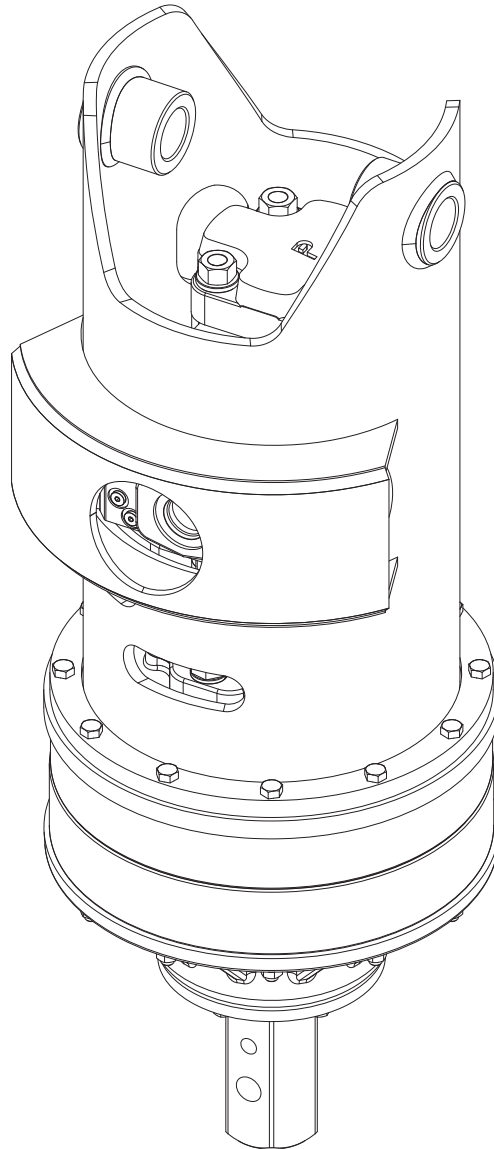




# MODEL 78K2 INTEGRAL KICK-DOWN AUGER DRIVE SERVICE MANUAL



## Example Part Number

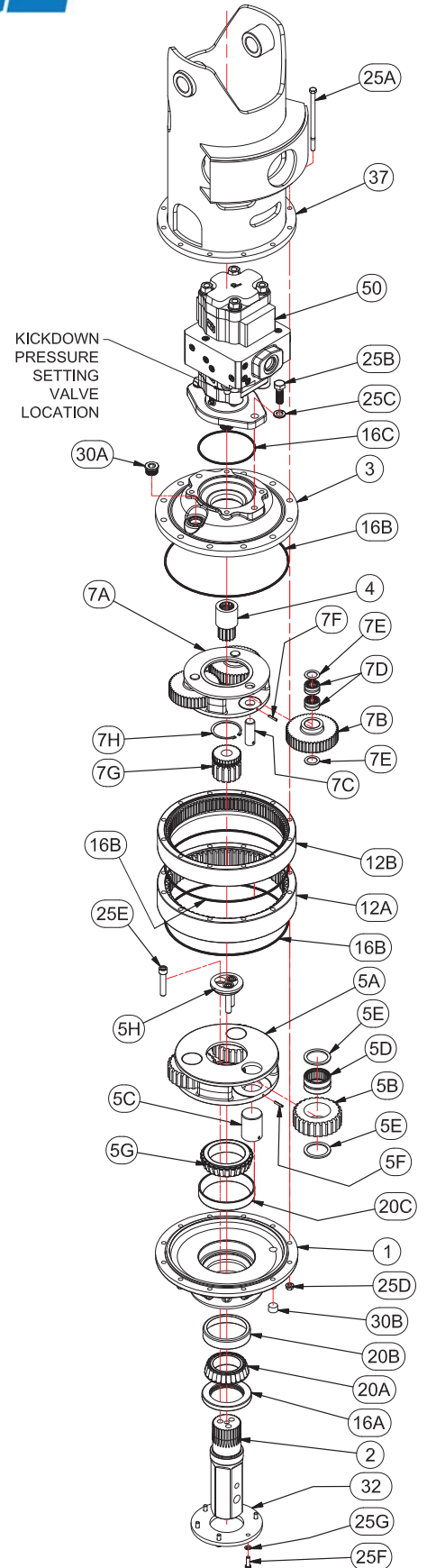
<b>78</b>	<b>48</b>	<b>6P</b>	<b>5</b>	<b>F</b>	<b>139</b>	<b>R</b>	<b>K2</b>
Model	Ratio	Shaft	Bail Boss	Motor Supplier	Motor Number	Option 1	Option 2

**THIS SERVICE MANUAL IS EFFECTIVE:**  
**S/N: 156890 TO CURRENT**  
**DATE: 3/01/2017 TO CURRENT**  
**VERSION: SM78K2I-AA**



7848 INTEGRAL KICKDOWN WITH PLATE RETAINED SHAFT

PARTS LIST			
ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	BEARING CARRIER	72-004-1102
2	1	OUTPUT SHAFT 2-1/2 HEX	71-004-4022
		OUTPUT SHAFT 2-5/8 HEX	71-004-4032
3	1	COVER	80-004-1174
4	1	INPUT SHAFT	73-004-1002
5	(1)	CARRIER ASSEMBLY - SEC	71-005-2342
5A	1	CARRIER - SEC PLANET	71-004-2332
5B	3	PLANET GEAR - SEC.	71-004-0092
5C	3	PIN - SEC. PLANET	71-004-0081
5D	3	BRG - (SEC PLANET)	01-105-0020
5E	6	WASHER - SEC PLANET	71-004-0871
5F	3	ROLL PIN (3/16 X 1)	01-153-0020
5G	1	BRG CONE	01-102-0100P
5H	1	PLATE - BEARING RETAINER	71-004-2322
7	(1)	CARRIER ASSEMBLY - PRIMARY	73-005-2041
7A	1	CARRIER - PRI (48:1)	73-004-1053
7B	3	PLANET GEAR - PRI 48:1	73-004-1022
7C	3	PIN - PRIMARY PLANET	71-004-0121
7D	6	BRG (PRI PLANET)	01-105-0010
7E	6	WASHER - PRI PLANET	71-005-0861
7F	3	ROLL PIN (3/16 X 1)	01-153-0020
7G	1	SUN GEAR - SEC.	71-004-0102
7H	1	RETAINING RING	01-160-0030
12	-	RING GEARS	
12A	1	RING GEAR - SEC	71-004-0042
12B	1	RING GEAR-PRIMARY	73-004-1063
16	-	SEALS & O-RINGS	
16A	1	SEAL, NAT'L #415088	01-405-0540
16B	3	O-RING	01-402-0020
16C	1	O-RING	01-402-0010
20	-	OUTPUT SHAFT BEARINGS	
20A	1	BEARING CONE	01-102-0090P
20B	1	BEARING CUP	01-103-0080P
20C	1	BEARING CUP	01-103-0090P
25	-	HARDWARE	
25A	12	HHCS (3/8-16X6-1/2 GR5)	01-150-0020
25B	2	HHCS (5/8-11 X 1-3/4)	01-150-0110
25C	2	LOCKWASHER - 5/8 ZINC PLATED	01-166-0040
25D	12	HEX FLANGE NUT	01-158-0360
25E	3	SHCS (1/2-20 X 2-1/2 GR8)	01-150-1480
25F	6	5/16-18 X 1, GR5 HEX HEAD CAP SCREW	01-150-1790
25G	6	LOCK WASHER; 5/16	01-166-0110
30	-	PLUGS	
30A	1	HOLLOW HEX PLUG (05HP-12)	01-208-0030
30B	1	PIPE PLUG (1/2 NPT MAGNETIC)	01-207-0010
32	1	SEAL PROTECTOR	72-004-1092
37	1	BAIL ASSY - 1.50 BAIL BOSS, ROTATED	73-005-2092
		BAIL ASSY - 1.25 BAIL BOSS, ROTATED	73-005-2212
		BAIL ASSY - 1.50 BAIL BOSS, STD	73-005-0152
		BAIL ASSY - 1.25 BAIL BOSS, STD	73-005-0142
50	1	MOTOR - KICKDOWN 7.02 IN <sup>3</sup> /REV, 3500PSI	01-304-1390
		MOTOR - KICKDOWN 9.56 IN <sup>3</sup> /REV, 2500 PSI	01-304-1410

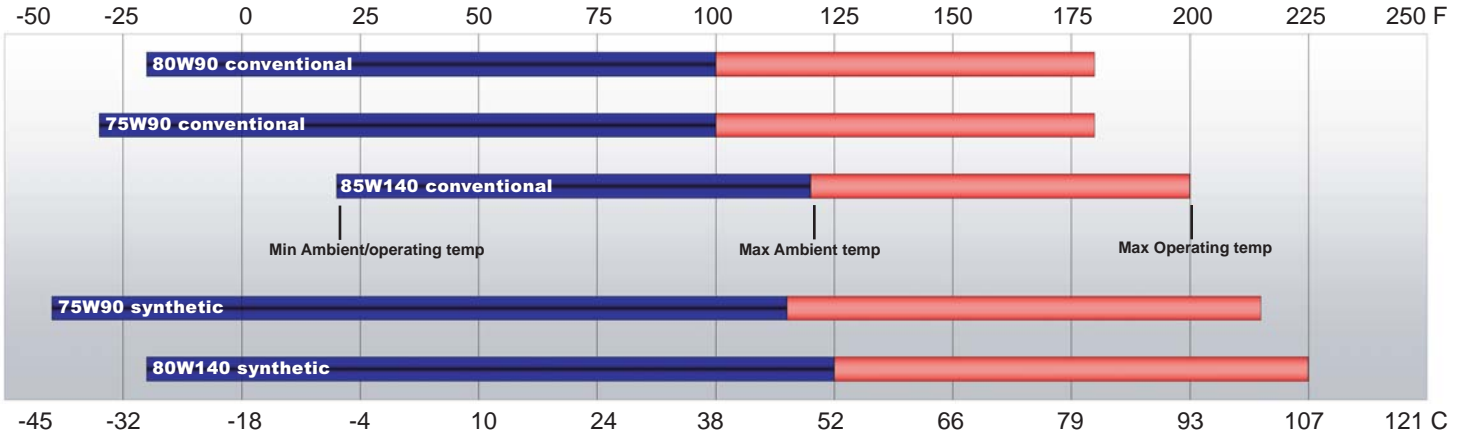


EFFECTIVE DATE: 3/1/2017  
 EFFECTIVE S/N: 156890  
 X7848-K2-AA DATE: 11/3/2017

# 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 78K2 OIL CAPACITY: 6.5 pints (3 liters)**

## 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/geardrives/gearprodspecs.html>



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

## Unit Teardown

- 1) Scribe a line across the outside of the unit from the bail (37) to the bearing carrier (1) to ensure proper orientation of parts as they are re-assembled.
- 2) Remove drain plugs (30A &/or 30B) and drain oil from unit. The oil will drain out more quickly and completely if warm.

**NOTE:** Particular care should be taken when placing the unit in a position for servicing. Unit should be blocked up so that weight of the unit is resting on the bearing carrier or the shaft is held so the unit does not topple over.

- 3) Remove the twelve hex head cap screws (25A) and hex flange nuts (25D) from bail (37). Lift bail from unit.

**NOTE:** There are no bolts retaining the major components together. Proceed with caution when moving the unit.

- 4) There are no fasteners holding the cover (3) and motor (50) in place so it may be easier to remove the motor (50) and cover (3) together. Remove the two cap screws (25B) and lock washers (25C) from hydraulic motor (50). Remove motor (50) and o-ring (16C) from unit. Check o-ring (16C) for damage.
- 5) Remove the cover (3), input gear (4), and o-ring (16B).
- 6) Lift the primary planet carrier assembly (7) out of the unit.
- 7) If sun gear (7G) and retaining ring (7H) has not been removed from auger drive, do so now. (Sometimes the sun gear remains in the primary carrier (7)).
- 8) Remove primary ring gear (12B) and o-ring (16B).
- 9) Remove secondary ring gear (12A) and o-ring (16B).
- 10) Turn bearing carrier assembly (1, 2, 5) over and remove hex-head cap screws (25F) and lockwashers (25G) and remove seal protector (32).
- 11) Turn assembly back over and loosen and remove three socket-head cap screws (25E) from secondary carrier (5).
- 12) Carefully support the bearing carrier (1) in a press so the seal (16A) can pass inside the support or supports.
- 13) Thread three 1/2-20x6" capscrews into the shaft (2) thru the retaining plate (7H). Be sure these are threaded into the shaft at least 8-10 threads and that they protrude equally above the top surface of the secondary carrier (5A).
- 14) Select a suitable press tool to span the three cap screws and be sure it sits level on the cap screws. Press the shaft (2) from the bearing carrier (1). The seal (16A) will be damaged by this step & must be replaced.

**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 below.**

## PRIMARY PLANET CARRIER TEARDOWN

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.

- 1) Drive roll pins (7F) completely into planet shafts (7C) using a 3/16" pin punch.
- 2) Press or drive planet shafts (7C) out of carrier (7A).
- 3) Remove planet gears (7B), planet washers (7E) and bearings (7D) from the carrier (7A).
- 4) If the planet bearings (7D) require replacement, press them out of the planet gears (7B) and replace with new ones.
- 5) Check primary planet shafts (7C) for any abnormal wear, especially ones where bearings needed to be replaced. If any abnormal wear is found, replace planet shafts.
- 6) Using a 3/16" pin punch, remove the roll pins (7F) from the planet shafts (7B).

## RE-ASSEMBLY

- 1) With planet washers (7E) on both sides of the planet gear (7B) and with bearings (7D) installed, slide gear into the carrier (7A). Insert the planet shaft (7C) through the carrier, washers, and planet gear.
- 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 three roll pins (7F) through the carrier (7A) holes and into the planet shafts (7C) to retain the parts.

## SECONDARY PLANET CARRIER TEAR-DOWN

As with the primary planet carrier, check for abnormal noise in the planet gear bearings (5D) by rotating the planets (5B) and listen and feel for any noise or roughness. If further inspection or replacement is required, proceed as follows.

- 1) Drive roll pins (5F) completely into planet shafts (5C) using a 3/16" pin punch.
- 2) Press or drive planet shafts (5C) out of carrier (5A).
- 3) Remove planet gears (5B), planet washers (5E) and bearings (5D) from the carrier (5A).
- 4) If the planet bearings (5D) require replacement, press them out of the planet gears (5B) and replace with new ones.
- 5) Check planet shafts (5C) for any abnormal wear, especially ones where bearings needed to be replaced. If any abnormal wear is found, replace planet shafts.
- 6) Using a 3/16" pin punch, remove the roll pins (5F) from the planet shafts (5B).

**NOTE:** If the inner bearing cone is damaged or worn, it is generally not possible to remove from the carrier without cutting the race with a small cut-off wheel. If this is necessary, extreme care must be taken not to nick the carrier as any nick will weaken the carrier. For this reason, it is often more economical to buy a new carrier assembly (5) if the bearing cone (5G) needs replacement.

## RE-ASSEMBLY

- 1) Prior to installing any planets (5B), install bearing retainer plate (5H).
- 2) With planet washers (5E) on both sides of the planet gear (5B) and with bearings (5D) installed, slide gear into the carrier (5A). Insert the planet shaft (5C) through the carrier, washers, and planet gear.
- 3) Planet shafts (5C) should be installed with chamfered end of 3/16 inch hole toward outside diameter of the carrier (5A). This will aid in alignment of holes while inserting roll pins (5F).
- 4) Drive three roll pins (5F) through the carrier (5A) holes and into the planet shafts (5C) to retain the parts.
- 5) If inner, output shaft bearing cone (5G) needs to be replaced, press a new cone onto the hub of the carrier (5A) using a suitable press tool. Do not press on the bearing cage; only press on the race of the cone. Press tool should have an ID slightly greater than 3.38 inch and an OD smaller than 3.7 inch. Press until bearing is fully seated.

## BEARING CARRIER DISASSEMBLY AND REPAIR

The output shaft (2) was removed to separate the secondary carrier assembly (5) from the bearing carrier (1).

Inspect all cones and cups and look for damage, wear, spalling or contamination. Replace parts in sets if damage is found.

- 1) If output shaft bearings require replacement, drive the old ones out with a brass drift.

**NOTE:** If reusing old, outer bearing cone (20A), do not damage roller cage by pulling on it. Inspect bearing in place and clean and prepare for re-use.

- 2) If outer bearing cone (20A) needs to be removed and replaced, a gear puller may be used. Do not damage the seal surface of the shaft (2) while removing the outer bearing.
- 3) Remove the shaft seal (16A) and discard.

## BEARING CARRIER ASSEMBLY

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

- 1) If outer bearing cone (20A) was removed for replacement, press a new bearing cone (large end down as shown) onto the shaft (2) until it seats against the shoulder.

- 2) Clean all foreign material from the oil plug (30B). Add a small amount of pipe thread compound to pipe plug before installing back into bearing carrier (1).
- 3) Press new bearing cups (20B) and/or (20C) into bearing carrier (1) where necessary.
- 4) Place the bearing carrier (1) (output side up, opposite shown) on the press table.
- 5) Apply a layer of lithium or general purpose bearing grease to surface of outer bearing cup (20B). Insert the shaft into the bearing carrier (1) (bearing cone down) and use a soft hammer to install the shaft seal (16A) into the bearing carrier (1).

**CAUTION:** Output shaft is not retained at this point.

- 6) Invert this assembly so it is standing on the shaft (on the press table).
- 7) Apply a layer of grease on the inner bearing cup (20C).
- 8) Align the holes of the plate retainer (5H) inside the secondary carrier assembly (5) so the holes are centered between the planets (5B). Align the splines of the shaft (2) with the splines of the secondary carrier. Using a suitable tool, press the carrier onto the splines of the shaft (2) until the inner bearing cone (5G) contacts the inner bearing cup (20C).
- 9) Apply a small amount of thread-locking compound onto the threads of the socket-head capscrews (25E). Tighten the capscrews to a torque of 90 ft-lb.
- 10) Flip the bearing carrier assembly over and install the seal protector (32). Align holes with holes in bearing carrier (1) and install hex-head cap screws (25F) and lockwashers (25G). Tighten to a torque of 13 ft-lb.

**All subassembly service or repairs should be complete at this point. Continue on through UNIT ASSEMBLY to complete unit buildup.**

## UNIT ASSEMBLY

- 1) Place a new o-ring (16B) on the bearing carrier (1). Referring to scribe marks for proper orientation, install the secondary ring gear (12A) onto the bearing carrier (1).
- 2) Place a new o-ring (16B) into the secondary ring gear (12A) and install the primary ring gear (12B). Refer to scribe marks for proper orientation.
- 3) Check to be sure retaining ring (7H) is installed on sun gear (7G). Slide the sun gear into the secondary planet carrier assembly (5).
- 4) Install the primary carrier (7) by rotating until the planet gear (7B) teeth line up with ring gear (12A) teeth, then rotate carrier assembly (7) until splines of the carrier line up with splines of the sun (7G) and the carrier should drop into place.

- 5) Slide the input gear **(4)** into the primary planet carrier assembly **(7)**.
- 6) Install a new o-ring **(16B)** onto the cover **(3)** and position the cover with the proper orientation to the scribed line. Loosely install a capscrew **(25A)** into the cover **(3)**, ring gears **(12B and 12A)** and bearing carrier **(1)** to maintain the alignment. Spin test the unit to be sure it runs smoothly without any tight-spots or rough spots.
- 7) Install a new o-ring **(16C)** onto motor **(50)**. Install motor onto cover **(3)** and tighten to a torque of 130 ft-lb.

**Note:** Support the unit during these steps so it does not tip over and cause injury or damage.

- 8) Remove the alignment cap screws.
- 9) Carefully install bail **(37)** over motor **(50)** and, watching for alignment mark, line up the bolt holes with the bolt holes in the cover **(3)**.
- 10) Install hex-head cap screws **(25A)**. Install the twelve new hex-flange nuts **(25D)** onto cap screws **(25A)**. Tighten to a torque of 30 ft-lb.
- 11) Fill the unit with the proper amount of new gear oil as specified on page 2. Install plug **(30A)** into cover **(3)**.
- 12) The motor with integral kickdown valve is factory set for the proper shift point so no adjustment should be necessary. If adjustment is necessary, the location of the kickdown valve is shown on the exploded drawing and adjustment can be done through the access holes in the bail **(37)**. Screwing the adjustment screw "in" will increase the shift pressure at an approximate rate shown below. Testing must be done to get an exact pressure.

ITEM	PART NO.	DESCRIPTION	RATE OF CHANGE/REVOLUTION
50	01-304-1390	MOTOR - 7.02 IN <sup>3</sup> /REV 3500 PSI	900 psi/rev <small>(adjustment screw)</small>
50	01-304-1410	MOTOR 9.56 IN <sup>3</sup> /REV 2500 PSI	500 psi/rev <small>(adjustment screw)</small>

The auger drive is now ready to use.