



## MODEL 120L 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: SM120L\_0307

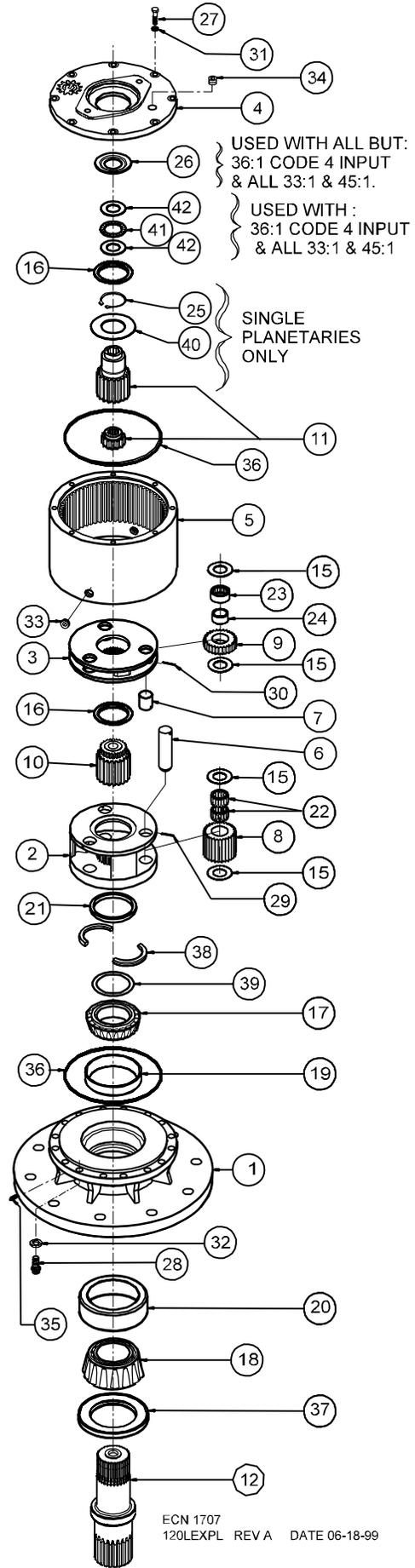
**NOTE:** Individual customer specifications (mounting case, output shaft, brake assembly, etc.) may vary from exploded drawing and standard part numbers shown. If applicable, refer to customer drawing for details.

ITEM	QTY	MODEL 120L DESCRIPTION	SGL PLANETARY		DOUBLE PLANETARY					
			PART NO. RATIO 4.42:1	PART NO. RATIO 6.00:1	PART NO. RATIO 19.54:1	PART NO. RATIO 26.52:1	PART NO. RATIO 33.00:1	PART NO. RATIO 36.00:1 W/O CODE 4	PART NO. RATIO 36.00:1 W/O CODE 4	PART NO. RATIO 45.00:1
BASE	1	A120 - ROUND FLANGE	81-004-0342	81-004-0342	81-004-0342	81-004-0342	81-004-0342	81-004-0342	81-004-0342	81-004-0342
		B120 - SQUARE FLANGE	81-004-0592	81-004-0592	81-004-0592	81-004-0592	81-004-0592	81-004-0592	81-004-0592	81-004-0592
		E120 - RECTANGULAR	81-004-3072	81-004-3072	81-004-3072	81-004-3072	81-004-3072	81-004-3072	81-004-3072	81-004-3072
		F120 - FLANGELESS	81-004-1142	81-004-1142	81-004-1142	81-004-1142	81-004-1142	81-004-1142	81-004-1142	81-004-1142
		C120 - CUSTOM								
	2	CARRIER (SEC)	81-004-2763	81-004-2773	81-004-2763	81-004-2763	81-004-2763	81-004-2773	81-004-2773	81-004-2773
	3	CARRIER (PRI)	N/A	N/A	81-004-2732	81-004-2742	81-004-8022	81-004-2742	81-004-2742	81-004-8022
COVER	4	SAE 'A' 2 & MOD. 4 BOLT	81-004-2803	81-004-2803	81-004-2803	81-004-2803	81-004-2923		81-004-2803	81-004-2923
		SAE 'A' 2 & MOD. 4 BOLT W/ CODE 4	81-004-2813	81-004-2813	81-004-2813	81-004-2813	81-004-2923	81-004-2923		81-004-2923
		SAE 'B' 2 BOLT	81-004-2723	81-004-2723	81-004-2723	81-004-2723	81-004-2913		81-004-2723	81-004-2913
		SAE 'B' 2 BOLT W/ CODE 4	81-004-2823	81-004-2823	81-004-2823	81-004-2823	81-004-2913	81-004-2913		81-004-2913
		SAE 'C' 2 BOLT & 4 BOLT	81-004-2833	81-004-2833	81-004-2833	81-004-2833	81-004-2893		81-004-2833	81-004-2893
		SAE 'C' 2 BOLT & 4 BOLT W/ CODE 4	81-004-2833	81-004-2833	81-004-2833	81-004-2833	81-004-2893	81-004-2893		81-004-2893
	5	1	RING GEAR	81-004-2362	81-004-2362	81-004-2362	81-004-2362	81-004-2362	81-004-2362	81-004-2362
	6	PLANET SHAFT (SEC)	81-004-0061	81-004-0061	81-004-0061	81-004-0061	81-004-0061	81-004-0061	81-004-0061	
	7	PLANET SHAFT (PRI)	N/A	N/A	81-004-0071	81-004-0071	81-004-0071	81-004-0071	81-004-0071	
	8	PLANET GEAR (SEC)	81-004-2472	81-004-2462	81-004-2472	81-004-2472	81-004-2462	81-004-2462	81-004-2462	
	9	PLANET GEAR (PRI)	N/A	N/A	81-004-1752	81-004-1762	81-004-8012	81-004-1762	81-004-1762	81-004-8012
	10	SUN GEAR	N/A	N/A	81-004-0712	81-004-0712	81-004-0712	81-004-0122	81-004-0122	81-004-0122
INPUT GEAR	11	CODE 1 - INPUT - 21 T 20/40 DP	N/A	81-004-2242	81-004-2342	N/A	N/A	N/A	N/A	N/A
		CODE 2 - INPUT - 13 T 16/32 DP	N/A	N/A	81-004-0652	81-004-0482	81-004-8002	N/A	81-004-0482	81-004-8002
		CODE 3 - INPUT - SAE 1"-6B	81-004-1592	81-004-1572	83-004-1112	83-004-1082	81-004-8122	N/A	83-004-1082	81-004-8122
		CODE 4 - INPUT - 14 T 12/24 DP	81-004-1582	81-004-1902	81-004-1342	SPECIAL	81-004-8072	81-004-2792	N/A	81-004-8072
		CODE 5 - INPUT - 15 T 16/32 DP	N/A	N/A	81-004-1892	81-004-2552	N/A	N/A	81-004-2552	N/A
OUTPUT SHAFT	12	D1 23 T 8/16 DP SPL 2.25" LG	81-004-1392L	81-004-1392L	81-004-1392L	81-004-1392L	81-004-1392L	81-004-1392L	81-004-1392L	81-004-1392L
		D2 3.000" DIA, 5/8" SQ KEY	81-004-0992L	81-004-0992L	81-004-0992L	81-004-0992L	81-004-0992L	81-004-0992L	81-004-0992L	81-004-0992L
		D3 23 T 8/16 DP SPL 1.22" LG	81-004-1412L	81-004-1412L	81-004-1412L	81-004-1412L	81-004-1412L	81-004-1412L	81-004-1412L	81-004-1412L
		D4 23 T 8/16 DP SPL 2.72" LG	81-004-0942L	81-004-0942L	81-004-0942L	81-004-0942L	81-004-0942L	81-004-0942L	81-004-0942L	81-004-0942L
		D5 3.500" DIA, 7/8" SQ KEY	81-004-1152L	81-004-1152L	81-004-1152L	81-004-1152L	81-004-1152L	81-004-1152L	81-004-1152L	81-004-1152L
		C1 CUSTOM								
	15	6	THRUST WASHER - PLANET	81-004-1561	81-004-1561	N/A	N/A	N/A	N/A	N/A
		12	THRUST WASHER - PLANET	N/A	N/A	81-004-1561	81-004-1561	81-004-1561	81-004-1561	81-004-1561
	16	1	THRUST WASHER - SECONDARY	N/A	N/A	81-004-2711	81-004-2711	N/A	N/A	81-004-2711
		2	THRUST WASHER - SECONDARY	N/A	N/A	N/A	N/A	81-004-2711	81-004-2711	N/A
	17	1	BEARING CONE	01-102-0030	01-102-0030	01-102-0030	01-102-0030	01-102-0030	01-102-0030	01-102-0030
	18	1	BEARING CONE	01-102-0020	01-102-0020	01-102-0020	01-102-0020	01-102-0020	01-102-0020	01-102-0020
	19	1	BEARING CUP	01-103-0030	01-103-0030	01-103-0030	01-103-0030	01-103-0030	01-103-0030	01-103-0030
	20	1	BEARING CUP	01-103-0020	01-103-0020	01-103-0020	01-103-0020	01-103-0020	01-103-0020	01-103-0020
	21	1	LOCK RING	81-004-8111	81-004-8111	81-004-8111	81-004-8111	81-004-8111	81-004-8111	81-004-8111
	22	6	BEARING - SEC. PLANET	01-105-0500	01-105-0500	01-105-0500	01-105-0500	01-105-0500	01-105-0500	01-105-0500
	23	3	BEARING - PRI. PLANET	N/A	N/A	01-105-0460	01-105-0460	01-105-0460	01-105-0460	01-105-0460
	24	3	BEARING RACE - PRI. PLANET	N/A	N/A	01-105-0470	01-105-0470	01-105-0470	01-105-0470	01-105-0470
	25	1	RETAINING RING	01-160-0350	01-160-0350	N/A	N/A	N/A	N/A	N/A
	26	1	INPUT THRUST WASHER	81-004-2701	81-004-2701	81-004-2701	81-004-2701	N/A	N/A	81-004-2701
	27	8	HEX HD CAPSCREW	01-150-1020	01-150-1020	01-150-1020	01-150-1020	01-150-1020	01-150-1020	01-150-1020
	28	16	FLANGE 12-PT SCREW	01-150-1460	01-150-1460	01-150-1460	01-150-1460	01-150-1460	01-150-1460	01-150-1460
	29	3	ROLL PIN - SEC. PLANET	01-153-0210	01-153-0210	01-153-0210	01-153-0210	01-153-0210	01-153-0210	01-153-0210
	30	3	ROLL PIN - PRI. PLANET	N/A	N/A	01-153-0180	01-153-0180	01-153-0180	01-153-0180	01-153-0180
	31	8	LOCKWASHER	01-166-0010	01-166-0010	01-166-0010	01-166-0010	01-166-0010	01-166-0010	01-166-0010
	32	16	FLAT WASHER - HARDENED	01-166-0120	01-166-0120	01-166-0120	01-166-0120	01-166-0120	01-166-0120	01-166-0120
	33	2	MAGNETIC PIPE PLUG	01-207-0041	01-207-0041	01-207-0041	01-207-0041	01-207-0041	01-207-0041	01-207-0041
	34	1	MAGNETIC PIPE PLUG	01-207-0070	01-207-0070	01-207-0070	01-207-0070	01-207-0070	01-207-0070	01-207-0070
	35	1	PIPE PLUG 1/4 NPT (SOC.HD.)	01-207-0020	01-207-0020	01-207-0020	01-207-0020	01-207-0020	01-207-0020	01-207-0020
	36	2	O-RING	01-402-0420	01-402-0420	01-402-0420	01-402-0420	01-402-0420	01-402-0420	01-402-0420
	37	1	SHAFT SEAL - OUTER	01-405-0270	01-405-0270	01-405-0270	01-405-0270	01-405-0270	01-405-0270	01-405-0270
	38	1	SPLIT RING	81-004-8101	81-004-8101	81-004-8101	81-004-8101	81-004-8101	81-004-8101	81-004-8101
	39	*	SHIMS	80-004-1151	80-004-1151	80-004-1151	80-004-1151	80-004-1151	80-004-1151	80-004-1151
	40	1	THRUST WASHER SGL PL	81-004-2883	81-004-2883	N/A	N/A	N/A	N/A	N/A
	41	1	BEARING (NTA NO. 0223)	N/A	N/A	N/A	N/A	01-112-0220	01-112-0220	N/A
	42	2	THRUST RACE (TRB NO. 2233)	N/A	N/A	N/A	N/A	01-112-0230	01-112-0230	N/A



# MODEL 120L

EFFECTIVE FOR:  
 FROM: S/N 17802 02/15/94  
 TO: (CURRENT)



(\*) QUANTITY DETERMINED FROM BEARING PRELOAD.

- 1 01-215-0040 GREASE FITTING (OPTIONAL) REPLACES ITEM NO. 35.
- 2 SPECIAL COVER 81-004-2963 FOR 95C BRAKE HAS 15 DEGREE PORT.

OPTIONS:  
 SEAL KIT P/N  
 81-016-2941 (INCLUDES 2 OF  
 ITEM 36 AND 1 OF ITEM 37).

# SERIES 120L SERVICE MANUAL

## SINGLE & DOUBLE PLANETARY GEARDRIVE

This manual will assist in disassembly and assembly of the above model planetary geardrives. Item numbers, indicated in parentheses throughout this manual, refer to the exploded parts breakdown drawing. 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.

For any spare or replacement parts, contact your distributor or equipment manufacturer. Always try to have available the geardrive unit part number, serial number and date code on the serial tag. This information may be necessary for verification of any component part numbers. Component part numbers and/or manufacturing lot numbers may be stamped on individual parts. This information may also be helpful in identifying replacement components.

## LUBRICATION & MAINTENANCE

**Change the oil after the first 50 hours of operation.** Oil should be changed at 500 hour intervals thereafter. Use a GL-5 grade EP 89/90 gear oil (EP = "Extreme Pressure"). The geardrive should be partially disassembled to inspect gears and bearings at 1000 hour intervals.

If your unit was specified "shaft up" or with a "-Z" after the part number, a grease zerk was provided in the base housing. For shaft-up operation, the output bearing will not run in oil and must be grease lubricated. Use a lithium base or general purpose bearing grease sparingly every 50 operating hours or at regular maintenance intervals. Over-greasing the output bearing tends to fill the housing with grease and thicken the oil.

OPERATING POSITION	OIL CAPACITY	OIL LEVEL
Horizontal shaft	2.5 pints (1,2 liters)	To horizontal centerline of geardrive
Vertical shaft	4.25 pints (2,0 liters)	To midway on upper/primary gearset



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

## 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 (33,34) and drain oil from unit. Maximum drainage occurs when oil is warm.
- 3) Remove 8 cover bolts (27) and lockwashers (31).
- 4) Lift off cover (4). Remove input thrust washer (26) and input gear (11).

\*5) Slide primary planet carrier assembly (items 3,7,9,15,23,24 & 30) out of unit by lifting up on planet carrier (3).

6) It is not necessary to remove ring gear (5).

7) Remove secondary planet carrier assembly (items 2,6,8,15,22 & 29), similarly to primary assembly above.

8) Remove lock ring (38) using a heel bar or a puller. If using a heel bar, do not pry against the cage of the inner output shaft bearing cone (17). Remove split ring segments (21).

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

9) 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 (17).

10) 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 12,18 & 37) DISASSEMBLY AND REPAIR

1) Tapered bearing cone **(18)** may be removed using a gear puller. If reusing old bearing cone, do not pull on or damage roller cage.

2) Remove old seal **(37)** and discard. Lubricate inner lip of new seal **(37)** 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 **(18)**(large end down) onto output shaft **(12)**. Be sure bearing cone is seated tightly against shoulder of output shaft. If old bearing cone **(18)** was removed only to replace seal, it may be reused.

## \*PRIMARY PLANETARY SUBASSEMBLY (ITEMS 3,7,9,15,23,24 & 30) DISASSEMBLY AND REPAIR

\*1) Drive roll pins **(30)** into planet shafts **(7)**.

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

\*3) Before sliding planet gears **(9)** and planet thrust washers **(15)** out of primary carrier **(3)**, hold hand under planet gear to catch inner bearing race **(24)** as it drops out of planet bearing **(23)**.

\*4) If planet bearings **(23)** 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 **(30)**.

## SECONDARY PLANETARY SUBASSEMBLY (ITEMS 2,6,8,15,22 & 29) DISASSEMBLY AND REPAIR

1) Drive roll pins **(29)** into planet shafts **(6)**.

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

3) Slide planet gears **(8)** and planet washers **(15)** out of carrier **(2)**.

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

5) If planet bearings **(22)** must be replaced, slide them out of planet gears **(8)**.

6) Rebuild planet carrier assembly using any needed new parts.

7) **To reassemble:** With a planet washer **(15)** on both sides of the planet gear and with bearings **(22)** installed, slide planet gear **(8)** into carrier. Insert planet shaft **(6)** through carrier, planet gear, and washers. Planet shafts **(6)** should be installed with chamfered end of 1/8" hole toward outside diameter of carrier **(2)**. This will aid in alignment of holes while inserting roll pins **(29)**.

## BASE SUBASSEMBLY (ITEMS 1,19,20,35 & 36) DISASSEMBLY AND REPAIR

1) Inspect inner and outer bearing cups **(19,20)**. Bearing cups are not removeable. If cups are damaged, cups **and base (1)** may need replacement. Contact Eskridge, Inc. if you have questions.

2) If ring gear **(5)** was removed, discard o-ring **(36)**.

## 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 **(20)**.

2) Invert output shaft assembly (retaining ring end down) and carefully lower it into base **(1)** until bearing cone **(18)** is seated.

\* applies only to the double planetary models.

3) Press outer shaft seal **(37)** 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, shaft should be 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 **(19)** 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 **(17)** (small end down) over internal end of output shaft. Press bearing on slowly until it is just seated.

**NOTE 1:** Rolling torque at proper bearing preload will vary according to 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 100 in-lbs.

**NOTE 2:** Bearing preload is achieved by adjusting the number of shims **(39)** between inner bearing cone **(17)** and split ring **(21)**.

**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.

8) Install shim(s) **(39)**, coat split ring segments **(21)** with anti-seize and start them into the groove in the shaft. Be sure the 15 degree bevel is facing away from the base **(1)**. Slide the lock ring **(38)** over the split ring **(21)** and drive the lock ring **(38)** until it 'clicks' over the detent. If the lock ring **(38)** cannot be driven on, remove a shim **(39)** and try again. Measure the rolling torque between the base **(1)** and the shaft **(12)**; if torque is not correct, add or remove one shim **(39)** as required and try again.

9) Install secondary carrier assembly.

If ring gear **(5)** was not removed during disassembly, skip to step number 13.

10) Lubricate a new o-ring **(36)** with general purpose grease and place over pilot on base **(1)**.

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

11) 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 pipe plug or grease fitting **(35)** in base, or to customer specifications.

12) Apply thread locking compound and install 16 flange screws **(28)** and washers **(32)** and torque to 110 ft-lbs.

13) Put pipe sealant on magnetic pipe plugs **(33)** and install into drain holes on ring gear **(5)** if they were removed.

\*14) Place thrust washer **(16)** onto top of secondary planet carrier.

\*15) Install sun gear **(10)** into center of secondary planet carrier.

\*16) Install primary planet carrier assembly by rotating it until planet gears line up with ring gear teeth and sun gear spline. Assembly should drop into place.

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

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

18) **Single planetary models only:** Place thrust washer **(40)** over input gear and install retaining ring **(25)** onto input gear.

\*19) **Double planetary models only:** Place input thrust washer **(26)** over input gear.

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

21) Install new o-ring **(36)** over pilot of cover **(4)**.

22) Place cover **(4)** on top of unit and refer to scribed line for proper orientation. Install and torque eight capscrews **(27)** with lockwashers **(31)** to 32 ft-lbs.

23) Put pipe sealant on magnetic plug **(34)** and install into oil fill hole in cover.

24) Insert a shaft, such as an output shaft from a hydraulic motor, into input gear **(11)** and rotate by hand to be sure unit turns smoothly and easily.

**THE GEARBOX IS NOW READY TO USE.**

\* applies only to the double planetary models.