



MODEL 120H 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: SM120H_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.



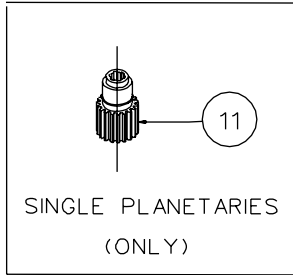
MODEL 120H

EFFECTIVE FROM:

S/N 17802

DATE 02/15/94

ITEM	DESCRIPTION	PART NUMBER	RATIO	
			4.42:1 6.00:1	19.54:1 26.52:1 36.00:1
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
13	BEARING SPACER	81-004-2051	1	1
14	SHIM	81-004-2061	-J-	-J-
15	THRUST WASHER - PLANET	81-004-1561	6	12
16	THRUST WASHER - CARRIER	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	CLAMP NUT	01-104-0090	1	1
22	BEARING - SEC. PLANET	01-105-0480	6	6
23	BEARING - PRI. PLANET	01-105-0460	-	3
24	BEARING RACE - PRI. PLANET	01-105-0470	-	3
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	01-153-0020	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	GREASE FITTING (OPTIONAL)	01-215-0040	1	1
36	O-RING	01-402-0420	2	2
37	SHAFT SEAL - OUTER	01-405-0270	1	1
38	SHAFT SEAL - INNER	01-405-0280	1	1



NOTE	CODE	BASE	PART NUMBER
-A-	A120	ROUND FLANGE	81-004-0342
-A-	B120	SQUARE FLANGE	81-004-0592
-A-	E120	RECTANGLE FLANGE	81-004-3072
-A-	F120	FLANGELESS	81-004-1142
-A-	C120	CUSTOM	

NOTE	CODE	SINGLE PLANETARY DESCRIPTION	PART NUMBER	
			4.42:1 RATIO	6.00:1 RATIO
-B-	-	CARRIER (SEC)	81-004-2863	81-004-2873
-C-	-	CARRIER (PRI)	N/A	N/A
-E-	-	PLANET GEAR (SEC)	81-004-1772	81-004-1782
-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
-H-	2	INPUT GEAR - 13 T 16/32 DP	N/A	N/A
-H-	3	INPUT GEAR - SAE 1" - 6B	81-004-1592	81-004-1572
-H-	4	INPUT GEAR - 14 T 12/24 DP	81-004-1582	81-004-1902
-H-	5	INPUT GEAR - 15 T 16/32 DP	N/A	N/A

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)

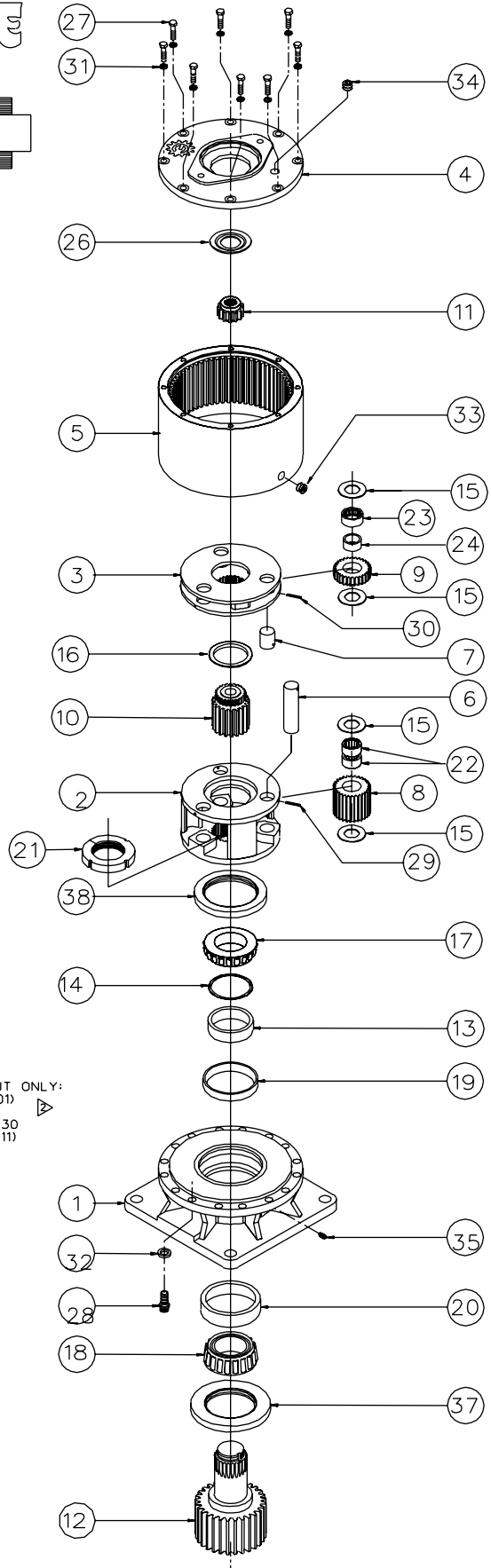
NOTE	CODE	DOUBLE PLANETARY DESCRIPTION	PART NUMBER		
			19.54:1 RATIO	26.52:1 RATIO	36.00:1 RATIO
-B-	-	CARRIER (SEC)	81-004-2863	81-004-2863	81-004-2873
-C-	-	CARRIER (PRI)	81-004-2732	81-004-2742	81-004-2742
-E-	-	PLANET GEAR (SEC)	81-004-1772	81-004-1772	81-004-1782
-F-	-	PLANET GEAR (PRI)	81-004-1752	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
-H-	2	INPUT GEAR - 13 T 16/32 DP	81-004-0652	81-004-0482	81-004-0482
-H-	3	INPUT GEAR - SAE 1" - 6B	83-004-1112	83-004-1082	83-004-1082
-H-	4	INPUT GEAR - 14 T 12/24 DP	81-004-1342	SPECIAL	81-004-2792
-H-	5	INPUT GEAR - 15 T 16/32 DP	81-004-1892	81-004-2552	81-004-2552

NOTE	CODE	COVER	PART NUMBER		
			ALL EXCEPT CODE 4 INPUT	WITH CODE 4 INPUT ONLY	ALL EXCEPT 36:1 36:1 ONLY
A		SAE 'A' 2 AND MOD. 4 BOLT	81-004-2803	81-004-2813	81-004-2923
-D-	B	SAE 'B' 2 BOLT	81-004-2723	81-004-2823	81-004-2913
-D-	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	81-004-1392
-I-	D2	3.000" DIA, 5/8" SQ KEY	81-004-0992
-I-	D3	23 T 8/16 DP SPL 1.22" LG	81-004-1412
-I-	D4	23 T 8/16 DP SPL 2.72" LG	81-004-0942
-I-	D5	3.500" DIA, 7/8" SQ KEY	81-004-1152
-I-	C1	CUSTOM	

OPTIONS:
 SEAL KIT P/N 81-016-0311
 (INCLUDES 2 OF ITEM 36 AND
 1 EACH OF ITEMS 37 AND 38)

NOTE -J- BEARING PRELOAD DETERMINES QUANTITY OF SHIMS.



ECN 1803
 X120HD2-HE

DATE 05-1-00

MODEL 120H SERVICE MANUAL SINGLE & DOUBLE PLANETARY

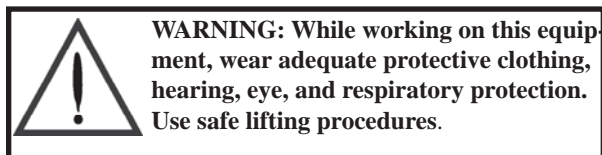
This manual will assist in disassembly and assembly procedures of major components for all Model 120H Planetary Gearboxes including single and double planetary models. Item numbers, indicated in parentheses throughout this manual, refer to the Eskridge Model 120H exploded parts breakdown drawings. Individual 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 120H gearbox is equipped with a grease fitting **(35)** 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:

Vertical shaft operating position: 4.25 pints
Horizontal shaft operating position: 2.5 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) Remove 12-point flange screws **(28)**, flat washers **(32)**, 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) Loosen locking screw in locknut **(21)** using 3/16 inch hex (Allen) wrench. Unscrew and remove locknut **(21)**.

CAUTION: The locknut 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 case.

10) Output shaft removal. Base **(1)** should be set 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)**. Set aside spacer **(13)** and shims **(14)** until needed in UNIT ASSEMBLY.

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

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)** completely into planet shafts **(7)**.

*2) Press or drive shafts out of 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 **(30)** 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" 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 2,6,8,15,21,22 & 29) DISASSEMBLY AND REPAIR

NOTE: Do not rebuild planet carrier assembly until step number 14 of unit assembly. The clamp nut **(21)** cannot be installed when planet gears are already in place.

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

2) Pry shafts 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 **(15)** out of carrier **(2)**.

4) Use a 1/8 inch pin punch to remove roll pins **(29)** from the planet shafts **(6)**.

5) If planet bearings **(22)** must be replaced, they may now be pressed out of planet gears **(8)**.

* applies only to the double planetary models.

BASE SUBASSEMBLY (ITEMS 1,13,14,17,19,20,35,36 & 38) DISASSEMBLY AND REPAIR

1) Inspect inner and outer bearing cups (19,20). 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 (36), inner shaft seal (38), inner bearing cone (17), spacer (13), and shim(s) (14).

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 lubricant to surface of bearing cup (20).

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

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, so that shaft is supporting unit).

5) While holding gear 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) Install bearing spacer (13) and shim(s) (14).

7) 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.

8) Slide bearing cone (17) (small end down) over internal end of output shaft. Press bearing on slowly until it is just seated.

9) Install inner shaft seal (38).

10) Insert the clamp nut (21) into the center of secondary planet carrier (2). If the carrier is pressed onto the shaft first, there will not be enough clearance to fit the clamp nut into the carrier.

11) Install secondary carrier (2) as follows: 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, preload torque of 50 to 80 in-lbs should be adequate, but may be as high as 150 in-lbs for extreme loading conditions.

NOTE 2: Bearing preload is achieved by tightening clamp nut (21) against the secondary planet carrier (2) and by adjusting the number of shims (14). The shims prevent the bearings from receiving too much preload which can cause over-heating for operating speeds of over 25 RPM.

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.

12) While carrier (2) is being pressed onto shaft, measure preload torque between base (1) and shaft (12). If torque is not correct, add or remove 1 shim (14) as required and try again. Once preload torque is correct, install locknut (21) (with locking screw loose) until hand tight. Then tighten locking screw till snug. Release clamping pressure against carrier and recheck preload torque.

13) Lubricate a new o-ring (36) and place over pilot on base (1).

14) **To assemble secondary carrier:** Install planet gears (8) into carrier (2). With a planet washer (15) on both sides of the planet gear and with bearings (22) installed, slide gear into carrier (2). 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 (29).

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

15) 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 (35) in base, or to customer specifications.

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

17) Put pipe sealant on magnetic pipe plugs (33) and install

* applies only to the double planetary models.

into drain holes on ring gear **(5)**.

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

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

*20) 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.

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

22) **Single planetary models only:** Install thrust washer **(40)** and retaining ring **(25)** onto input gear.

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

24) Add gear oil as specified on page 2. For vertical shaft operating positions, correct oil level will measure to middle of primary planet gears.

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

26) 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.

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

28) 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.**