CARCO®

INSTALLATION AND PARTS MANUAL

MODEL 70A WITH ELECTRONIC CONTROLS

FOR

D6R SERIES III TRACTORS

NOTE: This manual covers winch installation and parts, specific to the tractor or tractors listed above. For all other common winch parts, refer to Carco Winch Parts Manual LIT2115.

TABLE OF CONTENTS

MODEL NUMBER DESCRIPTION

70A	B	0	0	1	0	0	E
Basic Winch Model	Bevel Gear Ratio B-1.27:1 E-2.78:1	0-Overwind	0-Standard Brake	1-With Freespool	0-Four Shaft Winch	0-No Fairlead 3-3 Roller Fairlead 4-4 Roller Fairlead	E-Electronic Control

PACCAR WINCH
P.O. Box 547 Broken Arrow, OK 74013
Tel 918-251-8511 / Fax 918-259-1575
www.paccarwinch.com

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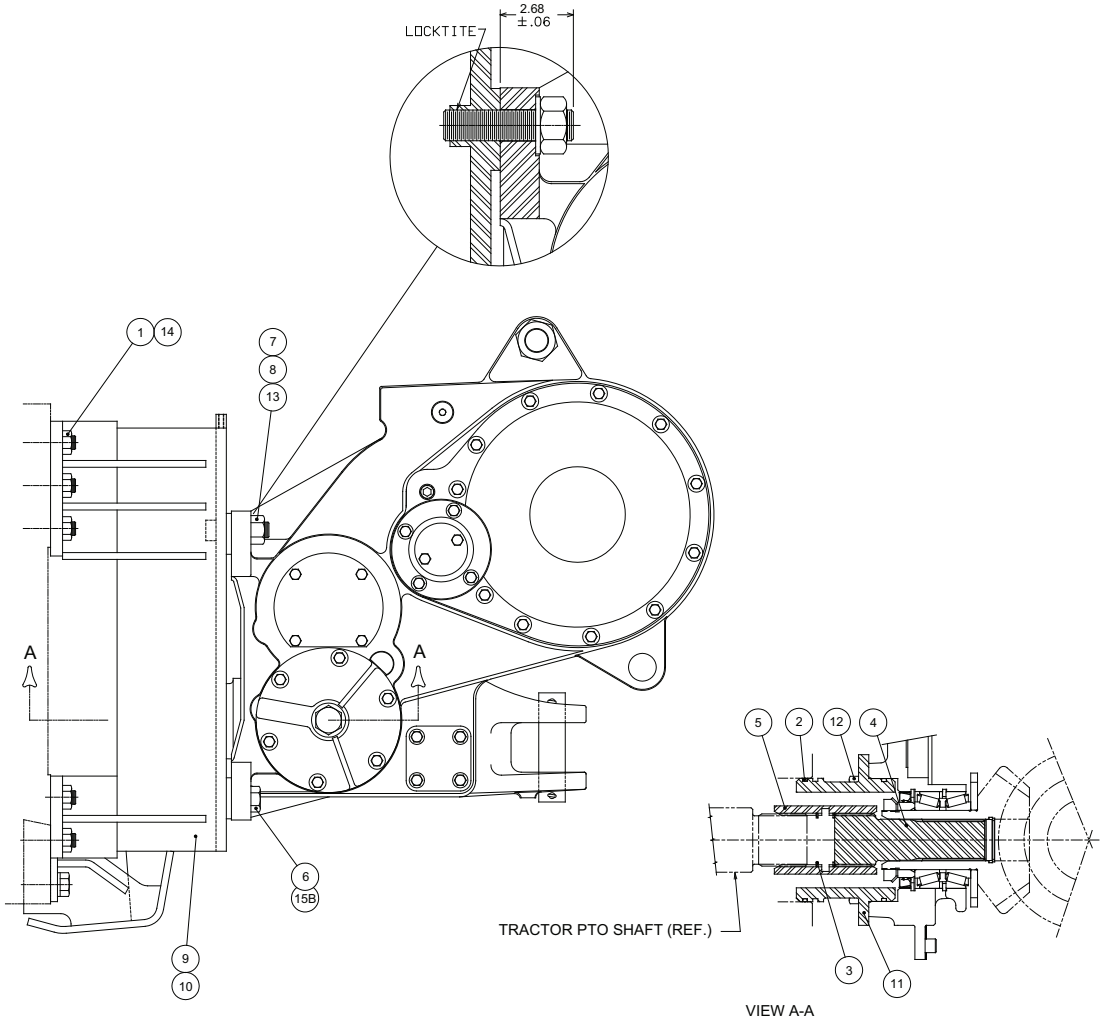
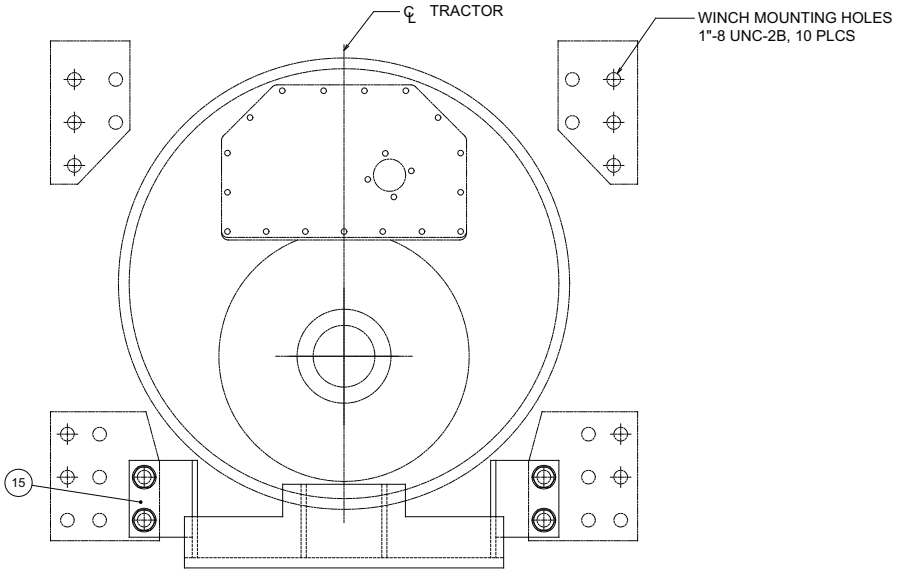
MODEL 70A
MOUNTING GROUP
D6R SERIES III PS





VIEW LOOKING AT TRACTOR REAR FACE

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	33446	STUD (1 - 8 X 3-1/4 G8)	10
2	69850	O-RING	3
3	32101	RETAINING RING	2
4	26242	PTO SHAFT	1
5	69106	COUPLING	1
6	102597	CAPSCREW, HEX HEAD (1 - 8 X 3 G8 Z)	4
7	70768	NUT, HEX (1-1/8 - 7)	4
8	100654	STUD (1-1/8 - 7 X 4-3/4)	4
9	27780	ADAPTER, RH	1
10	27781	ADAPTER, LH	1
11	69089	PILOT, PTO	1
12	104320	CAPSCREW, HEX HEAD (1/2 - 13 X 1 G8 Z)	4
13	103484	WASHER, HARDENED (1-1/8)	4
14	PA6V8190	NUT, HEX (1 - 8)	10
15	PA3W1356	ECOLOGY DRAIN GROUP (INCLUDES ITEMS 15A, B & C)	1
15A	PA3W1357	GUARD	1
15B	101205	WASHER, HARDENED (1)	8
15C	102883	CAPSCREW, HEX HEAD (1 - 8 X 1-1/2 G8 Z)	4

MOUNTING GROUP INSTRUCTIONS

1. PTO rotation is counterclockwise (CCW) as viewed from the rear of the tractor. Remove the tractor PTO cover.

2. Remove paint, dirt, rust, oil and grease from mounting surfaces of tractor, winch and winch adapters. If this material is left between the mounting surfaces, movement of the clamped members will result in loosening mounting fasteners and possible fastener or mounting component failure.

3. Coat splines of PTO shaft (4), with multi-purpose grease and install into bevel pinion gear of winch.

4. Install retaining rings (3), in coupling (5). Trial fit the coupling onto the tractor PTO shaft and the winch PTO shaft to make certain the splines fit well and there are no rough areas on either shaft that need to be smoothed. Install coupling onto winch PTO shaft with deepest bevel end away from winch.

5. Install O-rings (2), onto PTO pilot (11). NOTE: As the same PTO pilot may be used on several adaptations, typically only one O-ring groove will engage and seal in the tractor PTO opening.

6. Apply Loctite 271, 277 or equivalent to threads and install studs (8) into winch adapters (9, 10) to a height of 2-5/8 in. (67 mm).

7. Apply Loctite 242, 243 or equivalent to the threads of capscrews (6), and studs (8). Install the winch adapters (9, 10) onto the winch then install capscrews (6), washers (13) and nuts (7) onto studs (8). At this time, only lightly hand-tighten the capscrews (6), and nuts (21).

8. Fill winch to proper level with recommended oil.

⚠ WARNING ⚠

Winch weighs approximately 2500 lb (1134 kg) without oil, cable or tractor adapters. Make certain lifting equipment has adequate capacity to eliminate the possibility of damage or injury. Attempting to lift the winch with inadequate equipment may result in personal injury or property damage.

⚠ WARNING ⚠

DO NOT start the tractor engine until the winch has been filled to the proper level with the recommended oil. Bearing and gear damage may result if the tractor is run without oil in the winch.

There are two methods that may be used to install the winch with adapters onto the rear face of the tractor:

Method A: Involves removing winch guards and covers to gain access to the bevel gears.

A1. Apply Loctite 271, 277 or equivalent to threads and install studs (1) into rear face of tractor until they bottom in the stud bores but no lower than a height of 1.80 in. (46 mm) measured from the machined surface of the tractor rear face mounting pads to the end of the stud.

A2. Apply general purpose grease to the PTO pilot o-rings. Lift winch into position and install onto rear of tractor taking care to guide the PTO shaft/coupling onto the tractor PTO shaft. It may be necessary to rotate the winch bevel pinion gears to align the winch shaft with the tractor shaft. It will be necessary to remove the guard group and top cover from the winch to gain access to the bevel gears.

A3. Apply Loctite 242 or 243 to clean dry threads of studs (1) and install nuts (14).

NOTE: Keep the winch in a level position to avoid binding of the PTO pilot and shafts.

With the weight of the winch supported by the hoist, use a cross pattern to evenly tighten all mounting fasteners to approximately 25% of the recommended torque. Start the tractor engine and listen for any unusual gear train noise that would indicate binding in the PTO shafts or gear train. If no unusual noises are detected, remove the hoist from the winch and continue to evenly tighten all mounting fasteners to recommended torque. Tighten nuts (7) & (14) to 600 lb.ft. (815 N•m) torque. Tighten capscrews (6) to 680 lb•ft (920 N•m) torque. If torque wrench adapters are not available for tightening the nuts (7, 14) they may be tightened as follows: Tighten nuts with a hand wrench to approximately 100 lb.ft. (136 N•m) torque to remove all looseness from the assembly. Mark the position of a wrench flat on each nut, then tighten each nut one (1) additional wrench flat.

Method B: Does not require removal of guards and covers from the winch.

B1. Apply general purpose grease to the PTO pilot o-rings. Lift winch into position and install onto rear of tractor taking care to guide the PTO shaft/coupling onto the tractor PTO shaft. While the winch is supported on the hoist, slightly rotate the winch case to align the PTO coupling on the winch with the PTO shaft of the tractor.

NOTE: Keep the winch in a level position to avoid binding of the PTO pilot and shafts.

B2. Apply Loctite 271, 277 or equivalent to clean dry threads and install studs (1) through winch adapter holes into the tractor rear face. Install the studs till they bottom in the stud bores but no lower than 1.80 in. (46 mm) measured from the machined surface of the tractor rear face mounting pads to the end of the stud. Apply Loctite 242 or 243 to clean dry threads of studs (1) and install nuts (14). With the weight of the winch supported by the hoist, use a cross pattern to evenly tighten all mounting fasteners to approximately 25% of the recommended torque. Start the tractor engine and listen for any unusual gear train noise that would indicate binding in the PTO shafts or gear train. If no unusual noises are detected, remove the hoist from the winch and continue to evenly tightening all mounting fasteners to recommended torque. Tighten nuts (7) & (14) to 600 lb.ft. (815 N•m) torque. Tighten capscrews (6) to 680 lb•ft (920 N•m) torque. If torque wrench adapters are not available for tightening the nuts (7, 14) they may be tightened as follows: Tighten nuts with a hand wrench to approximately 100 lb.ft. (136 N•m) torque to remove all looseness from the assembly. Mark the position of a wrench flat on each nut, then tighten each nut one (1) additional wrench flat.

After winch is installed on tractor and all fasteners tightened to recommended torque, the bevel pinion must be pried toward the tractor. During installation, the pinion may get driven hard into the bevel gears, taking all end-play out of the pinion bearings and back-lash out of the gear set. Insert a pry bar between the clutch shaft and pinion then pry the pinion toward the tractor. A small amount of gear back-lash should be detected when the pinion moves forward.

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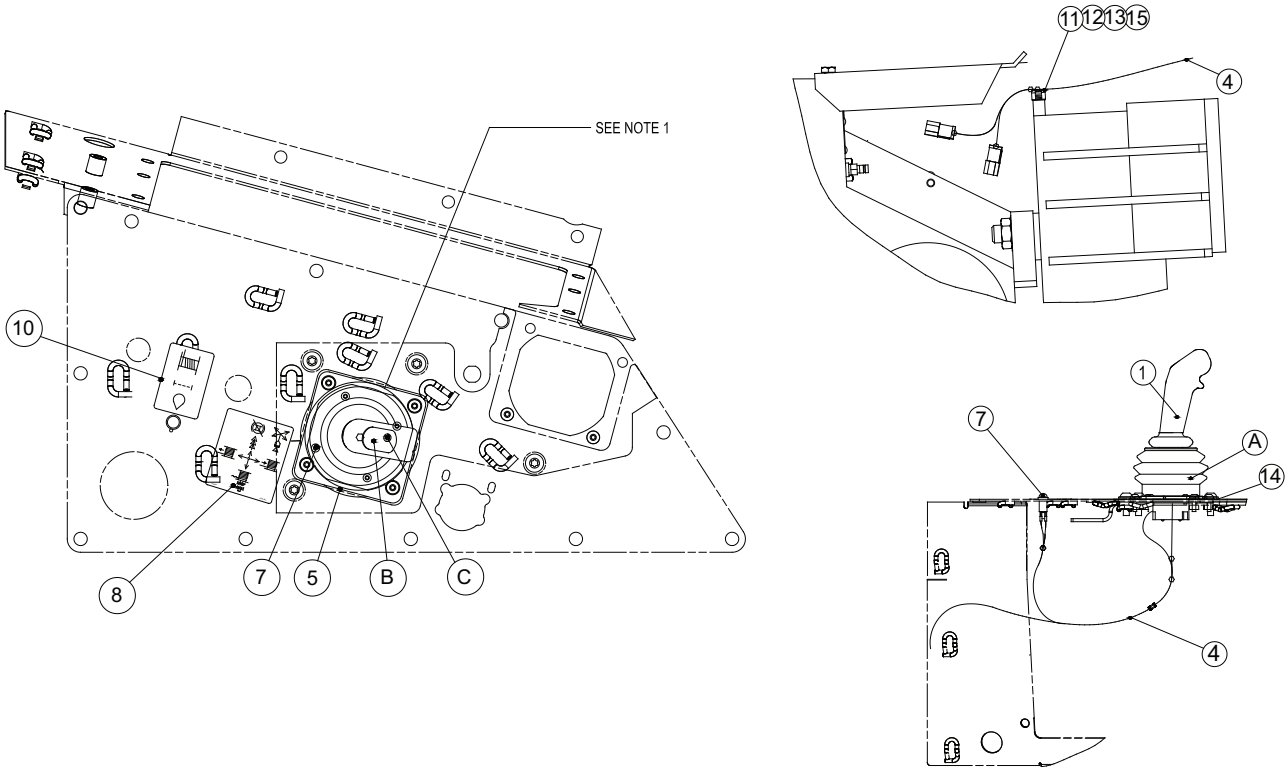
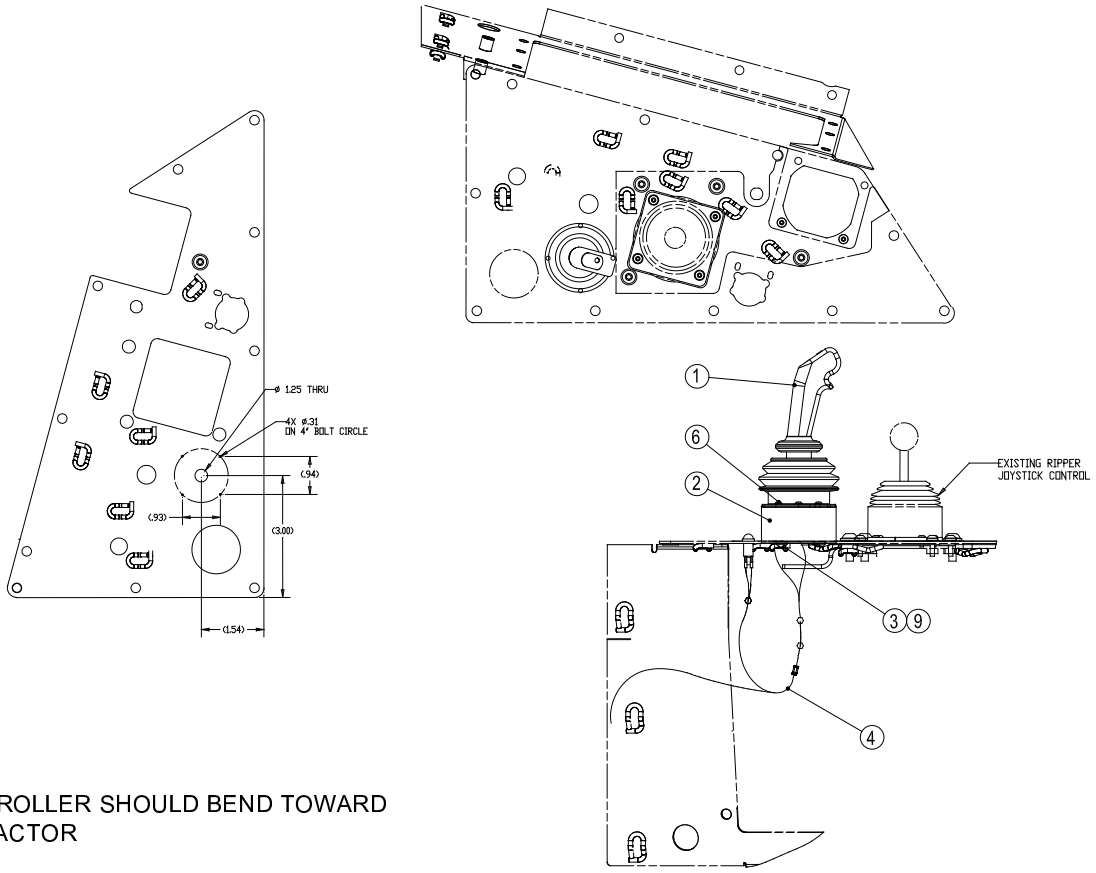
MODEL 70A
CONTROL GROUP
D6R SERIES III PS

CONTROL GROUP WITHOUT RIPPER CONTROL



CONTROL GROUP WITH RIPPER CONTROL



NOTES:

1. TOP OF CONTROLLER SHOULD BEND TOWARD FRONT OF TRACTOR

CONTROL INSTALLATION INSTRUCTIONS

These control installation instructions are provided as a general guide. Tractor options, application requirements or local regulations may require deviation from these recommendations. Stop engine, turn key switch and master power switch off.

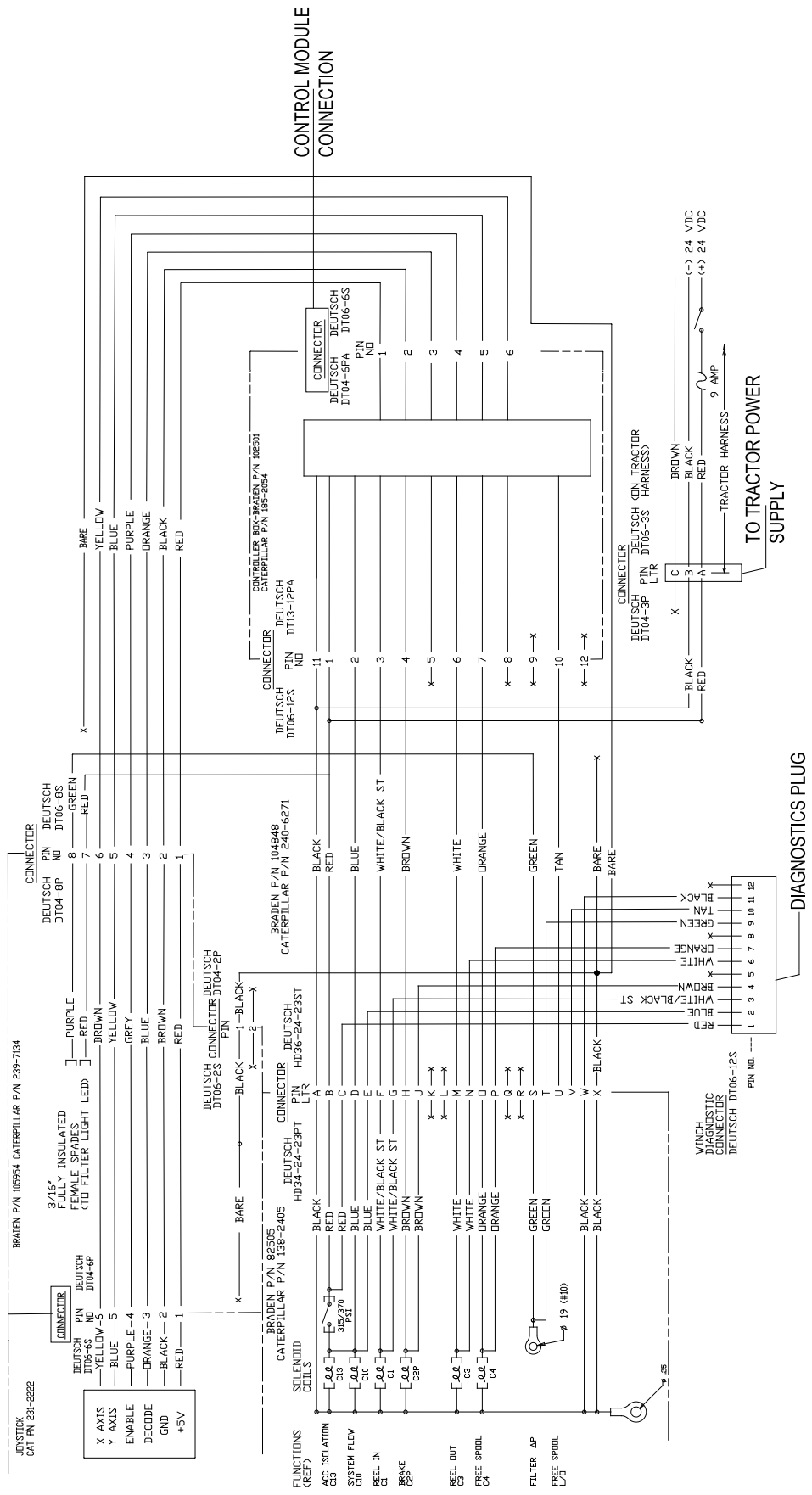
⚠CAUTION⚠

Avoid routing the wiring harness near moving shafts or linkages, which may cause damage to the wiring harness or restrict free movement of tractor components.

1. Attach dual axis controller (1), to controller mounting plate (5), with button head capscrews (6).
2. Remove RH tractor console.
3. Install harness (4), in tractor as shown. Connect winch and control module ends of harness. Secure winch end of harness with strap, capscrew, washer and wire tie strap (11, 12, 13, 15), as shown. Secure harness at console wall with wire tie straps, as shown.
4. Install decal, and indicator light (7, 10), onto console.
5. If tractor is equipped with a ripper control assembly, modify console as shown and install spacer (2) with capscrews and washers (3, 9) as shown. Install console cover.
6. Attach dual axis controller and mounting plate to console cover with existing Caterpillar fasteners.
7. Connect controller to control module and secure harness with wire tie straps (13).
8. Connect harness spade connectors to indicator light. Red wire must be connected to positive terminal of indicator light.
9. Insure tractor power is off. Connect harness to tractor power supply circuit 3-pin plug, which is located on right rear side of the fuel tank.
10. Install control decal (8) onto console cover.
11. Fill the winch to the proper level with recommended oil. Refer to the specifications found in the Operation and Preventive Maintenance Manual, publication LIT2089 or Service Manual, publication LIT2055.
12. Start the tractor and operate the engine at low RPM for several minutes to allow the winch control system pressure to stabilize. Operate the winch in brake-off for approximately one minute then all functions as instructed in the Operation and Preventive Maintenance Manual, publication LIT2089.

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	107640	DUAL AXIS JOYSTICK CONTROLLER	1
A	106427	BOOT	1
B	106428	CONTROLLER HANDLE DECAL	1
C	106429	SWITCH	1
2	106506	SPACER, USE W/RIPPER CONTROL	1
3	104301	CAPSCREW, HEX HD 1/4 - 20 X 3/4 (USE W/SPACER 2)	4
4	105954	WIRING HARNESS	1
5	102248	CONTROLLER MOUNTING PLATE	1
6	101817	CAPSCREW, BUTTON HD, 10 X 1/2, STAINLESS	4
7	100792	INDICATOR LIGHT, RED	1
8	100816	CONTROL CONSOLE DECAL	1
9	100857	WASHER, 1/4 (USE W/SPACER 2)	4
10	102247	FILTER BYPASS DECAL	1
11	104135	CAPSCREW, HEX HD, 3/8 - 16 X 3/4 GD 8 Z	1
12	101440	WASHER, 3/8	1
13	32489	WIRE TIE STRAP, BLACK	8
14	103145	CONTROLLER MOUNTING GASKET	1
15	PA4P7581	CLIP	1

MODEL 70A
ELECTRIC SCHEMATIC
D6R SERIES III PS

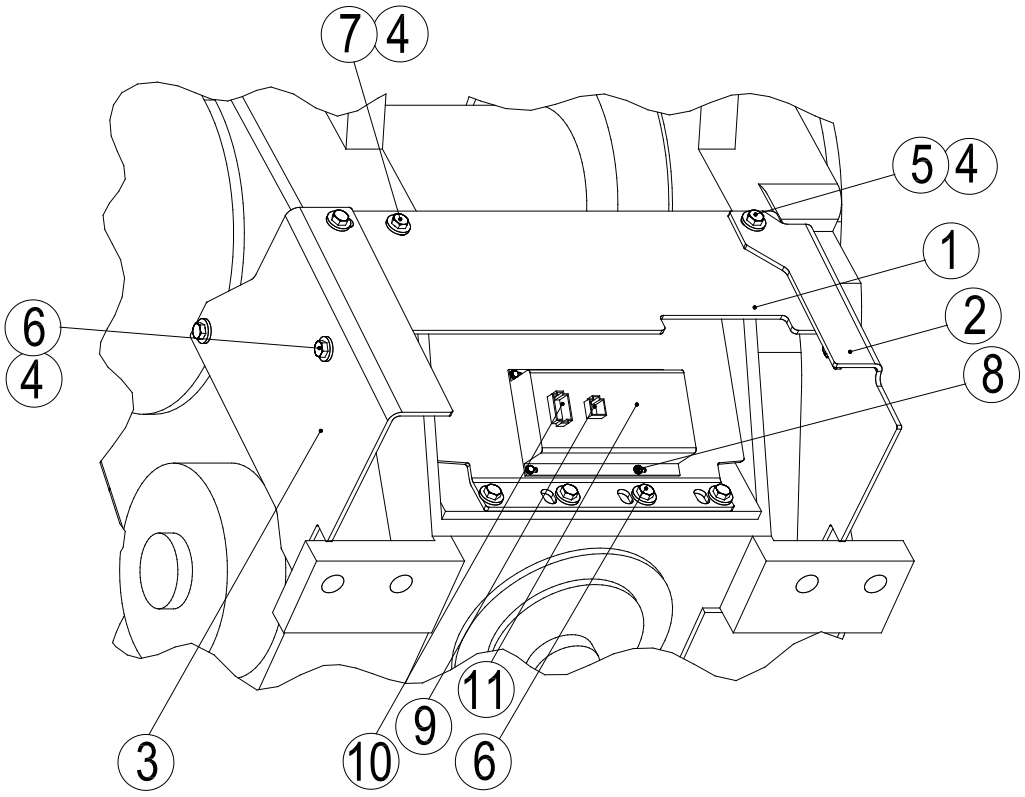


Module and Harness Installation

1. Mount module by installing self-tapping screw (item 8) using Loctite 222, 242, or equivalent low or medium strength thread locker.

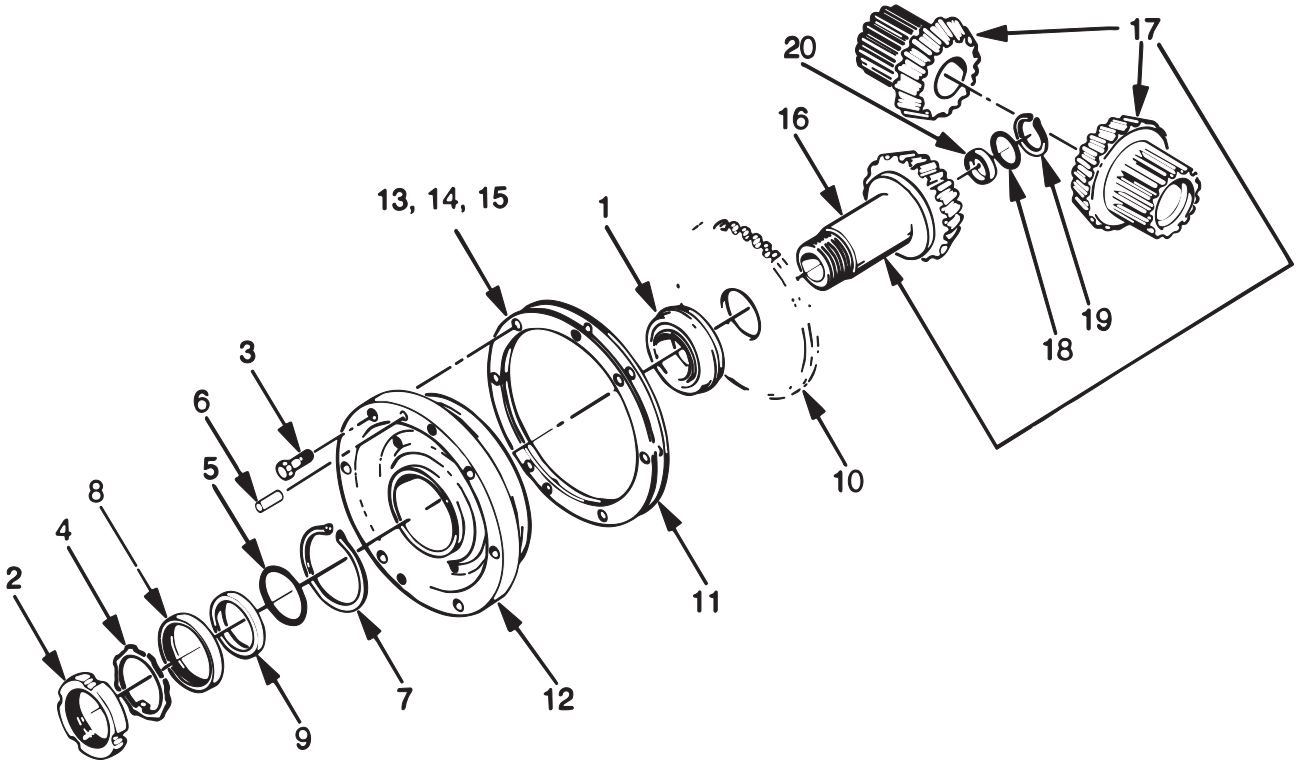
2. Insert wiring harness (pn# 239-7134) to winch and control module connectors (9 & 10), as well as in-cab mounted control group

3. Bundle loose wiring harness leads and secure with tie strap



ITEM NO.	PART NO.	DESCRIPTION	QTY
1	104844	UPPER GUARD	1
2	104845	LH GUARD	1
3	104846	RH GUARD	1
4	102987	HARDENED WASHER	10
5	104320	CAPSCREW,1/2-13 X 1 HEX HEAD GD8 Z	1
6	104174	CAPSCREW,1/2-13 X 1 1/4 HEX HEAD GD8 Z	8
7	104322	CAPSCREW, 1/2-13 X 1 1/2 HEX HEAD GD8 Z	1
8	70053	SELF TAPPING SCREW	4
9	-	HARNESS CONNECTION, CONTROL TO MODULE	
10	104848	HARNESS, MODULE TO WINCH	1
11	102501	CONTROL MODULE	1

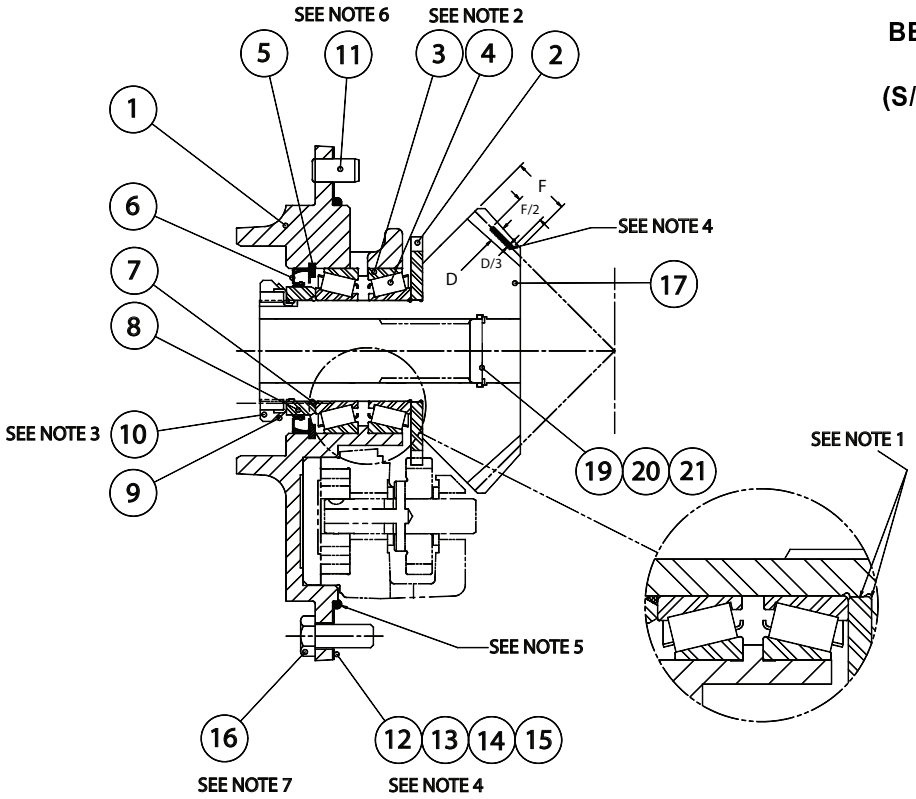
MODEL 70A
BEVEL GEAR GROUP
D6R SERIES III PS
(S/N 0704589 AND BELOW)



ITEM	PART NO.	DESCRIPTION	QTY.
1	70077	BEARING ASSEMBLY	1
2	24816	BEARING LOCKNUT	1
3	104174	CAPSCREW, HEX HEAD (1/2 - 13 X 1-1/4 G8 Z)	6
4	11418	BEARING LOCKWASHER	1
5	74992	O-RING	1
6	10318	DOWEL PIN	1
7	70163	RETAINING RING	1
8	107298	OIL SEAL	1
9	70382	SEAL SPACER SLEAVE	1
10	69947	PUMP DRIVE PINION	1
11	69946	SHIM GASKET	1
12	69961	BEVEL PINION CARRIER	1
13	69945	SHIM .005 in. (.13 mm)	2-AR
14	69827	SHIM .007 in. (.18 mm)	2-AR
15	69826	SHIM .020 in. (.51 mm)	2-AR
16	69824	BEVEL PINION - 26T (B RATIO) STANDARD SPEED	1
	69635	BEVEL PINION - 14T (E RATIO) SLOW SPEED	1
17	29075	BEVEL GEAR SET - 33/26T (B RATIO)* STANDARD SPEED	1
	69834	BEVEL GEAR SET - 39/14T (E RATIO)* SLOW SPEED	1
18	69813	O-RING (B RATIO ONLY)	1
19	70162	RETAINING RING (B RATIO ONLY)	1
20	70626	PLUG, BEVEL PINION (B RATIO ONLY)	1

* Bevel Gear Set includes one Bevel Pinion and two Bevel Gears.

MODEL 70A
BEVEL GEAR GROUP
D6R SERIES III PS
(S/N 0704590 AND UP)



NOTES:

1. Clean bevel and pump pinions with Loctite solvent. Verify press fit before assembly. Apply Loctite 609 or equal to surfaces indicated in Detail A. Press pump drive pinion, item 2, onto bevel pinion and seat securely against shoulder. Allow proper cure time for Loctite before usage.
2. Apply a thin coat of multi-purpose grease to rollers. Do not pack solid.
3. Tighten nut to ensure parts are fully seated. Loosen nut to set the rolling torque of 10 lb-in (1.1 N-m). Pinion must turn smoothly by hand.
4. Shim as required for tooth contact pattern as shown. The pattern height should be about 1/3 the whole depth, located midway between tip and root. It should be about ½ the face width shifted toward the toe. Set the backlash to .004 to .012 in. (.10 - .30 mm).
5. Apply approximately 3/16" (5 mm) bead of silastic sealant (RTV 732) to pilot diameter as indicated.
6. Clean with Loctite solvent and apply Loctite 242 to dowel pin and insert into winch case.
7. Clean with Loctite solvent and apply Loctite 242 to threads. Torque to 75 to 83 ft-lb (102 - 113 N-m).

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	106864	BEVEL PINION CARRIER	1
2	69947	PUMP PINION	1
3	70080	BEARING CUP	2
4	70081	BEARING CONE	2
5	70163	RETAINING RING	1
6	107298	OIL SEAL	1
7	74992	O-RING	1
8	70382	SEAL SPACER	1
9	11418	BEARING LOCKWASHER	1
10	24816	BEARING LOCKNUT	1
11	10318	DOWEL PIN	1
12	69946	SHIM GASKET	1
13	69945	SHIM, .005 in. (.13 mm)	2-AR
14	69827	SHIM, .007 in. (.18 mm)	2-AR
15	69826	SHIM, .020 in. (.51 mm)	2-AR
16	104174	CAPSCREW, HEX HD (½ - 13 X 1¼ in. G8, Z)	6
17	69824	BEVEL PINION - 26T (B RATIO)	1
	69635	BEVEL PINION - 14T (E RATIO)	1
18	29075	BEVEL GEAR SET - 33/26T (B RATIO)* (NOT SHOWN)	1
	69834	BEVEL GEAR SET - 39/14T (E RATIO)* (NOT SHOWN)	1
19	69813	O-RING (USED ON B RATIO ONLY)	1
20	70162	RETAINING RING (USED ON B RATIO ONLY)	1
21	70626	BEVEL PINION PLUG (USED ON B RATIO ONLY)	1

* Bevel Gear Set includes one Bevel Pinion and two Bevel Gears