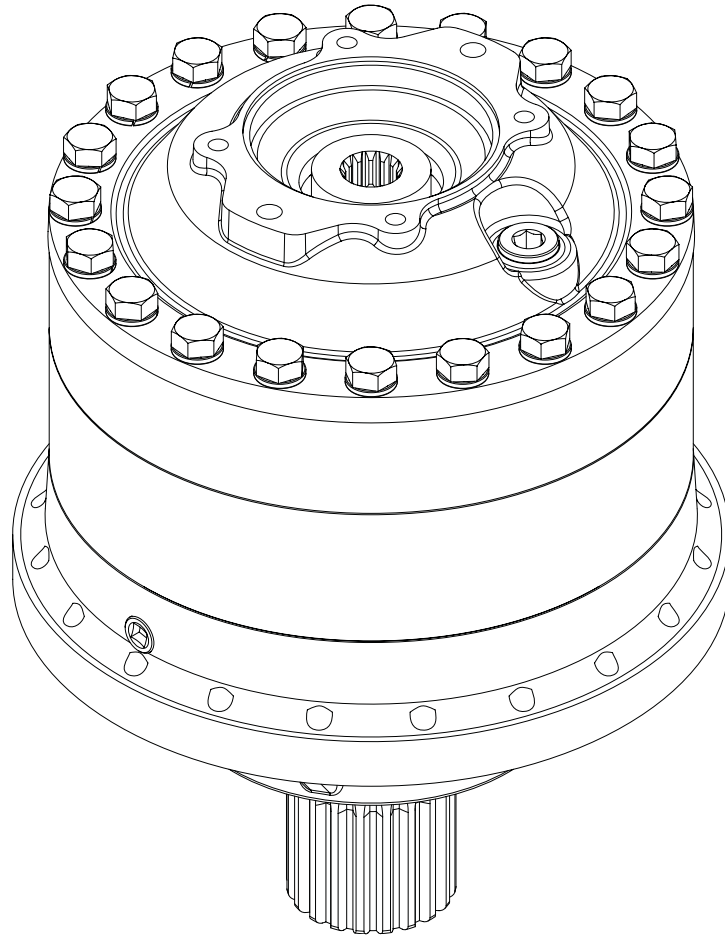


ESKRIDGE



Example Part Number

254	L	F	D1	C	4	–	40
Model	Shaft Retention	Gear Drive Mounting	Output Shaft	Input Mounting	Input Spline		Ratio

THIS SERVICE MANUAL IS EFFECTIVE
FROM: 6/9/1999
TO: CURRENT
REF: SM254BB

254 MODEL SERVICE MANUAL

DOUBLE STAGE PLANETARY GEAR DRIVE

This manual will assist in disassembly and assembly of the 254 Model planetary gear drives. 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 gear drive 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 80/90 gear oil (EP = "Extreme Pressure"). The gear drive should be partially disassembled to inspect gears and bearings at 1000 hour intervals.

If your unit was specified "shaft up" or with a "-Z" option, 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	6.0 pints / 2.8 liters	To horizontal centerline of gear drive
Vertical Shaft	10.0 pints / 4.7 liters	To midway on upper/primary gear set



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

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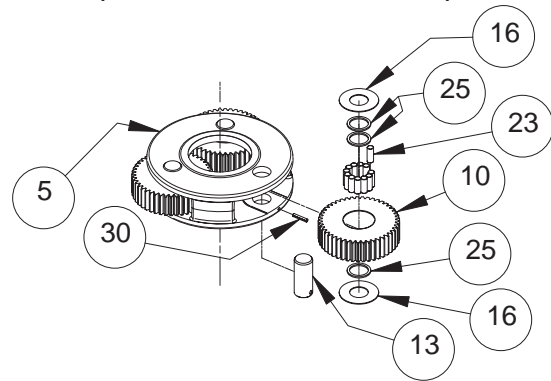
Unit Disassembly Procedure

(Refer to exploded view drawing on Page 7)

- 1) Scribe a diagonal line across the outside of the unit from the cover (4) to the base (1) before disassembly to assure proper positioning of pieces during reassembly.
- 2) Remove magnetic drain plug (33) and drain oil from unit. Maximum drainage occurs when oil is warm.
- 3) Remove the twenty hex head capscrews (29) and lockwashers (32).
- 4) Remove the cover (4), thrust washer (28), input gear (11) and carrier thrust washer (14). Inspect o-ring (15); discard if damaged or if it has taken a set.
- 5) Lift the primary planet carrier assembly out of the unit (includes Items 5, 10, 13, 16, 24, 25 & 30).
- 6) If sun gear (9) has not been removed from gearbox, do so now. (Sometimes the sun gear remains in the primary carrier (5).)
- 7) Remove primary ring gear (2). Inspect second o-ring (15), as before; discard if damaged.
- 8) Remove secondary ring gear (3). Inspect third o-ring (15), as before; discard if damaged.
- 9) Remove carrier thrust washer (14). Lift the secondary planetary assembly out of the unit (includes Items 6, 8, 12, 17, 23, 24 & 31). Use a puller if necessary.
- 10) The unit is now disassembled into subassemblies. The area(s) requiring repair should be identified by thorough inspection of the parts after they have been cleaned and dried.

Primary Planet Carrier Subassembly

(Items 5, 10, 13, 16, 23, 25 & 30)



Disassembly

- 1) Rotate planet gears (10) to check for abnormal noise or roughness in bearings (25) or planet shafts (13). If further inspection or replacement is required, proceed as follows.
NOTE: Support only the carrier (5) while pressing out planet shafts.
- 2) Drive roll pins (30) completely into the planet shafts (13).
- 3) Press or drive planet shafts (13) out of carrier (5).
- 4) Remove planet gears (10) and thrust washers (16) from the carrier (5).
- 5) If the planet bearing rollers (23) require replacement, remove them from planet gears (10) and replace with new ones. Roller bearings should be replaced as a set of twelve.
- 6) Check primary planet shafts (13) for any abnormal wear, especially ones where bearings needed to be replaced. If any abnormal wear is found, replace planet shafts.
- 7) Use 3/16 inch pin punch to remove roll pins (30) from planet shafts (13).

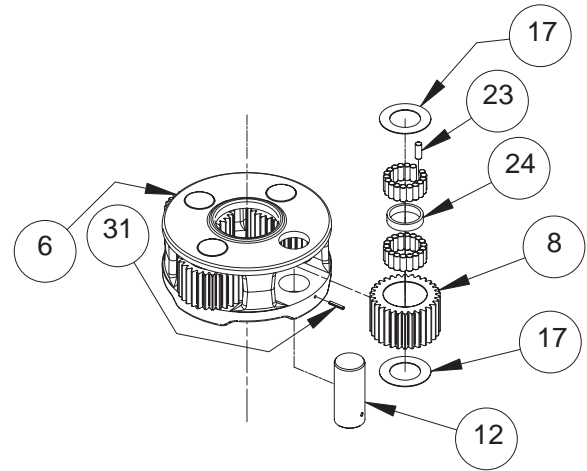
NOTE: If either the rollers or the planet shafts (pins) are damaged, both components should be replaced.

Reassembly

- 1) To install rollers in planet gear bore:
 - a) Set planet washer on work table, insert planet shaft in washer then slide one spacer (25) over shaft (13).
 - b) Place planet gear (10) centered over planet shaft (13).
 - c) Install twelve rollers into planet gear bore. Slide two spacers (25) onto planet shaft, slide planet washer (16) onto planet shaft (13).
 - d) Carefully remove planet shaft from this assembly and move the gear with bearings and washers to the carrier.

Secondary Planet Carrier Subassembly

(Items 6, 8, 12, 17, 23, 24 & 31)



Disassembly

- 1) Rotate planet gears (8) to check for abnormal noise or roughness in bearings (23) or planet shafts (12). If further inspection or replacement is required, proceed as follows.

NOTE: Support only the carrier (6) while pressing out planet shafts.

- 2) Drive roll pins (31) completely into the planet shafts (12).
- 3) Press or drive planet shafts (12) out of carrier (6).
- 4) Remove planet gears (8) and thrust washers (17) from the carrier (6).
- 5) If the planet bearing rollers (23) require replacement, remove them from planet gears (8) and replace with new ones. Roller bearing must be replaced as a set of eighteen.
- 6) Check secondary planet shafts (12) for any abnormal wear, pitting or spalling, especially ones where bearings needed to be replaced. If any abnormal wear is found, replace planet shafts.
- 7) Use 3/16 inch pin punch to remove roll pins (31) from planet shafts (12).

NOTE: If either the rollers or the planet shaft (pins) are damaged, both components must be replaced.

Reassembly

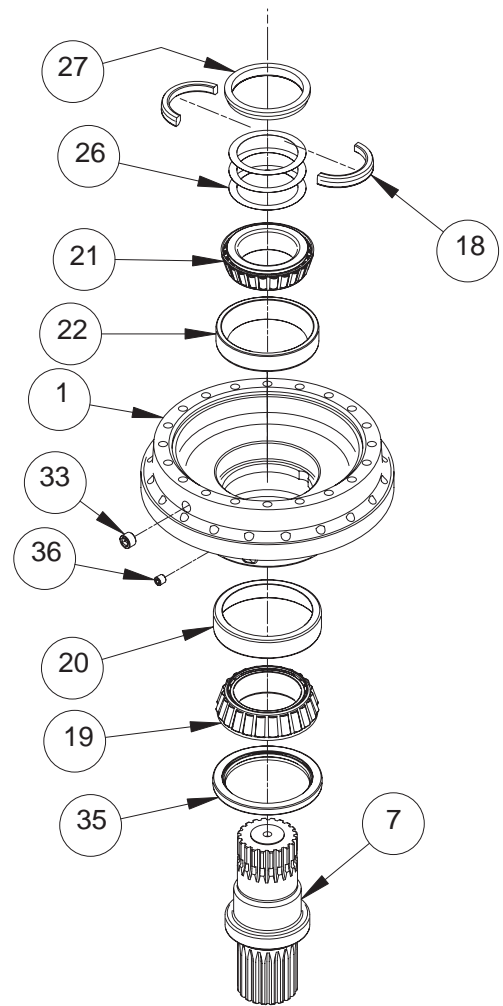
- 1) To install rollers in planet gear bore:
 - a) Set planet washer on work table, insert planet shaft (12) in washer (17).
 - b) Place planet gear (8) centered over planet shaft (12).
 - c) Install eighteen rollers into the planet gear bore. Slide spacer (24) onto planet shaft. Then install eighteen more rollers into the planet gear bore. Install washer (17).
 - d) Carefully remove planet shaft (12) from this assembly and move the gear with bearings and washers to the carrier.

- e) Slide the gear into place. (Oriented as shown.)
- 2) Planet shafts (13) should be installed with chamfered end of 3/16 inch hole toward outside diameter of the carrier (5). This will aid in alignment of holes while inserting roll pins (30).
 - 3) Drive a roll pin (30) through the carrier hole and into the planet shaft to retain the parts. Repeat for other planet gears (13).

- e) Slide the gear into place.
- 2) Planet shafts (12) should be installed with chamfered end of 3/16 inch hole toward outside diameter of the carrier (6). This will aid in alignment of holes while inserting roll pins (31).
- 3) Drive a roll pin (31) through the carrier hole and into the planet shaft to retain the parts. Repeat for other planet gears.

Base Subassembly

(Items 1, 7, 18, 19, 20, 21, 22, 26, 27, 33, 35 & 36)



Disassembly

- 1) Remove the lock ring (27) using a heel bar or puller. If using a heel bar, do not pry against the cage of the inner output shaft bearing (21). Remove the split ring segments (18) and shims (26).

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

NOTE: Removal of the shaft generally damages the shaft seal.

- 2) Output shaft removal. Base (1) should be set flange down, on a plate or table with output shaft (7) protruding through a hole in table or base can be set on sturdy blocks at least 6 5/8" tall. 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 (21).
- 3) If outer bearing cone (19) (on the shaft) needs to be removed, a gear puller may be used; otherwise skip to Step 5. If re-using old bearing cone, do not pull on or damage roller cage. Remove the shaft seal (35) for inspection or replacement.

- 4) Inspect inner and outer bearing cups and bearings (19, 20, 21 & 22); replace if necessary. Inspect for damage from pitting, bruising, brinelling, etc., and replace if more than 10% of the surface area is damaged. Also replace if any one damaged area is .01 sq. inches (.10" x .10") or greater.

Reassembly

- 1) Thoroughly clean all parts before assembly. Clean all foreign material from magnetic oil plug (33) and threaded hole located on side of base (1). Add a small amount of pipe thread compound to pipe plug before installing back into base.
- 2) Lubricate inner lip of new shaft seal (35) and slide the seal onto the shaft (7) until it fits snugly over shaft seal diameter with the open side toward the inside of the gearbox.

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 outer bearing cone (19) (large end down as shown) onto the shaft until it seats against the shoulder.
- 4) Place the base (1) (output side up, opposite shown) on the press table.
- 5) Apply a layer of lithium or general purpose bearing grease to surface of outer bearing cup (20). Insert the shaft into the base (bearing cone down) and use a soft hammer to install the shaft seal (35) with the open side towards the inside of the gear drive.

CAUTION: Output shaft is not retained at this point.

- 6) Invert this assembly so it is standing on the shaft (on the press table).

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

NOTE: The use of an anti-seize compound will help during bearing installation.

- 6) Apply a layer of lithium or general purpose bearing grease to surface of inner bearing cup (22). Press the inner bearing cone (21) (large end up as shown) onto the shaft (7) until it is just seated against inner bearing cup (22). A slight preload of less than 200 in-lbs rolling torque should be obtained. Most of the rolling torque should be from the seal drag.
- 7) Relieve the press and slide the shim(s) (26) onto the shaft. Coat the split ring (18) with anti-seize compound and begin installing ring in groove of shaft. Tap the segments into the groove of the shaft until you can drive the lock ring (27) over the segments. Be sure the lock ring (27) 'clicks' over the detent which helps keep the LOAD-N-LOCK® in place. Measure the rolling torque of the output shaft; torque is the product of the force (lbs) times the distance from the centerline of the gearbox (in). The rolling torque should be **100 to 200 in- lbs**. If the rolling torque is too high, remove the load and lock and remove a shim and install LOAD-N-LOCK® and measure again. If torque is too low, add a shim and measure again.

All subassembly service or repairs should be complete at this time. Continue to unit reassembly.

Unit Reassembly

(Refer to exploded drawing on Page 7)

- 1) When all subassemblies are complete, unit is ready to be assembled.
- 3) Install the secondary planet carrier (6); assemble by rotating it until carrier and shaft splines line up. Press until fully seated on shaft (7).
- 2) Lubricate o-ring (15) and install on the O.D. pilot of the secondary ring gear (3). Referring to scribe marks for proper orientation, install the secondary ring gear (3) onto the base (1).
- 4) Lubricate o-ring (15) and install on the O.D. pilot of the primary ring gear (2) and install the primary ring gear (2). Refer to scribe marks for proper orientation.
- 5) Slide the sun gear (9) into the secondary planet carrier (6).
- 6) Install the carrier thrust washer (14).
- 7) Install primary planet carrier (5); assemble by rotating it until planet gears line up with ring gear teeth and sun gear spline. Assembly should drop into place.
- 8) Slide the input gear (11) into the primary planetary carrier.
- 9) Install the carrier thrust washer (14) and input gear thrust washer (28).
- 10) Tighten four bolts, placed at 90° to each other, just enough to pull cover, ring gears and base together. Spin test the unit while making sure the base or output shaft turns at least one full revolution; the unit should spin freely without any binding, slowing down or locking of components. Listen for any unusual sounds, such as clicking or grinding noises.

If no problems are detected, continue to Step 11. If the unit locks up or does not spin freely, tear the unit down to its individual subassemblies; troubleshoot to identify the source of the problem.
- 11) Lubricate o-ring (15) and install on the O.D. pilot of the cover (4). Position the cover (4) with the proper orientation. Install the twenty 5/8-11 capscrews (29) with lockwashers (32) and torque to 220 ft-lbs (dry), 170 ft-lbs (lubed).
- 12) Fill to proper level, as specified on Page 2, with EP 80/90 gear oil after unit is sealed with a brake and/or motor.

THE GEARBOX IS NOW READY TO USE.

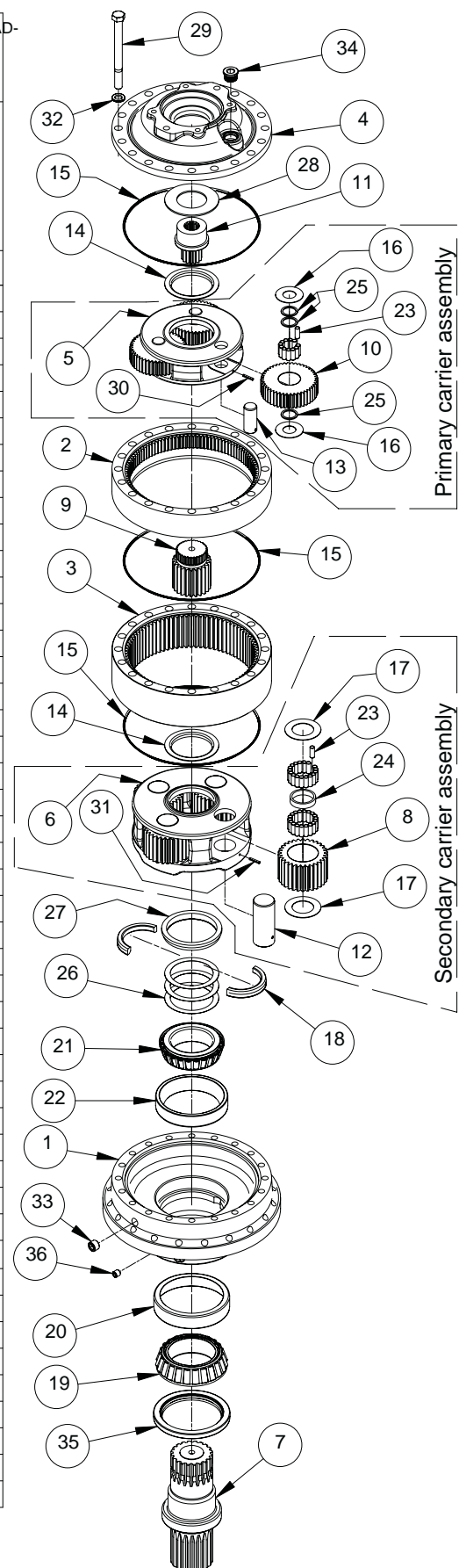
Exploded View Drawing



ESKRIDGE MODEL 254L

EQUIPPED WITH PATENTED "LOAD-

ITEM	QTY	RATIO →	20.25:1	26.34:1	29.58	40.24:1
			4.3125:1 4.6957:1	5.609:1 4.6957:1	6.3:1 4.6957:1	8.57:1 4.6957:1
		DESCRIPTION	PART NO.	PART NO.	PART NO.	PART NO.
1	1	250A BASE - ROUND	25-004-3042	25-004-3042	25-004-3042	25-004-3042
		250F BASE - FLANGELESS	25-004-3052	25-004-3052	25-004-3052	25-004-3052
		250Q BASE - ECCENTRIC PILOT	25-004-3132	25-004-3132	25-004-3132	25-004-3132
		CUSTOM BASE	-	-	-	-
2	1	RING GEAR - PRIMARY	25-004-1592	25-004-1592	25-004-1592	25-004-1592
3	1	RING GEAR - SECONDARY	25-004-1612	25-004-1612	25-004-1612	25-004-1612
4	1	A - SAE 'A' COVER	25-005-2061	25-005-2061	25-005-2061	25-005-2061
		B - SAE 'B' COVER	25-005-2051	25-005-2051	25-005-2051	25-005-2051
		C - SAE 'C' (2 AND 4 BOLT)	25-004-1222	25-004-1222	25-004-1222	25-004-1222
		D - SAE 'D' COVER	25-004-1232	25-004-1232	25-004-1232	25-004-1232
5	1	CARRIER - PRIMARY	25-004-1692	25-004-1642	25-004-1702	25-004-1412
6	1	CARRIER - SECONDARY	25-004-1602	25-004-1602	25-004-1602	25-004-1602
7	1	D1 - OUTPUT SHAFT 20T 6/12 SPLINE	25-004-4032L	25-004-4032L	25-004-4032L	25-004-4032L
		D2 - OUTPUT SHAFT 3.75" DIA, KEYED	25-004-4042L	25-004-4042L	25-004-4042L	25-004-4042L
		C1 - OUTPUT SHAFT - CUSTOM	-	-	-	-
8	4	PLANET GEAR - SECONDARY	25-004-1632	25-004-1632	25-004-1632	25-004-1632
9	1	SUN GEAR - SECONDARY	25-004-1622	25-004-1622	25-004-1622	25-004-1622
10	3	PLANET GEAR - PRIMARY	25-004-1712	25-004-1652	25-004-1722	25-004-1552
11	1	INPUT GEAR INPUT 14T SPL	25-004-1732	25-004-1792	25-004-1742	25-004-1812
		INPUT GEAR INPUT 13T SPL	25-004-1762	25-004-1802	25-004-1762	25-004-1782
12	4	PLANET SHAFT - SECONDARY	25-004-1432	25-004-1432	25-004-1432	25-004-1432
13	3	PLANET SHAFT - PRIMARY	25-004-1442	25-004-1442	25-004-1442	25-004-1442
14	2	THRUST WASHER - CARRIER	25-004-1132	25-004-1132	25-004-1132	25-004-1132
15	3	SEAL (O-RING)	01-402-0020	01-402-0020	01-402-0020	01-402-0020
16	6	THRUST WASHER - PRI. PLANET	13-004-1582	13-004-1582	13-004-1582	13-004-1582
17	8	THRUST WASHER - SEC. PLANET	25-004-1462	25-004-1462	25-004-1462	25-004-1462
18	1	SPLIT RING- LOAD-N-LOCK	25-004-1182	25-004-1182	25-004-1182	25-004-1182
19	1	BEARING CONE - OUTER	01-102-0120	01-102-0120	01-102-0120	01-102-0120
20	1	BEARING CUP - OUTER	01-103-0110	01-103-0110	01-103-0110	01-103-0110
21	1	BEARING CONE - INNER	01-102-0250	01-102-0250	01-102-0250	01-102-0250
22	1	BEARING CUP - INNER	01-103-0250	01-103-0250	01-103-0250	01-103-0250
23	180	ROLLER (SEC = 2 X 18, PRI = 1 X 12)	01-106-0010	01-106-0010	01-106-0010	01-106-0010
24	4	SPACER - SEC PLANET BEARING	25-004-1452	25-004-1452	25-004-1452	25-004-1452
25	3	SPACER - PRI PLANET BEARING	13-004-1592	13-004-1592	13-004-1592	13-004-1592
26	*	SHIM - SHAFT ADJUSTMENT	25-004-1051	25-004-1051	25-004-1051	25-004-1051
27	1	LOCK RING - LOAD-N-LOCK	25-004-1192	25-004-1192	25-004-1192	25-004-1192
28	1	THRUST WASHER - INPUT GEAR	25-004-1752	25-004-1752	25-004-1752	25-004-1752
29	20	HEX HEAD CAPSCREW (5/8-11 X 7) GR 8	01-150-1630	01-150-1630	01-150-1630	01-150-1630
30	3	ROLL PIN (3/16 X 1)	01-153-0020	01-153-0020	01-153-0020	01-153-0020
31	4	ROLL PIN (3/16 X 1 1/4)	01-153-0190	01-153-0190	01-153-0190	01-153-0190
32	20	LOCKWASHER - (5/8)	01-166-0040	01-166-0040	01-166-0040	01-166-0040
33	1	PIPE PLUG (1/2 NPT MAGNETIC) - BASE	01-207-0041	01-207-0041	01-207-0041	01-207-0041
34	1	PLUG - COVER	01-208-0030	01-208-0030	01-208-0030	01-208-0030
35	1	SHAFT SEAL	01-405-0740	01-405-0740	01-405-0740	01-405-0740
36	1	PLUG 1/4 NPT	01-207-0020	01-207-0020	01-207-0020	01-207-0020
		GREASE FITTING (OPTIONAL)	01-215-0040	01-215-0040	01-215-0040	01-215-0040



* QUANTITY OF SHIMS DETERMINED BY BEARING PRELOAD.

OPTIONS SEAL KIT P/N 25-016-2061
INCLUDES 1 EA. OF ITEMS 35
AND A QTY 3 OF ITEM 15

X254LD2-BA DATE: 01-12-06

Eskridge Product Warranty

ESKRIDGE, INC. ("Eskridge") warrants to its original purchaser ("Customer") that new component parts/units ("Units") sold by Eskridge will be free of defects in material and workmanship and will conform to standard specifications set forth in Eskridge sales literature current at the time of sale or to any custom specifications acknowledged by written Customer approval of drawings, SUBJECT TO THE FOLLOWING QUALIFICATIONS AND LIMITATIONS:

1. Prior to placing Units in service, the Customer shall provide proper storage such that foreign objects (e.g., rain or debris) cannot enter any Units via entry ports which are normally closed during operation.
2. The Customer must notify Eskridge in writing of any claim for breach of this warranty promptly after discovery of a defect. The warranty period shall commence when a unit is placed in service and shall expire upon the earlier of
 - a. the expiration of twelve (12) months from the date of Commencement of Service (as defined in Paragraph 4)
 - b. the completion of one thousand (1000) hours of service of the Units
 - c. the expiration of six (6) months after the expiration of any express warranty relating to the first item of machinery or equipment in which the Units are installed or on which it is mounted, or
 - d. the installation or mounting of the Units in or on an item of machinery or equipment other than the first such item in which the Units are installed or on which the Units are mounted.
3. Units shall be deemed to have been placed in service (the "Commencement of Service") at the time the machinery or equipment manufactured or assembled by the Customer and in which the Units are installed or on which the Units are mounted is delivered to the Customer's dealer or the original end-user, which ever receives such machinery or equipment first.
4. This warranty shall not apply with respect to Units which, upon inspection by Eskridge, show signs of disassembly, rework, modifications, lack of lubrication or improper installation, mounting, use or maintenance.
5. Eskridge makes no warranty in respect to hydraulic motors mounted on any Units. Failure of any such motor will be referred to the motor manufacturer.
6. Claims under this warranty will be satisfied only by repair of any defect(s) or, if repair is determined by Eskridge in its sole, absolute and uncontrolled discretion to be impossible or impractical, by replacement of the Units or any defective component thereof. No cash payment or credit will be made for defective materials, workmanship, labor or travel. IN NO EVENT SHALL ESKRIDGE BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE, FOR WHICH DAMAGES ARE HEREBY EXPRESSLY DISCLAIMED.
7. From time to time, Eskridge may make design changes in the component Units manufactured by it without incorporating such changes in the component Units previously shipped. Such design changes shall not constitute an admission by Eskridge of any defects or problems in the design of previously manufactured component Units.
8. All freight charges on Units returned for warranty service are the responsibility of the Customer.

Warranty Return Policy

1. Any part/Unit(s) returned to Eskridge must be authorized by Eskridge with an assigned return (CSR) number.
2. All Units shall be returned freight prepaid.
3. Any Units qualifying for warranty will be repaired with new parts free of charge (except for freight charges to Eskridge as provided above).
4. If Units are found to be operable, you have two options:
 - a. The Units can be returned to you with a service charge for inspection, cleaning, and routine replacement of all rubber components and any other Units that show wear;
 - b. We can dispose of the Unit(s) at the factory if you do not wish it to be returned.

NOTE: Any order of Units by customer shall only be accepted by Eskridge subject to the terms stated herein. Any purchase order forms used by Customer (to accept this offer to sell) which contain terms contrary to, different from, or in addition to the terms herein shall be without effect, and such terms shall constitute material alteration of the offer contained herein under K.S.A 84-2-207 (2)(b), and shall not become part of the contract regarding the sale of the Units.

The foregoing warranty is the sole warranty made by Eskridge with respect to any Units and is in lieu of any and all other warranties, expressed or implied. There are no warranties which extend beyond the description on the face hereof without limiting the generality of the foregoing, Eskridge expressly disclaims any implied warranty of merchantability or fitness for any particular purpose, regardless of any knowledge Eskridge may have of any particular use or application intended by the purchaser. The suitability or fitness of the Units for the customer's intended use, application or purpose and the proper method of installation or mounting must be determined by the customer.

ESKRIDGE PRODUCT LINE

Planetary Gear Drives

<u>Series</u>	<u>Features</u>	<u>Torque Rating (in-lb)</u> <i>Maximum Intermittent</i>
20	Shaft Output	20,000
28	Shaft Output	50,000
50	Shaft or Spindle Output	50,000
65	Shaft Output	65,000
105	Shaft Output	105,000
130/133	Shaft or Spindle Output	130,000
150	Shaft Output	150,000
250/252/254	Shaft or Spindle Output	250,000
440	Shaft or Spindle Output, Wheel Drive	440,000
600	Shaft or Spindle Output, Wheel Drive	600,000
1000	Shaft or Spindle Output, Wheel Drive	1,000,000

Multiple Disc Brakes

<u>Series</u>	<u>Features</u>	<u>Torque Rating (in-lb)</u>
10"—Integral Brake <i>(Available on Series 65, 105 & 130 Gear Drives)</i>	SAE A Input	to 4,800
90B	SAE B Output	to 4, 800
90BA	SAE B Output, Adjustable Torque	to 4,800
92B	SAE B Output, Low Profile	to 2,100
93 (931 or 921)	For Nichols Motors	to 6,200
95C	SAE C Output	to 12,000
98D	SAE D Output	to 25,000

Planetary Auger, Anchor & Digger Drives

<u>Series</u>	<u>Features</u>	<u>Torque Rating (ft-lb)</u> <i>Maximum Intermittent</i>
75	38 & 51, 2-Speed	14,000—20,000
76	BA & BC, 2-Speed	8,000—12,5000
77	BA, BC & BD	6,000—12,5000
78	35 & 48, 2-Speed	9,000—12,500
D50	1500, 2500 & 5000	1,500—5,000
D440	D440	35,000
D600	D600	50,000
D1000	D1000	83,000

