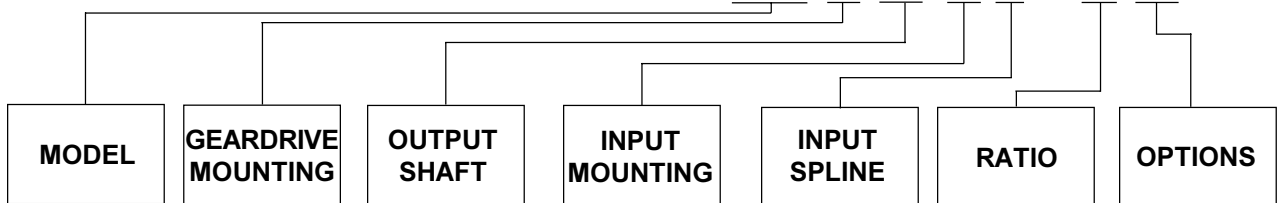


EXAMPLE PART NUMBER: E60 A D1 C 4 - 19 Z



Series E60 Planetary Geardrive Service & Repair Manual

EFFECTIVE FOR:
FROM S/N: 17802 - UP
DATE: TO CURRENT

MODEL E60 SERVICE MANUAL

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 **80/90** 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 zerker 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

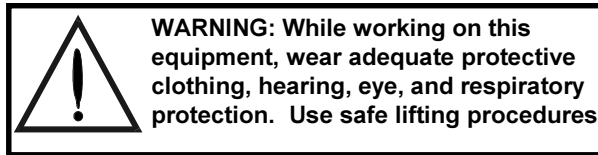
Horizontal shaft
Vertical shaft

OIL CAPACITY

2.25 pints (1,1 liters)
2.50 pints (1,2 liters)

OIL LEVEL

To horizontal centerline of geardrive
To midway on upper/primary gearset



UNIT DISASSEMBLY PROCEDURE

(Refer to exploded view on page 7)

- 1) Scribe a diagonal line across the outside of the unit from cover (6) to case (1) before disassembly to assure proper positioning of pieces during reassembly.
- 2) Remove magnetic pipe plug (32) and drain oil from unit. Maximum drainage occurs when oil is warm.
- 3) Remove 8 cover bolts (24) and lockwashers (27).
- 4) Lift cover (6) off. The input gear (12) and input thrust washer (17) may be lifted out of carrier assembly.
- 5) Lift primary planet carrier assembly (3,8,10,15,18, & 29) out of case.
- 6) Remove all three shaft retaining locknuts (26).

7) The output shaft (13) and secondary planet carrier assembly may now be removed as follows:

a) The secondary carrier (2) spline is a press fit onto output shaft (13) spline. Case (1) should be set on a plate or table with output shaft protruding downward through hole in table.

NOTE: Care should be taken not to damage output shaft or your feet when shaft falls out of case.

b) Press output shaft out bottom of case by applying press load to top end of studs (25).

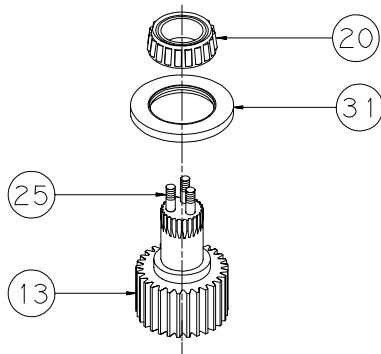
8) Secondary planet carrier assembly (2,5,7,9,15,19,22 & 28) may now be lifted out of case.

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 listed below.

1. Output Shaft subassembly
2. Primary Planet Carrier subassembly
3. Secondary Planet Carrier subassembly
4. Case subassembly

OUTPUT SHAFT SUBASSEMBLY

(ITEMS 13,20,25 & 31)
DISASSEMBLY AND REPAIR



(Also refer to exploded view on page 7)

1) If replacing shaft retaining studs (25), turn so that extended end of new stud is threaded into output shaft first. Screw studs into shaft holes until tight. Note that studs must be below top surface of bearing retainer plate (5) when secondary carrier is installed or they will interfere with sun gear (11).

2) Outer tapered bearing cone (20) may be removed using a gear puller. If reusing old bearing cone, do not damage roller cage by pulling on it.

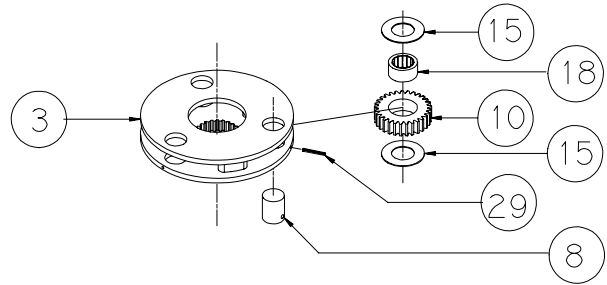
3) Replace shaft seal (31). Lubricate inner lip of new seal and turn so that open side is facing upward. Slide seal down output shaft (13) all the way to gear teeth or until it fits snugly over seal diameter.

NOTE: Press bearing onto shaft by pressing on inner race only. Do not press on roller cage or it may damage bearing.

4) With large end down, press outer bearing cone (20) onto output shaft (13). Be sure it is seated tightly against shoulder of shaft. If old outer bearing cone (20) was removed only to replace shaft seal, it may be reused.

PRIMARY PLANET CARRIER SUBASSEMBLY

(ITEMS 3,8,10,15,18, & 29)
DISASSEMBLY AND REPAIR



Rotate the planet gears (10) to check for abnormal noise or roughness in bearings (18) or planet shafts (8). If further inspection or replacement is required, proceed as follows.

1) Drive roll pins (29) into planet shafts (8).

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

3) Slide planet gears (10) along with planet washers (15) out of primary carrier (3).

4) If planet bearings (18) must be replaced, they may now be removed from primary planet gears (10).

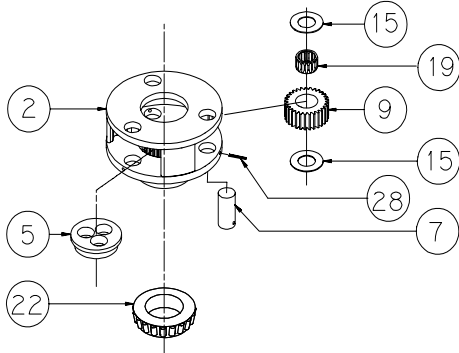
5) Use 1/8 inch pin punch to remove roll pins (28) from planet shafts.

RE-ASSEMBLY

6) Rebuild primary planet carrier assembly in reverse order using any needed new parts. Planet shafts (8) should be installed with chamfered end of 1/8 inch hole

toward outside diameter of carrier. This will aid in alignment of holes while inserting roll pins.

SECONDARY PLANET CARRIER SUBASSEMBLY (ITEMS 2,5,7,9,15,19,22 & 28) DISASSEMBLY AND REPAIR



1) Disassembly procedure is the same as previous section on Primary Planet Carrier Subassembly (steps 1-4) except substitute these parts: secondary carrier (2), secondary planet gears (9), planet bearings (19), secondary planet shafts (7) and roll pins (28).

RE-ASSEMBLY

1) To reassemble, place carrier (2) with hub down. Place bearing retainer plate (5) inside carrier. Slide the secondary planet gears (9) into place.

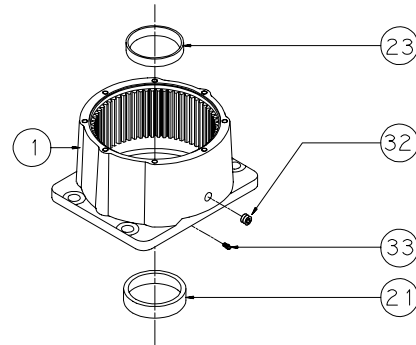
2) Turn carrier (2) over while using the planet gears (9) to hold the retainer plate (5) in place.

3) Remove one planet gear (9) and insert a cageless bearing (19). Install two washers (15) (one on either side of the planet gear). Place in carrier and install planet shaft (7) and roll pin (28). Repeat process for each planet gear.

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

4) If tapered inner bearing cone (22) on hub of secondary carrier (2) must be replaced, it may be removed using a gear puller. Then, press a new bearing cone onto hub making sure bearing shoulder is tight against hub shoulder.

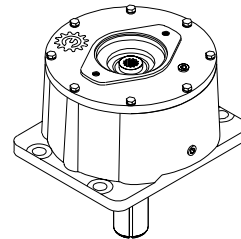
CASE SUBASSEMBLY (ITEMS 1,21,23,32 & 33) DISASSEMBLY AND REPAIR



1) Inspect inner and outer bearing cups (21 & 23) and replace if necessary.

2) Clean all foreign material from magnetic drain and fill plug (32).

UNIT ASSEMBLY REASSEMBLING



(Refer to exploded view on page 7)

1) Turn case pinion side up (opposite shown above). Apply a layer of lithium or general purpose grease to outer bearing cup (21). Place the shaft (13) into case (1) so the shaft's outer tapered bearing cone (20) is seated in case's outer bearing cup (21). Tap shaft seal (31) into place. A large drift punch may be helpful for seating the seal.

CAUTION: Shaft is not retained at this time.

2) Turn case pinion side down (standing on shaft as shown above).

3) Apply a layer of lithium or general purpose bearing grease to inner bearing cup (23).

4) Place shim(s) (14) over studs (25). Use same number of shims that came out of unit to allow for correct shaft bearing preload.

5) Rotate bearing retainer plate (5) inside secondary carrier assembly so that counter-bored holes are centered between planet gears (9).

NOTE: It is important that the holes in the retainer plate remain centered between planet gears. A certain amount of tool clearance will be necessary in order to install and torque the locknuts.

6) Install secondary carrier assembly **(2)** into case **(1)** as follows: Rotate secondary planet carrier assembly back and forth until planet gear teeth **(9)** mesh with gear teeth in case **(1)**. Let carrier assembly down until carrier spline touches output shaft **(13)** spline. Align holes in retainer plate directly over shaft studs. Rotate carrier by hand until you are certain carrier spline has started cleanly and squarely onto shaft spline. View down through top of secondary carrier assembly through counter-bored holes in retainer plate **(5)**.

7) Counter-bored holes in retainer plate **(5)** should be centered between planet gears **(9)**. Slowly press secondary carrier assembly down tightly against output shaft **(13)**.

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 **(14)** under the bearing retainer plate **(5)**.

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) While secondary carrier **(2)** assembly is under press load (**approx. 2 tons**), measure preload torque between case **(1)** and shaft **(13)**. If torque is not correct, add or remove 1 shim as required and try again.

9) Remove press load from secondary carrier **(2)**. Lubricate threads and install locknuts **(26)** onto studs **(25)** and torque to 70-75 ft-lbs. Use of a deepwell shallow-walled 11/16 inch socket is recommended.

10) Install sun gear **(11)** into center of secondary planet carrier.

11) Place secondary thrust washer **(4)** onto center of secondary planet carrier assembly.

12) To install primary planet carrier assembly hold inside diameter of carrier **(3)** and rotate until planet gears line up with case gear teeth and sun gear spline. Assembly should drop into place.

NOTE: A simple planetary such as this does not require a gear timing procedure.

13) Insert input gear **(12)** into unit so that teeth mesh with primary planet gears **(10)**.

14) Place input thrust washer **(17)** over input gear.

15) Replace o-ring **(30)** on bottom of cover **(6)**.

16) Set cover **(6)** on top of unit and refer to scribed line for proper orientation. Install and torque eight capscrews **(24)** with lockwashers **(27)** to 32 ft-lbs.

17) Check to be sure magnetic plug **(32)** is securely installed into side of case **(1)**.

18) Add gear oil as specified on page 2. Correct oil level will measure to middle of primary planet gears **(10)** in shaft vertical shaft position.

19) Put pipe sealant on magnetic plug **(30)** and install into oil fill hole in cover **(6)**.

20) Insert a shaft, such as the output shaft from a hydraulic motor, into input gear **(12)** and turn by hand to be sure unit turns smoothly and easily.

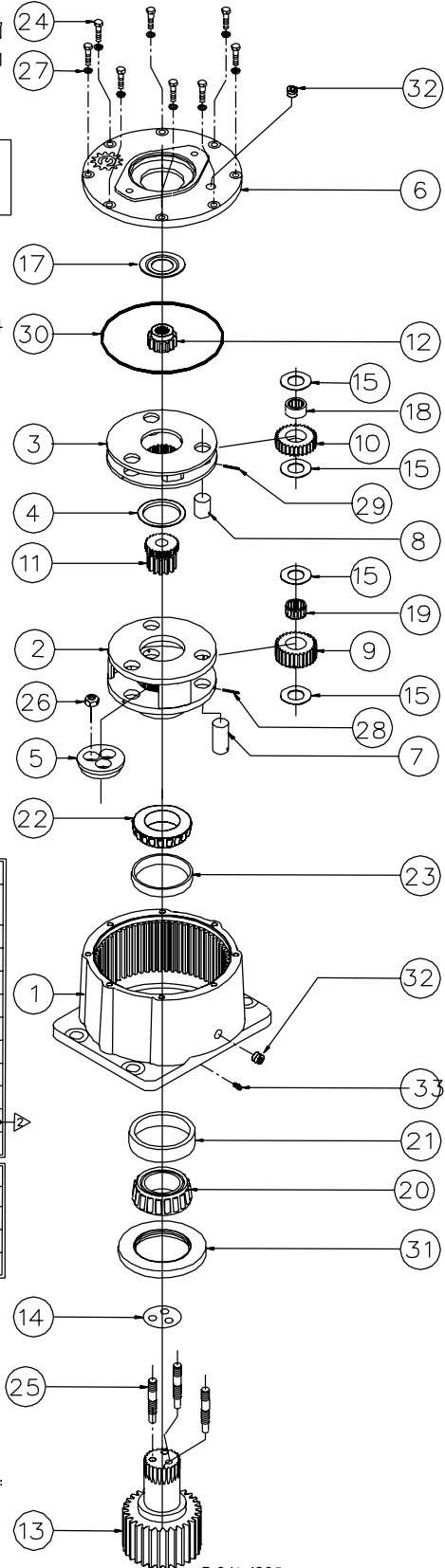
THE GEARBOX IS NOW READY FOR USE.

ITEM	DESCRIPTION	PART NUMBER	RATIO 19:1 26:1 36:1
1	CASE	83-004-3012	1
2	CARRIER (SEC)	-A-	1
3	CARRIER (PRI)	-B-	1
4	THRUST WASHER- SECONDARY	81-004-2711	1
5	PLATE- BEARING RETAINER	83-004-1062	1
6	COVER	-C-	1
7	PLANET SHAFT (SEC)	83-004-1031	3
8	PLANET SHAFT (PRI)	81-004-0071	3
9	PLANET GEAR (SEC)	-D-	3
10	PLANET GEAR (PRI)	-E-	3
11	SUN GEAR	-F-	1
12	INPUT GEAR	-G-	1
13	OUTPUT SHAFT	-H-	1
14	SHIM	83-004-1101	-J-
15	THRUST WASHER- PLANET	81-004-1561	12
16	-	-	-
17	INPUT THRUST WASHER	81-004-2701	1
18	BEARING	01-105-0410	3
19	BEARING	01-105-0420	3
20	BEARING CONE	01-102-0090	1
21	BEARING CUP	01-103-0080	1
22	BEARING CONE	01-102-0100	1
23	BEARING CUP	01-103-0090	1
24	HEX HD CAPSCREW	01-150-1020	8
25	STUD 7/16-20 X 2-15/16	83-004-1191	3
26	LOCKNUT	01-158-0330	3
27	LOCKWASHER	01-166-0010	8
28	ROLL PIN- SEC. PLANET	01-153-0210	3
29	ROLL PIN- PRI. PLANET	01-153-0180	3
30	O-RING	01-402-0420	1
31	SHAFT SEAL	01-405-0380	1
32	MAGNETIC PIPE PLUG	01-207-0070	2
33	GREASE FITTING (OPTIONAL)	01-215-0070	1



**MODEL E60
DOUBLE PLANETARY**

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



NOTE	CODE	DESCRIPTION	PART NUMBER		
			19.54:1 RATIO	26.52:1 RATIO	36.00:1 RATIO
-A-	-	CARRIER (SEC)	83-004-1213	83-004-1213	83-004-1223
-B-	-	CARRIER (PRI)	81-004-2732	81-004-2742	81-004-2742
-D-	-	PLANET GEAR (SEC)	84-004-1042	84-004-1042	83-004-1042
-E-	-	PLANET GEAR (PRI)	81-004-0642	81-004-0532	81-004-0532
-F-	-	SUN GEAR	63-004-1012	63-004-1012	83-004-1052
-G-	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	81-004-0482	81-004-0482
	3	INPUT GEAR - SAE 1" -6B	83-004-1112	83-004-1082	83-004-1082
	4	INPUT GEAR - 14 T 12/24 DP	81-004-1342	SPECIAL	81-004-2792
	5	INPUT GEAR - 15 T 16/32 DP	81-004-1892	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	WITH CODE 4 INPUT ONLY 36:1 ONLY
-C-	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
-H-	D1	2" DIA 3/8" KEY	83-004-4023
	D2	2" DIA 23T 12/24 DP SPL	83-004-4043
	D3	2-1/4" DIA 1/2" KEY	84-004-4073
	D4	3" DIA 3/4" KEY	83-004-4233
	D5	2" DIA 1/2" KEY	83-004-4393
	C1	CUSTOM	

OPTIONS:

SEAL KIT P/N 83-016-5011
(INCLUDES 1 EACH OF
ITEMS 30 AND 31)

36:1 UNITS WITH CODE 4 INPUT ONLY:
REPLACE ITEM 17 (81-004-2701)
WITH: 1 EACH OF 01-112-0220
2 EACH OF 01-112-0230
ADD 1 OF ITEM 4 (81-004-2711)

NOTE: -J- BEARING PRELOAD DETERMINES QUANTITY OF SHIMS.

E.C.N 1803
X60ED2-FD

DATE: 6-26-00

PRODUCT WARRANTY

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

- 1) Prior to placing warranted Parts in service, the Customer shall provide proper storage such that foreign objects (e.g., rain or debris) cannot enter any Parts via entry ports which are normally closed during operation.
- 2) If Parts requiring motorized power for operation are received from Eskridge without a motor, documentation must be available indicating proper lubrication upon placement of the Parts in service.
- 3) The Customer must notify Eskridge in writing of any claim for breach of this warranty promptly after discovery of a defect and in any event prior to the termination of the warranty period, which shall commence when a unit is placed in service and shall expire upon the earlier of (i) the expiration of twelve (12) months from the date of Commencement of Service (as defined in Paragraph 4) (ii) the completion of one thousand (1,000) hours of service of the Parts (iii) 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 Parts are installed or on which it is mounted, or (iv) the installation or mounting of the Parts in or on an item of machinery or equipment other than the first such item in which the Parts are installed or on which the Parts are mounted.
- 4) Parts 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 Parts are installed or on which the Parts are mounted is delivered to the Customer's dealer or the original end-user, whichever ever receives such machinery or equipment first.
- 5) This warranty shall not apply with respect to Parts which, upon inspection by Eskridge, show signs of disassembly rework, modifications or improper installation, mounting, use or maintenance.
- 6) Eskridge makes no warranty in respect to hydraulic motors mounted on any Parts. Failure of any such motor will be referred to the motor manufacturer.
- 7) 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 Parts or any defective component thereof. No cash payment or credit will be made for defective materials or workmanship. **IN NO EVENT SHALL ESKRIDGE BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE, WHICH DAMAGES ARE HEREBY EXPRESSLY DISCLAIMED.**
- 8) From time to time, Eskridge may make changes in the component parts manufactured by it without incorporating such changes in the component parts previously shipped. Such changes shall not constitute an admission by Eskridge of any defects or problems with previously manufactured component parts.
- 9) All freight charges on Parts returned for warranty service are the responsibility of the Customer.

THE FOREGOING WARRANTY IS THE SOLE WARRANTY MADE BY ESKRIDGE WITH RESPECT TO ANY PARTS, 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 PARTS FOR THE CUSTOMER'S INTENDED USE, APPLICATION OR PURPOSE AND THE PROPER METHOD OF INSTALLATION OR MOUNTING MUST BE DETERMINED BY THE CUSTOMER.

WARRANTY RETURN POLICY

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

NOTE: Any order of Parts 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 Parts.

OTHER ESKRIDGE PRODUCTS

PLANETARY GEARBOXES

MODEL	TORQUE RATING
20/28 SERIES	MAX. INTERMITTENT 20,000-28,000 IN-LBS
50 SERIES	50,000 IN-LBS
60 SERIES	60,000 IN-LBS
100 SERIES	100,000 IN-LBS
130 SERIES	130,000 IN-LBS
150 SERIES	150,000 IN-LBS
250 SERIES (MODEL 250 & 252)	250,000 IN-LBS
600 SERIES	600,000 IN-LBS
1000 SERIES	1,000,000 IN-LBS

MULTIPLE DISC BRAKES

	OUTPUT TORQUE
90B SAE B	TO 4,800 IN-LBS
90BA SAE B ADJUSTABLE TORQUE	TO 4,800 IN-LBS
92B SAE B LOW PROFILE	TO 2,800 IN-LBS
93 FOR NICHOLS MOTORS	TO 6,100 IN-LBS
95C SAE C	TO 12,000 IN-LBS
95W WHEEL MOUNT	TO 21,000 IN-LBS
98D SAE D	TO 25,000 IN-LBS

PLANETARY AUGER DRIVES (DIGGERS)

	TORQUE RATING
D50 MODELS 1600, 2000 & 2800	1,500-5,000 FT-LBS
76 MODELS BA & BC, TWO SPEED	8,000-12,500 FT-LBS
77 MODELS BA, BC & BD	6,000-12,500 FT-LBS
78 MODELS 35 & 48, TWO SPEED	9,000-12,500 FT-LBS
75 MODELS 38 & 51, TWO SPEED	16,500-20,000 FT-LBS



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E-MAIL: sales@eskridgeinc.com

Your nearest Eskridge Distributor is:

