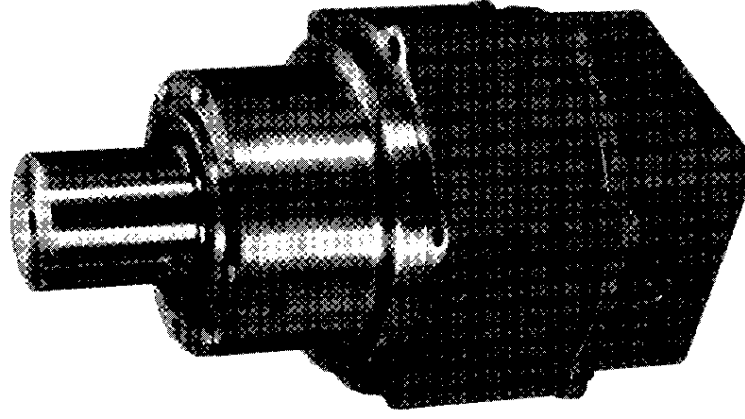
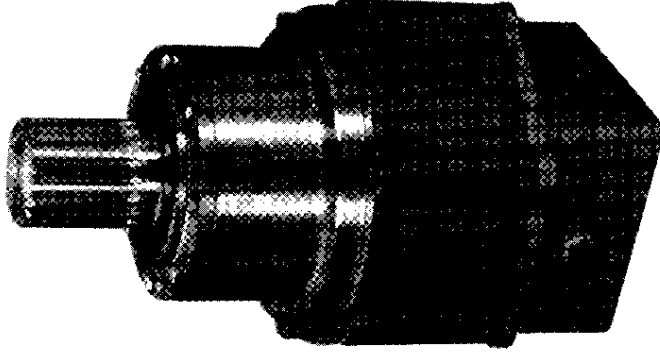


Model 50 & 50D

*Parts and Lubrication Information
Assembly/Disassembly Instructions*



2350 Del Monte Street
PO Box 835
West Sacramento CA 95691
916 372 5411
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Telex 377309

LUBRICATION INSTRUCTIONS

HECO planetary speed reducers may be lubricated as a self-contained unit (standard hydraulic motor), or as an integral part of the hydraulic system (bearingless motor).

In applications where the speed reducer is lubricated as a self-contained, horizontal unit, it is recommended that the unit be half-filled with EP ⁽¹⁾ oil (see chart for amount and proper grade gear oil). Self-contained, vertical installations (output shaft down) require the unit to be filled to the center line of the upper planetary gear train. For self-contained vertical installations (output shaft up) consult HECO. When installed as a self-contained unit, ensure adequate ventilation is provided to allow for lubricant expansion.

The oil should be changed after the first 50 hours and 100 hours of operation, and every 1000 hours thereafter. Oil should be drained while the unit is at operating temperature. The unit should be cleaned with flushing oil (use of solvents should be avoided). NOTE: The importance of a thorough gear case cleaning with flushing oil during the first lubricant change cannot be overemphasized. If the maximum oil operating temperature is exceeded, change oil immediately.

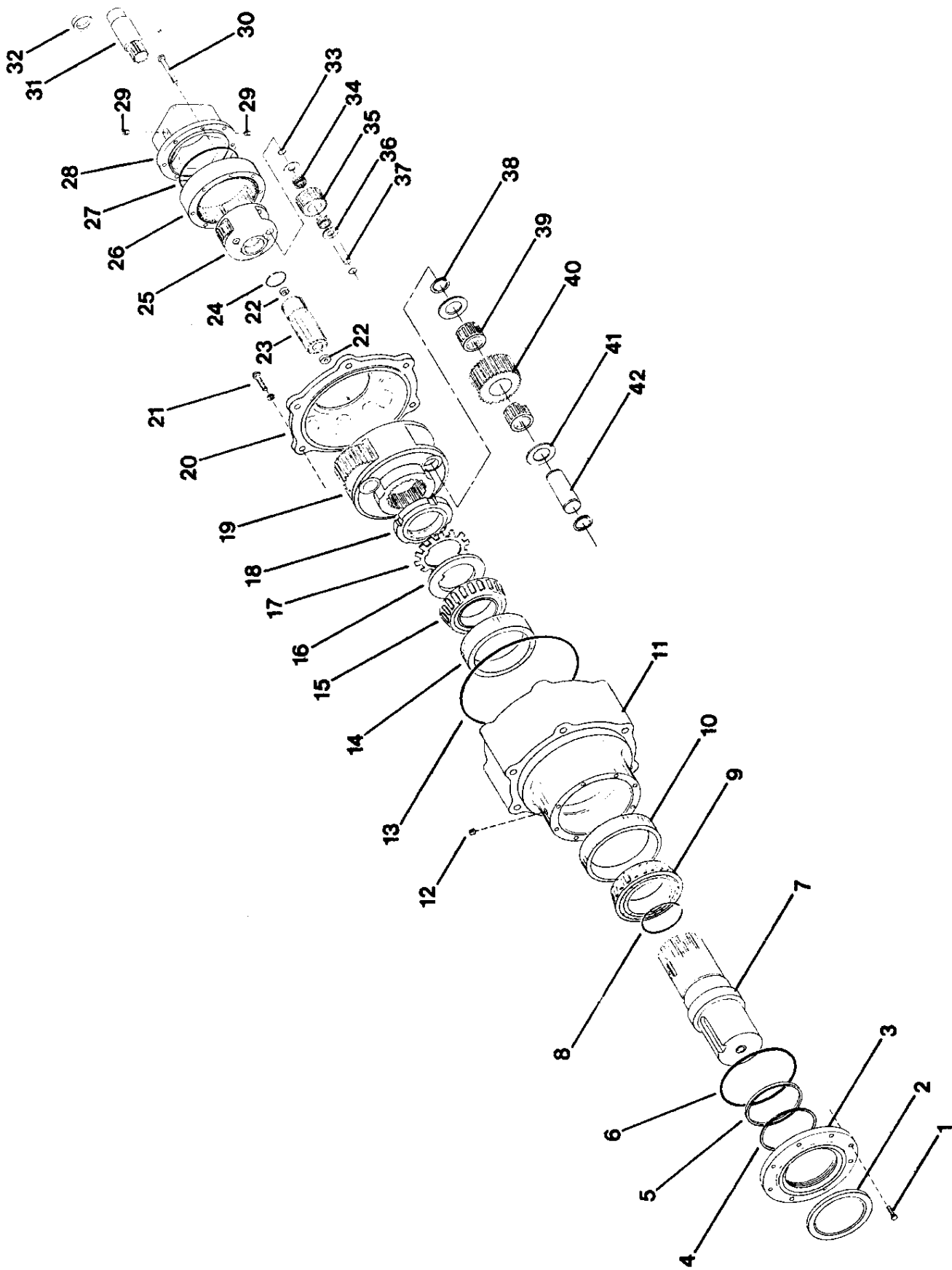
In applications where the speed reducer is lubricated by oil flow from the bearingless hydraulic motor, a petroleum based hydraulic oil with EP⁽¹⁾ additives should be used. Ensure that a minimum oil flow of 2 GPM is maintained, a separate case

drain line should be connected directly from the top of the reducer (ensure the reducer remains full) to the oil reservoir.

For maximum cooling and lubrication the case drain should be connected to the drain port at the opposite end of the reducer from the hydraulic motor. Reducer case pressure must not exceed 20 PSI with the standard shaft seal or 50 PSI with the optionally available high pressure seal installed.

(1) Extreme Pressure Lubricants — These lubricants are petroleum base liquids with chemical additives, such as, sulfur phosphorus or similar materials or soluble compounds which produce a protective film to withstand high pressures.

	HORIZONTAL OPERATION (1/2 FULL)	TOTAL CAPACITY	MAXIMUM OIL TEMPERATURE
Model 16	20 oz. (6 dl.)	40 oz. (12 dl.)	140°F (60°C) continuous
Model 20	50 oz. (15 dl.)	105 oz. (31 dl.)	170°F (76°C) intermittent
Model 20D	50 oz. (15 dl.)	105 oz. (31 dl.)	Consult HECO for higher temperatures
Model 50	100 oz. (30 dl.)	200 oz. (60 dl.)	
Model 50D	85 oz. (25 dl.)	170 oz. (50 dl.)	
Model 52D	85 oz. (25 dl.)	170 oz. (50 dl.)	
Model 52T	115 oz. (34 dl.)	230 oz. (68 dl.)	
OIL GRADE — Single Reduction (RPM Out)			
0-25 RPM — AGMA #5			
25-100 RPM — AGMA #3			
100-200 RPM — AGMA #1			
200 + — Consult HECO			
OIL GRADE — Double Reduction (RPM Out)			
0-40 RPM — AGMA #5			
40-60 RPM — AGMA #1			
60 + — Consult HECO			



Model 50 & 50D

ITEM #	PART #	DESCRIPTION	QTY/ASSY
1.	501160	Cap Screw	8
2.	501110	Shaft Seal (Not Available in Viton)	1
3.		Seal Carrier	1
4.	500100	Standard	
5.	500110	High Pressure	
6.	501100	Backup Ring	
7.	501090	(Not Used on High Pressure Seal)	
8.	501095	Quad Ring	1
9.	501050	Quad Ring Viton	1
10.	501080	High Pressure Lip Seal	
11.	501085	O Ring	
12.	501095	O Ring Viton	
13.	500070	Output Shaft	1
14.	500260	3.875" Straight Keyed	
15.	500170	20T 6/12 Spline	
16.	501010	Retaining Ring	
17.	501020	Cone	1
18.	500200	Cup	1
19.	501200	Housing	1
20.	501070	Pipe Plug	1
21.	501075	O Ring Viton	1
22.	501030	Cup	1
23.	501040	Cone	1
24.	501230	Keyed Washer	1
25.	501220	Lock Washer	1
26.	501210	Lock Nut	1
27.	500060	Planet Carrier	1
28.	500210	Motor Adapter	1
29.	500190	SAE C 2/4-Bolt	1
30.	500150	SAE D 2/4-Bolt	1
31.	151690	Transition Plate	1
32.	50G	Bolt — Motor Adapter/Transition Plate	6
33.	50J	Sun Gear Kit (Input Shaft Adapter)	1
34.	50K	Char-Lynn 6000 Bearingless	
35.	50L	1 1/4" — 14T 12/24 Spline	
36.	500160	Char-Lynn 10,000 Bearingless	
37.	150152	1 3/4" — 13T 8/16 Spline	
38.	150110	1 1/2" — 17T 12/24 Spline	
39.	150040	Intermediate Gear	1
40.	150030	Thrust Plug	2
41.	151020	Retaining Ring	1
42.	151025	Planet Carrier	1
43.	152050	Internal Gear	1
44.	150640	O Ring	2
45.	150180	O Ring Viton	1
46.	150901	Motor Adapter	
47.		SAE A 2-Bolt	
48.		SAE B 2-Bolt	
49.		SAE B 4-Bolt	
50.		Modified SAE A 4-Bolt	

ITEM #	PART #	DESCRIPTION	QTY/ASSY
D 29.	151290	Pipe Plug	2
D 30.	151100	Bolt	8
31.	151080	Stud — SAE C 2/4-Bolt Only	8
	151090	Nut — SAE C 2/4-Bolt Only	8
		Sun Gear Kit (Input Shaft Adapter)	1
		(See Separate Sheet for Kit Parts)	
	16B	1/8" — 13T 16/32 Spline	
	16C	1" — 15T 16/32 Spline	
	16D	1" Straight Keyed	
	16E	Char-Lynn 2000 Bearingless	
	16F	Char-Lynn 4000 Bearingless	
	16H	1 1/4" Straight Keyed	
	16I	1 1/4" — 14T Spline	
	16M	1" SAE 6B Spline	
	16O	7/8" Straight Keyed	
	16P	1 1/8" Straight Keyed	
	151070	Retaining Ring	6
	151130	Planet Bearing	6
	150050	Planet Gear	3
	151120	Thrust Washer	6
	150080	Planet Pin	3
	501120	Retaining Ring	6
	501190	Planet Bearing	6
	500020	Planet Gear	3
	501180	Thrust Washer	6
	500040	Planet Pin	3
		(Motor Bolt and Seal Kits — Includes all Bolts, O' Rings, Gaskets, etc. necessary to mount hydraulic motor to the gear reducers.)	
		(See Parts Price List for Motor Bolt and Seal Kit Prices)	
	509100	Seal Kit — Buna	
	509200	Seal Kit — Viton	
	509350	Seal Kit — High Pressure	
	509500	Seal Kit Double Reduction — Buna	
	509600	Seal Kit Double Reduction — Viton	
	509650	Seal Kit Double Red. — High Pressure	
		* Items which are included in Seal Kits	
		D Items for Model 50D only	

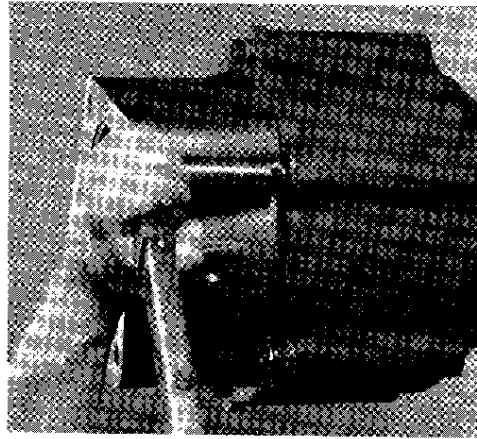


Fig. 1

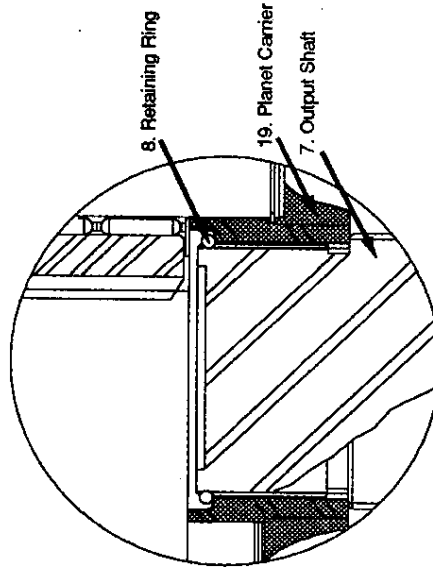


Fig. 2



Model 50 & 50D Disassembly Instructions

Introduction:

The Model 50D joins a Model 50 planetary reducer with a Model 16 planetary reducer through the use of a transition plate (20) and an intermediate gear (23).

The instructions which apply only to the Model 50D are shown in bold type.

Warning:

Standard safety practices must be followed during the procedures described herein. Eye protection is mandatory.

Disassembly Note:

Clean exterior of unit prior to attempting disassembly. Remove unit to a clean work area.

1. Clamp mounting flange in vice shaft down taking care not to damage output shaft surface.
2. Remove pipe plug (12) from case and drain oil from unit. Retain oil for analysis.
3. Remove remaining two pipe plugs (29) in motor adapter (28).
4. Remove hydraulic motor and examine for failures. Our experience indicates that motor failure is the most common cause of reducer failure.
5. Remove six bolts (30) from motor adapter (28). (Fig. 1)
6. [Model 50— Remove motor adapter (28) from internal gear/housing (11).]
[Model 50D— Remove motor adapter (28) from small internal gear (26).]

(continued)



Model 50 & 50D Assembly Instructions

Introduction:

The Model 50D joins a Model 50 planetary reducer with a Model 16 planetary reducer through the use of a transition plate (20) and an intermediate gear (23).

The instructions which apply only to the Model 50D are shown in bold type.

Warning:

Standard safety practices must be followed during the procedures described herein. Eye protection is mandatory.

Assembly Note:

Carefully inspect each item and clean prior to assembly.

Instructions 1-5 are for Model 50D only. To continue, refer to number 6.

1. Lubricate planet bearings (34) and press into planet gear (35). (Fig. 9)
2. Lubricate thrust washers (36), place one washer on each side of planet gear (35). Place planet gear and thrust washer in planet carrier (25). (Fig. 9)
3. Lubricate planet pin (37) and insert into planet pin hole in planet carrier (25) from splined side of carrier. Drive planet pin (37) through thrust washers and planet gear, into opposite planet pin hole in carrier housing. (Fig. 5 & 9)
4. Secure planet pin (37) with retaining rings (36) on each end of planet pin. (Fig. 9)

(continued)

Model 50 & 50D Disassembly Instructions, Continued

- Instructions 7-12 are for Model 50D only. To continue, refer to number 13.
7. Remove small internal gear (26) from transition plate (20).
 8. Remove 'O' rings (27) from small internal gear (26).
 9. Remove sungear (31) from small planet gears (35).
 10. Remove small planet carrier assembly (25) from large planet gears.
 11. Remove six bolts (21) from transition plate (20).
 12. Remove transition plate (20) from housing/internal gear (11).
 13. Remove 'O' rings (13) from internal gear/housing (11).

The following instruction applies only to the Model 50. To continue, refer to number 15.

14. Remove sungear (31) from planet gears (40).
15. Remove retaining ring (8) from groove in shaft (7). (Fig. 2 & 3)
Note: (8) is a wirelock retaining ring that retains the planet carrier assembly (19) on the output shaft (7). This locking ring must be pried out of the locking ring groove to remove the planet carrier assembly (19). This typically is accomplished by inserting two long screwdrivers between the planet gears and carefully working the wirelock out of the locking groove. (Fig. 2 & 3)
16. Lift planet carrier assembly (19) from shaft (7).
17. Bend tab on lock washer (17) away from lock nut (18).
18. Using a spanner wrench or HECO tool #59150, unscrew lock nut (18) and remove lock washer (17) and keyed washer (16). (Fig. 4)

(continued)

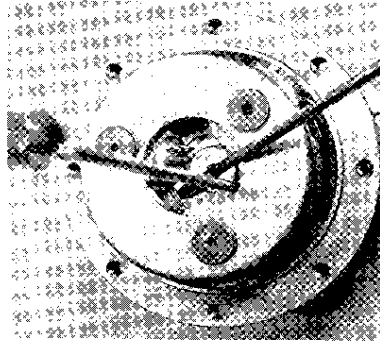


Fig. 3

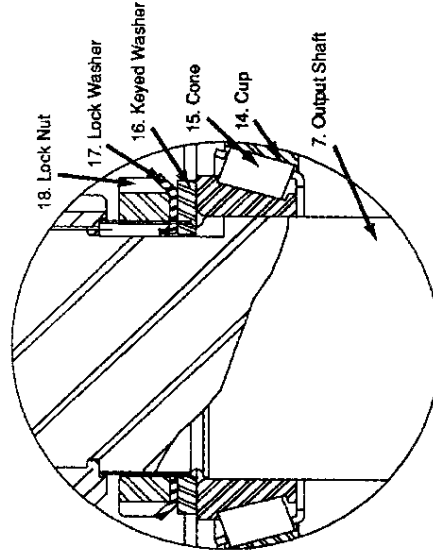


Fig. 4



Fig. 5

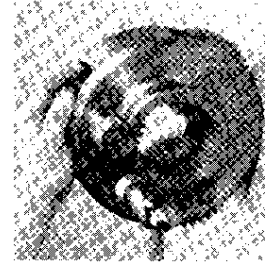


Fig. 6

Model 50 & 50D Assembly Instructions, Continued

5. Repeat steps 1-4 for installation of two remaining planet gears. At this point, small carrier assembly is complete.
6. Lubricate spline on intermediate gear (23), seat retaining ring (24) in groove between spline and gear. Stand intermediate gear on gear end, lay retaining ring (24) on splined end, slide small planet carrier assembly spline onto splined end of intermediate gear (23). With appropriate tool, seat retaining ring (24) into groove at end of intermediate gear (23).
7. Lubricate planet bearings (39) and press into planet gear (40). (Fig. 9)
8. Lubricate planet pin (42) and insert into planet pin hole in planet carrier (19) from splined side of carrier.
9. Lubricate thrust washers (41), place one washer on each side of planet gear (40). Place planet gear and thrust washer in planet carrier (19). (Fig. 9) Drive planet pin (42) through thrust washers and planet gear, into opposite planet pin hole in carrier housing. (Fig. 5 & 9)
10. Secure planet pin (42) with retaining rings (38) on each end of planet pin. (Fig. 9)
11. Repeat steps 7-10 for installation of two remaining planet gears. At this point, carrier assembly is complete.
12. Using an appropriate tool, press bearing cups (10) and (14) into the housing.
Note: Insure cups are square with counter-bore before seating.

(continued)

Fig. 7

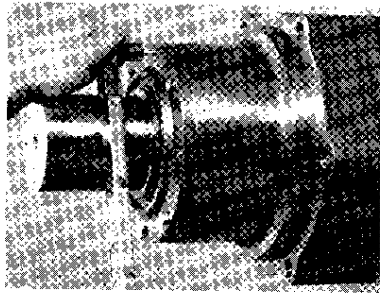
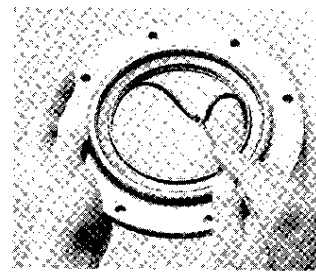
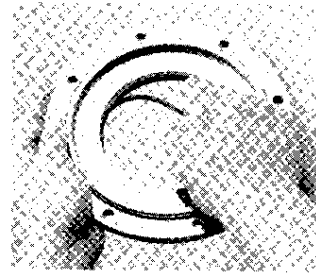
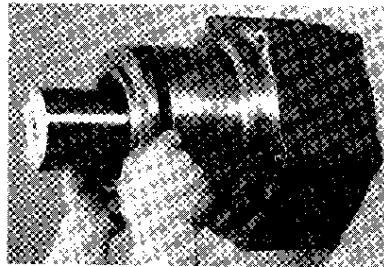


Fig. 8



Model 50 & 50D Disassembly Instructions, Continued

19. Take unit out of vice and turn it over. Remove eight cap screws (1) from seal carrier (3). (Fig. 7)
20. Remove seal carrier (3) from housing (11).
21. Remove 'O' ring (6), quad and backup rings (5 & 4) and shaft seal (2) from seal carrier (3) and discard. (Fig. 8)
22. Support housing (11) with output shaft down and press shaft (7) out of housing from input end of shaft. Note: Shaft may come out with bearing cone (9) attached. Remove bearing cone carefully to avoid damage to shaft.
23. Carefully drive bearing cups (10 & 14) out of housing (11).

Instructions 24-29 are for Model 50D only. To continue, refer to number 30.

24. Remove retaining rings (33) from ends of planet pins (37). (Fig. 9)
25. Support small planet carrier (25) spline side down and drive planet pins (37) out of planet carrier (25), from input side of carrier. (Fig. 9 & 5)
26. Remove small planet gears (35) and thrust washers (36) from small planet carrier (25). (Fig. 9)
27. Remove planet bearings (34) from small planet gears (35).
28. Remove retaining ring (24) from intermediate gear (23).
29. Remove intermediate gear (23) from small planet carrier (25).
30. Examine brass thrust plugs (22) in end of intermediate gear (23). If wear is apparent, remove by inserting a $\frac{1}{4}$ " self tapping screw and jacking the plug out of the gear.
31. Remove retaining rings (38) from ends of planet pins (42). (Fig. 9)
32. Support planet carrier (19) spline side down and drive planet pins (42) out of planet carrier (19). (Fig. 9 & 5)

(continued)

Model 50 & 50D Assembly Instructions, Continued

13. Press bearing cone (9) onto end of output shaft (7) using appropriate tool. Seat bearing cone against shoulder on shaft.
Note: If flange shaft unit is being assembled, the assembled seal carrier must be in position prior to installing bearing cone (9). (See instructions 27, 28 & 29 for assembly detail)
14. Stand output shaft (7) and assembled cone securely in vice with input spline of shaft up.
15. Stand housing (11) on shaft. Seat bearing cone (9) against bearing cup (10) in housing.
16. Press bearing cone (15) onto end of shaft (7) or heat bearing cone (15) to approximately 180°-200°F and slip into place. (HECO recommends heating the bearing cone) Seat bearing cone against its cup in housing.
17. Install keyed washer (16) and lock washer (17) on threaded end of shaft. Apply never-seize or similar lubricant on threads and thread lock nut (18) onto shaft. It is important to rotate housing to seat bearings while tightening lock nut till housing resists rotation and end play is minimal. (Fig. 4 & 6)
18. Locate tab on lock washer in line with slot on lock nut and bend tab into slot to prevent lock nut from loosening. (Fig. 4)
19. Lubricate spline end of shaft (7), lay retaining ring (8) on end of shaft. (Fig. 2) Slide planet carrier assembly spline onto shaft spline. [Model 50D—Slide large planet carrier assembly] Reach through the planet carrier and seat retaining ring (8) into groove at end of shaft (7). (Fig. 3) This is best accomplished using two long screwdrivers. (Fig. 3)

(continued)

33. Remove planet gears (40) and thrust washers (41) from planet carrier (19). (Fig. 9)
34. Remove planet bearings (39) from planet gears (40).
35. Clean and examine all parts for wear or failure. Replace planet gears as a "set", replace all 'O' rings, seals and quad rings. (disassembly complete)

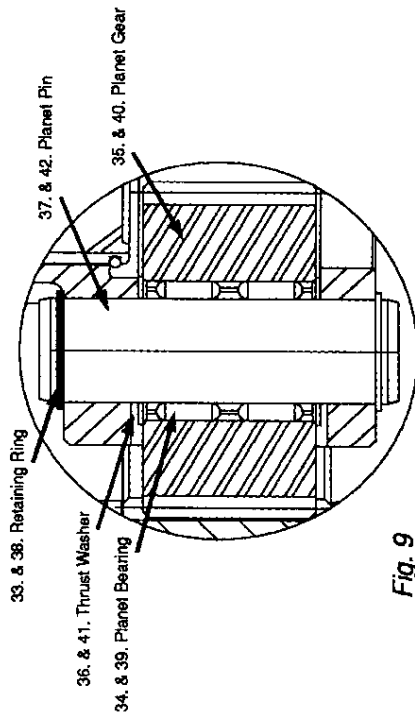


Fig. 9

20. Lubricate 'O' ring (13).
[Model 20— Place 'O' ring onto pilot of motor adapter (28).]
[Model 50D— Place 'O' ring onto pilot of transition plate (20).]
Note: Beware of sharp edges or burrs on adapter pilot.
21. [Model 50— Place motor adapter pilot into counterbore of internal gear/housing (11). Line up holes in motor adapter with matching holes in internal gear/housing. Insert six grade 8 cap screws (25) with lock washers in holes. Tighten to 75-95 ft. lbs. torque.]
[Model 50D— Place transition plate (20) pilot into counterbore of housing (11). Line up holes in transition plate with matching holes in housing. Insert six cap screws (21) with lock washers, in holes. Tighten to 60-70 ft. lbs. torque.] (Fig. 1)
22. Turn unit over and stand on transition plate end.
23. Lubricate backup ring (4), quad ring (5) and 'O' ring (6). Insert backup ring (4) into groove of seal carrier. (Fig. 10) Place 'O' ring (6) on seal carrier pilot. (Fig. 8)
Note: High pressure seal carrier uses 1 poly seal in place of quad ring and backup ring. (Fig. 11)
24. Note: Check for sharp edges or burrs on housing pilot.
Press seal (2) into its counterbore in seal carrier. (Fig. 10) The open face of the seal should be up. This seal functions as a wiper only and is installed to keep contaminants out of the unit.

(continued)

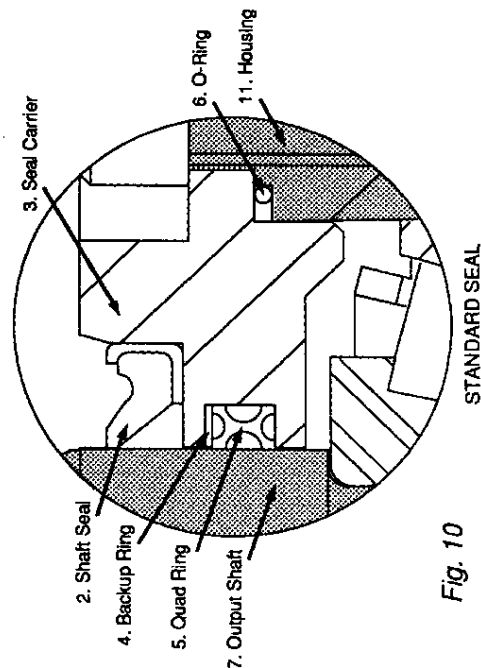


Fig. 10

Model 50 & 50D Assembly Instructions, Continued

25. Lubricate output shaft (7) and shaft seal (2). Place seal carrier (3) with backup ring, quad ring and 'O' ring installed, over output shaft (7) and carefully slide seal carrier into position. (Fig. 8) Line up holes, insert eight socket head cap screws (1) in holes and tighten to 20-25 ft. lbs. torque. (Fig. 7)

Instructions 26-30 are for Model 50D only. To continue, refer to number 31.

26. Turn unit over and support, shaft down. Lubricate intermediate gear and small planet carrier assembly, place gear in mesh with large planet gears. (Fig. 12) Lubricate 'O' rings (27). Place one 'O' ring onto pilot of transition plate (20). Note: Check for sharp edges or burrs on pilot.

28. Place small internal gear (26) into mesh with planet gears (35) of small planet carrier assembly. Line up holes in small internal gear with holes in transition plate (20).

29. Place other 'O' ring (27) on pilot of motor adapter (28).

Note: Check for sharp edges or burrs on pilot.

30. Place motor adapter pilot into counter-bore of internal gear, line up holes in motor adapter with holes in internal gear. Insert eight cap screws (30) with lock washers, in holes. Tighten to 60-75 ft. lbs. torque. (Fig. 1)

31. Tighten pipe plugs (12 & 29) into holes in housing (11) and motor adapter (28).

At this point unit assembly is complete.

Note: Before placing unit in service, insure unit is filled with correct amount and grade of gear lubricant. See lubrication instructions for further information.

(assembly complete)

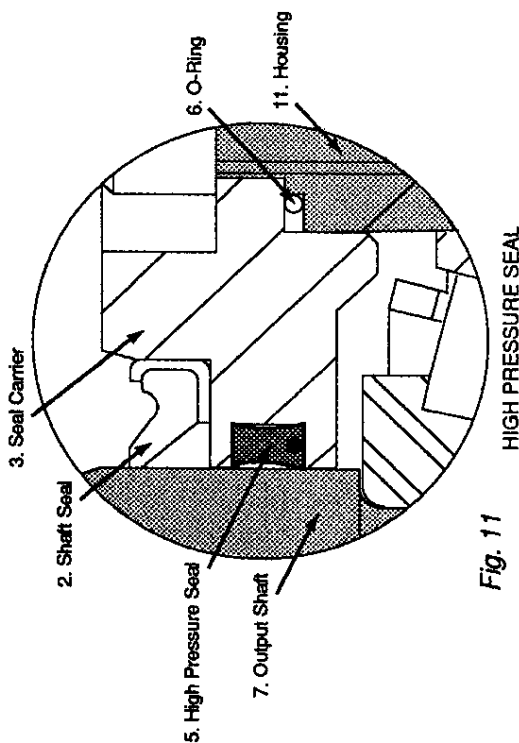


Fig. 11

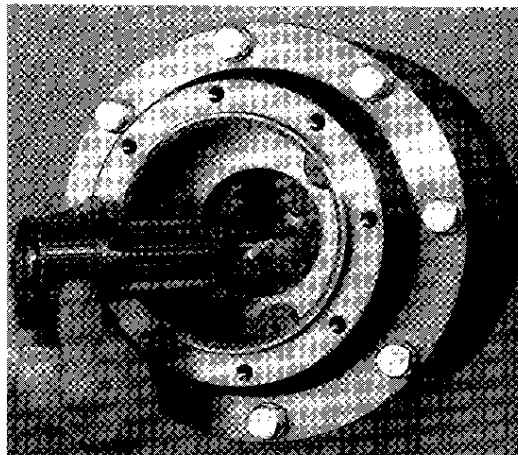


Fig. 12