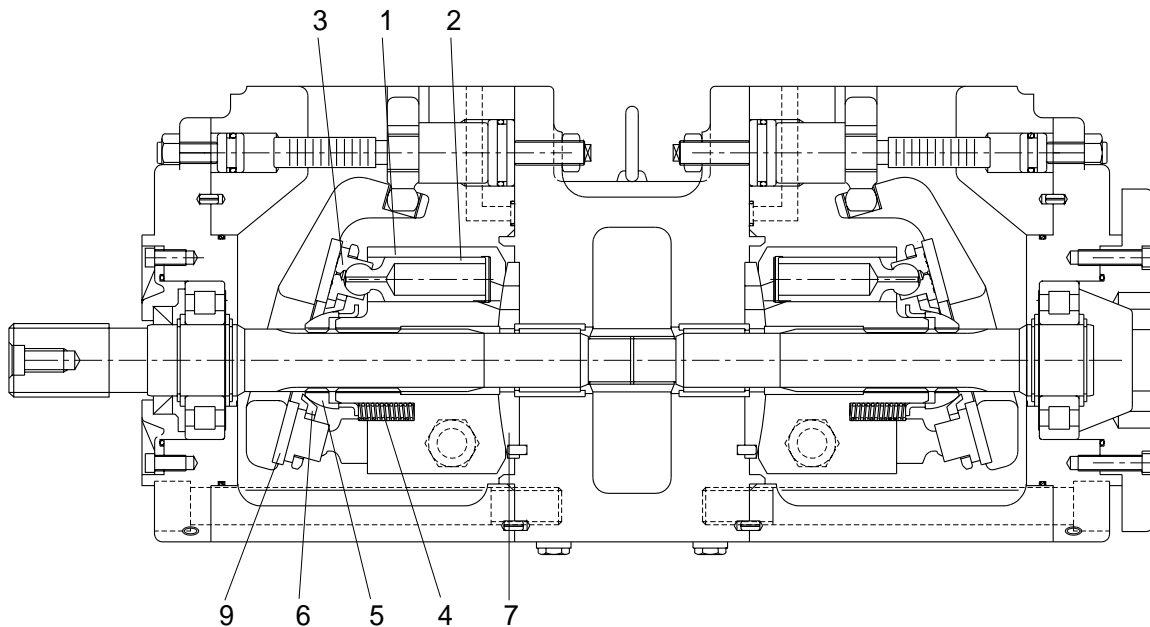


GROUP 2 MAJOR COMPONENT

1. MAIN PUMP




Part name & inspection item		Standard dimension	Recommended replacement value	Countermeasures
Clearance between piston(1) & cylinder bore(2) (D-d)		0.028	0.056	Replace piston or cylinder.
Play between piston(1) & shoe caulking section(3) (δ)		0-0.1	0.3	Replace assembly of piston & shoe.
Thickness of shoe (t)		3.9	3.7	Replace cylinder spring.
Free height of cylinder spring(t) (L)		31.3	30.5	
Combined height of set plate(H) & spherical bushing(h) (H-h)		10.5	9.8	Replace retainer or set plate.
Surface roughness for valve plate(sliding face)(7,8), swash plate (shoe plate area)(9), & cylinder(2)(sliding face)	Surface roughness necessary to be corrected	3z		Lapping
	Standard surface roughness (corrected value)	0.4z or lower		

2. MAIN CONTROL VALVE

Part name	Inspection item	Remedy
Casing	<ul style="list-style-type: none"> · Scratch, rust and corrosion 	<ul style="list-style-type: none"> · Replace parts that have damage on the following areas: <ul style="list-style-type: none"> - Sliding surface between casing hole and spool, particularly the land area. - Seal pocket section into which spool enters. - Sealing area to which O-ring contact. - Sealing area of main, travel and port relief valves. - Other areas which may be deemed to mar normal functions.
Spool	<ul style="list-style-type: none"> · Scratch, binding, rust and corrosion · O-ring seals on both ends · Insert spool into casing hole, rotate and stroke it. 	<ul style="list-style-type: none"> · Replace a spool with a scratch that may be caught by your nail (particularly on an area in contact with seals). · Replace such a spool having a scratch on its sliding surface. · Correct or replace such a spool that may damage O-rings or that does it operate smoothly.
Poppet	<ul style="list-style-type: none"> · Damage of poppet and spring · Insert poppet into casing and function it. 	<ul style="list-style-type: none"> · Correct or replace such a poppet that gives incomplete sealing effect. · Poppet is normal if it functions lightly without binding.
Spring and associated parts	<ul style="list-style-type: none"> · Inspect that spring, spring seat, plugs and covers are not rusted, corroded, deformed and broken. 	<ul style="list-style-type: none"> · Replace those showing excessive damage.
Spool seal and related areas	<ul style="list-style-type: none"> · Oil leakage to outside · Rusting, corrosion and deformation of seal plate 	<ul style="list-style-type: none"> · Correct or replace. · Correct or replace.
Relief valve	<ul style="list-style-type: none"> · External rusting and damage · Contact surface of valve seat · Contact surface of poppet · Fault on springs · O-rings, backup rings and seals 	<ul style="list-style-type: none"> · Replace. · Replace one that is damaged. · Replace one that is damaged. · Replace. · Replace all as a rule.

3. SWING DEVICE

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

4. TRAVEL DEVICE

1) MOTOR

Part name	General view	Standard dimension	Recommended replacement value	Remedy
Piston subassembly(159)	· Sliding surface has a deep score or is roughened.	-	-	Replace cylinder block kit
	· The clearance between the piston and the cylinder block bore is large.	0.035	0.050	
	· Shoe ball has a large gap.	0.15	0.4	
Cylinder block(157)	· Sliding surface has a deep score or is roughened.	-	-	Replace cylinder block kit
	· Bore is worn very much.	-	-	
	· Wear or breakage occurred during meshing of gear teeth.	-	-	
Valve plate(158)	· Sliding surface has a deep cut, seizure, uneven wear or is roughened.	-	-	Replace cylinder block kit
Retainer plate(160) Retainer holder(161)	· Sliding surface has a deep cut, seizure, uneven wear or is roughened.	-	-	Replace cylinder plate kit
Swash plate(162)	· Sliding surface has a deep cut, seizure, uneven wear or is roughened.	-	-	Replace swash plate steel ball
	· The swash plate has deep score and seizure in the face in contact with steel ball(174).	Depth of sphere 14.3	Depth of sphere 14.5	
Shaft(156)	· Sliding surface of oil seal(163) is deeply scored or roughened.	-	-	Replace shaft
	· Meshing gear teeth have been abnormally worn or broken.	-	-	
Valve(145)	· Sliding surface is deeply scored or roughened.	-	-	Replace base plate subassembly
	· The clearance between the valve and base plate(103) is large.	0.025	0.050	
Collar(142)	· Sliding surface is deeply scored or roughened.	-	-	Replace base plate subassembly
	· The clearance between the collar and valve(145) is large.	0.030	0.060	
Spring guide(144)	· Sliding surface is deeply scored or roughened.	-	-	Replace base plate subassembly
	· The clearance between the spring guide and valve(145) is large.	0.030	0.060	

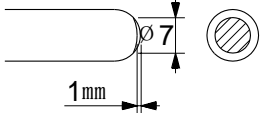
Part name	General view	Standard dimension	Recommended replacement value	Remedy
Free piston(136)	· The clearance between the piston and base plate(103) is large.	-	-	Replace valve subassembly
	· Sliding surface is deeply scored or roughened.	-	-	
Relief housing subassembly(122)	· Sliding surface of free piston is deeply scored or roughened.	-	-	Replace valve subassembly
Spring(107) Spring(111) Spring(118) Spring(126) Spring(150) Spring(169) Spring(183) Spring(194)	· Spring is deformed or broken excessively.	-	-	Replace spring
Brake piston(178) Friction plate(180)	· Sliding surface is deeply scored or roughened.	-	-	Replace brake piston Replace friction plate
Disc plate(181)	· Disc(abrasive agent)is deeply scored or peeled off.	-	-	Replace disc plate
Roller bearing(165)	· Rolling surface has developed flaking or peeling.	-	-	Replace roller bearing
	· Rolling surface has blow marks.	-	-	
	· Rotation is abnormal. (abnormal sound and unsmooth rotation)	-	-	
Piston subassembly (164)	· Sliding surface is deeply scored or roughened.	-	-	Replace piston case subassembly
	· The clearance between the piston and the casing is large.	0.020	0.040	
	· The shoe ball has a large gap.	0.5	1.0	
Steel ball(163)	· The contact surface of the steel ball with swash plate(162) is seized.	-	-	Replace swash plate steel ball
Plunger(105)	· Sliding surface is deeply scored or roughened.	-	-	Replace base plate subassembly
	· The clearance between the plunger and base plate(103) is large.	0.020	0.060	
Base plate(103)	· Sliding surface is deeply scored or roughened.	-	-	Replace base plate subassembly
	· Surface is so roughened that oil leak may occur.	-	-	

2) REDUCTION GEAR

Replace parts according to the standards of the below table : Handle parts with care so that too face and the sliding surface of bearings may not be scored. Do not reuse seals once used after disassembly, but replace all of them with new ones.

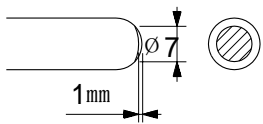
Part Name	Standard dimension	Recommended replacement value	Parts replacement standard
Holder A subassembly(301) Holder B subassembly(308) Holder C subassembly(315)	-	-	<ul style="list-style-type: none"> When gear teeth develop pitting or peeling. When flaking occurs on the rolling surface of needle bearings, gear shafts and planetary gears. Rotation of bearings is abnormal(abnormal sound, unsmooth rotation, etc). When gears have gap in their axial direction.
Drive gear(323) Sun gear B(325) Sun gear C(327) Link gear(342)	-	-	<ul style="list-style-type: none"> When gear tooth face develops pitting or peeling.
Planetary gear A(303) Planetary gear B(310) Planetary gear C(317)	-	-	<ul style="list-style-type: none"> When gear tooth develop pitting or peeling. When the rolling surface of needle bearings develops pitting or peeling(bore of gears).
Needle bearing(304) Bar-shape roller(311) Bar-shape roller(318) Bar-shape roller(305) Bar-shape roller(312) Bar-shape roller(319) Floating bush(320)	-	-	<ul style="list-style-type: none"> When the needle and the rolling surface develop flaking and peeling. When the needle and the rolling surface develop blow marks. The rotation of bearings is unusual (abnormal sound, unsmooth rotation, etc.)
Holder A(302) Holder B(309) Holder C(316)	-	-	<ul style="list-style-type: none"> Large gap is present between holder and gear shaft.
Thrust plate(324)	2.0	1.9	
Thrust plate(346)	3.2 3.0 2.8 2.3 1.8	3.1 2.9 2.7 2.2 1.7	
Angular bearing(12)	-	-	<ul style="list-style-type: none"> When rotation is abnormal(abnormal sound, unsmooth rotation, etc)
Floating seal(11)	-	-	<ul style="list-style-type: none"> When the sliding surface has such faults that may cause oil leakage.

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 ² Oil viscosity : 23cSt
Spool	This is to be replaced when the sliding surface has worn more than 10 μ 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 1 mm.</p>	
Play at operating section	The pin, shaft, and joint of the operating section are to be replaced when their plays become more than 2 mm 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, replace the related parts.	

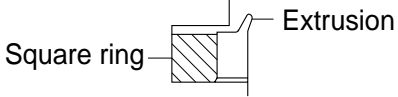
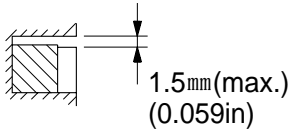
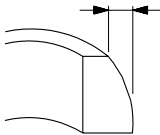
- Notes
1. It is desirable to replace seal materials, such as O-rings, every disassembling. However, they may be reused, after being confirmed to be free of damage.
 2. When loosening the hexagon socket head cap screw(125), replace the seal washers(121) without fail.

6. RCV PEDAL

Maintenance check item	Criteria	Remark
Leakage	The valve is to be replaced when the leakage effect to the system. For example, the primary pressure drop.	Conditions : Primary pressure : 30kgf/cm ² Oil viscosity : 23cSt
Spool	This is to be replaced when the sliding surface has worn more than 10 μ 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.

7. 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

8. 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.
	· Bend	Measure degree of bend (See Fig. 39.)	Refer to Table 4.
	· Plated surface	Check that : · 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.
Cylinder head	· Bushing at mounting part	Wear on inner surface	Replace.
	· Bushing	· Wear on inner surface · Flaw on inner surface	· See para. 4.2. · Replace if flaw is deeper than coating.