



## MODEL 120K 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: SM120K\_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	DESCRIPTION	PART NUMBER	RATIO	
			4.42:1 6.00:1	19.54:1 26.52:1 36.00:1
			QTY	QTY
1	BASE	-A-	1	1
2	CARRIER ( SEC)	-B-	1	1
3	CARRIER ( PRI)	-C-	-	1
4	COVER	-D-	1	1
5	RING GEAR	81-004-2362	1	1
6	PLANET SHAFT ( SEC)	81-004-0061	3	3
7	PLANET SHAFT ( PRI)	81-004-0071	-	3
8	PLANET GEAR ( SEC)	-E-	3	3
9	PLANET GEAR ( PRI)	-F-	-	3
10	SUN GEAR	-G-	-	1
11	INPUT GEAR	-H-	1	1
12	OUTPUT SHAFT	-I-	1	1
15	THRUST WASHER - PLANET	81-004-1561	6	12
16	THRUST WASHER - SECONDARY	81-004-2711	-	1
17	BEARING CONE	01-102-0030	1	1
18	BEARING CONE	01-102-0020	1	1
19	BEARING CUP	01-103-0030	1	1
20	BEARING CUP	01-103-0020	1	1
21	RETAINING RING	01-160-0030	1	1
22	BEARING - SEC. PLANET	01-105-0500	6	6
23	BEARING - PRI. PLANET	01-105-0460	-	3
24	BEARING RACE - PRI. PLANET	01-105-0470	-	3
25	RETAINING RING	01-160-0350	1	-
26	INPUT THRUST WASHER	81-004-2701	1	1
27	HEX HD CAPSCREW	01-150-1020	8	8
28	FLANGE 12-PT SCREW	01-150-1460	16	16
29	ROLL PIN - SEC. PLANET	01-153-0210	3	3
30	ROLL PIN - PRI. PLANET	01-153-0180	-	3
31	LOCKWASHER	01-166-0010	8	8
32	FLAT WASHER - HARDENED	01-166-0120	16	16
33	MAGNETIC PIPE PLUG	01-207-0041	2	2
34	MAGNETIC PIPE PLUG	01-207-0070	1	1
35	PIPE PLUG * NPT ( SOC. HD.)	01-207-0020	1	1
36	O-RING	01-402-0420	2	2
37	SHAFT SEAL - OUTER	01-405-0270	1	1
38	SPACER	80-004-1111	1	1
39	SHIMS	81-004-2061	*	*
40	THRUST WASHER SGL PL	81-004-2083	1	-

NOTE	CODE	BASE	PART NUMBER
-A-	AI 20	ROUND FLANGE	81-004-0342
	BI 20	SQUARE FLANGE	81-004-0592
	EI 20	RECTANGULAR FLANGE	81-004-3072
	FI 20	FLANGELESS	81-004-1142
	CI 20	CUSTOM	

NOTE	CODE	SINGLE PLANETARY DESCRIPTION	PART NUMBER	
			4.42:1 RATIO	6.00:1 RATIO
-B-	-	CARRIER ( SEC)	81-004-2763	81-004-2773
-C-	-	CARRIER ( PRI)	N/A	N/A
-E-	-	PLANET GEAR ( SEC)	81-004-2472	81-004-2462
-F-	-	PLANET GEAR ( PRI)	N/A	N/A
-G-	-	SUN GEAR	N/A	N/A
-H-	1	INPUT GEAR - 21 T 20/40 DP	N/A	81-004-2242
	2	INPUT GEAR - 13 T 16/32 DP	N/A	N/A
	3	INPUT GEAR - SAE 1" - 6B	81-004-1592	81-004-1572
	4	INPUT GEAR - 14 T 12/24 DP	81-004-1582	81-004-1902
	5	INPUT GEAR - 15 T 16/32 DP	N/A	N/A

NOTE	CODE	DOUBLE PLANETARY DESCRIPTION	PART NUMBER		
			19.54:1 RATIO	26.52:1 RATIO	36.00:1 RATIO
-B-	-	CARRIER ( SEC)	81-004-2763	81-004-2763	81-004-2773
-C-	-	CARRIER ( PRI)	81-004-2732	81-004-2742	81-004-2742
-E-	-	PLANET GEAR ( SEC)	81-004-2472	81-004-2472	81-004-2462
-F-	-	PLANET GEAR ( PRI)	81-004-1752	81-004-1762	81-004-1762
-G-	-	SUN GEAR	81-004-0712	81-004-0712	81-004-0122
-H-	1	INPUT GEAR - 21 T 20/40 DP	81-004-2342	N/A	N/A
	2	INPUT GEAR - 13 T 16/32 DP	81-004-0652	81-004-0402	81-004-0402
	3	INPUT GEAR - SAE 1" - 6B	83-004-1112	83-004-1002	83-004-1002
	4	INPUT GEAR - 14 T 12/24 DP	81-004-1342	SPECIAL	81-004-2792
	5	INPUT GEAR - 15 T 16/32 DP	81-004-1092	81-004-2552	81-004-2552

NOTE	CODE	COVER	ALL EXCEPT CODE 4 INPUT	WITH CODE 4 INPUT ONLY	
				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

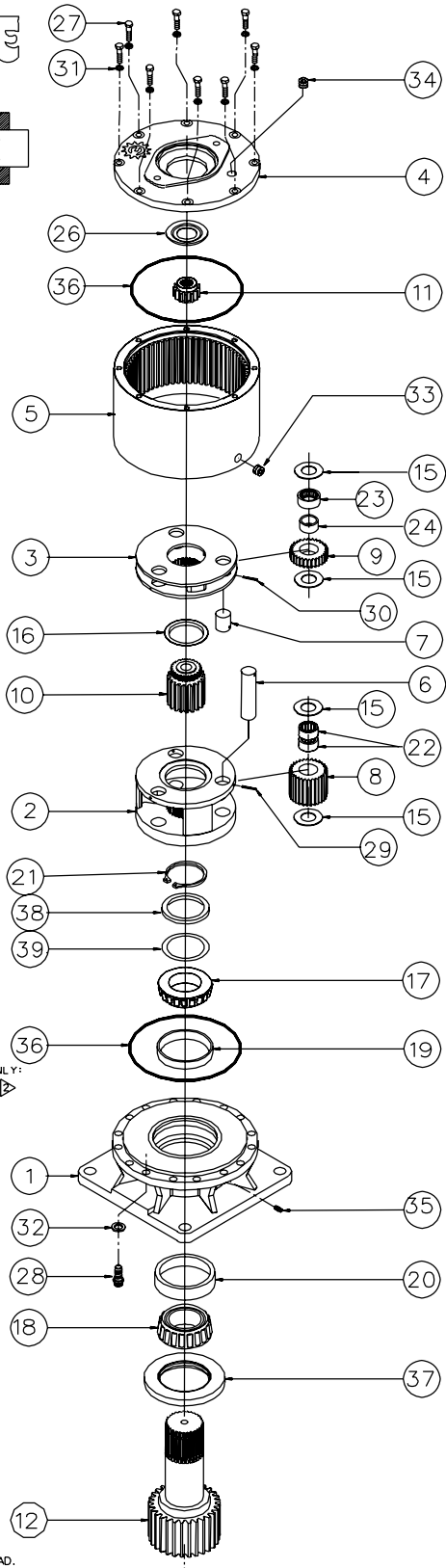
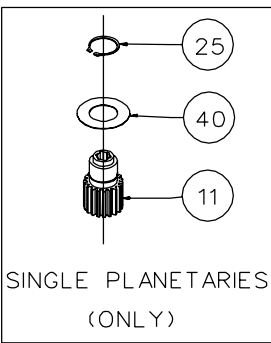
NOTE	CODE	OUTPUT SHAFT	PART NUMBER
-I-	D1	23 T 8/16 DP SPL 2.25" LG	81-004-1392K
	D2	3.000" DIA, 5/8" SQ KEY	81-004-0992K
	D3	23 T 8/16 DP SPL 1.22" LG	81-004-1412K
	D4	23 T 8/16 DP SPL 2.72" LG	81-004-0942K
	D5	3.500" DIA, 7/8" SQ KEY	81-004-1152K
CI	CUSTOM		

OPTIONS:  
SEAL KIT P/N 81-016-2941  
(INCLUDES 2 OF ITEM 36 AND  
1 OF ITEM 37 ).  
(\*) QUANTITY DETERMINED FROM BEARING PRELOAD.



**MODEL 120K**

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



36:1 UNITS WITH CODE 4 INPUT ONLY:  
REPLACE ITEM 26 (81-004-2701)  
WITH: 1 EACH OF 01-112-0220  
2 EACH OF 01-112-0230  
ADD 1 OF ITEM 16 (81-004-2711)

ECN1238  
120KEXPL REV E DATE 06-09-95

▷ 01-215-0040 GREASE FITTING (OPTIONAL) REPLACES ITEM NO. 35.

# MODEL 120K SERVICE MANUAL

## SINGLE & DOUBLE PLANETARY

This manual will assist in disassembly and assembly of major components for all Model 120K Planetary Gearboxes including single and double planetary models. Item numbers, indicated in parentheses throughout this manual, refer to the Eskridge Model 120K 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.

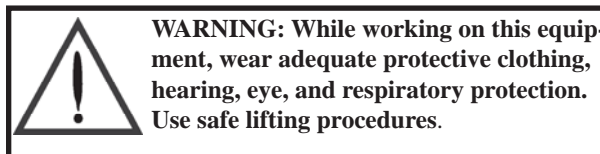
### LUBRICATION AND MAINTENANCE

The manufacturer recommends changing oil after the first 50 hours of operation. Oil should be changed at 500 hour intervals thereafter. All gearboxes require GL-5 grade EP 80/90 gear oil for lubrication. The manufacturer also recommends that the unit be partially disassembled to inspect gears and bearings at 1000 hour intervals. The standard base for the Model 120K is furnished with a 1/4" NPT hole at the output bearings. This hole has a pipe plug in it for horizontal or pinion-down applications, where oil lubrication of the output bearings is sufficient. If your unit was specified "pinion up" a grease zerk was provided. For pinion-up operation, the output bearings will not run in oil and must be grease lubricated. Use lithium base or general purpose bearing grease **sparingly** every 50 operating hours or at regular maintenance intervals. Over-greasing the output bearings in a pinion-up application tends to fill the gearbox with grease and thicken the oil.

#### 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 (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 retaining ring (21) from output shaft (12) then remove spacer (38) and shim(s) (39).

**CAUTION:** The retaining ring is no longer retaining output shaft. 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.

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 PLANET CARRIER 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 PLANET CARRIER 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, they may now be pressed 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:** 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 adjusting the number of shims **(39)** between inner bearing cone **(17)** and retaining 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)**, spacer **(38)**, and retaining ring **(21)**. Then measure preload torque between base **(1)** and shaft **(12)**. If torque is not correct, add or remove 1 shim 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.