPAIR MANUAL REVISION

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570270 (3-86)

ROUTE TO ATTENTION

PARTS MANAGER ☐
SERVICE MANAGER ☑
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This is an update for the Component Repair Manual for the **HYDROSTATIC MOTOR** (6570270). Remove the following page and put in the revised page as shown below.

TAKE OUT	PUT IN
Manual Index (Revised Jan. 91)	Manual Index (Revised Feb. 92)
TAB 1 (CHAR-LYNN)	
B—1, B—2	B—1, B—2 (Revised Feb. 92)
B—3, B—4	B—3 (Revised Feb. 92), B—4
B—9, B—10	B—9, B-10 (Revised Feb. 92)
CHAR-LYNN MOTOR-SECTION C	CHAR-LYNN MOTOR-SECTION C
TAB PAGE	TAB PAGE (Revised Feb. 92)
C—1, C—2 (Revised Feb. 88)	C—1 (Revised Feb. 92), C—2 (Revised Feb. 92)
D—5 (Added Jan. 91), D—6 (Added Jan. 91)	D—5 (Revised Feb. 92), D—6 (Added Jan. 91)
TAB 4 (SUNDSTRAND)	
C—11, C—12	C—11, C—12 (Revised Feb. 92)
C—13, C—14	C—13, C—14 (Revised Feb. 92)

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12 April 1994
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COMPONENT REPAIR MANUAL REVISION

ROUTE TO ATTENTION	
PARTS MANAGER	☐
SERVICE MANAGER	☑
SALES MANAGER	☐

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570270 (3-86)

NOTICE Insert This Sheet With The Appropriate Manual For Future Reference.

This is an update for the Component Repair Manual for the Hydrostatic Motor (6570270).

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

TAKE OUT	PUT IN
TAB 4 (Sundstrand)	TAB 4 (Sundstrand)
A–1, A–2 (Rev. June 91)	A–1, A–2 (Rev. April 94)

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27 May 1994
Date

COMPONENT REPAIR MANUAL REVISION

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PARTS MANAGER	☐
SERVICE MANAGER	☑
SALES MANAGER	☐

AFFECTING:

Product BOBCAT LOADER

Model AS LISTED IN MANUAL INDEX

Manual No. 6570270 (3-86)

NOTICE Insert This Sheet With The Appropriate Manual For Future Reference.

This is an update for the Component Repair Manual for the Hydrostatic Motor (6570270).

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

TAKE OUT	PUT IN
Manual Index (Revised Feb. 92)	Manual Index (Revised May 94)
TAB 1 (Char-Lynn)	
Char-Lynn Motor - Section C Index Page (Revised Feb. 92)	Char-Lynn Motor - Section C Index Page (Revised May 94)
C—1 (Revised Feb. 92), C—2(Revised Feb. 92)	C—1 (Revised May 94), C—2 (Revised May 94)
Char-Lynn Motor - Section D Index Page (Added Jan.91)	Char-Lynn Motor - Section D Index Page (Revised May 94)
D—1 thru D—6 (Added Jan. 91)	D—1 thru D—6 (Revised May 94)
TAB 4 (Sundstrand)	
	Add Section "D" after Section "C"

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COMPONENT REPAIR MANUAL REVISION

ROUTE TO ATTENTION

PARTS MANAGER	☐
SERVICE MANAGER	☒
SALES MANAGER	☐

AFFECTING:

Product BOBCAT LOADER

Model ALL LISTED IN MANUAL INDEX

Manual No. 6570270 (3–86)

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

The folowing pages are a revision to the Component Repair Manual for the Hydrostatic Motor 6570270 (3–86).

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

TAKE OUT	PUT IN
Manual Idex (Rev. May 94)	Manual Index (Rev. Nov. 96)
TAB 1 (CHAR–LYNN)	
CHAR–LYNN – Section C Index Page (Rev. May 94)	CHAR–LYNN – Section C Index Page (Rev. Nov. 96)
C–1 (Rev. May 94), C–2 (Rev. May 94)	C–1 (Rev. Nov. 96), C–2 (Rev. May 94)
CHAR–LYNN – Section D Index Page (Rev. May 94)	CHAR–LYNN – Section D Index Page (Rev. Nov. 96)
D–1 (Rev. May 94), D–2 (Rev. May 94)	D–1 (Rev. Nov. 96), D–2 (Rev. May 94)