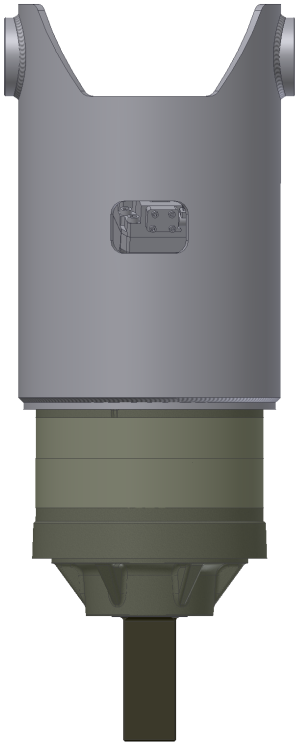
SERVICE MANUAL
440 SERIES DIGGER MODELS



Example Part Number

440	81	4	4	F	136	D	9
Model	Ratio	Shaft	Bail Boss	Motor Supplier	Motor Number	Cover	Input

THIS SERVICE MANUAL IS EFFECTIVE:
S/N: 159255 TO CURRENT
DATE: 5-2017 TO CURRENT
VERSION: SMD44081-44F136D9

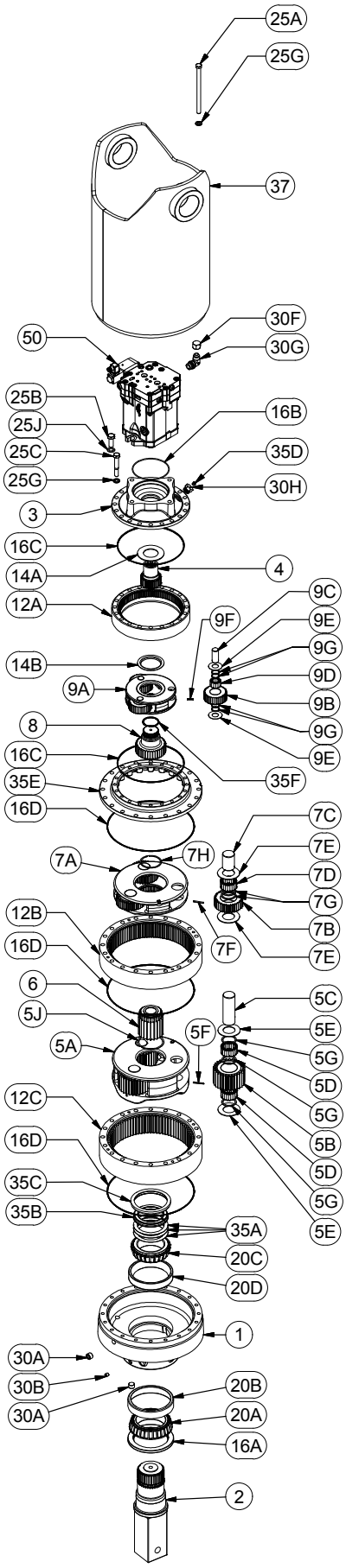
NOTE: Individual customer specifications (spindle mounting, sprocket pilot, brake assembly, etc.) may vary from exploded drawing and standard part numbers shown. If applicable, refer to customer drawing for details.

ESKRIDGE

STANDARD

44081-44F136D9
EFFECTIVE FROM: SN-159255 05-09-17

PARTS LIST				
GROUP	ITEM	QTY	PART NUMBER	DESCRIPTION
	1	1	42-004-3022	BASE
	2	1	42-004-4102	D440 SHAFT
	3	1	25-004-1232	COVER-'D' 4-BOLT (250/252)
	4	1	25-004-1762	INPUT GEAR
5		(1)	42-005-0131	CARRIER ASSY-SEC (440/4.77:1)
	5A	1	42-004-1402	CARRIER SEC
	5B	3	42-004-1092	PLANET GEAR - SEC
	5C	3	42-004-1332	PLANET SHAFT - SEC (440)
	5D	120	01-106-0040	PLANET ROLLER
	5E	6	42-004-1362	THRUST WASHER
	5F	3	01-153-0220	ROLL PIN (3/16X1-3/4)
	5G	9	42-004-1352	SPACER - LOOSE ROLLER 440
	5J	1	01-160-0680	RETAINING RING (SMALLEY VS-412)
	6	1	42-004-1472	SUN GEAR
7		(1)	42-005-0101	CARRIER ASSY-PRI (440/3.95:1)
	7A	1	42-004-1062	PRI CARRIER
	7B	3	42-004-1102	PLANET GEAR-PRI
	7C	3	42-004-1342	PLANET SHAFT - PRI (440)
	7D	60	01-106-0040	PLANET ROLLER
	7E	6	42-004-1362	THRUST WASHER
	7F	3	01-153-0220	ROLL PIN (3/16X1-3/4)
	7G	6	42-004-1352	SPACER - LOOSE ROLLER 440
	7H	1	01-160-0690	RETAINING RING
	8	1	42-004-1512	SUN GEAR
9		(1)	25-005-2201	CARRIER ASSY
	9A	1	25-004-1692	PRIMARY CARRIER
	9B	3	25-004-1712	PLANET GEAR - PRI
	9C	3	25-004-1442	PLANET SHAFT (PRI)
	9D	36	01-106-0010	ROLLER
	9E	6	13-004-1582	THRUST WASHER - PLANET
	9F	3	01-153-0020	ROLL PIN
	9G	12	13-004-1592	SPACER
12	-	-	-	RING GEARS
	12A	1	25-004-1562	RING GEAR PRIMARY
	12B	1	42-004-1042	RING GEAR - PRI (440)
	12C	1	42-004-1032	RING GEAR - SEC (440)
14	-	-	-	THRUST WASHERS & BEARINGS
	14A	1	25-004-1752	WASHER - INPUT THRUST - 254
	14B	1	25-004-1132	CARRIER THRUST WASHER
16	-	(1)	42-016-2043	SEAL KIT
	16A	1	01-405-0770	SEAL
	16B	1	01-402-0890	O-RING
	16C	2	01-402-0020	O-RING (PARKER#276)
	16D	3	01-402-0840	O-RING (PARKER #280)
20	-	-	-	OUTPUT SHAFT BEARINGS
	20A	1	01-102-0290	BEARING CONE
	20B	1	01-103-0290	BEARING CUP
	20C	1	01-102-0280	BEARING CONE
	20D	1	01-103-0280	BEARING CUP
25	-	-	-	HARDWARE
	25A	20	01-150-1950	HHCS 5/8-11 X 9.5
	25B	2	01-150-1890	HHCS (3/4-10 UNC 1.75" GR5)
	25C	20	01-150-1880	HHCS 5/8-11 X 4
	25G	40	01-166-0040	LOCKWASHER - 5/8 ZINC PLATED
	25J	2	01-166-0350	HARDWASHER - 3/4; 1.25 O.D.
30	-	-	-	PLUGS & FITTINGS
	30A	3	01-207-0100	PIPE PLUG 3/4 NPT MAGNETIC
	30B	1	01-207-0020	PIPE PLUG (1/4 NPT- HOLLOW HEX)
	30F	1	01-201-0760	CAP
	30G	1	01-201-0792	FITTING
	30H	1	01-201-0520	ADAPTOR SAE-12-1/8 NPT
35	-	-	-	MISCELLANEOUS
	35A	*	42-004-1202	SHIM - OUTPUT SHAFT (440)
	35B	1	42-004-1222	SPLIT RING
	35C	1	42-004-1212	LOCK RING (440)
	35D	1	01-216-0020	RELIEF VALVE
	35E	1	42-004-2072	RING ADAPTER
	35F	1	01-160-0740	RETAINING RING
	37	1	42-005-0171	440 BAIL ASSEMBLY w/3" PIN
	50	1	01-304-1360	MOTOR

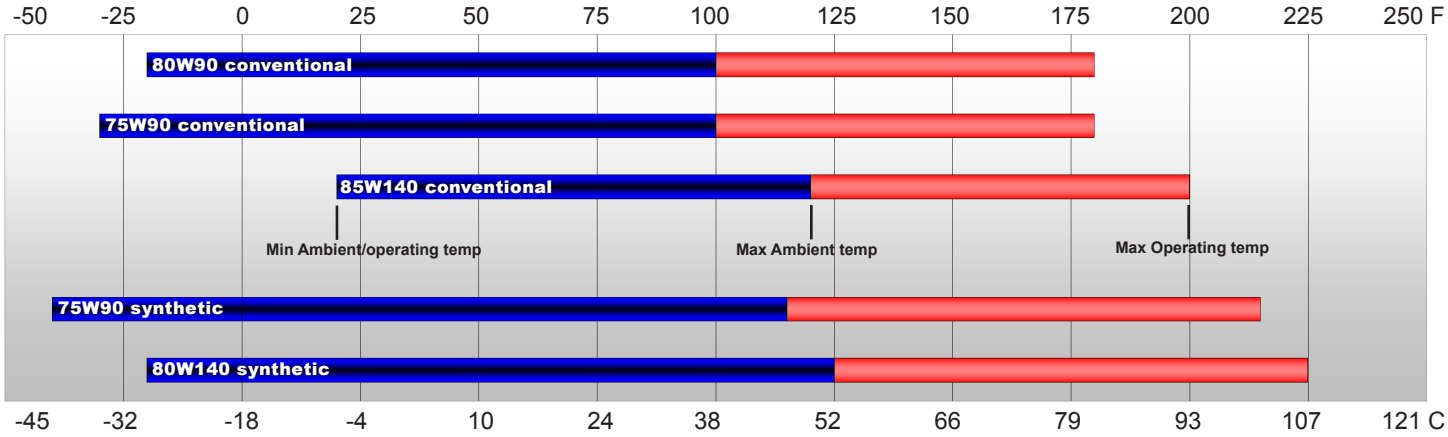


*QUANTITY DEPENDANT UPON DESIRED BEARING PRELOAD
X44081-44F136D9 ECN: - REV: A 05-08-17 HWP

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 D440 OIL CAPACITIES

Operating Position	Oil Capacity			Oil Level	
	Single stage	Double stage	Triple stage		
Horizontal Shaft	-		-	To horizontal centerline of auger drive	
Vertical Shaft (Pinion Down)			4.4 GAL/ 16.8 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.

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 unit from the bail **(37)** to the base **(1)** and the motor **(50)** to the cover **(35E)** 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 lockwashers **(25G)**.

4) Separate bail **(37)** from ring gear adapter **(35E)** and remove from digger assembly.

5) Install two hex-head capscrews **(25A)** into ring gear adaptor **(35E)** to retain gearbox assembly together.

6) Remove motor **(50)** from cover **(3)**.

7) Remove the twenty hex-head capscrews **(25C)** and lock-washers **(25G)**.

8) Remove cover **(3)**, thrust bearings **(14A & 14B)**, remove input gear **(4)**. Inspect o-ring **(16C)** discard if damaged or deformed.

9) Lift Stage I planet carrier assembly **(9)** out of the unit. Remove ring gear **(12A)** and inspect o-ring **(16C)**; discard if damaged or deformed.

10) Remove two hex-head capscrews **(25A)** and ring gear adapter **(35E)**. Remove ring gear adapter and inspect o-ring **(16D)** discard if damaged.

11) Remove Stage II sun gear **(8)**. Remove retaining ring **(7H)** that retains Stage II carrier **(7)** to Stage III sun gear **(6)**. Lift the Stage II planet carrier assembly **(7)** out of gearbox.

12) Remove Stage III sun gear **(6)** and Stage II ring gear **(12B)**. Inspect o-ring **(16D)**; as before, discard if damaged.

13) Using a screwdriver, seal pick or similar tool remove the retaining ring **(5J)**, which retains the Stage III planet carrier to the output shaft. The retaining ring can be left in the carrier but must be removed from the groove.

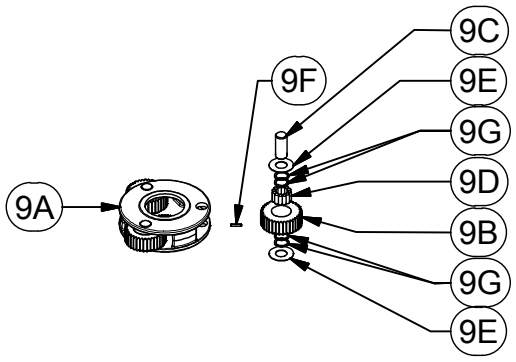
14) With a suitable lifting apparatus and a hoist, lift the Stage III planetary assembly out of the unit **(5)**.

15) Remove Stage III ring gear **(12C)**. Inspect o-ring **(16D)**discard if damaged or deformed.

16) 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.

Stage I Carrier Subassembly

(Items 9A, 9B, 9C, 9D, 9E, 9F & 9G)



Disassembly

1) Rotate planet gears **(9B)** to check for abnormal noise or roughness in bearings **(9D)** or planet shafts **(9C)**. If further inspection or replacement is required, proceed as follows.

2) Drive roll pins **(9F)** completely into the planet shafts **(9C)**.

3) Press or drive planet shafts **(9C)** out of carrier **(9A)**.

NOTE: Support only the carrier (9A) while pressing out planet shafts.

4) Remove planet gears **(9B)** and thrust washers **(9E)** from the carrier **(9A).**

5) Inspect the planet gear **(9B),** bearing bore, planet shaft **(9C)** and rollers **(9D)**. Check for spalling, bruising or other damage. Replace components as necessary; rollers should be replaced only as a set of 12.

6) Check primary planet shafts **(9C)** 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 **(9F)** from planet shafts **(9C)**.

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 **(9E)** on work table, insert planet shaft in washer then slide two spacers **(9G)** over shaft **(9C)**.

   b) Place planet gear **(9B)** centered over planet shaft **(9C).**

   c) Install tweleve rollers into planet gear bore. Slide two spacers **(9G)** onto planet shaft, slide planet washer **(9E)** onto planet shaft **(9C)**.

   d) Carefully remove planet shaft from this assembly and move the gear with bearings and washers to the carrier.

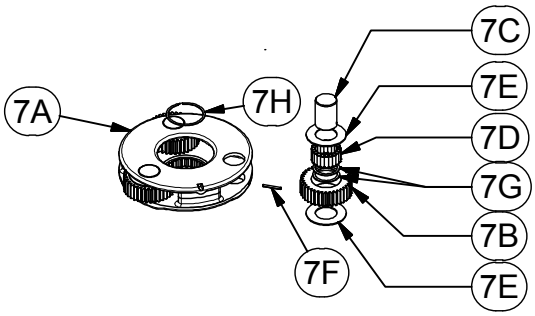
   e) Align the planet gear/bearing assembly inside the carrier and install the planet shaft through the entire assembly.

2) Planet shafts **(9C)** should be installed with chamfered end of 3/16 inch hole toward outside diameter of the carrier **(9A)**. This will aid in alignment of holes while inserting roll pins **(9F)**.

3) Drive a roll pin **(9F)** through the carrier hole and into the planet shaft to retain the parts. Repeat for other planet gears.

Stage II Carrier Subassembly

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



Disassembly

1) Rotate planet gears **(7B)** to check for abnormal noise or roughness in bearings **(7D)**. If further inspection or replacement is required, proceed as follows.

2) Drive roll pins **(7F)** completely into the planet shafts **(7C)**.

3) Slide planet shafts **(7C)** out of carrier **(7A)**.

4) Remove planet gears **(7B)**, washers **(7E)** and rollers **(7D)** from carrier **(7A)**.

5) Inspect the planet gear **(7B),** bearing bore, planet shaft **(7C)** and rollers **(7D)**. Check for spalling, bruising or other damage. Replace components as necessary; rollers should be replaced only as a set of 20.

6) Remove roll pins **(7F)** from primary planet shafts **(7C)** using a 3/16 inch pin punch.

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

Reassembly

1) Rebuild primary planet carrier assembly in reverse order using any needed new parts.

2) Install rollers in gear as follows:

   a) Set planet washer **(7E)** on work table with planet gear **(7B)** positioned on top of washer. Center the planet washer to the planet gear as closely as possible.

   b) Center the planet shaft **(7C)** in the planet gear **(7B)** bearing bore. Install roller spacer **(7G)** onto planet shaft.

   c) Begin placing rollers **(7D)** around the shaft **(7C)**. There should be clearance for the last roller to slide in. Be sure to install 20 rollers in each planet gear.

   d) Place spacer washer **(7G)** onto planet shaft.

   e) Place a washer **(7E)** over the shaft **(7C)** onto gear.

   f) Carefully slide the assembly off the table, holding the lower planet washer **(7E)** and planet gear **(7B)**.

   g) Slide the planet shaft **(7C)** out of the assembly and slide the assembly into the carrier.

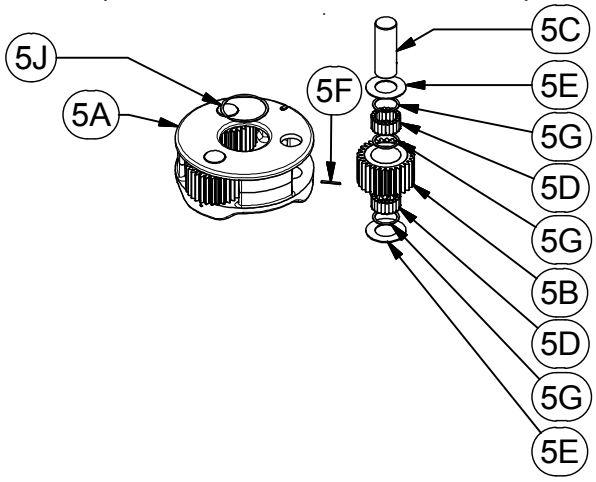
   h) Align the planet gear/bearing assembly inside the carrier and install the planet shaft through the entire assembly.

3) Planet shafts **(7C)** should be installed with the chamfered end of the 3/16 inch hole towards the outside diameter of the carrier **(7A)**; this will aid in alignment of holes while inserting roll pins **(7F)**.

4) Drive roll pin **(7F)** into the carrier hole and into the planet shaft to retain the parts. Repeat for remaining planet gears.

Stage III Carrier Subassembly

(Items 5A, 5B, 5C, 5D, 5E, 5F, 5G & 5J)



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) Drive roll pins **(5F)** completely into the planet shafts **(5C)**.

3) Slide planet shafts **(5C)** out of carrier **(5A)**.

4) Remove planet gears **(5B)**, washers **(5E)**, spacers **(5G)** and rollers **(5D)** from carrier **(5A)**.

5) Inspect the planet gear **(5B),** bearing bore and planet shaft **(5C)** and rollers **(5D)**. Check for spalling, bruising or other damage. Replace components as necessary; rollers should be replaced only as a set of 40 (2 rows of 20).

6) Remove roll pins **(5F)** from secondary planet shafts **(5C)** using a 3/16 inch pin punch.

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

Reassembly

1) Rebuild Stage III planet carrier assembly in reverse order using any needed new parts.

2) Place the spiral-wound retaining ring **(5J)** in the depression at the center of the carrier **(5A)** in preparation for installation

onto the output shaft **(2)**.

3) Install rollers in gear as follows:

   a) Set planet washer **(5E)** on work table with planet gear **(5B)** centered on top of washer. Center the planet washer and the planet gear as closely as possible.

   b) Slide a spacer **(5G)** over the planet shaft.

   c) Center the planet shaft **(5C)** in the planet gear **(5B)** bearing bore.

   d) Begin placing rollers **(5D)** around the shaft **(5C)**. There should be clearance for the last roller to slide in. Be sure to install 20 rollers per row in the planet gear **(5D)**.

   e) Slide a spacer **(5G)** over the first row of rollers **(5D)**.

   f) Place a second row of rollers **(5D)** around the planet shaft **(5C)** as before.

   g) Slide a spacer **(5G)** over the second row of rollers **(5D)**.

   h) Place a washer **(5E)** over the gear **(5B)** onto the shaft **(5C)**.

   i) Carefully slide the assembly off the table, holding the lower planet washer **(5E)** and planet gear **(5B)**.

   j) Slide the planet shaft **(5C)** out of the assembly and slide the assembly into the carrier **(5A)**.

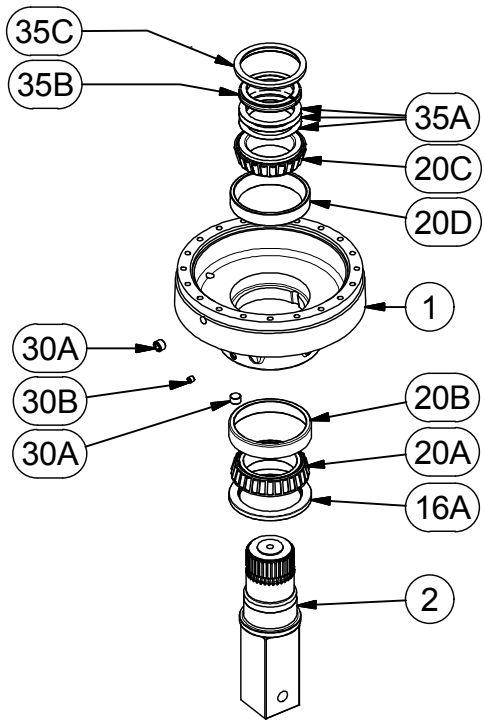
   k) Align the planet gear/bearing assembly inside the carrier and install the planet shaft through the entire assembly.

4) Planet shafts **(5C)** should be installed with the chamfered end of the 3/16 inch hole towards the outside diameter of the carrier **(5C)**. This will aid in alignment of holes while inserting roll pins **(5F)**.

5) Drive roll pin **(5F)** through the carrier hole and into the planet shaft to retain the parts. Repeat for the other planet gears.

Base Subassembly

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



Disassembly

1) 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 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.

2) Base **(1)** should be set pinion side down, as shown, on a plate or table. Press output shaft **(2)** 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)**.

Note: Removing the shaft from the base assembly damages the shaft seal and the seal will need to be replaced.

3) 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. Remove the shaft seal **(16A)** from the shaft for replacement.

4) Inspect inner and outer bearing cups **(20B & 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) Press outer bearing cone **(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.

2) Clean all foreign material from magnetic oil plug **(30A)** located on the side of the base **(1)**.

3) Place base **(1)** (output side up, opposite shown) on the table.

4) Apply a layer of lithium or general purpose bearing grease to the roller contact surface of outer bearing cup **(20A)**.

5) Place the shaft **(2)** 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 preload may result in a rolling torque that varies between 60 to 180 in-lb. The bearing preload should be tailored to your application; a low-speed application may require a high preload, 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 **(35A)**.

9) Lubricate inner lip of new shaft seal **(16A)** and slide it onto the shaft **(2)** and over the shaft seal diameter then press the seal into the base bore **(1)**.

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

Unit Assembly

1) When all sub-assemblies are complete, the unit is ready to be assembled.

2) Install the Stage III carrier assembly onto the output shaft; align the splines of the carrier **(5A)** with the splines of the shaft **(2)** and slide the carrier onto the shaft.

3) Install the retaining ring **(5J)** onto the groove of the shaft **(2)**, using a spiraling motion.

4) Install Stage III sun gear **(6)** into Stage III carrier assembly.

5) Lubricate o-ring **(16D)** and install on the pilot of the Stage III ring gear **(12C)**.

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

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) Slide Stage II carrier **(7A)** onto Stage III sun gear **(6)** then install retaining ring **(7H)** onto Stage III sun gear groove using a spiraling motion.

8) Lubricate o-ring **(16D)** and install on the pilot of the Stage II ring gear **(12B)**.

9) Align gear teeth of ring gear **(12B)** with those of the planet gears **(7G)**. Install ring gear. Align mounting holes of ring gear with holes in base. Use the scribed line made during disassembly for reference.

9) Lubricate o-ring **(16D)** and install on the pilot of the Stage I ring gear adapter **(35E)**.

10) Noting the scribed line made during disassembly, install the Stage I gear adapter **(35E)** and temporally install two fasteners (**25A)** to hold assembly together.

11) Install o-ring **(16C)** onto ring gear **(12A)** and place on ring adapter **(35E)**. Align mounting holes of ring gear with holes in the adapter. Using the scribed line made during disassembly for reference.

12) Install the Stage II input gear **(8)** and Stage I carrier assembly **(9)**.

13) Install the input gear **(4)** then thrust washers **(14B &14A)**.

15) Lubricate o-ring (**16C)** and install on the pilot of the cover **(3)**.

16) Noting the scribed line made during disassembly, install the cover **(3)**.

17) Install and torque the 20 5/8-11 hex-head cap-screws **(25C)** with lock-washers **(25G)**. The torque for the cap-screws: **220 ft-lb dry, 170 ft-lb if the fasteners are lubricated**.

18) Ensure the unit spins freely by using a splined shaft to drive the input gear **(4)**.

19) Install motor **(50)** onto cover **(3)** and align using mark made during disassembly. Install motor fasteners **(25B)** and washers **(25A)**. The torque for the cap-screws: **380 ft-lb dry, 280 ft-lb if the fasteners are lubricated**.

20) Remove two temporally fasteners installed in step 10. 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 5/8-11 hex head cap-screws **(25A)** with lock-washers **(25G)**. **The torque for the cap-screws is 220 ft-lbs dry, 170 ft-lbs if fasteners are lubricated.**

21) Fill the unit to the proper level. The drive is now ready for use.