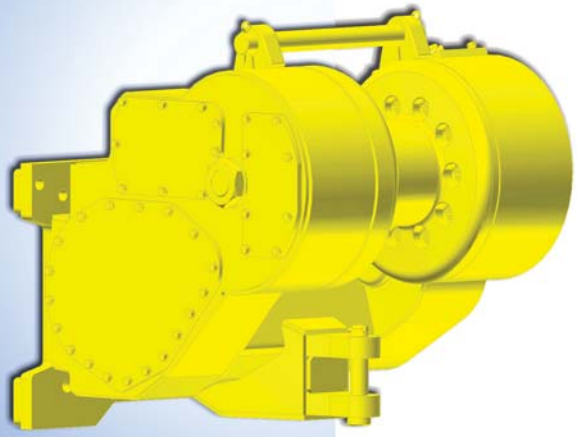
Allied® WINCH

Service Manual



Allied W6G

Power Controlled & Electronic Controlled Towing Winch

Please check the Allied Systems website regularly for updates to this manual.
www.alliedsystems.com

CUSTOMER EDITION

A PRODUCT OF
Allied Systems COMPANY
SHERWOOD, OREGON USA

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Safety Precautions

Read, understand and observe the precautions on the following pages to prevent injury to personnel and damage to equipment.

Winch serial number _____

Date put into service _____

NOTE: This publication may be translated to different languages for sole purpose of easy reference in non-English speaking locations. Should there be differences in interpretations to the text, please refer to the English language edition published by Allied Systems Company as the controlling document.

Safety Summary

General Safety Notices

The following pages contain general safety warnings which supplement specific warnings and cautions appearing elsewhere in this manual. All electrical and hydraulic equipment is dangerous. You must thoroughly review and understand the Safety Summary before attempting to operate, troubleshoot or service this winch.

The following symbols/terms are used to emphasize safety precautions and notices in this manual:

⚠ DANGER

The "DANGER" symbol indicates a hazardous situation which, if not avoided, will result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.

⚠ WARNING

The "WARNING" symbol appears wherever incorrect operating procedures or practices could cause serious injury or death. Carefully read the message that follows to prevent serious injury or death.

⚠ CAUTION

The "CAUTION" symbol appears where a hazardous situation which, if not avoided, could result in minor to moderate injury and equipment damage.

NOTICE

This signal word alerts to a situation that is not related to personal injury but may cause equipment damage.

NOTE: …

The term "NOTE" highlights operating procedures or practices that may improve equipment reliability and/or personnel performance.

Safety Regulations

Each country has its own safety legislation. It is in the operator's own interest to be conversant with these regulations and to comply with them in full. This also applies to local bylaws and regulations in force on a particular worksite.

Should the recommendations in this manual deviate from those in the user' country, the national regulations should be followed.

NOTE: All possible safety hazards cannot be foreseen so as to be included in this manual. Therefore, you must always be alert to potential hazards that could endanger personnel and/or damage the equipment.

⚠ WARNING

The winch shall not be used for hoisting.

⚠ WARNING

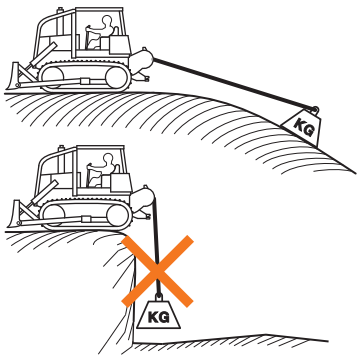
Use hearing protection when operating winches.

Operation, Inspection, and Maintenance Warnings

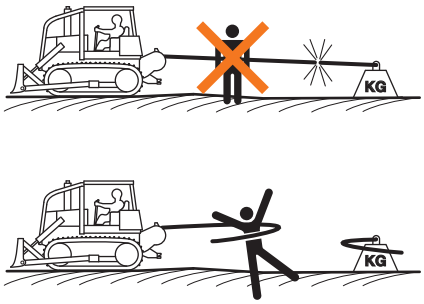
Obey the following cautions and warnings before using your winch to avoid equipment damage, personal injury or death.

- Do not operate the winch unless you are authorized and trained to do so.
- Do not operate the winch unless the vehicle is equipped with a screen to protect the operator if the wire rope breaks.
- Read, understand, and follow the operating, inspection, and maintenance instructions in this manual.
- Do not use the control levers for hand holds when entering or leaving the vehicle.

- Do not permit other people near the control area when you inspect or repair a machine.
- Never inspect, repair, or perform maintenance on a machine that is in motion.
- Inspect the winch before each use:
  - » Make sure that the controls and instruments operate correctly.
  - » Report the need for repairs immediately.
  - » Do not work with a damaged or worn wire rope.
  - » Do not use a winch that needs repairs.
  - » If the wire rope and ferrule must be removed from the drum, make sure the end of the wire rope and ferrule are controlled when the ferrule is released. The end of the wire rope can suddenly move from the drum like a compressed spring when the ferrule is released and cause an injury.
- Stay in the operator's seat when operating the winch.
- Do not stand on the vehicle when operating the winch.
- Avoid winch operation near people or other machines.
- Never stand nor permit others to stand in the bight (loop) of a wire rope.
- Do not stand nor permit others to be near the winch or wire rope when there is tension on the wire rope.
- Observe jobsite rules.
- Be in complete control at all times.
- Do not use the control levers as hangers for clothes, water bags, grease guns, lunch pails, etc.
- Do not leave the vehicle when the winch wire rope is under tension.
- Do not permit riders on the vehicle or load.
- Do not use the winch as an anchor for a double or two-part line.
- Do not pull the hook through the throat or over the drum, which will cause damage.
- When the winch is not in use, make sure the control lever is in **BRAKE-ON** position and the winch brake is applied.
- Do not use winch as a hoist. Tractor and skidder mounted winches are designed for towing.



- Always inspect wire rope, tail chain and other rigging components for wear, damage, broken strands or abuse before use.
- Never use wire rope, tail chain or other rigging that is worn-out, damaged or abused.
- Never overload wire rope, tail chain or rigging.
- Wire rope and tail chain will fail if worn-out, overloaded, misused, damaged, improperly maintained or abused. Wire rope or tail chain failure may cause serious injury or death!



- Do not terminate wire rope to tail chain by the use of a knot.
- Do not handle wire rope if the hook end is not free. A load could break away, suddenly tensioning the wire rope, resulting in serious injury or death.
- Stay clear of wire rope entry areas (fairlead or arch rollers, winch drum etc).
- Make sure ground personnel are in plain view of the operator, and at a distance of at least 1½ times the working length of the wire rope.
- Make sure that any hand signals used by ground personnel are clearly defined and understood by everyone involved.

- Do not attempt to “jerk” or “shock” a load free. Doing so can cause loads in excess of the rated capacity of the wire rope, winch, or mounting hardware.
- Replace any parts only with genuine Allied Winch parts. Refer to Parts Manual 599003W.
- Maintain **a minimum of three (3) complete wraps of wire rope** on the drum for normal operation. It may help to paint the last five wraps of wire rope a contrasting color, to serve as a visual indicator.
- Do not handle wire rope with bare hands. Wear leather gloves at all times.
- Align the tractor with the load to prevent side loading the winch, and to maintain even spooling of the wire rope.
- If applying tension to the wire rope manually during spooling:
  - » Ensure that the operator is winching in slowly,
  - » Keep your hands and clothing well clear of any rollers or the winch drum,
  - » Do not maintain tension by letting the wire rope to slip through your hands,
  - » Use a hand-over-hand technique to maintain tension.
- Be aware of the ground conditions, and make sure the ground and tractor are stable enough to pull the intended load.
- Do not attempt to pull loads in excess of the rated capacity of the winch.
- Keep yourself informed of any applicable codes, regulations and standards for the job.
- Your winch may have temperature shut-off system for protection of tractor and winch. Manual override of high temperature shut-off will cause damage to tractor and winch.
- This winch is neither intended, designed, nor rated for any application involved in the lifting or moving of personnel.
- Use only the lubricants listed in the Recommended Oil List. See Page 1-14 in Section 1.
- Do not weld on any part of the winch. Contact Allied Systems if weld repairs are needed.
- The hydraulic system must be kept clean and free of contamination at all times.
- Be aware of the hazards of pressurized hydraulics:
  - » Wear personal protective equipment, such as gloves and safety glasses, whenever servicing or checking a hydraulic system.
  - » Assume that all hydraulic hoses and components are pressurized. Relieve all hydraulic pressure before disconnecting any hydraulic line.
  - » Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.
  - » Small hydraulic hose leaks are extremely dangerous, and can inject hydraulic oil under the skin, even through gloves.
  - » Infection and gangrene are possible when hydraulic oil penetrates the skin. See a doctor immediately to prevent loss of limb or death.

Ordering Parts:

When ordering replacement parts, give the unit serial number,
part number, name of part and quantity required.

For any further information on parts, service or ordering, consult your local winch dealer,
or contact Allied Systems Company:

Allied Systems Company
21433 SW Oregon Street
Sherwood, OR 97140, the U.S.A.

Phone: 503-625-2560
Fax: 503-625-5132
E-Mail: parts@alliedsystems.com

Also see our website, www.alliedsystems.com, where the most current copy of this manual is always available.

Contents

(Continued on next page)

Contents (continued)

Notes

Notes

General

Introduction

This service manual is for the W6G winch. The following information is included in this manual:

Section 1. General includes operational descriptions of systems and components as an aid for troubleshooting and repair.

Section 2. Power/Cable Controls focuses on the system formation, provides a guide for periodic maintenance, checks and adjustments, and lists common problems and the possible causes and corrections for a winch with power/cable controls.

Section 3. Electronic Controls focuses on the system formation, provides a guide for periodic maintenance, checks and adjustments, and lists common problems and the possible causes and corrections for a winch with electronic controls.

Section 4. Repairs describes the removal, disassembly, assembly, and installation of the winch.

Description

The W6G Winch is a Power Forward (**LINE-IN**) and Power Reverse (**LINE-OUT**) winch used on tractors with a constant running power takeoff (PTO). The winch utilizes a Self Contained Hydraulic (SCH) system where all hydraulic power is produced inside the winch case. A hydraulic pump is connected by a gear drive to the constant running pinion. The design of the winch case permits different arrangements of PTO gear assemblies to fit different tractors that use this winch. (See repair section for the PTO gear assemblies.)

The W6G winch has **BRAKE-OFF** and **FREESPOOL** functions. The **BRAKE-OFF** and **FREESPOOL** functions permit the wire rope to be pulled from the drum.

The W6G winch has a maximum rated line pull capacity of 266,880N (60,000 lb.) when there is one layer of wire rope on the drum. When there is more than one layer of wire rope on the drum, the maximum rated line pull is reduced.

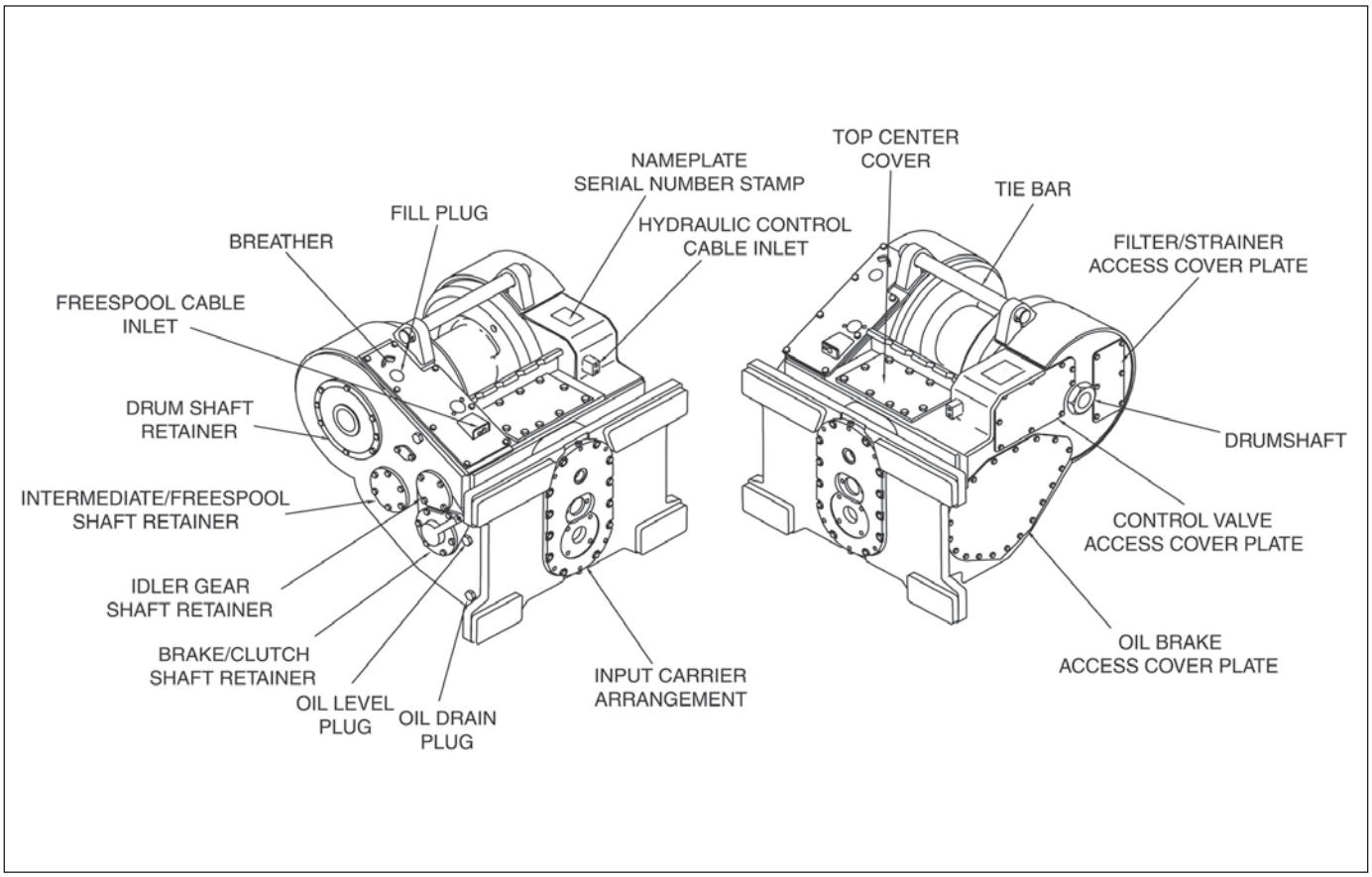


Figure 1-1 W6G Winch (Power Controls Configuration Shown)

Identification - Unit

Allied Winch S/N Nameplate Data For Tractor Mountings

A W6G P 1 F 1555 H44

Manufactured By
A = Made by Allied Systems Company

Winch Model
W6G = Standard
K6G = Special Applications

Type Drive
P = Power Controls
E = Electronic Controls

Gear Ratio
1 = 45.0:1
2 = 56.0:1
6 = 103.0:1
8 = 83.0:1
15 = 153.0:1

Vehicle Code
See Figure 1

Sequence Number

Internal Option
F = Freespool
N = Non-Freespool
U = Under Wind with Freespool

Notes: 1. In addition to the serial number plate, the serial number is stamped on the top left-hand side of the frame.

2. Circled numbers in Figure 1 indicate possible gear ratios.

Figure 1-2 Tractor Identification and Gear Ratio (1)

Tractor Make Model and Starting Tractor Serial Number Where Applicable						
CODE	A Fiat-Hitachi/ New Holland	C Caterpillar	E John Deere	H Dresser/ Dressta	K Komatsu	R Case
39						Quadtrac ⑥⑧
40						1650L ⑥⑧⑮
41			750B W/O CAB ⑥⑧⑮			
42			850B W/ CAB ⑥⑧⑮			
43		D6D/E/F PS ①② ⑥⑧⑮	850B W/O CAB ⑥⑧⑮			
44			750B W/ CAB ⑥⑧⑮	TD15E PS ①② ⑥⑧⑮		
45			750C I & II ⑥⑧⑮	TD15E DD ⑥⑧⑮		
46			850C I & II ①② ⑥⑧⑮	TD15H TIER I PS ①② ⑥⑧⑮	D65E-12,D65EX-12/15, D65EX-15E0, D65WX-15E0 ⑥⑧	
47		D6N* ①② ⑥⑧⑮		TD15H TIER II , TD15M ①②⑥⑧⑮	D61EX-12, D61EX-15 ⑥⑧	

(Continued on next page)

Figure 1-2 Tractor Identification and Gear Ratio (2)

Tractor Make Model and Starting Tractor Serial Number Where Applicable						
CODE	**A** Fiat-Hitachi/ New Holland	**C** Caterpillar	**E** John Deere	**H** Dresser/ Dressta	**K** Komatsu	**R** Case
48	FD14E, DX/FD175/195 ①②⑥⑧⑮					
480		D6H PS ①② ⑥⑧⑮				
481		D6H DD ①⑥⑧⑮				
49	DC180 ①② ⑥⑧⑮					1850K ①② ⑥⑧⑮
50		D6R PS ①② ⑥⑧⑮				
71		D6R II & III PS; D6T ①② ⑥⑧⑮				
73		D6G PS ①② ⑥⑧⑮				
78		D6N** ①② ⑥⑧⑮				
81		D6N*** ①② ⑥⑧⑮				
810		D6N**** ①② ⑥⑧⑮				

* **Tractors (C47) with linkage hydraulic valve controls**
Prior to the following serial numbers, tractor code C47 was used for D6N:

D6N--CBJ00400
ALH00735
CCK00500
ALR00635
AKM01235
ALY01335

** **Tractors (C78) with pilot operated hydraulics**
After the above serial numbers, tractor codes C78 are used for D6N.

*** **Tractors (C81) with pilot operated hydraulics**
After the above serial numbers, tractor codes C81 (with Diff-Steer) are used for D6N.

**** **Tractors (C810) with pilot operated hydraulics**
With serial number prefixes: PBA & PER, tractor codes C810 are used for D6N.

Serial Number Codes

The serial number codes are described on pages 1-2 and 1-3 of this manual. The nameplate with the serial number code is found on the top left hand side of the winch case. The serial number code is also stamped on the left hand side of the winch frame.

Nameplate

Each winch is shipped from the factory with a nameplate as shown in Figure 1. The nameplate is stamped with:

- winch model
- winch serial number
- maximum bare drum line pull
- maximum wire rope diameter

DO NOT operate the winch with larger diameter wire rope. If the nameplate is missing, DO NOT operate the winch until its capacity is known.

The serial number for the winch is also stamped into the frame next to the nameplate.

Figure 1-3 Nameplate

Warning and Maintenance Decals

The unit nameplate, a Warning Decal and a Maintenance Plate are located on the winch as shown in Figure 1-4. If the nameplate has been damaged, obtain a new one and install the new nameplate in the location shown in the figure. If the Warning Decal or Maintenance Plate have been damaged, install a new one in the location shown.

Decals are used on both sides of the winch frame as shown. Replace as necessary.

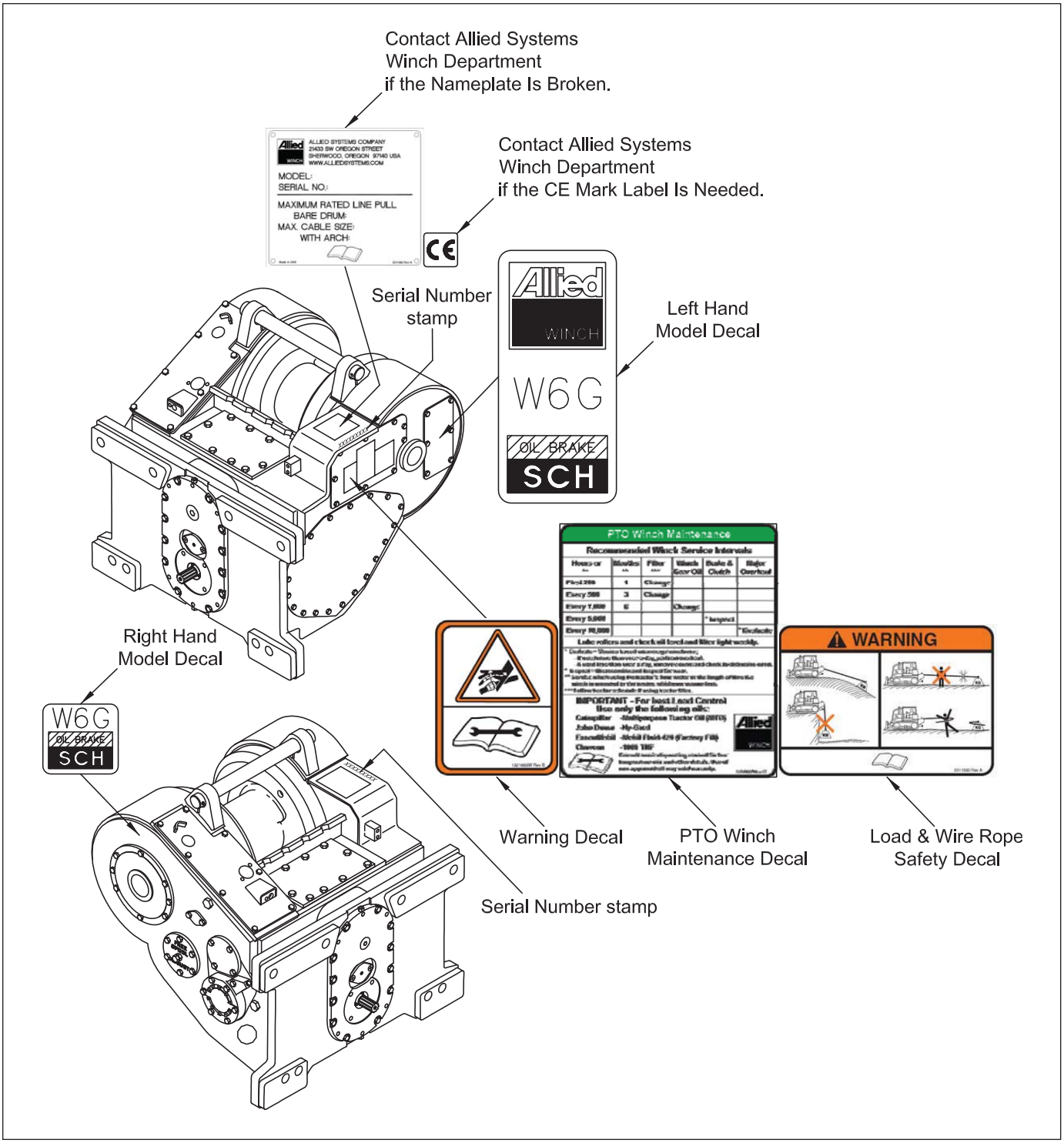


Figure 1-4 Decal Installation

Figure 1-5 List of Installation Drawings (1)

W6G INSTALLATION DRAWINGS BY TRACTOR

Winch Serial Number	Description	Installation Drawing Part Number
Electronic Control		
W6GE**----C43	W6G CAT D6E, E-CONTROLS 85:1	
W6GE**----C47	W6G CAT D6N W/MECHANICAL VALVE CONTROLS	2311715
W6GE**----C48	W6G CAT D6H PS	2310604
W6GE**----C480	W6G CAT D6H PS	2310604
W6GE**----C481	W6G CAT D6H DD	2310604
W6GE**----C49	W6G CAT D6H DD	2310604
W6GE**----C50	W6G CAT D6R PS	2310604
W6GE**----C71	W6G CAT D6R II & III, D6T	2310604
W6GE**----C78	W6G CAT D6N W/ PILOT CONTROLS	2311715
W6GE**----C81	W6G CAT D6N W/ PILOT CONTROLS	2311711
W6GE**----C810	W6G CAT D6N TIER 4i	2314450
W6GE**----E45	W6G JD 750C I & II	2311309
W6GE**----E46	W6G JD 850C I & II	2311309
W6GE**----E460	W6G JD 850K	2313382
W6GE**----H44	W6G DR TD15E PS	2311749
W6GE**----H45	W6G DR TD15E DD	2311749
W6GE**----H46	W6G DR TD15H PS	2311749
W6GE**----H47	W6G DRESSER TD15H TIER II, TD15M	2311749
W6GE**----K46	W6G KOM D65EX-12 & -15	2310718
W6GE**----K47	W6G KOM D61EX-12 & -15	2311733
W6GE**----R39	W6G CASE QUADTRAC	2311311
W6GE**----R40	W6G CASE 1650L	2310665
Power Control (push pull cable)		
W6GP**----A48	W6G FIAT, FIAT HITACHI; 14E, FD14, FD175, FD195, DX175, DX 195	2301472W
W6GP**----A49	W6G NEW HOLLAND DC-180	2304902W
W6GP**----C43	W6G CAT D6D, E	2301161W
W6GP**----C47	W6G CAT D6N W/MECHANICAL VALVE CONTROLS	2305618W
W6GP**----C48	W6G CAT D6H PS	2300737W
W6GP**----C49	W6G CAT D6H DD	2300737W
W6GP**----C480	W6G CAT D6H PS	2300737W
W6GP**----C481	W6G CAT D6H DD	2300737W
W6GP**----C50	W6G CAT D6R PS	2300737W
W6GP**----C71	W6G CAT D6R II & III, D6T	2300737W
W6GP**----C73	W6G CAT D6G	2305918W
W6GP**----C78	W6G CAT D6N W/ PILOT CONTROLS	2305618W
W6GP**----C81	W6G CAT D6N DIFF-STEER	2310078
W6GP**----C810	W6G CAT D6N TIER 4i	2315168
W6GP**----E41	W6G JD750, 750B	2301160W
W6GP**----E42	W6G JD 850, 850B W/CAB	2301160W
W6GP**----E43	W6G JD 850, 850B	2301160W
W6GP**----E44	W6G JD 750, 750B W/CAB	2301160W
W6GP**----E45	W6G JD 750C I & II	2301534W
W6GP**----E46	W6G JD 850C I & II	2301534W

(continued on next page)

Figure 1-5 List of Installation Drawings (2)

W6G INSTALLATION DRAWINGS BY TRACTOR

Winch Serial Number	Description	Installation Drawing Part Number
W6GP**----E460	W6G JD 850K	2313333
W6GP**----H44	W6G DR TD15E PS	2301173W
W6GP**----H45	W6G DR TD15E DD	2301173W
W6GP**----H46	W6G DR TD15H PS	2301173W
W6GP**----H47	W6G DRESSER TD15H TIER II, TD15M	2301173W
W6GP**----K46	W6G KOM D65EX-12 & -15	2301685W
W6GP**----K47	W6G KOM D61EX-12 & -15	2306267W
W6GP**----R39	W6G CASE QUADTRAC	2305395W
W6GP**----R40	W6G CASE 1650L	2310471
W6GP**----R49	W6G CASE 1850K	2304902W

Notes: 1. This list is for operators to keep track of necessary information of their winch installation drawings by tractors.

2. If any of the installation drawings listed above is needed, please contact the Engineering Department of Allied Systems Company.

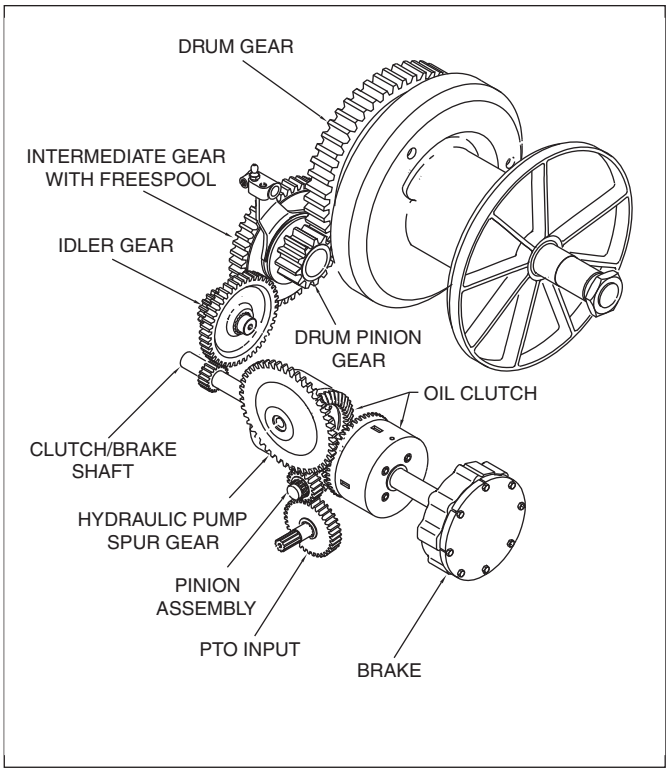


Figure 1-6 Gear Train

Gear Train (See Fig. 1-6)

The pinion assembly drives the hydraulic pump from a spur gear. A bevel gear is found on each side of the pinion. One bevel gear is connected to an oil clutch for **LINE-IN**, the other for **LINE-OUT** (See Figure 1-6). An oil brake on the end of the clutch/brake shaft holds the winch drum in a fixed position when no power operation occurs. If one of the clutches is applied, the brake is released by the same oil pressure. When neither clutch is applied, a spring applies the brake.

An intermediate gear assembly provides a gear reduction to increase torque at the winch drum. A dental clutch with splines engages the drum pinion gear and the intermediate gear. The operator can disengage the dental clutch with a control lever to engage the **FREESPOOL** option.

A drum gear engages the drum pinion gear and is connected to the drum. When power is applied to the gear train, the drum will rotate in the forward or reverse direction. The drum adapter connects the drum to the drum gear. The other side of the drum runs on roller bearings held by the drum shaft. The drum shaft is connected to the winch case.

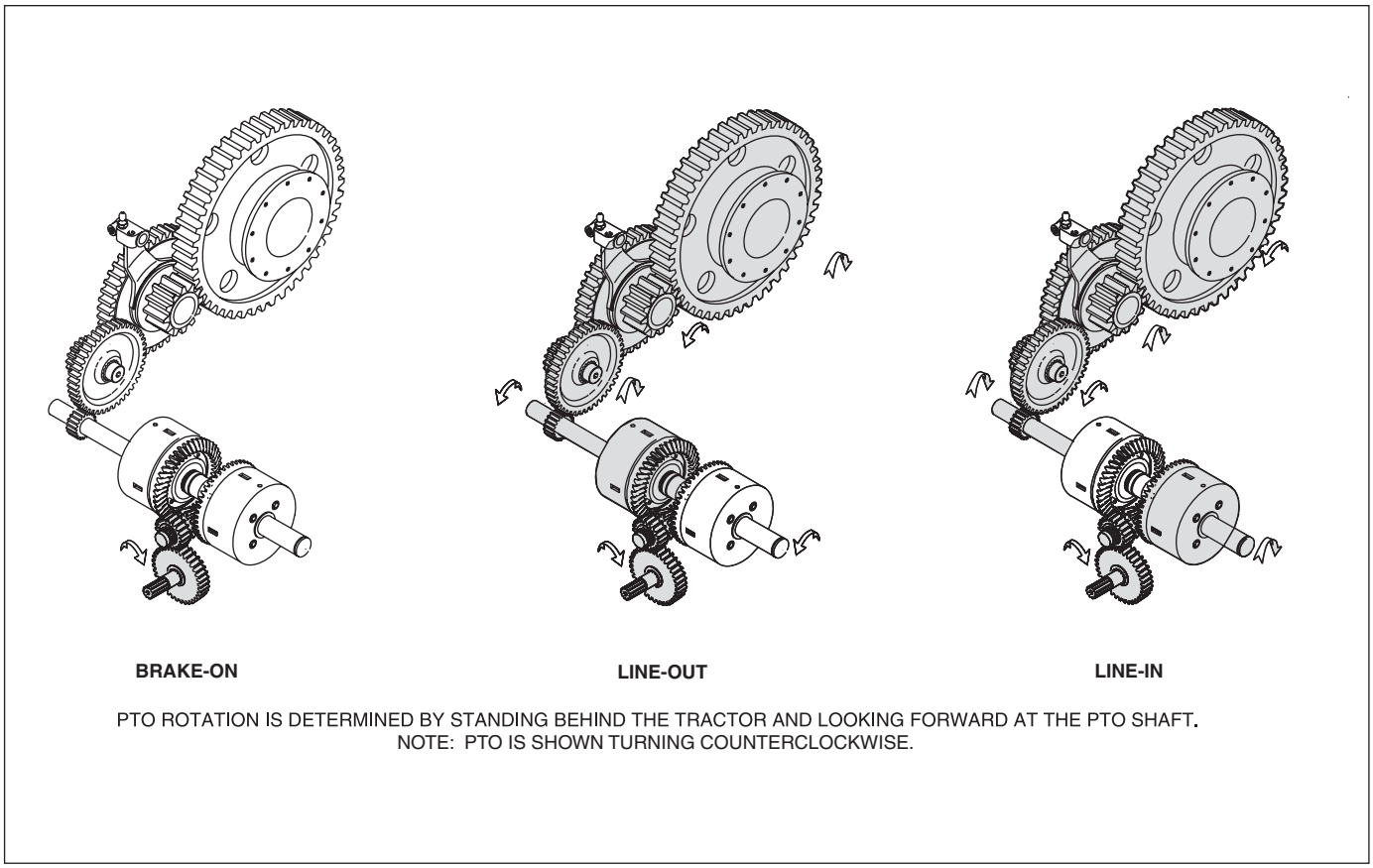


Figure 1-7 Grea Train Rotation Torque Transfer

Operation and Control

Power Controls

The control lever assembly has a power control lever for winch control (See Fig. 1-8). If the winch does not have the **FREESPOOL** function, the second control lever is not used. Both control levers are connected to the winch through control cables. The power control lever is connected to the spool in the control valve.

The power control lever is used to select one of the following operations:

- **BRAKE-OFF**
- **LINE-OUT**
- **BRAKE-ON**
- **LINE-IN**

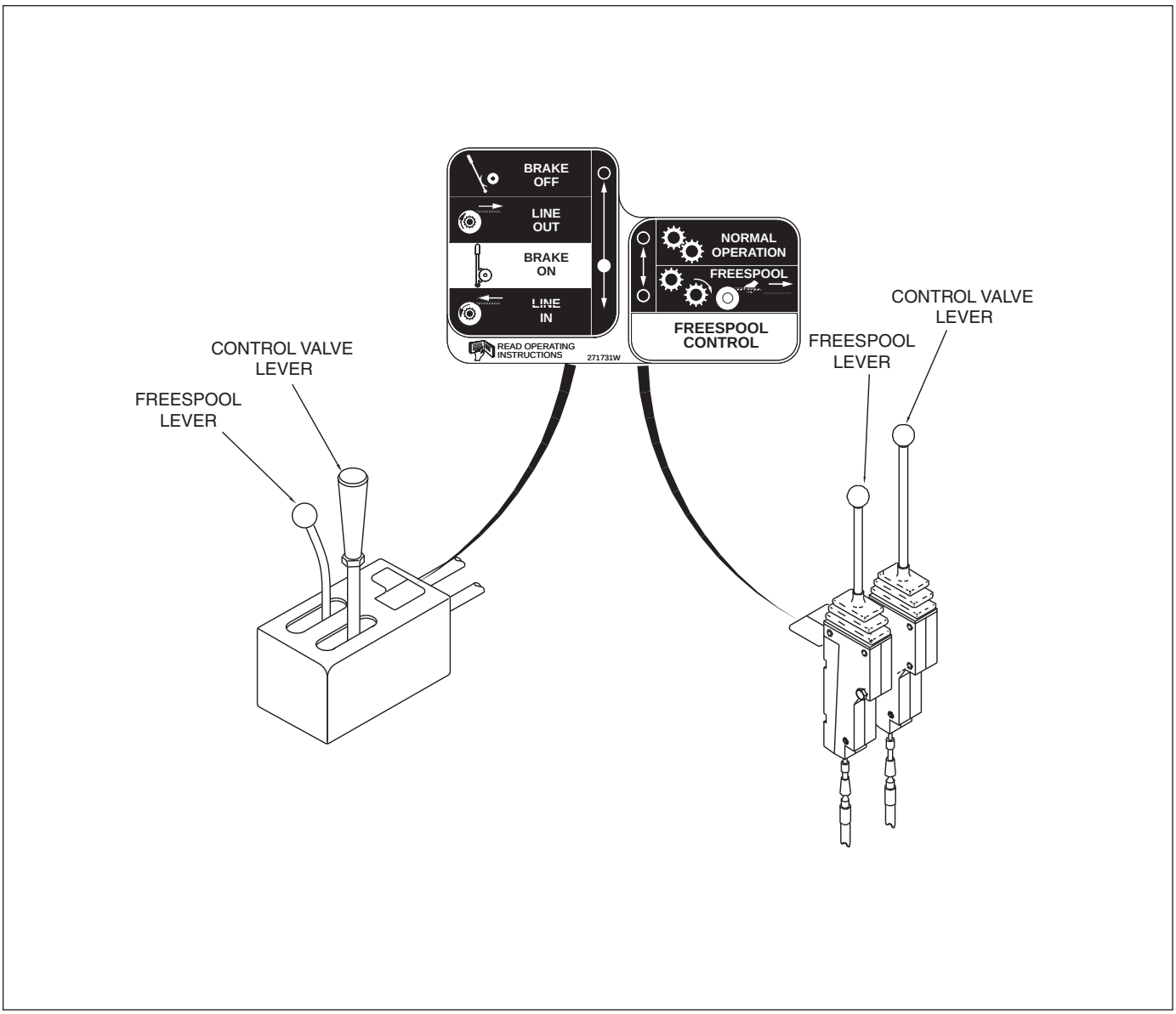


Figure 1-8 Typical Winch Power Controls

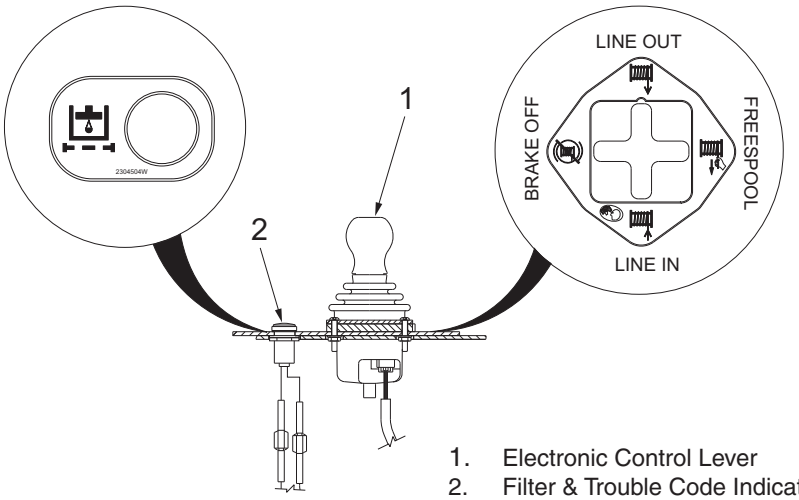
Electronic Controls

The electronic control assembly has one control lever (See Figs. 1-9 through 1-11). The control lever is connected to the winch through electrical wiring, an electronic control module and a solenoid-actuated control valve. This lever is used to select one of the following operations:

- **BRAKE-OFF**
- **LINE-OUT**
- **BRAKE-ON**
- **LINE-IN**
- **FREESPOOL** (Optional)

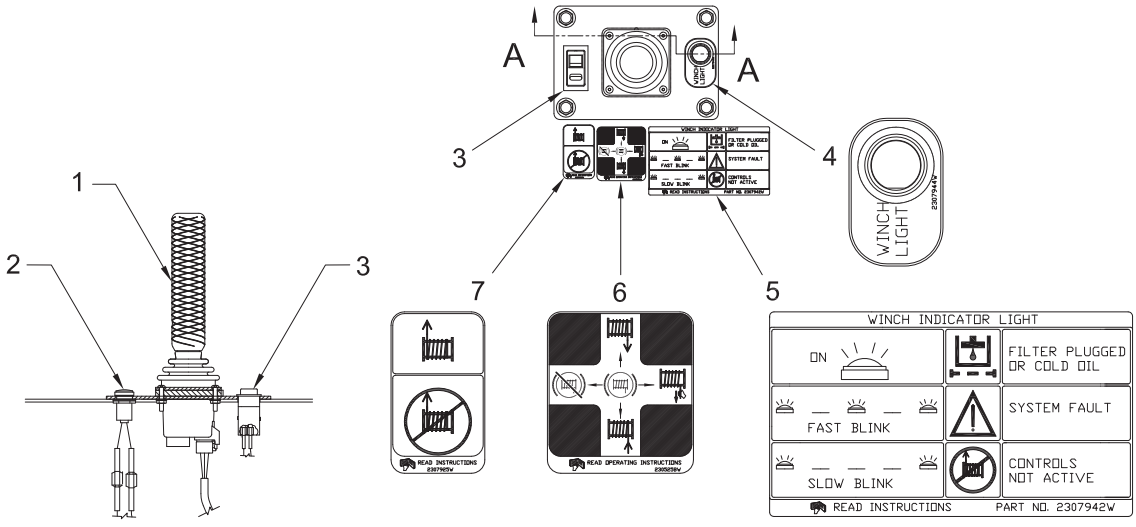
NOTE: The filter LED on the control lever plate illuminates momentarily at startup. This is part of the normal system check. Consult the Troubleshooting subsection in Section 3 if the light does not turn off.

NOTE: The winch will not operate unless the control lever is centered at startup.



1. Electronic Control Lever
2. Filter & Trouble Code Indicator

Figure 1-9 Electronic Winch Controls (Older Type)



1. Electronic Control Lever
2. LED Bypass Assembly
3. Rocker Switch Assembly
4. Winch Light Decal
5. Winch Light Indicator Decal
6. Control Lever Decal
7. Activation Switch Decal

Figure 1-10 Electronic Winch Controls (Old Type)

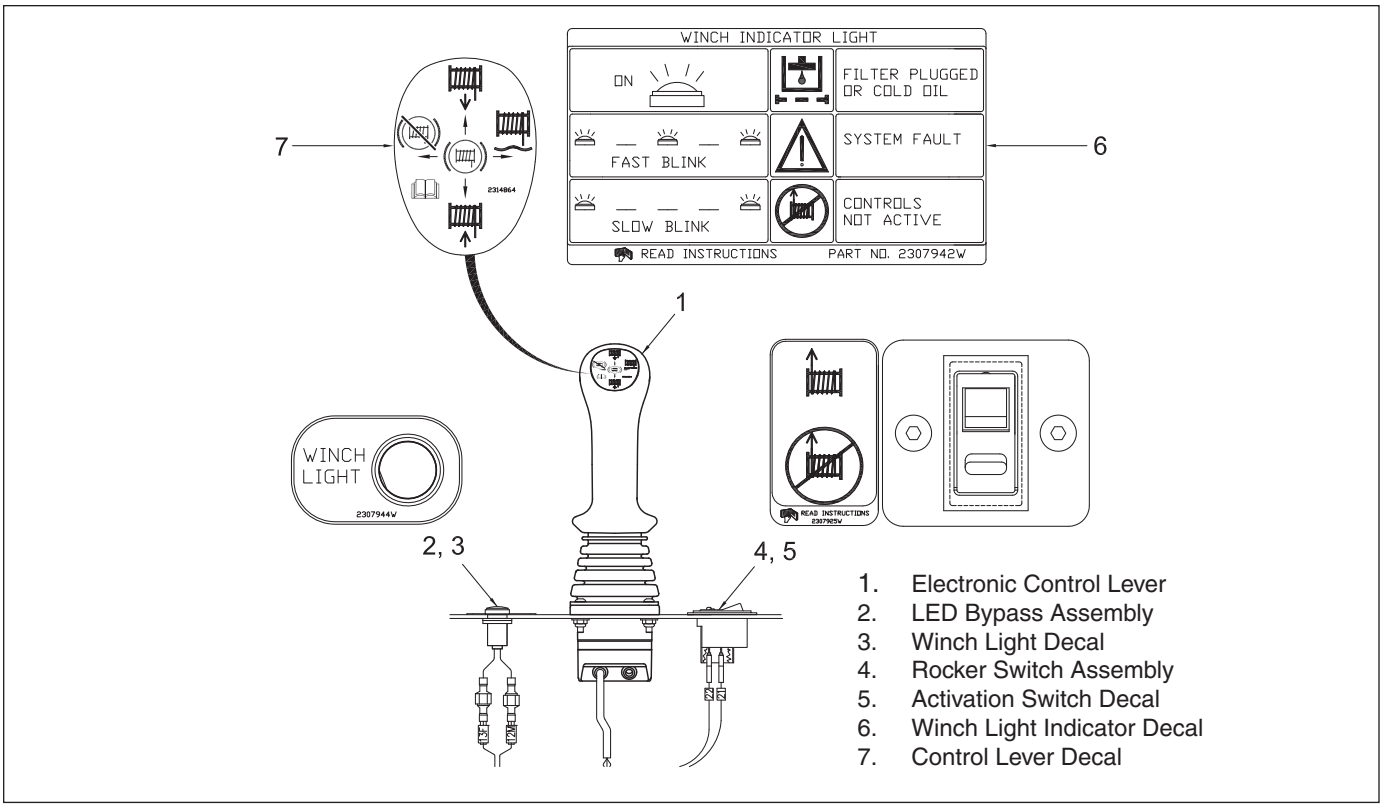


Figure 1-11 Electronic Winch Controls (New Type)

Description of Operations

BRAKE-OFF and **FREESPOOL** are detented positions on the control lever (electronic controls) or control lever (power controls), and the operator must pull the lever to release it from those positions. A spring arrangement on the lever returns the lever from the **LINE-IN** and **LINE-OUT** positions to the **BRAKE-ON** position. With the lever in the **BRAKE-OFF** position, oil pressure releases the brake but wire rope cannot be pulled from the winch by hand because of friction in the clutches, brake and gear train. The **BRAKE-OFF** position is used when the operator has a load attached to the winch wire rope. The operator can move the tractor forward without moving the load.

LINE-OUT position applies the reverse clutch and releases the brake. The winch will unwind the wire rope at a speed controlled by the PTO speed of the tractor and the weight of the load.

BRAKE-ON is a neutral position. No hydraulic pressure is applied to the brake or the clutches. Springs apply the brake so that the winch drum will not rotate.

LINE-IN position applies the forward clutch and releases the brake. The winch will wind the wire rope at a speed controlled by the PTO speed of the tractor.

Inching is used for fine control of the load. When the control lever is slowly moved to a position between **BRAKE-ON** and **LINE-IN** or between **BRAKE-ON** and **LINE-OUT**, inching occurs.

NOTE: Inching rapidly increases the temperatures of the clutch, the brakes and the oil, and will accelerate clutch and brake wear.

Inching (LINE-IN). This operation is used to slowly move a load toward the tractor. As the control lever is moved gradually towards the **LINE-IN** position, the control valve will cause the oil pressure to slowly release the brake and slowly apply the forward clutch. As the brake is released, the clutch takes control and begins to move the load.

Inching (LINE-OUT). This operation will release the brake as the reverse clutch is applied. This permits the weight of the load, with assistance from the reverse clutch, to unwind wire rope from the winch drum against the resistance of the brake. The operator controls the resistance of the brake by the position of the control lever.

FREESPOOL Operation (See Figs. 1-12 through 1-14)

The **FREESPOOL** arrangement allows mechanical disengagement of the drum gear from the remainder of the gear train. When the **FREESPOOL** control lever is shifted, the dental clutch engages or disengages the drum pinion and intermediate gear.

⚠ WARNING

When the control lever is moved to the FREESPOOL position, it will release the gear train and any load that may be on the wire rope. An uncontrolled release of the load may occur. Loss of the load can result in injury and damage.

The power control lever must be in the **BRAKE-ON** or **BRAKE-OFF** position to operate the **FREESPOOL** control lever. When the **FREESPOOL** control lever is moved to the **FREESPOOL** position, the sliding sleeve disengages the drum pinion gear from the intermediate gear. The gear train is disengaged from the drum gear so that the wire rope can be pulled from the drum by hand. Only the drum and drum pinion gear rotate when the wire rope is pulled during **FREESPOOL** operation. The resistance to rotation by the drum during **FREESPOOL** is controlled by the preload on the bearings for the intermediate shaft.

If the **FREESPOOL** control lever cannot be moved to engage the gear train for power operation, apply a clutch to move the gear train a small amount. This action will align the splines in the dental clutch so that the intermediate gear can be engaged.

1	Shifter	15	Piston, Freespool Adjust
2	Ball Stud	16	O-Ring
3	Washer	17	Bearing, Cup
4	Ball	18	Cover
5	Spring	19	Bearing Cone
6	Plug	20	Shaft, Intermediate
7	Lockwire	21	Gear, Pinion
8	Crank Shaft	22	Clutch
9	Crank	23	Setscrew *
10	Capscrew	24	Nut
11	Washer		
12	Bolt, Shoulder	*	S/N AW6G-1031 and below use capscrew
13	Gear		
14	Capscrew		

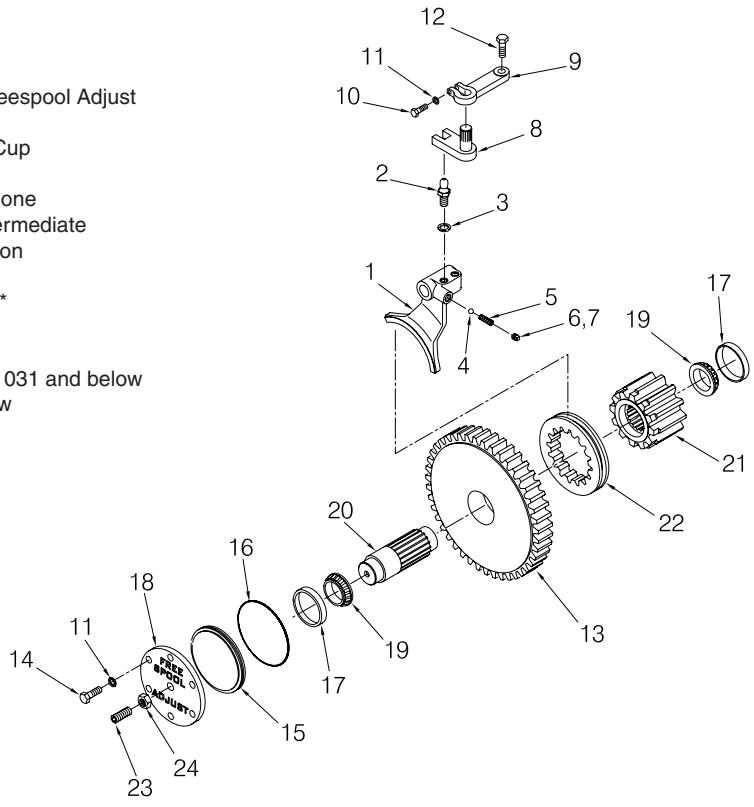


Figure 1-12 FREESPOOL Arrangement, Power Controls

1	Shifter	17	Bearing, Cup
2	O-Ring	18	Cover
3	Freespool Piston	19	Bearing. Cone
4	O-Ring	20	Shaft, Intermediate
5	Fitting	21	Gear, Pinion
11	Washer	21	Gear, Pinion
13	Gear	22	Clutch
14	Capscrew	23	Setscrew
15	Piston, Freespool Adjust	24	Nut
16	O-Ring		

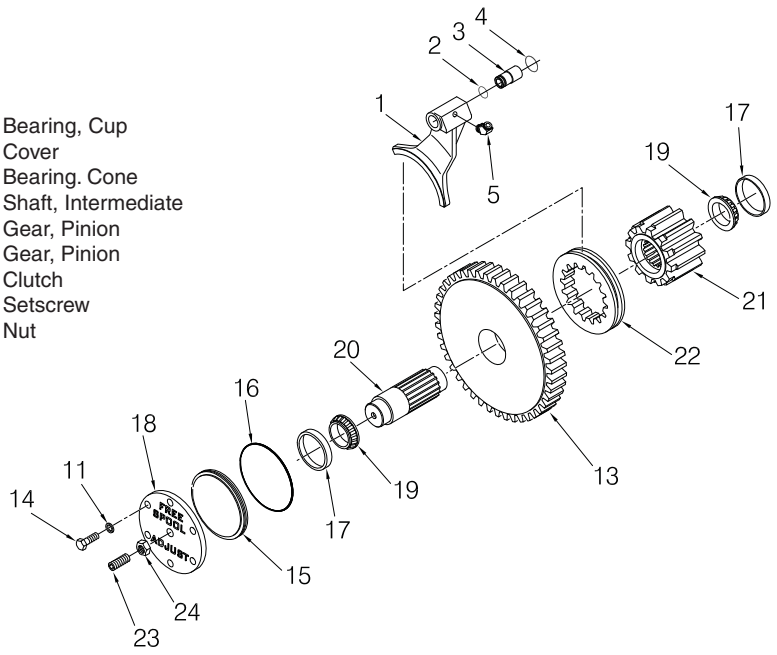


Figure 1-13 FREESPOOL Arrangement, Electronic Controls

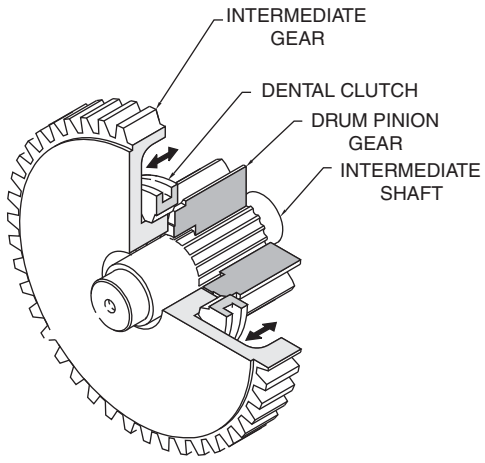


Figure 1-14 FREESPOOL Operation

Capacities & Specifications

Wire Rope Selection & Drum Line Capacities

The winch can have a variety of wire rope sizes installed by the user. The maximum wire rope size is shown on the nameplate. See Figure 1-15 for approved wire rope sizes and drum capacities. The winch can create a tension in the wire rope that is greater than the strength of the wire rope. The user must be careful to select a wire rope that has enough strength and length for the job.

⚠ WARNING

During operation of the winch, the operator must know or estimate the line pull and make sure that the line pull is within the capacity of the winch and the specifications of the wire rope installed on the drum. A broken wire rope under high tension can return suddenly in the direction of the winch and cause injury and damage.

Wire Rope Diameter	Drum Capacity
19 mm (3/4 in)	122 m (399 ft)
22 mm (7/8 in)*	87 m (287 ft)
25 mm (1 in)	68 m (223 ft)

Notes:
1. Loosely or unevenly spooled line will change capacities.
2. Use flexible wire rope with independent wire rope center.
3. Ferule size: 2.0 inch diameter, 2 1/4 inch long.

* If your winch is equipped with the optional arch, the largest wire rope diameter approved for use is 7/8 inch.

Figure 1-15 Drum Line Capacities

Hydraulic Specifications

Pump ..... Gear Type, 13 GPM (50 l/min) at high idle
Maximum operating pressure ..... 225 psi (1,550 kPa)
Valve, Cable Controls ..... Single-Spool
Valve, Electronic Controls ..... Solenoid Cartridge
Filters ..... Full flow magnetic strainer
20 micron paper cartridge

Oil Capacity

Winch Model	Oil Capacity
W6G	19.5 Gal. (73.8 L.)

Figure 1-16 Winch Oil Capacity

Recommended Oil List

Recommended Oils* - General Conditions			
Manufacturer	Oil Type	Ambient Temperature Range	
		°F	°C
ExxonMobil	Mobil Fluid 424 (Factory fill)	-13 to 104	-25 to 40
John Deere	Hy-Gard™	-13 to 122	-25 to 50
Chevron	1000 THF	-13 to 104	-25 to 40
Caterpillar	Multipurpose Tractor Oil (MTO)	-13 to 104	-25 to 40
Case	Hy-Tran Ultra	-20 to 122	-29 to 50

Recommended Oils* - Low Temperature Conditions			
Manufacturer	Oil Type	Ambient Temperature Range	
		°F	°C
ExxonMobil	Mobil Fluid LT	-40 to 86	-40 to 30
John Deere	Low Viscosity Hy-Gard	-40 to 86	-40 to 30
Chevron	THF W	-40 to 86	-40 to 30

* Note: Use of non-recommended oils may void warranty.

Figure 1-17 Recommended Oil List

Torque Specifications

ITEM	TORQUE VALUES		
	ft-lbs	N-m	kg-m
PTO Shaft Assembly			
Bearing Carrier Capscrews (1/2 UNC Gr. 8)	80	108	11
Housing Covers (1/2 UNC Gr. 8)	80	108	11
Clutch Shaft Assembly			
Clutch Spring Retainer Capscrews (1/4 UNC Gr. 8)	9	12	1
Bearing Retainer Housing Capscrews (1/2 UNC Gr. 8)	80	108	11
Ring Gear Capscrews (3/8 UNC Gr. 8)	33	44	4
Brake Bearing Retainer Capscrew (1/2 UNC Gr. 8)	80	108	11
Brake Cover Capscrews (5/8 UNC Gr. 8)	160	217	22
Idler Gear Bearing Carrier (1/2 UNC Gr. 8)	80	108	11
Intermediate Gear Bearing Carrier (1/2 UNC Gr. 8)	80	108	11
Pump Mounting Capscrews (3/8 UNC Gr. 5)	23	31	3
Drum Shaft Assembly			
Drum Gear to Adapter Capscrews (1/2 UNF Gr. 8)	90	122	12
Drum Adapter to Drum Capscrews (5/8 UNF Gr. 8))	220	298	30
Drum Shaft Nuts (2-1/2 UNC)	400	542	55
RH Bearing Retainer Capscrews (1/2 UNC Gr. 8)	80	108	11

Figure 1-18 Torque Specifications (1)

NOM. SIZE	THREAD SERIES	SAE GRADE 5 CAPSCREWS		SAE GRADE 8 CAPSCREWS	
		TORQUE (FT. LB. S)	TORQUE (Nm)	TORQUE (FT. LB. S)	TORQUE (Nm)
		LUBED (K=0.15)	LUBED (K=0.15)	LUBED (K=0.15)	LUBED (K=0.15)
1/4	20 UNC	6	9	9	12
	28 UNF	7	10	10	14
5/16	18 UNC	13	18	18	25
	24 UNF	14	20	20	28
3/8	16 UNC	23	31	33	44
	24 UNF	26	36	37	50
7/16	14 UNC	37	50	52	71
	20 UNF	41	56	58	79
1/2	13 UNC	57	77	80	110
	20 UNF	64	86	90	120
9/16	12 UNC	82	110	115	155
	18 UNF	91	125	130	175
5/8	11 UNC	115	155	160	215
	18 UNF	130	175	180	245
3/4	10 UNC	200	270	280	380
	16 UNF	225	300	315	425
7/8	9 UNC	320	435	455	615
	14 UNF	355	480	500	680
1	8 UNC	485	655	680	925
	14 UNS	540	735	765	1040
1 1/8	7 UNC	595	805	965	1310
	12 UNF	670	905	1080	1470
1 1/4	7 UNC	840	1140	1360	1850
	12 UNF	930	1260	1500	2050
1 3/8	6 UNC	1100	1490	1780	2420
	12 UNF	1250	1700	2040	2760
1 1/2	6 UNC	1460	1980	2370	3210
	12 UNF	1650	2230	2670	3620

Figure 1-19 Torque Specifications (2)

Winch Weight

Winch and Attachment	Weight
Winch	3,400 lb. (1,542 kg)
Arch	600 lb. (272 kg)
Fairlead	450 lb. (204 kg)
Wire Rope	350 lb. (159 kg)
Total	**4,800 lb. (2,177 kg)**

Figure 1-20 Winch Weight

Notes

Notes

Power/Cable Controls

Hydraulic System

The operation of the winch is controlled by a hydraulic system (See Fig. 2-1). This system directs the flow of oil for winch control functions. The hydraulic system is entirely contained within the winch. The bottom of the winch case is the sump for the hydraulic oil. The suction and pressure filters remove contaminants from the oil. The hydraulic pump supplies pressurized oil for the system. The control valve is connected by a cable to the control lever. The control valve distributes and regulates the flow and pressure of hydraulic oil to the clutches and brake while maintaining the cooling oil flow.

A separate accumulator valve, mounted on the front of the control valve body, controls the release of pressurized oil from the accumulator(s). The accumulator provides pressurized oil for a limited amount of actuation if the hydraulic pump is not functioning. This allows the release of the winch brake when the tractor engine or the PTO is not operating

The operation of the winch is controlled by the clutches and the brake except when the intermediate shaft is disengaged for **FREESPOOL**.

When the tractor's PTO is operating, the hydraulic system provides pressure and flow. The hydraulic flow path of the various functions is depicted in Figs. 2-6 through 2-9.

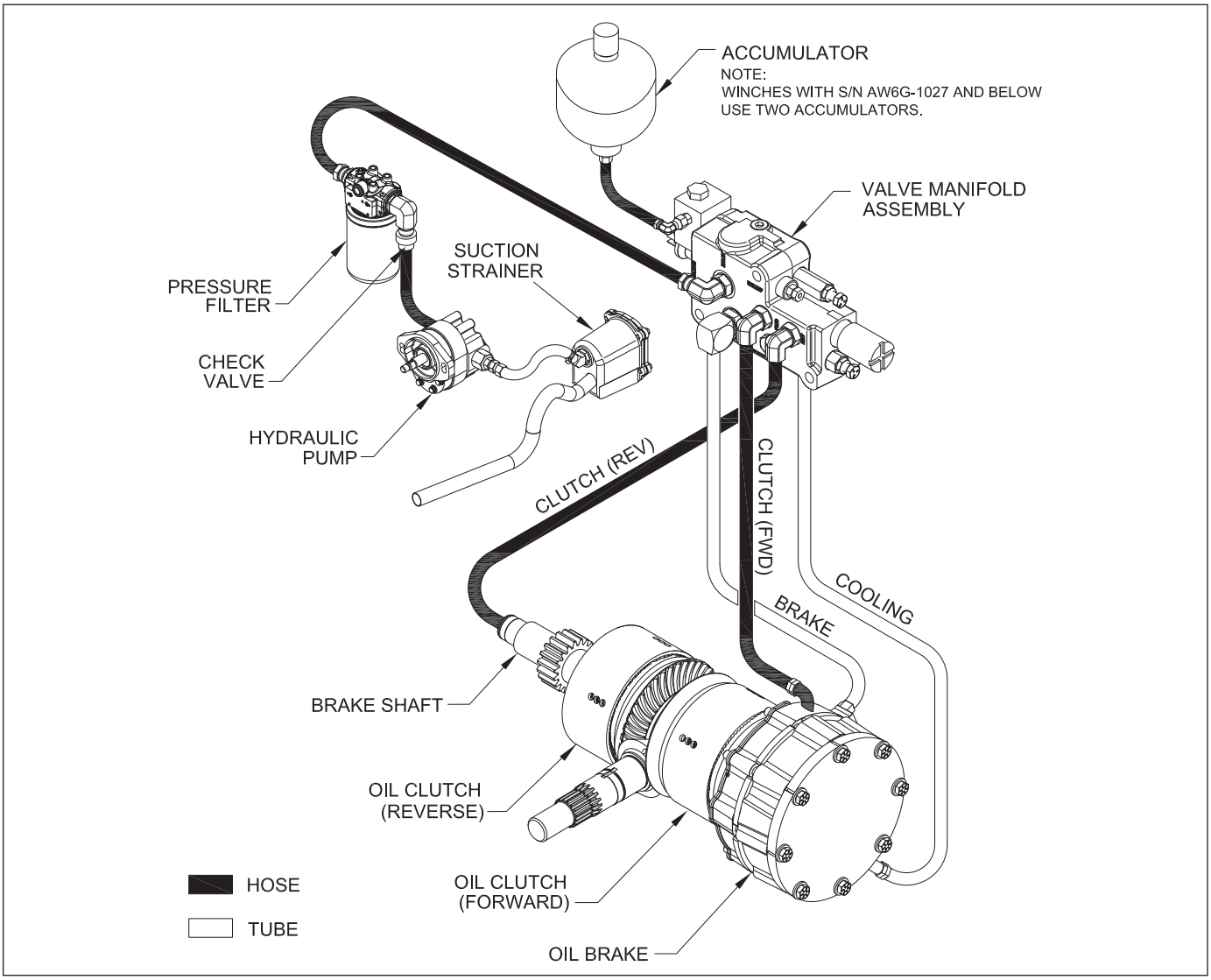


Figure 2-1 Hydraulic System, Power Controls

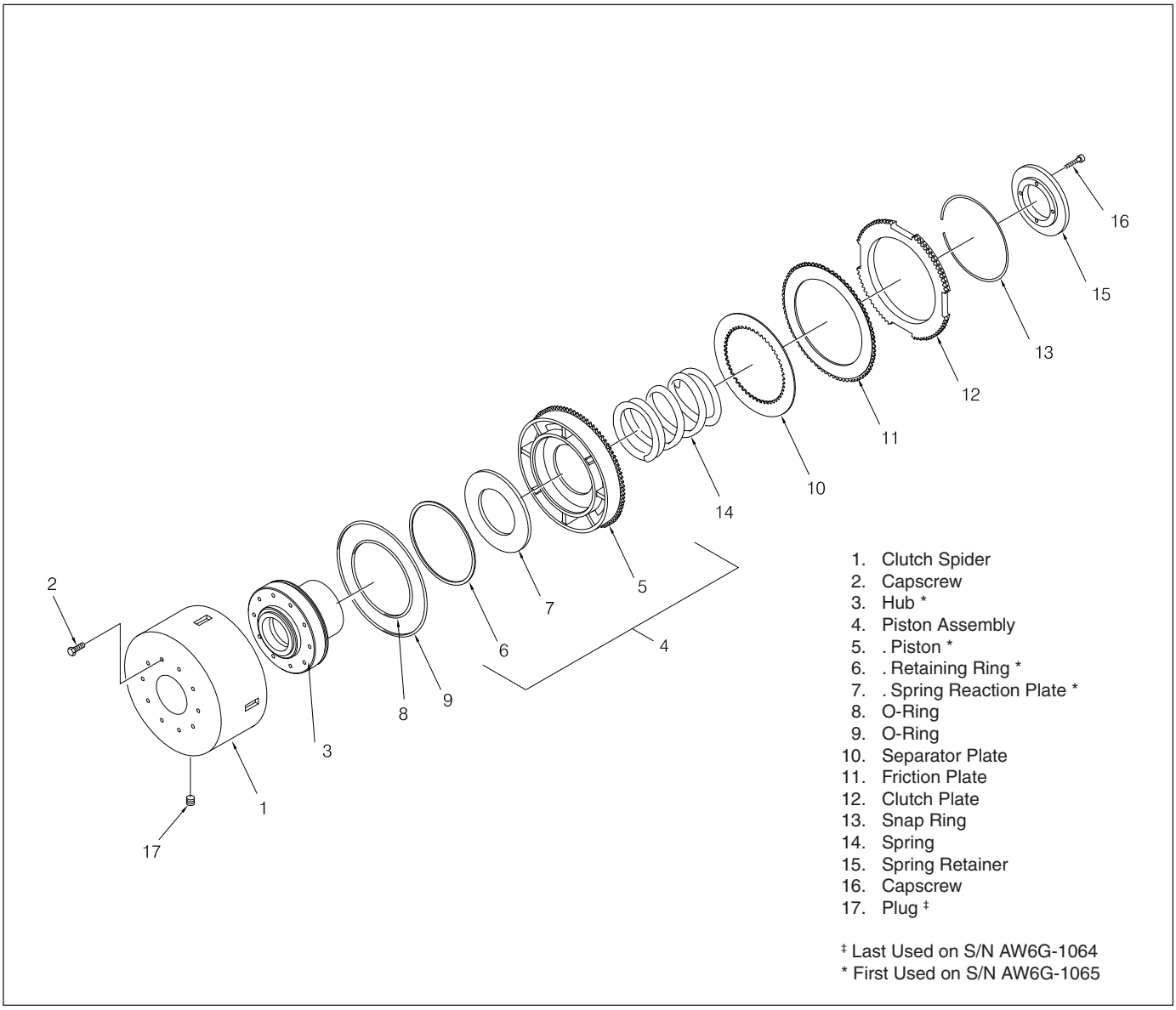


Figure 2-2 Oil Clutch

Oil Clutch (See Fig. 2-2)

The **LINE-IN** and **LINE-OUT** clutch assemblies are identical. Each clutch is a multi-disc type that is hydraulically applied and spring released.

The separator plates of the clutch are internally splined to the clutch hub. The friction discs have external teeth that fit the splines in the clutch spider. The separator plates rotate with the hub. The piston and clutch housing rotate with the clutch/brake shaft. Oil passages in the clutch shaft supply the oil pressure from the control valve to the piston. Hydraulic oil also cools and lubricates the bearings and internal components of the clutch. When the oil pressure pushes the piston against the separator plates and friction discs, the clutch is applied. The torque from the input shaft is transferred through the clutch and causes the winch to operate (see Figs. 1-18 and 1-19).

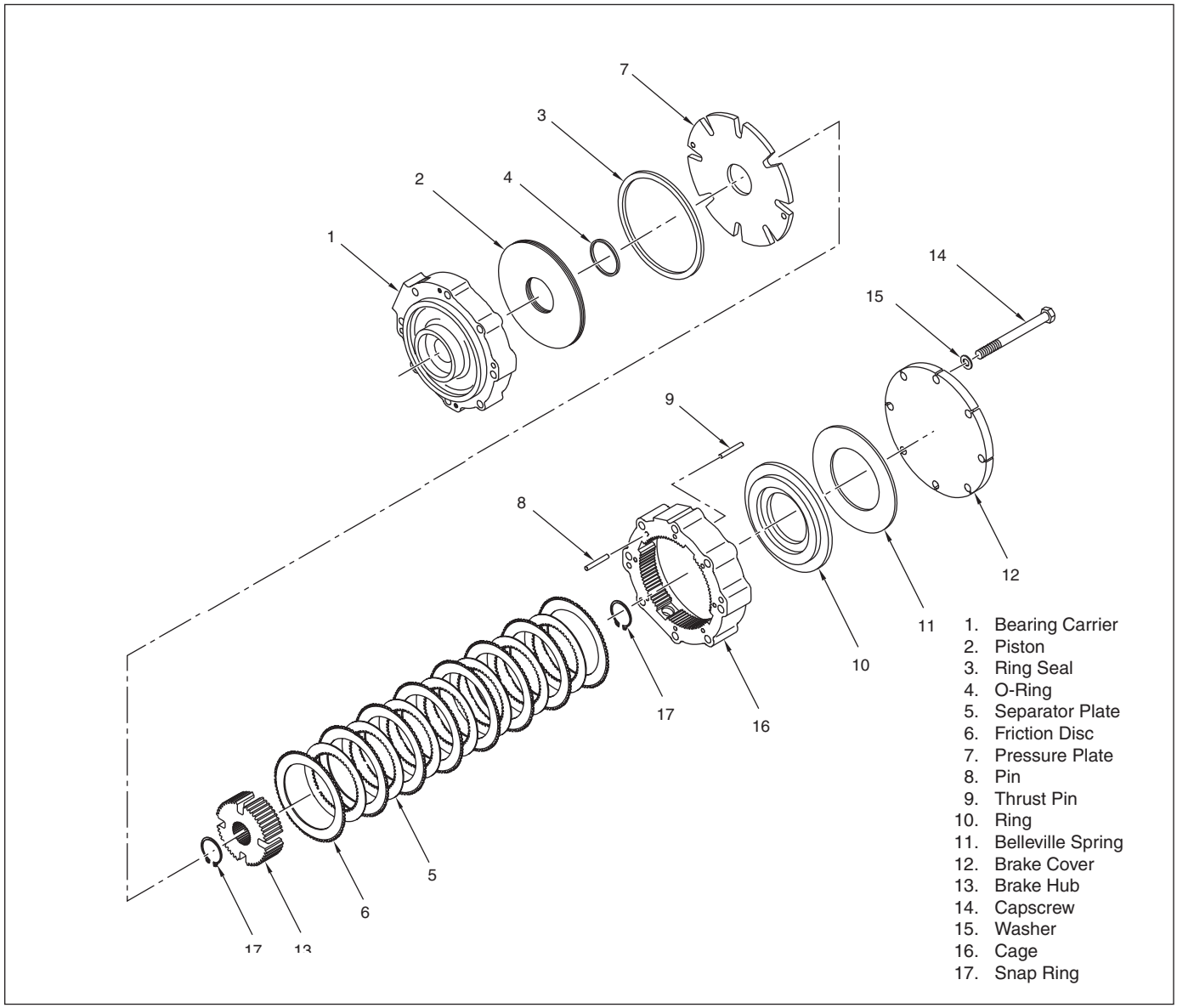


Figure 2-3 Oil Brake

Oil Brake (See Fig. 2-3)

The oil brake is a multi-disc brake that is spring applied and hydraulically released. The brake hub is connected to the clutch/brake shaft with splines. The brake is applied if a clutch is not applied. When oil pressure applies a clutch, oil pressure releases the brake. The brake will also be released when the control lever is in the **BRAKE-OFF** position.

The brake is applied by spring pressure from a belleville spring in the brake housing. The spring pushes against a ring, applying pressure to the friction discs and the separator plates. As pressurized oil is directed into the cavity between the piston and piston housing, the piston moves outward, compressing the belleville spring which releases the brake.

The friction discs have teeth that engage the splines inside the brake housing and are held stationary. Teeth in the separator plates engage the splines in the hub and rotate with the hub.

When the control valve sends hydraulic pressure to apply the clutch, the hydraulic pressure also releases the brake. The hydraulic pressure causes the piston to compress the belleville spring and releases the brake. The brake is released in the **LINE-IN**, **LINE-OUT**, and **BRAKE-OFF** positions of the control lever. The **BRAKE-OFF** function applies hydraulic pressure to release the brake, but no hydraulic pressure is sent to apply the clutch. Continuous low pressure oil flow is used for cooling the brake.

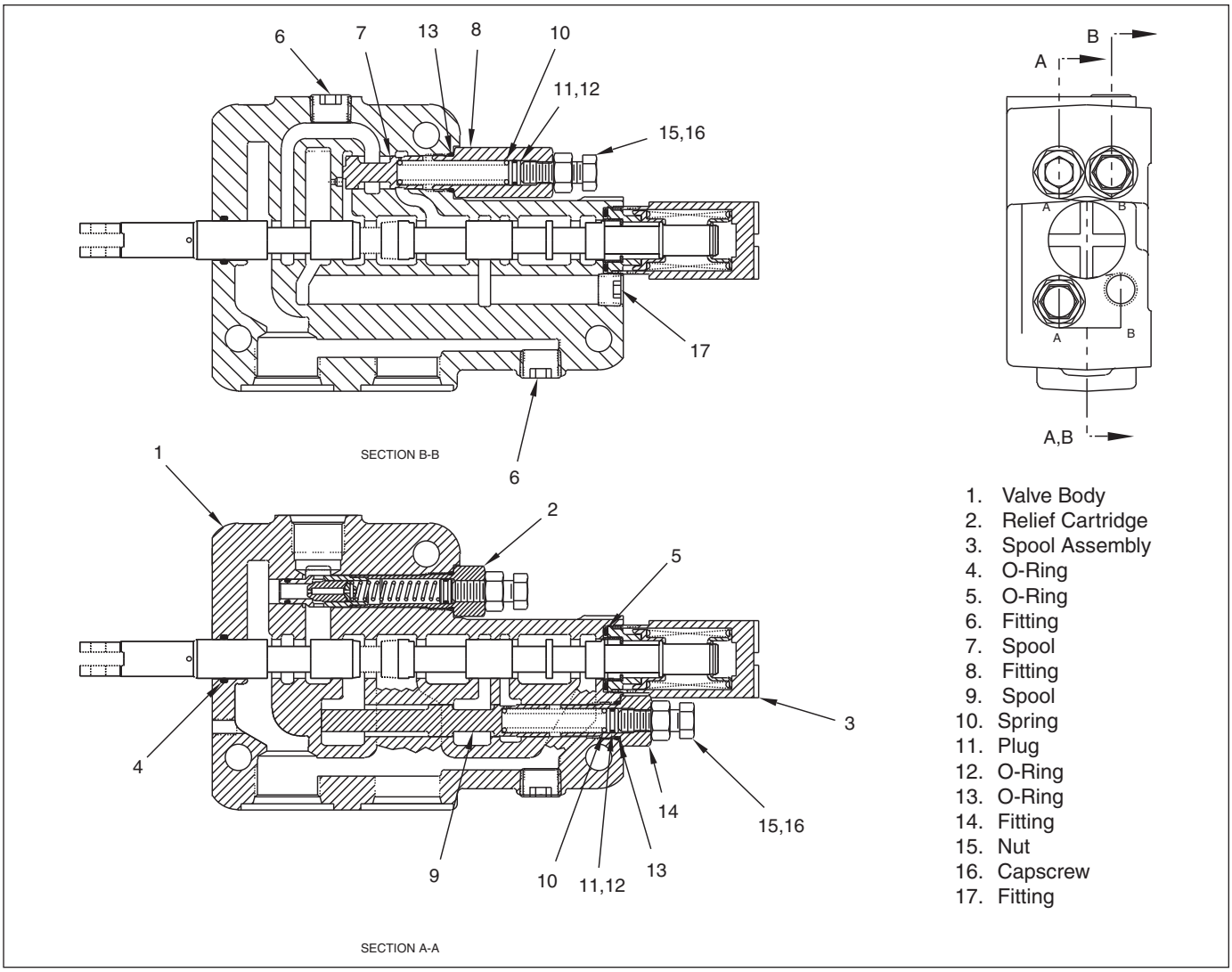


Figure 2-4 Hydraulic Control Valve

Hydraulic Control Valve (See Fig. 2-4)

The hydraulic control valve is a single spool valve installed inside the winch frame. The flow of hydraulic oil to and from the clutches and brake is controlled by the control valve. Passages inside the valve body connect the oil flow and pressure with the functions that control the winch. The control valve spool opens and closes passages to apply and release the clutches and brake.

The control valve spool is connected by a cable to the control lever for manual operation. Built in pressure modulators automatically ensure positive clutch engagement before the brake is fully released. The forward modulator and reverse modulator are adjustable (for specific instructions, see Subsection of Forward/Reverse Clutch Pressure Check & Modulator Valve Adjustment). The control valve spool is spring loaded in the **BRAKE-ON** position and has a detented position to hold it in the **BRAKE-OFF** position.

Hydraulic Control Relief Valve

A relief valve is in the control valve to prevent the hydraulic oil pressure from becoming too great. The valve is a spring loaded, poppet-type valve mounted in the control valve dump port. Cooling oil is distributed through the hydraulic lines to the brake and clutches to remove excess heat. Oil from the relief valve is discharged directly to the inside of winch housing.

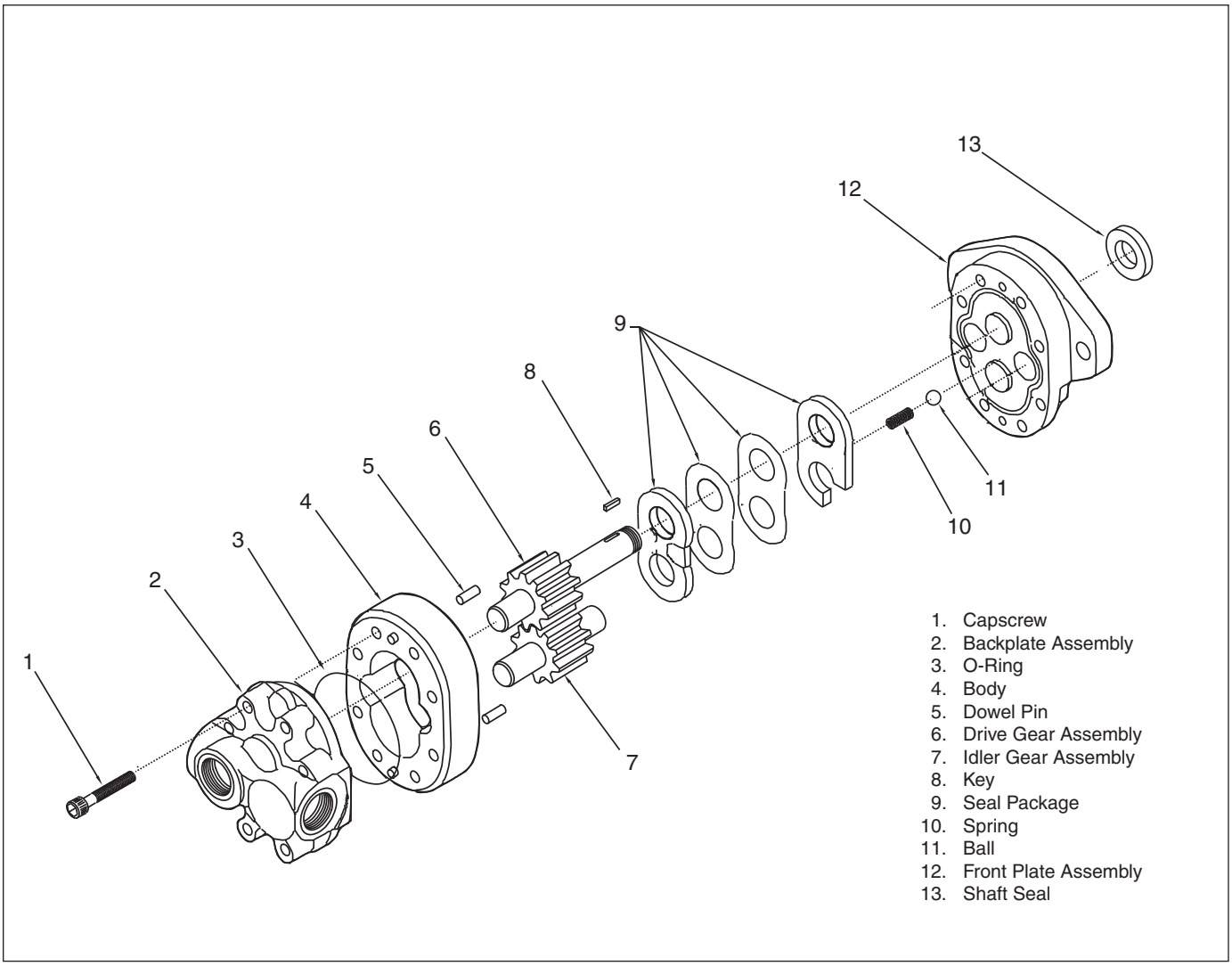


Figure 2-5 Hydraulic Pump

Hydraulic Pump (See Fig. 2-5)

The hydraulic pump is a positive displacement gear pump that supplies the hydraulic flow necessary for operation of the winch. The pump shaft is driven by a spur gear off of the input shaft. The pump inlet port is connected to the winch suction filter. The outlet is connected through the pressure filter to the control valve inlet port.

Accumulator *

The W6G hydraulic system utilizes an accumulator.* The bladder has a nitrogen charge so that the oil stored in the accumulator will be under pressure. When released, this oil will provide pressure for the hydraulic system during low engine rpm shifts and if the PTO shaft stalls.

*Units with S/N AW6G-1027 and below use **TWO** accumulators

Accumulator Valve

The accumulator valve is mounted adjacent to the control valve and is actuated by the control valve spool cam. As the hydraulic system builds up pressure, oil can flow past the check ball in the valve to be stored in the accumulator. When the control valve spool is moved to the **LINE-IN** or **LINE-OUT** position, a cam on the spool pushes up on the accumulator valve pin. This pin lifts the check ball off its seat to release the oil stored in the accumulator.

Check Valve

The check valve prevents accumulator oil from reverse flowing through the pump.

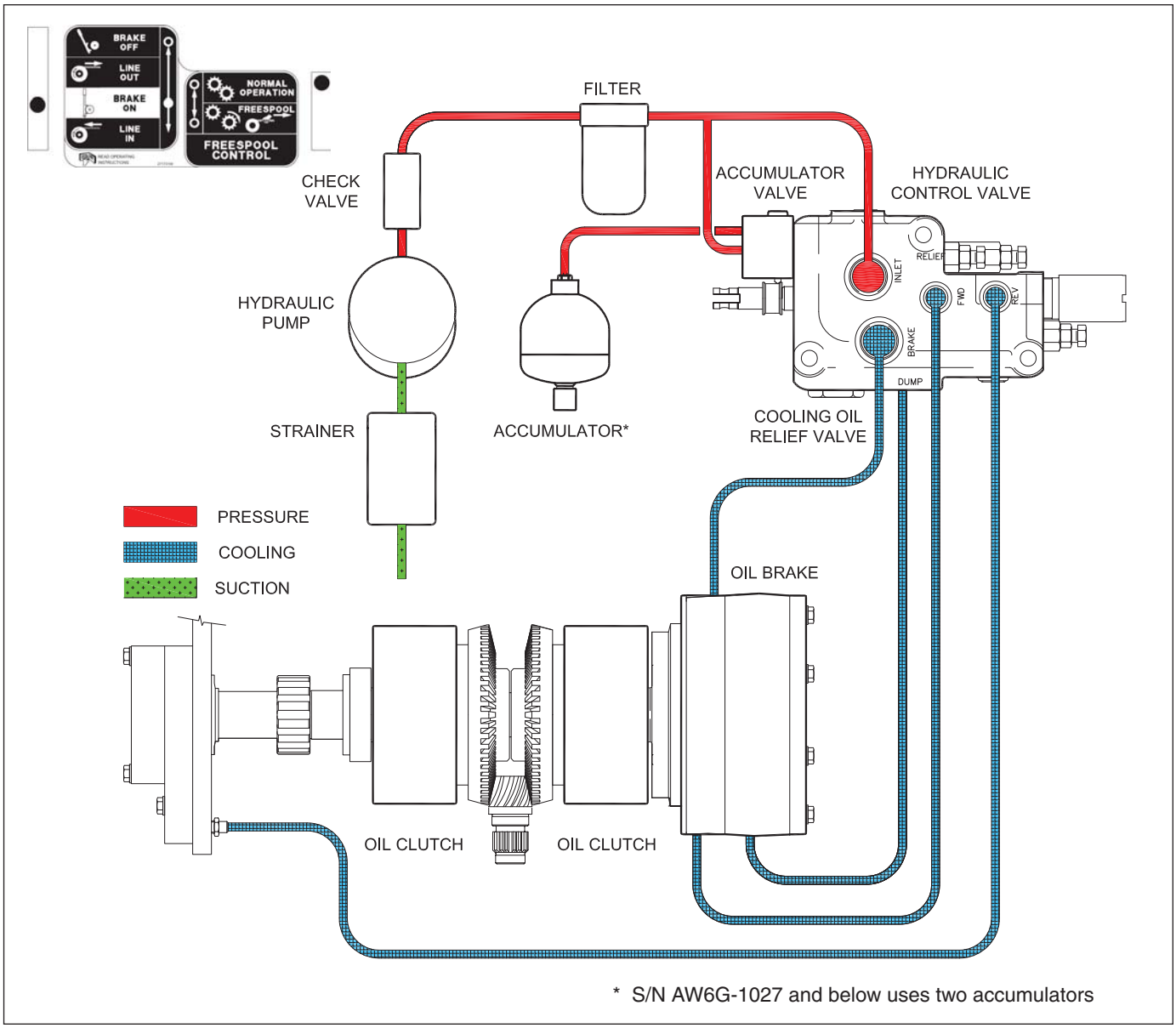


Figure 2-6 Hydraulic System - BRAKE-ON

Sequence of Operation - BRAKE-ON

The control valve spool is spring centered to neutral. In this position, oil entering the open center valve flows into the low pressure core passages. The cooling oil relief valve maintains hydraulic pressure in the cooling oil passage at 8 psi (55 kPa). Cooling oil flows out of the valve to lubricate and cool the brake and clutch assemblies. Excess flow goes directly to the sump.

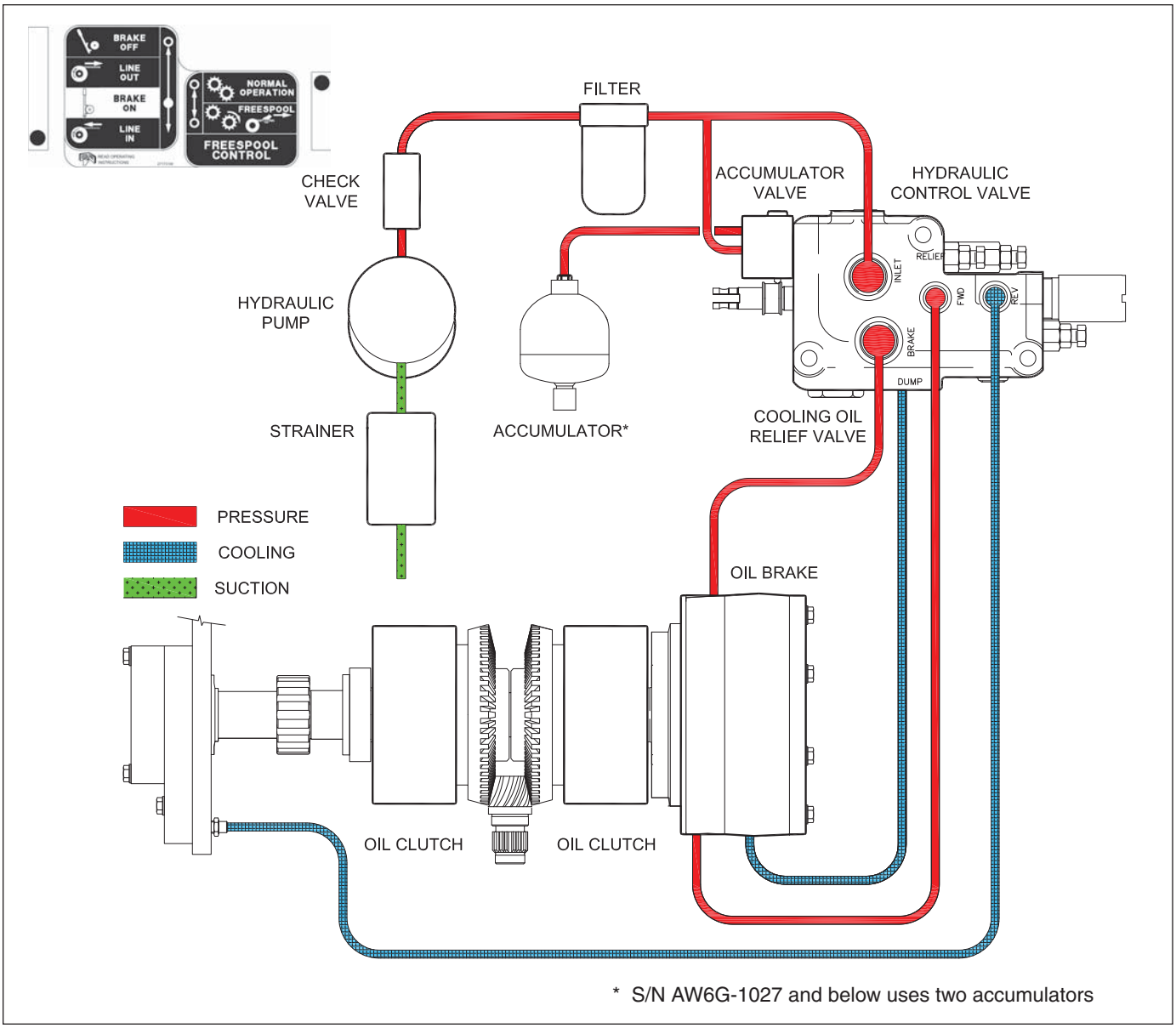


Figure 2-7 Hydraulic System - LINE-IN

Sequence of Operation - LINE-IN

For **LINE-IN** or FORWARD operation, the operator pulls back on the lever which causes the spool to move into the valve closing off the flow of oil to the cooling passage. This allows a pressure buildup in the inlet passage. Oil flows from the inlet passage to the brake passage through an orifice producing a pressure drop between the inlet and brake passage depending on the amount of oil flow. As the brake port to sump is closed off by the spool, the oil flow to sump is reduced, allowing the brake pressure to build up. As the brake pressure increases, the forward modulator valve will regulate the oil pressure to the forward clutch and maintain a constant pressure differential between the brake and clutch through the inching mode. At the end of the spool travel, a direct port to the clutch is opened.

On a fast shift, the spool moves into the full forward position routing oil directly to the forward clutch bypassing the forward modulator valve completely, thereby avoiding any delay in operation.

When pressure starts to rise above 220±5 psi (1520±35 kPa) at the inlet port passage, the spring loaded poppet in the relief valve will bypass the excess flow to the cooling passage. An orifice in the relief valve poppet prevents oil from becoming trapped behind the poppet and causing a hydraulic lock.

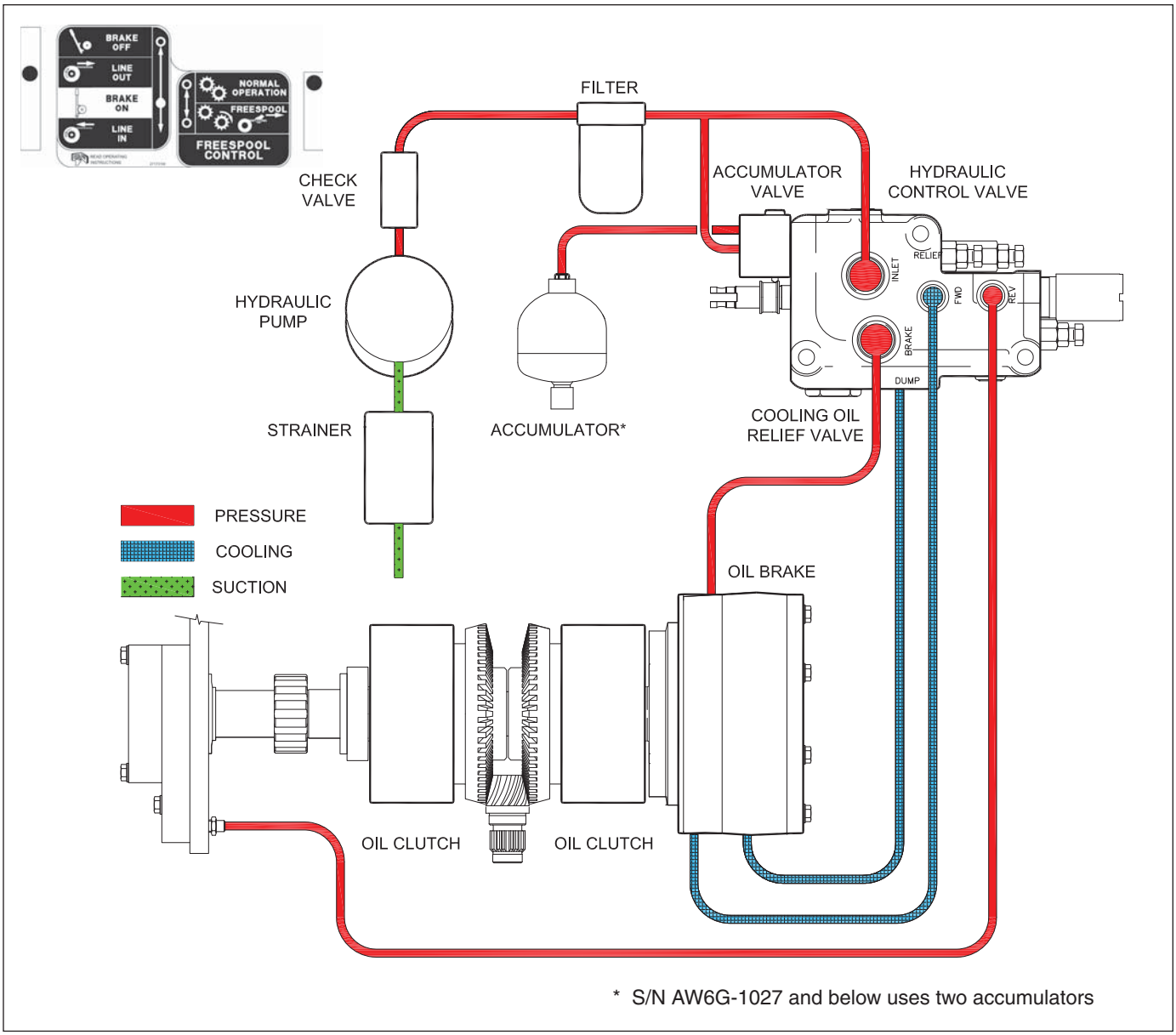


Figure 2-8 Hydraulic System - LINE-OUT

Sequence of Operation - LINE-OUT

LINE-OUT or reverse is achieved by pushing the control lever to the reverse position, thereby pulling the control spool out. As the control spool moves, the flow of oil to the cooling passage is blocked. This allows pressure to build up in the inlet passage. Oil flows from the inlet passage to the brake passage through an orifice, producing a pressure drop between the inlet and brake passages. As the sump port is closed off by the spool, the oil flow to sump is reduced, allowing the brake pressure to build up.

As the brake pressure increases, the reverse modulator valve will regulate the oil pressure to the reverse clutch and maintain a constant pressure differential between brake and clutch through inching mode. At the end of spool travel, a direct port to the reverse clutch is opened.

On a fast shift, the spool moves into the full reverse position routing oil directly to the reverse clutch bypassing the reverse modulator valve completely, and thereby avoiding any delay in operation.

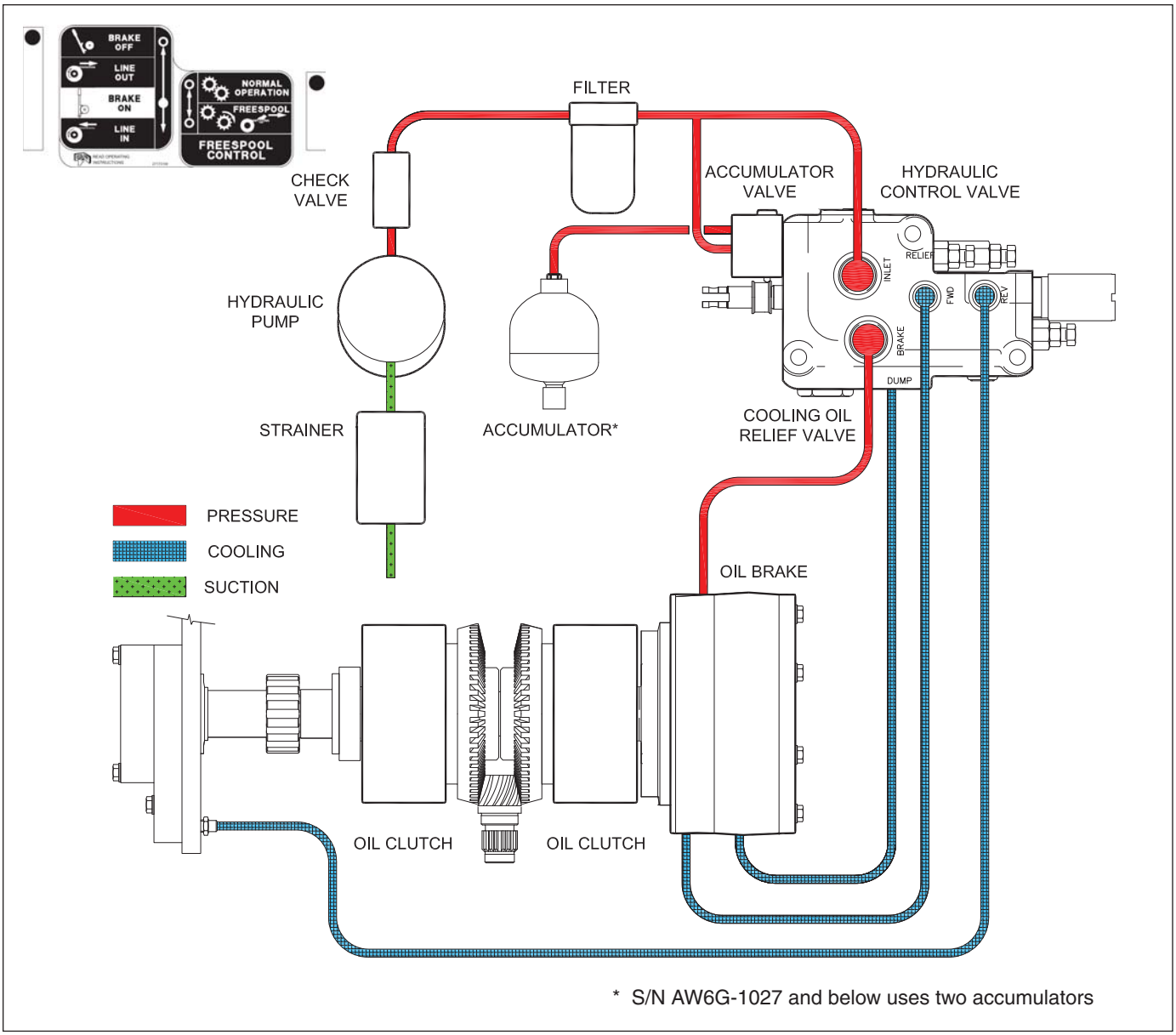


Figure 2-9 Hydraulic System - BRAKE-OFF

Sequence of Operation - BRAKE-OFF

BRAKE-OFF is achieved by pushing the control lever to the **BRAKE-OFF** position. This position is detented and the control lever must be moved manually to return it to the **BRAKE-ON** position. With the control spool in **BRAKE-OFF** position, oil flow to the clutches is blocked and high pressure oil flows directly to the brake port to fully release the brake.

Service

This subsection provides the instructions for performing maintenance and making checks and adjustments. Standard shop tools are used in doing the work described in this subsection.

Maintenance Points

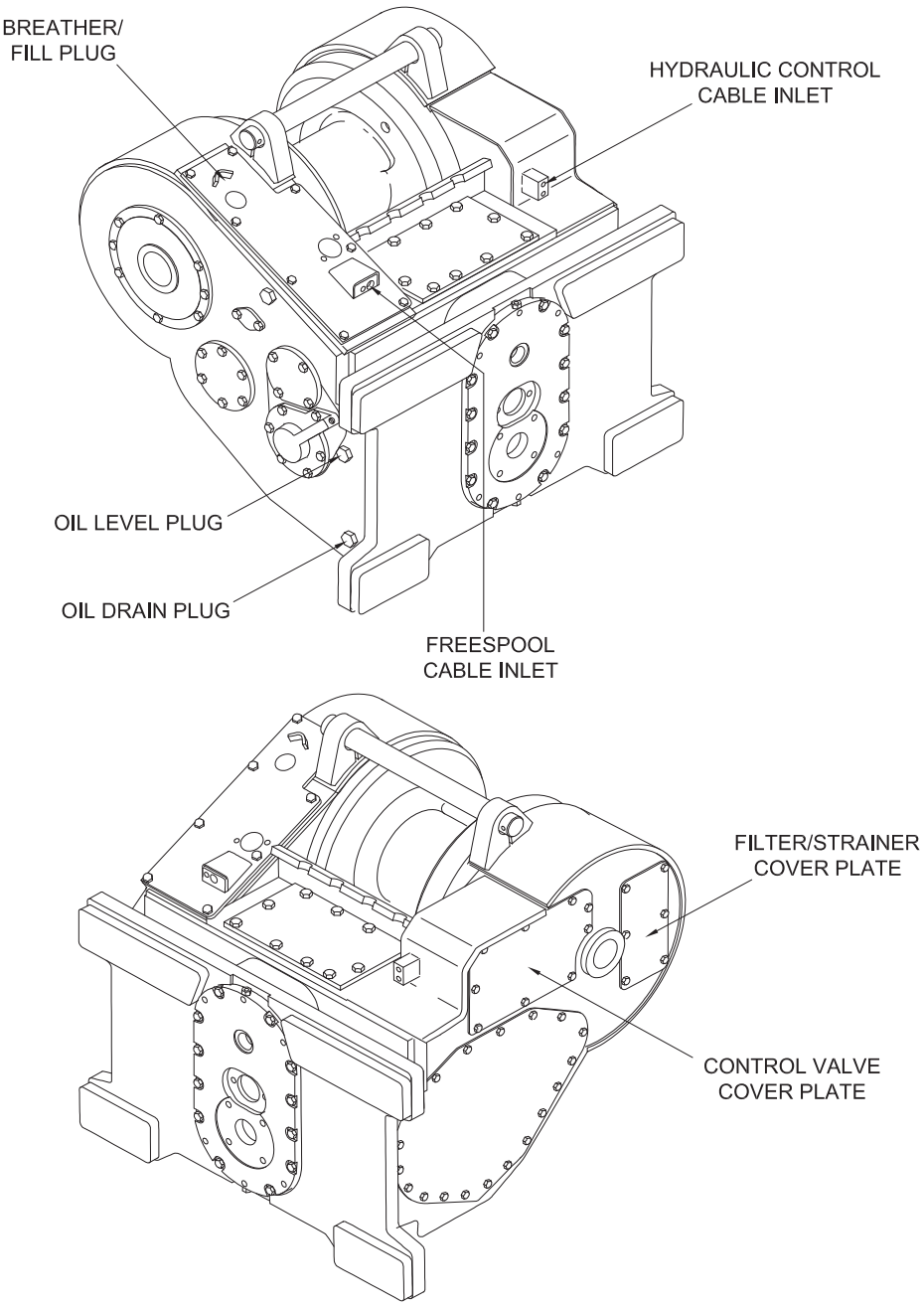


Figure 2-10 W6G Maintenance Points

Maintenance Schedule

The Maintenance Schedule is a program that includes periodic inspection and lubrication.

Use the operating time on the hour meter of the tractor to determine the maintenance time for the winch.

INTERVAL	PROCEDURE OR QUANTITY	SPECIFICATION
50 hours or weekly *	Check oil at oil level plug. Add oil as necessary. Do not operate the tractor when checking the oil level.	See Figure 1-17 – Recommended Oil List.
	Clean the breather near the fill plug.	Remove debris around breather. Clean the breather with solvent if necessary.
	Lubricate the rollers on arch or fairlead assembly if the winch is equipped with either option.	Use multi-purpose grease with 2-4% molybdenum disulfide.
	POWER CONTROLS ONLY: Lubricate the winch control lever and the **FREESPOOL** control lever.	Use SAE 30 on the linkage as needed. Check that the control cable and control housing are fastened correctly.
500 hours or every 3 months	Clean the oil suction screen and magnets.*	Tilt the tractor approximately 15° to prevent loss of oil when the cover is removed. Use a new gasket between the cover and the suction tube.
	Clean the breather near the fill plug.	Clean the breather with solvent.
	Replace the filter.*	See the Parts Manual for filter element and cover gasket. When replacing, be sure to lubricate filter seal ring between element and filter head.
1000 hours or every 6 months	Change the hydraulic oil. Drain oil from plug. Clean the oil strainer. Through fill plug, add 19.5 gallons (73.8 liters) † of oil. Check the oil level oil level plug.	See Figure 1-17 – Recommended Oil List.

* **NOTE: Clean the oil strainer screen and change the oil filter after the first 250 hours on new and rebuilt winches.**

† Amount of oil may vary slightly with tractor.

Figure 2-11 Maintenance Schedule

Checks Before Operation

Check that the wire rope and hook are not worn or damaged. Check that the periodic inspection and maintenance has been done at the recommended operating hours. See the Maintenance Schedule for the W6G winch.

Checks During Operation

The Charts in Troubleshooting subsection can be used by the operator to identify a problem with the winch operation. A trained service person is needed for additional troubleshooting and repair that requires disassembly of parts of the winch.

Checks and adjustments

The checks and adjustments for the winch have the following descriptions:

Control Cable Adjustments

Freespool Adjustment

Hydraulic System Checks

Control Cable Adjustments (See Figs 2-12 thru 2-14)

A single control cable connects the power control lever to the hydraulic control valve spool. Check the operation of the power control lever to make sure it moves smoothly and will return to the **BRAKE-ON** position. The power control lever will stay in **BRAKE-OFF** when pushed into DETENTED position. Cable adjustment is not necessary except to ensure full spool travel.

To adjust TYPE I control levers, proceed as follows:

1. Ensure that the cable bracket at the winch end of the control cable is securely attached to the winch housing.

2. Check the position of the control lever with control valve in **BRAKE-ON**. The lever should be approximately vertical. If not, loosen nuts on U-Bolt that clamps the control cable to the control lever housing. Move U-Bolt up or down in elongated slots to improve position of control lever. Tighten nuts securely.

3. Move control lever to **LINE-IN** and **BRAKE-OFF** positions and make sure the lever holds in the **BRAKE-OFF** position. Ensure that the control lever does not hit the housing in either position. If interference is found, repeat step 2.

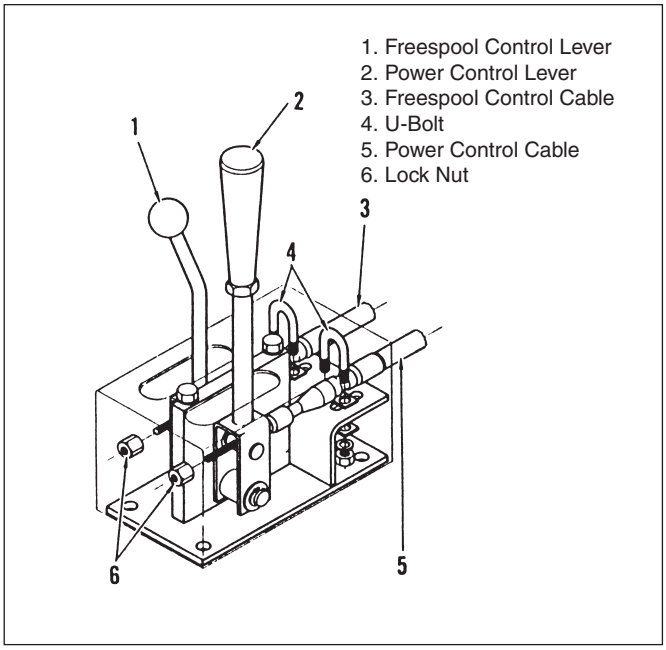


Figure 2-12 Control Cable Adjustments (Type I)

To adjust TYPE II control levers, proceed as follows:

1. Adjust control lever position so full valve spool stroke is attained by screwing cable in or out of tall nut.

2. Install cable adapter in groove on control lever cover and attach cover.

3. Check for complete lever travel. Repeat steps 1 and 2 if adjustment is still incorrect.

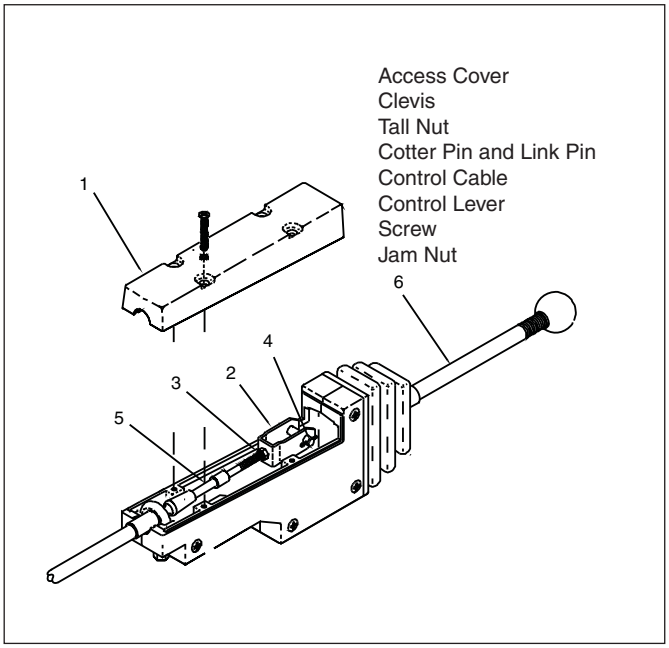
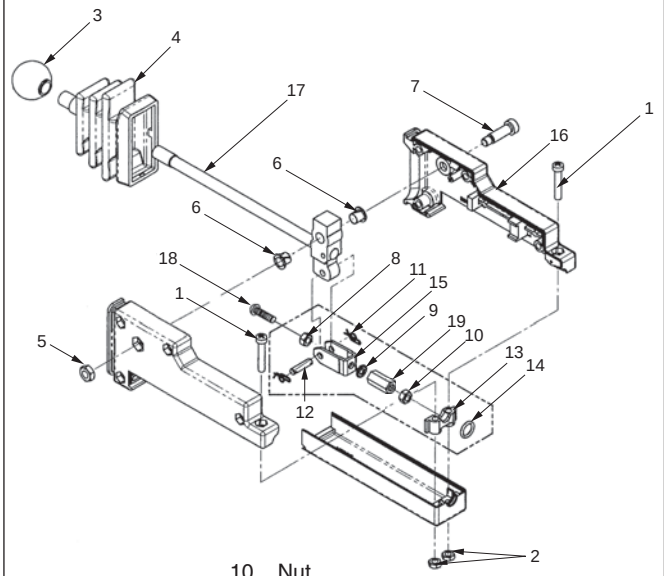


Figure 2-13 Control Cable Adjustments (Type II) - OBSOLETE



1. Screw
2. Nut
3. Knob
4. Boot
5. Jam Nut
6. Plastic Bearing
7. Shoulder Screw
8. Nut
9. Star Washer
10. Nut
11. Cotter Pin
12. Pin
13. Cable Adapter
14. O-Ring
15. Clevis
16. Cover
17. Lever
18. Button-Head Capscrew
19. Tall Nut

Figure 2-14 Control Cable Adjustments (Type II) - CURRENT

FREESPOOL Cable Adjustment

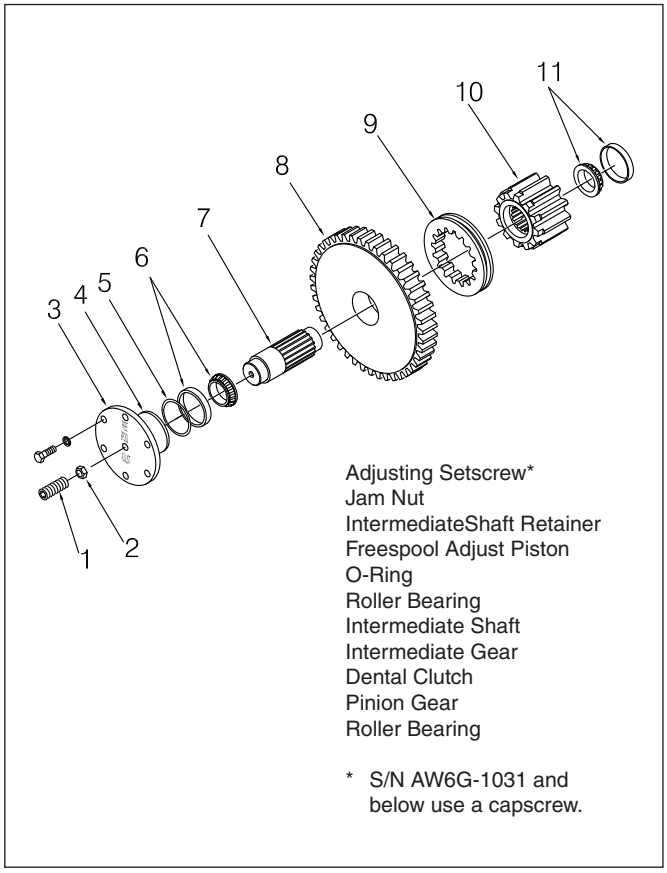
The only adjustment necessary is to position the control lever so that it allows the linkage to shift the **FREESPOOL** mechanism to normal and **FREESPOOL** positions. Check the operation of the **FREESPOOL** lever for smooth operation. Each of the two positions has a detent.

Check that the positions of the **FREESPOOL** lever are the same as the position indicators on the control housing. Loosen the U-bolt that holds the control cable in the housing to adjust the control lever. Make sure the control lever does not hit the housing at the end of its travel. The linkage and cable must be adjusted so that the **FREESPOOL** shifter mechanism will slide the drum pinion gear to both detent positions.

FREESPOOL Adjustment (See Fig. 2-15)

The preload on the bearings of the intermediate shaft controls the resistance to rotation of the drum during the **FREESPOOL** operation. The resistance to rotation is correct when the drum can be rotated by hand, but will not rotate more than one-half revolution after the hand is removed.

An adjusting setscrew is located in the center of the cover for the intermediate shaft. This screw can be tightend or loosened to adjust the preload on the intermediate shaft. The jam nut will maintain the **FREESPOOL** setting. This adjustment is normally only necessary if the winch has had an overhaul.



Adjusting Setscrew*
Jam Nut
IntermediateShaft Retainer
Freespool Adjust Piston
O-Ring
Roller Bearing
Intermediate Shaft
Intermediate Gear
Dental Clutch
Pinion Gear
Roller Bearing

* S/N AW6G-1031 and below use a capscrew.

Figure 2-15 FREESPOOL Adjustment

⚠ CAUTION

Setting shaft too tight will cause bearing overload. Setting shaft too loose will allow shaft not to be parallel. Use caution when adjusting. Start with loose, and adjust towards tight. Turn adjusting screw only 1/6 rotation max. Then strike housing with a hammer to make sure bearing is sliding.

Hydraulic System Pressure Checks

The hydraulic oil and filter(s) should be maintained as indicated in the Maintenance Schedule. If any problems are found, they should be corrected before operating the winch.

Preparation

1. These tests should be performed with a bare drum (no wire rope) since the drum will rotate during the tests.

⚠ WARNING

Tractor engine must be shut OFF before disconnecting drum wire rope. Be careful when you remove the wire rope from the drum. The end of the wire rope can move like a compressed spring, causing an injury when the ferrule is released from the drum.

⚠ WARNING

Always wear gloves when handling wire rope.

2. Start the engine and place the winch in **BRAKE-OFF** to raise the oil temperature. The oil temperature in the winch must be at least 20°C (70°F).

3. Remove any dirt from the left side of the winch. Remove control valve access plate.

4. Stabilize engine speed at 1000 RPM for all tests.

5. Leave test plugs securely installed unless testing that port.

6. After completing all pressure checks and making the necessary adjustments ensure that all plugs and hoses are securely installed.

7. Install control valve access plate and tighten capscrews.

Pressure gauges

To perform the hydraulic pressure checks, calibrated pressure test gauges will be required. Two 400 psi (2800 kPa) and one 30 psi (200 kPa) test gauges will be needed.

Brake Pressure Check

With the engine shut off, connect one high pressure gauge to Brake Port D. Start the engine and follow procedure in Figure 2-19. Adequate brake pressure is required to fully release the brake. If the pressure is not as specified, check for:

1. Improper relief valve setting or malfunction

2. Suction or pressure filter malfunction

3. Leaking pressure hoses or fittings

4. A defective hydraulic pump. A defective pump is usually indicated by low pressure and pressure increases with increased engine RPMs.

Cooling Oil Pressure Check

With the engine shut off, connect one 30-psi pressure gauge to Port A. Start the engine and follow the cooling procedure in Figure 2-19. If the cooling oil pressure is too high it can stroke the clutch piston and drag the clutch pack. The result is overheating. Low cooling oil pressure will not produce enough cooling oil flow and cause overheating. Check for a defective cooling oil relief valve.

Adjust Relief Valve as follows:

1. Start engine and place control lever in **BRAKE-OFF**.

2. Loosen relief valve locknut. Turn relief valve adjusting capscrew IN to increase pressure and OUT to decrease pressure. Adjust pressures as shown in Figure 2-19.

3. Tighten locknut after adjustment is completed.

4. Recheck pressure reading and repeat steps 2 and 3 if necessary.

Accumulator Pressure Check

With the engine shut off, connect one 400-psi (2758 kPa) pressure gauge to Port D. This check determines if the accumulators are functioning and have the correct nitrogen charge. Observe the following while following the accumulator procedures in Figure 2-19.

1. With engine running, place control lever in **BRAKE-OFF** and rev engine to maintain 220 psi (1517 kPa) for one minute. This will ensure that the accumulators will have a full supply of oil.

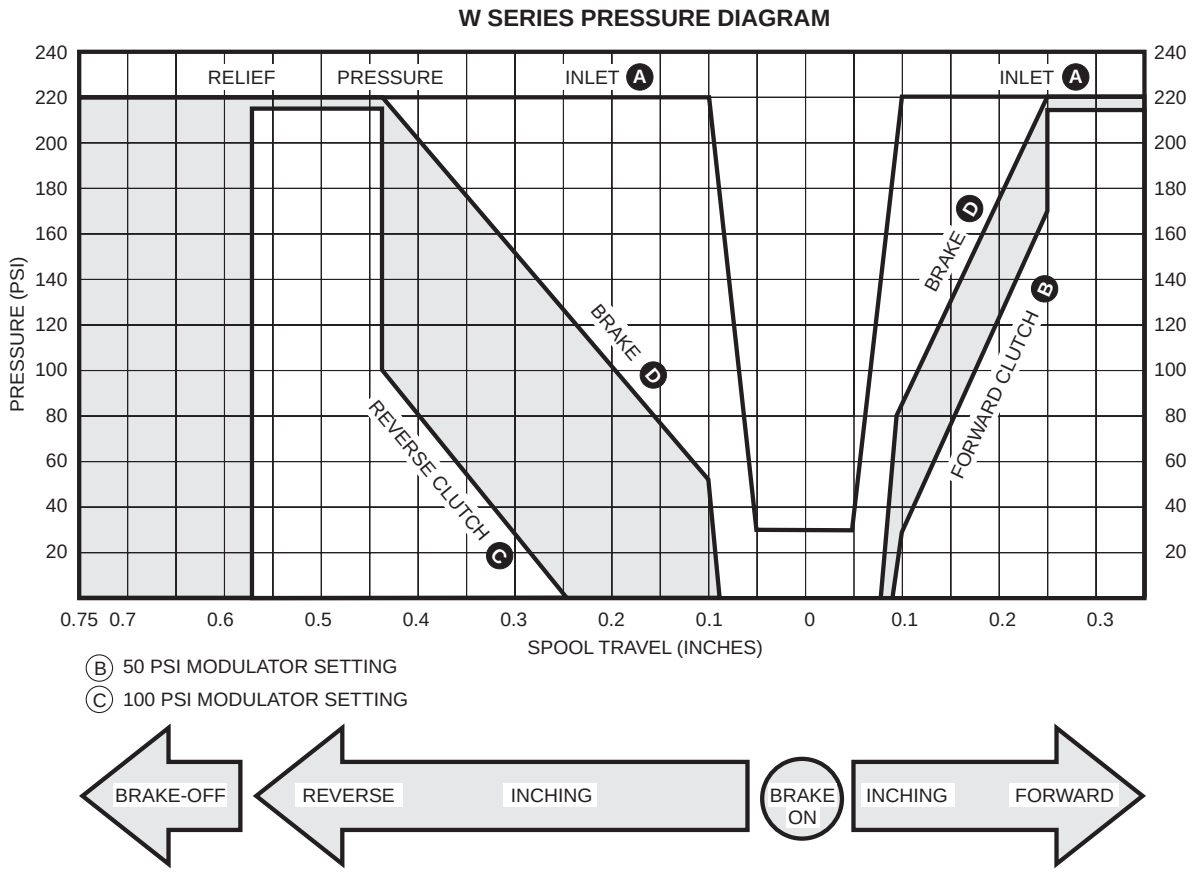


Figure 2-16 Hydraulic Pressure Diagram

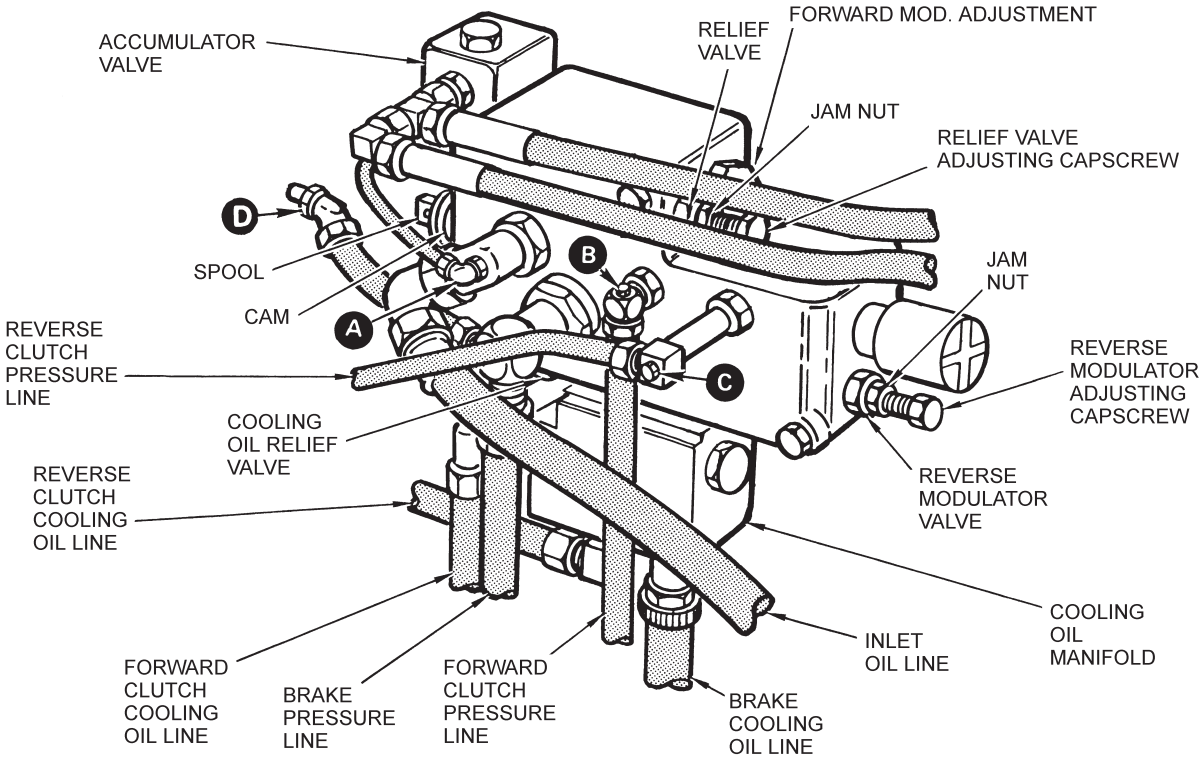


Figure 2-17 Hydraulic System Pressure Test Ports

2. Return control lever to **BRAKE-ON**.

3. Shut the engine off and wait one minute.

4. Place the control lever in the **BRAKE-OFF** position. This will release the oil in the accumulators. Observe the initial pressure reading and the time for the pressure to drop below that specified in Figure 2-19.

If the leak down time is less than specified in Figure 2-19, repeat steps 1 through 4, but do not delay in placing the control lever in **BRAKE-OFF** after the engine is shut down. If the leak down time is greater than that measured when waiting one minute, then there is either a leak in the lines between the accumulators and the accumulator valve or a leaking accumulator check valve. Low accumulator gas pressures will tend to stall the winch on a low engine rpm shift. To determine if accumulators have any gas pressure, remove valve stem protective cover, push gently on valve stem and check with an automotive air gauge. A ruptured bladder will emit oil. Accumulators are not rebuildable.

Note: Accumulator's pre-charge pressure should be 115 psi (793 kPa).

Forward Clutch Pressure Check and Forward Modulator Valve Check

With the engine shut off, connect one 400-psi (2758 kPa) pressure gauge to Port B and one to Port D. Start the engine and place control lever in **BRAKE-OFF** to build up the accumulator system pressure. Place control lever in **LINE-IN** position and check FORWARD (**LINE-IN**) clutch and **LINE-IN INCHING** pressures as indicated in Figure 2-19. On a fast shift, the clutch pressure should come up with the brake pressure. In **LINE-IN INCHING**, the clutch pressure should lag the brake release pressure as shown in Figure 2-19. If the pressure differential is too low, the brake will not release soon enough and cause stall. If the pressure differential is too high, the brake will release too soon and cause backspinning of the drum.

If the forward clutch pressure is not as specified in Figure 2-19, check for:

1. Leaking pressure hoses or fittings

2. Damaged or worn clutch piston seals

3. Improper control valve spool movement

4. Broken seal rings on clutch shaft

5. Damaged O-rings on clutch shaft. See information in Troubleshooting subsection.

If in **LINE-IN INCHING** the pressure differential is not as specified in Figure 2-19, remove the forward modulator valve and check for defective or dirty parts. To adjust the modulator valve, proceed as follows:

1. Loosen the forward modulator adjustment locknut. With engine running, move the control lever toward **LINE-IN** until the brake pressure reads 140 PSI (965 kPa). (Use 180 PSI [1241 kPa] for Komatsu D65.)

2. Turn the adjusting capscrew IN to decrease Forward Clutch Pressure, or OUT to increase pressure until the Forward Clutch Pressure is less than the brake pressure by the amount specified in Figure 2-19.

Tighten locknut and recheck pressure. Repeat steps 1 and 2 if necessary.

Reverse Clutch Pressure Check and Reverse Modulator Valve Adjustment

Shut off the engine and connect the high pressure gauge to Reverse Clutch Port C. Start the engine. Place the control lever in **LINE-OUT** and check reverse clutch and **LINE-OUT INCHING** pressures as indicated in Figure 2-19. On a fast **LINE-OUT** shift the clutch pressure should come up with the brake pressure. In **LINE-OUT INCHING**, the clutch pressure should lag the brake release pressure as shown in Figure 2-19. If the pressure differential is too low, the brake will not release soon enough and cause drag. If the pressure differential is too high, the brake will release too soon and cause backspinning of the drum.

If the reverse clutch pressure is not as specified in Figure 2-19, check for:

1. Leaking pressure hoses or fittings

2. Damaged or worn clutch piston seals

3. Improper control valve spool movement

4. Broken seal rings on clutch shaft

5. Damaged O-rings on clutch shaft. See information in Troubleshooting subsection.

If in **LINE-OUT INCHING** the pressure differential is not as specified in Figure 2-19, proceed as follows:

1. Loosen the reverse modulator adjustment locknut, start engine. Move the control lever towards **LINE-OUT** until the brake pressure reads 140 PSI (965 kPa). (Use 180 PSI [1241 kPa] for Komatsu D65.)

2. Turn the adjusting capscrew IN to decrease Reverse Clutch Pressure, or OUT to increase pressure until Reverse Clutch Pressure is less than the brake pressure by the amount shown in Figure 2-19.

3. Tighten locknut and recheck pressure. Repeat steps 1 and 2 if necessary.

Control Valve Spool Travel Check (See Fig. 2-18)

It may be necessary to check spool travel when control valve pressures do not meet specifications. Figure 2-18 shows the correct travel for the various spool positions. The control valve spool is self-positioned to **BRAKE-ON**. The three other travel positions are determined by spool assembly internal stops and detent assembly in the spool end cap. If spool travel is found to be out of adjustment, the spool assembly or complete control valve assembly should be replaced. Ensure that the spool end cap is installed securely, then perform the check for smooth return of control lever to neutral from any other position. Any binding or sticking should be investigated for by removing spool cap and examining parts for wear.

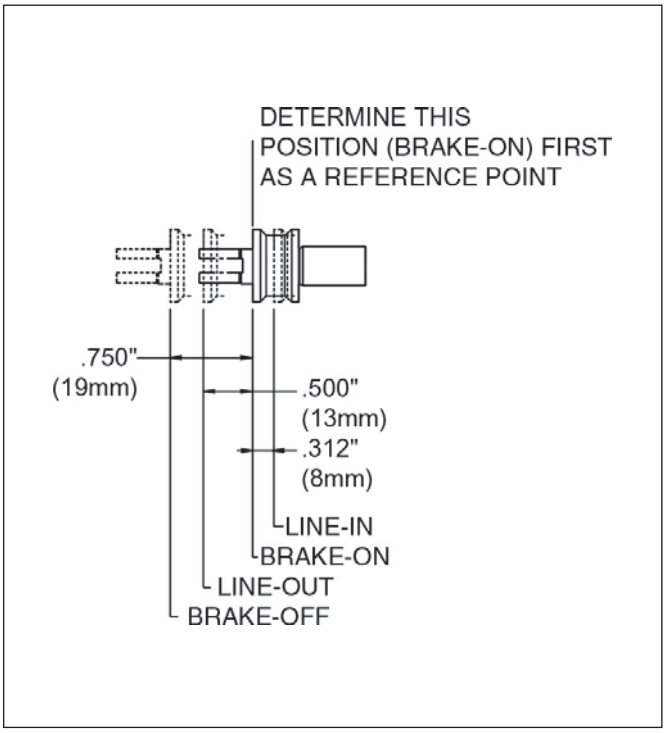


Figure 2-18 Control Valve Spool Travel

NOTE: The spool is detented in BRAKE-OFF. If spool does not lockup in this position, examine the detent parts inside the spool end cap and repair or replace as necessary.

Figure 2-19 Hydraulic System Pressure Tests

TEST ITEM	CHECK PORT (See Fig. 2-17)	TEST EQUIPMENT REQUIRED	CONTROL POSITION	PRESSURE	CORRECTIVE ACTION
Brake	D – Brake	400 psi (2757 kPa) gauge	**BRAKE-OFF**	220 psi (1517 kPa). Pressure not to exceed 250 psi (1724 kPa) at high idle.	Adjust relief valve.
Cooling	B – Cooling	30 psi (200 kPa) gauge	**BRAKE-ON**	8-11 psi, Full throttle (55-76 kPa)	Check plumbing for leakage or blockage; check bypass valve.
Accumulator (Pre charge at 115 psi (793 kPa))	D – Brake	400 psi (2757 kPa) gauge	1. **BRAKE-OFF** 2. **BRAKE-ON** 3. Stop Engine 4. **BRAKE-OFF** 5. Repeat if required	1. 220 psi (1517 kPa) 2. None 3. None—wait 1 minute 4. 145 psi (996 kPa) immediately & 100 psi (690 kPa) minimum after 30 seconds	1. Check hydraulic lines for leaks. 2. Replace accumulator valve. 3. Check for defective accumulators.
LINE-IN (**Forward**)	B – Forward	400 psi (2757 kPa) gauge	**LINE-IN**	220 psi (1517 kPa)	Refer to subsection of Troubleshooting for Low Forward or Reverse Clutch Pressure troubleshooting procedures.
LINE-IN (**INCHING**)	B – Forward D – Brake	2 – 400 psi (14-2757 kPa) gauge	Vary between **BRAKE-ON** and **LINE-IN**	Port B 50 psi (345 kPa) less than Port D (John Deere 750/755 and Case 1650L use 90 psi (620 kPa) less than Port D)	Adjust or replace forward modulator valve.
LINE-OUT (**Reverse**)	C – Reverse	400 psi (2800 kPa) gauge	**LINE-OUT**	220 psi (1517 kPa)	Refer to subsection of Troubleshooting for Low Forward or Reverse Clutch Pressure troubleshooting procedures.
LINE-OUT (**INCHING**)	C – Reverse D – Brake	2 – 400 psi (14-2757 kPa) gauge	Vary between **BRAKE-ON** and **LINE-OUT**	Port C 120 psi (827 kPa) less than Port D (Case 1650L use 120 psi (827 kPa) less than Port D)	Adjust reverse modulator valve.

Troubleshooting

This subsection includes various troubleshooting charts for power controlled winches. Where appropriate, the charts list the most common troubles that may be encountered and suggest possible causes and corrective actions.

Figure 2-20 Power Controls Troubleshooting Analysis Check Chart_1

PROBLEM	POSSIBLE CAUSE	CORRECTION
Operation is rough or not regular	Hydraulic oil is too cold.	Put the control lever in the **BRAKE-OFF** position. Run the engine at 1000 rpm to warm the oil before operating the winch.
	Low oil level.	Add hydraulic oil to the correct level.
	Low oil pressure.	See item on troubleshooting low oil pressure directly below.
	Wrong oil.	Drain oil and replace with correct grade. Refer to Figure 1-17, Recommended Oil List.
	Accumulator malfunction.	Check accumulator and recharge/ replace as necessary.
	Tractor engine idling too low.	Increase tractor idle speed.
	Hydraulic system suction leaks. Observe oil exiting lube valve while tractor is operating. Suction leaks will cause oil to foam.	Check the following for air leaks: 1. Suction hose to pump connection 2. Pump shaft seal 3. Suction filter cover and gasket 4. Suction hose for cracks or collapsed sections
Low oil pressure	Leaking pressure hoses and fittings.	Check for leaks and replace components where necessary. Be sure hoses are not rubbing on any gears or winch components.
	Defective or improperly adjusted oil relief valve; poppet may be stuck open.	Clean relief valve if no pressure, then adjust. Check relief valve with pressure gauge. Replace if defective.
	Clogged suction strainer.	Check and clean or replace suction strainer.
	Oil brake leaking internally (indicated by low brake pressure).	Repair as required.
	Defective hydraulic pump.	Check pump pressure output only after all other checks have been made. Worn pump indicated by pressure variation with engine RPM. If pump is at fault, replace.

Figure 2-20 Power Controls Troubleshooting Analysis Check Chart_2

PROBLEM	POSSIBLE CAUSE	CORRECTION
Brake does not release or winch stalls during low RPM shift	Low oil pressure.	Refer to “Low Oil Pressure” troubleshooting item above.
	Accumulator system malfunction.	Check for: 1. Correct leakdown time as described in Service subsection. 2. Leaking accumulator valve. 3. Leak in accumulator lines. 4. Damaged or defective accumulators.
	Pressure modulator set improperly.	Turn modulator screw in for earlier brake release. For specific instructions, see Forward/Reverse Clutch Pressure Check & Modulator Valve Adjustment in Service subsection.
	Damaged brake piston, piston housing or seal rings.	Check piston and piston housing cavity for damage. Replace if scored or broken. Always replace seals when brake is repaired.
	Low clutch pressure or low oil pump volume.	Refer to “Low Forward or Reverse Clutch Pressure” troubleshooting item below.
Overheating	Plugged pressure filter.	Replace filter.
	Plugged suction filter.	Check suction filter and clean or replace.
	One or both clutches dragging.	Check by placing joystick in **BRAKE-OFF**. Normally drum will rotate slowly in either direction. If the reverse clutch is dragging, the drum will rotate in the **LINE-OUT** direction. If forward clutch is dragging the drum will rotate in the **LINE-IN** direction and it will take more than 100 lbs. (45.4 kg) of line pull to prevent drum rotation.
	Low system pressure.	Adjust accordingly. For specific instructions, see Forward/Reverse Clutch Pressure Check & Modulator Valve Adjustment in Service subsection.
	Low or high cooling oil pressure.	Check cooling oil pressure. Replace relief valve if required.
	Clutch/brake shaft bearings set too tight.	Adjust accordingly.
	Control valve spool travel improperly adjusted.	Adjust accordingly.
	Excessive inching.	Avoid continuous operation in the inching zone.
	Low oil level.	Add oil.

Figure 2-20 Power Controls Troubleshooting Analysis Check Chart_3

PROBLEM	POSSIBLE CAUSE	CORRECTION
Winch will not operate while tracks are turning	Accumulator system malfunction.	Check for: 1. Correct leakdown time as described in Service subsection. 2. Leaking accumulator valve. 3. Leak in accumulator lines. 4. Damaged or defective accumulators.
	Low oil pressure.	Refer to “Low Oil Pressure” troubleshooting item above.
	Defective PTO shaft.	Inspect PTO shaft and coupling, clutch shaft bevel ring gear and PTO shaft pinion gear for wear or damage.
Forward or reverse clutch not releasing	Broken or weak release springs.	Check springs and replace as necessary.
	Warped frictions or separators.	Replace as necessary.
	Cooling pressure too high.	Test and reset.
	Dowels out of holes.	Inspect clutch and realign dowels.
Forward or reverse clutch not engaging	Low oil pressure.	See “Low Oil Pressure” troubleshooting item above.
	Low forward or reverse clutch pressure.	See troubleshooting for “Low Forward or Reverse Clutch Pressure” item below.
	Inadequate piston travel.	Remove the access cover and place the winch in gear while visually checking the clutch for piston movement.
	Worn friction discs and separator plates.	Replace the friction discs and separator plates if too thin, scored or distorted. Refer to Section 4.
	Control levers are in **FREESPOOL** mode.	Return handlever controls to normal operation mode.
Clutch does not apply correctly at low PTO rpm.	Accumulator not charged.	Check accumulator.
	PTO stalled (0 rpm).	Increase tractor rpm.

Figure 2-20 Power Controls Troubleshooting Analysis Check Chart_4

PROBLEM	POSSIBLE CAUSE	CORRECTION
Low forward or reverse clutch pressure	Broken seal rings on the clutch/ brake shaft.	Replace seal rings. **NOTE: A broken seal ring is the most common cause of a pressure differential between the two clutches. Check preload on clutch/brake shaft and adjust it if necessary to prevent additional breakage of seal rings; refer to Section 4.**
	Damaged clutch/brake shaft seal ring grooves.	Check grooves for taper, scoring and rust. Replace or rebuild shaft if surfaces between the inner side of groove and seal ring are not flat.
	Damaged clutch/brake shaft bearing retainers.	Check retainer for grooves. Replace retainer if defective, or re-sleeve.
	Damaged clutch piston or O-rings.	Check piston cavity for damage. Always repair both O-rings when clutch is repaired. Refer to Section 4.
	Pressure tube damaged.	Remove cover and inspect.
	Leaky clutch circuit.	Perform clutch bleed-down test on clutch circuit.
Brake slipping or drum backspin on fast shift from neutral to forward	Low brake release pressure.	Check brake release pressure. Replace friction discs and separator plates if too thin.
	Broken belleville spring.	Replace. Refer to Section 4.
Brake releases before forward clutch engagement	Modulator valve in control valve not functioning.	Check forward modulator valve. For specific instructions, see Forward/ Reverse Clutch Pressure Check & Modulator Valve Adjustment in Service subsection.
	Low brake release pressure.	See “Brake Slipping” troubleshooting item above.
	Clutch line plugged.	Clean clutch line and orifices.
Brake releases before reverse clutch engagement	Modulator valve in control valve not functioning.	Check reverse modulator valve. For specific instructions, see Forward/ Reverse Clutch Pressure Check & Modulator Valve Adjustment in Service subsection.
Winch noisy	Ring and pinion out of adjustment.	Set ring and pinion backlash.
	Air in oil.	1. Check for suction leaks. 2. Add oil.
	Gears and bearings worn.	Replace components.
	FREESPOOL drag too loose.	Tighten setscrew to increase bearing preload. Refer to **FREESPOOL** drag adjustment instructions in Service subsection.

Figure 2-20 Power Controls Troubleshooting Analysis Check Chart_5

PROBLEM	POSSIBLE CAUSE	CORRECTION
Hard to shift	Linkage or cable binding or rusted.	Clean, straighten, repair or replace parts as necessary.
	Shifting collar too tight on splines or splines rough.	Remove shifting collar, dress splines with fine stone, and replace parts if necessary.
	Dental clutch installed backwards.	Install clutch so that chamfered ramp faces drum pinion gear.
	Lever difficult to move.	Lube, disassemble and repair. Check control cable for damage and tight radiuses.
	Ball detent spring load too much.	Back off on spring plug.
Jumps out of gear	Control linkage improperly adjusted.	Check and adjust as necessary.
	Worn shifter fork.	Replace shifter fork and related parts as necessary.
	Worn intermediate gear.	Replace gear.
	Worn drum pinion gear bushing.	Replace bushing and related parts as necessary.
	Detent ball and spring loose, damaged or sticking.	Clean or replace as necessary.
Winch will not work in **FREESPOOL** function	Intermediate shaft assembly damaged, rusted or preloaded.	Adjust and repair or replace as necessary. Refer to Section 4.
	Control linkage improperly adjusted.	Check and adjust as necessary.
	Drum shaft assembly damaged, rusted or binding.	Clean or replace as necessary.
Winch goes to **FREESPOOL** function too easily	Insufficient preload on intermediate shaft.	On winches with exterior Freespool Drag Adjust: Tighten preload on the intermediate shaft. On winches without exterior Freespool Drag Adjust: Remove shims as required to preload shaft. Refer to Section 4.
Winch requires too much effort to go to the **FREESPOOL** function	Too much preload on intermediate shaft.	On winches with exterior Freespool Drag Adjust: Loosen preload on the intermediate shaft. On winches without exterior Freespool Drag Adjust: Add shims as required to preload shaft. Refer to Section 4. **NOTE: It may be necessary to use a slide hammer on the shaft to unload the bearing race because of the fit in the bore.**

Notes

Notes

Notes

Electronic Controls

Hydraulic System

The operation of the winch is controlled by an internal hydraulic system (See Fig. 3-1). When the tractor's PTO is operating, this system provides pressure and directs the flow of oil for the main winch functions. The hydraulic flow path of these various functions is depicted in Figures 3-13 through 3-17.

The suction strainer and pressure filter remove contaminants from the oil. The hydraulic pump supplies pressurized oil for the system. The valve manifold assembly distributes and regulates the flow and pressure of hydraulic oil to the clutches and brake while maintaining the cooling oil flow. It also controls the release of pressurized oil from the accumulator. The accumulator provides pressurized oil for a limited amount of actuation if the hydraulic pump is not functioning. This allows the release of the winch brake when the tractor is not operating. It also allows the winch to shift properly at low tractor RPM's.

The operation of the winch is controlled by the clutches and the brake except when the intermediate shaft is disengaged for **FREESPOOL**.

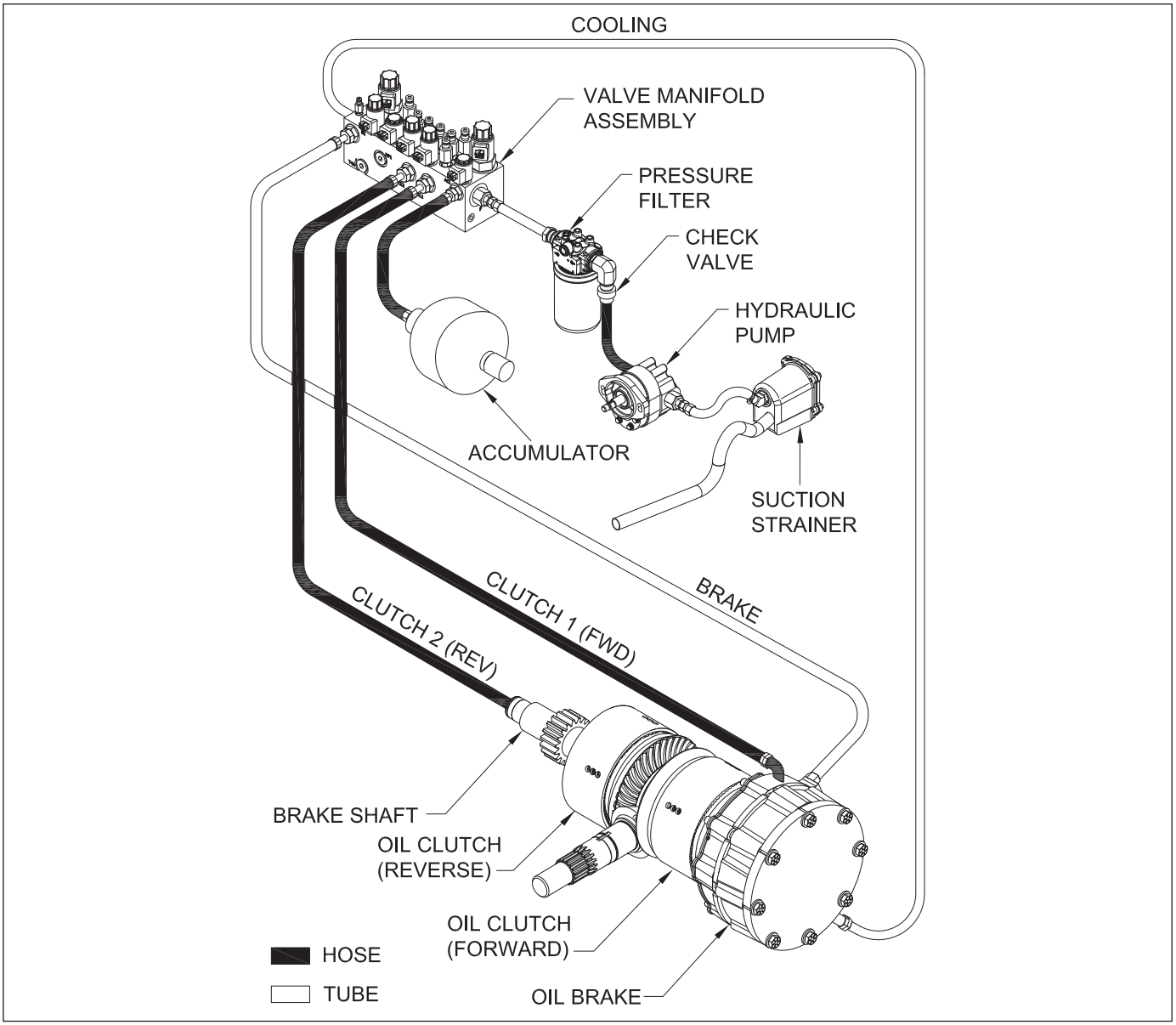
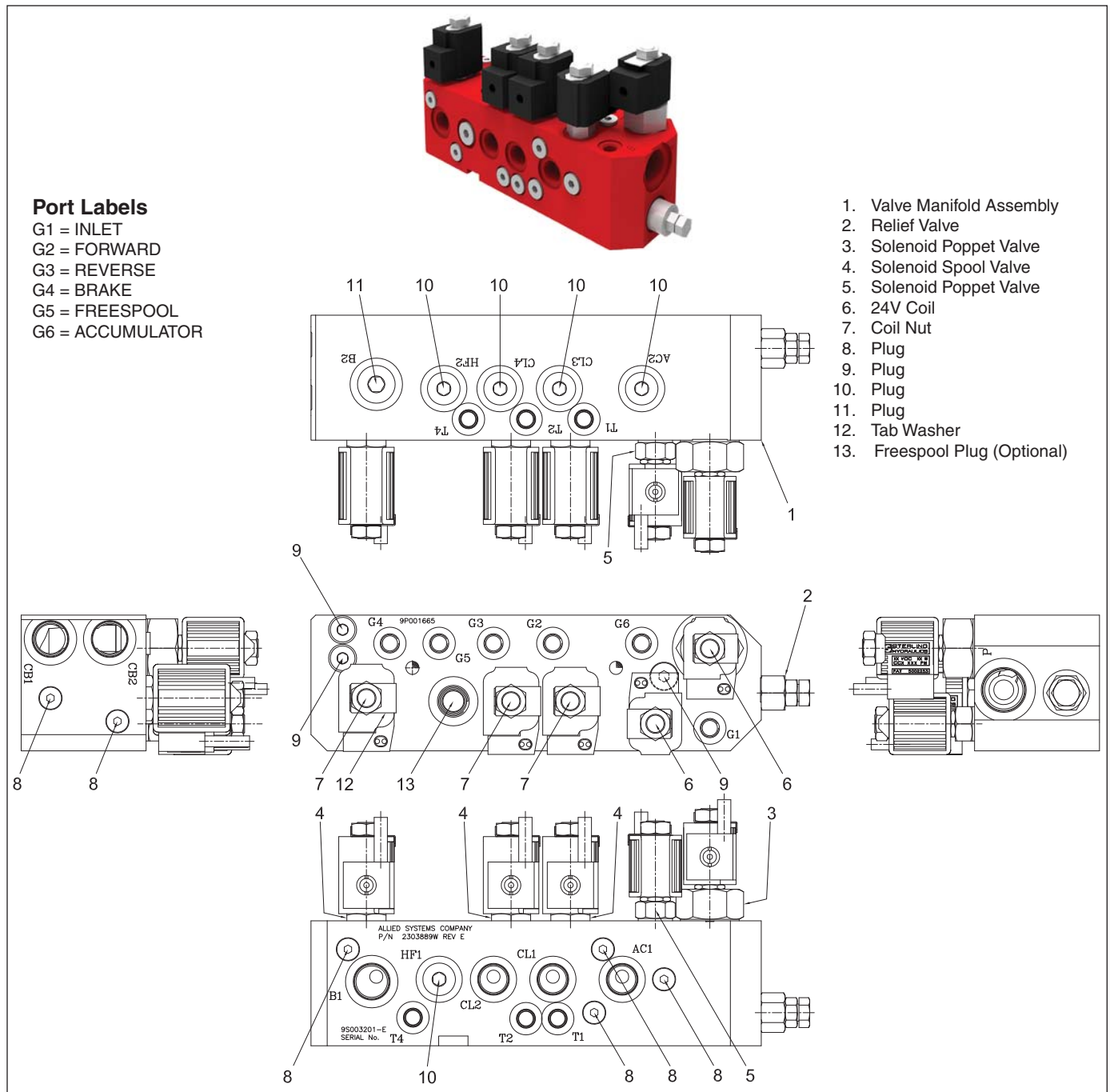


Figure 3-1 Hydraulic System (Electronic Controls)

Valve Manifold Assembly (See Figs. 3-2 through 3-9)

The valve manifold assembly controls the flow of hydraulic oil to and from the clutches, brake and freespool mechanism. Passages inside the valve body connect the oil flow with the functions that control the winch. Various cartridge solenoid valves within the manifold cavity open and close passages to apply and release the clutches and brake.

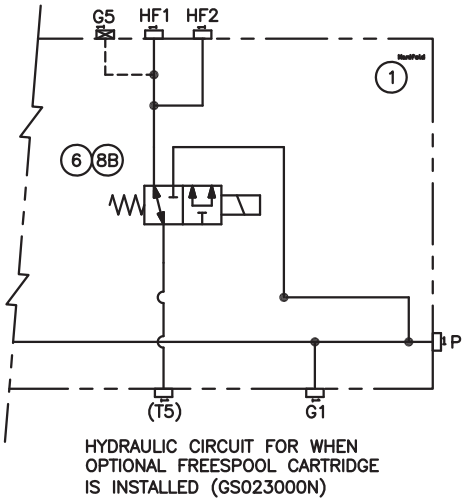


Valve Manifold Assembly
P/N 2303889W
(The color of the manifold body is red.)

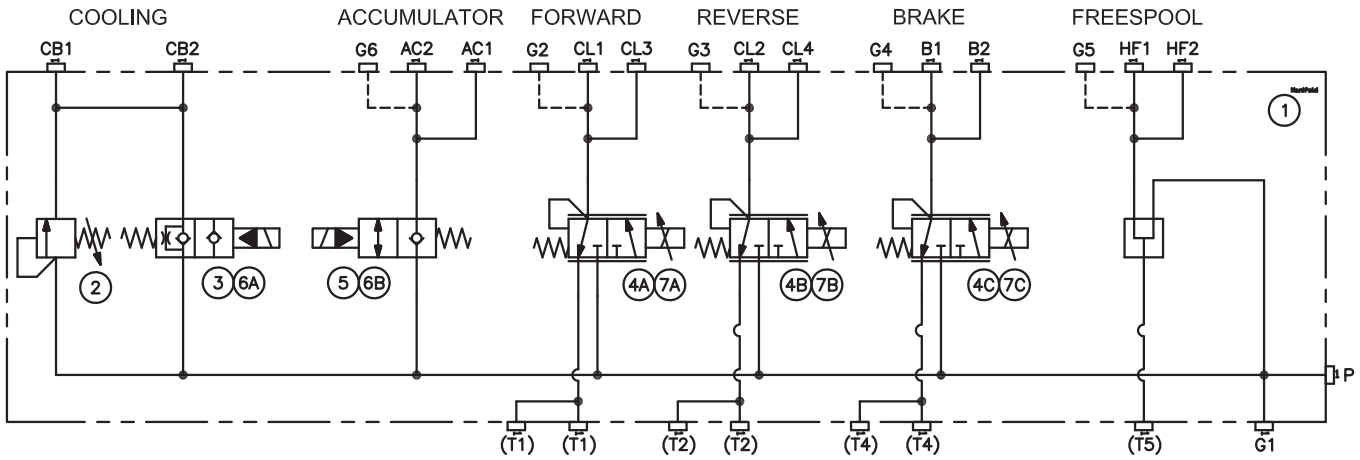
Figure 3-2 Valve Manifold Assembly and Hydraulic Schematic (1)
Usage - S/N AW6G-1287 and below

PORTS:

P.....SAE #12
B1, B2, CB1, CB2.....SAE #10
AC1, AC2, CL1, CL2, CL3, CL4, HF1, HF2.....SAE #8
G1, G2, G3, G4, G5, G6, T1, T2, T4.....SAE #4



HYDRAULIC CIRCUIT FOR WHEN OPTIONAL FREESPOOL CARTRIDGE IS INSTALLED (GS023000N)

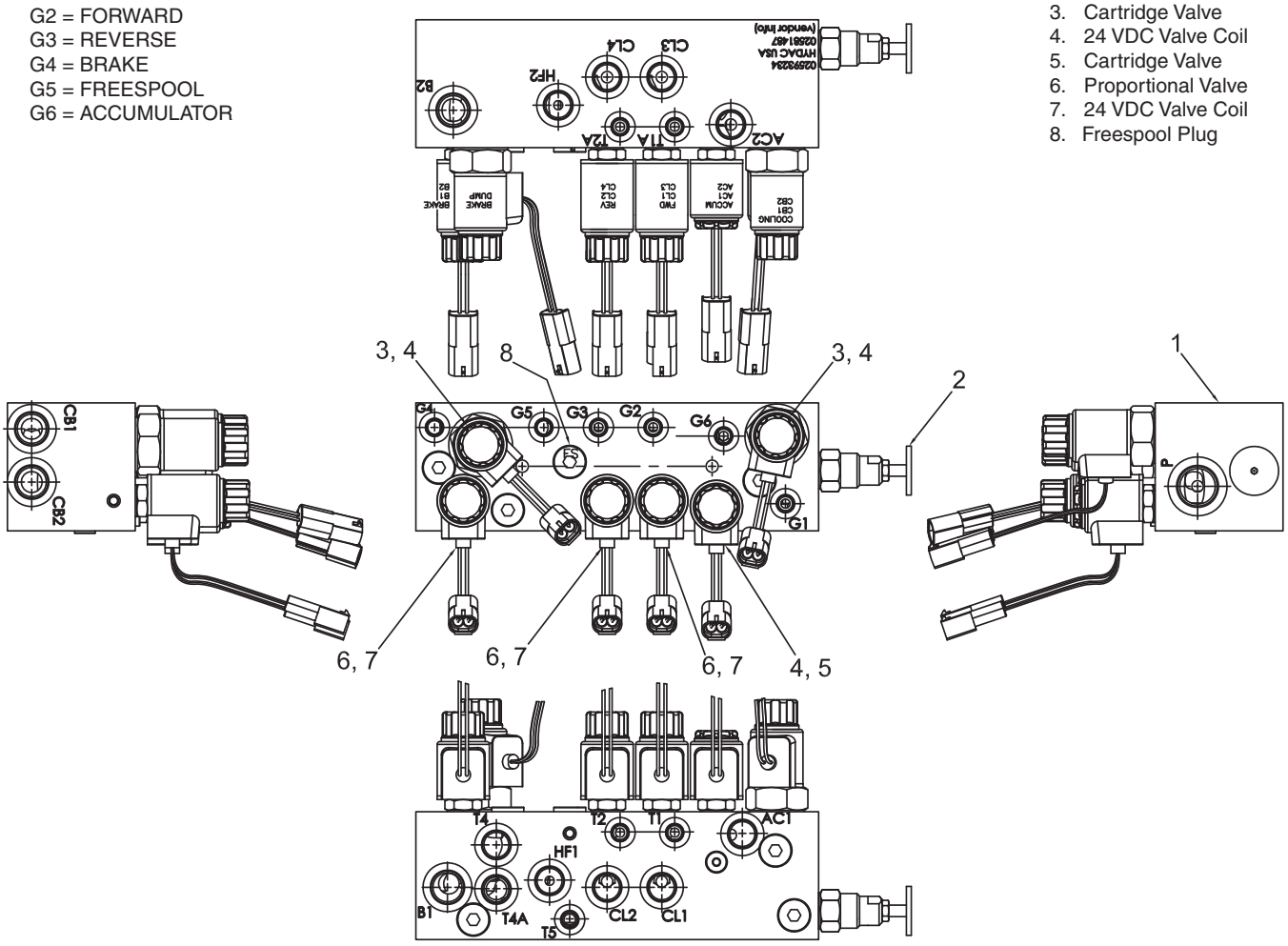


Hydraulic Schematic

Figure 3-3 Valve Manifold Assembly and Hydraulic Schematic (2)
Usage - S/N AW6G-1287 and below

Gauge Port Labels
G1 = INLET
G2 = FORWARD
G3 = REVERSE
G4 = BRAKE
G5 = FREESPOOL
G6 = ACCUMULATOR

1. Manifold Block
2. Relief Valve
3. Cartridge Valve
4. 24 VDC Valve Coil
5. Cartridge Valve
6. Proportional Valve
7. 24 VDC Valve Coil
8. Freespool Plug



Valve Manifold Assembly
P/N 2306547W
(The color of the manifold body is silver, and coils have leads.)

Figure 3-4 Valve Manifold Assembly and Hydraulic Schematic (1)
Usage - S/N AW6G-1288 through S/N AW6G-1763

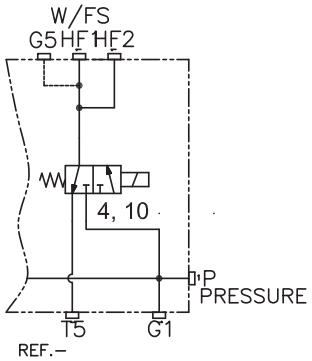
GENERAL

HOUSING MATERIAL
Aluminum, anodized

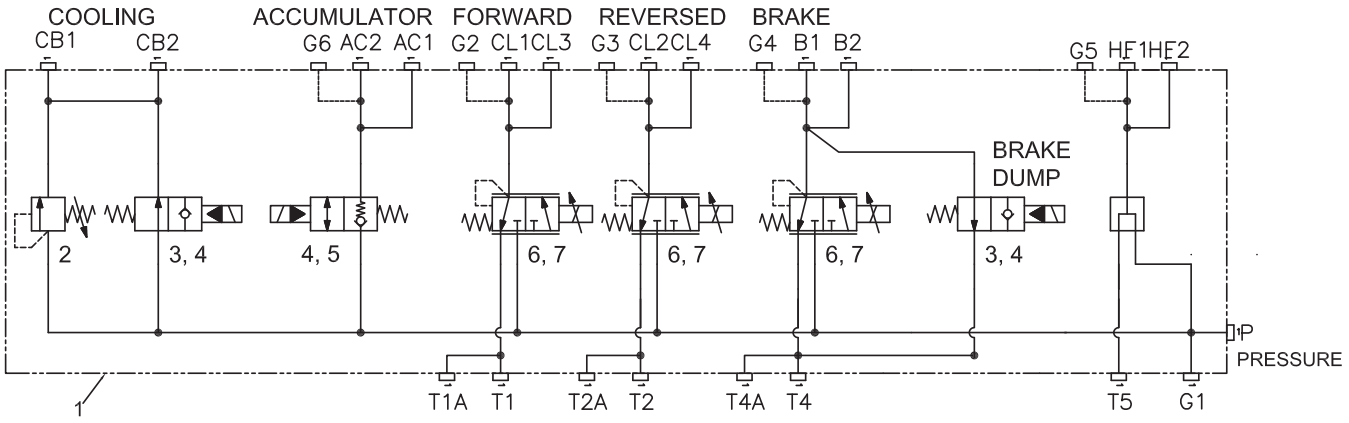
AMBIENT TEMPERATURE RANGE
min. -4°F.
max. +140°F.

TYPE OF CONNECTION
P = SAE-12
B1, B2, CB1, CB2 = SAE-10
AC1, AC2, CL1, CL2, CL3, T4,
T4A, CL4, HF1, HF2 = SAE-8
Others = SAE-4

MOUNTING POSITION
Optional



REF.–
HYDRAULIC CIRCUIT FOR
WHEN FREESPOOL
CARTRIDGE VALVE IS USED.



HYDRAULIC

OPERATING FLUID
Mineral based hydraulic fluid

OPERATING FLUID
TEMPERATURE RANGE
min. -4°F.
max. +248°F.

VISCOSITY RANGE
min. 5 SUS
max. 2000 SUS

MAX. PRESSURE
3000 psi

MAX. FLOW RATE
3 gpm

FILTRATION
Maximum permissable
contamination level of
operating fluid to
ISO 4406 class 21/19/16.
Use a filter with a
minimum minimum retention
rate of Beta20 equal to
or less than 100. 2026

ELECTRICAL

SAFETY TYPE
IP65 to DIN 40050
Safety type applies for
correctly fitted plugs.

NOMINAL VOLTAGE
24 VDC

RESISTANCE
Standard coil - 32 Ohms
Proportional coils -22 Ohms

SWITCH-ON-TIME
100%
(CONTINUOUS OPERATION)

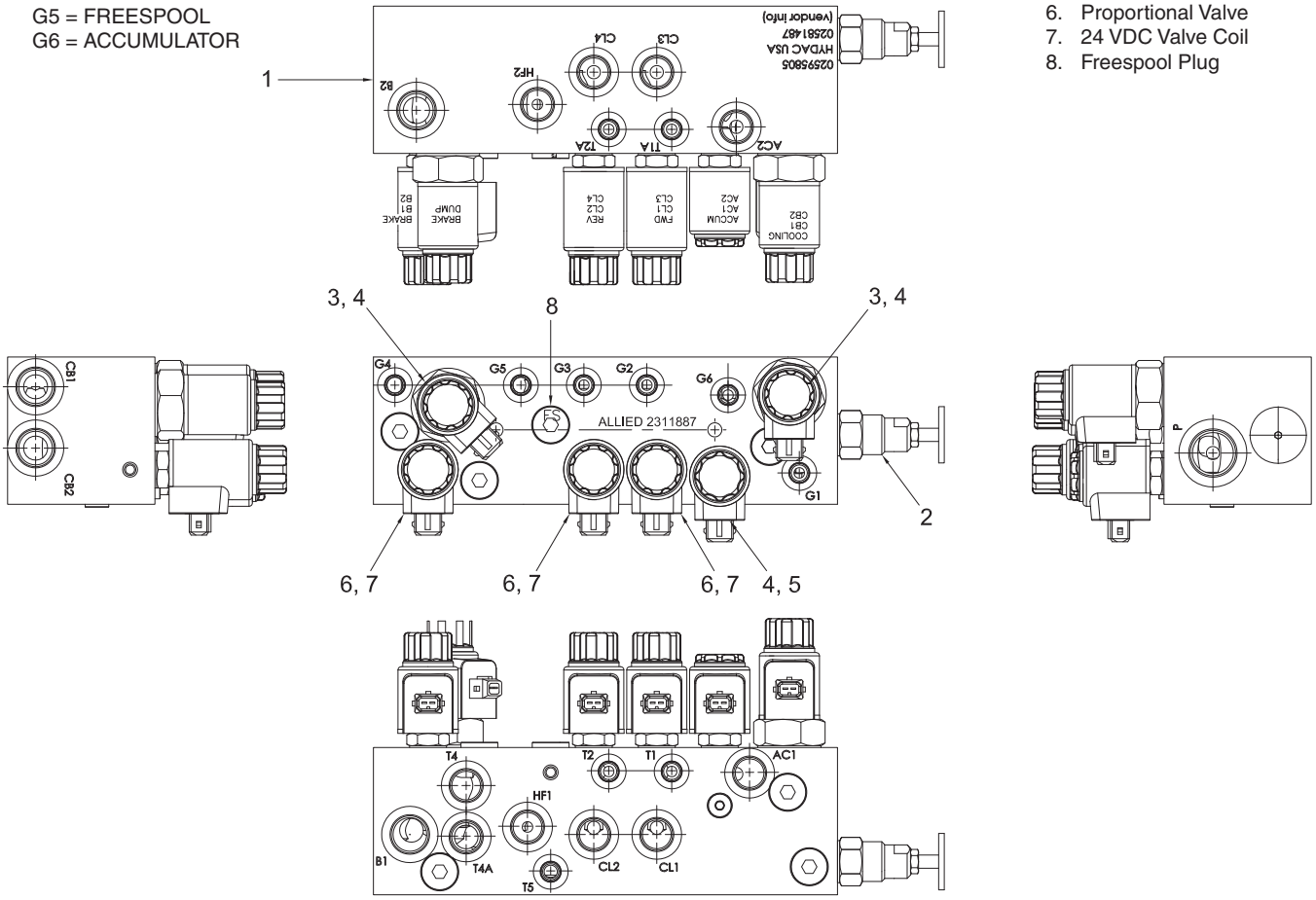
TYPE OF CONNECTION
Packard on flying leads.

Hydraulic Schematic
P/N 2306547W

Figure 3-5 Valve Manifold Assembly and Hydraulic Schematic (2)
Usage - S/N AW6G-1288 through S/N AW6G-1763

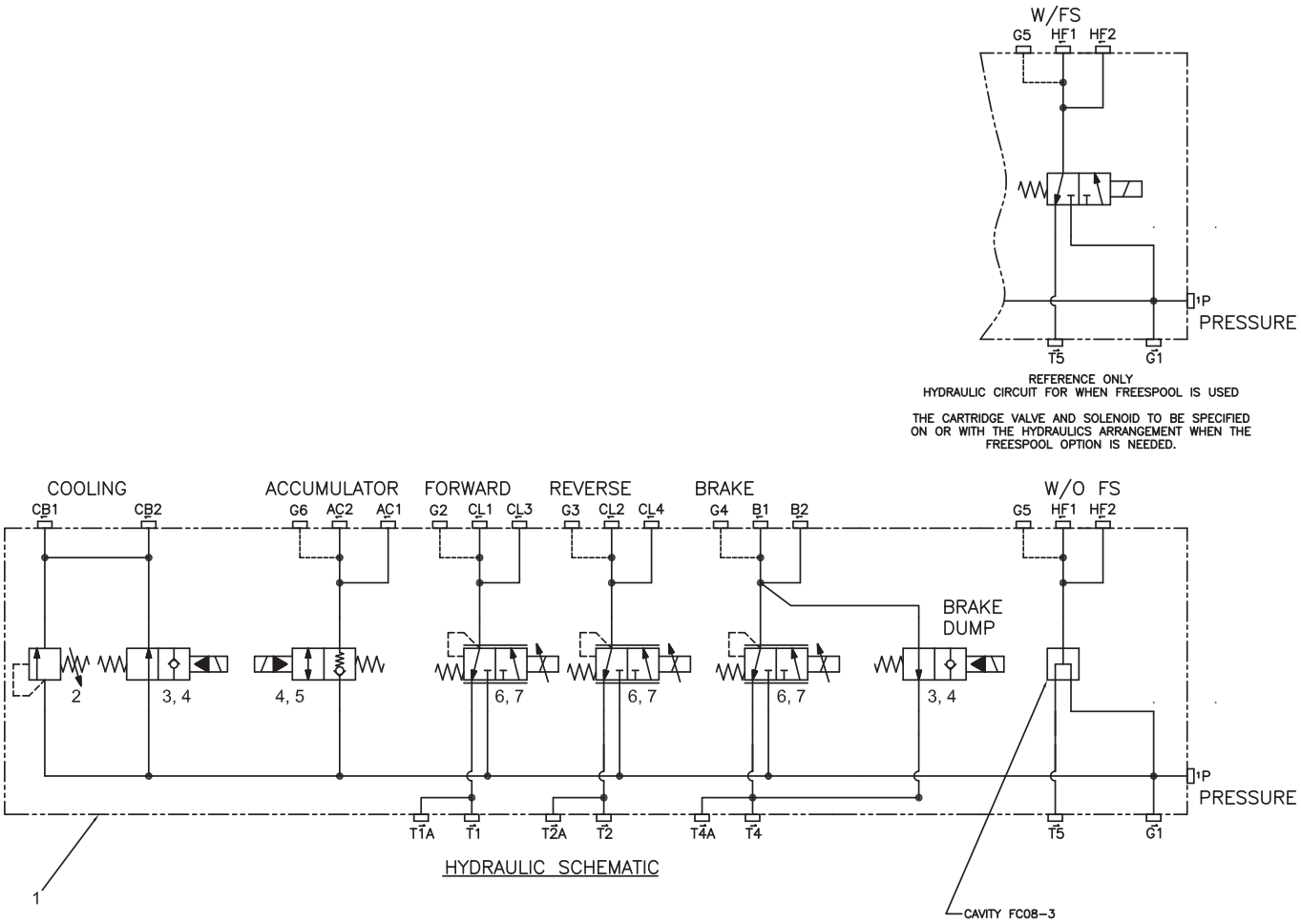
Gauge Port Labels
G1 = INLET
G2 = FORWARD
G3 = REVERSE
G4 = BRAKE
G5 = FREESPOOL
G6 = ACCUMULATOR

1. Manifold Block
2. Relief Valve
3. Cartridge Valve
4. 24 VDC Valve Coil
5. Cartridge Valve
6. Proportional Valve
7. 24 VDC Valve Coil
8. Freespool Plug



Valve Manifold Assembly
P/N 2311887
(The color of the manifold body is silver, and coils do not have leads.)

Figure 3-6 Valve Manifold Assembly and Hydraulic Schematic (1)
Usage - S/N AW6G-1764 through S/N AW6G-2019



GENERAL

HOUSING MATERIAL:
Aluminum, clear anodized

AMBIENT STORAGE TEMPERATURE RANGE:
Min. −4°F.
Max. +140°F.

TYPE OF CONNECTIONS:
P = SAE−12
B1, B2, CB1, CB2 = SAE−10
AC1, AC2, CL1, CL2, CL3, T4, T4A, CL4, HF1, HF2 = SAE−8
Others = SAE−4

MOUNTING POSITION(S):
All

HYDRAULIC

OPERATING FLUID:
Mineral based hydraulic fluid

OPERATING FLUID TEMPERATURE RANGE:
Min. −4°F.
Max. +248°F.

VISCOSITY RANGE:
min. 5 SUS
max. 2000 SUS

MAX. PRESSURE:
3000 psi

MAX. FLOW RATE:
3 gpm

FILTRATION:
Maximum permissible contamination level of operating fluid to ISO 4406 class 21/19/16. Use a filter with a minimum minimum retention rate of $Beta_{20}$ equal to or less than 100. 2026

ELECTRICAL

NOMINAL VOLTAGE:
24 VDC

DUTY CYCLE:
100% (CONTINUOUS OPERATION) AT 115% OF NOMINAL VOLTAGE

MAX COIL TEMP:
320°F (160°C)

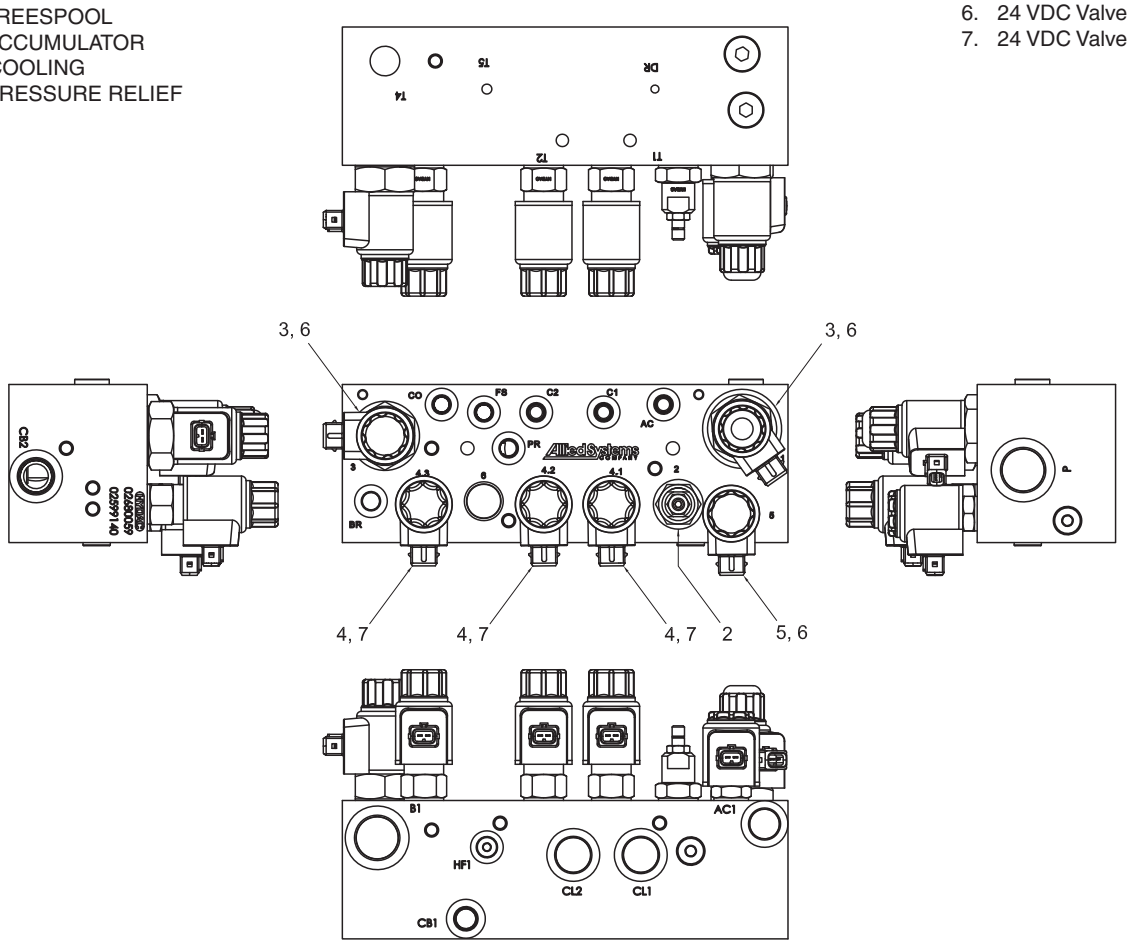
TYPE OF CONNECTION:
AMP JR TIMER

Hydraulic Schematic
P/N 2311887

Figure 3-7 Valve Manifold Assembly and Hydraulic Schematic (2)
Usage - S/N AW6G-1764 through S/N AW6G-2019

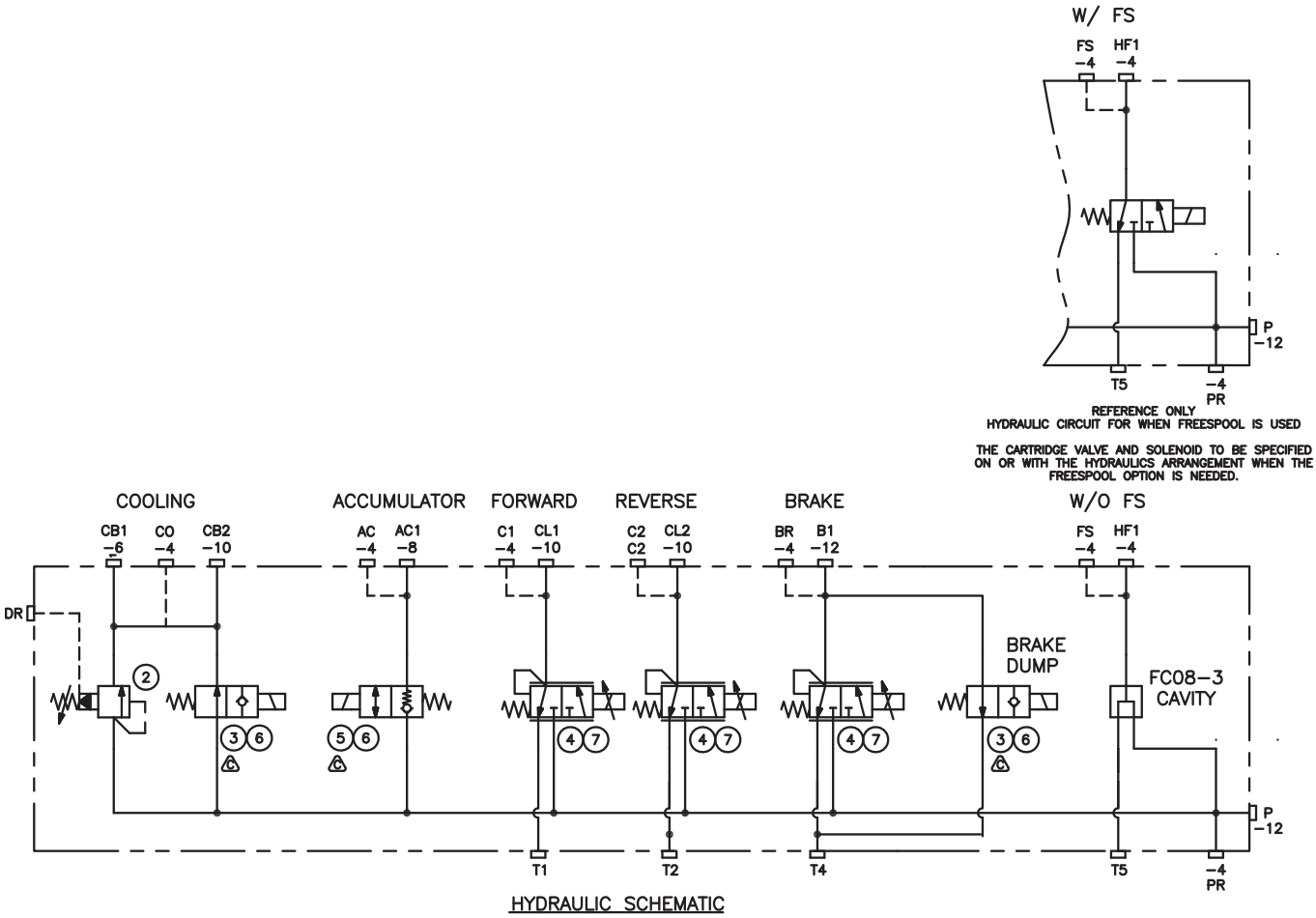
Gauge Port Labels
C1 = FORWARD
C2 = REVERSE
BR = BRAKE
FS = FREESPOOL
AC = ACCUMULATOR
CO = COOLING
PR = PRESSURE RELIEF

2. Relief Valve
3. Cartridge Valve
4, Proportional Valve
5. Cartridge Valve
6. 24 VDC Valve Coil
7. 24 VDC Valve Coil



Valve Manifold Assembly
P/N 2314998
(The color of the manifold body is blue, and coils do not have leads.)

Figure 3-8 Valve Manifold Assembly and Hydraulic Schematic (1)
Usage - S/N AW6G-2020 and Up



GENERAL

HOUSING MATERIAL:
Aluminum, Blue anodized

AMBIENT STORAGE TEMPERATURE RANGE:
Min. −4°F.
Max. +140°F.

MOUNTING POSITION(S):
All

CARTRIDGE INSTALLATION TORQUES:
All 7/8 Hex Head: 18−22 Ft−Lbs (25−29 N−M)
All 1 1/2 Hex Head: 96−133 Ft−Lbs (131−180 N−M)

HYDRAULIC

OPERATING FLUID:
Mineral based hydraulic fluid

OPERATING FLUID TEMPERATURE RANGE:
Min. −4°F.
Max. +248°F.

VISCOSITY RANGE:
min. 5 SUS
max. 2000 SUS

MAX. OPERATING PRESSURE:
900 psi

MAX. FLOW RATE:
10 gpm

FILTRATION:
Maximum permissible contamination level of operating fluid to ISO 4406 class 21/19/16 and 18/16 /13.
Use a filter with a minimum retention rate of β > 200.

ELECTRICAL

NOMINAL VOLTAGE:
24 VDC

DUTY CYCLE:
100% (CONTINUOUS OPERATION) AT 115% OF NOMINAL VOLTAGE

MAX COIL TEMP:
320°F (160°C)

TYPE OF CONNECTION:
AMP JR TIMER

Hydraulic Schematic
P/N 2314998

Figure 3-9 Valve Manifold Assembly and Hydraulic Schematic (2)
Usage - S/N AW6G-2020 and Up

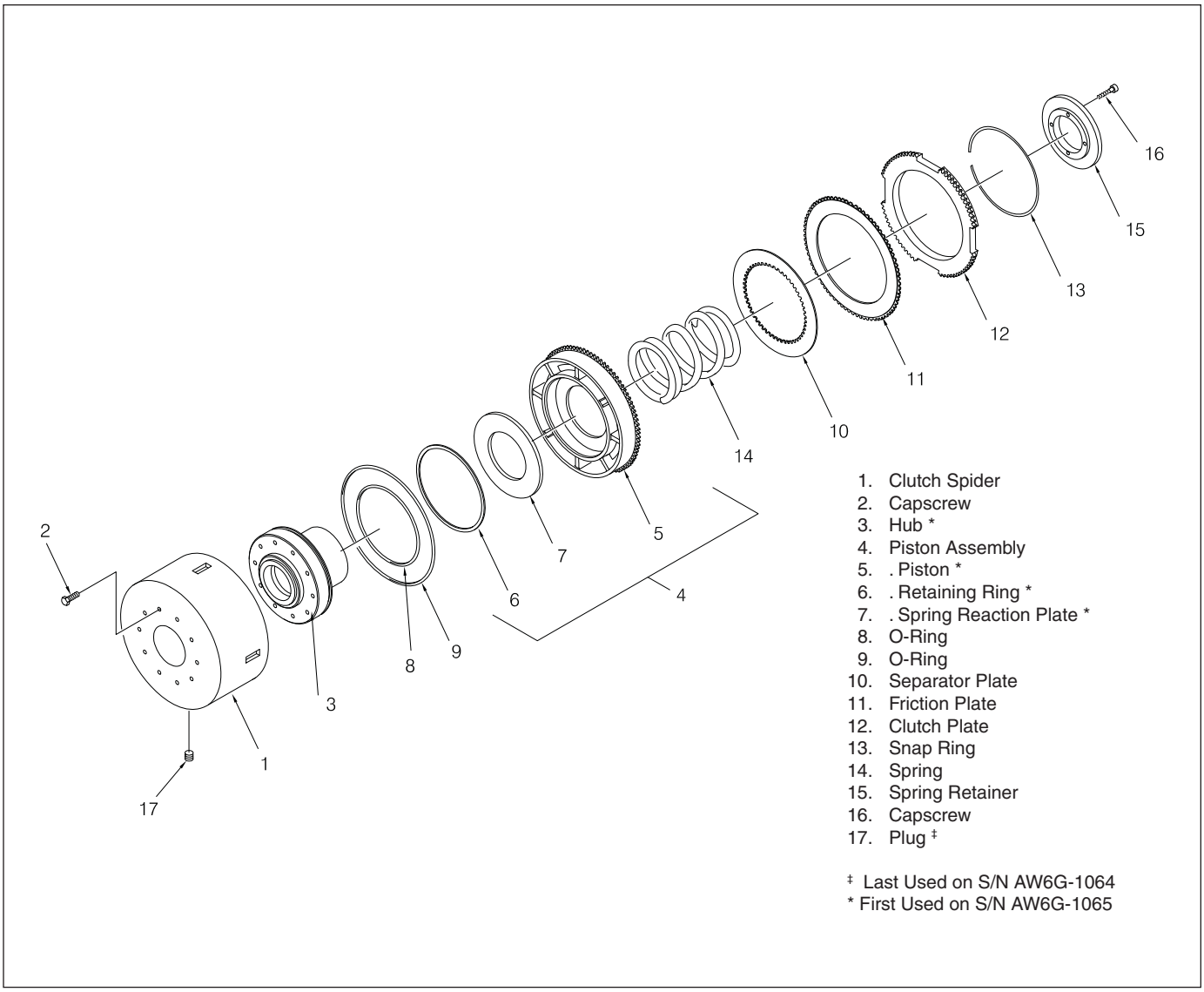


Figure 3-10 Oil Clutch

Relief Valve

A pressure relief valve is installed in the valve manifold assembly to prevent excessive hydraulic oil pressure. It is a spring loaded, poppet-type valve mounted below the valve manifold assembly's inlet port. Cooling oil is distributed through the hydraulic lines to the brake and clutches to remove excess heat. When pressure starts to rise above 220±5 psi (1520±35 kPa) at the inlet port, the spring-loaded poppet in the relief valve will bypass the excess flow to the cooling passage. An orifice in the relief valve poppet prevents oil from becoming trapped behind the poppet and causing a hydraulic lock.

Oil Clutch (See Fig. 3-10)

The **LINE-IN** and **LINE-OUT** clutch assemblies are identical. Each clutch is a multi-disc type that is hydraulically applied and spring released.

The separator plates of the clutch are internally splined to the clutch hub. The friction discs have external teeth that fit the splines in the clutch spider. The separator plates rotate with the hub. The piston and clutch housing rotate with the clutch/brake shaft. Oil passages in the clutch shaft supply the oil pressure from the control valve to the piston. Hydraulic oil also cools and lubricates the bearings and internal components of the clutch. When the oil pressure pushes the piston against the separator plates and friction discs, the clutch is applied. The torque from the input shaft is transferred through the clutch and causes the winch to operate. (See Figs. 1-18 and 1-19)

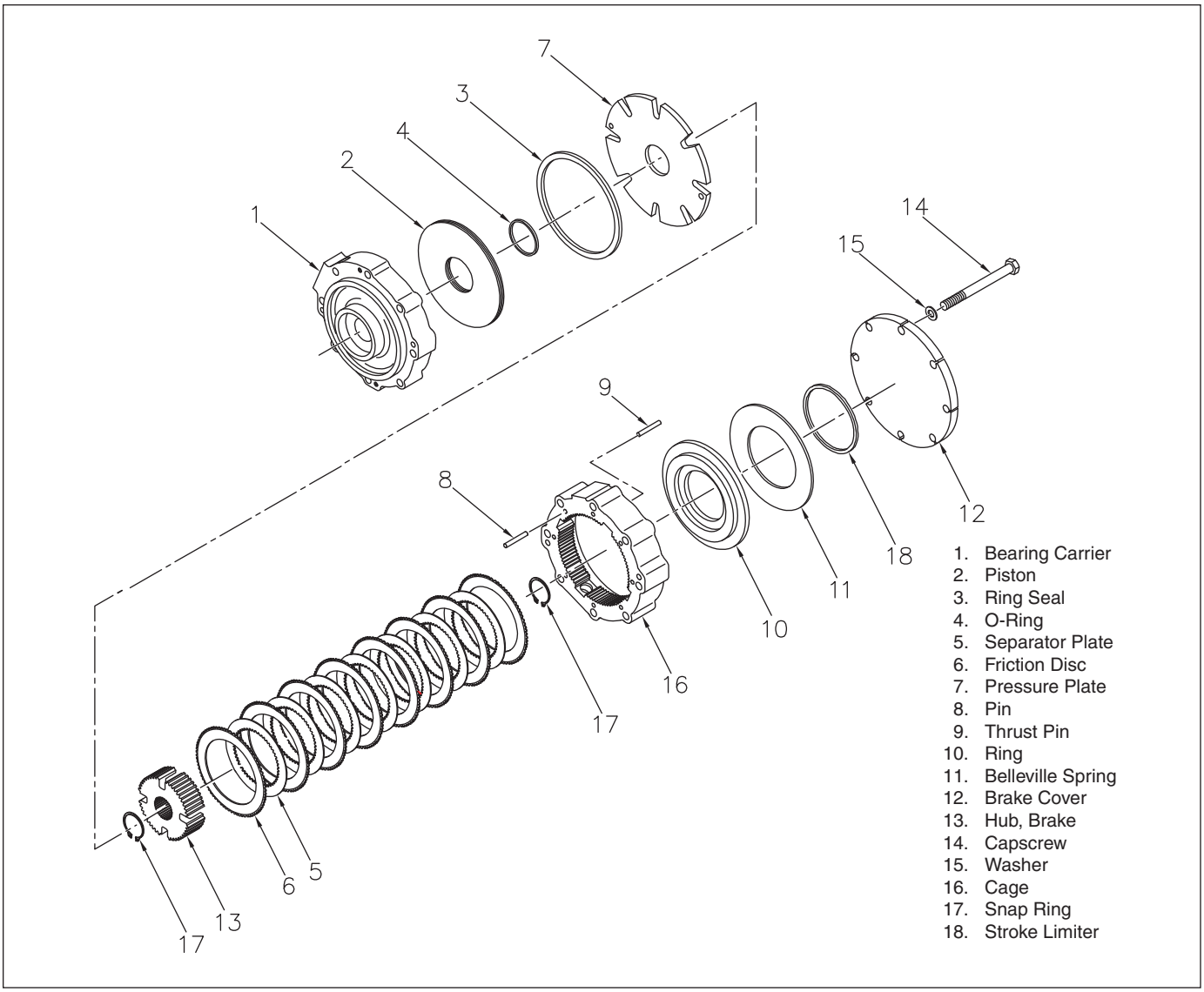


Figure 3-11 Oil Brake

Oil Brake (See Fig. 3-11)

The oil brake is a multi-disc brake that is spring applied and hydraulically released. The brake hub is connected to the clutch/brake shaft with splines. The brake is applied if a clutch is not applied. When oil pressure applies a clutch, the oil pressure also releases the brake. The brake will also be released when the control lever is in the **BRAKE -OFF** position.

The brake is applied by spring pressure from a belleville spring in the brake housing. The spring pushes against a ring, applying pressure to the friction discs and the separator plates. As pressurized oil is directed into the cavity between the piston and piston housing, the piston moves outward, compressing the belleville spring which releases the brake.

The friction discs have teeth that engage the splines inside the brake housing and are held stationary. Teeth in the separator plates engage the splines in the hub and rotate with the hub.

A piston stroke limiter, used on some versions, limits the total volume of oil consumed in releasing the brake. This helps with clutch/brake timing.

When the control valve sends hydraulic pressure to apply the clutch, the hydraulic pressure also releases the brake. The hydraulic pressure causes the piston to compress the belleville spring and releases the brake. The brake is released in the **LINE-IN**, **LINE-OUT**, and **BRAKE-OFF** positions of the control lever. The **BRAKE-OFF** function applies hydraulic pressure to release the brake, but no hydraulic pressure is sent to apply the clutch. Continuous low pressure oil flow is used for cooling the brake.

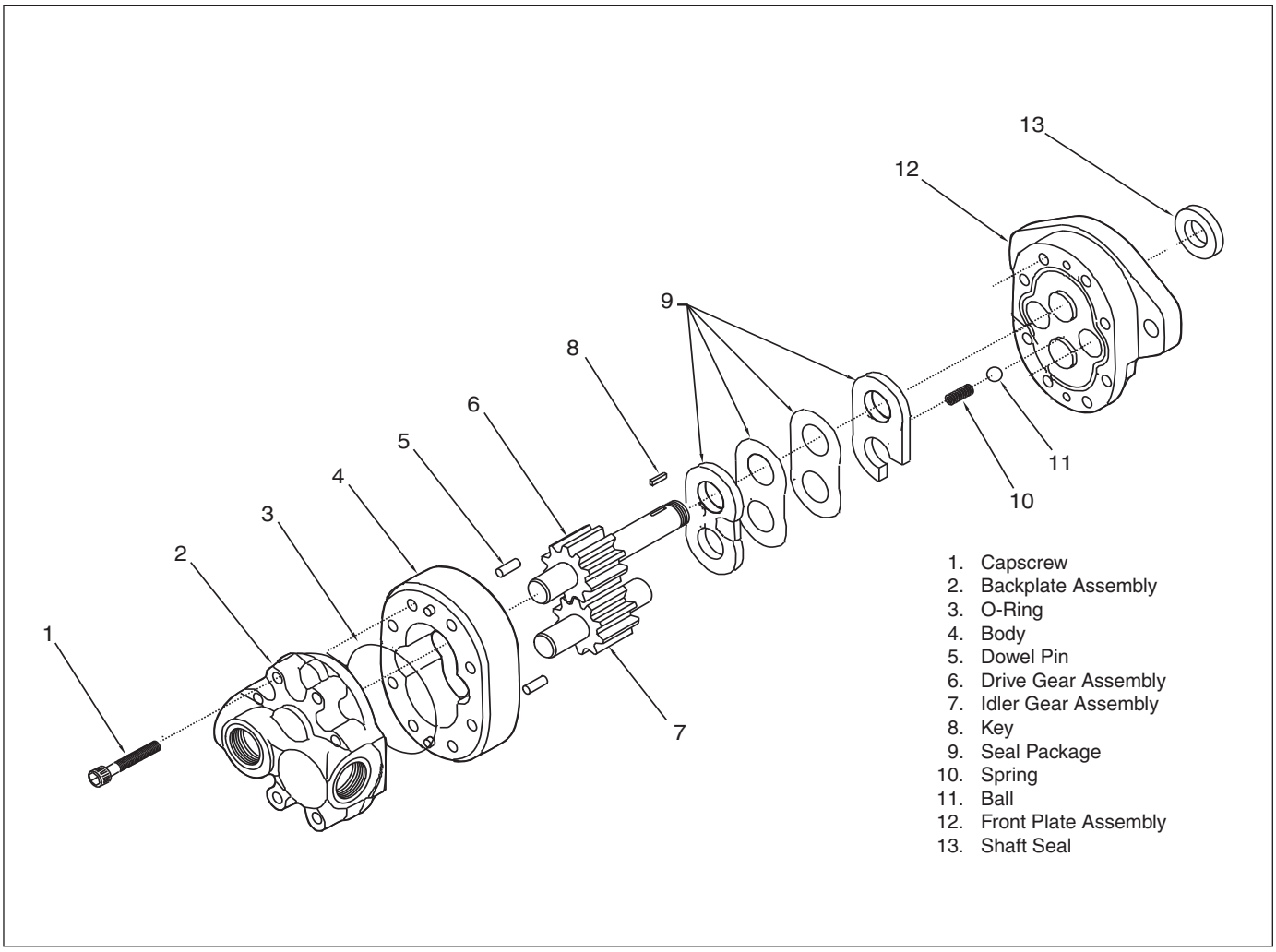


Figure 3-12 Hydraulic Pump

Hydraulic Pump (See Fig. 3-12)

The hydraulic pump is a positive displacement gear pump that supplies the hydraulic flow necessary for operation of the winch. The pump shaft is driven by a spur gear off of the input shaft. The pump inlet port is connected to the winch suction filter. The outlet is connected through the pressure filter to the control valve inlet port.

Accumulator *

The W6G hydraulic system utilizes an accumulator. The bladder has a nitrogen charge so that the oil stored in the accumulator will be under pressure. When released, this oil will provide pressure for the hydraulic system during low engine rpm shifts and if the PTO shaft stalls.

* Units with S/N AW6G-1027 and below use **TWO** accumulators

Accumulator Valve

The accumulator valve is located in the manifold. As the hydraulic system builds up pressure, oil can flow past the check ball in the valve and on into the accumulator. When the control lever is moved to the **LINE-IN**, **LINE-OUT** or **BRAKE-OFF** position, an electronic signal opens the accumulator valve to allow its pressurized oil to join the oil from the pump. It remains open while these functions are activated so that the accumulator can be recharged by pump flow. Numerous quick shifts of the control lever can deplete the accumulator quicker than it is being recharged. Therefore, the accumulator valve is also open for the first 8 seconds of being in the **BRAKE-ON** position.

Check Valve

The check valve prevents accumulator oil from reverse flowing through the pump.

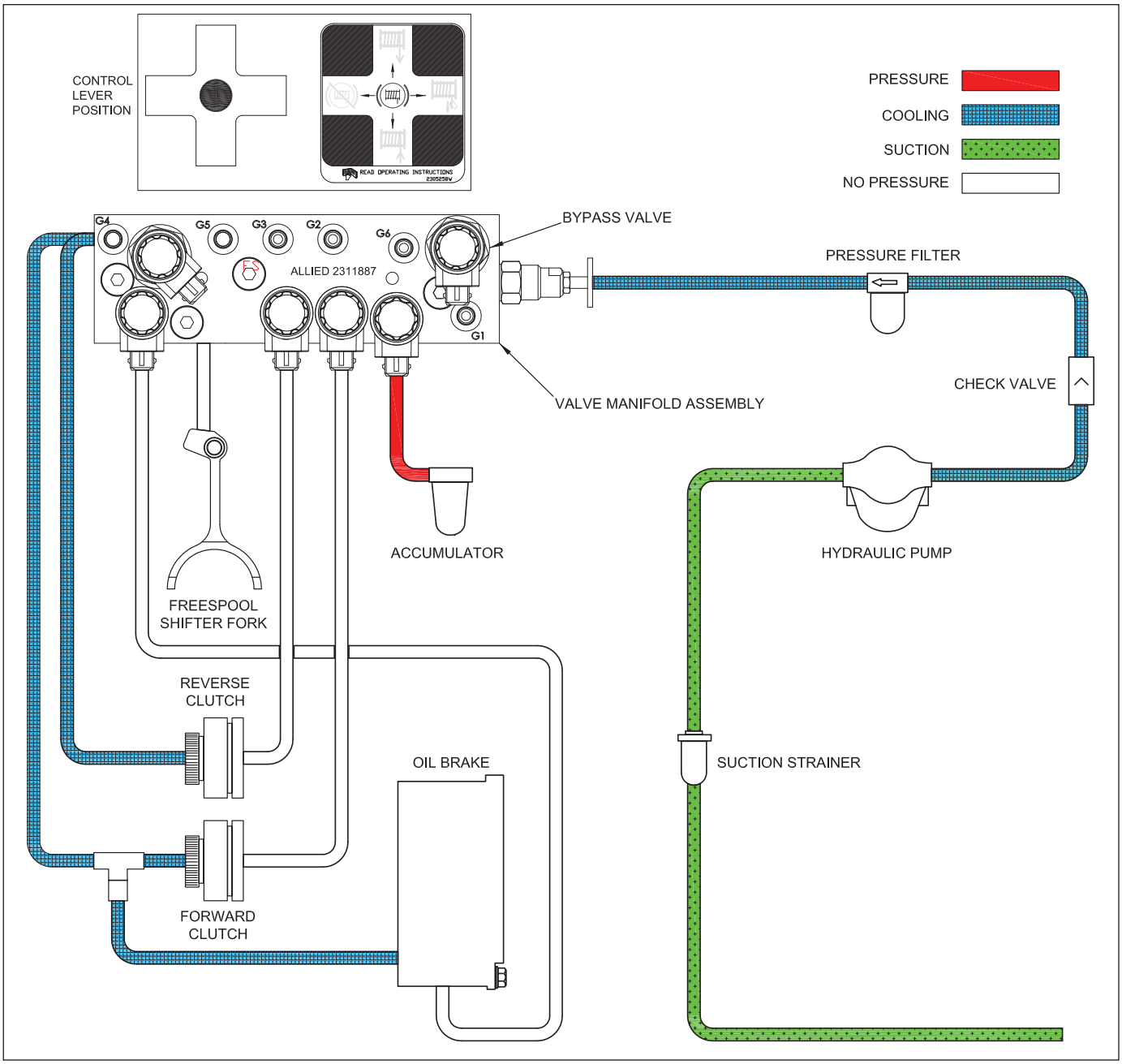


Figure 3-13 Hydraulic System, BRAKE-ON (Neutral)

Sequence of Operation, BRAKE-ON

Oil flows through the bypass valve to cool and lubricate the brake and clutch frictions. The brake is locked.

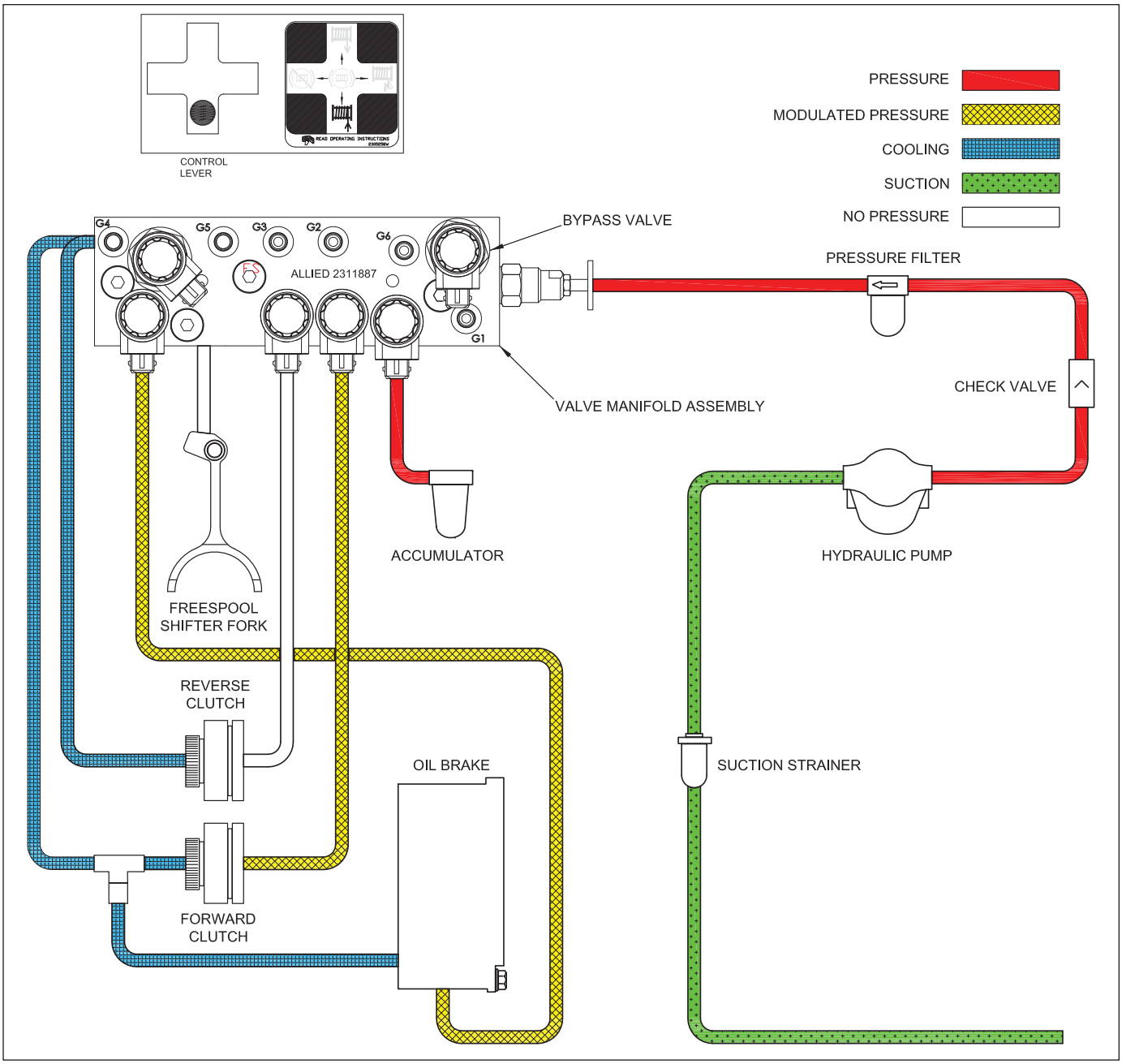


Figure 3-14 Hydraulic System, LINE-IN (Forward)

Sequence of Operation, LINE-IN

For **LINE-IN** (forward) operation, the operator pulls back on the control lever, which simultaneously closes the bypass valve and opens the accumulator valve. Oil flow from the pump and accumulators increases pressure. Brake pressure increases. The proportional brake and forward clutch valves open according to the control module program. Modulated pressure to the clutch and brake is supplied during inching (slight movement of the control lever from the **BRAKE-ON** position). Full pressure is applied to the clutch when the control lever is in full **LINE-IN** position. Brake pressure is limited to just above brake release pressure for faster response.

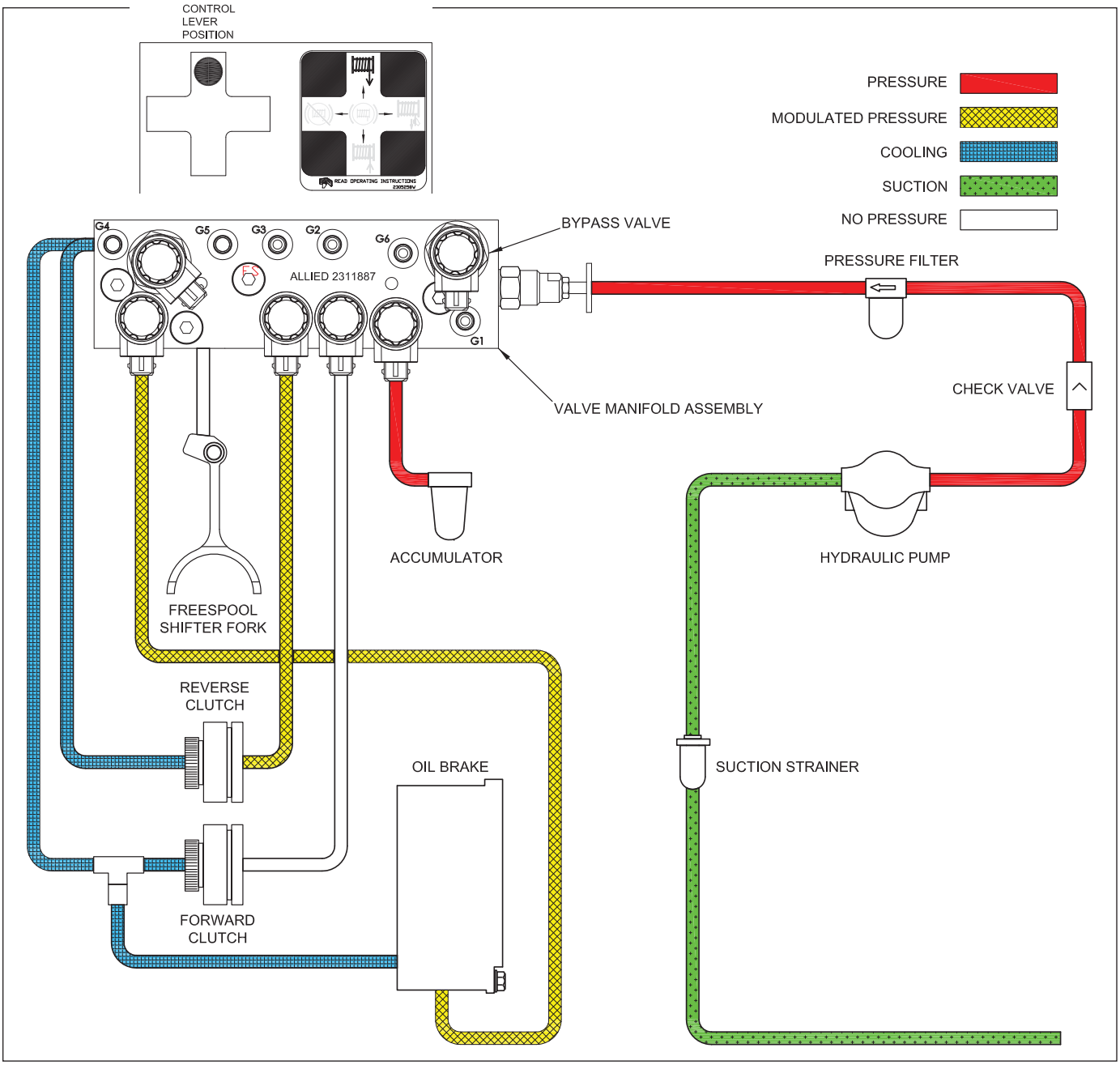


Figure 3-15 Hydraulic System, LINE-OUT (Reverse)

Sequence of Operation, LINE-OUT

LINE-OUT (reverse) operation is achieved by pushing the control lever forward from the **BRAKE-ON** position, which simultaneously closes the bypass valve and opens the accumulator valve. Oil flow from the pump and accumulators increases pressure. Brake pressure increases. The proportional brake and reverse clutch valves open according to the control module program. Modulated pressure to the clutch and brake is supplied during inching (slight movement of the control lever from the **BRAKE-ON** position). Full pressure is applied to the clutch when the control lever is in full **LINE-OUT** position. Brake pressure is limited to just above brake release pressure for faster response.

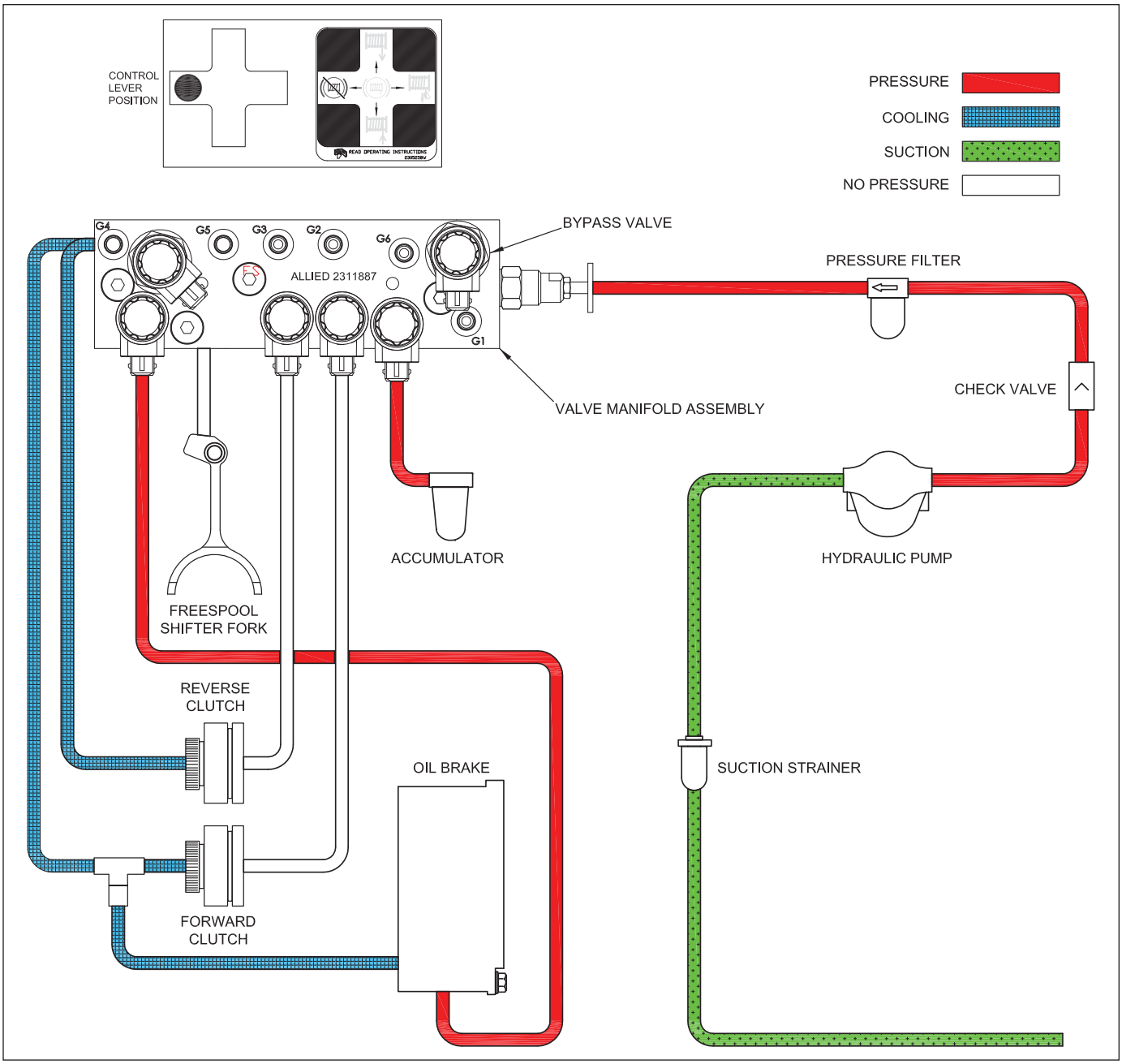


Figure 3-16 Hydraulic System, BRAKE-OFF

Sequence of Operation, BRAKE-OFF

BRAKE-OFF is achieved by pushing the control lever to the left of the **BRAKE-ON** position. This position is detented and the control lever must be moved manually to return it to the **BRAKE-ON** position. The bypass valve closes as the accumulator valve opens. Brake pressure increases, and fully releases the brake.

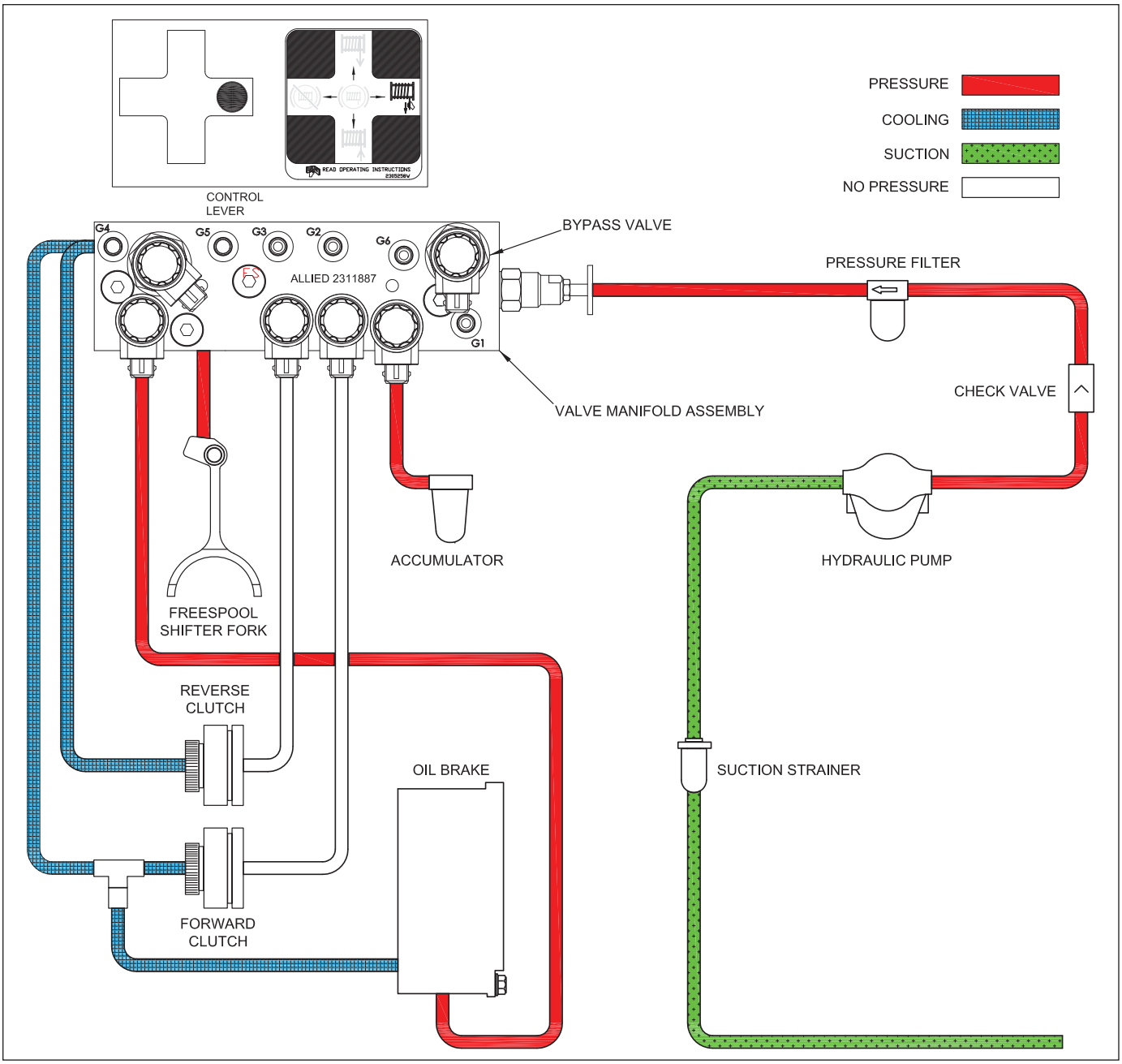


Figure 3-17 Hydraulic System, FREESPOOL

Sequence of Operation, FREESPOOL

When equipped with the **FREESPOOL** option, operation is achieved by pushing the control lever to the right from the **BRAKE-ON** position. This position is detented and the control lever must be moved manually to return it to the **BRAKE-ON** position. The bypass valve closes as the accumulator valve opens. Brake pressure increases. The freespool valve opens and supplies full pressure to the freespool shifter fork, allowing the dental clutch to disengage the drum pinion gear from the intermediate gear. The gear train is disengaged from the drum gear so wire rope can be pulled from the drum by hand.

⚠ WARNING

The FREESPOOL function disengages the gear train and any load that may be on the wire rope, an uncontrolled release of the load may occur. Loss of the load can result in injury and damage.

Electronic Control Module

The DVC10, the programmable controller, has a large number of inputs and outputs allowing stand-alone operation or it can be the controller for a large CAN Bus system with up to 16 DVC expansion modules.

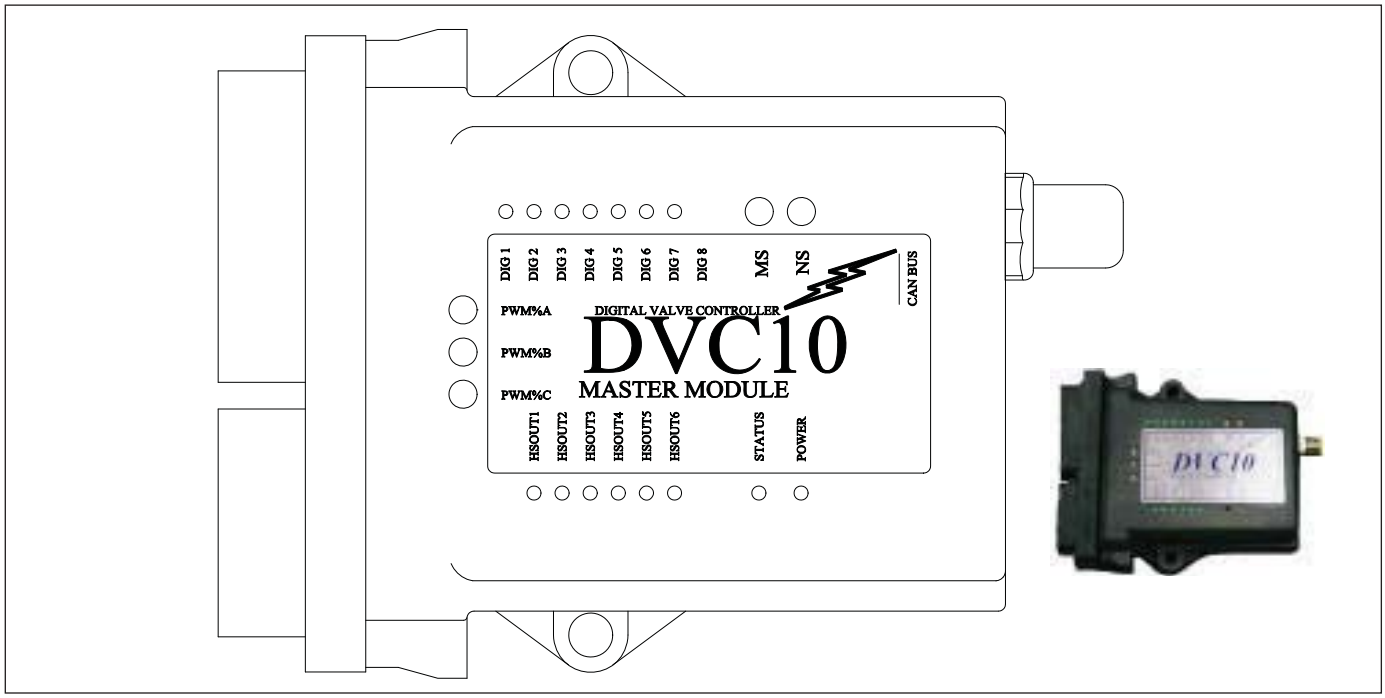


Figure 3-18 Electronic Control Module DVC10

LED	FUNCTION	NORMAL (POWERED) CONDITION
MS	Module status	Lit (green) after power-up. While downloading a program to the module, MS and NS LEDs will flash in an alternating fashion.
NS	Network status	Lit or flashing after power-up. While downloading a program to the module, MS and NS LEDs will flash in an alternating fashion.
DIG1-DIG8	Digital inputs	Not used.
PWM%A	FWD/REV modulation	Solid red to green in FWD or REV.
PWM%B	Brake modulation	Solid red to green in FWD, REV or **BRAKE-OFF**.
PWM%C	Fault detection	Solid at startup.
HSOUT1	Forward output	FWD operation.
HSOUT2	Reverse output	REV operation.
HSOUT3	Brake output	FWD, REV or **BRAKE-OFF** operation.
HSOUT4*	Brake dump/Cooling oil output;	FWD, REV or **BRAKE-OFF** operation. (with activation switch installed)
HSOUT5	Freespool output	**FREESPOOL** operation.
HSOUT6**	Accumulator output	FWD, REV or **BRAKE-OFF** operation. (with activation switch installed)
STATUS	Not used	N/A
POWER	Power indicator	Lit after power-up.
* Prior to S/N 1518: HSOUT4 = Accumulator/Cooling output (without activation switch installed). ** Prior to S/N 1518: HSOUT6 = Brake dump output (without activation switch installed).		

Figure 3-19 Electronic Control Module LED States For Various Functions

Input / Output Functions

There are eight Input/Output Functions that can be programmed individually. The Input/Output Function gives Allied the ability to change the response of the output with the change of the input (see sample screen below). Different adjustable points on the response curve give Allied full flexibility to control non-linear responses. These functions are adjustable while the controller is running, allowing adjustment of unknown output characteristics.

WINCH FUNCTION	ECM LEDs ILLUMINATED GREEN
BRAKE-ON	Power MS
BRAKE-OFF	Power MS HSOUT3 HSOUT4 HSOUT6 PWM%B
LINE-IN	Power MS HSOUT1 HSOUT3 HSOUT4 HSOUT6 PWM%A PWM%B
LINE-OUT	Power MS HSOUT2 HSOUT3 HSOUT4 HSOUT6 PWM%A PWM%B

Figure 3-20 Electronic Control Module LED Description Chart

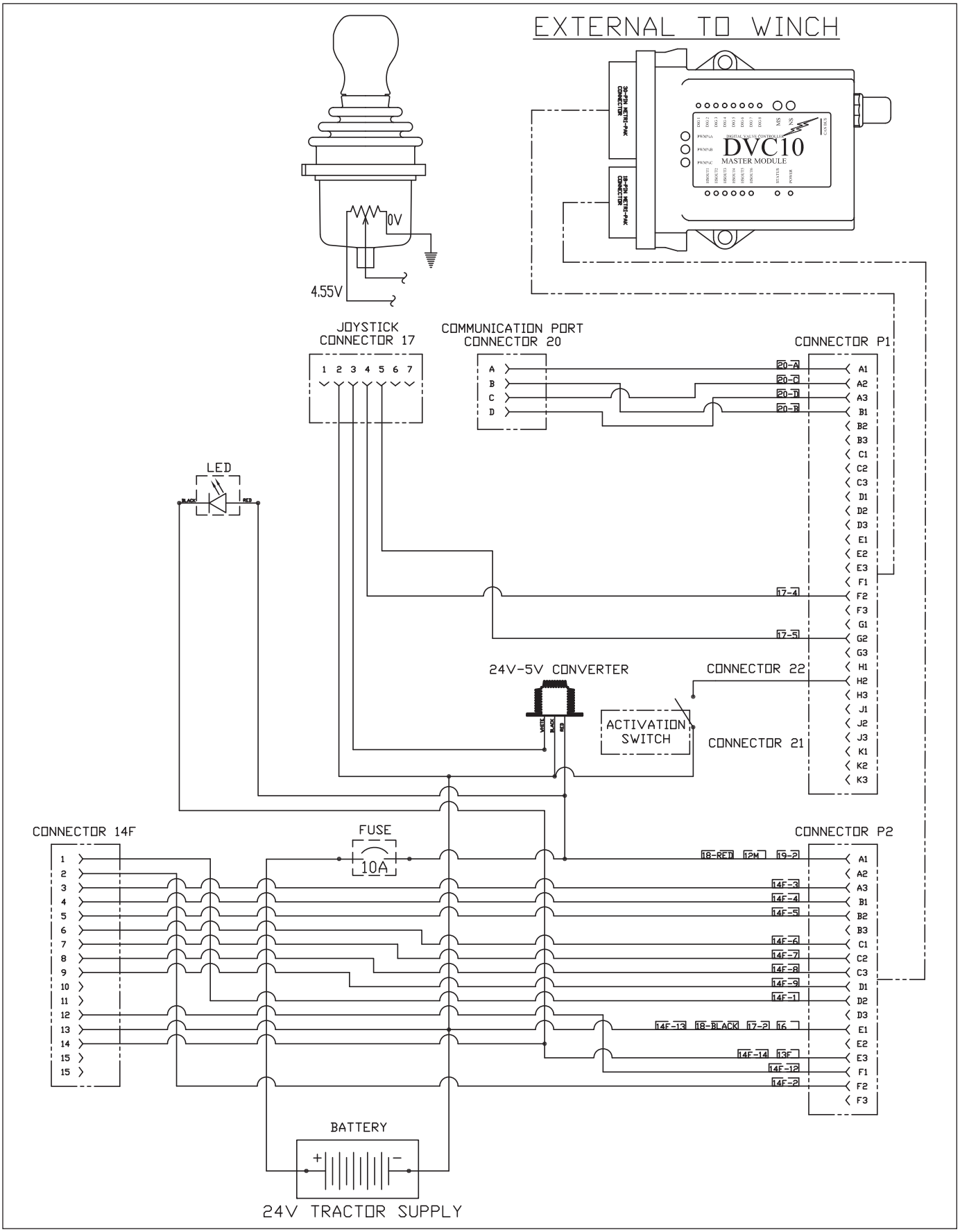
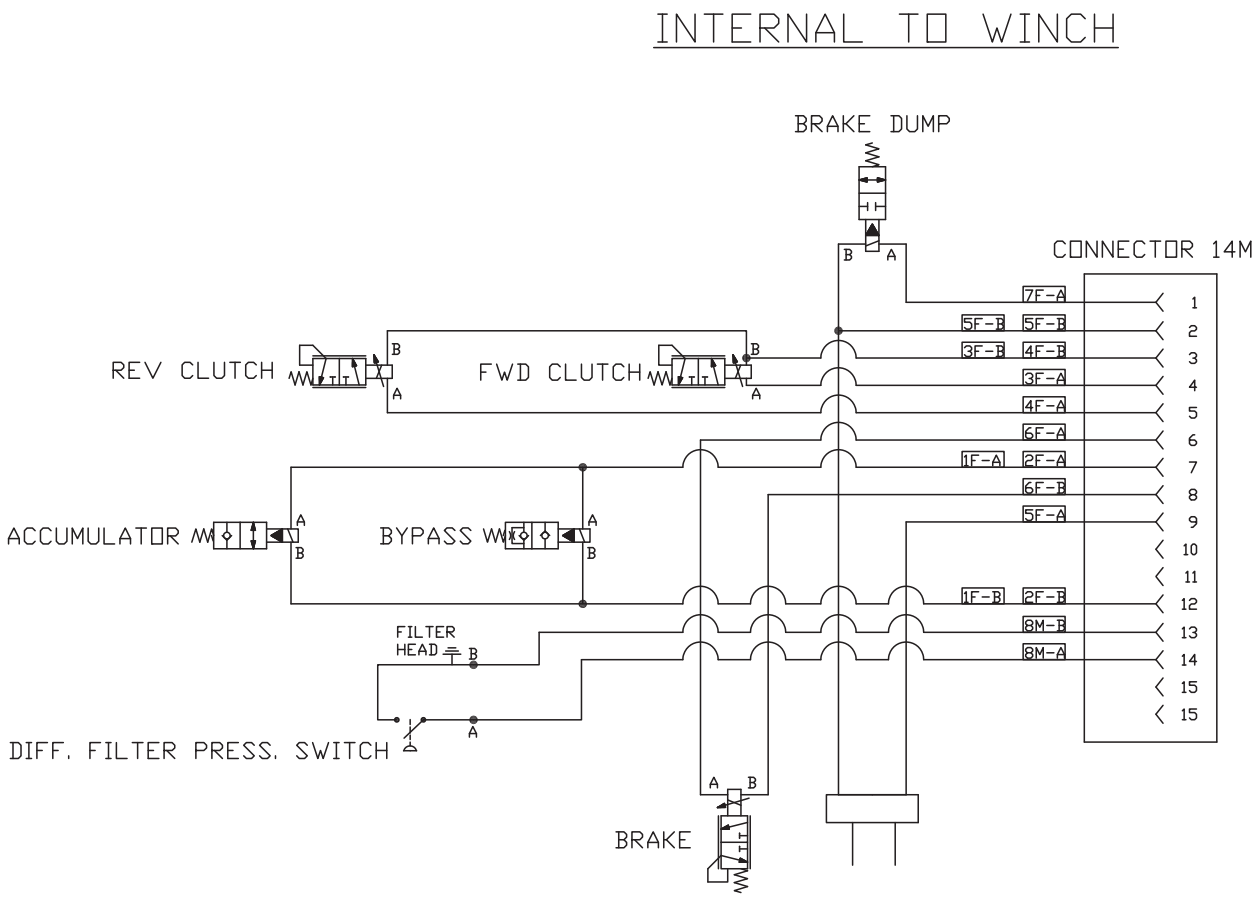


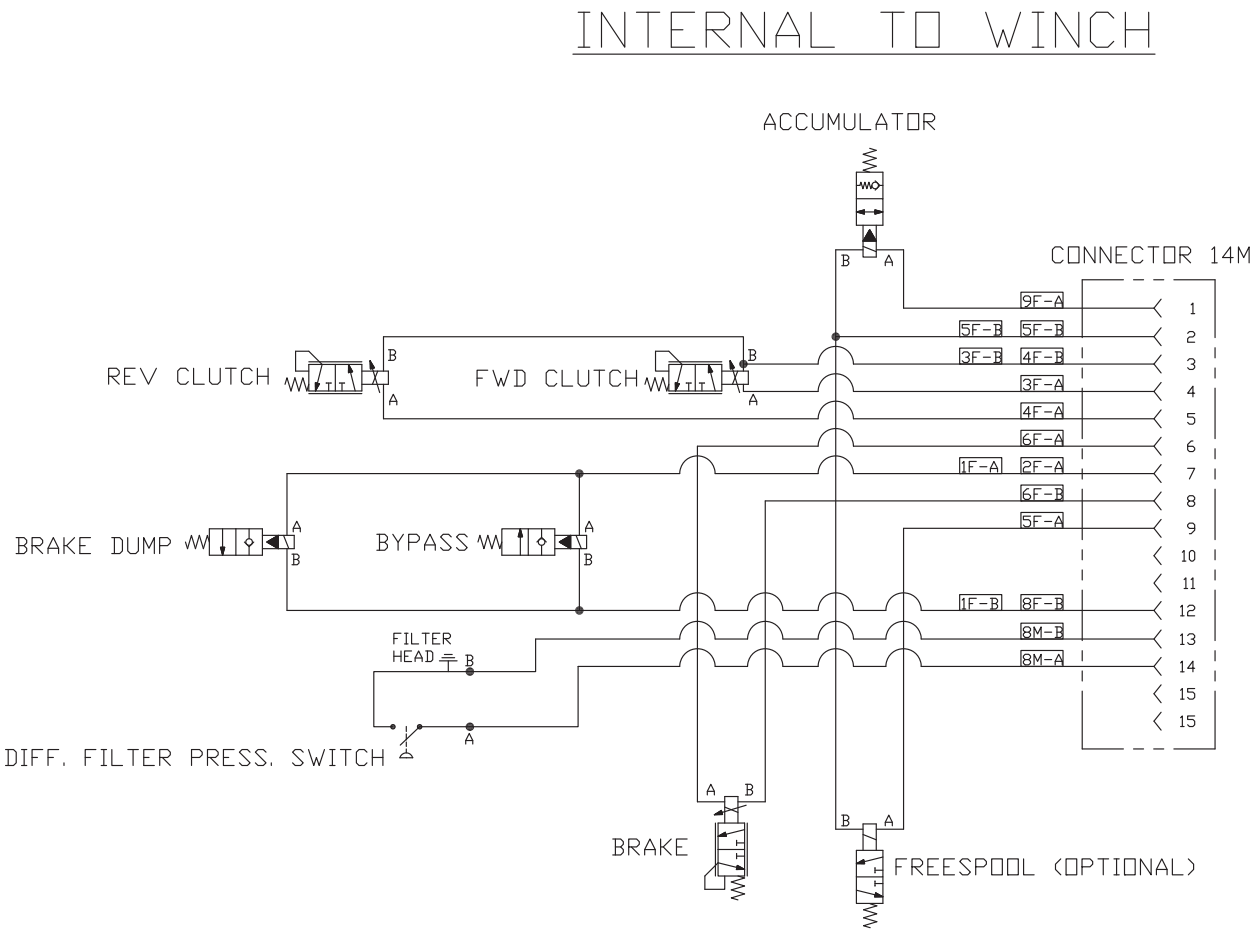
Figure 3-22 DVC10 Electronic Schematic (1)



NOTES:

1) EXTERNAL WIRING HARNESS CONNECTOR 14F CONNECTS TO INTERNAL HARNESS CONNECTOR 14M.
2) SPECIFICATIONS:
   (VOLTAGE CONVERTER)
   +8VDC TO +30VDC POWER INPUT RED WIRE
   +5VDC ±5% AT 40 MILLIAMP OUTPUT WHITE WIRE
   (JOYSTICK)
   +5VDC POWER SUPPLY ±0.5VDC
   15 MILLIAMP CURRENT CONSUMPTION
   +0.5VDC TO +4.5VDC OUTPUT
   (LED)
   +24VDC POWER SUPPLY
   20 MILLIAMP MAXIMUM SUPPLY CURRENT
   (DVC CONTROL MODULE)
   +8VDC TO +30VDC POWER SUPPLY
   (SOLENOID VALVES)
   FWD, REV, BRAKE, COOLING 1.17 AMP MAXIMUM CURRENT
   FREESPOOL, BRAKE DUMP, ACCUMULATOR 0.8 AMP MAXIMUM CURRENT
   +24VDC POWER SUPPLY
   15-50 OHMS RESISTANCE THROUGH COILS

Figure 3-23 DVC10 Electronic Schematic (2)
Last Used on S/N AW6G-1517



NOTES:

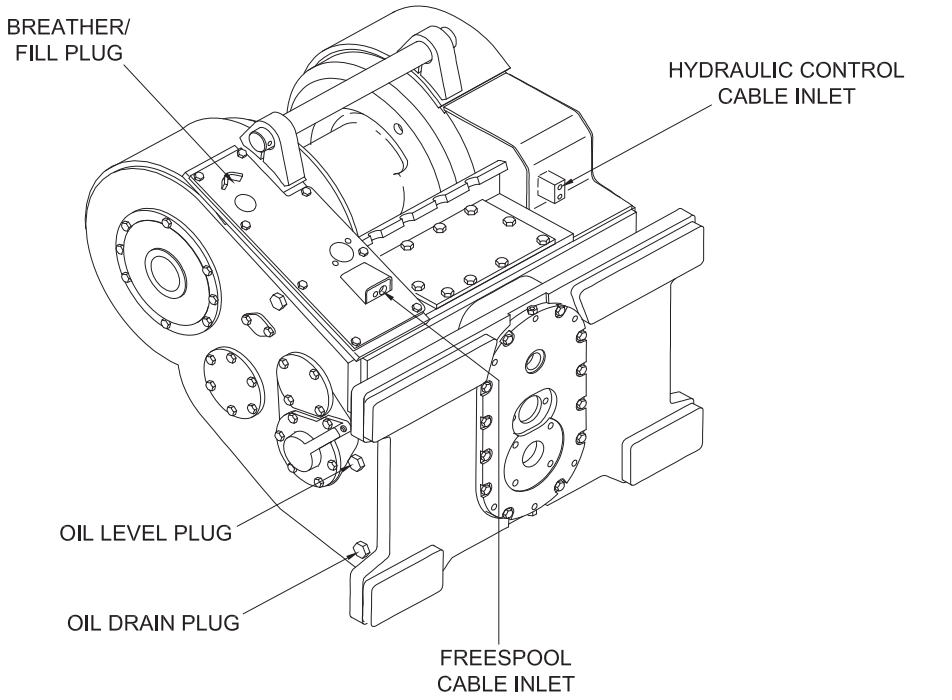
1) EXTERNAL WIRING HARNESS CONNECTOR 14F CONNECTS TO INTERNAL HARNESS CONNECTOR 14M.
2) SPECIFICATIONS:
   (VOLTAGE CONVERTER)
   +8VDC TO +30VDC POWER INPUT RED WIRE
   +5VDC ±5% AT 40 MILLIAMP OUTPUT WHITE WIRE
   (JOYSTICK)
   +5VDC POWER SUPPLY ±0.5VDC
   15 MILLIAMP CURRENT CONSUMPTION
   +0.5VDC TO +4.5VDC OUTPUT
   (LED)
   +24VDC POWER SUPPLY
   20 MILLIAMP MAXIMUM SUPPLY CURRENT
   (DVC CONTROL MODULE)
   +8VDC TO +30VDC POWER SUPPLY
   (SOLENOID VALVES)
   FWD, REV, BRAKE, COOLING 1.17 AMP MAXIMUM CURRENT
   FREESPOOL, BRAKE DUMP, ACCUMULATOR 0.8 AMP MAXIMUM CURRENT
   +24VDC POWER SUPPLY
   15-50 OHMS RESISTANCE THROUGH COILS

Figure 3-24 DVC10 Electronic Schematic (3)
First Used on S/N AW6G-1518

Service

This subsection provides the instructions for performing maintenance and making checks and adjustments. Standard shop tools are used in doing the work described in this subsection.

Maintenance Points



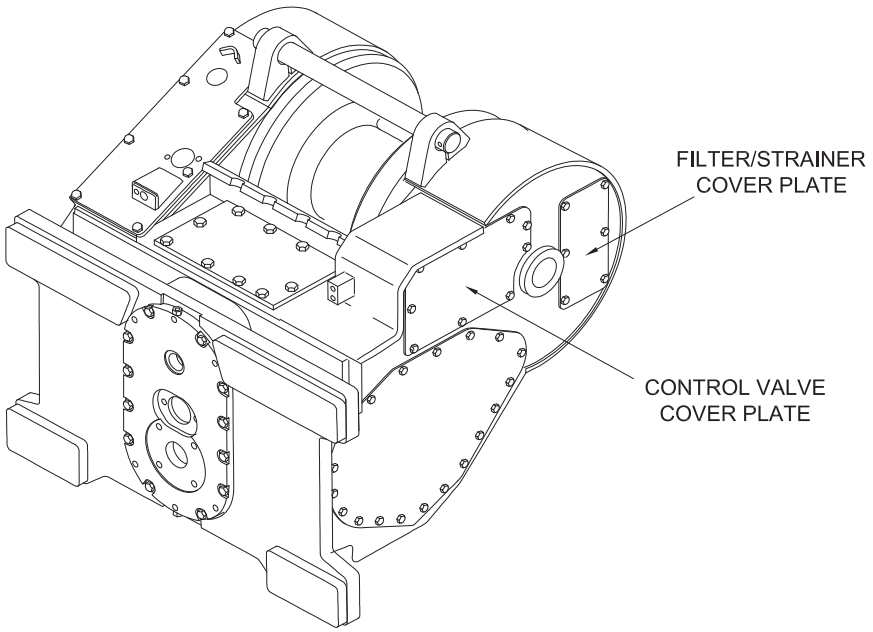


Figure 3-25 W6G Maintenance Points

Maintenance Schedule

The Maintenance Schedule is a program that includes periodic inspection and lubrication. Use the operating time on the hour meter of the tractor to determine the maintenance time for the winch.

INTERVAL	PROCEDURE OR QUANTITY	SPECIFICATION
50 hours or weekly *	Check oil at oil level plug. Add oil as necessary. Do not operate the tractor when checking the oil level.	See Figure 1-17 – Recommended Oil List.
	Clean the breather near the fill plug.	Remove debris around breather. Clean the breather with solvent if necessary.
	Lubricate the rollers on arch or fairlead assembly if the winch is equipped with either option.	Use multi-purpose grease with 2-4% molybdenum disulfide.
	POWER CONTROLS ONLY: Lubricate the winch control lever and the **FREESPOOL** control lever.	Use SAE 30 on the linkage as needed. Check that the control cable and control housing are fastened correctly.
500 hours or every 3 months	Clean the oil suction screen and magnets.*	Tilt the tractor approximately 15° to prevent loss of oil when the cover is removed. Use a new gasket between the cover and the suction tube.
	Clean the breather near the fill plug.	Clean the breather with solvent.
	Replace the filter.*	See the Parts Manual for filter element and cover gasket. When replacing, be sure to lubricate filter sealing O-ring between element and filter head. Torque filter to 30 lbs-ft.
1000 hours or every 6 months	Change the hydraulic oil. Drain oil from plug. Clean the oil strainer. Through fill plug, add 19.5 gallons (73.8 liters) † of oil. Check the oil level oil level plug.	See Figure 1-17 – Recommended Oil List.

* **NOTE: Clean the oil strainer screen and change the oil filter after the first 250 hours on new and rebuilt winches.**

† Amount of oil may vary slightly with tractor.

Figure 3-26 Maintenance Schedule

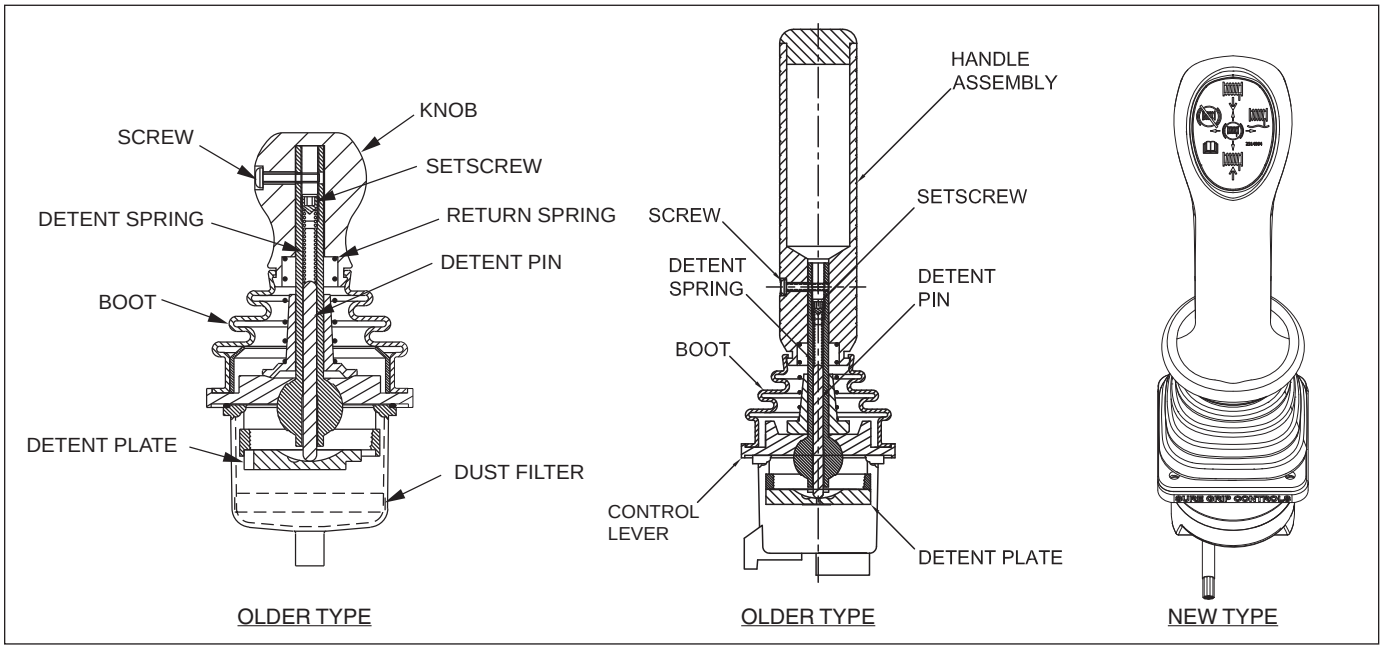


Figure 3-27 Control Lever

Checks Before Operation

Check that the wire rope and hook are not worn or damaged. Check that the periodic inspection and maintenance has been done at the recommended operating hours. See the Maintenance Schedule for the W6G winch.

Checks During Operation

The charts in subsection of Troubleshooting can be used by the operator to identify a problem with the winch operation. A trained service person is needed for additional troubleshooting and repair that requires disassembly of parts of the winch.

⚠ CAUTION

Make sure vehicle engine is OFF before performing any of these procedures.

⚠ CAUTION

Removing the Detent Plate from the control lever may cause a calibration error, which will prevent proper winch response.

Control lever Detent Force Adjustment (See Fig. 3-27)

1. Remove screw on control lever knob/handle. Lift knob/handle and boot from control lever.

2. Using an Allen wrench, turn the setscrew inwards to increase detent force, or outwards to decrease detent force.

3. Move control lever from **BRAKE-ON** to **BRAKE-OFF** and back again. If detent force is still unsatisfactory, adjust setscrew again.

NOTE: Detent force is different with knob/handle installed, since the compressed return spring works against the detent force.

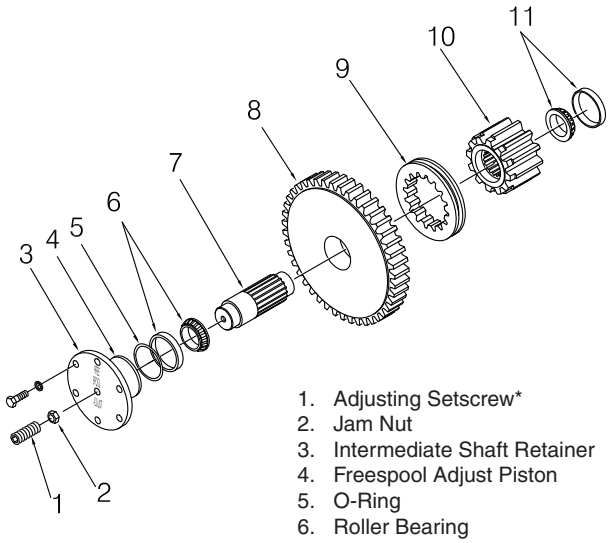
4. Place boot and knob/handle over control lever assembly, ensuring boot is securely installed, then install knob/handle screw.

NOTE: No lubrication or adjustment is required for the new type control lever.

Freespool Adjustment (See Fig. 3-28)

The preload on the bearings of the intermediate shaft controls the resistance to rotation of the drum during the **FREESPOOL** operation. The resistance to rotation is correct when the drum can be rotated by hand, but will not rotate more than one-half revolution after the hand is removed.

An adjusting setscrew is located in the center of the cover for the intermediate shaft. This screw can be tightened or loosened to adjust the preload on the intermediate shaft. The jam nut will maintain the **FREESPOOL** setting. This adjustment is normally only necessary if the winch has had an overhaul.



1. Adjusting Setscrew*
2. Jam Nut
3. Intermediate Shaft Retainer
4. Freespool Adjust Piston
5. O-Ring
6. Roller Bearing
7. Intermediate Shaft
8. Intermediate Gear
9. Dental Clutch
10. Pinion Gear
11. Roller Bearing

* S/N AW6G-1031 and below use a capscrew.

Figure 3-28 Freespool Adjustment

Hydraulic System Pressure Checks

The hydraulic oil and filter(s) should be maintained as indicated in the Maintenance Schedule. Dirty or restricted filters may cause inaccurate pressure readings.

Preparation

Prior to checking the hydraulic pressures, perform the following:

1. Remove wire rope from drum to prevent entanglement during pressure checks since the drum will rotate during the tests.

⚠ WARNING

Vehicle engine must be shut OFF before disconnecting drum wire rope. Be careful when you remove the wire rope from the drum. The end of the wire rope can move like a compressed spring, causing an injury when the ferrule is released from the drum.

⚠ WARNING

Always wear gloves when handling wire rope.

2. Start the engine and place the winch in **BRAKE-OFF** to raise the oil temperature to at least 27°C (80°F).
3. Remove any dirt from the left side of the winch. Remove control valve access cover. See Figure 3-29.

Pressure gauges

Two 400 psi (2800 kPa) calibrated pressure test gauges are required to perform the hydraulic pressure checks.

Figure 3-29 Remove Control Valve Cover Plate (Current Production with Blue Manifold Shown)

NOTE: Shut off the tractor engine when connecting and disconnecting test gauges.

⚠ WARNING

Place control lever in BRAKE-ON to prevent accidental discharge of pressurized oil stored in the accumulator.

Discussion

When the control valve cover is removed, determine which control valve manifold is installed. Units with a serial number of AW6G-2020 and later were shipped with the blue manifold, as shown in Figure 3-29. Older units were shipped with either a silver or red manifold. Some test pressures differ based on the control valve manifold installed. Additionally, the gauge port labels vary. See Figure 3-30 to determine the gauge port labels for your control valve manifold.

Manifold Port Labels		
Circuit or Function	**Blue Manifold S/N AW6G-2020 and after**	**Silver or Red Manifold Prior to S/N AW6G-2019**
Brake	BR	G4
Cooling	CO	G1
Freespool	FS	G5
Pressure Relief	PR	G1
Reverse Clutch	C2	G3
Forward Clutch	C1	G2
Accumulator	AC	G6

Figure 3-30 Hydraulic Gauge Port Labels

System Pressure Test

Test Equipment:

- 400 psi (2800 kPa) Gauge

Connect pressure gauge to system pressure port. See Figure 3-32. Port labels:

- **G1** (Silver or Red Manifold)
- **PR** (Blue Manifold)

Instructions

1. Shut down the engine.
2. Connect pressure gauge to the system pressure port.
3. Start the engine.
4. Set the PTO to a minimum of 1,000 RPM.
5. Move the control lever to the **BRAKE-OFF** position. Hold the control lever at its maximum travel position.
6. Check that the pressure is within the range shown in Figure 3-31.

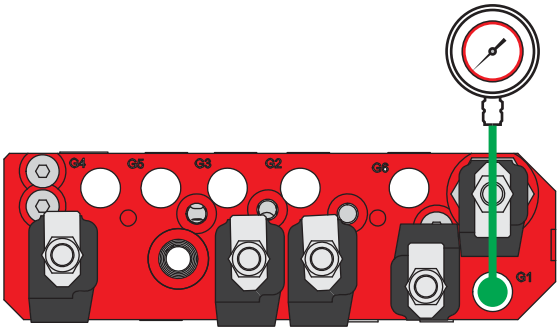
Troubleshooting

If the pressure observed differs from the values shown in Figure 3-31, check the following:

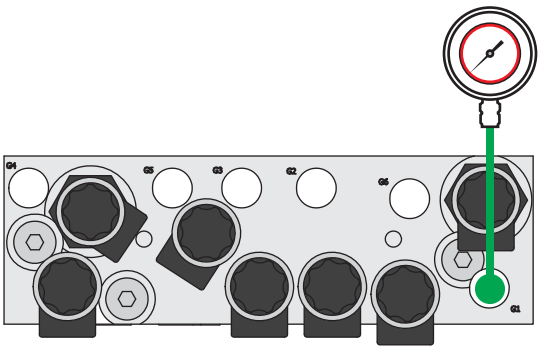
1. Improper setting at the relief valve.
2. Dirty filter or strainer.
3. Loose strainer cover.
4. Leaks at the pressure hoses or fittings.
5. Defects at the hydraulic pump, indicated by low pressure and pressure increases with increased engine RPM.

	Pressure in PSI [kPa]	
Manifold P/N	Min	Max
2303889W (Red)	200 [1,379]	300 [2,068]
2306547W or 2311887 (Silver)	215 [1,482]	255 [1,758]
2314998 (Blue)	215 [1,482]	255 [1,758]

Figure 3-31 Hydraulic Pressure Readings



Manifold PN: 2303889W (Red)



Manifold PN: 2306547W or 2311887 (Silver)

Manifold PN: 2314998 (Blue)

Figure 3-32 Gauge at System Pressure Port

Brake Pressure Test

Test Equipment:
- 400 psi (2800 kPa) Gauge

Connect pressure gauge to brake port. See Figure 3-34.
Port labels:
- **G4** (Silver or Red Manifold)
- **BR** (Blue Manifold

Instructions

1. Verify that the system pressure is correct.
2. Shut down the engine.
3. Connect pressure gauge to the brake port.
4. Start the engine.
5. Set the PTO to a minimum of 1,000 RPM.
6. Move the control lever to the **BRAKE-OFF** position. Hold the control lever at its maximum travel position.
7. Check that the pressure is within the range shown in Figure 3-33.

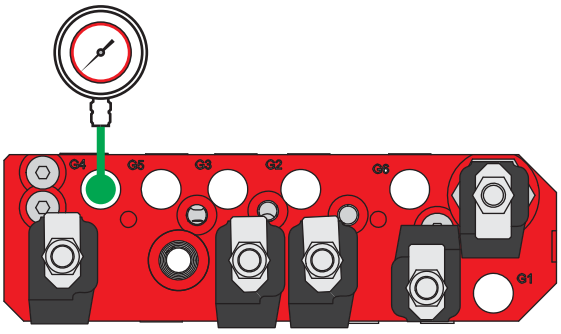
Troubleshooting

If the pressure observed differs from the values shown in Figure 3-33, check the following:

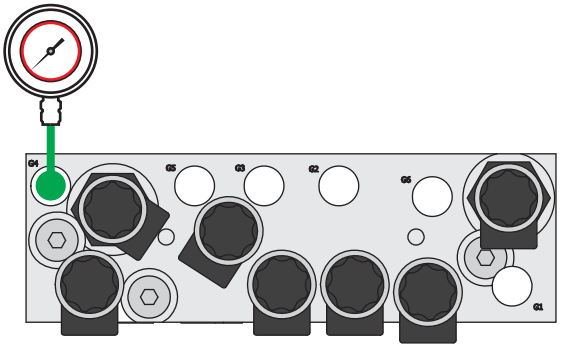
1. Improper setting at the relief valve.
2. Malfunctions at the suction strainer or pressure filter.
3. Leaks at the pressure hoses or fittings.
4. Defective brake piston seals.
5. Malfunction with brake dump valve or solenoid.
6. Defects at the hydraulic pump, indicated by low pressure and pressure increases with increased engine RPM.
7. If your readings are high for this test and your manifold is silver, your control program may need to be updated. Contact Allied Systems Service Department at 503.625.2560 for details.

	Pressure in PSI [kPa]	
Manifold P/N	Min	Max
2303889W (Red)	200 [1,379]	300 [2,068]
2306547W or 2311887 (Silver)	150 [1,034]	185 [1,276]
2314998 (Blue)	190 [1,310]	255 [1,758]

Figure 3-33 Hydraulic Pressure Readings



Manifold PN: 2303889W (Red)



Manifold PN: 2306547W or 2311887 (Silver)

Manifold PN: 2314998 (Blue)

Figure 3-34 Gauge at Brake Port

Cooling Oil Pressure Test

Test Equipment:

- 400 psi (2800 kPa) Gauge

Connect pressure gauge to cooling oil port. See Figure 3-36. Port labels:

- **G1** (Silver or Red Manifold)
- **CO** (Blue Manifold)

Instructions

1. Verify that the system pressure is correct.
2. Shut down the engine.
3. Connect pressure gauge to the cooling oil port.
4. Start the engine.
5. Set the PTO to a minimum of 1,000 RPM.
6. Ensure the control lever is in the **BRAKE-ON** position.
7. Check that the pressure is within the range shown in Figure 3-35.

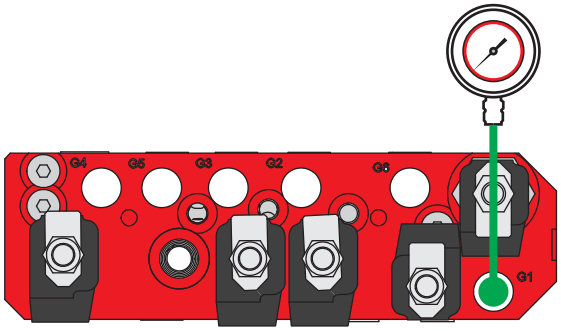
Troubleshooting

If the cooling oil pressure is too high or too low, overheating can occur. If the pressures observed differ from what is described above, check the following:

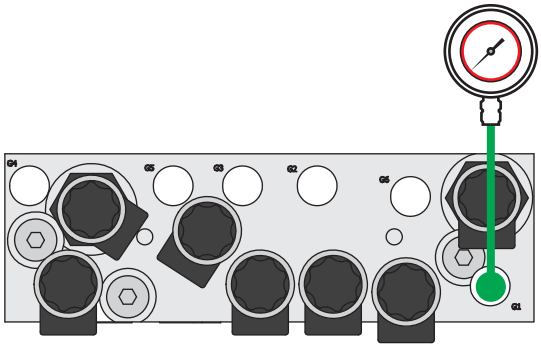
1. Malfunctions at the bypass valve.
2. Leaks or blockage at the pressure hoses or fittings.

	Pressure in PSI [kPa]	
Manifold P/N	**Min**	**Max**
2303889W (Red)	3 [21]	150 [1,034]
2306547W or 2311887 (Silver)	3 [21]	150 [1,034]
2314998 (Blue)	3 [21]	150 [1,034]

Figure 3-35 Hydraulic Pressure Readings



Manifold PN: 2303889W (Red)



Manifold PN: 2306547W or 2311887 (Silver)

Manifold PN: 2314998 (Blue)

Figure 3-36 Gauge at Cooling Oil Port

LINE-IN and LINE-OUT Pressure Test

Test Equipment:

- Two 400 psi (2800 kPa) Gauges

Connect pressure gauges to **LINE-IN** and **LINE-OUT** ports. See Figure 3-38. Port labels:

- **G2** and **G3** (Silver or Red Manifold)
- **C1** and **C2** (Blue Manifold)

General

Whether a particular port shown here is associated with **LINE-IN** or **LINE-OUT** depends on the direction of the PTO rotation of your tractor.

Instructions

1. Shut down the engine.
2. Connect pressure gauges to both ports shown.
3. Start the engine.
4. Set the PTO to a minimum of 1,000 RPM.
5. Place the control lever in **BRAKE-OFF** to build up the accumulator system pressure.
6. The pressure reading for both gauges should be near 0 psi.
7. Move the control lever in the **LINE-IN** position. Hold the control lever at its maximum travel position. One of the pressure gauges should indicate increased pressure.
8. Check that the pressure is within the range shown in Figure 3-37.
9. Move the control lever in the **LINE-OUT** position. Hold the control lever at its maximum travel position. The first gauge should drop back to near 0 psi, while the other pressure gauge should now indicate increased pressure.
10. Check that the pressure is within the range shown in Figure 3-37.

	Pressure in PSI [kPa]	
Manifold P/N	**Min**	**Max**
2303889W (Red)	200 [1,379]	300 [2,068]
2306547W or 2311887 (Silver)	200 [1,379]	225 [1,551]
2314998 (Blue)	190 [1,310]	255 [1,758]

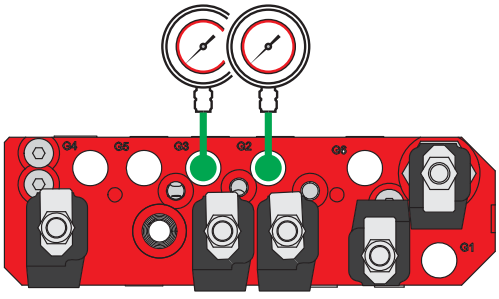
Figure 3-37 Hydraulic Pressure Readings

Troubleshooting

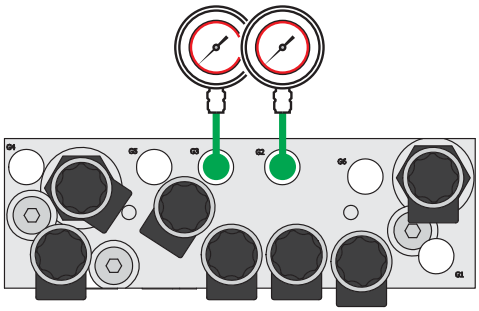
If either pressure observed differs from the values shown in Figure 3-37, check the following:

1. Damaged or worn clutch piston seals.
2. Damaged or worn valve manifold assembly parts.
3. Broken seal rings on clutch shaft.
4. Damaged O-rings on clutch shaft.
5. Leaks at the pressure hoses or fittings.

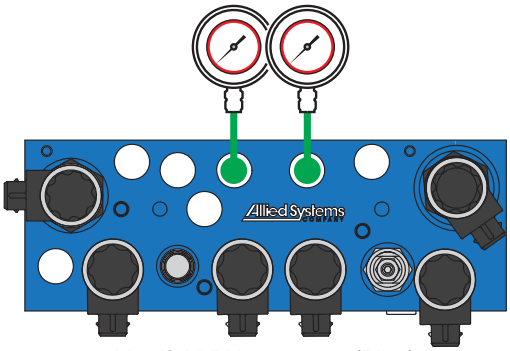
On a fast shift the clutch pressure should come up with the brake pressure. If the pressure differential is too low, the brake will not release soon enough and cause it to stall. If the pressure differential is too high, the brake will release too soon and cause backspinning of the drum.



Manifold PN: 2303889W (Red)



Manifold PN: 2306547W or 2311887 (Silver)



Manifold PN: 2314998 (Blue)

Figure 3-38 Gauges at LINE-IN & LINE-OUT Ports

Accumulator Pressure Test

Test Equipment:

- 400 psi (2800 kPa) Gauge

Connect pressure gauge to accumulator port. See Figure 3-40. Port labels:

- **G6** (Silver or Red Manifold)
- **AC** (Blue Manifold)

General

This check determines if the accumulator is functioning and has the correct nitrogen charge.

Instructions

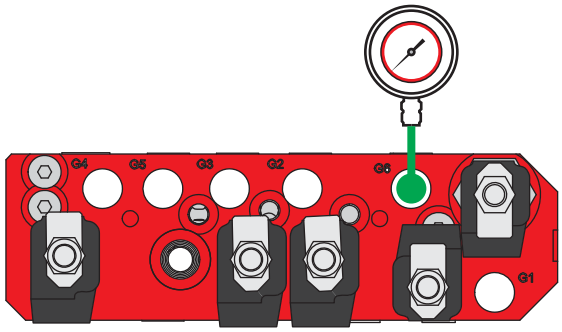
1. Shut down the engine.
2. Connect a pressure gauge to the accumulator port.
3. Start the engine.
4. Set the PTO to a minimum of 1,000 RPM.
5. Place the control lever in the **BRAKE-OFF** position and hold for 1 minute. This is to ensure the accumulator has a full supply of oil.
6. Return the control lever to **BRAKE-ON**.
7. Wait 10 seconds, until the accumulator valve closes (HSOUT4 light will go out).
8. Observe the pressure reading. It should remain above the value shown in Figure 3-39 for several minutes.
9. Shut down the engine.
10. Remove the accumulator valve stem protective cover.
11. Push gently on the valve stem. If any oil is emitted, it indicates a ruptured bladder. The accumulator must be replaced.

Recharging

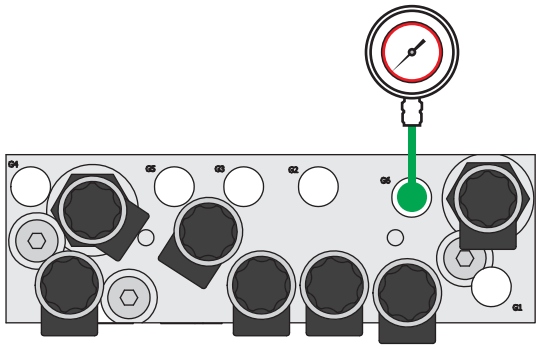
If the accumulator needs to be recharged, charge with dry nitrogen to 115 psi [793 kPa].

Manifold P/N	Pressure in PSI [kPa]
2303889W (Red)	200 [1,379]
2306547W or 2311887 (Silver)	200 [1,379]
2314998 (Blue)	200 [1,379]

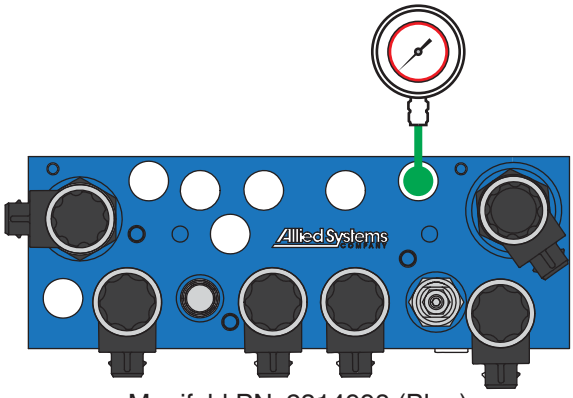
Figure 3-39 Hydraulic Pressure Readings



Manifold PN: 2303889W (Red)



Manifold PN: 2306547W or 2311887 (Silver)



Manifold PN: 2314998 (Blue)

Figure 3-40 Gauge at Accumulator Port

Troubleshooting

This subsection includes E-Controls Troubleshooting Analysis Check Chart (Figure 3-41); Troubleshooting Chart and information for Electronic Control Module (Figure 3-42). The charts list the most common troubles that may be encountered. A possible cause and recommended corrective action are listed to restore the winch to normal operating condition.

Figure 3-41 E-Controls Troubleshooting Analysis Check Chart_1

PROBLEM	POSSIBLE CAUSE	CORRECTION
Operation is rough or not regular.	Hydraulic oil is too cold.	Put the control lever in the **BRAKE-OFF** position. Run the engine at 1000 rpm to warm the oil before operating the winch.
	Low oil level.	Add hydraulic oil to the correct level.
	Low oil pressure.	See item on troubleshooting low oil pressure directly below.
	Wrong oil.	Drain oil and replace with correct grade. Refer to Figure 1-17, Recommended Oil List.
	Accumulator malfunction.	Check accumulator and recharge/ replace as necessary.
	Tractor engine idling too low.	Increase tractor idle speed.
	Hydraulic system suction leaks. Observe oil exiting lube valve while tractor is operating. Suction leaks will cause oil to foam.	Check the following for air leaks: 1. Suction hose to pump connection 2. Pump shaft seal 3. Suction filter cover and gasket 4. Suction hose for cracks or collapsed sections
Low oil pressure.	Leaking pressure hoses and fittings.	Check for leaks and replace components where necessary. Be sure hoses are not rubbing on any gears or winch components.
	Defective or improperly adjusted oil relief valve; poppet may be stuck open.	Clean relief valve if no pressure, then adjust. Check relief valve with pressure gauge. Replace if defective.
	Clogged suction strainer.	Check and clean or replace suction strainer.
	Oil brake leaking internally (indicated by low brake pressure).	Repair as required.
	Defective hydraulic pump.	Check pump pressure output only after all other checks have been made. Worn pump indicated by pressure variation with engine RPM. If pump is at fault, replace.

Figure 3-41 E-Controls Troubleshooting Analysis Check Chart_2

PROBLEM	POSSIBLE CAUSE	CORRECTION
Brake does not release or winch stalls during low RPM shift.	Low oil pressure.	Refer to “Low Oil Pressure” troubleshooting item above.
	Accumulator system malfunction.	Check for: 1. Correct leakdown time as described in subsection of Service. 2. Leaking accumulator valve. 3. Leak in accumulator lines. 4. Damaged or defective accumulators.
	Damaged brake piston, piston housing or seal rings.	Check piston and piston housing cavity for damage. Replace if scored or broken. Always replace seals when brake is repaired.
	Low clutch pressure or low oil pump volume.	Refer to “Low Forward or Reverse Clutch Pressure” troubleshooting item below.
Overheating.	Plugged pressure filter.	Replace filter.
	Plugged suction filter.	Check suction filter and clean or replace.
	One or both clutches dragging.	Check by placing joystick in **BRAKE-OFF**. Normally drum will rotate slowly in either direction. If the reverse clutch is dragging, the drum will rotate in the **LINE-OUT** direction. If forward clutch is dragging the drum will rotate in the **LINE-IN** direction and it will take more than 100 lbs. of line pull to prevent drum rotation.
	Low system pressure.	Adjust accordingly.
	Low or high cooling oil pressure.	Check cooling oil pressure. Possible blocked passages. Bypass valve partially open.
	Clutch/brake shaft bearings set too tight.	Adjust accordingly.
	Excessive inching.	Avoid continuous operation in the inching zone.
	Low oil level.	Add oil.
Winch will not operate while tracks are turning.	Accumulator system malfunction.	Check for: 1. Correct leakdown time as described in subsection of Service. 2. Leaking accumulator valve. 3. Leak in accumulator lines. 4. Damaged or defective accumulators.
	Low oil pressure.	Refer to “Low Oil Pressure” troubleshooting item above.
	Defective PTO shaft.	Inspect PTO shaft and coupling, clutch shaft bevel ring gear and PTO shaft pinion gear for wear or damage.

Figure 3-41 E-Controls Troubleshooting Analysis Check Chart_3

PROBLEM	POSSIBLE CAUSE	CORRECTION
Winch will not operate in any function.	Control lever off-center at startup.	Return control lever to neutral position and attempt function again.
	Control module not powered.	Check fuse & replace if necessary.
	Control lever DC-DC converter malfunction.	Replace converter if the red & green LEDs are not lit.
	Control module fault.	Check status indicator on module. Red LED should **not** be illuminated. If it is, consult factory.
	Coil open or shorted.	1. Check module output LEDs. Flashing LED indicates open or shorted circuit. 2. Check wiring harness continuity. 3. Replace faulty coil. **Note: A working coil will have 15 to 50Ω resistance and will be magnetized when energized.**
	Cartridge valve plugged.	Check valve for obstruction. Clean or replace as necessary.
	Loose or worn connector.	Check and replace as needed.
	Relief pressure not being reached.	Check bypass coil & valve—replace faulty parts.
Forward or reverse clutch not releasing.	Broken or weak release springs.	Check springs and replace as necessary.
	Warped frictions or separators.	Replace as necessary.
	Cooling pressure too high.	Test and reset.
	Dowels out of holes.	Inspect clutch and realign dowels.
Forward or reverse clutch not engaging.	Low oil pressure.	See “Low Oil Pressure” troubleshooting item above.
	Low forward or reverse clutch pressure.	See troubleshooting for “Low Forward or Reverse Clutch Pressure” item below.
	Inadequate piston travel.	Remove the access cover and place the winch in gear while visually checking the clutch for piston movement.
	Worn friction discs and separator plates.	Replace the friction discs and separator plates if too thin, scored or distorted. Refer to Section 4.
Clutch does not apply correctly at low PTO rpm.	Accumulator not charged.	Check accumulator.
	PTO stalled (0 rpm).	Increase tractor rpm.

Figure 3-41 E-Controls Troubleshooting Analysis Check Chart_4

PROBLEM	POSSIBLE CAUSE	CORRECTION
Low forward or reverse clutch pressure.	Broken seal rings on the clutch/ brake shaft.	Replace seal rings. **NOTE: A broken seal ring is the most common cause of a pressure differential between the two clutches.** Check preload on clutch/brake shaft and adjust it if necessary to prevent additional breakage of seal rings; refer to Section 4.
	Damaged clutch/brake shaft seal ring grooves.	Check grooves for taper, scoring and rust. Replace or rebuild shaft if surfaces between the inner side of groove and seal ring are not flat.
	Damaged clutch/brake shaft bearing retainers.	Check retainer for grooves. Replace retainer if defective, or re-sleeve.
	Damaged clutch piston or O-rings.	Check piston cavity for damage. Always repair both O-rings when clutch is repaired. Refer to Section 4.
	Pressure tube damaged.	Remove cover and inspect.
	Leaky clutch circuit.	Perform clutch bleed-down test on clutch circuit.
	Faulty valve or coil.	Check valve and coil for proper operation. Check coil for voltage.
Brake slipping or drum backspin on fast shift from neutral to forward.	Low brake release pressure.	Check brake release pressure. Replace friction discs and separator plates if too thin.
	Broken belleville spring.	Replace. Refer to Section 4.
Brake releases before forward clutch engagement.	Faulty forward clutch valve or coil.	Check forward clutch valve and coil.
	Low brake release pressure.	See “Brake Slipping” troubleshooting item above.
	Clutch line plugged.	Clean clutch line and orifices.
Brake releases before reverse clutch engagement.	Faulty reverse clutch valve or coil.	Check reverse clutch valve and coil.
Noisy buzz emanating from winch.	Air in relief valve.	This is not a detrimental condition. Noise may be intermittent.
Winch noisy.	Ring and pinion out of adjustment.	Set ring and pinion backlash.
	Air in oil.	1. Check for suction leaks. 2. Add oil.
	Gears and bearings worn.	Replace components.
Control lever will not detent in **BRAKE-OFF** or **FREESPOOL**.	Detent mechanism worn or broken.	1. Replace control lever assembly. 2. Adjust detent spring force (see Adjusting Control Lever Detent Force in subsection of Service).

Figure 3-41 E-Controls Troubleshooting Analysis Check Chart_5

PROBLEM	POSSIBLE CAUSE	CORRECTION
Control lever does not return to neutral when released.	Insufficient lubrication.	Lubricate detent pin (see Adjusting Control Lever Detent Force in subsection of Service).
	Excessive detent force.	Remove knob and adjust detent force (see Adjusting Control Lever Detent Force in subsection of Service).
	Control lever is in detented position (**BRAKE-OFF** or **FREESPOOL**).	Move control lever out of detent.
	Dirt in mechanism.	Check boot for proper seal. Remove boot and clean dirt from top portion of Control Lever assembly if necessary.
Winch does not engage and tractor engine draws down in **LINE-IN** or **LINE-OUT.**	Plugged brake valve.	Replace valve.
	Faulty brake coil.	Replace coil.
	Open or shorted brake circuit.	Check wiring harness. See “Winch will not operate in any function” above.
Winch does not engage and/ or load rolls out in **LINE-IN** or **LINE-OUT**.	Plugged forward or reverse valve.	Replace valve.
	Faulty forward or reverse coil.	Replace coil.
	Open or shorted forward/reverse circuit.	Check wiring harness. See “Winch will not operate in any function” above.
Filter LED blinking.	Open or shorted coil.	See the **Electronic Control Module Troubleshooting** in subsection of Troubleshooting for more information.
Filter LED illuminated.	Filter is clogged.	Change filter and oil. **NOTE: Change filter only after first 50 hours of operation when winch is new or freshly rebuilt.**
	Cold oil is causing filter bypass.	Monitor LED condition. If LED remains illuminated after normal operating temperature has been reached, change oil and filter.
	Electrical short circuit.	Check filter bypass switch circuit of wiring harness.

Figure 3-41 E-Controls Troubleshooting Analysis Check Chart_6

PROBLEM	POSSIBLE CAUSE	CORRECTION
Winch will not go to **FREESPOOL** functon.	Intermediate gear or shaft damaged or rusted.	Adjust and repair or replace as necessary.
	Drum shaft assembly damaged, rusted or binding.	Clean or replace as necessary.
	Faulty brake or freespool valve.	Check cartridge valves and coils.
Winch goes to **FREESPOOL** function too easily.	Insufficient preload on intermediate shaft.	Tighten preload on the intermediate shaft using **FREESPOOL** drag adjustment instructions give in subsection of Service.
Winch requires too much effort to go to **FREESPOOL function.**	Too much preload on intermediate shaft.	Loosen preload on the intermediate shaft using **FREESPOOL** drag adjustment instructions give in subsection of Service.
Jumps out of gear.	Shifting fork improperly adjusted.	Check and adjust as necessary.
	Worn shifter fork.	Replace shifter fork and related parts as necessary.
	Worn intermediate gear.	Replace gear.
	Pressure to FREESPOOL circuit at wrong time, winching in or out.	Verify 0 psi during winching. If pressure is present, seals on solenoid valves could be damaged, or solenoids being activated by stray voltage.
	Broken spring.	Replace spring.

Figure 3-42 Troubleshooting Chart for Electronic Control Module

LED STATUS	FAULT DESCRIPTION	PROBABLE CAUSE	CORRECTIVE ACTION
PWM%C lit	Winch won't function	Control lever off-center at startup	Center control lever.
PWM%C & HSOUTx flashing	Shorted or open output circuit	Wiring harness failure	Check appropriate circuit from module to valve.
		Faulty coil	Replace coil if resistance is outside of 15-50Ω range.
PWM%C flashing; HSOUTx may be lit, but not flashing	Winch won't function or only allows one function	Control lever output faulty	Replace control lever.
PWM%C flashing; Green to Red	Winch won't function	Incorrect wiring harness for program	Verify harness and program for winch serial number.
MS lit (steady red)	Winch won't function	Module fault	Turn power off, then on. If MS light is still steady red, replace module.

Interfacing with the Electronic Control Module (ECM, also called DVC)

The ECM regulates the cartridge valves on the valve manifold assembly, based on control lever input and a preset computer program. Occasionally, it may be necessary to download a new control program for the ECM or perform higher-level electronic control system troubleshooting through the ECM interface. Should this be necessary, a communication cable (P/N 2304603W) and a CD with the relevant software is available from Allied Systems. The files may also be downloaded from Allied Systems' e-Commerce website. Please contact a dealer or call Allied Systems for more information.

DVC Controller Goes into Programming Mode When Powered On

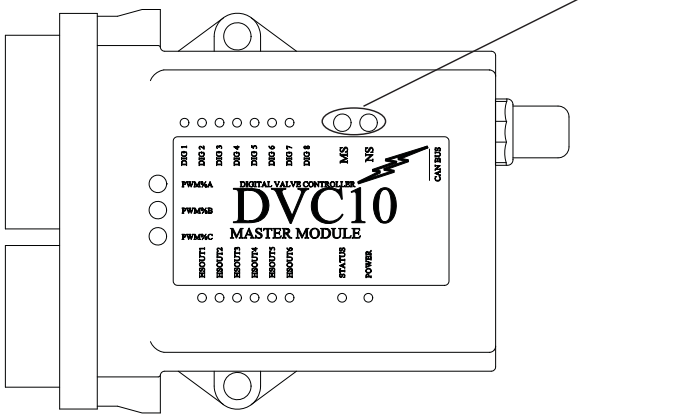
Background:

The DVC controller is in programming mode when its MS and NS LEDs blink green in an alternating pattern. When the controller is in normal execution mode the MS and NS LEDs will be solid green or red.

The DVC controller normally goes into programming mode when the Program Loader Monitor running on your PC is active, the cable is connected between the PC and the DVC controller, you are attempting to load an application and the DVC electrical power is switched off and back on. The DVC, when its electrical power is switched off and back on, looks at the signal from the connecting cable to decide if it should go into programming or normal execution mode. On some PCs depending on the installed software driver and the last program used, the DVC can receive a signal instructiong it to go into programming mode even though the Program Loader Monitor is not operating.

Solution:

To insure that this does not happen, disconnect the serial cable from the PC or the DVC controller and power cycle the DVC. Reconnect the cables, and operate as normal.



Module & Network Status (MS/NS)
Alternating Flashing Green – Device is being programmed (BIOS or Application Code).

Network Status (NS) (R/G)
Off – There is no J1939 device (or other DVC5) in the project.
Flashing green – J1939 device in project but communication has not been established.
On green – J1939 communication has been established.
Flashing red – The J1939 communication is in a timed-out state.
On red – The device has detected an error that has rendered it incapable of communicating on the network.

Module Status (MS) (R/G)
Off – There is no power applied to the Module.
On green – The module is operating in a normal condition.
Flashing green – Device is in standby state, may need commissioning.
Flashing red – Recoverable Fault.
On red – Module has an unrecoverable fault.
Flashing Red/Green – Device is in self-test.

Figure 3-43 Electronic Control Module DVC10

Re-Commissioning DVC Master Modules

Introduction:

This procedure should be used to regain use of a DVC Master Module (DVC10) if the module Flash Memory becomes corrupt due to a power interruption during a BIOS/Application Program download or any other reason. The presenting symptoms include a module that will not communicate with a PC or other modules on the buss and the Module Status (MS) and Node Status (NS) indicators are flashing green alternately at a one second interval.

There are two procedures listed below as a guide to regaining control of a DVC Master Module. The procedures are for BIOS / Program Loader Monitor 4.0 and BIOS/ Program Loader Monitor 4.2 and higher.

BIOS / PLM Version 4.0:

Users must have a working DVC Module to establish RS232 communication with the Program Loader Monitor (PLM) before reprogramming an Un-Commissioned Master Module. If there is no working module available, the user must download and use the latest software revision release as well as the procedure for BIOS/Program Loader Monitor 4.2 and higher.

1. Connect the PC to a working DVC Module with the DVC using normal procedures and launch the PLM version 4.0.
2. When communication between the DVC and the PLM has been established, disconnect the working DVC and connect the non-working DVC.
3. Within the PLM, select the DVC10 MASTER switch to open the Main DVC10 screen. Reference Figure 3-45 below.
4. Within the Main DVC10 screen, select the Program Loader switch to open the Program Loader screen. Reference Figures 3-45, 3-46 below.
5. Within the Program Loader screen, select the module to be programmed from the pull down menu in the upper left hand corner of the screen. Reference Figure 3-47 below. If the Serial Label on the back of the module does not have a box with “REV B” written between the model number and the serial number, select DVC-10 on the pull down menu. If the Serial Label on the back of the module does have a box with “REV B” written between the model number and the serial number, select DVC-10B on the pull down menu. Reference Figure 3-47.
6. Cycle power and wait for the unit to enter programming mode signified by the red indicator on the programming loader screen turning green and the programming buttons to be active.
7. Cycle power again and wait for the unit to enter programming mode signified by the red indicator on the programming loader screen turning green and the programming buttons to be active.
8. Select the Load BIOS switch and load the DVC10 BIOS version 4.0.
9. When the BIOS has finished loading, select the Load Application switch and load an application.
10. After the Application has loaded, cycle power.
11. On the Main screen, Figure 3-44, enter the word “victory” into the password field. The password level should change to 4.
12. On the Main DVC10 screen, Figure 3-45, select the Factory Information switch.
13. On the Factory Information screen in the same pull down menu as was on the Program Loader screen, select the same DVC10 model that was selected before downloading the BIOS/Program.
14. Select Send Changes.
15. The unit should now be operational.

BIOS / PLM Version 4.2 and Higher:

This procedure should be used with PLM version 4.2 and higher.

1. Within the PLM, select the DVC10 MASTER switch to open the Main DVC10 Screen. Reference Figure 3-45.
2. Within the Main DVC10 screen, select the Program Loader switch to open the Program Loader screen. Reference Figures 3-46 and 3-47.
3. Cycle Power and wait for the unit to enter programming mode signified by the red indicator on the programming loader screen turning green and the programming buttons to be active.
4. Select the Load BIOS switch and load the DVC10 BIOS version 4.x.
5. When the BIOS has finished loading, select the Load Application switch and load an application.
6. After the Application has loaded, cycle power.
7. The unit should now be operational.

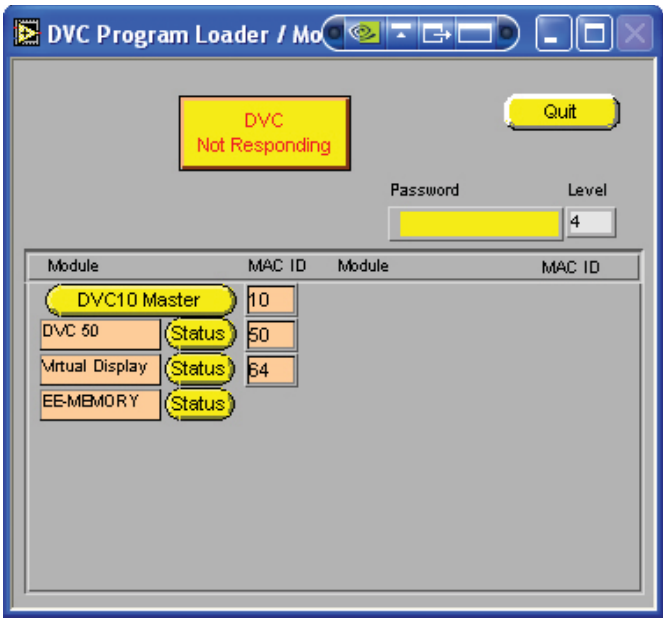


Figure 3-44

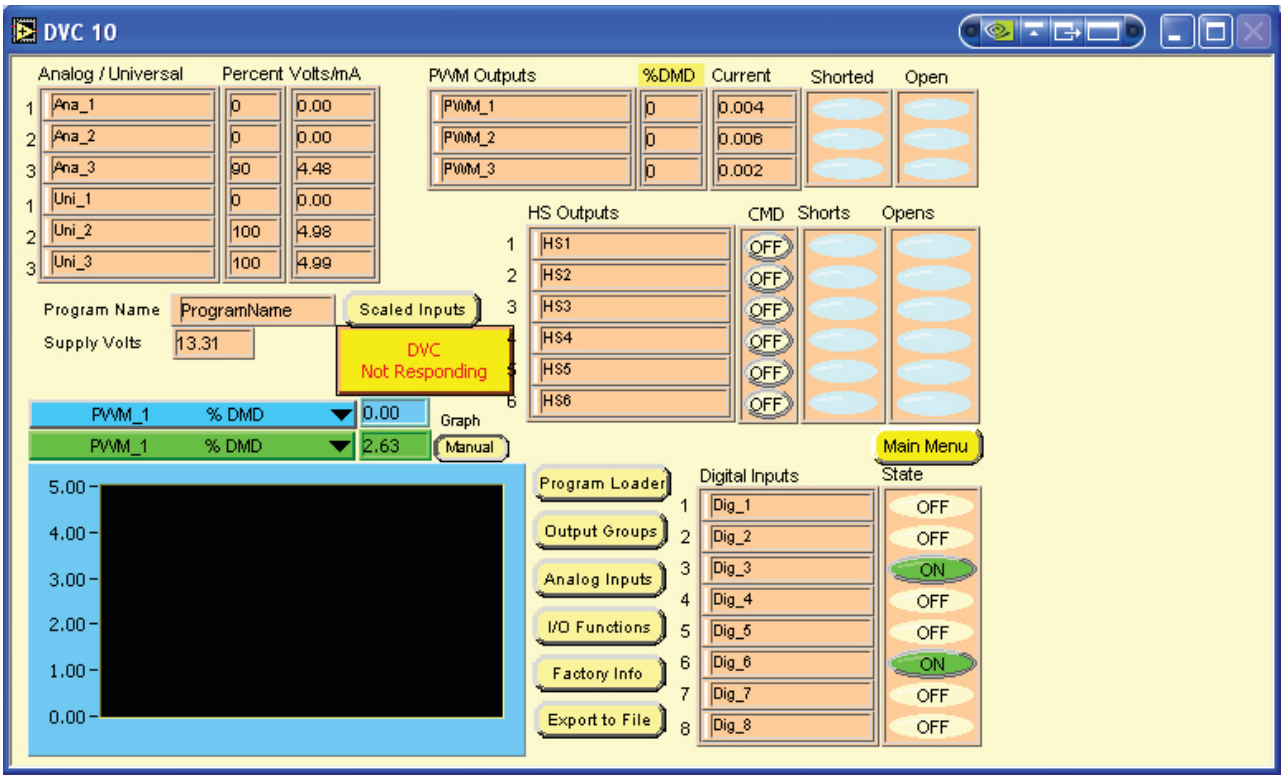


Figure 3-45

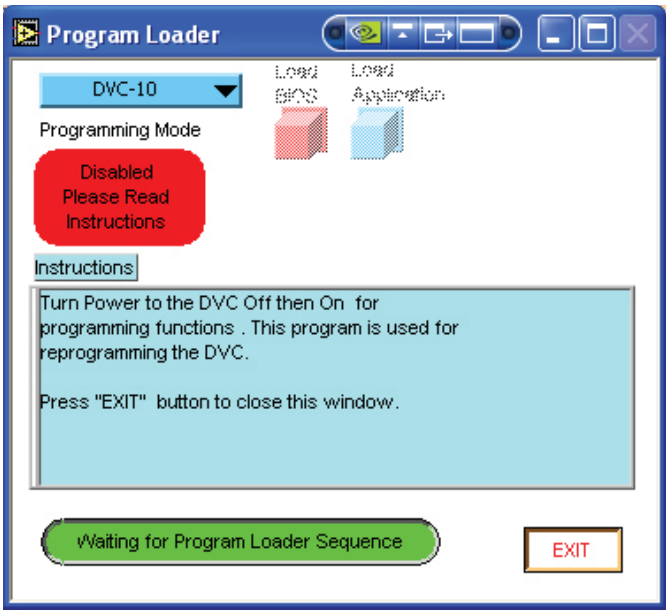


Figure 3-46

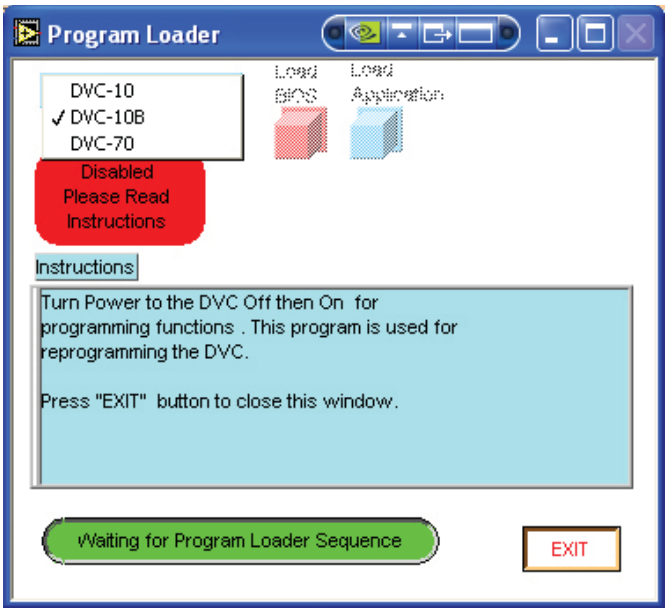


Figure 3-47

Notes

Repairs

General

This section includes the removal and disassembly of all major shaft assemblies, inspection of components, and reassembly and installation. The wear points detailed in Figure 4-11 should be inspected at the time of disassembly so that worn parts may be ordered and replaced prior to reassembly. If the winch is to be completely overhauled, perform the removal, disassembly, inspection and reassembly procedures in the sequence of the following paragraphs.

NOTE: Always use the troubleshooting procedures given in subsections of Troubleshooting in Sections 2 and 3 to locate a malfunction before performing a major overhaul of the unit. Make all checks in a systematic manner. Haphazard checking wastes time and can cause further damage.

Review and perform any adjustments that may be the cause of a malfunction (refer to subsections of Service in Sections 2 and 3).

Use new seals, gaskets and O-rings when installing components.

⚠ CAUTION

Cleanliness is of extreme importance in the repair and overhaul of any hydraulic unit. Before attempting any repairs, the exterior of the winch must be thoroughly cleaned to prevent the possibility of contamination.

Winch Removal

1. Remove the arch or fairlead from the winch. If these accessories are left on the winch, the winch will not remain level when lifted from the tractor.

2. Remove the wire rope from the drum. Clean the outside of the winch and the area where the winch contacts the tractor.

⚠ WARNING

Be careful when you remove the wire rope from the drum. The end of the wire rope can move like a compressed spring, causing an injury when the ferrule is released from the drum.

3. Move the control lever to the **LINE-IN** position at least three times to discharge the pressure in the accumulator.

4. Remove the control valve cover.

5. Disconnect control cable and freespool cable from winch.

6. Connect slings and a crane or lifting device to the winch.

⚠ WARNING

Before lifting the winch, check Figure 1-20, Winch Weight, to make sure the minimum rated capacity for the slings, crane or other lifting devices exceeds the load being lifted.

7. Drain the oil from the winch.

8. Remove transmission cover.

9. Remove mounting nuts or capscrews and lockwashers securing winch to tractor.

NOTE: When removing the mounting nuts or capscrews, loosen all nuts slightly, then pry winch away from mounting pad. Loosen all nuts again and pry winch again. Continue this sequence until winch can be removed.

Winch Disassembly

Most repairs require disassembly of the winch, although many major assemblies can be removed from the winch with the winch still on the tractor. The procedures in this section describe a complete unit overhaul with the winch removed from the tractor.

Figures 4-1 and 4-2 show the gears and components contained within the winch housing.

General Arrangement

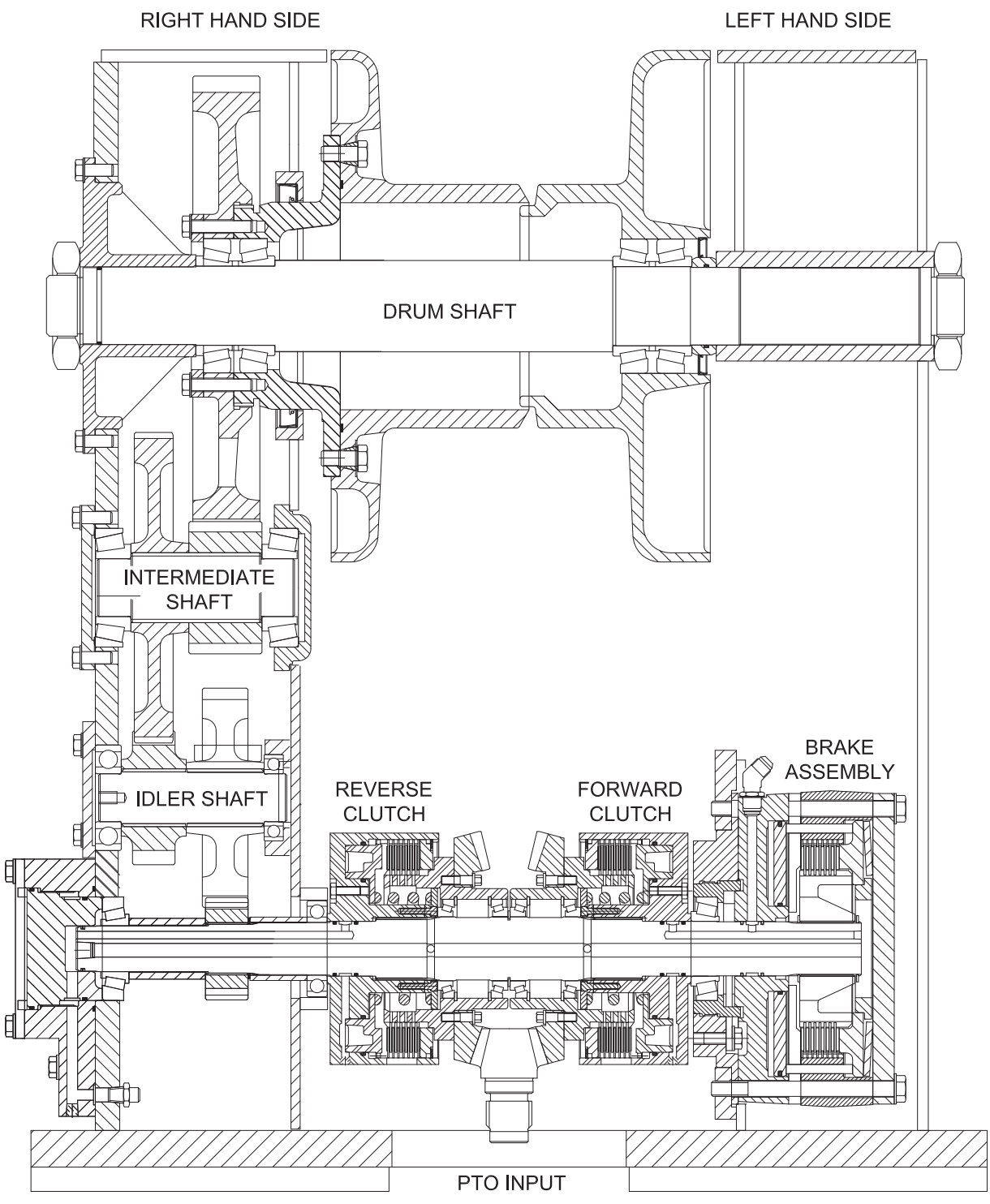


Figure 4-1 General Arrangement, Non-Freespool

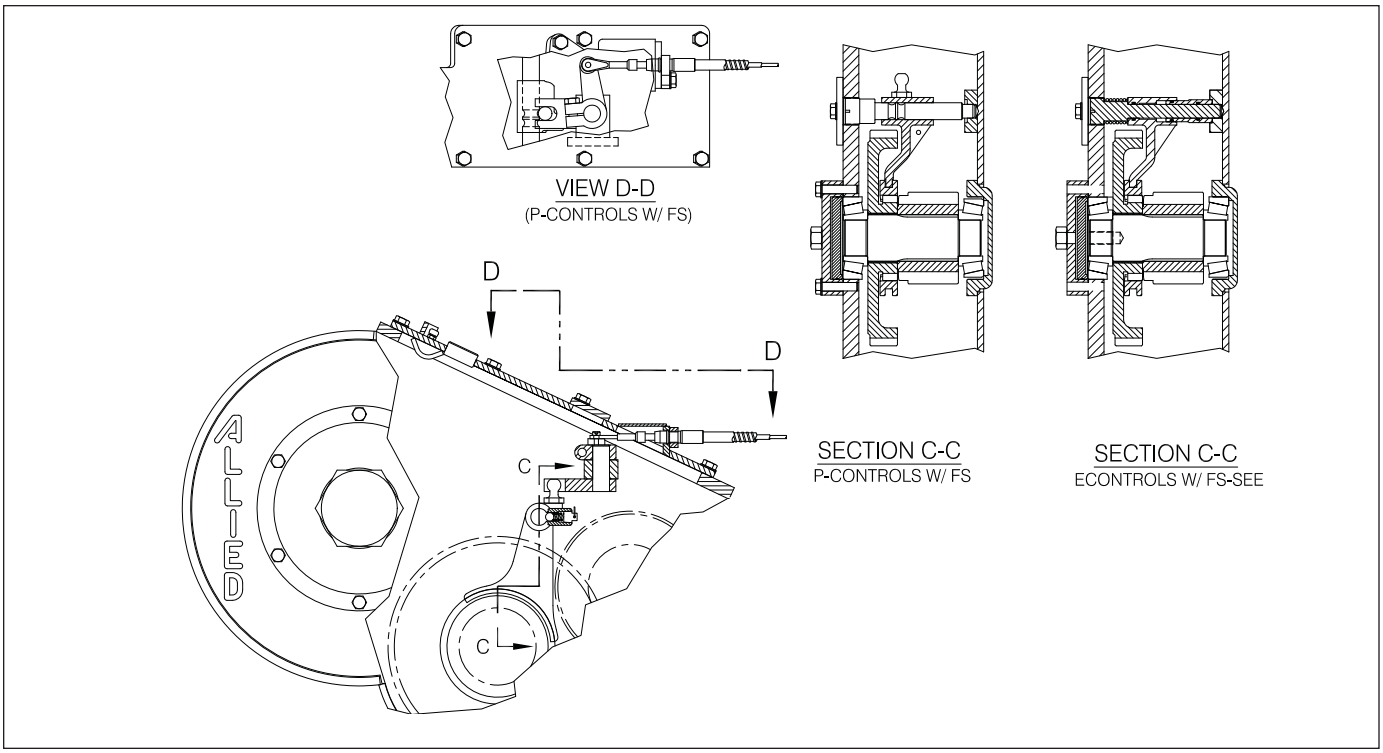


Figure 4 -2 Freespool Arrangement

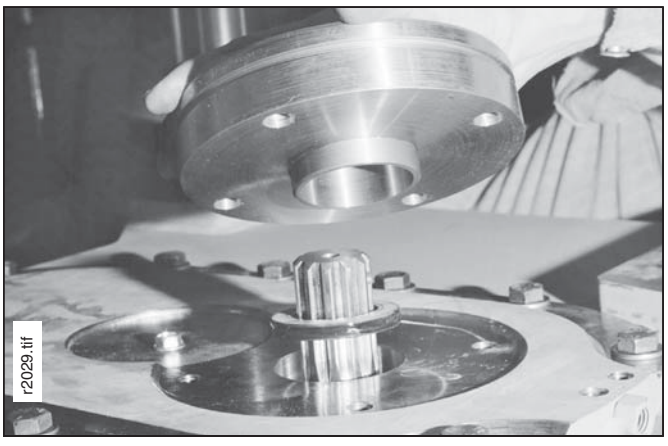
Input Carrier and PTO Removal and Disassembly

NOTE: Photographs for the input carrier disassembly in this section are meant for reference only. Please refer to Figures 4-3 to 4-8 for the specific configuration for your tractor.

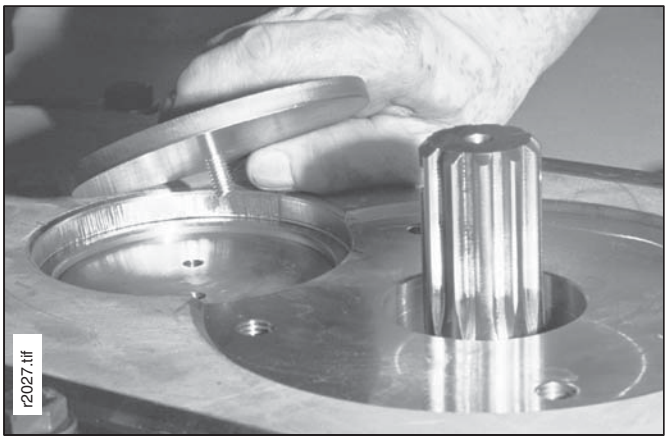
Before removing the input carrier assembly, the winch must be removed from the tractor as explained in **Winch Removal**.

1. Remove capscrews and remove the input carrier assembly from winch using an appropriate lifting device.

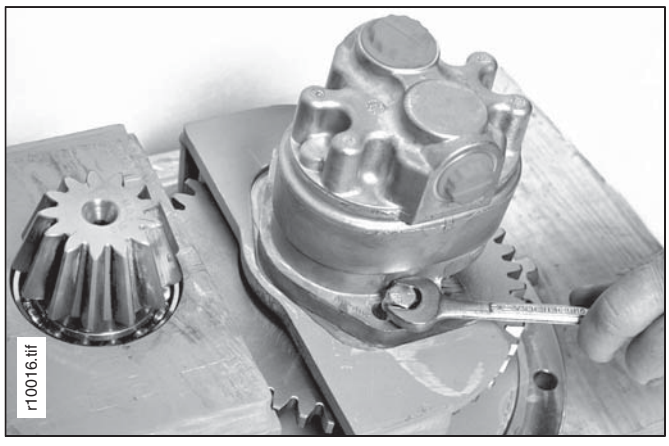
2. Remove PTO pilot and seal from input carrier.



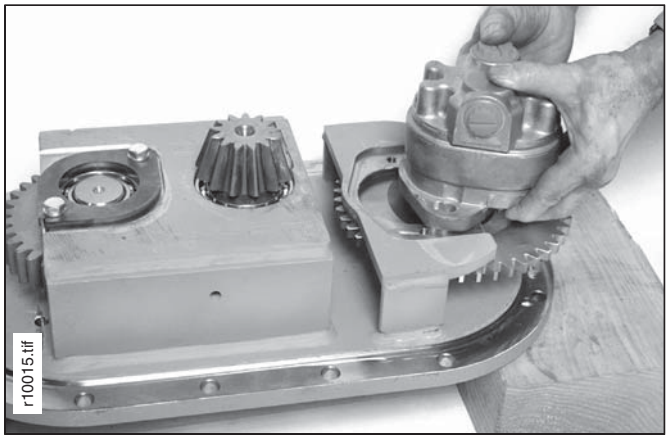
3. Remove bevel pinion keeper.



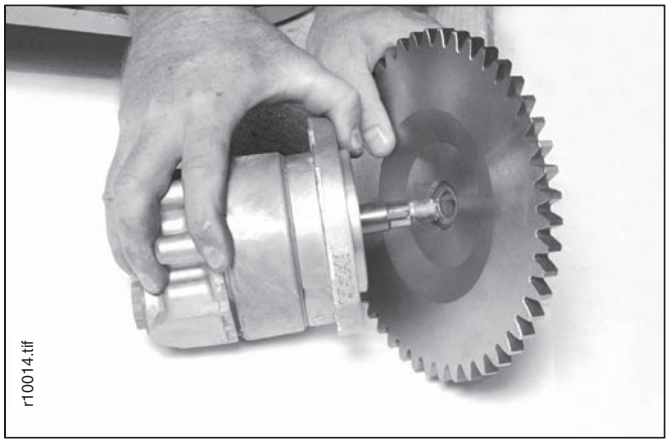
4. Disconnect hydraulic connections to pump.



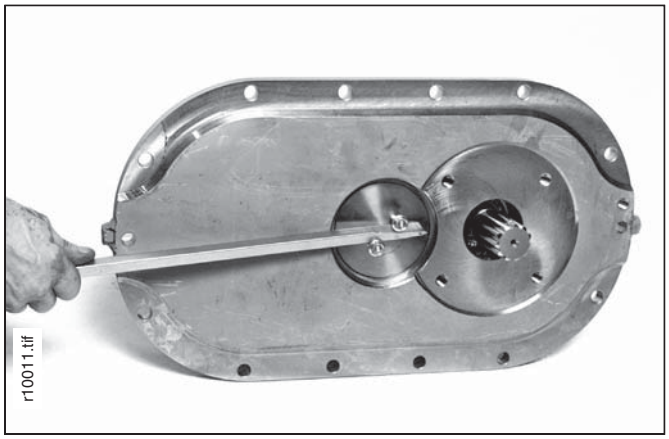
5. Remove pump and pump gear.



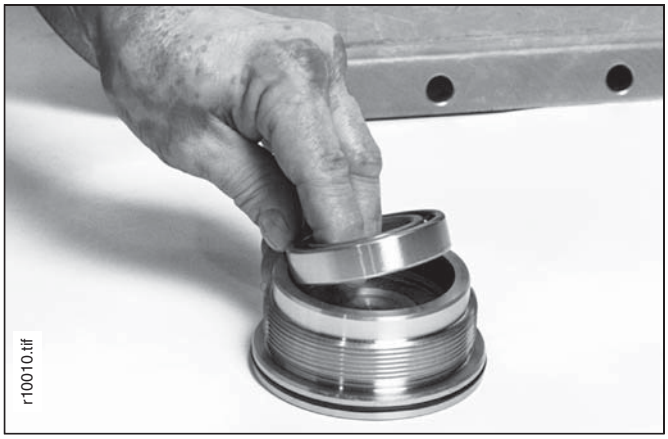
6. Remove pump from pump gear.



7. Insert two 3/8 UNC capscrews into holes on face of bearing adjuster. Place a metal bar between the two capscrews as shown in picture and turn counterclockwise to remove adjuster.

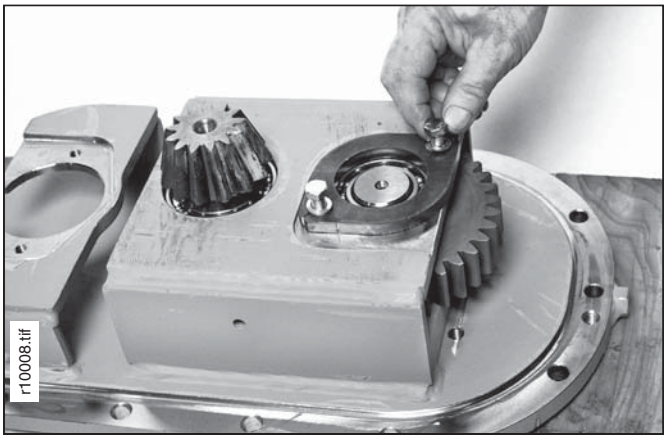


8. Remove bearing in pinion bearing adjuster.

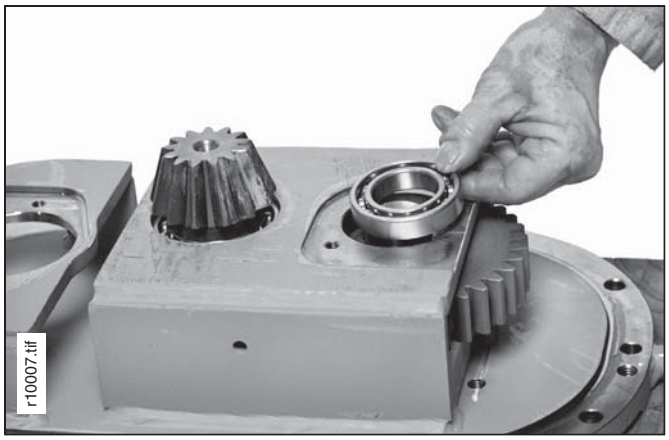


9. Remove and discard O-rings from pinion bearing adjuster.

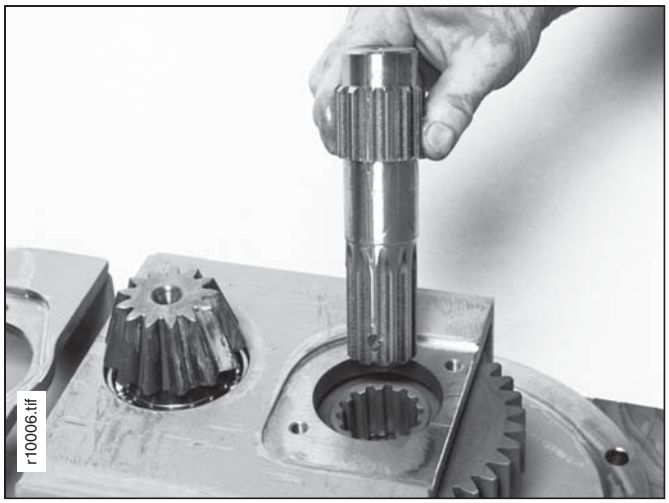
10. Remove the bearing retainer.



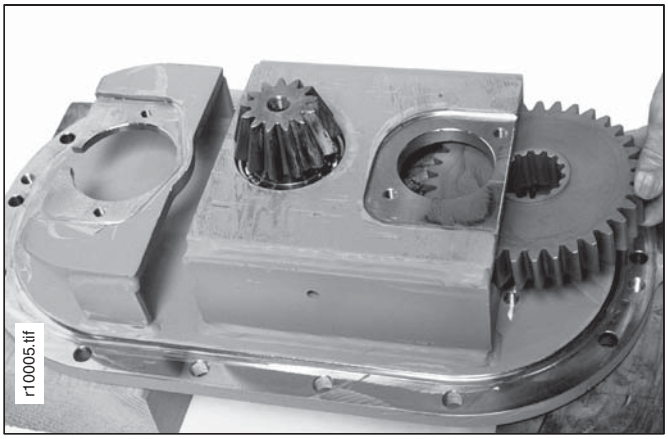
11. Remove bearing from input shaft.



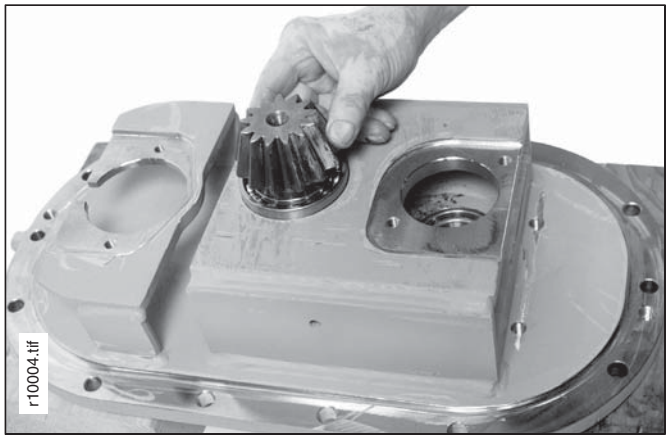
12. Remove input shaft.



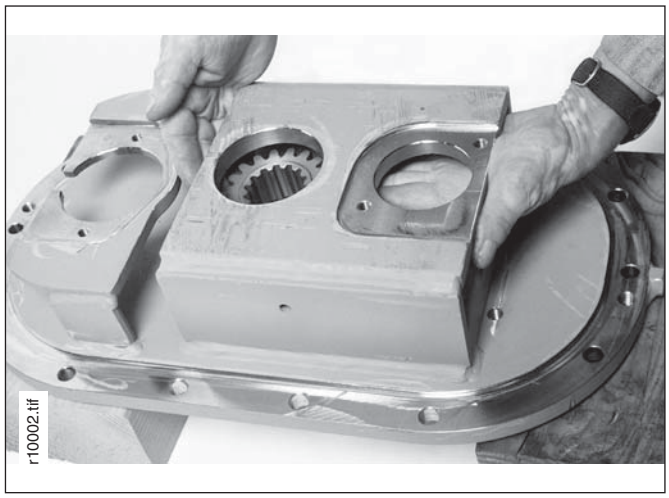
13. Remove input shaft gear.



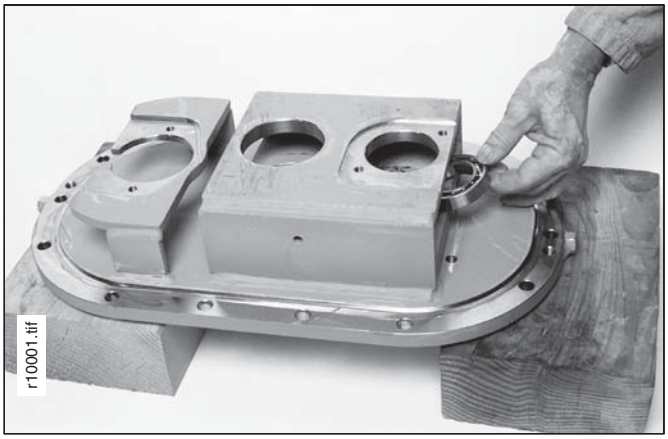
14. Remove bevel pinion gear and bearing.

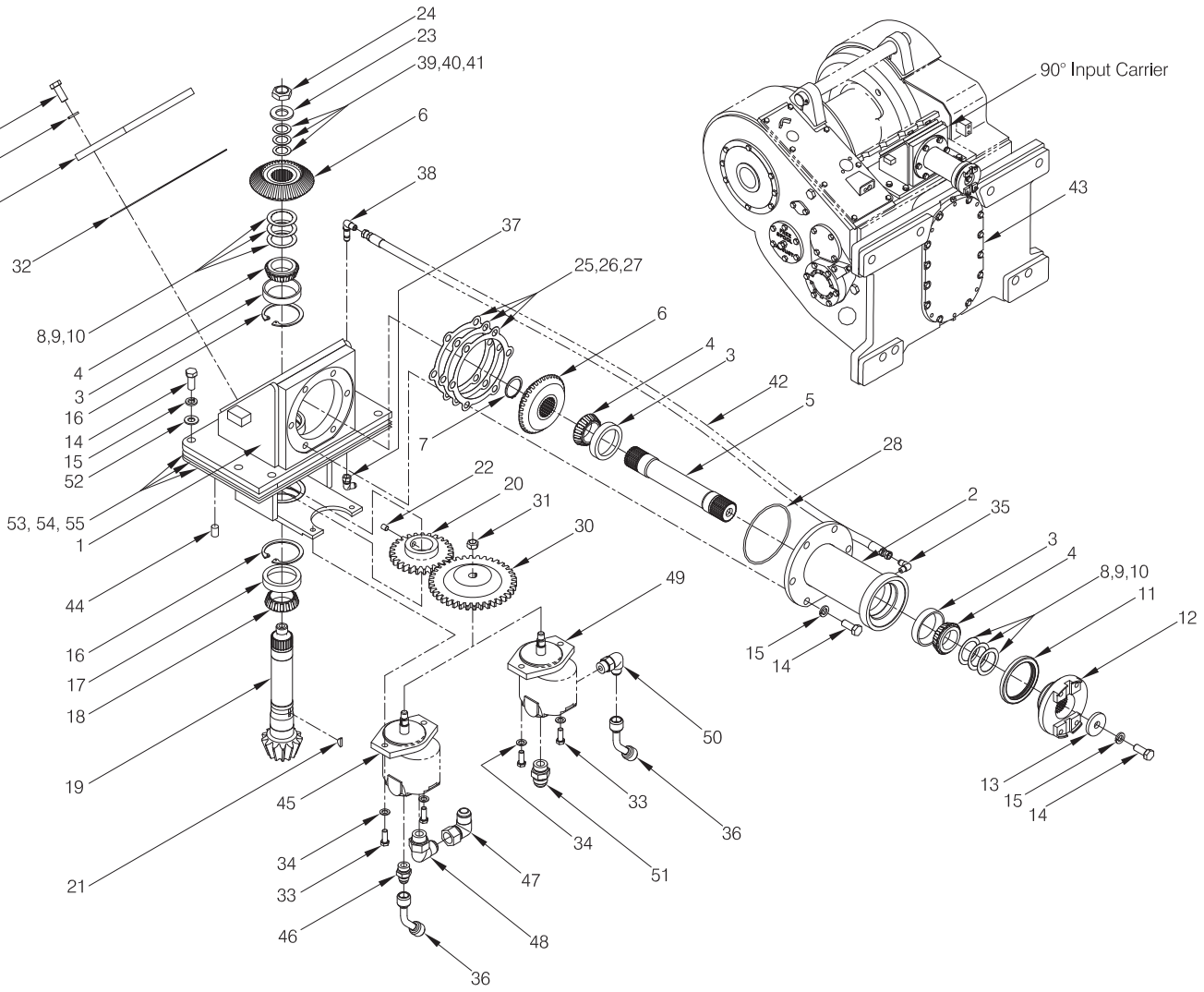


15. Remove pinion shaft gear.



16. Remove ball bearing.



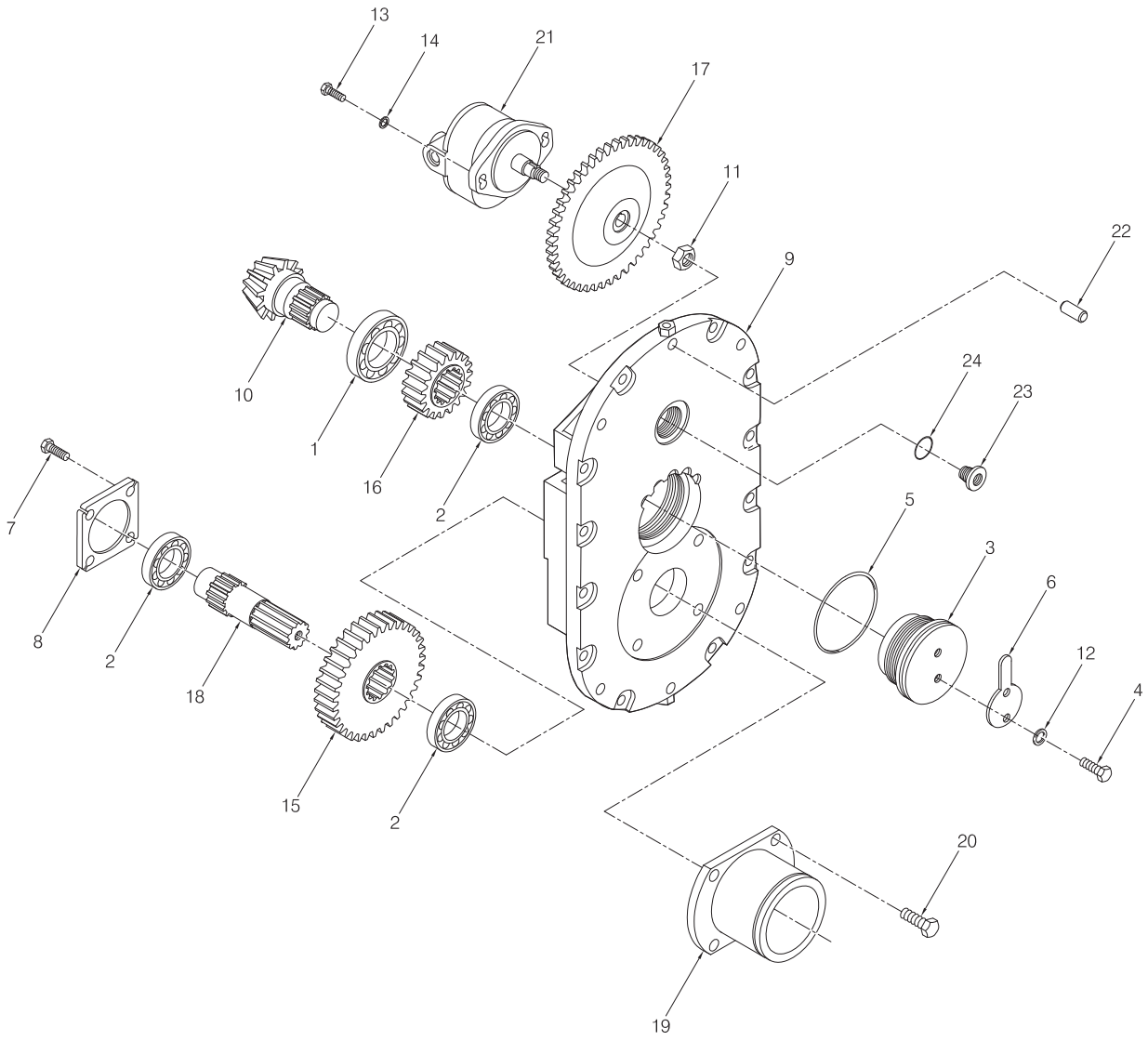


1. Gear Housing
2. PTO Carrier
3. Roller Bearing Cup
4. Roller Bearing Cone
5. Shaft
6. Bevel Gear
7. Snap Ring
8. Shim, .005
9. Shim, .007
10. Shim, .020
11. Seal
12. Yoke
13. Washer
14. Capscrew
15. Washer
16. Snap Ring
17. Roller Bearing Cup
18. Roller Bearing Cone
19. Pinion
20. Gear
21. Key
22. Screw
23. Washer
24. Nut
25. Shim, .005
26. Shim, .007
27. Shim, .020
28. O-Ring
29. Cover
30. Gear
31. Nut
32. Gasket
33. Capscrew
34. Washer
35. Fitting
36. Tube Assembly
37. Fitting
38. Fitting
39. Shim, .005
40. Shim, .007
41. Shim, .020
42. Hose Assembly
43. Cover Plate
44. Pin
45. Pump*
46. Fitting*
47. Fitting*
48. Fitting*
49. Pump†
50. Fitting†
51. Fitting†
52. Washer
53. Shim, .005
54. Shim, .007
55. Shim, .020

* Used on Komatsu D61EX-12, and D65EX-12 Only.

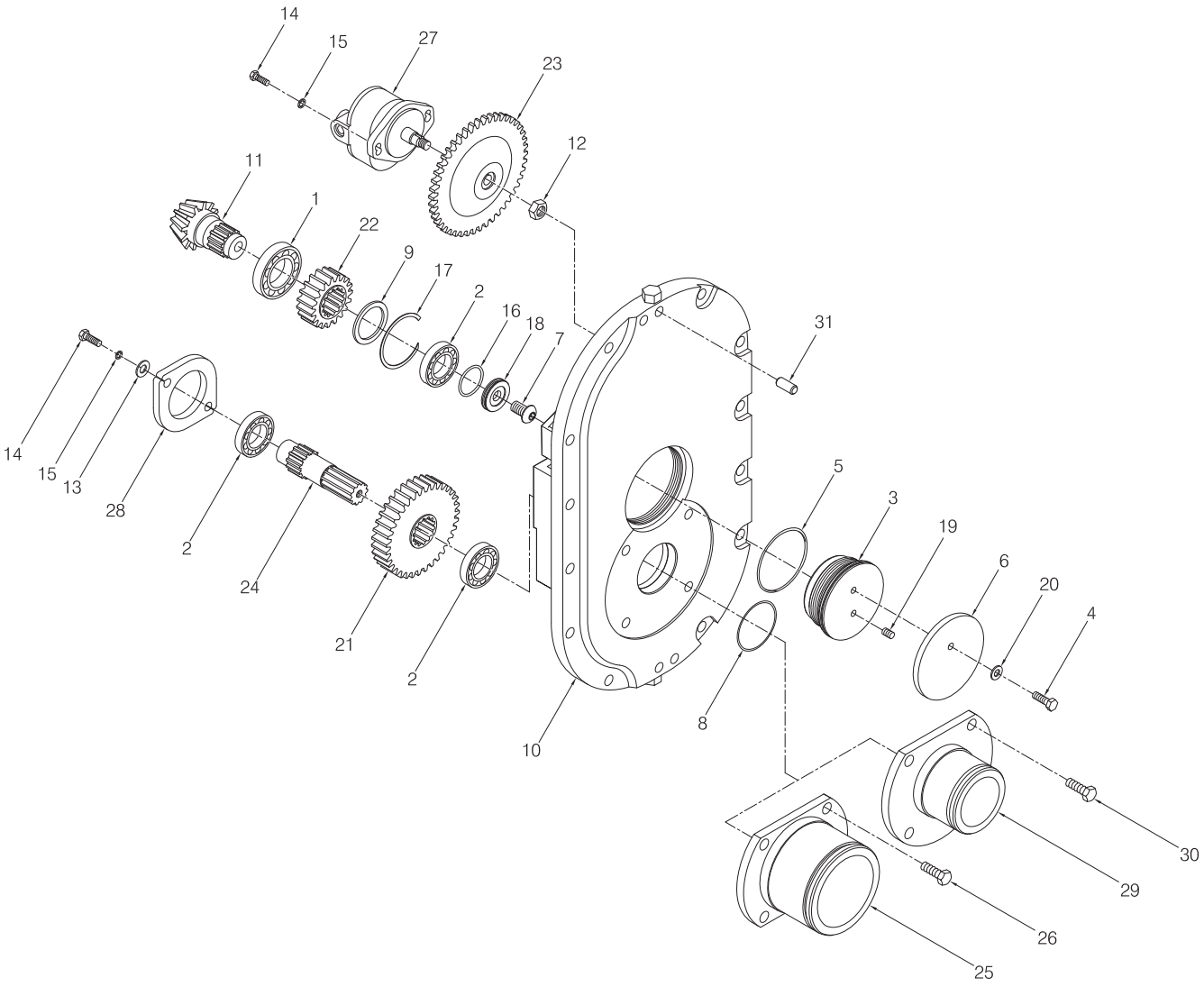
† Used on Case Quadtrac Only.

Figure 4-3 90° Input Carrier Arrangement for Case Quadtrac, Komatsu D61EX-12 D65EX-12



1. Bearing
2. Bearing
3. Pinion Bearing Adjuster
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew
8. Bearing Retainer
9. Input Carrier
10. Bevel Gear
11. Nut
12. Washer
13. Capscrew
14. Washer
15. Gear
16. Gear
17. Gear
18. Input Shaft
19. PTO Pilot
20. Capscrew
21. Pump
22. Pin
23. Fitting
24. . O-Ring

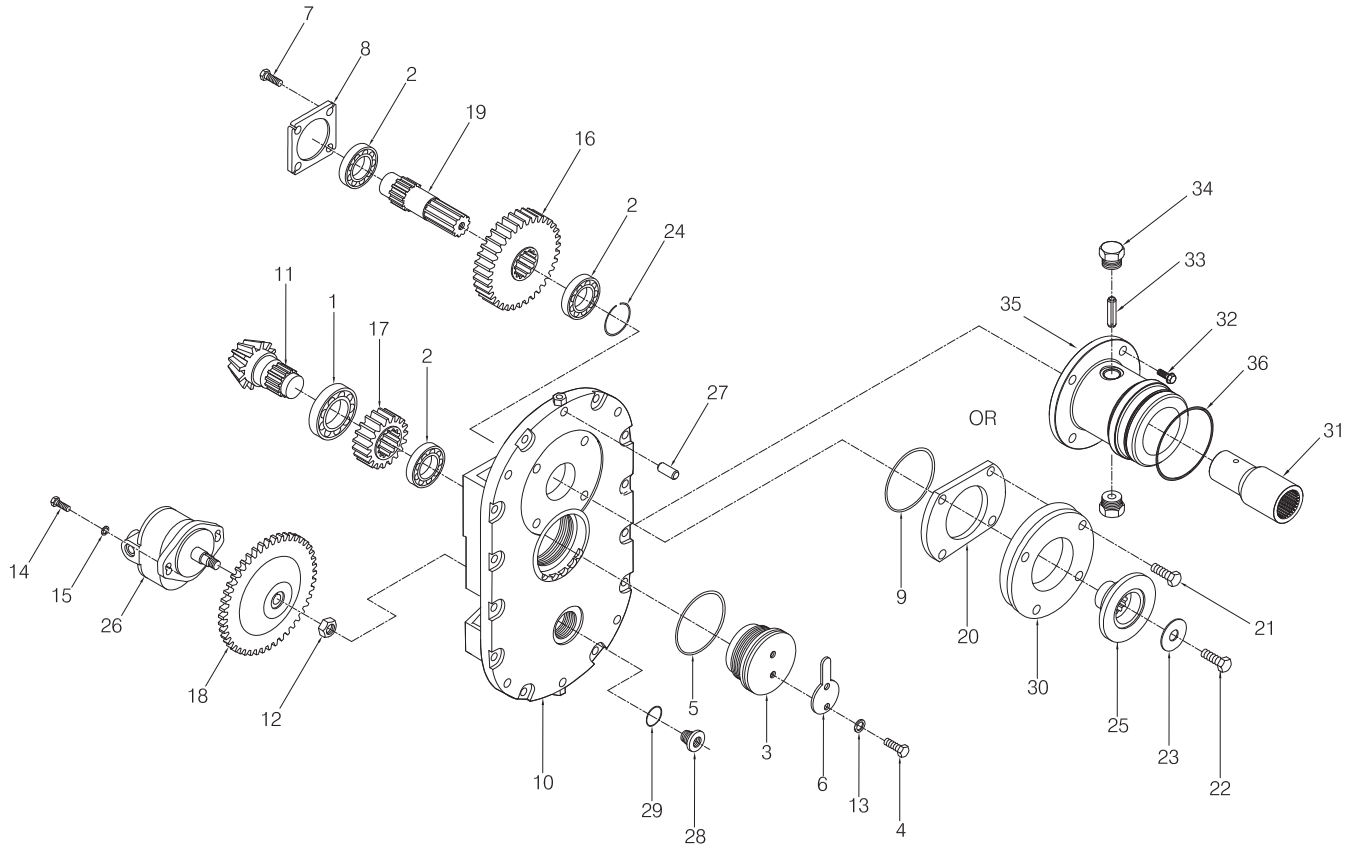
Figure 4-4 Input Carrier Arrangement for Case 1850K, Caterpillar D6H D6R Series I & II and Fiat-Hitachi/New Holland DC180 FD/FH 14E
Last Used on S/N AW6G-1061



1. Bearing
2. Bearing
3. Pinion Carier
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew‡
8. Seal
9. Spacer‡
10. Input Carrier
11. Bevel Gear
12. Nut
13. Washer
14. Capscrew
15. Lock Washer
16. O-Ring‡
17. Snap Ring‡
18. Plate‡
19. Set Screw‡
20. Washer‡
21. Gear
22. Gear
23. Gear
24. Input Shaft*
25. PTO Pilot*
26. Capscrew*
27. Pump
28. Bearing Retainer
29. PTO Pilot§
30. Capscrew§
31. Pin

* Caterpillar D6H/R, I & II
§ Fiat-Hitachi/New Holland FD 14E, FD 175/195, DX 175/195, DC-180, Case 1850K
‡ First used on S/N AW6G-1112

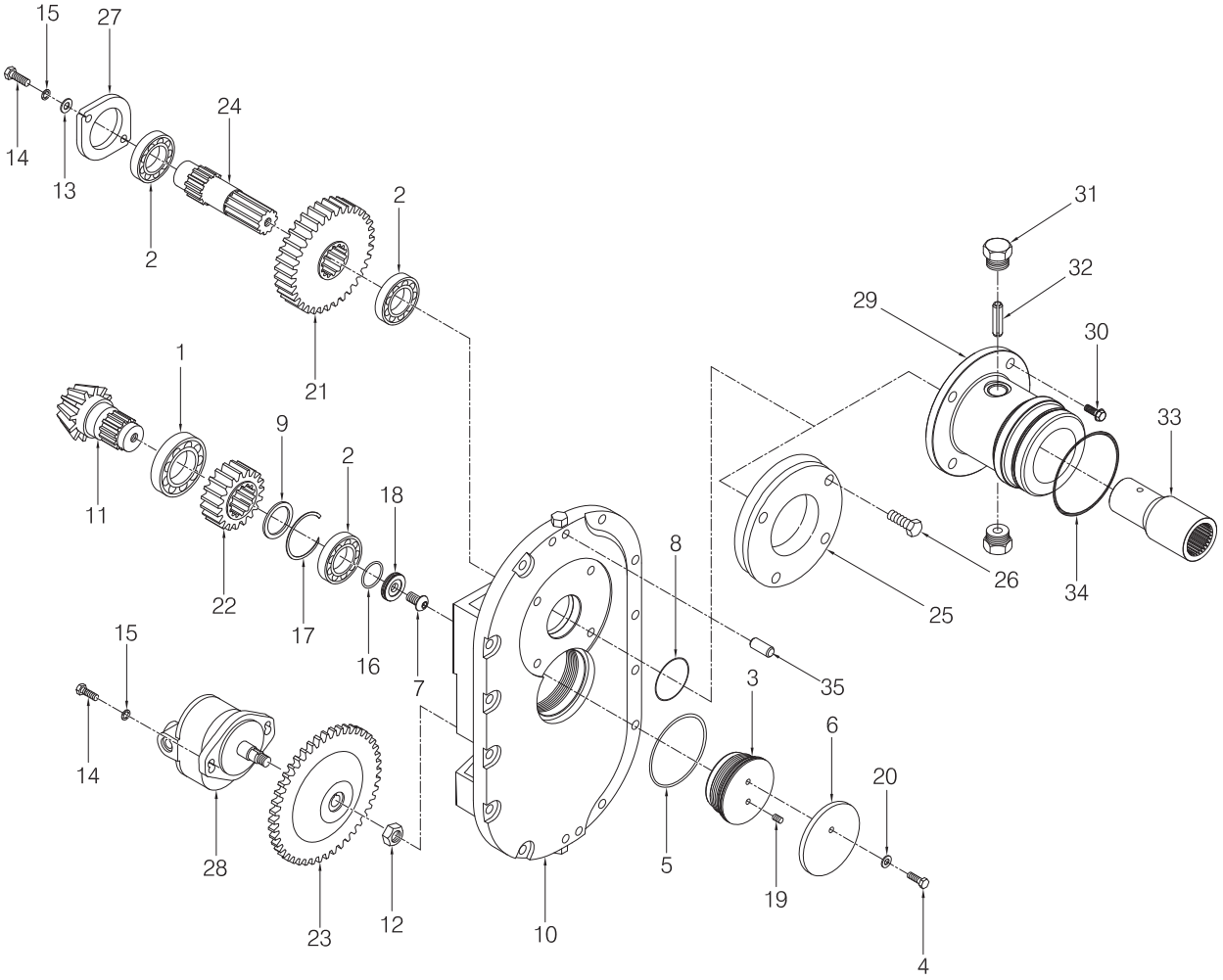
Figure 4-5 Input Carrier Arrangement for Case 1850K, Caterpillar D6H D6R Series I & II and Fiat-Hitachi/New Holland DC180 FD/FH 14E FD175/195, DC 175/195 First Used on S/N AW6G-1062



1. Bearing
2. Bearing
3. Pinion Bearing Adjuster
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew
8. Bearing Retainer
9. Seal
10. Input Carrier
11. Bevel Gear
12. Nut
13. Washer
14. Capscrew
15. Washer
16. Gear
17. Gear
18. Gear
19. Input Shaft
20. PTO Pilot *
21. Capscrew
22. Capscrew *
23. Washer *
24. Snap Ring *
25. Yoke
26. Pump
27. Pin
28. Fitting
29. . O-Ring
30. Retainer *
31. Coupler §
32. Capscrew §
33. Pin §
34. Fitting §
35. PTO Pilot §
36. O-Ring ‡

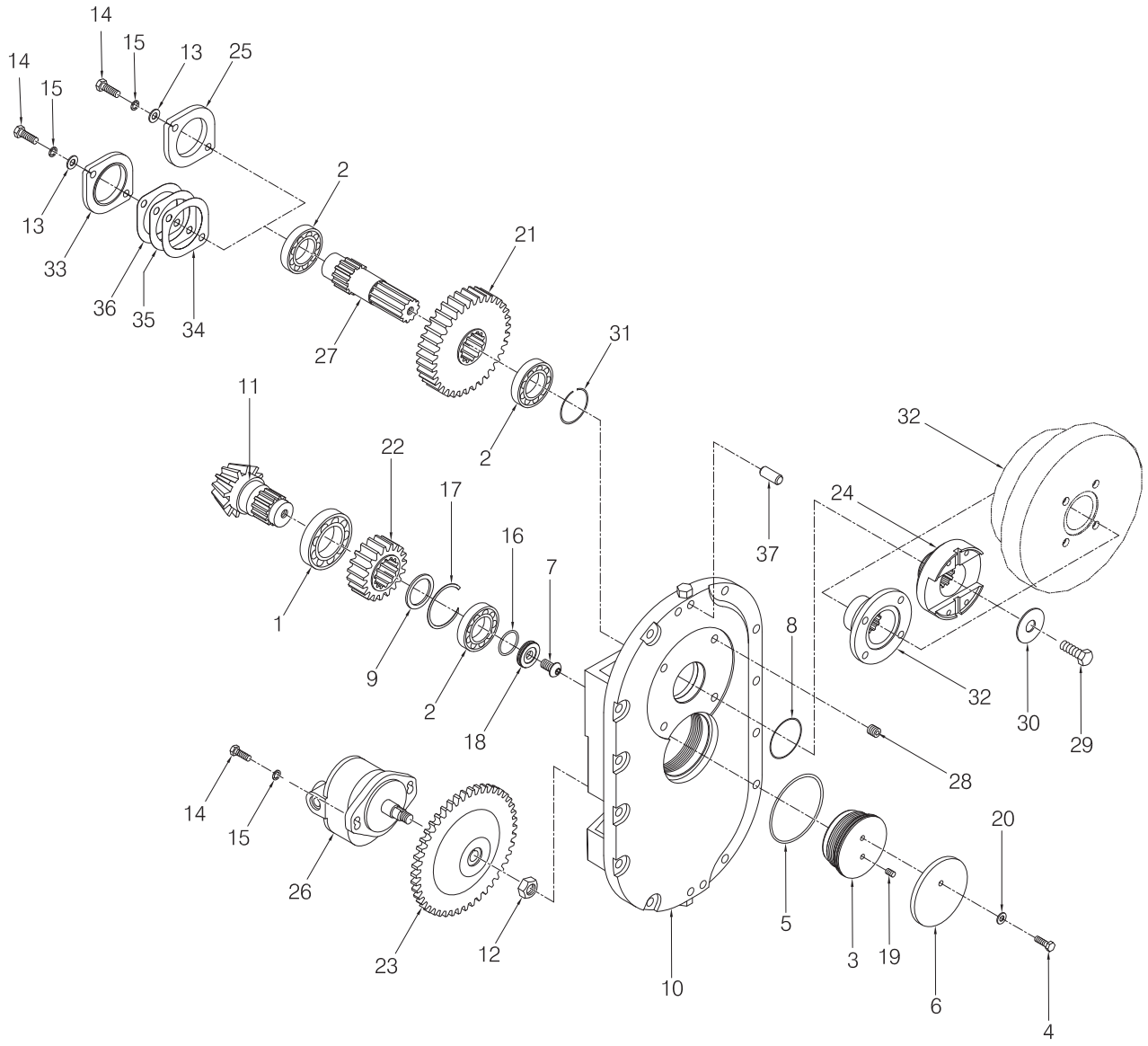
* Used on John Deere Only
§ Used on Caterpillar D6G & D6N Only
‡ Used on Caterpillra D6H Only

Figure 4-6 Input Carrier Arrangement for Caterpillar D6D/E/G, Dresser/Dressta TD15E and John Deere 750B/C 850B/C Last Used on S/N AW6G-1061



1.	Bearing	14.	Capscrew	27.	Bearing Retainer
2.	Bearing	15.	Lock Washer	28.	Pump
3.	Pinion Carrier	16.	O-Ring‡	29.	PTO Pilot§
4.	Capscrew	17.	Snap Ring‡	30.	Capscrew§
5.	O-Ring	18.	Plate‡	31.	Fitting§
6.	Keeper	19.	Set Screw‡	32.	Pin§
7.	Capscrew‡	20.	Washer‡	33.	Coupler§
8.	Seal	21.	Gear	34.	O-Ring§
9.	Spacer‡	22.	Gear	35.	Pin
10.	Input Carrier	23.	Gear		
11.	Bevel Gear	24.	Input Shaft	*	Caterpillar D6C/D/E/G, Dresser/Dressta TD15E/H
12.	Nut	25.	PTO Pilot*	§	Caterpillar D6N
13.	Washer	26.	Capscrew*	‡	First used on S/N AW6G-1112

Figure 4-7 Input Carrier Arrangement for Caterpillar D6D/E/G/N, Dresser/Dressta TD15E TD15H PS First Used on S/N AW6G-1062



1. Bearing
2. Bearing
3. Pinion Carrier
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew
8. Seal
9. Spacer
10. Input Carrier
11. Bevel Gear
12. Nut
13. Washer
14. Capscrew
15. Lock Washer
16. O-Ring‡
17. Snap Ring‡
18. Plate‡
19. Set Screw‡
20. Washer‡
21. Gear
22. Gear
23. Gear
24. Yoke*
25. Bearing Retainer*
26. Pump
27. Input Shaft
28. Setscrew
29. Capscrew
30. Washer
31. Snap Ring
32. Yoke§
33. Bearing Retainer§‡
34. Shim§‡
35. Shim§‡
36. Shim§‡
37. Pin

* John Deere 750B, 850B
§ John Deere 750C, 850C
‡ First used on S/N AW6G-1112

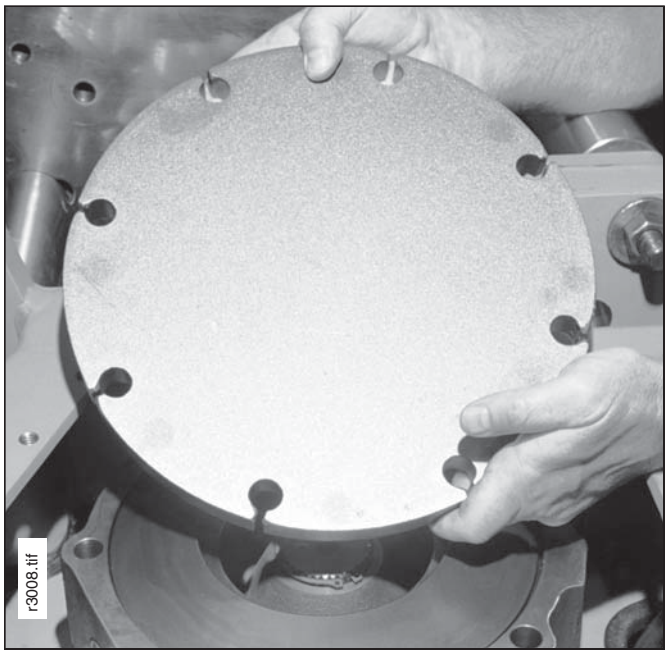
Figure 4-8 Input Carrier Arrangement for John Deere 750/850B 750/850C Series I & II
First Used on S/N AW6G-1062

Oil Brake Removal & Disassembly

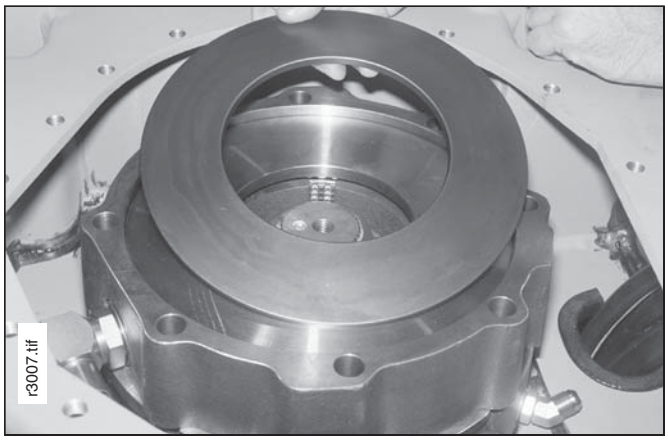
Removal and disassembly of the brake can be accomplished while the winch is mounted on the tractor. During disassembly, place all parts in a clean container to protect them from dust, dirt and moisture. Inspect all parts for damage and wear as specified in Figure 4-11.

1. Drain oil from winch or position winch with left-hand side up. Remove brake cover plate.

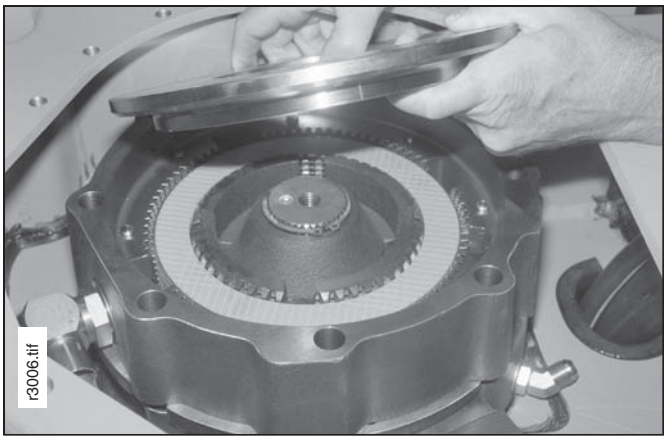
2. Loosen the capscrews evenly, then remove the brake assembly cover.



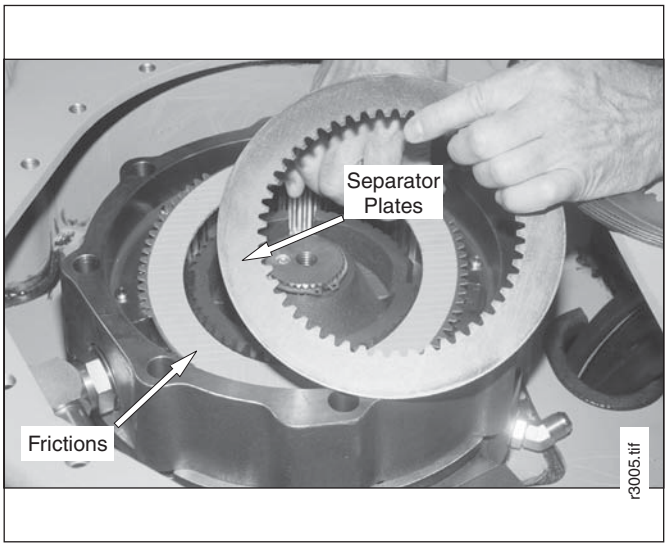
3. Remove belleville spring and stroke limiter (if applicable) from brake cage assembly.



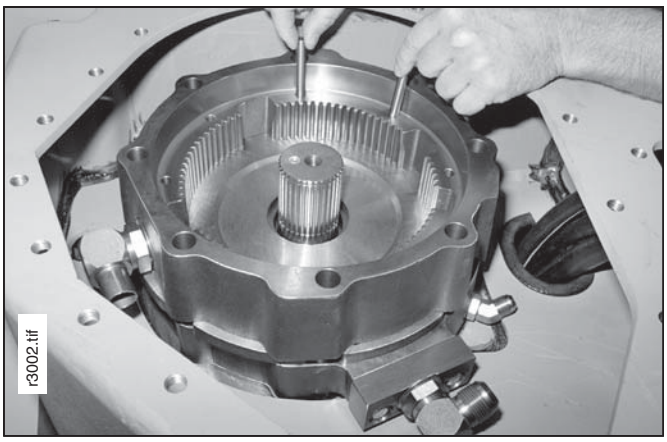
4. Remove thrust ring.



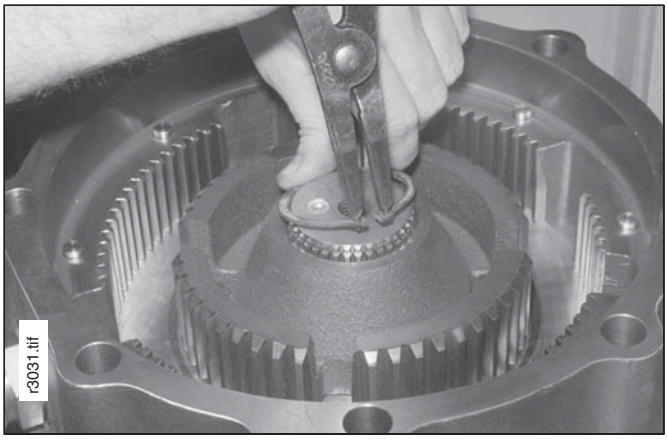
5. Remove friction discs and separator plates from the hub.



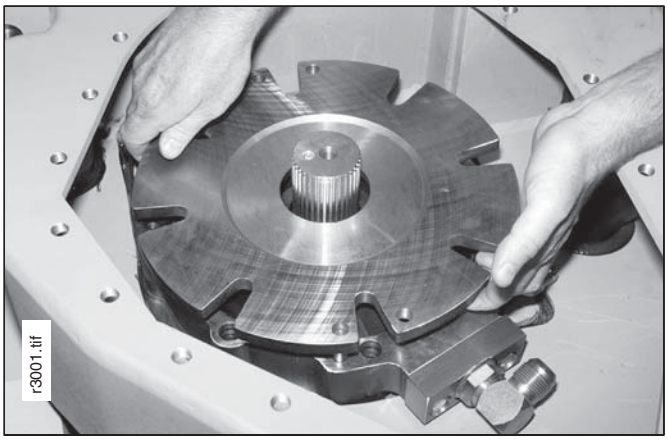
6. Remove thrust pins and cage. It may be necessary to tap cage with a soft hammer to loosen it.



7. Remove both snap rings from brake shaft and pull hub off brakeshaft.

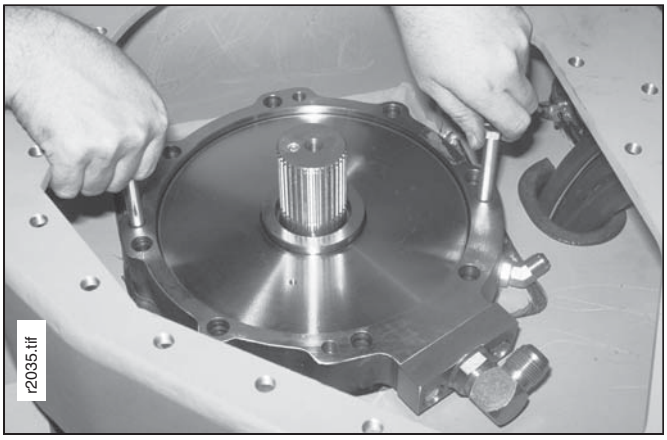


8. Remove pressure plate.



9. Remove seal rings from clutch shaft.

10. Remove the piston housing from winch case using two 1/2 UNC x 4-1/2 capscrews to lift housing out.



11. Pull the piston out of the housing using two 1/4-inch capscrews, or pressurize housing with low-pressure air.

12. Remove two O-rings from the piston. Discard O-rings. Inspect all oil brake components as specified in Figure 4-11.

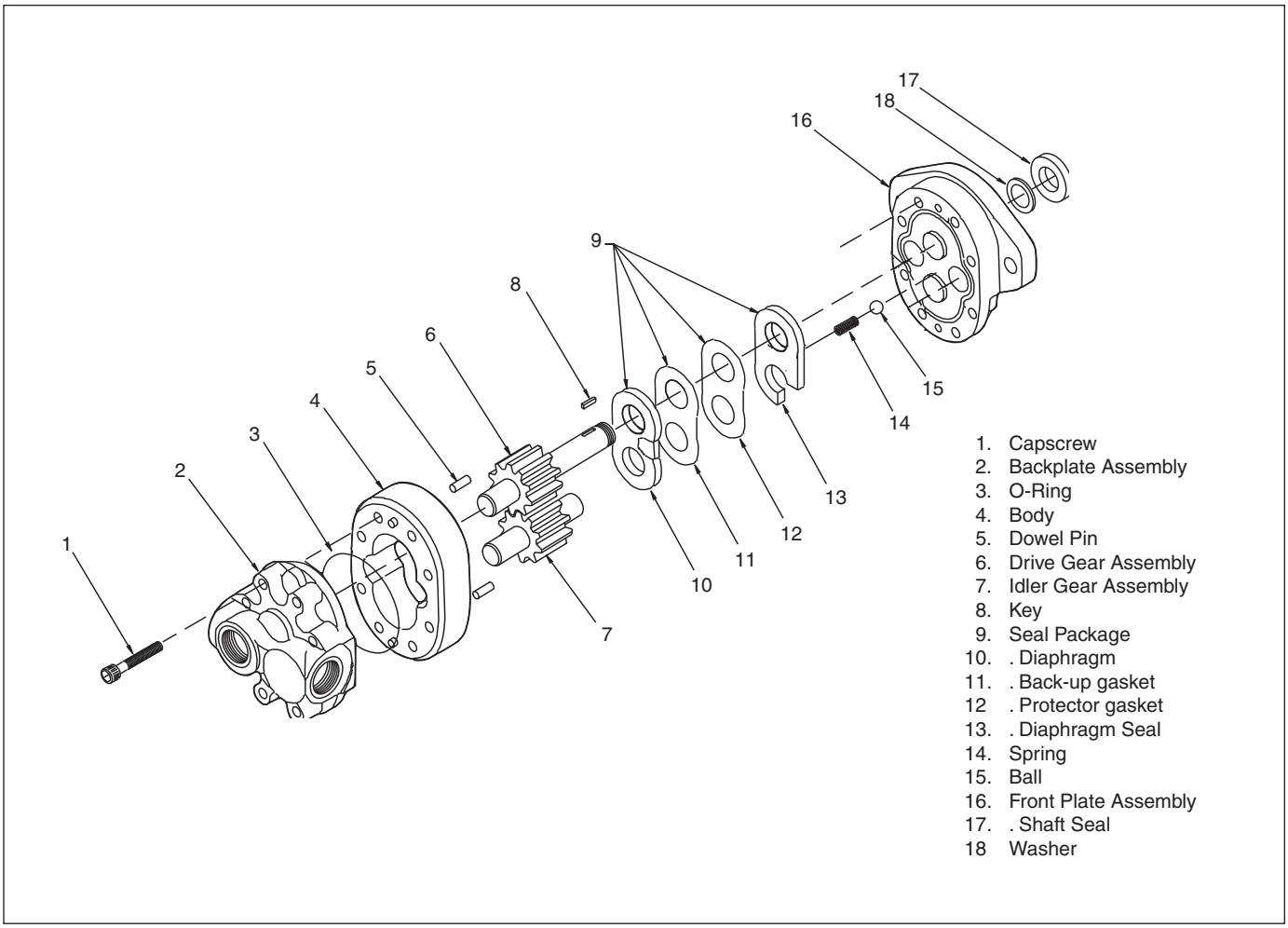


Figure 4-9 Hydraulic Pump

Hydraulic Pump Removal & Disassembly

To remove the hydraulic pump, the winch must be removed from the tractor and the input carrier must be removed (see **Input Carrier and PTO Removal and Disassembly)**. Cleanliness is extremely important when repairing these pumps. Work in a clean area.

Pump Disassembly

1. Clean the pump thoroughly with solvent, kerosene, or other non-corrosive cleaning fluid which will not affect rubber components.

2. Clamp pump in vise, shaft down.

3. Scribe a line across the three sections of the pump to act as a guide in reassembly.

4. Remove capscrews.

5. Remove from vise. Hold pump in hands and bump shaft against wooden block to separate front plate (16) from backplate (2). Body (4) will remain with either front plate or backplate.

6. To separate body from section that remains, place drive gear (6) in bearing and tap protruding end with plastic hammer.

7. Remove O-ring (3) from backplate assembly.

8. Remove diaphragm (10) from front plate by prying with O-ring pick.

9. Remove spring (14) and balls (15) from front plate.

10. Remove diaphragm seal (13) and shaft seal (17) from front plate.

Pump Inspection

1. Clean and dry all parts.
2. Remove nicks and burrs from all parts.

Pump Gear

1. Inspect drive gear shaft (6) for broken keyway.
2. Inspect all bearing points for excessive wear and rough surfaces.
3. Replace gear assembly if shafts measure less than .6580 in (17.40 mm) in bearing area.
4. Inspect gear face for scoring and excessive wear.
5. Assure that snap rings are in grooves on either side of drive and idler gears.
6. If edge of gear teeth are sharp, dull with emery cloth.

Pump Front and Backplates

1. Oil grooves in bearings should line up with dowel pin holes.
2. Replace plate if inner diameter of bearings exceed .691 in (17.55 mm).
3. Bearings in front plate should be flush with island in groove pattern.
4. Check for scoring on face of backplate, replace if wear exceeds .0015 in (.038 mm).

Pump Body

1. Check inside gear pockets for excessive scoring or wear of body.
2. Replace body if inner diameter of gear pocket exceeds 1.719 in (43.66 mm).

Clutch Shaft Removal & Disassembly

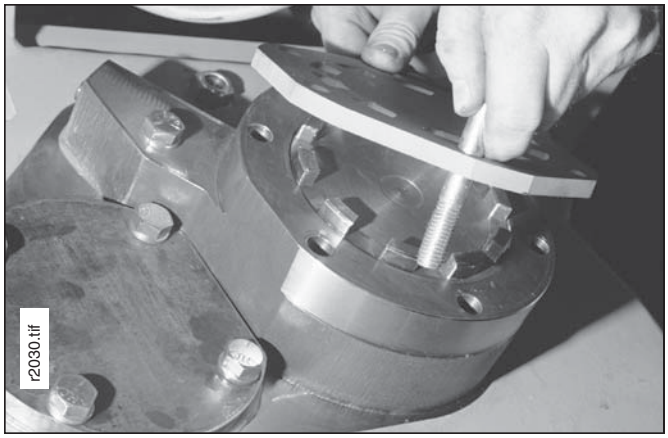
Figure 4-1 shows the location of clutch shaft components. Prior to removal of the clutch shaft, perform the following:

a) Drain oil from winch.

b) Remove all brake components as shown in the **Oil Brake Removal and Disassembly** section, steps 1 through 10.

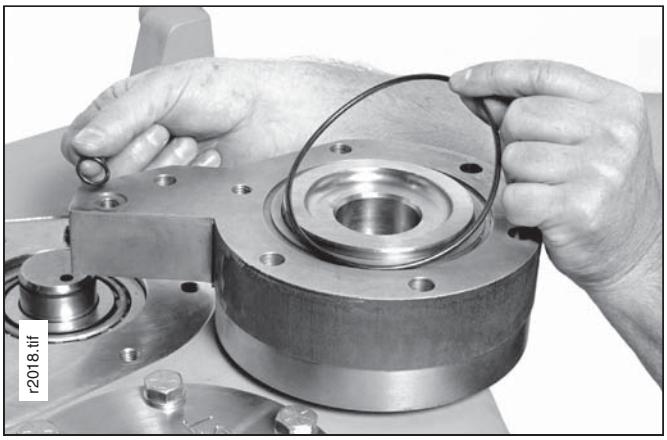
c) If equipped with freespool option, remove freespool shifter shaft and fork.

1. Remove right-hand bearing retainer keeper.

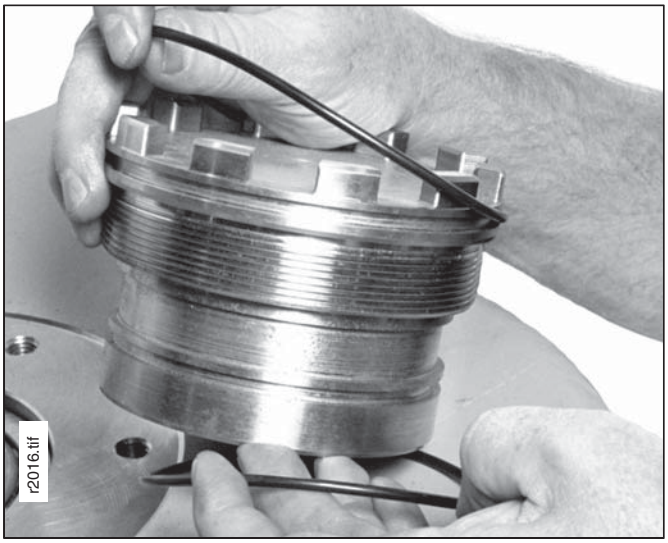


2. Remove the right-hand bearing retainer and bearing adjuster.

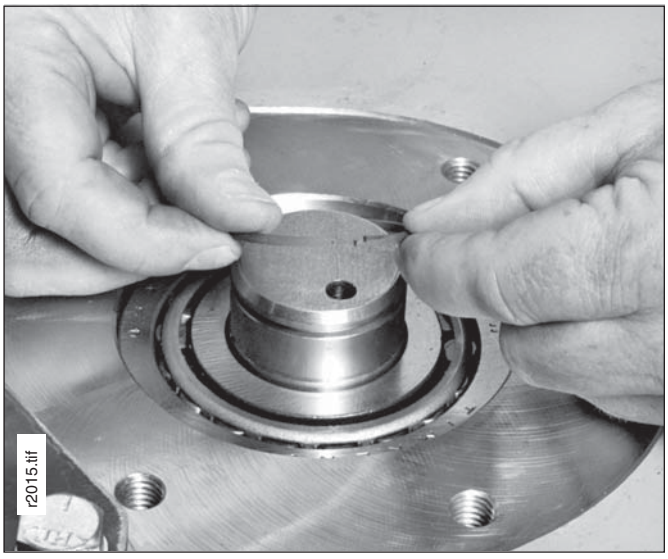
3. Remove and discard O-rings on bottom end of bearing retainer.



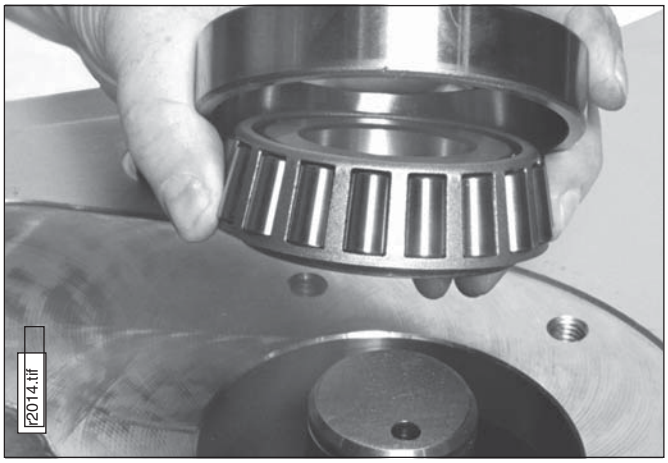
4. Remove bearing adjuster from bearing retainer. Remove and discard O-rings.



5. Remove seal ring from clutch shaft.

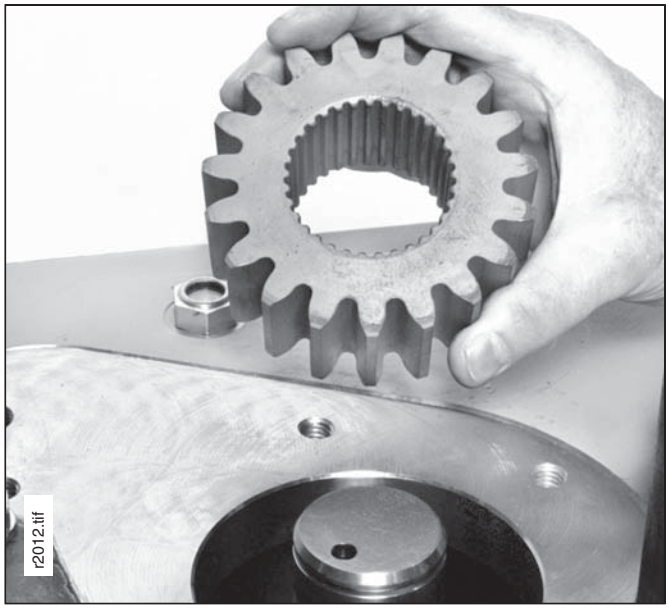


6. Remove bearing cup and cone.

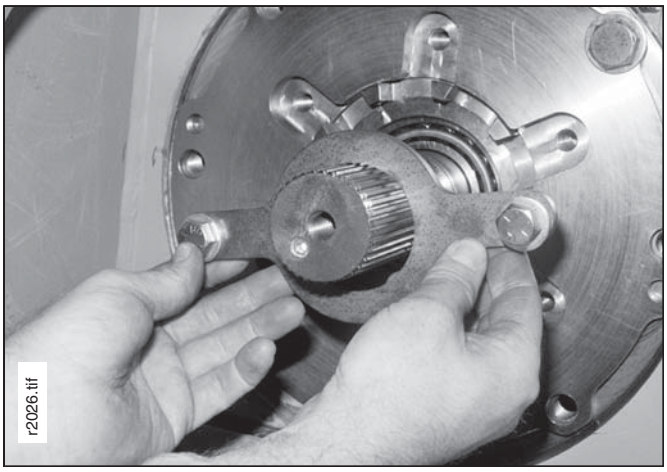


7. Remove spacer.

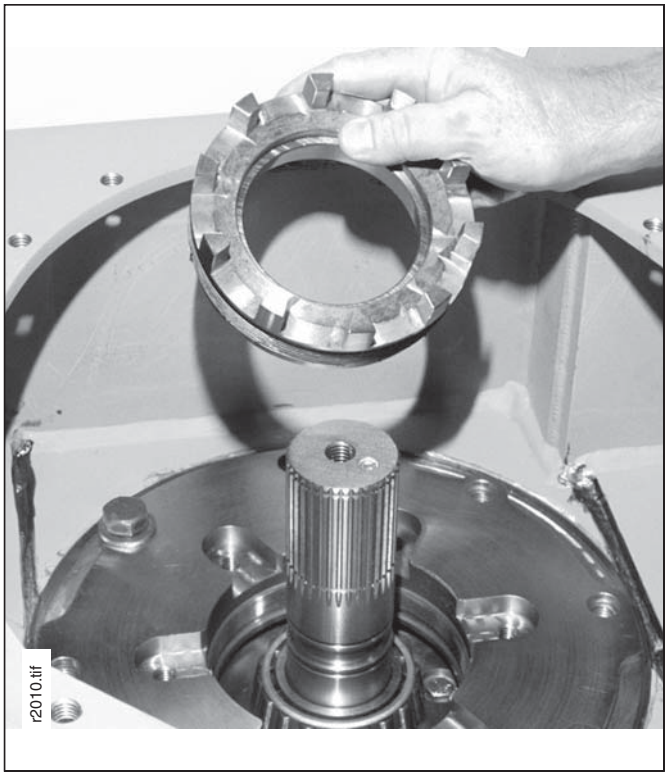
8. Remove clutch shaft gear.



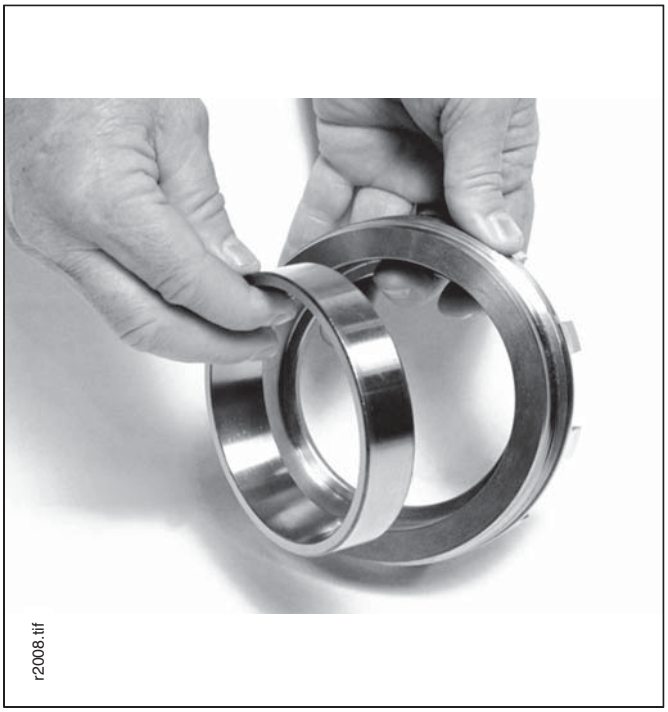
9. Remove left-hand bearing adjustment retainer.



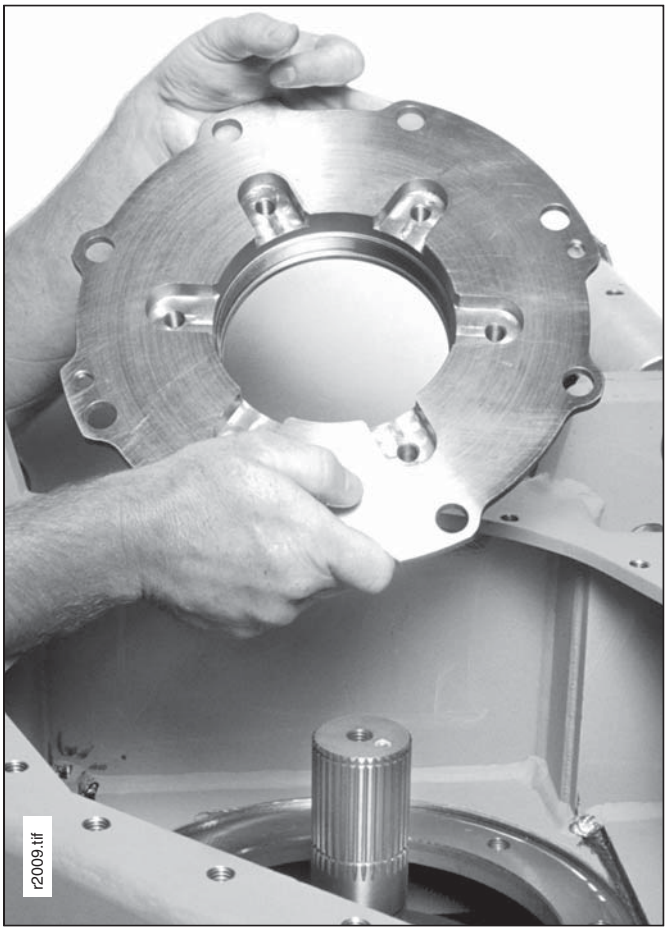
10. Remove left-hand bearing adjuster.



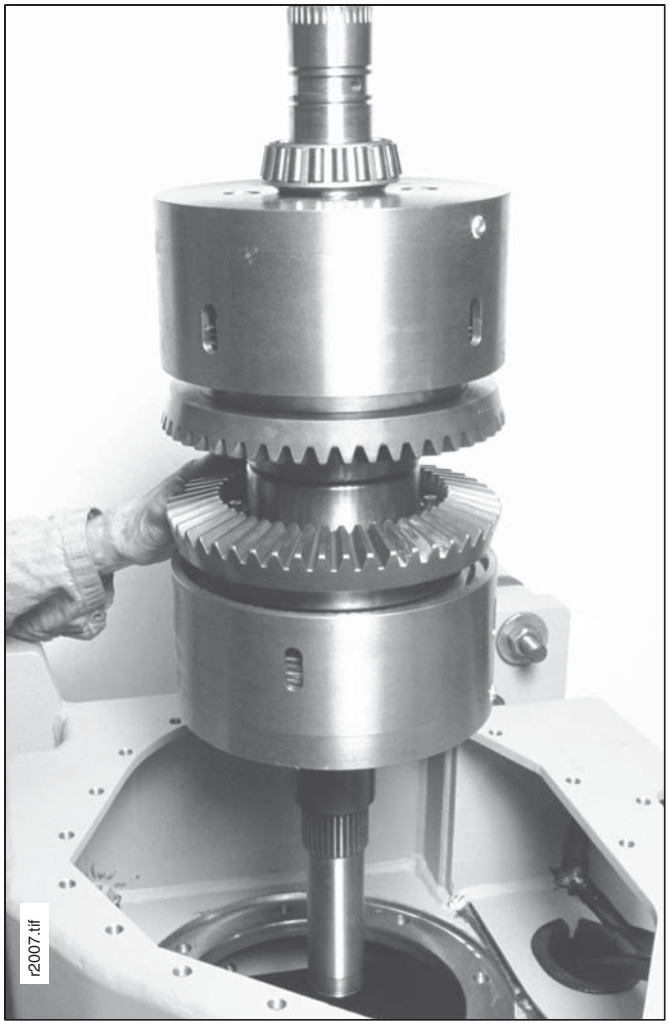
11. Remove bearing race from bearing adjuster.



12. Remove left-hand bearing retainer.



13. Using crane, remove entire clutch shaft from left-hand side of winch.



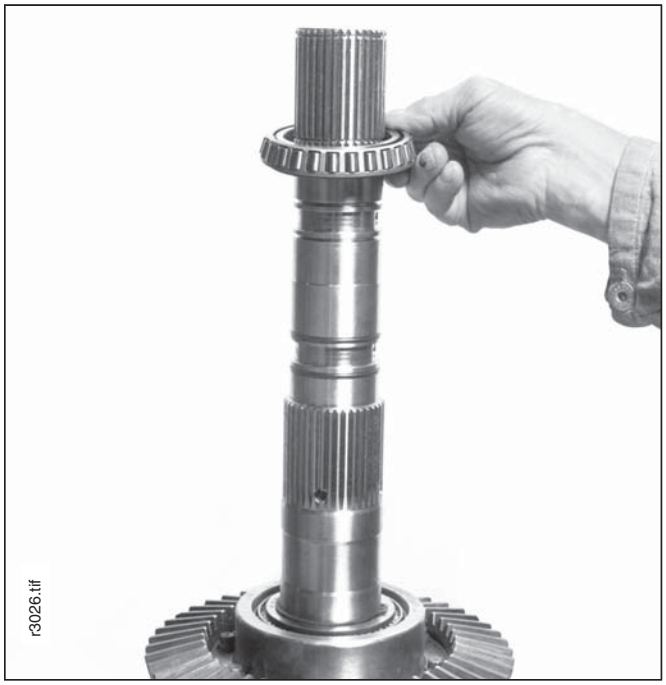
14. Remove spacer from clutch shaft.

15. Remove snap ring from clutch shaft.

16. Remove bearing cone, clutch assembly capscrews and clutch assembly.

17. Remove clutch hub.

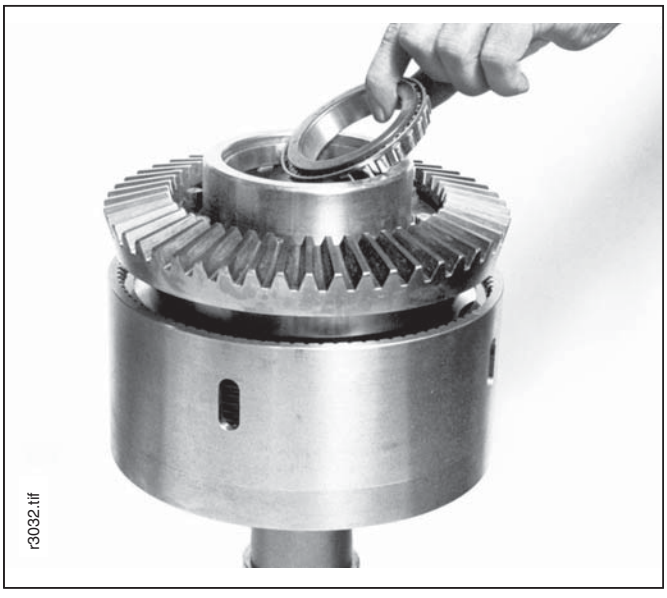
18. Remove bearing cone.



19. Remove shims or spacers.

NOTE: Older clutch shafts may use a snap ring instead of spacers or shims.

20. Remove clutch shaft, then remove bearing cone from clutch hub. Remove clutch hub and second clutch. A spacer and a roller bearing will be left.



Oil Clutch Disassembly

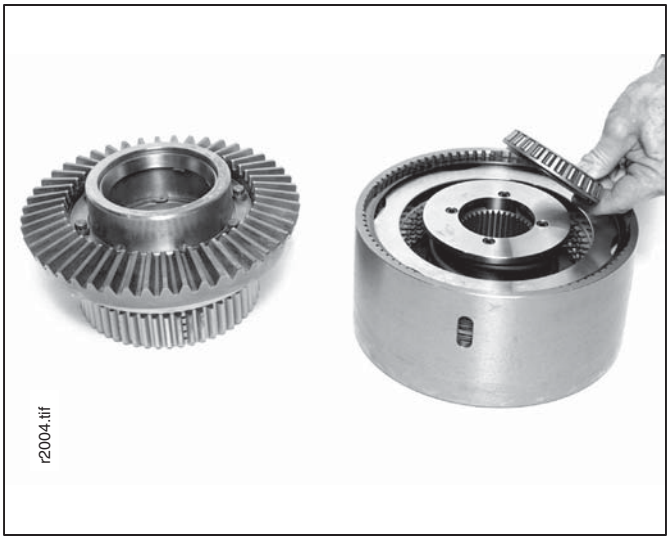
This section details the disassembly of the oil clutches. Removal of the clutch assemblies is shown in the **Clutch Shaft Removal & Disassembly** subsection.

NOTE: Disassembly is the same for both the forward and reverse clutches.

1. Remove the capscrews from the clutch.

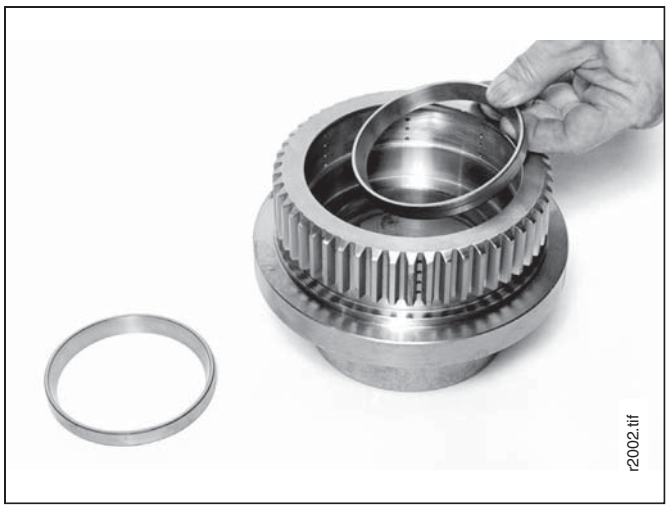
2. Turn clutch assembly over, and remove clutch hub assembly.

3. Remove bearing cone from clutch assembly.

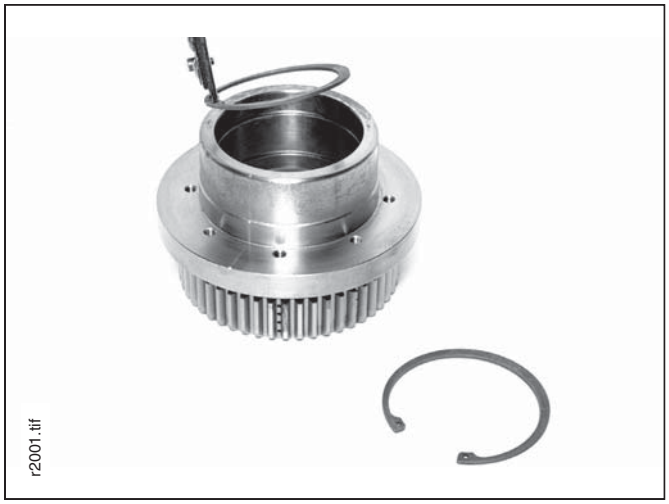


4. Remove the capscrews and ring gear from the clutch hub assembly.

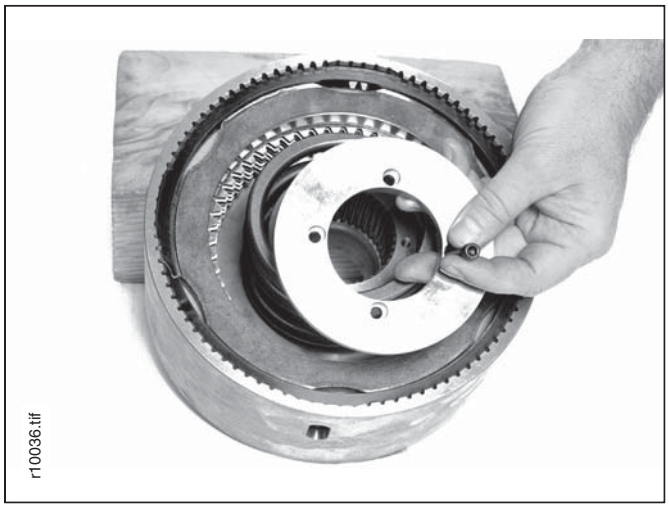
5. Remove bearing bearing cup and cone from each end of clutch hub.



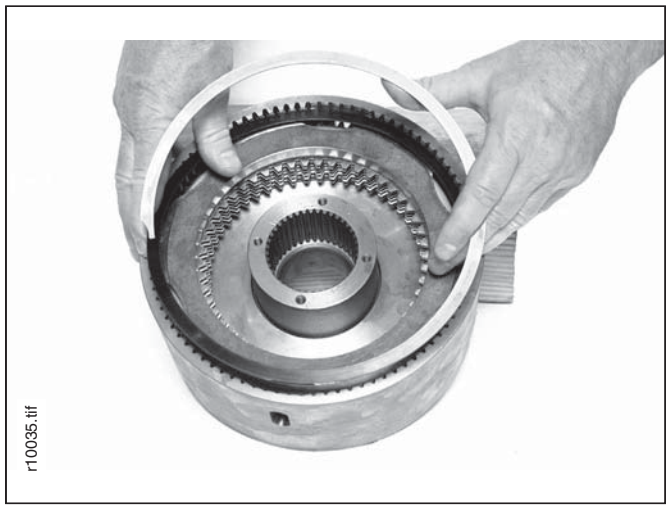
6. Remove both snap rings from clutch hub.



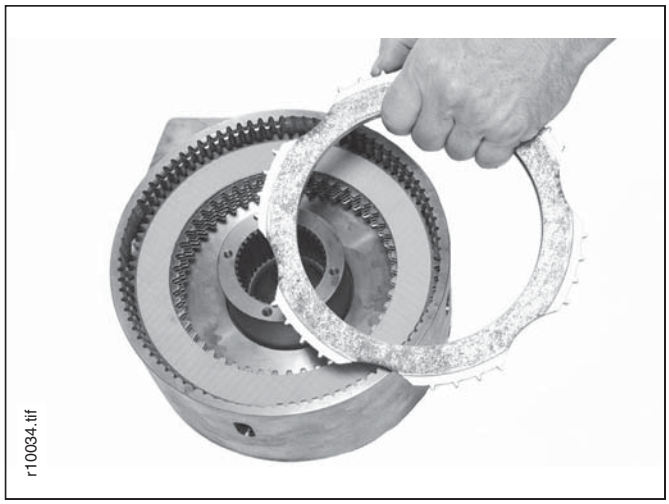
7. Remove capscrews, spring retainer and spring. Inspect for wear.



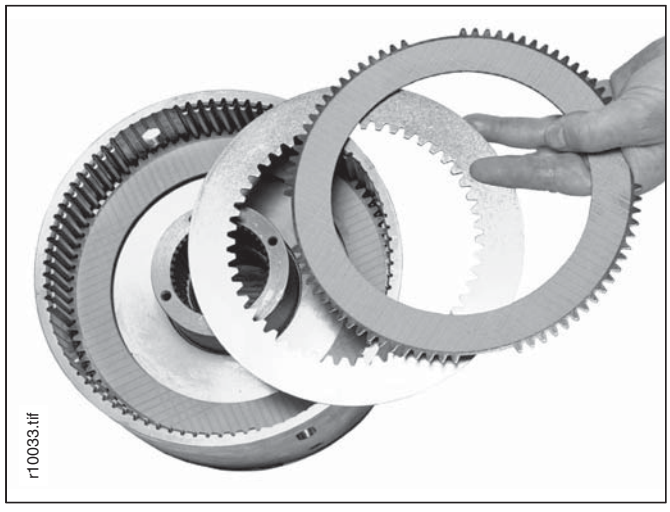
8. Remove snap ring.



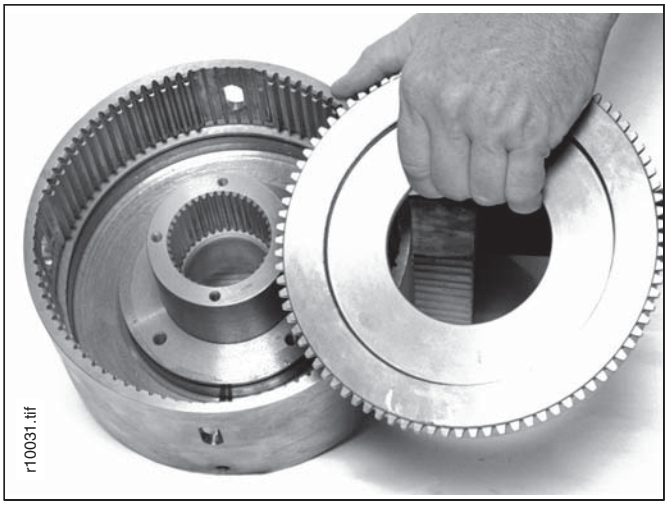
9. Remove the clutch plate. Inspect for wear.



10. Remove friction and separator plates. Inspect as described in Figure 4-11.



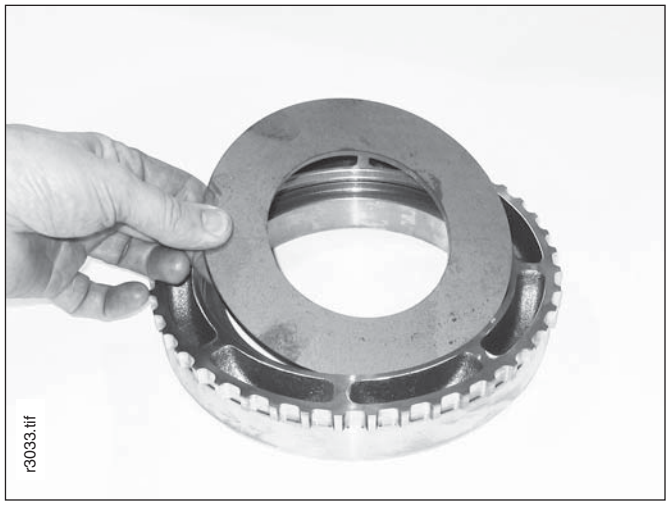
11. Remove piston and inspect for wear.



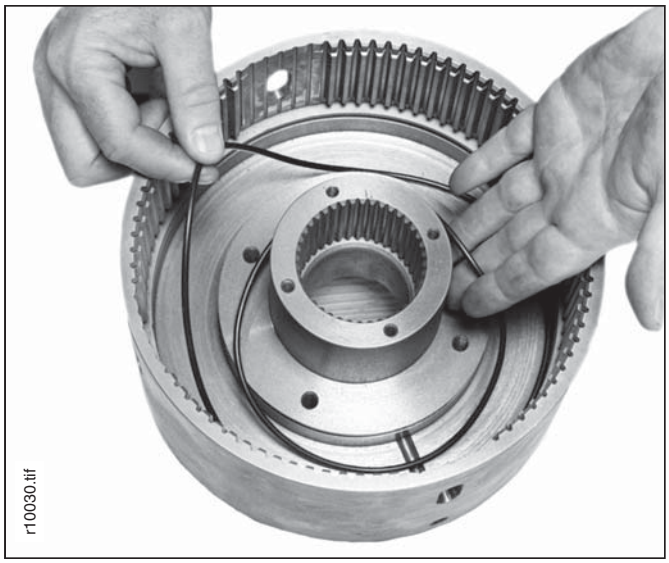
NOTE: For winches with older-style single-piece pistons, go to step 14. For winches with newer-style three-piece pistons, see steps 12 and 13.

12. Remove retaining ring.

13. Remove reaction plate.

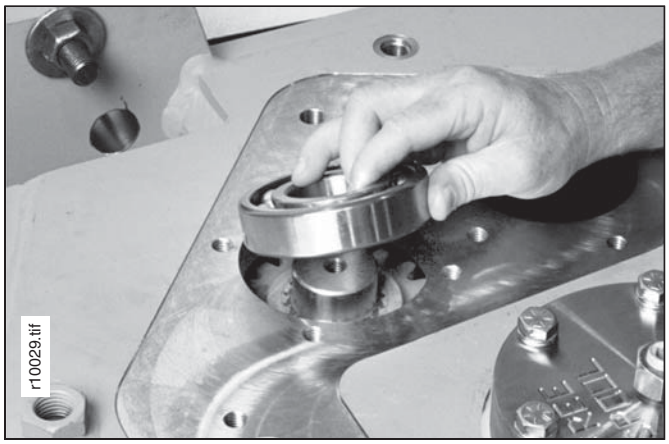


14. Remove and discard the two O-rings from clutch housing.

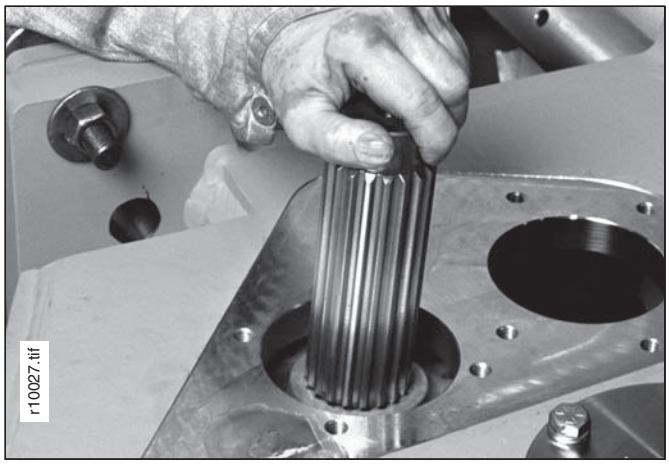


Idler Shaft Removal

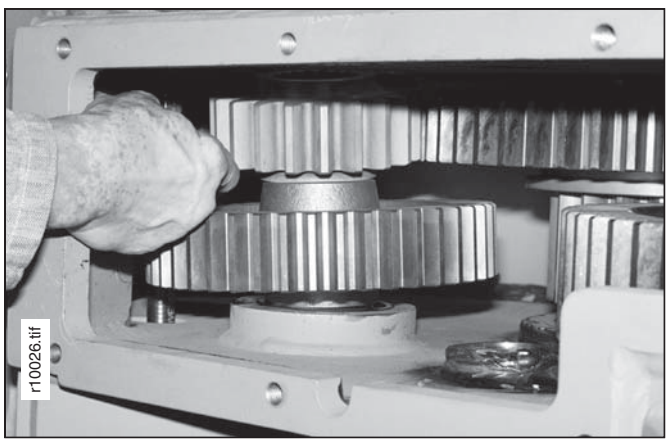
1. Remove idler gear shaft retainer and bearing.



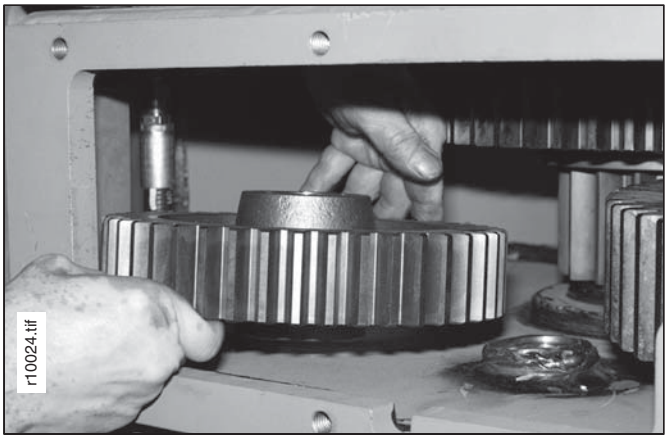
2. Withdraw idler shaft from winch housing.



3. Remove cover on top of winch and remove idler gear.



4. Remove gear from winch housing.



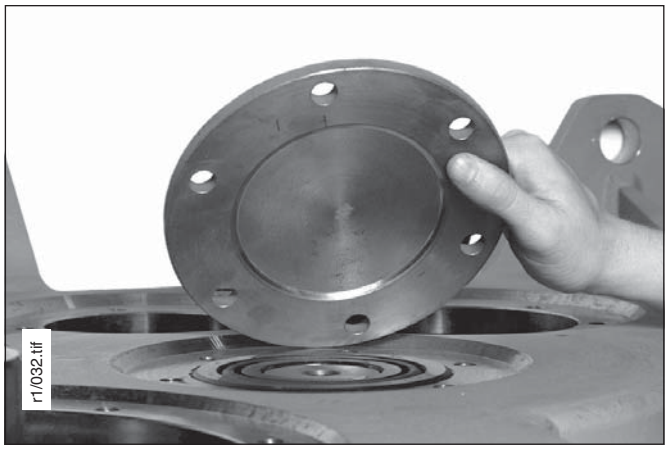
5. Remove bearing.

Intermediate Shaft Removal, Non Freespool

NOTE: The following steps show the winch removed from the tractor with the clutch shaft and brake shaft removed. This is the normal sequence for complete unit overhaul but it is not necessary for the removal of the intermediate shaft only.

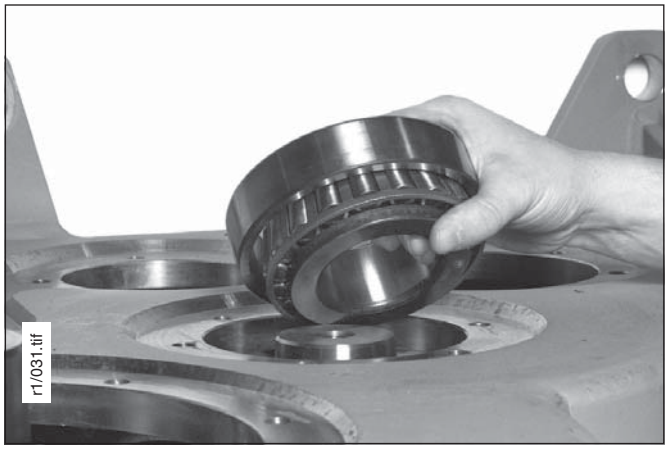
NOTE: The instructions below appply only to a winch NOT equipped with the optional freespool arrangement. Refer to the next subsection, Intermediate Shaft Removal, Freespool, for instructions relevant to winches equipped with the freespool option.

1. Remove the intermediate shaft cover.

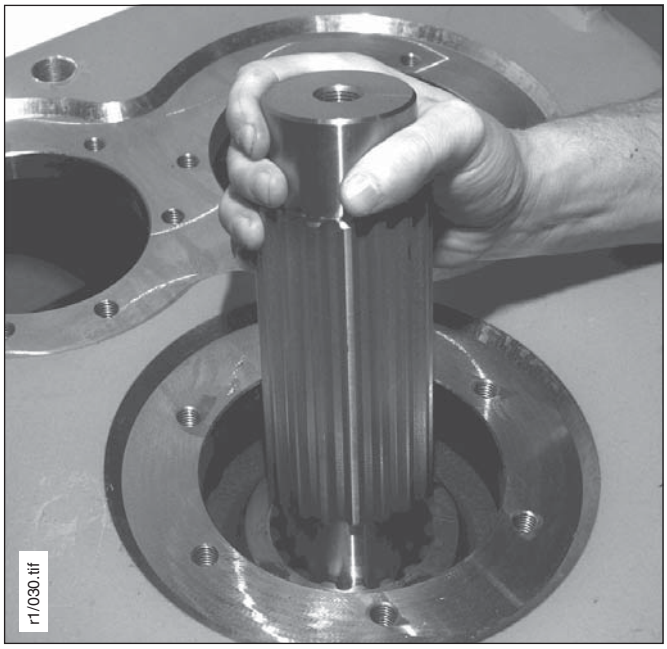


2. Screw a 3/4-16 UNF slide hammer into the end of the intermediate shaft and partially pull it out.

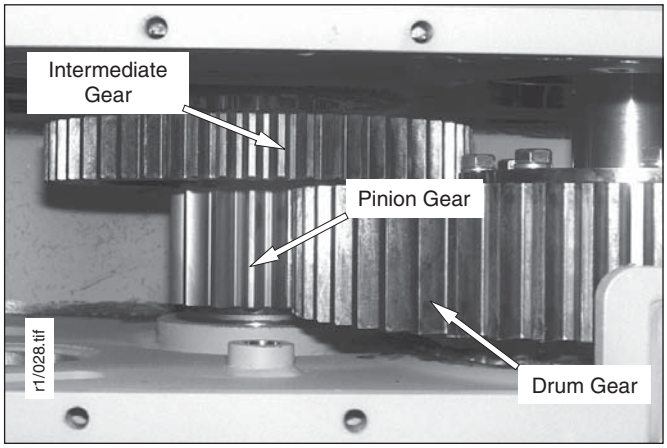
3. Remove bearing cup and cone.

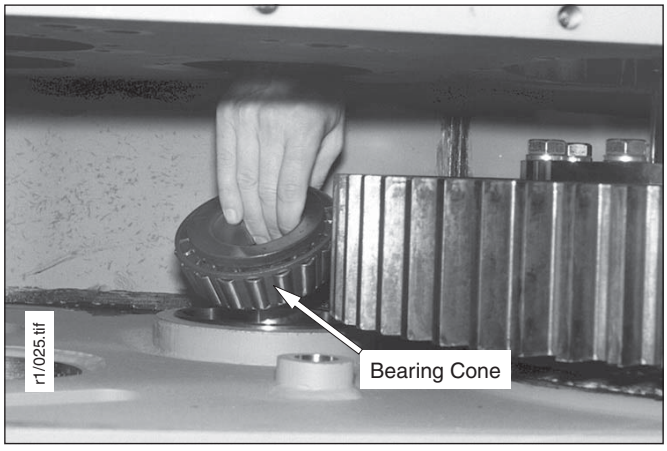


4. Remove the intermediate shaft, while ensuring that the intermediate gear does not fall.

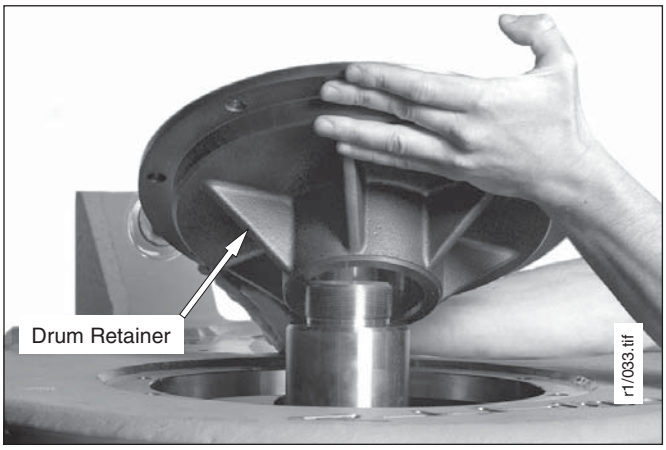


5. Remove the drum pinion gear and the inner bearing cone.





6. Remove drum shaft retainer prior to removing intermediate gear. See **Drum Shaft and Drum Removal** subsection that follows.



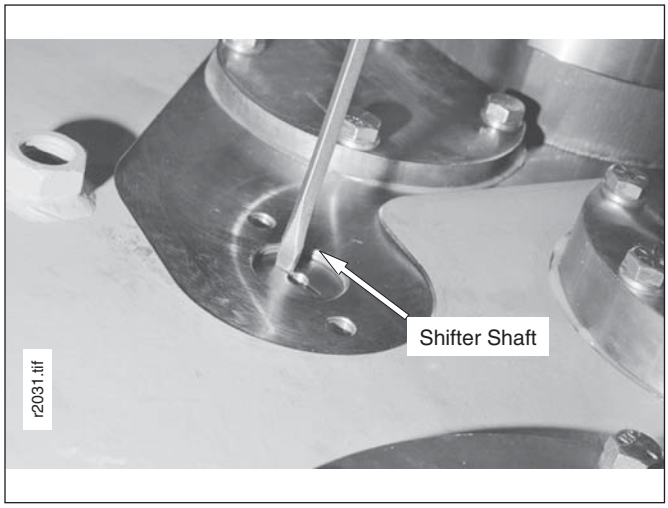
Intermediate Shaft Removal, Freespool

The intermediate shaft can be removed with the winch mounted on the tractor.

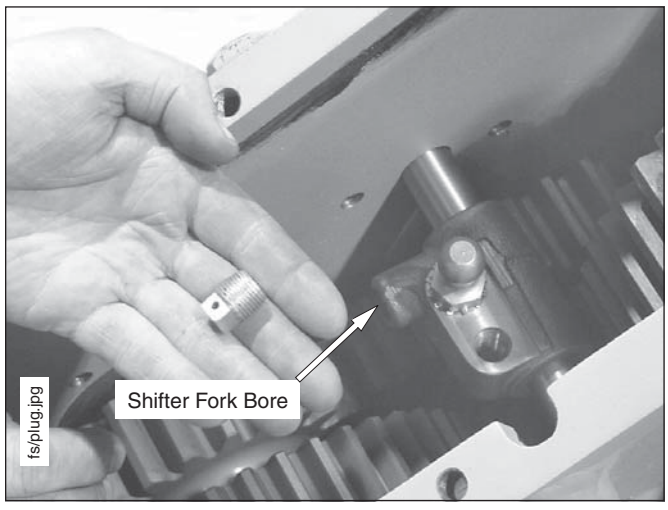
NOTE: The following steps show the winch removed from the tractor with the clutch shaft and brake shaft removed. This is the normal sequence for complete unit overhaul but it is not necessary for the removal of the intermediate shaft only.

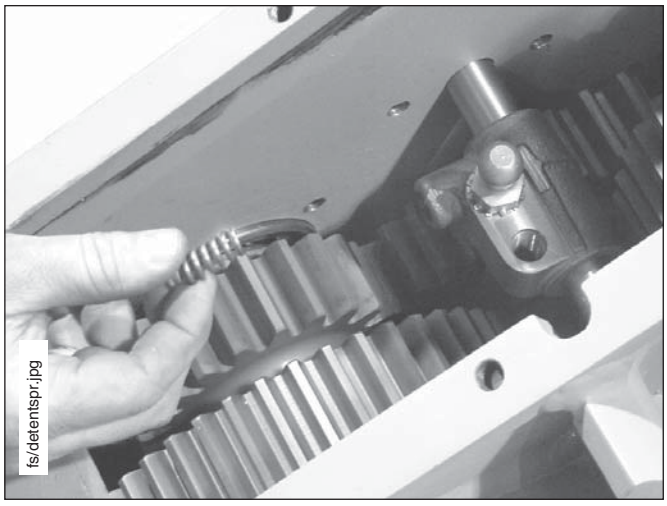
NOTE: The instructions below apply only to a winch equipped with the optional freespool arrangement. Refer to the previous subsection, Intermediate Shaft Removal, Non Freespool, for instructions relevant to winches without the freespool option.

1. Remove the capscrews securing the shifter shaft cover.

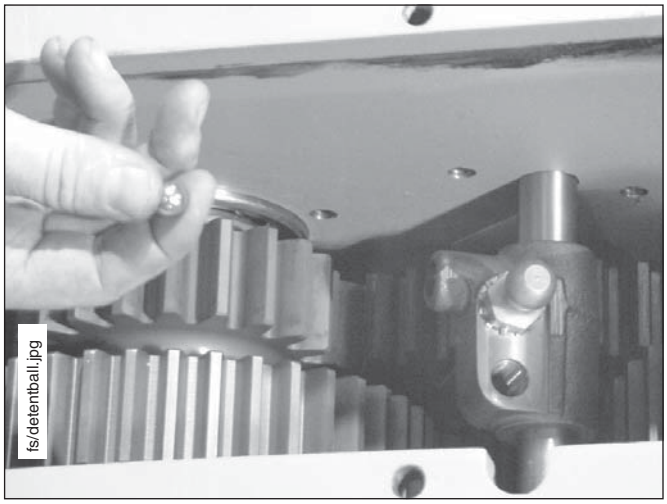


2. **POWER CONTROLS ONLY:** Remove the plug and spring from the freespool shifter fork.

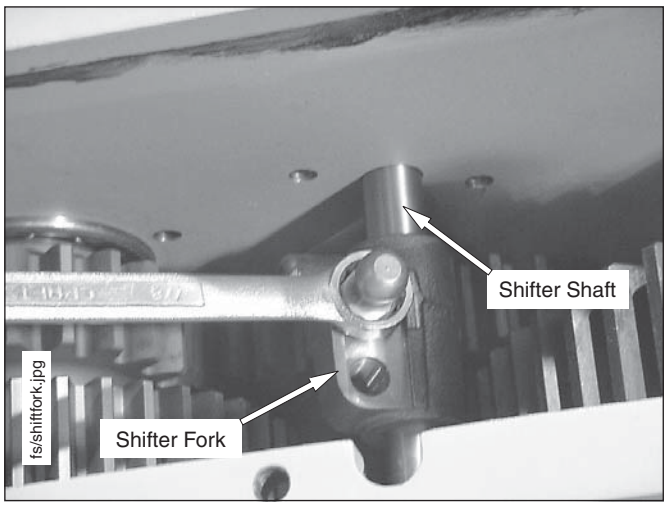




3. **POWER CONTROLS ONLY:** Use a magnet to remove the detent ball.



4. Withdraw the shaft and remove the fork **(POWER CONTROLS CONFIGURATION SHOWN BELOW)**.



5. Remove the intermediate shaft cover.

6. Tag shims for reference during reassembly (not shown).

7. Screw a 3/4-16 UNF slide hammer into the end of the intermediate shaft and partially pull it out.

8. Remove the drum pinion gear and the inner bearing cone. Refer to Figure 4-2 for the location of components.

9. Remove bearing cup and cone and the intermediate shaft, while ensuring that the intermediate gear does not fall.

10. Remove intermediate gear.

NOTE: Remove drum shaft retainer prior to removing intermediate gear. See Drum Shaft and Drum Removal subsection that follows.

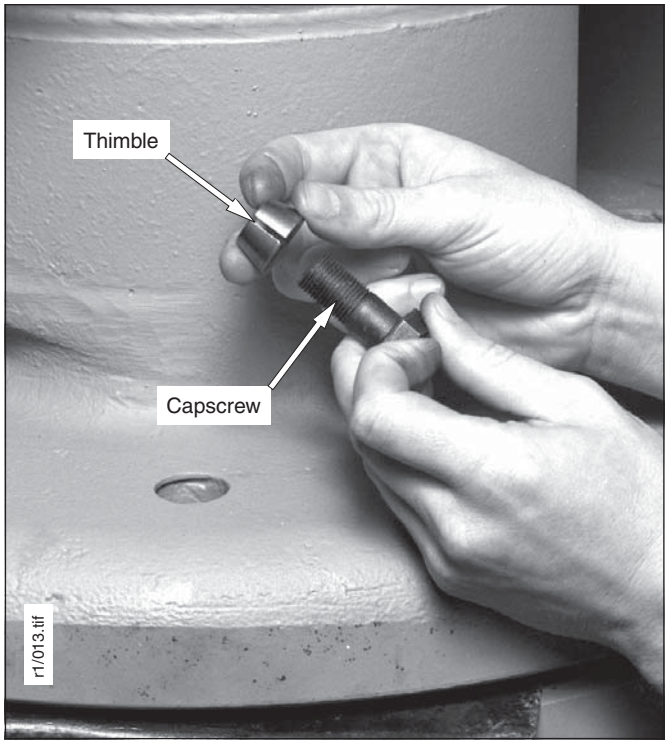
Drum Shaft & Drum Removal

Figure 4-10 shows the location of drum and drum shaft components. Do not attempt to remove heavy components such as the drum or drum gear by hand. Always use a lifting device and the recommended attachments whenever possible. To remove the drum gear, it will be necessary to first remove the intermediate shaft (see **Intermediate Shaft Assembly Removal** subsection) and the clutch assembly (see **Clutch Shaft Removal and Disassembly** subsection).

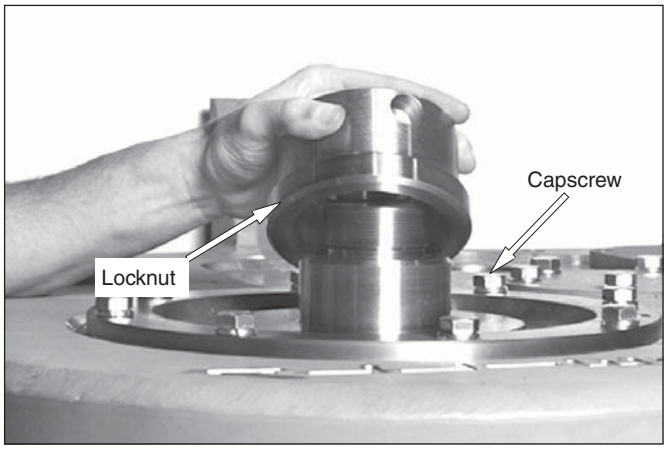
⚠ WARNING

Fabricated drums weigh approximately 540 lbs (245 kg). Pay special attention when you work.

1. Loosen the drum capscrews, then remove capscrews with thimbles, leaving two located 180° apart.



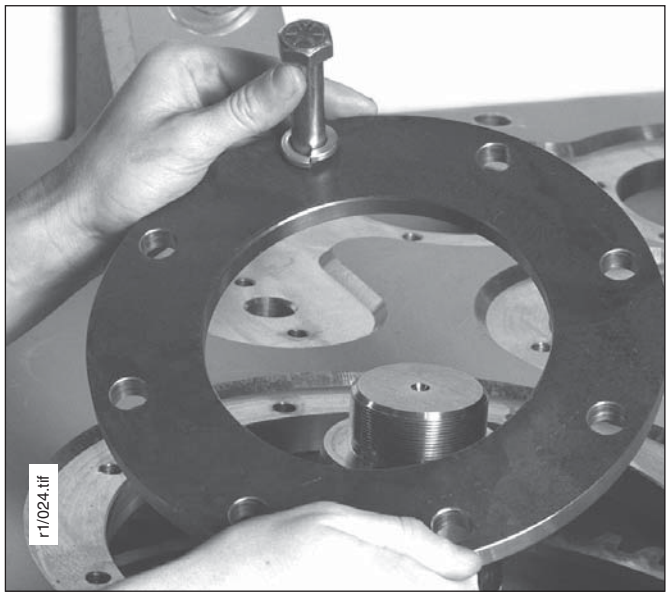
2. Remove both drum shaft locknut and the retainer capscrews.

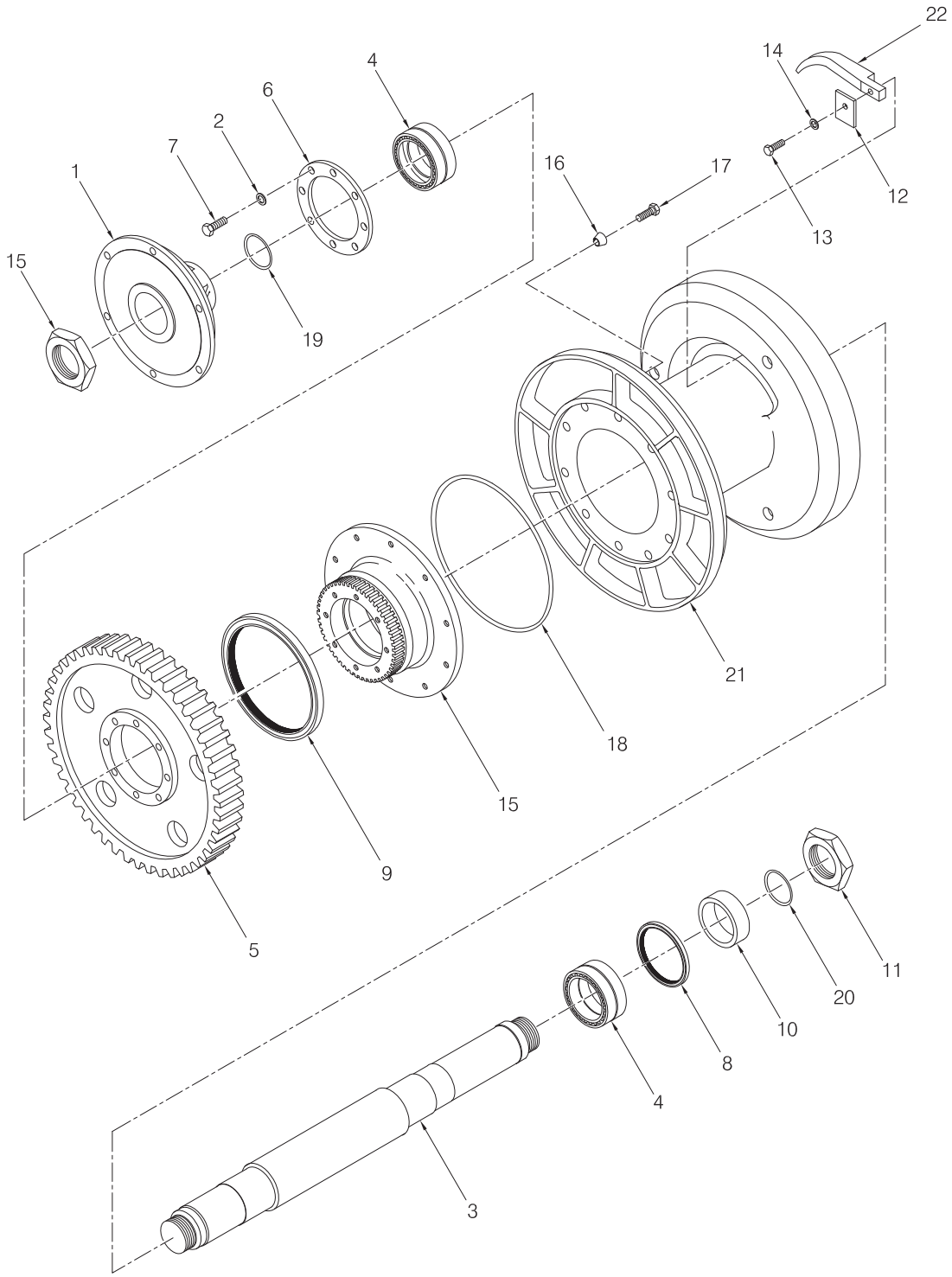


3. Remove bearing retainer and shim pack.

NOTE: Tag shim pack for reference during reassembly.

4. Remove retainer ring by removing retainer capscrews.





1. Cover
2. Washer
3. Drum Shaft
4. Roller Bearing
5. Drum Gear
6. Retainer Plate
7. Capscrew
8. Oil Seal
9. Oil Seal
10. Spacer
11. Nut
12. Ferrule Keeper
13. Capscrew
14. Washer
15. Adapter
16. Thimble
17. Capscrew
18. Ring Seal
19. O-Ring
20. O-Ring
21. Drum
22. . Filler

Figure 4-10 Location of Drum and Drum Shaft Components

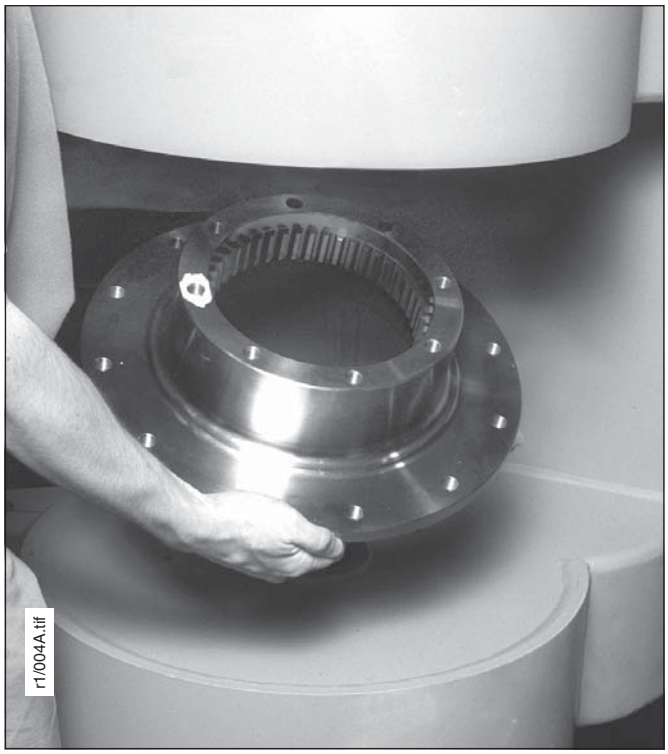
5. Attach a sling around the drum and hoist until there is no slack, then drive the shaft out the right hand side.

NOTE: Support or sling the drum gear so that it does not fall during shaft removal.

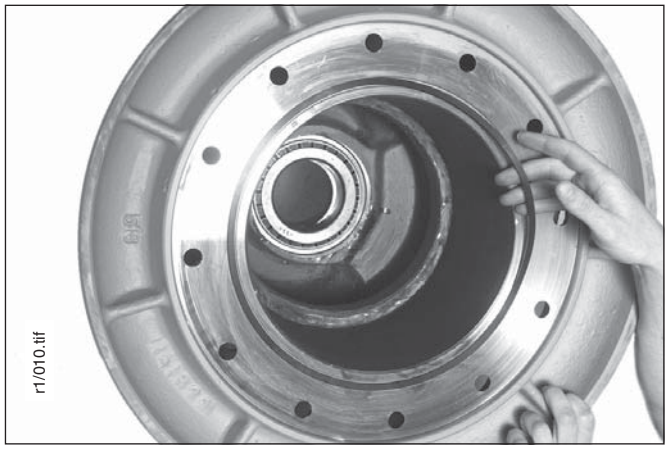
6. Remove two remaining drum capscrews.

7. Carefully remove the drum from winch frame. Ensure that the adapter does not fall.

8. Remove adapter.



9. Remove and discard adapter seal.



NOTE: This seal must be replaced with a new Allied Systems Company-approved seal during reassembly.

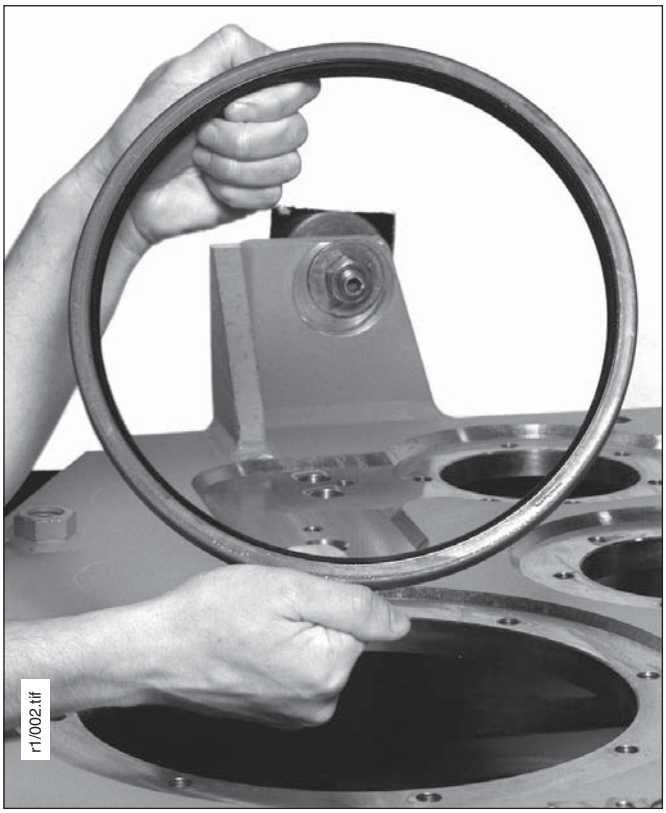
10. Remove double tapered roller bearing assembly and drum seal spacer from the left-hand end of the drum.

NOTE: Bearing, cups and spacers are a matched set, and must not be interchanged with other bearing set components.

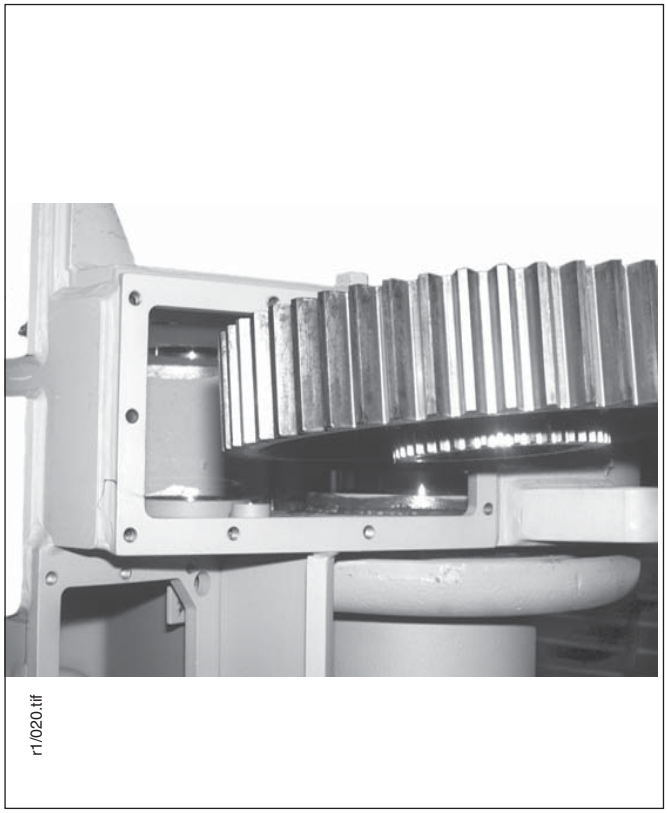
NOTE: Refer to Figure 4-10 for location of components.

11. Remove and discard shaft seal from drum. (Seal lip should normally be pointed in.)

12. Remove and discard adapter seal from winch housing.



13. Using a suitable lifting device, the drum gear can now be removed.



Winch Assembly

All components should be inspected for wear or damage as they are removed. Refer to Figure 4-11, Visual Inspection. All seals that were removed should be replaced during assembly. Carefully inspect all bearings that have been removed. Used bearings often appear satisfactory, but may fail when placed under a load. When in doubt, it is recommended to install a new bearing. Any component that indicates excessive wear or damage should be replaced. The following reassembly and installation sequence assumes a complete winch overhaul.

Figure 4-11 Visual Inspection_1

ITEM	INSPECTION REQUIREMENTS	CORRECTIVE ACTION
PTO Shaft with Integral Bevel Pinion	Check for broken or severely worn bevel gear teeth. Also check splines for wear or twisting. Observe tooth contact wear pattern.	Replace shaft if gear teeth are broken or severely worn, or if splines are not true.
Clutch Shaft	Check for deep scratches or scoring on bearing surfaces at each end of shaft.	Dress surface or replace shaft if severely worn.
	Inspect clutch shaft O-ring grooves for taper, scoring, burrs and corrosion.	Replace or repair shaft if surfaces of the seal groove are not damaged.
	Check for broken, scored, pitted and corroded cast iron seal rings.	Replace seal rings if worn or damaged slightly.
	Check for broken or severely worn splines.	Replace shaft if splines are broken or severely worn.
	Inspect cast iron seal ring grooves for damage.	Dress grooves or replace shaft if seal will not seat properly.
	Check for damage on enlarged plugs in the shaft ends.	Replace plugs if damaged.
	Check plug hole internal threads in the shaft for scoring or distortion.	Dress threads with a thread chaser.
	Inspect clutch shaft bearings for wear or damage.	Replace worn or damaged bearings.
Clutch Shaft Bearing Retainers	Check retainer seal ring bore for grooves, scoring and rust.	Replace if scored or rusted.
Clutch Shaft Spacers	Inspect spacer ends for scoring or corrosion.	Replace if damaged in any way.
Bevel Gear	Check for broken or worn teeth.	Replace if teeth are broken or severely worn.
	Inspect gear hub faces for scoring, wear or corrosion. Check bolts between gear and clutch for tightness.	Replaced if the hub faces are defective in any way.
Forward and Reverse Clutch Assemblies	Check for plugged oil holes in clutch hub.	Clean oil holes as necessary.
	Carefully inspect friction discs for wear, distortion and damaged teeth.	Replace friction disc(s) if oil grooves are worn from facing, or if distorted or damaged.
	Carefully inspect separator plates to verify that surfaces are free of large blue areas (caused by overheating) and/or not worn excessively or unevenly.	Replace separator plates if surfaces are warped or damaged.
	Inspect piston, O-ring grooves and center bore for scoring, burrs and corrosion. Look for any internal cracks.	Replace piston retainer plate if damaged.
	Check for wear or collapsed release spring.	Replace spring(s) if distorted or damaged in any way.
	Inspect spider gear for broken or worn gear teeth. Be sure pinion gear is secured to spider gear. Inspect bearing bore for scoring or galling.	Replace gear if teeth are broken or severely worn, or if pinion gear has broken free from spider gear. Replace gear if bearing bore is badly scored.

Figure 4-11 Visual Inspection_2

ITEM	INSPECTION REQUIREMENTS	CORRECTIVE ACTION
Brake Assembly	Check for cracked or broken belleville spring.	Replace spring if cracked or broken.
	Inspect oil brake cover for scoring, burrs, cracks or warping.	Replace cover if damage affects sealing or proper contact with belleville spring.
	Carefully inspect friction discs for facing wear, distortion and damaged teeth.	Replace friction discs if oil grooves are worn from facing or distorted or distorted in any way.
	Carefully inspect separator plates to verify that surfaces are free of large blue areas (caused by overheating) and/or not worn excessively or unevenly.	Replace separator plates if surfaces are warped or scored.
	Inspect piston housing and piston for cracks and damage. Ensure O-ring grooves and sealing surfaces are undamaged.	Replace piston or piston housing if damaged. Always replace piston seals (O-rings) when brake is repaired.
	Inspect brake cage for wear, scoring, burrs and cracks.	Replace cage if splines are notched or cage is cracked.
	Inspect brake hub and shaft for wear, scoring, burrs and cracks.	Replace hub if splines are notched or hub is cracked. Replace shaft if damaged.
	Check push rods for straightness, mushrooming and end faces out of square.	Replace if damaged enough to cause binding or if diameter, length or end squareness is distorted.
	Check capscrews for tightness and depth in frame.	Tighten if loose.
	Carefully check aligning dowels for grooves and distortion.	Replace if damaged sufficiently to cause binding or misalignment.
Intermediate Shaft	Check for deep scratches or scoring on bearing surfaces at each end of shaft.	Dress surface or replace shaft if severely worn.
	Check for broken or severely worn splines.	Replace if splines are broken or severely worn.
Intermediate Gears	Inspect both gears for broken or severely worn teeth. Pay particular attention to leading edges of straight-cut gear teeth.	Replace gears if teeth are broken or severely worn.
Freespool Dental Clutch	Check for broken or worn teeth.	Replace dental clutch if teeth are broken or severely worn.
Drum Shaft	Check for deep scratches or scoring on bearing surfaces.	Dress surface or replace shaft if severely worn.
	Check O-ring groove and seal surface.	Dress groove or replace shaft if severely worn.
	Check for cross-threaded or damaged threads.	Dress threads with thread chaser.
Drum Gear	Check for broken or severely worn gear teeth. Pay particular attention to leading edges of straight-cut gear teeth.	Replace gear if teeth are broken or severely worn.
Drum	Inspect quad-ring groove for burrs, scoring and rust.	Replace drum or rebuild drum groove if a new quad-ring will not seat properly.
Drum Adapter	Carefully inspect double seal contact surface for deep scratches, burrs and rust.	Replace if damaged.
Winch Frame	Check area around drum and drum adapter for damage if wire rope has slipped between wire rope guard and winch frame.	Consult the factory.

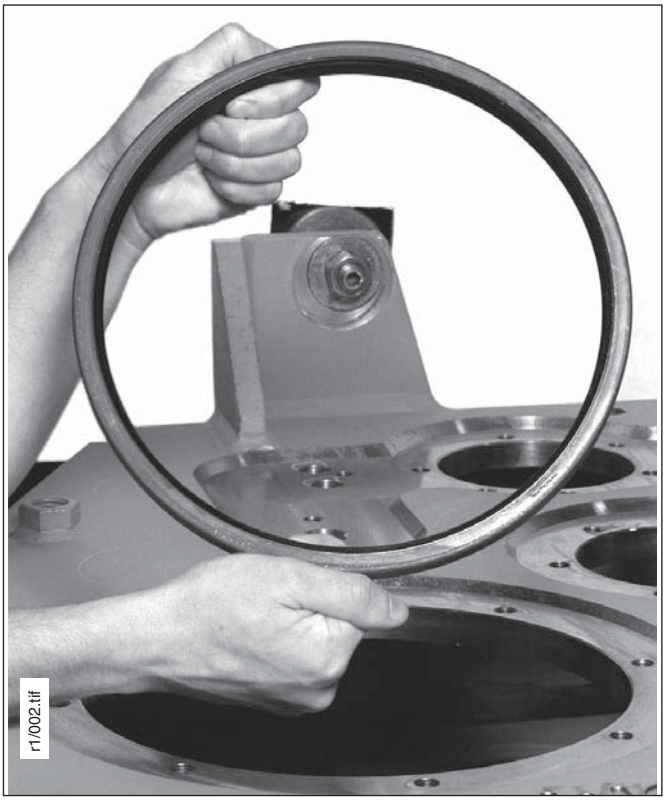
Drum and Drum Shaft Installation

If the drum gear was removed, it must be installed prior to installation of the intermediate shaft and reverse clutch assembly. However, the intermediate shaft bearing cup must be installed prior to the drum gear. Otherwise, access to the bearing cup bore will be partially blocked.

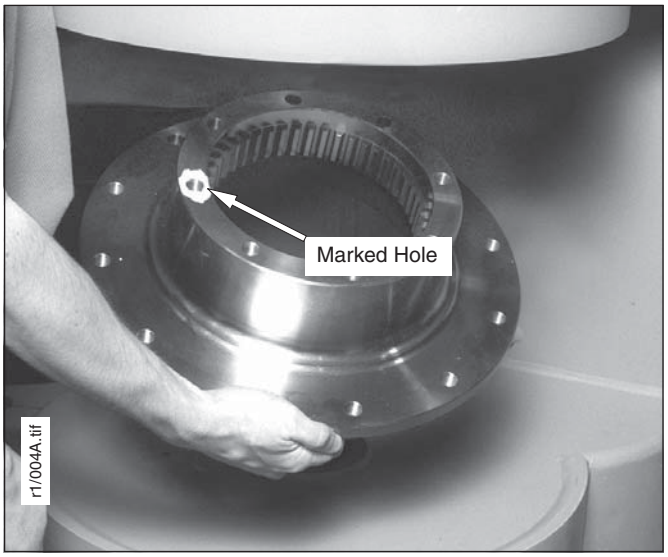
⚠ WARNING

Fabricated drums weigh approximately 540 lbs (245 kg). Pay special attention when you work.

1. Coat seal bore with sealant. Install double-lip seal with smooth side toward the drum in the right hand side of the frame.



2. Install drum adapter by pushing it through the double-lip seal.



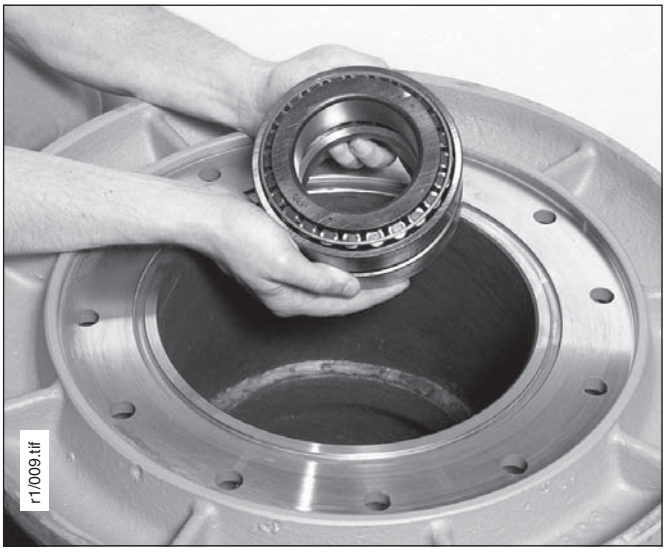
NOTE: To prevent drum adapter from falling out, insert eyebolt on marked hole, then slip metal bar through eyebolt.

3. Install drum seal.

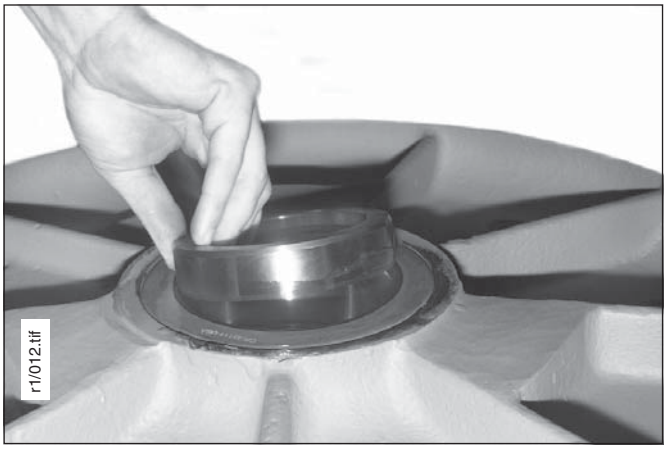
NOTE: Smooth side of seal must face outboard.

4. Lubricate the left-hand drum bore with Lubriplate or other light lube grease, then install double tapered roller bearing assembly.

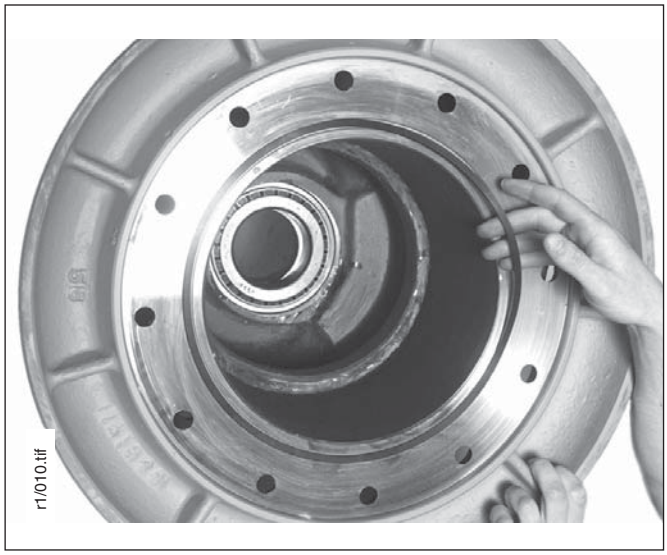
NOTE: Bearing, cups and spacers are a matched set, and must not be interchanged with other bearing set components.



5. Replace drum spacer O-ring and install spacer in drum bore.

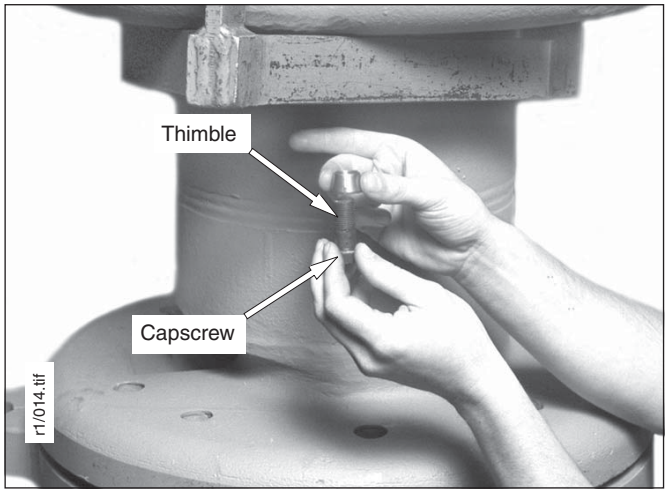


6. Lubricate right-hand drum bore. Coat right-hand seal ring and groove with O-ring lube. Install new seal ring.

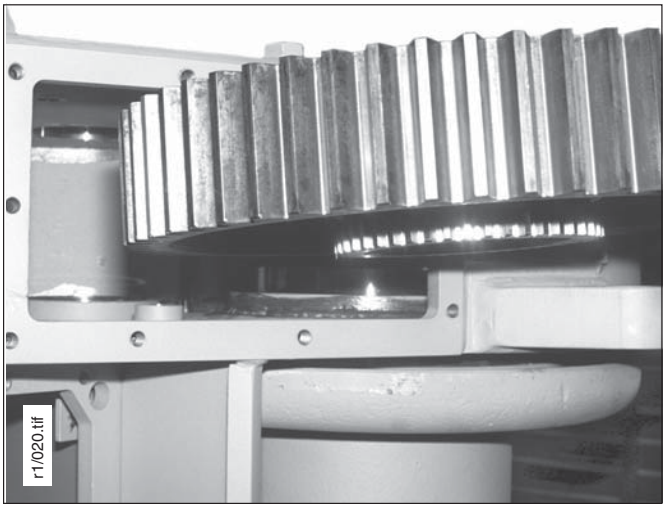


7. Move the drum into position while being careful not to move the seal ring.

8. Align adapter and drum holes, then install the thimbles and screws. Tighten progressively and evenly to ensure uniform compression of seal ring. Do not tighten to final torque.



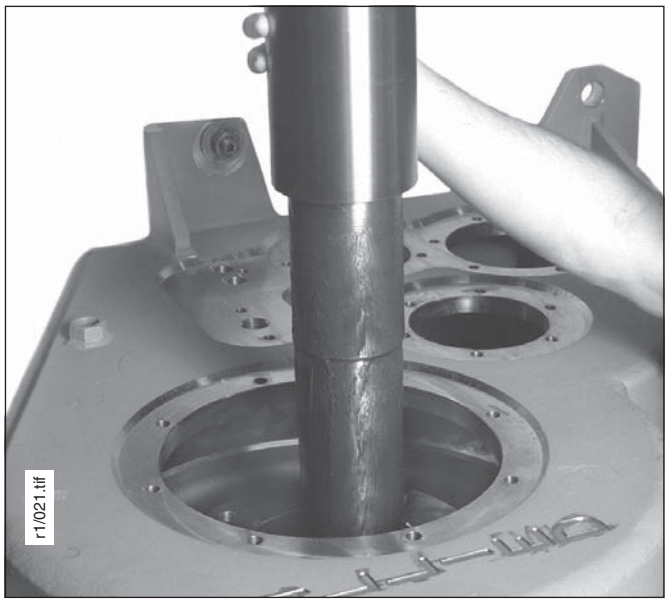
9. Install drum gear.



10. Align drum gear with adapter and temporarily secure the drum gear to the adapter, using the retainer plate and two capscrews. This will ensure that the gear will not fall during installation of the shaft.

11. Coat bearings in the drum with the recommended oil (see Figure 1-17) to ensure initial bearing lubrication.

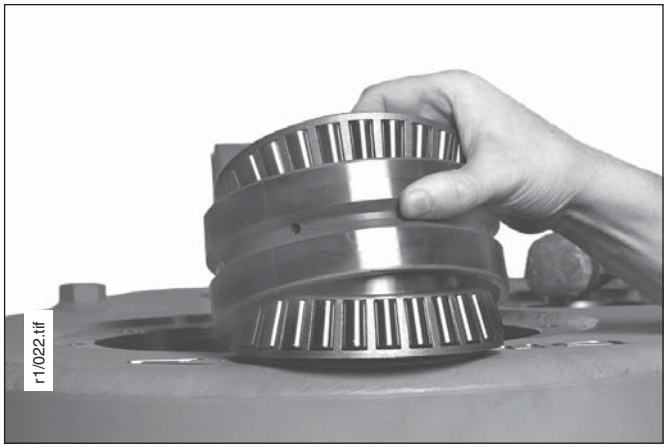
12. Make sure that double-tapered roller bearing, seal and spacer are properly seated in the left-hand side of the drum. Then install the shaft until it bottoms solidly against the left hand tapered roller bearing. Tighten left hand nut.



⚠ CAUTION

Do not hammer on drum shaft surface.

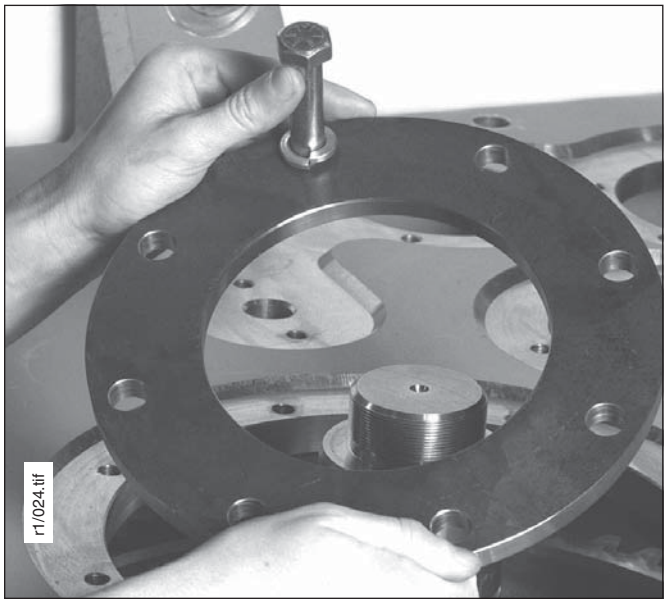
13. Remove the retainer plate and install the bearing assembly.



⚠ WARNING

Make sure the drum gear does not fall off the adapter.

14. Install retainer plate using the eight special capscrews. Tighten capscrews to 90 ft-lb (12 kg-m).

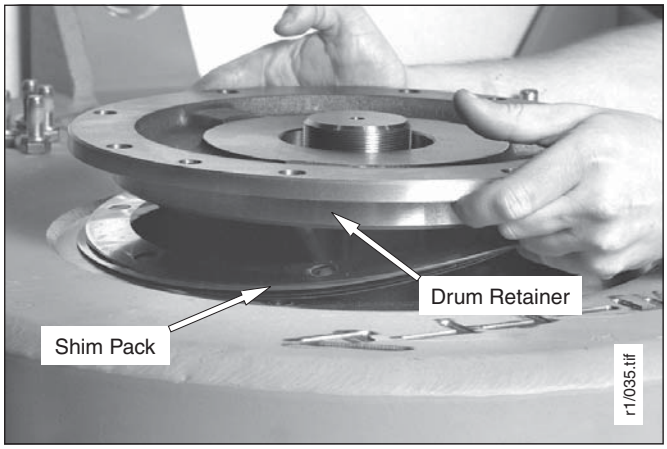


NOTE: Capscrews cannot be installed unless drum gear and drum adapter have been aligned as indicated in Step 8.

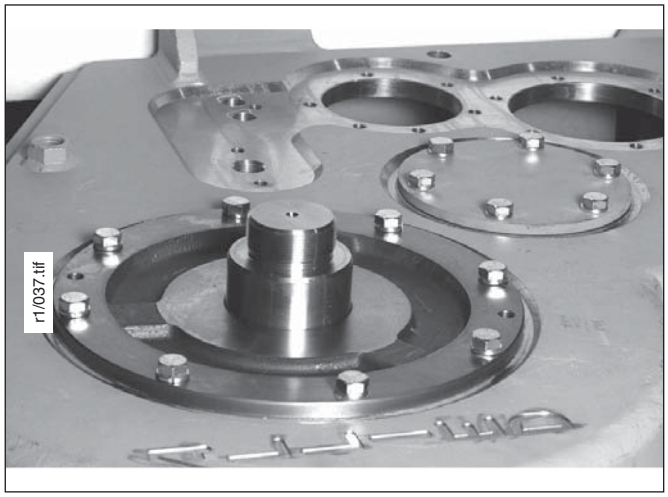
15. Set drum retainer into place and tighten capscrews (do not tighten to final torque). Measure gap between retainer and winch frame in three places around the retainer. Add the three indications and divide by three to obtain the average gap. Assemble shim pack to provide a net fit with ± 0.005 inch (0.1288 mm) tolerance.

NOTE: Intermediate shaft assembly must be installed before the final installation of drum retainer. See next section.

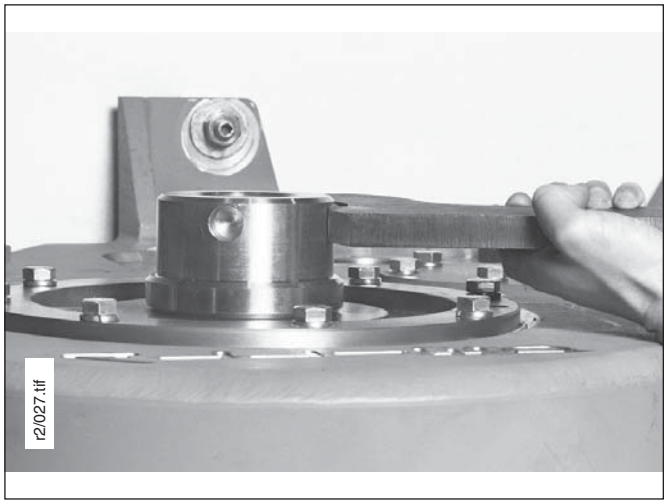
16. Coat winch frame and bearing retainer with silicone. Install drum shaft O-ring. Install finalized shim pack (determined in step 15). If intermediate shaft assembly not installed, install before retainer.



17. Secure retainer with capscrews and lockwashers. Tighten capscrews to 80 ft-lb (11 kg-m).



18. Coat shaft nut threads with anti-seize. Install right side shaft nut and torque to 400 ft-lb (55 kg-m).



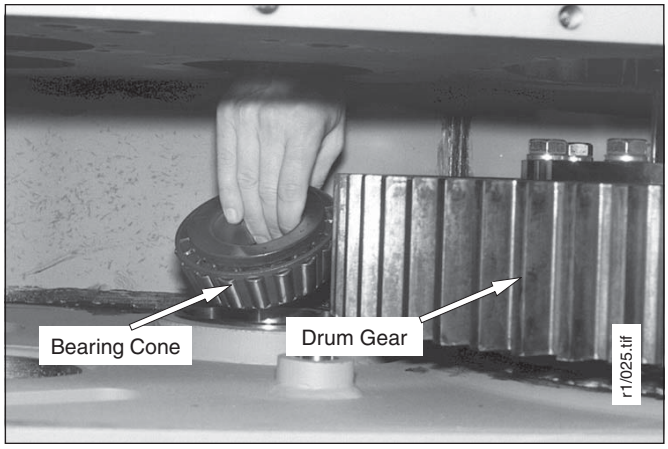
19. Tighten drum-to-adapter capscrews to 220 ft-lb (30 kg-m) torque.

Intermediate Shaft Installation, Non Freespool

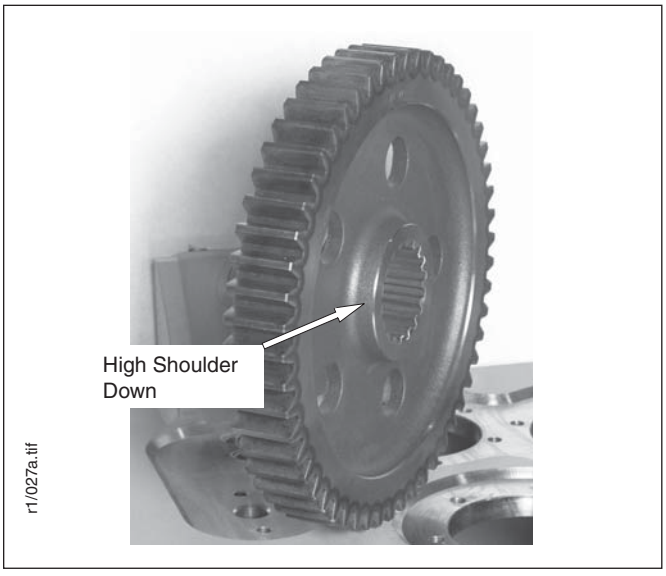
These figures show the winch removed from the tractor with the clutch shaft and brake shaft removed.

NOTE: The winch is shown equipped without the optional freespool arrangement. For instructions on how to install an intermediate shaft on a freespool winch, refer to the next section, Intermediate Shaft Installation, Freespool.

1. Install inner bearing assembly if previously removed. Use a liberal amount of lubriplate or other light lube grease to hold the inner bearing cone in place.

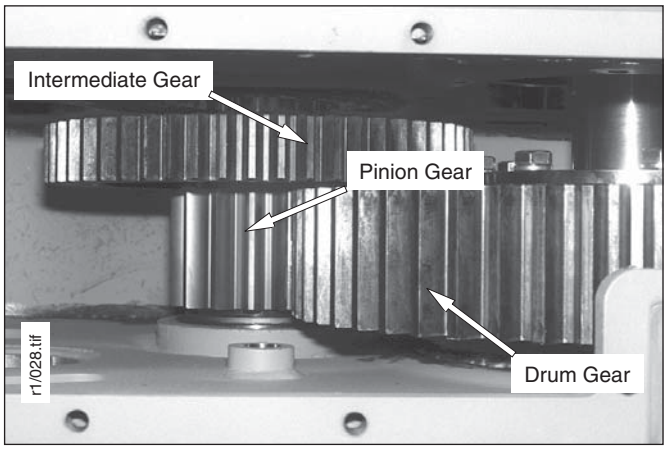


2. Position intermediate gear in housing. Install intermediate shaft far enough to support the gear.

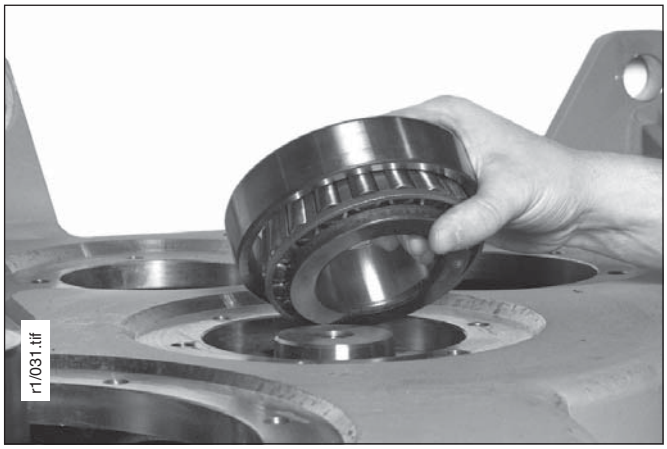


NOTE: Install intermediate gear with high shoulder down, towards the drum gear, to set enough clearance between the intermediate gear and the drum gear.

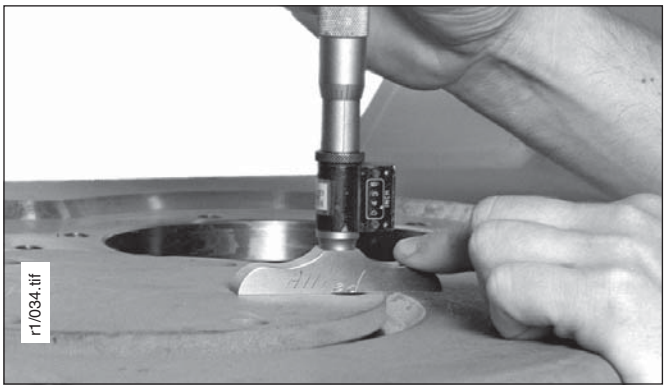
3. Position the pinion gear so that the teeth are splined to the intermediate shaft.



4. Install the outer bearing assembly. Make sure that the cup is firmly seated against the bearing cone.

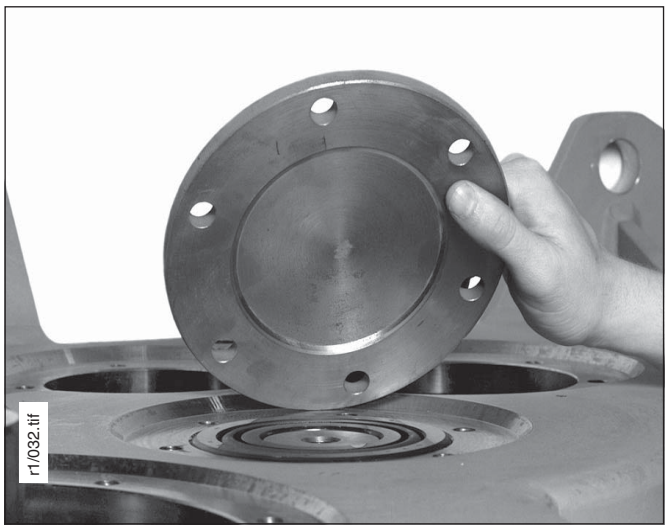


5. Using a depth gauge measure the distance from the face of the bearing cup to the winch housing. Add a shim pack of 0.004 to 0.007 in (0.102 to 0.178 mm) greater than the measured distance. For example, if the measured distance is 0.004 in (0.102 mm), add a shim pack with a total thickness of 0.008 to 0.011 in (0.203 to 0.279 mm). This will allow 0.004 to 0.007 in (0.102 to 0.178 mm) endplay of the shaft.



NOTE: Shafts requiring a finalized shim pack of 0.020 in (0.510 mm) are not uncommon.

6. Coat the winch frame and retainer with silicone or other suitable sealing compound. Install finalized shim pack and retainer.



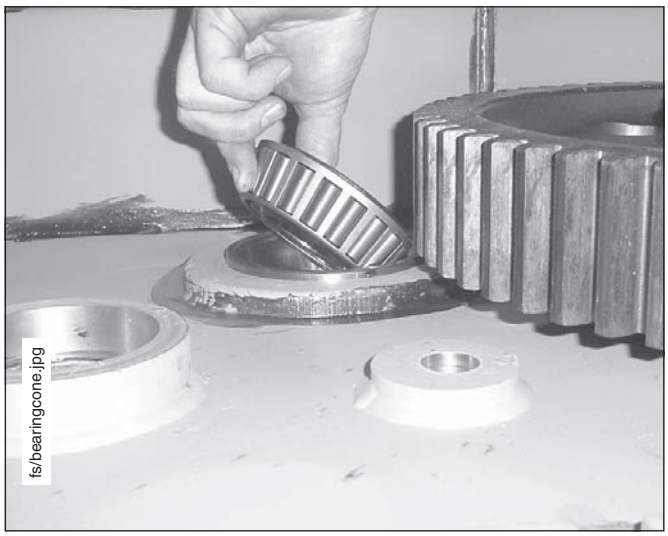
7. Tighten the six capscrews to 75 ft-lb (10 kg-m).

Intermediate Shaft Installation, Freespool

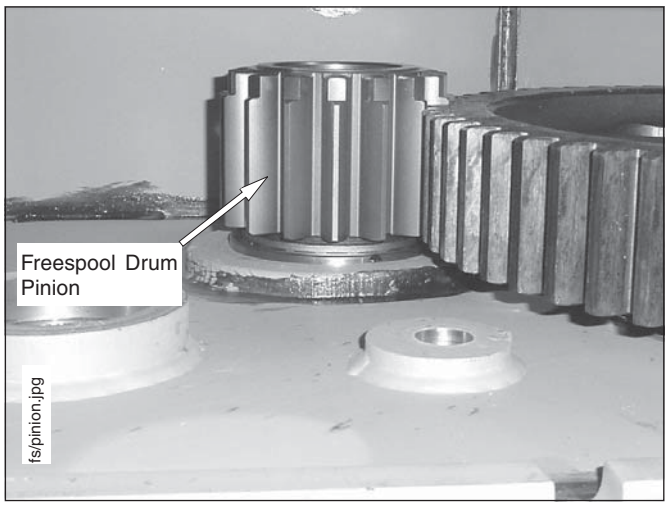
These figures show the winch removed from the tractor with the clutch shaft and brake shaft removed.

NOTE: The winch is shown equipped with the optional freespool arrangement. For instructions on how to install an intermediate shaft on a winch without freespool, refer to the previous subsection, Intermediate Shaft Installation, Non Freespool.

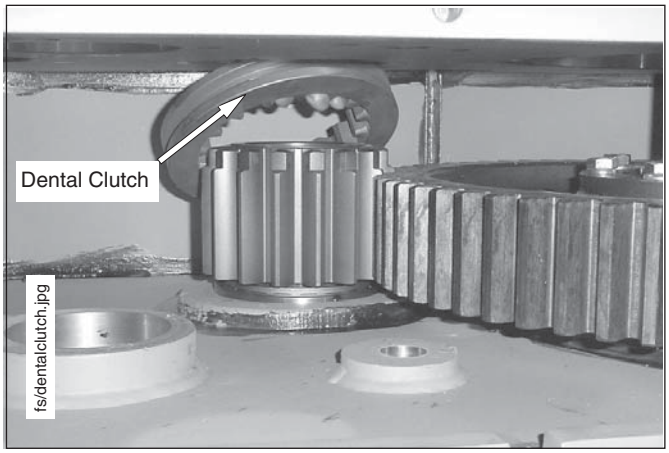
1. Install inner bearing assembly if previously removed. Use a liberal amount of lubriplate or other light lube grease to hold the inner bearing cone in place.



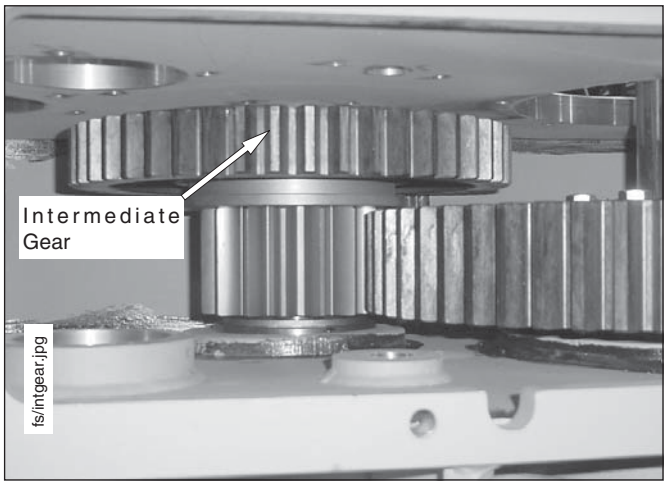
2. Position the freespool drum pinion in the housing.



3. Place dental clutch on pinion gear. Ensure chamfered ramp faces pinion.

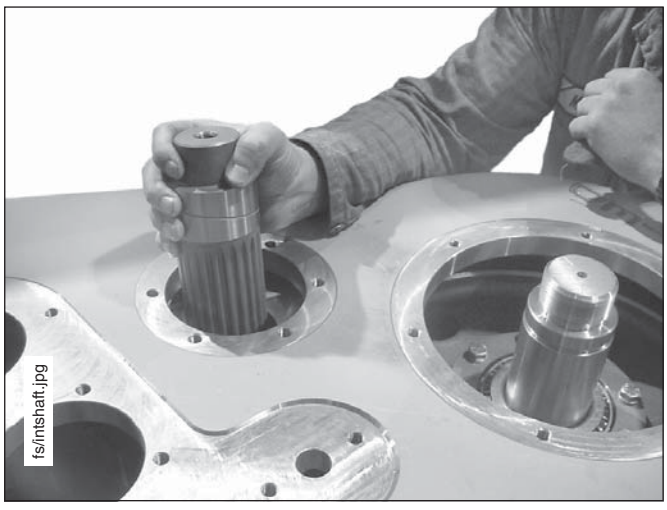


4. Position intermediate gear in housing.

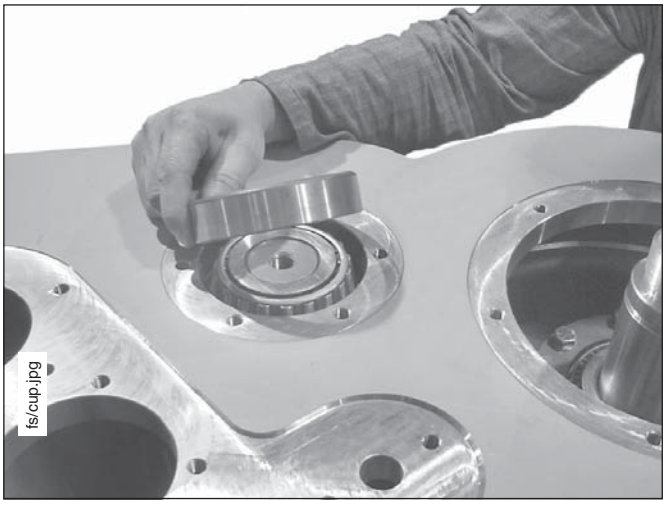


NOTE: Install intermediate gear with high shoulder down.

5. Install intermediate shaft.



6. Install the outer bearing cup and cone. Make sure that the cup is firmly seated against the bearing cone.

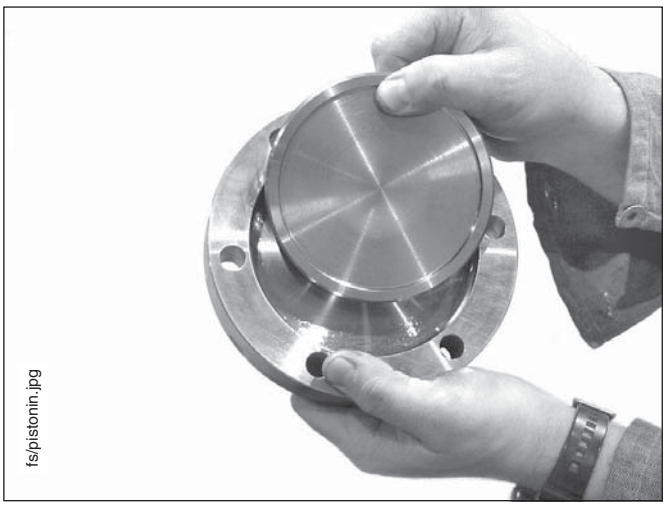


NOTE: The following step only applies to S/N AW6G-1005 and below without exterior freespool drag adjust.

7. To adjust the freespool drag, loosen the bearing slightly as detailed in Step 6 of the **Intermediate Shaft Removal, Freespool** subsection. Place the winch in freespool and measure the rolling torque of the drum by placing 25 ft-lb (3.5 kg-m) torque wrench on one of the eight drum nuts. Keep the wrench handle pointed straight out from the drum center. The torque should be 12-15 ft-lb (1.7-2.0 kg-m). Add or remove shims from the intermediate shaft retainer to reduce or increase torque respectively.

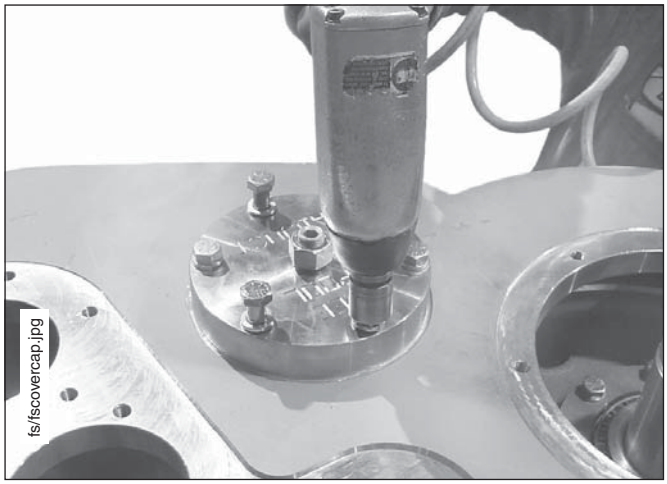
NOTE: The following step only applies to S/N AW6G-1006 and above with exterior freespool drag adjust.

8. Install new O-ring on freespool piston and install piston in freespool adjust cover.

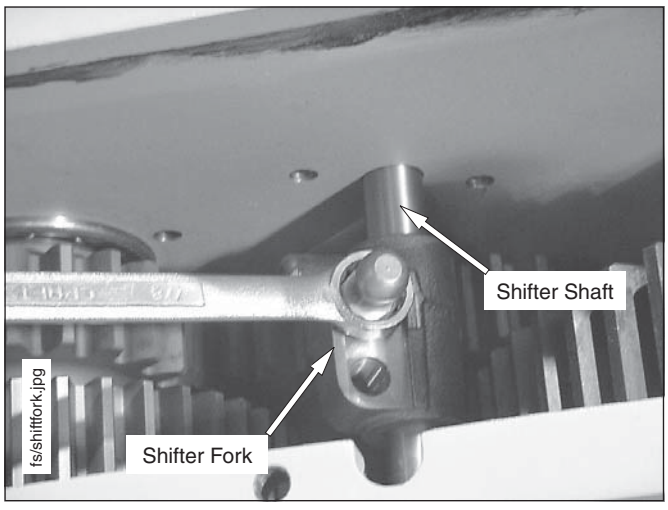


9. Coat the winch frame and retainer with silicone or other suitable sealing compound. Install shim pack (if necessary) and cover.

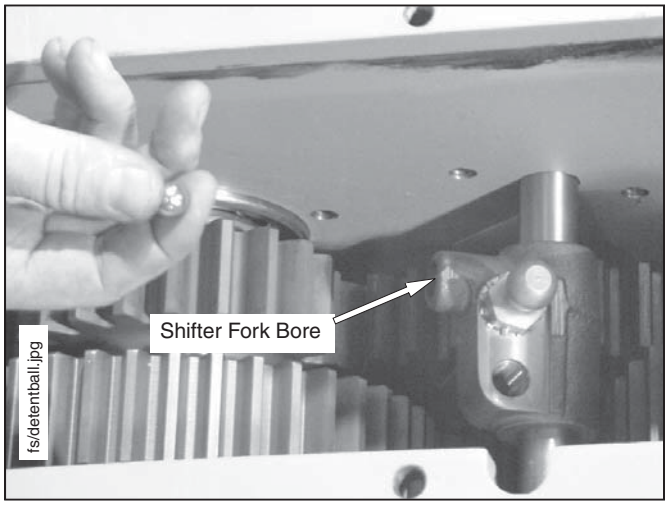
10. Tighten the six capscrews to 75 ft-lb (10 kg-m).

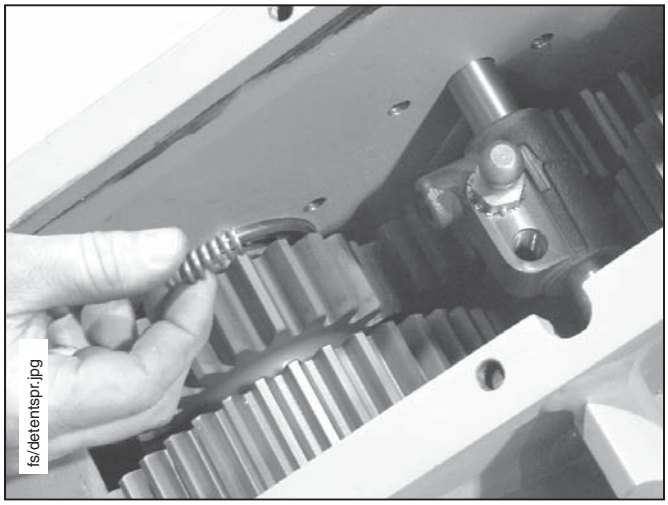


11. Position the freespool shifter fork on the dental clutch and install the shifter shaft. **(NOTE: Power Controls configuration shown.)**

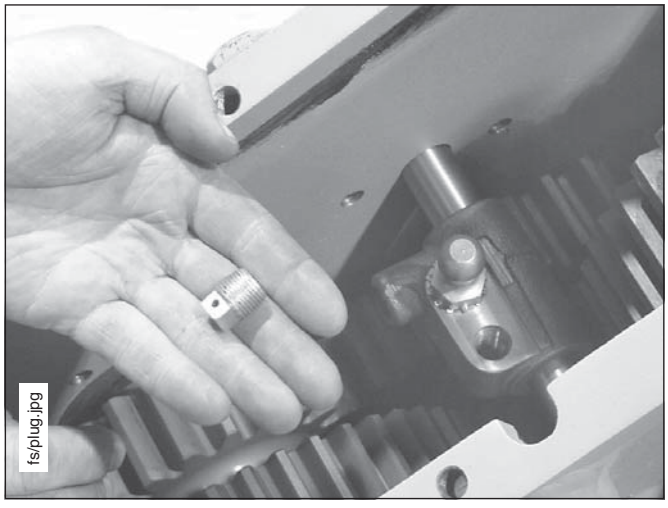


12. **POWER CONTROLS ONLY:** Install detent ball and spring into bore of the shifter fork.

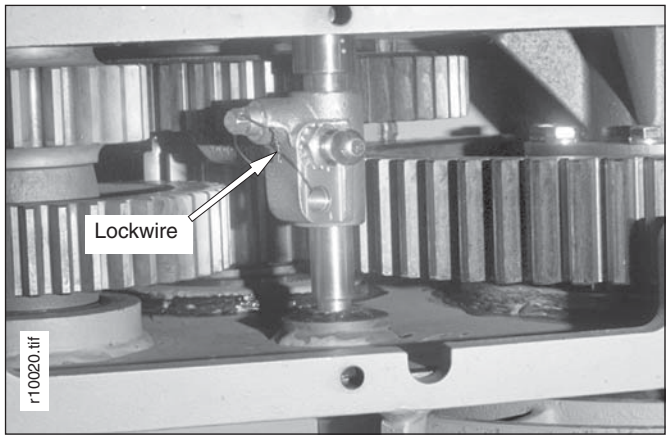




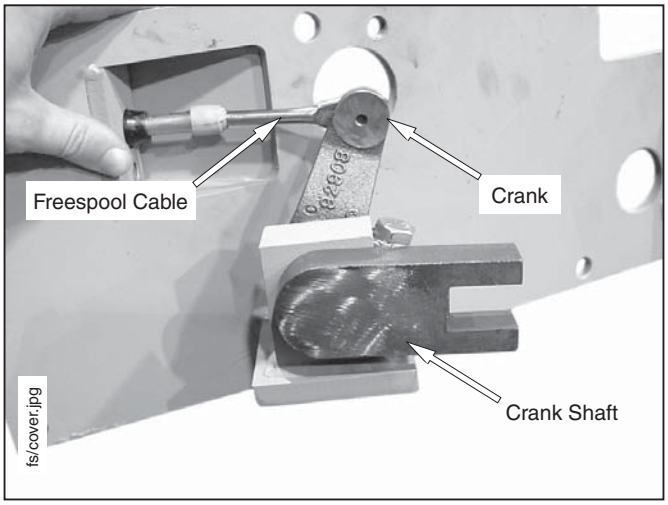
13. Install plug securely. **(NOTE: Power Controls configuration shown.)**



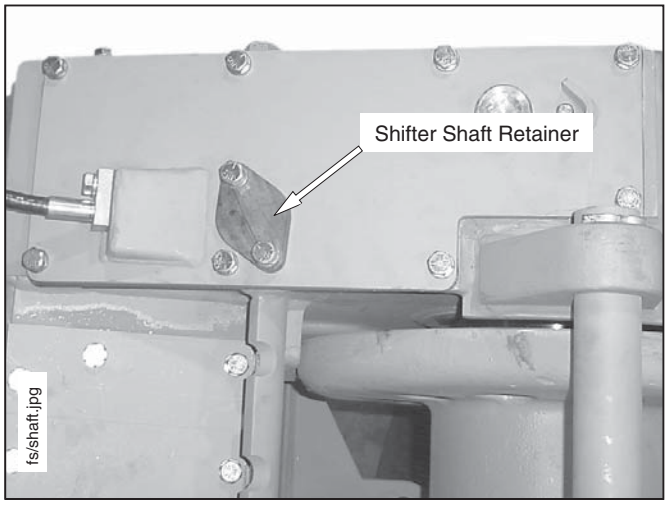
14. Lockwire as shown. **(NOTE: Power Controls configuration shown.)**



15. **POWER CONTROLS ONLY:** Assemble crank shaft, crank and freespool cable on cover as shown.



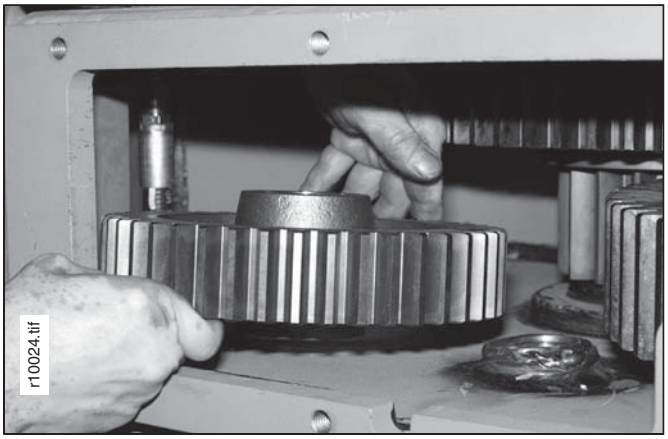
16. Install cover. Tighten capscrews on shifter shaft to 75 ft-lb (10 kg-m). **(NOTE: Power Controls configuration shown.)**



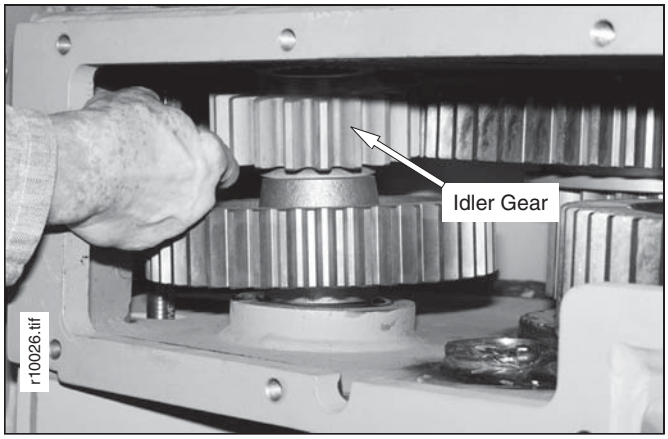
Idler Shaft Installation

1. Insert roller bearing into winch housing.

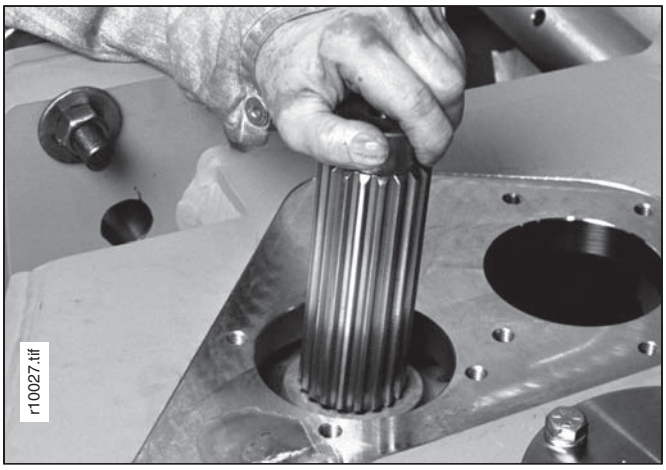
2. Insert gear on top of bearing.



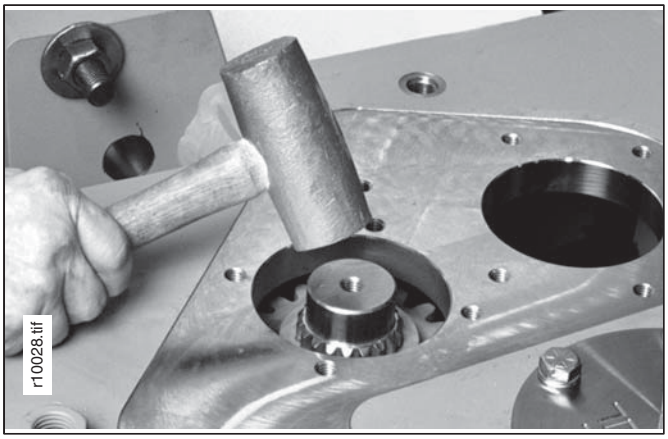
3. Place idler gear on top.



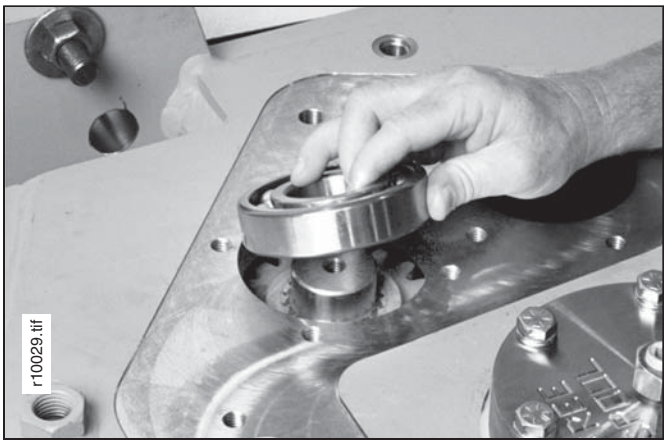
4. Lubricate idler shaft well, then insert into winch housing.



5. Tap into place gently with a soft hammer.



6. Insert bearing on top of shaft. Squeeze a bead of sealant on surface of winch and fasten idler shaft cover over it.



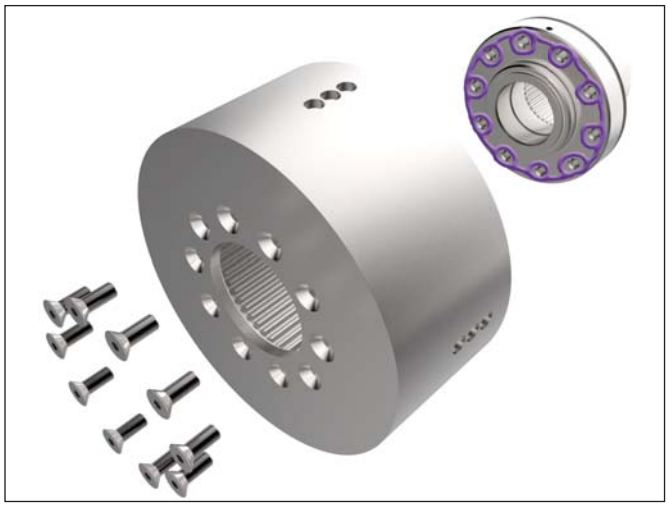
Oil Clutch Reassembly

⚠ CAUTION

Make certain all parts have been thoroughly cleaned prior to reassembly. Dirt particles will seriously affect operation of the clutch assembly.

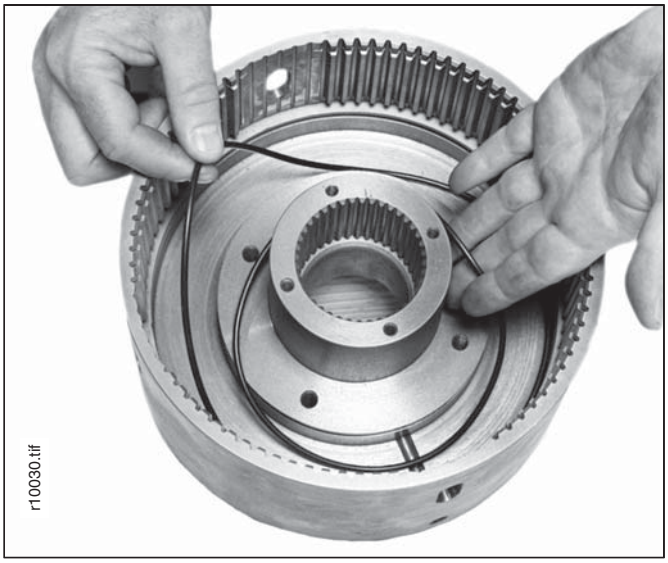
NOTE: Reassembly is the same for both the forward and reverse clutches.

1. If it was necessary during disassembly to separate the Spider Clutch from the Clutch Hub, apply a continuous bead of gasket eliminator as shown below. Torque 10 capscrews to 33 ft-lbs [4.56 kg-m].

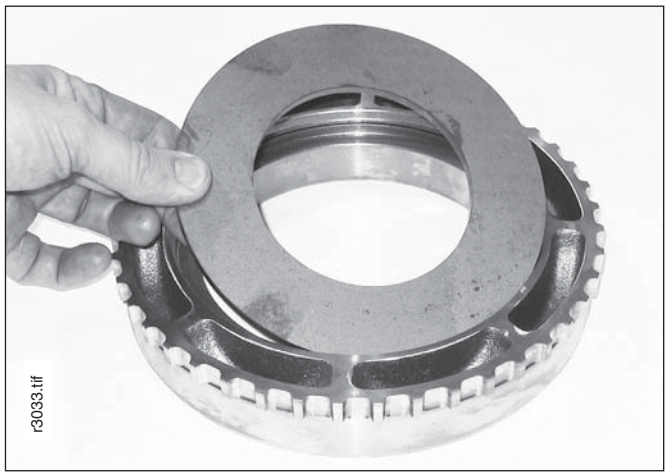


2. Install two new O-rings in clutch housing.

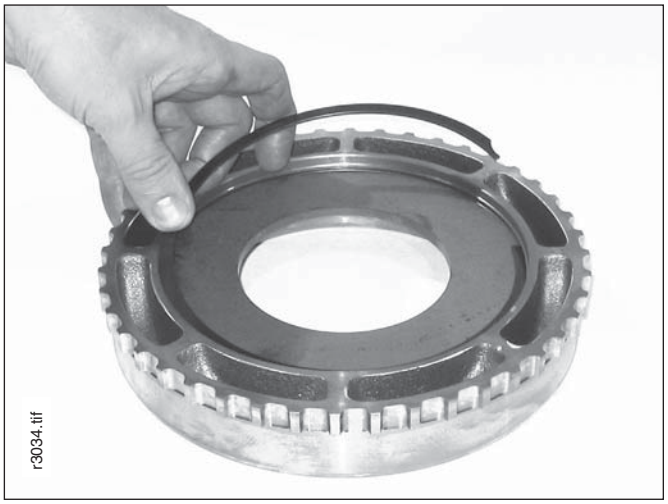
NOTE: It may be necessary to stretch the large O-ring so that it will stay in its groove during installation of the piston.



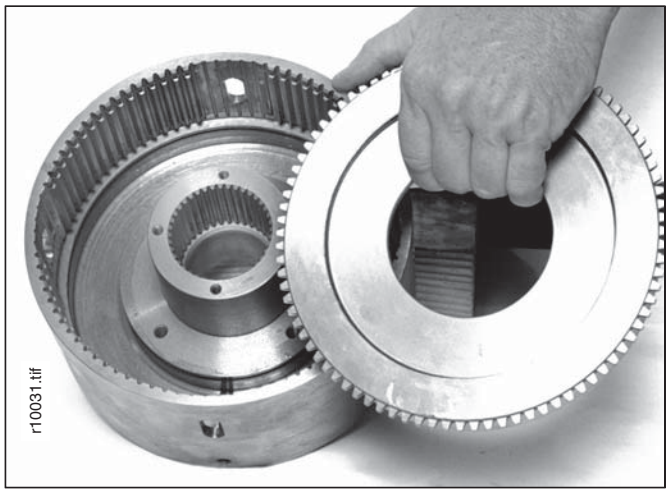
3. For winches with the old-style single-piece piston, proceed to step 5. For winches with the new-style 3-piece piston, install spring reaction plate in piston housing.



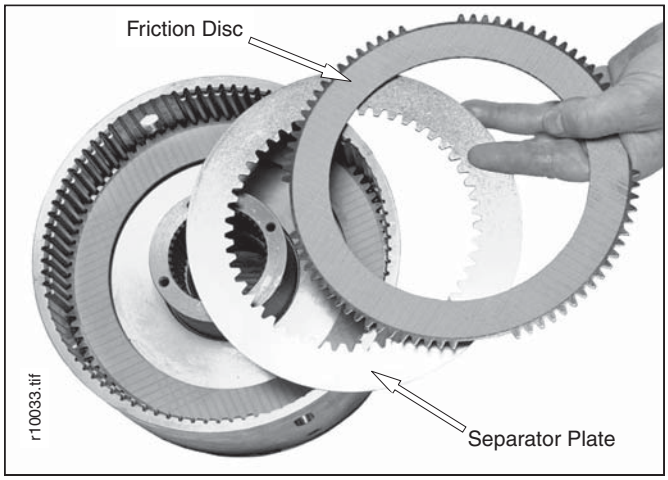
4. Install retaining ring.



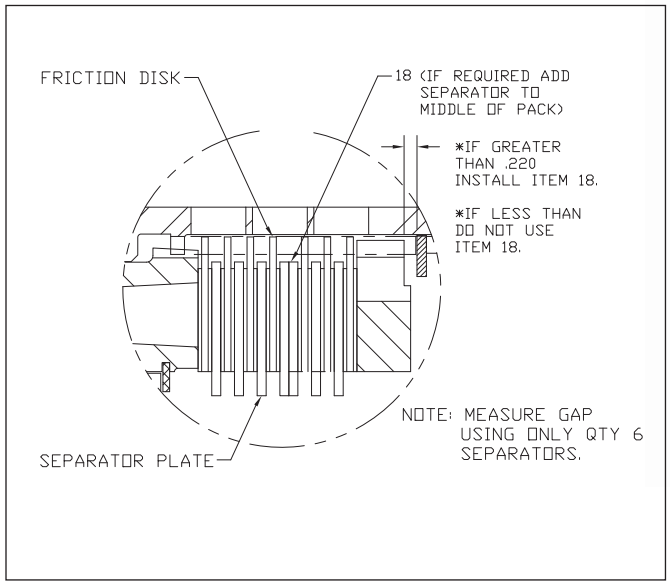
5. Lubricate piston and install in clutch housing.



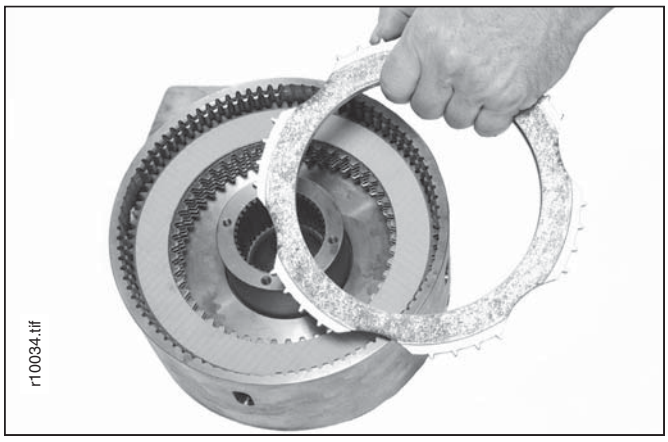
6. Place friction discs alternately with separator plates in housing. Line teeth on plates.



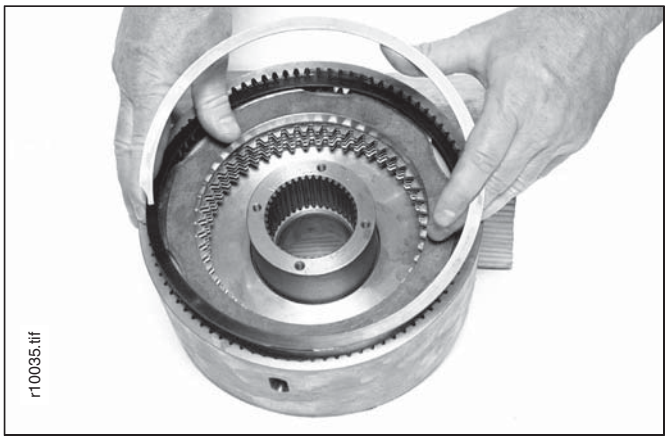
NOTE: If air gap exceeds .220 inch (5.6 mm) between piston assembly, disc and plates, then additional separator is needed to be used as a shim to reduce the air gap. See detail below.



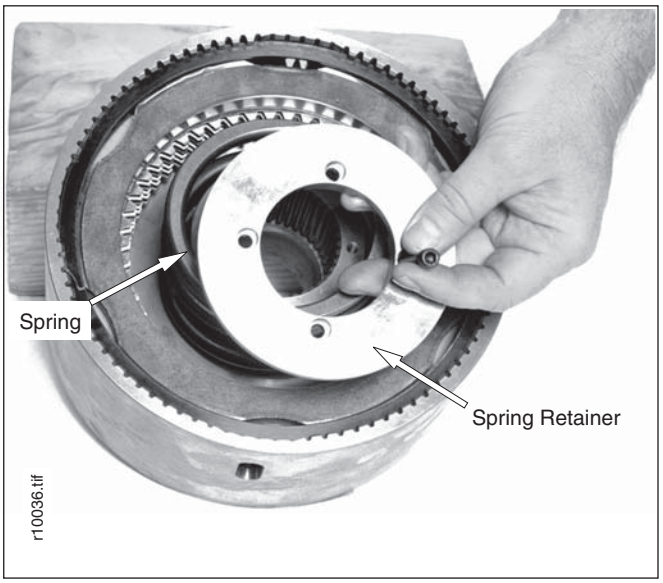
7. Place the clutch plate on top.



8. Insert the snap ring.

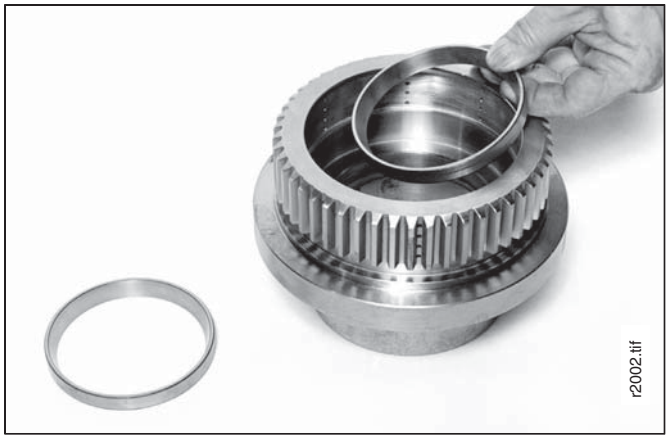


9. Insert spring and spring retainer. Push down firmly and fasten with capscrews.

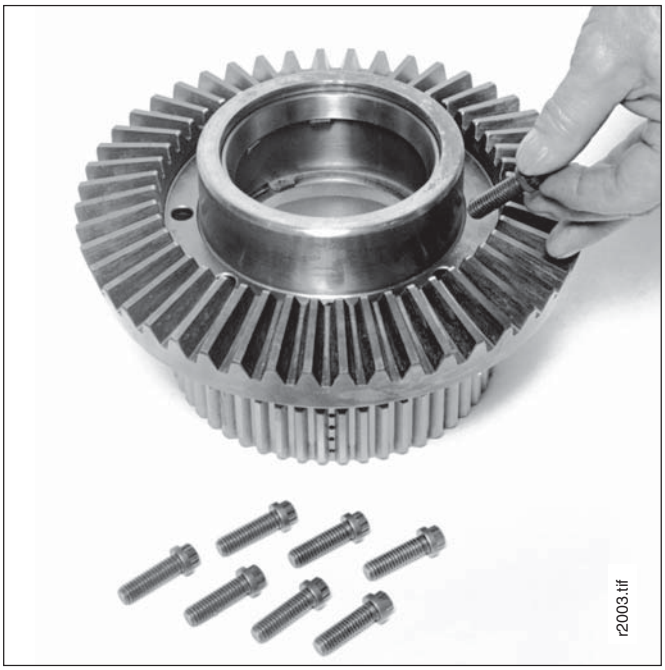


10. Insert two snap rings in the clutch hub.

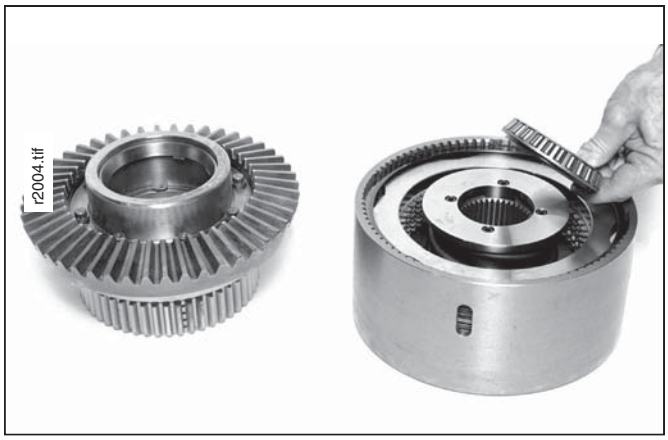
11. Insert one bearing cup into each end of hub. Tap in place with driver.



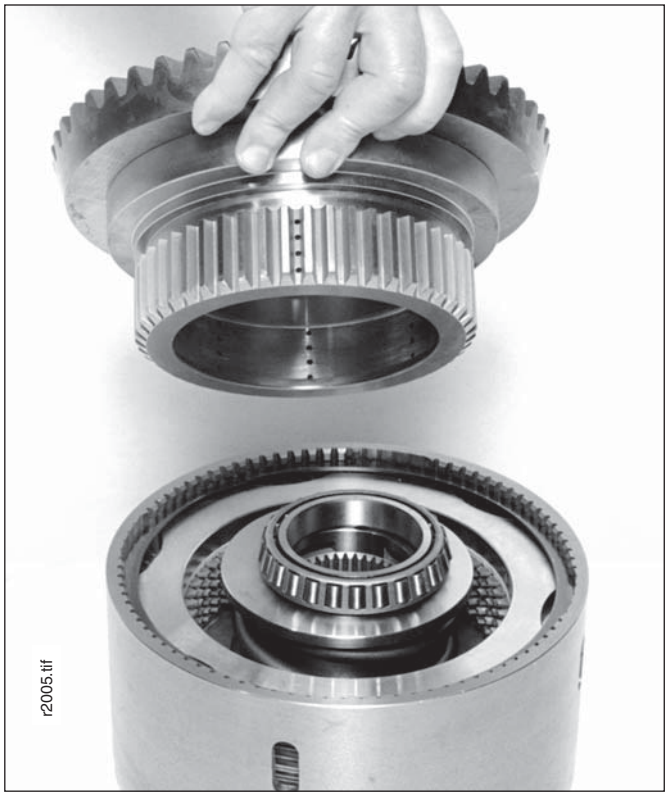
12. Place the ring gear on top of hub and fasten with capscrews.



13. Place bearing cone on top of clutch assembly.



14. Using screwdriver or similar tool, line up internal teeth of separator plates. Place clutch hub assembly on top of clutch assembly and insert.



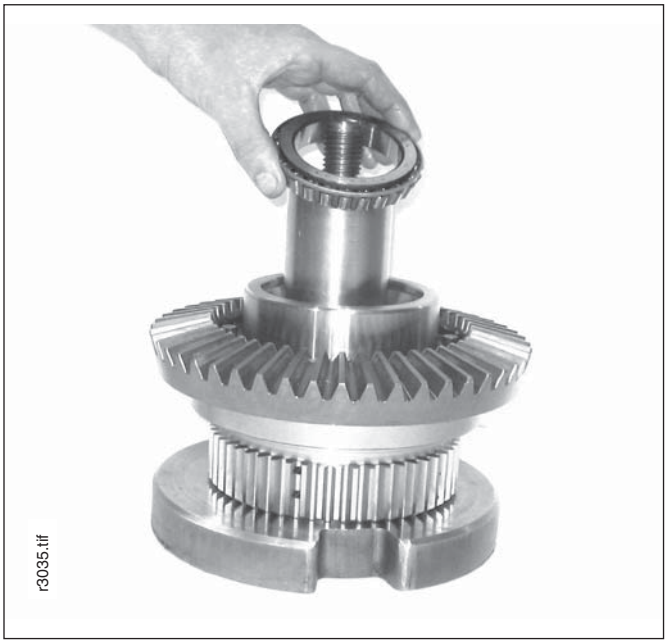
15. Upend clutch assembly and fasten with two temporary capscrews to prevent assembly from falling apart when picked up. See **Clutch Shaft Reassembly and Installation** on following pages for installation of permanent capscrews.

Clutch Shaft Reassembly and Installation

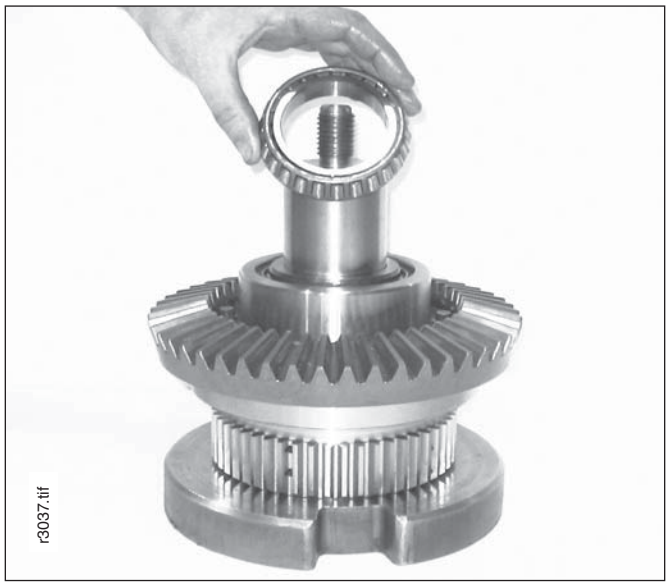
See Figure 4-1 for the location of clutch shaft components.

NOTE: The shim verification process shown in steps 1 through 5 only needs to be done if the ring gears, clutch hubs or bearing cones were replaced. If none of these components were replaced, go straight to step 6. However, if any of those components were replaced, steps 1 through 5 should to be performed.

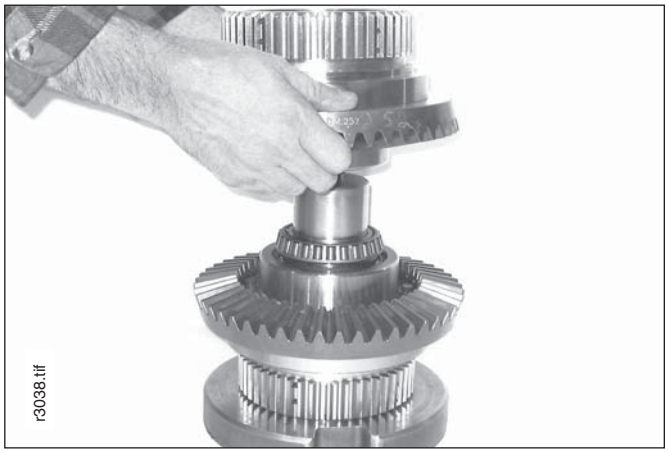
1. Set ring gear and hub assembly on a stacking tool. Place bearing cone inside assembly.



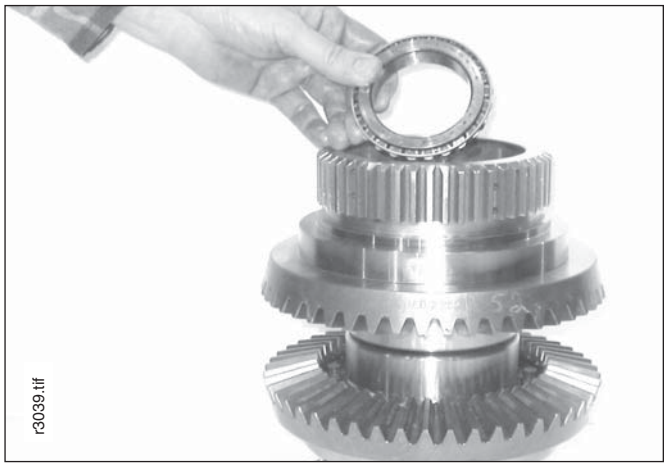
2. Stack bearing cone on top of ring gear assembly.



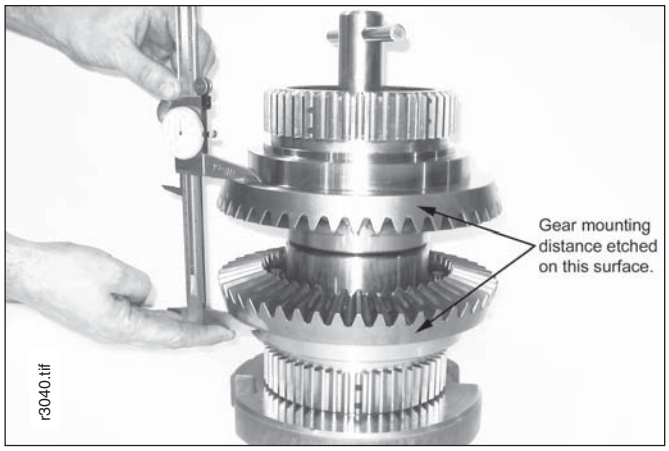
3. Stack other ring gear assembly on top.



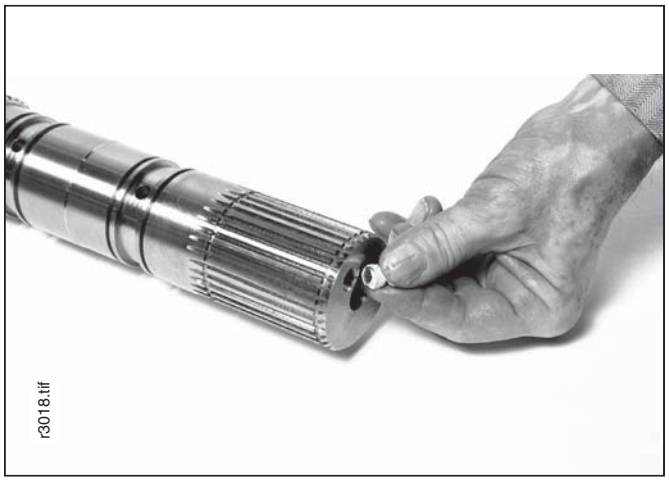
4. Place bearing cone inside ring gear assembly.



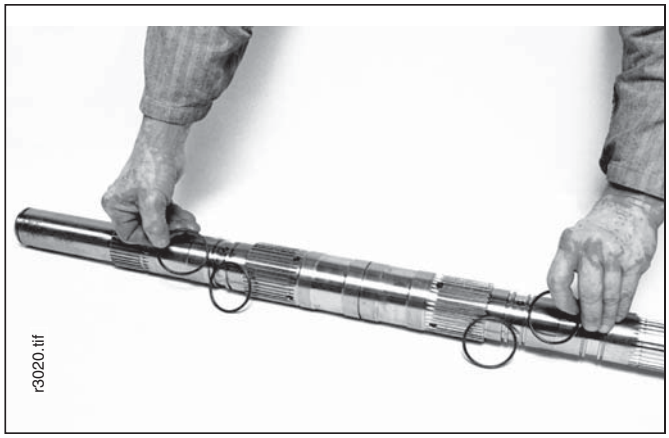
5. Ensure the components are seated tightly against each other by using a compression tool or by tapping the components firmly from the top. Measure the distance between the ring gears as shown and call this number “A”. Each ring gear has a mounting distance etched on it. Add these two numbers together and call it “B.“ “A” needs to be within .001 inch (0.0254 mm) of “B,” so note the number of shims or spacers needed to achieve this number. Shim installation is shown in step 11.



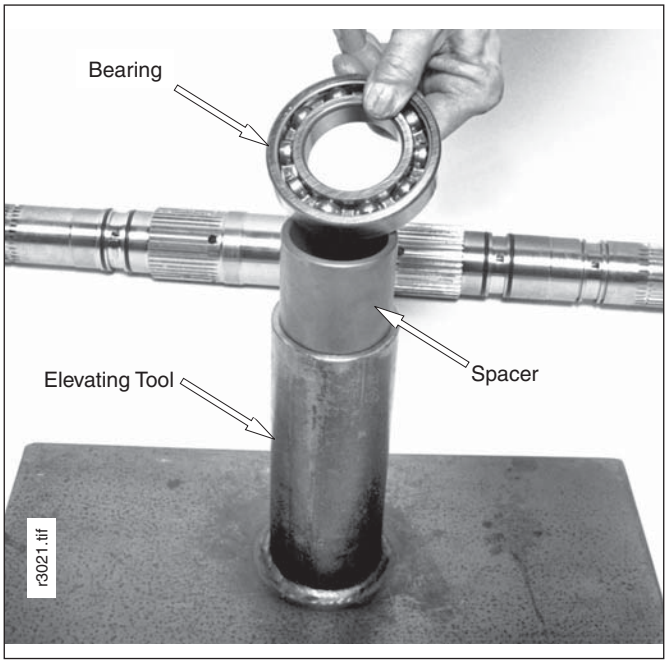
6. Remove components from stacking tool. Coat plug with sealant and insert into end of clutch shaft.



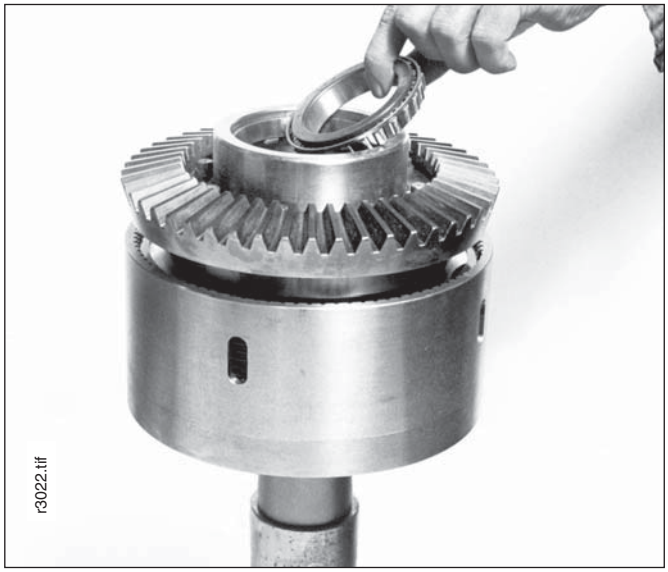
7. Install new O-rings on the clutch shaft.



8. Stack spacer and ball bearing on top of elevating tool.



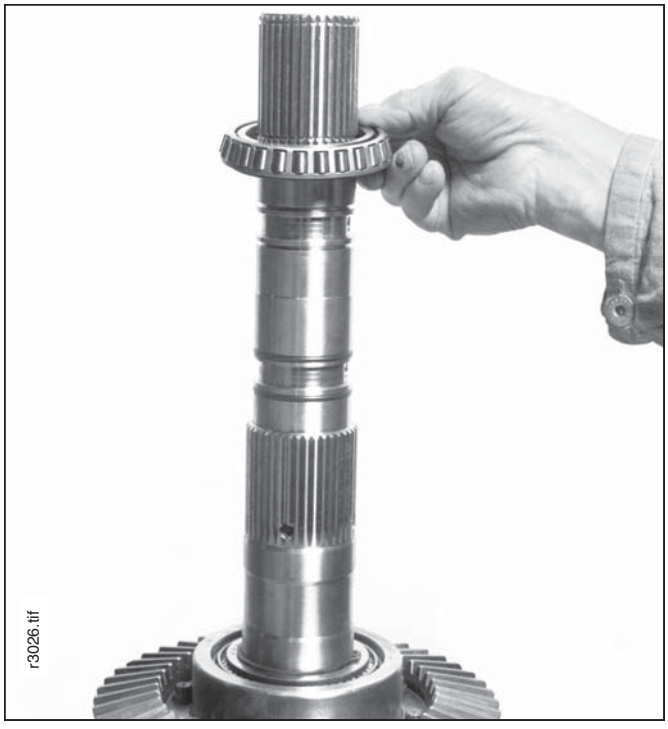
9. Stack complete clutch assembly on top, and insert bearing cone.



10. Insert clutch shaft.

11. Insert shims or spacers. Older clutch shafts may use a snap ring instead. If any bearing cones, ring gears or clutch hubs were replaced, be sure to perform steps 1 through 5 first to determine the correct spacer or number of shims required.

12. Insert bearing cone.



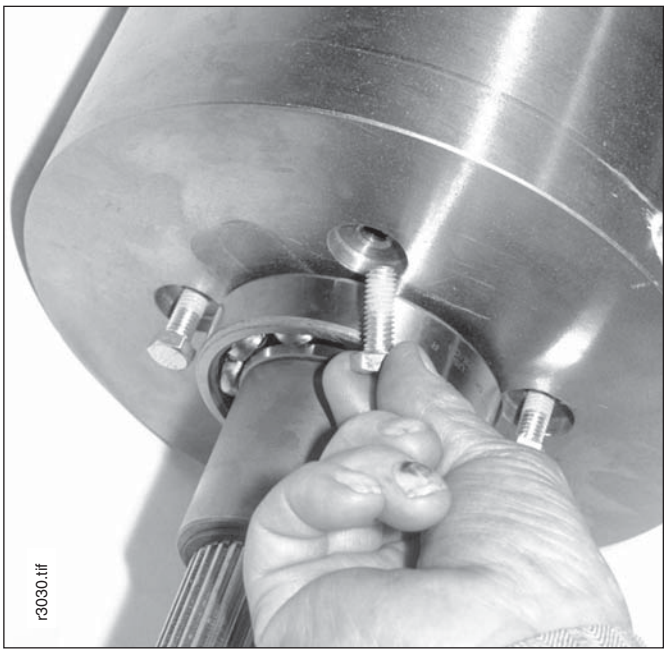
13. Stack the ring gear and hub assembly on top.

14. Stack the second clutch assembly on top and install bearing cone.

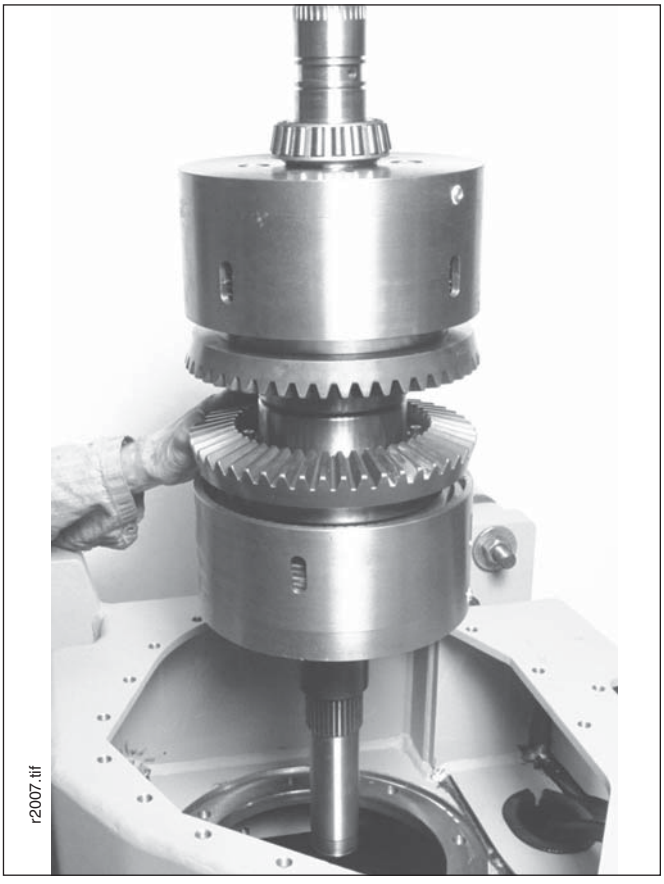
15. Carefully remove clutch shaft assembly from stacking tool and install snap ring.

16. Install spacer.

17. Tap end of shaft to seat components firmly against snap ring. Remove temporary capscrews on clutch. Coat actual capsrews with sealant and fasten on clutch assembly.

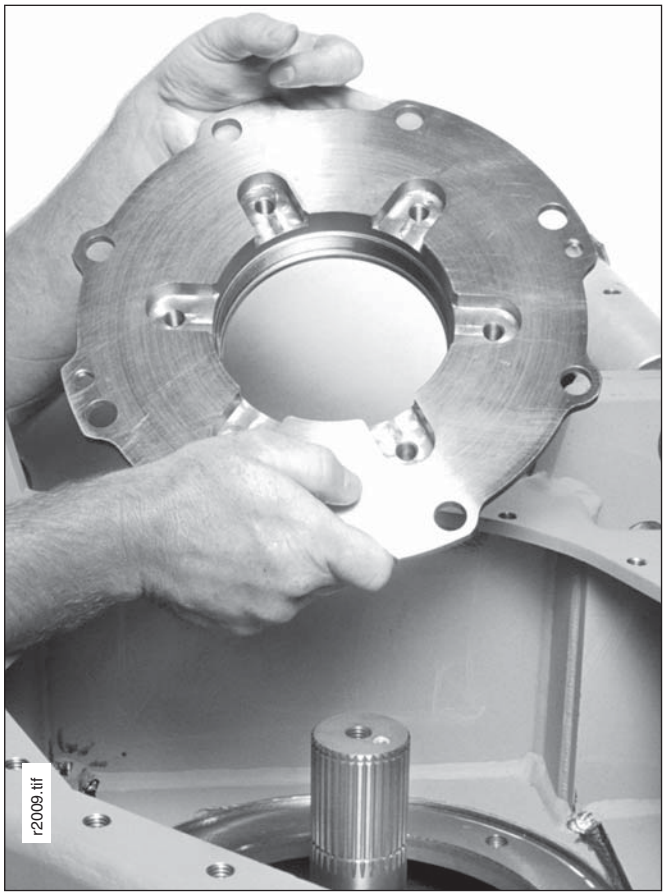


18. Using hoist, place clutch shaft assembly into left-hand side of winch.

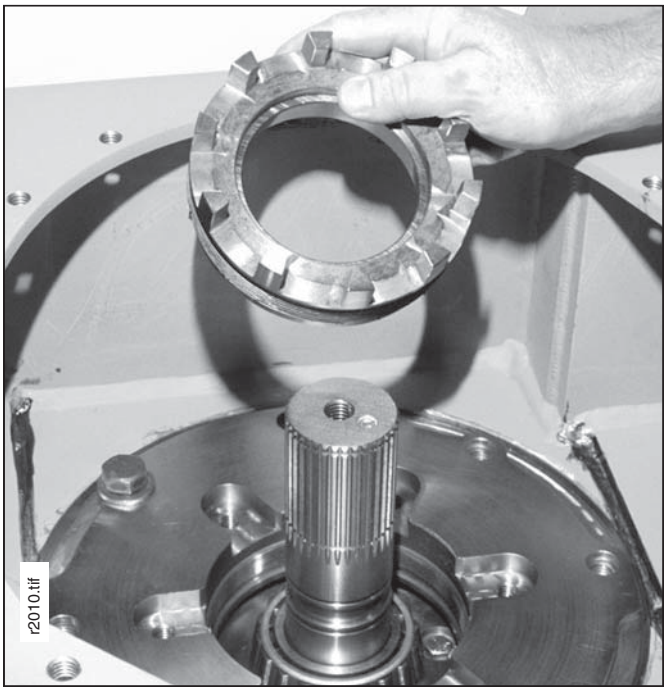


19. Press bearing race into left-hand bearing adjuster. Coat the threads with anti-seize.

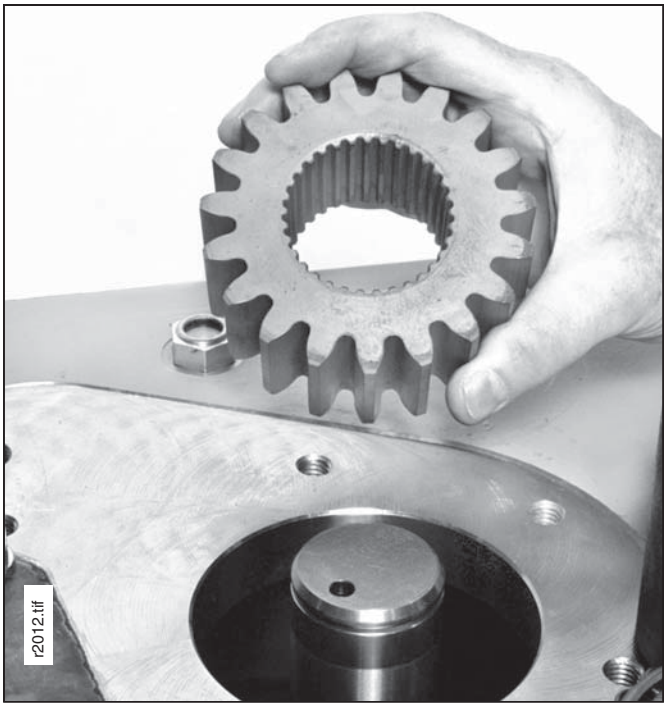
20. Place left-hand bearing retainer on top of shaft.



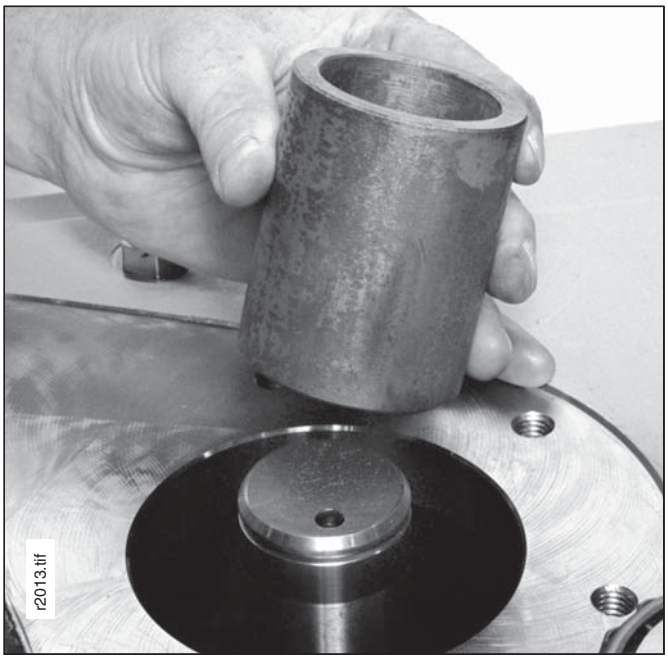
21. Insert and tighten two temporary capscrews, 5/8 UNC X 1 1/2 to hold bearing retainer, then place bearing adjuster on top.



22. Turn winch over and install clutch gear on right-hand side of winch.

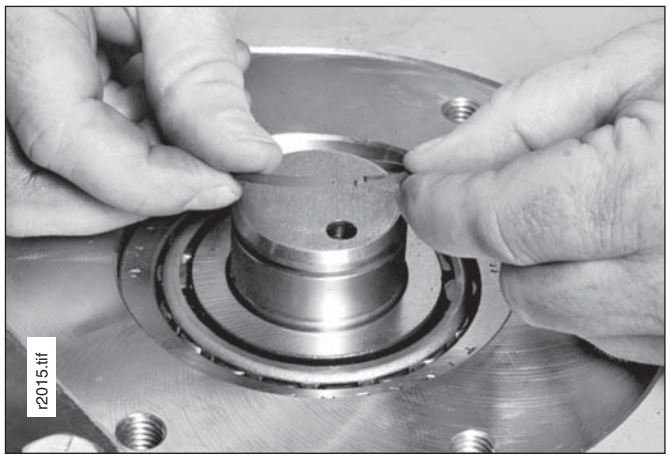


23. Place spacer on top of gear.

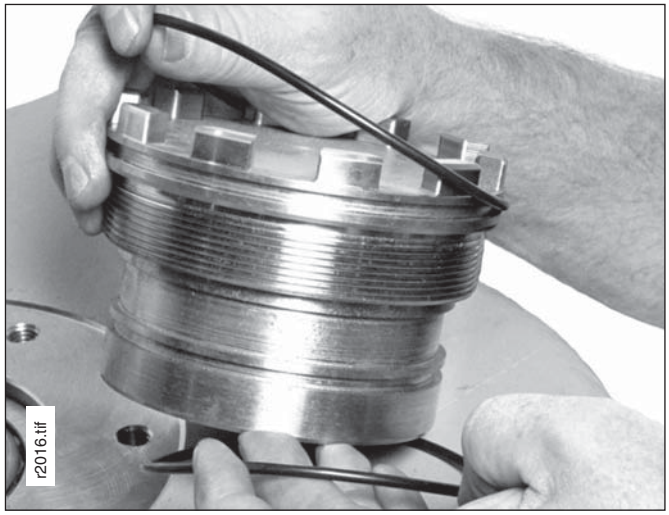


24. Place bearing cup and cone on top of spacer.

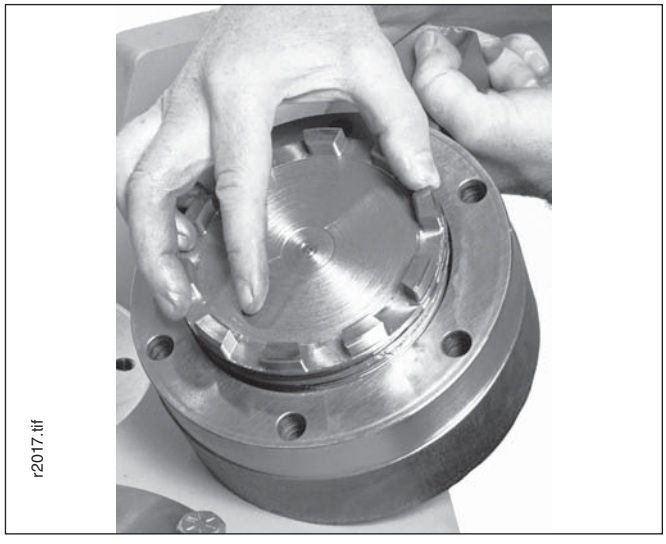
25. Insert seal ring on clutch shaft.



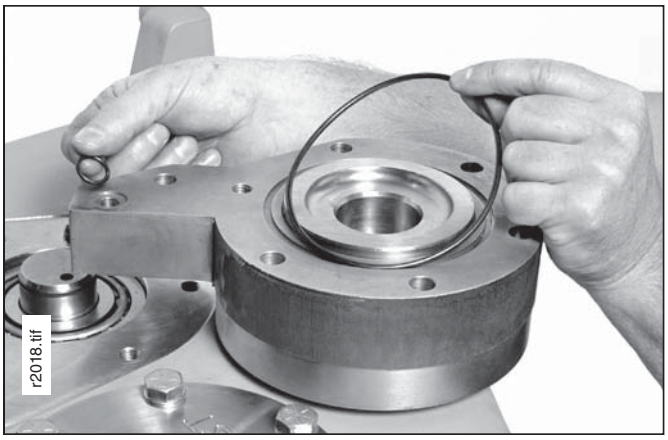
26. Insert O-rings on right-hand bearing adjuster and coat anti-seize on threads. Lubricate O-ring grooves.



27. Thread bearing adjuster into right-hand bearing retainer.



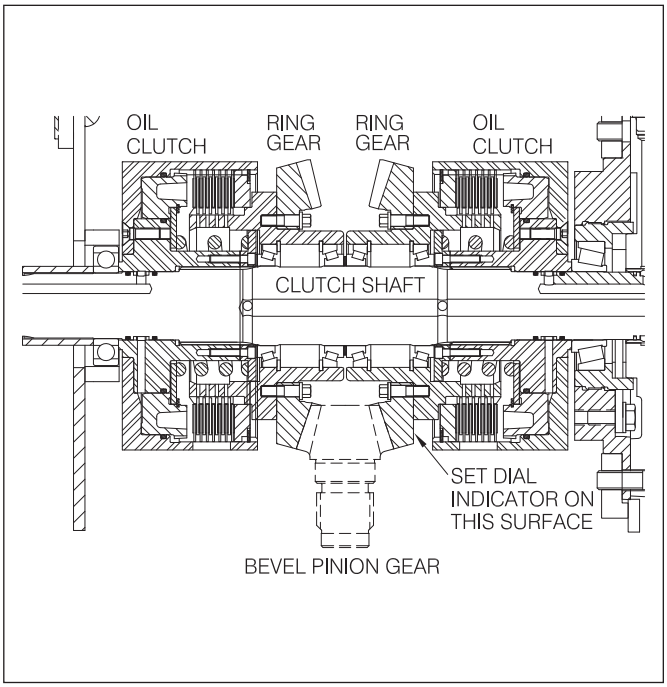
28. Place two O-rings on reverse side of right-hand bearing retainer. Secure large O-ring with a large dab of grease so the O-ring doesn't fall when retainer is upended.



29. Fasten bearing retainer onto frame temporarily with 1/2 UNC x 3 1/2 capscrews.

NOTE: Finishing up the clutch shaft installation requires setting the gear backlash, which requires installing the input carrier first. Please refer to steps 17 through 21 in the "Input Carrier Reassembly and Installation" subsection for details on these procedures.

30. Set clutch shaft endplay:



a) Set dial indicator on ring gear surface as shown in the above illustration.

b) Push shaft all the way to one side, towards the gear with the dial indicator. Set indicator to "0".

c) Push shaft all the way to the other side. Record the figure measured by the dial indicator.

d) The clutch shaft endplay needs to be between .001 inch (0.0254 mm) tight to .004 inch (0.1016 mm) loose. To adjust endplay, tighten or loosen the bearing adjusters on either end of the clutch shaft, which can be adjusted in increments of .003 inch (0.0762 mm).

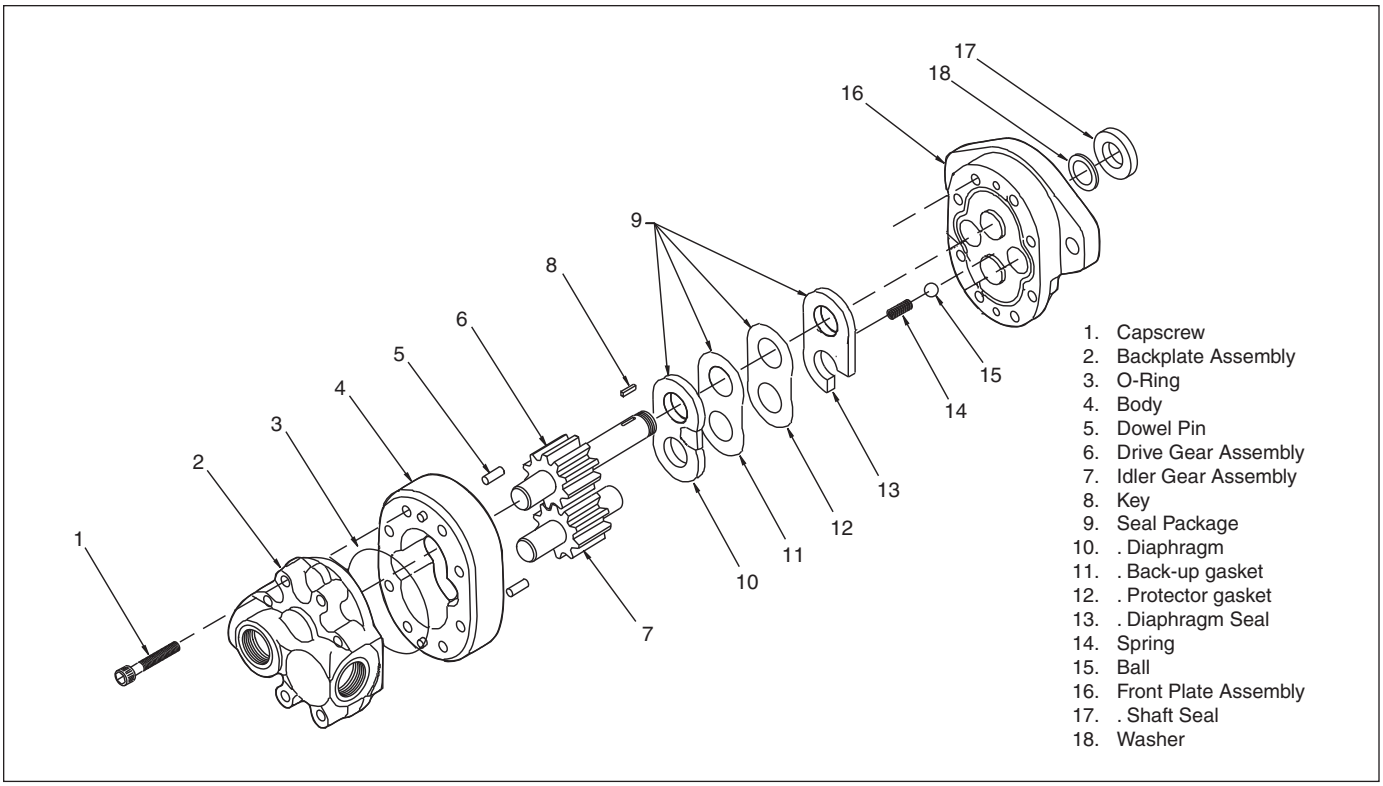


Figure 4-12 Hydraulic Pump

Hydraulic Pump Reassembly & Installation

1. Replace as new parts seal kit (9), O-Ring (3), and shaft seal (17).

2. Tuck diaphragm seal (13) into grooves in front plate with open part of "V" section down.

3. Press protector gasket (12) and back-up gasket (11) into diaphragm seal.

4. Drop steel balls (15) into respective seats and place springs (14) over balls.

5. Place diaphragm (10) on top of back-up gasket - bronze face up.

6. Entire diaphragm must fit inside raised rim of the diaphragm seal.

7. Dip gear assembly into oil and slip into front plate bearings.

8. Install dowel pins.

9. Apply a thin coat of petroleum jelly to both milled gear pockets of body. Slip body over gears onto front plate with half moon port cavities in body facing backplate. Check if scribed location mark lines up.

10. Install O-Ring (3) in groove of backplate.

11. Slide backplate over gear shafts until dowel pins are engaged. Line up scribed location mark.

12. Place pump in vise, shaft down, and install capscrews (1). Torque evenly 25 to 28 ft-lb (33.9 to 38.0 Nm).

13. Oil shaft seal (17) with petroleum jelly and work shaft seal over drive gear shaft taking care not to cut rubber sealing lip.

14. Seat shaft seal carefully by tapping with plastic hammer.

15. Add a generous portion of clean oil to both ports to ensure that the pump is adequately lubricated. Rotate pump shaft by hand. Pump will have small amount of drag but should turn freely after short period of use.

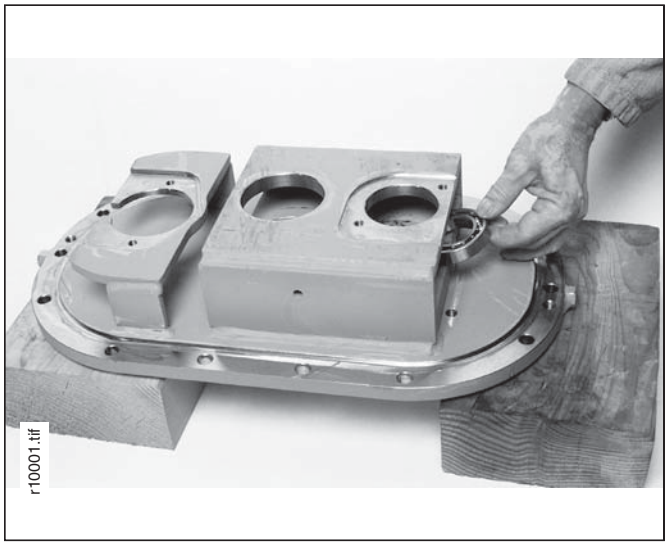
16. Replace the driveshaft key (15).

NOTE: To prime the pump, fill it with heavy oil such as SAE 90W prior to installation. This is important to protect the pump from aeration during initial operation.

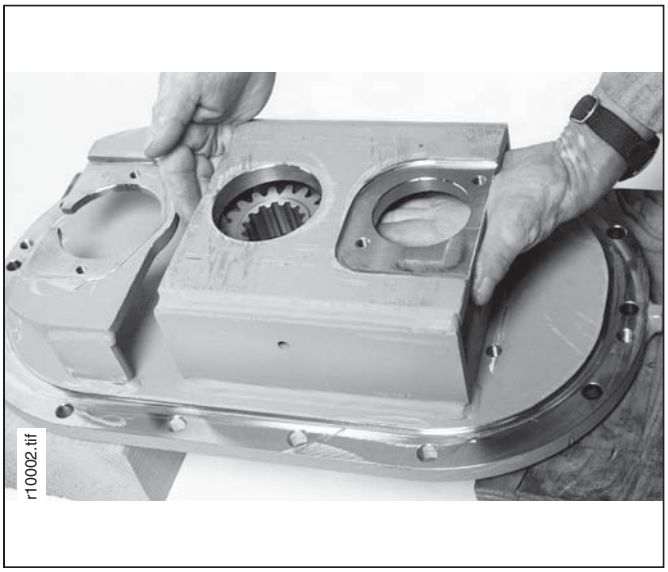
Input Carrier Reassembly and Installation

NOTE: Photographs for the input carrier reassembly in this section are meant for reference only. Please refer to Figures 4-13 to 4-18 and the W6G Parts Manual (P/N 599003W) for the specific configuration for your tractor.

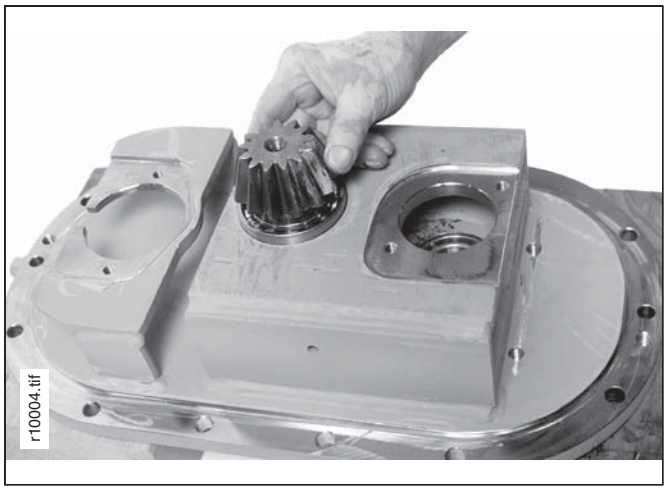
1. Set input carrier on wooden blocks for easy access. Lubricate ball bearing bore. Insert bearing and tap to seat.



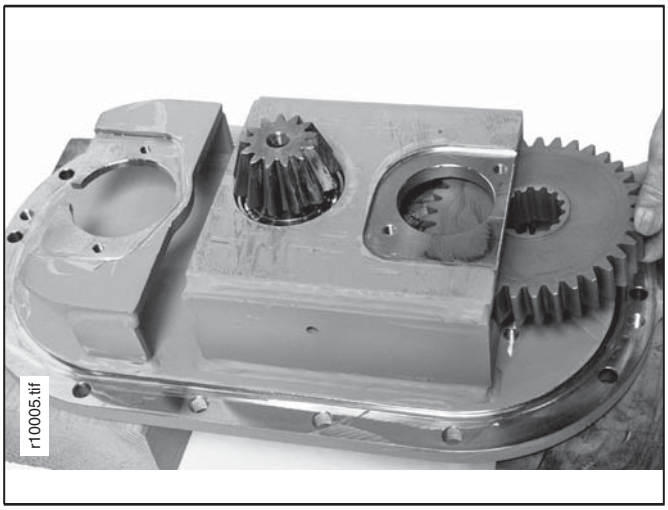
2. Insert pinion shaft gear and slide to center hole.



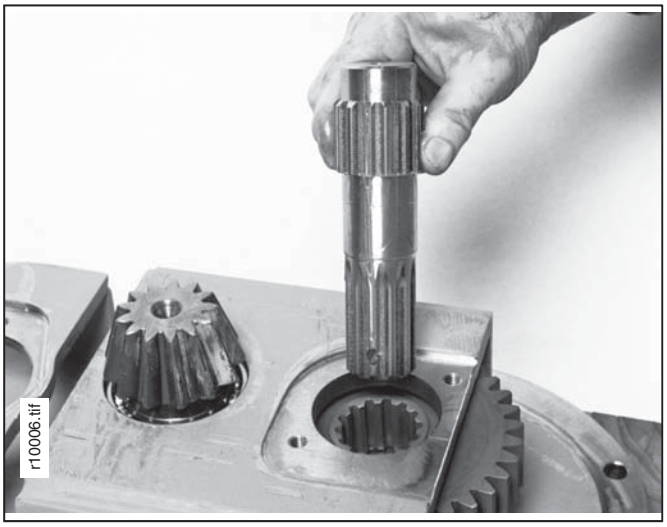
3. Lubricate bearing and set on bevel pinion gear. Insert bevel pinion gear onto pinion shaft gear.



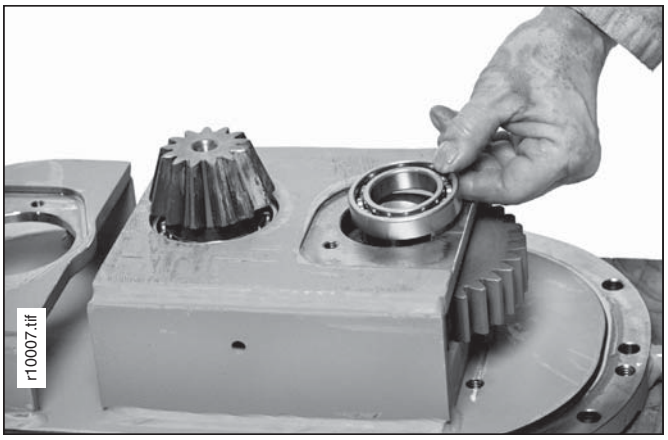
4. Insert input shaft gear.



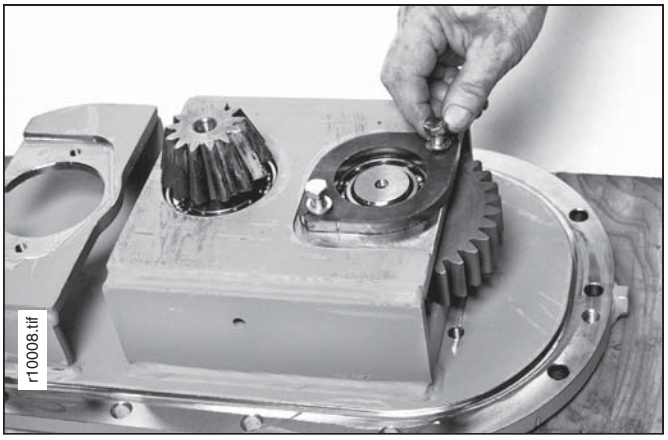
5. Lubricate input shaft well and insert into input shaft gear. Tap gently into place.



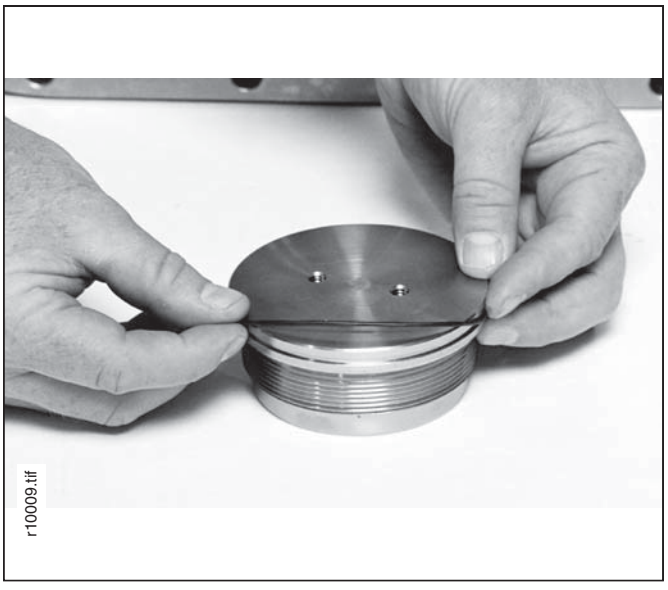
6. Lubricate ball bearing and insert on top of input shaft. Tap to seat bearing flush with face of input carrier.



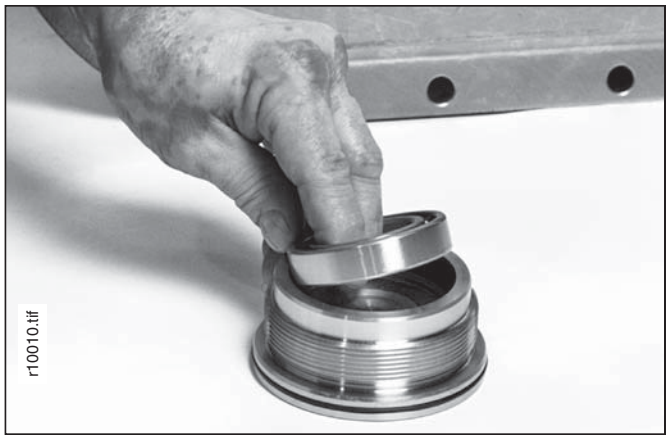
7. Install bearing retainer and fasten with capscrews and washers.



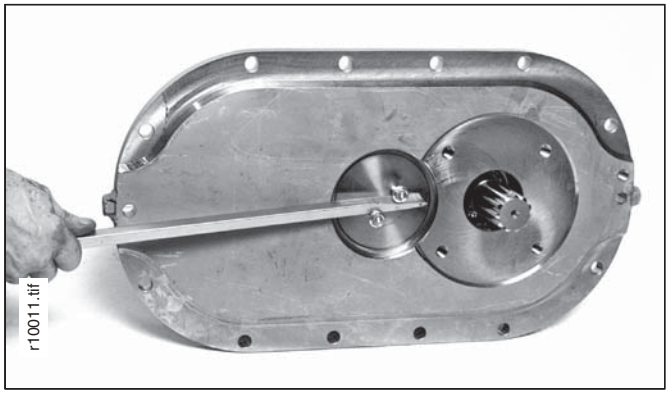
8. Insert lubricated O-ring on pinion bearing adjuster.



9. Seat bearing in pinion bearing adjuster and apply anti-seize compound to threads. Lubricate O-ring groove.

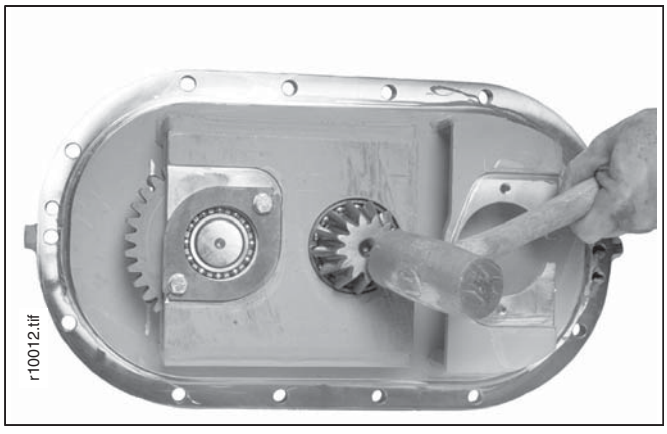


10. Turn carrier over and prop back with block. Insert bearing adjuster in place. Insert two 3/8 UNC capscrews and tighten bearing adjuster until O-ring just contacts chamfered surface on carrier housing using a metal bar as shown.

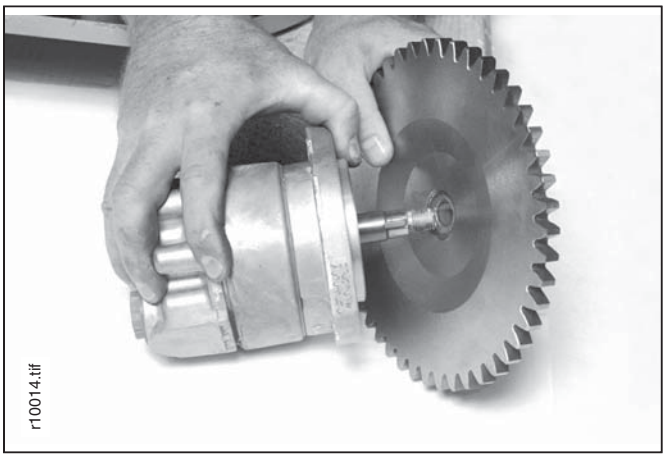


NOTE: Ensure pinion shaft gear and input shaft gear splines are aligned. Tap lightly on bevel pinion gear if necessary.

11. Turn carrier over again. Tap bevel pinion gear in place lightly to ensure it is seated properly on bearing and that O-ring is completely through bearing bore.

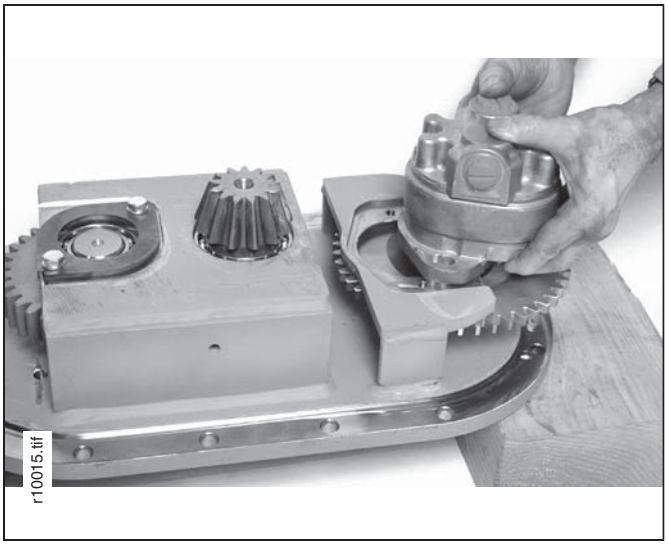


12. Apply blue loctite to pump shaft threads and insert pump gear. Match keyway on gear to key on shaft. Install the nut and torque to 38-40 ft-lb (52-54 Nm).

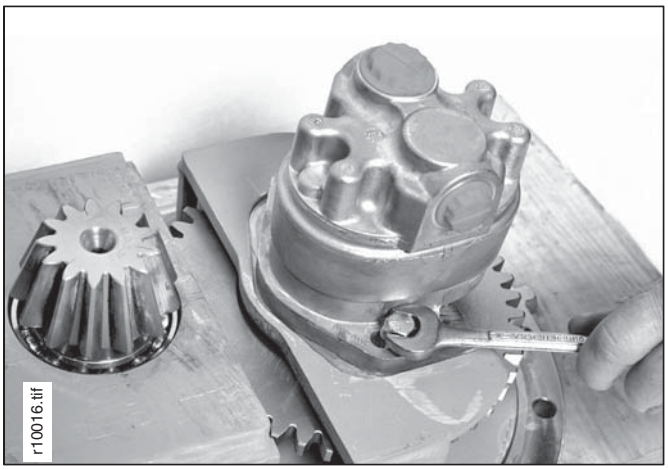


NOTE: Ensure concave side of gear faces towards pump.

13. Insert pump and gear, and tap assembly in place.



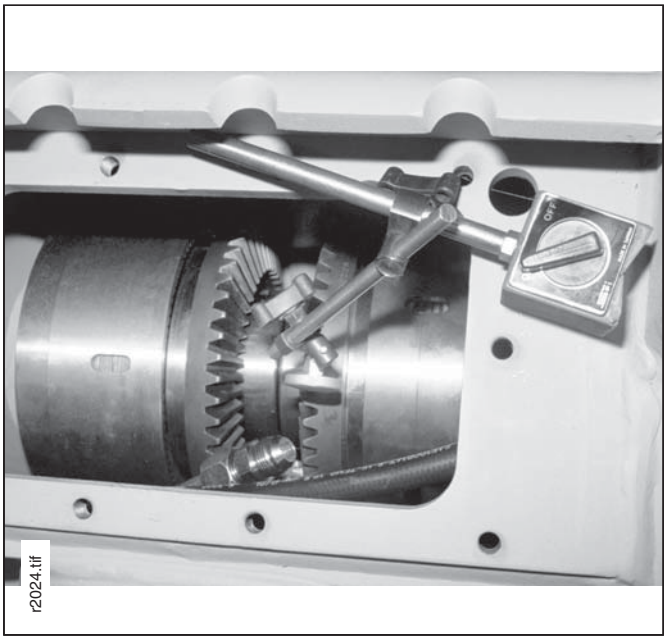
14. Insert capscrews on pump and tighten.



15. Plumb pump accordingly. Refer to the hydraulic arrangement specific to your tractor in the W6G Parts Manual, P/N 599003W.

16. Squeeze bead of sealant on input assembly surface and install on winch.

17. Set gear backlash:



a) Pry pinion forward (**away** from ring gears) to make sure the pinion is tight against the pinion bearing adjuster. If the pinion is the newer design with an O-ring on the shaft, doing this ensures the O-ring goes completely through the bearing bore.

b) Set dial indicator on a ring gear tooth.

c) Use dial indicator to measure backlash for that gear.

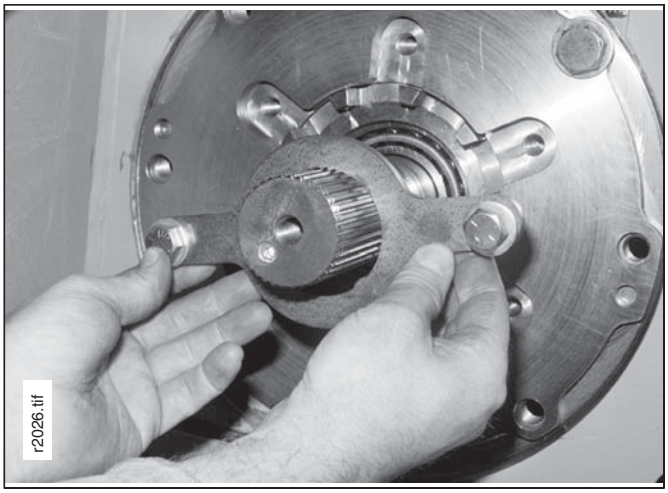
NOTE: Do not allow pinion to rotate when measuring backlash.

d) Repeat procedure for other ring gear.

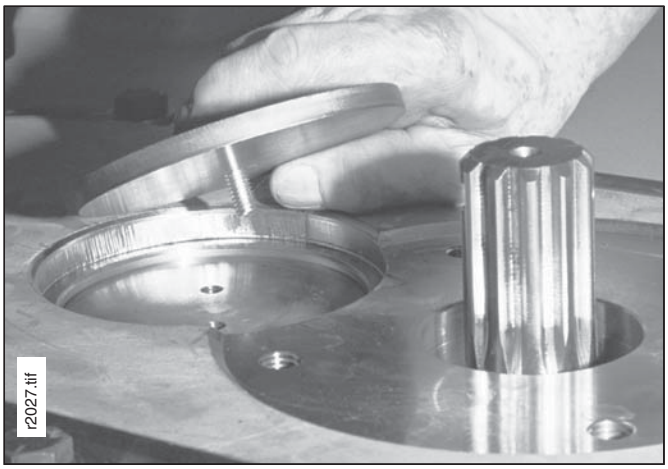
e) Backlash measurements need to be between .007 inch (0.178 mm) and .014 inch (0.356 mm), and as close to identical as possible for both sides. If backlash is different for the two gears, the clutch shaft needs to be centered. To do this, use the bearing adjusters on either end of the clutch shaft, both of which can be adjusted in increments of .003 inch (0.076 mm).

f) Once the backlash is identical for the two gears, tighten or loosen the pinion bearing adjuster to bring the backlash within tolerance.

18. Install bearing keeper on left-hand side of clutch shaft.

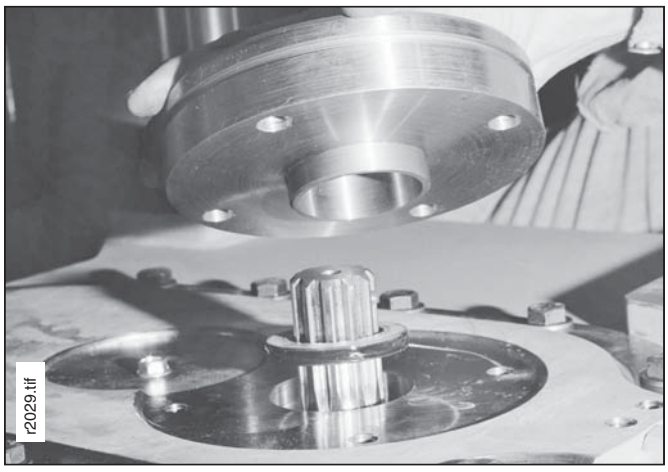


19. Install bevel pinion keeper on input carrier.

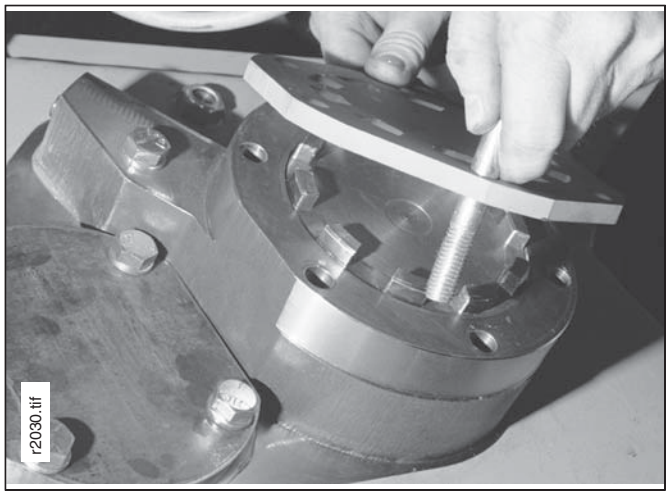


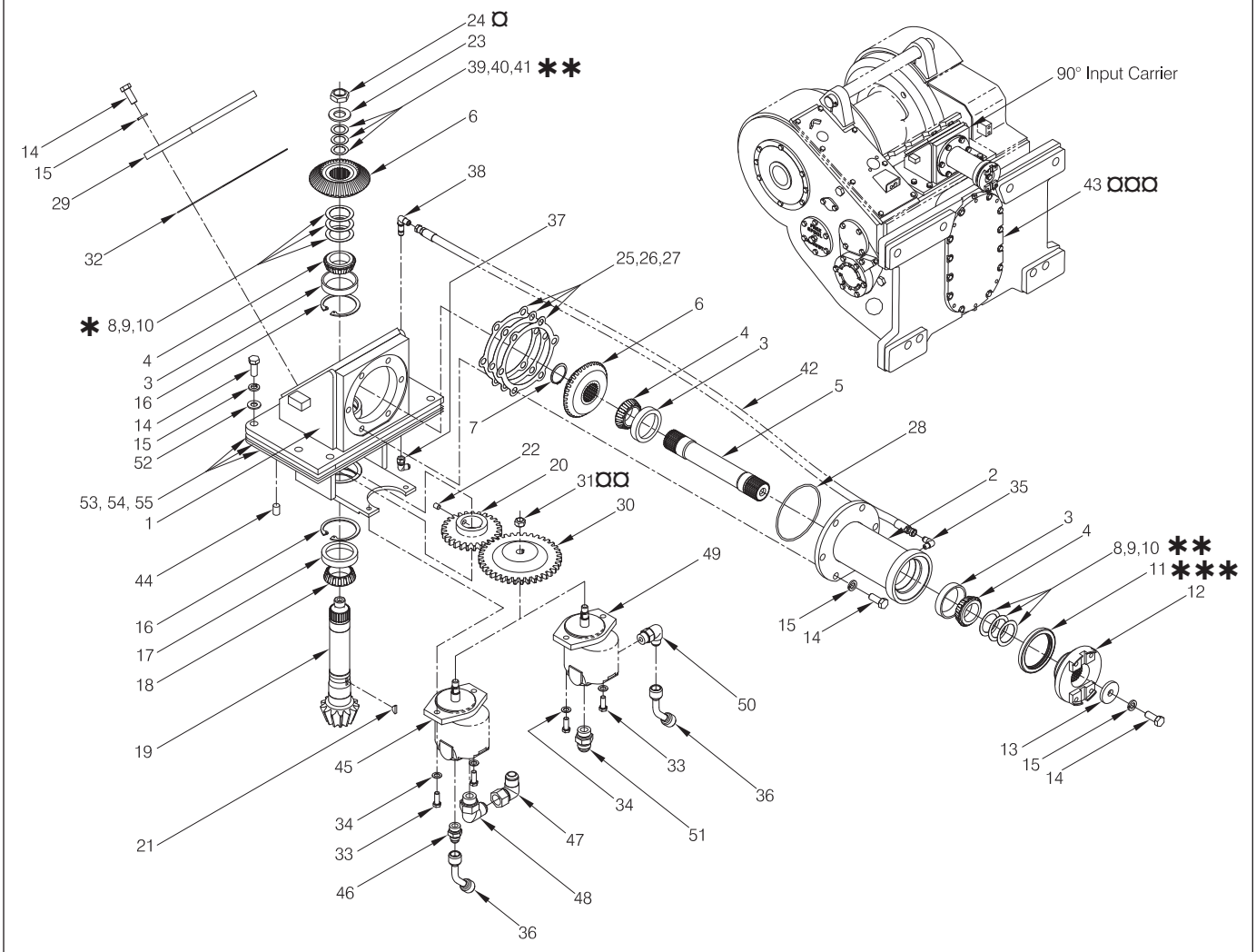
NOTE: New-style bevel pinion keeper is shown above. For older bevel pinion keepers, see Figures 4-13 through 4-18.

20. Install PTO pilot and greased seal on input carrier.



21. Remove temporary capscrews from right-hand bearing retainer keeper, and install actual capscrews.

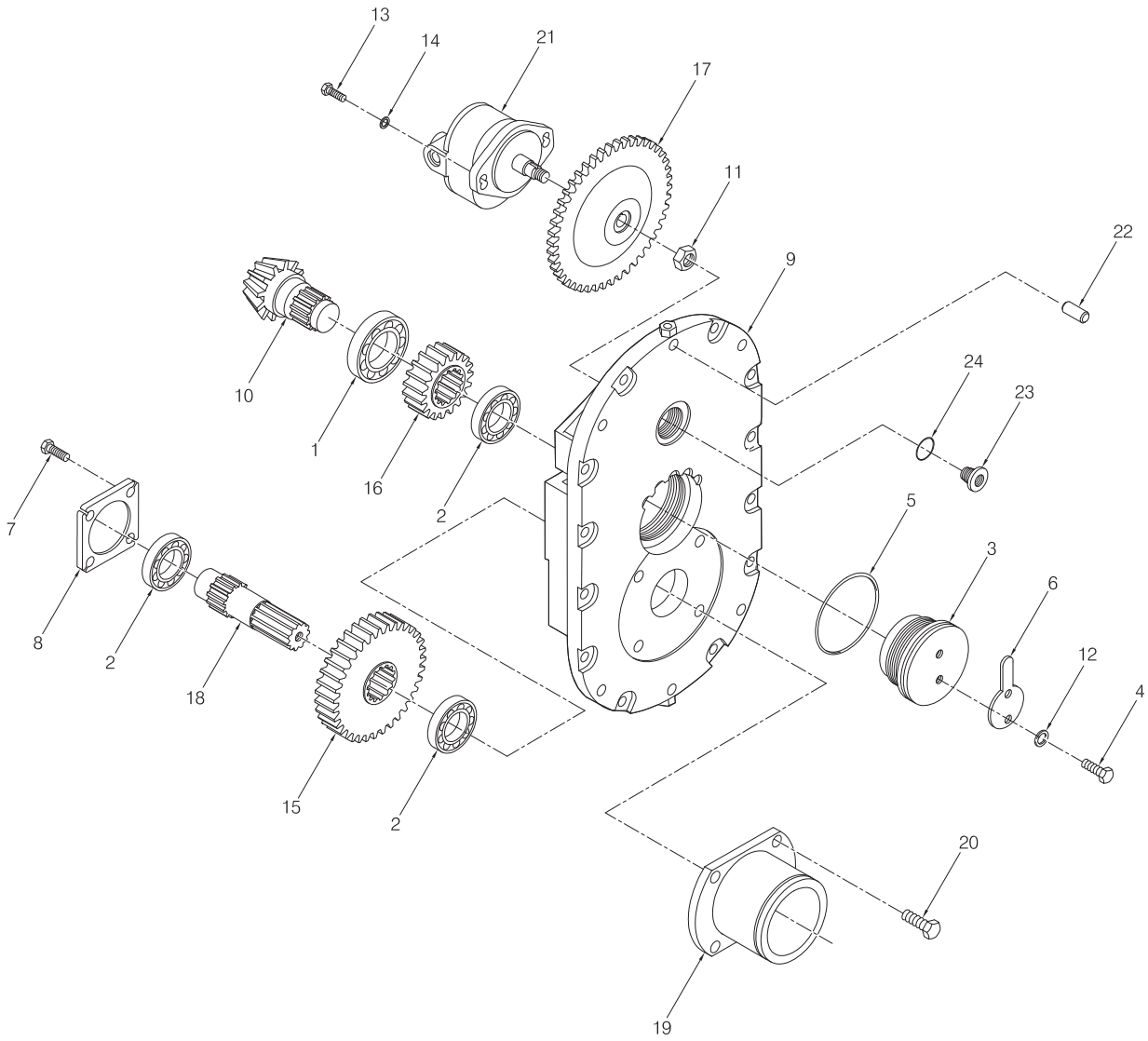




1. Gear Housing
2. PTO Carrier
3. Roller Bearing Cup
4. Roller Bearing Cone
5. Shaft
6. Bevel Gear
7. Snap Ring
8. Shim, .005
9. Shim, .007
10. Shim, .020
11. Seal
12. Yoke
13. Washer
14. Capscrew
15. Washer
16. Snap Ring
17. Roller Bearing Cup
18. Roller Bearing Cone
19. Pinion
20. Gear
21. Key
22. Screw
23. Washer
24. Nut
25. Shim, .005
26. Shim, .007
27. Shim, .020
28. O-Ring
29. Cover
30. Gear
31. Nut
32. Gasket
33. Capscrew
34. Washer
35. Fitting
36. Tube Assembly
37. Fitting
38. Fitting
39. Shim, .005
40. Shim, .007
41. Shim, .020
42. Hose Assembly
43. Cover Plate
44. Pin
45. Pump†
46. Fitting†
47. Fitting†
48. Fitting†
49. Pump††
50. Fitting††
51. Fitting††
52. Washer
53. Shim, .005
54. Shim, .007
55. Shim, .020

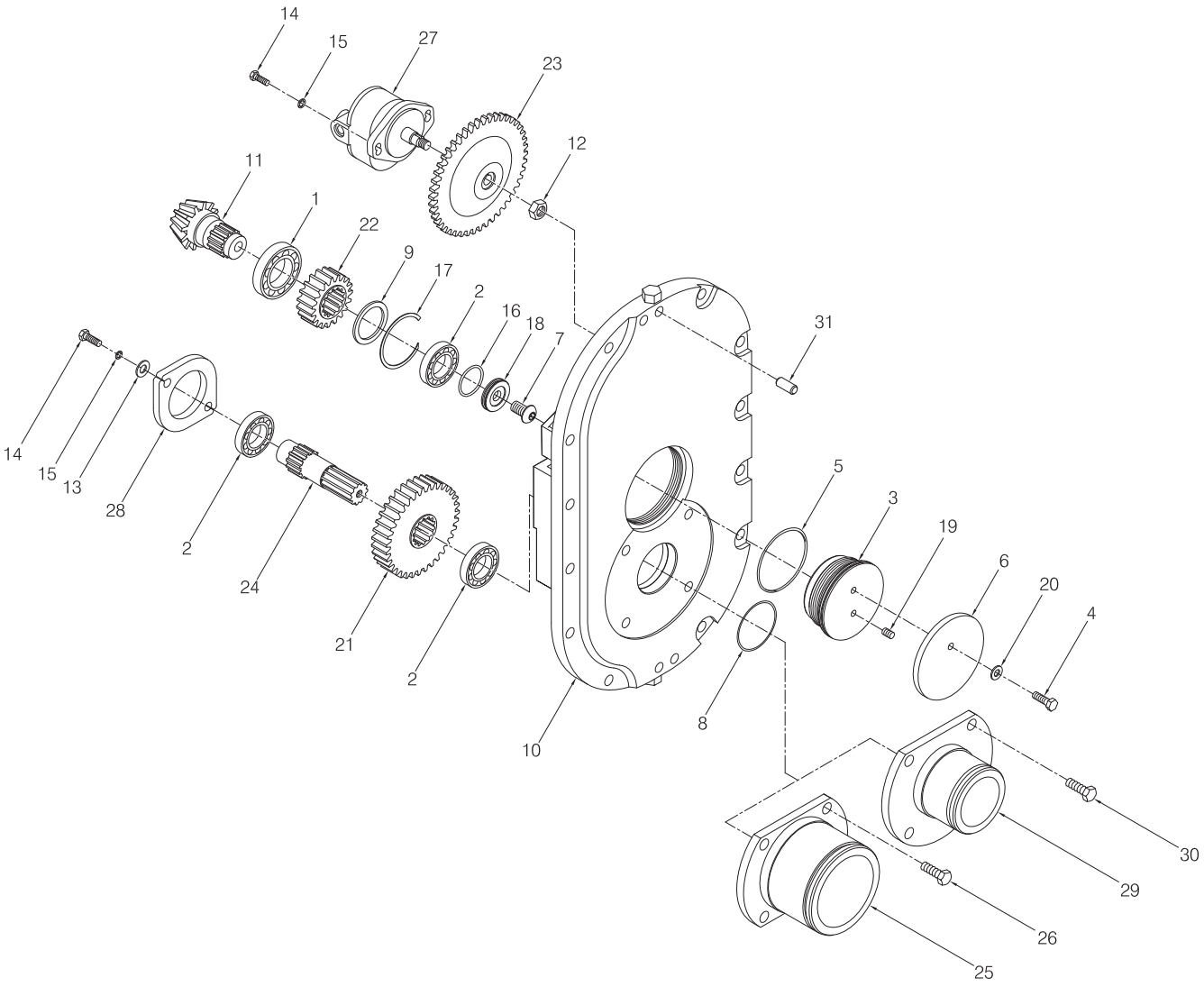
† Used on Komatsu D61EX-12, and D65EX-12 Only.
†† Used on Case Quadtrac Only.
* Shim to produce .005 to .010 backlash. Check for proper gear contact pattern.
** Install sufficient shims to produce .002 - .005 endplay.
*** Seal lip must face out of carrier.
¤ Tighten to 165 ft-lbs.
¤¤ Tighten to 38-40 ft-lbs.
¤¤¤ Use HCE-96 sealant in place of gasket.

Figure 4-13 90° Input Carrier Arrangement for Case Quadtrac, Komatsu D61EX-12 D65EX-12



1. Bearing
2. Bearing
3. Pinion Bearing Adjuster
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew
8. Bearing Retainer
9. Input Carrier
10. Bevel Gear
11. Nut
12. Washer
13. Capscrew
14. Washer
15. Gear
16. Gear
17. Gear
18. Input Shaft
19. PTO Pilot
20. Capscrew
21. Pump
22. Pin
23. Fitting
24. . O-Ring

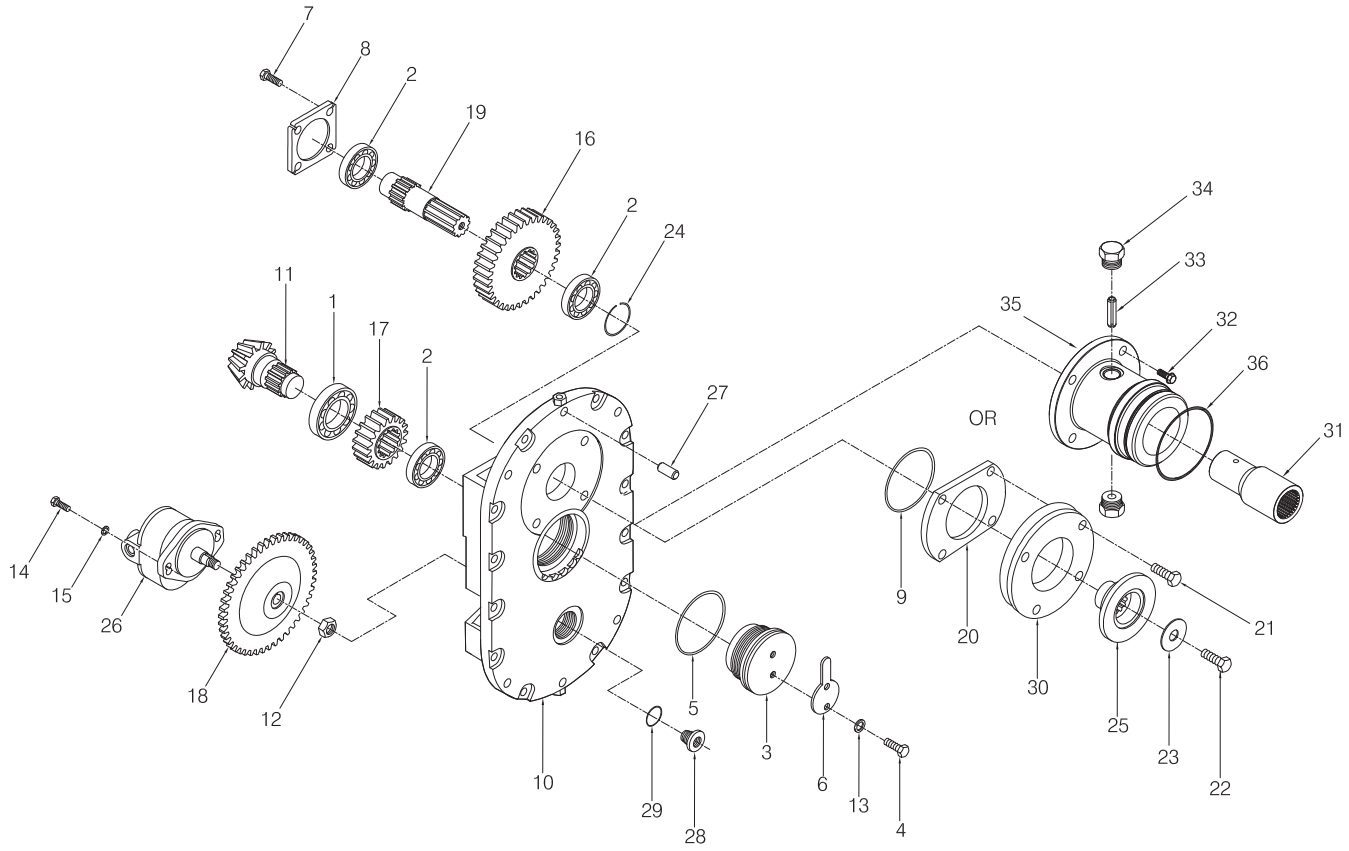
Figure 4-14 Input Carrier Arrangement for Case 1850K, Caterpillar D6H D6R Series I & II and Fiat-Hitachi/New Holland DC180 FD/FH 14E
Last Used on S/N AW6G-1061



1. Bearing
2. Bearing
3. Pinion Carier
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew‡
8. Seal
9. Spacer‡
10. Input Carrier
11. Bevel Gear
12. Nut
13. Washer
14. Capscrew
15. Lock Washer
16. O-Ring‡
17. Snap Ring‡
18. Plate‡
19. Set Screw‡
20. Washer‡
21. Gear
22. Gear
23. Gear
24. Input Shaft*
25. PTO Pilot*
26. Capscrew*
27. Pump
28. Bearing Retainer
29. PTO Pilot§
30. Capscrew§
31. Pin

* Caterpillar D6H/R, I & II
§ Fiat-Hitachi/New Holland FD 14E, FD 175/195, DX 175/195, DC-180, Case 1850K
‡ First used on S/N AW6G-1112

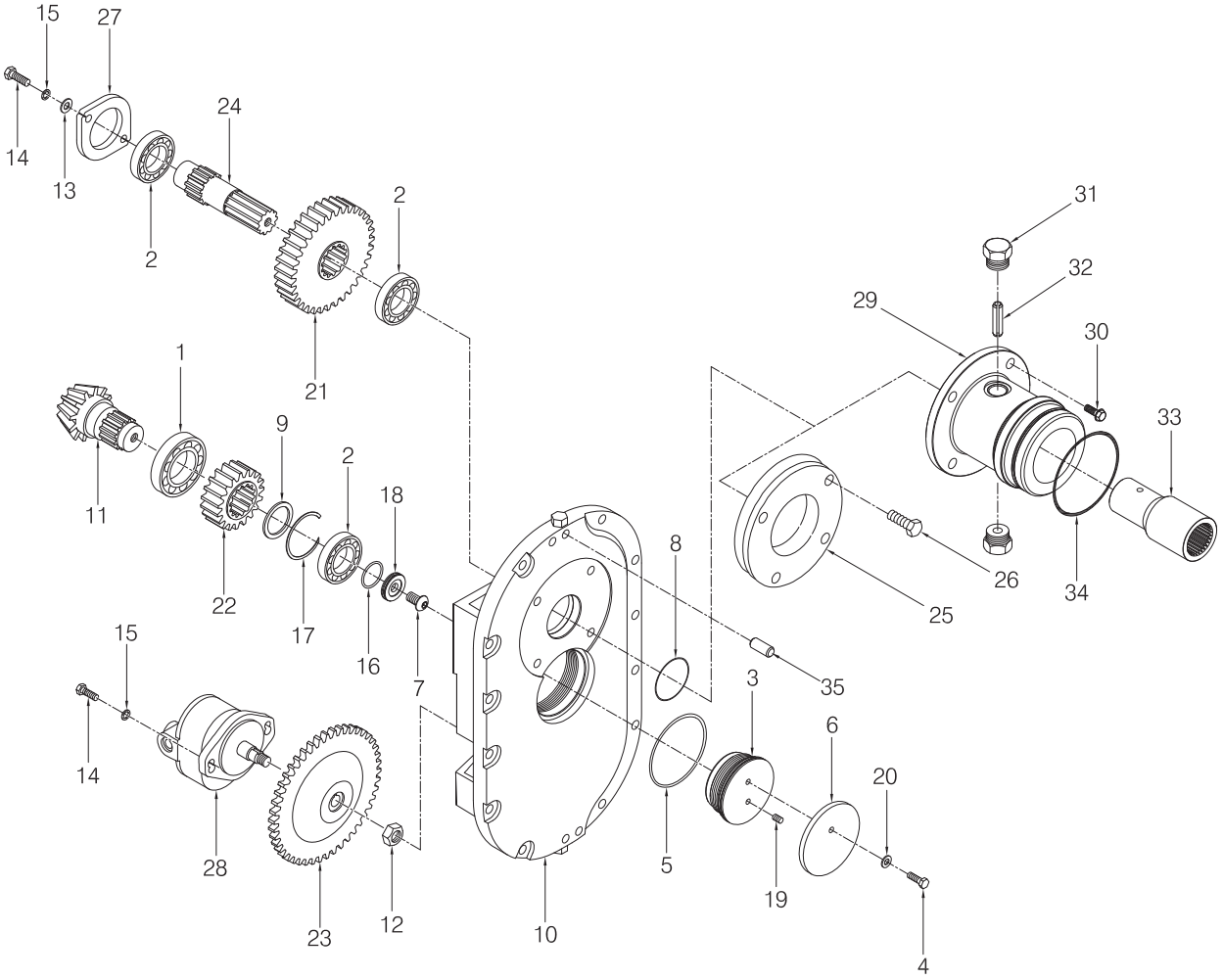
Figure 4-15 Input Carrier Arrangement for Case 1850K, Caterpillar D6H D6R Series I & II and Fiat-Hitachi/New Holland DC180 FD/FH 14E FD175/195, DC 175/195 First Used on S/N AW6G-1062



1. Bearing
2. Bearing
3. Pinion Bearing Adjuster
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew
8. Bearing Retainer
9. Seal
10. Input Carrier
11. Bevel Gear
12. Nut
13. Washer
14. Capscrew
15. Washer
16. Gear
17. Gear
18. Gear
19. Input Shaft
20. PTO Pilot *
21. Capscrew
22. Capscrew *
23. Washer *
24. Snap Ring *
25. Yoke
26. Pump
27. Pin
28. Fitting
29. . O-Ring
30. Retainer *
31. Coupler §
32. Capscrew §
33. Pin §
34. Fitting §
35. PTO Pilot §
36. O-Ring ‡

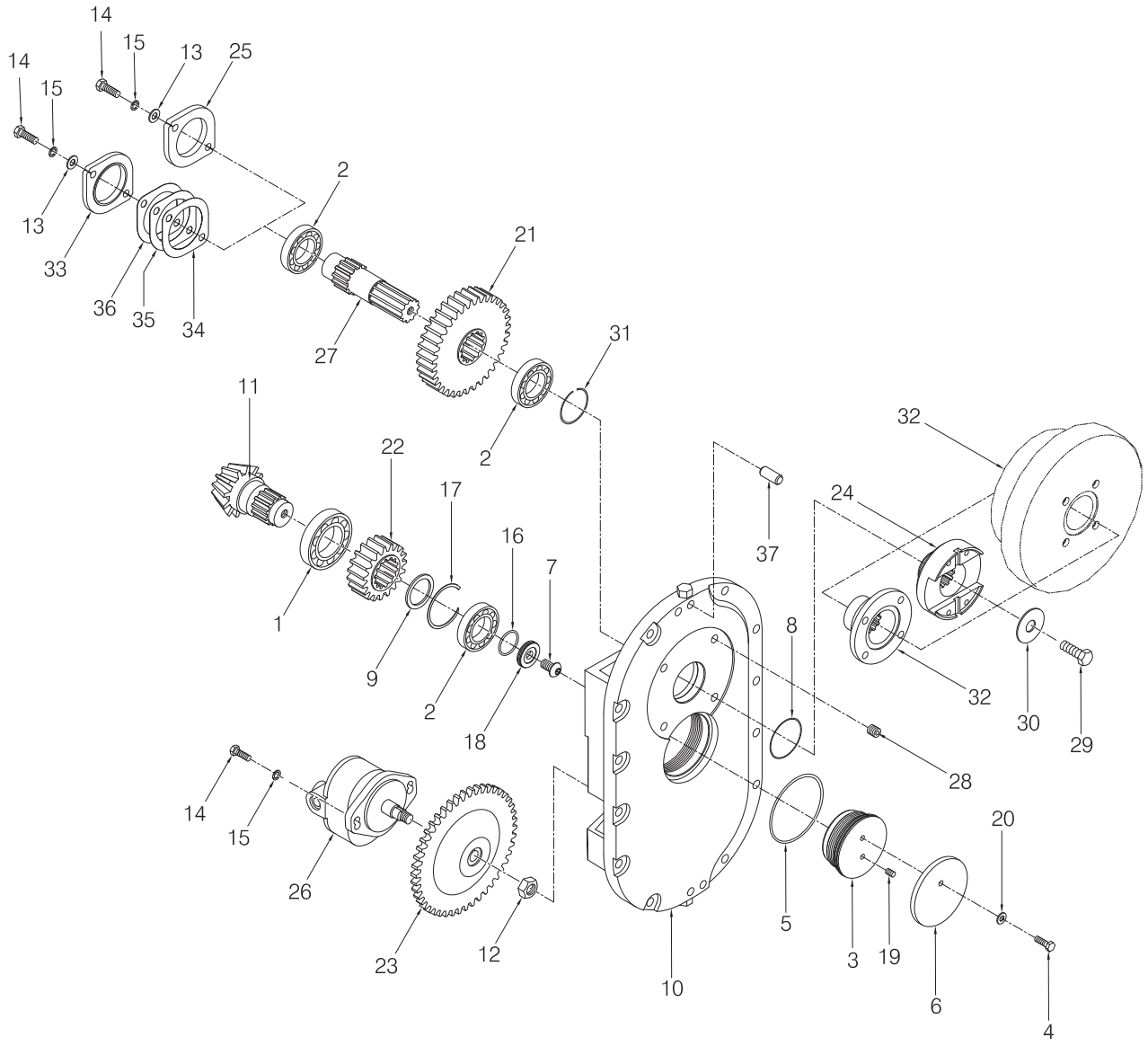
* Used on John Deere Only
§ Used on Caterpillar D6G & D6N Only
‡ Used on Caterpillra D6H Only

Figure 4-16 Input Carrier Arrangement for Caterpillar D6D/E/G, Dresser/Dressta TD15E and John Deere 750B/C 850B/C Last Used on S/N AW6G-1061



1. Bearing	14. Capscrew	27. Bearing Retainer
2. Bearing	15. Lock Washer	28. Pump
3. Pinion Carrier	16. O-Ring‡	29. PTO Pilot§
4. Capscrew	17. Snap Ring‡	30. Capscrew§
5. O-Ring	18. Plate‡	31. Fitting§
6. Keeper	19. Set Screw‡	32. Pin§
7. Capscrew‡	20. Washer‡	33. Coupler§
8. Seal	21. Gear	34. O-Ring§
9. Spacer‡	22. Gear	35. Pin
10. Input Carrier	23. Gear	
11. Bevel Gear	24. Input Shaft	* Caterpillar D6C/D/E/G, Dresser/Dressta TD15E/H
12. Nut	25. PTO Pilot*	§ Caterpillar D6N
13. Washer	26. Capscrew*	‡ First used on S/N AW6G-1112

Figure 4-17 Input Carrier Arrangement for Caterpillar D6D/E/G/N, Dresser/Dressta TD15E TD15H PS First Used on S/N AW6G-1062



1. Bearing
2. Bearing
3. Pinion Carrier
4. Capscrew
5. O-Ring
6. Keeper
7. Capscrew
8. Seal
9. Spacer
10. Input Carrier
11. Bevel Gear
12. Nut
13. Washer
14. Capscrew
15. Lock Washer
16. O-Ring‡
17. Snap Ring‡
18. Plate‡
19. Set Screw‡
20. Washer‡
21. Gear
22. Gear
23. Gear
24. Yoke*
25. Bearing Retainer*
26. Pump
27. Input Shaft
28. Setscrew
29. Capscrew
30. Washer
31. Snap Ring
32. Yoke§
33. Bearing Retainer§‡
34. Shim§‡
35. Shim§‡
36. Shim§‡
37. Pin

* John Deere 750B, 850B
§ John Deere 750C, 850C
‡ First used on S/N AW6G-1112

Figure 4-18 Input Carrier Arrangement for John Deere 750/850B 750/850C Series I & II
First Used on S/N AW6G-1062

Oil Brake Reassembly and Installation

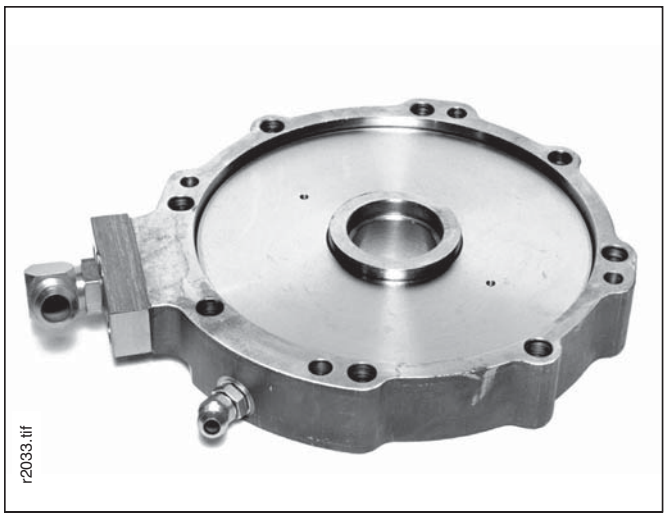
Make sure the clutch shaft has been installed prior to installation of the brake assembly.

1. Lubricate and install two new O-rings in piston. It may be necessary to stretch inner O-ring to hold it in place until piston is installed in piston cavity.

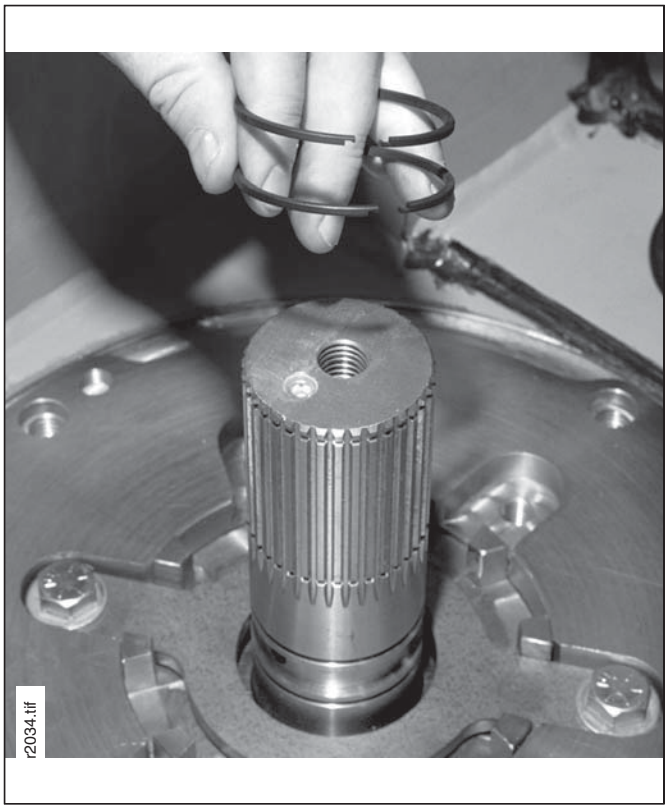
⚠ CAUTION

Use only Allied Systems Company-approved O-rings to ensure proper sealing.

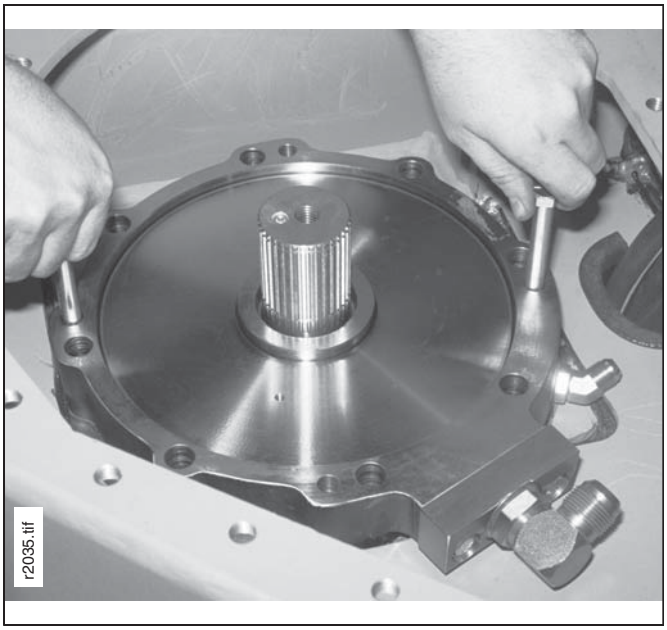
2. Lubricate the piston as well as the cavity in the brake piston housing. Install piston in housing. Ensure the two holes in the piston face up.



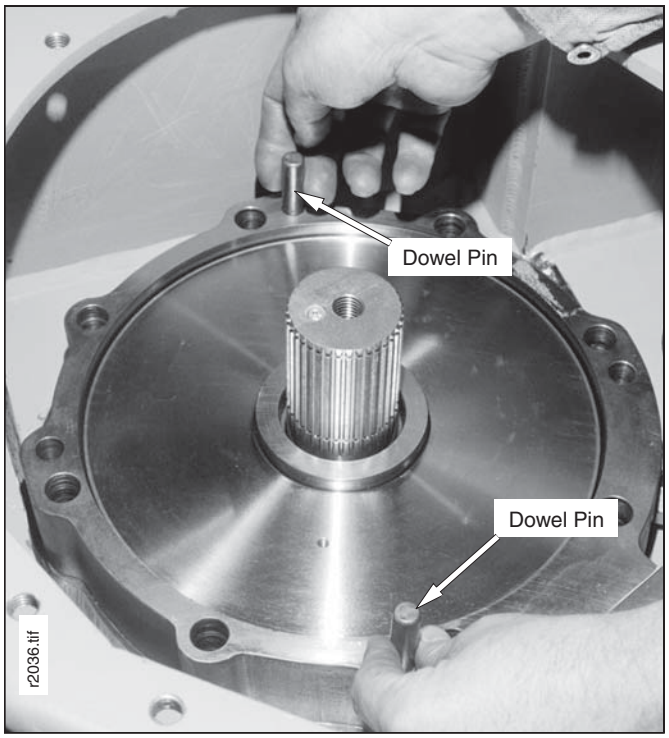
3. Insert two seal rings on the left-hand side of the clutch shaft and lubricate the grooves.



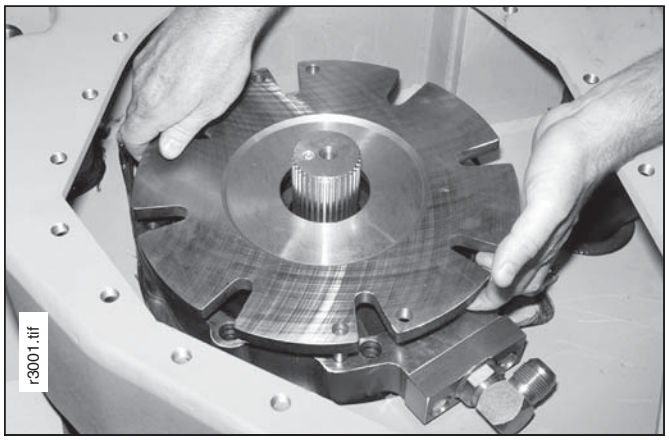
4. Using two 1/2 UNC x 4 1/2 capscrews, lift brake piston assembly and place on left-hand side of clutch shaft.



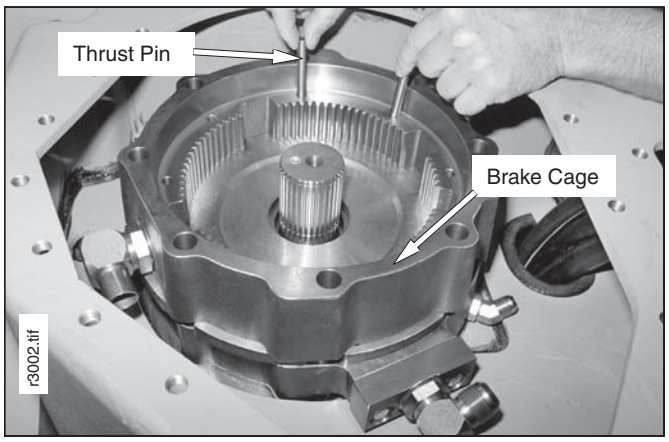
5. Insert two dowel pins in brake piston assembly.



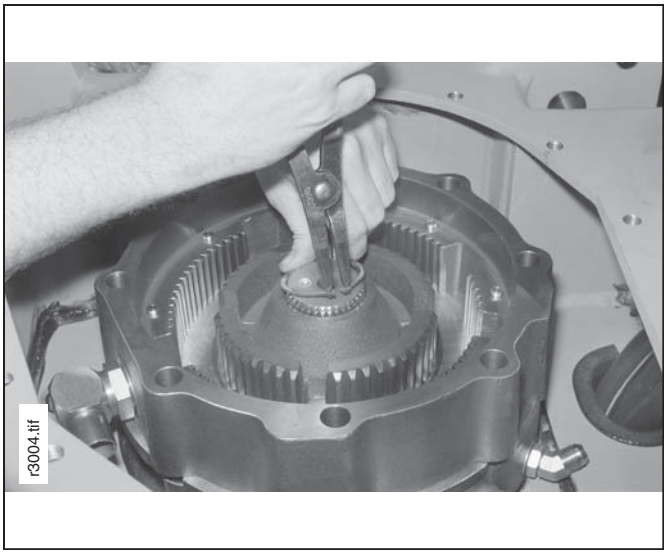
6. Place pressure plate on top of brake piston housing.



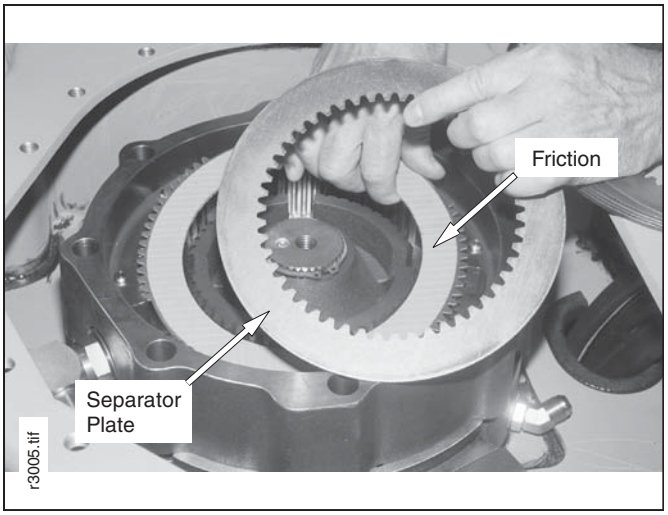
7. Place brake cage on top of brake piston housing and install thrust pins.



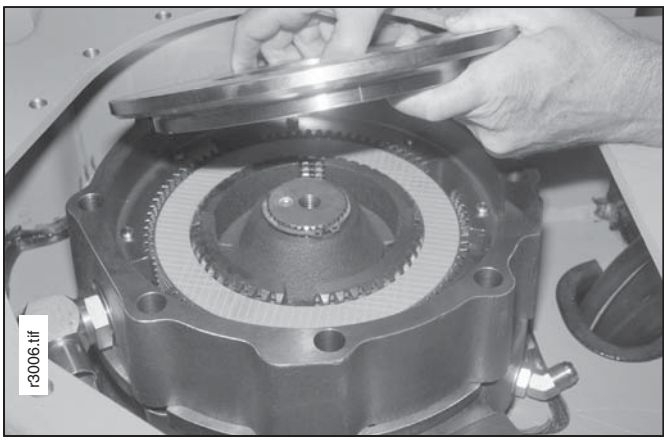
8. Install brake hub and two snap rings.



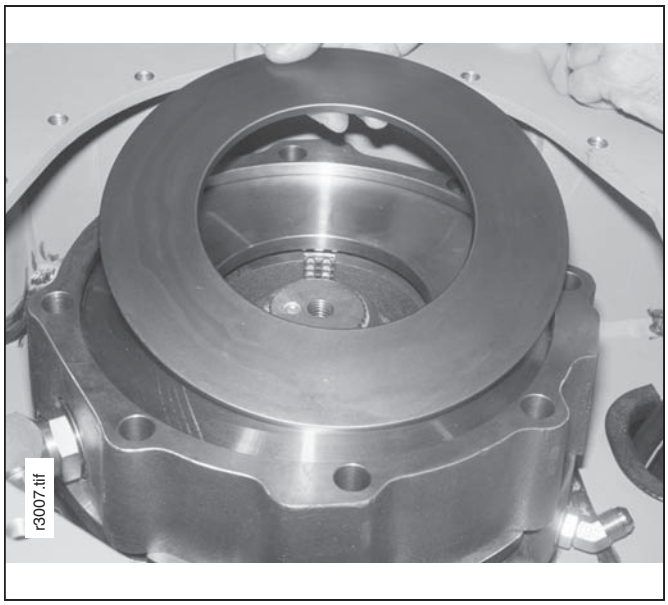
9. Install friction discs and separator plates alternately, starting with a friction disc. Align blanked-out teeth on all friction discs.



10. Insert the thrust ring, smooth side out.



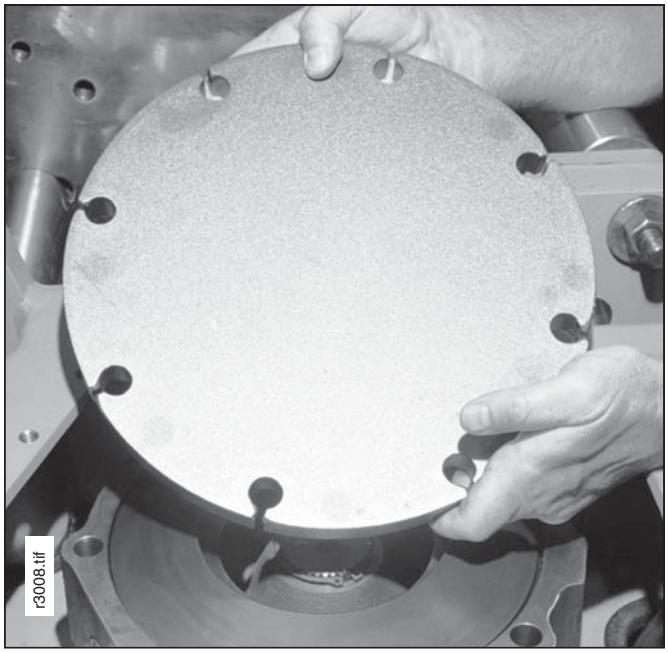
11. Place the belleville spring with the convex side out on top of the thrust ring. Place and center the stroke limiter (if applicable) inside the belleville spring.



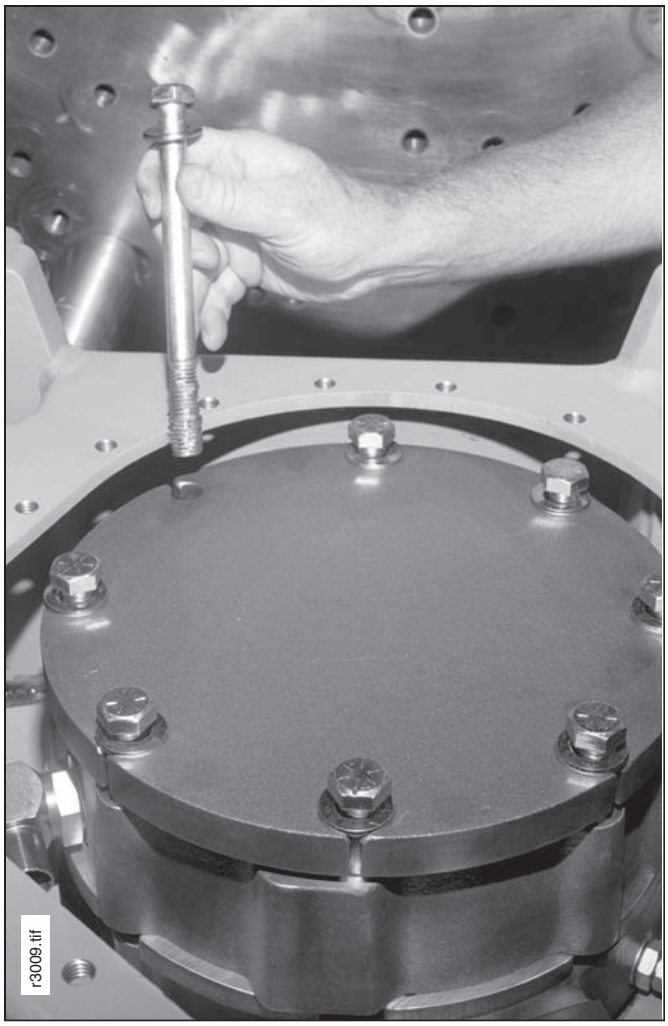
⚠ CAUTION

Make sure that the stroke limiter does not move during assembly or it can become trapped under belleville spring, and not allow brake to release properly.

12. Install the brake cover.



13. Fasten with capscrews lubed with anti-seize. Torque the capscrews to 160 ft-lb (22 kg-m).



14. Restore hydraulic connections to brake (refer to the Hydraulic Arrangement page for your specific tractor in the W6G Parts Manual for specifics).

15. Install winch covers.

Winch installation

1. Thoroughly clean the mounting surfaces on the winch and the tractor. Clean the mounting holes and hardware of dirt, grit and oil.

2. Check the condition of the mounting studs on the vehicle. Ensure that all studs are tight. Replace any studs that are loose, bent or otherwise damaged. Minor thread damage may be dressed with a thread chaser.

3. Loctite all studs.

4. Install mounting adapter, if required.

5. Attach sling or chain fall to lift points.

6. Raise the winch and align the splines on the tractor PTO with the splines of the PTO coupling.

⚠ WARNING

Before lifting the winch, check Figure 1-20, Winch Weight, to make sure the minimum rated capacity for the slings, crane or other lifting devices exceeds the load being lifted.

8. Align the studs with the mounting holes to prevent thread damage.

9. Loosely install the two top nuts or capscrews before the winch is fully seated against the tractor.

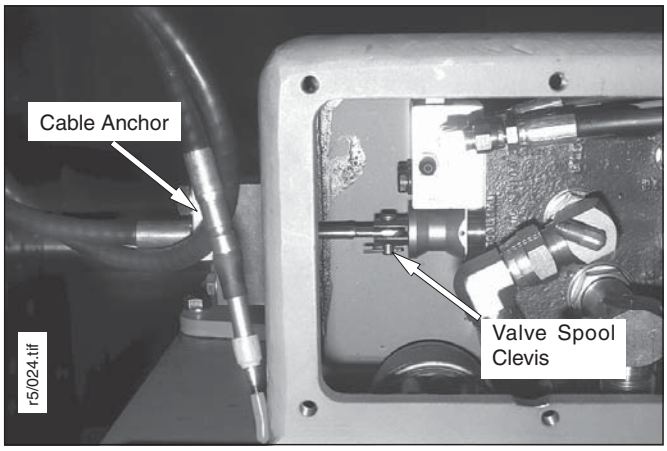
10. Secure the winch in place using the parts listed in the mounting kit instructions. Tighten the nuts/capscrews alternately at each side of the winch to pull the winch evenly against the tractor. The two top inboard nuts should be snug then turned on to the next slot so that the cotter pin can be installed. All outboard nuts should be tightened to 500 ft-lbs (69 kg-m). Torque all nuts and capscrews as specified in Figures 1-18 and/or 1-19.

11. Install control lever assembly per mounting kit instructions.

12. Attach push-pull cable(s) to control lever assembly (cable controls) or connect wire harness to electronic control module (electronic controls).

13. Attach cable bracket(s) to winch. Do not tighten fasteners at this time.

14. **POWER CONTROLS ONLY:** Attach push-pull cable(s) to control valve clevis and freespool, then tighten cable bracket(s) to winch.



15. Fill unit with oil.

16. **FOR POWER CONTROLS:** Adjust control cable and check hydraulic pressure settings as described in subsection of Service in Section 2.

    FOR ELECTRONIC CONTROLS: Check for proper control lever function and verify hydraulic pressure settings as described in subsection of Service in Secion 3.

NOTE: Pressure checks in accordance to Figure 2-19 (for cable controls) or Figure 3-28 (for electronic controls) should be taken with hydraulic oil at operating temperature.

Notes

Notes

Notes

To find a dealer in your area,
Call: (503) 625-2560,
Fax: (503) 625-7269 , or
Email: marketing@alliedsystems.com, or
Visit our website: http://www.alliedsystems.com

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