GROUP 3 PUMP DEVICE

1. REMOVAL AND INSTALL

1) REMOVAL

(1) Lower the work equipment to the ground and stop the engine.

(2) Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping

(3) Loosen the breather slowly to release the pressure inside the hydraulic tank.

⚠ Escaping fluid under pressure can penetrate the skin causing serious injury.

(4) Loosen the drain plug under the hydraulic tank and drain the oil from the hydraulic tank.

- Hydraulic tank quantity : 220 ℓ

(5) Remove bolts(8,9) and disconnect hoses (1,2).

(6) Disconnect pilot line hoses(4,5,6,7).

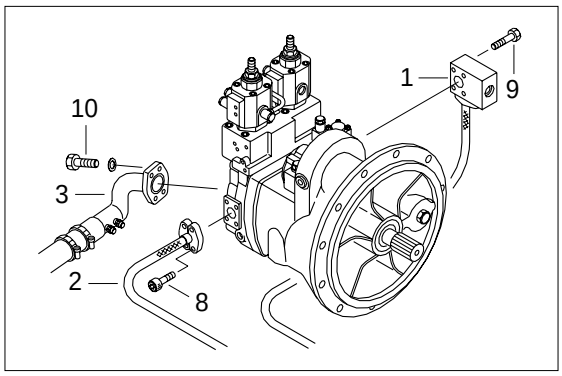
(7) Remove bolts(10) and disconnect pump suction tube (3).

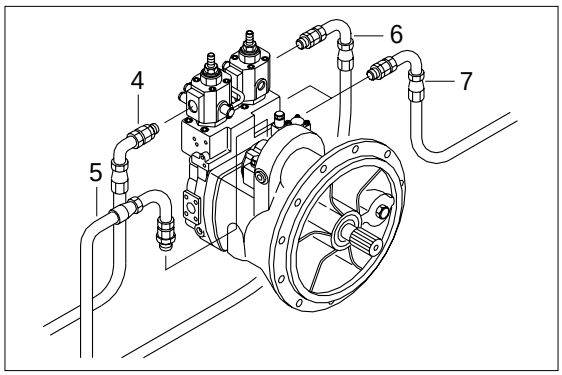
※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

(8) Sling the pump assembly and remove the pump mounting bolts.

- Weight : 80kg(176lb)

※ Pull out the pump assembly from housing. When removing the pump assembly, check that all the hoses have been disconnected.





2) INSTALL

(1) Carry out installation in the reverse order to removal.

(2) Remove the suction strainer and clean it.

(3) Replace return filter with new one.

(4) Remove breather and clean it.

(5) After adding oil to the hydraulic tank to the specified level.

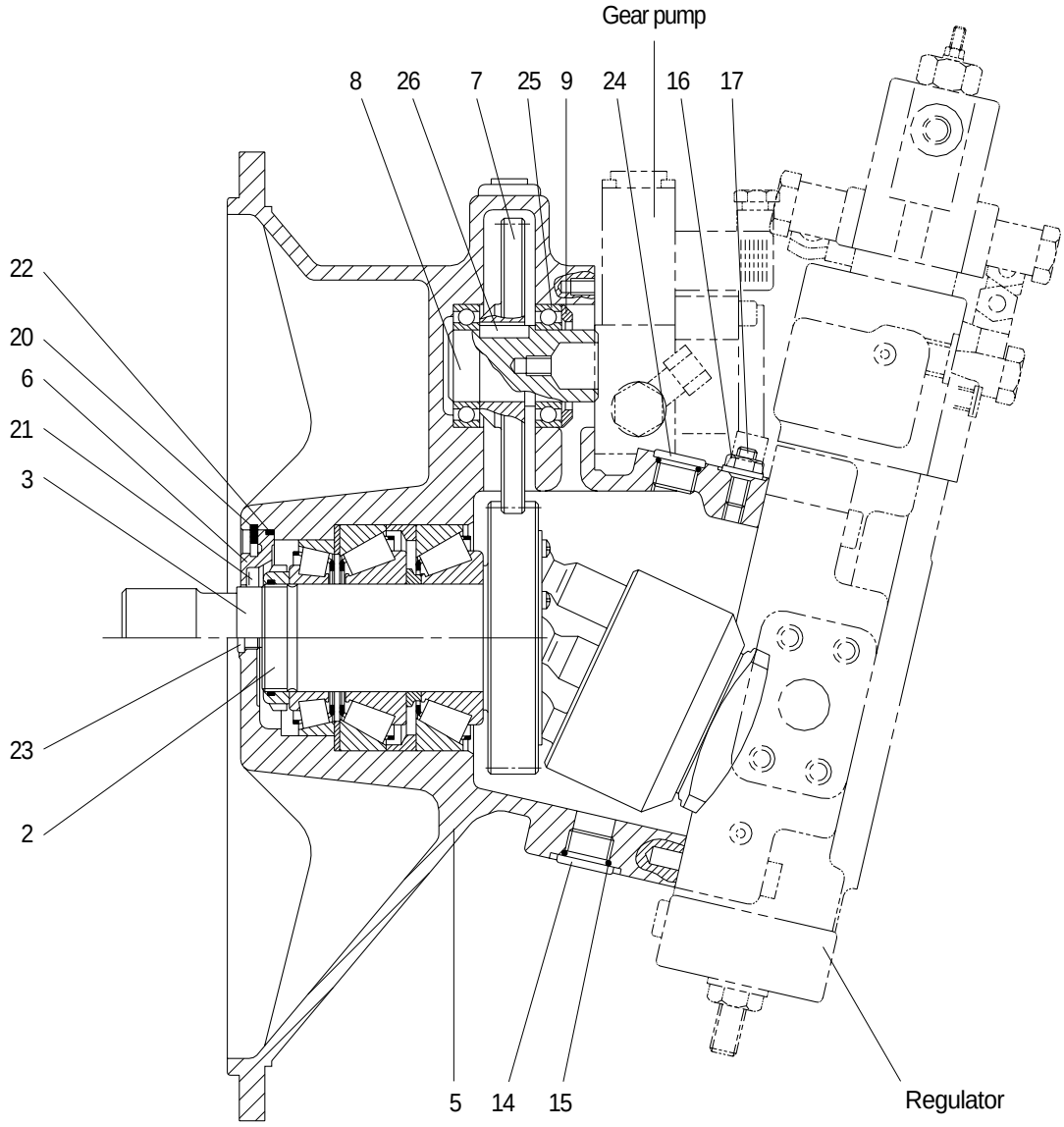
(6) Bleed the air from the hydraulic pump.
① Remove the air vent plug(2EA).
② Tighten plug lightly.
③ Start the engine, run at low idling, and check oil come out from plug.
④ Tighten plug.

(7) Start the engine, run at low idling(3~5 minutes) to circulate the oil through the system.

(8) Confirm the hydraulic oil level and check the hydraulic oil leak or not.

2. STRUCTURE

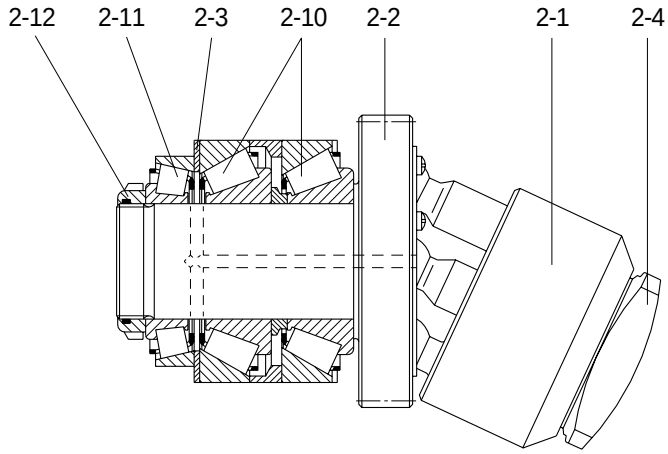
1) MAIN PUMP(1/2)



2	Rotary group	9	Spacer	21	Shaft seal ring
3	Rotary group	14	Locking screw	22	O-ring
5	Pump housing	15	O-ring	23	Locking screw
6	Cover	16	Seal lock nut	24	Locking screw
7	Gear	17	Threaded pin	25	Ball bearing
8	Stub shaft	20	Retaining ring	26	Shaft key

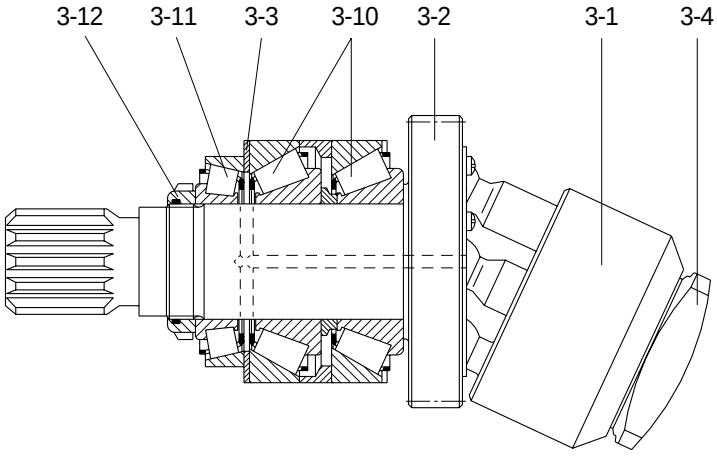
MAIN PUMP(2/2)

- **Rotary group**(item2)



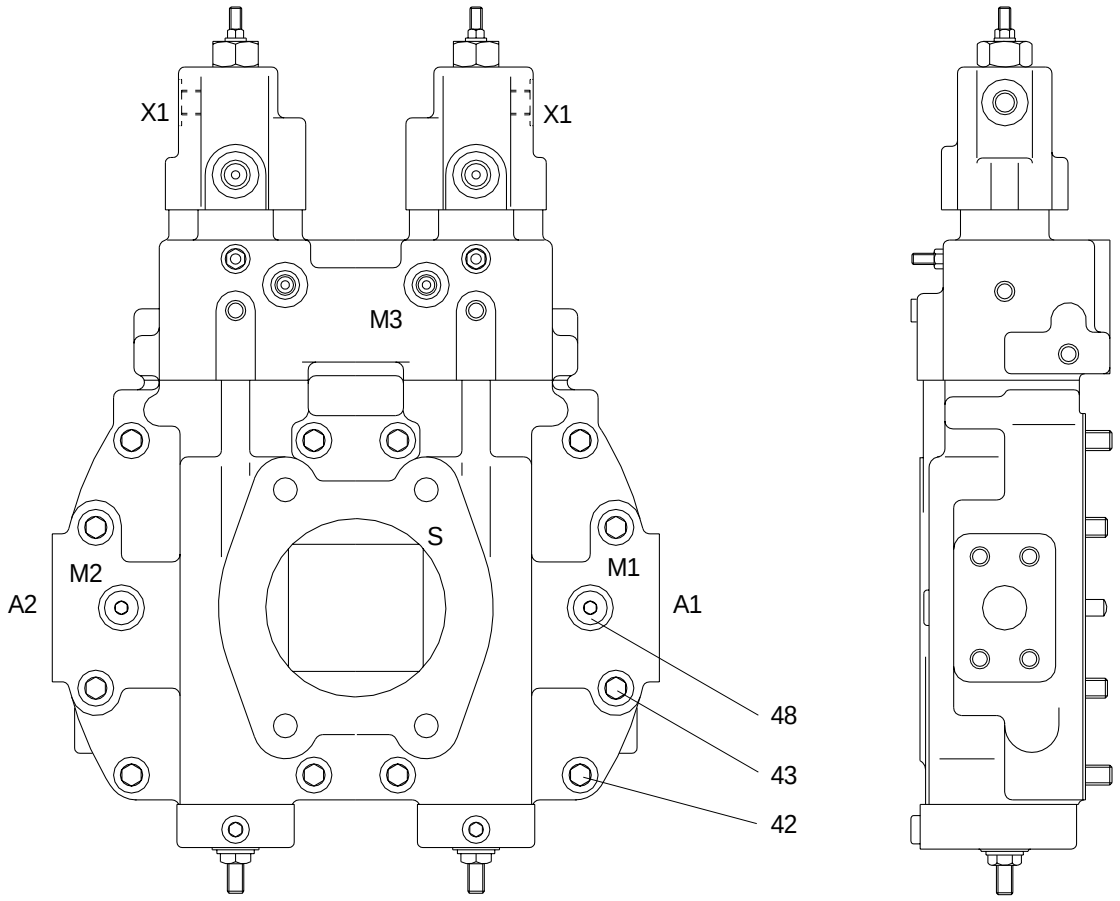
2-1	Hydraulic section	2-4	Control lens	2-11	Tapered roller bearing
2-2	Pinion gear	2-10	Tapered roller bearing	2-12	Ring nut
2-3	Shim				

- **Rotary group**(item3)



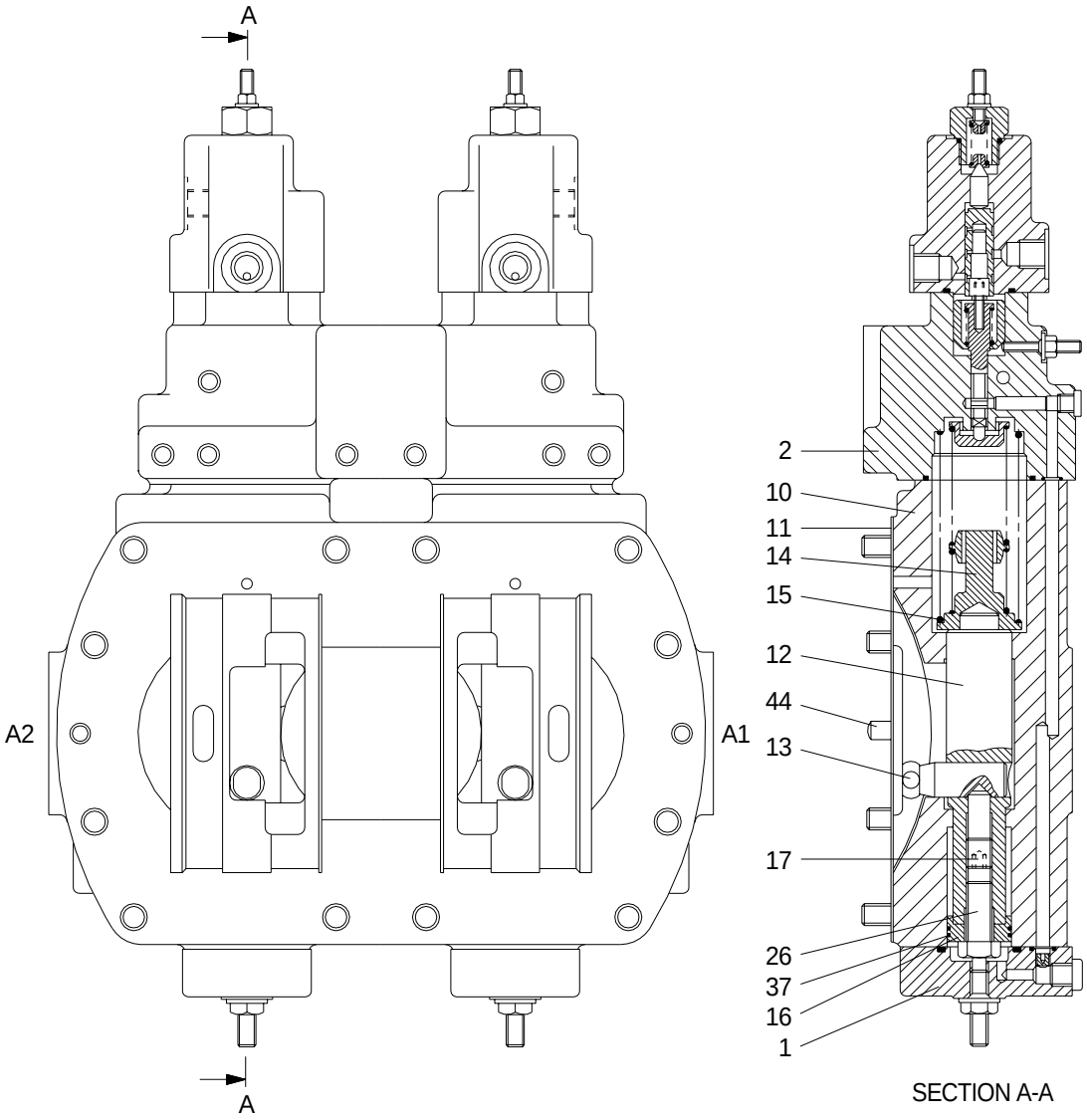
3-1	Hydraulic section	3-4	Control lens	3-11	Tapered roller bearing
3-2	Drive shaft	3-10	Tapered roller bearing	3-12	Ring nut
3-3	Shim				

2) REGULATOR(1/3)



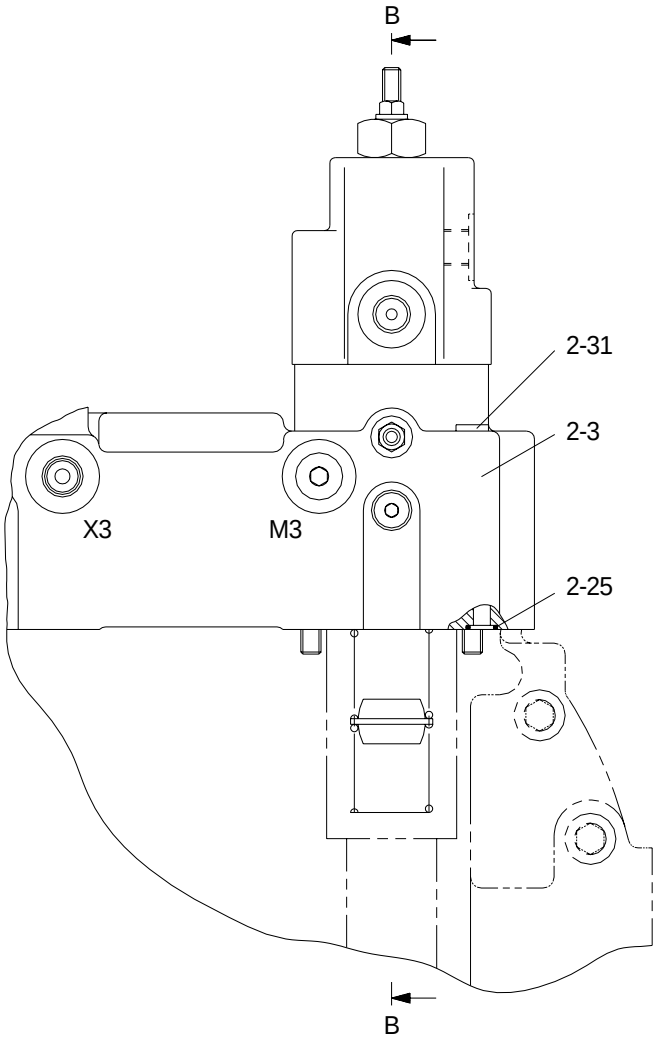
42	Socket head screw	43	Socket head screw	48	Locking screw

REGULATOR(2/3)

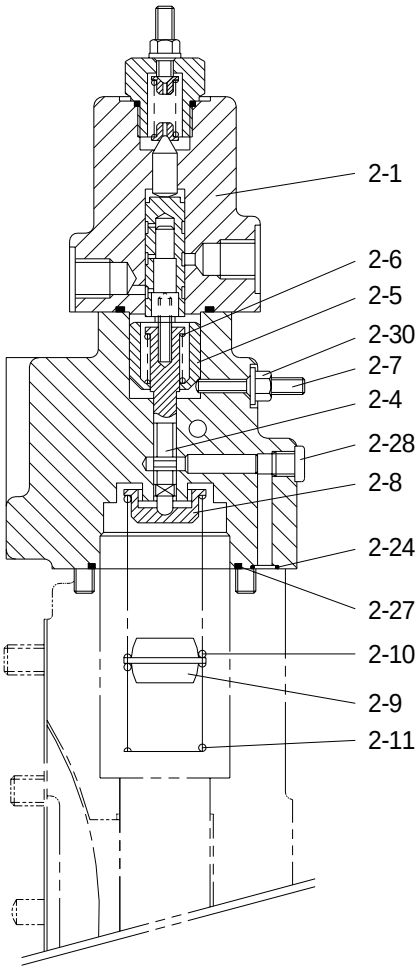


2	Control module assy	14	spring collar	26	Hexagon screw
10	control housing	15	Pressure spring	37	Square ring
12	positioning piston	16	piston	44	Cylinder pin
13	Positioning trunnion	17	Threaded pin		

REGULATOR(3/3)



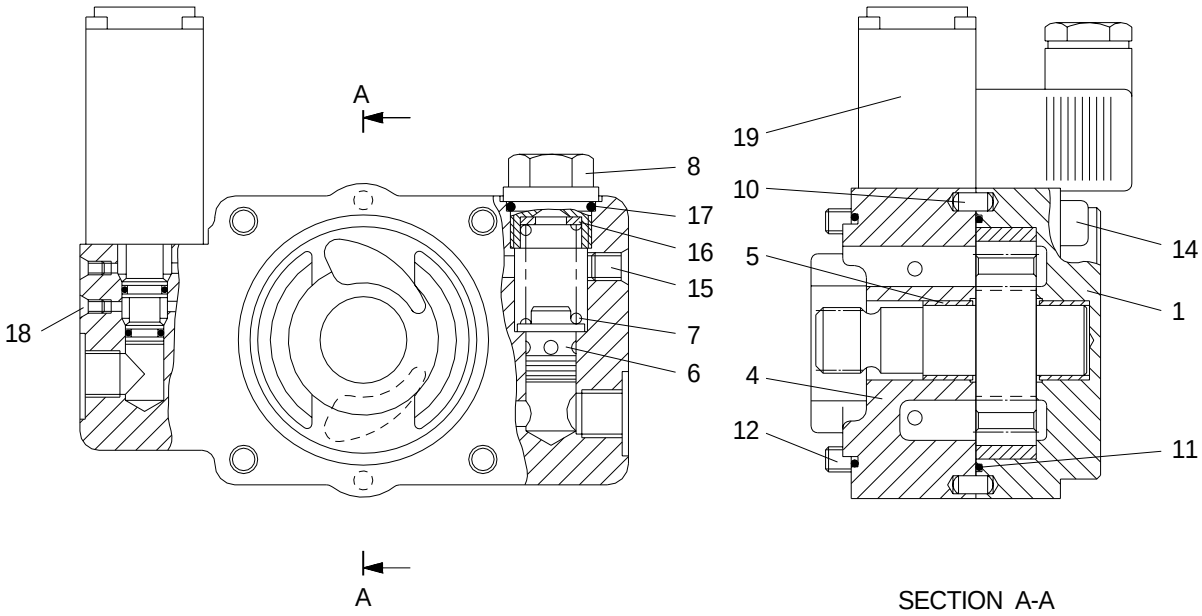
DETAIL (item 2)



SECTION B-B

2-1	Control module	2-8	Spring collar	2-27	O-ring
2-3	Control housing	2-9	Spring collar	2-28	Locking screw
2-4	Control piston	2-10	Pressure spring	2-29	Locking screw
2-5	Spring bush	2-11	Pressure spring	2-30	Lock nut
2-6	pressure spring	2-24	O-ring	2-31	Socket head screw
2-7	Threaded pin	2-25	O-ring	2-32	Double break-off pin

3) GEAR PUMP



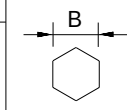
SECTION A-A

1	Pump cover	8	Locking screw	15	Double brake off pin
4	Sandwich plate	10	Cylinder pin	16	Washer
5	Bearing bushing	11	O-ring	17	O-ring
6	Valve piston	12	O-ring	18	Double brake off pin
7	Pressure spring	14	Socket head screw	19	Pressure control valve

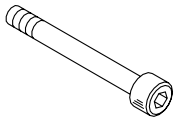
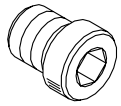
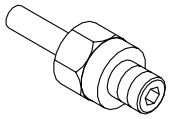
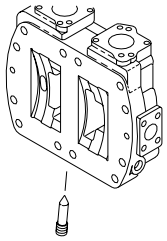
3. TOOLS AND TIGHTENING TORQUE

1) TOOLS

The tools necessary to disassemble/reassemble the pump are shown in the follow list.

Tool name & size		Part name
Allen wrench		5, 6, 8, 10, 12, 17
Double ring spanner, socket wrench, double(single) open end spanner		8, 10, 13, 17, 19
Adjustable angle wrench		Medium size, 1 set
Screw driver		Minus type screw driver, Medium size, 2 sets
Hammer		Plastic hammer, 1 set
Pliers		For snap ring, TSR-160
Steel bar		Steel bar of key material approx. $10 \times 8 \times 200$
Torque wrench		Capable of tightening with the specified torques.

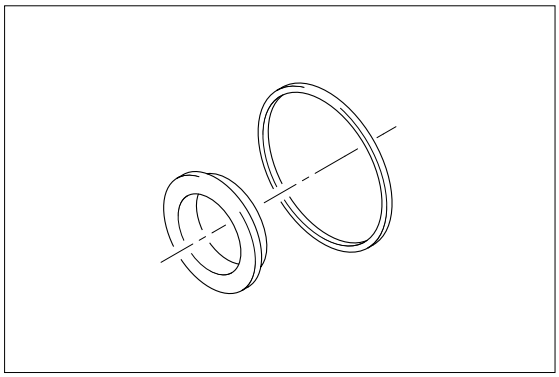
2) TIGHTENING TORQUE

Part name	Bolt size	Torque(8.8)		Torque(10.9)	
		kgf · m	lbf · ft	kgf · m	lbf · ft
	M 5	0.6	4.3	0.8	6
	M 6	1.0	7.1	1.4	10.1
	M 8	2.4	17.3	3.4	24.5
	M10	4.8	34.6	6.8	49.1
	M12	8.4	60.6	11.8	85.2
	M14	13.2	95.3	18.6	134
	M16	20.6	149	28.8	209
	M18	28.3	205	39.6	287
	M20	40.1	290	56.8	411
	Bolt size	kgf · m		lbf · ft	
	M12 × 1.5	2.0		14.5	
	M22 × 1.5	6.0		43.3	
	M26 × 1.5	7.0		50.6	
	M33 × 1.5	12.0		86.8	
	M12 × 1.5	3.0		21.7	
	M14 × 1.5	4.0		28.9	
	M10	2.5		18.1	

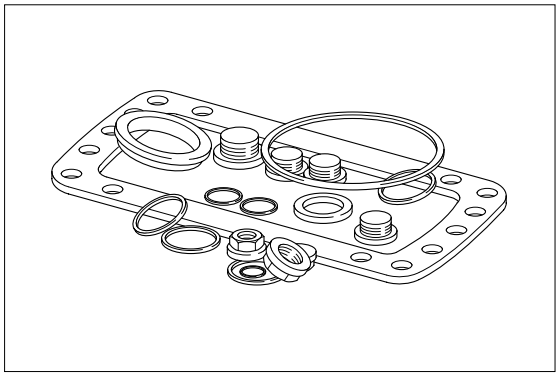
4. DISASSEMBLY AND ASSEMBLY

1) SEAL KITS AND SUB-ASSEMBLIES

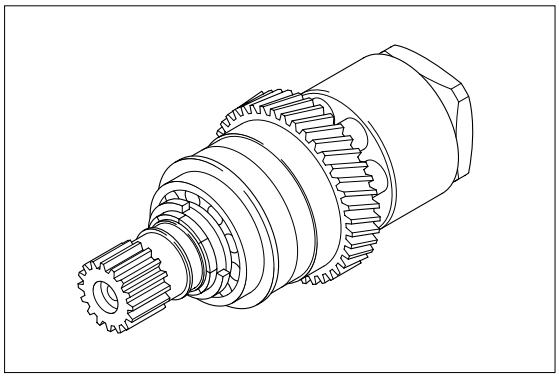
Seal kit for drive shaft.



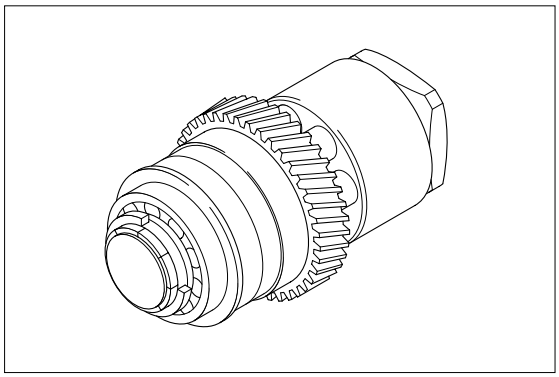
Outer seal kit



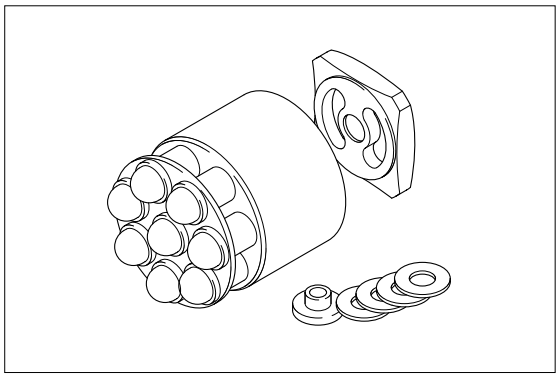
Rotary group 1, ready to install.



Rotary group 2, ready to install.

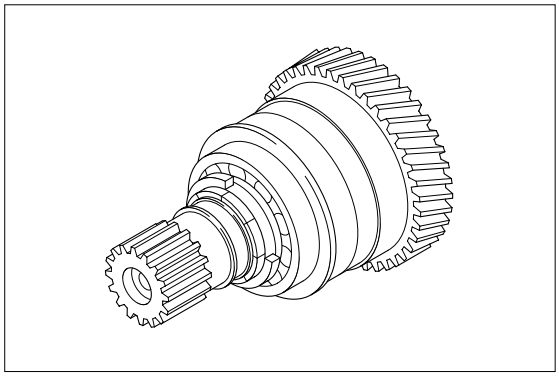


Rotary group, hydraulic section(order separately for rotary groups 1 and 2).

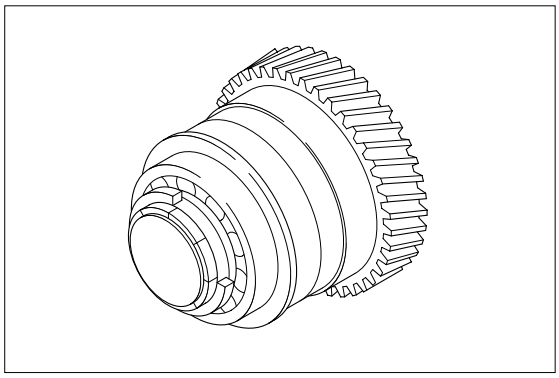


2) SUB-ASSEMBLIES

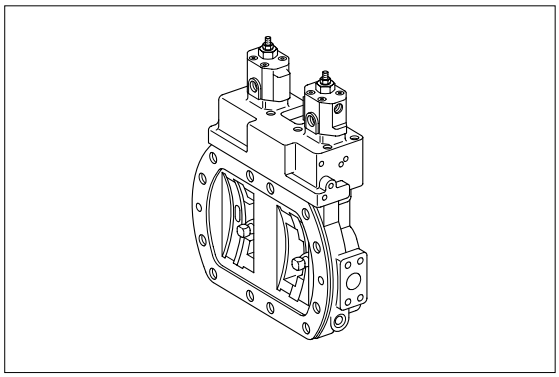
Rotary group 1, mechanical section, ready to install.



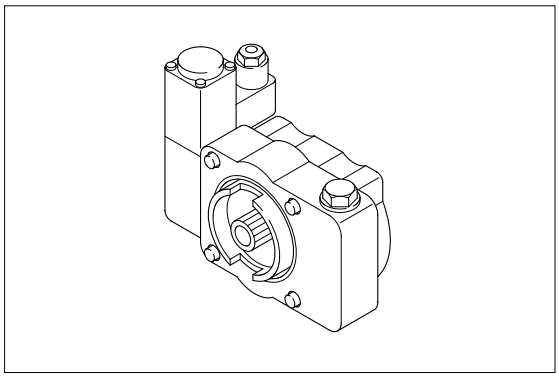
Rotary group 2, mechanical section, ready to install.



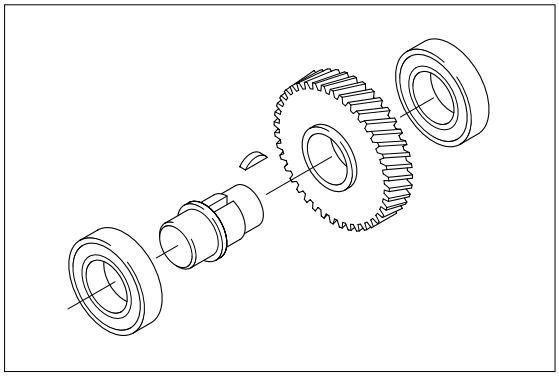
Control, pretested.



Auxiliary pump.

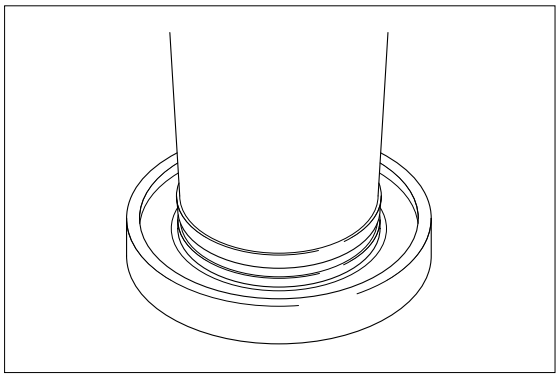


Auxiliary drive.

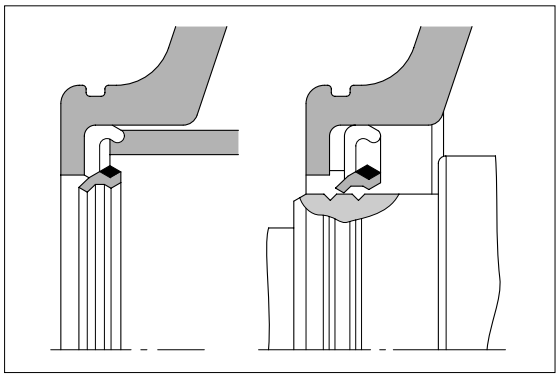


3) SEALING THE DRIVE SHAFT

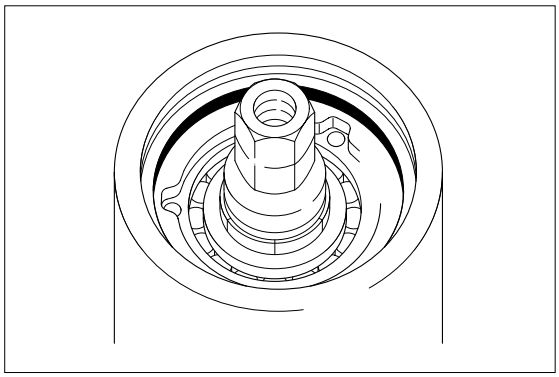
Press in shaft seal.



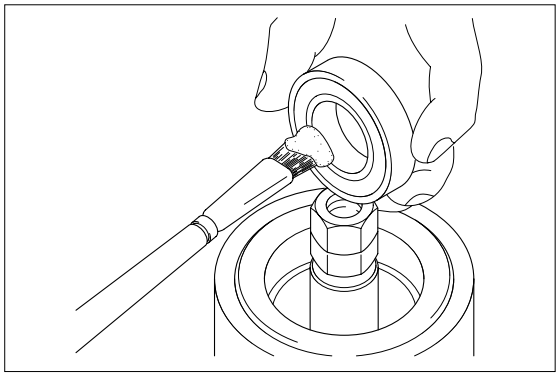
If the shaft is deeply grooved, insert shim behind seal.



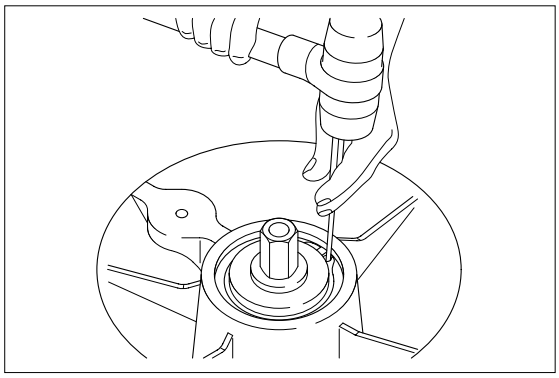
Fit new O-ring, make sure there is a snug fit.
Grease O-ring and lips of shaft seal.



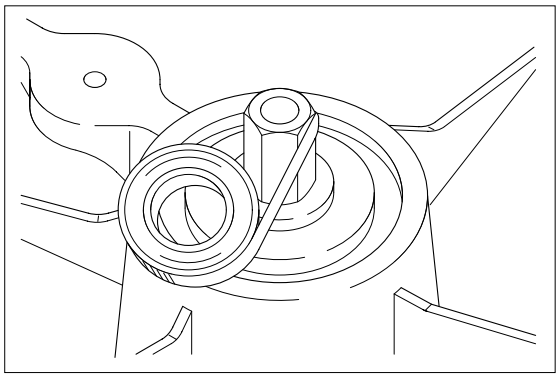
Fit front cover.



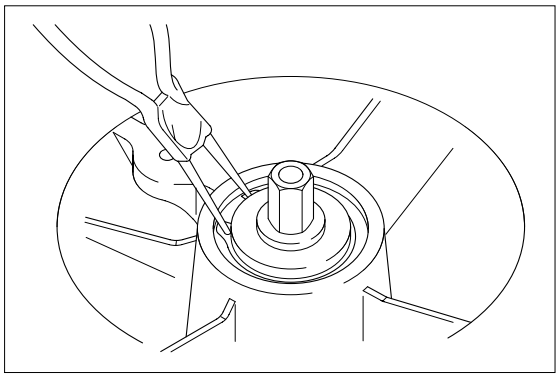
Fit circlip using a punch, then check that circlip is well seated!



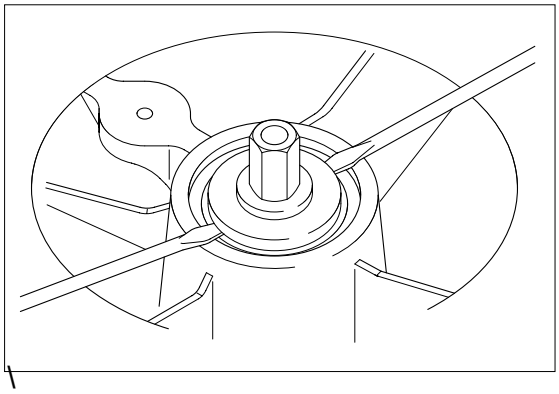
Remove protective cover.



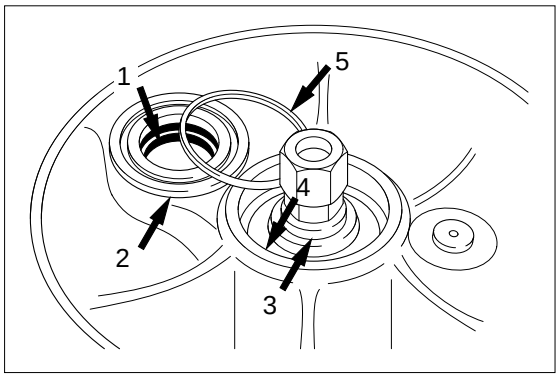
Free circlip and remove.



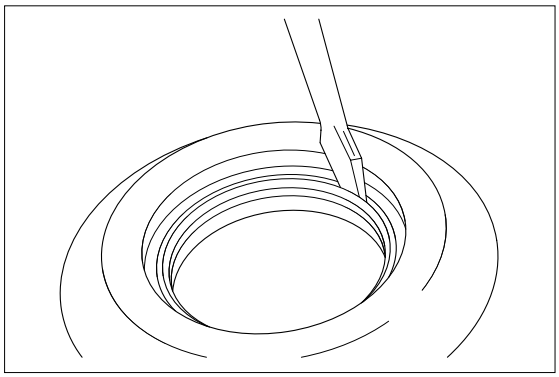
Prise off front cover.



Visual check : Shaft seal 1, cover 2, drive shaft 3, housing 4, O-ring 5.

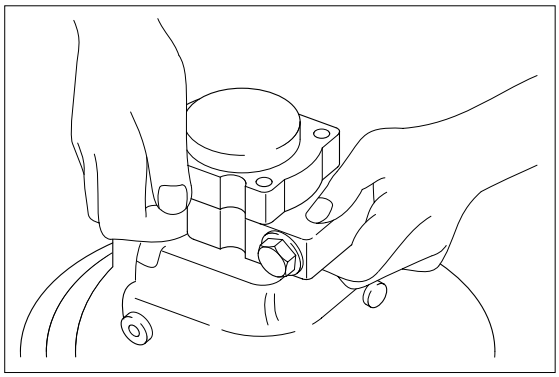


Remove old shaft seal.

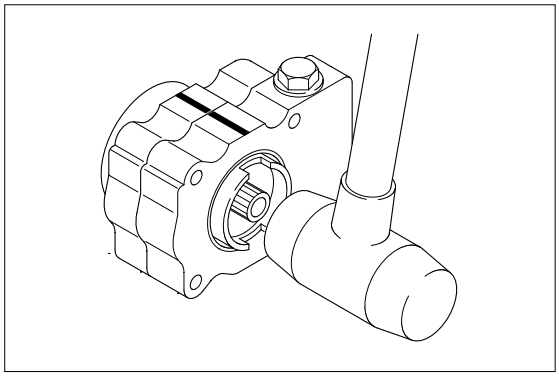


4) SEALING/REPLACING AUXILIARY PUMP

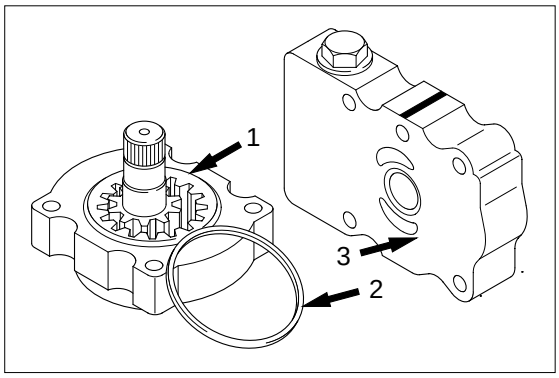
Free auxiliary pump and lift off.



Strip down auxiliary pump.

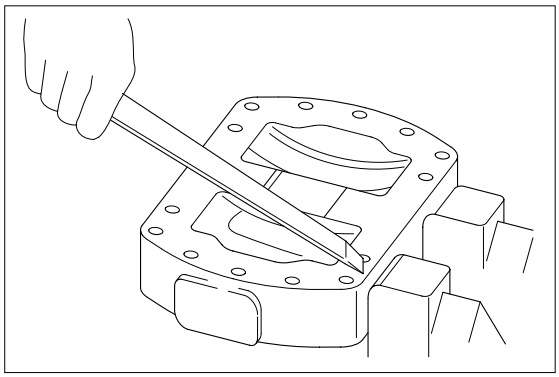


Visual check : groove(1), O-ring(2), sealing face(3).

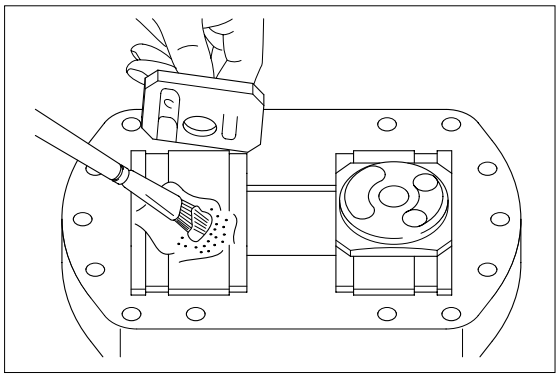


5) SEALING CONTROL HOUSING

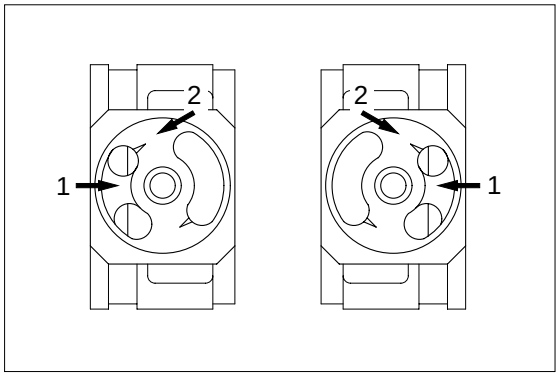
Remove gasket, clean sealing faces.



Fit control lenses in sliding surface with grease.
Place new gasket on pump housing.

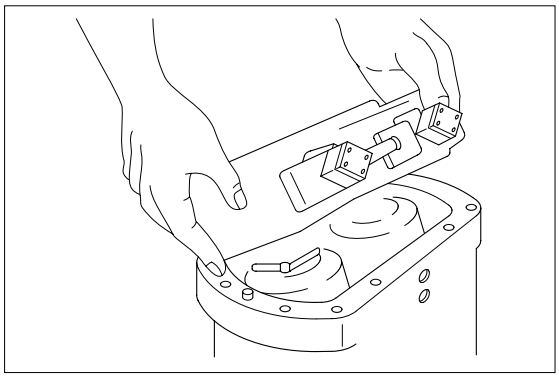


Make sure control lenses are fitted in correct position. Bridge piece 1, large noise damping notches 2.

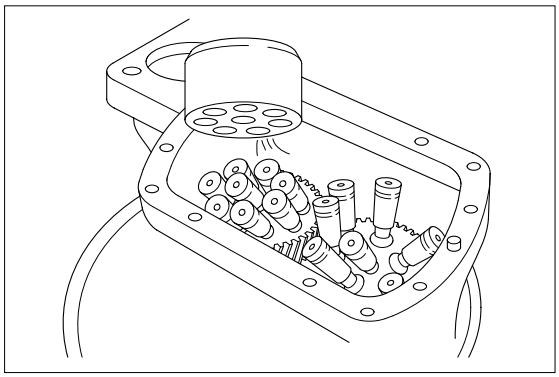


6) DISASSEMBLY ROTARY GROUPS

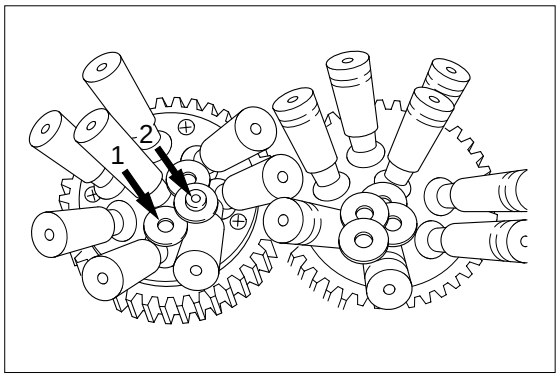
Remove control housing.



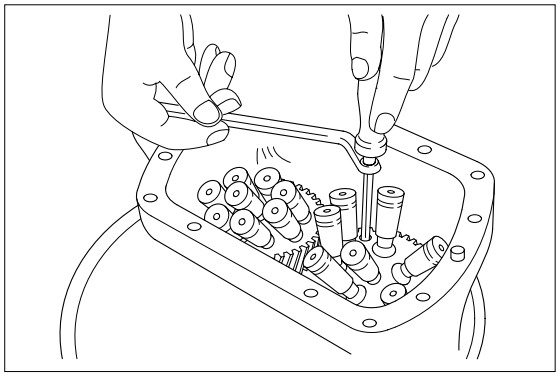
Remove cylinder block.



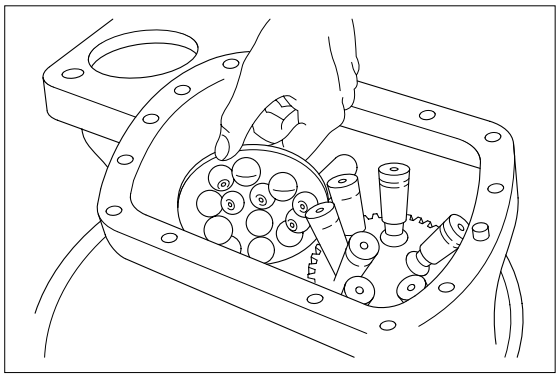
Remove cup springs 1 and spring plates 2.



Remove fastening screws of retaining plate (loctited).

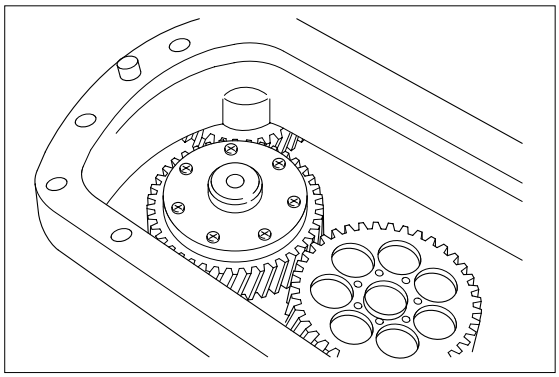


Lift out piston assembly with screws, retaining plate and center pin.

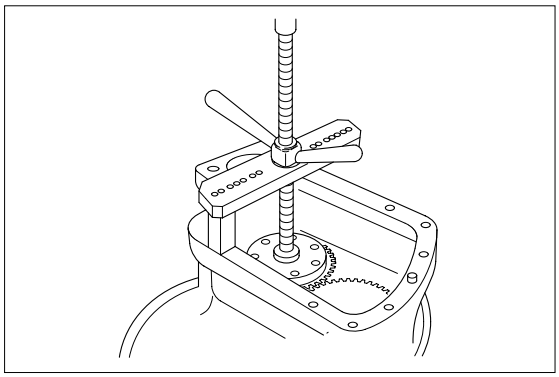


Auxiliary drive

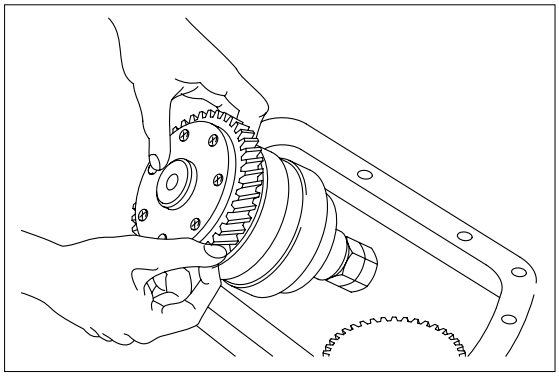
Fit plate of extractor device on drive flange.



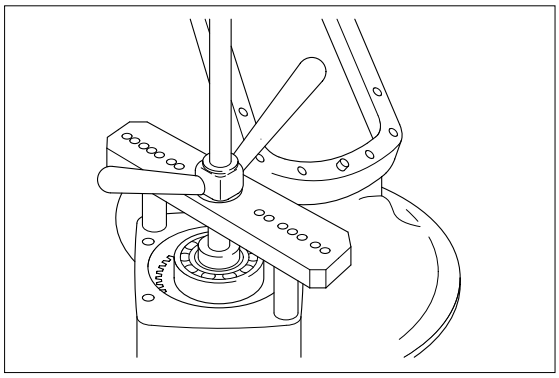
Assemble rest of extractor and pull out drive shaft.



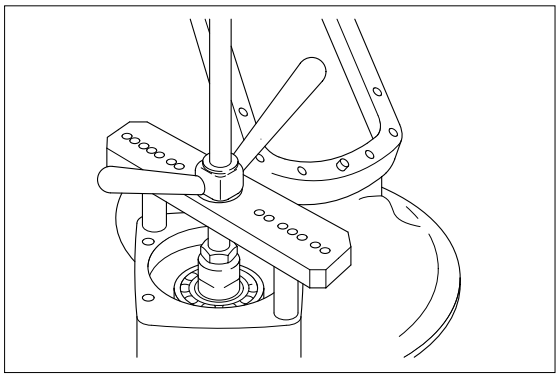
Lift out drive shaft.



Fit extractor device. Pull out output pinion.



Completely mount device and pull out bearing.

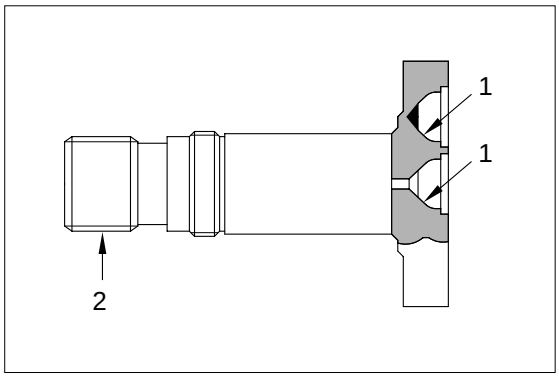


7) INSPECTION INSTRUCTIONS

Drive shafts

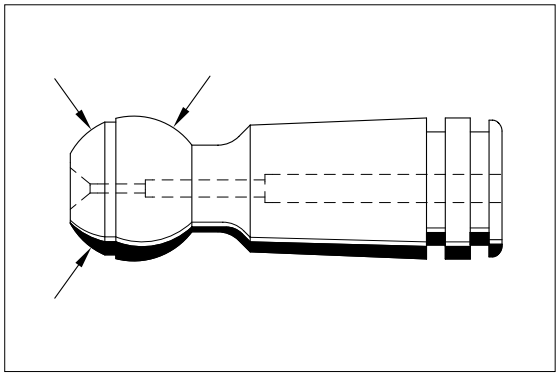
Cups free of scratches and no pitting.

Free of corrosion, erosion or fretting; no damage to splines or keyways.



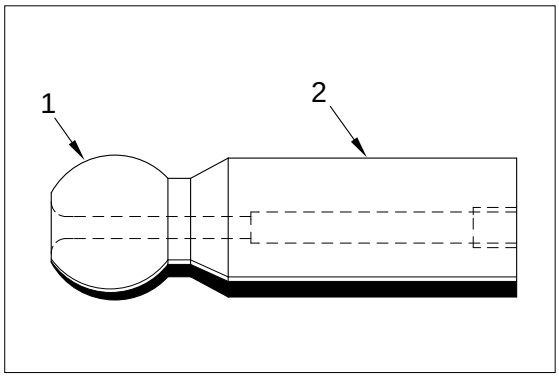
Piston

No scoring and no pitting.



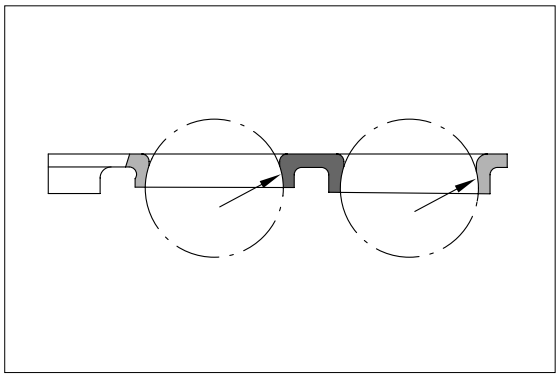
Center pin

No scoring and no pitting.



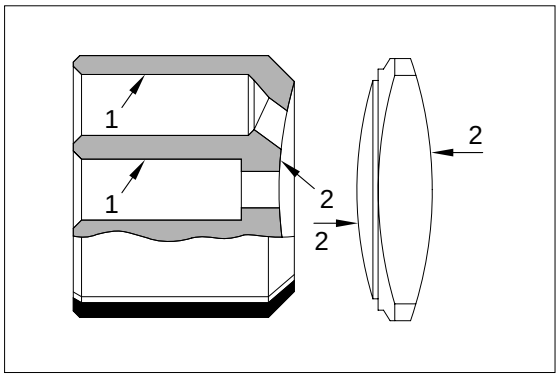
Retaining plate

Free of scoring and no evidence of wear.



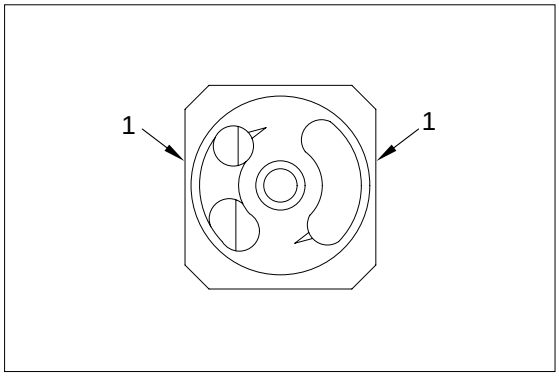
Cylinder block/control lens

Bores free of scoring, no evidence of wear.
Faces smooth an even, free of cracks and scoring.



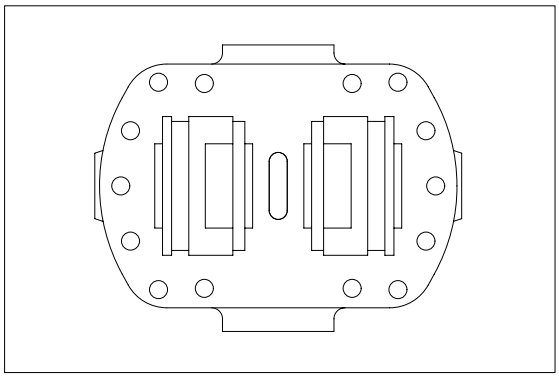
Control lens, side guides

Free of scoring, no evidence of wear.



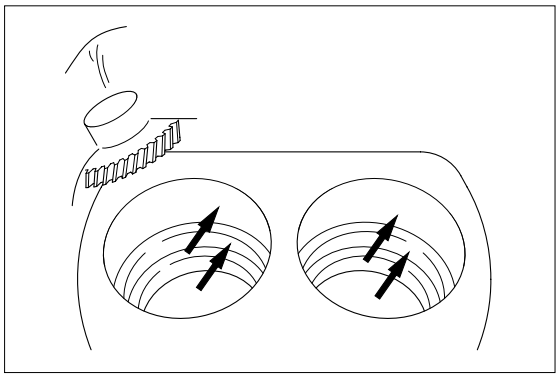
Control housing

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



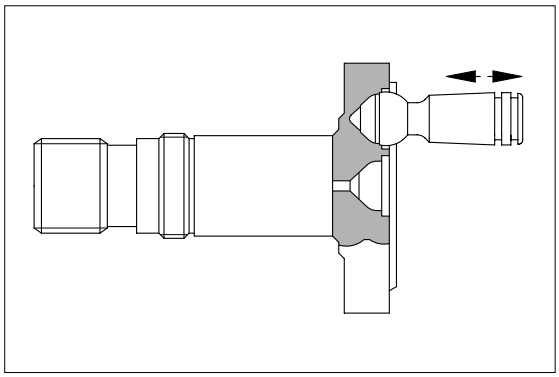
Visual check

Bearing areas free of scoring and no evidence of wear.



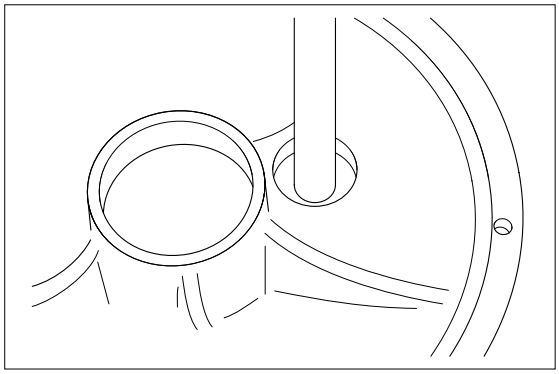
Axial piston play

Inspection with the retaining plate mounted.

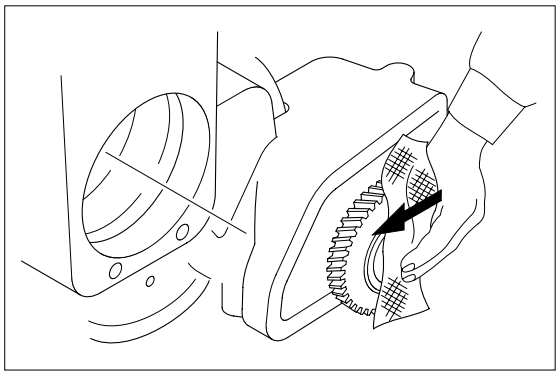


8) ASSEMBLY ROTARY AND AUXILIARY DRIVE

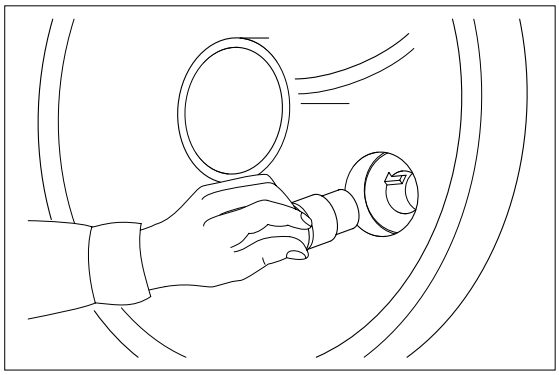
Press bearing into position. Take care to put pressure only on the outer rings of bearing.



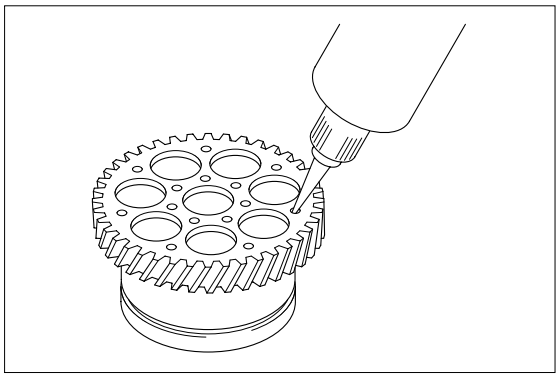
Pre-warm intermediate gear to 90°C and place in mounting site. Observe position for inserting(shoulder 1).



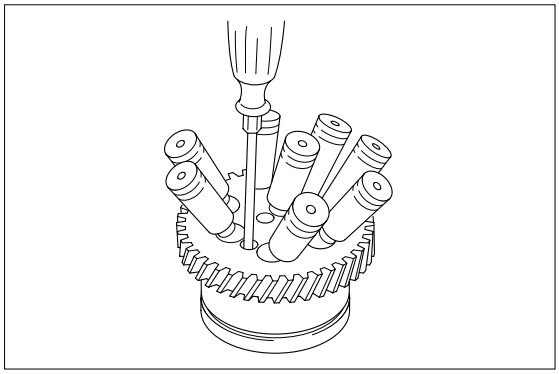
Align key with keyway in gear, press in swiftly.



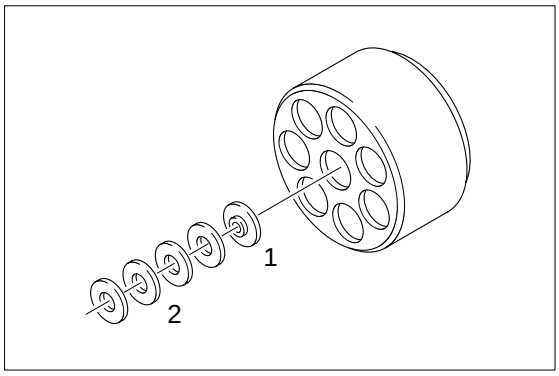
Apply loctite to screw lock. Tapped holes must be absolutely free of oil, grease, dirt and other contamination which may impair screw lock.



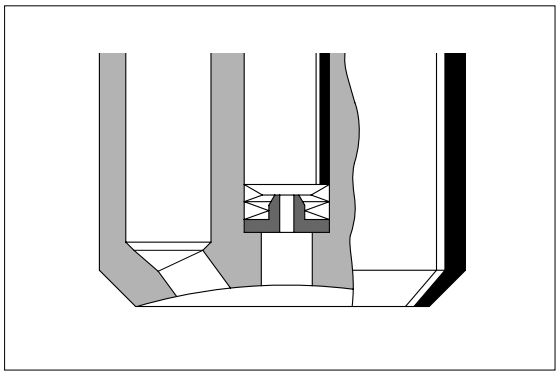
Place piston assembly, center pin and retaining plate into position, fit fixing screws.



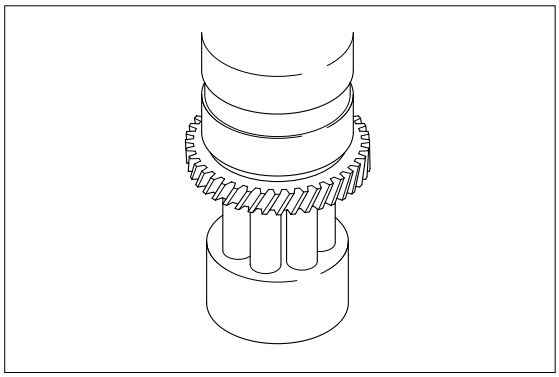
Fit spring plate 1 and cup springs 2 in correct position with grease.



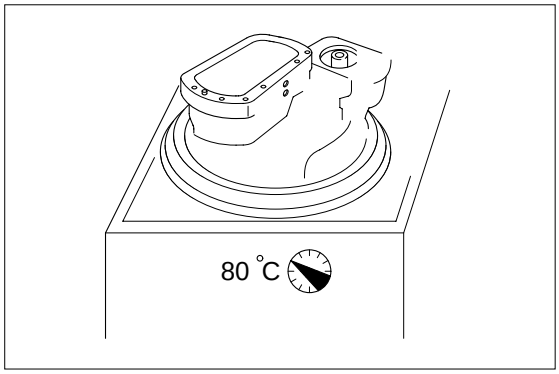
Make sure that all parts are fitted in correct order.



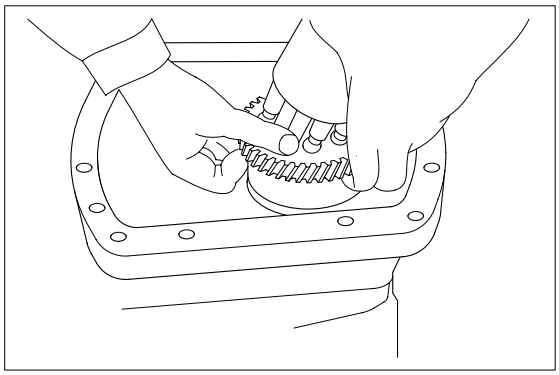
Thread in piston. Use soft support to prevent sliding surface from being damaged. Pre-assemble both rotary groups in this way.



Pre-warm housing to approx. 80°C

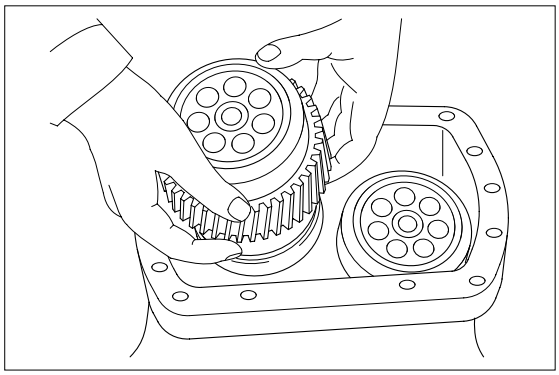


Insert pre-assembled rotary group 2 dry. Align marked gear teeth.

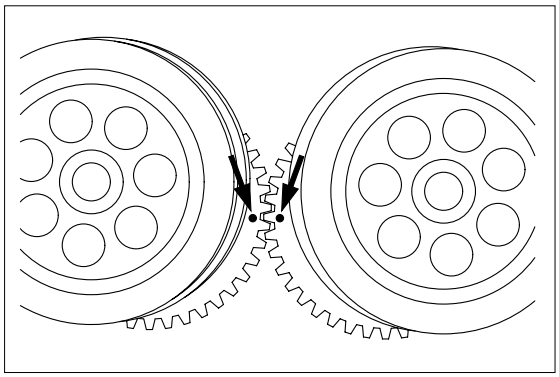


Assembly auxiliary drive

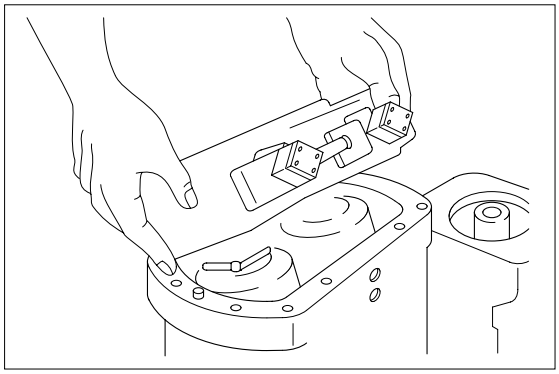
Insert rotary group 1, observing marked gear teeth.



Marked teeth must mate.



Mount control.



Mount front cover.