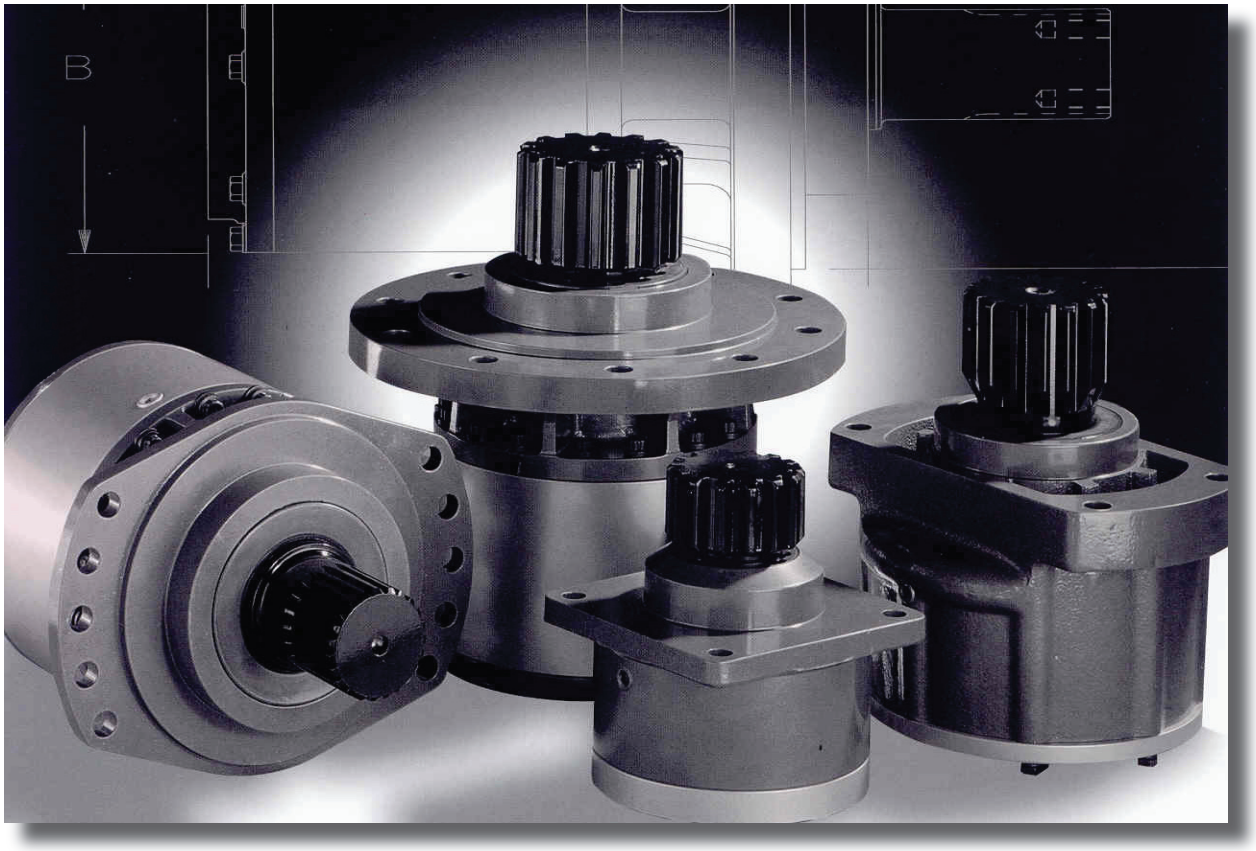
ESKRIDGE

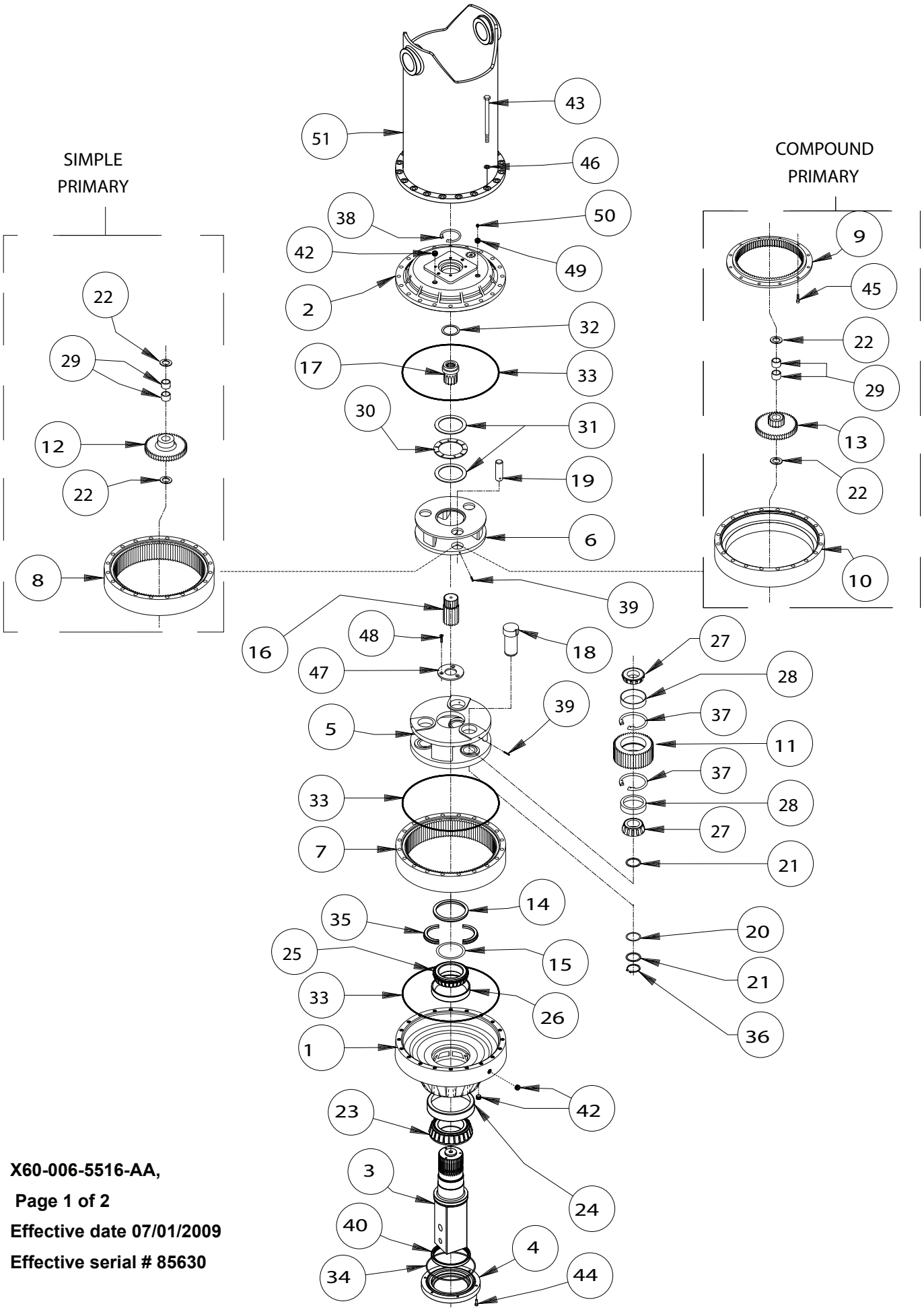
MODEL D1000 DOUBLE PLANETARY DIGGER SERVICE MANUAL



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:85630 TO CURRENT
DATE:07/01/2009 TO CURRENT
VERSION: SM60-006-5516-AA

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.



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Effective date 07/01/2009

Effective serial # 85630

Model 1000 Digger
60-006-5516

COMPOUND PRIMARY

RATIO
96.00:1

ITEM	QTY.	DESCRIPTION	PART NUMBER
1	1	BASE - CODE F - FLANGELESS	60-004-3014
2	1	COVER - SAE 'E' (4 BOLT)	60-004-1564
3	1	SHAFT - 130mm SQUARE	60-004-4239L
4	1	SEAL CARRIER	60-004-1922
5	1	CARRIER - SECONDARY	60-004-1044
6	1	CARRIER - PRIMARY	60-004-1024
7	1	RING GEAR - SECONDARY	60-004-1243
9	1	RING GEAR - COMPOUND PRIMARY	60-004-1213
10	1	RING SPACER - PRIMARY	60-004-1253
11	3	PLANET GEAR - SECONDARY	60-004-1232
13	3	CLUSTER GEAR	60-004-1182
14	1	LOCK RING - SHAFT BEARING	60-004-1472
15	-J-	SHIM(S) - SHAFT	60-004-1311
16	1	SUN GEAR	60-004-1222
17	1	INPUT GEAR - CODE 5 - (15T; 8/16 SPLINE)	60-004-1462
18	3	PLANET SHAFT-SECONDARY	60-004-1262
19	3	PLANET SHAFT-PRIMARY	60-004-1272
20	-J-	SHIM(S) - SECONDARY PLANET	60-004-1321
21	6	WASHER - SECONDARY PLANET	60-004-1291
22	6	WASHER - PRIMARY PLANET	60-004-1881
23	1	BEARING CONE - SHAFT OUTER	01-102-0190
24	1	BEARING CUP - SHAFT OUTER	01-103-0190
25	1	BEARING CONE - SHAFT INNER	01-102-0220
26	1	BEARING CUP - SHAFT INNER	01-103-0220
27	6	CONE - SEC.PLANET	01-102-0210
28	6	CUP - SEC.PLANET	01-103-0210
29	6	BRG-PRIMARY PLANET	01-105-0510
30	1	BRG-PRI. CARR. THRUST	01-112-0340
31	2	RACE-PRI. CARR. THRUST	01-112-0350
32	1	RACE- INPUT THRUST	01-112-0060
33	3	O-RING - RING GEAR	01-402-0660
34	1	O-RING - SEAL CARRIER	01-402-0670
35	1	SPLIT RING	60-004-1482
36	3	RETAINING RING -SEC. PIN	01-160-0490
37	6	RETAINING RING-SEC. PLNT.	01-160-0500
38	1	RETAINING RING - INPUT	01-160-0510
39	6	ROLL PIN - PRI. 1/4 X 1 3/8	01-153-0150
40	1	SHAFT SEAL	01-405-0810
42	5	PIPE PLUG 3/4 NPT MAGNETIC	01-207-0100
43	20	H.H.C.S 3/4-10 X 10.5 GRD 8	01-150-1720
44	6	S.H.C.S 3/8-16 X 1 GRD 8	01-150-1110
45	12	S.H.C.S 1/2-13 X 1.5 GRD 8	01-150-0570
46	20	HARDWASHER - 3/4	01-166-0350
47	1	RING - SEC CARRIER RETAINER	60-004-1352
48	3	FLAT HD. SOC. C.S. 3/8-24 X 1 GR8	01-150-1590
49	1	ADAPTER 3/4 NPT - M TO 1/8 NPT-F	01-201-0530
50	1	REL.FIT .25-1psi	01-216-0010
51	1	BAIL ASSEMBLY	60-005-2153

-J- BEARING PRELOAD
DETERMINES QUANTITY OF SHIMS.

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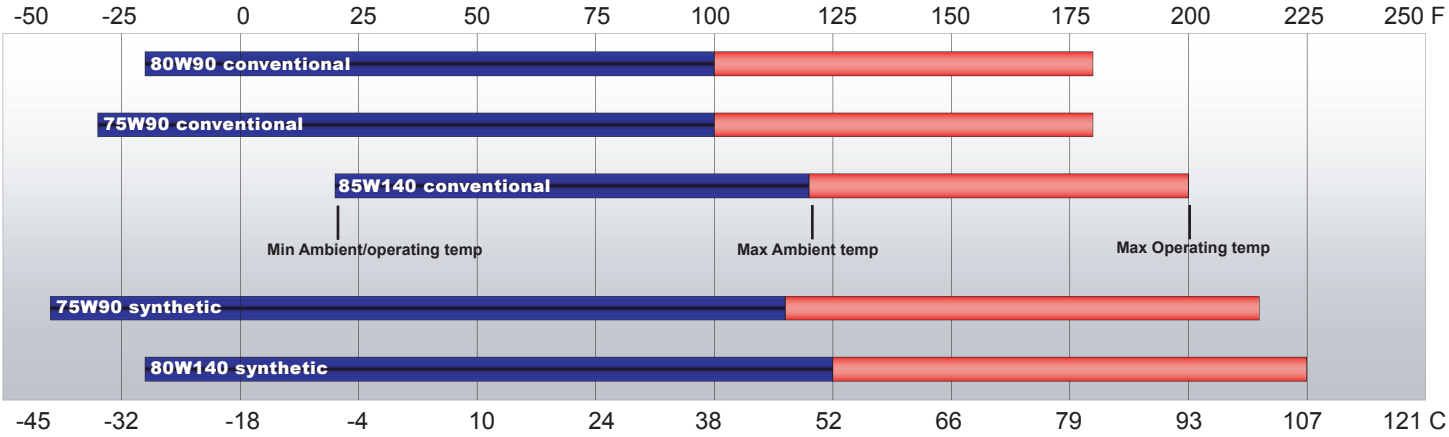
LUBRICATION & MAINTENANCE

Using the chart below, determine an appropriate lubricant viscosity. Use only EP (extreme pressure) or API GL-5 designated lubricants. Change the lubricant after the first 50 hours of operation and at 500 hour intervals thereafter. The gear drive should be partially disassembled to inspect gears and bearings at 1000 hour intervals.

Recommended ambient and operating temperatures for conventional and synthetic gear lubricants



Note: Ambient temperature is the air temperature measured in the immediate vicinity of the gearbox. A Gearbox exposed to the direct rays of the sun or other radiant heat sources will operate at higher temperatures and therefore must be given special consideration. The max operating temp must not be exceeded under any circumstances, regardless of ambient temperature.

ESKRIDGE MODEL 1000 OIL CAPACITIES

Operating Position	Oil Capacity			Oil Level
	Single stage	Double stage	Triple stage	
Horizontal Shaft	-	-	-	To horizontal centerline of gear drive
Vertical Shaft (Pinion Up)	-	-	-	To side port on gear drive base
Vertical Shaft (Pinion Down)		29 qts / 27 Liters	-	To midway on upper/ primary gear set

ESKRIDGE PART NUMBER INTERPRETATION

Note: All standard Eskridge Geardrives are issued a descriptive part number which includes information regarding the Model, means of shaft retention, base style, shaft style, input mounting, input shaft size, overall ratio and various available options. For a detailed breakdown of this information, please refer to Eskridge product specification sheets found at: http://www.eskridgeinc.com/geardrives/gearprodspecs.html

Unit Teardown

1) Scribe a diagonal line across the outside of the unit from the bail **(51)** to the base **(1)** before disassembly to aid in the proper positioning of pieces during reassembly.

2) Remove drain plugs **(42)** and drain oil from unit. The oil will drain out more quickly and completely if warm.

3) Remove the 20 3/4-10 capscrews **(43)** and flat-washers **(46)** retaining the bail **(51)** and cover **(2)**.

4) Remove the bail **(51)**, cover **(2)**, thrust washer(s)/ bearing(s) **(30,31,32)**, and input gear **(17)**. Inspect o-ring **(33)**; discard if damaged or deformed.

5) Lift the planet carrier assembly out of the unit .

6) Remove ring gear(s)/spacer **(8/10pri, 7sec)** and subsequent carrier assemblies. Inspect gear to gear and gear to base O-ring(s) **(33)**; as before, discard if damaged or deformed.

7) The unit is now disassembled into groups of parts. The area(s) requiring service should be identified by thorough inspection of the individual components after they have been cleaned and dried.

Carrier Assembly Teardown

Rotate planet gears (12/13 pri;11 sec) to check for abnormal noise or roughness in bearings. If further inspection or replacement is required, proceed as follows.

1) *Primary:* Drive roll pins **(39)** completely into the planet shafts **(19)**. *Secondary:* Remove planet shaft retaining rings **(36)**, spacers **(21)** and preload shims **(20)**

2) Slide planet shafts **(19 pri/18 sec)** out of carrier **(6 pri/5 sec)**.

3) Remove planet gears **(12/13 pri; 11 sec)**, washers **(22 pri)** and bearings **(29 pri;27/28 sec)** from carrier **(6 pri/5 sec)**.

4) Inspect the planet gear **(12/13 pri; 11 sec),** bearing bore and planet shaft **(19 pri/18 sec)** and bearings **(29 pri; 27/28 sec)**. Check for spalling, bruising or other damage and replace components as necessary.

5) *Primary only:* Remove roll pins **(39)** from planet shafts **(19)** using a 1/4 inch pin punch.

Carrier Reassembly

1) *Primary:* Planet shafts **(19)** should be installed with chamfered end of 1/4 inch roll pin hole towards outside diameter of carrier **(6)**; this will ease alignment of holes while inserting roll pins **(39)**. *Secondary:* Planet shafts must be installed aligning the slot in the large end of the shaft with the roll pin protruding into the shaft bore.

2) *Primary:* Drive roll pin **(39)** into the carrier hole and into planet shaft to retain parts. *Secondary:* Install the first planet washer **(21)** to the small end of the planet shaft, the appropriate number of preload shims **(20)** and then the second planet washer **(21)** and retaining ring **(36)** Repeat for remaining planet gears.

Base Subassembly Teardown

1) Remove the seal carrier retaining screws **(44)** and seal carrier **(4)** from unit. Inspect seal **(40)** for signs of wear or damage and replace as necessary.

2) Remove the output shaft lock ring **(14)** using a heel bar or puller; if using a heel bar, be sure not to pry against the cage of the inner output shaft bearing **(25)**. Remove the split ring segments **(35)** and shims **(15)**.

Caution: Since the shaft is no longer positively retained, care should be taken to avoid injury. Care should also be

taken not to damage it while pressing through base.

3) Place base **(1)** exterior side down, on a plate or table. Press output shaft out bottom of base by applying a load to internal end of shaft until it passes through inner shaft bearing cone **(25)**.

4) A gear puller may be used to remove the outer bearing cone **(23)** from the shaft **(3)**. If reusing old bearing cone, do not pull on or damage roller cage.

Note: Press bearing cone onto output shaft by pressing on inner race only. DO NOT press on roller cage, as it may damage the bearing assembly.

5) Inspect inner and outer bearing cups **(26 & 24)**. If cups are damaged, drive them out using a brass drift and utilizing the bearing knock-out notches in the base **(1)**

Base Reassembly

1) Clean all foreign material from magnetic oil plugs located in base **(1)**.

2) Place base exterior side up on work table.

3) Apply a layer of lithium or general purpose bearing grease to the roller contact surface of outer bearing cup **(24)**.

4) Press outer bearing cone **(23)** onto the shaft **(3)** until it seats against the shoulder.

5) Place the shaft **(3)** with the outer bearing cone into the base.

6) Flip shaft/base assembly, and apply lithium or general purpose bearing grease to roller contact surface of the inner cup **(26)**, then press inner bearing cone **(25)** onto shaft until it seats against inner bearing cup.

7) Prior to installation of the shaft seal the preload may result in a rolling torque which varies between 200 to 300 in-lb. The bearing preload should be tailored to your application; a low-speed application may require a high pre-load, while high-speed applications usually benefit from low pre-load. Adding shims **(15)** will increase the pre-load on the bearing set. Determine your pre-load requirement and install shims to obtain this pre-load.

   Install the Load-N-Lock™ segments **(35)** over the shims and into the shaft groove. Then, install the lock ring **(14)** over the segments **(35)**.

8) Lubricate shaft seal **(40)** with grease and apply a small amount of sealant onto the OD of the seal. Install the seal into the seal carrier **(4)**. Install the O-ring **(34)** into the seal carrier and install the seal carrier. Tighten the socket-head capscrews **(44)** to 45 ft-lb (dry) or 35 ft-lb (lubricated).

All subassembly service or repairs should be complete at this time. Continue to Unit Assembly to complete buildup of unit.

Unit Reassembly

1) Install the secondary carrier assembly onto the output shaft; aligning the splines of the carrier **(5)** with the output shaft **(3)** splines and centering the three threaded holes in the ouput shaft between the planet gears. Once aligned slide the carrier onto the shaft.

2) Install carrier retaining plate **(47)** & secure using the 3/8-24 Flathead capscrews **(48).** If using thread locking compound to assist in screw retention, apply only a small amount to internal threads. Use of excess thread lock may cause screws to be irremovable once compound has cured.

3) Lubricate o-ring **(33)** and install on the ring gear **(7)** pilot.

Caution: Hold ring gear by outside diameter or use lifting device to prevent injury. Threaded lifting holes are provided on the ring gear for this purpose.

4) Align the gear teeth of secondary ring gear **(7)** with the gear teeth of the planet gears **(11)** and place ring gear on base **(1)** aligning mounting holes of ring gear with holes in base. Use the scribed line made during disassembly for reference. With carrier in place, install secondary sun gear **(16)**.

Compound primary (76:1 ratio and up):

5C) a) The planet gears will now need to be timed. Refer to the diagram appropriate for your unit's gear ratio (above, right). The planet gears each have a timing mark, usually a round punch mark stamped into the surface which is shown as a circle on the diagram.

b) As seen from above, start with the top planet gear with it's timing mark pointing straight down. Next, rotate the lower left planet gear counterclockwise as indicated in the timing diagram. Then rotate the lower right planet gear clockwise as indicated.

c) Set the input gear **(17)** and the input thrust race **(32)** into the center of the primary planet carrier assembly.

d) If compound primary ring gear **(9)** was not removed during disassembly, then skip to step 7. Otherwise, bolt to the inside of the cover **(2)** with twelve bolts **(45)**. Use a removable thread locking compound on the threads of the bolts **(45)**. Tighten to 110 ft.-lbs. dry or 80 ft.-lbs. lubricated.

e) Install primary ring spacer **(10)** w/ O-ring **(33)** in place.

6) Install the input to cover thrust washer **(32)** and carrier to cover thrust washers **(31, 2ea; 30, 1ea)** Refer to exploded view for details.

7) Noting the scribed line made during disassembly, (with lubricated o-ring **(33)** in place) align and install the cover **(2)** and the bail **(51)**.

8) Install and torque the 20 3/4-10 hex-head cap-screws **(43)** with flat-washers **(46)**. The torque for the cap-screws: 380 ft-lb dry, 280 ft-lb if the fasteners are lubricated.

9) Using a splined shaft to drive the input gear **(17)** ensure that the unit spins freely.

10) Fill the unit to the proper level, as specified, with recommended gear oil (refer to chart, page 3) after unit is sealed with brake and/or motor.

The gearbox is now ready to use.The gear drive is now ready to use.

Primary Carrier Timing Diagram
Unit Ratio: 96:1