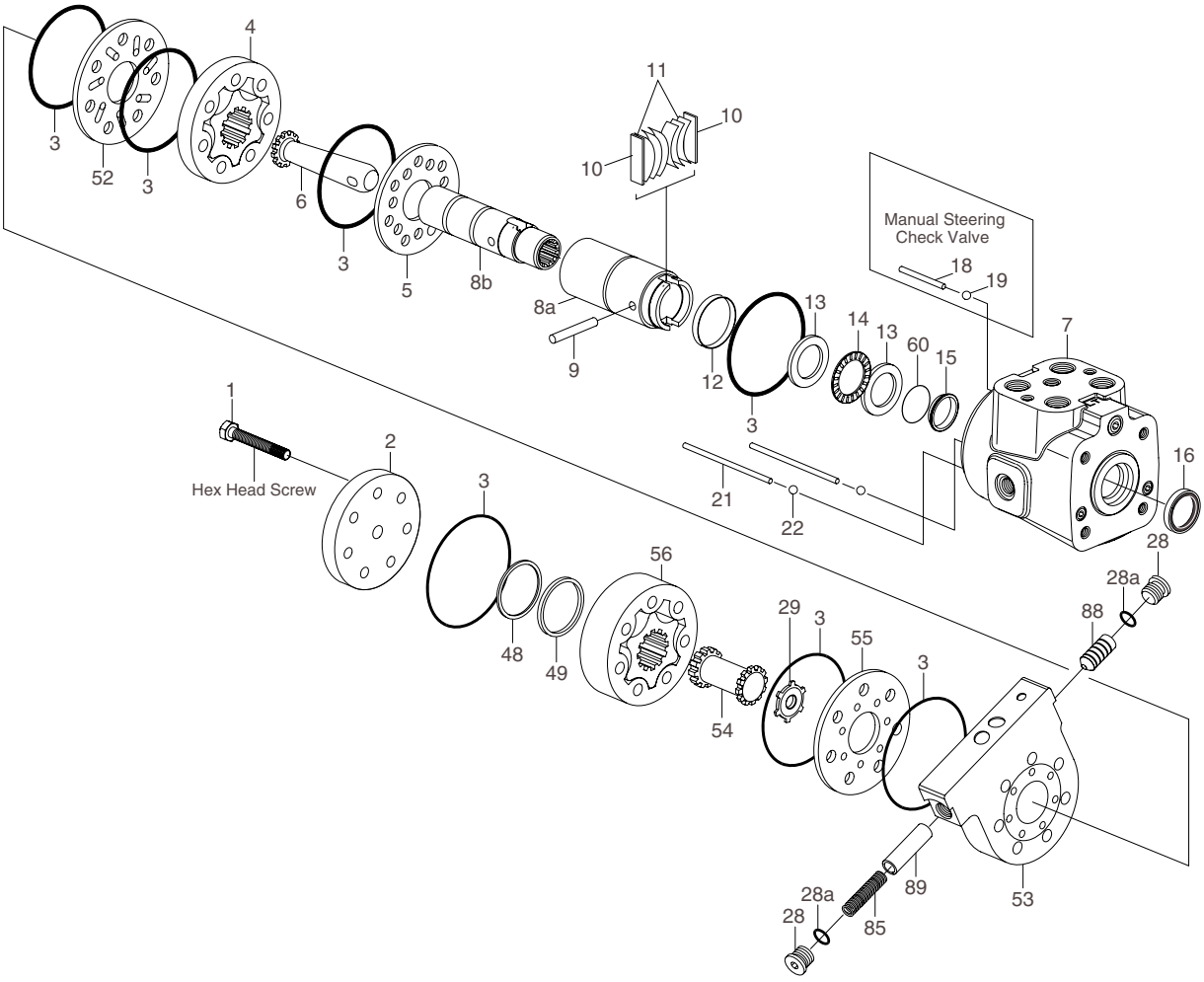
1. STEERING UNIT

1) STRUCTURE



1	Cap screw	12	Retainer spring	52	Valve plate
2	End cap	13	Race bearing	53	Valve sub assy
3	Seal	14	Needle thrust bearing	54	Drive
4	Gerotor sub assy	15	Seal	55	Valve plate
5	Spacer plate	16	Dust seal	56	Gerotor sub assy
6	Drive	18	Roll pin	60	O-ring
7	Valve housing	19	Ball	85	Compression spring
8a	Control sleeve	21	Roll pin	86a	Plug
8b	Control spool	22	Check ball	86b	O-ring
9	Centering pin	29	Spacer	88	Piston
10	Spacer spring	48	Seal ring	89	Guide spring piston
11	Centering spring	49	Back-up ring		

2) INTRODUCTION

(1) Most repairs require the removal of the control unit from the machine.
(2) Cleanliness is extremely important.
(3) Clean the port areas thoroughly before disconnecting the hydraulic lines.
(4) Plug the control unit ports and cover open hydraulic lines immediately after they have been disconnected.
(5) Drain the oil and clean the exterior of the control unit before making repairs.
(6) Wash all metal parts in clean solvent.
(7) Use filtered, moisture-free compressed air to dry the parts.
Do not wipe them dry with paper towels or cloth - lint in a hydraulic system will cause damage.
(8) Always use new seals when reassembling hydraulic control units.
(9) Lubricate new rubber seals with a petroleum jelly installation.
(10) Torque all bolts over gasketed joints, then repeat the torquing sequence to make up for gasket compression.

After all repairs are complete it is essential to verify the accuracy of control unit repairs on an authorized test stand.

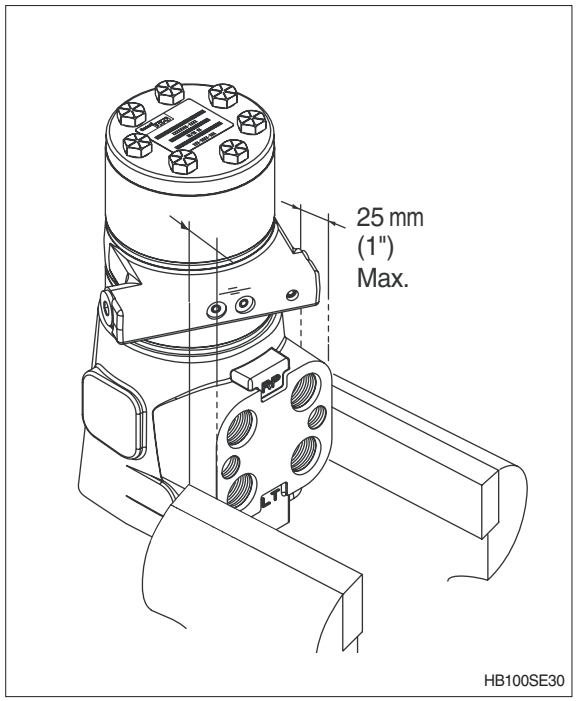
3) TOOLS

(1) Screwdriver (102~152 ㎜ [4~6"] long, × 3 ㎜ [118"] thin flat blade)
(2) 1/2" socket for current hexagon head cap screws.
(3) Breaker bar wrench.
(4) Torque wrench (3 ㎏f · m [22 lbf · ft] capacity).
(5) 1/4" hexagon key.
(6) Special tools : Plunger and sleeve

4) DISASSEMBLY

※ **Cleanliness is extremely important when repairing a steering control unit. Work in a clean area. Before disconnecting lines, clean port area of unit thoroughly. Use a wire brush to remove foreign material and debris from around exterior joints of the unit.**
We recommend that you keep the unit in a vise during disassembly. Follow the clamping procedures explained throughout the manual.

(1) Clamp unit in vise, meter end up. Clamp lightly on edges of port face sides.
Use protective material on vise jaws.
Housing distortion could result if jaws are overtightened.

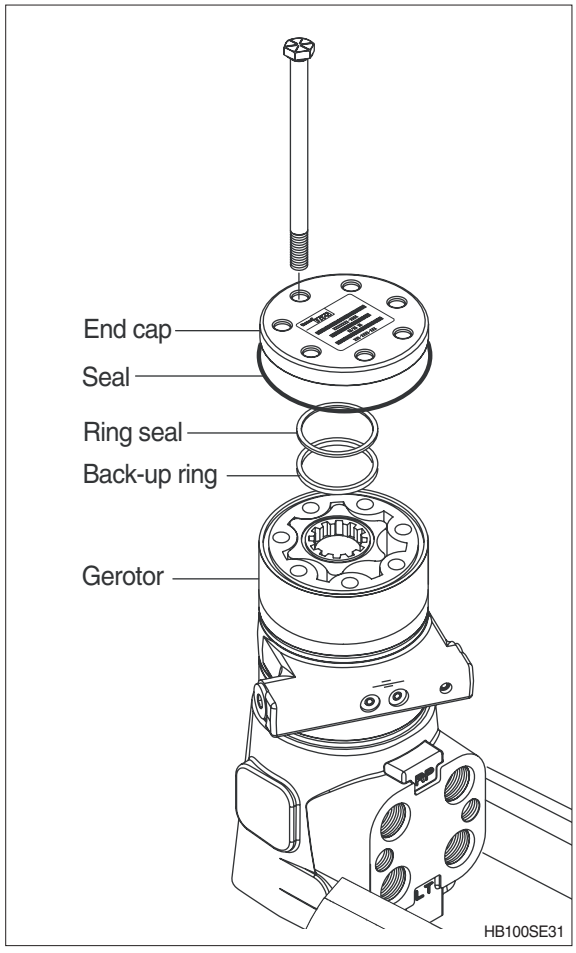


(2) Remove (5/16") cap screws.

(3) Remove end cap.

(4) Remove seal.

※ **This unit has a low slip sealed gerotor star, this unit includes a ring seal and a back-up ring.**
Remove these parts.

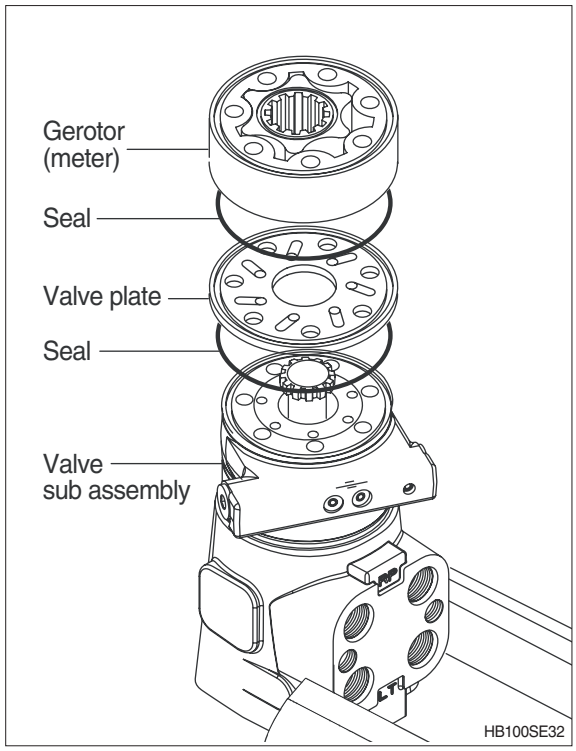


(5) Remove gerotor (meter).
Be careful not to drop star.

(6) Remove seal from valve plate.

(7) Remove valve plate.

(8) Remove seal from valve sub assembly.



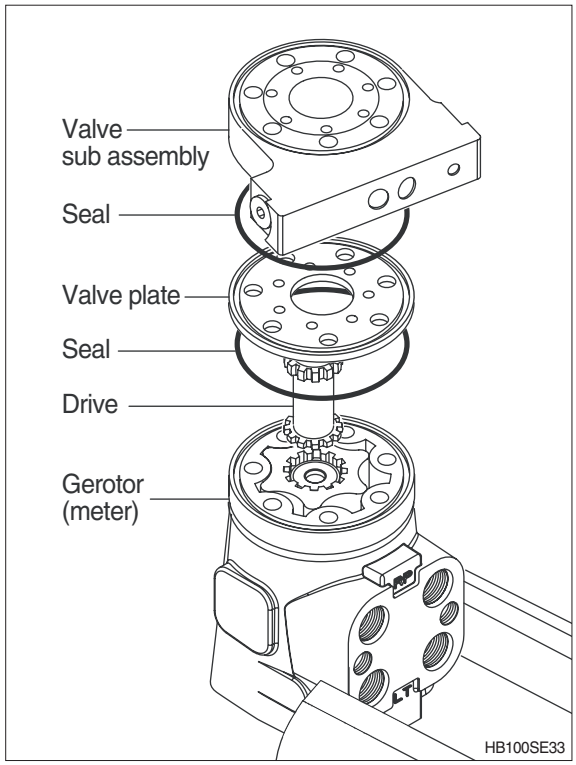
(9) Remove valve sub assembly

(10) Remove seal from valve plate.

(11) Remove valve plate.

(12) Remove the first of the two drives.

(13) Remove seal from gerotor (meter).



(14) Remove gerotor (meter).
Be careful not to drop star.

(15) Remove seal from spacer plate.

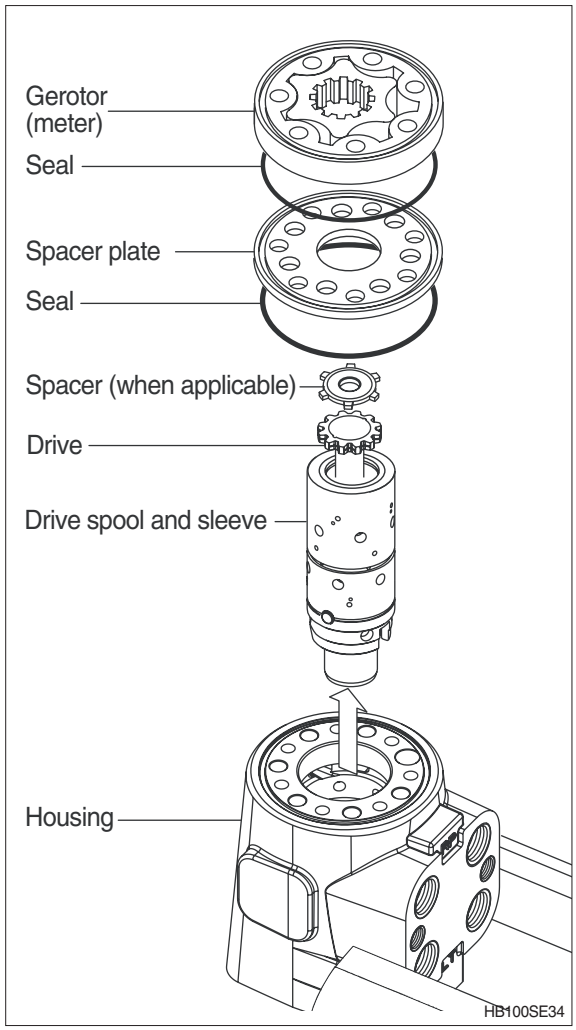
(16) Remove spacer plate.

(17) Remove seal from housing.

(18) Pull drive and twist to remove drive spool and sleeve assembly from housing.

(19) Remove housing from vise.

※ **Do not bind spool and sleeve in housing. Rotate spool and sleeve assembly slowly when removing it from housing.**

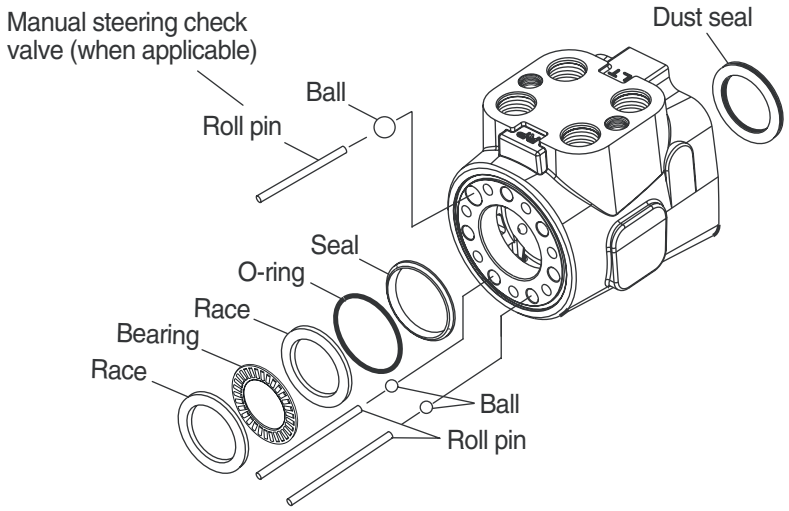


(20) Carefully remove bearing and races, anti-cavitation valves and manual steering check valve (roll pin and ball) from bolt holes by tipping housing gerotor side down (see figure).

(21) Do not remove any valves other than manual steering check valve assembly and anti-cavitation valve assembly. All other valves are factory preset and are non-serviceable.

(22) Carefully remove seal with a thin-blade screw driver.
Do not scratch seal groove with screw driver.

(23) Use thin bladed screw driver to pry dust seal from housing. Do not damage housing.

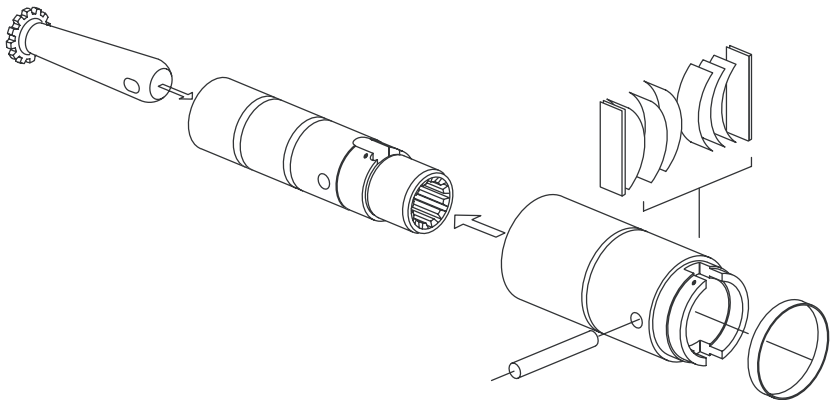


HB100SE35

(24) Push pin from spool and sleeve assembly.

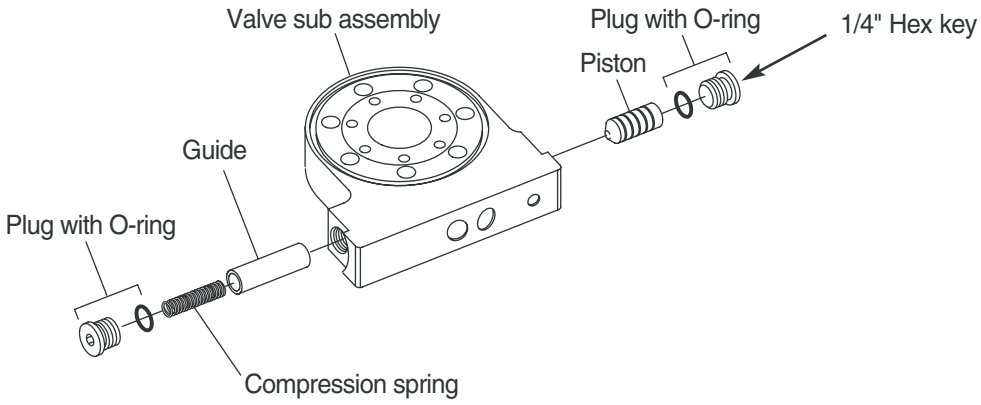
(25) Remove drive.

(26) Push spool partially from control end of sleeve, then carefully remove centering springs and retaining ring from spool by hand (see figure).



HB100SE36

(27) Disassemble valve sub-assembly as shown in figure.



HB100SE37

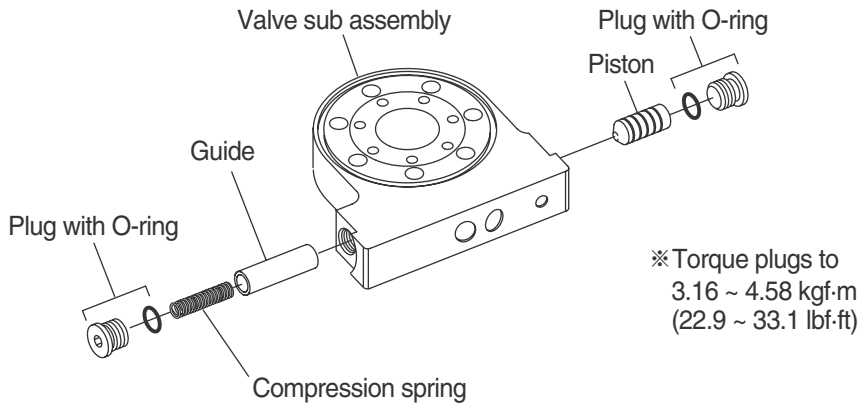
5) ASSEMBLY

※ **Assembly cleanliness**

Check all mating surfaces. Replace any parts that have scratches or burrs that could cause leakage. Clean all metal parts in clean solvent. Blow dry with air. Do not wipe dry with cloth or paper towel because lint or other matter can get into the hydraulic system and cause damage. Do not use grit paper or file or grind these parts.

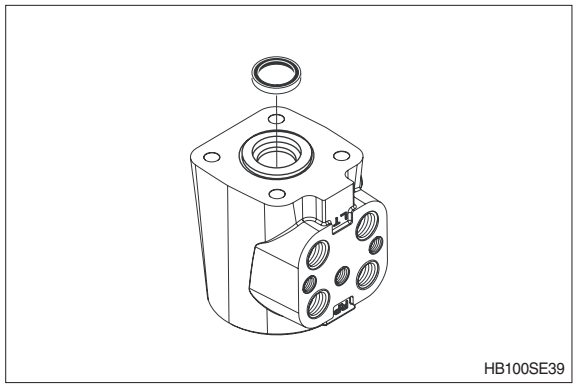
※ Lubricate all seals with clean petroleum jelly. A good service policy is to replace all old seals with new seals. Do not use excessive lubricant on seals for meter section.

(1) Reassemble valve parts with new O-rings on plugs.



HB100SE38

(2) Place housing on a flat work area on a clean lint free cloth.
Install press-fit 24.9 ㎜ (0.98") ID seal in housing with metal surface of seal facing toward housing.

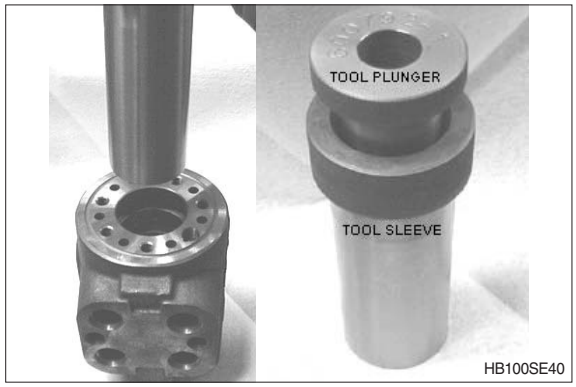


HB100SE39

2-Piece shaft seal installation

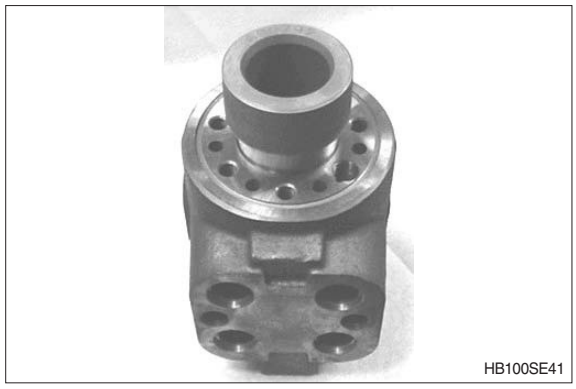
(3) For installation of O-ring and seal

① Place housing on a flat work area as shown in figure.
② Lubricate seal and O-ring with hydraulic oil before installation.
③ Align tool sleeve with housing bore.

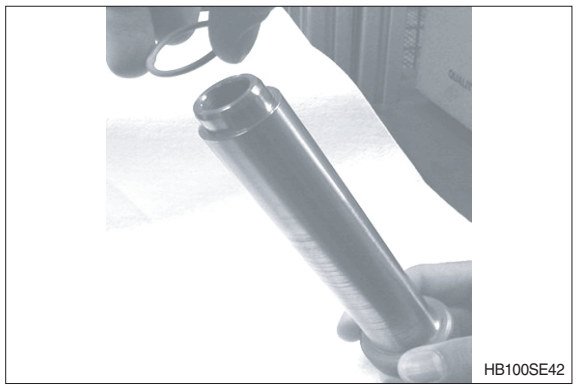


HB100SE40

④ Insert tool sleeve into housing bore.


HB100SE41

⑤ Place O-ring on tool plunger.


HB100SE42

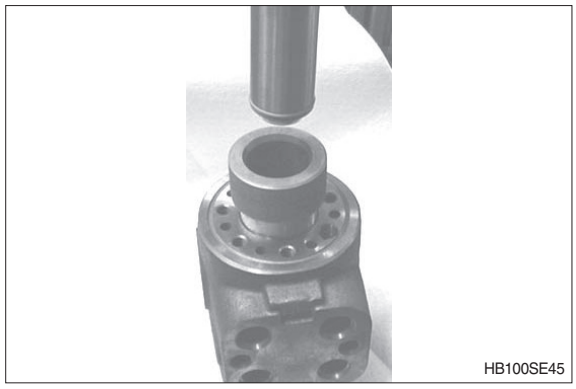
⑥ Align seal with tool plunger cross section L shape of seal should be upside down.


HB100SE43

⑦ Push seal onto plunger.
Lip of seal should be between O-ring and tool plunger. No gap should exist between O-ring and seal.


HB100SE44

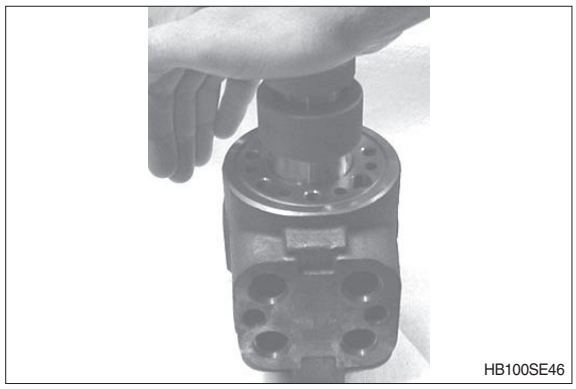
⑧ Align tool plunger with tool sleeve.



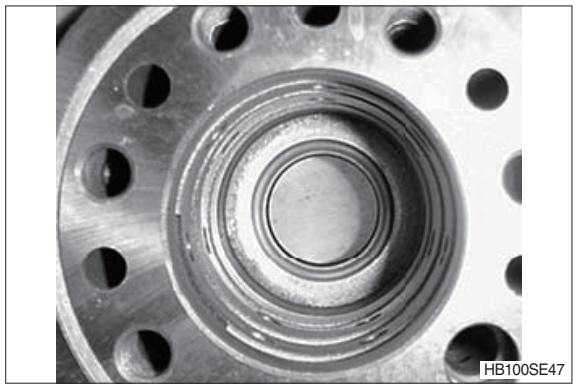
⑨ Push tool plunger into tool sleeve until it bottoms out, rotate 1/4 turn.

⑩ While holding sleeve in housing, withdraw tool plunger.

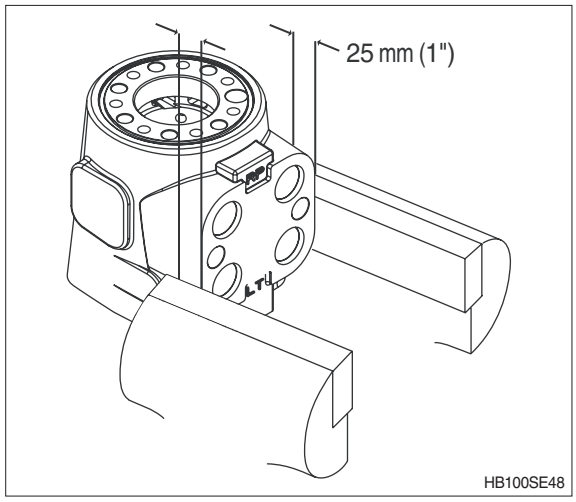
⑪ Withdraw tool sleeve.



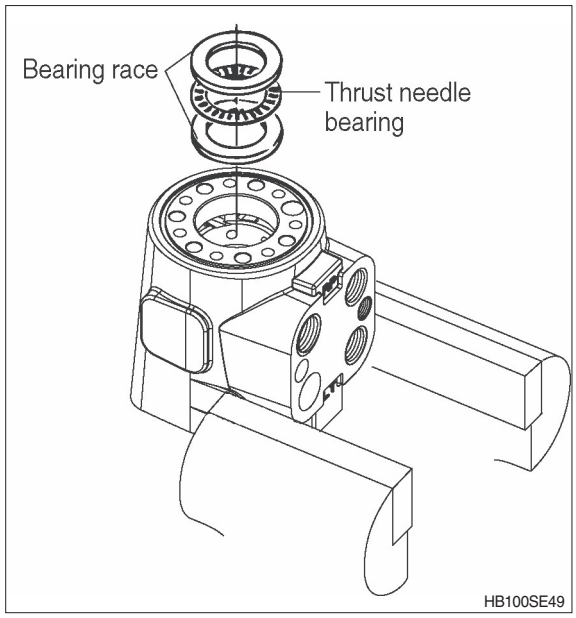
⑫ Inspect seal installation.
Seal and O-ring must both be within shaft seal counterbore of housing.



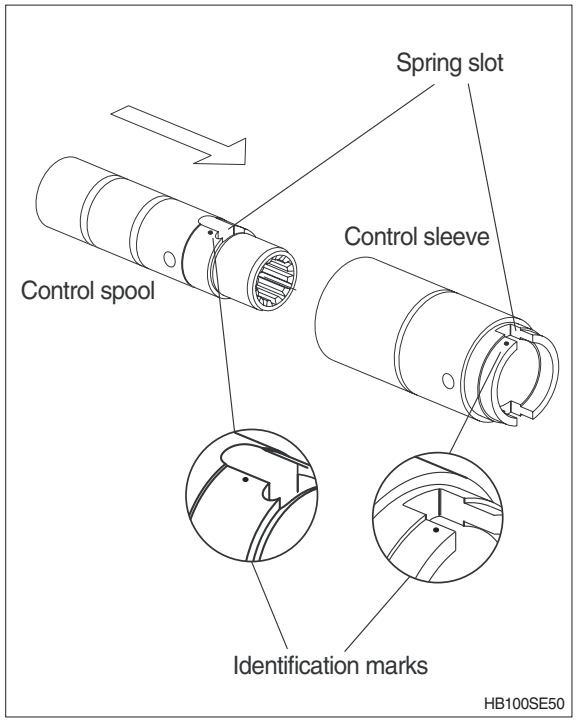
(4) Clamp housing in vice.



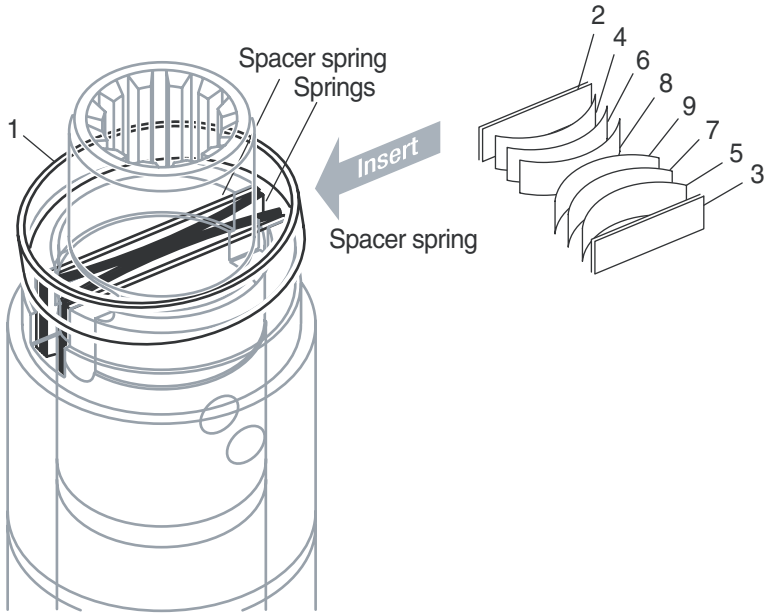
(5) Install two bearing races and thrust bearing as shown in figure.



(6) Assemble spool and sleeve carefully so that spring slots line up at the same end. Rotate spool while sliding parts together. Test for free rotation. Spool should rotate smoothly in sleeve with fingertip force applied at splined end.
Align spring slots and identification marks (figure) in spool and sleeve and stand parts on end of bench.



(7) Installation of spring spacers and springs, hold spring retainer at an angle as shown (see figure reference number 1), insert spring spacers and springs one at a time in sequence noted by reference numbers 2~9, then position spring retainer correctly over all these parts. Adjust alignment of spring parts with a small screwdriver.



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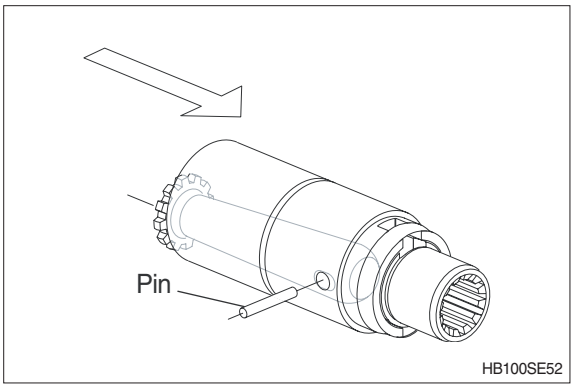
(8) Assemble drive and spool/sleeve.

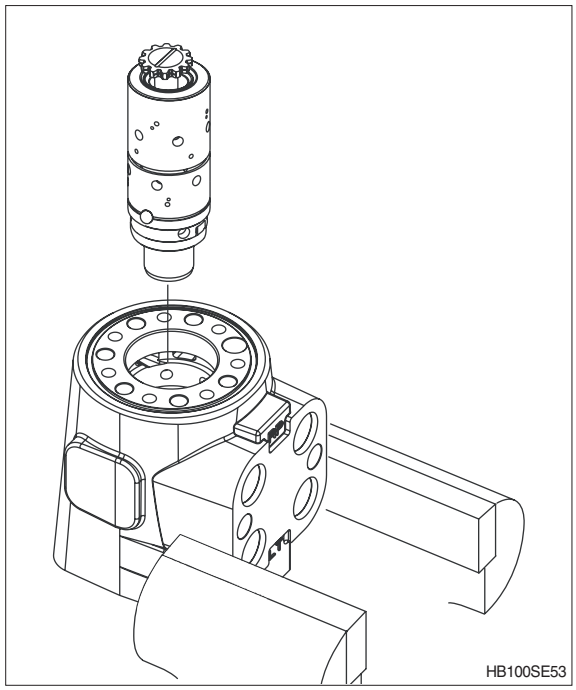
(9) Insert pin through spool and sleeve assembly through hole in drive, until pin is flush at both sides of sleeve.



HB100SE52

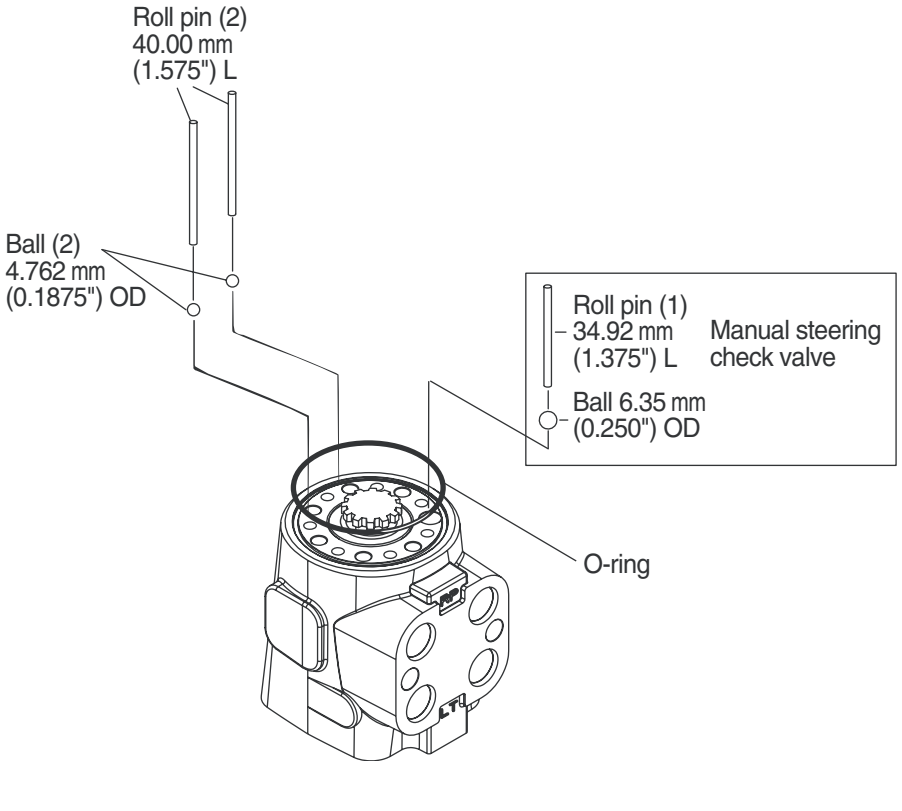
(10) Position spool and sleeve assembly so that splined end of spool enters 14 hole end of housing first.

※ While inserting spool and sleeve assembly into housing, make sure parts do not tilt out of position.
Push assembly gently into place with slight rotating action. Bring spool assembly entirely within housing bore until parts are flush at 14 hole end of housing. With spool assembly in this flush position, check for free rotation within housing by turning assembly with fingertip force at splined end.



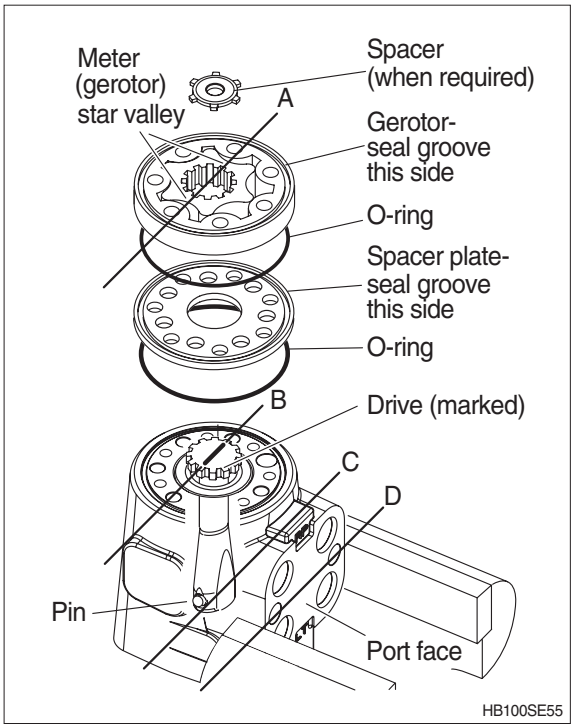
(11) Install 72.6 mm (2.86") ID O-ring in housing.

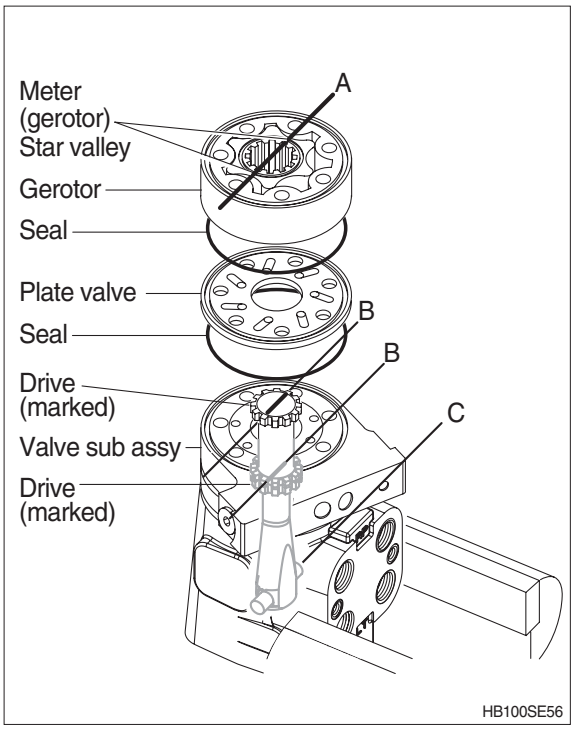
(12) Install anti-cavitation valves and manual steering check valve (if used) in holes, as shown in figure. After installing balls, inspect holes to make sure they are properly seated.



※ **Timing reference data**

Align star valleys (reference A) with marked drive 1 and drive 2 (reference B). Valleys must align with pin. Note parallel relationship of reference lines A, B, C, and D in figure. Align bolt holes without disengaging gerotor (meter) from drive.





(13) Lubricate and install 72.6 mm (2.86") ID seal in gerotor (meter).

(14) Install spacer plate. Align bolt holes in spacer plate with tapped holes in housing.

(15) Lubricate and install 72.6 mm (2.86") ID seal in spacer plate.

(16) Install gerotor (meter) seal groove up, note position of star valleys in relation to marked drive.

(17) Install drive spacer when required.

(18) Lubricate and install 72.6 mm (2.86") ID seal in gerortor ring.

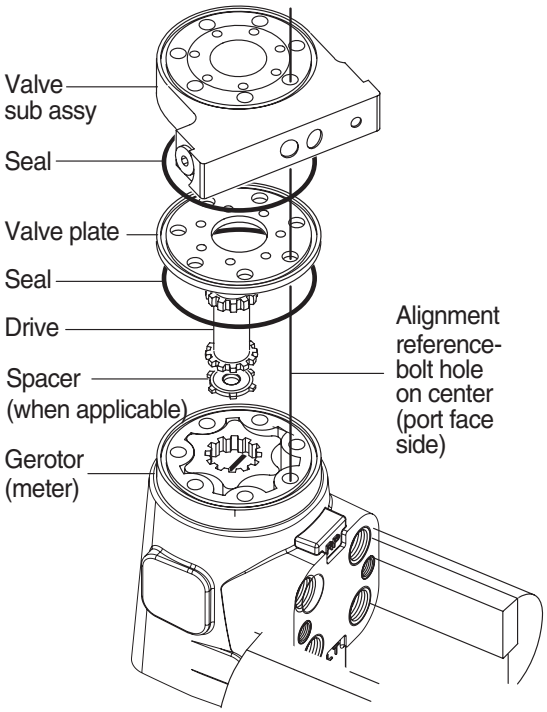
(19) Position second marked drive correctly over marked first drive.

(20) Install valve plate.

(21) Lubricate and install 72.6 (2.86") ID seal in valve plate.

(22) Install valve sub assembly, see figure for correct position.

※ Check to insure that spool and sleeve are flush or slightly below 14 hole surface of housing.
Clean upper surface of housing by wiping with palm of clean hand. Clean each of the flat surfaces of meter section parts in a similar way just before reassembly. Do not use cloth or paper to clean surfaces.



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(23) Lubricate and install 72.6 mm (2.86") ID seal in valve sub assembly.

(24) Install valve plate.

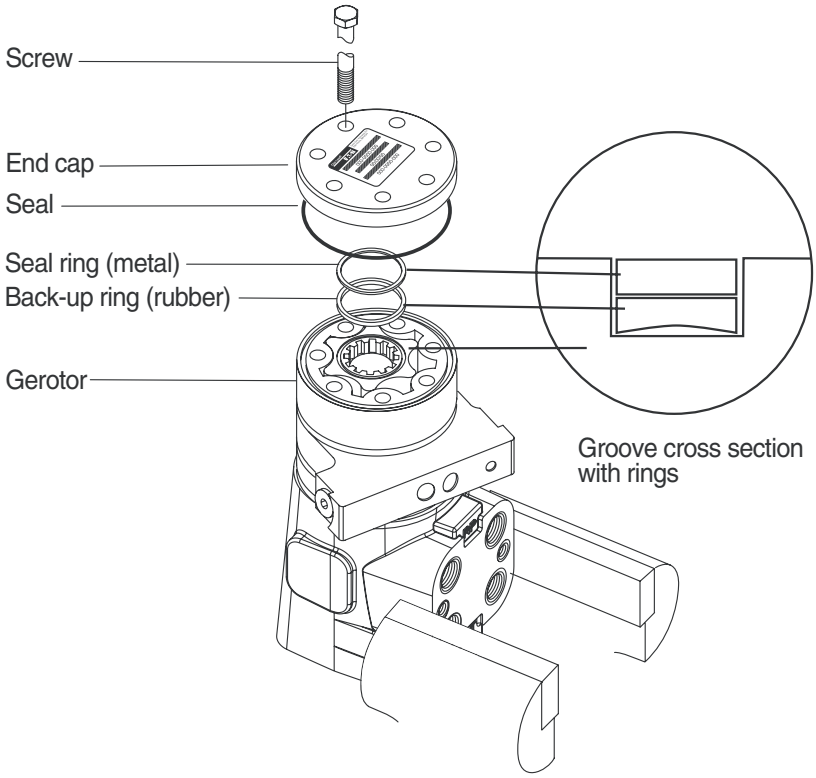
(25) Lubricate and install 72.6 mm (2.86") ID seal in valve plate.

(26) Install second gerotor (should be the thicker of the two) seal groove up, note position of star valleys in relation to marked drives.

(27) Install back-up ring and seal ring in gerotor star.

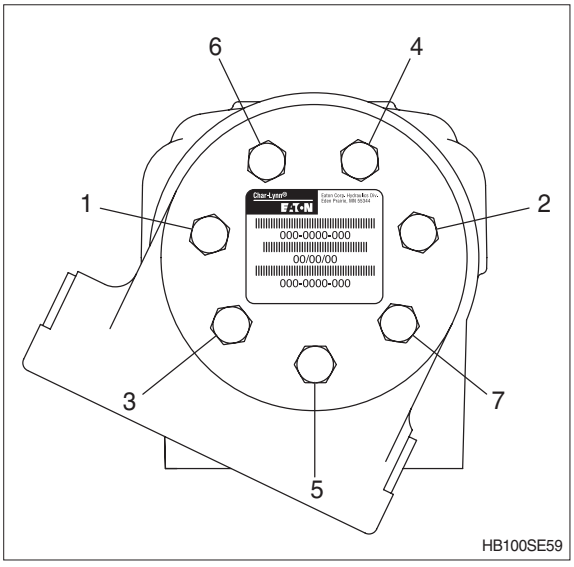
(28) Lubricate and install 72.6 mm (2.86") ID seal in gerotor (meter).

(29) Install end cap on gerotor, aligning holes.



HB100SE58

(30) Install 7 dry cap screws in end cap. Pretighten cap screws to 1.73 kgf · m (12.5 lbf · ft), then torque screws to 2.86~3.47 kgf · m (20.7~25.1 lbf · ft) in sequence shown in figure.



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