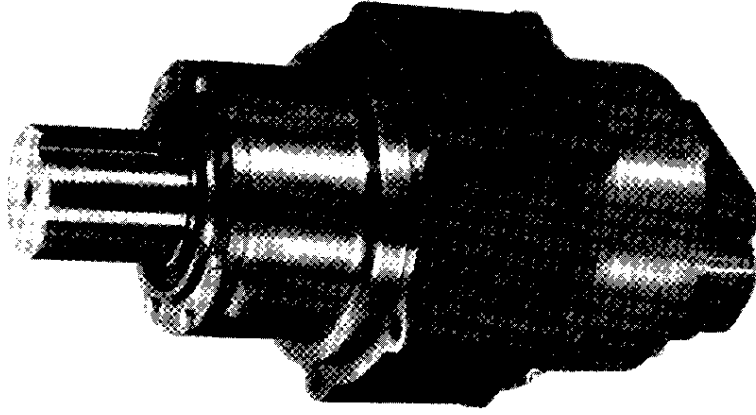
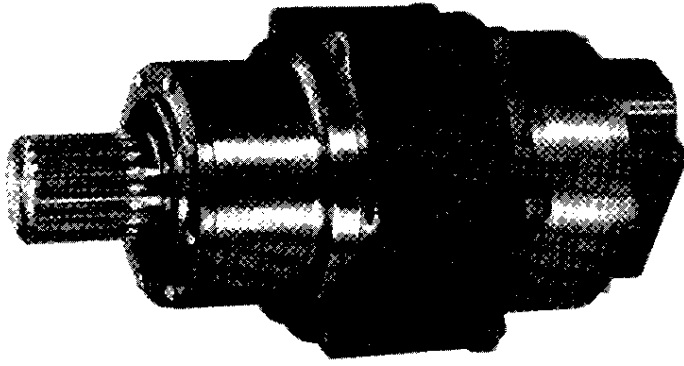


Model 52D

*Parts and Lubrication Information
Assembly/Disassembly Instructions*



HECO

INC.

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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.

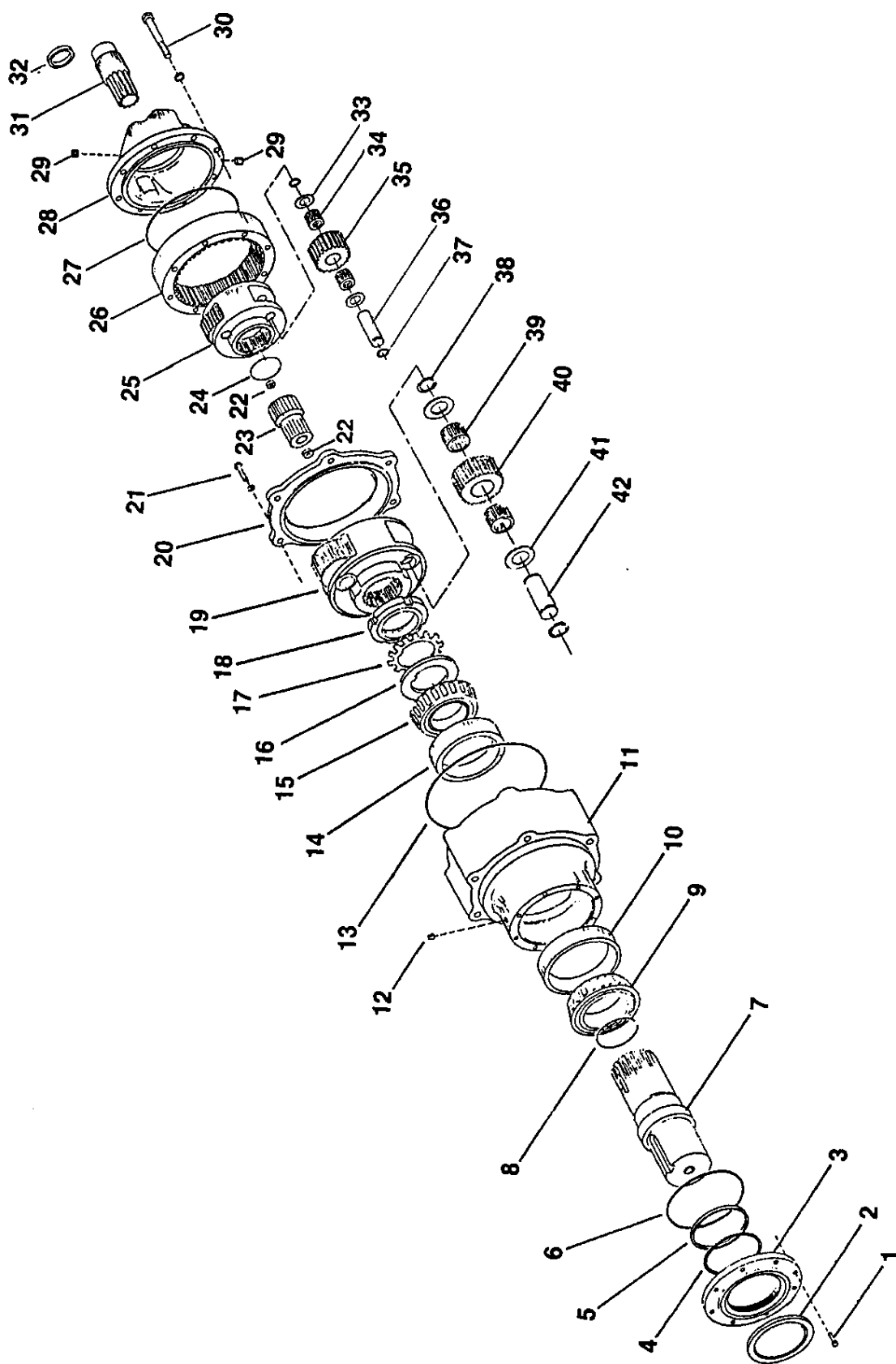
In applications where the speed reducer is lubricated by oil flow from the bearingless hydraulic motor, a petroleum based hydraulic oil with EP⁽¹⁾ additives should be used. Ensure that a minimum oil flow of 2 GPM is maintained, a separate case

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 phosphorous 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)	OIL GRADE — Double Reduction (RPM Out)		
0-25 RPM — AGMA #5	0-40 RPM — AGMA #5		
25-100 RPM — AGMA #3	40-60 RPM — AGMA #1		
100-200 RPM — AGMA #1	60 + — Consult HECO		
200 + — Consult HECO			



Model 52D

ITEM #	PART #	DESCRIPTION	QTY/ASSY
1.	501160	Cap Screw	8
* 2.	501110	Shaft Seal (Not Available in Viton)	1
3.		Seal Carrier	1
	500100	Standard	
	500110	High Pressure	
* 4.	501100	Backup Ring	1
		(Not Used on High Pressure Seal)	
* 5.	501090	Quad Ring	1
	501095	Quad Ring Viton	
	501050	High Pressure Lip Seal	
* 6.	501080	O Ring	1
	501085	O Ring Viton	
7.		Output Shaft	1
	500070	3.875" Straight Keyed	
	500260	20T 6/12 Spline	
8.	500170	Retaining Ring	1
9.	501010	Cone	1
10.	501020	Cup	1
11.	500200	Housing with 6:1 Ratio	1
12.	501200	Pipe Plug	2
* 13.	501070	O Ring	1
	501075	O Ring Viton	
14.	501030	Cup	1
15.	501040	Cone	1
16.	501230	Keyed Washer	1
17.	501220	Lock Washer	1
18.	501210	Lock Nut	1
19.	500060	Planet Carrier	1
20.	502010	Transition Plate	1
21.	151690	Cap Screw	6
22.	150152	Thrust Plug	2
23.	502020	Intermediate Gear	1
24.	200110	Retaining Ring	2
25.	200050	Planet Carrier	1
26.		Internal Gear	1
	200190	36:1	
	200040	28.8:1	
* 27.	201010	O Ring	2
	201015	O Ring Viton	
ITEM #	PART #	DESCRIPTION	QTY/ASSY
28.	200240	Motor Adapter	1
	200701	SAE C 2- & 4-Bolt	
29.	201100	Modified SAE A 4-Bolt	3
30.	201090	Pipe Plug	8
31.		Cap Screw	1
	20F	Sun Gear Kit (Input Shaft Adapter)	
	20G	6:1 Char-Lynn 4000 Bearingless	
	20I6	6:1 Char-Lynn 6000 Bearingless	
	20I4	6:1 1 1/4" — 14T 12/24 Spline	
33.	201150	4.8:1 1 1/4" — 14T 12/24 Spline	6
34.	201110	Thrust Washer	6
35.		Planet Bearing	3
	200080	Planet Gear	
	200180	28.8:1	
36.	200100	36:1	3
37.	201050	Planet Pin	6
38.	501120	Retaining Ring	3
39.	501190	Retaining Ring	6
40.	500020	Planet Bearing	3
41.	501180	Planet Gear	6
42.	500040	Thrust Washer	3
		Planet Pin	
		(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)	
	529500	Seal Kit — Buna	
	529600	Seal Kit — Viton	
	529650	Seal Kit — High Pressure	
		* Items which are included in Seal Kits	



Model 52D Disassembly Instructions

Model 52D Assembly Instructions

Introduction:

The Model 52D joins a Model 50 planetary reducer with a Model 20 planetary reducer through the use of a transition plate (20) and an intermediate gear (23).

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.

Assembly Note:

Carefully inspect each item and clean prior to assembly.

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 eight bolts (30) from motor adapter (28). (Fig. 1)
6. Remove motor adapter (28) from small internal gear (26).
7. Remove small internal gear (26) from transition plate (20).
8. Remove 'O' rings (27) from small internal gear (26).

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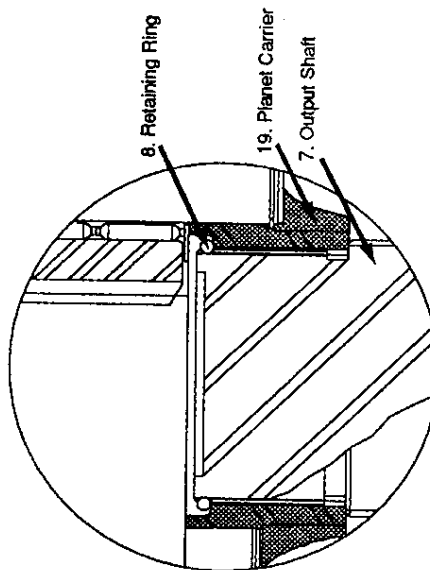


Fig. 2

Introduction:

The Model 52D joins a Model 50 planetary reducer with a Model 20 planetary reducer through the use of a transition plate (20) and an intermediate gear (23).

Warning:

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

1. Lubricate planet bearings (34) and press into planet gear (35). (Fig. 9)
2. Lubricate thrust washers (33), 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 (36) and insert into planet pin hole in planet carrier (25) from splined side of carrier. Drive planet pin (36) through thrust washers and planet gear, into opposite planet pin hole in carrier housing. (Fig. 5 & 9)
4. Secure planet pin (36) with retaining rings (37) on each end of planet pin. (Fig. 9)
5. Repeat steps 1-4 for installation of two remaining planet gears. At this point, small carrier assembly is complete.

(continued)

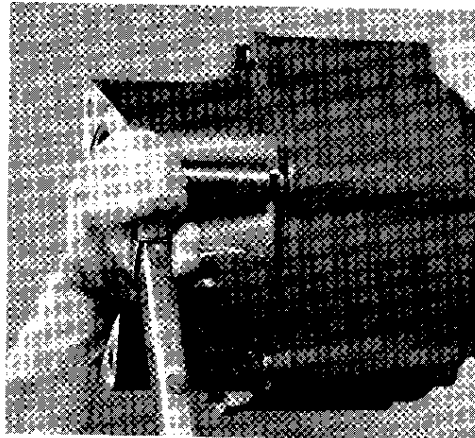


Fig. 1

Model 52D Disassembly Instructions, Continued

Model 52D Assembly Instructions, Continued

9. Remove sungear (31) from small planet gears (35).
10. Remove small planet carrier assembly (25) from large planet gears (40).
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).
14. 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)
15. Lift planet carrier assembly (19) from shaft (7).
16. Bend tab on lock washer (17) away from lock nut (18).
17. Using a spanner wrench or HECO tool #59150, unscrew lock nut (18) and remove lock washer (17) and keyed washer (16). (Fig. 4)
18. Take unit out of vice and turn it over. Remove eight cap screws (1) from seal carrier (3). (Fig. 7)
19. Remove seal carrier (3) from housing (11).
20. Remove 'O' ring (6), quad and backup rings (5 & 4) and shaft seal (2) from seal carrier (3) and discard. (Fig. 8)

(continued)

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.
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)

(continued)

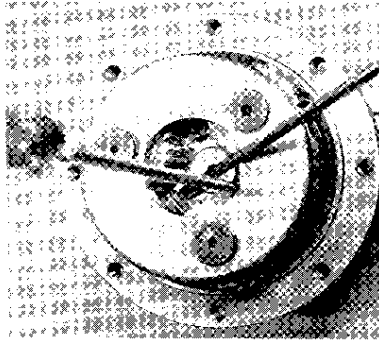


Fig. 3

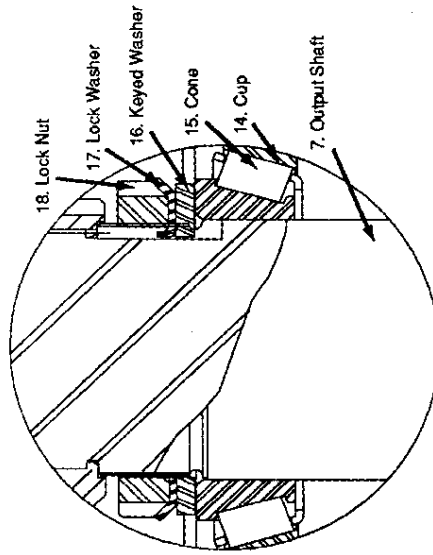


Fig. 4



Fig. 6

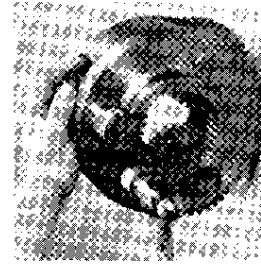


Fig. 5

Model 52D Disassembly Instructions, Continued

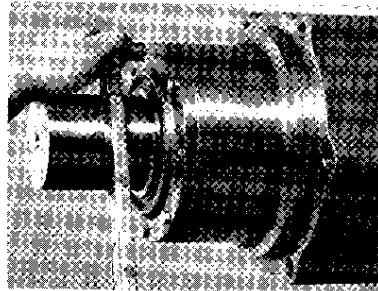
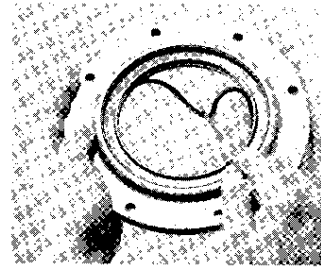
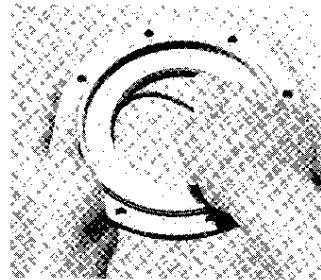
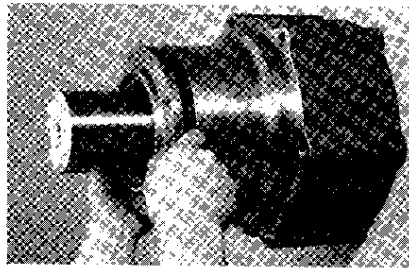


Fig. 7

21. 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.
Carefully drive bearing cups (10 & 14) out of housing (11).
22. Remove retaining rings (37) from ends of planet pins (36). (Fig. 9)
23. Support small planet carrier (25) spline side down and drive planet pins (36) out of planet carrier (25), from input side of carrier. (Fig. 9 & 5)
24. Remove small planet gears (35) and thrust washers (33) from small planet carrier (25). (Fig. 9)
25. Remove planet bearings (34) from small planet gears (35).
26. Remove retaining ring (24) from intermediate gear (23).
27. Remove intermediate gear (23) from small planet carrier (25).
28. Examine brass thrust plug (22) in end of intermediate gear (23). If wear is apparent, remove by inserting a 1/4" self tapping screw and jacking the plug out of the gear.
29. Remove retaining rings (38) from ends of planet pins (42). (Fig. 9)
30. Support planet carrier (19) spline side down and drive planet pins (42) out of planet carrier (19). (Fig. 9 & 5)
31. Remove planet gears (40) and thrust washers (41) from planet carrier (19). (Fig. 9)
32. Remove planet bearings (39) from planet gears (40).
33. 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. 8



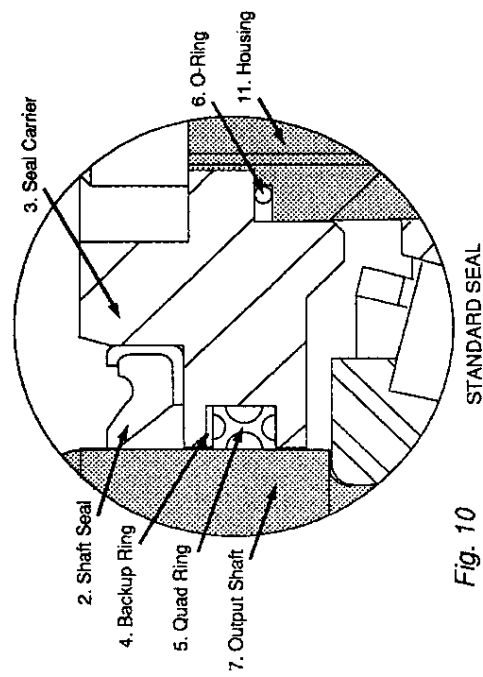
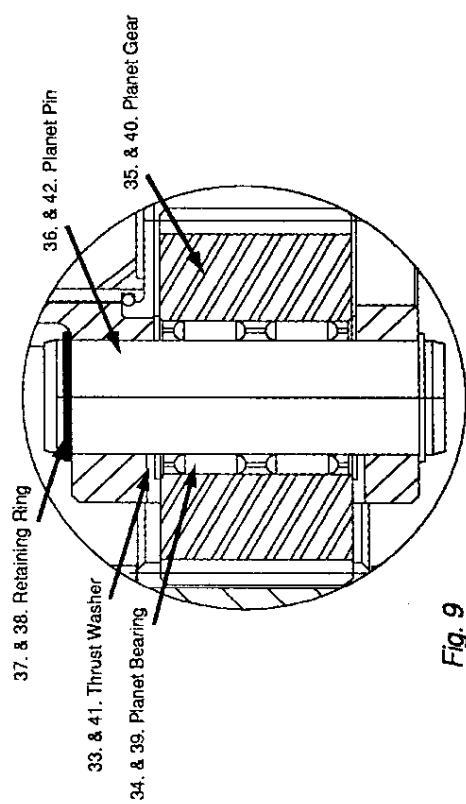
Model 52D Assembly Instructions, Continued

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 large planet carrier assembly spline onto shaft spline. 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)
20. Lubricate and place 'O' ring (13) onto pilot of transition plate (20).
Note: Beware of sharp edges or burrs on adapter pilot.

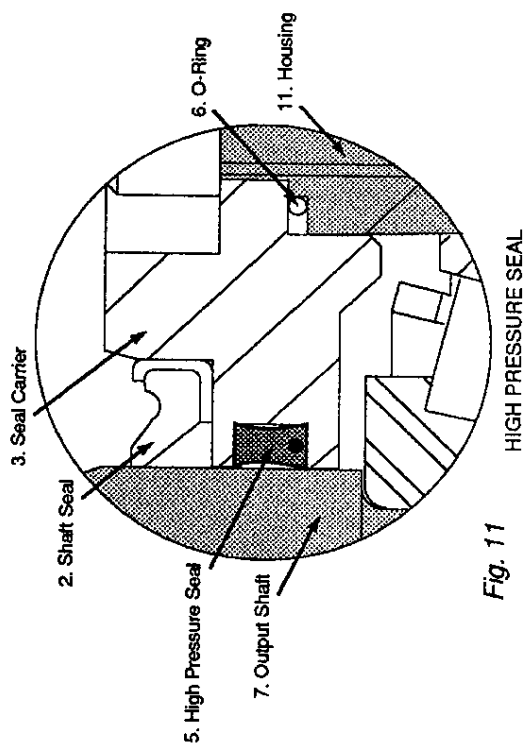
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Model 52D Assembly Instructions, Continued

21. Place transition plate (20) pilot into counter-bore 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)
Note: Check for sharp edges or burrs on housing pilot.
24. 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.
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)
Turn unit over and support, shaft down. Lubricate intermediate gear and small planet carrier assembly, place gear in mesh with large planet gears (40). (Fig. 12)
26. (continued)



Model 52D Assembly Instructions, Continued



27. 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 counterbore 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)
23. Tighten pipe plugs (12 & 29) into holes in housing (11) and motor adapter (28).
24. 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)

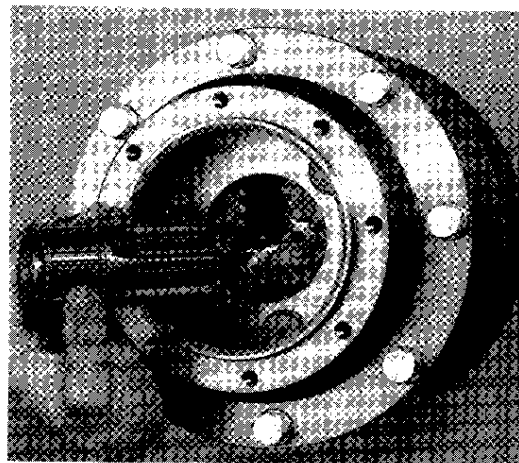


Fig. 12