

# OPERATING MANUAL

## W6F

### DIRECT DRIVE TOWING WINCH

INCLUDES W6E, W8K AND W12D

THIS MANUAL MUST BE WITH THE VEHICLE  
ON WHICH THIS WINCH IS INSTALLED

## NOTICE

- Report damage or erratic operation of winch or pressure gauge immediately.
- Operate the unit efficiently.
- Do not stand while operating the tractor or the winch.
- Be sure instruments and controls are operative before working the unit.
- Do not use control levers or handles as machine mounting assists.
- Do not use control levers or handles as hangers for clothing, water bags, grease guns, lunch pails, etc.
- Do not permit personnel in the control area when working or making checks on the machine.
- Do not allow riders on the machine or load.
- Use extreme care when operating close to other machines.
- Avoid operating near anyone working or standing.
- Do not stand or permit others to stand in the bight (loop) of a cable.
- Do not stand or permit others to stand near the winch or cable when it is under tension.
- Do not work a damaged cable (broken wire or strands, or a decrease in the diameter of the cable are warning signs).
- Do not leave the tractor while the winch line is under tension.
- Do not anchor a double or two-part line to the winch.
- Never attempt to clean, oil or adjust a machine while it is in motion.
- Authorized operators only!

# TABLE OF CONTENTS

<u>Subject</u>	<u>Page</u>
MOUNTING . . . . .	1
INTRODUCTION . . . . .	2
Purpose . . . . .	2
Applications . . . . .	2
Winch Types . . . . .	2
Controls . . . . .	6
OPERATION . . . . .	8
Operating Precautions . . . . .	8
Controls and Indicators . . . . .	8
Operating Procedures . . . . .	8
MAINTENANCE . . . . .	13
SafeGuard Maintenance Schedule . . . . .	13
ADJUSTMENTS . . . . .	22
Direct Drive Winch Adjustments . . . . .	22
Power Controlled Winch Adjustments . . . . .	32
ANNUAL TUNE-UP . . . . .	41
Inspection . . . . .	41
Service . . . . .	42
Unit Painting . . . . .	43
Decal, Nameplate, and Service Plate Installation . . . . .	44
TROUBLESHOOTING . . . . .	46
OPTIONAL EQUIPMENT . . . . .	60
SPECIFICATIONS . . . . .	63
MODEL IDENTIFICATION . . . . .	ii
Serial Number Data . . . . .	ii

## LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 SafeGuard Maintenance and Service Inspection Schedule . . . . .	14
2 Trouble Analysis for Direct Drive Winch . .	47
3 Trouble Analysis for Power Controlled Winch . . . . .	50
4 Optional Equipment . . . . .	60
5 Drum Line Capacities . . . . .	63
6 Hydraulic Specifications . . . . .	64
7 Torque Specifications . . . . .	65
8 Ferrule Sizes . . . . .	67

# MODEL IDENTIFICATION \_\_\_\_\_



## SERIAL NUMBER DATA

Unit identification data is contained on the unit nameplate. The nameplate is located on the left-hand side of the winch frame and contains the Serial Number, Model Number and Special Application Data. The Serial Number is also stamped on the winch frame just below the nameplate. The Model Number is stamped above the nameplate. The Unit Serial Number indicates the design series, manufacturing plant, serial number and year manufactured. A typical serial number designates the following:

EXAMPLE:   A129    P    0000    S  
              (1)   (2)    (3)    (4)

(1) The first letter and number denote the design series and model of the unit. In the example, A129 denotes the W8K series.

(2) The second letter denotes the plant at which the unit was manufactured.

A. Scotland	F. France	P. Portland
B. Tacoma	G. Belgium	R. Ipswich
C. Kewanee	H. South Africa	S. Austrlia
D. Danville	J. Africa	T. Canada
E. Nijmegen	L. Peoria	Y. Brazil
	N. New Zealand	

(3) The number series indicates the serial number of the unit.

(4) The final letter designates the year of manufacture starting with "A" in 1957. The letters "I", "O", and "Q" are not used.\*

A. 1957	G. 1963	L. 1967	Q. *	V. 1975
B. 1958	H. 1964	M. 1968	R. 1971	W. 1976
C. 1959	I. *	N. 1969	S. 1972	X. 1977
D. 1960	J. 1965	O. *	T. 1973	Y. 1978
E. 1961	K. 1966	P. 1970	U. 1974	Z. 1979
F. 1962				

## SERIAL NUMBER CODES

### Allis Chalmers

W6EA:  
Direct Drive A123  
Power Controlled A124

W8KA:  
Direct Drive A127  
Power Controlled A128

W12DA:  
Direct Drive A131  
Power Controlled A132

### Caterpillar

W6EC:  
Direct Drive D39  
Power Controlled C82 (D6E to W6E, effective S/N  
C82P-3052)

W8KC:  
Direct Drive F47  
Power Controlled E77 (D7K to W8K, effective S/N  
E77P-2344)

W12DC:  
Direct Drive B67  
Power Controlled D68 (D89D to W12D, effective S/N  
D68P-1621)

### Fiatallis

W5F:  
Direct Drive A151

W6EF:  
Direct Drive A152  
Power Controlled A153

W8KF:  
Direct Drive A154  
Power Controlled A155

### International

W6EH:  
Direct Drive A125  
Power Controlled A126

W9KH:  
Direct Drive           A 129  
Power Controlled       A 130

W12DH:  
Direct Drive           A 133  
Power Controlled       A 134

### Komatsu

W6EK:  
Direct Drive           A 149  
Power Controlled       A 145

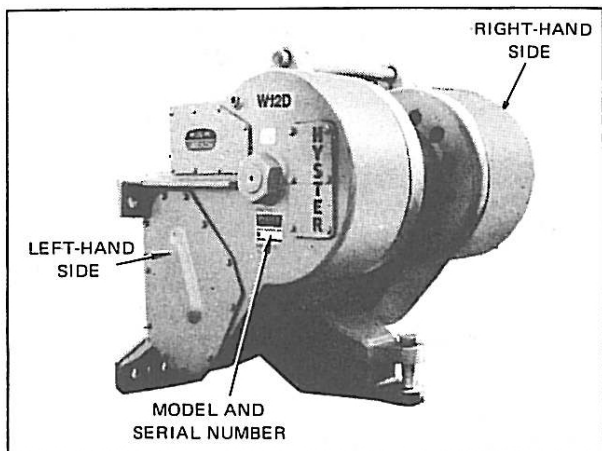
W8KK:  
Direct Drive           A 150  
Power Controlled       A 139

W12DK:  
Power Controlled       A 140

### Terex

W8KT:  
Power Controlled       A 148

W12DT:  
Power Controlled       A 141



Serial Number and Nameplate Location

Power required for rotation of the winch gear train is provided by a Power Take-Off (PTO) shaft connected between the tractor and winch.

Power Controlled winches use a hydraulic pump for the supply of hydraulic oil to the winch brake and oil clutches. The pump is driven by the tractor engine. Operation of the winch is controlled by a single-lever control conveniently mounted in the operator's compartment of the tractor.

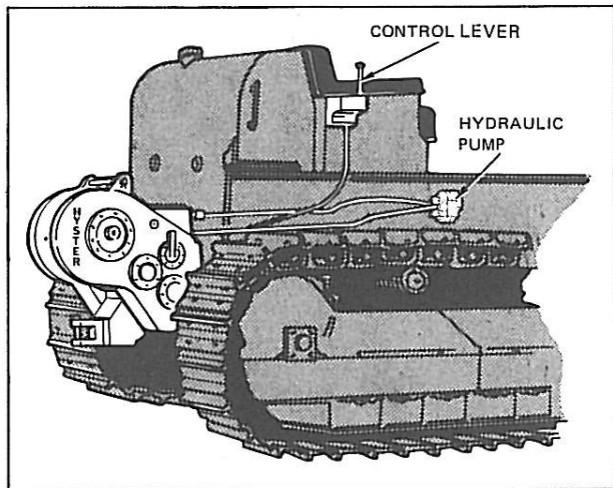


Figure 1. Winch Mounting

## PURPOSE

The winch is used for two main purposes:

- 1 IT APPROXIMATELY DOUBLES THE PULLING POWER OF THE TRACTOR.
- 2 IT PROVIDES AN ADDED REACH TO THE TRACTOR

## APPLICATIONS

- Logging Operations
- Pipeline Construction
- Equipment Rescue
- Mining
- Road Construction
- Drill Rig Skidding
- General Construction
- Landfills
- Land Clearing

## WINCH TYPES

Allied towing winches are available as either Direct Drive or Power Controlled winches. Due to the variety of winch applications and tractor models, the proper winch can therefore be obtained for the job at hand. Also, each type of winch is available in different sizes (W6E, W6F, W8K and W12D) to ensure maximum performance in application.

## DIRECT DRIVE WINCH.

The Direct Drive winch is primarily designed for use on direct drive. This is basically a manual-shift winch equipped with a band-type brake which is also manually applied.

The gear train is contained within an oil filled compartment and is constantly lubricated during operation. The brake assembly is housed in a separate compartment that is sealed to prevent oil from contacting the brake band.

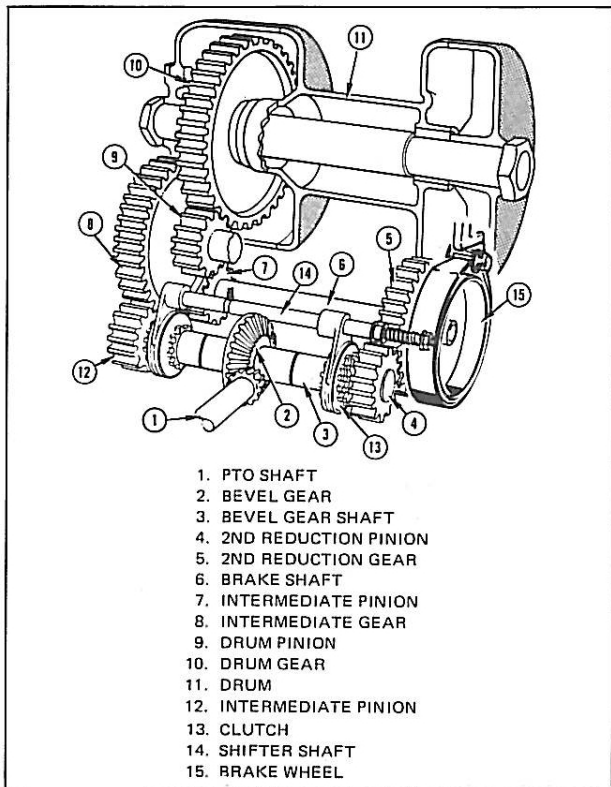


Figure 2. Direct Drive Winch Arrangement

Direction shifting and brake actuation are accomplished by means of push-pull cables connected between the winch and handlevers.

## POWER CONTROLLED WINCH.

The Power Controlled winch is designed for use on both direct drive, and power shift tractors equipped with a constant running PTO shaft.

This winch is essentially the same as the direct drive winch, except that shifting is accomplished by means of power-actuated multi-disc clutches. Braking is accomplished by means of a multi-disc oil brake assembly or a hydraulic cylinder-actuated brake band.

The power controlled winch uses a tractor mounted pump to provide oil flow necessary for winch operation. The oil supply is contained within the winch housing. This oil provides for hydraulic pressures and also lubrication of the gear train during operation.

Oil filtration is provided by two filters located within the winch housing. A wire-mesh suction filter strains the oil drawn (by the pump) from the winch housing. Operating-pressure oil returned to the winch is filtered by a replaceable element type filter located inside of the winch housing.

A single-spool control valve routes the oil to and from the oil brake and clutches to control the operation of the winch. The valve spool is actuated by a cable connected to the control lever in the operator's compartment.

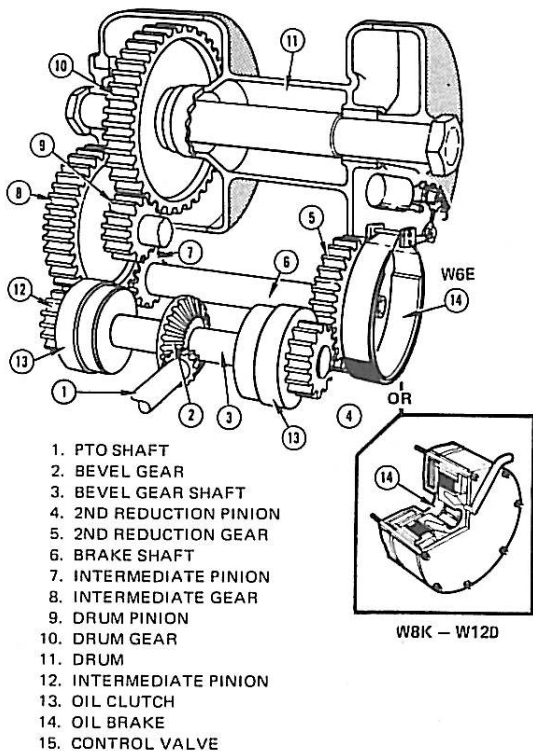


Figure 3. Power Controlled Winch Arrangement

## CONTROLS

### FOR DIRECT DRIVE WINCHES.

The handling gear used to control the operation of the direct drive winch consists of a clutch handlever, brake handlever assembly and mounting bracket with an attached quadrant bar. The clutch and brake handlevers control the two mechanical clutches and the dry brake through push-pull control cables attached to the bottom of the handlevers. The brake handlever has a pawl and rod which engages with teeth on a quadrant bar. This locks the handlever in any desired position to control the degree of braking effort. A release button on the end of the brake handlever must be depressed before the handlever can be moved forward to release the brake. The pawl will allow increased brake application without having to depress the release button.

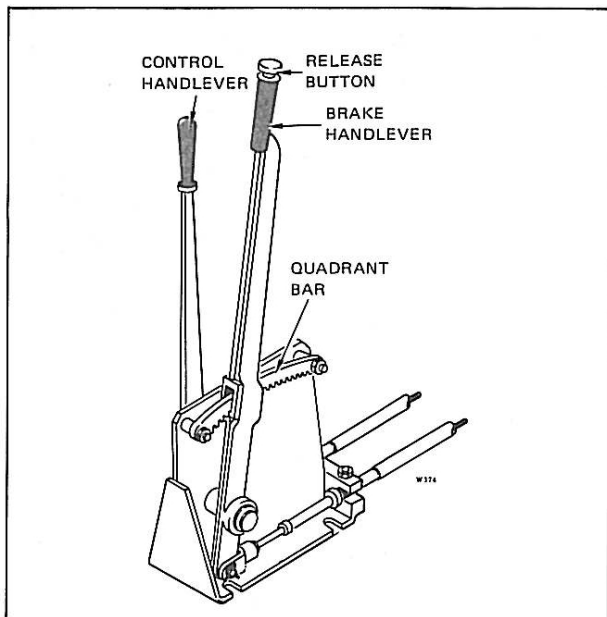


Figure 4. Controls for Direct Drive Winches

## FOR POWER CONTROLLED WINCHES.

The handling gear used to control the operation of the power controlled winch consists mainly of a housing, handle-lever assembly and pressure gauge. A push-pull cable links the handlelever to the winch control valve spool. Threaded ends on the cable allow for adjusting handlelever position. The housing is tractor mounted, usually on the right-hand side of the operator's seat and is positioned so that the handlelever moves from right to left for Hauling In line and left to right for Paying Out line. The pressure gauge indicates brake release pressures.

On power controlled winches equipped with the free-spool option, a second handlelever is mounted on the handling gear housing. This lever is attached to the winch gear train through a separate control cable.

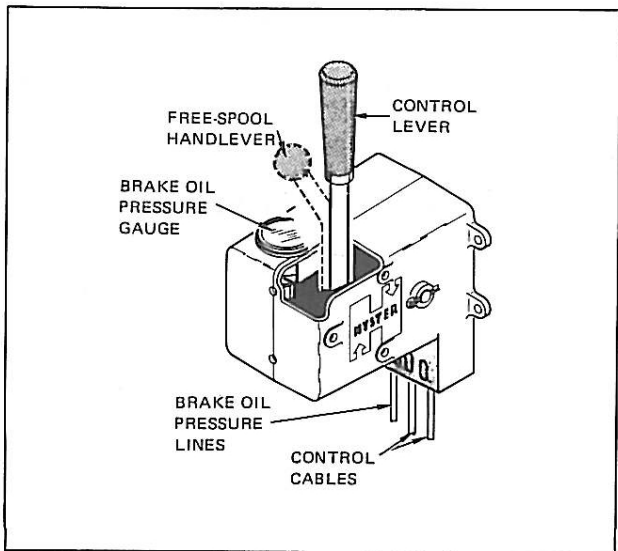


Figure 5. Controls for Power Controlled Winches

## OPERATING PRECAUTIONS

Be safety conscious. Carefully review the operating precautions given on the inside, front cover of this manual prior to operating the winch.

## CONTROLS AND INDICATORS

Operation of the winch is controlled by handlevers mounted in the tractor operator's compartment. The levers allow the operator to pay out or pull in line easily from the operator's seat.

Power controlled winches have a hydraulic pressure gauge that indicates brake release pressure.

## OPERATING PROCEDURES

### A. DIRECT DRIVE WINCHES.

#### 1. Setting the Brake.

To set the brake, pull back the brake handlever. Releasing the handlever button will hold the brake APPLIED until manually moved.

#### 2. Releasing the Brake.

To release the brake, pull back slightly on the brake handlever. Depress the release button and push the handlever forward.

**NOTE** If the winch is equipped with an optional automatic brake, the winch may haul in line with the brake set. The brake must be released before line can be payed out.

#### 3. Hauling In Line.

- a. Disengage the tractor master clutch.
- b. Place the tractor transmission in NEUTRAL.

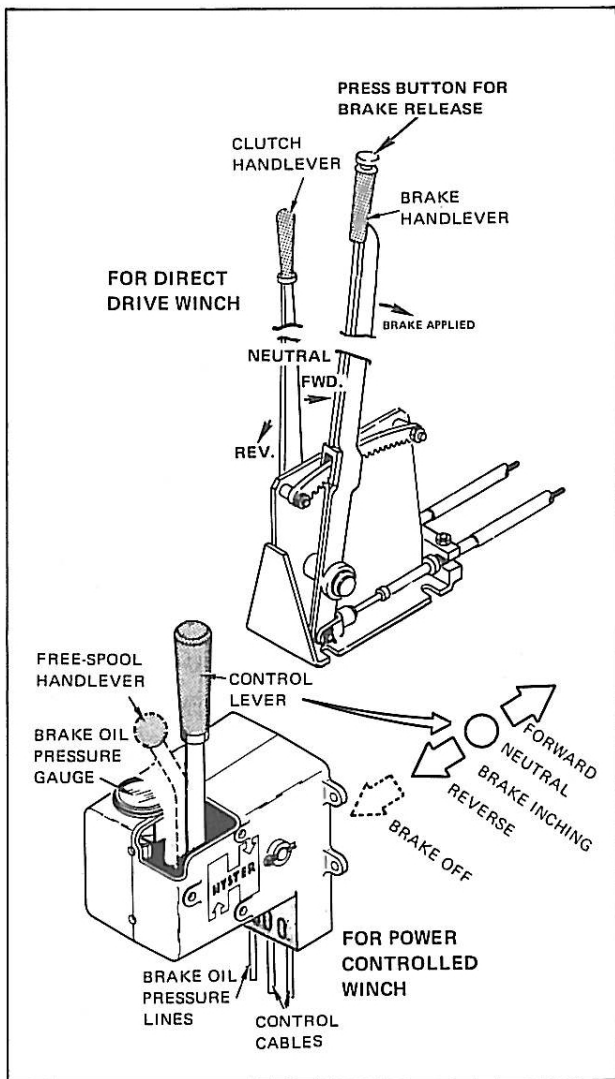


Figure 6. Operator Controls and Instruments

c. Pull the Clutch Handlever all the way back to the FORWARD position.

d. Release the brake (refer to paragraph A-2).

**NOTE** Line speed is varied by throttling the tractor engine.

#### 4. Stopping the Winch.

a. Throttle down the engine.

b. Disengage the tractor master clutch and apply the brake at the same time.

**NOTE** The brake may be set before the tractor master clutch is disengaged if the winch is equipped with an automatic brake.

#### 5. Paying-Out Line Under Power.

a. Disengage the tractor master clutch.

b. Push the winch Clutch Handlever past NEUTRAL and into REVERSE.

c. Release the brake (refer to paragraph A-2).

d. Engage the tractor master clutch.

**NOTE** Line speed is varied by throttling the engine.

#### 6. Shifting to Neutral.

To shift to NEUTRAL, disengage the tractor master clutch. Move the Clutch Handlever to the "straight up" position.

**CAUTION** Do not operate the winch while the tractor is in motion.

### B. POWER CONTROLLED WINCHES.

A single control lever is used to select any one of five modes of operation: NEUTRAL, FORWARD (line in), BRAKE INCHING (gradual brake release), REVERSE (line out) and BRAKE OFF (free-spooling). The Brake-Inching position will be found useful where a finer control for paying out line is required, such as pipelining, matching pipe flanges, rescue work, etc. The Brake-Off position allows semi-

free-spool operation where cable can be payed out without power to the PTO drive shaft.

1. To operate the winch, proceed as follows:

a. For NEUTRAL, the handlever is spring-centered to NEUTRAL and will remain in this position until moved by hand. The handlever will automatically return to NEUTRAL from any position, except BRAKE OFF. In NEUTRAL, the brake is fully applied. The winch brake oil pressure gauge will be in the lower green zone.

b. For FORWARD, pull handlever all the way to the left (toward operator) to the FORWARD position and hold. In FORWARD, the brake is completely released, the forward clutch is engaged. The drum will haul-in line at a rate dependent on load and tractor engine speed. The winch brake oil pressure gauge will be in the upper green zone.

**CAUTION** Do not stall the tractor converter for prolonged periods of time.

c. For BRAKE INCHING, ease handlever slowly to the right (away from operator) through the BRAKE INCHING band shown on decal. This will gradually release the brake. As the brake nears the release point, the tractor torque converter and winch reverse clutch will assume control of the load to inch line out under power. The winch brake oil pressure gauge will rise from the lower green zone, pass through the red zone, and remain in the upper green zone as the handlever approaches REVERSE.

d. For REVERSE, push the handlever to the right (away from operator) until a stop is felt and lever is in REVERSE. Hold in this position.

**WARNING** Do not force the lever past the stop. This will place the winch in the BRAKE OFF detent, resulting in possible uncontrolled line pay-out.

In REVERSE, the brake is completely released, the reverse clutch engaged, and the drum will pay out line against resistance of the tractor torque converter. Tractor engine speed may be increased from idle to increase line speed. The winch brake oil pressure gauge will rise quickly through the red zone to the upper green zone.

e. For BRAKE OFF, push the handlever all the way to the right (away from operator) into the BRAKE OFF detent position. The handlever will remain in this position until manually pulled out of detent. The winch brake oil pressure gauge will be in the upper green zone. In the BRAKE OFF position, the winch drum will free-spool.

**CAUTION** Do not operate winch for extended periods of time in the BRAKE OFF position. Overheating may result due to the hydraulic pump working continuously at full pressure output.

### C. FREE-SPOOLING (POWER CONTROLLED WINCHES ONLY).

The optional free-spooling arrangements are used to allow cable to be payed-out by hand. This is accomplished by disengaging the drum pinion gear from the remainder of the winch gear train, thus allowing the drum to rotate freely. On the Power Controlled winch, a second handlever is used on the handling gear.

The winch is placed in free-spooling by removing tension from the winch line and pushing the free-spool handlever forward. This disengages the drum pinion gear from the winch gear train. To return to normal operation, remove tension from the winch cable, release the winch brake and pull the free-spool handlever back toward the operator's seat.

Safeguard maintenance is a planned maintenance program which includes periodic inspection and lubrication. Safeguard maintenance should be correlated closely with the operating hours recorded on the tractor SERVICE METER.

Maintenance procedures may be performed using standard shop tools, except Special Factory Tool No. 196957\* or 186955\*\* must be used to tighten the bevel gearshaft nut.

(\*W12D) (\*\*W6E and W8K)

## SafeGuard MAINTENANCE SCHEDULE

Table 1 is outlined in two time schedules; the hourly schedule and the periodic schedule. If the unit is operated more than eight hours per day, follow the hourly schedule. Follow the periodic schedule if the unit is operated less than eight hours per day.

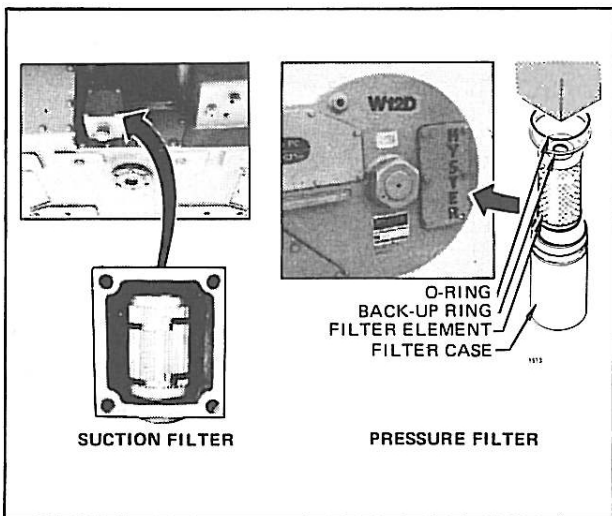


Figure 7. Suction and Pressure Filters  
(Power Controlled Winch Only)

Table 1. SafeGuard Maintenance and Service Inspection Schedule

Item	Schedule (Hour/Period)				Quantity	Type	Procedure
	8/ dy	50/ wk	500/ 3 mo	1000/ 6 mo			
Oil Level (Direct Drive)		✓		C H A N G E	10 Gals. (37.850 liters) W6E, W6F  18 Gals. (68.130 liters) W8K  18 Gals. (68.130 liters) W12D	SAE 90, MIL-L-2105B, for temperatures above +10°F (12°C). SAE 10, MIL-L-2104B, or MIL-L-45199 Series 3, for temperatures +10°F (12°C) and lower.	Check winch oil at level plug <b>A</b> on right side of winch. Add oil as required at plug <b>B</b> . Drain oil at plug <b>C</b> and <b>D</b> .  <b>NOTE</b> For winches mounted on direct drive tractors, disengage tractor master clutch to obtain correct reading.
Oil Level (Power Controlled)		✓		C H A N G E	12 Gals.* (45.420 liters) W6E  20 Gals. (75.700 liters) W8K	Automatic transmission fluid "DEXRON", for temperatures above -10°F (-23°C). SAE	

	✓			<p>22 Gals. (83.270 liters) W12D</p>	<p>5W, MIL-L-2104B, or MIL-L-45199 Series 3 for temperatures -10°F (-23°C) and lower.</p>	<p><b>CAUTION</b> If winch is new or overhauled, drain after 50 hours of operation, then flush, refill, replace pressure filter element, and service suction filter.</p>
<p>Brake and Transmission Compartments (Direct Drive)</p>					<p>Remove plug <b>D</b> and drain any accumulation of water or oil in brake compartment. Replace plug <b>D</b>. Loosen plug <b>C</b> and drain any accumulation of water in transmission compartment. Tighten plug <b>C</b> when oil appears.</p>	

\*Use SAE 10 per MIL-L-2104B, Series 3, in W6E Winch only.

Table 1. SafeGuard Maintenance and Service Inspection Schedule (Cont.)

Item	Schedule (Hour/Period)				Quantity	Type	Procedure
	8/ dy	50/ wk	500/ 3 mo	1000/ 6 mo			
Controls	✓				Few drops	SAE 30.	Lubricate fulcrum pin connections and other moving parts at end of each eight hour shift.
Suction Filter (Power Controlled Only)					One	Refer to Parts Manual.	Remove suction filter Ⓔ, clean thoroughly and reinstall.  <b>CAUTION</b> If winch is new or overhauled, re- move suction filter Ⓔ after first 50 hours of operation, clean thoroughly and rein- stall.



Table 1. SafeGuard Maintenance and Service Inspection Schedule (Cont.)

Item	Schedule (Hour/Period)				Quantity	Type	Procedure
	8/50/ dy wk	500/ 3 mo	1000/ 6 mo	2000/ 1 yr			
Automatic Brake (Optional, Direct Drive Only)			S E R V I C E			High temperature grease as follows: Atlantic Richfield (thermo-grease) Mobil Oil (Mobile-temp grease #1) Shell Oil (Darina Grease #1) Standard Oil (Chevron Indus- trial Grease) Texaco (Ther- matex EP #1)	Remove automatic brake assembly <b>F</b> . Disassemble and clean brake assembly compo- nents. Pack the two bearings with a high temperature grease. Put a heavy film of high temperature grease on ratchet ring, pawl as- sembly, and hub. DO NOT completely fill automatic brake assem- bly with grease or at- tempt to grease brake through the vent plug.



Table 1. SafeGuard Maintenance and Service Inspection Schedule (Cont.)

Item	Schedule (Hour/Period)				Quantity	Type	Procedure
	8/ dy	50/ wk	500/ 3 mo	1000/ 6 mo			
Pressure Filter (Power Controlled Only)			C H A N G E		One	Refer to Parts Manual	Replace with Factory approved filter element Ⓚ. Coat O-ring and back-up ring with multi-purpose grease to ensure a leakproof seal between filter and case.
Bevel Gear Shaft Locknut				✓		Refer to Parts Manual if neces- sary to replace lockwasher.	Pry lockwasher tangs away from locknut flats and retighten locknut to 200 ft-lbs (27.660 kg/m) torque. Bend lockwasher tangs over locknut flats.

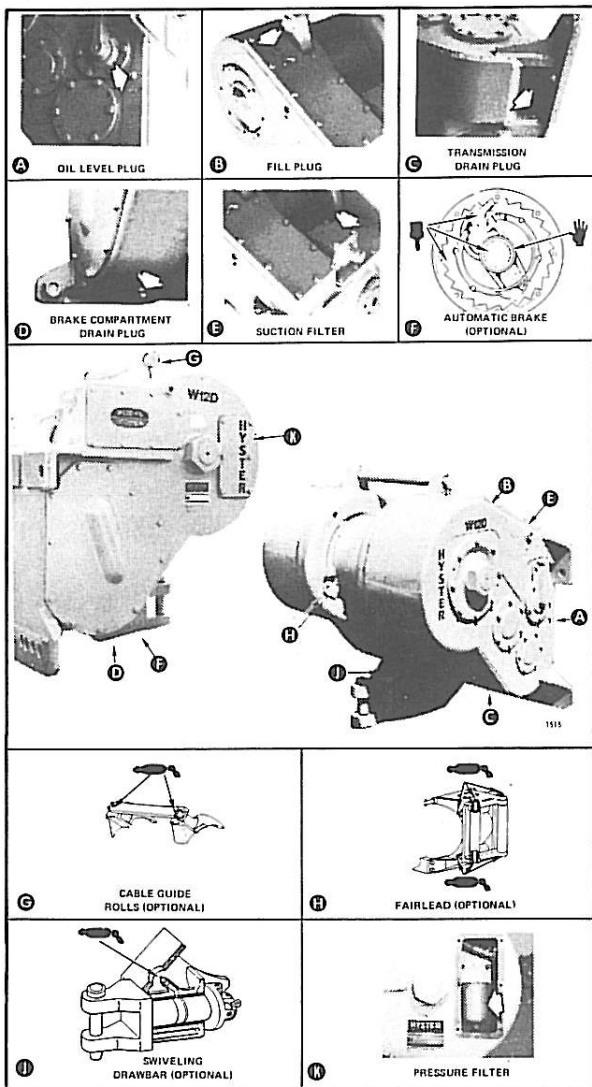


Figure 8. SafeGuard Maintenance Diagram

## DIRECT DRIVE WINCH ADJUSTMENTS

### A. ADJUSTING THE CLUTCH HANDLEVER. (See Figures 9 and 11.)

The Clutch Handlever controls the dental clutches through a plastic-lined control cable. The shifter assembly will shift the dental clutches into Forward, Neutral and Reverse positions when the control cable is properly adjusted. To adjust the position of the clutch handlever, proceed as follows:

1. Remove the LH upper access cover and place the shifter assembly in Neutral (see Figure 9). The shifter linkage will positively detent to this position.

2. Adjust the rod end, at the winch control housing, so that the small cable grommet, threaded cable end, and center of the clevis pin are at dimension **A** and **B**, respectively, as shown in Figure 11.

**NOTE** Allow the clutch handlever to move as adjustments are made. The shifter assembly must remain in NEUTRAL during the measurement check.

3. Adjust the cable rod end at the clutch handlever as necessary to place the handlever vertical and in the center of travel when the shifter assembly is in Neutral.

4. Make sure that Forward, Neutral and Reverse can be selected by moving the Clutch Handlever to the corresponding position.

5. Ensure that jam nuts are tight at each cable rod end.

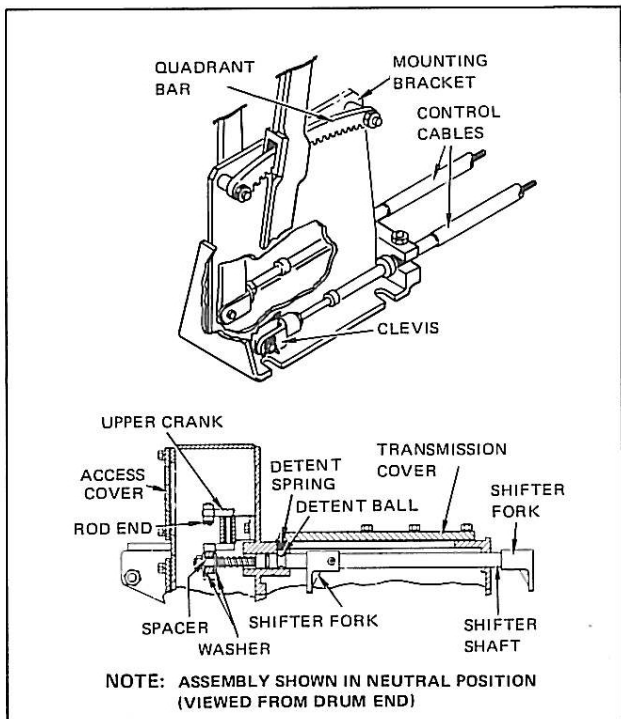


Figure 9. Direct Drive Winch Shifter Arrangement

## B. ADJUSTING THE BRAKE.

The Brake Handlever controls the brake through a plastic-lined control cable (identical to the clutch control cable). Two adjustments are required to properly adjust the brake. Refer to paragraphs 1 and 2 below.

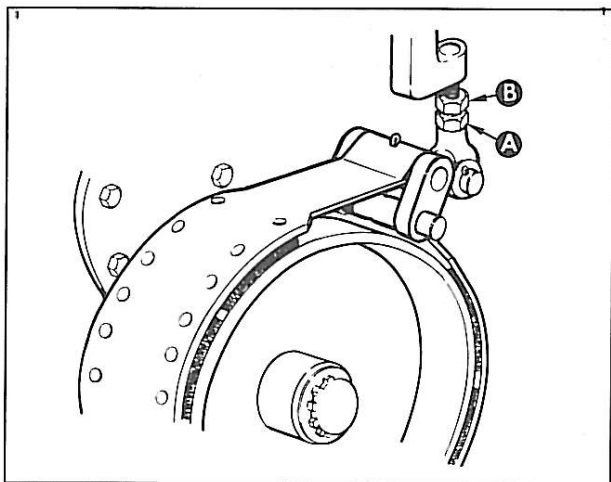


Figure 10. Brake Band Adjustment Diagram,  
Direct Drive Winch

1. Brake Band Adjustment. (See Figure 10.)

a. Remove the small brake cover from the left-hand side of the winch.

b. Push the brake handlever to its full release position.

c. Loosen jam nut **A**.

d. Turn adjusting link **B** until there is approximately 1/32-inch (0.807 cm) clearance between the brake band and brake wheel or until there is just enough clearance to prevent "brake drag".

e. Tighten jam nut **A**.

f. Replace the brake cover.

## 2. Brake Handlever Adjustment. (See Figure 11.)

a. Adjust the brake band as described in paragraph 1. above.

b. Loosen cable rod end jam nut.

c. Adjust the control cable at the winch control housing end until dimension **C** is obtained (distance between the cable end and the centerline of the rod end pin).

d. Tighten the jam nut.

e. Push the Brake Handlever to the full release position.

f. Adjust the push-pull cable at the Brake Handlever end until dimension **D** is obtained. Tighten jam nut.

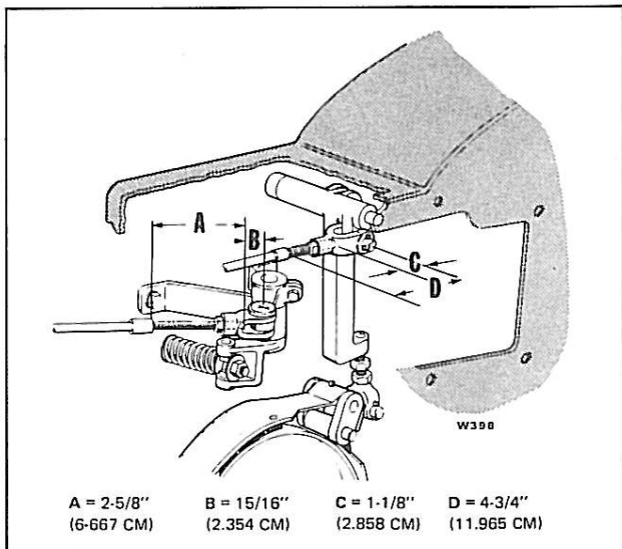


Figure 11. Adjustment of Brake Linkage,  
Direct Drive Winch

## C. OVERWIND ADJUSTMENT PROCEDURE.

When the cable passes over the top of the drum during forward rotation, the drum is said to be overwinding. Unless otherwise specified, the winch is factory set for overwind operation. However, it can be ordered from the factory set for underwind operations. The bevel gear shaft assembly, brake assembly, and drum assembly must be rearranged when using the original underwind winch for overwind operation (refer to paragraphs 1, 2 and 3 below.

### 1. Bevel Gear Shaft Overwind Arrangement. (See Figure 12.)

a. Pull the bevel gear shaft from the right-hand side of the winch far enough to enable switching of the bevel gear and the spacers. Refer to your Service Manual.

b. Arrange the spacers and bevel gear so the bevel gear meshes on the right-hand side of the PTO shaft assembly.

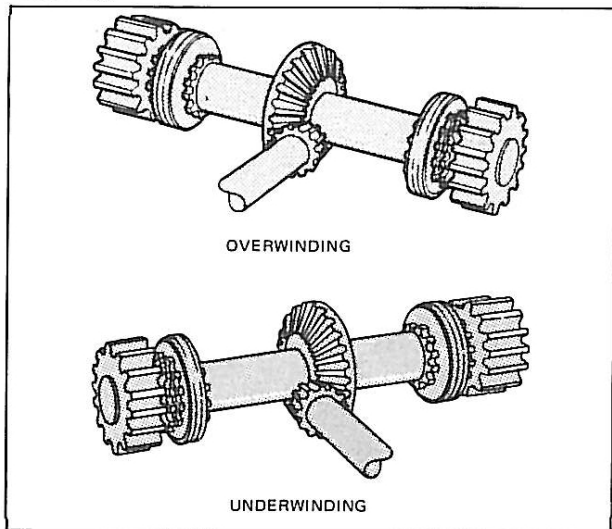


Figure 12. Bevel Gear Shaft Overwind and Underwind Arrangement

c. Install bevel gear shaft.

**NOTE** This change in operation may affect gear lash, but should not affect the shaft endplay. However, both should be checked and adjusted if necessary.

## 2. Brake Assembly Arrangement.

If the winch is equipped with a standard brake wheel, follow procedure a. Follow procedure b if the winch is equipped with an optional automatic brake.

a. BRAKE BAND. (See Figure 13.)

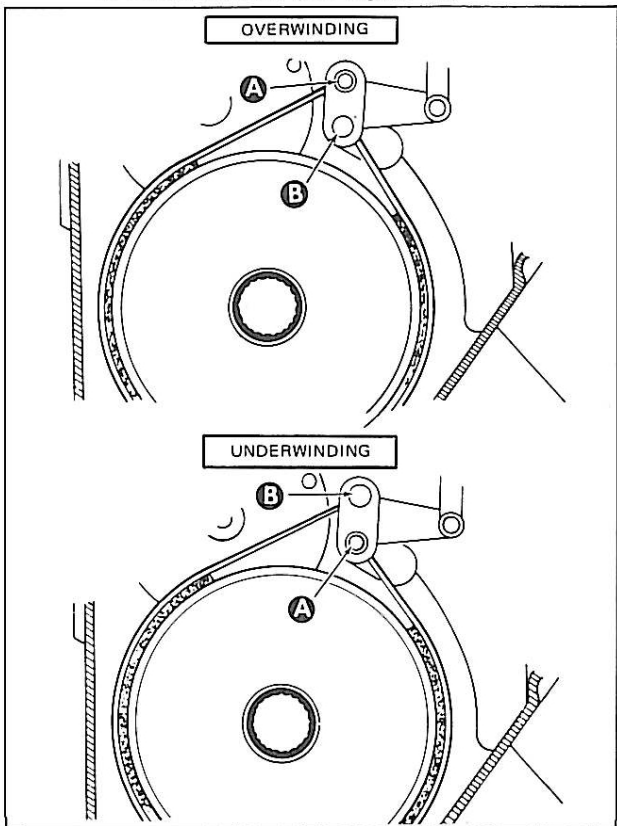


Figure 13. Brake Band Overwind and Underwind Arrangement

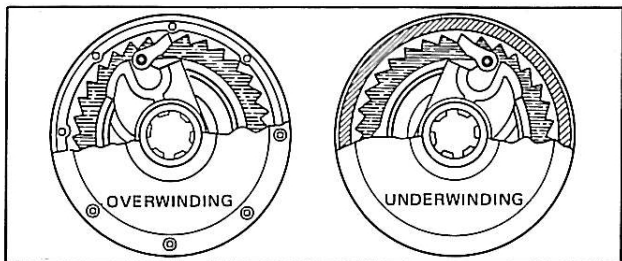


Figure 14. Automatic Brake (Optional) Overwind and Underwind Arrangement

Change the anchoring end of the brake band by changing the positions of pins **A** and **B**.

**NOTE** Pin **A** connects the moveable end of the band to the crank. This pin is 4-5/8 inches (11.748 cm) long and has a cotter pin hole in the center. Pin **B** is 6-3/8 inches (16.192 cm) long and has a tapped hole in the end. It anchors the band and provides a pivot for the crank.

b. AUTOMATIC BRAKE (Optional). (See Figure 14.)

Interchange position of brake band pins **A** and **B** per step a above. Remove the automatic brake assembly and reinstall so that the word OVERWINDING is facing outward.

### 3. Drum Assembly Arrangement. (See Figure 15.)

The drum cable must be anchored and wound in the opposite direction for overwind operation. To setup the drum for overwind operation, follow procedure a for Hi-Capacity (Lo-Speed) drum and procedure b for standard drum:

**WARNING** Use extreme care when removing the cable end ferrule from the drum. When the cable lock is removed, the cable may spring out with extreme force.

a. HI-CAPACITY (LO-SPEED) DRUM:

1. Unwind the cable.

2. Unscrew capscrew (4) and remove ferrule lock (3) and ferrule (2).

3. Break or cut the tack welds securing the filler (1) and grind smooth the sharp edges of filler and groove.

4. Tack weld the filler in the overwind position.

5. Lock ferrule (2) in overwind position with ferrule lock (3) and capscrew (4).

b. STANDARD-SPEED DRUM:

1. Unwind the cable.

2. Unscrew capscrew (3) and remove ferrule lock (6) and ferrule (4).

3. Reverse the position of the filler (2) from underwind to overwind.

4. Place ferrule (4) in overwind position and secure with ferrule lock (5) and capscrew (3).

**NOTE** The overwind ferrule lock (5) is different than the underwind ferrule lock (6).

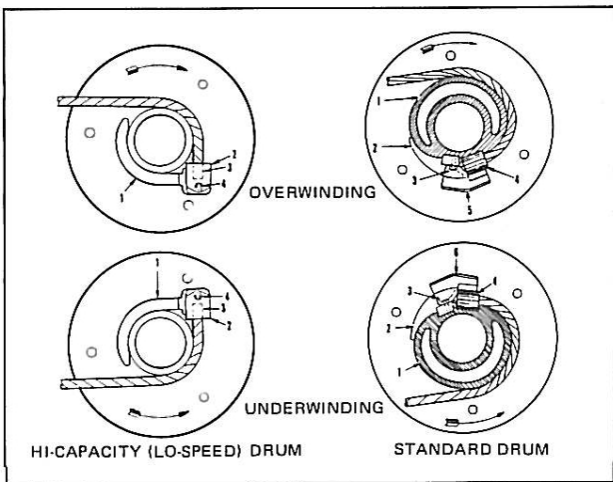


Figure 15. Winch Drum Overwind and Underwind Arrangement

## D. UNDERWIND ADJUSTMENT PROCEDURE.

When the cable is pulled under the drum during forward rotation, the drum is said to be UNDERWINDING. Unless otherwise specified, the winch is set for overwind at the factory. The bevel gear shaft assembly, brake assembly, and drum assembly must be rearranged when using an original overwind winch for underwind operation (refer to paragraphs 1, 2 and 3 below).

### 1. Bevel Gear Shaft Arrangement. (See Figure 12.)

a. Pull the bevel gear shaft from the right-hand side of the winch (refer to your Service Manual) far enough to enable switching of the bevel gear and the spacers.

b. Arrange the spacers and bevel gear so that the bevel gear meshes on the left-hand side of the PTO shaft assembly.

c. Install the bevel gear shaft.

**NOTE** This change in operation may affect gear lash, but it should not affect the shaft endplay. However, both should be checked and adjusted if necessary.

### 2. Brake Assembly Arrangement.

If the winch is equipped with a standard brake wheel, follow procedure a. Follow procedure b if equipped with an optional automatic brake.

a. BRAKE BAND. (See Figure 13.)

Change the anchoring end of the brake band by changing the positions of pins **A** and **B**.

**NOTE** Pin **A** connects the moveable end of the band to the crank. This pin is 4-5/8 inches (11.748 cm) long and has a cotter pin hole in the center. Pin **B** is 6-3/8 inches (16.192 cm) long and has a tapped hole in the end. It anchors the band and provides a pivot for the crank.

b. AUTOMATIC BRAKE (Optional).

(See Figure 14.)

Interchange position of brake band pins **A** and **B** per procedure a above. Remove the automatic brake assembly and reinstall so that the word UNDERWINDING is facing to the outside.

### 3. Drum Assembly Arrangement. (See Figure 15.)

The cable on the drum must be anchored and wound in the opposite direction for UNDERWIND operation. To setup the drum for underwind operation, follow procedure a for Hi-Capacity (Lo-Speed) drum and procedure b for Standard drum.

**WARNING** Use extreme care when removing the cable end ferrule from the drum. When the cable lock is removed, the cable may spring out with extreme force.

#### a. HI-CAPACITY (LO-SPEED).

1. Unwind the cable.
2. Unscrew capscrew (4) and remove ferrule lock (3) and ferrule (2).
3. Break or cut the tack welds securing the filler (1) and grind smooth the sharp edges of the filler and groove.
4. Tack weld the filler in the underwind position.
5. Lock ferrule (2) in underwind position with ferrule lock (3) and capscrew (4).

#### b. STANDARD SPEED DRUM.

1. Unwind the cable.
2. Unscrew capscrew (3) and remove ferrule lock (5) and ferrule (4).
3. Reverse the position of the filler (2) from overwind to underwind.
4. Place ferrule (4) in underwind position and secure it with ferrule lock (6) and capscrew (3).

**NOTE** The underwind ferrule lock (6) is different than the overwind ferrule lock (5).

## POWER CONTROLLED WINCH ADJUSTMENTS

The checks and adjustments for the power controlled winch include hydraulic system pressure checks, a valve spool travel check, and a control cable adjustment. Hydraulic system pressure checks include the adjustment of the relief valve and reverse overlap valve.

### A. HYDRAULIC SYSTEM PRESSURE CHECKS. (See Figure 16.)

Ensure that handling gear and control cable operate freely without binding before starting this check.

a. Remove the line from the drum to prevent entanglement during pressure checks.

**WARNING** The tractor engine must be OFF before disconnecting line. Be extremely careful when removing the lock. The line may spring away from the drum with extreme force.

b. Remove control valve access cover plate on upper, left-hand side of winch housing.

c. Remove plug from control valve INLET port **(A)** and connect a 400 PSI (28.124 kg/cm<sup>2</sup>) pressure test gauge to the port.

d. Start tractor engine, warm up, and stabilize engine speed at 1500 RPM. When winch hydraulic oil temperature is 100-140°F (38-60°C), read pressure gauge with handle in BRAKE OFF position. Pressure should be 220 (±5) PSI (15.468 ±0.352 kg/cm<sup>2</sup>). If pressure is not correct, loosen the relief valve locknut, then turn the adjusting capscrew IN to increase pressure or OUT to decrease pressure. Retighten locknut after readjustment is completed.

e. Shut down tractor engine and transfer test pressure gauge to FWD port **(B)**. Install plug in INLET port **(A)**.

f. Start engine and stabilize speed at 1500 RPM.

g. Check pressure at FWD port **(B)** with handle in NEUTRAL. Pressure should be less than 10 PSI (0.703 kg/cm<sup>2</sup>). If there is an indication of oil pressure greater than 10 PSI (0.703 kg/cm<sup>2</sup>), proceed directly to step p.

h. Check pressure at FWD port **(B)** with handle lever in FORWARD. Pressure should be 220 ( $\pm 10$ ) PSI (15.486  $\pm 0.703$  kg/cm<sup>2</sup>). If pressure is not correct, check control cable adjustment (refer to paragraph C) and control spool travel (refer to paragraph B).

i. Shut down engine and transfer pressure gauge to REV port **(C)**. Install plug in FWD port **(B)**.

j. Start engine and stabilize speed at 1500 RPM.

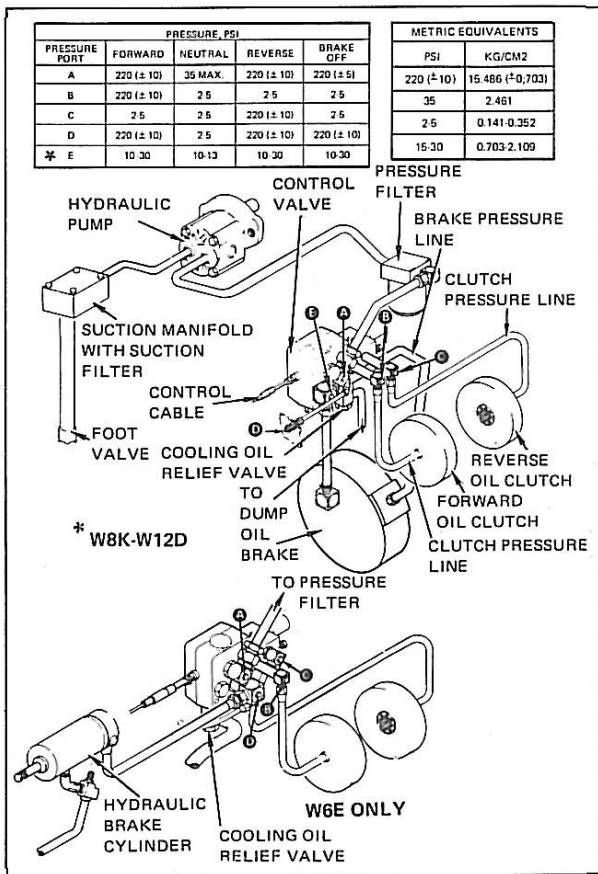


Figure 16. Hydraulic System Pressure Checks

k. Check pressure at REV. port **C** with handlever in NEUTRAL. Pressure should be less than 10 PSI (0.703 kg/cm<sup>2</sup>). If there is an indication of oil pressure greater than 10 PSI (0.703 kg/cm<sup>2</sup>), proceed directly to step p.

1. Check pressure at REV port **C** with handlever in REVERSE. Pressure should be 220 ( $\pm 10$ ) PSI (15.486  $\pm 0.703$  kg/cm<sup>2</sup>). If pressure is not correct, check control cable adjustment (refer to paragraph C) and control spool travel (refer to paragraph B). Move handlever back to NEUTRAL.

m. Setting reverse overlap - install pressure gauges at BRAKE port **D** and REV port **C**. Move handlever slowly towards REVERSE until the pressure at **D** is 160 PSI (11.25 kg/cm<sup>2</sup>). Hold the lever steady. The pressure on gauge **C** should be less than **D** by the amount shown on Table 6 on page 64. If pressure is not correct, then:

1. Loosen reverse overlap valve locknut.
2. Turn reverse overlap adjusting capscrew IN to decrease port **C** pressure, or OUT to increase pressure. Retighten locknut after adjustment is completed.

**NOTE** Use of a test gauge at fitting **D** eliminates the possibility of inaccurate readings from a faulty handling gear pressure gauge.

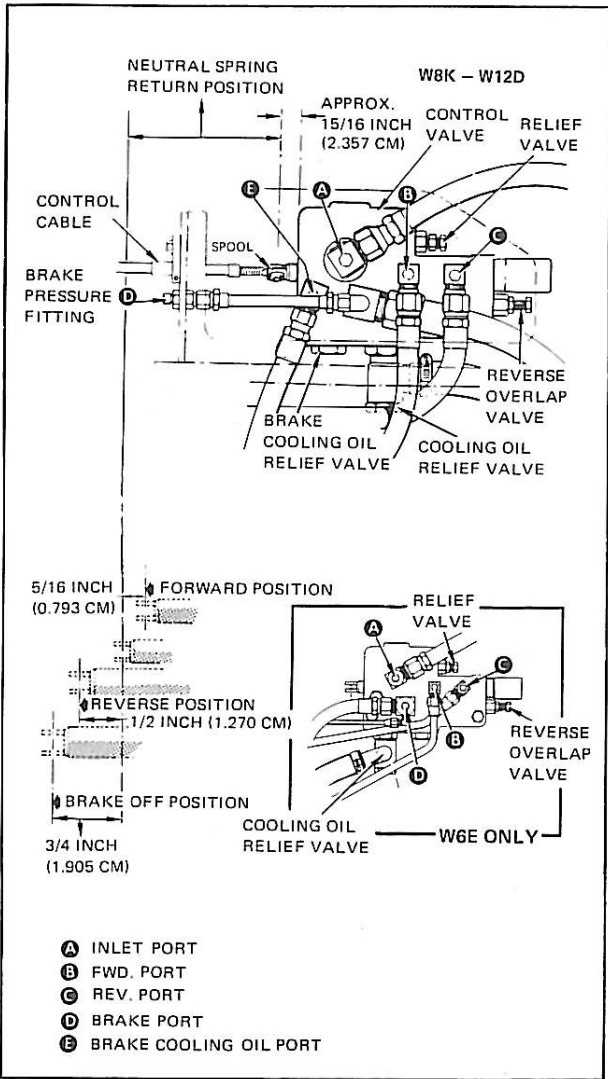


Figure 17. Control Valve Spool Travel Check

n. Stabilize engine speed at 1500 RPM.

o. Check the pressure at brake fitting **(D)** with the handlever in FORWARD, REVERSE, and BRAKE OFF. Pressure should be 220 ( $\pm 10$ ) PSI ( $15.486 \pm 0.703$  kg/cm<sup>2</sup>) for each position. If the pressure is not correct, review previous procedures and repeat as necessary.

p. Shut down the engine and remove the 400 PSI ( $28.124$  kg/cm<sup>2</sup>) test gauge.

q. Repeat the pressure checks at BRAKE fitting **(D)**, FWD port **(B)**, and REV port **(C)** with the handlever in NEUTRAL. Pressure should be 2-5 PSI ( $0.141-0.352$  kg/cm<sup>2</sup>) at each port or fitting. If the pressure is not correct, perform the following:

1. Check the control cable adjustment (refer to paragraph B). Check for cable binding which would prevent the valve spool from automatically returning to NEUTRAL. If necessary, replace the control cable.

2. Check for valve spool binding.

3. Replace the poppet and/or spring in the non-adjustable cooling oil relief valve. (Refer to your Service Manual.)

r. On W8K and W12D Winches only, transfer low range pressure test gauge to the COOLING port **(E)**.

s. Check pressures at port **(E)** with oil temperature at 70-140°F (21-60°C), varying tractor engine speeds and different positions of the control handlever. Pressure at port **(E)** should range from 10 to 30 PSI ( $0.703-2.109$  kg/cm<sup>2</sup>). If pressure is not correct, perform the following:

1. If the pressure is too high, check for a stuck poppet or clogged orifices in the brake cooling oil relief valve. Clean or replace parts as necessary.

2. If the pressure is too low, check for a stuck poppet or weak or broken spring in the brake cooling oil relief valve. Clean or replace parts as necessary.

t. If both high- and low-pressure checks are completed, remove the test gauges, replace any port plugs and replace the control valve access cover.

## B. CONTROL VALVE SPOOL TRAVEL CHECK. (See Figure 17.)

A spool travel check should be made to ensure that the spool mechanical stops will limit spool travel to the exact position for each of the three control positions off of NEUTRAL. Pressures are included, for reference only, to tie together corresponding mechanical position and valve hydraulic function. If hydraulic pressure readings are measured, observe the procedures given in paragraph A. The control valve spool is self-positioned to NEUTRAL by the neutral return spring which is a part of the W-10 spool assembly. The three other travel positions are determined by spool assembly internal stops and detent. If spool travel is found to be out of adjustment, the spool assembly should be repaired or replaced. Ensure that the handling gear and control cable operate freely without binding before starting check. Perform the spool travel check as follows:

a. Check Neutral position of spool. In this position, the spool end should protrude 15/16 inch (2.357 cm) from the valve body. Pressure at port **A** should be 35 PSI (2.461 kg/cm<sup>2</sup>) maximum, 2-5 PSI (0.141-0.352 kg/cm<sup>2</sup>) at ports **B** and **C** and fitting **D**, and 10-30 PSI (0.703-2.109 kg/cm<sup>2</sup>) at port **E**.

b. Move the spool into the valve body until it bottoms. This position is FORWARD and should be at 5/16 inch (0.793 cm) travel from NEUTRAL as shown in Figure 17. The pressure at port **B** should be 220 (±10) PSI (15.486 ±0.703 kg/cm<sup>2</sup>).

c. Move the spool out of the valve body until the first stop is felt. This position is REVERSE and should be at 1/2-inch (1.270 cm) travel from NEUTRAL as shown in Figure 17. The pressure at port **C** should be 220 (±10) PSI (15.486 ±0.703 kg/cm<sup>2</sup>).

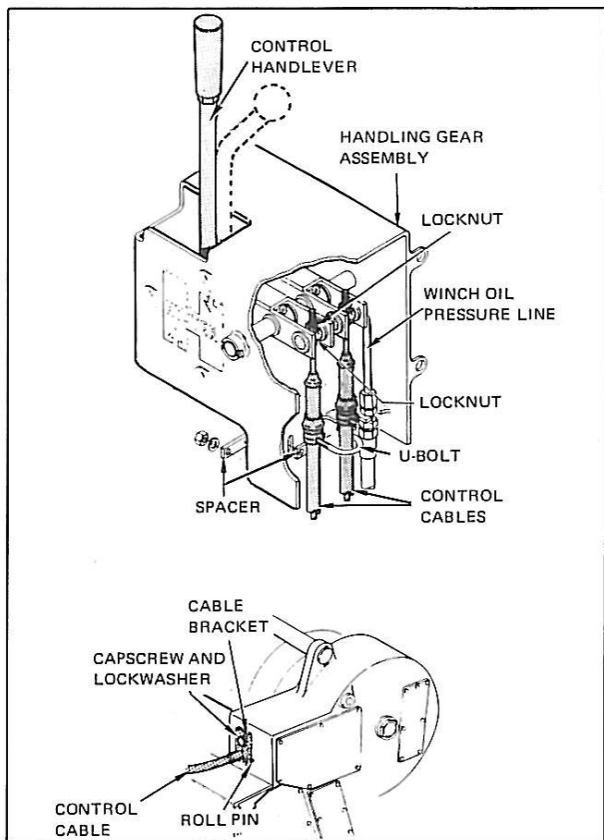


Figure 18. Control Cable Adjustment

d. Move the spool out of the valve body, past the stop felt in step c, into the detent lock-up position. This position is BRAKE OFF and should be at 3/4-inch (1.905 cm) travel from NEUTRAL as shown in Figure 17. Pressure at fitting **(D)** should be 220 ( $\pm 10$ ) PSI (15.486  $\pm 0.703$  kg/cm<sup>2</sup>).

**NOTE** The spool is self-holding in BRAKE OFF. If it does not lockup in this position, the detent parts should be repaired or the spool assembly replaced.

g. Push the spool out of detent and allow spool to return to NEUTRAL.

### C. CONTROL CABLE ADJUSTMENT. (See Figure 18.)

A single teflon-lined control cable connects the handlever, on the handling gear assembly, to the control valve spool. Cable adjustment is limited to synchronizing the handlever position to valve spool position and ensures that full spool travel is not restricted by the handling gear assembly housing. Adjust the cable as follows:

- a. Check valve spool travel as specified in paragraph B.
- b. Ensure that the cable bracket, at the winch end of the control cable, is securely attached to the winch housing and that the roll pin in the bracket is engaged in the cable end groove.
- c. Check the position of the handlever with the control valve in NEUTRAL. The lever should be approximately vertical. If not, correct as follows:

1. Loosen the nuts on the U-bolt that clamp the control cable to the handlever housing. With U-bolt engaged in the cable end groove, move the bolt up or down in the elongated slots to improve the position of the handlever. Tighten the nuts securely.

2. If the U-bolt elongated slots do not allow sufficient travel, loosen the locknuts on the cable end and adjust the nuts as required to extend or retract the cable threaded end in the hole in the handlever pin.

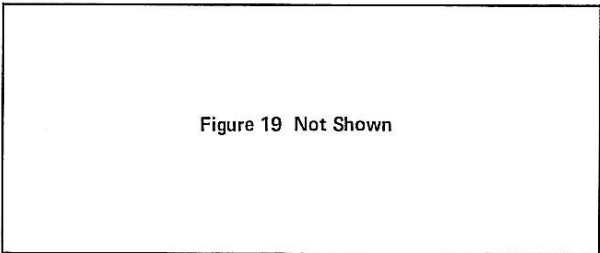


Figure 19 Not Shown

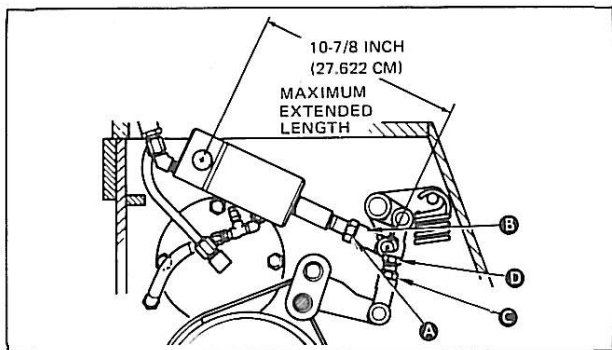


Figure 20. Hydraulic Brake Cylinder and Band Adjustment Diagram, Power Controlled Winch

d. Move the handlever to the FORWARD and BRAKE OFF positions and check that the handlever does not contact the housing in either position. If so, repeat step c.

#### D. ADJUSTING THE BRAKE (W6E WINCH ONLY).

The brake is spring-applied and hydraulically-released. Two adjustments are required to properly adjust the brake. (Refer to paragraphs 1 and 2 below.)

##### 1. Brake Cylinder Adjustment. (See Figure 20.)

- Fully extend the cylinder rod.
- Loosen jam nut **A**. Adjust rod end **B** to maximum extended cylinder length of 10-7/8 inches (27.622 cm).
- Tighten jam nut **A**.

##### 2. Brake Band Adjustment. (See Figure 20.)

- Release the brake.
- Loosen jam nut **C**.
- Turn adjusting link **D** to achieve 1/32-inch (0.078 cm) clearance between the brake band and drum.
- Tighten jam nut **C**.

#### E. OVERWIND AND UNDERWIND ADJUSTMENT PROCEDURE.

Follow the same procedure as listed for the Direct Drive Winches, except omit brake assembly arrangement.

**INSPECTION****A. HOSES AND FITTINGS.**

1. Remove the tractor rear cross sheets and floor-plates to expose the winch hydraulic pump and hoses. Thoroughly clean the winch, pump and hydraulic hoses using high-pressure water or a steam cleaner.

2. Check the pressure hoses for cracks, hardening, softening and swelling. Remove the hose and check the interior section for cracks and restrictions.

3. Remove the suction hose. Carefully check for cracks and for a loose inner liner. Check the outside of the hose for damage.

**NOTE** The condition of the suction hose is very important. A suction hose can allow dirt and air into the system without noticeable effects. Both dirt and air can cause serious damage to the hydraulic system.

4. Check the ends of the suction hose for damage caused by the hose clamps. **IF IN DOUBT, ALWAYS INSTALL A NEW HOSE.** Use sealing compound sparingly on the fittings.

5. Tighten all hose clamps securely.

6. Remove the brake compartment covers and check for oil leakage into the compartment. Check all hoses, tubes and fittings for leakage. Replace any damaged parts. Also, check the brake shaft seal and seal-retainer capscrews for signs of oil leakage. If leakage is present, replace the seal. Sealant type capscrews are available to help seal the retainer. While the brake compartment covers are removed, inspect the brake band as specified in paragraph E.

## **B. ACCESS COVERS AND GASKETS**

Inspect for dented covers, missing capscrews, damaged gaskets and rubber boots that would allow dirt and other foreign material to enter the winch case.

## **C. PUSH-PULL CABLES AND HANDLEVER.**

1. Check the operation of the push-pull cables. Look for loose cable anchors at both the handlever and winch housing. Make sure that the anchor setscrews are in the cable grooves. Replace the cables if they bind or if handlever effort is excessive.

2. Check the handlever assembly for worn bushings and pins. Replace all worn parts.

## **D. BEVEL GEAR SHAFT.**

1. Carefully inspect the cast-iron seal rings at both ends of the shaft. Refer to your Service Manual. Replace worn or broken rings.

2. When installing the bearing retainers, carefully check the retainer bores for nicks, scoring and burrs. The bores should be smooth. Adjust bearing preload or endplay as specified in your Service Manual. Check bevel gear tooth contact and backlash.

3. Adjust the bevel gear shaft locknut as specified in your Service Manual.

## **E. BRAKE BAND.**

Remove the brake compartment access covers. Check the brake band for excessive wear. Check for chips or scoring on the lining. The band should be clean and free of oil.

## **SERVICE**

To ensure the most efficient and dependable service from your winch, the following items should be performed at the time of annual tune-up. Between tune-up times, always follow the recommended hourly or monthly service procedures given in the MAINTENANCE section of this manual.

## **A. DRAIN AND FLUSH THE CASE.**

1. Drain the brake and transmission compartments by removing the plugs shown in Figure 8. Flush the transmission section with a mineral-base solvent.

2. Wipe the bottom of the brake compartment using a lint-free cloth. Be careful not to allow oil to contact the brake lining (Direct Drive winches).

3. Fill the transmission section with oil as specified in Table 1.

## **B. REPLACE THE PRESSURE FILTER.**

1. Remove the access cover (see Figure 7) and filter assembly.

2. Wash the filter bowl and head in cleaning solvent. Blow parts dry using compressed air.

3. Install a new filter element. Be sure to install a new O-ring and back-up ring.

## **C. CLEAN THE SUCTION FILTER.**

1. Remove the suction manifold cover (see Figure 7).

2. Remove the filter, then wash the filter and all parts of the suction manifold in cleaning solvent. Blow parts dry using compressed air.

3. Check the foot valve on the suction line to be sure it is clean and operates smoothly.

4. Install the filter and manifold cover. Always install a new cover gasket.

## **D. CHECK PUSH-PULL CABLE ADJUSTMENT.**

Check that the push-pull cables are adjusted as specified in this manual. This is important for efficient winch operation.

## **UNIT PAINTING**

Upon completion of unit overhaul or major repairs, paint the exterior sections of the winch as follows (see Figure 21):

A. Remove any corrosion or peeling paint using a stiff wire brush or coarse sandpaper. Scrape off any deteriorated decals.

B. Touch-up bare metal surfaces using zinc chromate primer. Allow primer to air-dry for a minimum of four hours.

C. Install all bearing retainers and covers. Cover the winch nameplate, Filter Service Plate, logotype letter decals, and Caution decal with masking tape.

D. Spray paint the entire external surface of the winch with Factory YELLOW enamel.

## **DECAL, NAMEPLATE, AND SERVICE PLATE INSTALLATION**

A. A Caution Decal is located on the drum gear cover, as shown in Figure 21. Make sure that all markings on the decal are clearly legible and that the decal is installed in the correct location. If the decal has been lost or damaged, install a new decal in the proper location.

B. The unit nameplate is located on the left-hand side of the winch housing as shown in Figure 21. Data contained on the nameplate is given in the UNIT IDENTIFICATION section of this manual. If the nameplate has been damaged, install a new nameplate in the same location. Use drive screws for nameplate installation.

C. A filter service plate is located on the left-hand side of the winch housing as shown in Figure 21. If the service plate has been damaged, install a new plate in the location shown. Use drive screws to retain the plate on the housing.

D. The model decals and logotype letter decals are used on both sides of the winch housing as shown in Figure 21. Replace as necessary.

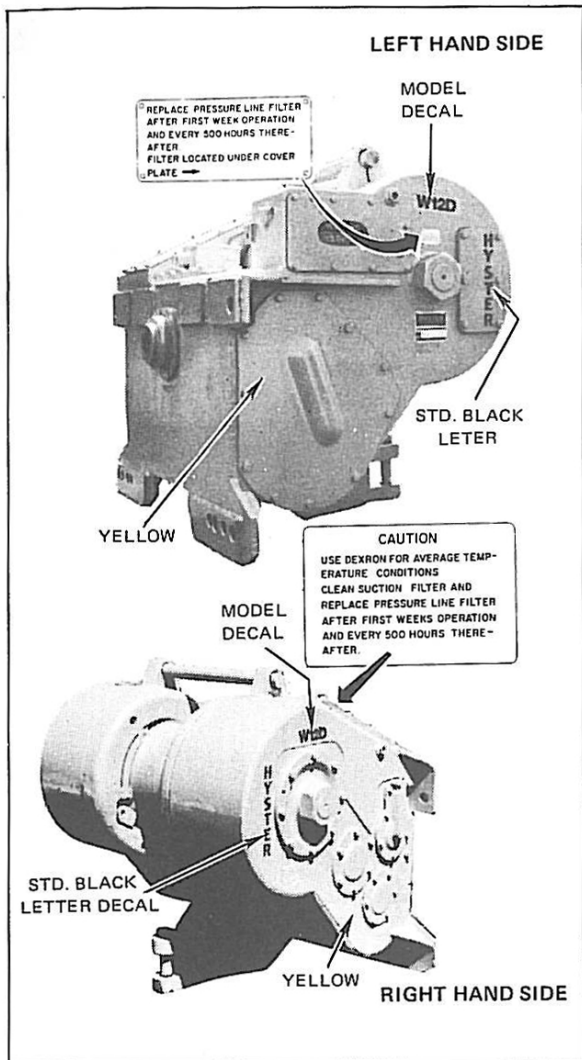


Figure 21. Painting and Decals



Tables 2 and 3 are trouble analysis check charts that list the most common troubles that may be encountered, the probable causes of the trouble and the corrective action that should be taken to restore the unit to a normal operation condition. Always observe the four basic principles of good systematic troubleshooting: Know the System, Determine the Symptoms, List the Possible Causes, then Take Corrective Action. Hit-or-miss troubleshooting wastes time and can cause further problems.

Table 2. Trouble Analysis for Direct Drive Winch

Trouble	Probable Cause	Corrective Action
Hard to Shift into Forward or Reverse	Control cable damaged.	Check for pinched, rusted, or broken cable housing. Replace if defective.
	Control cable improperly adjusted.	Check and adjust as necessary
	Linkage 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.
Will Not Stay in NEUTRAL Position	Detent ball and spring damaged or sticking.	Replace spring if broken. Check that ball is free in the bore. Lubricate ball, spring and bore.
	Annular groove on shifter shaft elongated.	Replace shifter shaft.
	Dental clutches installed backwards.	*

\*Refer to your Service Manual.

Table 2. Trouble Analysis for Direct Drive Winch (Cont.)

Trouble	Probable Cause	Corrective Action
Jumps Out of Gear	Dental teeth worn.	*
	Shifter fork improperly positioned on the shifter shaft.	Check for loose anchor screw on: a. Forward shifter fork. b. Reverse shifter fork. Tighten securely and lock with lockwire.
Brake Not Holding or Hard to Apply	Dental clutches installed backwards.	*
	Shifter forks installed backwards.	*
	Water in brake compartment resulting from condensation or marine use.	Drain water from brake compartment each day if necessary.
	Improper clearance between brake band assembly and brake wheel.	Check that clearance is approximately 1/32-inch (0.078 cm). Refer to ADJUSTMENT Section.
	Worn brake lining.	Replace with new lining.

\*Refer to your Service Manual.

<p>Brake Not Holding or Hard to Apply (Cont.)</p>	<p>Brake cable improperly adjusted.</p>	<p>Adjust cable ends so Brake Handlever applies brake before it reaches end of travel. Refer to ADJUSTMENT Section.</p>
	<p>Brake control cable assembly not anchored securely.</p>	<p>Check for loose connection of control cable house to the:</p> <ul style="list-style-type: none"> <li>a. Handling Gear mounting bracket.</li> <li>b. Winch control housing bracket.</li> </ul> <p>Tighten securely and lock with jam nut.</p>
	<p>Control cable damaged.</p>	<p>Check for pinched, rusted or broken cable housing. Replace if found defective.</p>
	<p>Brake linkage set for overwind operation and winch is used for underwind operation.</p>	<p>Change linkage for underwind operation. Refer to ADJUSTMENT Section.</p>
	<p>Brake linkage set for underwind operation and winch is used for overwind operation.</p>	<p>Change linkage for overwind operation. Refer to ADJUSTMENT Section.</p>

Table 3. Trouble Analysis for Power Controlled Winch

Trouble	Probable Cause	Corrective Action
Erratic Operation	Low oil level.	Add oil as necessary.
	Pump cavitating due to air leaks in hydraulic system.	Check the following for air leaks: a. Suction manifold cover gasket. b. Suction manifold cover screw tightness. c. Suction hose to manifold connection. d. Suction hose to pump connection. e. Suction hose for cracks or collapsed condition. f. Suction manifold pick-up tube weld connection to manifold. g. Pump shaft seal. CAUTION Use only Hyster Approved gaskets and hoses.
	Stuck or clogged suction foot valve.	Clean or replace foot valve as necessary to remove restriction.

	<p>Push-pull cable out of adjustment.</p>	<p>Check for proper adjustments as outlined in ADJUSTMENT Section. Adjust if necessary. Double check push-pull cable casing to be sure it is securely anchored on both ends.</p>
	<p>Tractor engine idling too low.</p>	<p>Adjust to correct idle RPM.</p>
	<p>Oil viscosity too high.</p>	<p>Drain oil and refill with specified hydraulic oil.</p>
	<p>Oil too cold.</p>	<p>Allow oil to warm before operating the winch.</p>
	<p>Low oil pressure.</p>	<p>Refer to LOW OIL PRESSURE troubleshooting procedures.</p>
<p>Low Oil Pressure</p>	<p>Refer to ERRATIC OPERATION troubleshooting procedures.</p> <p>Leaking pressure hoses and fittings.</p>	<p>Refer to LOW OIL PRESSURE troubleshooting procedures.</p> <p>Check for leaks and replace components where necessary.</p>

Table 3. Trouble Analysis for Power Controlled Winch (Cont.)

Trouble	Probable Cause	Corrective Action
Low Oil Pressure (Cont.)	Defective or improperly adjusted relief valve.	Check relief valve setting with pressure gauge as outlined in ADJUSTMENT Section. Replace Relief Valve Assembly if defective.  <b>NOTE</b> Do not rely on brake release pressure gauge when adjusting relief pressure. Always use a calibrated gauge.
Dry Brake Not Releasing (W6E Only)	Brake Oil Pressure Gauge defective.	Check gauge reading against a calibrated gauge. Replace if gauge is faulty.
	Internal slippage (leakage) in the pump.	Check pump for pressure output only after all the above checks have been made.
	Refer to LOW OIL PRESSURE troubleshooting procedure.  Cover plate capscrew too long. (These capscrews will jam against brake lever assembly.)	Remove and replace with correct capscrew.

	Rusted or corroded linkage and pins. Brake cylinder damaged or piston ring worn.	Clean and replace as necessary. * Repair or replace as necessary.
Oil Brake Not Releasing (W8K and W12D Only)	Refer to LOW OIL PRESSURE troubleshooting procedure. Refer to LOSS OF OPERATING OIL PRESSURE IN BRANCH LINES troubleshooting procedure.	
	Brake cooling oil relief valve stuck closed.	* Check relief valve poppet for freedom of operation.
	Friction disc/separator plate pack thickness excessive.	*
Dry Brake Slipping (W6E Only)	Water in brake compartment resulting from condensation or marine use.	Drain water from brake compartment each day if necessary.

\*Refer to your Service Manual.

Table 3. Trouble Analysis for Power Controlled Winch (Cont.)

Trouble	Probable Cause	Corrective Action
Dry Brake Slipping (W6E, W6F Only) (Cont.)	Brake lining saturated with oil.	Replace lining, clean brake wheel and brake compartment, locate source of oil leakage and repair leak. Refer to OIL IN BRAKE COMPARTMENT trouble.
	Broken springs	*Replace as a set.
	Hydraulic brake cylinder incorrectly adjusted. Cylinder rod bottoming.	Adjust as necessary. Refer to ADJUSTMENT Section.
	Improper clearance between brake band assembly and brake wheel.	Check that clearance is <u>approximately</u> 1/32-inch (0.078 cm). Refer to ADJUSTMENT Section.
	Worn brake lining.	* Replace with new lining.
	Brake linkage set for overwind operation and winch is used for underwind operation.	Change linkage for underwind operation. Refer to ADJUSTMENT Section.

\*Refer to your Service Manual.

<p>Dry Brake Slipping (W6E, W6F Only) (Cont.)</p>	<p>Brake linkage set for underwind operation and winch is used for overwind operation.</p>	<p>Change linkage for overwind operation. Refer to ADJUSTMENT Section.</p>
<p>Oil in Brake Compartment (Dry Brake - W6E, W6F Only)</p>	<p>Worn brake shaft seal.</p>	<p>*</p>
	<p>Bevel gear shaft or brake shaft retainer capscrews leaking.</p>	<p>Remove capscrews and coat with sealing compound.</p>
	<p>Ball check connectors (valves) are malfunctioning.</p>	<p>* Replace valves as necessary. <b>CAUTION</b> Upper ball check must point up with pipe thread end installed in fitting and straight thread end out.</p>
	<p>Brake cylinder packing worn or damaged.</p>	<p>*</p>
	<p>Oil leaking from control valve, pressure filter, cooling oil relief valve, brake cylinder, or associated fittings and hoses.</p>	<p>* Repair leaks or replace components as necessary in brake compartment.</p>

\*Refer to your Service Manual.

Table 3. Trouble Analysis for Power Controlled Winch (Cont.)

Trouble	Probable Cause	Corrective Action
Oil Brake Slipping (W8K and W12D Only)	Worn friction discs.	*
	Notches worn in brake assembly cage or hub.	*
	Broken Belleville spring.	*
Overheating	Operating in BRAKE-OFF too long.	Position handlever in NEUTRAL when free spool condition is not required. In BRAKE-OFF position the pump continually works against high pressure release.
	Spool travel improperly adjusted.	Check and adjust as necessary. Refer to ADJUSTMENT Section.
	Excessive inching.	Allow oil to cool periodically. <b>NOTE</b> Install heat exchanger if excessive inching is necessary.
	Clutch cooling oil valve not opening.	* Check and clean valve. Replace valve, if necessary.

\*Refer to your Service Manual.

Overheating (Cont.)	Plugged suction filter.	Remove suction filter, clean, and replace.
	High cooling oil pressure.	* Check cooling oil pressure. Replace cooling oil relief valve assembly if reading is over 7 PSI at the forward or reverse port.
	Insufficient clutch assembly clearance.	* Adjust to correct clearance.
	Control valve spool travel improperly adjusted.	Check spools for correct travel. Refer to ADJUSTMENT Section.
Loss of Operating Oil Pressure in Branch Lines	Broken cast iron seal ring on the bevel gear shaft.	*
	Damaged bevel gear shaft seal ring grooves.	*
	Damaged bevel gear shaft bearing retainers.	*
	Defective spline seals on the bevel gear shaft.	*

\*Refer to your Service Manual

Table 3. Trouble Analysis for Power Controlled Winch (Cont.)

Trouble	Probable Cause	Corrective Action
Loss of Operating Oil Pressure in Branch Lines (Cont.)	Damaged clutch piston, piston retainer, or O-rings.	*
	Clutch cooling oil valve plunger not seating.	* Check and clean valve. Replace spring if weak or broken.
	Damaged brake piston, piston housing, or O-rings.	*
Brake Releases Before Clutch Engagement	Overlap valve in control valve not functioning or out of adjustment.	*
High Oil Level	Engine oil transferring past pump shaft seal into winch hydraulic system (only on some tractor applications).	*

\*Refer to your Service Manual.

Forward or Reverse Oil Clutch Not Engaging	Refer to LOW OIL SUPPLY PRES-SURE troubleshooting procedures. Refer to LOSS OF OPERATING OIL PRESSURE IN BRANCH LINES troubleshooting procedures.	
Forward or Reverse Reverse Oil Clutch Not Releasing	Worn friction discs. Broken or weak release springs. Too little operating clearance in friction disc pack.	* * *

\*Refer to your Service Manual.

# OPTIONAL EQUIPMENT



Table 4 lists the optional equipment available for each winch model. This equipment can be ordered through your Hyster Dealer. Before ordering equipment, refer to your parts manual for the correct part numbers. When ordering, specify the tractor serial number, winch model and the correct name of the optional equipment as it appears in your parts manual. This will ensure prompt delivery of your equipment.

## A. AUTOMATIC BRAKE.

The automatic brake permits the operator to preset the brake before winding in the load, thereby eliminating the need for close coordination in controlling the brake and clutch and possible load slip-back. When the winch drum is turning, the pawl retracts and does not click against the ratchet, but as the drum stops the pawl engages the ratchet instantly.

## B. FAIRLEAD ASSEMBLY.

The fairlead consists of two vertical and two horizontal rolls. Permits pulling line under maximum pull from wide angles. It cannot be used with towed type logging arches.

Table 4. Optional Equipment

Equipment	W12D (DD)	W12D (PC)	W8K (DD)	W8K (PC)	W6E W6F (DD)	W6E (PC)
Automatic Brake	.		.		.	
Fairlead Assembly	.	.	.	.	.	.
Cable Guide Rolls	.	.	.	.	.	.
Swiveling Drawbar	.	.	.	.	.	.
Free-Spooling						.
Small Diameter Drum	.	.	.	.	.	.
(DD) - Direct Drive    (PC) - Power Controlled						

### **C. CABLE GUIDE ROLLS.**

The cable guide rolls replace the winch tie bar ears. They permit pulling in line from wide angles. Recommended for use on all logging operations. Protect line by providing smooth guide surface during side pulls.

### **D. SWIVELING DRAWBAR.**

When pulling equipment that does not have a swivel in the tongue, it is necessary to have a swiveling type tractor drawbar. Although this type of drawbar is available, it is recommended that instead of using the swiveling drawbar, the tongue of the unit being towed should be altered to include a swivel.

### **E. FREE-SPOOLING.**

A free-spooling arrangement is available to allow line to be pulled out by hand. This is accomplished by a shifter arrangement that disengages the drum pinion from the remainder of the gear train, thus allowing the drum to rotate freely.

### **F. SMALL DIAMETER DRUM.**

The winch may be equipped with a small diameter drum when maximum, bare-drum line pull or minimum line speed is needed.

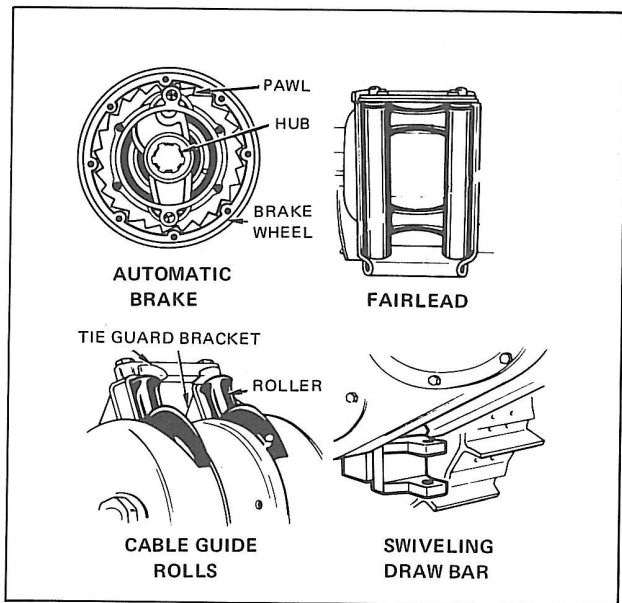


Figure 22. Optional Equipment

Table 5  
Drum Line Capacities per SAE J115B Specifications

Standard Drum	Line Size (Inches)				
	Inches (CM) - Line Length (Feet)				
	3/4 (1.705)	7/8 (2.222)	1 (2.540)	1-1/8 (2.858)	1-1/4 (3.177)
W12D				220	175
W8K		345	268	214	
W6E, W6F	370	293	206		
Small Dia. Drum					
W12D				276	220
W8K		362	280	224	
W6E, W6F	425	305	237		

1. Capacities given are for tight and evenly spooled line. Allowance should be made for loose or unevenly spooled line.
2. To find line length in meters, multiply number of feet by .3048.

Table 6. Hydraulic Specifications

Item	Design Data	
	Direct Drive	Power Controlled
<b>CONTROL VALVE</b> High Pressure Relief Cooling Oil Pressure Brake Cooling Oil Pressure Brake Cooling Oil Relief Pressure Reverse Overlap Pressure Difference	None	220 ( $\pm 5$ ) PSI (15.486 $\pm 0.703$ kg/cm <sup>2</sup> ) 2-5 PSI (0.141-0.352 kg/cm <sup>2</sup> ) 10-30 PSI (0.703-2.109 kg/cm <sup>2</sup> )  20 PSI (1.406 kg/cm <sup>2</sup> ) W6E: 125 — W8K: 80 W12D: 110
<b>SUCTION FILTER</b> Type Relief Valve Opening Pressure	Not applicable	35 mesh, Full Flow Strainer 4.5 to 5.5 PSI (0.317 to 0.387 kg/cm <sup>2</sup> )
<b>PRESSURE FILTER</b> Type Relief Valve Opening Pressure	Not applicable	Full Flow, Replaceable 25-micron element 50 ( $\pm 5$ ) PSI (3.515 $\pm 0.352$ kg/cm <sup>2</sup> )

Table 7. Torque Specifications

Item	Design Data - Ft. Lbs. (Kg/M)	
	Direct Drive	Power Controlled
<b>TORQUE VALUES</b>		
<b>NOTE</b> All torques are given in foot-pounds and with threads lubricated.		
Bevel Gear Shaft Assembly	75 (10)	75 (10)
Bearing Retainer Capscrews	None	175-225 (24.202-31.117)
Bearing Locknut	None	48 (6.638)
Control Valve Mounting Capscrews	75 (10)	75 (10)
Intermediate Shaft Assembly Bearing Retainer Capscrews	75 (10)	75 (10)
Brake Shaft Assembly Bearing Retainers		

Table 7. Torque Specifications (Cont.)

Item	Design Data - Ft. Lbs. (Kg/M)	
	Direct Drive	Power Controlled
Brake Assembly	None	200 (27.660)
Oil Brake Cover Nuts	None	36 (4.979)
Pressure Inlet Fitting Capscrews	69 (9.543)	69 (9.543)
PTO Shaft Assembly Retainer Capscrews	75 (10)	None
Dental Clutch Shift Linkage Shifter Crank Bracket Capscrews	None	36 (4.979)
Pressure Filter Assembly		75 (10)
Head Assembly Mounting Capscrews		
Access Cover		
Suction Manifold	None	
Manifold Mounting Capscrews	75 (10)	75 (10)
Housing Cover Capscrews	75 (10)	75 (10)
Brake Compartment Cover	75 (10)	75 (10)
Brake Linkage Cover	75 (10)	75 (10)
Housing Covers, Miscellaneous	75 (10)	75 (10)

Table 8. Ferrule Sizes

Line Size Inches (CM)	Ferrule Size		
	W6E, W6F	W8K	W12D
3/4 (1.905)	L6		
7/8 (2.222)	L7	J7	J7
1 (2.540)	L8	J8	J8
1-1/8 (2.858)		J9	J9
1-1/4 (3.177)			J10

**NOTE** Generally, wire rope is supplied with swag-type ferrules. When babbitt-type ferrules are used, the above ESCO sizes are available. Refer to Factory Parts-Service Gram A99-Z-17R2 for listing of reusable ferrules.

	<u>Parts Manual</u>	<u>Service Manual</u>
W6E	599189 (Cat Only) 599356 (Non-Cat)	599332
W6F-DD	599750	599753
W8K	599357 PC 599754 DD	599699
W12D	599284 (Cat only) 599692 (Non-Cat)	599700

PARTS BOOKS AND SERVICE MANUALS may be ordered from your local tractor/winch dealer.

RECORD YOUR UNIT DATA HERE

Unit Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

SPECIAL OR OPTIONAL EQUIPMENT  
(List your special or optional equipment  
for future reference)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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