

**AT-8003 AND AT-8029 (CD) WINCH—
AT-8111 WINCH HYDRAULIC DRIVE
DESCRIPTION AND OPERATION**

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2. DESCRIPTION	1	2.01 These winches differ only in the design of the drums. The AT-8003 is a single-drum winch. The AT-8029 Winch is equipped with a divided drum. The AT-8003 and AT-8029 Winches are identical in all other respects.
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5. MAINTENANCE	7	2.02 The winches consist of a drum, drum shaft, hanger assembly, winch clutch and brake assembly, final drive assembly, and a drive and safety brake assembly. The drum and drum shaft are supported by the hanger bearing assembly and the final drive assembly. The winch clutch and brake assembly is mounted on the drum shaft next to the hanger assembly and the drive and safety brake assembly is part of the final drive assembly. The safety brake itself is enclosed in a separate housing above the drive assembly. The components are mounted on an H-beam frame assembly for mounting on the truck chassis. The winches are illustrated in Fig. 1 and 2.
1. GENERAL		
1.01 The AT-8003 and AT-8029 Winches are continuous duty winches intended for truck mounting. ♦Continuous duty (CD) winches are designed so they will not heat under sustained pulls. They may be driven mechanically by the truck engine through a power takeoff or hydraulically with a power take-off driven pump supplying hydraulic fluid to a hydraulic motor attached to the 3-speed AT-8111 Winch Hydraulic Drive.♦		2.03 The AT-8003 and AT-8029 Winches are rated at 20,000 pounds capacity measured at the first layer on the bare drum. ♦To obtain rated capacity, a full torque power takeoff is required.♦ Typical line pulls and line speeds at half and full drums are shown in Fig. 3 for P.T.O. driven winches and Fig. 4 for hydraulically driven winches. The winches are intended primarily for placing and removing underground cable but may also be used for other heavy pulling purposes or work involving sustained pulls.
1.02 This section is revised to:		2.04 ♦List numbers L1B and L2B have been assigned to the AT-8003 Winch to designate drum width. The L1B and L2B Winches are identical in all other respects. The AT-8003 L1B Winch has a drum width of 22-1/2 inches and will
<ul style="list-style-type: none">• Change AT-8003 and AT-8029 list numbers L1A and L2A to L1B and L2B• Revise Fig. 3 and 4• Make miscellaneous changes.		
Change arrows are used to indicate changes.		
1.03 The AT-8111 Winch Hydraulic Drive is essentially a 3-speed transmission fitted with a hydraulic motor. The hydraulic drive is intended for driving truck-mounted AT-7897, AT-8003, and AT-8029 Winches on trucks equipped with hydraulic power.		

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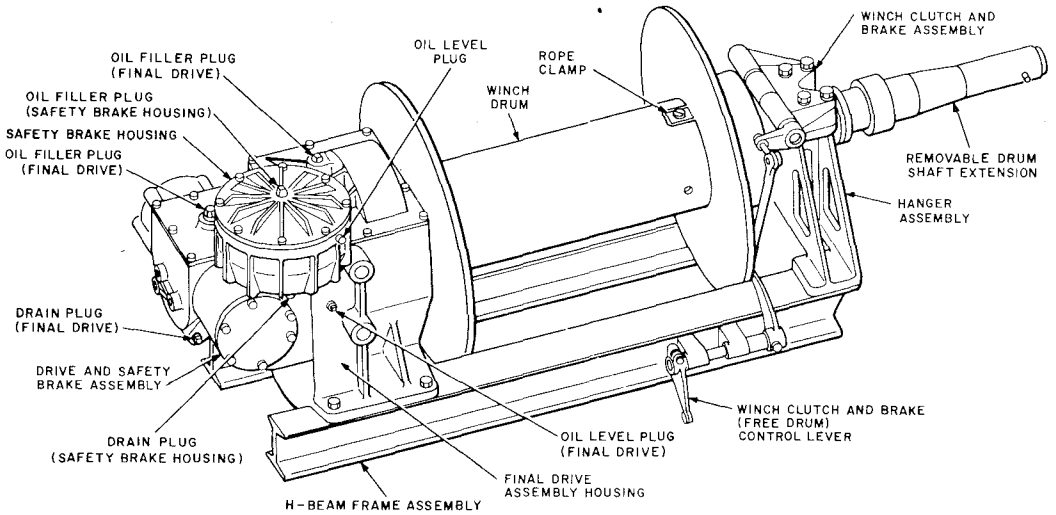


Fig. 1—AT-8003 Winch

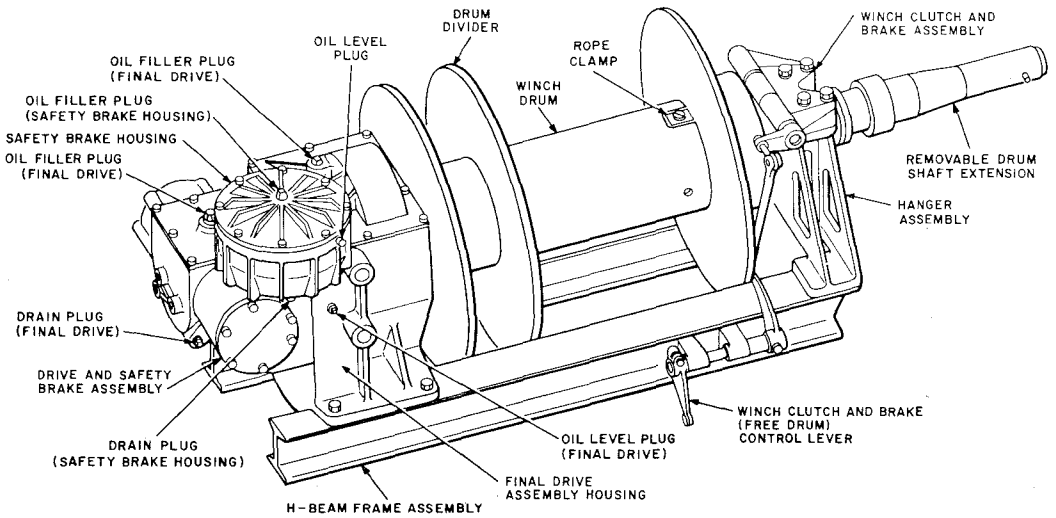


Fig. 2—AT-8029 Winch

TRUCK TRANSMISSION	P. T. O. POSITION-WINCH FORWARD						P.T.O.-WINCH REVERSE(NOTE 4)		
	TOTAL WINCH DRIVE RATIO	LINE PULL LBS. (NOTE 3)		LINE SPEED FT./MIN.		TOTAL WINCH DRIVE RATIO	LINE SPEED FT./MIN		
		HALF DRUM	FULL DRUM	HALF DRUM	FULL DRUM		HALF DRUM	FULL DRUM	
1 8.08	171			29	47	136	37.5	59	
2 4.67	99	(NOTE 1)	(NOTE 1)	50	81	78.5	64	102	
3 2.62	55.7			89	143	44	114	182	
4 1.38	29.3	14,000	10,000	172	272	24.2	216	346	
5 1.00	21.2	10,000	7,250	236	375	16.8	300	475	
R 8.12	172	WINCH REVERSE		29	46	136.5	29(NOTE 2)	46(NOTE 2)	

NOTES:

1. ABOVE CAPACITY OF 1/2 IN. WINCH LINE.
2. WINCH FORWARD
3. LINE PULLS AND LINE SPEEDS BASED ON ENGINE TORQUE OF 300 LBS.-FT. AT 1600 R.P.M. LINE PULLS SHOWN ARE TYPICAL AND MAY VARY.
4. MOST POWER TAKE-OFFS ARE NOT EQUIPPED WITH REVERSE DRIVE. THEREFORE, WINCH REVERSE CAN BE OBTAINED ONLY BY SHIFTING THE TRUCK TRANSMISSION INTO REVERSE.

◆ Fig. 3—Winch Line Pulls and Winch Line Speeds for AT-8003 and AT-8029 Winches with P.T.O. Drive ◆

WINCH HYDRAULIC DRIVE RATIO	TOTAL WINCH DRIVE RATIO	LINE PULL LBS			LINE SPEED FT/MIN		
		BARE DRUM	HALF DRUM	FULL DRUM	BARE DRUM	HALF DRUM	FULL DRUM
HIGH .91	18	7,300	4,350	3,100	139	233	312
INT. 2.3	46	18,600	11,000	7,800	55	92	123
LOW 5.4	108	ABOVE CAPACITY OF 1/2 IN WINCH LINE		18,400	23	39	52

NOTES:

1. LINE PULL AND LINE SPEEDS BASED ON 2-1/4 IN HYDR. GEAR MOTOR. SPEED 1200 R.P.M. AT 40 G.P.M. TORQUE 1800 LBS.-IN AT 2000 P.S.I.
2. LINE PULLS SHOWN ARE TYPICAL AND MAY VARY.

◆ Fig. 4—Winch Line Pulls and Winch Line Speeds for AT-8003 and AT-8029 Winches Using Winch Hydraulic Drive AT-8111 ◆

accommodate 2100 feet of 7/16-inch wire rope wound with a winch rope winder. The AT-8003 L2B Winch has a drum width of 28 inches and will accommodate 2500 feet of 7/16-inch wire rope wound with a winch rope winder.◆

2.05 ◆List numbers L1B and L2B have been assigned to the AT-8029 Winch to designate the position of the small drum section. On the

AT-8029 L1B Winch, the small drum section is located next to the drive assembly side; on the AT-8029 L2B Winch,◆ it is next to the winch clutch and brake assembly. The large section is 18 inches wide and will accommodate 1600 feet of 7/16-inch wire rope wound with a winch rope winder. The small section is 4 inches wide and will hold 250 feet of 7/16-inch wire rope wound without a winch rope winder. ◆The AT-8029 Winch was designed

to accommodate derrick operation, the small section being used for a derrick fall line. New rotating derricks usually have boom-tip winches or a turret winch and the AT-8029 is not in general use.♦

2.06 ♦The winch drum heads are 8 inches in diameter with 19-inch diameter flanges.♦ The drums are equipped with a combination clutch and brake. The clutch can be disengaged when there is no load on the winch to permit the drum to rotate freely. The drum brake is intended to retard rotation of the freely rotating drum and not to hold a load. A safety brake, which functions as an automatic brake, holds the load when power is cut off. ♦When paying out winch rope, input power must be sufficient to overcome the brake force.♦ The drum shaft is furnished with a removable drum shaft extension which extends to the right to be flush with the outside of the truck body for mounting a power reel.

AT-8111 WINCH HYDRAULIC DRIVE

2.07 The AT-8111 Winch Hydraulic Drive is a heavy-duty, 3-speed transmission fitted with a high torque hydraulic motor that is operated by the truck hydraulic system.♦ The transmission is capable of transmitting sufficient torque not only for driving the winch in the forward direction but also for driving the winch against the automatic load brake. Ratios, winch line pulls, and winch line speeds which can be obtained with the hydraulic drive are given in Fig. 4. The AT-8111 Winch Hydraulic Drive is illustrated in Fig. 5.

2.08 List numbers have been assigned to identify hydraulic drives that have different first reduction pinions. The AT-8111 L1A Drive is used with a Commercial Shearing and Stamping Company motor. The AT-8111 L2A Drive is used with a Vickers, Inc. motor.

2.09 The AT-8111 L3A Drive Accessories consists of a silent chain, idler, and idler bracket for directing power from the drive to the winch; a bracket and necessary hardware for mounting the drive and accessories; and drive installation information. One AT-8111 L3A Drive Accessories is required to mount an AT-8111 L1A or L2A Hydraulic Drive on an AT-8003 or AT-8029 Winch.

2.10 The AT-8111 L4A Drive Accessories consists of a silent chain, winch sprocket, winch bracket, idler, and idler bracket for directing

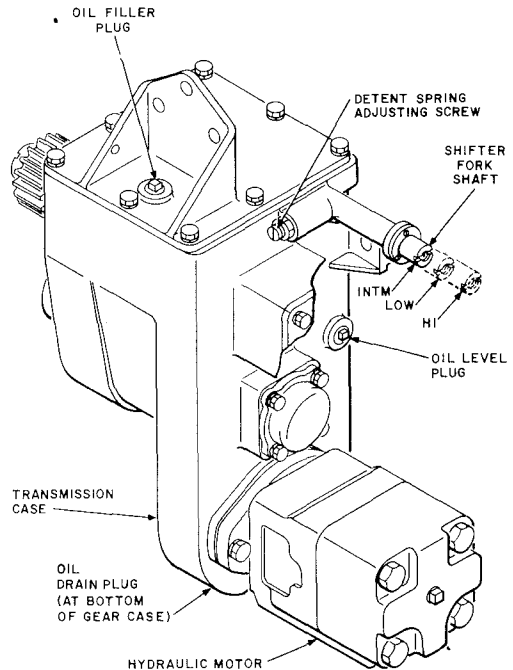


Fig. 5—AT-8111 Winch Hydraulic Drive

power from the drive to the winch; a bracket and necessary hardware for mounting the drive and accessories; and drive installation information. One AT-8111 L4A Drive Accessories is required to mount an AT-8111 L1A or L2A Hydraulic Drive on an AT-7897 UG Winch.

3. PRECAUTIONS

3.01 All personnel associated with winch operation should be familiar with the signals described in Section 620-020-020. However, the responsibility for giving the signals during work operations should be assigned to **one** individual. Other personnel should not attempt to give signals unless an emergency should arise.

3.02 The truck operator should be thoroughly familiar with the operation of the truck, the power takeoff, and the winch and should know the effect the truck clutch, accelerator pedal, truck transmission, and power take-off controls will have

on the winch. If the winch is driven hydraulically, the operation of the hydraulic drive and the truck hydraulic system and their effect on winch movements should be thoroughly familiar to the operator. The operator shall not leave his position at the controls while the load is suspended.

3.03 The winch and winch line shall not be loaded beyond their rated load capacity. The loaded winch line shall not be extended beyond the point where less than 20 full wraps of rope remain on the winch drum. Stand clear of loads suspended by the winch line. Do not stand inside of angles formed by the winch line and, where possible, do not stand where there is a danger of being struck by the winch line if it should break.

3.04 Gloves should be worn when handling the winch line and the hands should be kept at least 3 feet away from any sheave, block, eye, and the drum when guiding the winch line.

3.05 Operate the winch as smoothly as possible. Sudden, jerking pulls can place extreme loads on the equipment causing damage or possible equipment failure.

3.06 Be sure the winch clutch and brake is properly engaged before attempting to move a load with the winch. If the clutch does not positively engage when the lever is moved to the CLUTCH-IN position, it may be necessary to engage the winch drive momentarily to align the clutch teeth. The clutch should then engage with a positive clang. In some vehicles, lights or sight blocks are provided to indicate full clutch engagement.

3.07 Standard safety headgear and eye protection must be worn during all operations involving the use of the winch.

4. OPERATION

WINCH CLUTCH AND BRAKE

4.01 The winch clutch and brake, mounted on the winch shaft, is a dual purpose device. It will transmit power from the winch shaft to the drum utilizing a 16-tooth parallel sided spline or will allow the drum to run freely on the shaft. The brake serves to slow down or stop free rotation and is *not* designed to *hold a load*.

4.02 The winch clutch consists of a flanged collar (clutch and brake plate) and an outer sleeve. Teeth in the edge of the flange match similar teeth in a projection on one drum flange. The clutch and brake plate is faced with brake lining. The outer sleeve (detent sleeve) slides on the collar of the clutch and brake plate to release the detent which locks the clutch and brake assembly in the CLUTCH-IN or CLUTCH-ENGAGED position. The detent sleeve and the clutch and brake plate are positioned by the winch clutch and brake control. Depending upon the type of installation, the winch clutch and brake controls may be actuated by one of the following methods:

- (a) Manual operating lever mounted on shifter fork shaft (operated from truck bed).
- (b) Manual control lever in vehicle cab.
- (c) Electrovacuum cylinder, remote control switches in cab or at rear of vehicle.
- (d) Electric actuator, remote control switches in cab or at rear of vehicle.

4.03 Actuating the winch clutch and brake control from the CLUTCH-IN to the free-drum position moves the sleeve on the collar to unlock the detent. Continued actuation of the control moves the entire clutch assembly toward the drum, disengaging the clutch teeth. The drum can then freely rotate and the lever may be released. The clutch will remain disengaged until the lever is again moved. When returning the clutch to the CLUTCH-IN or CLUTCH-ENGAGED position, full engagement is accompanied by a characteristic clang. If the clutch does not engage immediately, another workman should be requested to pull back on the winch line until the characteristic clang is heard.

4.04 Application of the brake is accomplished by moving the mechanism toward the winch drum to the limit of its travel, which brings the brake lining against the machined face on the drum flange. Pressure must be kept on the clutch and brake plate to keep the brake on. Release of the pressure permits a heavy coil spring to push the brake away from the drum to the free-drum position. The brake is not intended to hold the drum against a load, but is intended merely to slow down and stop the drum to prevent the winch line from spilling over and becoming tangled.

SAFETY BRAKE

4.05 The safety brake is an automatic device designed to hold a load on the winch line and prevent the winch from overrunning when the power is cut off. ♦The load is held through the application of an irreversible worm and friction discs.♦

4.06 Basically the brake mechanism consists of a double-thread worm wheel, an overrunning clutch and a multiple disc-friction brake which operates in an oil bath to aid in heat dissipation.

4.07 The action of the brake is as follows: When the winch is operated in the take-up direction, the brake is inoperative since the input shaft freewheels in the overrunning clutch. When the take-up power is cut off, the suspended load attempts to drive the winch in the reverse direction. This causes the sprags within the overrunning clutch to lock up causing the worm wheel to attempt to drive the worm. A multiple disc brake on the worm shaft augments the braking action to give positive braking of the worm and wheel. The axial pressure on the brake plates determines the load which can be suspended on the winch line. The tension on the four springs located in the thimbles on the brake pressure plate determines the degree of braking effort. The tension on these springs may be increased or decreased by removing the safety brake housing cover and adjusting the nuts on the spring mounting studs. ♦Since the braking effort must be overcome by the winch when paying out winch line, the brake should be set no tighter than necessary to hold a normal load. If the brake is set too tight, the transmission or hydraulic drive will have to be in low gear to pay out winch line. If heavy loads, such as reels of cable, are normally handled, it may be necessary to use low gear to pay out the winch line because of the brake adjustment required to hold the load.♦ When making brake adjustments, the springs must be compressed equally or braking action will be erratic.

4.08 When the winch line is being paid out, the winch is being driven against the braking action. To prevent overheating, the brake plates run in an oil bath. However, it is recommended that loads be driven downward at a slow speed and that the winch be slowed further before winch power is cut off. ♦When it is desired to pay out more than 100 feet of winch line, disengage the

drum clutch and manually pull the winch rope off the drum.♦

OPERATING THE WINCH—MECHANICALLY DRIVEN

4.09 When mechanically driven, the winch drive sprocket is connected to a full torque power takeoff by means of a silent chain. The winch is controlled by operation of the truck clutch and by selection of the proper gears in the truck transmission and power takeoff.

4.10 ♦The various possible positions of the power take-off lever and the clutch and brake lever must be just as familiar to the operator as the operation of the truck transmission.♦ A complete knowledge of the various combinations available through proper manipulation of the transmission and power takeoff is required to realize the full capabilities of the equipment.

4.11 To operate the winch, the following steps are necessary:

- (1) Depress truck clutch pedal.
- (2) Start engine.
- (3) Select truck transmission lever position desired. Whenever possible, the truck transmission lever should be used for changing speed and direction of winch rotation because it is easier to shift than it is to shift the power takeoff.
- (4) Move power take-off lever to give desired direction of rotation of the winch—forward or reverse.

♦**Note:** If power takeoff does not have a reverse position, reverse (payout) is obtained by shifting the truck transmission to the reverse position.♦

- (5) Check the winch clutch lever to make sure that it is in the clutch engaged position.
- (6) Release the truck clutch pedal slowly, meanwhile bringing the engine up to speed.
- (7) To stop the winch, depress the truck clutch pedal. The left foot should remain lightly on the clutch pedal during winch operation in readiness for a quick stop.

4.12 When choosing power take-off and truck transmission positions, it should be remembered that when one lever is in a forward position and the other in a reverse position, the winch line will pay out and that when both levers are in either the forward or the reverse position the winch line will pull in. Whenever possible, the truck transmission should be used for sifting because a greater choice of speeds is available. If, for example, a fast payout and a slow pull-in is required, it could be obtained by placing the power takeoff in the winch reverse position and shifting the truck transmission into one of the forward positions for the payout and to the reverse position for the pull-in.

4.13 It is recommended that winches be operated in the highest transmission speed which will enable the load to be moved easily and smoothly. It is also recommended that the proper speed be selected *before starting the pull* to eliminate trouble usually resulting from attempting to shift *after* starting the pull. When lowering loads, care should be taken to lower slowly and carefully and whenever possible, engine speed should be slowed to idling before the clutch pedal is depressed.

OPERATING THE WINCH—HYDRAULICALLY DRIVEN

4.14 When hydraulically driven, the winch drive sprocket is connected to the AT-8111 Winch Hydraulic Drive by means of a silent chain. The winch is controlled by a directional control valve and by the selection of the proper gears in the AT-8111 Drive. The mechanical shift linkage for selecting the speed range for the hydraulic drive is usually connected to an operating lever located adjacent to the hydraulic valve bank assembly or at the rear of the truck. High-production cable placing vehicles are adapted for remote control operation by use of a pendant equipped with a control panel.

4.15 To control winch direction of rotation on trucks, move the directional valve to the WINCH FORWARD position for "pulling in" and to the WINCH REVERSE position for "paying out." On trucks equipped with a remote control pendant, winch directional switches are incorporated in the control panel which provides electrical controls to start and stop the truck engine and to regulate engine speed.

4.16 To operate the winch the following steps are necessary:

- (1) Start the truck engine and engage the power takeoff to operate the hydraulic pump. Set the truck engine throttle to proper engine idle speed. On full torque power takeoffs, it will be necessary to select a transmission speed. This is usually specified by the hydraulic equipment manufacturer and is posted in the vehicle cab. If not specified, place the transmission in the highest gear (4th or 5th) available.
- (2) Shift the AT-8111 Winch Hydraulic Drive to obtain the desired speed range (Intermediate-Low-High).
- (3) Check the winch clutch lever to make sure it is in the CLUTCH-ENGAGED position.
- (4) Operate the winch directional control valve handle (or remote switch) for the desired winch direction of rotation.
- (5) To stop the winch, release the winch directional control handle (or remote switch).

4.17 It is recommended that winches be operated in the highest speed range that will allow the load to be moved easily and smoothly. The proper speed should be selected before starting the pull to eliminate possible trouble resulting from attempting to shift after starting the pull. When lowering loads, use the low range on the AT-8111. Avoid abrupt stops by easing off on the direction control lever.

5. MAINTENANCE

5.01 Inspection of the winch and hydraulic drive should be a continuous process during operation of the equipment. The operator should be constantly alert to detect any unusual or excessive oil leakage, overheating of the brake housing or final drive assembly, and changes in the shifting characteristics of the winch transmission or the hydraulic drive.

5.02 The operator should observe the action of the power takeoff during operation, note looseness of drive chain as evidenced by chattering, and be aware of any unusual or excessive noises in the equipment while it is operating. In any case where equipment trouble is detected, it should

be reported in accordance with established local procedures.

5.03 The condition of the winch line should be checked each time the winch is used. The winch line should be handled and inspected in accordance with methods given in Section 649-310-011.

5.04 The winch has two oil reservoirs in which the oil level must be maintained:

(a) **Safety Brake Housing (Drive and Safety Brake Assembly)**—To check the oil level, remove the oil level plug in the side of the housing. The lubricant in the housing should be kept to the height of the oil level plug. To add oil: With the oil level plug removed, remove the filler plug in the brake housing cover and add SAE20 engine oil, as required, to fill the housing to the proper level. The level plug should always be removed before adding oil to prevent overfilling. Drain the oil from the housing and replace with new oil at least once each year.

(b) **Final Drive Housing and Drive Housing (Drive and Safety Brake Assembly)**—The oil level in these housings will be the same because of the flow-through of lubricant from one housing to the other. To check the oil level, remove the oil level plug on the front of the final drive housing. The lubricant should be kept to the height of the oil level plug. To add oil: With the oil level plug removed, remove the filler plug in the final drive housing cover and add SAE90 mild noncorrosive, extreme pressure oil, as required, to fill the housings to the proper level. The oil level plug should

always be removed before adding oil to prevent overfilling. Be certain that the oil has time to equalize its level between final drive housing and drive housing. Drain the oil from the housings and replace with new oil at least once each year. To completely drain the housings, the drain plug in both housings must be removed.

5.05 The oil level in the AT-8111 Hydraulic Drive should be kept to the height of the oil level plug on the front of the transmission case. To add oil: With the oil level plug removed, remove the filler plug from the top of the transmission in the transmission cover and add SAE90 oil until the oil is at the proper level. The oil level plug should always be removed before adding oil to prevent overfilling. Drain the oil from the transmission case and replace with new oil at least once each year.

5.06 Grease the winch hanger bearing (one fitting), the clutch shaft (two fittings), and the winch chain adjusting sprocket (one fitting) every 75 hours of operation or semiannually.

5.07 Apply cup grease sparingly to the drum clutch splines every 75 hours of operation or semiannually.

5.08 Apply a few drops of engine oil, as required, to the pivot points in the clutch and brake linkage to assure free operation and to minimize wear.

5.09 Lubricate drive chains on the inside with CITCO (Cities Service) Anti-Corrode No. 100 or a good grade of engine oil as required.