

UG 22 AND UG 28
INFORMATION



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ADAMS EQUIPMENT, INC.
TREVOSTE, PA. 19047

MODEL UG-22 AND UG-28
INTERMITTENT DUTY WINCH
(AT-7897)

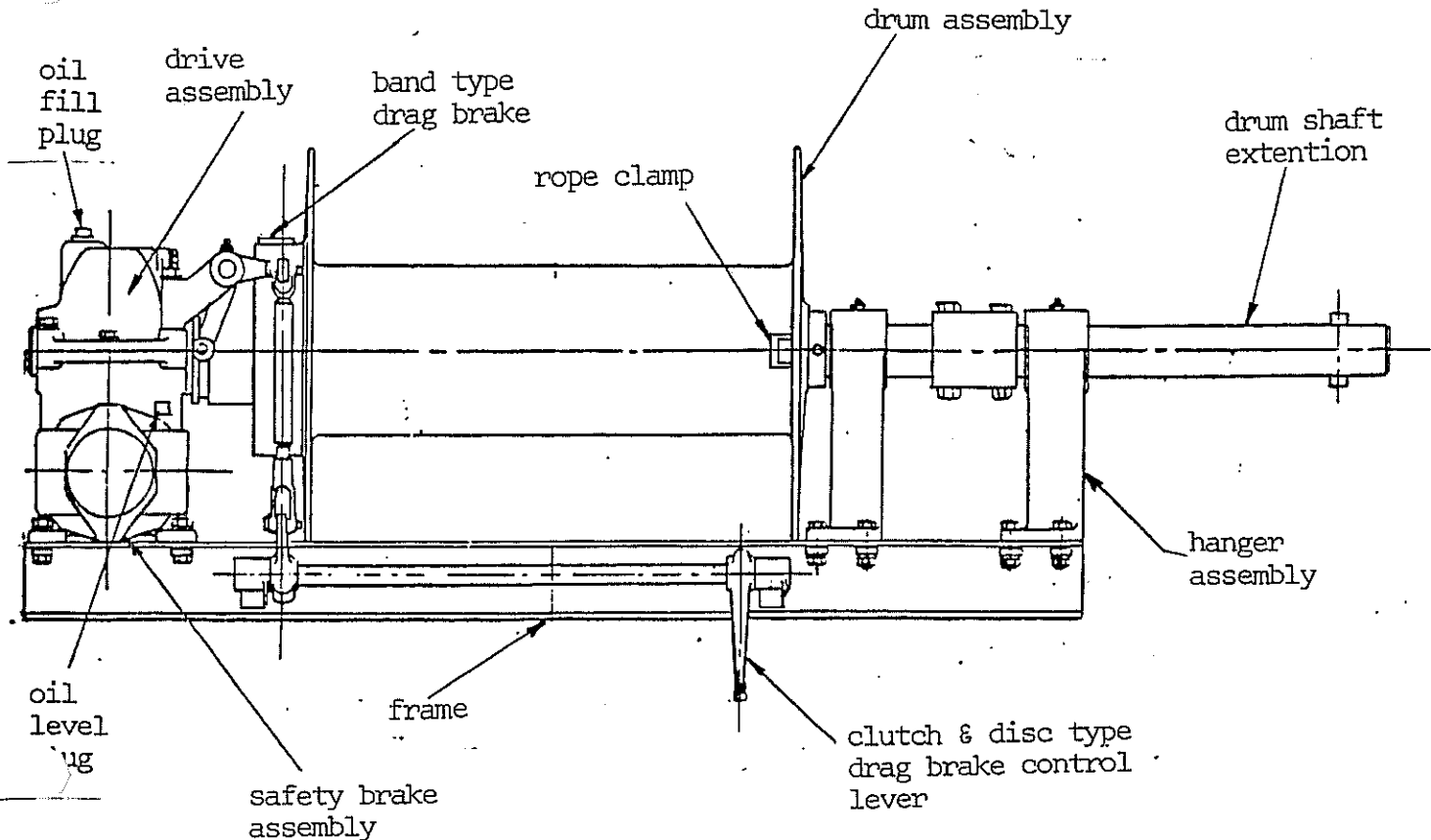
INSTALLATION, OPERATION AND MAINTENANCE

I BASIC DETAILS

	UG-22	UG-28
1-Maximum rated pull-bare drum	14,500 lbs.	14,500 lbs.
2-Minimum rated pull-full drum	6,600 lbs.	6,600 lbs.
3-Drum width	22 1/2"	28"
4-Net weight	640 lbs.	655 lbs.
5-Cube dimension 22" high x 20" wide x 54" long		
6-Driven-mechanically or hydraulically		

II GENERAL

The Model UG-22 and UG-28 winches are suitable for applications involving stationary or mobile mounting. Driven by worm input gears, having a ratio of 29:1, these units are designed for intermittent duty.



III MAJOR COMPONENTS

- 1-Drive assembly
- 2-Drum assembly
- 3-Safety brake assembly
- 4-Clutch assembly
- 5-Disc or band type drag brake assembly
- 6-Hanger assembly
- 7-Frame

IV APPLICABLE ACCESSORIES

- 1-Level-wind Model CH-222 or CH-228
- 2-Three speed transmission-hydromechanical Model 230-1891A
- 3-Power take-off, split shaft, type P-1 or P-2
- 4-Drum shaft extension

V USE

The Models UG-22 and UG-28 can be driven mechanically or hydromechanically; ideal for applications requiring heavy duty, intermittent operation

- 1-Mechanically - for mobile mounting, using the truck engine as the prime source of power, thru a type P-1 or P-2 split shaft power take-off mounted in the drive line or a side mount power take-off mounted on the transmission and a silent chain drive to the winch input shaft
- 2-Hydromechanically - for mobile mounting, using the truck engine as the prime source of power, thru a type P-1 or P-2 split shaft power take-off mounted in the drive line or a side mount power take-off mounted on the transmission, coupled to a hydraulic pump, driving a hydraulic motor integrally mounted to the mechanically shifted three speed transmission and a silent chain drive to the winch input shaft

Stationary mounted units can also be driven mechanically or hydromechanically as described above. The prime source of power can vary according to that which is readily available

VI DRIVE REQUIREMENTS

- 1-Mechanical-to obtain the maximum rated pull and line speed, an input torque of 5000 inch pounds @ 660 RPM is required; maximum input speed not to exceed 1600 RPM
- 2-Hydromechanical-to obtain the maximum rated pull and line speed, using the three speed transmission Model 230-1891A, the hydraulic system should have an operating pressure of 2000 PSI and a flow of 55 GPM. The pressure relief should be set at 2200 PSI

The hydraulic suction line hoses are 1" diameter minimum; return line hoses 1 1/4" diameter

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

VII INSTALLATION

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

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

For standard installation, 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 at the top. Deviation from this standard mounting procedure and direction of rotation, could cause severe heat and operation 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; 5/8" - 18 x 2" long class five hardened steel bolts are 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, are shipped in a parts box with the winch.

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

VIII 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
- 4-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 and speed.

On all units there is a clutch and drag brake assembly located on the left side. Normally, this function is controlled by a mechanical push-pull lever at the vehicle rear. All units manufactured prior to October 1, 1980 require a single control for the clutch and disc type drag brake. Units manufactured after October 1, 1980 require separate controls for the winch clutch and band type drag brake.

IX 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, locking the clutch assembly in the clutch engaged 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 meshed clutch teeth. The drum is now 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 a 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 October 1, 1980 incorporate a band type drag brake.

This brake, mounted on the outside hub of the left 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.

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.

X SAFETY BRAKE

The safety brake, located on the left side of the winch at the base of the drive housing, is an air cooled device that is automatically applied when the forward rotation of the drum stops. The mechanism consists of two sets of laminated brake plates and discs that do not become engaged when the drum is rotating in the normal pull-in direction. When the operator stops drum rotation, and proceeds to rotate in the counter-clockwise direction under power, the floating worm shaft will move inward, forcing the brake laminations to make contact.

The safety brake is assembled for proper braking action at the factory. Additional adjustment cannot be made in the field.

IMPORTANT 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 assembly, possibly causing winch damage and/or injury.

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

To pay-out wire rope over one hundred 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.

XI 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. Higher line pull capability can be obtained by only installing a slight excess of the maximum length required for the job.
- 5-If the winch is being driven hydraulically, 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.
- 9-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.
- 10-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 the wire rope.

XII 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 no tools or equipment to restrict the wire rope travel.

- 3-Check the winch drum for extreme wire rope entanglement or erratic build-up in any location.
- 4-With rotation stopped, place the winch clutch control lever in the clutch engaged or pull-in position.
- 5-Operate the directional control lever 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 the 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 onto 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.

XIII 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 or the hydraulic system.

Oil levels, oil cups, grease fittings and chain adjustments should be checked after each seventy-five 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 should be checked periodically for:

- 1-Overheating
- 2-Abnormal noise
- 3-Maintain 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.

1-ASSEMBLY OF DRIVE HOUSING COMPONENTS

Refer to parts & assembly booklet
Figure 5

- a-Mount the bearing cage item 31 with shim item 30, roller bearing item 26, bearing retainer item 27, cap screws item 28 and wire item 29 into the lower drive housing item 10, figure 3.

Figure 4

- b-After inserting the worm assembly into the housing, install the bearing sleeve item 16 with shims item 10 in position. Install the bearing cone of item 9 onto the worm shaft; install the cup portion. Place the shims items 17, 18, 19 onto the worm shaft and against the bearing assembly. Insert the second bearing assembly.
- c-Press the oil seal item 20 into the bearing retainer item 8. Install shim item 10 onto the bearing retainer and attach to the housing, using four drilled hex head capscrews item 7. Safety wire in accordance with your standard practice. Install the retainer plate item 6 using four flat head screws item 21.
- d-Insert sprocket spacer item 5 thru the oil seal to butt against the outer bearing assembly. Install the sprocket spacing shim item 4 to provide approximately 1/4" clearance between the winch chain and winch frame. Install the winch driving sprocket with the retaining washer item 2 and special bolt item 1. Safety wire the bolt and retaining washer.

2.-REPLACING THE STOP SLEEVE

Refer to parts and assembly booklet
Figure 4

- a-Remove the worn or broken stop sleeve item 14 from the worm shaft.
- b-Drive out the old pin item 13 from the worm shaft. Press the new stop sleeve onto the worm shaft so that the hole in the sleeve aligns with the hole in the shaft.
- c-Drill and ream the stop sleeve to allow for either a 5/16" or 3/8" diameter pin.

3.-ASSEMBLY OF THE WINCH CLUTCH

Refer to parts and assembly booklet
Figure 6

- a-Line up the 7/16" diameter hole in the drum shaft with the 45/64" diameter hole in the clutch plate item 25 and the 1/2" diameter pipe tapped hole in the detent sleeve item 18.
- b-Insert one detent item 16 thru the 1/2" diameter pipe tapped hole, making sure that the detent slides freely thru the 7/16" diameter hole in the drum shaft to the detent sleeve item 18.
- c-Insert the detent spring item 17 on top of the detent. Insert the second detent item 16 on top of spring item 17.
- d-Insert one 11/16" diameter ball item 15 on top of the detent.
- e-Press down on the ball, allowing the sleeve to go toward the face of the clutch. Turn the detent sleeve 180 degrees so that the first inserted detent can be seen. Insert the second 11/16" diameter ball on top of the detent now in view, allowing the detent sleeve to go forward against the clutch face.
- f-Turn the detent sleeve clockwise until the 9/16" diameter hole is on top. Hold the sleeve and turn the clutch and shaft assembly clockwise until the 35/64" diameter hole in the clutch plate comes partially into view. Move the detent sleeve away from the clutch teeth and insert the 17/32" diameter steel ball item 24 into the hole in the clutch plate. Release the detent sleeve against the face of the clutch.

g-Hold the detent sleeve as before, turn the clutch plate 180 degrees, lining up the $35/64$ " diameter hole in the clutch plate with the $9/16$ " diameter hole in the detent sleeve. Slide the sleeve away from the clutch plate as before and insert the second $17/32$ " diameter ball into the hole in the clutch plate. Release the detent sleeve.

h-Hold the clutch plate, rotate the detent sleeve until the outside $1/2$ " diameter tapped hole in the sleeve is lined up with the $7/16$ " diameter x 1" long milled slot in the clutch plate. Insert the screw with lockwasher items 20 and 23 and tighten.

i-Insert the $1/2$ "-20 x $5/8$ " long fillister head screw item 22 with serrated washer item 19 in the center tapped hole in the detent sleeve and tighten.

j-Insert the $1/2$ " pipe plug item 14 into the detent sleeve.

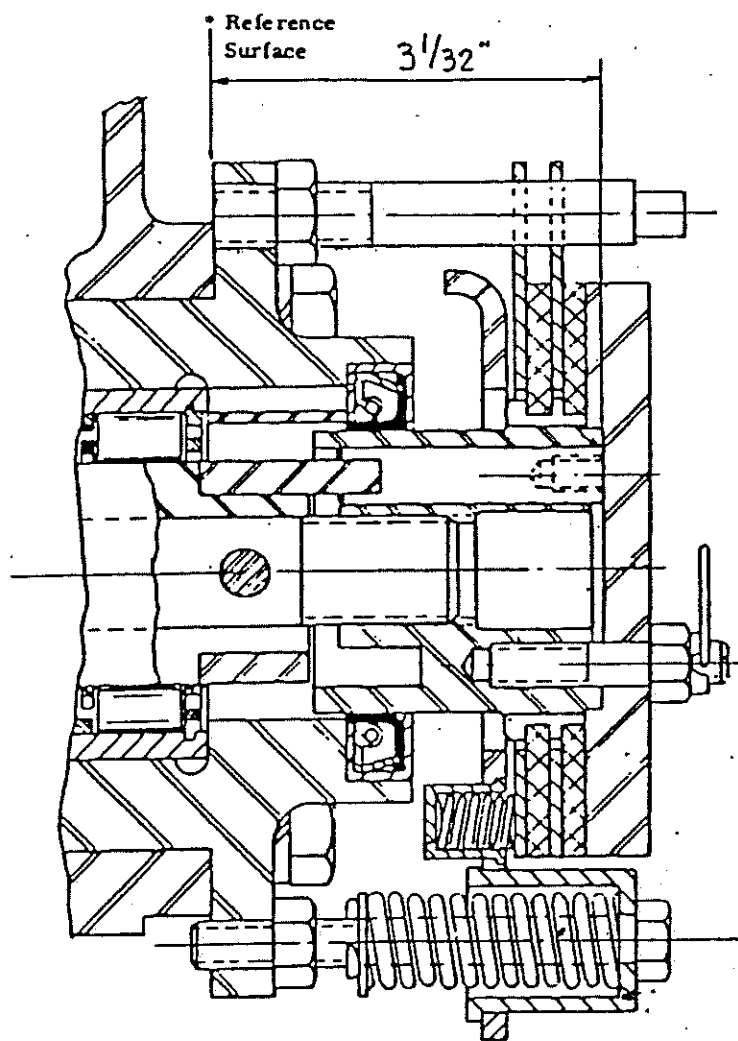
4.-ASSEMBLY OF SAFETY BRAKE FOR OVER WIND DRUM ROTATION

Refer to parts and assembly booklet
Figure 5

a-Insert new oil seal item 16 into the housing.

b-Rotate the worm shaft in its bearings until the lug on the stop sleeve item 14 is on top. Hold it in this position until the brake nut item 12 has been threaded all the way onto the worm brake stud item 13.

c-Rotate the winch drum manually to position the worm at its most forward location in the housing toward the front of the vehicle. Turn the worm brake nut item 12 away from the winch until the distance between the outer face of the nut and the reference surface on the bearing cage item 31 measures approximately $3 \frac{1}{32}$ " as shown on the cut-away view on the next page.



SAFETY BRAKE ADJUSTMENT

- d-Place the stop pin item 10 into the brake nut item 12 using the nearest open hole to the right of the lug for a right hand worm or the nearest hole to the left side of the lug for a left hand worm. The worm and the worm brake stud must be of the same hand.
- e-Place the pressure plate item 9 on the four outer spring thimble assemblies item 33. Mount the two small spring thimbles item 8. Insert the two light springs item 7 into the two small spring thimbles item 8.
- f-Place the brake plate item 6 on the brake anchor studs item 15 until it makes contact with the light springs item 7. Insert a brake lining item 5 over the splined brake nut item 12 until it contacts the brake plate. Position the second brake plate and brake lining in the same manner.
- g-Insert the undrilled end of the two studs item 11 into the brake nut item 12 to the depth of the thread. Place the gasket item 4 onto the face of the brake nut item 12. Use gasket sealer as required.
- h-Mount the brake disc item 3 onto the brake nut studs item 11 and fasten the castle nuts item 1. Replace locking wire item 2.
- i-Adjust the worm brake under load. Place a strain of approximately 1000 pounds on the winch line. While holding the load, adjust the spring pin assemblies item 33 by rotating them in or out of the housing to obtain a uniform clearance of 1/32" between the inner brake plate item 6 and the pressure plate item 9.

XIV LUBRICATION

A-Drive Housing

The oil level in the winch drive housing should be maintained to the height of the oil level plug located on the front side of the housing.

To add oil, remove the oil level plug and the oil fill plug located at the top of the housing. Add 80W140 (or equivalent 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.

The drive housing oil level should be checked after seventy-five hours of operation. It should be completely drained and filled with new oil at least once each year.

B-Miscellaneous Lubrication

- 1.-Grease fittings-there are six grease fittings that should be checked every seventy-five hours of operation -ie- two on the clutch shaft, one on each hanger bearing and one on each clutch lever brakcet.
- 2.-Engine oil - apply engine oil to all linkage pivot points every seventy-five hours of operation.

Apply engine oil to all chain drives every seventy-five 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.

XV. 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 tie 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.

XVI WIRE ROPE

When the Model UG-22 or UG-28 winch is equipped with a level-wind, the winch drum has the following storage capacity:

Diameter	Length	
	UG-22	UG-28
3/8	2600'	3600'
7/16	2100'	2700'
1/2	1600'	2000'
9/16	1300'	1700'

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 using 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 also develop tight coils and even layers on the winch drum.

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 UG-22 or UG-28 winches.

It should be noted that on these winches the rope clamp is located on the right side of the drum when viewed from the rear of the vehicle. Or, the rope is attached at the right and spools to the left. This condition requires the wire rope to have a right 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 possible, however, not standard. 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 left 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 clock-springing.

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.

WIRE ROPE STORAGE CAPACITY IN FEET *

MODEL UG

LAYER

MODEL	WIRE ROPE DIA.	1	2	3	4	5	6	7	8	9	10	11	12
UG 22	7/16"	110	230	370	510	665	830	1000	1180	1370	1570	1775	2100
	1/2"	100	205	325	460	600	750	910	1080	1260	1450	1600	
UG 28	7/16"	140	290	460	640	835	1035	1260	1485	1730	1980	2245	2700
	1/2"	125	260	405	570	740	925	1120	1325	1540	1770	2000	

* winch equipped with level wind

LINE PULL IN POUNDS

MODEL UG

LAYER

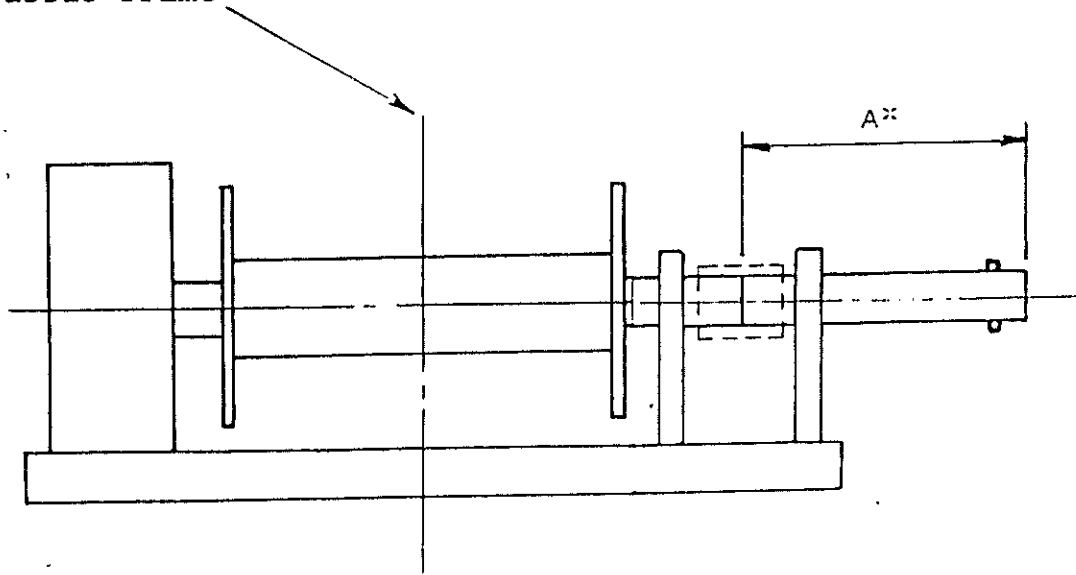
WIRE ROPE DIA.	1	2	3	4	5	6	7	8	9	10	11	12
7/16"	14,500	13,050	11890	11020	10150	9425	8845	8410	7830	7395	7105	6597
1/2"	14,500	12,905	11600	10585	9860	8990	8410	7830	7395	6960	6597	



ADAMS EQUIPMENT DIVISION
 TREVOSE, PA 19047

DRUM SHAFT EXTENSION LENGTH
 WINCH MODELS UG-22 & UG-28

centerline of winch
 drum on centerline
 of chassis frame



UG-22	
BODY WIDTH	A
88	20
90	21
91	21 1/2
92	22
93	22 1/2
94	23
95	23 1/2
96	24

UG-28	
BODY WIDTH	A
88	22 3/4
90	23 3/4
91	24 1/4
92	24 3/4
93	25 1/4
94	25 3/4
95	26 1/4
96	26 3/4

**OVERALL LENGTH
 DOES NOT INCLUDE LOOSE COUPLING

