

GENERAL MACHINE PRODUCTS CO., INC.  
TREVOSTE, PA 19047

MODEL LCD-22  
LIGHT CONTINUOUS DUTY WINCH  
(AT8467)

INSTALLATION, OPERATION AND MAINTENANCE

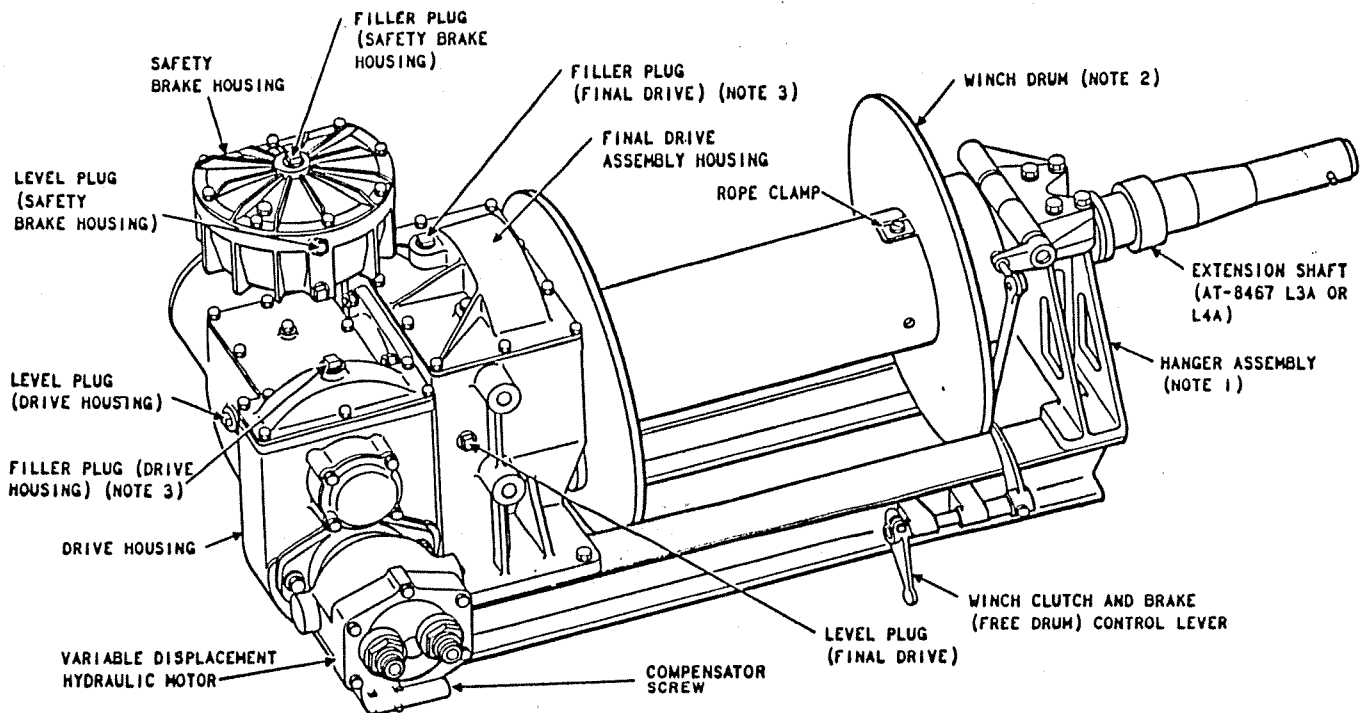
I. BASIC DETAILS

1-MAXIMUM RATED PULL	14,000 POUNDS (BARE DRUM)
2-MINIMUM RATED PULL	6,400 POUNDS (FULL DRUM)
3-DRUM WIDTH	22 1/2"
4-NET WEIGHT	930 POUNDS
5-CUBE DIMENSION	59" LONG, 24" HIGH, 27 1/4" WIDE
6-DRIVEN HYDRAULICALLY ONLY	

II. GENERAL

The Model LCD-22 winch is designed for applications involving stationary or mobile mounting. Driven by an integrally mounted hydraulic motor and a series of highly efficient helical gears, this unit will not overheat under long, maximum pull conditions.

The hydraulic motor is a variable displacement, pressure compensating type that operates at a speed automatically modulated by the system hydraulic pressure. As the line pull increases, the hydraulic pressure increases and the line speed decreases. Conversely, as the line pull decreases, the hydraulic pressure decreases and the line speed increases. The over-all speed range has a ratio variation of 2.5:1 with torque varying proportionately.



III. MAJOR COMPONENTS

- |                         |                                |
|-------------------------|--------------------------------|
| 1-Winch drive assembly  | 6-Clutch assembly              |
| 2-Final drive assembly  | 7-Disc or band type drag brake |
| 3-Safety brake assembly | 8-Hanger bearing               |
| 4-Hydraulic motor       | 9-Frame                        |
| 5-Drum assembly         |                                |

IV. APPLICABLE ACCESSORIES

- 1-Level-Wind Model CH-122
- 2-Drum shaft extension

V. HYDRAULIC REQUIREMENT

For the maximum rated pull and speed, the hydraulic system requires an operating pressure of 2500 P.S.I. and a flow of 22 G.P.M. The pressure relief valve should be set at 2700 P.S.I.

Hoses to and from the hydraulic motor are one inch diameter.

The hydraulic oil reservoir capacity should not be less than 33 gallons. The suction line must be fitted with a 100 mesh strainer; the return line must be fitted with a 10 micron by-pass type filter.

The winch directional control valve must be open center allowing the hydraulic oil to return to tank when the valve is in neutral.

For additional information, see hydraulic system installation drawing SK-2086 in your catalog.

A drain line must be connected from the uppermost motor drain port and extend to a point below the fluid level in the reservoir.

The motor case pressure should not exceed 5 PSI

Caution should be taken when installing the hydraulic motor to make certain that straight thread fittings are used on all ports. Do not use tapered pipe thread fittings.

VI. INSTALLATION

For the mobile application, the winch is normally mounted behind the chassis cab in the forward section of the body load area, directly to the chassis frame or sub-frame.

Sufficient clearance should be allowed between the front body panel and other restrictive members and the winch to permit normal maintenance.

For standard installations, place the winch assembly on the chassis frame so that the level-wind is facing rearward and the drum shaft is projecting toward the right or curb side.

The normal direction of drum rotation for pulling in is clockwise when viewed from the right side of the vehicle. The wire rope is wound onto the drum from the top. Deviation from this standard mounting procedure could cause severe heat and operational difficulties.

With the two mounting brackets on the winch frame, locate the winch drum centerline on the chassis frame centerline. Slide the mounting brackets tight to the chassis frame. Using the eight 3/8" diameter pre-drilled holes in each bracket as a guide, finish drill all holes in both brackets for a tight 5/8" - 18 x 2" long class five hardened steel bolt furnished in the winch mounting kit.

Weld both sides of the mounting bracket to both winch frame rails. Do not weld the mounting brackets to the chassis frame.

All of the mounting hardware and if ordered, the drum shaft extension, is shipped in a parts box banded to the winch drum.

To protect the entire winch assembly against rust, various parts are sprayed with a rust inhibitor and both drive housings are filled with oil when shipped from the factory. If the winch will be placed in outside stock for an indefinite period, care should be taken to prevent rust due to condensation.

## VII. CONTROLS

When the winch has been mounted, consideration must be given to the control of:

- 1-Drum direction of rotation
- 2-Drum speed
- 3-Winch clutch and drag brake

Because of the wide variation in the type of controls available, it is the responsibility of the dealer to furnish and install those required in the bid specifications. This is particularly true for drum rotation direction and speed.

On all units there is a clutch and drag brake assembly located on the right side. Normally, this function is controlled by a mechanical push-pull lever at the vehicle rear. All units manufactured prior to February 15, 1980 require a single control for the clutch and disc type drag brake. Units manufactured after February 15, 1980 require a separate control for the winch clutch and band type drag brake.

## VIII. WINCH CLUTCH AND DISC TYPE DRAG BRAKE

Basically, there are three control positions for the winch clutch and disc type drag brake. Using the mechanical push-pull shift, with the control lever installed at the rear of the vehicle, operation is as follows:

- 1-Control handle all the way in-clutch engaged for pulling.
- 2-Control handle partially out-clutch disengaged for free spool operation.
- 3-Control handle all the way out and holding-applies drag brake to drum.

The winch clutch consists of a clutch plate, brake lining, detent sleeve and shifter fork. Teeth in the clutch plate match similar teeth in the drum flange. The clutch plate is faced with a brake lining. The detent sleeve slides on the hub of the clutch plate to release the detent, detent, locking the clutch assembly in the clutch engage position. The winch is now ready to pull.

Continued movement of the control lever to the rear moves the clutch assembly toward the drum, disengaging the clutch teeth. The drum is then disengaged and can rotate freely. The clutch will remain disengaged until the control lever is again moved. The winch is now ready for free spool operation.

When the winch clutch is disengaged, the drum will rotate freely on the drum shaft. It should also be noted that power can still be transmitted thru the drum shaft to the drum shaft extension to drive a capstan or reel.

**NOTE - SHIFTING OF THE CLUTCH SHOULD ONLY BE DONE WHEN THE DRUM ROTATION HAS STOPPED.**

When shifting from the disengaged to the engaged position, the operator should make certain that full engagement is accomplished. Normally, proper engagement is identified by a characteristic clang of the clutch plate and the drum.

Application of the disc type drag brake is accomplished by moving the clutch plate toward the drum to the limit of its travel. This action is normally achieved by pulling the control lever rearward, forcing the clutch plate brake lining into the machined surface of the drum flange.

Pressure between the brake lining and the drum must be maintained to keep the brake on. Or, the amount of braking is in direct proportion to the amount of pull exerted.

Release of the control handle allows a coiled spring to push the brake plate away from the drum into the free spool position.

**NOTE: THE DISC TYPE DRAG BRAKE IS USED TO CONTROL THE DRUM SPEED ONLY. IT IS NEVER TO BE USED TO HOLD THE LOAD.**

## BAND TYPE DRAG BRAKE

As outlined previously, units manufactured after February 15, 1980 incorporate a band type drag brake.

This brake, mounted on the outside hub of the right hand drum flange, is completely separate from the clutch assembly. Using the mechanical push-pull method of control, the handle is located at the rear to the left of the clutch control. Pulling the control handle will slow down or stop the drum rotation.

NOTE - THE BAND TYPE DRAG BRAKE IS USED TO CONTROL THE DRUM SPEED ONLY. IT IS NEVER TO BE USED TO HOLD THE LOAD.

When designing the drag brake control handle, concern should be given to specify a straight push/pull type and not an overcenter type. This will prevent the operator from setting the brake and using it to hold the load.

Under present mechanized, high winch line speed conditions, it is extremely important to operate either drag brake properly and maintain sufficient tension on the wire rope. This will enable the level-wind assembly to operate properly, minimize over-spinning of the drum and generally achieve good coils and lays of wire rope.

## IX. SAFETY BRAKE

The safety brake, located on the left side above the winch, is an automatic device designed to hold a maximum load of 5,000 pounds.

The brake mechanism consists of a double threaded worm and worm wheel, an overrunning clutch and a multiple disc type friction brake. The latter operates in a bath of oil to aid in the dissipation of heat.

When the winch is operated in the pull in direction, the brake is inoperative since the input shaft runs freely in the overrunning clutch. When the power is cut off, the load attempts to drive the drum in the opposite direction. This causes the sprags in the overrunning clutch to lock, forcing the worm wheel to drive the worm. The multiple disc brake on the worm shaft supplements the braking action. The pressure on the brake plate determines the load holding capabilities.

Removal of the safety brake cover will locate 4 studs, springs, nuts and washers. The amount of compression of the four springs is in direct proportion to the amount of braking effort that will be achieved. Torque the 4 nuts until the winch will support a maximum braking load of 5,000 pounds or less to satisfy your particular requirement.

When making a brake adjustment, the springs must be compressed equally or the resultant braking action will be erratic. To obtain an initial brake setting with optimum holding action, it is recommended that the 4 nuts be rotated until contact is made with the washers and springs. Then rotate the 4 nuts equally an additional 1 1/2 turns. Check for the maximum braking action of 5,000 pounds or less to satisfy your particular requirement.

Braking action will be increased by rotating the nuts in a clockwise direction. Conversely, braking action is decreased by rotating the nuts counter-clockwise.

NOTE - WHEN THE WIRE ROPE IS BEING PAYED-OUT UNDER POWER, THE WINCH IS BEING DRIVEN AGAINST THE BRAKE. CONSEQUENTLY, EXCESSIVE HEAT WILL DEVELOP IN THE SAFETY BRAKE HOUSING, POSSIBLY CAUSING THE OIL TO BOIL OVER.

If it is necessary to pay the wire rope out under power, do not operate in this manner for more than 100 feet. Drive the winch at slow speed only.

To pay-out wire rope over 100 feet in length, the winch drum should be placed in the free spool position. Care should be taken to operate the drag brake properly to prevent wire rope entanglement.

#### X. PREPARING FOR OPERATION

Before placing the winch in service the following checks should be made:

1. Make certain that the winch assembly is properly secured to the chassis frame.
2. The operator should have a complete understanding of all functions and the location and operation of all controls.
3. The wire rope should be spooled on the drum properly with tight, even coils and lays.
4. It is not necessary to have the drum filled with wire rope. Additional pulling capability can be obtained by installing a slight excess of the maximum length required.
5. Check the hydraulic system for the correct pressure and flow.
6. Check the hydraulic system to make certain that the reservoir is filled to the correct level with the proper grade of oil.
7. Make certain that the reservoir shut-off valve is open.
8. Check all winch and winch accessory gear housings for the correct oil level and grade (see lubrication-section XIII).

9. Prior to using, disconnect the hydraulic motor drain line and pour hydraulic oil into the line to flood the motor housing. It is important that this be done on all new motors before rotating to prevent seizure. Reconnect the line.
10. Engage the hydraulic system and allow the oil to circulate and warm up for a few minutes before operating the winch. This is particularly important during extremely cold weather.
11. Check the body load area in a triangular section between the tail shelf sheave and both drum flanges for obstructions that will restrict the travel of wire rope.

XI. OPERATING THE WINCH

1. Start the truck engine and engage the power take-off.
2. Check the body load area to make certain there are not tools or equipment to restrict the wire rope travel.
3. Check the winch drum for extreme wire rope entanglement or erratic build-up in one location.
4. With rotation stopped, place the winch clutch control lever in the clutch engaged or pull-in position.
5. Operate the directional control valve for the desired direction of drum rotation.
6. Pull the load steadily and adjust the truck engine speed to satisfy conditions.
7. To stop the winch, release the directional control lever; return engine speed to idle.
8. When free spool is required, stop the drum rotation and pull the clutch control lever out.
9. To control the drum speed in free spool:
  - A. For those winches having a disc type drag brake, pull the single clutch control lever all the way out and hold according to the amount of braking required.
  - B. For those winches having a band type drag brake, pull the separate control lever all the way out and hold according to the amount of braking required.
10. When finished with the winch, it is suggested that the wire rope pass thru the tail shelf sheave and hook into a fixed section of the chassis frame. In this manner, a slight tension can be maintained in the wire rope preventing entanglement on the drum.

## XII. MAINTENANCE

Inspection of the winch and related components should be a continuing procedure. The operator should be constantly alert to detect unusual noises, excessive oil leakage and overheating. He should report immediately any changes in the normal characteristics of the winch, winch accessory, hydraulic motor or the hydraulic system.

Oil levels, oil cups, grease fittings and chain adjustments should be checked after each 75 hours of operation.

If the winch has not been used for an extended period of time, the interior should be inspected for water deposits and rust due to the elements or condensation. Particular attention should be given to any damaged bearings, seals or gaskets. The oil should be checked for contamination, abrasive foreign particles and lubricating qualities. As required, oil should be added or completely drained and filled.

The wire rope should be inspected visually for kinks, bends, cuts or broken strands while operating.

Depending on the total length of the wire rope vs the length most often used, it is possible that the top lays will show the most wear. To obtain additional life, subject to the proper conditions, the rope can be rotated end to end.

The hydraulic system and motor should be checked periodically for:

1. Overheating
2. Abnormal noise
3. Maintaining a clean sufficient quantity of hydraulic oil of the proper grade
4. Keeping all connections sufficiently tight to prevent oil leakage and air from entering the system.
5. Change the oil filter periodically

## XIII. LUBRICATION

The winch has 2 reservoirs that must be checked and maintained.

### A. Safety Brake Housing

To check for the proper oil level, remove the oil level plug in the side of the housing. The lubricant should be maintained to the height of the oil level opening.

To add oil, remove the oil level plug in the side of the housing. Remove the oil filler plug in the housing cover. Add type "A" automatic transmission fluid as required to the height of the oil level opening.



The oil level plug should always be removed prior to adding oil to prevent over filling.

The safety brake housing should be checked after 75 hours of operation. It should be completely drained and filled with new transmission oil at least once each year.

#### B. Drive and Final Drive Housing

The oil level in these 2 housings will be the same because of the designed flow-thru lubrication.

To check for the proper oil level, remove the oil level plug on the front side of the final drive housing. The lubricant should be maintained to the height of the oil level opening. To add oil, remove the oil level plug on the front side of the final drive housing. Remove the filler plug in the drive housing cover. Add 80W140 oil as required to the height of the oil level opening.

The oil level plug should always be removed prior to adding oil to prevent over filling.

Make certain that the oil has had sufficient time to equalize between the 2 housings.

The drive and final drive oil level should be checked every 75 hours of operation. Both should be completely drained and filled with new oil at least once each year.

#### C. Miscellaneous Lubrication

1. Grease fittings - there are 5 grease fittings that should be checked every 75 hours of operation i.e. 2 on the clutch shaft, 1 on the hanger bearing and 2 on the clutch control.
2. Grease - grease the drum clutch splines every 75 hours of operation.
3. Engine Oil - Apply engine oil to all linkage pivot points every 75 hours of operation.

Apply engine oil to all chain drives every 75 hours of operation. The lubricant should be applied on the inside surface of the chain by means of a spray or brush.

Lubricating the wire rope periodically will assist in extending the life expectancy. Consult your local wire rope representative for proper instructions.

XIV. SAFETY

All personnel associated with the operation of the winch should adhere to the following:

1. The operator should be completely knowledgeable concerning each winch and winch accessory function and its control.
2. Complete coordination with other members of the crew, giving clear instructions by hand signal or walkie-talkie.
3. Loose clothing or ties should never be worn. Use gloves when handling the wire rope.
4. Operate the winch as smoothly as possible. Sudden jerking pulls can place extreme loads on the equipment causing damage or injury.
5. Make certain that the wire rope is properly attached to the drum and that no less than one half of the first lay remains on the drum at all times.
6. Check the wire rope periodically for kinks, cuts and broken strands. Make certain that the lunet eye is properly spliced or swedged.
7. Refrain from standing within the angles formed by the wire rope as it passes from the tail shelf sheave to either side of the drum.
8. The operator should not leave the control location while the winch is rotating, the winch power take-off is engaged or the truck engine is running.
9. Load demands on the winch or wire rope should not exceed the rated maximum pulling capacity.
10. Make certain that the winch clutch is positively engaged before starting the pull.
11. Do not operate the winch at speeds faster than necessary.
12. As much as possible and practical do not stand where there is the danger of being struck by the wire rope if it should fail or snag.
13. When pulling in, do not allow the wire rope to build up in one location on the drum. This can cause wire rope "roll-over" and possible erratic, damaging pulls.
14. The winch was not designed for, nor intended to be used for, the movement of people.

## XV. COMPENSATOR ADJUSTMENT

As noted previously, this winch is equipped with a variable displacement piston type hydraulic motor. The motor is designed to sense the variation in load demand. As the load increases, the system pressure increases and the speed decreases. Conversely, as the load demand decreases, the system pressure decreases and the line speed increases.

To provide for the correct pull and speed, the hydraulic motor is equipped with a compensator. The compensator adjustment screw is located on the front of the motor.

If the winch pull or speed is not responding properly, the compensator should be adjusted using the following method:

1. The hydraulic system should include the various components as outlined on the hydraulic schematic shown on page 12.
2. Adjustment to the compensator can only be made when the hydraulic motor is not rotating.
3. Place approximately 20 wraps of wire rope on the bare winch drum. Secure the opposite end of wire rope to a dead weight that will result in a minimum wire rope tension of approximately 2000 pounds. This can be done by pulling a suitable weight or a vehicle which can be braked to offer the required resistance.
4. With the weight still in motion and the needle valve fully open, count the number of winch shaft revolutions.
5. With the weight in motion gradually close the needle valve until the pressure gauge on the input side of the winch reaches 2000 P.S.I. At this point, there should be a noticeable reduction in the number of drum shaft revolutions.
6. If the winch does not slow down at this pressure, stop the pull and turn the compensator screw 1/4 turn counter-clockwise.
7. Repeat the Pull. If the winch slows down before the pressure gauge reaches 2000 P.S.I. stop the pull and turn the compensator screw one eighth turn clockwise.
8. If in the initial pull the winch slows down before the 2000 P.S.I. pressure is obtained, stop the pull and turn the compensator screw one quarter turn clockwise.
9. Repeat the pull. If the winch does not slow down when 2000 P.S.I. is reached, stop the pull and turn the compensator screw 1/8 turn counter-clockwise.

10. Repeat the procedure until the desired pull and speed have been obtained.
11. When the test and adjustments have been completed, fully open the needle valve and return to normal winch operation. It is advisable to wire the needle valve in the open position to prevent accidental closing.

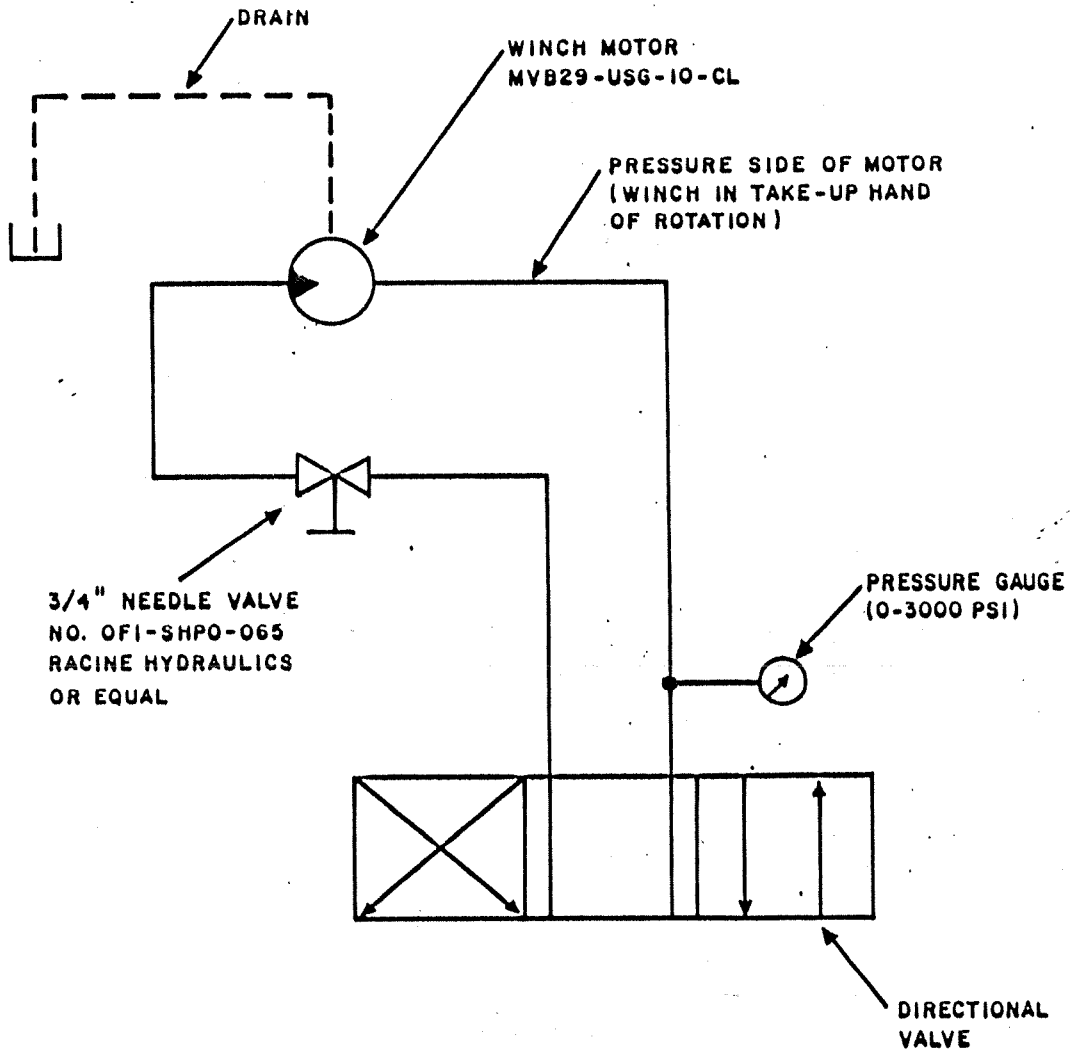


Fig. 2—Hydraulic Schematic for AT-8467 LCD Winch Compensator Adjustment Test

## XVI. WIRE ROPE

When the Model LCD-22 winch is equipped with a level-wind, the winch drum has the following storage capacity:

<u>Diameter</u>	<u>Length</u>
3/8"	2600'
7/16"	2100'
1/2"	1600'
9/16"	1300'

## A. GENERAL

It is important to select the correct winch for a particular application. In like manner, it is equally important to select the correct wire rope.

Wire rope is specified in terms of diameter, length, number of strands, number of wires per strand, type of center and type of lay.

There is a definite advantage in applying wire rope of the proper direction of lay when spooling onto a smooth surface winch drum.

Wire rope, having an improper lay, will permit the coils to spread apart each time the load is removed. Using wire rope with the proper lay will tend to keep the coils together when tension is removed. The correct lay will develop tight coils and even layers.

## B. OVERWINDING

Overwinding is when the winch drum is rotating in the clockwise direction (viewing from the right side) and the wire rope is spooled onto the winch drum at the top. This is the normal method for the LCD-22 winch.

It should be noted that on the LCD-22 winch the rope clamp is located on the left side of the drum. Or, the rope is attached at the left and spools to the right. This condition requires the wire rope to have a left lay.

## C. UNDERWINDING

Underwinding is when the winch drum is rotating in a counter-clockwise direction (viewing from the right side) and the wire rope is spooled onto the winch at the bottom. This direction of rotation is permitted, however, not normal. Caution should be taken to check the assembly of the safety brake for opposite direction rotation. This condition requires the wire rope to have a right lay.

#### D. INSTALLATION

It is important to install the wire rope onto the winch drum with care. Kinking of the rope, caused by the rope taking a spiral shape as a result of an unnatural twist, should be avoided.

When removing wire rope from the reel and spooling onto the winch drum, the reel must be in the vertical plane and free to rotate. Spool the rope onto the drum with the natural bend in the same direction as it was on the reel.

If wire rope is received in a coil, it should be unwound with the coil in the vertical plane. Again, spool the rope onto the winch drum with the natural bend in the same direction as it was on the coil.

Reverse bending of the wire rope should always be avoided or kept to a minimum.

Wire rope should always be under tension when spooling onto the winch drum.

When the winch drum is in free spool and the drum shaft extension only is being used with a capstan or reel, the wire rope pulling end should be affixed to the drum. This will prevent the rope from unwinding or clockspringing.

When the winch is not in operation, it is recommended that the winch line quick hook be attached to a solid member on the tail shelf. Slowly take up the slack. This will best maintain the rope under a slight amount of tension until required again.

#### E. LUBRICATION

Wire rope is considered to be a machine, having many moving parts. Each time the rope bends or flexes, the various wires and strands slide over each other. Lubrication is required to facilitate this movement.

The type of lubricant, method of applying and frequency of application is dependent on each particular circumstance. For specific lubrication details contact the wire rope manufacturer.

#### XVII. WINCH IDENTIFICATION

When contacting your local dealer or the factory, proper assistance can be offered if the model and serial number of the winch in question is specified.

On all Adams winches this information is stamped on a nameplate affixed in the center of the winch frame rail nearest the rear of the vehicle.