

Disassembling reduction gear

1. Remove following parts.

Reference Number	Description
1-37	O-ring
1-24	Thrust plate
1-25	Drive gear
1-23	Planetary gear
1-22	Needle bearing
1-21	Inner race
1-20	Thrust washer
1-19	Holder

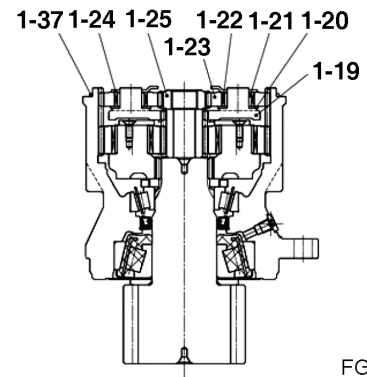


Figure 37

FG011150

2. Remove sun gear (1-17, Figure 38).

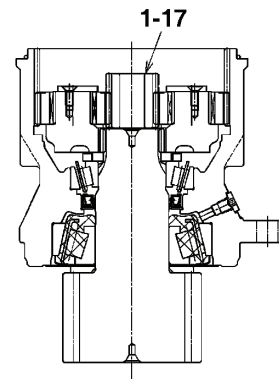


Figure 38

FG011151

3. Remove holder (1-11, Figure 75) and other associated parts.

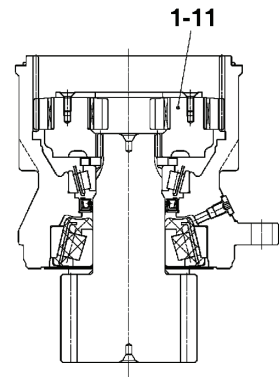
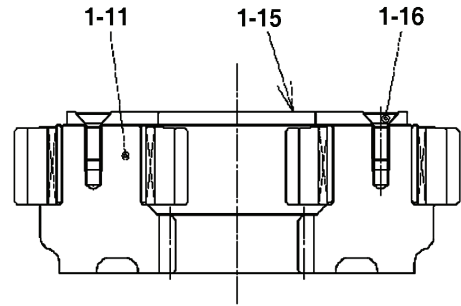


Figure 39

FG011152

- Secure holder (1-11, Figure 75) in a vice and loosen screw (1-16, Figure 40) to remove thrust plate (1-15, Figure 40).

NOTE: *The screw is hard to remove because Loctite was used during assembly. To facilitate removal of screw, warm screw with a drier.*

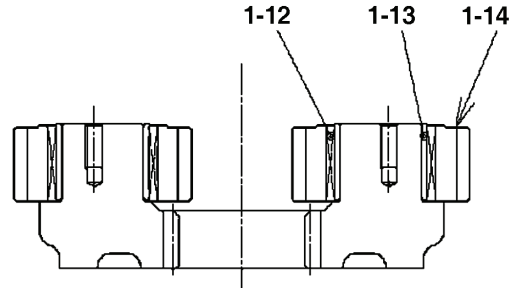


FG011153

Figure 40

- Remove following parts.

Reference Number	Description
1-14	Planetary gear
1-13	Needle bearing
1-12	Inner race



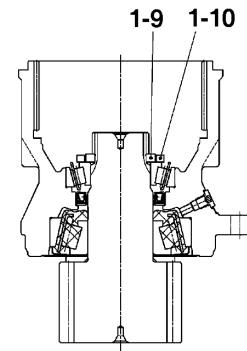
FG011154

Figure 41

- Remove following parts.

Reference Number	Description
1-10	Collar
1-9	Plate

NOTE: *When replacing taper roller bearings (1-6, Figure 45) and (1-8, Figure 42), collar (1-3) and plate (1-4), they are to be replaced by body assembly.*



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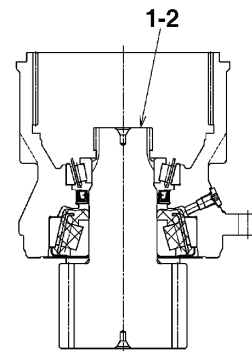
Figure 42

- Remove pinion shaft (1-2, Figure 43).



CAUTION

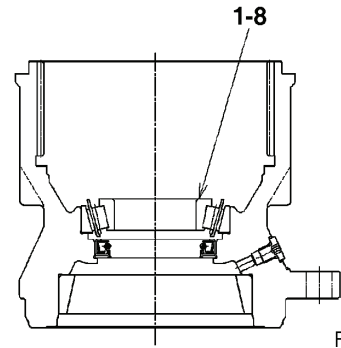
When removing shaft, be careful not to drop it. If it is hard to remove, lightly strike it with a plastic hammer.



FG011156

Figure 43

- Remove inner race of taper roller bearing (1-8, Figure 42).



FG011157

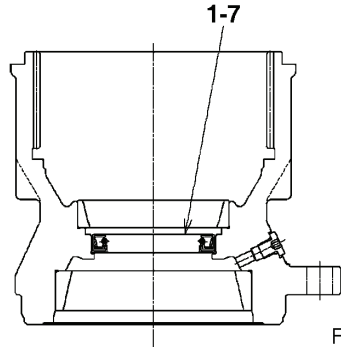
Figure 44

- Break oil seal (1-7, Figure 44) to remove it.



CAUTION

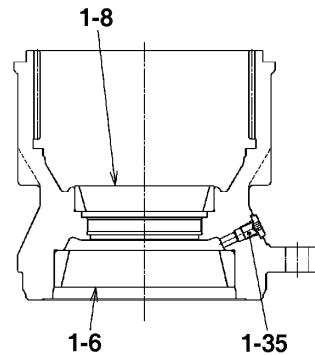
The removed oil seal must not be used again. When removing it, exercise with care to prevent damage to outer races of taper roller bearings (1-8, Figure 42) and (1-6, Figure 45).



FG011158

Figure 45

- Remove outer race of taper roller bearing (1-8, Figure 42) and plug (1-35, Figure 46).



FG011159

Figure 46

Assembly Procedure

Precautions for assembly

1. Wash all parts with treated oil and blow oil completely.
2. Be sure that washed parts are free of dust and other foreign material. Handle them with care so they will not be dented or damaged.
3. Always replace seals, bearings and pins with new ones.
4. Tighten all tightening areas to specified torque.
5. Apply grease to oil seals and O-rings in advance. (In particular, oil seal lips must be oiled.)
6. Many small parts are used. Exercise care so as not to lose them (such as dropping them in holes).

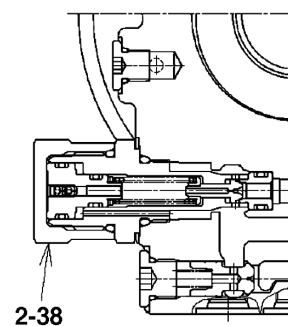
Assembly

Assemble parts by following procedure.

Assembling motor

1. Install relief valve assembly (2-38, Figure 47).

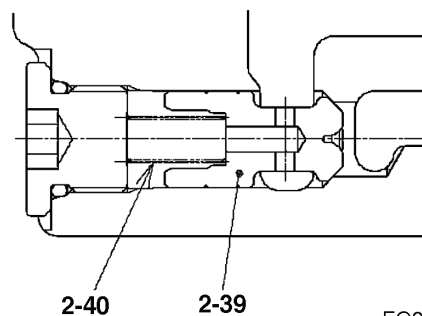
Tightening torque: 157 ± 10 Nm.



FG011160

Figure 47

2. Assemble check valve (2-39, Figure 48) and spring (2-40, Figure 48).



FG011161

Figure 48

3. Install plug (2-41, Figure 49).
Tightening torque: 39.2 ± 2.0 Nm

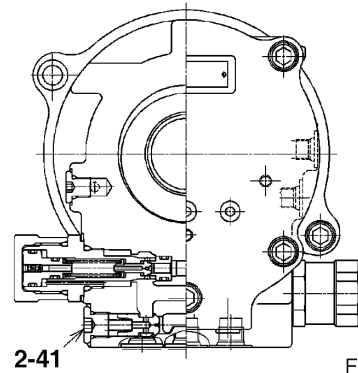


Figure 49

FG011162

4. * With timer valve type
Install the O-ring (2-29-2-4, Figure 50) on the sleeve (2-29-1, Figure 50).

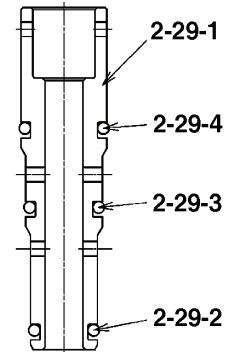


Figure 50

FG011163

5. * With timer valve type
Assemble the sleeve (2-29-1, Figure 50) in the case (2-1, Figure 51) and set the spool (2-29-5, Figure 51), the washer (2-34, Figure 51) and the spring (2-35, Figure 51) in the hole of the sleeve.
6. Install plug (2-37, Figure 51).
Tightening torque: 84 ± 5 Nm

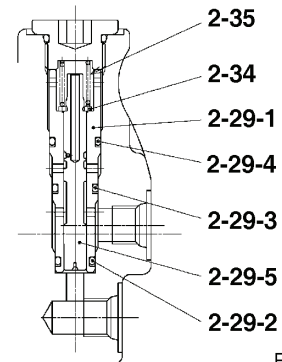


Figure 51

FG011149

7. Assemble collar (2-6, Figure 52), spring (2-7, Figure 52) and washer (2-8, Figure 52) in cylinder block (2-5, Figure 52).



CAUTION

Be sure to assemble collar (2-6, Figure 52) in correct direction.

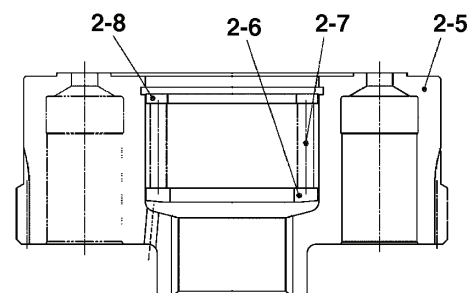
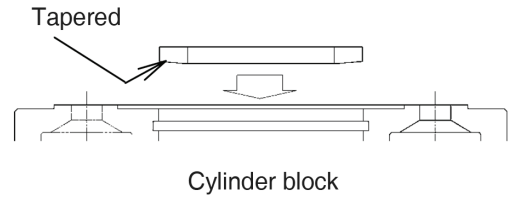


Figure 52

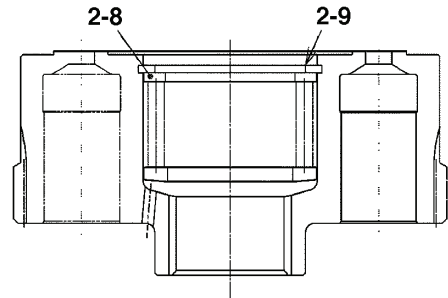
FG007391



FG012301

Figure 53

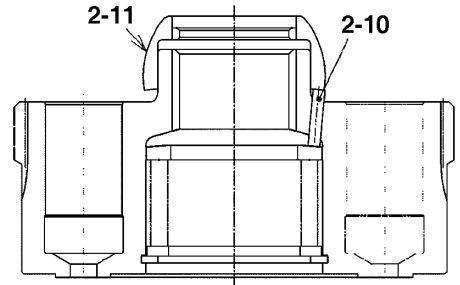
8. While pushing washer (2-8, Figure 54), assemble retaining ring (2-9, Figure 54).



FG007354

Figure 54

9. Apply grease to pin (2-10, Figure 55) and assemble it in cylinder block (2-5, Figure 52).
10. Assemble retainer holder (2-11, Figure 55).



FG007353

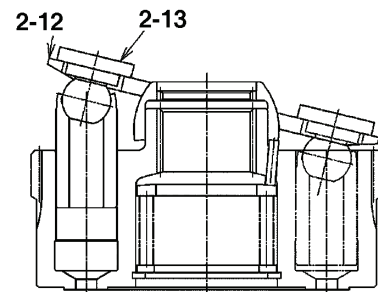
Figure 55

11. Set piston assembly (2-13, Figure 56) on retainer plate (2-12, Figure 56) and assemble it in cylinder block (2-5, Figure 52).



CAUTION

Apply an ample amount of hydraulic fluid to sliding part before assembly.



FG007352

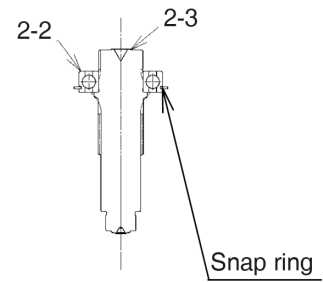
Figure 56

- Press fit ball bearing (2-2, Figure 57) on shaft (2-3, Figure 57).



CAUTION

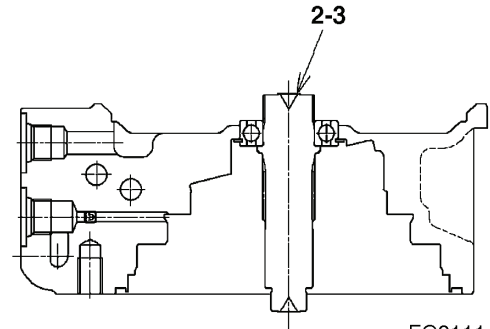
Press Fit ball bearing (2-2, Figure 57) with attached retaining ring facing as shown in figure.



FG007393

Figure 57

- Press fit shaft (2-3, Figure 58) and ball bearing (2-2, Figure 57) in case (2-1).



FG011146

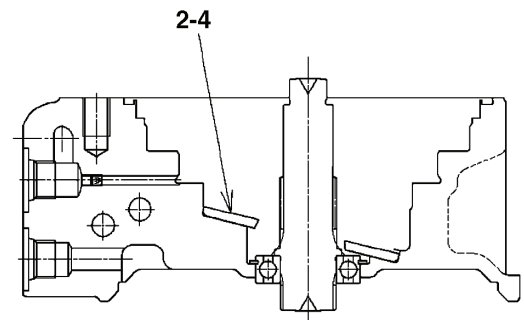
Figure 58

- Apply grease to back of thrust plate (2-14, Figure 61) and assemble it.



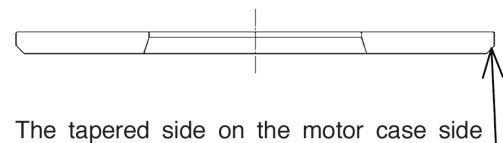
CAUTION

The thrust plate must be assembled in correct direction.



FG011145

Figure 59



FG007395

Figure 60

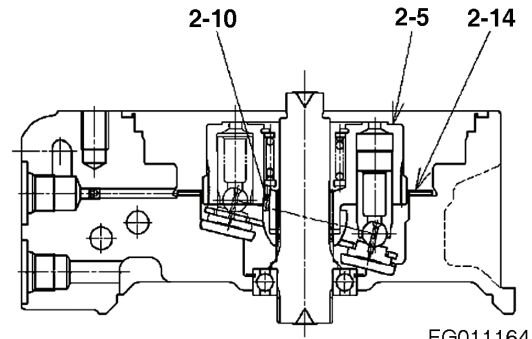
15. Assemble cylinder block (2-5, Figure 61) and other associated parts.



CAUTION

During assembly, be sure that pin (2-10, Figure 61) will not come out.

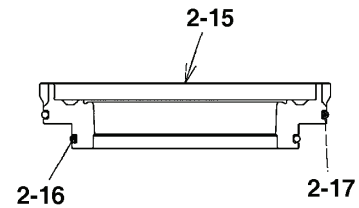
*2: The disk (2-14, Figure 61) is assembled only for parking brake spec. only.



FG011164

Figure 61

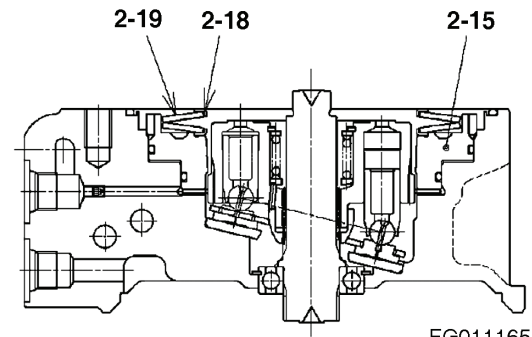
16. * With parking brake type
Apply grease to O-ring (2-16, Figure 62) and O-ring (2-17, Figure 62) and assemble them on brake piston (2-15, Figure 62).
17. * With parking brake type
While paying attention to location of hole of pin (2-25, Figure 68), assemble brake piston (2-15, Figure 63) in case (2-1, Figure 51).



FG007397

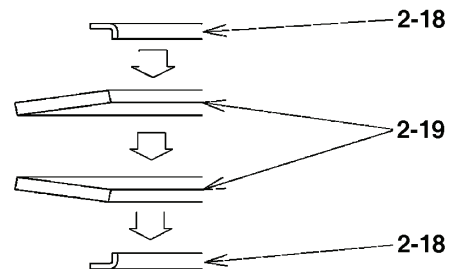
Figure 62

18. * With parking brake type
Assemble spring seat (2-19, Figure 63) and disk spring assembly (2-18, Figure 63) in correct direction. Pay attention to orientation



FG011165

Figure 63



FG007399

Figure 64

19. Apply grease to O-ring (2-20, Figure 65) and assemble it in case (2-1, Figure 51).

Check to see if pin (2-25, Figure 65) can be assembled in brake piston and case hole. If not, remove brake piston (2-15, Figure 63) and reorient it, then reassemble. (*2 Parking brake spec. only)



CAUTION

Assemble pin (2-25, Figure 65) while being attached on cover.

20. Apply grease to O-ring (2-26, Figure 66) and pin (2-25, Figure 66), then assemble them in cover (2-21, Figure 66).

Press fit ball bearing (2-22, Figure 66).

21. Install pin (2-23, Figure 67), then install valve plate (2-24, Figure 67).

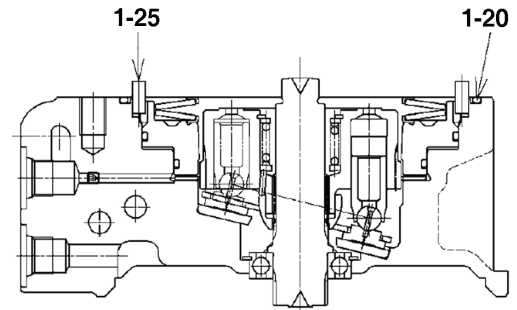
To prevent falling, apply grease to back side.

22. While paying attention to location of pin (2-25, Figure 68), install cover (2-21, Figure 68) and other associated parts to case (2-1, Figure 51).



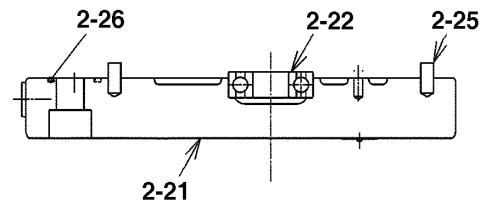
CAUTION

Exercise care so pin (2-25, Figure 68) and valve plate (2-24, Figure 68) will not fall.



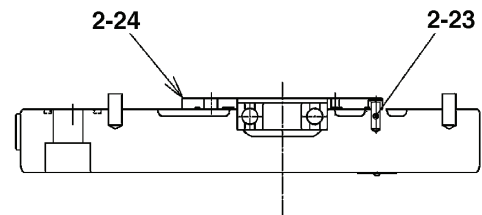
FG011166

Figure 65



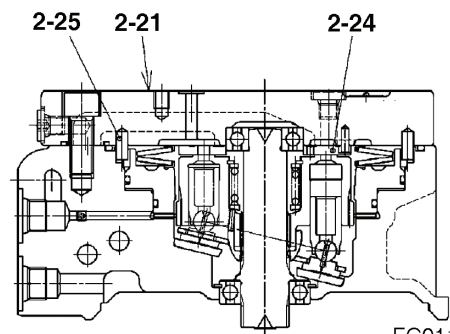
FG007401

Figure 66



FG007402

Figure 67



FG011167

Figure 68