▶AT-8467 (LCD) WINCHES
DESCRIPTION AND OPERATION◀

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1. GENERAL

1.01 ▶The AT-8467 winches are Light Continuous Duty (LCD) winches rated at 10,000 pounds and are designed for truck mounting. These winches are directly driven by an integrally mounted hydraulic motor and will not overheat on substained pulls as is common with the worm drive winches.◀

1.02 ▶This section is revised to:

- Emphasize the continuous duty feature
- Add information to initial operation procedures
- Change the method of testing and adjusting the hydraulic motor compensator
- Add precautions.

Change arrows are used to indicate these changes.◀

1.03 ▶The hydraulic motor used to drive the winch is operated by an SAE power take-off driven pump. The use of the hydraulic motor eliminates the chain drive, mechanical transmission, and manual gear shifting that is required with variable speed mechanically driven winches.◀

1.04 The hydraulic motor is a variable-displacement, pressure-compensated motor that operates at a speed that is automatically modulated by system pressure. As the load increases, system pressure increases and winch speed decreases. The speed is varied through a 3:1 speed range, with torque varying proportionately, to provide approximately constant horsepower.

2. DESCRIPTION

2.01 The major components of the AT-8467 Winches are the drum, a drum shaft assembly, a hanger assembly, a winch clutch and brake assembly, a final drive assembly, a drive and safety brake assembly, and the variable displacement hydraulic motor. The drum and drum shaft are supported by the hanger 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 mounted adjacent to the final drive assembly. The safety brake itself is enclosed in a separate housing mounted on top of the drive assembly. The hydraulic motor is mounted on the drive and safety brake housing. The assembled components are mounted on the winch frame assembly for mounting on a truck chassis.

2.02 The AT-8467 L1A and L2A Winches are identical except for drum length. The drums are 8 inches in diameter and have flanges that are 19 inches in diameter. The AT-8467 L1A Winch (Fig. 1) has a drum length of 22-1/2 inches and will accommodate 2100 feet of 7/16 inch wire rope wound with a winch rope winder. The AT-8467 L2A Winch has a drum length of 16 inches and will accommodate 1400 feet of 7/16-inch wire rope wound with a winch rope winder. Typical winch line pulls and line speeds for the winches are shown in Table A.

TABLE A

WINCH LINE PULLS AND WINCH LINE SPEEDS FOR AT-8467 WINCHES

WINCH LINE PULL (Pounds at 2500 PSI)			WINCH LINE SPEED (Ft/Min at 20 GPM and 0 to 2000 PSI)		
BARE DRUM	HALF DRUM	FULL DRUM	BARE DRUM	HALF DRUM	FULL DRUM
14000	9000	6500	105	170	240
Note: Pressure Compensator Set at 2000 PSI					

2.03 The winch clutch and brake assembly can be operated from the truck cab or from the rear of the truck. The clutch can be disengaged, only when there is no load on the winch to permit the drum to be free spooled. The brake is intended to retard drum rotation and is not intended to hold a load. The load is held by an automatic brake in the winch drive when the winch is not being driven.

2.04 The drum shaft extends to the right and is designed to accommodate either an AT-8467 L3A or L4A Extension Shaft. When in place, the end of the extension shaft will be flush with the right side of the truck body and will accommodate a power reel. The extension shafts must be ordered separately with the required overall length specified. Shafts with an overall length of 19 inches or less are covered by L3A, and shafts with an overall length in excess of 19 inches are covered by L4A.

2.05 The AT-8467 Winches will accommodate an AT-8414 Winder (CH Type) which must be ordered separately.

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 winch operator should be thoroughly familar with the operation of the truck, the power takeoff, and the winch as well as the operation of the truck hydraulic system. The operator shall not be allowed to leave his position at the controls while a load is suspended.

3.03 The winch and winch line shall not be loaded beyond their rated 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 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.

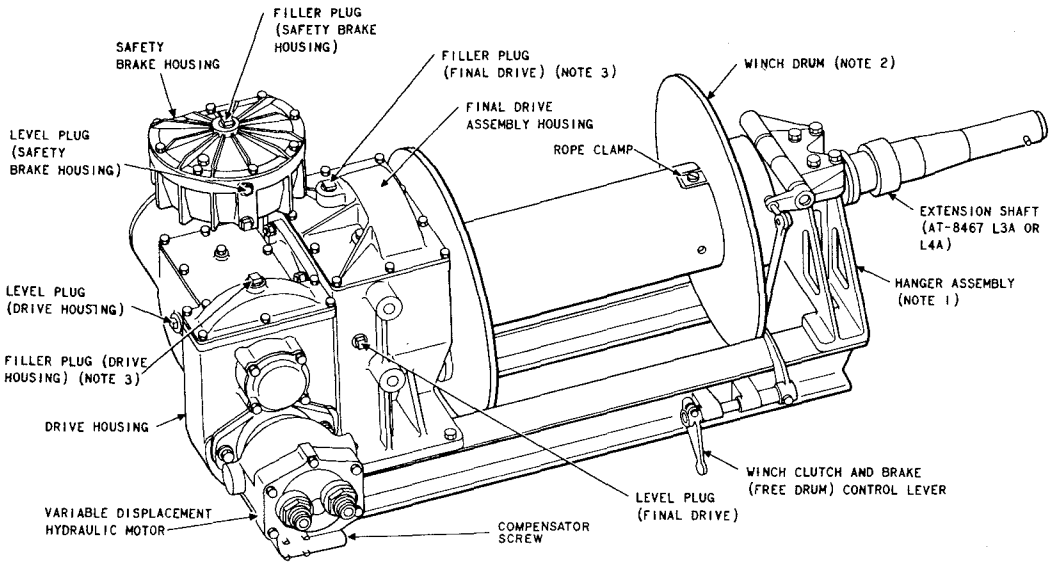
3.07 Standard safety headgear and eye protection must be worn during all operations involving the use of the winch.

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



NOTES:

1. AT-8467 L2A WINCH HAS A SHORTER DRUM LENGTH THAN L1A WINCH AND UTILIZES TWO HANGER ASSEMBLIES TO SUPPORT DRUM SHAFT.
2. DRUM LENGTH IS 22-1/2 INCHES FOR L1A WINCH AND 16 INCHES FOR L2A WINCH.
3. FLOW-THROUGH OF LUBRICANT FROM FINAL DRIVE HOUSING TO DRIVE HOUSING ALLOWS BOTH HOUSINGS TO BE FILLED THROUGH EITHER ONE OF THE FILLER HOLES, HOWEVER, TO COMPLETELY DRAIN BOTH HOUSINGS, THE DRAIN PLUG ON BOTTOM OF FINAL DRIVE ASSEMBLY HOUSING AND TWO DRAIN PLUGS ON BOTTOM OF DRIVE HOUSING MUST BE REMOVED.

Fig. 1—AT-8467 L1A Winch

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, the winch line may be pulled until the clang sound is heard.

4.04 Application of the brake is accomplished by moving the mechanism toward the winch drum to the limit of its travel, bringing 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 loosening and becoming tangled ▶when the winch is in "free drum."◀

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.

4.06 The brake mechanism consists of a double-thread worm and 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.

4.08 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. When making such an adjustment, the springs must be compressed equally or braking action will be erratic.

4.09 When the winch line is being payed out, the winch is being driven against the braking action. For cooling the brake plates, run in an oil bath. However, do not pay out more than ▶100◀ feet of winch line by driving against the brake since overheating may occur. Lengths of more than ▶100◀ feet should be payed out by declutching the winch drum. 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.

PREPARATION PRIOR TO INITIAL OPERATION OF THE WINCH

4.10 ▶An improperly designed hydraulic system will result in unsatisfactory winch operation. The vehicle hydraulic system must have these characteristics:

(1) Pressure relief valve setting—2500 to 2800 psi.

(2) Flow rate—20 gpm.◀

Before placing the winch into service initially:

(a) Be certain that all gear housings are filled with the proper lubricant. (See Part 5.)

(b) Be certain that the hydraulic system is filled with the proper grade of oil and that the reservoir shut-off valve is open.

(c) ▶Before rotating the hydraulic motor,◀ disconnect motor drain line from tank and pour hydraulic oil into drain line to flood the motor casing. ▶It is important that this be done on all new or replacement motors ***before*** they are rotated for the first time; otherwise, ***motor seizure may occur.*** Reconnect the motor drain line.◀

(d) Engage the hydraulic pump and allow the oil to circulate for a few minutes before operating the winch.

OPERATING THE WINCH

4.11 The winch is driven by an integrally mounted hydraulic motor that is connected to the truck hydraulic system and controlled by a directional control valve. To control winch direction of rotation, move the directional control valve handle to the winch forward position for "pulling in" and the

winch reverse position for "paying out". On trucks equipped with a remote control pendant, winch directional switches are incorporated in the control panel.

4.12 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 ▶if it is a fixed control. On winches with variable speed control, regulate the truck engine speed with the throttle as required.◀

(2) Place the winch clutch lever in the CLUTCH-ENGAGED position.

(3) Operate the winch directional control valve handle (or remote switch) for the desired winch direction of rotation. Winch speed is controlled by the control valve ▶and truck engine speed◀ within the limits of the pressure compensator. When lowering loads, operate the winch at a slow speed.

(4) To stop the winch, release the winch directional control handle (or remote switch).

Note: Avoid abrupt stops by easing off on the direction control valve handle.

5. MAINTENANCE

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

5.02 Observe the action of the power takeoff during operation 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 ▶to motor equipment forces◀ 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 reservoirs in which the lubricant level must be maintained:

(a) ***Safety Brake Housing (Drive and Safety Brake Assembly)***—To check the lubricant level, remove the level plug in the side of the housing. The lubricant in the housing should be kept to the height of the level plug. To add lubricant: With the 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 lubricant to prevent overfilling. Drain the housing and replace with new lubricant at least once each year.

(b) ***Final Drive Housing and Drive Housing (Drive and Safety Brake Assembly)***—The lubricant level in these housings will be the same because of the flow-through of lubricant from one housing to the other. To check the lubricant level, remove the level plug on the front of the final drive housing. The lubricant should be kept to the height of the level plug. To add lubricant: With the level plug removed, remove the filler plug in either the final drive housing or the drive housing cover and add SAE90 mild noncorrosive, extreme pressure lubricant, as required, to fill the housings to the proper level. The level plug should always be removed before adding lubricant to prevent overfilling. Be certain that the lubricant has time to equalize its level between final drive housing and drive housing. Drain the housings and replace with new lubricant at least once each year. To completely drain the housings, the drain plugs in both housings must be removed.

5.05 Grease the winch hanger bearing (one fitting) and the clutch shaft (two fittings) every 75 hours of operation ▶or semiannually.◀

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

5.07 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.

5.08 System hydraulic pressure relief valve setting ▶should be 2500 to 2800 psi. It should never

be less than 2500 psi. The hydraulic motor compensator should be set at 2000 psi.◀

5.09 ▶Accurate adjustment of the hydraulic motor compensator is necessary to obtain the proper winch speed. To provide the means for testing the adjustment of the motor compensator, design the hydraulic system as shown in Fig. 2. Place six or seven turns of wire rope on the winch drum and secure the free end to a dead weight that will result in a minimum winch line tension of about 1,000 pounds while the weight is in motion. This can be accomplished by hauling the weight across a level surface or by raising a suspended load. To make the compensation adjustment, proceed as follows:

(1) With the load in motion and the needle valve ***fully open,*** count and record the number of winch shaft revolutions. This should be about 55 rpm.

(2) With the load in motion, gradually close the needle valve until the pressure gauge on the input side of the winch reaches 2,000 psi. At this point, there should be a very noticeable reduction in winch rotational speed.

(a) If the winch ***does*** not slow down at this pressure, stop the pull and turn the compensator screw about 1/4-turn ***counterclockwise.*** Repeat the procedure and if the winch slows down ***before*** the pressure gauge reaches 2,000 psi, turn the compensator screw about 1/8-turn clockwise. Repeat the procedure until the desired setting has been obtained.

(b) If in the initial pull the winch slows down ***before*** the 2,000 psi pressure reading is obtained, stop the pull and turn the compensator screw about 1/4-turn clockwise. Repeat the procedure and if the winch does ***not*** slow down when 2,000 psi is reached, turn the compensator screw about 1/8-turn counterclockwise. Repeat the procedure until the desired setting has been obtained.

(3) When test and adjustments have been completed, fully open the needle valve for normal winch operation. It is advisable to wire the needle valve in the open position to prevent accidental closing of the valve.◀

5.10 ▶To test and adjust the motor compensator on winches not equipped with the pressure gauge and needle valve, a sufficient load must be placed on the winch line to cause a system pressure of 2,000 psi while tests and adjustments are being made. This can be approximated with a winch line pull of 11,000 to 12,000 pounds on the bare drum. Since accurate adjustments are difficult to obtain using this method, installation of the needle valve and pressure gauge is recommended for tests and adjustments.◀

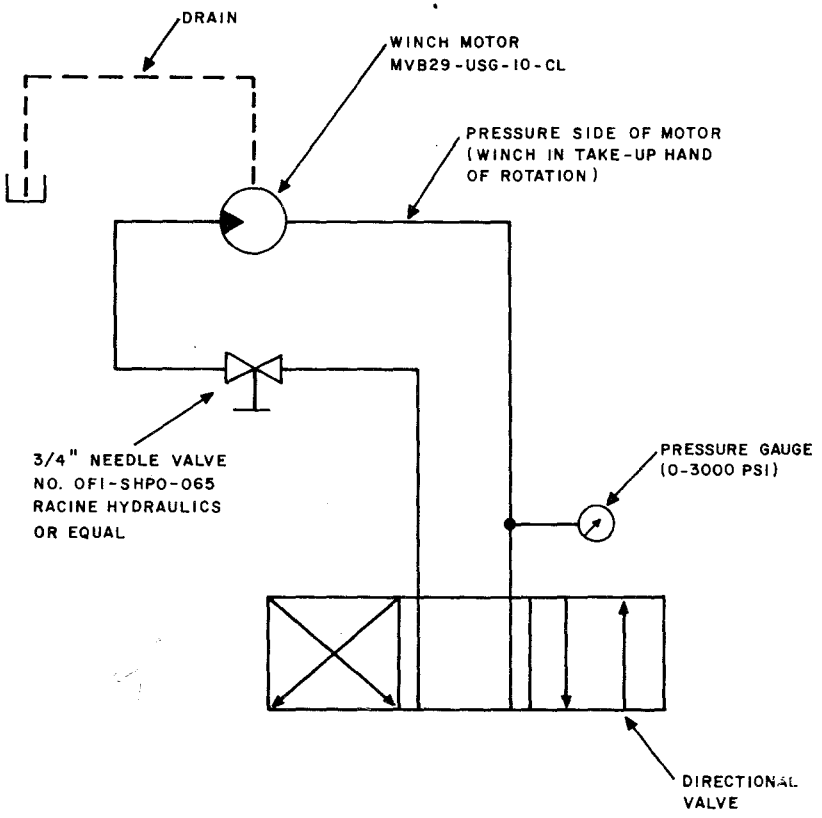


Fig. 2—Hydraulic Schematic for AT-8467 LCD Winch Compensator Adjustment Test