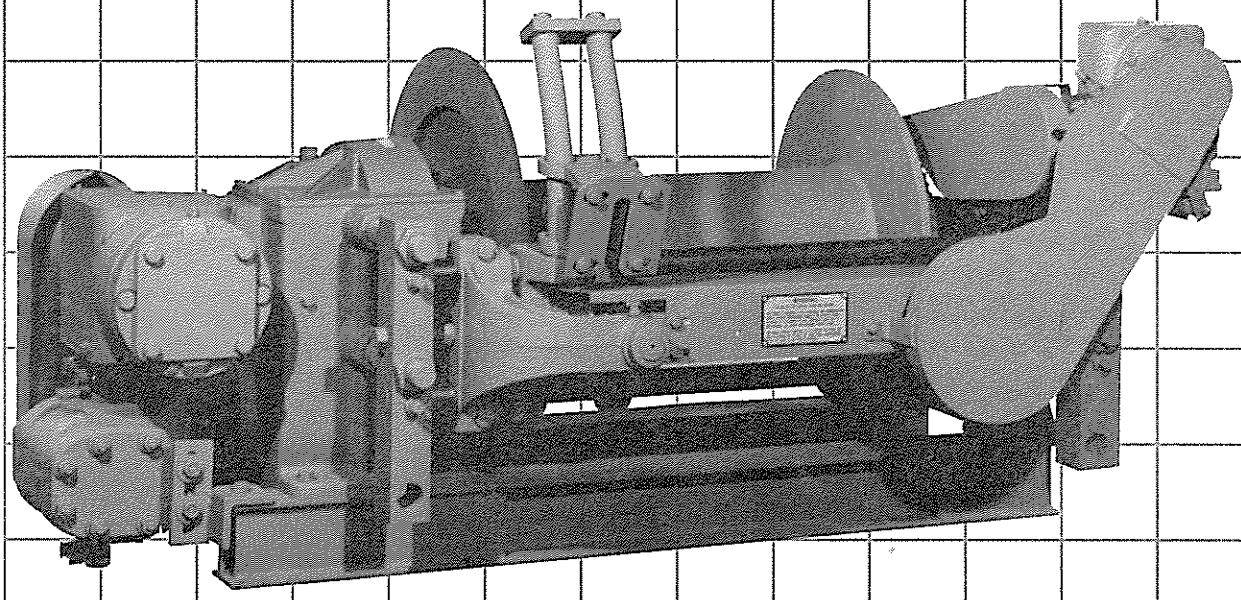
August 1993

Adams®

Proven Quality Winches from GMP

Model CDe-22 & CDe-28 Continuous Duty Winch

Installation, Operation and Maintenance Manual



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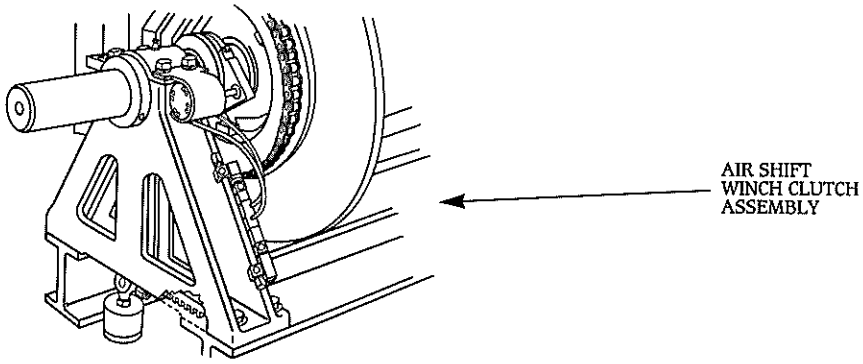
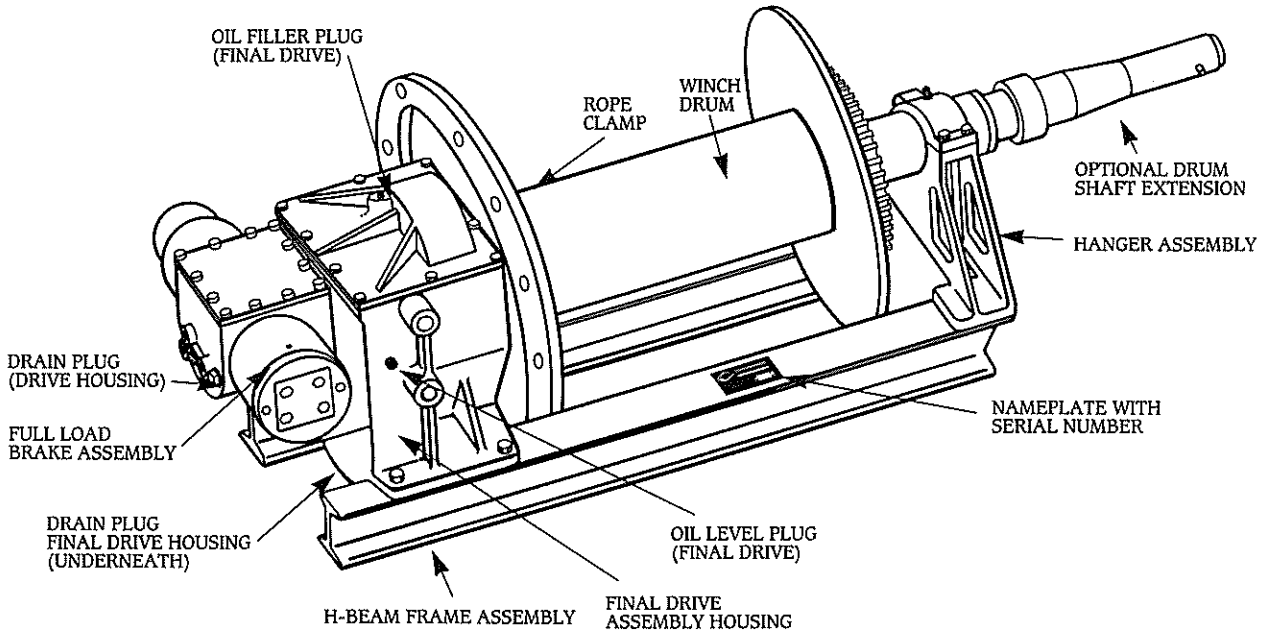




1. GENERAL AND DESCRIPTION

1.01 GENERAL — The information contained in this manual pertains exclusively to the Adams CDe-22 and CDe-28 winches manufactured after January 1, 1993 which have serial numbers of 93-1000 and higher. To obtain information on earlier model CD, LCD or UG winches, please contact the factory for the appropriate manual.

The Model CDe-22 and CDe-28 winches were derived from Bell System Specification No. 8003. Both models are continuous duty rated in conformance to SAE J706 for 25,000 pounds pull on the first layer. Driven by a series of highly efficient helical gears, these units will not generate excessive heat under long duration, maximum pull conditions. They are suitable for applications involving stationary or mobile mounting.

1.02 PERTINENT WINCH SPECIFICATIONS:	**CDe-22**	**CDe-28**
• Maximum Rated Pull-Bare Drum	25,000 lbs.	25,000 lbs.
• Maximum Rated Pull-Full Drum w/Tri-Drive	13,000 lbs.	13,000 lbs.
• Drum Width (inches)	22½	28
• Net Weight	925 lbs.	935 lbs.
• Cube Dimension (inches) 24 high X 24 wide x	60 long	65 long

1.03 WINCH MAJOR COMPONENTS

- Drive Assembly
- Final Drive Assembly
- Full Load Brake Assembly
- Drum Assembly
- Clutch Assembly
- Drag Brake Assembly
- Hanger
- Frame

1.031 WINCH CLUTCH — The air shift mechanism replaces the former mechanical linkage for clutch actuation. The clutch provides a means of transferring the torque from the drum shaft to the winch drum. When the winch clutch is disengaged, the drum will rotate freely on the drum shaft. Power can still be transmitted through the drum shaft to the drum shaft extension to drive a capstan or reel while the clutch is disengaged. To help ascertain clutch engagement or disengagement, optional clutch position sensing is available; (the clutch plate position is sensed at the end of the stroke of the air cylinder actuating the clutch plate).

1.032 CALIPER TYPE DRAG BRAKE — Under rapid winch line payout conditions, it is extremely important to operate the caliper brake properly, maintaining sufficient tension on the wire rope. This will enable the levelwind assembly to operate properly, minimize over-spinning of the drum, and help to prevent erratic lays of winch line on the drum.

All CDe-22 and CDe-28 units are factory equipped with a caliper-type drag brake assembly. The caliper brake is controlled by the hydraulic actuator(supplied), and is intended to be mounted with the winch controls.

The assembly shown on parts drawing 230-1970 includes:
1 - Brake Assembly, Caliper
1 - Bracket, Brake Mounting
1 - Actuator Assembly
1 - Reservoir
1 - Flexible Hose
1 - Disc, Brake

The purpose of the caliper brake is to control the speed of the winch drum when in the free spool mode. Movement of the actuator lever will force the brake pads together, reducing the drum speed. Continued movement of the control lever will eventually force drum rotation to stop.

The primary brake assembly is mounted at the factory on the left side, top surface of the forward winch frame rail using the mounting bracket with four bolts, nuts and lockwashers.

The brake disc is mounted at the factory on the outboard surface of the left side drum flange using eight machine screws.

The remote actuator, reservoir and flexible hose section are shipped loose with other winch mounting hardware in the parts box. These components are to be installed by the dealer. The components are compatible with brake fluid; do not use hydraulic oil.

1.033 **FULL LOAD BRAKE** — The full load brake, located on the left side of the winch, is an automatic device designed to hold the rated load of the winch, up to 25,000 pounds on a bare drum.

The full load brake assembly is spring loaded and requires hydraulic pressure to release the brake. The hydraulic pressure is applied on the piston, which exerts the force on the primary disc, which compresses the springs into the brake housing. When the disc stack (comprised of both rotating and stationary discs) is not compressed, the rotating discs are free to turn and the brake is released. The pressure from either side of the motor can release the brake. This feature enables the winch to pull in as well as power-out. The brake is not direction-sensitive.

The pressure to release the brake is sensed at the hydraulic motor. There are two different types of hydraulic motors on the CDe winch. One type is a single section gear motor on the Hydro-Mechanical Transmission (Model 240-584) and the other type is a tandem section gear motor on the Tri-Drive Transmission (Model 230-1600). Depending on the type of motor, the pressure will pass through one or three cartridge type shuttle valves. The valves allow the pressure to release the brake as well as relieve the pressure on the brake after the system pressure is ported to the tank. The plumbing for both the shuttle valves and the brake is completed at the factory.

1.04 **ACCESSORIES** — In order to enhance the utility of the winch, the following accessories are available:

Levelwind Model CH-22 or CH-28, Overwind or Underwind
(Derived from Bell System Specification No. 8414).

Three Speed Tri-Drive Hydraulic Transmission Model 230-1600. P/N 15248 Overwind or P/N 15715 Underwind.

Three Speed Hydro-mechanical Transmission Model 240-584
(Derived from Bell System Specification No. 8111). P/N 15669

Drum shaft extension. This accessory has a 2 7/16" diameter and is mounted on the winch drum shaft by means of a coupling secured by a connecting pin. Designed with the conventional bayonet type of connection, it is suitable for driving a reel or capstan. To mount a device onto the shaft extension, slide the device spindle over the shaft extension, push all the way in, turn counter clockwise and pull out into the locked position.

The drum shaft extension projects from the right side of the winch only; the required shaft length is determined by the width of the body.

The maximum allowable pull of the standard drum shaft extension is 1,500 pounds using a standard 7" diameter capstan. Allowable pulls will be less when using a larger diameter accessory and/or using a longer drum shaft extension. See details below.

Note: An optional outboard hanger bearing is available to increase the allowable pull to 4000 lbs (17.8 kN) on the drum shaft extension.

Maximum allowable pulls on a standard drum shaft extension equipped with a 7" diameter capstan and corresponding body widths:

Body Width		**Allowable Pull**	
(inches)	(meters)	(pounds)	(kN)
92	2.34	1,500	6.7
94	2.38	1,425	6.4
96	2.44	1,350	6.0
98	2.49	1,275	5.7
100	2.54	1,200	5.4

For additional versatility, the drum shaft extension can be an ideal means to drive various types of equipment to place fiber optic cable. A wide range of components is available from GMP. Consult the GMP Fiber Optic catalog section available from your dealer or the factory.

1.05 **USE** — The Adams models CDe-22 and CDe-28 may be driven hydraulically or hydro-mechanically or mechanically. Both winches have been primarily designed for placing communication cable and electrical conductors. However, their robust construction and continuous duty rating make them suitable for most applications where a long, continuous, pull is required.

1.051 Winch Driven Hydraulically — For mobile mounting, using the truck engine as the prime source of power, through a split shaft or side mount power take-off, coupled to a hydraulic pump, driving a three speed hydraulic motor and silent chain drive to the winch input shaft.

This configuration employs the Model 230-1600 Tri-Drive three speed transmission. The hydraulic motor is of the tandem gear type, having two unequal flow sections. The larger section has a 2½" gear face width; the smaller a 1½" gear face width. By means of a two spool control valve, the motor sections are actuated individually or in combination to achieve the desired speed and pull variation. Power is transmitted from the motor to the winch input shaft by a ¾" pitch x 2½" wide, side guide, silent chain. A chain guard is furnished for purposes of safety.

The Tri-Drive provides three individual speed and pull capacities that can be selected to accurately meet specific requirements. It should be noted that shifting from one speed to another can be accomplished without stopping the winch operation. This benefit provides for a smooth and uninterrupted transmission of power.

1.052 Winch Driven Hydro-mechanically — For mobile mounting, using the truck engine as the prime source of power, through a split shaft or side mount power take-off, coupled to a hydraulic pump, driving a hydraulic motor integrally mounted to the mechanically shifted three speed transmission and silent chain drive to the winch input shaft.

This configuration employs the Model 240-584 Hydro-Mechanical three speed transmission. This unit is comprised of a transmission gear housing, a hydraulic motor and a mechanical shift mechanism. Power is transmitted from the output shaft of the transmission to the winch input shaft by a ¾" pitch x 2½" wide, side guide, silent chain. A chain guard is furnished for purposes of safety.
CAUTION! When shifting to any one of the three speed positions the winch drum rotation must be stopped.

1.053 Winch Driven Mechanically — For mobile mounting, using the truck engine as the prime source of power through a split shaft or side mount power take-off and silent chain drive to the winch input shaft. This is a special application, and the factory should be consulted for assistance.

Stationary mounted units can also be driven hydraulically, hydro-mechanically or mechanically using a variety of primary power sources. Please contact the factory for engineering assistance for this special application.

2. PRECAUTIONS

2.01 — Observe the following precautions when operating the winch:

CAUTION! THE WINCH WAS NOT DESIGNED FOR, NOR INTENDED TO BE USED FOR, THE MOVEMENT OF PEOPLE.

CAUTION! THE DRAG BRAKE IS USED TO CONTROL THE DRUM SPEED ONLY. IT IS NEVER TO BE USED TO HOLD THE LOAD.

CAUTION! SHIFTING OF THE CLUTCH SHOULD ONLY BE DONE WHEN THE DRUM ROTATION HAS STOPPED.

As required by OSHA, it is imperative, and the responsibility of the employer, to properly instruct the winch operator and the crew relative to the safe working capabilities and operational limitations of the winch, its accessories and especially the winch controls. The operator should never leave his position at the controls while the winch is in operation or the winch line is under load.

Maintain complete coordination with other members of the crew, giving clear instruction by hand signal or radio communication.

Stand clear of loads suspended by the winch line. Do not stand inside of angles formed by the winch line. As much as possible, do not stand where there is the danger of being struck by the wire rope if it should fail or snag. Never place hands on a moving winch line. Always stand clear of moving winch line. When working around the winch, wire rope and the tail sheave, do not wear loose fitting clothing that may become entangled with moving parts and cause possible serious injury.

Operate the winch as smoothly as possible. Sudden jerking pulls can place extreme loads on equipment, causing damage or injury. Make certain that the winch line is properly attached to the drum and that no less than one half of the first lay remains on the drum at all times. Make certain that the eye at the end of the winch line is properly spliced or swaged. Wire rope (winch line) may be old, damaged or weakened by such defects as kinks, cuts, extreme bends or loops. Such conditions are potentially dangerous and detrimental to safe operation of the winch. The wire rope must be routinely inspected at regular intervals and replaced when worn. See Maintenance Section 6.0 for replacement criteria.

Loads on the winch, winch line or extension shaft should not exceed their rated capacity.

Make certain that the winch clutch is engaged before starting the pull.

Do not operate the winch at speeds faster than necessary.

When pulling in, do not allow the winch line to build up in one location on the drum. This can cause winch line "roll-over" and possible erratic, damaging, pulls.

3. INSTALLATION

3.01 GENERAL — The following procedures are recommended to assure safe, trouble-free operation:

For mobile applications, 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. Two steel mounting brackets are furnished with each winch.

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

For standard installations, orient the winch assembly on the chassis frame so that the levelwind is facing rearward and the drum shaft is projecting toward the right (curb) side as viewed from the rear of the vehicle looking forward.

The direction of drum rotation for pulling in when the winch is an overwind unit is clockwise when viewed from the right side of the vehicle. The wire rope is wound onto the drum from the top.

With the two mounting brackets on the winch frame, locate the winch drum center-line on the chassis frame center-line. Slide the mounting brackets tight to the chassis frame. Using the eight $^{7}/_{16}$" diameter pre-drilled holes in each bracket as a guide, finish drill all holes in both brackets for a tight fit, using the $^{5}/_{8}$" - 18 x 2" long grade five hardened steel bolts furnished in the winch mounting kit.

Weld both sides of the mounting bracket to both winch frame rails.

CAUTION! 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 attached to the shipping crate. To avoid rusting problems when storing winches outside, the parts boxes MUST be removed and stored in an indoor area.

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.

IMPORTANT! If the winch will be placed in outdoor inventory for an indefinite period, care should be taken to prevent oil contamination or rust due to condensation.

IMPORTANT! BEFORE THE WINCH IS ACTUATED, THE "FULL LOAD BRAKE" MUST BE BLED. See the instructions in Section 3.05 under the heading for "FULL LOAD BRAKE".

Controls — When the winch has been mounted, consideration must be given to the control of:
- Drum direction of rotation
- Drum speed
- Winch clutch control
- Drag brake caliper/actuator

Because of the wide variation in the type of controls available, it is the responsibility of the dealer to furnish and install the controls in conformance with the customer's specifications. Proper sizing of each hydraulic component, and hence the complete hydraulic system, will avoid such problems as overheating, and will provide for economical operation throughout the hydraulic system's life cycle.

3.02 HYDRAULIC REQUIREMENTS

3.021 Tri-Drive Transmission — To obtain the maximum rated pull and line speed, using the Tri-Drive three speed transmission model 230-1600, the system should have a maximum operating pressure of 2,000 psi and a flow of 30 GPM. The pressure relief valve should be set at 2,100 psi. The recommended hydraulic oil reservoir capacity for Model 230-1600 Tri-Drive transmission is 60 gallons of petroleum-based hydraulic oil. For additional details and information concerning the model 230-1600 Tri-Drive transmission, see drawings 230-1600 and 25121.

3.022 Hydro-mechanical Transmission — To obtain the maximum rated pull and line speed, using the three speed transmission model 240-584, the system should have a maximum operating pressure of 2,000 psi and a flow of 55 GPM. The pressure relief valve should be set at 2,200 psi. The recommended hydraulic oil reservoir capacity for Model 240-584 three speed transmission is 80 gallons of petroleum-based hydraulic oil. For additional details and information concerning the model 240-584 three speed transmission, see drawings 15669 and 25647.

3.023 Recommended hydraulic line diameters are:
- Pump to control valve: 1¼".
- Control valve to tank: 1¼".
- Control valve through power beyond to hydraulic system: 1¼".
- Control valve work ports to Tri-Drive motor ports: 1".
- Control valve work ports to Hydro-mechanical motor ports: 1¼".

Suggested filtration, based on the hydraulic motor requirements, is 20 to 30 micron (nominal) filters. Typically, the return line is fitted with a 10 micron bypass type filter. Consult the filter supplier for specific filter recommendation.

3.03 WINCH CLUTCH — The clutch plate is actuated by an air cylinder assembly that is mounted to the hanger assembly. A fork is connected to the piston rod in the air cylinder and the fork contains two cam followers which ride in a groove on the clutch plate. The air cylinder is plumbed to a two position four-way directional control valve. The directional control valve is electrically operated, and is rated for 12 volts DC with a continuous duty rating of 100%. A regulator is provided for maintaining a normal setting of 30 psi supply pressure to the directional control valve. A pressure gauge is provided on the regulator, for ease of monitoring input pressure to the cylinder as required.

The regulator has a ⅛" NPT port for the incoming air supply. The directional control valve and the cylinder are plumbed at the factory. At the time of installation, the only connection required is the air supply line to the aforementioned regulator port. Refer to drawing 25686.

A terminal strip is provided for the electrical connection to the directional control valve. The terminal strip is located on the underside of the hanger assembly on the inboard web. A two position switch should be used to energize the solenoids in the directional control valve. The solenoids control the positioning of the valve spool thereby directing the airflow to the two ports on the air cylinder. There are three screws on the terminal strip; the center screw is for connection to the ground or common. The other two screws are for the connection to the switch. Each of the two connections from the terminal strip should lead to one side of the two position switch. Refer to drawing 25687 for additional details.

Optional clutch position sensing is available. The output can be wired to a set of lights to provide the operator with information on clutch engagement or disengagement.

The air cylinder that actuates the clutch is equipped with a solid state digital output limit sensor at each end of the cylinder. When the sensor detects the magnetic piston, the current sinking device completes the circuit by connecting the load to the ground. The sensors are magnetically activated and while they work on the same principal as Hall Effect sensors, they are extremely more sensitive. The sensors are 100% solid state devices. They have no moving parts to wear, break, bounce or stick and they are fully encapsulated in plastic resin.

The sensors should be wired as per drawing 25777. The sensors detect the magnetic piston in the air cylinder and not the switch used to activate the directional control valve, so even manual actuation of the clutch is detected by the sensors.

Warning! Reverse wiring will destroy the solid state electronic components in the sensors.

3.04 CALIPER TYPE DRAG BRAKE — For reasons of safety and convenience, the drag brake is equipped with a remote actuator. The remote actuator, reservoir and flexible hose section are shipped loose with other winch mounting hardware in the parts box. These components are to be installed by the dealer.

3.041 GENERAL GUIDELINES — Hydraulic brake components are precision built mechanisms and must be treated as such. Certain procedures must be followed at the time of installation to be assured of their optimum performance, and a few of the more common procedures are listed below. (Ref. Dwg 230-1700)

To properly locate the brake component or brake line, you must always try to...

- Make it convenient for the operator.
- Use the shortest and most protected route.
- Avoid mounting near the engine, exhaust lines, muffler or anywhere that heat may be generated. NOTE: Excessive heat transferred to the brake fluid may result in damage to the lines or seals.
- Mount the reservoir higher than the brake component to facilitate bleeding.

To properly mount components and brake lines to withstand the most severe vibration and service conditions, always try to:

Use the right size bolt for the hole and secure with a steel lockwasher.

Secure tubing to frame with proper size tube clamps to avoid possible fractures or fittings loosening and leaking.

Use good, factory flared lengths of steel tubing. Hand-made flares, when used, should be double flared. Any flash or loose particles must be removed.

Use flexible brake line between frame and body.

If tubing passes through frame or firewall a grommet or some other means should be used to protect line from chafing.

Use tubing rated for 1500 psi minimum for line between actuator and caliper brake assembly.

The proper removal of air from the brake system is very important. All too often, air has remained trapped in systems causing a spongy actuator and inadequate brakes. The bleeder screw in the brake assembly must be toward the top. The air in the system will always seek the highest level. To properly bleed system...

Be certain all fittings are tight to avoid leaking.

Depress actuator and open up bleeder screws to allow air to escape.

Retighten bleeder screws and allow actuator to return.

Repeat cycle until actuator is firm.

Make several static brake applications and then repeat cycle once more.

The closed circuit hydraulic system must not leak. Even the smallest leak could destroy what was once a well operating brake system. It could eventually deplete the reservoir and reduce the braking pressure. To avoid...

- Check connections during the bleeding and static brake processes to be sure they are tight.
- Always re-install new hoses, lines and fittings if they look the least bit questionable.

It is impossible to over emphasize the importance of cleanliness at installation. Always...

- Use good, clean, quality fluid.
- Use brake fluid which conforms to S.A.E. Spec. No. J1703 or D.O.T. 3 or 4. Do not use hydraulic oil.
- Be sure fittings and seats are clean before making connections.
- Be sure top of reservoir is clean before removing filler cap.

CAUTION: As routine maintenance, it is recommended that brake hoses and brake lines be inspected regularly. All damaged or worn parts should be replaced. The reservoir should be checked for brake fluid level and clean brake fluid added as required.

3.042 CALIPER BRAKE ASSEMBLY — The Caliper brake assembly is mounted at the factory on its mounting bracket attached to the winch frame. Steps 1-4 may already be performed, if the brake assembly is mounted at the factory. See Drawing 230-1700 and Drawing 25789.

1. Screw in brake module assembly (item 7) until a clearance of approximately .012" total is obtained between the disc and lining.
2. Back off brake module assembly as required to position ports in vertical alignment.
3. Tighten lock screw with ⅜" allen wrench.
4. Move bleeder screw to higher of 2 ports for ease of bleeding (BOTH PORTS ⅛ - 27 NPTF).
5. Install hydraulic line, from hydraulic actuator, in lower port. The line should be rated for 1500 psi minimum.
6. Bleed the system making sure all air is eliminated. Apply hydraulic pressure and check for leaks.

3.043 RESERVOIR AND ACTUATOR — The remote actuator is normally mounted at the rear of the body, under the tailshelf. Find a location that is safe and convenient to the operator and within sight of the winch operation. Alternate mounting would be in accordance with end user specifications.

The reservoir should be mounted above, and as close as possible to, the inlet fitting of the actuator.

The reservoir should be mounted higher than the caliper brake assembly to facilitate bleeding.

The flexible hose should be connected to the outlet fitting of the actuator.

1. Mount actuator assembly, using four 5/16" diameter bolts, lock washers and locking nuts, as required. Note: bracket may be used as template for drilling mounting holes.
2. Make necessary hydraulic connections to reservoir and caliper brake.
3. The closed circuit hydraulic system is shipped void of any oil. Fill the system with brake fluid, do not use hydraulic oil.
4. Bleed the system making sure all air is removed from system. Apply hydraulic pressure and check for leaks. Make several applications to be sure actuator is working properly.
5. After bleeding is complete, check reservoir for brake fluid level and add brake fluid if necessary.

3.05 FULL LOAD BRAKE — Although the full load brake is factory installed, procedures must be followed at installation to ensure proper brake operation.

Bleeding the full load brake is a required step anytime air has been introduced into the system, in order to assure proper release of the brake for winch drum rotation. Bleeding is accomplished by pressurizing the system and loosening the bleeder screw on the top of the brake (refer to drawing 25699). To avoid fluid loss or spill, a hose should be connected to the top of the bleeder screw and the outlet of the hose can be directed to a can or similar container. The brake should be bled until all the air is removed from the brake. Several cycles of pressure bleeding may be required to remove all of the air from the brake.

The pressure from either side of the motor can release the brake. This feature enables the winch to pull in as well as power-out. The brake is not direction-sensitive.

The maximum pressure rating is 3000 PSI, including spikes or surges.

SURGE PRESSURE IN EXCESS OF 3000 PSI GENERATED BY PUMP SURGE OR RAPID OPENING OR CLOSING OF THE CONTROL VALVE WILL CAUSE THE PISTON TO FRACTURE.

The O-rings (Buna "N" material) in the piston are only compatible with petroleum based fluid. DO NOT USE NON-PETROLEUM BASED FLUID.

The brake is provided with a case drain. Should fluid leak into the brake housing, the case drain will open to let the fluid escape. If the fluid leaks from the case drain, contact the factory for assistance.

WARNING! THE FULL LOAD BRAKE MAY NOT HOLD THE RATED LOAD IF THE CASE DRAIN IS LEAKING FLUID.

Any back pressure in the tank return line may reduce the holding power of the brake. The brake is spring applied and hydraulically released. The back pressure may start to release the brake, thus reducing the holding power of the brake.

CAUTION! BENCH TESTING IS NOT RECOMMENDED. THE UNIT SHOULD ONLY BE TESTED WHEN PROPERLY MOUNTED TO THE WINCH.

3.06 WIRE ROPE INSTALLATION — When installing the wire rope observe the following recommendations: It is important to select the correct winch and wire rope for a particular application. Wire rope is specified in terms of diameter, length, number of strands, number of wires per strand, type of center and type of lay. Refer to table on back cover for winch drum capacities.

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 with 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.

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 supported on a horizontal axis and free to rotate. Spool the rope onto the drum with the natural bend in the same direction as it comes off 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, pass the winch line through the tail shelf sheave and hook the pulling eye to a fixed section of the chassis. This will prevent the rope from unwinding or "clock-springing".

3.07 WINCH DRUM ROTATION — Depending upon customer specifications, the wire rope will either be overwound or underwound.

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.

It should be noted that on these winches the rope clamp is located on the left side of the drum. The rope is attached at the left and spools to the right. It is recommended that the wire rope have a left lay for overwind applications .

UNDERWINDING — Underwinding is when the winch drum rotates in a counter-clockwise direction (view ing from the right side) and the wire rope is spooled onto the winch drum at the bottom. It is recommended that the wire rope have a right lay for underwind applications. "Underwind Application" should be specified on the customer order.

For underwind applications, the wire rope must be guided and maintained as it is routed forward under the body deck to the winch drum. This can be done by using a trough or tube with sufficient width at the front section to allow the wire rope to freely traverse the width of the drum. As the wire rope travels to the drum, and depending on the angle of incline combined with the body crossmember configuration, a floating sheave or roller may be required. Application engineering assistance is available from the factory.

Warning! The cable clamp alone is not designed to hold the rated load. Approximately ½ of the first layer must be left on the drum to achieve the rated load and avoid cable clamp failure.

3.08 WINCH IDENTIFICATION — Manufacturer or dealer assistance is available to help resolve unique problems. 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.

This information is stamped on a nameplate affixed in the top center of the winch frame rail nearest the rear of the vehicle. See figure on page 2.

4. PREOPERATIONAL CHECKS

4.01 — IMPORTANT! BEFORE PLACING THE WINCH IN SERVICE THE FOLLOWING CHECKS MUST BE MADE:

Make certain that the winch assembly is properly secured to the chassis frame.

The operator should have a complete understanding of all functions and the location and operation of all controls.

The winch line should be spooled on the drum with tight, even, coils and lays.

It is not necessary to have the drum filled with winch line. Additional pulling capability can be obtained by only installing a slight excess of the maximum length required for the job, while also improving the laying of winch line on the drum.

Refer to operating manual for the vehicle for specific operational instructions on the hydraulic system.

Check the hydraulic system to make certain that the reservoir is filled to the correct level with the proper grade of oil.

Make certain that the reservoir shut-off valve is open.

Check the hydraulic system for the correct pressure and flow.

Check all winch and winch accessory gear housings for the correct oil level and grade.
See Section 6.02, LUBRICATION.

Engage the hydraulic pump drive 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.

Check operation of the drag brake.

Check the body load area in a triangular section between the tail shelf sheave and both drum flanges for obstructions that could restrict the travel of the winch line or level wind.

IMPORTANT! BEFORE THE WINCH IS ACTUATED, THE FULL LOAD BRAKE MUST BE BLED. See Section 3.05, INSTALLATION.

Make sure the full load brake and drag brake have been bled to assure positive activation of the brakes. See Section 3 for procedures.

5. OPERATING INSTRUCTIONS

5.01 — The following procedures must be observed to assure safe and efficient winch operation:

Refer to operating manual for the vehicle for specific operational instructions on the hydraulic system.

Check the body load area to make certain there are no tools or equipment to restrict winch line travel or level wind movement.

Check the lay of the winch line on the drum and check for uneven build-up of the winch line.

Check to be certain that the winch clutch is fully engaged, as described in Section 2, Precautions. With rotation stopped, place the winch clutch control switch in the desired position for either paying out or winding.

Operate the directional control valve to achieve the desired direction of drum rotation.

Pull the load steadily and evenly.

To stop the winch, release the directional control valve lever.

When free spool is required, stop the drum rotation and disengage the clutch by moving the control switch to free-spool position.

To control the drum speed in free spool:

Use the caliper brake actuator lever and apply pressure according to the amount of braking required to keep the drum from over-spooling.

CAUTION! THE DRAG BRAKE IS USED TO CONTROL THE DRUM SPEED ONLY. IT IS NEVER TO BE USED TO HOLD THE LOAD.

When finished with the winch and it is desired to stow the free end of the winch line, pass the winch line through the tail shelf sheave and hook the pulling eye to a fixed section of the chassis. A slight tension should be maintained in the winch line, preventing the formation of loose wraps on the drum.

6. MAINTENANCE

6.01 GENERAL — 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. The operator should report immediately any changes in the normal characteristics of the winch, winch accessory or the hydraulic system.

If the winch has not been used for an extended period of time, inspect the interiors of the drive housing and final drive housing 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 lubrication 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. Wire rope that does not meet OSHA criteria must be replaced.

Depending on the total length of the wire rope versus 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 for end.

The hydraulic system should be checked periodically for:

- Overheating
- Abnormal noise
- Maintaining a clean, sufficient, quantity of hydraulic oil of the proper grade.
- Keeping all connections sufficiently tight to prevent oil leakage and air from entering the system.
- Changing the hydraulic system oil filter at the frequency recommended by the filter manufacturer.

IMPORTANT! BEFORE THE WINCH IS ACTUATED, THE FULL LOAD BRAKE MUST BE BLED. See Section 3.05 Full Load Brake.

WARNING! THE FULL LOAD BRAKE MAY NOT HOLD THE RATED LOAD IF THE CASE DRAIN IS LEAKING FLUID.

IMPORTANT! THE LOAD HOLDING ABILITY OF THE FULL LOAD BRAKE SHOULD BE TESTED ON A PERIODIC BASIS.

6.02 LUBRICATION — An ongoing routine for assuring proper lubrication should be a part of the overall maintenance program.

The drive and final drive housings have a common reservoir that must be checked and maintained. The oil level in these two housings will be the same because of the flow-through lubrication design.

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 final drive housing. Remove the filler plug in the final drive housing cover. Add 80W140 oil as required to the height of the oil level opening.

Always remove the oil level plug before adding oil to prevent over filling.

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

The final drive oil level should be checked every seventy-five (75) hours of operation. Both housings should be completely drained and filled with new oil at least every other year.

Grease fittings and oil cups on the levelwind should be serviced every seventy-five (75) hours of operation.

Apply a coat of engine oil to all chain drives every seventy-five (75) hours of operation. The lubricant should be applied on the inside surface of the roller or silent chain by means of a spray or brush.

When the winch is not in operation, pass the winch line through the tail shelf sheave and hook the pulling eye to a fixed section of the chassis. Slowly take up the slack. This will best maintain the rope under a slight amount of tension until required again. 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. Lubricating the wire rope periodically will minimize friction and extend life expectancy. The type of lubricant, method and frequency of application is dependent on each particular circumstance. For specific lubrication details, contact the wire rope manufacturer.

6.03 WINCH IDENTIFICATION — Manufacturer or dealer assistance is available when needed to assist in resolving unique maintenance problems. 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. This information is stamped on a nameplate affixed in the top center of the winch frame rail nearest the rear of the vehicle. See figure on page 2.

6.04 CALIPER BRAKE — It is recommended that brake hoses and brake lines be inspected regularly. All damaged or worn parts should be replaced. The reservoir should be checked for brake fluid level and clean brake fluid added as required.

See Section 3.04 Caliper Brake for Special Instructions on Bleeding.

NOTE: Linings can be replaced without retracting (unscrewing) brake module assembly. (Ref. Dwg. 25789).

1. Remove cap screw (item 3) and spring (item 2); allow linings (item 4) to drop out of housing (item 1).
2. Push piston back into brake module bore.
3. Install new lining assembly (item 4) on piston side of housing.
4. Install spring (item 2); then install second new lining assembly (item 4) on housing.
5. Install cap screw (item 3) and torque 10 - 12 ft. lbs.
6. Thread brake module assembly into housing until a .012 feeler gauge, placed between lining and disc, is tight. (Providing .012" clearance.)
7. Loosen brake module assembly as required to position ports in vertical alignment and remove feeler gauge.
8. Move bleeder screw to higher of 2 ports for ease of bleeding (both ports 1/8-27 NPTF).
9. Install hydraulic line in lower port.
10. Bleed the system making sure all air is eliminated. Apply hydraulic pressure and check for leaks.

7. CDe-22 & 28 WINCH SPECIFICATIONS

7.01 — The CDe family of winches have been tested to, and exceeded Society of Automotive Engineers Standard SAE J706, Rating of Winches. Pertinent specifications are given in both U.S. Customary and SI units.

Rated in compliance with SAE J706

- Winch line speed based on 9/16" dia. (14.3 mm) wire rope for all drive types.
- The rated line pulls shown are for the winch only. Consult the wire rope manufacturer for wire rope ratings.
- Winch duty cycle rating - 183° F (84°C)
- Rated input speed - 319 RPM.
- Starting Torque - 490 lb. ft. (664 N·m)
- Running Torque - 447 lb. ft. (606 N·m)

Line pull & line speed capacities

Hydraulic Tri-Drive Three-Speed Transmission (Model 230-1600)

Control Valve Position	Maximum Rated Line Pull (lbs./kN)		Winch Line Speed (ft./min.) (m/min.)	
	Bare drum	Full drum	Bare drum	Full drum
High	8300 36.9	4000 17.8	93 28.3	191 58.2
Intermediate	15200 67.6	7400 32.9	59 18.0	122 37.2
Low	❶	13000 57.8	37 11.3	76 23.2

- Rated working capacity: 25000 lbs. (111.2 kN) bare drum pull
- Hydraulic system flow: 30 GPM (114 l/min.) maximum
- Hydraulic system pressure: 2000 psi (13 790 kPa) operating with 2100 psi (14 479 kPa) maximum relief valve setting.

❶ **Warning!** In low control valve position, the winch can generate a pulling force beyond its rated working capacity and possibly that of the wire rope. Such a condition can damage the winch, cause wire rope failure or result in injury to persons or property. It is most important that the maximum operating pressure be restricted to permit a specifically limited winch line pull.

Hydro-mechanical Three-Speed Transmission (Model 240-584)

Gear Position	Maximum Rated Line Pull (lbs./kN)		Winch Line Speed (ft./min. m/min.)					
			30 GPM (114 l/min.)		40 GPM (151 l/min.)		55 GPM (208 l/min.)	
	Bare drum	Full drum	Bare drum	Full drum	Bare drum	Full drum	Bare drum	Full drum
High	7000 31.1	3400 15.1	119 36.3	244 74.4	159 48.5	326 99.4	221 67.4	453 138.1
Intermediate	18700 83.2	8700 38.7	48 14.6	98 29.9	66 20.1	135 41.1	91 27.7	186 56.7
Low	❷	❷ 20000 88.9	22 6.7	46 14.0	28 8.5	58 17.7	40 12.2	81 24.7

- Rated working capacity: 25,000 lbs. (111.2 kN) bare drum pull
- Hydraulic system flow: 55 GPM (208 l/min.) maximum
- Hydraulic system pressure: 2,000 psi (13 790 kPa) operating with 2,200 psi (15 168 kPa) maximum relief valve setting

❷ **Warning!** In low gear, this winch can generate a pulling force beyond the maximum rated capacity of the winch and possibly that of the wire rope. Such a condition can damage the winch, cause wire rope failure or result in injury to persons or property. Use low gear with extreme caution for slow speed operation only. It is most important that the maximum operating pressure be restricted to permit a specifically limited line pull.

Wire rope drum storage capacities (by wire rope size)❸ ❹

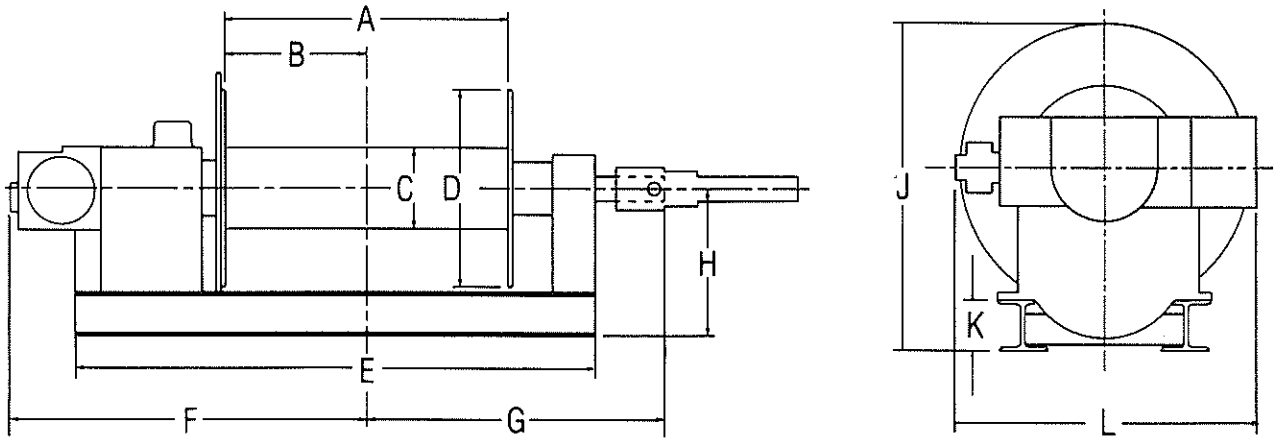
	Rope Diameter (Inches/mm)				
	5/16 7.9	3/8 9.5	7/16 11.1	1/2 12.7	9/16 14.3
Model	Capacity (ft./m)				
CDe-22	3920 1195	2910 887	2140 652	1530 466	1230 375
CDe-28	4880 1487	3620 1103	2660 811	1900 579	1530 466

- Wire rope lengths are based on the winch being equipped with a Model CH Level-Wind.
- Selection of the proper wire rope diameter, with a minimum breaking strength and allowable pull appropriate for use on winches such as the CDe-22 and CDe-28, is the responsibility of the user.

❸ For SAE rated wire rope capacities, use 90% of the values shown.

❹ Based on a minimum bending diameter of 18 times the value of the rope diameter, 9/16" diameter wire rope should only be used with two or more layers on the drum. If less than two layers remain on the drum, premature fatigue of the wire rope may occur, due to an insufficient bending radius.

Basic winch dimensions (U.S. CUSTOMARY / S.I.)



DIMENSIONS (INCHES/MM)

Winch Model	A	B	C	D	E	F	G	H	J	K	L	Wt. (lbs./kgs.)
CDe-22	22½ 572	11¼ 286	8 203	19 483	46½ 1181	32⅜ 822	26⅝ 676	14⅜ 365	25¾ 654	4 102	23¾ 603	925 420
CDe-28	28 711	14 356	8 203	19 483	52 1321	35¼ 895	29⅜ 746	14⅜ 365	25¾ 654	4 102	23¾ 603	935 424

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