

GROUP 5 HST PUMP (MECHANICAL TYPE)

1. REMOVAL AND INSTALL

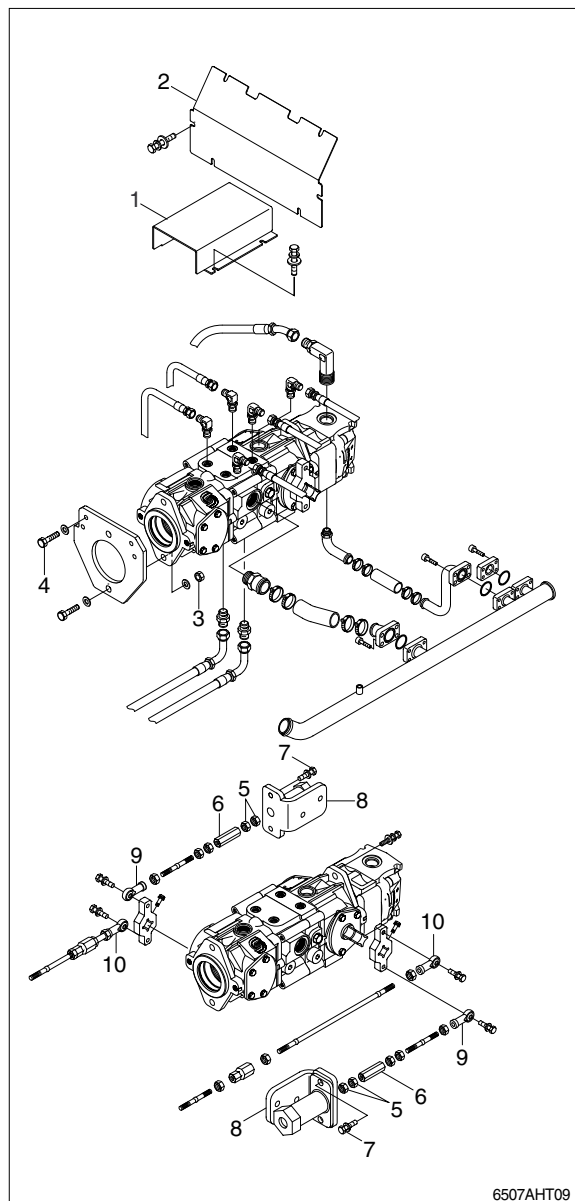
1) REMOVAL

▲ If engine is running or full up pressure into hydraulic system, absolutely does not repair or tighten hose, fitting. As hydraulic line explode, dangerous accident may occur.

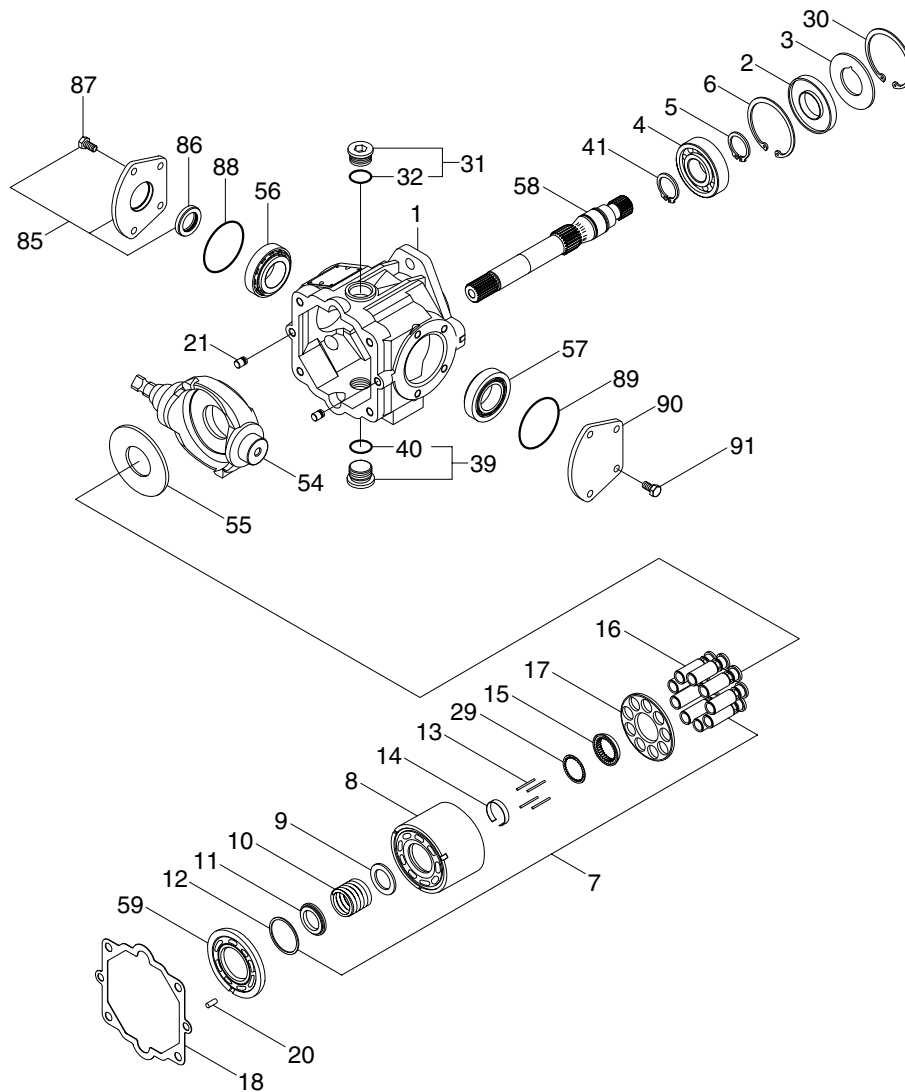
- (1) Lowered the bucket on the ground.
- (2) Shut off engine and raise the seat bar.
- (3) Raise canopy and remove the front cover (1, 2).
- ※ For raising and lowering of the canopy, refer to page 4-14 of the operator's manual.
- (4) Disassemble hoses connected with HST pump and auxiliary pump.
- (5) Loosen the nut(3) and bolt(4).
- (6) Loosen lock nuts(5) to allow adjust nut(6) to move.
- (7) Loosen the hex bolt(7) and remove bracket assy(8).
- (8) Remove the rod end(9, 10) from HST pump.

2) INSTALL

- (1) Install pump to frame by tightening the nut(3) and bolts(4).
 - Tightening torque
 - Nut(3) : $12.8 \pm 3.0 \text{ kgf} \cdot \text{m}$
($92.6 \pm 21.7 \text{ lbf} \cdot \text{ft}$)
 - Bolt(4) : $12.8 \pm 3.0 \text{ kgf} \cdot \text{m}$
($92.6 \pm 21.7 \text{ lbf} \cdot \text{ft}$)
- (2) Assemble hose connected with HST pump and auxiliary pump.



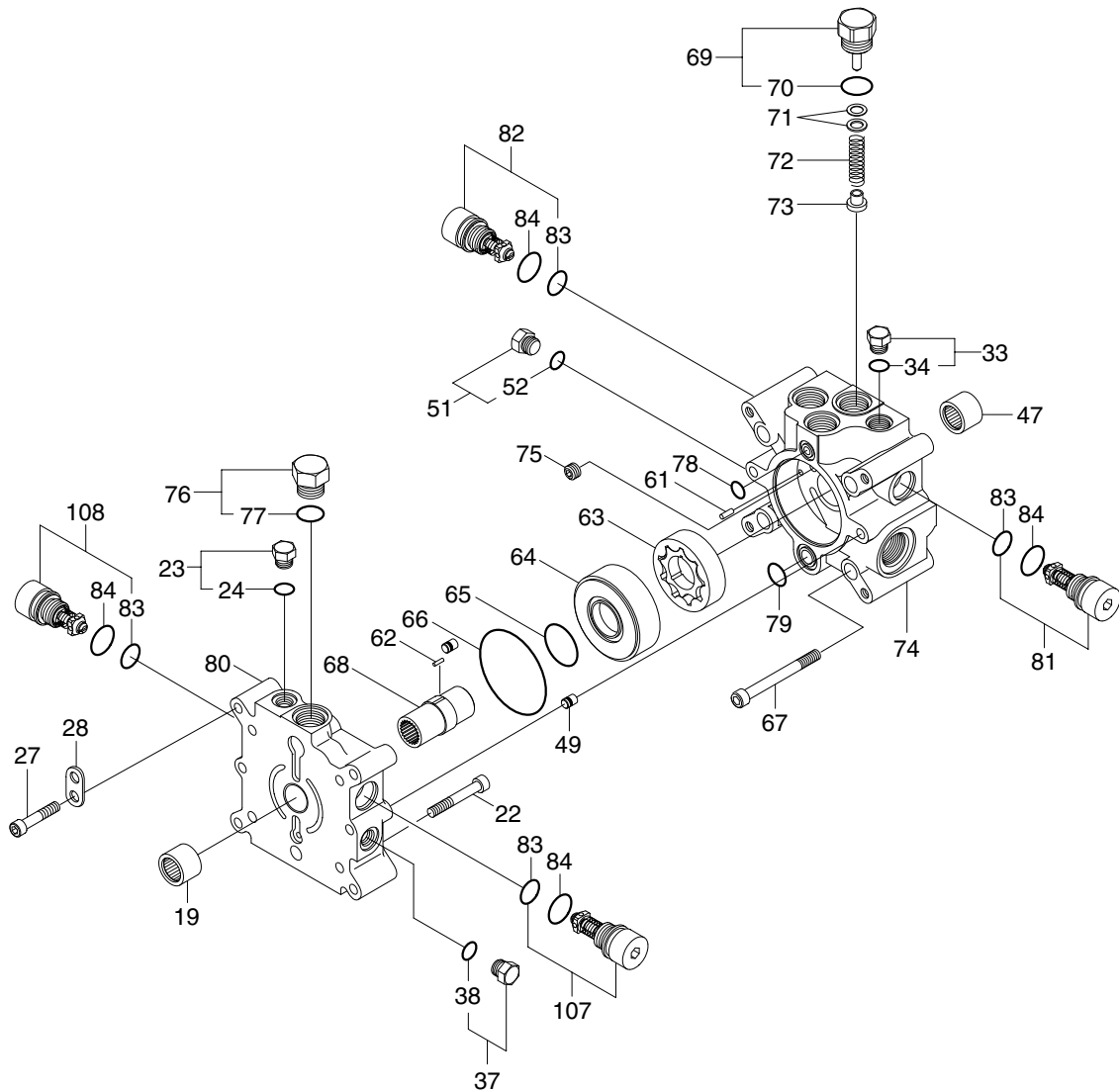
2. STRUCTURE(1/3)



6507AHT47

1	Pump housing	15	Guide	55	Thrust plate
2	Lip seal	16	Piston assy	56	Taper roller bearing
3	Washer	17	Retainer	57	Taper roller bearing
4	Ball bearing	18	Gasket	58	Front shaft
5	Ring	20	Spring pin	59	Valve plate-RH
6	Pin	21	Pin	85	Trunnion cover assy
7	Cylinder block kit	29	Thrust washer	86	Lip seal
8	Cylinder block	30	Retaining ring	87	Screw
9	Washer	31	Plug	88	O-ring
10	Cylinder block spring	32	O-ring	89	Trunnion cover
11	Washer	35	Plug	90	O-ring
12	Retaining ring	36	O-ring	91	Screw
13	Dowel pin	41	Ring		
14	Retaining ring	54	Swash plate		

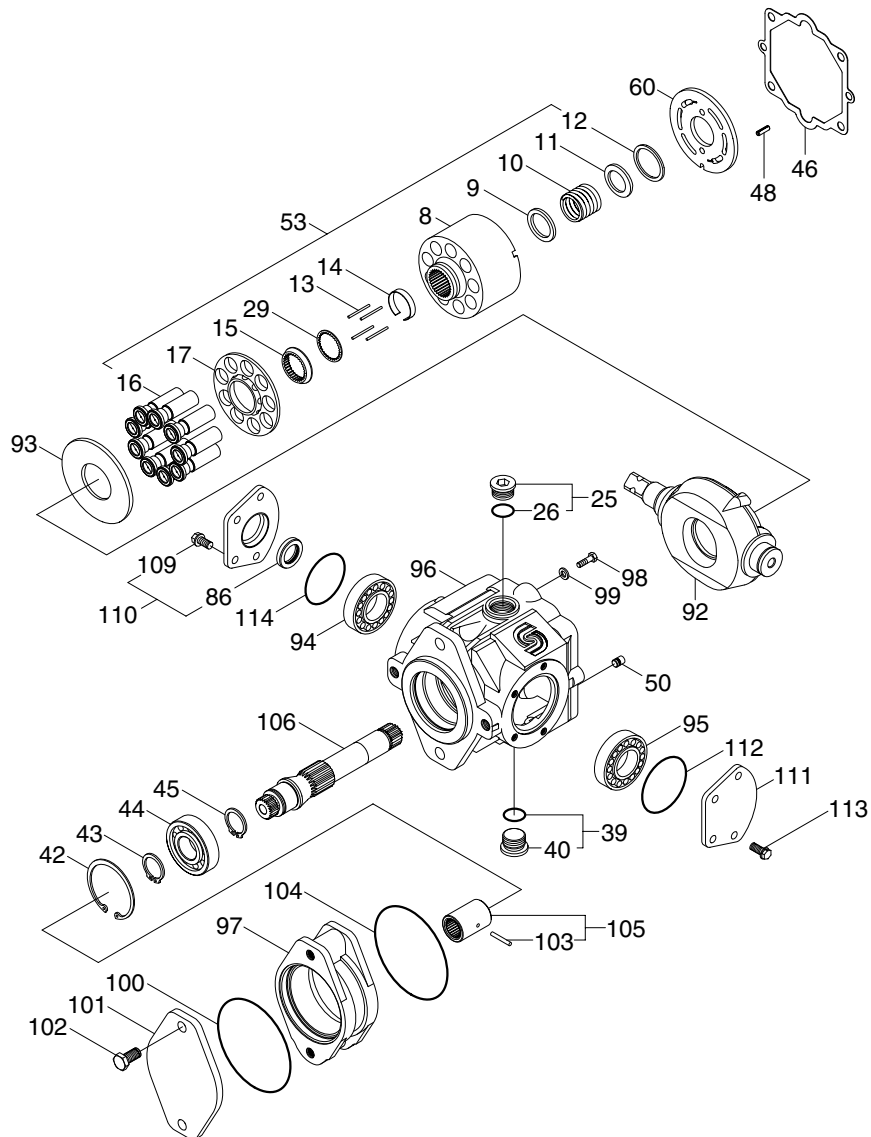
STRUCTURE(2/3)



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- | | | | | | |
|----|-----------------|----|----------|-----|-----------|
| 19 | Needle bearing | 61 | Pin | 75 | Pipe plug |
| 22 | Screw | 62 | Pin | 76 | Plug |
| 23 | Plug | 63 | Gerotor | 77 | O-ring |
| 24 | O-ring | 64 | Spacer | 78 | O-ring |
| 27 | Screw | 65 | O-ring | 79 | O-ring |
| 28 | Lifting bracket | 66 | O-ring | 80 | End cap |
| 33 | Plug | 67 | Screw | 81 | SCR valve |
| 34 | O-ring | 68 | Coupling | 82 | SCR valve |
| 37 | Plug | 69 | Plug | 83 | O-ring |
| 38 | O-ring | 70 | O-ring | 84 | O-ring |
| 47 | Needle bearing | 71 | Shim kit | 107 | SCR valve |
| 49 | Pin | 72 | Spring | 108 | SCR valve |
| 51 | Plug | 73 | Poppet | | |
| 52 | O-ring | 74 | End cap | | |

STRUCTURE(3/3)



6507AHT49

8	Cylinder block	43	Ring	99	Washer
9	Washer	44	Ball bearing	100	Seal
10	Cylinder block spring	45	Ring	101	Flange cover
11	Washer	46	Gasket	102	Screw
12	Retaining ring	48	Spring pin	103	Pin
13	Dowel pin	50	Pin	104	O-ring
14	Retaining ring	53	Cylinder block kit	105	Coupling assembly
15	Guide	60	Valve plate-LH	106	Rear shaft
16	Piston assy	86	Lip seal	109	Screw
17	Retainer	92	Swash plate	110	Trunnion cover assy
25	Plug	93	Thrust plate	111	Trunnion cover
26	O-ring	94	Taper roller bearing	112	O-ring
29	Thrust washer	95	Taper roller bearing	113	Screw
39	Plug	96	Pump housing	114	O-ring
40	O-ring	97	Flange adapter		
42	Retaining ring	98	Screw		

3. GENERAL DESCRIPTION

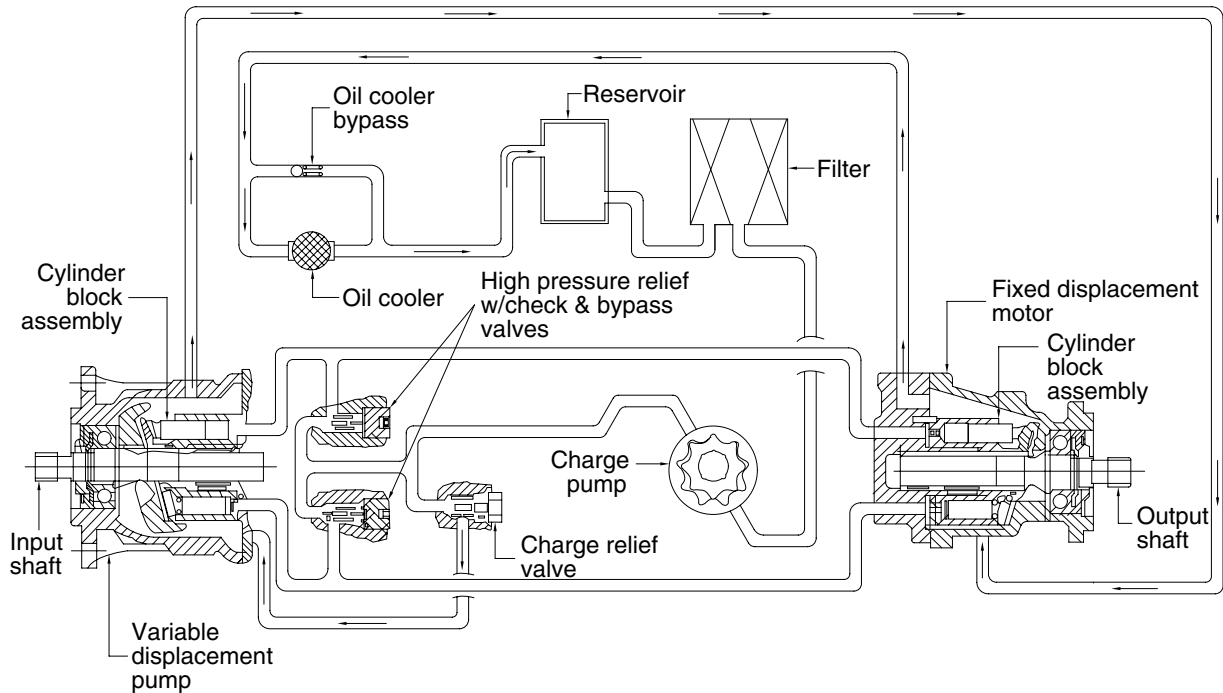
The HST pump is a compact, state-of-the-art design, using the parallel axial piston design in conjunction with a tiltable swash plate to vary the pump's displacement. Reversing the direction of tilt of the swash plate reverses the flow of oil from the pump and thus reverses the direction of the motor output rotation.

The HST pump is controlled by a compact responsive hydro-mechanical, closed loop control system.

A charge relief valve and charge check valves are included in the pump end cap to control the makeup and cooling oil flow for the system. The charge check valves also incorporate the high pressure relief valve function into their design.

The HST pump is including a $1\text{in}^3/\text{rev}$ ($16.4\text{cc}/\text{rev}$) integral gerotor type charge pump.

The fixed displacement motors also incorporate the parallel axial piston design. Fixed displacement motors utilize a fixed swash plate angle.



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4. TRANSMISSION HYDRAULIC SUPPORT SYSTEM

The HST pump are easy to install, requiring no adjustments and few auxiliary components. They have their own hydraulic support system which discussed in this section.

1) BASIC CLOSED CIRCUIT

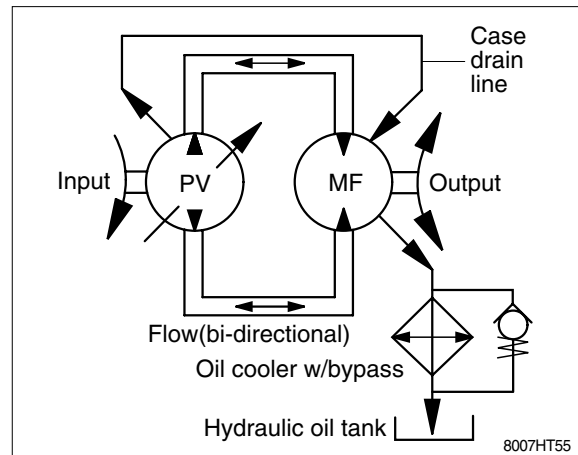
The main ports of the pump are connected by hydraulic lines to the main ports of the motor. Fluid flows, in either direction, from the pump to the motor then back to the pump in this closed circuit. Either of the hydraulic lines can be under high pressure. The direction and speed of fluid flow (And the motor output shaft rotation) depends on the position of the pump swash plate. The system pressure is determined by the machine load.

2) CASE DRAIN AND OIL COOLER

The pump and motor require case drain lines to remove hot fluid from the system. The pump case should be drained from its upper drain port to insure the case remains full of fluid. The pump case drain is then connected to the lower drain port on the motor housing. The upper motor housing drain port is then connected to the reservoir.

A oil cooler, with a bypass valve, may be required to cool the case drain fluid before it returns to the reservoir.

- ※ **When operating pump near rated speed, some case flow may have to be diverted around the motor to ensure pump case pressure remain within recommended limits.**
- ※ **Continuous case pressure should not exceed 25psi(1.7bar).**



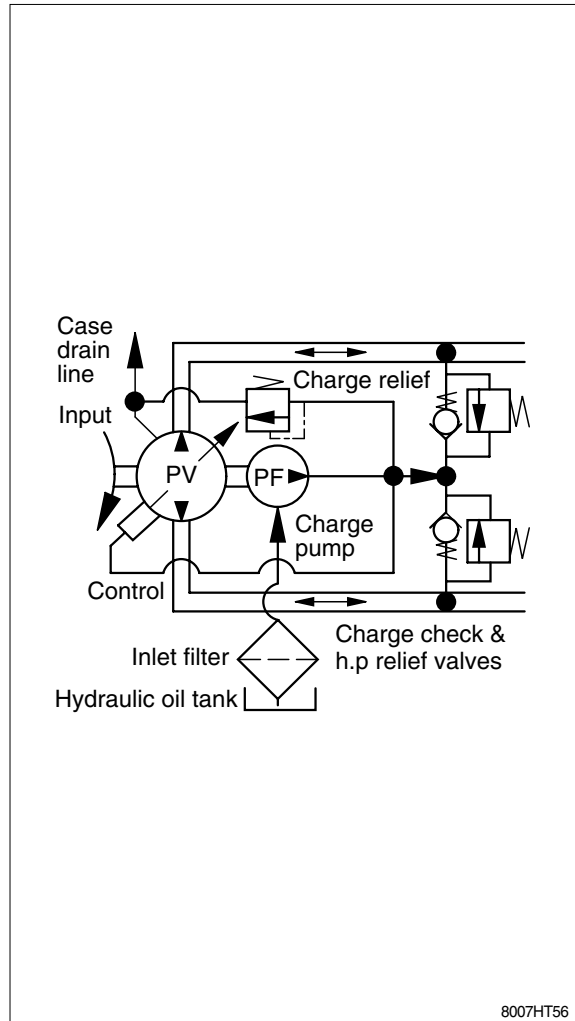
3) CHARGE SYSTEM AND INLET FILTER

The charge pump supplies cool fluid to the system and keeps the closed loop charged to prevent cavitation. The charge pump draws its fluid from the system reservoir.

- ※ **The inlet vacuum, measured at the charge pump inlet should not exceed 5in.Hg(0.8bar abs), except during cold starts.**

Since either or the main hydraulic lines can be high pressure, two charge check valves are used to direct the charge supply into the low pressure line. These check valves are incorporated into the high pressure relief valves in the pump end cap. Any charge flow not being used for the closed circuit is discharged over a direct operating charge relief valve, through the pump and motor housings and back to the system reservoir. The charge pressure relief valve is 260psi (18bar).

- ※ **Charge pressure must not be less than 220psi(15.2bar) for satisfactory operation. Pressure less than this may result in premature unit failure or loss of control.**



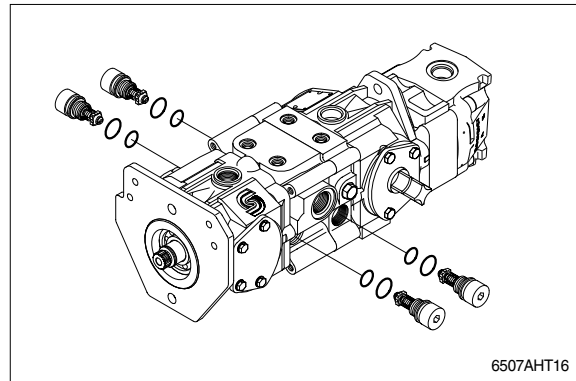
4) HIGH PRESSURE RELIEF VALVES

Two optional combination check / high pressure relief valves may be provided in the pump end cap for overload protection. These cartridge type relief valves are factory set and are not field adjustable. Changing the maximum system pressure can be accomplished by installing different cartridges with the desired setting.

⚠ Certain service procedures may require the machine to be disabled (Wheels raised off the ground, work function disconnected, etc.) while performing them in order to prevent injury to the technician and bystanders.

⚠ Use caution when dealing with hydraulic fluid under pressure. Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin causing serious injury. This fluid may also be hot enough to burn. Serious infection or reactions can develop if proper medical treatment is not administered immediately.

⚠ Some cleaning solvents are flammable. To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.



5. CONTROLS AND OPTIONS

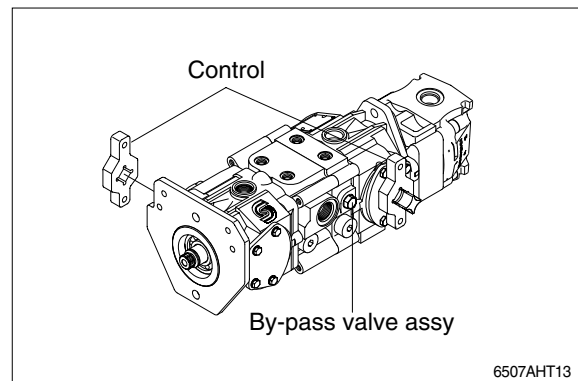
1) DIRECT DISPLACEMENT CONTROL

With the direct displacement control (DDC), the pump displacement and output flow, in either direction, is approximately proportional to the angular movement of the control handle. The control will return to neutral if the pump control handle is released the control centering mechanism is not sufficient to overcome external control linkage friction.

This control may have various sized orifices installed in the supply and drain passages for controlling maximum acceleration and deceleration (Control response).

2) BY- PASS VALVE

In some applications it is desirable to bypass fluid, allowing, for example, a vehicle to be moved short distances at low speeds without running the prime mover. This is accomplished by a manually operated bypass valve installed in the pump housing. When open (Unscrewed 2 turns maximum), this valve connects both sides of the pump/motor closed circuit and allows the motor to turn. This valve must be fully closed for normal operation.



6. START UP AND MAINTENANCE

1) START UP PROCEDURE

- (1) The following start up procedure should always be followed when starting up a new HST pump installation or when restarting an installation in which either the pump or motor had been removed from the system.
 - ※ **The following procedure may require the machine to be disabled(Wheels raised off the ground, work function disconnected, etc.) while performing the procedure in order to prevent injury to the technician and bystanders. Take necessary safety precautions before moving the machine.**
- (2) Prior to installing the pump and/or motor, inspect the units for damage incurred during shipping and handling. Make certain all system components(Reservoir, hoses, valves, fittings, heat exchanger, etc.) are clean prior to filling with fluid.
- (3) Fill the reservoir with recommended hydraulic fluid, which should be passed through a 10 micron(Normal, no bypass) filter prior to entering the reservoir. The use of contaminated fluid will cause damage to the components, which may result in unexpected machine movement.
- (4) The inlet line leading from the reservoir to the pump should be filled prior to start up. Check inlet line for properly tightened fittings and make sure it is free of restrictions and air leaks.
- (5) Be certain to fill the pump and/or motor housing with clean hydraulic fluid prior to start up. Fill the housing by pouring filtered oil into the upper case drain port.
- (6) Install a 0 to 500psi(35bar) pressure gauge in the charge pressure gauge port to monitor the charge pressure during start up.
- (7) It is recommended that the external control input signal be disconnected at the pump control until after initial start up. This will allow the pump to remain in its neutral position.
- (8) Jog or slowly rotate prime mover until charge pressure starts to rise. Start the prime mover and run at the lowest possible rpm until charge pressure has been established. Excess air may be bled from the high pressure lines through the high pressure gauge ports.
 - ※ **Do not start prime mover unless pump is in neutral position(0 swash plate angle). Take precautions to prevent machine movement in case pump is actuated during initial start up.**
- (9) Once charge pressure has been established, increase speed to normal operating rpm. Charge pressure should be approximately 260psi(18bar) minimum. If charge pressure is incorrect, shut down and determine cause for improper pressure.
 - ※ **Inadequate charge pressure will affect the operator's ability to control the machine.**
- (10) Shut down prime mover and connect external control input signal. Start prime mover, checking to be certain pump remains in neutral. With prime mover at normal operating speed, slowly check for forward and reverse machine operation.
- (11) Charge pressure should remain at 260psi(18bar) minimum during forward or reverse operation. Continue to cycle slowly between forward and reverse for at least 5 minutes.
- (12) Shut down prime mover, remove gauges, and plug ports. Check reservoir level and add fluid if necessary.
- (13) The transmission is now ready for operation.

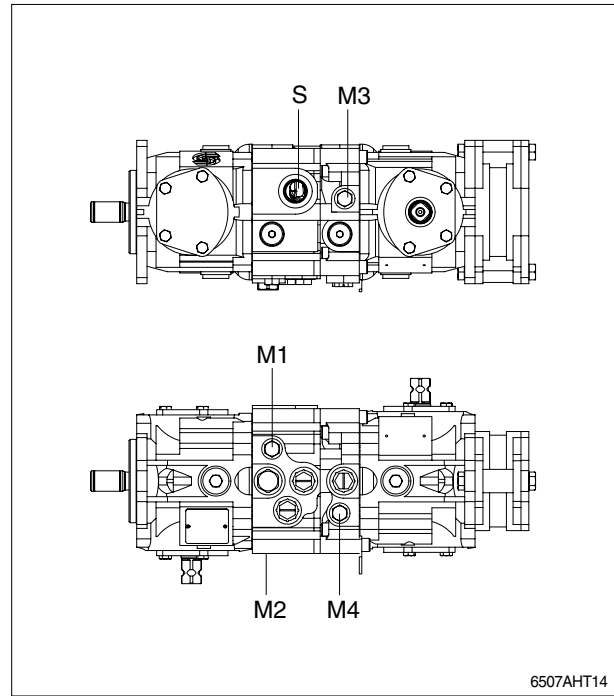
2) MAINTENANCE

- (1) To insure optimum service life on this pump, regular maintenance of the fluid and filter must be performed.
- (2) Check the reservoir daily for proper fluid level, the presence of water(Noted by a cloudy to milky appearance, or free water in bottom of reservoir), and rancid fluid order(Indicating excessive heat).
- (3) It is recommended that the hydraulic oil filter be changed per the machine every 500hrs.
- (4) It may be necessary to change the fluid more frequently than the above intervals if the fluid becomes contaminated with foreign matter(Dirt, water, grease, etc.) or if the fluid has been subjected to temperature levels greater than the maximum recommended. Never reuse fluid.
- (5) The filter should be changed whenever the fluid is changed or whenever the filter indicator shows that it is necessary to change the filter.

7. TROUBLESHOOTING

1) GAUGE INSTALLATION

- (1) Various pressure and vacuum gauge readings can be a great asset in troubleshooting problems with this transmission or support system.
- (2) It will be necessary to install a high pressure gauge into the system pressure gauge ports to check the setting of the high pressure relief valve.
- (3) Measuring the charge pump inlet vacuum will help locate restrictions in the inlet lines, filter, etc.
- (4) Case pressure readings can help locate restrictions in the return lines, oil cooler and return filter.

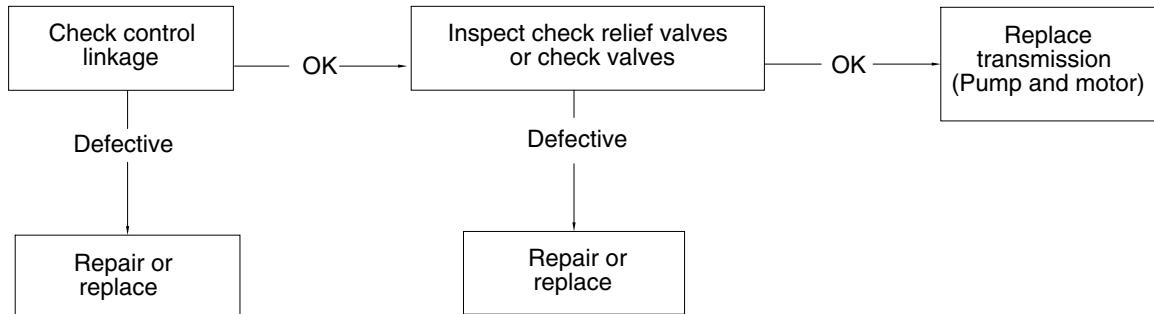


Port		Description
M1	System pressure port M1	5700psi or 400bar gauge
		9/16 - 18 O-ring fitting
M2	System pressure port M2	5700psi or 400bar gauge
		9/16 - 18 O-ring fitting
M3	Charge pressure	500psi or 35bar gauge
		Suction filtration 7/8 - 14 O-ring fitting
		Pressure filtration : Tee into charge Pressure filter outlet line
M4	Case pressure	500psi or 35bar gauge
		1-1/16 - 12 O-ring fitting (PV, PT, MV)
		7/8 - 14 O-ring fitting (MF)
S	Charge pump inlet vacuum	Vacuum gauge
		Tee into charge pump inlet line

- ※ Tandem pumps have two (2) additional system pressure gauge ports (for system ports "M3" and "M4" in the rear section).
- ※ Snubbers are recommended to protect pressure gauge. Frequent gauge calibration is necessary to insure accuracy.

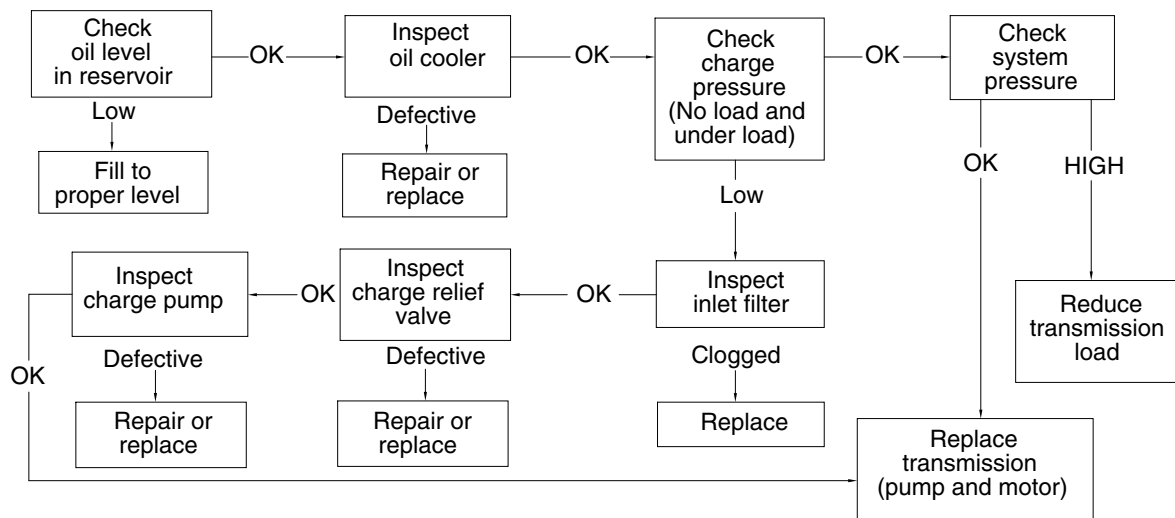
2) LOGIC DIAGRAM FAULT

(1) Transmission operates in one direction only



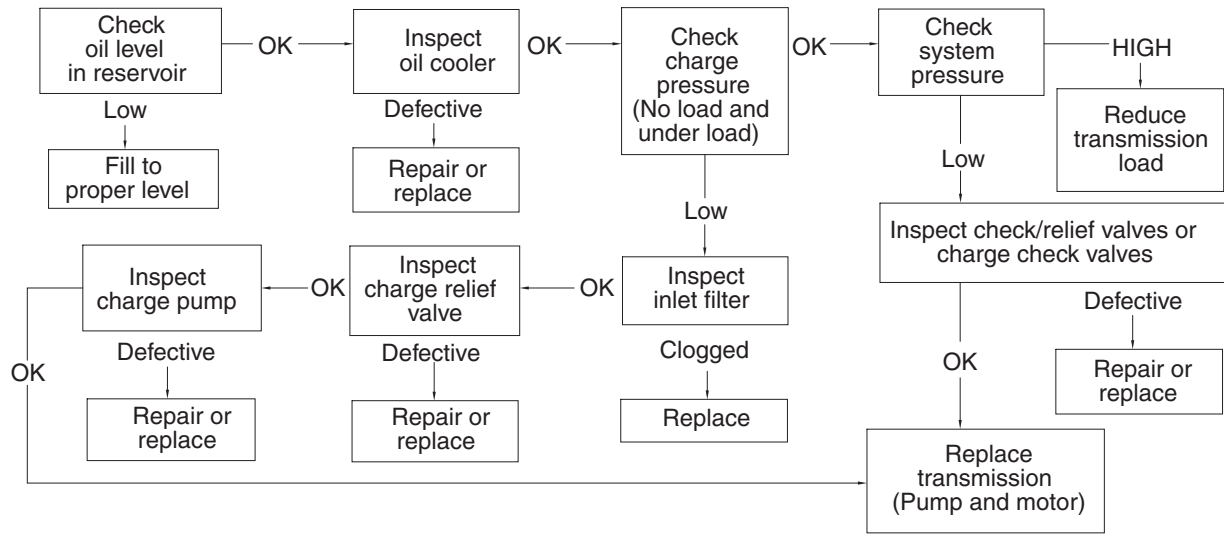
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(2) Transmission operating hot



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(3) Loss of power or transmission will not operate in either direction



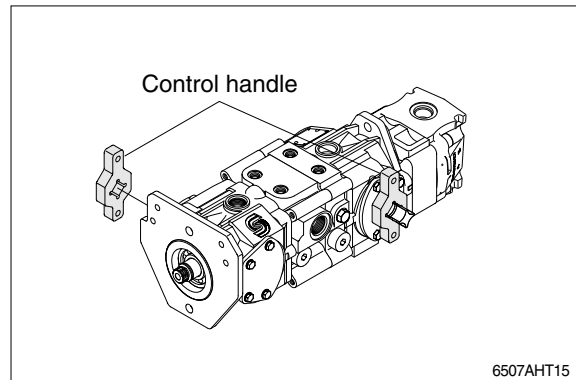
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8. INSPECTIONS AND ADJUSTMENTS

1) DIRECT DISPLACEMENT CONTROL

Disconnect the external control linkage from the control handle and check for neutral by manually operating the control handle. Releasing the control handle should allow the pump to return to neutral. If operation is satisfactory with the external control linkage disconnected, the problem is not in the hydrostatic transmission.

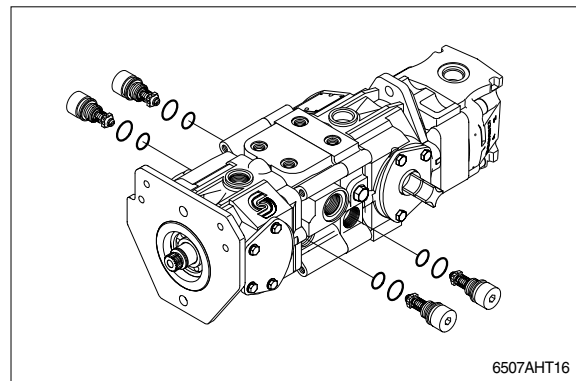
If operation is not satisfactory with the external control linkage disconnected from the handle, the control may be incorrectly adjusted.



2) CHECK / HIGH PRESSURE RELIEF VALVE

The system check/relief valves have the dual purpose of providing make up oil during by directional rotation and providing protection from system over pressure. When the problem occurs in one direction only, interchange the check/relief valves to see if the problem changes to the other direction. If so, one check/relief valve cartridge is either malfunctioning or does not have the proper setting.

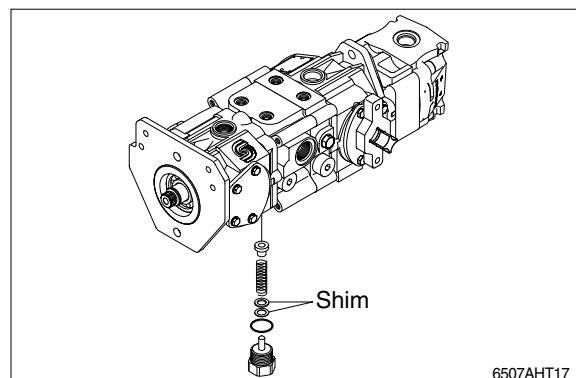
- ※ **The relief valves are factory set and should not be tampered with except for replacing the entire cartridge. Disassembly may change the setting and cause erratic unit operation or premature failure.**



3) PUMP CHARGE RELIEF VALVE

If charge pressure is low(Less than 260psi (18bar) above case pressure), the charge relief valve should be inspected. Inspect for foreign material holding the poppet open, and for scoring or wear on the poppet and seat in the housing.

Adjustment of the charge pressure is accomplished by changing the shim thickness behind the spring.



9. DISASSEMBLY AND ASSEMBLY

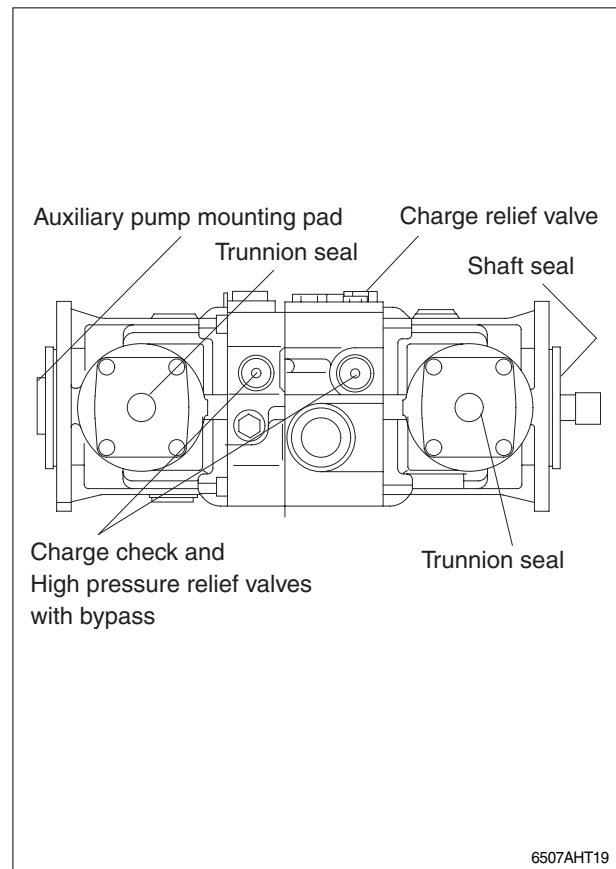
1) GENERAL

- (1) Minor repairs may be performed, following the procedures in this section, without voiding the unit warranty.

Cleanliness is a primary means of assuring satisfactory transmission life, on either new or repaired units. Cleaning parts by using a clean solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign materials and chemicals.

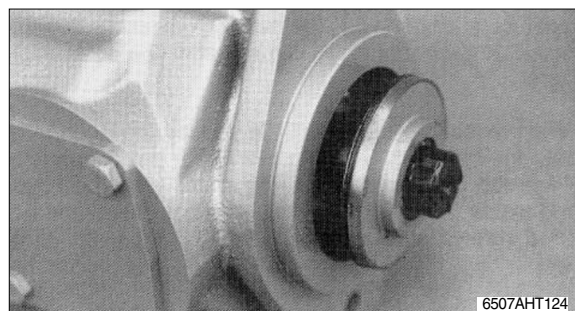
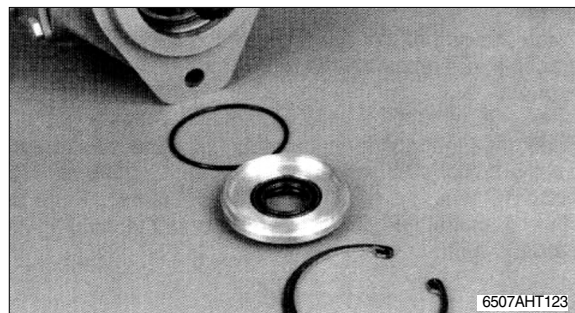
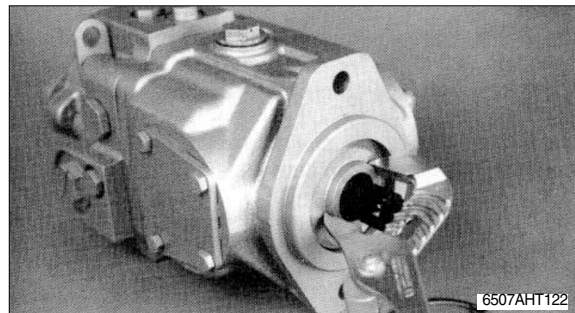
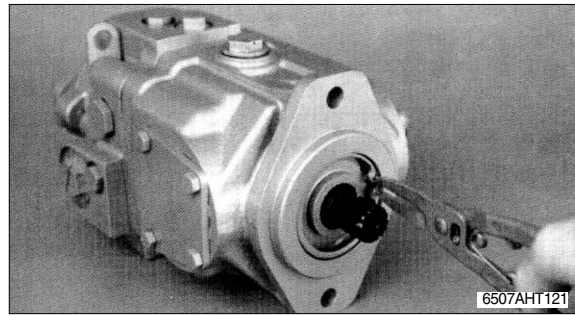
Protect all exposed sealing surfaces and open cavities from damage and foreign material.

It is recommended that all gaskets and O-rings be replaced. Lightly lubricate all O-rings with clean petroleum jelly prior to assembly. All gasket sealing surfaces must be cleaned prior to installing new gaskets.



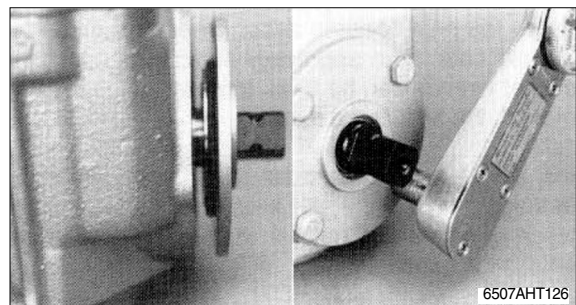
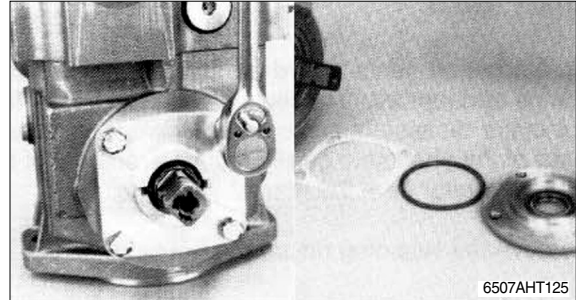
2) SHAFT SEAL

- (1) Lip type shaft seals are used on pumps and motor. These seals can be replaced without major dis-assembly of the unit. However, replacement of the shaft seal requires removal of the pump or motor from the machine.
 - ※ After the seal cover is removed, the shaft may be free in the housing. DO NOT PULL SHAFT OUT. The slipper hold down pins could become dislodged, requiring major disassembly of the unit.
- (2) Remove the retaining ring from the housing.
- (3) Carefully pull the seal cover out of the housing using pliers. Care must be taken so as not to damage the housing bore or shaft.
- (4) Remove the O-ring from the seal cover or the housing.
- (5) Place the seal cover in an arbor press and press out the old seal. An appropriately sized pipe spacer or socket wrench can be used as a press tool. Once removed, the seal is not reusable.
- (6) Inspect the seal cover, the new seal, and the O-ring for damage. Inspect the sealing area on the shaft for rust, wear, or contamination. Polish the sealing area or the shaft if necessary.
- (7) Using the arbor press, press the new seal into the seal cover. Be careful not to damage seal.
 - ※ New seals are lubricated with an assembly grease.
- (8) Wrap the spline or key end of shaft with thin plastic to prevent damage to the seal lip during installation.
- (9) Install the O-ring onto the seal cover and retain with petroleum jelly.
- (10) Slide the seal cover assembly over the shaft and into the housing bore. Install the retaining ring.
 - ※ If a beveled retaining ring is used, install the ring with its beveled side out.



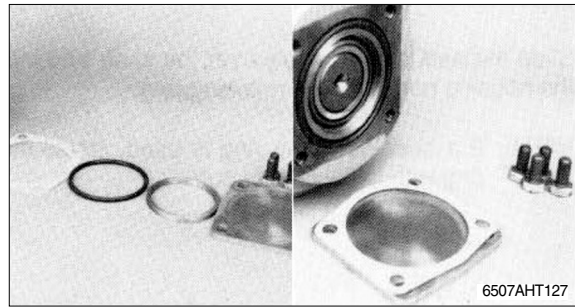
3) TRUNNION SEAL (Control shaft side)

- (1) Remove the control linkage from the swash plate control shaft. With a 13mm wrench, remove the hex screws retaining the trunnion seal carrier to the unit housing. Note the position of the seal carrier for reassembly.
- (2) Remove the trunnion seal carrier and lip seal, the trunnion bearing shims, and the O-ring. Do not alter the shim thickness.
- (3) Place the carrier in an arbor press and press out the oil seal. An appropriately sized pipe spacer or socket wrench can be used as a press tool. Once removed, the seal is not reusable.
- (4) Inspect the seal cover for damage. Inspect the sealing area on the shaft for rust, wear, or contamination. Polish the sealing area on the shaft in necessary.
- (5) Using the arbor press, press the new seal into the seal carrier. Be careful not to damage seal.
※ New seals are lubricated with an assembly grease.
- (6) Place the trunnion bearing shims onto the seal carrier, and retain with petroleum jelly.
- (7) Install the O-ring into the housing bore, and retain with petroleum jelly.
- (8) Wrap the end of the swash plate control shaft with thin plastic to prevent damage to the seal lip during installation.
- (9) Slide the seal carrier assembly over the swash plate control shaft and onto the housing. Install the hex head screws and torque to 2.45~3.06kgf · m (18~22lbf · ft). Reinstall the control linkage onto the swash plate control shaft.



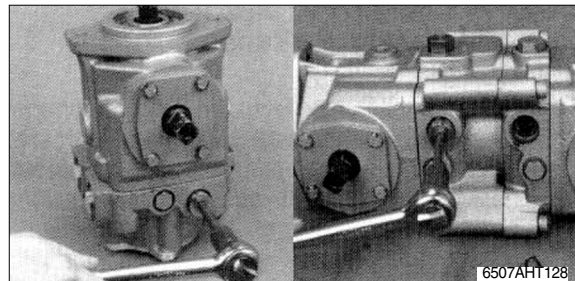
4) TRUNNION COVER (Plain)

- (1) The O-ring under the plain trunnion cover may be replaced after removing the hex screws, cover, bearing shims, and spacer ring. Do not alter the shim thickness.
- (2) When reassembling, install the spacer ring and O-ring onto the housing, retaining them with petroleum jelly. Place the trunnion bearing shims onto the cover, and install the cover onto the housing. Install the hex head screws and torque to 2.45~3.06kgf · m (18~22lbf · ft).



5) CHECK AND HIGH PRESSURE RELIEF VALVES

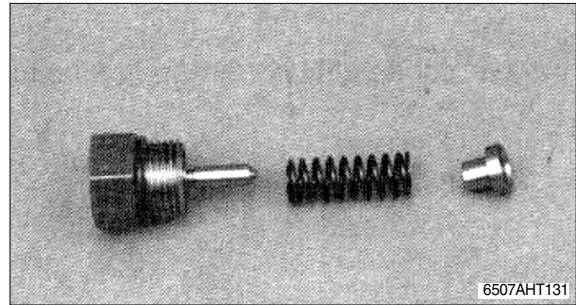
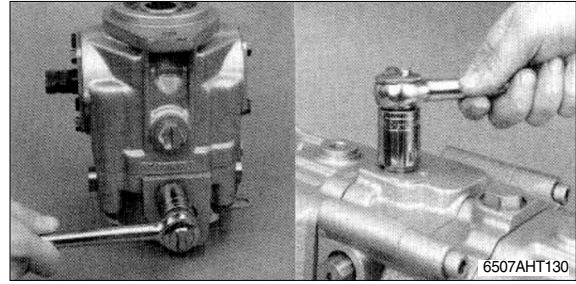
- (1) Remove the check and high pressure relief valves with a 5/16" internal hex wrench.
- (2) Remove the valve cartridge assembly from the pump end cap. Inspect the valve and mating seal in the end cap for damage or foreign material.
- (3) The check poppet or relief valve is retained in the special plug by a circlip. The poppet or valve and check valve spring into the special plug with its larger diameter toward the plug, and snap the poppet or valve into position in the plug.
- (4) Reinstall the valve cartridge (with O-rings) into the end cap. Torque the plug to 4.18~6.93kgf · m (30~50lbf · ft).



- ※ The relief valves are factory set and should not be tampered with except for replacing the entire valve.

6) CHARGE PRESSURE RELIEF VALVE

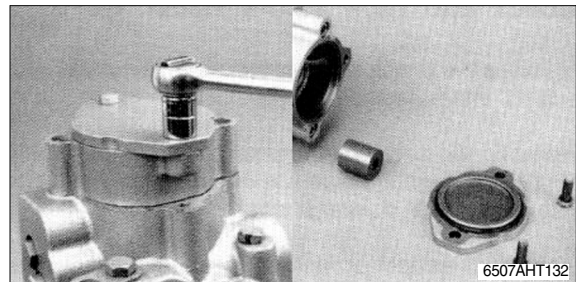
- (1) Remove the charge relief valve hex plug with a 1" wrench.
- (2) Remove the spring and poppet from the end cap.
 - ※ Do not allow the poppet to fall into the pump housing.
- (3) Do not alter the shims (which may be installed between the spring and valve plug) or interchange parts with another valve. Inspect the poppet and mating seat in the end cap for damage or foreign material.
- (4) Reinstall the poppet, spring, and plug (with shims and O-ring) into the end cap. Torque the plug to 5.51~13.8kgf · m (40~100lb · ft).



7) INTEGRAL CHARGE PUMP AND AUXILIARY PUMP MOUNTING PAD (Variable pump)

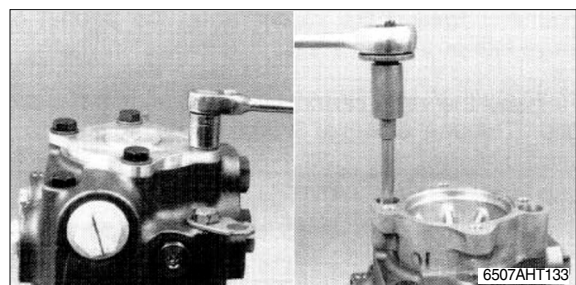
- ※ Variable pumps without an integral charge pump have the charge pump inlet port and gerotor cavity outlet plugged, and no gerotor assembly installed. Procedures for removing and installing the charge pump cover or auxiliary mounting pad are similar to those for units with an integral charge pump.

- (1) If the unit is equipped with an auxiliary pump mounting pad, remove the two screws retaining the flange cover or auxiliary pump. Remove the flange cover or auxiliary pump and O-ring.

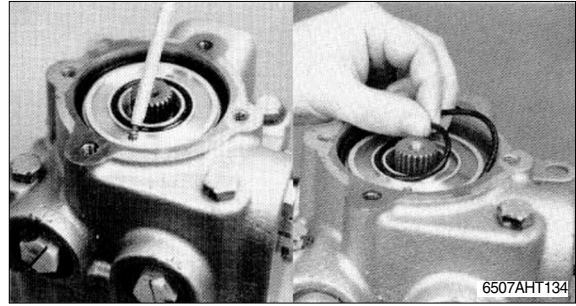


If an auxiliary pump was installed, remove the drive coupling (and retaining pin for 13T spline coupling).

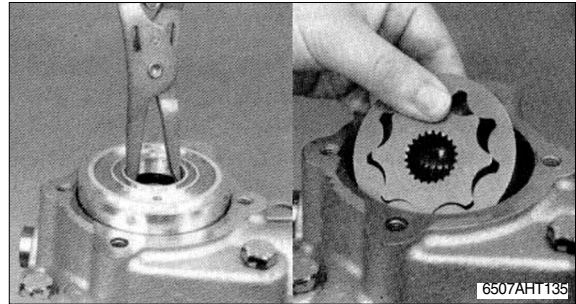
- (2) On pumps with no auxiliary mounting pad, remove the four hex screws and washers retaining the charge pump cover, using a 17mm wrench. On pumps with an SAE "A" auxiliary mounting pad, remove the two screws and washers retaining the pad adapter, using an 8mm internal hex wrench. On pumps with an SAE "B" auxiliary mounting pad, remove the four hex screws and washers retaining the pad adapter, using a 17mm wrench. Remove the cover or adapter.



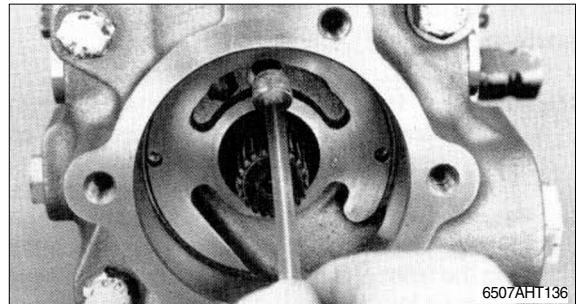
- (3) Remove the steel check ball from the gerotor spacer with a magnet.
- (4) Remove the two gerotor spacer O-rings.



- (5) Lift the gerotor spacer (with its locating pin) out of the end cap using a large pair of retaining ring pliers. Take care to avoid damaging the gerotor spacer. Note the orientation of the gerotor spacer and pin for reassembly.
- (6) Remove the gerotor assembly from the end cap.



- (7) If the pump is equipped for remote pressure filtration or is not equipped with an integral charge pump, a pipe plug will be installed in the threaded hole in the end cap gerotor cavity. This plug must not be installed if the pump is used with suction filtration. The plug may be removed with a 1/4" internal hex wrench. When reinstalling, use a thread locking compound on the plug and torque to 6.24~6.93kgf · m (45~50lbf · ft).
- (8) Each part should be inspected separately if they are to be reused. If either of the gerotor assembly parts needs to be replaced, they must both be replaced. Always replace the O-rings.



(9) Prior to assembly, lubricate the gerotor assembly with clean hydraulic oil.

(10) Slide the gerotor assembly into position on the shaft spline.

※ The charge pump rotation is determined by the position of the gerotor spacer and locating pin in the pump end cap.

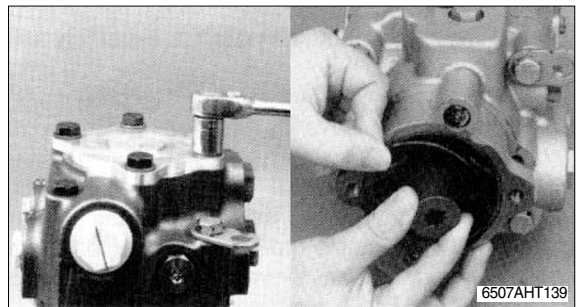
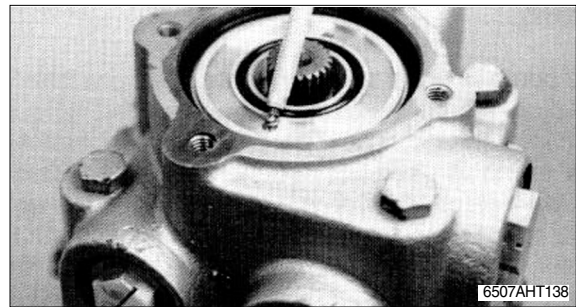
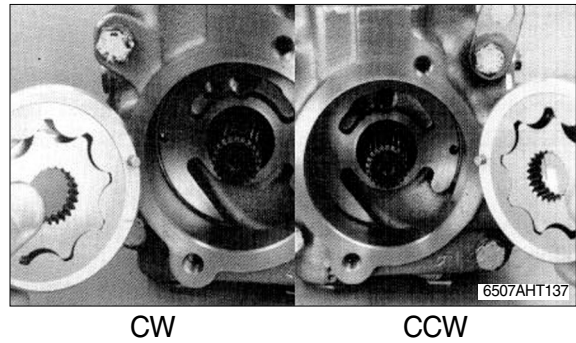
(11) Install the gerotor spacer (with locating pin), over the gerotor assembly and into the pump end cap, orienting them for the proper input shaft rotation direction. The pin in the gerotor spacer should be located in the end cap hole farthest away from the charge pump inlet port for clockwise (CW) input rotation, and closest to the inlet port for counterclockwise (CCW) input rotation.

(12) Install the two O-rings into the grooves of the gerotor spacer.

(13) Install the steel check ball into the gerotor spacer the ball must always be located next to the inlet side of the charge pump to allow balance pressure to build up on the gerotor spacer.

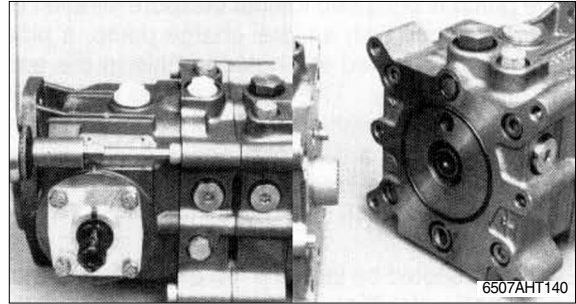
(14) Reinstall the charge pump cover or auxiliary pad adapter, and torque the screws to 4.86~6.24kgf · m (35~45lbf · ft).

If the unit is equipped with an auxiliary pump mounting pad, install the O-ring, coupling (if used), and flange cover or auxiliary pump.

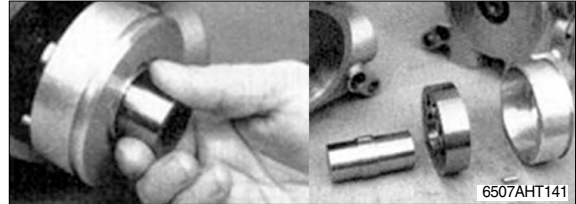


8) INTEGRAL CHARGE PUMP (Tandem pump)

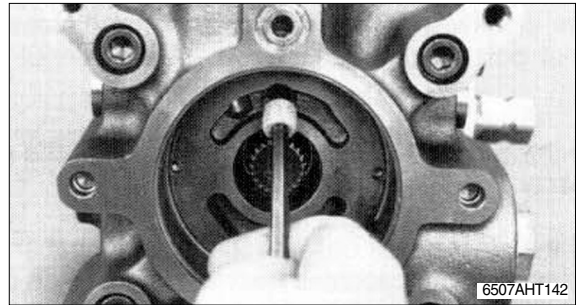
※ Tandem pumps without an integral charge pump have O-ring seals and a short drive coupling installed between the sections. In addition, the end cap for the front pump section is thinner and is not machined to accept a charge pump. Procedures for separating and attaching the front and rear pump sections are similar to those for units with an integral charge pump.



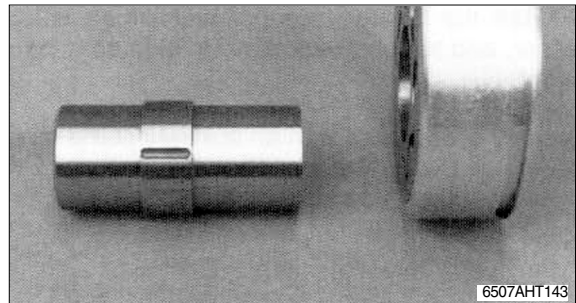
(1) Remove the four screws (using an 8mm internal hex wrench) which retain the front and rear pump sections together. Separate the front and rear sections of the pump. Remove the two alignment pins.



(2) Remove the two small O-rings from the front section the cap. Remove the single large O-ring (units less charge pump), or the two gerotor spacer O-rings (units with charge pump).



(3) For units less charge pump, remove the shaft coupling. For units with charge pump, remove the shaft coupling with the gerotor assembly, gerotor spacer, and locating pin, from the front section. Note the orientation of the gerotor spacer and pin for reassembly.



(4) Separate the shaft coupling and gerotor assembly from the gerotor spacer. Remove the drive pin from the coupling.

(5) If the pump is equipped for remote pressure filtration, a pipe plug will be installed in the threaded hole in the end cap gerotor cavity.

This plug must not be installed if the pump is used with suction filtration. This plug may be removed with a 1/4" internal hex wrench. When reinstalling, use a thread locking compound on the plug and torque to 6.24~6.93kgf · m (45~50lbf · ft).

(6) Each part should be inspected separately if they are to be reused. If either of the gerotor assembly parts needs to be replaced, they must both be replaced. Always replace the O-rings.

(7) Prior to assembly, lubricate the gerotor assembly with clean hydraulic oil.

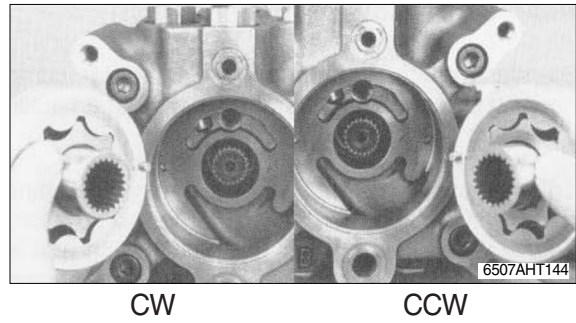
(8) Install the gerotor drive pin in the groove in the coupling, and retain with petroleum jelly.

(9) Install the gerotor assembly into the gerotor spacer. Install the assembled gerotor and spacer onto the coupling, being certain the drive pin engages the slot in the gerotor. The longer portion of the coupling must be installed toward the spacer (toward the rear pump section).

(10) Install the locating pin into the gerotor spacer.

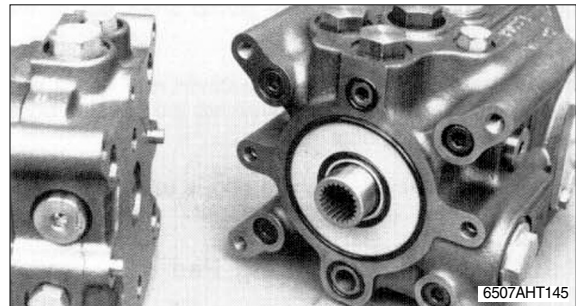
※ The charge pump rotation is determined by the position of the gerotor spacer and locating pin in the front pump end cap.

(11) Install the gerotor spacer (with locating pin, gerotor assembly, and drive coupling), into the front pump end cap, orienting the spacer for the proper input shaft rotation direction. The pin in the gerotor spacer should be located in the end cap hole farthest away from the charge pump inlet port for clockwise (CW) input rotation, and closest to the inlet port for counterclockwise (CCW) input rotation.



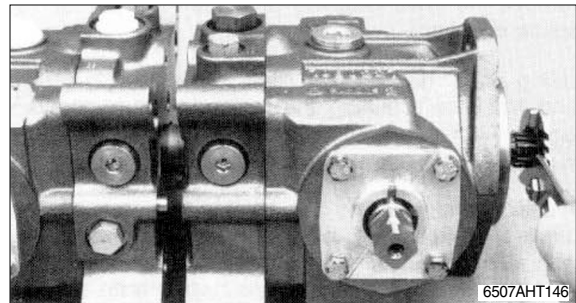
(12) For units less charge pump, install the shaft coupling onto the front pump shaft.

(13) Install the two small O-rings into the front section end cap. Install the single large O-ring into the front section end cap (units less charge pump), or the two O-rings into the grooves of the gerotor spacer (units with charge pump).

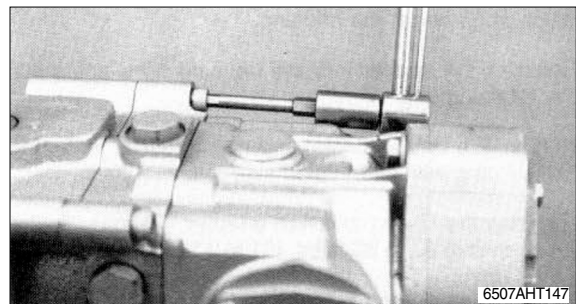


(14) Install the two alignment pins into the rear section end cap.

(15) Slide the front and rear sections of the pump together, rotating the front pump shaft to align the splines on the coupling and rear pump shaft.



(16) Install the four socket head screws to retain the front and rear pump sections together. Torque the screws to 4.86~6.24kgf · m (35~45lb · ft). Check for proper internal assembly by slowly rotating the pump shaft while tightening these screws.



9) REAR SHAFT COVER (Tandem pump)

(1) Standard tandem pumps use the same rear pump housing and shaft for all units, with or without an auxiliary pump mounting pad.

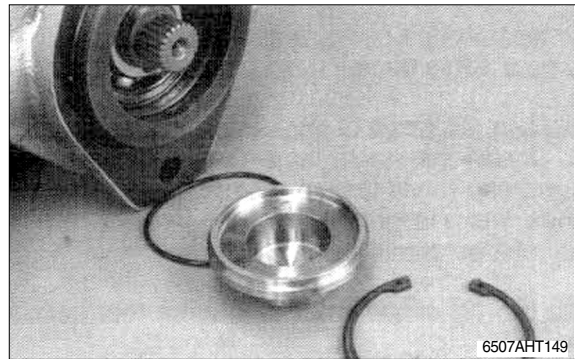
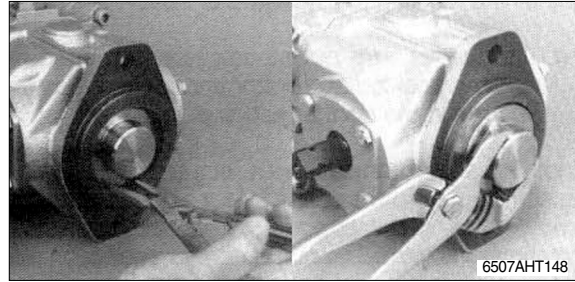
(2) Tandem pumps without an auxiliary pump mounting pad have a cover installed over the rear pump shaft.

This cover is held in place by a retaining ring and is sealed by an O-ring. The cover retains the rear pump shaft in its housing.

(3) Remove the retaining ring from the housing and carefully pull the cover out of the housing using pliers. Remove the O-ring from the cover or the housing. Do not attempt to pull the rear pump shaft out of the housing.

(4) Install the new O-ring onto the cover and retain with petroleum jelly. Press the cover into the housing bore. Install the retaining ring.

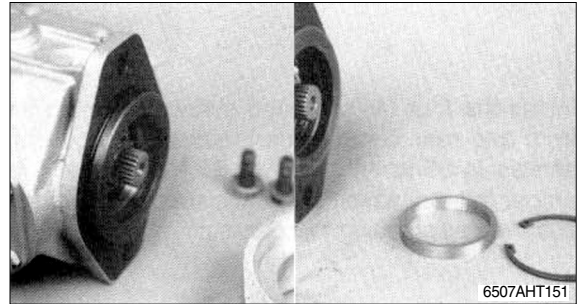
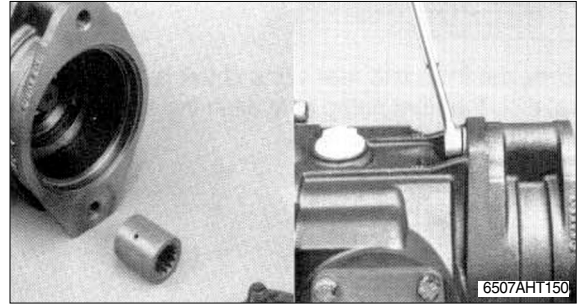
※ If a beveled retaining ring is used, install the ring with its beveled side out.



10) AUXILIARY PUMP MOUNTING PAD

(Tandem pump)

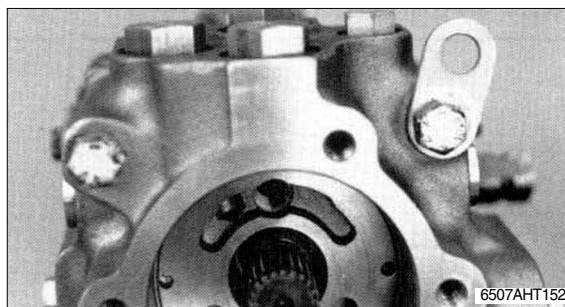
- (1) Remove the two screws retaining the flange cover or auxiliary pump, and remove the cover or pump with its sealing O-ring. If an auxiliary pump was installed, remove the drive coupling (and retaining pin for 13T spline coupling).
 - (2) Using a 3/4" hex wrench, remove the two (2) screws and washers retaining the pad adapter to the rear pump housing, and remove the adapter. The adapter is sealed to the rear pump housing with an O-ring.
 - (3) A spacer and retaining ring are used to retain the rear pump shaft in its housing on tandem pumps equipped with auxiliary pads. This spacer must be installed in place of the shaft cover before installing and auxiliary pad.
 - (4) Remove the retaining ring from the housing and remove the spacer. Do not attempt to pull the rear pump shaft out of the housing.
 - (5) Reinstall the spacer into the housing bore and install the retaining ring.
- ※ If a beveled retaining ring is used, install the ring with its beveled side out.
- (6) Reinstall the O-ring and pad adapter. Torque the two screws to 9.28~11.3 kgf · m (67.1~81.7 lbf · ft).
 - (7) If an auxiliary pump is to be installed, install the drive coupling (with retaining pin for 13T spline coupling). Install the O-ring and flange cover or auxiliary pump.



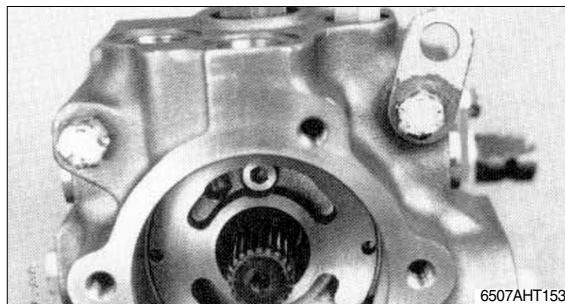
11) FILTRATION AND CHARGE PUMP OPTIONS

- (1) Variable pumps and tandem pumps with integral charge pumps equipped for suction filtration ports in the end cap.

In addition, a pipe plug is NOT installed in the threaded hole in the end cap gerotor cavity.



- (2) Variable pumps and tandem pumps with integral charge pumps equipped for remote pressure filtration do not have plugs installed in the remote filter ports in the end cap. In addition, a pipe plug is installed in the threaded hole in the end cap gerotor cavity.



- (3) Variable pumps without integral charge pumps have a plug installed in the remote filter outlet port in the end cap. In addition, a pipe plug is installed in the threaded hole in the end cap gerotor cavity, and the charge pump inlet port in the end cap is plugged.



- (4) Tandem pumps without integral charge pumps use a thinner end cap for the front pump section, which is not machined to accept a charge pump. A shorter drive coupling and shorter screws are also used.

- ※ Removal of the end cap is considered to be a major repair, which may affect the unit warranty status. Major repairs are to be performed only by Sundstrand-Sauer authorized service centers and/or original equipment manufacturers who have been adequately trained by Sundstrand-Sauer.

