

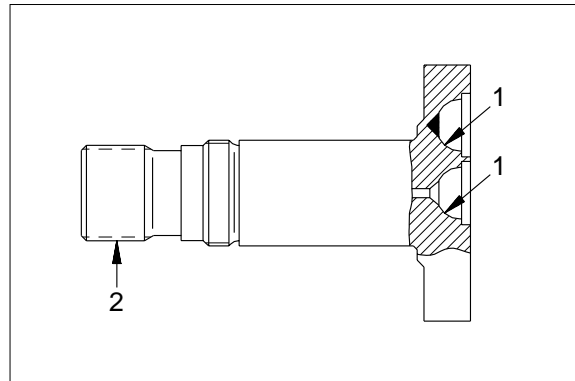
## GROUP 2 MAJOR COMPONENT

### 1. MAIN PUMP

#### 1) INSPECTIIN INSTRUCTION

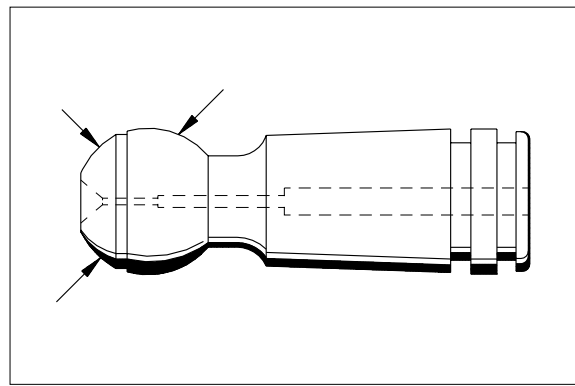
##### (1) Drive shafts

- ① Cups free of scratches and no pitting.
- ② Free of corrosion, erosion or fretting ; no damage to splines or keyways.



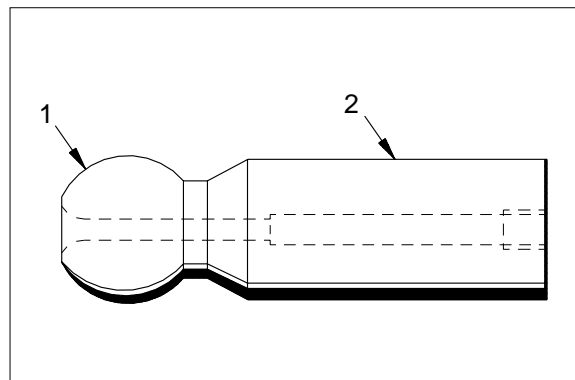
##### (2) Piston

No scoring and no pitting.



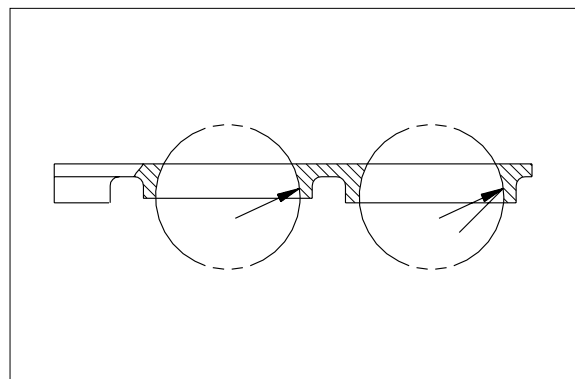
##### (3) Center pin

No scoring and no pitting.



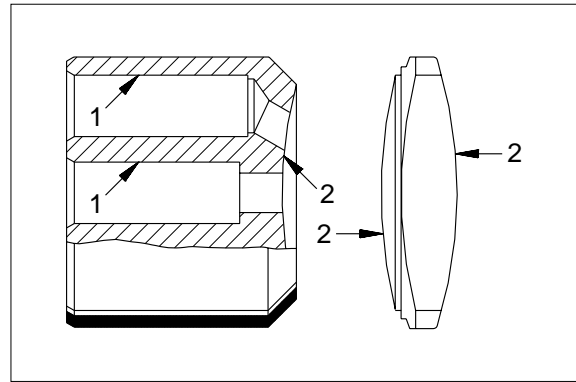
##### (4) Retaining plate

Free of scoring and no evidence of wear.



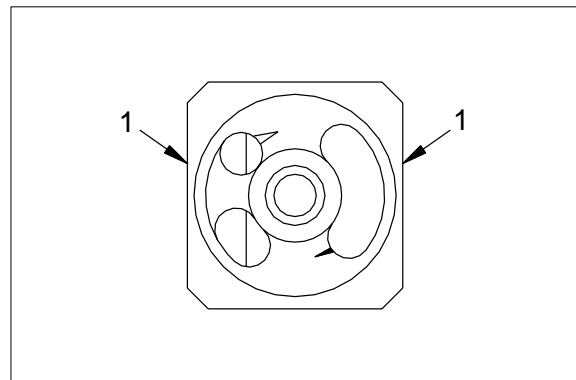
**(5) Cylinder block / control lens**

- ① Bores free of scoring, no evidence of wear.
- ② Faces smooth and even, free of cracks and scoring.



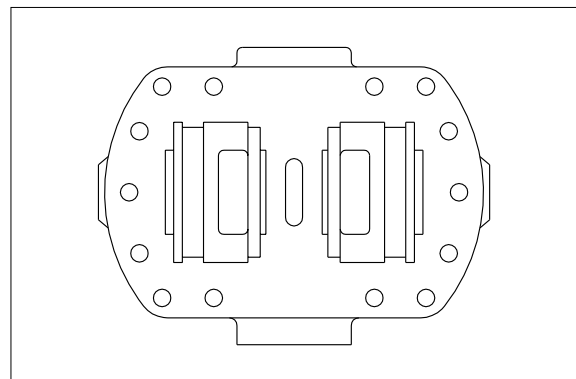
**(6) Control lens, side guides**

Free of scoring, no evidence of wear.



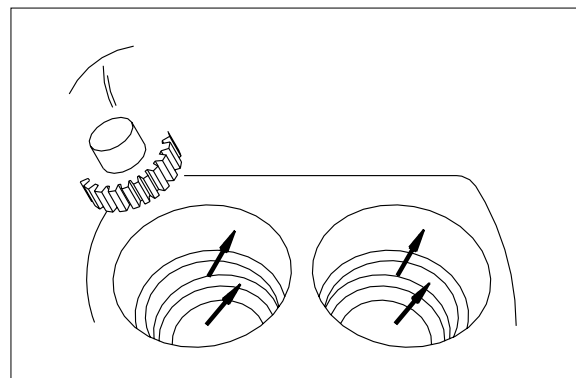
**(7) Control housing**

Sliding surface and side guides free of scoring and no wear.

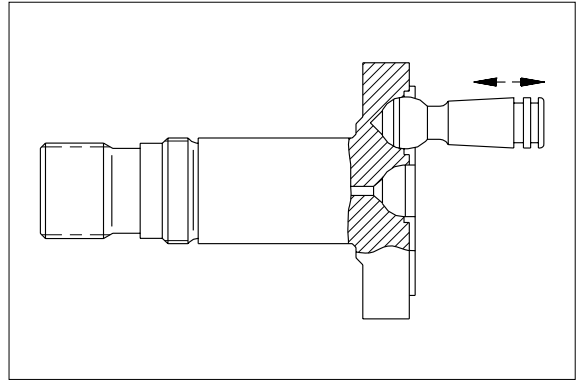


**(8) Visual check**

Bearing areas free of scoring and no evidence of wear.




**(9)** Axial piston play. (Inspection with the retaining plate mounted).



## 2. MAIN CONTROL VALVE

Part name	Inspection item	Criteria & measure
Casing	<ul style="list-style-type: none"> <li>Existence of scratch, rusting or corrosion.</li> </ul>	<ul style="list-style-type: none"> <li>In case of damage in following section, replace part. <ul style="list-style-type: none"> <li>Sliding sections of casing fore and spool, especially land sections applied with holded pressure.</li> <li>Seal pocket section where spool is inserted.</li> <li>Seal section of port where O-ring contacts.</li> <li>Seal section of each relief valve for main, travel, and port.</li> <li>Other damages that may damage normal functions.</li> </ul> </li> </ul>
Spool	<ul style="list-style-type: none"> <li>Existence of scratch, gnawing, rusting or corrosion.</li> <li>O-ring seal sections at both ends.</li> <li>Insert spool in casing hole, rotate and reciprocate it.</li> </ul>	<ul style="list-style-type: none"> <li>Replacement when its outside sliding section has scratch(especially on seals-contacting section).</li> <li>Replacement when its sliding section has scratch.</li> <li>Correction or replacement when O-ring is damaged or when spool does not move smoothly.</li> </ul>
Poppet	<ul style="list-style-type: none"> <li>Damage of poppet or spring</li> <li>Insert poppet into casing and function it.</li> </ul>	<ul style="list-style-type: none"> <li>Correction or replacement when sealing is incomplete.</li> <li>Normal when it can function lightly without being caught.</li> </ul>
Around spring	<ul style="list-style-type: none"> <li>Rusting, corrosion, deformation or breaking of spring, spring seat, plug or cover.</li> </ul>	<ul style="list-style-type: none"> <li>Replacement for significant damage.</li> </ul>
Around seal for spool	<ul style="list-style-type: none"> <li>External oil leakage.</li> <li>Rusting, corrosion or deformation of seal plate.</li> </ul>	<ul style="list-style-type: none"> <li>Correction or replacement.</li> <li>Correction or replacement.</li> </ul>
Main relief valve, port relief valve & negative control relief valve	<ul style="list-style-type: none"> <li>External rusting or damage.</li> <li>Contacting face of valve seat.</li> <li>Contacting face of poppet.</li> <li>Abnormal spring.</li> <li>O-rings, back up rings and seals.</li> </ul>	<ul style="list-style-type: none"> <li>Replacement.</li> <li>Replacement when damaged.</li> <li>Replacement when damaged.</li> <li>Replacement.</li> <li>100% replacement in general.</li> </ul>

### 3. SWING DEVICE

Part name	Inspection item	Remedy
Balance plate	<ul style="list-style-type: none"> <li>• Worn less than 0.03mm</li> <li>• Worn more than 0.03mm</li> <li>• Sliding surface has a seizure(even though small).</li> </ul>	<ul style="list-style-type: none"> <li>• Lapping</li> <li>• Replace</li> <li>• Replace</li> </ul>
Shoe of piston assembly	<ul style="list-style-type: none"> <li>• Sliding surface has a damage.</li> <li>• Sliding surface depression(  ) dimension less than 0.45mm or has a large damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Lapping</li> <li>• Replace parts or motor</li> </ul>
Piston of piston assembly	<ul style="list-style-type: none"> <li>• Sliding surface has a seizure(even though small).</li> </ul>	<ul style="list-style-type: none"> <li>• Replace motor</li> </ul>
Piston hole of cylinder assembly	<ul style="list-style-type: none"> <li>• Sliding surface has a seizure.</li> <li>• Sliding surface has a damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace motor</li> <li>• Replace motor</li> </ul>
Taper roller bearing Needle bearing Roller bearing	<ul style="list-style-type: none"> <li>• In case 3000hour operation.</li> <li>• Rolling surface has a damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> </ul>

#### 4. TRAVEL MOTOR

Disassembling and inspection of the motor must be done in strict accordance with the servicing standards described here. During servicing, handle each part very carefully not to damage them, especially for their movable or sliding sections.

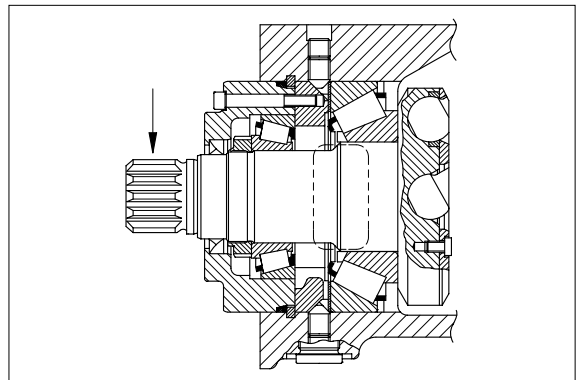
##### 1) SEALS

Once the seals(O-ring, oil seals, and floating seals) have been disassembled, they must be replaced with new ones even if no damage is observed.

##### 2) CRITICAL SPOTS TO BE CHECKED

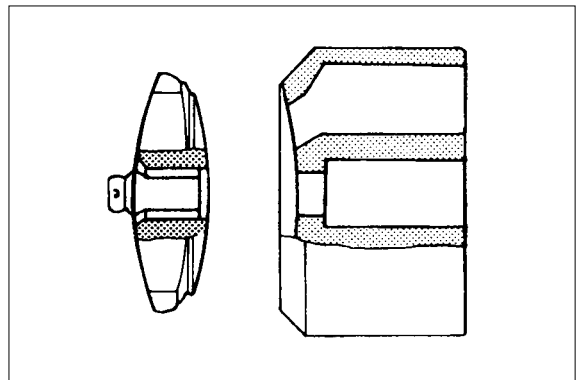
###### (1) Drive shaft

Cups free of scratches and no pittings.



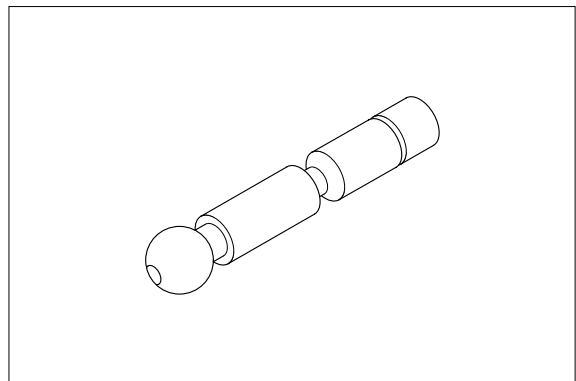
###### (2) Cylinder block / control lens

- ① Bores free of scoring, no evidence of wear.
- ② Faces smooth and even, free of cracks and scoring.



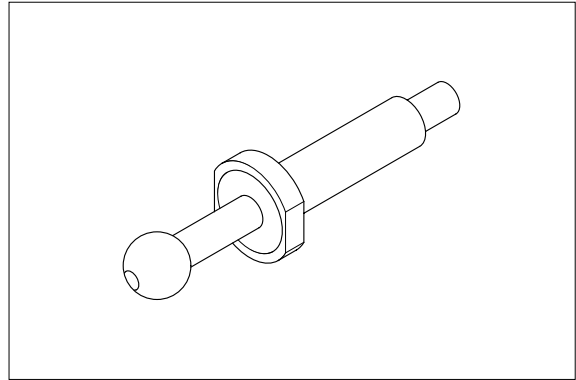
###### (3) Pistons

No scoring and no pittings.



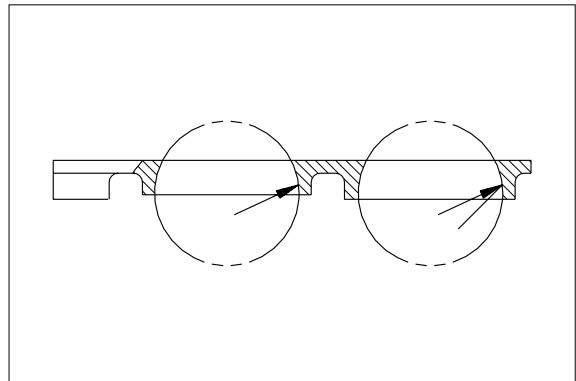
**(4) Center pin**

No scoring and no pittings.



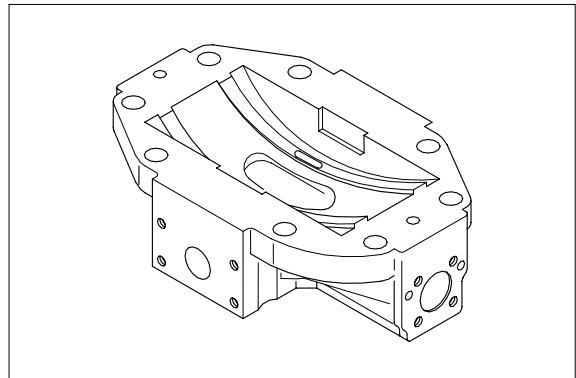
**(5) Retaining plate**

No scoring and no evidence of wear.

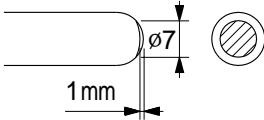


**(6) Control housing**

Sliding surface and side guides free of scoring and no wear.



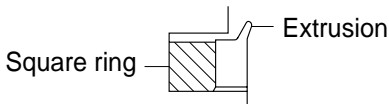
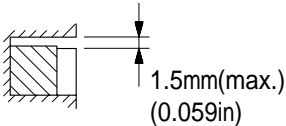
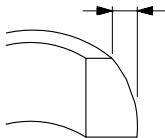
## 5. RCV LEVER

Maintenance check item	Criteria	Remark
Leakage	The valve is to be replaced when the leakage becomes more than 1000cc/m at neutral handle position, or more than 2000cc/m during operation.	Conditions : Primary pressure : 30kgf/cm <sup>2</sup> Oil viscosity : 23cSt
Spool	This is to be replaced when the sliding surface has worn more than 10 $\mu$ m, compared with the non-sliding surface.	The leakage at the left condition is estimated to be nearly equal to the above leakage.
Push rod	 <p>This is to be replaced when the top end has worn more than 1mm.</p>	
Play at operating section	The pin, shaft, and joint of the operating section are to be replaced when their plays become more than 2mm due to wears or so on.	When a play is due to looseness of a tightened section, adjust it.
Operation stability	When abnormal noises, hunting, primary pressure drop, etc. are generated during operation, and these cannot be remedied, referring to section 6. Troubleshooting, replace the related parts.	

- Notes
1. It is desirable to replace seal materials, such as O-rings, every disassembling. However, they may be reused, after being confirmed to be free of damage.
  2. When loosening the hexagon socket head cap screw(125), replace the seal washers(121) without fail.



## 6. TURNING JOINT

Part name		Maintenance standards	Remedy
Body, Stem	Sliding surface with sealing sections.	Plating worn or peeled due to seizure or contamination.	Replace
	Sliding surface between body and stem other than sealing section.	• Worn abnormality or damaged more than 0.1mm (0.0039in) in depth due to seizure contamination.	Replace
		• Damaged more than 0.1mm(0.0039in) in depth.	Smooth with oilstone.
	Sliding surface with thrust plate.	• Worn more than 0.5mm(0.02in) or abnormality.	Replace
		• Worn less than 0.5mm(0.02in).	Smooth
		• Damage due to seizure or contamination remediable within wear limit (0.5mm)(0.02in).	Smooth
Cover	Sliding surface with thrust plate.	• Worn more than 0.5mm(0.02in) or abnormality.	Replace
		• Worn less than 0.5mm(0.02in).	Smooth
		• Damage due to seizure or contamination remediable within wear limit (0.5mm)(0.02in).	
Seal set	-	• Extruded excessively from seal groove square ring.  	Replace
	-	• Slipper ring 1.5mm(0.059in) narrower than seal groove, or narrower than back ring.  	Replace
	-	• Worn more than 0.5mm(0.02in) ~ 1.5mm(MAX.) (0.059in)  	Replace

## 7. CYLINDER

Part name	Inspecting section	Inspection item	Remedy
Piston rod	• Neck of rod pin	• Presence of crack	• Replace
	• Weld on rod hub	• Presence of crack	• Replace
	• Stepped part to which piston is attached.	• Presence of crack	• Replace
	• Threads	• Presence of crack	• Recondition or replace
	• Plated surface	• Plating is not worn off to base metal. • Rust is not present on plating. • Scratches are not present.	• Replace or replate • Replace or replate • Recondition, replate or replace
	• Rod	• Wear of O.D.	• Recondition, replate or replace
Cylinder tube	• Bushing at mounting part	• Wear of I.D.	• Replace
	• Weld on bottom	• Presence of crack	• Replace
	• Weld on head	• Presence of crack	• Replace
	• Weld on hub	• Presence of crack	• Replace
	• Tube interior	• Presence of faults	• Replace if oil leak is seen
	• Bushing at mounting part	• Wear on inner surface	• Replace
Gland	• Bushing	• Flaw on inner surface	• Replace if flaw is deeper than coating

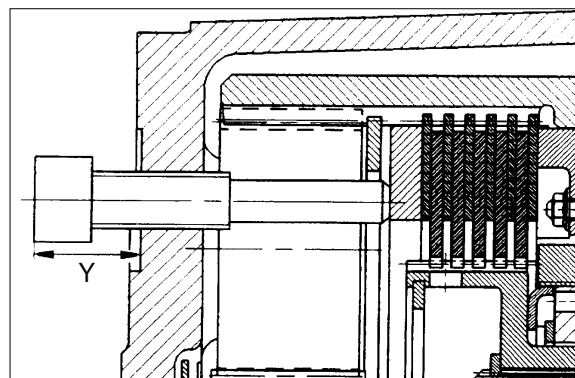
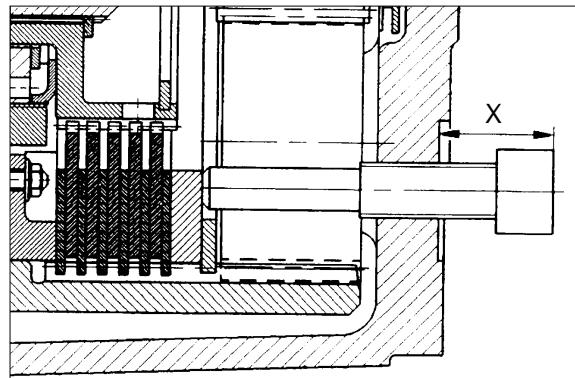
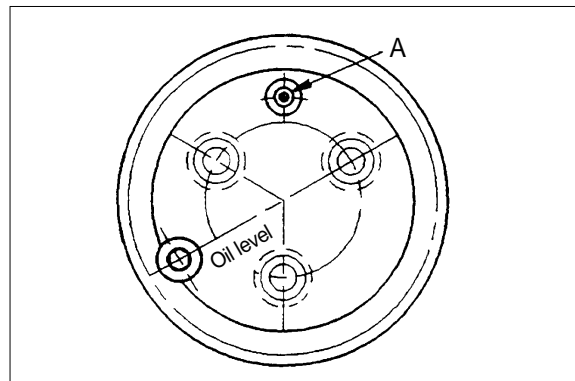
## 8. AXLE BRAKE LINING WEAR

### 1) GENERAL

- (1) The brake lining wearing test gives a limited information about the overall condition of the brake plate pack - without disassembly of the planetary carrier, resp. of the plates.
- (2) The wearing test has to be carried out in case of the following criteria :
  - ① In the course of the oil change intervals(min. once a year)
  - ② Braking noises
  - ③ Reduced braking power
  - ④ Change of deceleration, of the brake fluid level as well as of the brake pressure
  - ⑤ In case of a general change of the brake performance.
- (3) Carry out the wearing test on both final drive sides.
  - ① **Permitted piston stroke max. : 5.2mm(Front axle), 5.0mm(Rear axle)**
  - ② **Piston stroke in new condition of the plate pack : 3.1-3.5mm(Front and Rear axle)**

### 2) CARRY OUT THE WEARING TEST

- (1) Turn the planetary carrier until screw plug A(M16 × 1.5) is in the upper position(12 o'clock position).  
Now, remove the screw plug.
- (2) Apply the brake(required brake pressure min. 40bar).
- (3) Screw measuring screw(M16 × 1.5) in until contact is obtained and tighten it with a torque of 1kg · m.
- (4) Determine dimension X according to the figure on the right.
- (5) Release the brake and equalize the plate clearance by resetting the measuring screw.  
Torque limit 1kg · m.
- (6) Determine dimension Y according to the figure on the right.
- (7) The difference of the two dimensions (X-Y) corresponds to the **piston stroke** (actual state).



### 3) RESULT

If the max. permitted piston stroke(5.0mm) is exceeded, the lining plates must be renewed on both final drive sides.