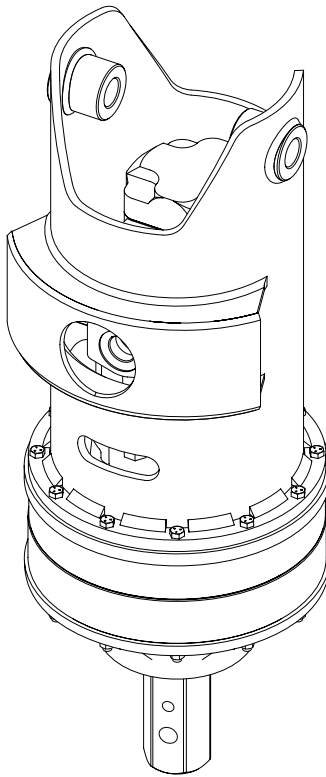
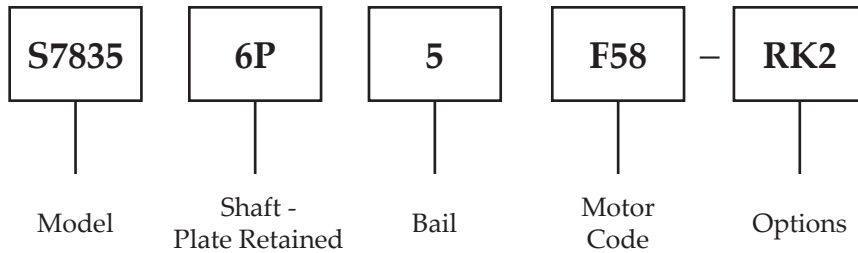


ESKRIDGE

S78P AND 78P PLANETARY AUGER DRIVE WITH KICKDOWN OPTION



Example Part Number



THIS SERVICE MANUAL IS EFFECTIVE
FROM: S/N 26435, NOVEMBER 1999
TO: CURRENT
REF: SMS78PK2-BB

S78 (WITH KICKDOWN OPTION) SERVICE MANUAL

SINGLE SPEED PLANETARY AUGER DRIVE

This manual will assist in disassembly and assembly of major components for all Model S78 Planetary Auger Drives. Item numbers, indicated in parentheses throughout this manual, refer to the Eskridge Model S78 exploded parts breakdown drawings. Individual customer specifications (bail assembly, output shaft, hydraulic motor, etc.) may vary from exploded drawing and standard part numbers shown; if applicable, refer to individual customer drawings for details.

LUBRICATION & MAINTENANCE

Change the oil after the first 50 hours of use and at 500 hour intervals thereafter. Gear drives in auger drives require GL-5 grade AP 80/90 gear oil for lubrication. The manufacturer recommends that the unit be partially disassembled to inspect gears, spines and bearings at 1000 hour intervals.

The oil capacity of this unit is 6.5 pints. Proper oil level will measure to middle of primary cluster gears when auger drive is in vertical position.



WARNING: While working on this equipment, use safe lifting procedures, wear adequate clothing and wear 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 auger drive, from the bail assembly (35) to the bearing carrier (4), to assure proper orientation of parts as they are reassembled.
- 2) To drain oil, position unit vertically and remove oil plug (28) located in the bearing carrier (4). To help ventilate oil while draining, loosen or remove oil plug (37) located in cover (1). Maximum drainage occurs when oil is 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 (2). This fixture must be secure so that the auger drive will not tip over during disassembly and assembly procedures.

Note: Serial numbers through 38201 were manufactured with the kickdown valve attached to a bracket on the bail. Those built after this serial number range were built with the kickdown valve attached to a bracket which is clamped to the motor.

Note: If the kickdown valve was performing acceptably prior to taking the digger out of service, do not adjust the kickdown valve setting.

- 3) With either style, begin by removing the two pressure sense lines (A) and (B) which run from the hydraulic motor (34) inlet port and outlet port to the kickdown valve body (38).
- 4) Remove the small fitting (K) from the large -16 fitting (40) on the outlet port of the motor (34). Remove the large -16 fitting (40).
- 5) Remove the shift control tube (C) which runs from the kickdown valve body (38) to the shift port on the motor (34).
- 6) If your digger falls within the serial number range stated above, loosen the two cap-screws (41) which attach the kickdown valve body (38) to the bail bracket, otherwise, proceed to the next step.
- 7) Remove the twelve hex-head cap screws (22) and hex-flange nuts (24) from bail assembly (35). Lift bail assembly from unit.

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

- 8) Remove the tube (E) which runs from the kick-down valve body (38) to the drain port of the motor (34) and the tube assembly (D) which runs from the drain side of the shift spool to the drain port of the motor (34). On units with the serial numbers listed above, the kickdown valve is now free to be removed. On those diggers made since the above serial number range, loosen the T-bolt clamp (44) and slide the bracket (43) and kickdown valve (38) off the motor (34).
- 9) Remove the two cap screws (32) and lock washers (33) from hydraulic motor (34). Remove motor from unit. Check o-ring (31) for damage.
- 10) Remove cover (1), input gear (9) and o-ring (30).
- 11) Lift the primary planet carrier assembly out of the unit (includes Items 7, 10, 12, 14, 19 & 23).

- 12) If sun gear (16) has not been removed from auger drive, do

so now. (Sometimes the sun gear remains in the primary carrier (7).)

- 13) Remove primary ring gear (6).
- 14) Remove secondary ring gear (5) and o-ring (30).
- 15) The output shaft (2) and secondary planet carrier assembly may now be removed as follows:

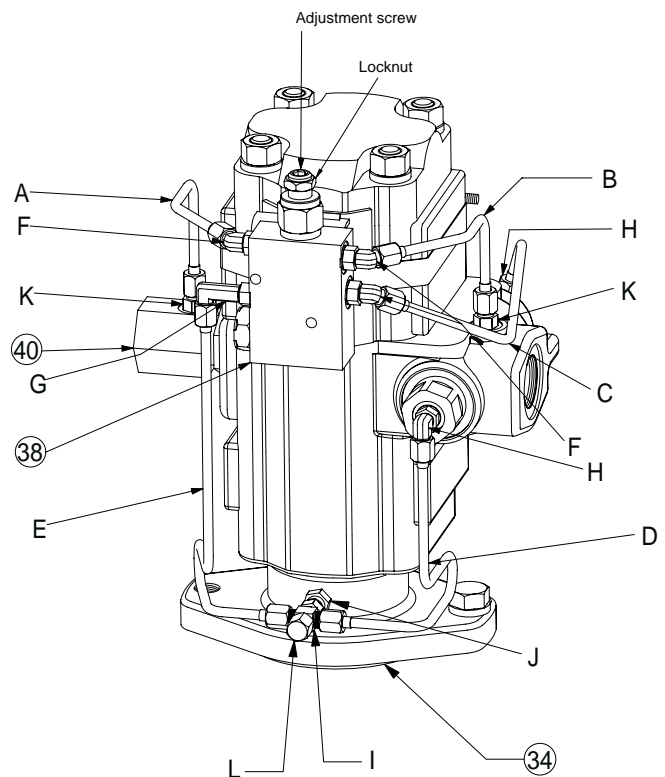
- a) The secondary planet carrier (8) spline is a press fit onto output shaft (2) spline. Bearing carrier (4) should be set on plate or table with output shaft protruding downward through hole in table.
- b) Loosen, but do not remove, shaft retaining cap screws (29).

NOTE: Care should be taken not to damage output shaft or injure your feet when shaft falls out of case.

- c) Press output shaft out bottom of case by applying press load to top end of cap screws (29). Remove cap screws to allow shaft to pass through case.

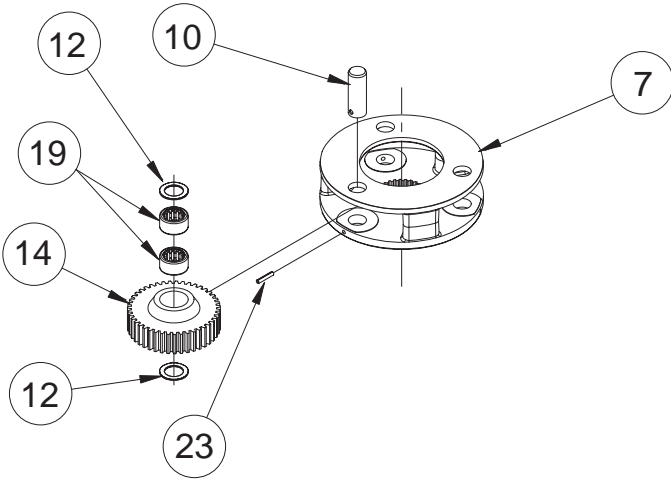
- 16) Lift the secondary planet assembly out of the unit (includes Items 8, 11, 13, 15, 17, 18, 21 & 23). Use a puller, if needed.

- 17) The unit is now disassembled into subassemblies. 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 7, 10, 12, 14, 19 & 23)



Disassembly

- 1) Rotate planet gears (14) to check for abnormal noise or roughness in bearings (19) or planet pins (10). If further inspection or replacement is required, proceed as follows.
- 2) Drive roll pins (23) completely into planet pins (10).
- 3) Press or drive planet pins (10) out of carrier (7).
- 4) Remove planet gears (14) and washers (12) from the carrier (7).

Reassembly

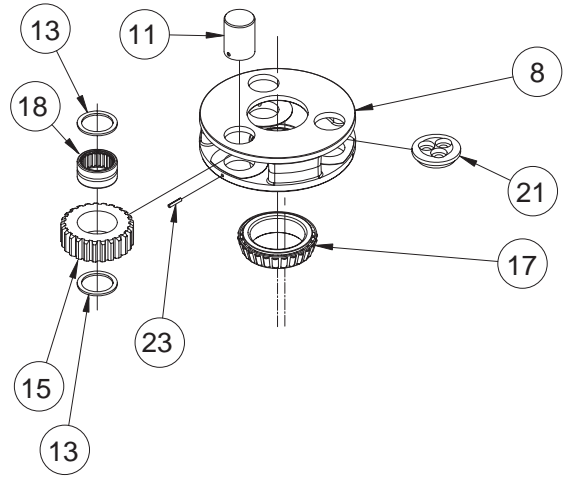
- 1) If the planet bearings (19) require replacement, press them out of the planet gears (14) and replace with new ones.

NOTE: If necessary to replace planet pins or bearings, then both components should be replaced.

- 2) Check primary planet pins (10) for any abnormal wear, especially ones where bearings needed to be replaced. If any abnormal wear is found, replace planet shafts.
- 3) Remove the roll pins (23) from planet pins (10).
- 4) With washers (12) on both sides of the planet gear (14) and with bearings (19) installed, slide gear into the carrier (7). Be sure the hub side of gear is away from the splined side of carrier. Insert the planet pin (10) through the carrier, washers and planet gear.
- 5) Planet pins (10) should be installed with chamfered end of 3/16 inch hole toward outside diameter of the carrier (7). This will aid in alignment of holes while inserting roll pins (23).
- 6) Drive three roll pins (23) through the carrier holes and into the planet shafts to retain the parts.

Secondary Planet Carrier Subassembly

(Items 8, 11, 13, 15, 17, 18, 21 & 23)



Disassembly

- 1) Rotate the secondary planet gear (15) to check for abnormal noise or roughness in planet bearings (18) or secondary planet shafts (11). If further inspection or replacement is required, proceed as follows.
- 2) Drive roll pins (23) into secondary planet shafts (11).
- 3) Press or drive secondary planet shafts out of secondary carrier (8).
- 4) Slide secondary planet gears (15) along with planet washers (13) out of secondary carrier (8).

Reassembly

- 1) If the planet bearings (18) require replacement, press them out of the planet gears (15) and replace with new ones.

NOTE: If replacing planet pins or bearings, then both components should be replaced.

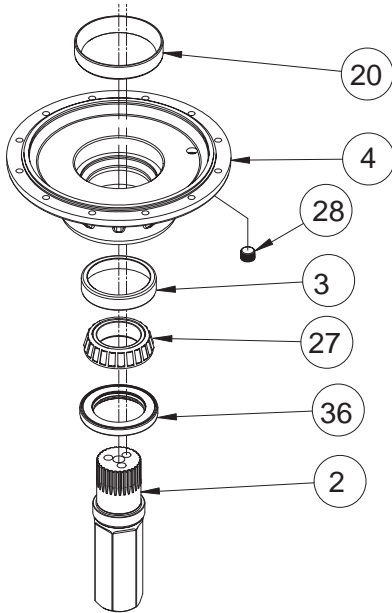
- 2) Check planet pins (11) for any abnormal wear, especially ones where bearings needed to be replaced. If any abnormal wear is found, replace planet shafts.
- 3) Remove the roll pins (23) from planet pins (11).
- 4) With washers (13) on both sides of the planet gear (15) and with bearings (18) installed, slide gear into the carrier (8). Insert planet retainer. Insert the planet pin (11) through the carrier, washers and planet gear.
- 5) Planet pins (11) should be installed with chamfered end of 1/8 inch hole toward outside diameter of the carrier (8). This will aid in alignment of holes while inserting roll pins (23).
- 6) Drive three roll pins (23) through the carrier holes and into the planet shafts to retain the parts.

NOTE: Press bearing onto hub by pressing on inner race only. DO NOT press on roller cage: it may damage bearing.

- 7) If tapered inner bearing cone (17) on secondary carrier (8) hub must be replaced, it may be removed using a gear puller. Then, press a new bearing cone onto the hub, making sure bearing shoulder is tight against the hub shoulder.

Bearing Carrier Subassembly

(Items 2, 3, 4, 20, 27, 28 & 36)



Disassembly

NOTE: If reusing old bearing cone, do not damage roller cage by pulling on it.

- 1) If outer bearing cone (27) needs to be replaced a puller may be used.
- 2) Inspect inner and outer bearing cups and bearing (3, 20 & 27); replace if necessary.

Reassembly

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 (27) was removed for replacement, press a new bearing cone (large end down, as shown) onto the shaft until it seats against the shoulder.
- 2) Place the bearing carrier (4) (output shaft side up, opposite shown) on the press table.
- 3) Apply a layer of lithium or general purpose bearing grease to surface of outer bearing cup (3). Insert the shaft (2) into the bearing carrier (4) (bearing cone down) and use a soft hammer to install the shaft seal (36), with the open side toward the inside of the auger drive, into the bearing carrier.

CAUTION: Output shaft is not retained at this point.

- 4) Invert this assembly so it is standing on the shaft (on the press table).

Unit Reassembly Procedure

(Refer to exploded drawing on Page 6)

- 1) Install secondary carrier assembly (8) onto bearing carrier (4) as follows.
 - a) Set carrier assembly down onto output shaft (2) spline.
 - b) Rotate carrier by hand until you are certain carrier spline has started cleanly and squarely onto shaft spline. View down through top of secondary carrier assembly through counter-bored holes in retainer plate (21).
 - c) Counter-bored holes in retainer plate should be centered between planet gears and must line up with holes in shaft. Slowly press secondary carrier assembly down tightly against the output shaft (2).
 - 2) Install cap screws (29) and tighten to a torque of 120 ft-lbs if dry, 90 ft-lbs if lubed.
 - 3) Install a new o-ring (30) on the bearing carrier (4).
 - 4) Referring to scribe marks for proper orientation, install the secondary ring gear (5) by rotating until ring gear teeth line up with planet gears.
 - 5) Check to be sure retaining ring (25) is installed on sun gear (16). Slide the sun gear into the secondary planet carrier.
 - 6) Install a new o-ring (30) on the primary ring gear (6) and install ring gear, referring the scribe marks for alignment.
 - 7) Install the primary carrier (7) by rotating until spline lines up with sun gear. It may be easier to install the sun gear (16) into the bottom of the primary carrier and then install primary carrier.
 - 8) Install input gear (9).
 - 9) Install a new o-ring (30) on the cover and install cover (1), again referring to scribe marks for alignment.
 - 10) Install o-ring (31) onto the hydraulic motor (34).
 - 11) Attach hydraulic motor (34) to mounting pad on cover (1) with two cap screws (32) and lock washers (33); tighten to a torque of 150 ft-lbs
- Note: If you have access to a hydraulic test stand and need to re-adjust the kickdown shift pressure, do this before proceeding.**
- 12) On units with serial numbers newer than 38201, attach the kickdown valve (38) to the bracket (43) and slip the T-bolt clamp (44) through the bracket (43). Slip the clamp over the motor and leave it loose for now. Attach the tube (E) which runs from the kickdown valve (38) to the drain port of the motor and the tube (D) which runs from the back side of the shift spool housing of the motor to the drain port of the motor. On older diggers, put two sapscrews (41) and washers (42) in the holes of the kickdown valve (38).
 - 13) Attach the shift line (C) to the lower fitting of the kickdown valve body and to the shift port of the motor as shown.
 - 14) Line up scribe mark on bail assembly (35) with scribe mark on cover (1) and place bail over hydraulic motor (34). Install twelve cap screws (22) with hex-flange nuts (24) and torque to 65 ft-lbs.

- 15) Attach the large fitting **(40)** to the outlet port of the motor **(34)** and attach the small, #4 fitting **(K)** to the large fitting. Align the fitting until the small fitting points straight up, along the axis of the motor (34).
- 16) Attach the sense line **(A)** from this small, #4 fitting **(K)** to the kickdown fitting and attach the other sense line **(B)** from the motor inlet fitting to the kickdown valve **(38)**.
- 17) Recheck all fittings and tube connections to be sure they are tight.
- 18) Tighten the T-bolt clamp **(44)** on newer diggers. On older diggers, tighten the two capscrews (41).
- 19) Fill to proper level with EP 80/90 gear oil, as specified on Page 2.

THE AUGER DRIVE IS NOW READY TO USE

Note: The best way to set the shift pressure accurately is to do so on an hydraulic test bench. If you do not have access to a test bench you can contact your hydraulics dealer or send the kickdown valve to Eskridge for setting. If you need to adjust the shift pressure in place, proceed as described below.

- 1) Loosen the locknut on the kickdown valve **(38)**.
- 2) Slowly turn the adjustment screw in (clockwise) until it seats in the valve.
- 3) Turn the adjustment screw out 2 to 3 turns.
- 4) Dig a hole or begin setting an anchor. The digger should begin in high speed.
- 5) Watch the pressure.
- 6) If the unit shifts at the desired pressure, stop the digger and tighten the locknut.

If the digger shifts to low speed at a pressure which is too low, stop the digger and turn the adjustment screw IN and test again.

If the digger does not shift or shifts at a pressure which is too high, stop the digger and turn the adjustment screw OUT (counterclockwise) and retest.

Continue this iterative process until the digger shifts at an acceptable level.

Note: The max operating pressure of the digger motor is 2500 psi and the maximum safe operating back-pressure is 500 psi. Even at pressures somewhat less than 500 psi, a motor case drain may be required to prevent overpressurizing the motor shaft seal. The "cross" fitting **(I)** at the motor case drain is provided if backpressure is near 500 psi. Otherwise, the cap **(L)** is installed on this fitting.

Exploded View Drawing



HYDRASYNC MODELS S78-35 & S78-48 WITH KICKDOWN

EFFECTIVE FOR:
FROM: S/N 37850 12-14-05
TO: CURRENT

ITEM	QTY	DESCRIPTION	S78-35	S78-48
1	1	COVER - 'C' MOUNT	80-004-1174	80-004-1174
2	1	OUTPUT SHAFT 2-1/2" HEX	71-004-4022	71-004-4022
		OUTPUT SHAFT 2-5/8" HEX	71-004-4032	71-004-4032
3	1	BEARING CUP - LOWER	01-103-0080	01-103-0080
4	1	BEARING CARRIER	72-004-1102	72-004-1102
5	1	RING GEAR, SEC.	71-004-0042	71-004-0042
6	1	RING GEAR, PRI.	73-004-1063	73-004-1063
7	1	CARRIER-PRI.	73-004-1043	73-004-1053
8	1	CARRIER-SEC.	71-004-2332	71-004-2332
9	1	INPUT GEAR	73-004-1012	73-004-1002
10	3	PLANET SHAFT-PRI.	71-004-0121	71-004-0121
11	3	PLANET SHAFT-SEC.	71-004-0081	71-004-0081
12	6	WASHER-PRI.	71-004-0861	71-004-0861
13	6	WASHER-SEC.	71-004-0871	71-004-0871
14	3	PLANET GEAR-PRI.	73-004-1032	73-004-1022
15	3	PLANET GEAR-SEC.	71-004-0092	71-004-0092
16	1	SUN GEAR	71-004-0102	71-004-0102
17	1	BEARING CONE - UPPER SHAFT	01-102-0100	01-102-0100
18	3	BEARING - PLANET SEC.	01-105-0020	01-105-0020
19	6	BEARING - PLANET PRI.	01-105-0010	01-105-0010
20	1	BEARING CUP - UPPER	01-103-0090	01-103-0090
21	3	S.H.C.S. 1/2-20 X 2-1/2	01-150-1480	01-150-1480
22	12	H.H.C.S. 3/8-16 X 6-1/2	01-150-0020	01-150-0020
23	6	ROLL PIN (3/16 X 1)	01-153-0020	01-153-0020
24	12	HEX FLANGE NUT (3/8-16)	01-158-0360	01-158-0360
25	1	RETAINING RING	01-160-0030	01-160-0030
26	1	PLATE-BRG RETAINER	71-004-2322	71-004-2322
27	1	BEARING CONE - LOWER	01-102-0090	01-102-0090
28	1	HOLLOW HEX PLUG (1/2 NPT)	01-207-0010	01-207-0010
30	3	O-RING	01-402-0020	01-402-0020
31	1	O-RING	01-402-0010	01-402-0010
32	2	H.H.C.S. (5/8-11 X 2)	01-150-0050	01-150-0050
33	2	LOCKWASHER (5/8)	01-166-0040	01-166-0040
34	1	MOTOR	01-304-0580	01-304-0580
35	1	BAIL ASSY (1-1/2" BAIL BOSS DIA)	S73-005-0152	S73-005-0152
		BAIL AS. (H-SYNC/1.5BB/ROT/K2)	S73-005-2092	S73-005-2092
36	1	SEAL	01-405-0540	01-405-0540
37	1	HOLLOW HEX PLUG 3/4 O-RING	01-208-0030	01-208-0030
38	1	VALVE BODY 2-DIRECTION (K2)	01-308-0150	01-308-0150
39	1	KIT-TUBE AS&FIT'G KICKDOWN-58	01-309-0580	01-309-0580
40	1	FITTING, K2 ONLY	01-316-0020	01-316-0020
41	2	H.H.C.S. 1/4-20 X 1-3/4 GR5	01-150-1690	01-150-1690
42	2	FLAT WASHER 1/4"	01-166-0390	01-166-0390
43	1	BRACKET	01-360-0040	01-360-0040
44	1	BAND CLAMP	01-365-0020	01-365-0020

OPTIONS

SEAL KIT P/N 76-016-2011
INCLUDES 3 OF ITEM 30, AND
1 EA. OF ITEMS 31 AND 36

XS78K2-B- ECN: 2511

DATE: 06-13-2006

