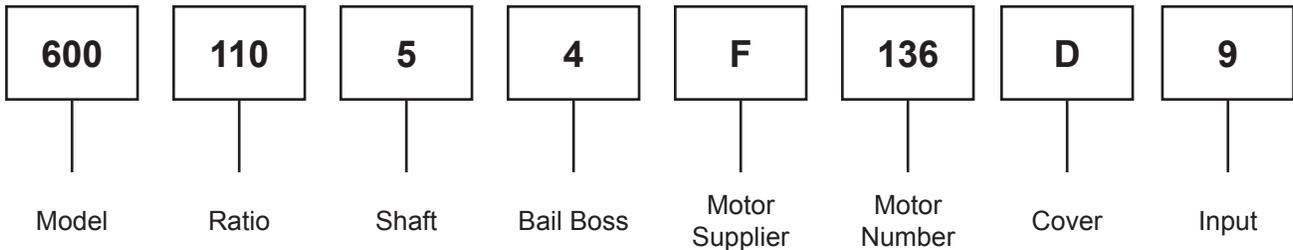




SERVICE MANUAL 600 SERIES DIGGER MODELS



Example Part Number



THIS SERVICE MANUAL IS EFFECTIVE:
S/N: 159696 TO CURRENT
DATE: 6-2017 TO CURRENT
VERSION: SMD600110-54F136D9_AA

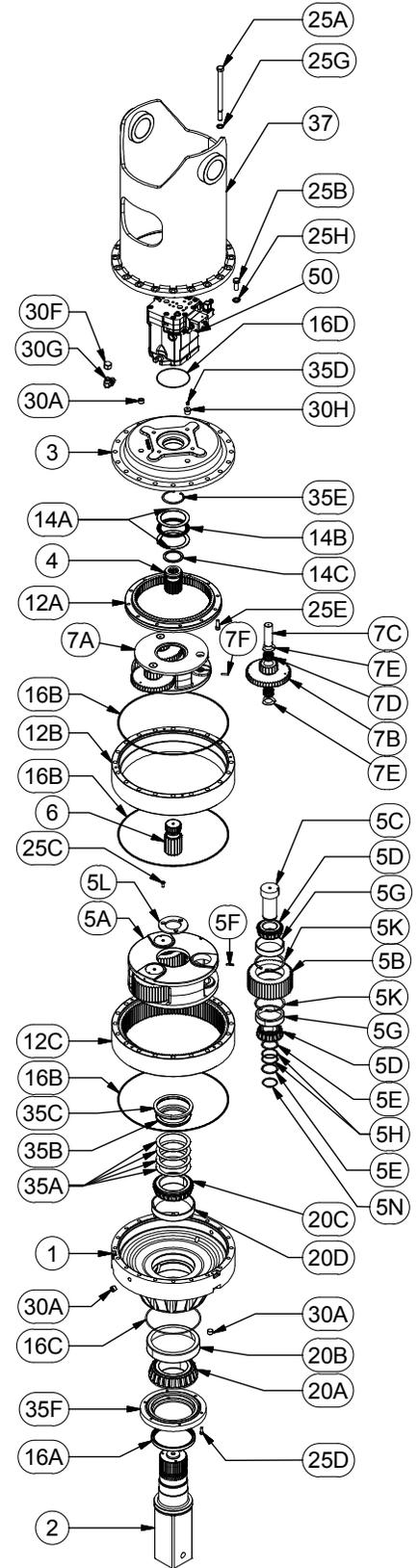
NOTE: Individual customer specifications (spindle mounting, sprocket pilot, brake assembly, etc.) may vary from exploded drawing and standard part numbers shown. If applicable, refer to customer drawing for details.



STANDARD

600110-54F136D9
EFFECTIVE FROM: SN-05-15-17 159696

PARTS LIST				
GROUP	ITEM	QTY	PART NUMBER	DESCRIPTION
	1	1	60-004-3014	BASE-FLANGELESS-F600/F1000
	2	1	60-004-4222L	SHAFT - 600/1000 - D2
	3	1	60-004-1074	COVER
	4	1	60-004-1142	INPUT GEAR
5	5	1	60-005-2063	CARRIER ASSY SEC. 5.33:1 1000
	5A	1	60-004-1054	CARRIER SEC
	5B	3	60-004-1112	PLANET GEAR SEC
	5C	3	60-004-1262	PLANET SHAFT - SEC. 600/1400
	5D	6	01-102-0210	TAPERED BEARING CONE
	5E	6	60-004-1291	WASHER - SEC. PLANET 600 1000 1400
	5F	3	01-153-0150	ROLL PIN 1/4" X 1-3/8"
	5G	6	01-103-0210	TAPERED BEARING CUP
	5H	6	60-004-1321	SHIM-SECONDARY PLANET
	5K	6	01-160-0500	RETAINING RING
	5L	1	60-004-1352	SECONDARY CARRIER RETAINER
	5N	3	01-160-0490	RETAINING RING; EXTERNAL; 5100-262
	6	1	60-004-1102	SUN GEAR
7	7	1	60-005-2033	PRIMARY CARRIER ASSY
	7A	1	60-004-6109	CARR.-PRI(7.76/14.33/18.20:1)
	7B	3	60-004-1162	CLUSTER GEAR-600
	7C	3	60-004-1272	PLANET SHAFT - PRI
	7D	6	01-105-0510	NEEDLE ROLLER AND CAGE ASSY
	7E	6	60-004-6110	WASHER - THRUST- PRI
	7F	3	01-153-0150	ROLL PIN 1/4" X 1-3/8"
12	-	-	-	RING GEARS
	12A	1	60-004-1213	RING GEAR - COMPOUND PRI
	12B	1	60-004-1253	RING SPACER - CMPD PRI - 600/1000
	12C	1	60-004-1193	RING GEAR - SEC- 600; PRI 600/1000 SIMPLE
14	-	-	-	THRUST WASHERS & BEARINGS
	14A	2	01-112-0350	THRUST RACE AS120155
	14B	1	01-112-0340	THRUST BRG AXK120155
	14C	1	01-112-0060	THRUST WASHER
16	-	-	60-016-2076	SEAL KIT
	16A	1	01-405-0810	SEAL
	16B	3	01-402-0660	O-RING
	16C	1	01-402-0670	O-RING 2-377
	16D	1	01-402-0890	O-RING
20	-	-	-	OUTPUT SHAFT BEARINGS
	20A	1	01-102-0190	BEARING CONE
	20B	1	01-103-0190	BEARING CUP
	20C	1	01-102-0220	BRG CONE
	20D	1	01-103-0220	BEARING CUP
25	-	-	-	HARDWARE
	25A	20	01-150-1720	HHCS (3/4-10 x 11.5 GRD 8)
	25B	2	01-150-1890	HHCS (3/4-10 UNC 1.75" GR5)
	25C	3	01-150-1590	FLAT HD SOC C.S.;GR8 3/8-24X1
	25D	6	01-150-1110	SOCKET HEAD CAP SCREW
	25E	12	01-150-0570	SOC HD CAP SCREW
	25G	20	01-166-0350	HARDWASHER - 3/4; 1.25 O.D.
	25H	2	01-166-0360	LOCKWASHER 3/4" MED.
30	-	-	-	PLUGS AND FITTINGS
	30A	5	01-207-0100	PIPE PLUG 3/4 NPT MAGNETIC
	30F	1	01-201-0760	CAP
	30G	1	01-201-0792	FITTING
	30H	1	01-201-0530	ADAPTOR
35	-	-	-	MISCELLANEOUS
	35A	*	60-004-1311	SHIM - SHAFT, 600/1400
	35B	1	60-004-1482	SPLIT RING - 600/1000/1400
	35C	1	60-004-1472	LOCKING RING
	35D	1	01-216-0020	RELIEF VALVE
	35E	1	01-160-0510	RETAINING RING; INTERNAL
	35F	1	60-004-1922	SEAL CARRIER - D1400
	37	1	60-005-1622	BAIL ASSY
	50	1	01-304-1360	MOTOR

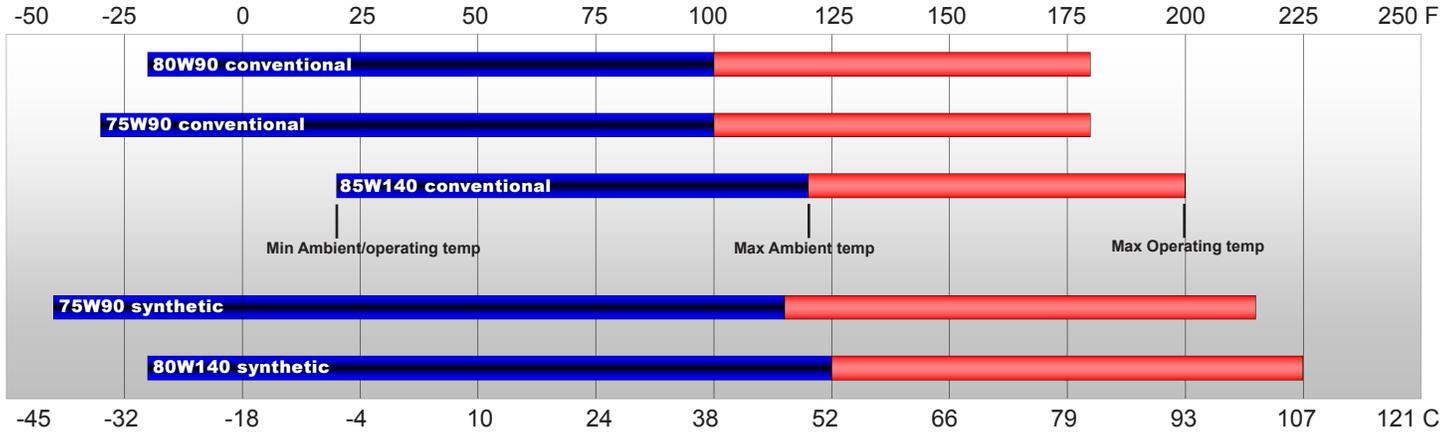


*QUANTITY DEPENDANT UPON DESIRED BEARING PRELOAD
X600110-54F136D9 ECN: - REV: A 05-11-17

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 auger 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.

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 based or general purpose bearing grease sparingly every 50 operating hours or at regular maintenance intervals. Over-greasing the output bearing should be avoided as it tends to fill the housing with grease and thicken the oil

ESKRIDGE MODEL D1000 OIL CAPACITIES

Operating Position	Oil Capacity			Oil Level
	Single stage	Double stage	Triple stage	
Horizontal Shaft	-	9.5 gal	-	To horizontal centerline of auger drive
Vertical Shaft (Pinion Down)	-	9.5 gal	-	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.

ESKRIDGE PART NUMBER INTERPRETATION

Note: All non custom 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/diggers/diggerprodspecs.html>

Unit Disassembly Procedure

- 1) Scribe a diagonal line across the outside of the unit from the bail (37) to the base (1) before disassembly to aid in the proper positioning of pieces during reassembly.
- 2) Remove magnetic drain plugs (30A) and drain oil from unit. The oil will drain out faster and more completely if warm.
- 3) Remove the twenty hex-head capscrews (25A) and flat washers (25G).
- 4) Remove bail (37) from gearbox assembly.
- 5) Install two hex-head capscrews (25A) into cover (3) to retain gearbox assembly together while removing motor fasteners.
- 6) Remove motor fasteners (25B) and washer (25H). Remove motor (50) and temporary fasteners (25A).
- 7) Remove cover (3), thrust bearings (14A, 14B & 14C), remove input gear (4). Inspect o-ring (16B); discard if damaged or deformed.
- 8) Lift Stage I planet carrier assembly (7) out of the unit. Remove ring gear spacer (12B) and inspect o-ring (16B); discard if damaged or deformed.
- 9) Remove Stage II sun gear (6) from secondary carrier assembly (5).
- 10) Remove the three 3/8-24 flat head capscrews (25C) securing the carrier retaining plate (5L) to the output shaft (2).
- 11) Remove remaining ring gear (12C) and Stage II carrier assembly (5). Inspect o-ring(s) (16B), discard and replace any damaged or deformed o-rings.
- 12) The unit is now separated into subassemblies. The area(s) requiring repair should be identified by thorough inspection of the individual components after they have been cleaned and dried.

- 5) Inspect the planet gear (7B) bearing bore, planet shaft (7C) and rollers (7D). Check for spalling, bruising or other damage.
- 6) Replace any parts where abnormal wear is found.
- 7) Use 3/16 inch pin punch to remove roll pins (7F) from planet shafts (7C).

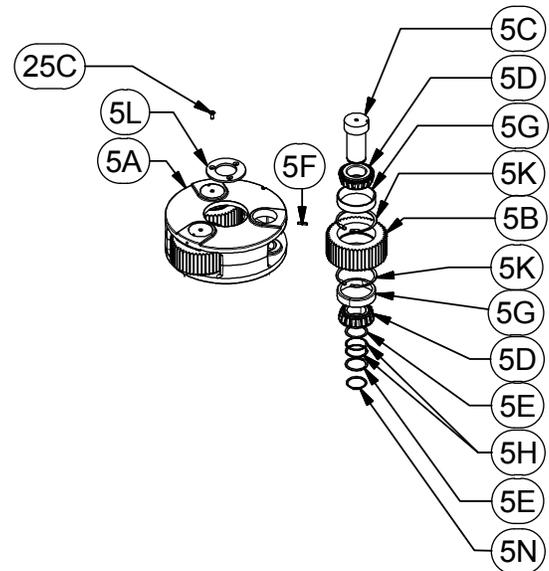
NOTE: If either the rollers or the planet shafts (pins) are damaged, both components should be replaced.

Reassembly

- 1) To install rollers in planet gear bore:
 - a) Set planet washer (7E) on work table, place planet gear (7B) onto washer and insert bearings (7D) into planet bore.
 - b) Place planet washer (7E) onto top of planet gear then slide the gear into carrier (7A). (Oriented as shown, align washer pins with groove in carrier.)
- 2) Planet shafts (7C) should be installed with chamfered end of 3/16 inch hole toward outside diameter of the carrier (7A). This will aid in alignment of holes while inserting roll pins (7F).
- 3) Drive a roll pin (7F) through the carrier hole and into the planet shaft to retain the parts. Repeat for other planet gears.

Stage II Carrier Subassembly

(Items 5A, 5B, 5C, 5D, 5E, 5F, 5G, 5H, 5K, 5L 5N & 25C)

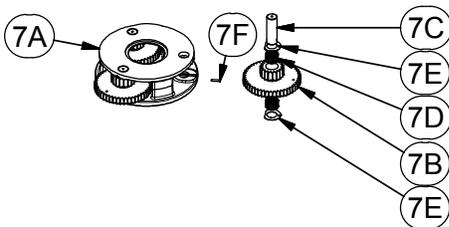


Disassembly

- 1) Rotate planet gears (5B) to check for abnormal noise or roughness in bearings (5D). If further inspection or replacement is required, proceed as follows.
- 2) Removing retaining ring (5N), washer (5E) and shims (5H) from planet shaft (5C).
- 3) Press planet shafts (5C) out of carrier (5A).
- 4) Remove planet gears (5B) and washer (5D) from carrier.

Stage I Carrier Subassembly

(Items 7A, 7B, 7C, 7D, 7E, & 7F)



Disassembly

- 1) Rotate planet gears (7B) to check for abnormal noise or roughness in bearings (7D) or planet shafts (7C). If further inspection or replacement is required, proceed as follows.
- 2) Drive roll pins (7F) completely into the planet shafts (7C).
- 3) Press or drive planet shafts (7C) out of carrier (7A).
- 4) Remove planet gears (7B) and thrust washers (7E) from the carrier (7A).

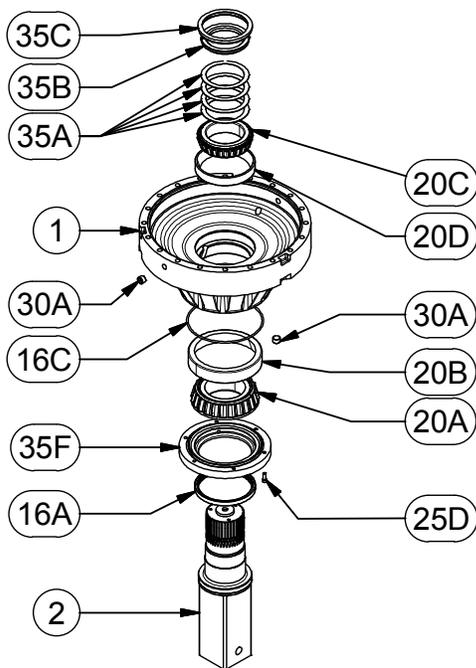
- 5) Inspect the planet gear (5B), bearing cone (5D), bearing cup (5G) and planet shaft (5C). Check for spalling, bruising or other damage. Replace components as necessary; bearing need to be replaced as a cup and cone set.
- 6) Replace any parts where abnormal wear is found.

Reassembly

- 1) Rebuild Stage II planet carrier assembly in reverse order using any needed new parts.
- 2) Install bearing cones (5D) into planet gear bearing cups (5G). Place washer (5E) onto interior carrier spot faced surface.
- 3) Insert planet gear assembly into carrier (5A). Slide planet shaft (5C) into carrier planet assembly and align planet pin notch with roll pin in carrier.
- 4) Place shims (5H) and washer (5E) onto planet shaft. Install retaining ring (5N). Rotate planet gears by hand to test bearing preload. Correct bearing preload on the planet gears requires 50-75 in-lbs rotating torque. If gear doesn't rotate remove a shim and test again until a smooth loaded rotation is developed. Repeat for remaining planet gears.

Base Subassembly

(Items 1, 2, 16A, 16C, 20A, 20B, 20C, 20D, 25D, 30A, 35A, 35B, 35C & 35F)



Disassembly

- 1) Remove the seal carrier retaining screws (25D) and seal carrier (35F) from unit. Inspect seal (16A) and o-ring (16C) for signs of wear or damage and replace as necessary.
- 2) Remove the lock ring (35C) 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 (20C). Remove the split ring segments (35B) and shims (35A).

Caution: Since the output shaft is no longer retained, care should be taken to avoid personal injury. Care should also be taken not to damage it when it is pressed through base.

- 3) Base (1) should be set shaft side down, as shown, on a plate or table. Press output shaft through the bottom of base by applying a load to top end (internal end) of shaft until it passes through inner shaft bearing cone (20C).
- 4) A gear puller may be used to remove the outer bearing cone (20A) from the shaft (2). If reusing old bearing cone, do not pull on or damage roller cage.
- 5) Inspect inner and outer bearing cups and cones (20A, 20B, 20C & 20D). If cups are damaged, drive them out using a brass drift and utilizing the bearing knock-out notches in the base (1)

Reassembly

- 1) Clean all foreign material from magnetic oil plug (30A) located on the side of the base (1).
- 2) Place base (1) (output side up, opposite shown) on the table.
- 3) Apply a layer of lithium or general purpose bearing grease to the roller contact surface of outer bearing cup (20B).
- 4) If the outer bearing was removed press bearing (20A) (large end down as shown) onto the shaft until it seats against the shoulder.

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

- 5) Place the shaft (2) with the bearing (20A) into the base (1).
- 6) Flip this assembly, resting the base (1) on the end of the output shaft (2).
- 7) Apply a layer of lithium or general purpose bearing grease to the roller contact surface of the inner cup (20D). Press the inner bearing cone (20C) (large end up as shown) onto the shaft (2) until it is seated against inner bearing cup (20D).
- 8) Without the shaft seal (16A) installed, the bearing rolling torque should be 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, high-speed applications usually benefit from low pre-load. Adding shims (35A) 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 (35B) over the shims (35A) and into the groove in the shaft (2). Finally, install the lock ring (35C) over the segments (35B).
- 9) Install o-ring (16C) onto seal carrier (35F). Lubricate inner lip of shaft seal (16A) and slide seal carrier assembly onto the shaft (2). Install seal carrier fasteners (25D) and torque to 35 ft-lbs.

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

Unit Assembly

- 1) When all subassemblies are complete, the unit is ready to be assembled.
- 2) Install the Stage II carrier assembly onto the output shaft. Position carrier with retainer plate holes in-between the planet gears. Align the splines of the carrier (**5A**) with the splines of the shaft (**2**) and slide the carrier onto the shaft.
- 3) Install 3 3/8-24 flathead capscrews (**25C**) into carrier retainer plate (**5L**) using a removable thread locking compound. **Torque fasteners to 35 ft-lbs.**
- 4) Lubricate o-ring (**16B**) and install on the pilot of the Stage II ring gear (**12C**).

Caution: Hold ring gear by outside or use lifting device to prevent injury.

- 5) Install Stage II sun gear (**6**) into Stage II carrier assembly.
- 6) Align gear teeth of ring gear (**12C**) with the gear teeth of the planet gears (**5B**) and place on base. Align mounting holes of ring gear with holes in base. Using the scribed line made during disassembly for reference.
- 7) Place Stage I carrier assembly (**7**) onto Stage II sun gear (**6**).
- 8) Lubricate o-ring (**16B**) and install on the pilot of the Stage I ring gear spacer (**12B**). Install spacer.
- 9) Compound primary timing instructions:
 - a) The planet gears will now need to be timed. Refer to the diagram. The planet gears each have a timing mark, usually a round punch. Locate timing marks on planet gears (**7B**).
 - b) As seen below, start with the top planet gear and position 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 (**4**) and the input thrust race (**14C**) into the center of the primary planet carrier assembly.
- d) If compound primary ring gear (**12A**) was not removed during disassembly, skip to step 9. Otherwise ring gear to inside of the cover (**3**) with 12 1/2-13 screws (**25E**). Use a removable thread locking compound on the threads of the bolts. **Tighten to 80 ft.-lbs.**
- 9) Install thrust washer (**14A**) onto primary carrier then install thrust bearing (**14B**) and then thrust washer (**14A**).
- 10) Lubricate o-ring (**16B**) and install on the pilot of the cover (**3**).
- 11) Noting the scribed line made during disassembly, install the cover (**3**). Install 2 fasteners (**25A**) to retain unit together.
- 12) Ensure the unit spins freely by using a splined shaft to drive the input gear (**4**). If unit does not rotate freely for one revolution remove cover and verify primary planet gearing is timed correctly. Adjust timing to get correct orientation.
- 13) Install motor (**50**) onto cover (**3**) Install 2 3/4-10 fasteners (**25B**) with washers (**25H**). **Torque fasteners to 380 ft-lbs dry and 280 ft-lbs lubed.**
- 14) Remove two temporarily fasteners installed in step 11. Place bail (**37**) onto assembly and aligning holes in bail and cover using scribed line made during disassembly as a reference. Install and torque the 20 3/4-10 hex head capscrews (**25A**) with flat washers (**25G**). **The torque for the capscrews is 380 ft-lbs dry, 280 ft-lbs if fasteners are lubricated.**
- 15) Fill the unit to the proper level, as specified, with GL5 EP 80/90 gear oil after it is sealed with the motor.

The digger is now ready to use.

PRIMARY CARRIER TIMING DIAGRAMS

