



MODEL 120 PLANETARY GEAR DRIVE SERVICE MANUAL



WARNING: While working on this equipment, use safe lifting procedures, wear adequate clothing and wear hearing, eye and respiratory protection.

THIS SERVICE MANUAL IS EFFECTIVE:
S/N: 17802 TO CURRENT
DATE: 2/15/94 TO CURRENT
VERSION: SM120_0307

NOTE: Individual customer specifications (mounting case, output shaft, brake assembly, etc.) may vary from exploded drawing and standard part numbers shown. If applicable, refer to customer drawing for details.



MODEL 120 SINGLE PLANETARY

EFFECTIVE FROM:
S/N 17802
DATE 02/15/94

ITEM	DESCRIPTION	QTY	RATIO	4.42:1	6.00:1
1	BASE	1	-A-	-A-	-A-
2	CARRIER (SEC)	1	81-004-1823	81-004-1823	81-004-1833
4	COVER	1	-D-	-D-	-D-
5	RING GEAR	1	81-004-2362	81-004-2362	81-004-2362
6	PLANET SHAFT (SEC)	3	81-004-0061	81-004-0061	81-004-0061
8	PLANET GEAR (SEC)	3	81-004-0722	81-004-0722	81-004-0722
11	INPUT GEAR	1	-H-	-H-	-H-
12	OUTPUT SHAFT	1	-I-	-I-	-I-
13	THRUSTWASHER-PLANET	6	81-004-1561	81-004-1561	81-004-1561
14	THRUSTWASHER-SEC	1	81-004-2711	81-004-2711	81-004-2711
15	BEARING CONE	1	01-102-0030	01-102-0030	01-102-0030
16	BEARING CONE	1	01-102-0020	01-102-0020	01-102-0020
17	BEARING CUP	1	01-103-0030	01-103-0030	01-103-0030
18	BEARING CUP	1	01-103-0020	01-103-0020	01-103-0020
19	LOCKNUT	1	01-104-0040	01-104-0040	01-104-0040
20	LOCKWASHER	1	01-104-0030	01-104-0030	01-104-0030
21	BEARING-SEC, PLANET	6	01-105-0420	01-105-0420	01-105-0420
24	INPUT THRUST WASHER	1	81-004-2701	81-004-2701	81-004-2701
25	HEX HD CAPSCREW	8	01-150-1020	01-150-1020	01-150-1020
26	FLANGE 12-PT SCREW	16	01-150-1460	01-150-1460	01-150-1460
27	ROLL PIN-SEC. PLANET	3	01-153-0020	01-153-0020	01-153-0020
29	LOCKWASHER	8	01-166-0010	01-166-0010	01-166-0010
30	FLAT WASHER-HARDENED	16	01-166-0120	01-166-0120	01-166-0120
31	MAGNETIC PIPE PLUG	2	01-207-0041	01-207-0041	01-207-0041
32	MAGNETIC PIPE PLUG	1	01-207-0070	01-207-0070	01-207-0070
33	GREASE FITTING	1	01-215-0040	01-215-0040	01-215-0040
34	O-RING	2	01-402-0420	01-402-0420	01-402-0420
35	SHAFT SEAL- OUTER	1	01-405-0270	01-405-0270	01-405-0270
36	SHAFT SEAL- INNER	1	01-405-0280	01-405-0280	01-405-0280
37	RETAINING RING	1	01-160-0350	01-160-0350	01-160-0350
38	THRUST WASHER SGL PL	1	81-004-2883	81-004-2883	81-004-2883

NOTE	CODE	BASE	PART NUMBER
-A-	A120	ROUND FLANGE	81-004-0342
	B120	SQUARE FLANGE	81-004-0592
	F120	FLANGELESS	81-004-1142
	C120	CUSTOM	

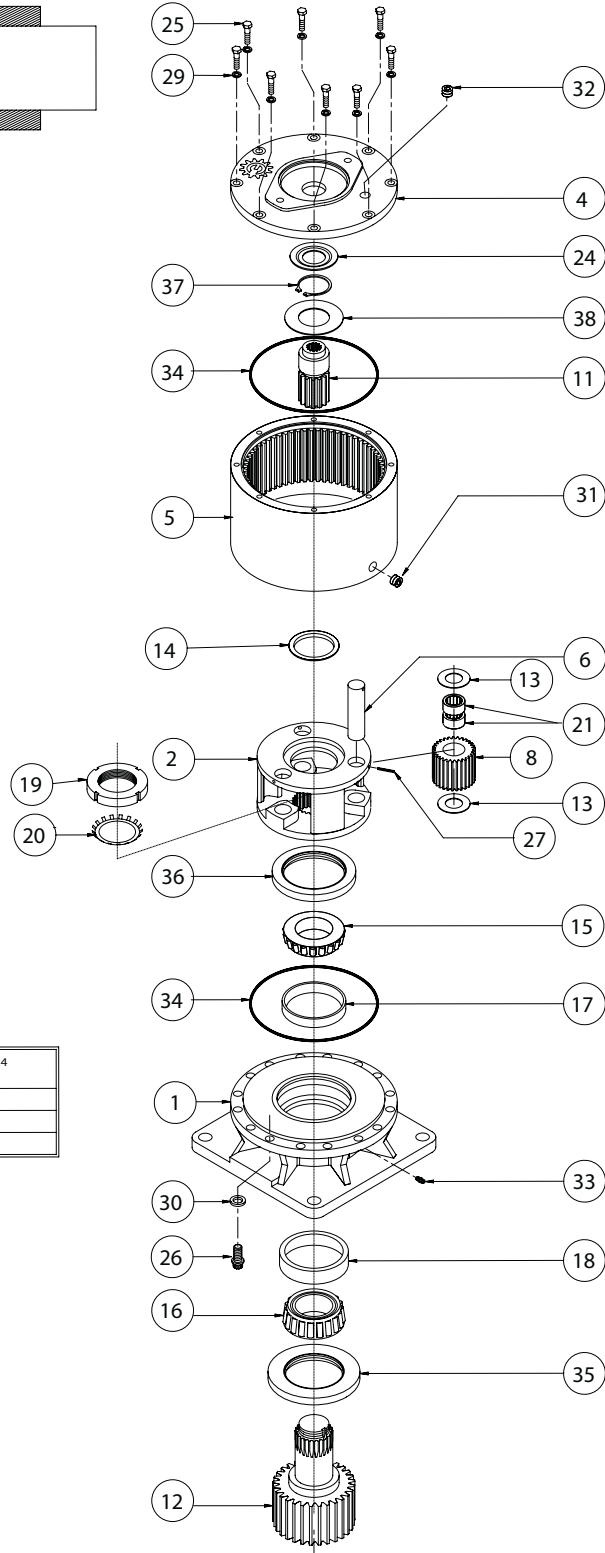
NOTE	CODE	COVER	EXCEPT WITH CODE 4 INPUT	WITH CODE 4 INPUT ONLY
-D-	A	SAE 'A' MOD. 4 BOLT	81-004-2803	81-004-2813
	B	SAE 'B' 2 BOLT	81-004-2723	81-004-2823
	C	SAE 'C' 2 BOLT AND 4 BOLT	81-004-2833	81-004-2833

NOTE	CODE	INPUT GEAR DESCRIPTION	PART NUMBER	
			4.42:1 RATIO	6.00:1 RATIO
-H-	1	21 T 20/40 DP	N/A	81-004-2242
	2	13 T 16/32 DP	N/A	N/A
	3	SAE 1"-6B	81-004-1592	81-004-1572
	4	14T 12/24 DP	81-004-1582	81-004-1902
	5	15 T 16/32 DP	N/A	N/A

NOTE	CODE	OUTPUT SHAFT	PART NUMBER
-I-	D1	23 T 8/16 DP SPL 2.25" LG	81-004-1392
	D2	3.000" DIA, 5/8" SQ KEY	81-004-0992
	D3	23 T 8/16 DP SPL 1.22" LG	81-004-1412
	D4	23 T 8/16 DP SPL 2.72" LG	81-004-0942
	D5	3.500" DIA, 7/8" SQ KEY	81-004-1152
	C1	CUSTOM	

OPTIONS:

SEAL KIT P/N 81-016-0311
(INCLUDES 2 OF ITEM 34 AND
1 EACH OF ITEMS 35 AND 36)



ECN1803
X120ND1-HC DATE 05-1-00



MODEL 120 DOUBLE PLANETARY

EFFECTIVE FROM:

S/N 17802

DATE 2/15/94

ITEM	DESCRIPTION	QTY	RATIO 19.5:1	RATIO 26.52:1	RATIO 36.00:1
1	BASE	1	-A-	-A-	-A-
2	CARRIER (SEC)	1	81-004-2863	81-004-2863	81-004-2873
3	CARRIER (PRI)	1	81-004-2732	81-004-2742	81-004-2742
4	COVER	1	-D-	-D-	-D-
5	RING GEAR	1	81-004-2362		
6	PLANET SHAFT (SEC)	3	81-004-0061		
7	PLANET SHAFT (PRI)	3	81-004-0071		
8	PLANET GEAR (SEC)	3	81-004-0722	81-004-0722	81-004-0082
9	PLANET GEAR (PRI)	3	81-004-0642	81-004-0532	81-004-0532
10	SUN GEAR	1	81-004-0712	81-004-0712	81-004-0122
11	INPUT GEAR	1	-H-	-H-	-H-
12	OUTPUT SHAFT	1	-I-	-I-	-I-
13	THRUST WASHER- PLANET	12	81-004-1561		
14	THRUST WASHER- SEC.	1	81-004-2711		
15	BEARING CONE	1	01-102-0030		
16	BEARING CONE	1	01-102-0020		
17	BEARING CUP	1	01-103-0030		
18	BEARING CUP	1	01-103-0020		
19	LOCKNUT	1	01-104-0040		
20	LOCKWASHER	1	01-104-0030		
21	BEARING- SEC. PLANET	6	01-105-0420		
22	BEARING- PRI. PLANET	3	01-105-0410		
23	-	-	-		
24	INPUT THRUST WASHER	1	81-004-2701		
25	HEX HD CAPSCREW	8	01-150-1020		
26	FLANGE 12-PT SCREW	16	01-150-1460		
27	ROLL PIN- SEC. PLANET	3	01-153-0020		
28	ROLL PIN- PRI. PLANET	3	01-153-0180		
29	LOCKWASHER	8	01-166-0010		
30	FLAT WASHER-HARDENED	16	01-166-0120		
31	MAGNETIC PIPE PLUG	2	01-207-0041		
32	MAGNETIC PIPE PLUG	1	01-207-0070		
33	GREASE FITTING	1	01-215-0040		
34	O-RING	2	01-402-0420		
35	SHAFT SEAL- OUTER	1	01-405-0270		
36	SHAFT SEAL- INNER	1	01-405-0280		

NOTE	CODE	BASE	PART NUMBER
-A-	A	120 ROUND FLANGE	81-004-0342
	B	120 SQUARE FLANGE	81-004-0592
	F	120 FLANGELESS	81-004-1142
	C	120	CUSTOM

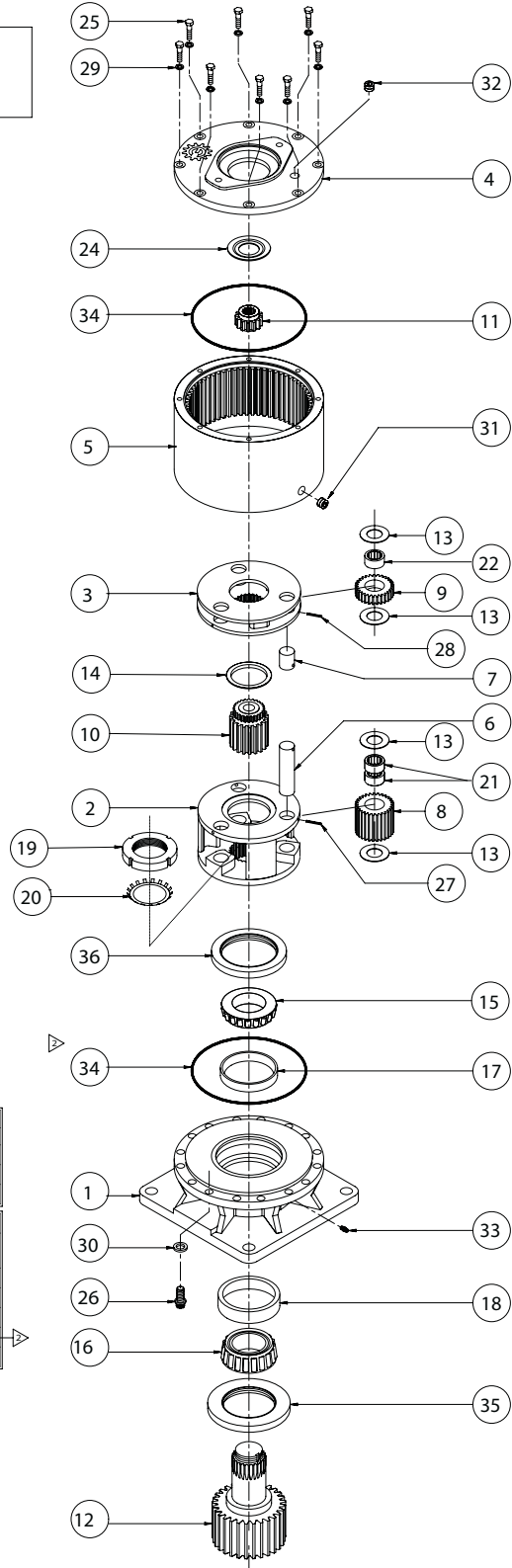
36:1 UNITS WITH CODE 4 INPUT ONLY:
REPLACE ITEM 24 (81-004-2701)
WITH: 1 EACH OF 01-112-0220
2 EACH OF 01-112-0230
ADD 1 OF ITEM 14 (81-004-2711)

NOTE	CODE	COVER	WITH CODE 4 INPUT ONLY		
			ALL EXCEPT CODE 4 INPUT	ALL EXCEPT 36:1	36:1 ONLY
-D-	A	SAE 'A' 2 AND MOD. 4 BOLT	81-004-2803	81-004-2813	81-004-2923
	B	SAE 'B' 2 BOLT	81-004-2723	81-004-2823	81-004-2913
	C	SAE 'C' 2 BOLT AND 4 BOLT	81-004-2833	81-004-2833	81-004-2893

NOTE	CODE	INPUT GEAR DESCRIPTION	PART NUMBER		
			19.5:1 RATIO	26.52:1 RATIO	36.00:1 RATIO
-H-	1	21 T 20/40 DP	81-004-2342	81-004-2342	N/A
	2	13 T 16/32 DP	81-004-0652	81-004-0482	81-004-0482
	3	SAE 1"-68	83-004-1112	83-004-1082	83-004-1082
	4	14 T 12/24 DP	81-004-1342		SPECIAL 81-004-2792
	5	15 T 16/32 DP	81-004-1892	81-004-2552	81-004-2552

NOTE	CODE	OUTPUT SHAFT	PART NUMBER
-I-	D1	23 T 8/16 DP SPL 2.25" LG	81-004-1392
	D2	3.000" DIA, 5/8" SQ KEY	81-004-0992
	D3	23 T 8/16 DP SPL 1.22" LG	81-004-1412
	D4	23 T 8/16 DP SPL 2.72" LG	81-004-0942
	D5	3.500" DIA, 7/8" SQ KEY	81-004-1152
	C1	CUSTOM	

OPTIONS:
SEAL KIT P/N 81-016-0311
(INCLUDES 2 EA, ITEM 34 AND
1 EA ITEMS 35 AND 36)



ECN 1803
X120ND2-HD DATE 5-1-00

MODEL 120 SERVICE MANUAL SINGLE & DOUBLE PLANETARY

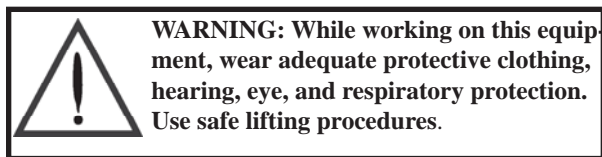
This manual will assist in disassembly and assembly of major components for all Model 120 Planetary Gearboxes including single and double planetary models. Item numbers, indicated in parentheses throughout this manual, refer to the Eskridge Model 120 exploded parts breakdown drawings. Individual customer specifications (mounting case, output shaft, brake assembly, etc.) may vary from exploded drawing and standard part numbers shown. If applicable, refer to individual customer drawing for details.

LUBRICATION AND MAINTENANCE

The manufacturer recommends changing oil after the first 50 hours of operation. Oil should be changed at 500 hour intervals thereafter. All gear boxes require GL-5 grade EP 80/90 gear oil for lubrication. Manufacturer also recommends that unit be partially disassembled to inspect gears and bearings at 1000 hour intervals. The standard Model 120 gearbox is equipped with a grease fitting **(33)** for lubrication of the output shaft bearings. The bearings should be greased sparingly with lithium or general purpose grease every 50 operating hours or at regular maintenance intervals.

OIL CAPACITIES:

Horizontal shaft operating position: 2.5 pints
Vertical shaft operating position: 4.25 pints



BEFORE DISASSEMBLY

There are two types of units: Single planetary without a primary planet carrier and double planetary with a primary planet carrier. **Steps with an asterisk (*) apply only to the double planetary models.**

UNIT DISASSEMBLY PROCEDURE

- 1) Scribe a diagonal line across the outside of the unit from the cover **(4)** to the base **(1)** before disassembly to aid in the proper positioning of pieces during reassembly.
- 2) Remove magnetic drain plugs **(31,32)** and drain oil from unit. Maximum drainage occurs when oil is warm.
- 3) Remove 8 cover bolts **(25)** and lockwashers **(29)**.
- 4) Lift off cover **(4)**. Remove input thrust washer **(24)** and input gear **(11)**.

*5) Slide primary planet carrier assembly **(items 3,7,9,13,22 & 28)** out of unit by lifting up on planet carrier **(3)**.

6) Remove 12-point flange screws **(26)**, washers **(30)** and ring gear **(5)**.

*7) Remove sun gear **(10)**.

8) Remove planet shafts **(6)** and gears **(8)** by following the procedure on the facing page SECONDARY PLANET CARRIER SUBASSEMBLY.

9) Remove locknut **(19)** and washer **(20)** from output shaft **(12)**. The locknut may have to be removed by splitting in half with a chisel.

CAUTION: The output shaft is no longer retained. Care should be taken if moving base because output shaft can fall out. Care also should be taken not to injure feet or damage output shaft when shaft is pressed through base.

10) Output shaft removal. Base **(1)** should be set pinion side down on a plate or table with output shaft **(12)** protruding through a hole in table. Press output shaft out bottom of base by applying a load to top end (internal end) of shaft until it passes through inner shaft bearing cone **(15)**.

11) The unit is now disassembled into groups of parts. The area(s) requiring repair should be identified by thorough inspection of the parts after they have been cleaned and dried. Then refer to the appropriate group repair section below.

1. Output Shaft subassembly
- *2. Primary Planet Carrier subassembly
3. Secondary Planet Carrier subassembly
4. Base subassembly

* applies only to the double planetary models.

OUTPUT SHAFT SUBASSEMBLY (ITEMS 12,16 & 35) DISASSEMBLY AND REPAIR

1) Tapered bearing cone **(16)** may be removed using a gear puller. If reusing old bearing cone, do not pull on or damage roller cage.

2) Remove old seal **(35)** and discard. Lubricate inner lip of new seal **(35)** and turn so open side is upward. Slide seal down output shaft **(12)** all the way to gear teeth or until it fits snug over shaft seal diameter.

NOTE: Press bearing cone onto output shaft by pressing on inner race only. DO NOT press on roller cage or it may damage bearing.

3) Press bearing cone **(16)**(large end down) onto output shaft **(12)**. Be sure bearing cone is seated tightly against shoulder of output shaft. If old bearing cone **(16)** was removed only to replace seal, it may be reused.

*PRIMARY PLANET CARRIER SUBASSEMBLY (ITEMS 3,7,9,13,22 & 28) DISASSEMBLY AND REPAIR

*1) Drive roll pins **(28)** completely into planet shafts **(7)**.

*2) Press or drive shafts out of carrier **(3)**.

*3) Slide planet gears **(9)** and planet thrust washers **(13)** out of primary carrier **(3)**.

*4) If planet bearings **(22)** must be replaced, they may now be pressed out of primary planet gears **(9)**.

*5) Use a 1/8 inch pin punch to remove roll pins from primary planet shafts **(7)**.

*6) Rebuild primary planet carrier assembly in reverse order using any needed new parts.

*7) Planet shafts **(7)** should be installed with chamfered end of 1/8 inch hole toward outside diameter of the carrier **(3)**. This will aid in alignment of holes while inserting roll pins **(28)**.

SECONDARY PLANET CARRIER SUBASSEMBLY (ITEMS 2,6,8,13,19,20,21 & 27) DISASSEMBLY AND REPAIR

NOTE: Do not rebuild planet carrier assembly until step number 15 of UNIT ASSEMBLY. The locknut **(19)** and lockwasher **(20)** cannot be installed when the planet gears are in place.

1) Drive roll pins **(27)** completely into planet shafts **(6)**.

2) Pry planet shafts **(6)** upwards out of carrier **(2)** using a screwdriver or similar tool between bottom of carrier and top of base **(1)**.

3) Slide planet gears **(8)** and planet washers **(13)** out of carrier **(2)**.

4) Use a 1/8 inch pin punch to remove roll pins **(27)** from the planet shafts **(6)**.

5) If planet bearings **(21)** must be replaced, they may now be pressed out of planet gears **(8)**.

* applies only to the double planetary models.

BASE SUBASSEMBLY (ITEMS 1,15,17,18,33,34 & 36) DISASSEMBLY AND REPAIR

1) Inspect inner and outer bearing cups (17,18). Bearing cups are not removable. If cups are damaged, cups and base (1) may need replacement. Contact Eskridge, Inc. if you have questions.

2) Remove and inspect o-ring (34), inner shaft seal (36), and inner bearing cone (15).

UNIT ASSEMBLY REASSEMBLING

1) When all the subassemblies are complete, unit is ready to be assembled. Start with base (1) with internal end down (end with 16 holes) on the press table. Apply a thick layer of lithium or general purpose bearing grease to surface of bearing cup (18).

2) Invert output shaft assembly (threaded end down) and carefully lower it into base (1) until bearing cone (16) is seated.

3) Press outer shaft seal (35) into base until it is flush using a press fixture or a hammer and a large flat-ended bar or rod.

CAUTION: Output shaft is not retained at this point.

4) Invert unit and stand it on end of output shaft (12) (pinion down, so that shaft is supporting base assembly).

5) While holding end of output shaft (12) with one hand, rotate base (1) to be sure it moves freely. The slight resistance you feel is due to seal load on output shaft.

6) Grease inner bearing cup (17) using lithium or general purpose grease.

NOTE: Press bearing cone onto output shaft by pressing on inner race only. DO NOT press on roller cage or it may damage bearing.

7) Slide bearing cone (15) (small end down) over internal end of output shaft. Press bearing on slowly until it is just seated.

8) Install inner shaft seal (36).

9) Install secondary carrier (2). Move carrier by hand until you are certain carrier spline has started cleanly and squarely onto shaft spline. Note that this is a press fit. Press carrier slowly onto shaft spline.

NOTE 1: Torque at proper bearing preload will vary according to the application. At output speeds of greater than

25 RPM, preload torque (including seal drag) should be in the range of 20 to 50 in-lbs. At less than 25 RPM, torque should be 50 to 80 in-lbs.

NOTE 2: Bearing preload is achieved by tightening locknut (19) against the secondary carrier (2).

NOTE 3: Bearing preload will be determined by measuring bearing rolling resistance which is the torque required to turn shaft (or to turn base with shaft stationary). Torque can be measured with a spring scale attached to the base. For example, with shaft stationary, if a scale is attached to the base, measuring 5 inches from the center of the gearbox and it takes 10 lb. force to rotate base, then preload torque is 5 inch x 10 lb = 50 in-lbs.

10) Install lockwasher (20) and locknut (19). Tighten locknut against top of carrier and measure preload torque between base (1) and shaft (12). If torque is not correct, tighten or loosen locking nut as required and try again. Once preload torque is correct, set the locknut by bending a tab on lockwasher into slot on locknut. For extreme applications that require very high preload, it may be necessary to further secure the locknut by deforming the threads with a centerpunch or by applying an wicking type anaerobic locking compound such as *Loctite Threadlocker 290*.

11) Lubricate a new o-ring (34) with general purpose grease and place over pilot on base (1).

12) **To assemble secondary carrier:** Install planet gears (8) into carrier (2) with a planet washer (13) on both sides of the planet gear and with bearings (21) installed, slide gear into carrier. Insert planet shaft (6) through carrier, planet gear, and washers. Planet shafts (6) should be installed with chamfered end of 1/8 inch hole toward outside diameter of carrier (2). This will aid in alignment of holes while inserting roll pins (27).

CAUTION: Hold ring gear by outside diameter to avoid injuring fingers.

13) Place ring gear (5) over secondary carrier assembly. Rotate until bolt holes line up with holes in base and one of the two drain holes in ring gear as near as possible to grease fitting (33) in base, or to customer specifications.

14) Apply thread locking compound and install 16 flange screws (26) and washers (30) and torque to 110 ft-lbs.

15) Put pipe sealant on magnetic pipe plugs (31) and install into drain holes on ring gear (5).

16) Place thrust washer (14) onto center of secondary planet carrier assembly.

*17) Install sun gear (10) into center of secondary planet carrier.

*18) Install primary planet carrier assembly by rotating it until planet gears line up with ring gear teeth and sun gear

* applies only to the double planetary models.

spline. Assembly should drop into place.

NOTE: This model does not require a gear timing procedure.

19) Install input gear **(11)**.

20) **Single planetary models only:** Place thrust washer **(38)** over input gear and install retaining ring **(37)** onto input gear.

21) Place input thrust washer **(24)** over input gear.

22) Add gear oil as specified on page 2. Correct oil level will measure to middle of primary planet gears with unit in vertical shaft position.

23) Install new o-ring **(34)** over pilot of cover **(4)**.

24) Place cover **(4)** on top of unit and refer to scribed line for proper orientation. Install and torque eight capscrews **(25)** with lockwashers **(29)** to 32 ft-lbs.

25) Put pipe sealant on magnetic plug **(32)** and install into oil fill hole in cover.

26) Insert a shaft into input gear **(11)** and rotate by hand to be sure unit runs smoothly and easily.

THE GEARBOX IS NOW READY TO USE.