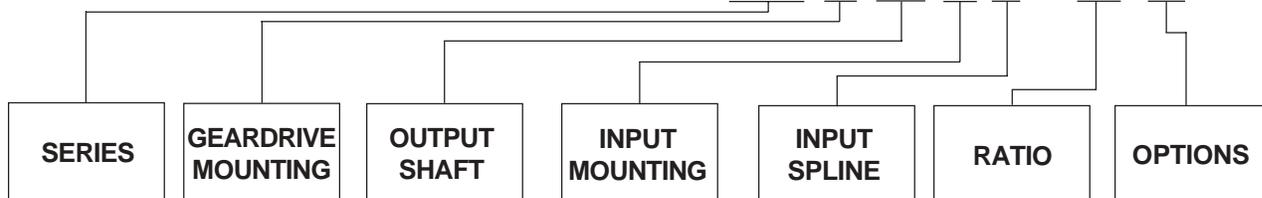


**EXAMPLE PART NUMBER: 150 A D1 C 4 - 35 Z**



## 150 PLANETARY GEAR DRIVE SERVICE & REPAIR MANUAL

THIS SERVICE MANUAL IS EFFECTIVE  
FROM: ..... S/N 12747, MARCH 1991  
TO: ..... CURRENT  
REF: ..... SM150AD1-AB

# 150 SERVICE MANUAL

## DOUBLE STAGE PLANETARY GEAR DRIVE

This manual will assist in disassembly and assembly of the above 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.

<u>Operating Position</u>	<u>Oil Capacity</u>	<u>Oil Level</u>
Horizontal Shaft	5.0 pints (2.4 liters)	To horizontal centerline of gear drive
Vertical Shaft	9.25 pints (4.4 liters)	To midway on upper/primary gearset

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

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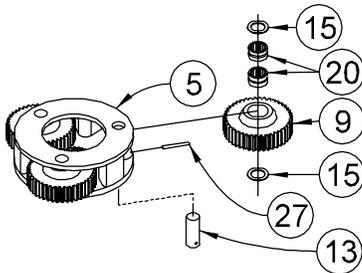
# Unit Disassembly Procedure

(Refer to exploded view drawing on page 6)

- 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 (32) and drain oil from unit. Maximum drainage occurs when oil is warm.
- 3) Remove the twelve hex head capscrews (25) and lockwashers (29) which retain cover (4) and ring gears (2 & 3) to base (1).
- 4) Remove the cover (4), thrust washer (33), and input gear (11). Discard gasket (14).
- 5) Lift the primary planet carrier assembly out of the unit (includes items 5,9,13,15,20, & 27).
- 6) If sun gear (10) has not been removed from gearbox, do so now. (Sometimes the sun gear remains in the primary carrier (5).)
- 7) There are two dowels (26) connecting the primary and secondary ring gears (2 & 3) together. The primary ring gear (2) may be removed by inserting two 3/8-16 capscrews into the threaded holes in the ring gear. Continue threading the capscrews into the holes to cause separation of the dowels and primary ring gear. Remove primary ring gear (2). Discard gasket (14).
- 8) Remove carrier retaining ring (28) from top end of output shaft (7). Lift the secondary planet carrier assembly out of the unit (includes items 6,8,12,16,19, & 27). Use a puller if necessary.
- 9) There are four dowels (26) connecting the secondary ring gear to the base (1). Insert two 3/8-16 capscrews into the threaded holes and separate the ring gear from the mounting base as done for the primary ring gear. Remove secondary ring gear (3). Discard gasket (14).
- 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.

## Primary Planet Carrier Subassembly

(Items 5, 9, 13, 15, 20 & 27)



Rotate the planet gears (9) to check for abnormal noise or roughness in bearings (20) or planet shafts (13). If further inspection or replacement is required, proceed as follows.

**NOTE: Support carrier (5) only while pressing out planet shafts.**

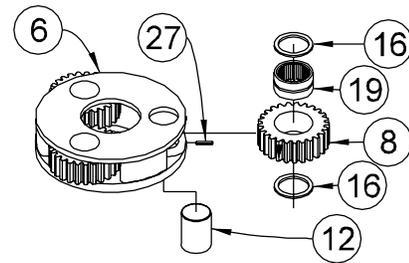
- 1) Drive roll pins (27) into the planet shafts (13).
- 2) Press or drive planet shafts out of carrier (5).
- 3) Remove planet gears (9) and planet washers (15) from the carrier (5).
- 4) If the planet bearings (20) require replacement, press them out of the planet gears (9) and replace with new ones.
- 5) Check primary planet shafts (13) for any abnormal wear, especially ones where bearings need to be replaced. If any abnormal wear is found, replace planet shafts.
- 6) Use 1/8 inch pin punch to remove roll pins (27) from planet shafts (13).

## Reassembly

- 1) With planet washers (15) on both sides of the planet gear (9) and with bearings (20) installed, slide gear into the carrier (5). Insert the planet shaft (13) through the carrier, washers, and planet gear.
- 2) Planet shafts (13) should be installed with chamfered end of 1/8 inch hole toward outside diameter of the carrier (5). This will aid in alignment of holes while inserting roll pins (27).
- 3) Drive a roll pin (27) through the carrier hole and into the planet shaft to retain the parts. Repeat for other planet gears.

## Secondary Planet Carrier Subassembly

(Items 6, 8, 12, 16, 19 & 27)



Rotate the planet gears (8) to check for abnormal noise or roughness in bearings (19) 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.**

- 1) Drive roll pins (27) into the planet shafts (12).
- 2) Press or drive planet shafts out of carrier (6).
- 3) Remove planet gears (8) and planet washers (16) from the carrier (6).
- 4) If the planet bearings (19) require replacement, press them out of the planet gears (8) and replace with new ones.
- 5) Check planet shafts (12) for any abnormal wear,

especially ones where bearings need to be replaced. If any abnormal wear is found, replace planet shafts.

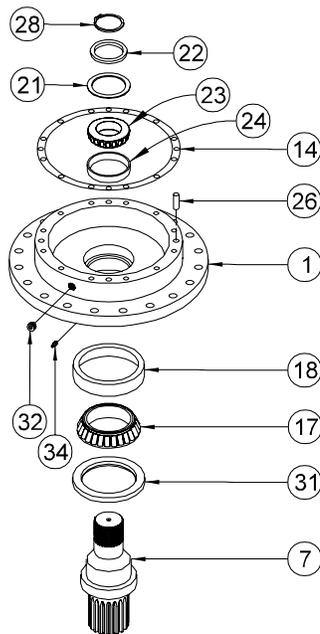
- Use 1/8 inch pin punch to remove roll pins (27) from planet shafts (12).

#### Reassembly

- With planet washers (16) on both sides of the planet gear (8) and with bearings (19) installed, slide gear into the carrier (6). Insert the planet shaft (12) through the carrier, washers, and planet gear.
- Planet shafts (12) should be installed with chamfered end of 1/8 inch hole toward outside diameter of the carrier (6). This will aid in alignment of holes while inserting roll pins (27).
- Drive a roll pin (27) through the carrier hole and into the planet shaft to retain the parts. Repeat for other planet gears.

#### Base Subassembly

(Items 1, 7, 14, 17, 18, 21, 22, 23, 24, 26, 28, 31 & 32)



- Remove the shaft retaining ring (28). Remove the spacer (22) and shim(s) (21).

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

- Press outer bearing cone (17) (large end down as shown) onto the shaft until it seats against the shoulder. Bearing cone (17) may be reused if it was removed only to replace the seal (31).
- Inspect inner and outer bearing cups (24 & 18). Bearing cups are not removable. If cups are damaged,

cups and base (1) may need replacement. Contact Eskridge, inc., if you have any questions.

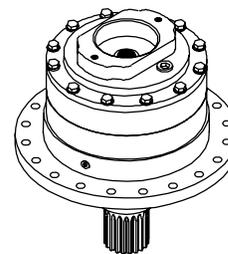
#### Reassembly

- Clean all foreign material from magnetic oil plug (32) located on side of base (1). Add a small amount of pipe thread compound to pipe plug before installing back into base.
- Place the base (1) (output side up, opposite shown) on the press table.
- Apply a layer of lithium or general purpose bearing grease to surface of outer bearing cup (18). Insert the shaft into the base (bearing cone down) and use a soft hammer to install the shaft seal (31) into the mounting base.

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

- Apply a layer of lithium or general purpose bearing grease to surface of inner bearing cup (24). Press the inner bearing cone (23) (large end up as shown) onto the shaft (7) until it is just seated against inner bearing cup (24). A slight preload of less than 100 in-lbs. rolling torque should be obtained.
- Relieve the press and slide the shim(s) (21) and the spacer (22) onto the shaft (7). Install the retaining ring (28) into the shaft groove. It is important that the retaining ring is completely seated in the groove. If the retaining ring cannot be installed into the groove, one shim must be removed and the procedure must be repeated. Once the retaining ring is installed, check for proper shaft bearing preload by pressing down on the end of the shaft and rotating the mounting base. There should be from 50 to 100 in-lbs of rolling resistance in the bearings. If the retaining ring is not tight against the spacer, remove the spacer and add one shim and repeat the procedure.

#### Unit Reassembly



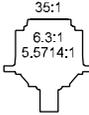
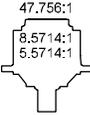
(Refer to exploded view drawing on page 6)

- When all subassemblies are complete, unit is ready to be assembled.
- Place a new gasket (14) on the base (1). Referring to scribe marks for proper orientation, start the secondary ring gear (3) onto the base.
- Place a flat metal plate over ring gear and use a hydraulic press to push the ring gear down into place.

- 4) Push the retaining ring **(28)** inside the secondary planet carrier **(6)**.
- 5) Install the secondary planet carrier **(6)** assembly by rotating it until planet gears line up with ring gear teeth and shaft spline. Install carrier retaining ring **(28)** to top end of output shaft **(7)**. Press carrier down onto the shaft until fully seated.
- 6) Place a new gasket **(14)** on the secondary ring gear **(3)** and install the primary ring gear **(2)** as described in step number 3. Refer to scribe marks for proper orientation.
- 7) Check to be sure retaining ring **(28)** is installed on sun gear **(10)**. Slide the sun gear **(10)** into the secondary planet carrier.
- 8) 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.
- 9) Slide the input gear **(11)** into the primary planetary carrier.
- 10) Install thrust washer **(33)**.
- 11) Place a new gasket **(14)** on the primary ring gear **(2)** and position the cover **(4)** with the proper orientation. Install the twelve capscrews **(25)** with lockwashers **(29)** and torque to 65 ft-lbs.
- 12) Fill gearbox 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 GEAR DRIVE IS NOW READY TO USE.**

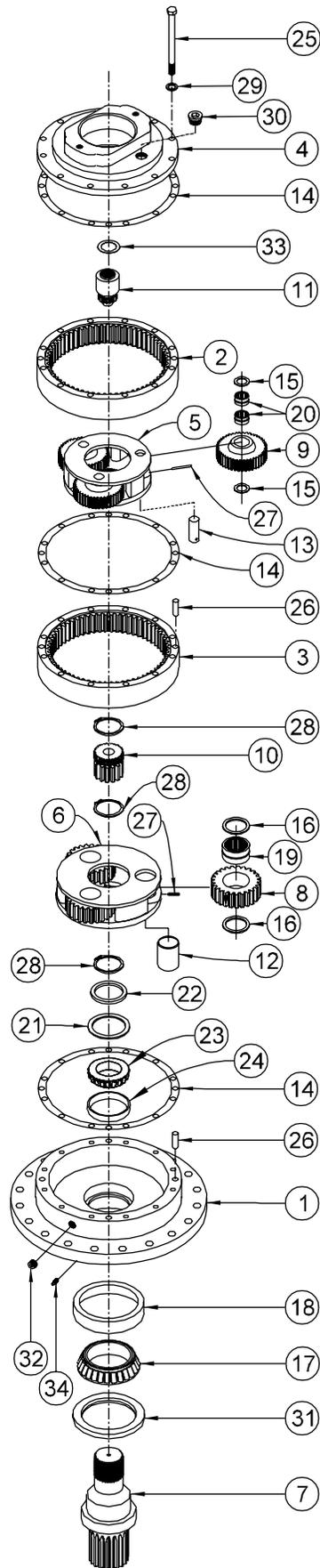
# 150 Double Stage Exploded View Drawing

		 <b>ESKRIDGE</b>		<b>MODEL 150</b>	
I T E M	Q T Y	RATIO →		35:1	47.756:1
		EFFECTIVE: FROM: S/N 12747 3-18-91 TO: CURRENT		 6.3:1 5.5714:1	 5.5714:1 5.5714:1
		DESCRIPTION	PART NO.	PART NO.	PART NO.
1	1	BASE - (A150)	80-004-3023	80-004-3023	
2	1	RING GEAR - PRIMARY	80-004-0832	80-004-0832	
3	1	RING GEAR - SECONDARY	80-004-0842	80-004-0842	
4	1	COVER- SAE 'A' 2 AND 4 BOLT @ 45° ('A' OPTION)	80-005-1254	80-005-1254	
		COVER- SAE 'A' 4 BOLT @ 90° ('F' OPTION)	80-005-1264	80-005-1264	
		COVER- SAE 'B' 2 AND 4 BOLT ('B' OPTION)	80-005-1274	80-005-1274	
		COVER- SAE 'C' 2 AND 4 BOLT ('C' OPTION) ***	80-004-1174	80-004-1174	
5	1	CARRIER-PRI.	73-004-1043	73-004-1053	
6	1	CARRIER-SEC.	80-005-1303	80-005-1303	
7	1	D1-3.5 DIA X 20T 6/12 DP SPLINE	80-004-4052	80-004-4052	
		D2-3.75" DIA X 1" KEY	80-004-4082	80-004-4082	
		C1 SHAFT- CUSTOM (PER CUSTOMER SPECS.)			
8	3	PLANET GEAR-SEC.	71-004-0092	71-004-0092	
9	3	PLANET GEAR-PRI.	73-004-1032	73-004-1022	
10	1	SUN GEAR	71-004-0102	71-004-0102	
11	1	INPUT GEAR-13T,16/32 DP SPLINE	80-004-1312	80-004-1292	
		INPUT GEAR-SAE 1"-6B SPLINE	80-004-1322	80-004-1282	
		INPUT GEAR-14T,12/24 DP SPLINE	73-004-1012	73-004-1002	
12	3	PLANET SHAFT-SEC.	71-004-0081	71-004-0081	
13	3	PLANET SHAFT-PRI.	71-004-0121	71-004-0121	
14	3	GASKET - RING GEAR	80-004-1041	80-004-1041	
15	6	WASHER-PRI.	71-004-0861	71-004-0861	
16	6	WASHER-SEC.	71-004-0871	71-004-0871	
17	1	BEARING CONE - LOWER SHAFT	01-102-0120	01-102-0120	
18	1	BEARING CUP - LOWER SHAFT	01-103-0110	01-103-0110	
19	3	BEARING - PLANET SEC.	01-105-0020	01-105-0020	
20	6	BEARING - PLANET PRI.	01-105-0010	01-105-0010	
21	★	SHIM	81-004-2061	81-004-2061	
22	1	SPACER	80-004-1111	80-004-1111	
23	1	BEARING CONE - UPPER SHAFT	01-102-0030	01-102-0030	
24	1	BEARING CUP - UPPER SHAFT	01-103-0030	01-103-0030	
25	12	H.H.C.S. (1/2-13 X 6)	01-150-1190	01-150-1190	
26	6	DOWEL (1/2 X 1-1/2)	01-152-0040	01-152-0040	
27	6	ROLL PIN (3/16 X 1)	01-153-0020	01-153-0020	
28	3	RETAINING RING	01-160-0030	01-160-0030	
29	12	LOCKWASHER - MED (1/2)	01-166-0030	01-166-0030	
30	1	HOLLOW HEX PLUG * O-RING	01-208-0030	01-208-0030	
31	1	SEAL	01-405-0500	01-405-0500	
32	1	PLUG (1/2 NPT MAGNETIC)	01-207-0041	01-207-0041	
33	1	THRUST WASHER **	01-112-0230	01-112-0230	
34	1	PIPE PLUG 1/4 NPT - HOLLOW HEX	01-207-0020	01-207-0020	
		ZERK (1/4 NPT) (OPTIONAL)	01-215-0040	01-215-0040	

\* QUANTITY OF SHIMS DETERMINED BY BEARING PRELOAD.  
 \*\* NOT USED WITH 80-004-1174 COVER.  
 \*\*\* HYDRAULIC MOTORS USED WITH THIS COVER MUST HAVE A 2.19 DISTANCE FROM MOUNTING FACE TO END OF SHAFT. CONTACT ESKRIDGE FOR INPUT GEARS TO BE USED WITH OTHER MOTORS.

OPTIONS  
 SEAL KIT P/N 80-016-2011  
 INCLUDES 1 EA. OF ITEM 31 AND  
 A QTY 3 OF ITEM 14

E.C.N. 1803  
 X150D2-AC DATE: 04-28-00



# 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.

## OTHER ESKRIDGE PRODUCTS

### Planetary Gear Drives

<u>SERIES</u>	<u>TORQUE RATING</u>
20/28 SERIES	MAX. INTERMITTENT 20,000 - 28,000 IN-LB
50 SERIES	50,000 IN-LB
65 SERIES	60,000 IN-LB
100 SERIES	100,000 IN-LB
130 SERIES	130,000 IN-LB
150 SERIES	150,000 IN-LB
250 SERIES	250,000 IN-LB
600 SERIES	600,000 IN-LB
1000 SERIES	1,000,000 IN-LB

### Multiple Disc Brakes

<u>SERIES</u>	<u>TORQUE RATING</u>
90B SAE B	TO 4,800 IN-LB
90BA SAE B ADJUSTABLE TORQUE	TO 4,800 IN-LB
92B SAE B LOW PROFILE	TO 2,800 IN-LB
93 FOR NICHOLS MOTORS	TO 6,100 IN-LB
95C SAE C	TO 12,000 IN-LB
95W SAE C WHEEL MOUNT	TO 21,000 IN-LB
98D SAE D	TO 25,000 IN-LB

### Diggers (Planetary Auger Drives)

<u>SERIES</u>	<u>TORQUE RATING</u>
D50 MODELS 1500, 2500 & 5000	1,500 - 5,000 FT-LB
76 MODELS BA & BC, TWO SPEED	8,000 - 12,500 FT-LB
77 MODELS BA, BC & BD	6,000 - 12,500 FT-LB
78 MODELS 35 & 48, TWO SPEED	9,000 - 12,500 FT-LB
75 MODELS 38 & 51, TWO SPEED	16,500 - 20,000 FT-LB

