

# Operating Manual



## W5C

### Power Controlled & Electronic Controlled Towing Winch

This manual must be with the vehicle  
on which this winch is installed.

Please check the Allied Systems website  
regularly for updates to this manual.  
[www.alliedsystems.com](http://www.alliedsystems.com)

A Product of  
**Allied Systems**  
COMPANY  
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## Foreword

The safe and efficient operation of a winch requires skill and alertness on the part of the operator. To develop the skills required, the operator must:

- Receive training in the proper operation of the winch and the machine on which it is mounted.
- Understand the capabilities and limitations of the winch and the machine on which it is mounted.
- Become familiar with the winch and the machine on which it is mounted and see that they are maintained in good condition.
- Read and understand the SAFETY SUMMARY and OPERATING PROCEDURES contained in this Operating Manual.

In addition, a qualified person experienced in the operation of the winch must guide a new operator through several load handling applications before the new operator attempts to operate the equipment alone. It is the employer's responsibility to make sure that the operator can see, hear, and has the physical and mental ability to operate the equipment safely.

This Operating Manual contains basic information necessary for the operation and maintenance of a winch. Optional equipment is sometimes installed that can change the characteristics described in this manual. Make sure the necessary instructions are available and understood before operating the winch.

Some of the components described in this Operating Manual will NOT be installed on your winch. If you have questions about any item on your winch or described in this Operating Manual, contact your local winch dealer, or contact Allied Systems Company:

Allied Systems Company  
21433 SW Oregon Street  
Sherwood, OR 97140 USA

Phone: 503-625-2560  
Fax: 503-625-7269

E-Mail: [marketing@alliedsystems.com](mailto:marketing@alliedsystems.com)

Also visit our website, [www.alliedsystems.com](http://www.alliedsystems.com), where the most current copy of this manual is always available.



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**NOTE:** For repairs and overhaul, contact your Allied winch dealer. If you maintain your own equipment, a service manual is available for your specific winch.

**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.

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## 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.

### Operation, Inspection, and Maintenance Warnings

 **WARNING**

The winch shall not be used for hoisting.

 **WARNING**

Use hearing protection when operating winches.



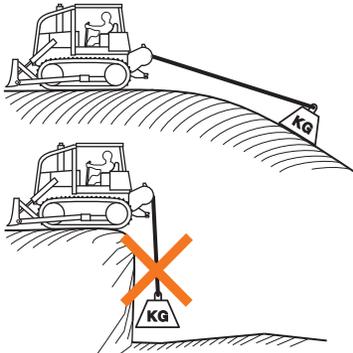
Obey the following cautions and warnings before using your winch to avoid equipment damage, personal injury or death.

# Safety Summary

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- 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 Operating 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. Dozer 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.



# Safety Summary

- 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 599006W.
- 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 dozer 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 dozer 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 dozer and winch. Manual override of high temperature shut-off will cause damage to dozer 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 9.
- 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.



Notes



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## Notes

## General

### Introduction

This Operating Manual is divided into separate sections to describe the various operating characteristics of the W5C winch.

### How the Winch Operates

A winch is normally installed on a skidder or dozer to:

- increase the pulling power of the skidder or dozer.
- reach into an area where a skidder or dozer cannot go.
- make lift functions available when special attachments are installed.

The winch has hydraulic clutches that are similar to a hydraulic (powershift) transmission. Dozers and skidders have a power take-off (PTO) that is used to transfer the power from the engine to the winch. The **SCH** (Self Contained Hydraulics) on the winch label indicates that the hydraulic system for control of the winch is inside of the winch case. When the PTO is operating, a hydraulic pump in the winch case takes hydraulic oil from the

winch sump and sends it to the hydraulic control valve. The hydraulic control valve controls the operation of the winch. Removable covers on the winch case allow access for repairs and adjustments. The design of the winch cases permits a variation in the arrangement of PTO assemblies to fit the different dozers and skidders that use these winches.

The PTO is connected to the pinion assembly in the winch. When the pinion rotates, a spur gear turns the hydraulic pump and the ring gear (bevel gear). The bevel gear is connected to an oil clutch for the **LINE-IN** (power forward) operation and another oil clutch for the **LINE-OUT** (power reverse) direction.

The power through the winch to the drum for the wire rope is controlled by a **LINE-IN** and a **LINE-OUT** clutch. When the **LINE-IN** clutch is applied, the drum rotates to pull the wire rope into the winch. When the **LINE-OUT** clutch is applied, the drum rotates to unwind the wire rope from the winch at the speed controlled by the PTO rpm.

When the control lever is in the **BRAKE-ON** position, the oil brake is automatically applied by a spring to hold the drum in its position. If the control lever is moved to apply one of the clutches, the brake is released by the same oil pressure that applies the clutch. In the event that hydraulic pressure is lost, the brake remains applied and the winch will not turn.

The winch has an intermediate gear assembly that provides a gear reduction and increases the available torque at the winch drum. A sliding sleeve with splines engages the drum pinion gear and the intermediate gear. The operator can disengage the sliding sleeve with a control lever for the **FREESPOOL** operation when there is no load on the wire rope. When the 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 clutch and brake shaft 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 from the drum during **FREESPOOL** operation.



## CAUTION

**Shifting to FREESPOOL with a suspended load on the wire rope will cause the load to fall uncontrollably.**

The W5C winch has a maximum line pull capacity of 62,500 lbf (278,000 N) when there is one layer or less of wire rope on the drum.

## 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 rated 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.

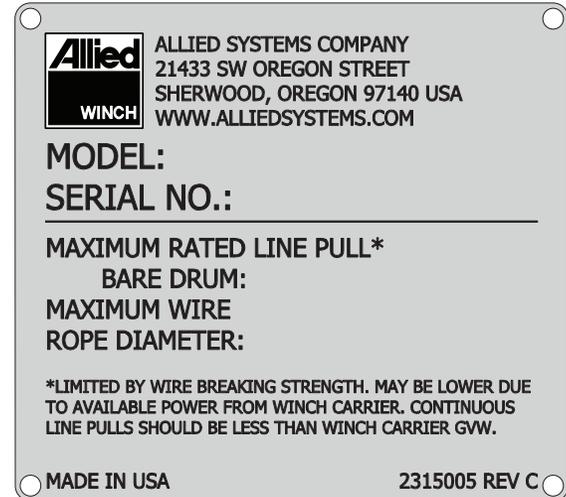


Figure 1 Nameplate

## Wire Rope Selection

Each winch model can have a variety of wire rope sizes, lengths, or grades installed by the user. The maximum wire rope size is shown on the nameplate. The maximum rated line pull stamped into the nameplate is based on the maximum wire rope size, EEIPS grade. When a smaller diameter wire rope, or a different grade is installed, the line pull is limited by the capacity of the wire rope.

See Figure 2 for approved wire rope sizes, drum capacities and maximum rated line pulls. When a larger diameter wire rope is used, the length of wire rope installed on the drum will be shorter. Be aware that 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

**Load loss hazard.**

**A wire rope that breaks under high tension can suddenly whip back towards the winch, causing injury or product damage.**

**Be sure the operator knows the capacity of the wire rope and the winch.**



## WARNING

**Load loss hazard.**

**A loaded wire rope with fewer than three complete wraps on the drum could disengage from the ferrule pocket, causing load loss and possible injury.**

**Paint the last five wraps of wire rope a contrasting color to alert the operator that end of the wire rope has been reached.**

<b>Wire Rope Diameter in (mm)</b>	<b>Capacity for Full Drum Fill ft (m)</b>	<b>Capacity for 2/3 Drum Fill ft (m)</b>	<b>EIPS Maximum Rated Line Pull Lbs (N)</b>	<b>EEIPS Maximum Rated Line Pull Lbs (N)</b>
5/8 (16)	423 (129)	279 (85)	29,400 (130,700)	32,400 (144,100)
3/4 (19)	298 (91)	197 (60)	42,000 (186,800)	46,200 (205,500)
7/8 (22) <sup>4</sup>	215 (66)	142 (43)	56,800 (252,600)	62,500 (278,000)
<p><b>NOTE:</b></p> <ol style="list-style-type: none"> <li>Loosely or unevenly spooled line will reduce capacities.</li> <li>Use flexible wire rope with independent wire rope center.</li> <li>Ferule size: 2 inches diameter, 2 1/4 inches long.</li> <li>If your winch is equipped with the optional arch, the largest wire rope diameter approved for use is 3/4 inch.</li> </ol>				

Figure 2 Wire Rope Sizes and Capacities

## Wire Rope Reel

When the wire rope is transferred from a reel to the drum, or from the drum back onto a reel, it must go from “top to top” for overwind winches, or “bottom to bottom” for un-

derwind winches, as shown in Figure 3, to avoid putting a reverse bend into the wire rope.

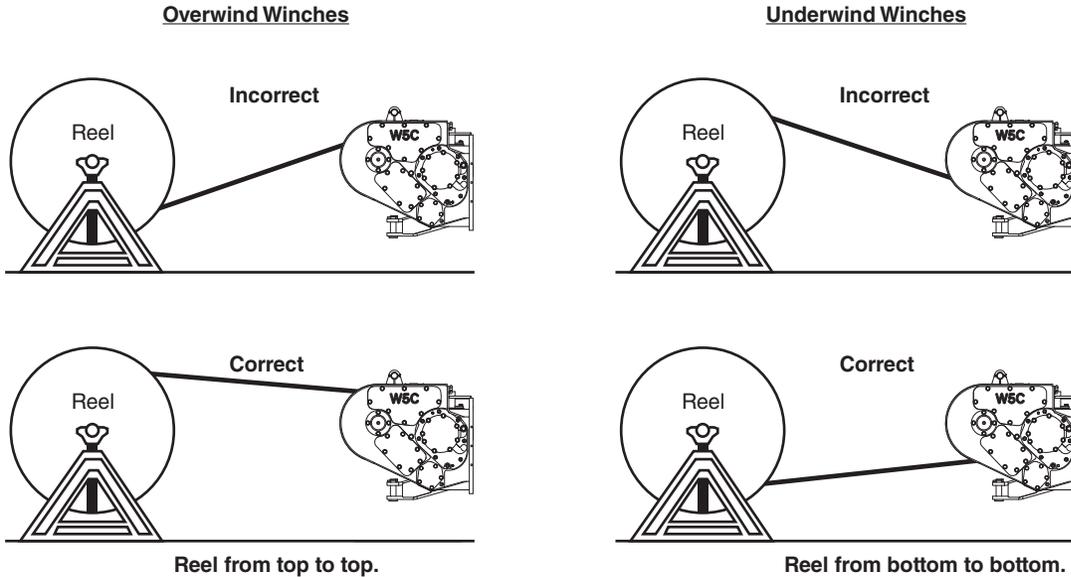


Figure 3 Transferring Wire Rope from or to Reel

## Wire Rope Installation



# WARNING

Gloves should be worn when working with or near wire rope to prevent cuts and abrasions.

**NOTE:** The illustrations in this section show a winch with an “overwind” configuration, which is standard. Some winches are configured for “underwind”, with the wire rope spooling onto the bottom of the drum instead of the top. The procedures for installation are the same.

Seat the ferrule on the drum end of the wire rope in the ferrule pocket in the drum. See Figure 4. Use the keeper and related hardware to secure the ferrule. Torque the capscrew to 28-29 ft-lbs.

Once the ferrule is properly secured in the pocket, the wire rope may be spooled slowly onto the drum. Apply enough tension to the wire rope as it is being spooled to ensure that it spools neatly and tightly on the drum.

Tension may be created by a variety of methods. The methods described here are not exclusive.

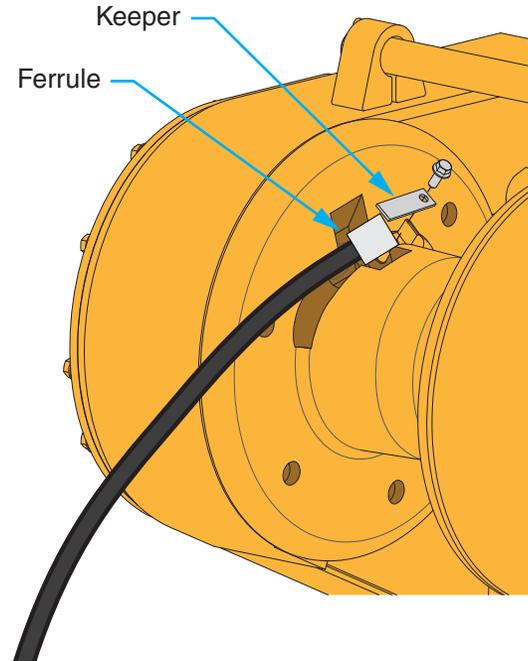


Figure 4 Secure Ferrule in Pocket with Keeper

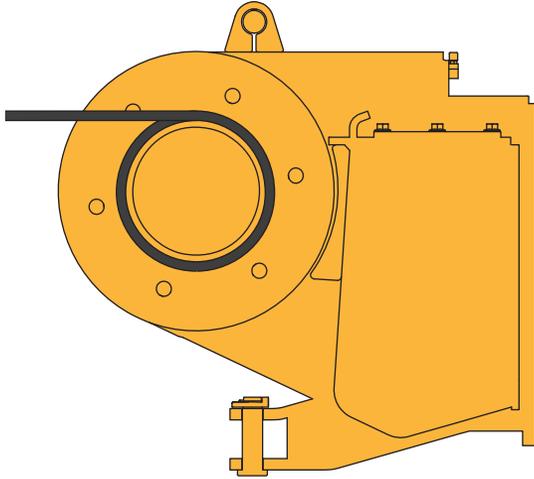
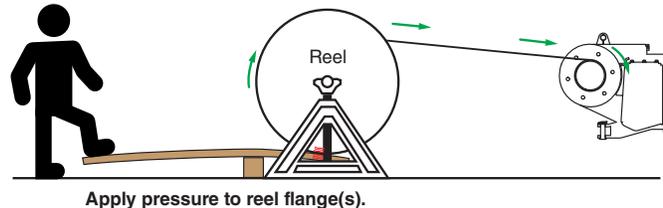


Figure 5 First Layer, Overwind Configuration

Another method is to use the tines of a forklift to bear against the reel flange(s). Again, the friction generated between the tines and the flange(s) will create tension in the wire rope.

Finally, the end of the wire rope may be fastened to a forklift. The forklift may be driven away from the winch drum as the wire rope is paid out, and the forklift operator may use the brake on the forklift to provide tension on wire rope as the wire rope is spooled back onto the winch drum. The movement of the forklift and the paying out or spooling back onto the winch drum shall be coordinated to prevent the wire rope from contacting the ground.

One method is to create a wooden plank lever, as shown in Figure 6 to apply pressure to the reel flange(s). The friction between the wooden plank and the reel flange(s) will create resistance to rotation of the reel, which will create tension in the wire rope as it is slowly spooled onto the winch drum.



Apply pressure to reel flange(s).

Figure 6 Create Tension

## Oil Capacity & Recommended Oil List

The oil capacity for W5C winch is 14.5 gallons (54.9 liters).  
The type of oil used in Allied winches affects the line

control. Use the following oils in the W5C winch:

<b>Recommended Oils* - General Conditions</b>			
<b>Manufacturer</b>	<b>Oil Type</b>	<b>Ambient Temperature Range</b>	
		<b>°F</b>	<b>°C</b>
ExxonMobil	Mobil Fluid 424 (Factory fill)	-13 to 105	-25 to 43
John Deere	Hy-Gard™	-13 to 122	-25 to 50
Chevron	1000 THF	-13 to 105	-25 to 43
Caterpillar	Multipurpose Tractor Oil (MTO)	-13 to 104	-25 to 40
Case	Hy-Tran Ultra	-20 to 122	-30 to 50
<b>Recommended Oils* - Low Temperature Conditions</b>			
<b>Manufacturer</b>	<b>Oil Type</b>	<b>Ambient Temperature Range</b>	
		<b>°F</b>	<b>°C</b>
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 a non-recommended oil may void warranty.			

Figure 7 Recommended Oil List

## W5C Winch Description

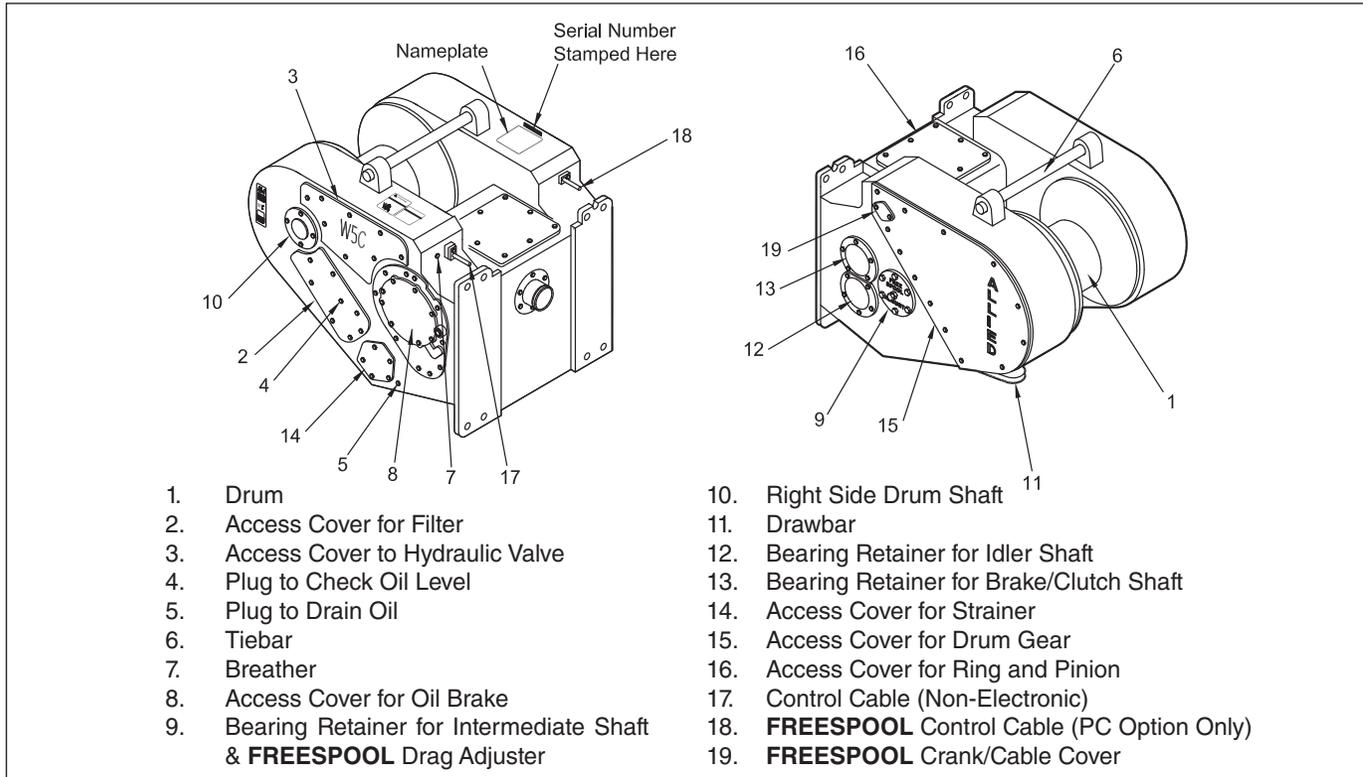


Figure 8 W5C Towing Winch

## Optional Equipment

The W5C winch may be equipped with the following options:

- integral arch
  - fairlead assembly
  - heavy-duty extended drawbar (not illustrated)
- alternate gear ratios
  - electronic controls
  - underwind

**NOTE: Not all optional equipment listed is available for each model of dozer.**

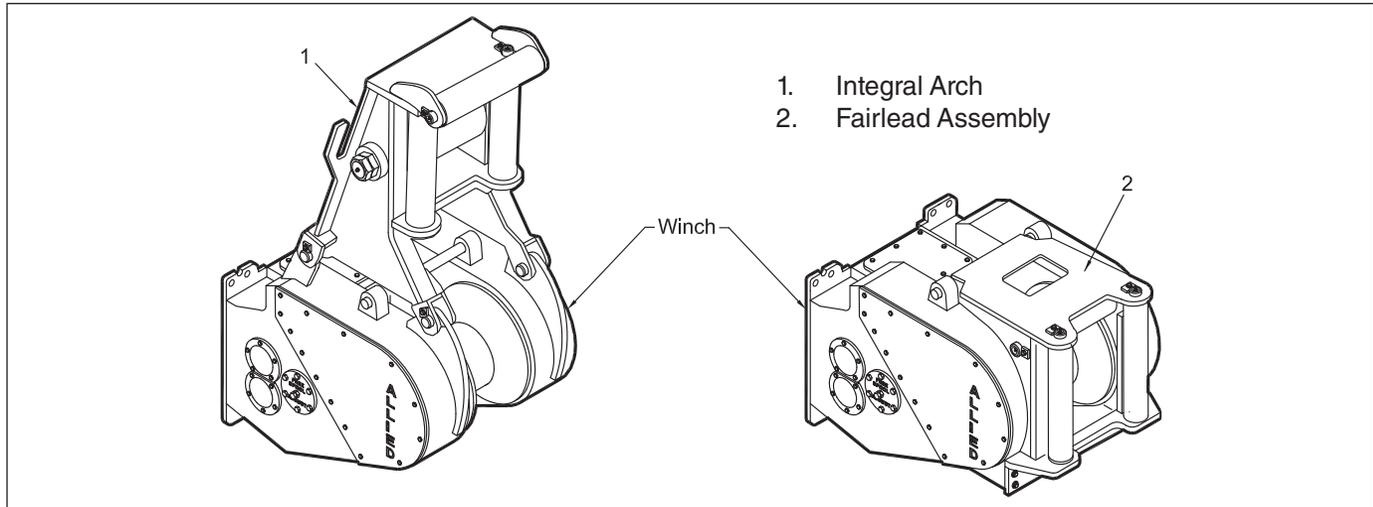
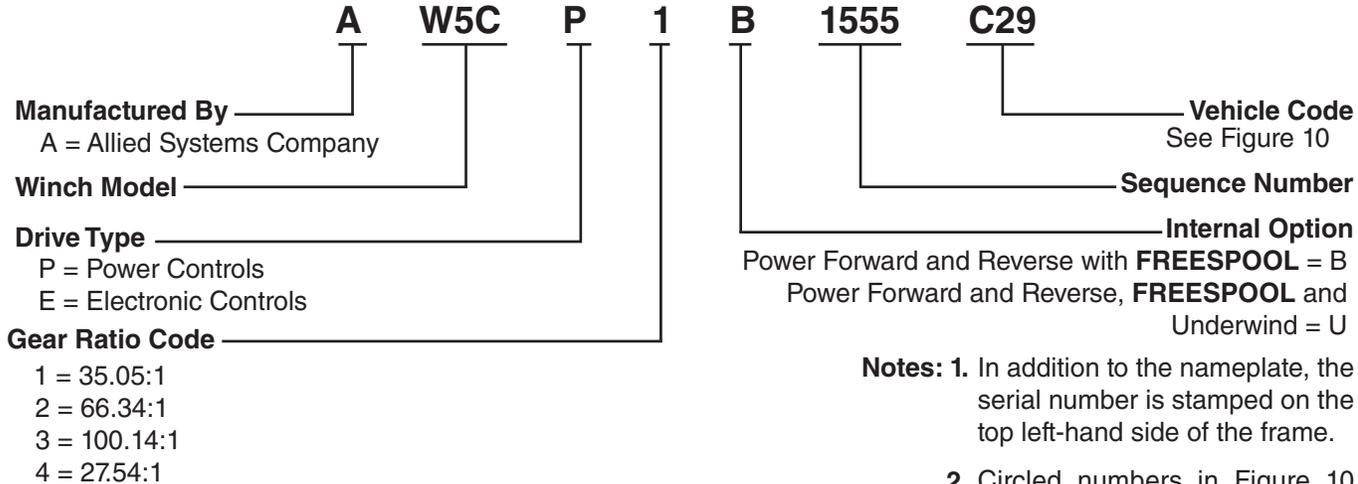


Figure 9 W5C Towing Winch Optional Equipment



## Serial Number Codes

The nameplate with the serial number code is found on the left front corner of the winch case. A serial number indicates the following information:



- Notes:**
1. In addition to the nameplate, the serial number is stamped on the top left-hand side of the frame.
  2. Circled numbers in Figure 10 indicate possible gear ratios.

Figure 10 Dozer or Skidder Identification Codes and Available Gear Ratios

Dozer Make Model and Starting Dozer Serial Number Where Applicable							
C O D E	A Fiat-Hitachi/ New Holland	C Caterpillar	E John Deere	H Dresser/ Dressta	K Komatsu	R Case*	V Ranger
27					D41E-6 ②③		
28		D5N* (Mechanical Dozer Controls) ②③					
29		D5M, D6M PS ②③					
31							H67C ④
35				TD12B/C ②③		1150D/E/G ②③	
36					D53, D58, D63 ②③	1150H ②③	

Dozer Make Model and Starting Dozer Serial Number Where Applicable							
C O D E	A Fiat-Hitachi/ New Holland	C Caterpillar	E John Deere	H Dresser/ Dressta	K Komatsu	R Case*	V Ranger
360		D4H Series I & II ②③					
37	New Holland DC130 ②③					1150K ②③	
370		D4H III, D5H PS, XL, LGP; 517 ②③					
371						1150M ②③	
38	New Holland DC150 PS ②③			TD14M ②③		1650K ②③	

(Continued on next page)

Dozer Make Model and Starting Dozer Serial Number Where Applicable							
C O D E	A	C	E	H	K	R	V
	Fiat-Hitachi/ New Holland	Caterpillar	John Deere	Dresser/ Dressta	Komatsu	Case*	Ranger
381		D6H/R W/ ESCO Grapple ②③					
39	Fiat/Hitachi FD/FL10E, FD/DX145 ②③		700J ②③				
390		Challenger 65 - 69 ②③					
391			700K ③				
392			700L ③				

(Continued on next page)

Dozer Make Model and Starting Dozer Serial Number Where Applicable							
C O D E	A Fiat-Hitachi/ New Holland	C Caterpillar	E John Deere	H Dresser/ Dressta	K Komatsu	R Case*	V Ranger
40	New Holland DC150 ②③		700H ②③			1650L ②③	
45			750C I & II ②③				
464			750K ③				
466			750L ③				
47		D6N* (Mechanical Dozer Controls) ②③			D61EX-12 ②③		

Dozer Make Model and Starting Dozer Serial Number Where Applicable							
C O D E	A	C	E	H	K	R	V
	Fiat-Hitachi/ New Holland	Caterpillar	John Deere	Dresser/ Dressta	Komatsu	Case*	Ranger
77		D5N** (Pilot Hydr. Dozer Controls) ②③					
78		D6N** (Pilot Hydr. Dozer Controls) ②③					
81		D6N*** (Diff-Steer after Sep. 2005) ②③					
810		D6N*** Tier 4i ②③					

(Continued on next page)



- \* Dozers (C28 & C47) with mechanical controls,
- \*\* Dozers (C77 & C78) with pilot hydraulic controls, and
- \*\*\* Dozers (C81 & C810) with pilot hydraulic controls were effective with the following dozer serial numbers:

Dozer Model	Dozer Serial Number	Dozer Code
D5N	AGG00000 to AGG01334	C28
	AKD00000 to AKD01134	
	AGG01335 and higher	C77
	AKD01135 and higher	

Dozer Model	Dozer Serial Number	Dozer Code
D6N	CBJ00000 to CBJ00399	C47
	ALH00000 to ALH00734	
	CCK00000 to CCK00499	
	ALR00000 to ALR00634	
	AKM00000 to AKM01234	
	ALY00000 to ALY01334	
	CBJ00400 and higher	C78
	ALH00735 and higher	
	CCK00500 and higher	
	ALR00635 and higher	
	AKM01235 to AKM01793	
	ALY01335 to ALY02065	
	AKM01794 and higher	C81
	ALY02066 and higher	
	Prefixes DJA, DJY, GHS, MLW & LJR	C810
	Prefixes PBA & PER	

## Operation, Power Controls

### Checks Before Operation

- Check the wire rope and hook for wear or damage. Check that the periodic inspection and maintenance have been done at the recommended operating hours. See Maintenance Schedule, Figure 20 on page 44 and 43.
- Check lever adjustment.

### Checks During Operation

- Check **FREESPOOL** drag adjustment if equipped.

The Troubleshooting Chart at the end of this section 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.

## Operating Procedures

The control lever assembly has two control levers and the operation is the same in all configurations. Both control levers are connected to the winch through control cables. The power control lever is connected to the spool in the control valve. This lever is used to select one of the following operations:

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

Except for the **BRAKE-OFF** position, the power control lever will return to the **BRAKE-ON** position when the control lever is released. A spring arrangement on the spool of the control valve returns the spool and control lever to the **BRAKE-ON** position. A ball and detent arrangement will hold the spool and control lever in the **BRAKE-OFF** position. The operator must pull the control lever from the **BRAKE-OFF** position.

The **BRAKE-ON** position 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.

The **BRAKE-OFF** position has a detent and is a neutral position for the clutches. Hydraulic pressure is applied to release the brake. The winch will not rotate easily because of friction in the clutches, brake and gear train. Wire rope cannot be pulled from the winch by hand. The **BRAKE-OFF** position is different from the **FREESPOOL** position where the drum is disengaged from the gear train. The **BRAKE-OFF** position is used when the operator has a load on the winch wire rope. The operator can move the dozer forward without moving the load and still keep the wire rope tight.

A second control lever engages and disengages a sliding sleeve to control the **FREESPOOL** operation. The **FREESPOOL** control lever has two positions: **NORMAL OPERATION** and **FREESPOOL**. The **FREESPOOL** control lever disengages the gear train so the wire rope can be pulled from the winch by hand.

A yellow rectangular box containing a black exclamation mark inside a triangle, followed by the word "CAUTION" in bold, black, sans-serif capital letters.

## CAUTION

**Engaging BRAKE-OFF or FREESPOOL with a suspended load on the wire rope will cause it to fall uncontrollably.**

# Operation, Power Controls

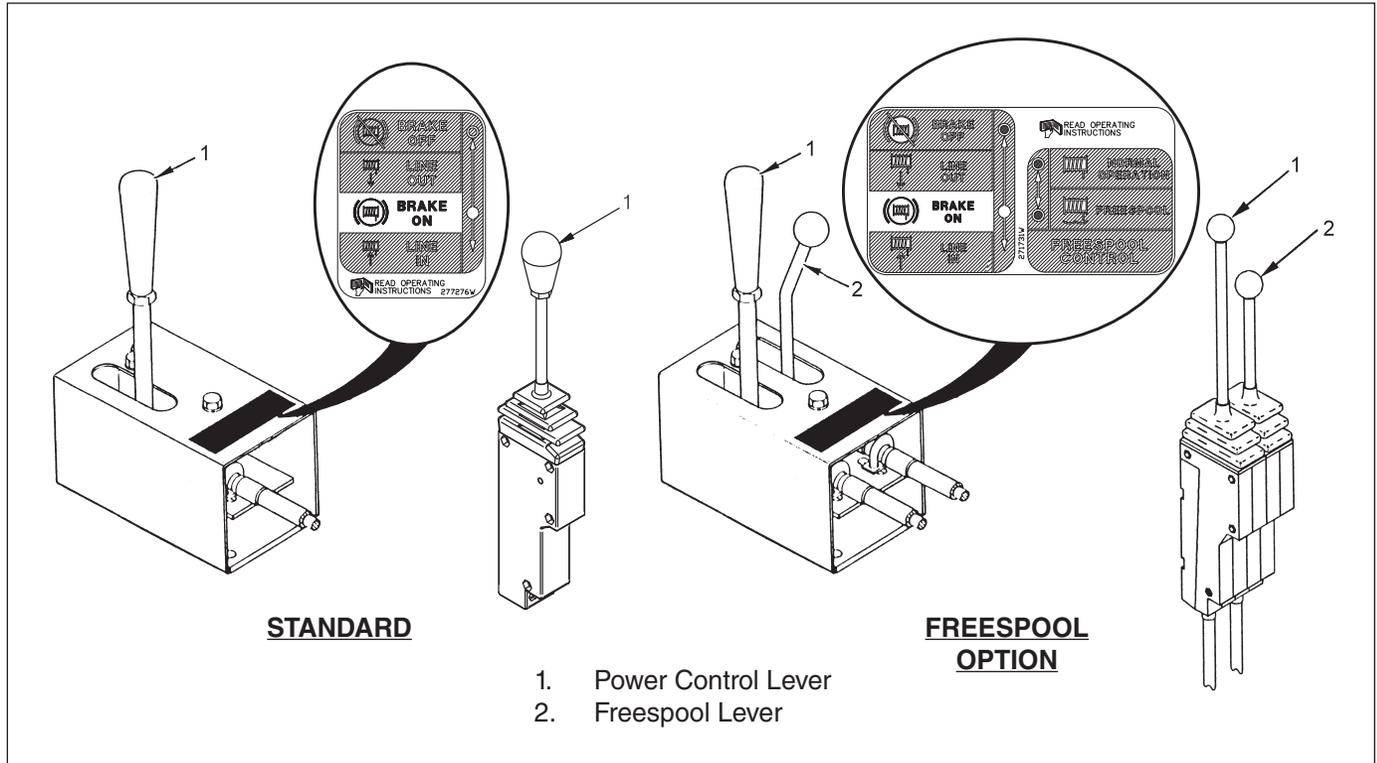
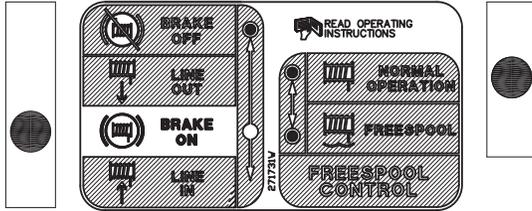
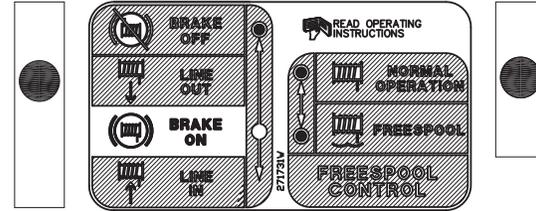


Figure 11 W5C Towing Winch Operator Controls

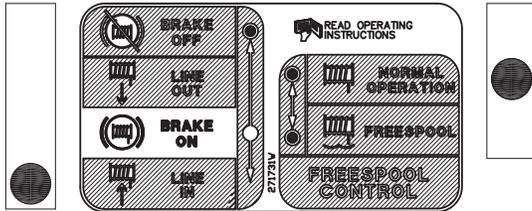
## Power Operation



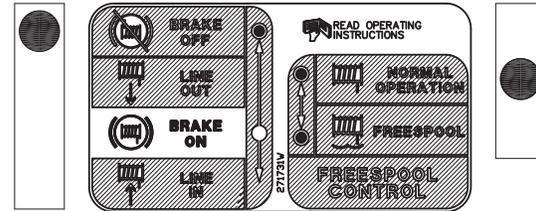
**BRAKE-ON** position is a neutral position. Neither clutch is applied. The brake is fully applied.



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



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

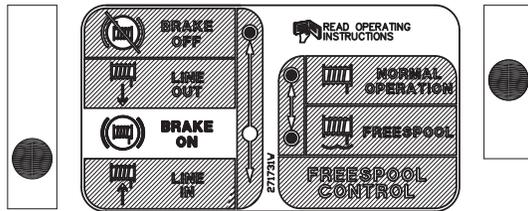


**BRAKE-OFF** position is a detent position. The clutches are released and the oil pressure has released the brake. This position will permit the wire rope to unwind from the winch against the friction of the clutches, brake, and gear train as the dozer moves away from the load.

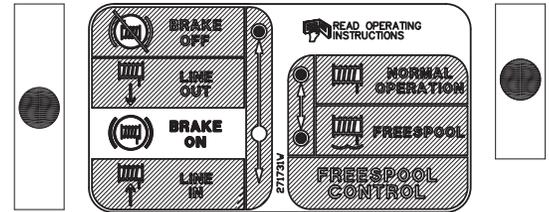
# Operation, Power Controls

**Inching** is used for a fine control of the winch speed. When the power control lever is slowly moved to a position between **BRAKE-ON** and **LINE-IN** or between **BRAKE-ON** and **LINE-OUT**, inching occurs. The normal adjustment of inching for **LINE-IN** is different from the adjustment for **LINE-OUT**. These adjustments can be modified by changing the overlap pressures of the modulator valves. This change is necessary for some customer operations. The following paragraphs describe the normal adjustments for inching.

**NOTE: Inching will accelerate clutch and brake wear, and cause winch overheating. Inching for more than a few seconds should be followed by several minutes of cooling recovery. Operate the PTO at a minimum of 1000 RPM to provide adequate cooling flow.**



**Inching (LINE-IN).** This operation is used to slowly move a load toward the dozer. The control valve will cause the oil pressure to slowly release the brake and slowly apply the **LINE-IN** 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 before the **LINE-OUT** clutch is applied. This adjustment permits the weight of the load 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 power control lever. The **LINE-OUT** clutch is not applied until the operator moves the power control lever more toward the **LINE-OUT** position. When the power control lever is moved so that the **LINE-OUT** clutch is engaged, the speed that the drum unwinds is controlled by the rpm of the dozer PTO.

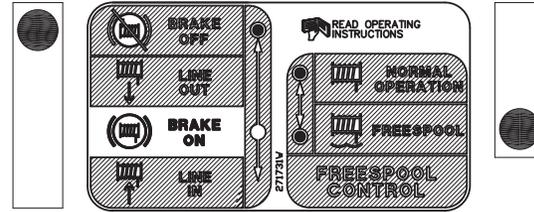
## FREESPOOL Operation

### **WARNING**

The control lever normally cannot be moved to the **FREESPOOL** position if there is a load on the wire rope. If enough force is used to disengage the gear train for the **FREESPOOL** operation, an uncontrolled release of the load will occur. Loss of the load can result in injury and damage.

The power control lever must be in the **BRAKE-ON** or **BRAKE-OFF** positions to operate the **FREESPOOL** control lever. When the **FREESPOOL** control lever is moved to the **FREESPOOL** position, the winch drum is disengaged from the gear train. The **FREESPOOL** operation permits the wire rope to be pulled from the winch drum by hand.

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 sliding sleeve so that the intermediate gear can be engaged.



### FREESPOOL Drag Adjustment

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 the drum will not rotate more than one-half revolution freely.

An adjusting screw is located in the center of the bearing retainer for the intermediate shaft (see Figure 12). This screw can be tightened or loosened to adjust the preload on the intermediate shaft. The jam nut will maintain the **FREESPOOL** setting.

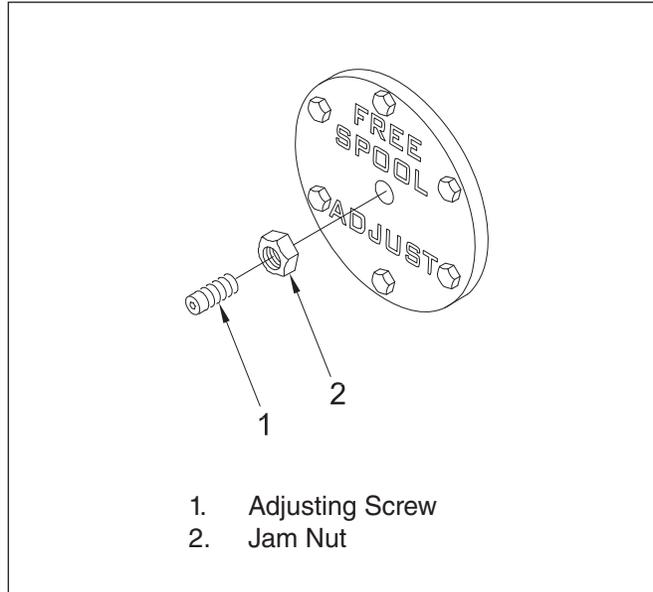


Figure 12 FREESPOOL Adjustments

## CAUTION

Setting the preload on the intermediate shaft too tight will cause bearing overload. Setting the preload too loose will allow shaft to not be parallel. Use caution when adjusting. Determine the correct preload by starting with the preload too loose, and gradually increase the preload until the correct resistance to rotation is achieved (see Page 24). Increase the preload by turning the adjusting screw by a maximum of 1/6 rotation (60 degrees), and striking the housing with a hammer to make sure the bearing is sliding. Check resistance to rotation after each adjustment.

Figure 13 Troubleshooting Analysis Chart (Continued on next page)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Operation is rough or irregular.	Hydraulic oil is too cold.	Put the control lever in the <b>BRAKE-OFF</b> 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 the Service Manual for additional troubleshooting.
	Wrong oil.	Drain oil and replace with correct grade. Refer to the approved oil list.
	Control cables need adjustment.	Check for correct adjustment. Make sure the ends of the cables are fastened correctly.
Hydraulic oil becomes too hot.	Winch is operated in the <b>BRAKE-OFF</b> position for long periods.	Use the <b>BRAKE-OFF</b> position less. When the <b>BRAKE-OFF</b> position is used, the hydraulic oil flows continuously through the relief valve. See the Service Manual for additional troubleshooting.
	Winch is inched too much.	Use engine speed to control load.
	Low oil level.	Add oil.
	Clogged suction strainer/pressure filter.	Check and clean or replace the suction strainer/pressure filter.
	Defective or improperly adjusted oil relief valve.	See the Service Manual for additional troubleshooting.

# Operation, Power Controls

Figure 13 Troubleshooting Analysis Chart

PROBLEM	POSSIBLE CAUSE	CORRECTION
Brake begins to release before clutch is applied.	Brake is worn or needs adjustment.	See the Service Manual for additional troubleshooting.
	Pressure modulator needs repair or adjustment.	
Winch brake does not apply or release correctly.	Brake is worn or needs adjustment.	See the Service Manual for additional troubleshooting.
	Low oil pressure.	
Clutch does not apply correctly.	Worn or damaged clutch.	See the Service Manual for additional troubleshooting, checks and adjustments.
	Control valve or control cable needs adjustment.	
	Low oil pressure.	
Clutch does not apply correctly at low PTO rpm	Accumulator not charged.	Check accumulator.
	PTO stalled (0 rpm).	Increase dozer rpm.
<b>FREESPOOL</b> does not operate correctly.		See the Service Manual for additional troubleshooting, checks and adjustments.
Winch engine stops during shift when engine speed is low.	Not enough engine torque.	Increase engine rpm.
	Low accumulator pressure.	See the Service Manual for additional troubleshooting, checks and adjustments.



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## Operation, Electronic Controls

### Checks Before Operation

- Check the wire rope and hook for wear or damage.
- Check that the periodic inspection and maintenance have been done at the recommended operating hours. (See Maintenance Schedule, Figure 20 on page 44.)
- Turn activation switch ON, and check the winch indication light:
  - Light on means filter plugged or oil cold;
  - Light fast blink (1/2 second on and 1 second off) means system fault;
  - Light slow blink (3 second on and 3 second off) means controls not active.

**Note: The winch oil should be warm (approximately 80°F) prior to operating a winch with a suspended load.**

### Checks During Operation

- Check the winch indication light:
  - Light steady on after oil warmup means some problem(s).

The Troubleshooting Chart (Figure 18 on page 38) can be used by the operator to identify a problem with the winch operation. Check light for trouble codes if the chart does not cover the problem. A trained service person is needed for additional troubleshooting and repair that requires disassembly of parts of the winch.

- Check **FREESPOOL** drag adjustment if equipped.



## Operating Procedures

The electronic control assembly has one control lever. The control lever is connected to the winch through electrical wiring, an electronic control module, a solenoid actuated control valve, and an activation switch. The activation switch is a locking rocker switch installed near the control lever. When the activation switch is in the OFF position, the control lever is disabled. This prevents inadvertent winch operation if the control lever is bumped. The activation switch should be in the OFF position unless the winch is being used. This control lever is used to select one of the following operations:

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

Except for the **BRAKE-OFF** and **FREESPOOL** positions, the control lever will return to the **BRAKE-ON** position when it is released. A collar and spring arrangement on the control lever returns it from the **LINE-IN** and **LINE-OUT** positions to the **BRAKE-ON** position. The operator

must pull the control lever from the **BRAKE-OFF** or **FREESPOOL** position.

The **BRAKE-ON** position 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.

The **BRAKE-OFF** position has a detent and is a neutral position for the clutches. Hydraulic pressure is applied to release the brake. The winch will not rotate easily because of friction in the clutches, brake and gear train. Wire rope cannot be pulled from the winch by hand. The **BRAKE-OFF** position is different from the **FREESPOOL** position where the drum is disengaged from the gear train. The **BRAKE-OFF** position is used when the operator has a load on the winch wire rope. The operator can move the dozer forward without moving the load and still keep the wire rope tight.

**NOTE: The filter LED illuminates briefly at startup. This is part of the normal system check. Consult the troubleshooting guide (see Figure 18 on page 38) if the light does not turn off.**

**NOTE: The winch will not operate until control lever is centered after startup.**

## WARNING

Moving the control lever with the engine OFF and the keyswitch ON may result in accumulator discharge and brake release which will cause loss of load.

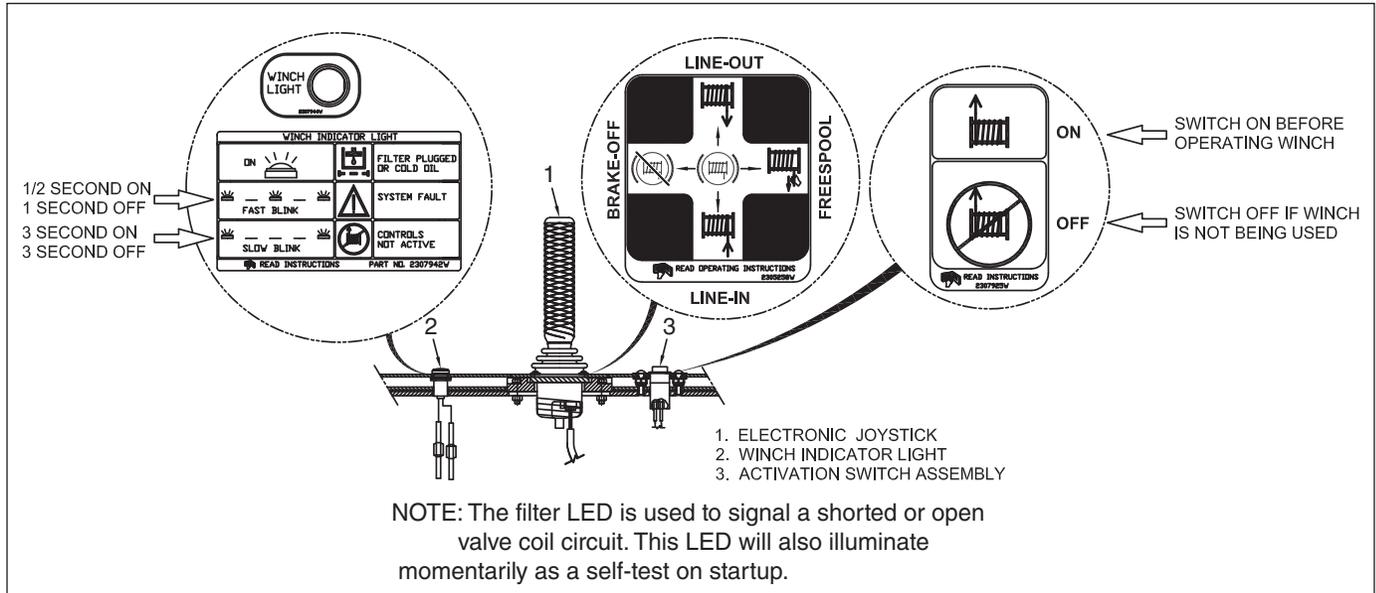
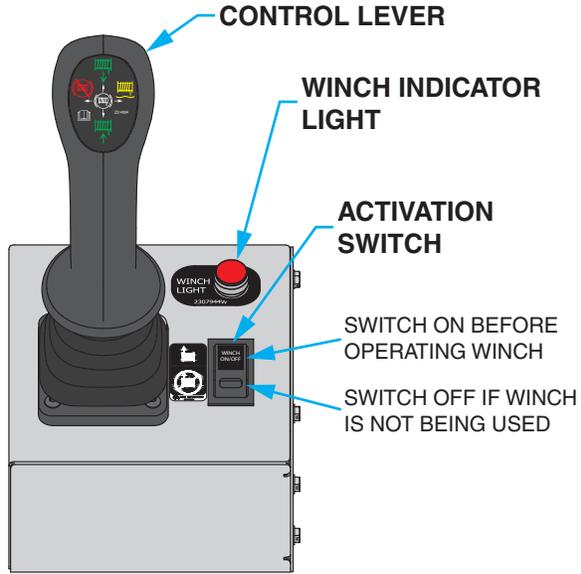
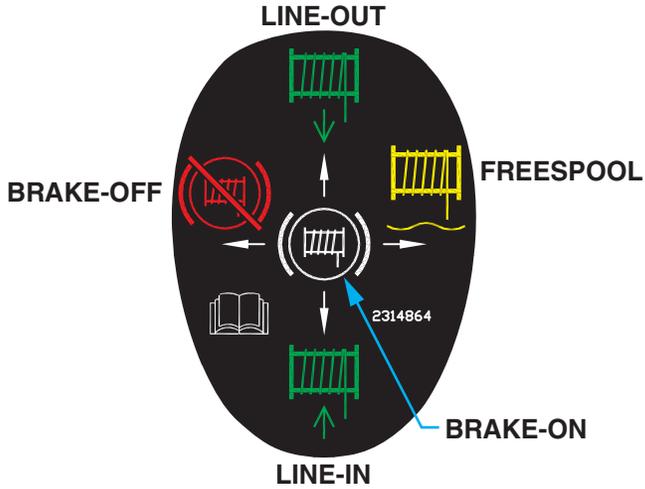


Figure 14 W5C Towing Winch Operator Electronic Controls (Old Style)



**WARNING**

Moving the control lever with the engine OFF and the keyswitch ON may result in accumulator discharge and brake release which will cause loss of load.

Figure 15 W5C Towing Winch Operator Electronic Controls (New Style)

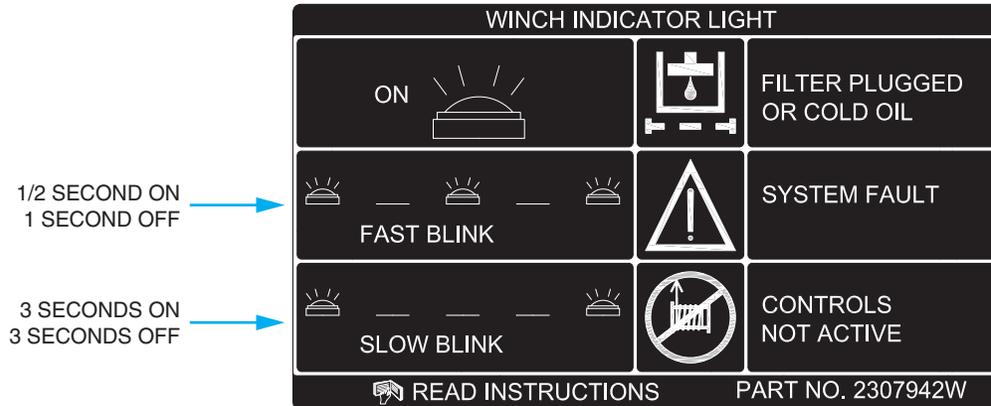
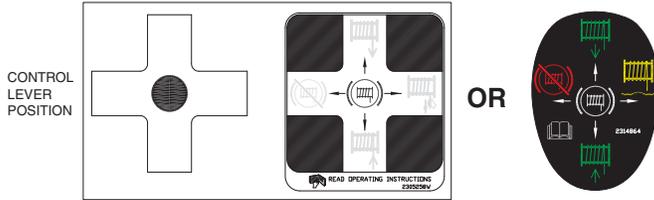
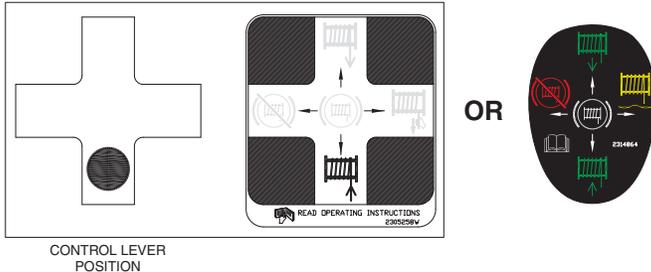


Figure 16 Winch Indicator Light Blink Codes

## Power Operation

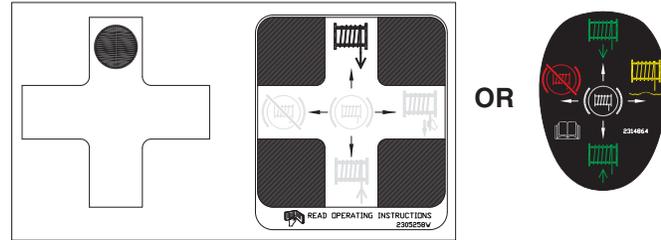


**BRAKE-ON** is a neutral position. Neither clutch is applied. The brake is fully applied.

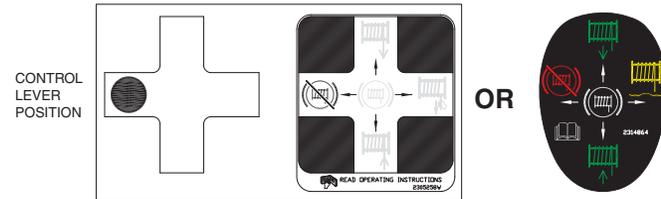


**LINE-IN** position applies the forward clutch and releases the brake. The winch will wind the wire rope at a speed controlled by the PTO rpm of the dozer.

## CONTROL LEVER POSITION



**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 rpm of the dozer and the weight of the load.

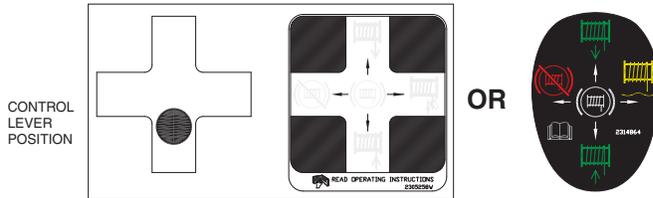


**BRAKE-OFF** is a detent position. Oil pressure has released the brake but the wire rope cannot be pulled by hand from the winch because of friction in the clutches, brake and gear train. **BRAKE-OFF** is used to move the dozer away from the load while keeping the wire rope tight.

# Operation, Electronic Controls

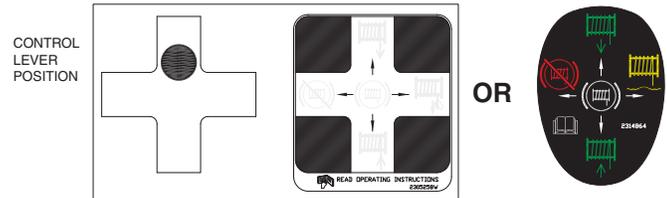
**Inching** is used for fine control of the winch speed. When the power control lever is slowly moved to a position between **BRAKE-ON** and **LINE-IN** or between **BRAKE-ON** and **LINE-OUT**, inching occurs. Any adjustments require computer program changes and may be necessary for some customer operations. Contact Allied Systems Company if inching needs adjustment. The following paragraphs describe the normal procedures for inching.

**NOTE: Inching will accelerate clutch and brake wear, and cause winch overheating. Inching for more than a few seconds should be followed by several minutes of cooling recovery. Operate the PTO at a minimum of 1000 RPM to provide adequate cooling flow.**

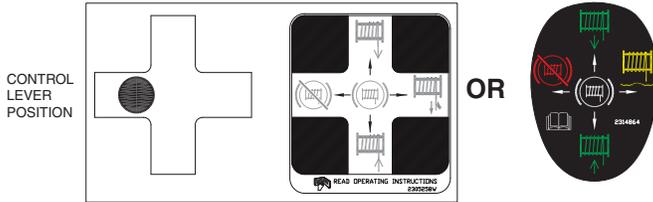


**Inching (LINE-IN).** This operation is used to slowly move a load toward the dozer. The control valve will cause the

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 before 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 reverse clutch is completely applied when the operator moves the power control lever into the **LINE-OUT** position. When the power control lever is moved so that the reverse clutch is engaged, the speed that the drum unwinds is controlled by the rpm of the dozer PTO.



**Inching (BRAKE-OFF).** This operation is used to partially release a load. For example, when an operator wants to maintain the position of a load while climbing a slippery slope, partial brake off will allow the load to remain stationary as the dozer climbs the hill. Brake pressure increases proportionally as the control lever moves toward the fully engaged (detented) brake off position, allowing controlled slipping of the brake.

## ! WARNING

**BRAKE-OFF inching is not intended for heavy suspended loads, as unintended load fallback can occur.**

## FREESPOOL Operation

### ! WARNING

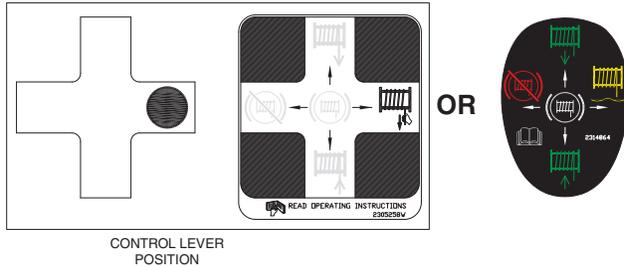
**Moving the lever into FREESPOOL while there is a load on the wire rope will cause sudden loss of load which can result in injury and damage.**

When the control lever is moved to the **FREESPOOL** position, hydraulic pressure moves the **FREESPOOL** shift collar and releases brake. The **FREESPOOL** operation permits the wire rope to be pulled from the winch drum by hand. The drum may rotate a small amount after the lever is returned to the **BRAKE-ON** position.

**Do not** move the lever from **FREESPOOL** to **LINE-IN** with a moving load attached to the wire rope.

## FREESPOOL Drag Adjustment

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 the drum will not rotate more than one-half revolution freely.



An adjusting screw is located in the center of the bearing retainer for the intermediate shaft; please refer to Figure 17. This screw can be tightened or loosened to adjust the preload on the intermediate shaft. The jam nut will maintain the **FREESPOOL** setting.

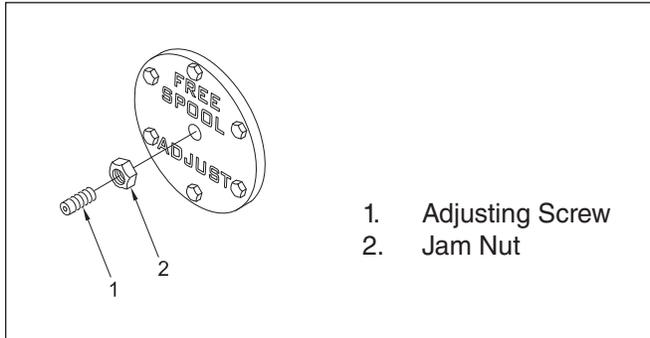


Figure 17 FREESPOOL Adjustments

## CAUTION

Setting the preload on the intermediate shaft too tight will cause bearing overload. Setting the preload too loose will allow shaft to not be parallel. Use caution when adjusting. Determine the correct preload by starting with the preload too loose, and gradually increase the preload until the correct resistance to rotation is achieved (see Page 34). Increase the preload by turning the adjusting screw by a maximum of 1/6 rotation (60 degrees), and striking the housing with a hammer to make sure the bearing is sliding. Check resistance to rotation after each adjustment.

Figure 18 Troubleshooting Analysis Chart (Continued on next page)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Operation is rough or irregular.	Hydraulic oil is too cold.	Put the control lever in the <b>BRAKE-OFF</b> 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 the Service Manual for additional troubleshooting.
	Wrong oil.	Drain oil and replace with correct grade. Refer to Figure 7, Recommended Oil List.
Hydraulic oil becomes too hot.	Winch is operated in the <b>BRAKE-OFF</b> position for long periods.	Use the <b>BRAKE-OFF</b> position less. When the <b>BRAKE-OFF</b> position is used, the hydraulic oil flows continuously through the relief valve. See the Service Manual for additional troubleshooting.
	Low oil level.	Add oil.
	Clogged suction strainer/pressure filter.	Check and clean or replace the suction strainer/pressure filter.
	Clutches are dragging.	Check the clutch pressure.
	Defective or improperly adjusted oil relief valve.	See the Service Manual for additional troubleshooting.

# Operation, Electronic Controls

Figure 16 Troubleshooting Analysis Chart (Continued...)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Brake begins to release before clutch is applied.	Brake is worn.	See the Service Manual for additional troubleshooting.
Winch brake does not apply or release correctly.	Brake is worn.	See the Service Manual for additional troubleshooting.
	Low oil pressure.	
Clutch does not apply correctly.	Worn or damaged clutch.	See the Service Manual for additional troubleshooting, checks and adjustments.
	Control valve failure.	
	Low oil pressure.	
Clutch does not apply correctly at low PTO rpm.	Accumulator not charged.	Check accumulator.
	PTO stalled (0 rpm).	Increase dozer rpm.
Filter LED illuminated.	Filter is clogged.	Change filter and oil
	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 appropriate section of wiring harness.

Figure 16 Troubleshooting Analysis Chart (Continued...)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Filter light blinking.	Control module fault or controls not activated.	Check Service Manual.
<b>FREESPOOL</b> does not operate correctly.		See the Service Manual for additional troubleshooting, checks and adjustments.
Winch will not freespool.	Inadequate freespool piston pressure.	Inspect <b>FREESPOOL</b> shaft o-rings and replace as necessary. Tighten loose fittings.
Winch will not re-engage after being in <b>FREESPOOL</b> .	Broken return spring.	Replace spring.
Control lever does not return to <b>BRAKE-ON</b> when released.	Defective return spring, worn detent parts, or lubricant evacuation.	See the Service Manual for additional troubleshooting.
	Control lever is in detented position ( <b>BRAKE-OFF</b> or <b>FREESPOOL</b> ).	Move Control lever out of detent.
Winch stalls dozer engine during winch shift when dozer RPM is low.	Not enough engine torque.	Increase engine rpm.
	Low accumulator pressure.	See the Service Manual for additional troubleshooting, checks and adjustments.

# Operation, Electronic Controls

Figure 16 Troubleshooting Analysis Chart (Continued...)

Winch will not operate in any function.	Control lever off-center at startup.	Return Control lever to <b>BRAKE-ON</b> position and attempt function again.
	Control module not powered.	Check fuse & replace if necessary.
	Control lever DC-DC converter malfunction.	Check fuse & replace if necessary.
	Control module fault.	Check status indicator on module. Red LED should <u>not</u> be illuminated. If it is, consult factory.
	Coil open or shorted.	Check module output LEDs. Flashing LED indicates open or shorted circuit. Check wiring harness continuity. Replace faulty coil. <b>Note: A working coil will have 15 to 50Ω resistance and will be magnetized when energized.</b>
	Cartridge valve plugged.	Replace cartridge if pressure at appropriate gage port is not close to relief pressure with coil energized.
	Loose or worn connector.	Check and replace as needed.
	Relief pressure not being reached.	Check cooling coil & cartridge—replace faulty parts.
	Activation switch off.	Check the switch and turn it on.

Figure 16 Troubleshooting Analysis Chart

PROBLEM	POSSIBLE CAUSE	CORRECTION
Noisy buzz emanating from winch.	Air in relief cartridge.	This is not a detrimental condition. Noise may be intermittent.
Control lever will not detent in <b>BRAKE-OFF</b> or <b>FREESPOOL</b> .	Detent pin, plate, or spring worn or broken.	Replace appropriate parts. <b>Note:</b> see procedure for Control lever disassembly and reassembly in Service Manual. Lubricate detent plate with bearing grease.
Winch does not engage and dozer engine draws down in <b>LINE-IN</b> or <b>LINE-OUT</b> .	Plugged brake cartridge.	Replace cartridge.
	Faulty brake coil.	Replace coil.
	Open or shorted brake circuit.	Check wiring harness. See “winch will not operate...” above.
Winch does not engage and/or load rolls out in <b>LINE-IN</b> or <b>LINE-OUT</b> .	Plugged <b>LINE-IN</b> or <b>LINE-OUT</b> cartridge.	Replace cartridge.
	Faulty <b>LINE-IN</b> or <b>LINE-OUT</b> coil.	Replace coil.
	Open or shorted <b>LINE-IN/LINE-OUT</b> circuit.	Check wiring harness. See “winch will not operate...” above.

## Maintenance

The Maintenance Schedule is a program that includes periodic inspection and lubrication. Use the operating time

on the hour meter of the dozer to find the maintenance time for the winch.

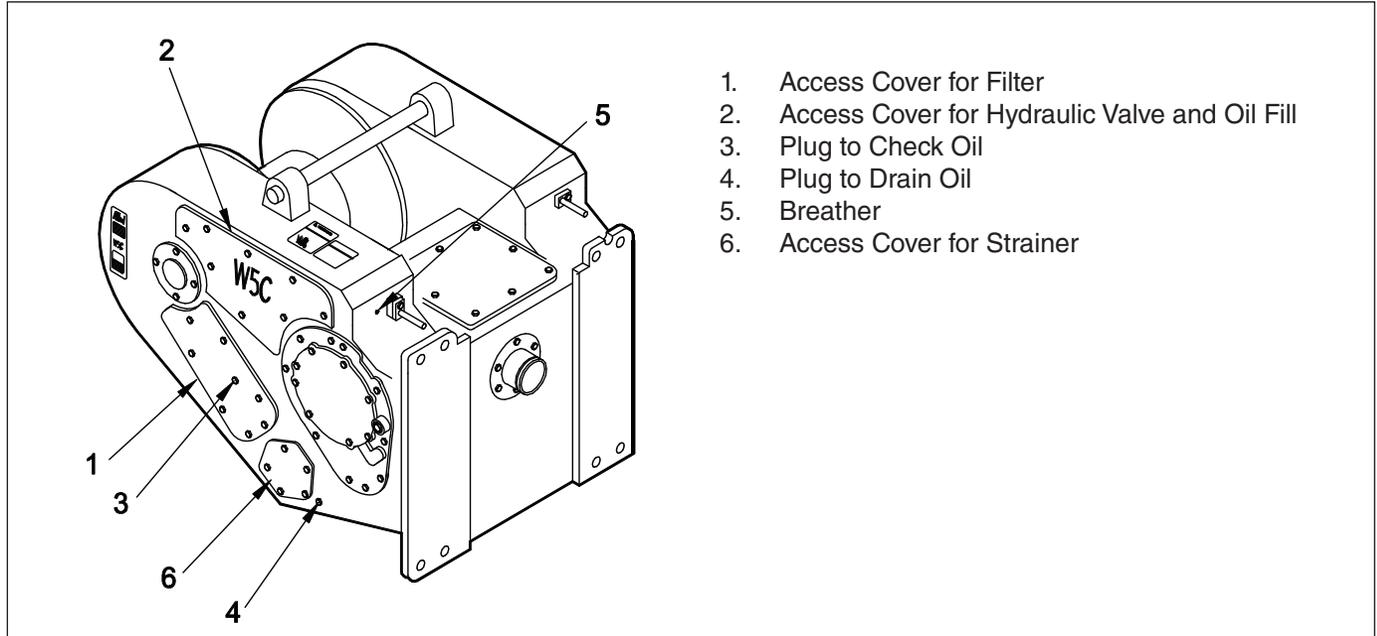


Figure 19 W5C Winch Maintenance Points

INTERVAL	PROCEDURE OR QUANTITY	SPECIFICATION
50 hours or weekly*.	Check oil level at plug (item 2). Add oil as necessary. <b>Do not operate the dozer when checking the oil level.</b>	See Figure 7 – Recommended Oil List.
	Lubricate the winch control lever and the <b>FREESPOOL</b> control lever.	Use SAE 30 oil on the linkage as needed. Check that the control cable and control housing are fastened correctly.
	Check winch control lever.	Refer to Adjusting control lever Detent Force in service manual.
	Clean the breather.	Remove debris around breather. Clean the breather with solvent if necessary.
	Lubricate the rollers on the integral arch or the fairlead assembly if the winch is equipped with this option.	Use multi-purpose grease with 2-4% molybdenum disulfide.
250 hours or monthly	There may be a gear box fastened to the front of the winch which has a separate oil reservoir. If this gear box lowers the Input shaft of the winch, then the oil level in this gear box must be checked and filled independently of the main winch.	Fill to proper level if low. If oil level cannot be checked, add 1/2 quart. See Figure 21 for details.
500 hours or every 3 months.	Clean the oil suction screen and magnets.*	Tilt the dozer approximately 15° to prevent loss of oil when the cover is removed.
	Clean the breather.	Clean the breather with solvent.
	Check oil filter light, if continuously illuminated with winch warm, replace the filter.	Replace the filter.* -- Electronic Controls.

Figure 20 Maintenance Schedule

INTERVAL	PROCEDURE OR QUANTITY	SPECIFICATION
1000 hours or every 6 months.	Change the hydraulic oil. Drain oil from plug (item 4). Clean the oil strainer. Add 14.5 gallons (54.9 liters) <sup>†</sup> through cover plug (item 2). Check the oil level at item 3.	See Figure 7 – 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 dozer.		

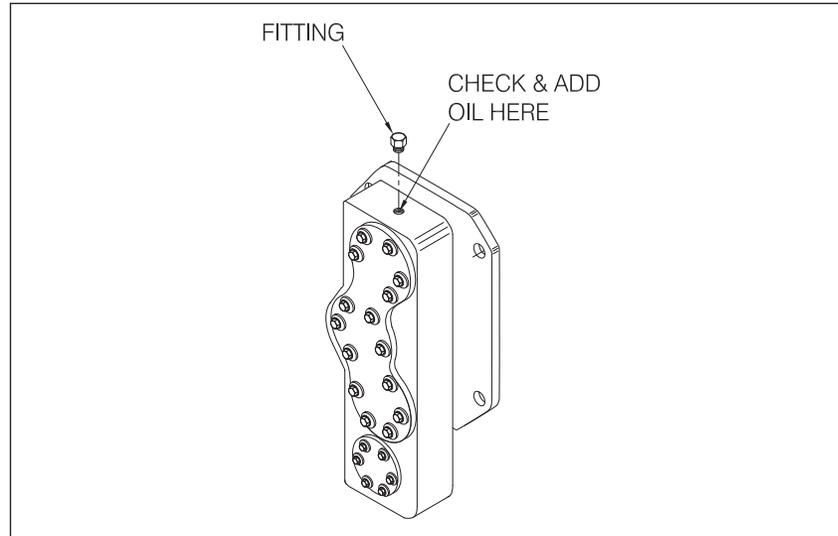


Figure 21 Oil Checking & Adding Point

## Operator Control Adjustment

There are three configurations of operator controls normally used on the W5C winch. Two configurations have cable controls and the third is electronic. **The electronic configuration does not require periodic adjustment.**

Adjustments of the cable control configurations are described in the following paragraphs. 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 DETENT position. **Make sure the control lever does not hit the housing at either end of its travel.**

**A.** See Figure 22. Make sure the positions of the power control lever (Item 2) are the same as the position indicators on the control housing. Remove the two capscrews and raise the cover. Loosen the U-bolt (Item 4) that holds the power control cable (Item 5) in the housing to adjust the control lever.

Check that the position of the **FREESPOOL** lever (Item 1) is the same as the position indicators on the control housing. Loosen the U-Bolt (Item 4) that holds the freespool control cable (Item 3) in the housing to adjust

the control lever. The linkage and cable must be adjusted so that the **FREESPOOL** shifter mechanism will slide the drum pinion gear to both positions. Both positions have a detent. Install the cover when the adjustments are complete.

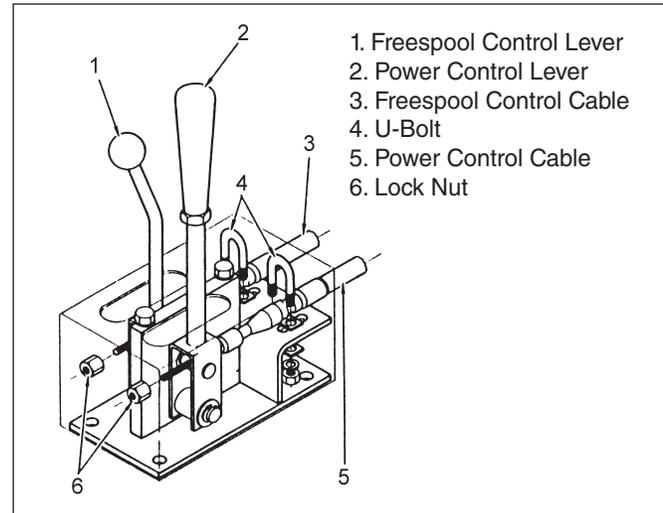


Figure 22 Control Cable Adjustments

**B.** See Figure 23. Make sure the positions of the power control lever are the same as the position indicators on the decal. Remove the access cover (Item 1) on the housing to make adjustments. Loosen the jam nut (Item 8) that keeps the tall nut (Item 3) from turning. Remove the cotter pin and link pin (Item 5) from the clevis (Item 2). Turn the tall nut and clevis to adjust the length of the control cable (Item 5). Use the link pin and cotter pin to connect the clevis to the control handle again and check the operation. When the adjustment is complete, tighten the jam nut and install the access cover.

Check that the positions of the **FREESPOOL** lever are the same as the position indicators on the decal. Remove the access cover on the housing. Loosen the nut that keeps the tall nut from turning. Remove the cotter pin and link pin from the clevis. Turn the tall nut and clevis to adjust the length of the control cable. Use the link pin and cotter pin to connect the clevis to the control handle again and check the operation. The linkage and cable must be adjusted so that the **FREESPOOL** shifter mechanism will slide the drum pinion gear to both positions. Both positions have a detent. When the adjustment is complete, tighten the jam nut and install the cover.

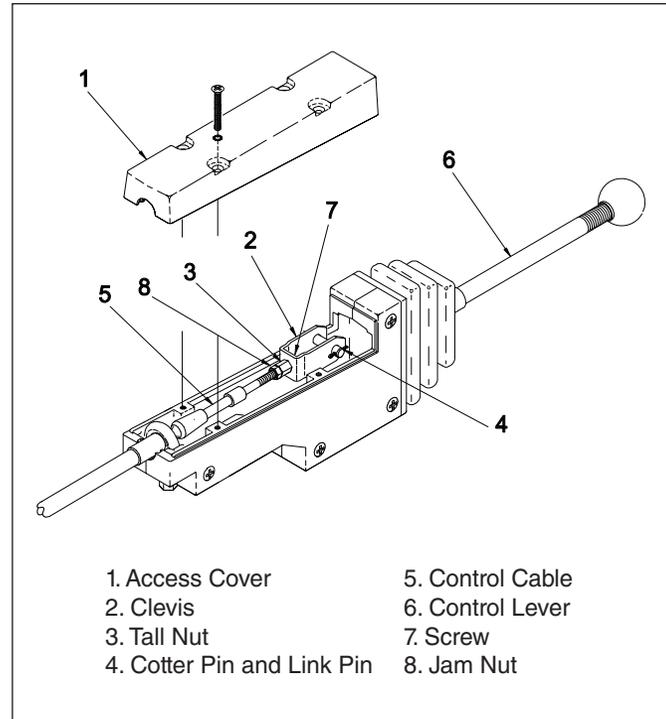


Figure 23 Control Cable Adjustments



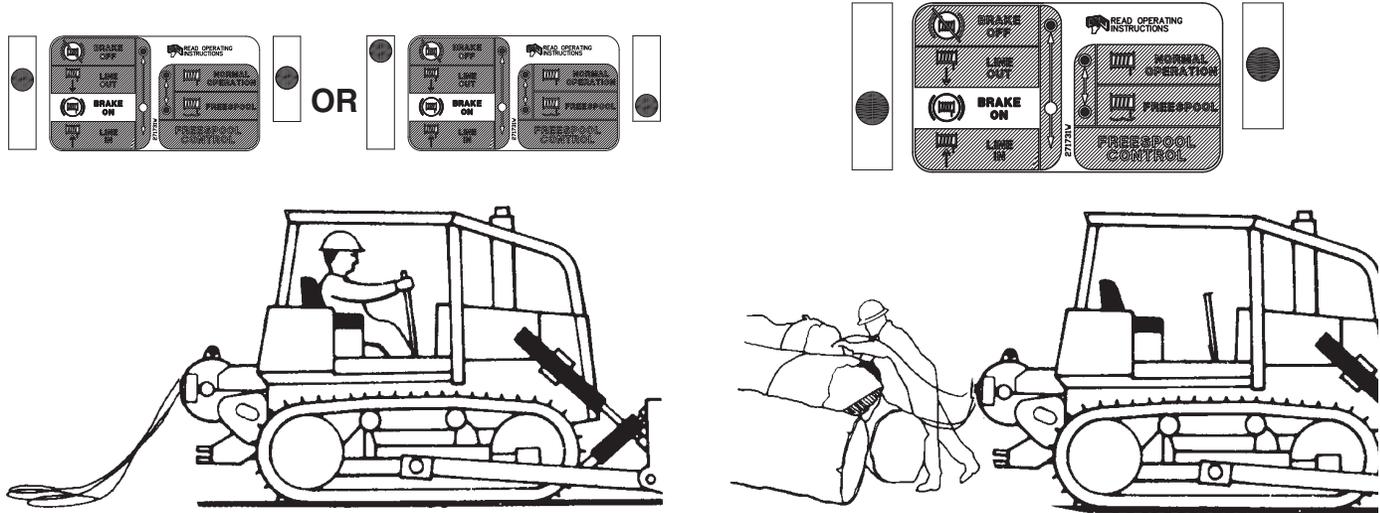
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# Operating Techniques, Power Controls

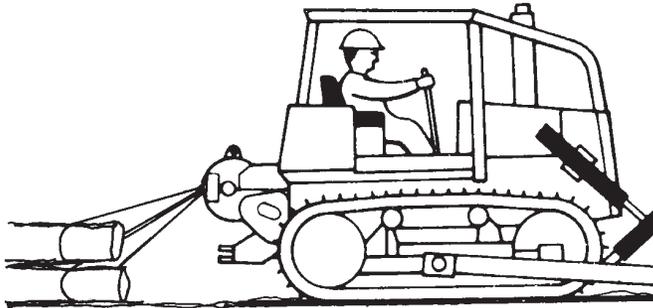
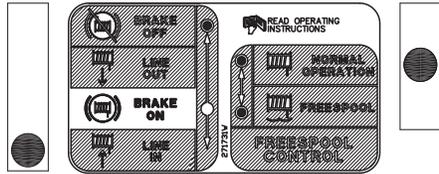
## Operating Techniques, Power Controls

### Dozer or Skidder Operation

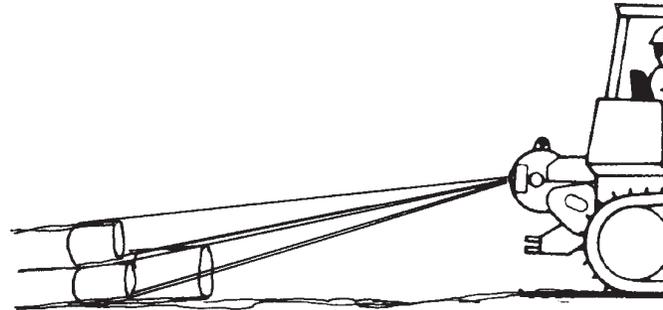
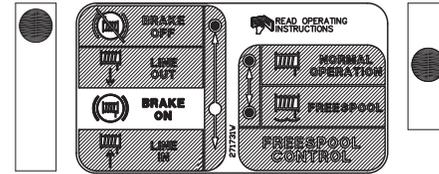


**Step 1.** The dozer or skidder is moved to an area where a load will be connected. The operator moves the control lever to the **LINE-OUT** or the **FREESPOOL** control lever into **FREESPOOL** position so that the wire rope can be pulled from the winch drum.

**Step 2.** A load (logs) is connected to the wire rope. The operator moves the **FREESPOOL** control lever to the **NORMAL OPERATION** position.

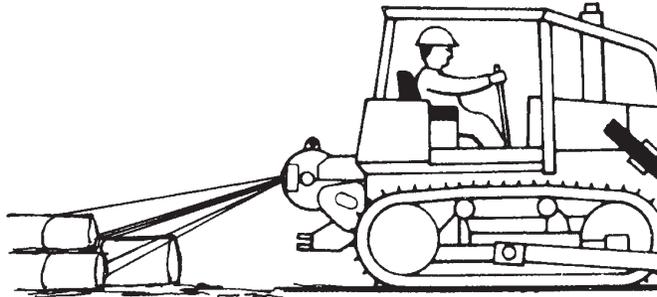
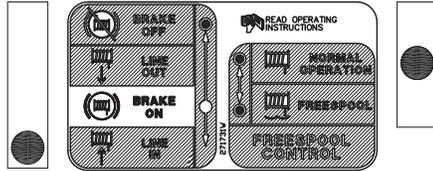


**Step 3.** The operator can move the control lever to the **LINE-IN** position. If the load is less than approximately 75% of the maximum line pull, the operator can begin traveling with the vehicle at the same time. The winch will wind the load toward the vehicle as it travels. If the load is nearly the capacity of the line pull, the operator must move the load close to the vehicle before beginning to travel.

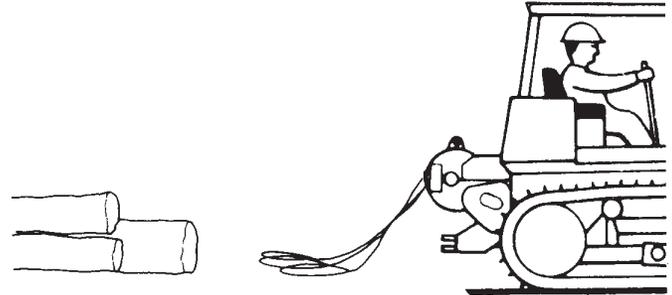
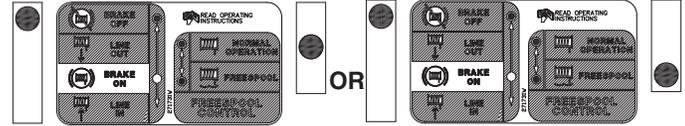


**Step 4.** If the dozer or skidder must travel through an area with bad traction conditions, the operator can move the control lever to the **BRAKE-OFF** position. This procedure will permit the vehicle to move through the bad traction area while keeping the wire rope tight, but without pulling the load at the same time.

# Operating Techniques, Power Controls



**Step 5.** When the vehicle is on firm ground, the operator can move the control lever to **LINE-IN** to pull the load toward the vehicle.



**Step 6.** When the operator wants to disconnect from the load, the vehicle is stopped and the control levers are moved to the **BRAKE-OFF** or **FREESPPOOL** positions to loosen the wire rope. The wire rope is then disconnected from the load.



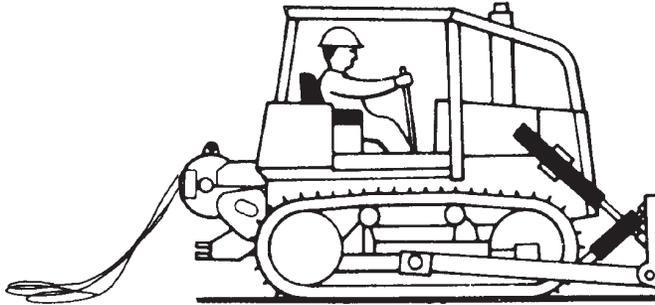
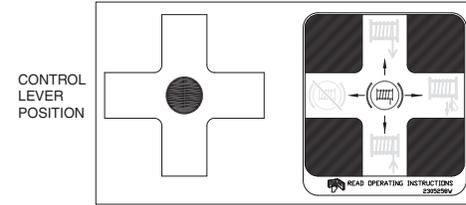
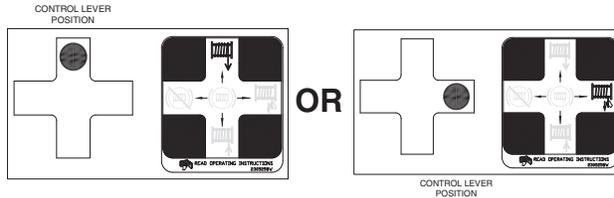
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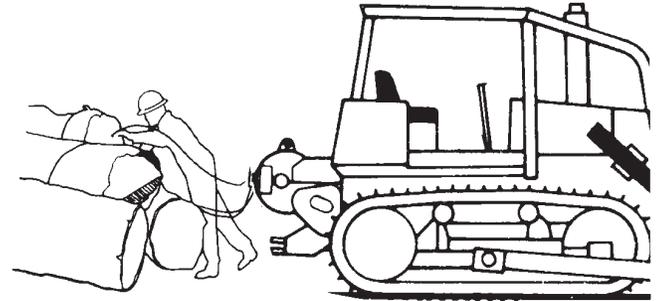
# Operating Techniques, Electronic Controls

## Operating Techniques, Electronic Controls

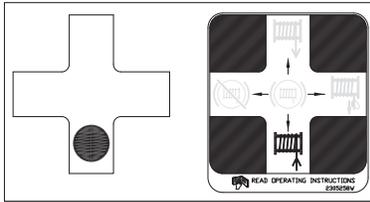
### Dozer or Skidder Operation



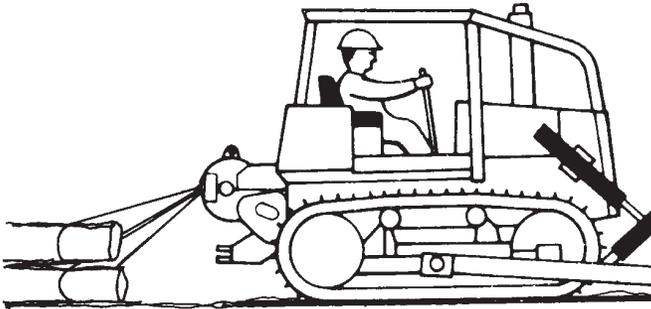
**Step 1.** The dozer or skidder is moved to an area where a load will be connected. The operator moves the control lever to the **LINE-OUT** or the **FREESPOOL** position so that the wire rope can be pulled from the winch drum.



**Step 2.** A load (logs) is connected to the wire rope. The operator moves the control lever to the **BRAKE-ON** position.

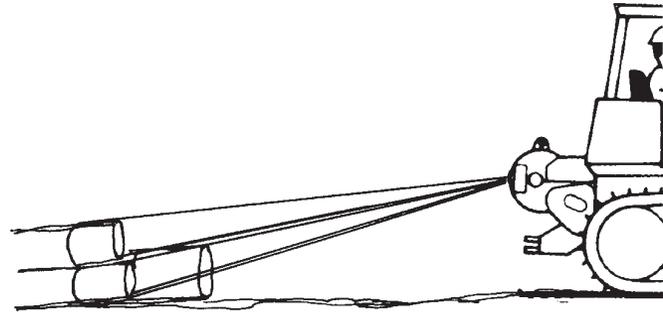
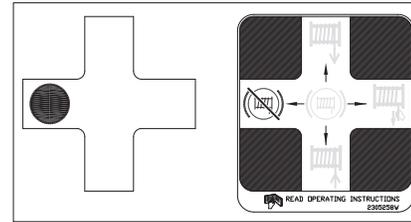


CONTROL LEVER POSITION



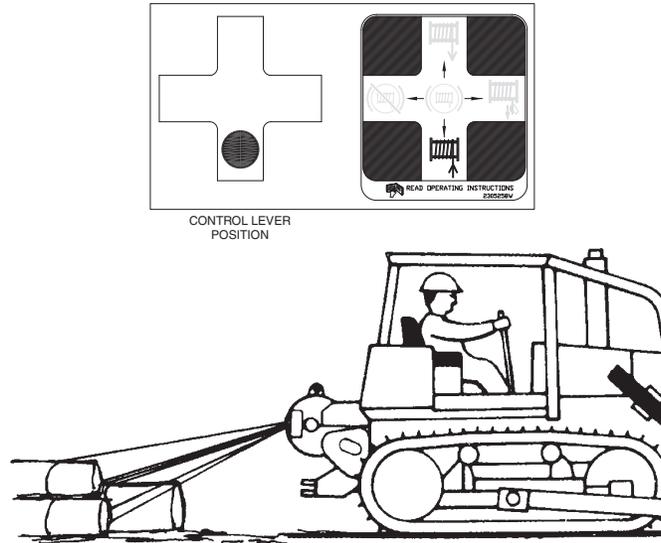
**Step 3.** The operator can move the control lever to the **LINE-IN** position. If the load is less than approximately 75% of the maximum line pull, the operator can begin traveling with the vehicle at the same time. The winch will wind the load toward the vehicle as it travels. If the load is nearly the capacity of the line pull, the operator must move the load close to the vehicle before beginning to travel.

CONTROL LEVER POSITION

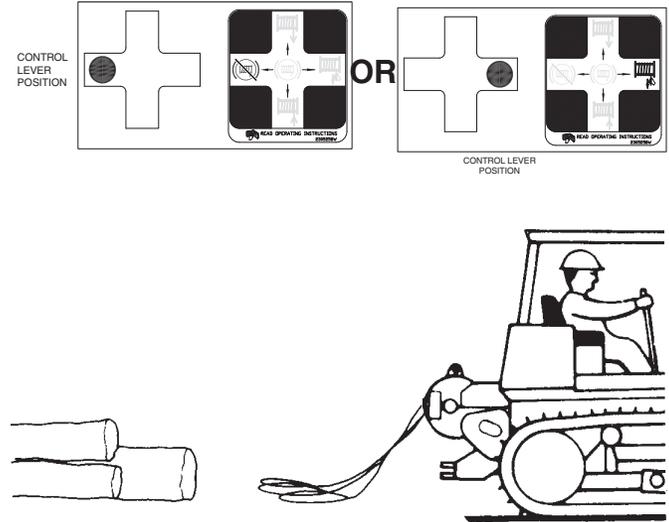


**Step 4.** If the dozer or skidder must travel through an area with bad traction conditions, the operator can move the control lever to the **BRAKE-OFF (DETENT)** position. This procedure will permit the vehicle to move through the bad traction area while keeping the wire rope tight, but without pulling the load at the same time.

# Operating Techniques, Electronic Controls



**Step 5.** When the vehicle is on firm ground, the operator can move the control lever to **LINE-IN** to pull the load toward the vehicle.



**Step 6.** When the operator wants to disconnect from the load, the vehicle is stopped and the control lever is moved to the **BRAKE-OFF** or **FREESPOOL** positions to loosen the wire rope. The wire rope is then disconnected from the load.



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## Operating Techniques, General

### How to Move a Disabled Vehicle

**A.** A dozer or skidder often travels in areas where traction conditions are bad. A vehicle equipped with a winch can be used to remove itself from mud or other areas where it cannot move using only the drive wheels or tracks. See Figure 24. Use the following procedure:

1. Fasten the winch wire rope to a structure, tow bar of another vehicle, or a tree that has enough strength for the line pull. The wire rope must be in a direction that is approximately parallel to the direction of travel of the vehicle. A slight upward pull will assist.
2. Use the throttle to set the engine speed at a power level to operate both the winch and the tracks or drive wheels. (Operator experience is required, because the winch can use most of the engine power in some vehicles.)
3. Use the **LINE-IN** control lever to tighten the winch wire rope. When the winch wire rope is tight, put the vehicle transmission in **REVERSE\*** and engage the tracks or drive wheels. Use the power from the

engine to the winch and tracks together to remove the vehicle from the bad area.

4. If the vehicle travels faster than the winch winds the wire rope, disengage the transmission until the winch wire rope is tightened again.

**\* NOTE: If the tracks or drive wheels on the vehicle stop turning, the torque converter in the transmission has stalled and the winch will stop also. If this happens, put the vehicle in neutral to operate the winch.**

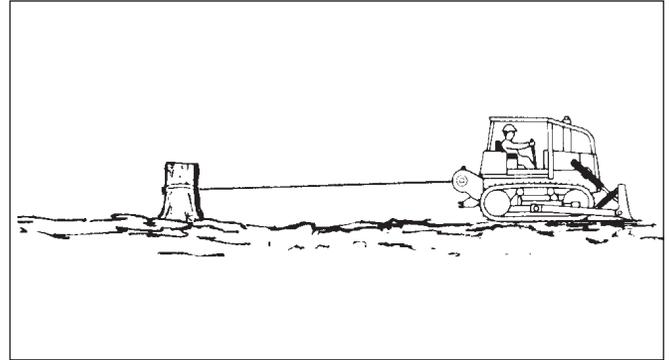


Figure 24 Moving a Disabled Vehicle (Step A)

**B.** A dozer or skidder equipped with a winch can be used to pull another vehicle from mud or other areas where it cannot move using only the drive wheels or tracks. See Figure 25. Use the following procedure:



## WARNING

**Use extra care if traction conditions are bad or if the vehicles are on a slope. Bad traction can cause the disabled vehicle or the dozer to slide. A slope can require additional distance to stop the vehicles.**

**Ensure the wire rope and tow chain have the capacity to do the job. If the disabled vehicle does not have a tow pin or other equipment for towing, carefully fasten the tow chain around the axle of the disabled vehicle. Make sure the tow chain is fastened so that the chain will not injure people or damage the vehicle.**

**An operator must be on the disabled vehicle to operate the steering and brakes when it is towed.**

1. Fasten the winch wire rope to the tow bar of the other vehicle. The wire rope must be in a direction that is approximately parallel to the direction of travel of the vehicle. Apply the brakes on the dozer or skidder. Use the throttle to set the engine speed at a power level to operate the winch. (Operator experience is required, because the winch can use most of the engine power in some vehicles.)
2. Use the **LINE-IN** control lever to tighten the winch wire rope. When the winch wire rope is tight, use the power from the engine to the winch to pull the vehicle from the bad area. If the disabled vehicle moves under its own power, keep the towing wire rope tight so that the wire rope does not pass under the drive wheels or tracks of the vehicle being towed.

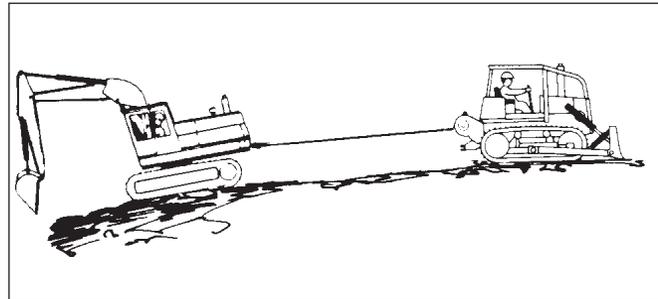


Figure 25 Moving a Disabled Vehicle (Step B)

# Operating Techniques, General

## Working on a Steep Slope



### WARNING

The winch and the dozer must be in good condition for the following procedures. Make sure that the required maintenance has been done on the dozer and winch. Use only a wire rope that is in good condition. Make sure the wire rope and winch have enough capacity for the load. Make sure the anchor for the wire rope has enough capacity for the load. A failure of the dozer, winch, or wire rope while working on a steep slope can cause death or injury and loss of equipment.

### Dozer is Down the Slope (See Figure 26).

Sometimes a dozer must work on a steep slope and can use a winch to give assistance when moving on the slope. Fasten the winch wire rope to the drawbar of another dozer, a structure or a tree that has enough strength to hold the dozer on the slope.

### A. Moving down the slope:

1. Set the throttle on the dozer for the required engine speed.
2. Put the dozer in **FORWARD**. At the same time, move the winch control lever to a position between **BRAKE-ON** and **LINE-OUT** (inching) to control the speed of the dozer down the slope.

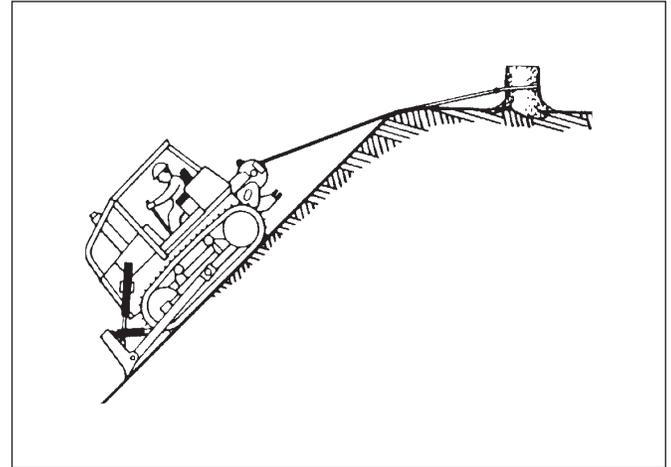


Figure 26 Working on a Steep Slope

## B. Moving up the slope:

1. Set the throttle on the dozer for the required engine speed.
2. Use the **LINE-IN** control lever to tighten the winch wire rope. When the winch wire rope is tight, put the dozer transmission in the **FIRST** speed range and **REVERSE** and engage the tracks or drive wheels. At the same time, move the control lever on the winch to **LINE-IN**.
3. Use the steering on the dozer to keep the travel of the dozer in line with the winch wire rope.
4. Fully engage the **LINE-IN** clutch as necessary and use minimal inching to prevent additional heat and wear. Do not permit the winch wire rope to loosen and pass under the drive wheels or tracks of the dozer.

## Other Equipment is Down the Slope (See Figure 27).

In this operation, the dozer and winch are on stable ground and other equipment is working on a steep slope. The winch is used to give additional control to the equipment working on the steep slope. A winch with a fairlead option is recommended for this operation if alignment of the other equipment with the winch and dozer is a problem.

Make sure the dozer and winch are on stable ground and will not slide when the load is applied. Align the dozer and winch with the load. Apply the parking brake on the dozer.

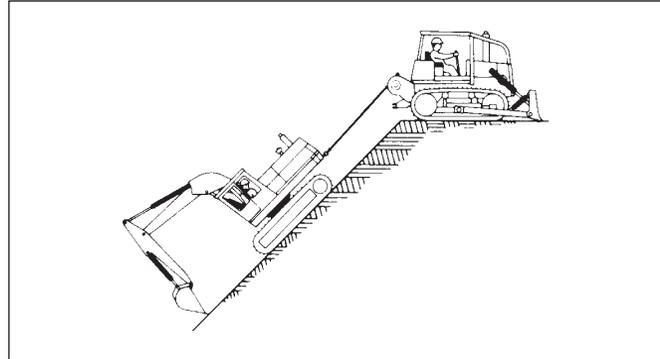


Figure 27 Other Equipment on a Steep Slope

# Operating Techniques, General

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## A. Lowering the equipment on the slope:

1. Set the throttle on the dozer for the required engine speed. Operator experience is required for this operation so that the load is carefully controlled.
2. Keep the winch wire rope tightened between the dozer and the equipment being lowered down the slope. Use the control lever in the **LINE-OUT** position to control the lowering of the equipment down the slope.
3. Move the control lever between **LINE-OUT** and **BRAKE-ON** if inching is required. Use minimum inching to prevent additional heat and wear.

## B. Raising the equipment on the slope:

1. Set the throttle on the dozer for the required engine speed. Operator experience is required for this operation so that the load is carefully controlled.
2. Keep the winch wire rope tightened between the dozer and the equipment being lowered down the slope. Use the control lever in the **LINE-IN** position to control the lowering of the equipment down the slope.
3. Move the control lever between **LINE-IN** and **BRAKE-ON** if inching is required. Use minimal inching to prevent additional heat and wear.
4. Keep the equipment being raised in alignment with the winch and dozer. Do not permit the winch wire rope to loosen and pass under the drive wheels or tracks of the dozer.



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# Operational Differences, Optional Equipment

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## Operational Differences, Optional Equipment

### Integral Arch

When using an integral arch, the wire rope passes over a raised horizontal roller and between a set of smaller vertical side rollers and an upper horizontal roller. This causes the winch to pull upwards on loads. In this way, the load can be lifted slightly to reduce drag due to ground contact. The side and top rollers act as fairleads to protect the wire rope from damage and from damaging the frame.

Because the line of action of the wire rope is higher than normal, the tipping moment applied to the dozer is increased, and the dozer will tip backwards at significantly lower line pulls. The operator must exercise care to not pull more than the dozer can handle stably, especially on side slopes.

Line pulls through the arch also exert higher loads on the fasteners holding the winch to the dozer. For this reason, the wire rope diameter is limited. Refer to tag, manual, or consult the factory.

### Fairlead

A fairlead consists of a set of top and bottom horizontal rollers and side rollers that the wire rope is passed between. With this attachment, if the direction of line pull is not directly behind the drum, then the wire rope is pulled across one of the fairlead rollers instead of across the frame, thus protecting both the frame and the wire rope from excessive wear.

Stability of the dozer is affected somewhat by the fact that the fairlead rollers are more rearward than the drum, thus putting slightly more moment on the dozer during side pulls. The operator must take care to assure stability on slopes.



## **Drawbar**

Do not use the drawbar as an anchor point for a multipoint (over puller) line from the winch. Loads applied to the drawbar are transmitted to the bolts holding the winch to the dozer. Standard integral drawbars are designed to handle pulls of 66% of winch rated capacity; bolt on drawbars are 60%. Optional heavy duty and extended drawbars are available which increase the capacity of the drawbar and/or move the pin farther back so it is not under the winch drum.

## **Alternate Gear Ratios**

Lower speed ratios allow better operator control of line speed. They may also allow the winch to pull in excess of wire rope or winch rated capacity. They do not increase the durability or damaging load limit of the winch. Line pulls in excess of rated capacity will dramatically reduce the life of winch components.

## **Underwind**

Allows line pull to come from the bottom of the drum instead of over the top. Used to pull objects where minimum upward power on the load is desired.

# NO MATTER HOW YOU SAY IT ...

La Prudence Paye  
La Seguridad Paga  
Betriebssicherheit Macht Sich Bezahlt  
Passaa Olla Huolellinen  
Veiligheid Voor Alles  
Säkerhet Först  
Essere Sicuro Paga  
Segurança Paga  
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