THERN

Read this Owner's Manual thoroughly before operating the equipment. Keep it with the equipment at all times. Replacements are available from Thern, Inc., PO Box 347, Winona, MN 55987, 507-454-2996. www.thern.com

IMPORTANT: Please record product information on page 2. This information is required when calling the factory for service.

Owner's Manual

For
CW-1100 and CW-2500 Series
Clew Winches

A8615B-1206

Two-Year Limited Warranty

Please record the following:

Date Purchased:

Model Number:

Serial Number:

This information is required when calling the factory for service.

Thern, Inc. warrants its products against defects in material or workmanship for two years from the date of purchase by the original using buyer, or if this date cannot be established, the date the product was sold by Thern, Inc. to the dealer. To make a claim under this warranty, contact the factory for an RGA number. The product must be returned, prepaid, directly to Thern, Inc., 5712 Industrial Park Road, Winona, Minnesota 55987. The following information must accompany the product: the RGA number, the date of purchase, the description of the claimed defect, and a complete explanation of the circumstances involved. If the product is found to be defective, it will be repaired or replaced free of charge, and Thern, Inc. will reimburse the shipping cost within the contiguous USA.

This warranty does not cover any damage due to accident, misuse, abuse, or negligence. Any alteration, repair or modification of the product outside the Thern, Inc. factory shall void this warranty. This warranty does not cover any costs for removal of our product, downtime, or any other incidental or consequential costs or damages resulting from the claimed defects. This warranty does not cover brake discs, wire rope or other wear components, as their life is subject to use conditions which vary between applications.

FACTORY AUTHORIZED REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY TO THE CONSUMER. THERN, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Note: Thern, Inc. reserves the right to change the design or discontinue the production of any product without prior notice.

About This Manual

The Occupational Safety and Health Act of 1970 states that it is the employer's responsibility to provide a workplace free of hazard. To this end, all equipment should be installed, operated, and maintained in compliance with applicable trade, industrial, federal, state, and local regulations. It is the equipment owner's responsibility to obtain copies of these regulations and to determine the suitability of the equipment to its intended use.

This Owner's Manual, and warning labels attached to the equipment, are to serve as guidelines for hazard-free installation, operation, and maintenance. They should not be understood to prepare you for every possible situation.

The information contained in this manual is applicable only to the Thern CW-1100 and CW-2500 Series Clew Winches. Do not use this manual as a source of information for any other equipment.

The following symbols are used for emphasis throughout this manual:

⚠WARNING

Failure to follow 'WARNING!' instructions may result in equipment damage, property damage, and/or serious personal injury.

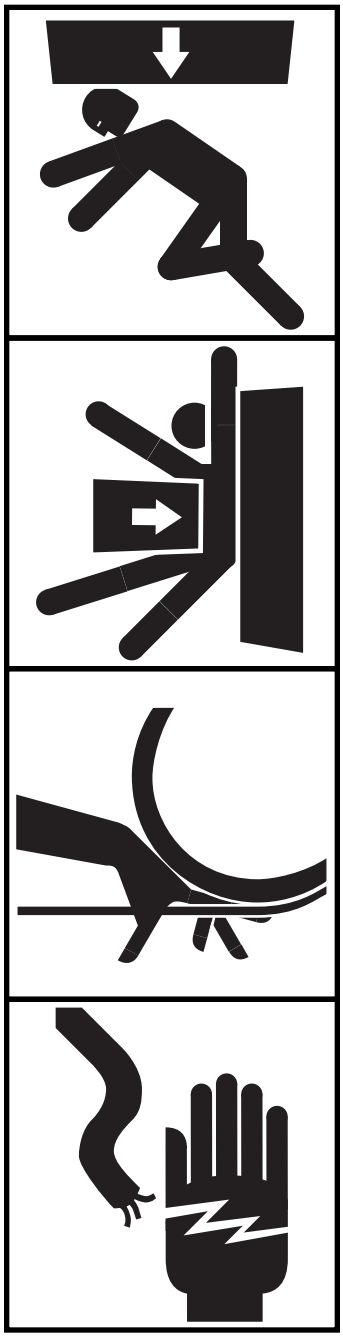
⚠CAUTION

Failure to follow 'CAUTION!' instructions may result in equipment damage, property damage, and/or minor personal injury.

Important!

Failure to follow 'important!' instructions may result in poor performance of the equipment.

Suggestions for Safe Operation



⚠WARNING

DO the following:

Read and comply with the guidelines set forth in this Owner's Manual. Keep this manual, and all labels attached to the winch, readable and with the equipment at all times. Contact Thern, Inc. for replacements.

Check lubrication before use.

Install the wire rope securely to the winch drum.

Keep at least 4 wraps of wire rope wound on the drum at all times, to serve as anchor wraps. With less than 4 wraps on the drum the wire rope could come loose, causing the load to escape.

Keep hands away from the drum, wire rope, and other moving parts of the equipment.

Disconnect the power before servicing the equipment.

Secure the drum with the drum lock before leaving the load suspended.

Keep all unnecessary personnel away from the crane while in operation. Keep out of the path of the load, and out of the path of a broken wire rope that might snap back and cause injury.

DO NOT do the following:

This product designed for lifting and moving material only. Do not use this product for any other purpose.

Do not exceed the load rating of the winch or any other component in the system. To do so could result in failure of the equipment.

Do not use more than one winch to move a load unless each winch was designed for use in a multiple winch system.

Do not use damaged or malfunctioning equipment. To do so could result in failure of the equipment.

Do not modify the equipment in any way. To do so could cause equipment failure.

Do not wrap the wire rope around the load. This damages the wire rope and could cause the load to escape. Use approved rigging connectors to secure the wire rope to the load.

Do not divert your attention from the operation. Stay alert to the possibility of accidents, and try to prevent them from happening.

Do not jerk or swing the load. Avoid shock loads by starting and stopping the load smoothly. Shock loads overload the equipment and may cause damage.

Do not adjust the winch brake with the load suspended.

Do not exceed the duty cycle rating of the winch when operating with a drill-motor, and do not operate the winch with a drill-motor that exceeds 400 rpm or an impact wrench. To do so could result in equipment damage or failure. See Table 1.

Do not attempt to operate the winch with the drum lock installed in the drum flange.

Table 1 – Duty Rating

Series	Winch Duty Cycle Rating with Drill-Motor
CW-1100	15 minute
CW-2500	5 minute

Do not continue to operate winch with drill-motor if gearbox or brake show signs of overheating.

Allow winch to cool to ambient temperature before continuing operation.

1.1 Installing the Winch

Important!

- Inspect the winch immediately following installation according to the Instructions for Periodic Inspection. This will give you a record of the condition of the winch with which to compare future inspections.
- A qualified professional should inspect or design the foundation to insure that it will provide adequate support.
- Do not weld the winch frame to the foundation or support structure. Welding the frame may void warranty, contact Thern, Inc. Use fasteners as instructed.

⚠WARNING

Do not install the winch in an area defined as hazardous by the National Electric Code, unless installation in such an area has been thoroughly approved.

Do not install the winch near corrosive chemicals, flammable materials, explosives, or other elements that may damage the winch or injure the operator. Adequately protect the winch and the operator from such elements.

Position the winch so the operator can stand clear of the load, and out of the path of a broken wire rope that could snap back and cause injury.

Attach the winch to a rigid and level foundation that will support the winch and its load under all load conditions, including shock loading.

1.1.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on installing the equipment.

1.1.2 LOCATE THE WINCH in an area clear of traffic and other obstacles. Make sure the winch is accessible for maintenance and operation.

1.1.3 LOCATE THE WINCH in an area with adequate temperatures. The winch is rated for operation in ambient temperatures ranging from 0° to 100° F.

1.1.4 POSITION THE WINCH to allow access for proper lubrication.

a **FOR THE CW-1100 SERIES, the winch frame has two sets of mounting holes, one for base mounting and one for wall mounting.** The winch can be fastened to horizontal or vertical structures without modification. See figure 2.

b **FOR THE CW-2500 SERIES, the CWH series is designed for HORIZONTAL base installation, the CWV is designed for VERTICAL or wall installation.** To convert the winch for horizontal or wall installation, please contact the factory. See figure 3.

1.1.5 MAINTAIN A FLEET ANGLE between 1/2 and 1-1/2 degrees. The proper fleet angle minimizes wire rope damage by helping the wire rope wind uniformly onto the drum. See figure 1.

1.1.6 FASTEN THE WINCH securely to the foundation.

a FOR STANDARD PRODUCTS referred to in this manual, use 1/2 inch coarse thread fasteners, grade 5 or better, torqued dry to 75 ft-lbs without lubrication. Use templates provided to locate mounting holes. Make sure the winch frame is secured to a solid foundation able to support the winch and the load under all conditions with a minimum design factor of 5:1. We recommend using a steel plate when fastening the winch to a wall.

b NON-STANDARD PRODUCTS that vary from the original design may have different fastening requirements. Contact a structural engineer or Thern, Inc. for this information.

TO COMPLY WITH LOCAL CODES, CONTACT A QUALIFIED PROFESSIONAL TO OBTAIN PROPER STRUCTURE OR FOUNDATION SPECIFICATIONS FOR THE MOUNTING OF THERN PRODUCTS.

Important!

- Install sheaves, guide wires and other equipment so they will remain fixed under all load conditions. Follow the recommendations of the equipment manufacturer.
- Use sheaves of proper diameter to minimize wear on the wire rope. Follow the recommendations of the sheave manufacturer.

Figure 1 – Maintaining the Fleet Angle

Install the winch to maintain the proper fleet angle as shown

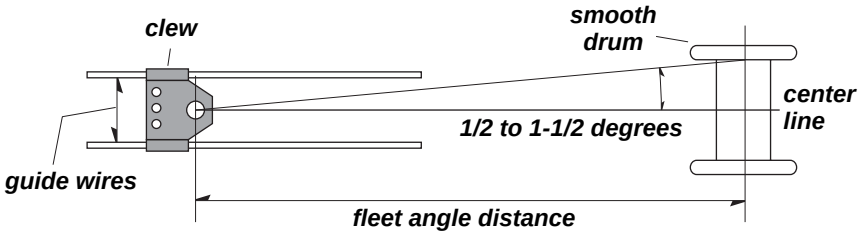


Figure 2 – Installing the CW-1100 Series Clew Winch

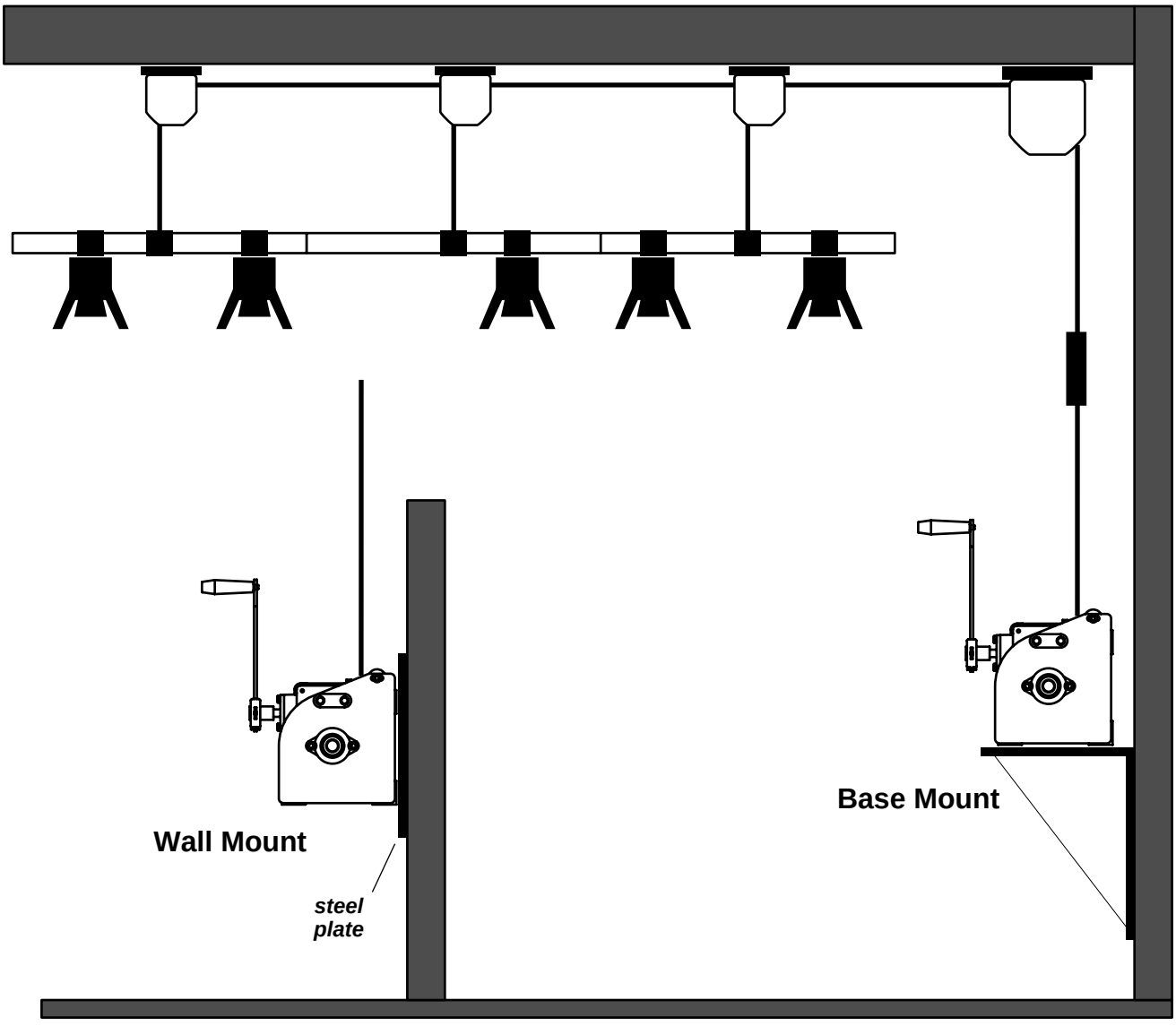
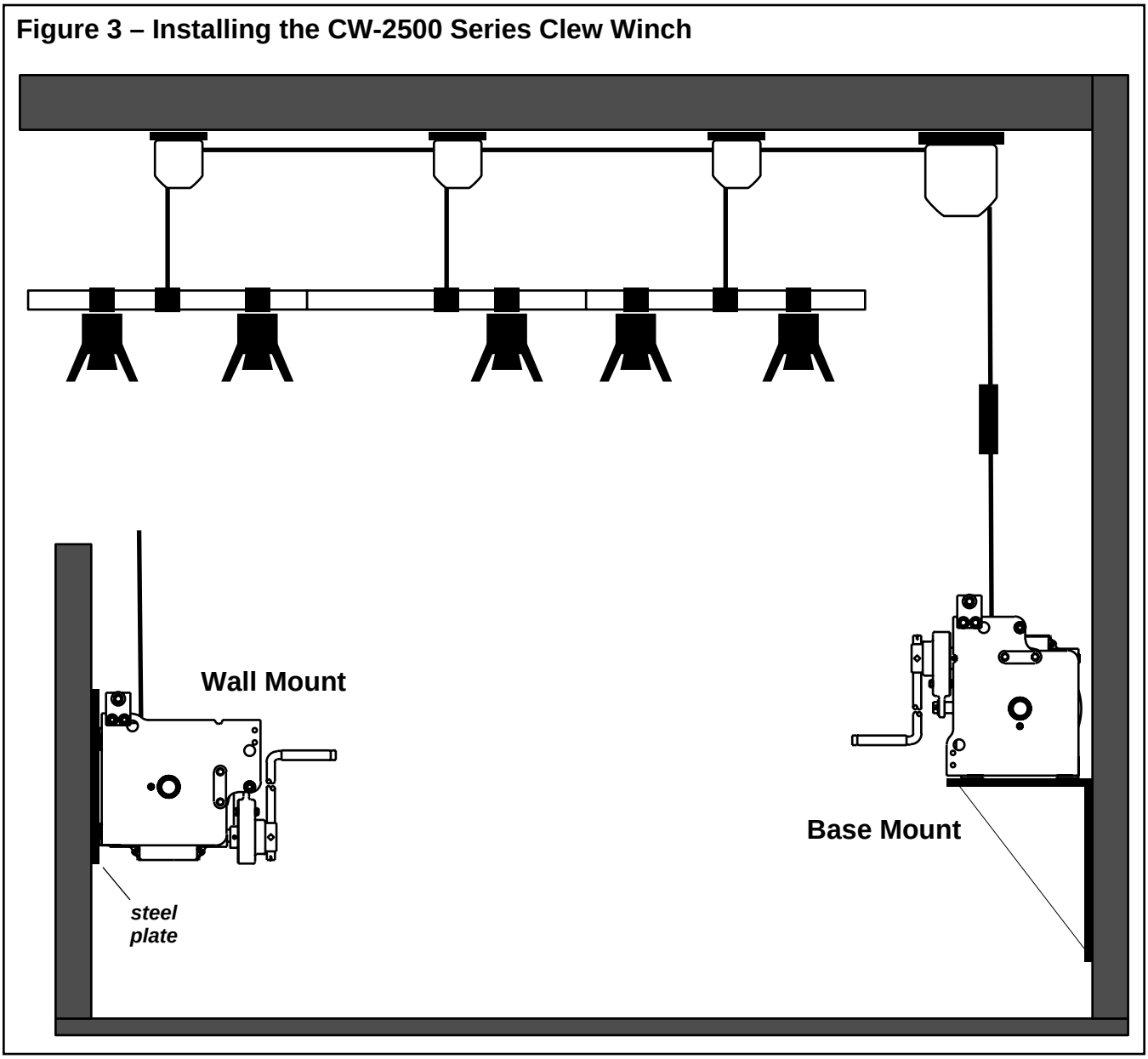


Figure 3 – Installing the CW-2500 Series Clew Winch



1.2 Installing the Breather Plug

Important!

- Save the extra oil plug for use when the winch is removed for storage or transport.

⚠CAUTION

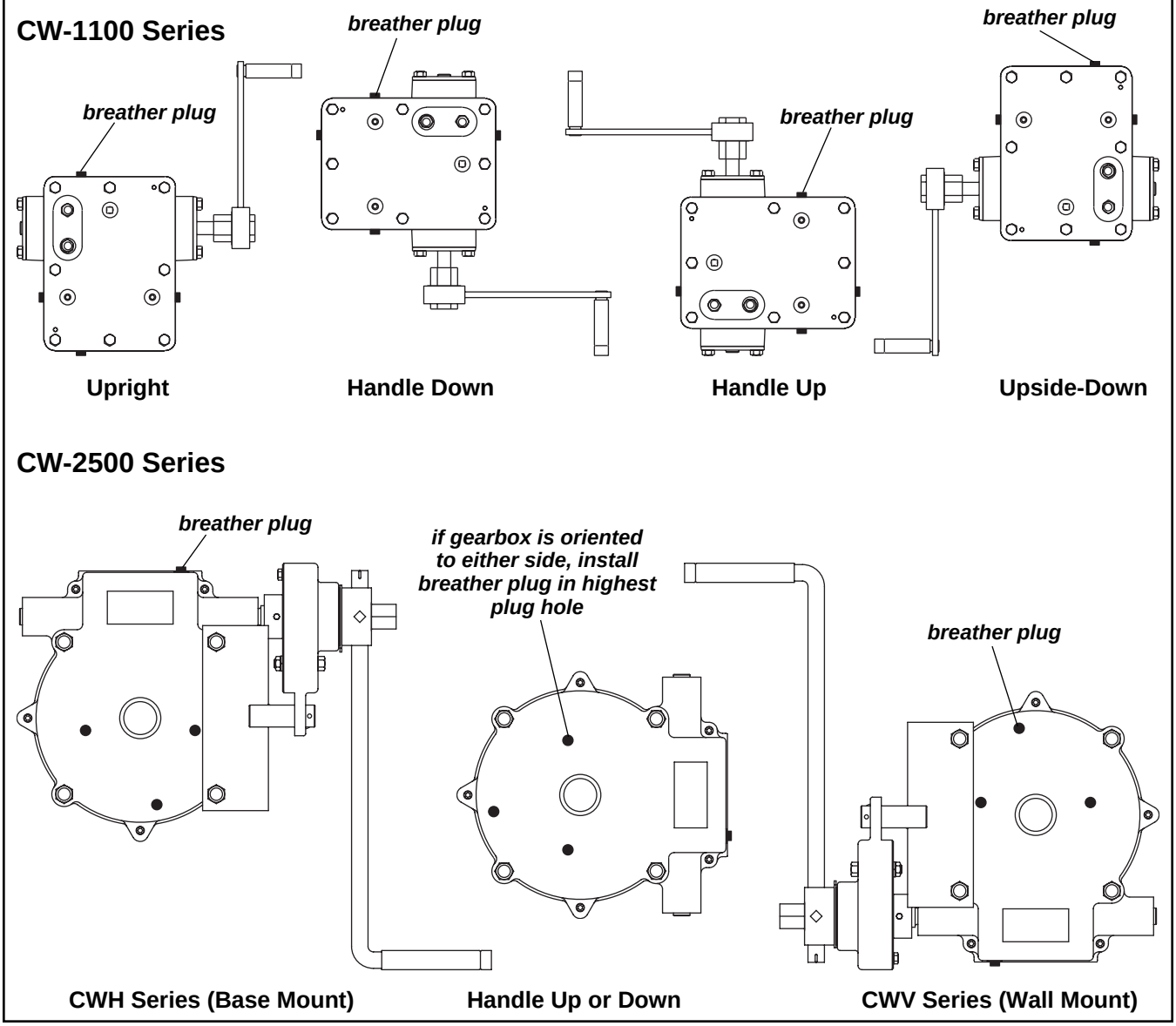
Install the breather plug to vent heat and pressure from the gearbox. Failure to do so could result in pressure buildup which can cause the gearbox to leak or damage the equipment.

For shipment, the gearbox is filled with lubricant and sealed with an oil plug. The breather plug is attached to the gearbox or shipped in a separate envelope.

1.2.1 REMOVE THE OIL PLUG and install the breather plug in the proper location. Make sure the breather plug is above the lubricant level. See figure 4.

1.2.2 CHECK LUBRICANT LEVEL in the gearbox to make sure no lubricant was lost during shipment. See Section 3.3 Lubricating the Winch.

Figure 4 – Installing the Breather Plug



1.3 Installing the Guide Wires

Important!

- Consult a qualified professional to determine best methods for installing guide wires and other rigging components. All rigging components, including the structures they are mounted too, must be adequately sized for all load conditions. Tension in the guide wires creates additional loading that must be accounted for.

⚠CAUTION

Do not overtighten guide wires, this could damage the equipment. Consult a qualified professional and comply with local codes and standards.

Thern Clew Winches include a guide bar and shaft collars. Guide wires and other rigging components must be purchased separately.

1.3.1 **FOR CW-1100 SERIES, see figures 5 and 6.**

a ALIGN THE GUIDE BAR HORIZONTALLY by moving the guide bar in or out and tightening the fasteners with an allen wrench. The guide bar should be positioned according to the maximum amount of wire rope that will be wound onto the drum during operation. See figure 5.

- FOR DRUM CAPACITIES UP TO 30 FEET, position the guide bar IN toward the drum.
- FOR DRUM CAPACITIES OVER 30 FEET, position the guide bar OUT away from the drum.

b FOR CLEWS UP TO 9.5 INCHES WIDE, attach guide wires to the guide bar using approved rigging hardware and secure alignment by fastening 1 shaft collar on each side of the guide wires. See figure 6.

1.3.2 **FOR CW-2500 SERIES, see figure 7.**

a FOR CLEWS 15 INCHES WIDE, remove the guide bar and attach the guide wires directly to the holes in the frame.

b FOR CLEWS LESS THAN 15 INCHES WIDE, attach guide wires to the guide bar using approved rigging hardware and secure alignment by fastening 1 shaft collar on each side of the guide wires.

Figure 5 – Aligning the Guide Bar – CW-1100

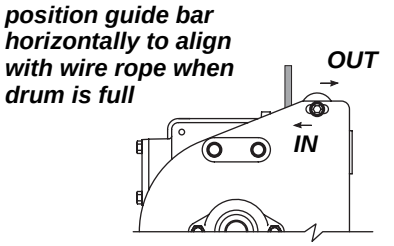
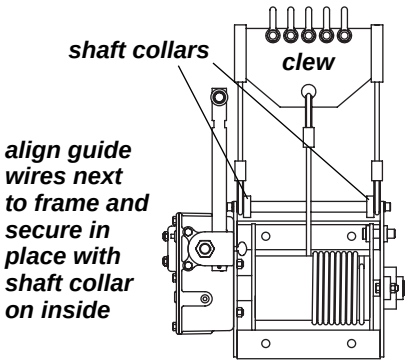
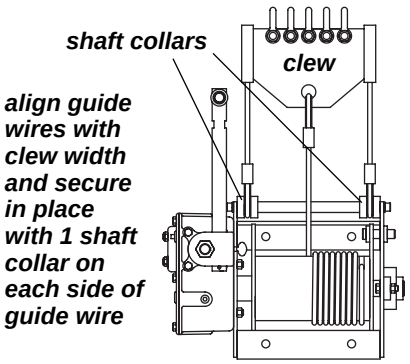


Figure 6 – Installing Guide Wires – CW-1100



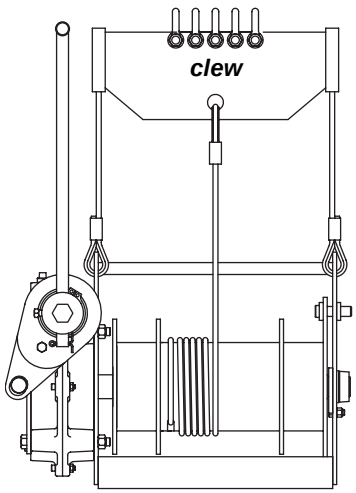
9.5 inch clew width



clew width less than 9.5 inches

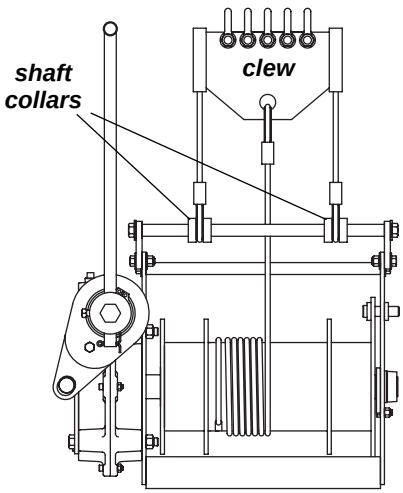
Figure 7 – Installing Guide Wires – CW-2500

remove guide bar and shaft collars and attach guide wires directly to frame holes



15 inch clew width

align guide wires with clew width and secure in place with 1 shaft collar on each side of guide wire



clew width less than 15 inches

1.4 Installing the Handle

The winch includes a 1-1/8 inch hex drive input. You can attach the handle to this input, or you can use a 1-1/8 inch hex socket to power drive the winch with a maximum 400 rpm drill-motor. **Remove the handle before power driving the winch with a drill-motor.**

1.4.1 **FOR CW-1100 SERIES, install the handle as follows, see figure 8.**

a LOOSEN THE THUMBSCREW and slide the handle toward the medallion as shown. See 8A.

b LINE UP THE NOTCH in the handle with the point of the hex in the medallion. See 8B.

c SLIDE THE HANDLE AND MEDALLION ASSEMBLY onto the hex drive until the flat of the handle lines up with the groove in the hex drive. See 8C.

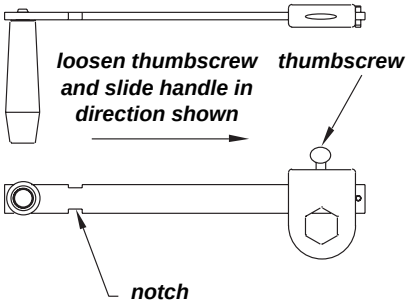
d SLIDE THE HANDLE outward away from the medallion to the desired length and tighten the thumbscrew. See 8D.

1.4.2 **FOR CW-2500 SERIES, install the handle as follows, see figure 9.**

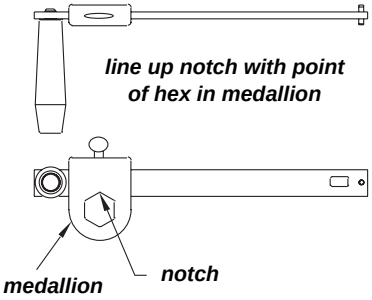
a INSERT THE HANDLE in the handle socket, adjust handle length to suit the operation, and tighten the set screw to hold it in place.

b INSERT THE COTTER PIN in the end of the handle and bend the arms back to secure in place.

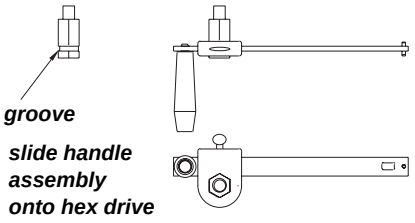
Figure 8 – Installing the Handle – CW-1100



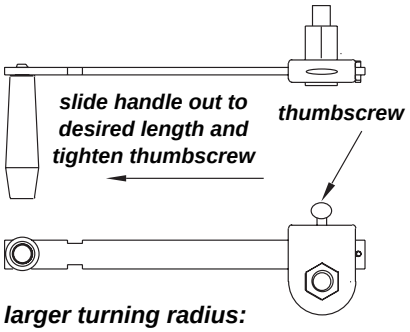
8A – Slide Handle In



8B – Line Up Notch



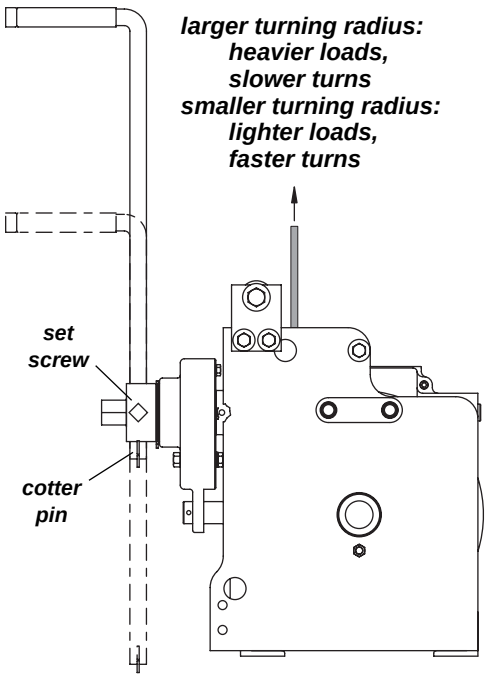
8C – Slide Handle onto Hex

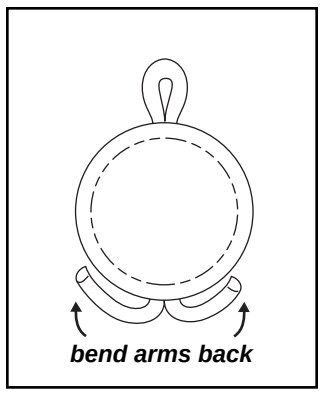


larger turning radius:
heavier loads, slower turns
smaller turning radius:
lighter loads, faster turns

8D – Adjust Handle Length

Figure 9 – Installing the Handle – CW-2500





1.5 Installing the Wire Rope

Important!

- Use wire rope and other rigging equipment rated for the size of the largest load you will be moving.
- Do not drag the wire rope through dirt or debris that could cause damage, or poor operation.
- Always wear protective clothing when handling wire rope.

⚠WARNING

Install the wire rope securely to the winch drum. A poorly secured wire rope could come loose from its anchor and allow the load to escape.

Install the wire rope so it is wound correctly as shown or the winch and brake will not work properly, and could allow the load to escape, see figures 10 and 11.

1.5.1 PURCHASE THE PROPER WIRE ROPE for your application. Keep the following in mind when selecting a wire rope. Contact a reputable wire rope supplier for help.

a BREAKING STRENGTH of new wire rope should be at least 5 times greater than the largest load placed on the winch. This is a minimum value and will vary with the type of load and how you are moving it.

b WIRE ROPE LAY must agree with the winding direction of the drum to help insure proper winding.

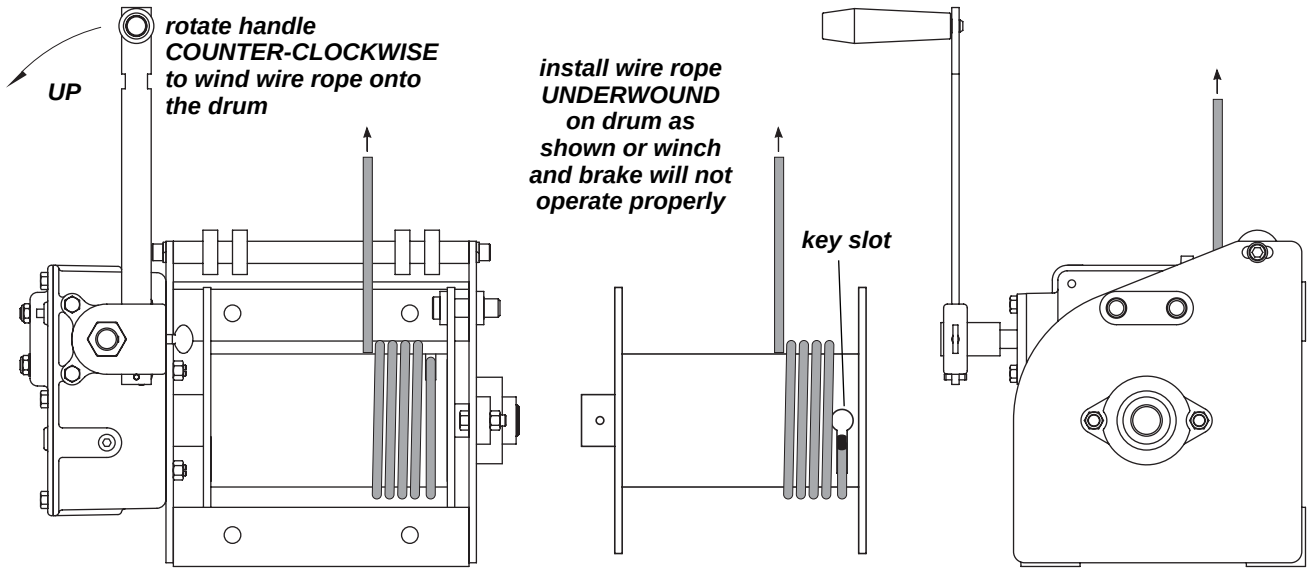
c WE RECOMMEND 7 x 19 galvanized aircraft cable for diameters up to 5/16 inch, and 6 x 37 IWRC improved plow steel (IPS) or extra improved plow steel (EIPS) wire rope for diameters of 3/8 inches and up.

1.5.2 ANCHOR THE WIRE ROPE to the drum using the key slot anchor. **A swaged ball or other approved anchor fitting must be attached to the end of the wire rope.**

a PASS THE WIRE ROPE under the drum and position the anchor fitting in the key slot in the drum.

b PULL THE WIRE ROPE to firmly lodge the anchor fitting in the narrowest part of the key slot. Make sure the wire rope remains securely anchored as wire rope is wound onto the drum.

Figure 10 – Installing the Wire Rope – CW-1100



1.5.3 **FOR CW-1100 SERIES, SEE FIGURE 10.**

a INSTALL THE WIRE ROPE SO IT IS UNDERWOUND on the drum as shown, or the winch and brake will not work properly and could allow the load to escape.

b TURN THE HANDLE COUNTER-CLOCKWISE to wind wire rope onto the drum. If wire rope unwinds from the drum when the handle is rotated counter-clockwise, the wire rope is installed incorrectly. **Install the wire rope correctly before continuing.**

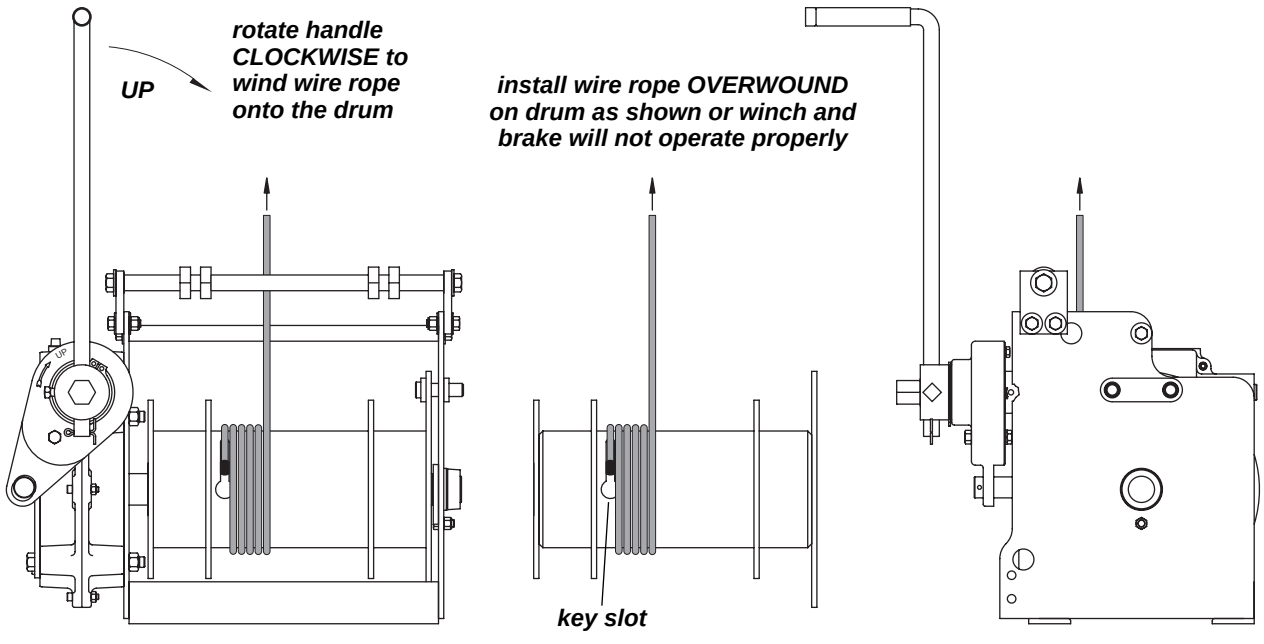
1.5.4 **FOR CW-2500 SERIES, SEE FIGURE 11.**

a INSTALL THE WIRE ROPE SO IT IS OVERWOUND on the drum as shown, or the winch and brake will not work properly and could allow the load to escape.

b TURN THE HANDLE CLOCKWISE to wind wire rope onto the drum. If wire rope unwinds from the drum when the handle is rotated clockwise, the wire rope is installed incorrectly. **Install the wire rope correctly before continuing.**

1.5.5 WIND FOUR FULL WRAPS of wire rope onto the drum by operating the winch while holding the wire rope taught. **These wraps serve as anchor wraps and must remain on the drum at all times.**

Figure 11 – Installing the Wire Rope – CW-2500



2.1 General Theory of Operation

Important!

- Limit nonuniform winding by keeping tension on the wire rope and by maintaining the proper fleet angle.
- It is your responsibility to detect and account for different factors affecting the condition and performance of the equipment.

Table 1 – Duty Rating

Series	Winch Duty Cycle Rating with Drill-Motor
CW-1100	15 minute
CW-2500	5 minute

Do not continue to operate winch with drill-motor if gearbox or brake show signs of overheating.

Allow winch to cool to ambient temperature before continuing operation.

2.1.1 THE PULL REQUIRED to move the load must not exceed the load rating of the winch. Consider the total force required to move the load, not the weight of the load.

2.1.2 THIS EQUIPMENT CAN develop forces that will exceed the load rating. It is the responsibility of the equipment user to limit the size of the load. Inspect the equipment regularly for damage according to the instructions contained in this manual.

2.1.3 USE THE DRUM LOCK to secure the drum when the winch is not in use. This prevents unauthorized use of the equipment and also functions as a load holding device.

2.1.4 PERFORMANCE RATINGS of the equipment are affected by the amount of wire rope wound on the drum, the way in which it is wound, and the way the winch is used.

a DRUM CAPACITY depends on how tightly and evenly the wire rope is wound on the drum. Actual drum capacities are usually 25-30% less than values shown in performance tables, due to loose winding and overlapping.

b FORCE REQUIRED TO LIFT the load increases with each additional layer of wire rope wound onto the drum.

c LOAD RATING represents the maximum pull that can be placed on new equipment. Load ratings are assigned values for specific amounts of load travel or wire rope accumulation. The load rating decreases as layers of wire rope accumulate on the drum. The load rating may decrease when operated with a drill-motor, check the winch nameplate for ratings.

2.1.5 DUTY RATINGS refer to the type of use the equipment is subject to. Consider the following when determining duty rating. **Duty cycle ratings of the winch are based on operation with a maximum 400 rpm drill-motor. See Table 1.**

a ENVIRONMENT: harsh environments include hot, cold, dirty, wet, corrosive, or explosive surroundings. **Protect the equipment from harsh environments when possible.**

b MAINTENANCE: poor maintenance, meaning poor cleaning, lubrication, or inspection, leads to poor operation and possible damage of the equipment. **Minimize poor maintenance by carefully following the instructions contained in this manual.**

c LOADING: severe loading includes shock loading and moving loads that exceed the load rating of the equipment. **Avoid shock loads, and do not exceed the load rating of the equipment.**

d FREQUENCY OF OPERATION: frequent or lengthy operations increase wear and shorten the life span of gears, bearings, and other components. **Increase maintenance of the equipment if used in frequent operations. Length of operation should not exceed duty cycle rating when operating with a maximum 400 rpm drill-motor. See Table 1.**

CONTACT THE FACTORY FOR MORE INFORMATION.

2.2 Breaking-In the Winch

2.2.1 BREAK-IN OCCURS during the first few hours of normal operation. During break-in, mating surfaces become polished, and clearances increase. This is desired for efficient operation of bearings and gears.

2.2.2 INSPECT THE WINCH following break-in according to the Instructions for Periodic Inspection. See Section 3.4 Inspecting the Equipment.

2.3 Preparing for Operation

Important!

- When determining whether the load will exceed the load rating, consider the total force required to move the load.

2.3.1 CONSIDER THE OPERATION. Do not begin until you are sure you can perform the entire operation without hazard.

2.3.2 BEFORE EACH OPERATION inspect all components of the system.

a INSPECT THE WINCH and other equipment according to the Instructions for Frequent Inspection. Do not operate winch until all defects have been corrected. See Section 3.4 Inspecting the Equipment.

b OPERATORS must be in good health, alert, and thoroughly trained in operating the equipment, and properly clothed (safety equipment as required, no loose clothing, no loose jewelry).

c THE LOAD must be clear of other objects and free to move. Make sure the load will not tip, bind, or in any way move uncontrollably.

2.3.3 KNOW YOUR LOAD and make sure you do not exceed the load rating of the winch or other equipment in the system.

Figure 12 – Attaching the Load – CW-1100

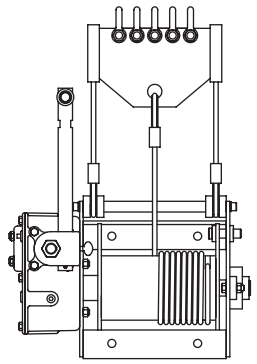
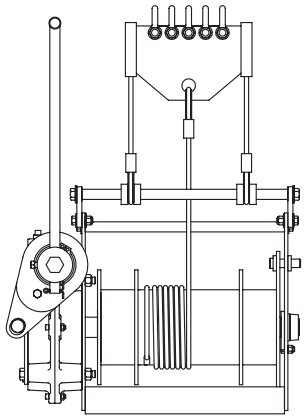


Figure 13 – Attaching the Load – CW-2500



2.4 Attaching the Load

⚠WARNING

Do not wrap the wire rope around the load. This damages the wire rope and could cause the load to escape. Use a sling or other approved lifting device.

2.4.1 CLEAR OBJECTS from the path of the load so you can move it freely and observe it at all times during the operation.

2.4.2 MAKE SURE THE WIRE ROPE is not twisted. A twisted wire rope could cause objects to spin and can cause premature wear of wire rope.

2.4.3 ATTACH THE LOAD using a clew or other approved lifting device. Follow the recommendations of the manufacturer.

2.5 Moving the Load

Important!

- Obey a stop signal from anyone.
- Maintain tension on the wire rope to keep it tightly and evenly wound on the drum.
- If the winch and load are not visible during the entire operation, get help from another person.
- Appoint a supervisor if more than one person is involved in the operation. This will reduce confusion and increase safety.
- Remove the winch handle and secure the drum using the drum lock when the winch is not in use, to help avoid unauthorized use.

Table 1 – Duty Rating

Series	Winch Duty Cycle Rating with Drill-Motor
CW-1100	15 minute
CW-2500	5 minute

Do not continue to operate winch with drill-motor if gearbox or brake show signs of overheating.

Allow winch to cool to ambient temperature before continuing operation.

2.5.1 MOVE THE LOAD slowly and smoothly, only a small distance at first. Make sure the load is balanced and securely attached before continuing.

2.5.2 **FOR CW-1100 SERIES, TURN THE HANDLE COUNTER-CLOCKWISE to wind wire rope onto the drum.** If wire rope unwinds from the drum when the handle is rotated counter-clockwise, the wire rope is installed incorrectly. **Install the wire rope correctly before continuing. See figure 10.**

2.5.3 **FOR CW-2500 SERIES, TURN THE HANDLE CLOCKWISE to wind wire rope onto the drum.** If wire rope unwinds from the drum when the handle is rotated clockwise, the wire rope is installed incorrectly. **Install the wire rope correctly before continuing. See figure 11.**

2.5.4 OBSERVE THE WIRE ROPE as it winds onto the drum. If it becomes loose, uneven, or overlapped, stop the operation and rewind the wire rope before continuing. **Continued operation with overlapped or uneven wire rope can damage the wire rope and shorten its life.**

2.5.5 A MAXIMUM 400 RPM DRILL-MOTOR can be used to operate the winch by following the guidelines below.

a **DO NOT EXCEED THE DUTY CYCLE RATING of the winch when operating with a maximum 400 rpm drill-motor. See Table 1.**

b ALLOW THE WINCH AND BRAKE TO COOL DOWN to ambient temperature in rest periods between operations.

c USE A MAXIMUM 400 RPM DRILL -MOTOR with a 1-1/8 inch hex socket to power drive the input shaft on the winch. The drill-motor should be set for low speed operation if possible. Thern recommends using a drill-motor rated for 400 rpm at 10 amps.

d THE LOAD RATING OF THE WINCH may decrease when operated with a drill-motor. Check the winch nameplate.

2.5.6 OBSERVE THE GEARBOX AND BRAKE during operation for signs of overheating. **Frequent overheating may be a sign of damage, or may indicate the need for a larger winch.**

a WATCH FOR SMOKE, the smell of burnt lubricant, and other signs of overheating. Use a thermocouple or other device to monitor gearbox and brake temperature. The temperature of the gearbox should not exceed 150° F.

b STOP THE OPERATION if the gearbox or brake overheats, and allow the winch to cool until it reaches ambient temperature. **Continued operation may cause damage.**

3.1 Cleaning the Winch

Important!

Increase the frequency of maintenance procedures if the winch is:

- Operated frequently.
- Used to pull heavy loads.
- Operated in wet, dirty, hot, or cold surroundings.

Clean the winch to remove dirt and help prevent rust and corrosion.

3.1.1 CLEAN THE WINCH every 6 months or whenever it is dirty.

a WIPE ALL EQUIPMENT to remove dirt and grease.

b LEAVE A LIGHT FILM of oil on all surfaces to protect them against rust and corrosion.

c WIPE OFF excessive amounts of oil to avoid the accumulation of dirt.

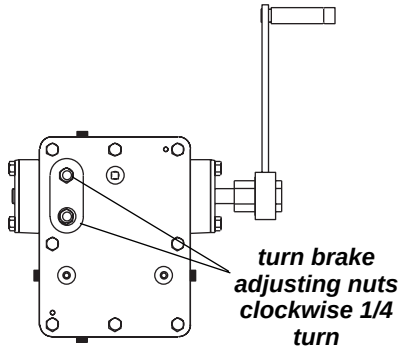
3.1.2 REMOVE ALL UNNECESSARY OBJECTS from the area surrounding the winch.

3.2 Adjusting the Brake

Important!

- Do not overtighten the brake, since this will cause parts to wear and become damaged.

Figure 14 – Adjusting the Brake – CW-1100



⚠WARNING

Do not adjust the brake with the load suspended. Accidental release of the brake could allow the load to escape.

3.2.1 ADJUST THE BRAKE whenever it appears to need adjustment, or at least every 3 months.

3.2.2 CHECK THE BRAKE by operating the winch with a load equal to the winch load rating.

a RAISE THE LOAD, then lower it and stop it about one foot off the ground.

b OBSERVE THE LOAD when stopped. If it continues to coast or creep, follow the instruction below:

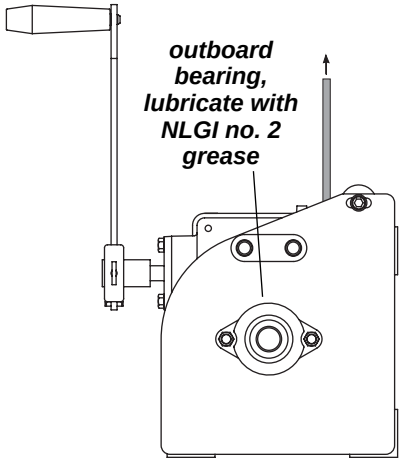
- **FOR CW-1100 SERIES,** tighten the brake by turning the adjusting nuts clockwise about 1/4 turn. Continue to test and tighten the brake by alternate tightening of each brake nut until brake stops and holds the load securely. See figure 14.
- **FOR CW-2500 SERIES,** the friction discs in the brake may be worn and in need of replacement. Contact the factory.

3.3 Lubricating the Winch

Important!

- Do not leave plug holes in the gearbox open. Open plug holes will allow grease to leak out and dirt or moisture to contaminate the grease.
- Make sure lubricant has a temperature rating appropriate for the ambient temperatures of the operation.

Figure 15 – Outboard Bearing – CW-1100



⚠CAUTION

Make sure the breather plug is clean and open to vent heat and pressure. Poor ventilation may cause overheating and result in equipment damage.

Check the gearbox for proper lubrication before operation. Too much or too little lubricant will cause overheating and result in equipment damage.

Lubricate the winch properly to help protect it from wear and rust. Read the following instructions carefully.

3.3.1 **FOR CW-1100 SERIES,** the winch is shipped from the factory with the proper amount (44 ounces) of Mobil gear 630 lubricant in the gearbox. Lubricate the winch as follows, see figures 15 and 16.

a CHECK OIL LEVEL and fill if needed every 10 hours of operation. Remove the level check plug and make sure oil is even with the plug hole. Add oil to the gearbox if necessary. **Do not use synthetic lubricants and do not mix different lubricants. See figure 16.**

b CHANGE GEARBOX OIL at least every 6 months, depending on usage, or whenever it is dirty or contaminated. Remove the drain plug to drain oil from the gearbox. See figure 16.

c LUBRICATE THE OUTBOARD BEARING at least once every month or more, depending on usage. Use a grease gun to insert NLGI no. 2 grease until clean grease appears at the seals. The bearing will squeak if it is dry. See figure 15.

3.3.2 **FOR CW-2500 SERIES,** the winch is shipped with grease in the gearbox. The gearbox is lubricated for life with the proper amount (2 pounds) of Mobilith SHC-007 grease. Lubricate the winch as follows, see figure 17.

a LUBRICATE THE OUTBOARD BEARING at least every 10 hours of operation, depending on usage. Place 2 to 3 drops of SAE 30 non-detergent oil into the hole in the bearing housing marked “oil”. Rotate the drum 1/2 turn, and add 2 to 3 more drops of oil. See figure 17.

b LUBRICATE THE DISC BRAKE at least every 6 months, more frequently if operated with a drill-motor. Place 1 or 2 drops of SAE 30 non-detergent oil into the hole in the brake housing marked “oil” and turn the brake several times to allow the oil to penetrate. See figure 17.

3.3.3 LUBRICATE THE WIRE ROPE and other equipment by following the manufacturer’s recommendations.

Figure 16 – Lubricating the Gearbox – CW-1100 Series

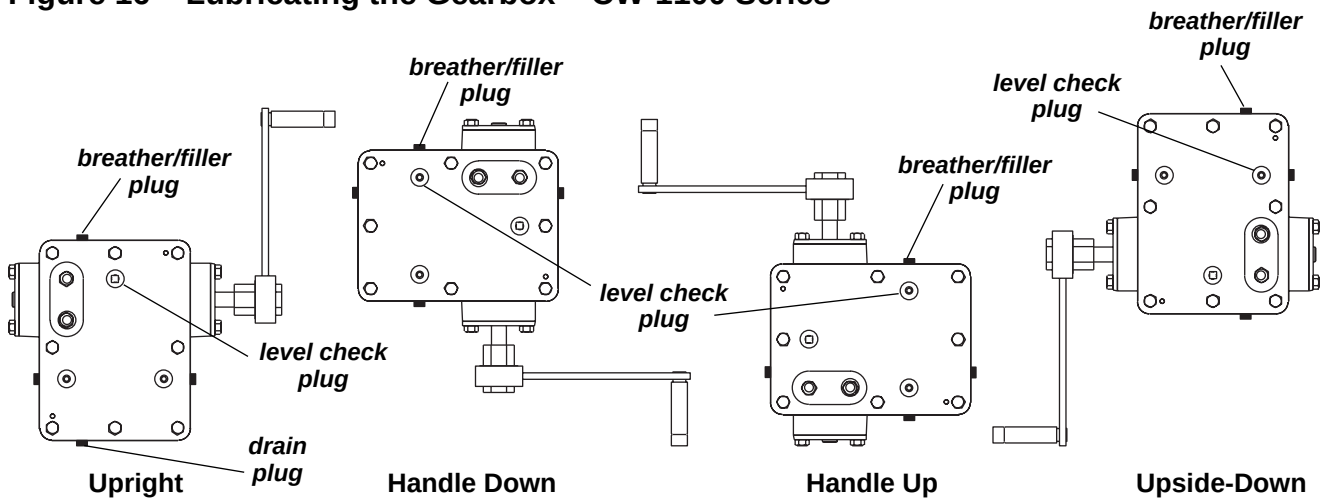
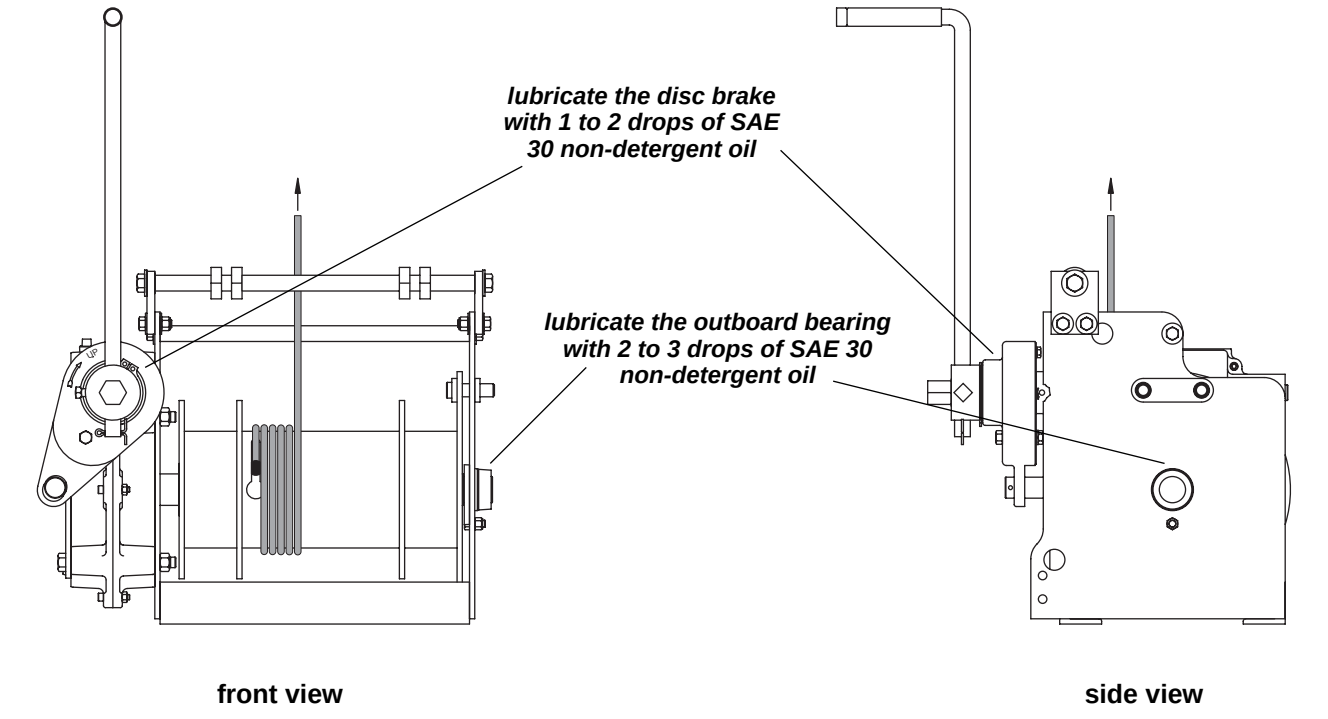


Figure 17 – Lubricating the Outboard Bearing and Brake – CW-2500 Series



3.4 Inspecting the Equipment

Important!

- Start an inspection program as soon as you put the winch into use.
- Appoint a qualified person to be responsible for regularly inspecting the equipment.
- Keep written records of inspection. This allows comparison with comments from previous inspections so you can see changes in condition or performance.

Perform frequent inspections:

- Before each operation.
- Every 3 hours during operation.
- Whenever you notice signs of damage or poor operation.

Frequent Wire Rope Inspection:

- Use ASME B30.7 as a guideline for rope inspection, replacement and maintenance.
- Check the wire rope, end connections and end fittings for corrosion kinking, bending, crushing, birdcaging or other signs of damage.
- Check the number, distribution and type of visible broken wires. See paragraph 3.4.4 c and figure 18.
- Check the wire rope for reduction of rope diameter from loss of core support, or wear of outside wires. See figure 19.
- Take extra care when inspecting sections of rapid deterioration such as sections in contact with saddles, sheaves, repetitive pickup points, crossover points and end connections.

⚠WARNING

Do not use damaged or malfunctioning equipment. Place an "OUT OF ORDER" sign on the winch. Do not use the winch until the sign is removed by a qualified maintenance person who has completely corrected the problem.

Inspect the winch to detect signs of damage or poor operation before they become hazardous.

3.4.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on inspecting the winch and other equipment.

3.4.2 CONSULT MANUFACTURER'S RECOMMENDATIONS for information on inspecting the wire rope and other equipment.

3.4.3 Instructions for Frequent Inspection

a VISUALLY INSPECT the entire winch and all other equipment involved in the operation.

- Check all equipment for cracks, dents, bending, rust, wear, corrosion and other damage.
- Make sure the wire rope is installed correctly and anchored securely to the drum.
- Make sure the thumbscrew or set screw holding the handle in place is tight.
- Make sure the winch is properly lubricated.
- Check the gearbox for signs of leakage, and make sure it is filled with the proper lubricant. Contact the factory if there are any signs of lubricant leaking from the gearbox.
- Make sure the breather plug is clean, open, and installed correctly.
- Make sure all fasteners including mounting fasteners are tight and secure.
- Make sure clew guide wires are snug.
- Make sure the foundation is in good condition, and capable of supporting the winch and its load under all load conditions.

b TEST WINCH PERFORMANCE by operating the winch with a load not exceeding the load rating.

- Listen for unusual noises, and look for signs of damage as you operate the winch.
- Make sure the wire rope winds evenly and tightly onto the drum. If it is loose or uneven, rewind it before continuing.
- Make sure the load moves smoothly, without hesitation or strain.
- Make sure the handle rotates freely in both directions.
- Check the brake. Raise the load, then lower it and stop it a few feet off the ground. If the load continues to coast or creep, the brake may be in need of repair or adjustment. See Section 3.2 Adjusting the Brake.

Completely correct all problems before continuing. Use the Troubleshooting Chart to help determine the cause of certain problems. See table 3.

Perform periodic inspections:

- Every 6 months, or more frequently if drill driven.
- Whenever you return the winch to service from storage.
- Whenever you notice damage or poor operation in a frequent inspection.
- Whenever you have, or think you may have, overloaded or shock loaded the winch.

3.4.4 Instructions for Periodic Inspection, see table 2

a VISUALLY INSPECT the winch and all other equipment.

- Disassembly may be required in order to properly inspect individual components. Contact factory for assembly/disassembly instructions. Disassembly of the gearbox before contacting Thern, Inc. voids all warranties.
- Check the finish for wear, flaking, or other damage.
- Check all equipment for cracks, dents, bending, rust, wear, corrosion and other damage. If the equipment was overloaded, or if you notice cracks or other signs of overloading and damage, promptly remove equipment from use and have it repaired or replaced. **DO NOT CONTINUE TO USE DAMAGED OR OVERLOADED EQUIPMENT OR WIRE ROPE**.
- Check all fasteners for stripped threads, wear, bending, and other damage.
- Check the gearbox for signs of leakage. Contact the factory if there are any signs of lubricant leaking from the gearbox.
- Make sure the breather plug is clean, open, and installed correctly.
- Make sure the winch outboard bearing and disc brake (CW-2500 Series) are lubricated properly.
- Make sure all labels and plates are readable, firmly attached, free of damage and clean. Replacements are available from the factory.

Table 2 – Inspection Checklist

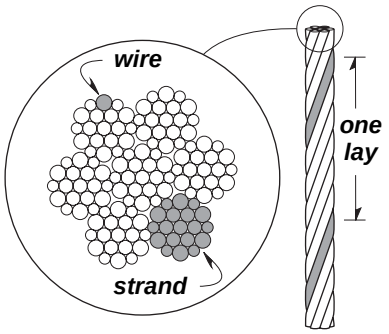
checked boxes indicate damage or problem in need of repair

	damages	problems
general	☐ finish weathered, flaking, otherwise damaged	☐ winch jerks or hesitates during operation
	☐ parts cracked, bent, rusted, worn, otherwise damaged	☐ unusual noises, other signs of malfunction
fasteners	☐ stripped threads, bent, worn, otherwise damaged	☐ loose, not tightened to the proper torque
gearbox	☐ gears, bearings, or shafts loose, worn, otherwise damaged	☐ not properly lubricated
	☐ lubricant leakage	☐ lubricant contaminated
drum	☐ anchor worn, distorted, otherwise damaged	☐ excessive movement or backlash
brake	☐ brake worn, corroded, otherwise damaged	☐ brake does not operate properly
wire rope	☐ bent, crushed, otherwise damaged	☐ wire rope loosely or unevenly wound
	☐ broken wires, see figure 18	
	replace if more than 6 wires in one lay,	number per strand =
	or 3 wires in one strand in one lay, are broken	number per lay =
	☐ diameter reduced, see figure 19	
	replace if diameter is excessively worn	diameter =
end connections	☐ corroded, rusted, worn, otherwise damaged	☐ not securely attached
labels and plates	☐ dirty, illegible, otherwise damaged	☐ loosely attached or missing

comments:

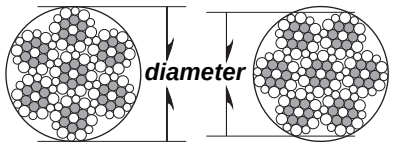
authorized signature: _____ **date** _____

Figure 18 – Broken Wires



Wire rope assembly must be replaced if more than 6 wires are broken in one lay, or if more than 3 wires are broken in one strand in one lay.

Figure 19 – Rope Diameter



The wire rope assembly must be replaced if the diameter measures less than the minimum diameter at any point.

wire rope diameter	minimum diameter
3/16 in	11/64 in (.1719 in)
1/4 in	15/64 in (.2344 in)
5/16 in	19/64 in (.2969 in)
3/8 in	11/32 in (.3438 in)

b FOR CW-1100 SERIES, DRAIN A SMALL AMOUNT OF OIL into a clean container.

- Check the oil for dirt, metal particles, water, and other signs of contamination. Completely drain the gearbox if oil is contaminated.
- Make sure the gearbox is properly lubricated. See Section 3.3 Lubricating the Winch.

c INSPECT THE WIRE ROPE according to the wire rope manufacture's recommendations, or follow accepted industry standards for wire rope inspection.

- Always wear protective clothing when handling wire rope.
- Check the entire length of wire rope for bent wires, crushed areas, broken or cut wires, corrosion, and other damage. Carefully inspect areas that pass over sheaves or through roller guides.
- Note the location and concentration of broken wires. Replace wire rope if more than 6 wires are broken in one lay, or more than 3 wires are broken in one strand in one lay. See figure 18.
- Make sure hooks and other fittings are securely attached to the wire rope, and the wire rope where they are attached is not frayed, corroded, broken, or otherwise damaged.
- Make sure any hook latches open without binding and close when released.
- Check the anchor holes in the drum and the surrounding area for signs of wear or distortion.

d MOVE THE DRUM with your hands. Check for excessive movement indicating worn or loose gears, bearings, or shafts. Slight endplay in the driveshaft is normal. Excessive movement is caused by overloading or overheating, and is a sign that your application may require a larger winch.

f INSPECT THE FOUNDATION AND RIGGING

- Check mounting fasteners for stripped threads, wear, and other damage.
- Check the foundation for cracks, corrosion, and other damage.
- Make sure clew guide wires are snug and properly installed.

g TEST WINCH PERFORMANCE by operating the winch with a load equal to the load rating.

- Listen for unusual noises, and look for signs of damage as you operate the winch.
- Make sure the wire rope winds evenly and tightly onto the drum. If it is loose or uneven, rewind it before continuing.
- Observe the rotating drum; look for signs of loose or misaligned bearings.
- Make sure the load moves smoothly, without hesitation or strain.
- Make sure the handle rotates freely in both directions.
- Check the brake. Raise the load, then lower it and stop it a few feet off the ground. If the load continues to coast or creep, the brake may be in need of repair or adjustment. See Section 3.2 Adjusting the Brake.

Completely correct all problems before continuing. Use the troubleshooting chart to help determine the cause of certain problems. See table 3.

Table 3 – Troubleshooting Chart

Contact the factory for detailed instructions on re-sealing the gearbox if you are required to disassemble the gearbox for any reason. Disassembly of the gearbox before contacting Thern, Inc. voids all warranties.

problem	cause	correction
handle turns, drum doesn't turn	• loose or broken spring pins or shafts	inspect winch and brake, repair as necessary
	• loose, stripped or broken gears or keys	repair as necessary
handle turns hard or not at all	• unit overheated	allow to cool
	• load too heavy	lighten load
	• gearbox contaminated with dirt or debris	inspect and relubricate as necessary
	• keys or spring pins loose or broken	inspect winch and brake, repair as necessary
	• brake band too tight (CW-1100 Series)	loosen brake and readjust
	• brake broken or locked	inspect and repair as necessary
	• gears or bearings broken or locked	inspect and replace as necessary
brake does not operate properly	• wire rope installed improperly	reinstall wire rope correctly
	• brake adjusted incorrectly	adjust brake
	• brake worn or damaged	inspect and replace as necessary
	• brake components broken or locked	inspect and repair as necessary
lubricant leakage	• worn bearings	inspect and replace as necessary
	• oil seals leaking or damaged	inspect and replace as necessary
	• gaskets leaking or damaged	tighten fasteners or replace gasket
	• cracked or damaged gearbox	inspect and repair as necessary
	• gearcase plugs not tightened	tighten
	• breather plug clogged or damaged	clean or replace vent plug as needed
excessive end play on drive shaft	• loose or damaged keys or keyways	inspect and replace as necessary
	• thrust washer or bearing worn out	inspect and replace as necessary
	• excessively worn gears	inspect and repair as necessary
excessively worn gears or bearings	• load too heavy	lighten load
	• poor lubrication of gears or bearings	inspect and lubricate as necessary
overheating	• operated too long without rest	allow to cool
	• load too heavy	lighten load
	• poor lubrication	inspect and lubricate as necessary
	• breather plug clogged or damaged	clean or replace vent plug as needed
	• bearing seized up	inspect and replace as necessary
unusual noises		
high pitched squeak	• poor lubrication	inspect and lubricate as necessary
grinding noise	• contaminated lubrication	drain, clean and lubricate the winch
	• dirt in winch gears	inspect and clean as necessary
	• broken gears or bearings	inspect and replace as necessary
rattling noise	• loose fasteners or set screws	tighten all fasteners and screws
heavy thump during operation	• contaminants in lubricant	drain, clean and lubricate the winch
	• loose set screws or keys in gears or shafts	inspect and repair as necessary
	• bearings defective	inspect and replace as necessary
back drive	• brake out of adjustment	adjust brake per manual

3.5 Repairing the Winch

Important!

- It is your responsibility to determine when to replace parts. When considering whether to continue using a part or to replace it, remember that replacing it is the best way to avoid further equipment damage.
- Replace spring pins, retaining rings, and oil seals whenever the winch is disassembled for inspection or repair.
- During reassembly, use **Loctite 598 Ultra Black** to create a seal between the two halves of the gearbox and the input shaft. Contact the factory for detailed instructions. Disassembly of the gearbox before contacting Thern, Inc. voids all warranties.
- Appoint a qualified person to be responsible for all repairs to the equipment.

3.5.1 GET FACTORY AUTHORIZATION for all repairs. Unauthorized repairs will void the warranty, and may lead to damage or failure of the winch.

3.5.2 REPLACE DAMAGED OR POORLY OPERATING PARTS with Thern repair parts.

3.5.3 REFINISH AREAS where the paint is worn or flaking. A good finish helps to protect against corrosion and weather damage.

a REMOVE THE FINISH from damaged areas, down to the bare metal.

b CLEAN THE AREA thoroughly.

c REPAINT with a high quality primer and finishing coat.

3.5.4 TO ORDER REPAIR PARTS, contact your local dealer. Include the following information when ordering:

- model number
- **serial number** (or code number)
- part number
- date purchased, and from whom
- description of what happened, or what is wrong
- your name and return address

4.1 Transporting the Winch

Important!

- Keep a record of what you ship, and when you send it.

4.1.1 REMOVE THE BREATHER PLUG and install a sealed oil plug to prevent the loss of lubrication during shipment.

4.1.2 PACK THE WINCH in an upright position for transport, using the original packaging materials, if possible.

a FASTEN THE WINCH to a wooden base using lag bolts, to keep it from moving during transport.

b SEAL THE WINCH in plastic with a desiccant to help protect it from rust, corrosion, and other damage.

c CONSTRUCT WOODEN SIDES and top to enclose the winch in a solid protective crate.

d PACK LOOSE PARTS in small boxes or ship separately.

4.1.3 INSPECT THE WINCH according to the Instructions for Periodic Inspection before installing it in a new location.

4.2 Storing the Winch

4.2.1 LUBRICATE THE WINCH as necessary, and make sure the breather plug is clean and properly installed. Add a rust preventative for long term storage.

4.2.2 SEAL THE WINCH in plastic with a desiccant to help protect it from rust, corrosion, and other damage.

4.2.3 STORE THE WINCH upright, in a cool clean place away from corrosive chemicals and moisture.

4.2.4 ROTATE THE DRUM PERIODICALLY to keep bearing and gears surfaces from becoming lacquered.

4.2.5 INSPECT THE WINCH according to the Instructions for Periodic Inspection before installing it for operation.

4.2.6 LUBRICATE THE WINCH PROPERLY prior to operation. See Section 3.3 Lubricating the Winch.

CW-1100 and CW-2500 Series Performance Characteristics[1]

Model	number of compartments	wall or base mount	load rating	load rating per comp.	load rating drill driven[2]	maximum travel distance[3]	wire rope dia.	D/d ratio	gear ratio	ultimate design factor	brake holding torque
CWH1-2500	one	base	2500 lb	2500 lb	1500 lb	40 ft	3/8 in	15.7:1	62:2	8:1	800%
CWV1-2500	one	wall	2500 lb	2500 lb	1500 lb	40 ft	3/8 in	15.7:1	62:2	8:1	800%
CWH2-2500	two	base	2500 lb	1250 lb	1500 lb	40 ft	5/16 in	19:1	62:2	8:1	800%
CWV2-2500	two	wall	2500 lb	1250 lb	1500 lb	40 ft	5/16 in	19:1	62:2	8:1	800%
CW1-1100	one		1100 lb	1100 lb	1100 lb	40 ft	5/16 in	15.6:1	32:1	8:1	800%
CW2-1100	two		1100 lb	550 lb	1100 lb	40 ft	1/4 in	19.1:1	32:1	8:1	800%

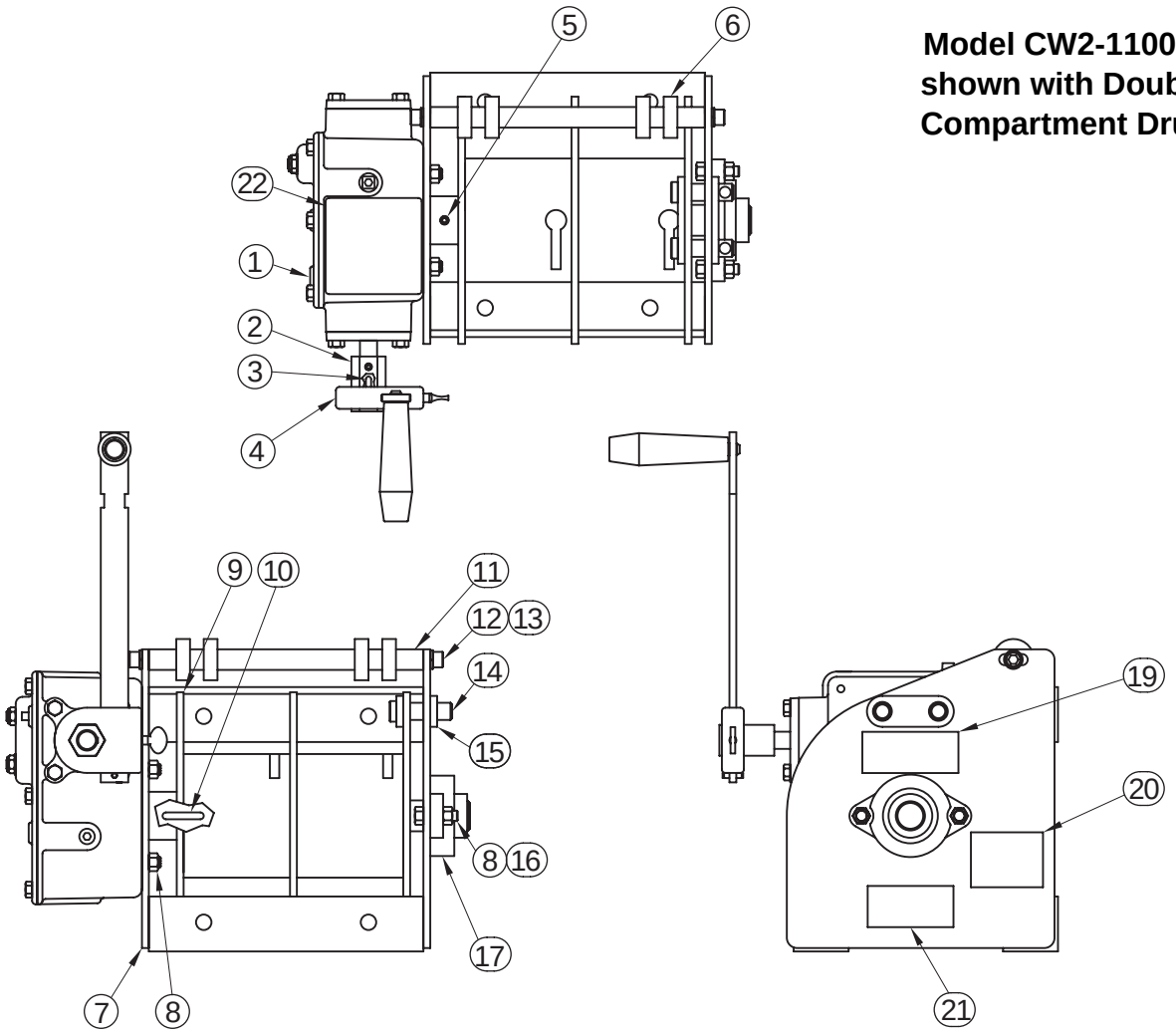
[1] Performance Characteristics are for standard products referred to in this manual. Non-standard products may vary from the original design. Contact Thern, Inc. for this information.

[2] Ratings based on operation with drill rate for 10 amps at 250 rpm.

[3] Greater travel distance is possible with reduced load ratings. Contact factory for information.

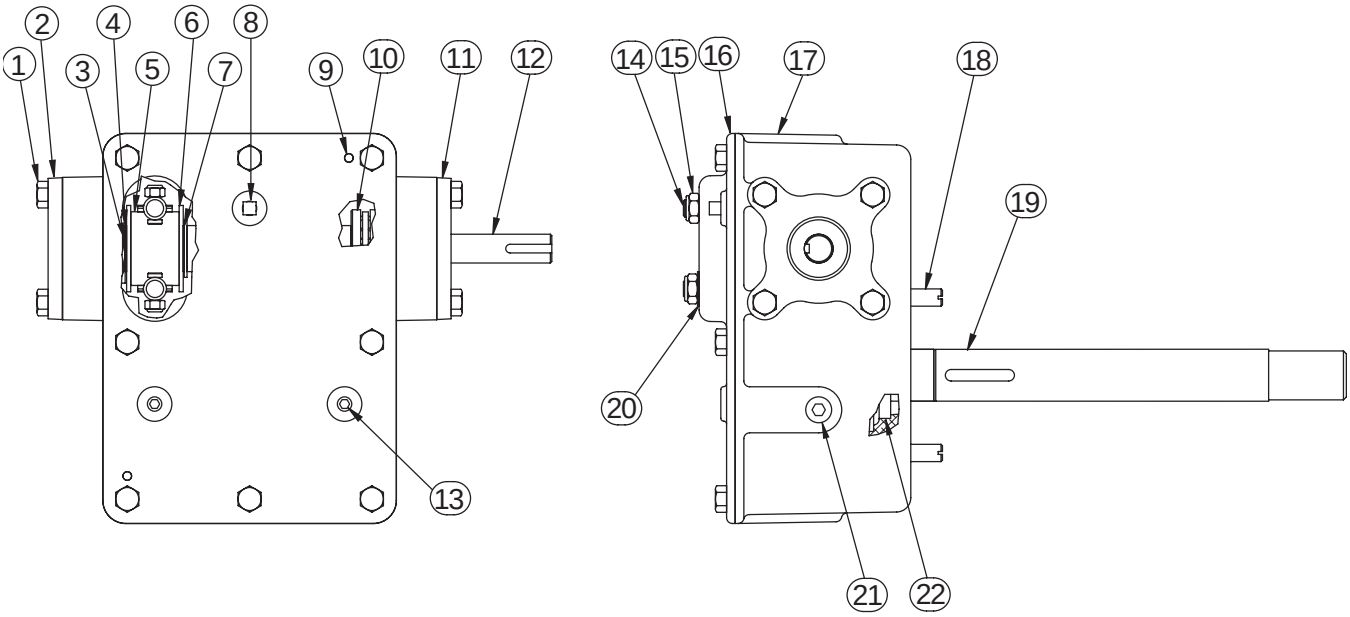
CW-1100 Series Clew Winches		CW1-1100		CW2-1100	
item	**description**	**part number**	**qty.**	**part number**	**qty.**
1	REDUCER ASSEMBLY	D2611	1	D2611	1
2	HEX INPUT ASSEMBLY	B3705	1	B3705	1
3	KEY .188 X .188 X 1.000 4140 HT OER	A7310	1	A7310	1
4	HANDLE MEDALLION ASSEMBLY STL	B4218	1	B4218	1
5	SETSCREW SOKHD NYLK .312-18NC X .500 BLKOX ALYS	A3746	1	A3746	1
6	SHAFT COLLAR 2PC .750ID X 1.500OD X .50	A8110	4	A8110	4
7	FRAME	D2612	1	D2612	1
8	HEX NUT .375-16NC ZNPL GR2	A3017	6	A3017	6
9	DRUM	D2613	1	D2615	1
10	KEY .250 X .250 X 1.500 4140 HT BER	A5067	2	A5067	2
11	CROSS BRACE	B4278	1	B4278	1
12	CAPSCREW SOKHD .375-16NC X 1.000 ALYSTL	A3445	2	A3445	2
13	WASHER HELSPRLK .375 X .683 X .094 ZNPL	A2926	2	A2926	2
14	LOCKING PIN PLATE WELDMENT	A8208	1	A8208	1
15	LOCKING PIN PLATE	A8209	1	A8209	1
16	CAPSCREW HEXHD .375-16NC X 1.250 ZNPL GR5	A3112	2	A3112	2
17	BEARING FLANGE 1.062 2 BOLT	A7285	1	A7285	1
18[1]	BREATHER PLUG .375-18NPT X .48 PLN STL	A3408	1	A3408	1
19	LABEL WARNING INSTALL WIRE ROPE	A7406	1	A7406	1
20	LABEL WARNING KEEP HANDS AWAY FROM DRUM	A2659	1	A2659	1
21	THERN LOGO NAMEPLATE	A6889	1	A6889	1
22	LABEL WARNING	SA5756	1	SA5756	1
23[1]	LABEL WARNING DO NOT ADJUST BRAKE	A2658	1	A2658	1
24[1]	LABEL CLEW WINCH NAMEPLATE	A8195	1	A8195	1

[1] Items 18, 23 and 24 not shown.

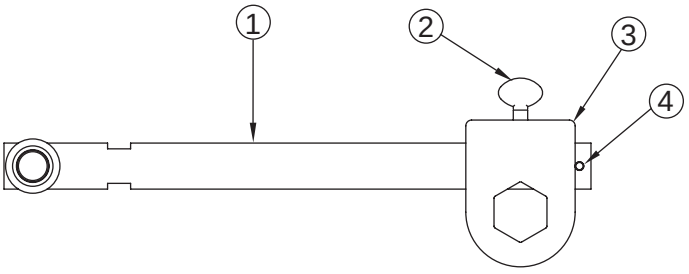


Model CW2-1100 shown with Double Compartment Drum

CW-1100 Series Reducer Assembly		D2611	
item	**description**	**part number**	**qty.**
1	CAPSCREW HEXHD .312-18NC X .750 ZNPL GR5	A3032	16
2	BEARING HOUSING ASSEMBLY	B3582	1
3	THRUST BEARING .628ID X 1.250OD X .125 BRZ	A7291	1
4	SHIM .626/.630 X 1.00 X .018/.022 STL	A3308	1
5	BRAKE DRUM ASSEMBLY	B1700	1
6	FLAT WASHER .656ID X 1.875OD X .094	A7292	2
7	BRAKE DRUM SPACER .660/.665ID X 1.250OD	A2642	2
8	PIPE PLUG SQHD .125-27NPT X .35 PLN STL	A3407	1
9	DOWEL PIN .188 X .500	A7308	2
10	THRUST BALL BEARING .753ID X 1.685OD X .625	A1498	1
11	BEARING HOUSING ASSEMBLY INPUT SIDE	B3581	1
12	WORM SHAFT	C3276	1
13	PIPE PLUG HEXSOC .125-27NPT X .31 SAE	A3405	2
14	BRAKE BAND CONNECTOR ASSEMBLY	B2917	1
15	HEX JAM NUT NYLK .375-16NC ZNPL GR2	A3180	2
16	COVER	D2052	1
17	GEARCASE	D2051	1
18	STUD .375-16NC X 1.312 GR5	A7279	4
19	DRUM SHAFT ASSEMBLY	D2610	1
20	SPRING WASHER .380 X .750 X .034 SPR ST	A3296	1
21	PIPE PLUG HEXSOC .375-18NPT X .425 SAE	A3290	4
22	OIL SEAL 1.125ID X 1.874OD X .250 NITRIL	A7287	1

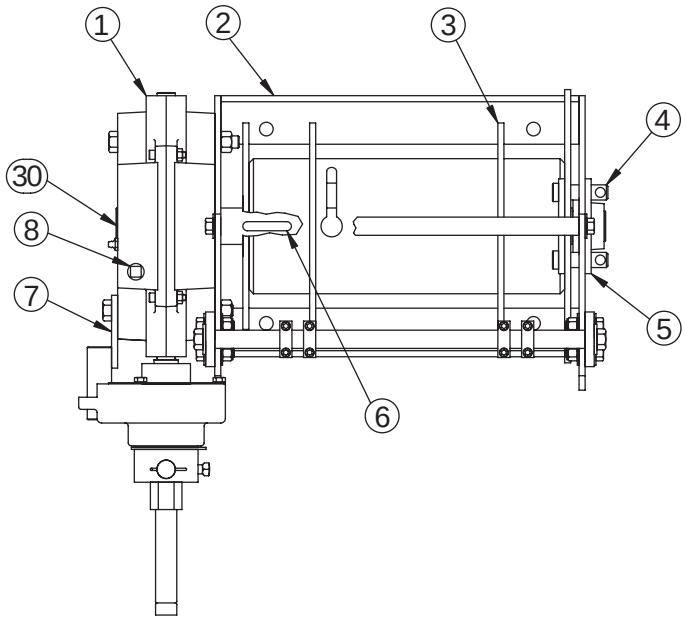


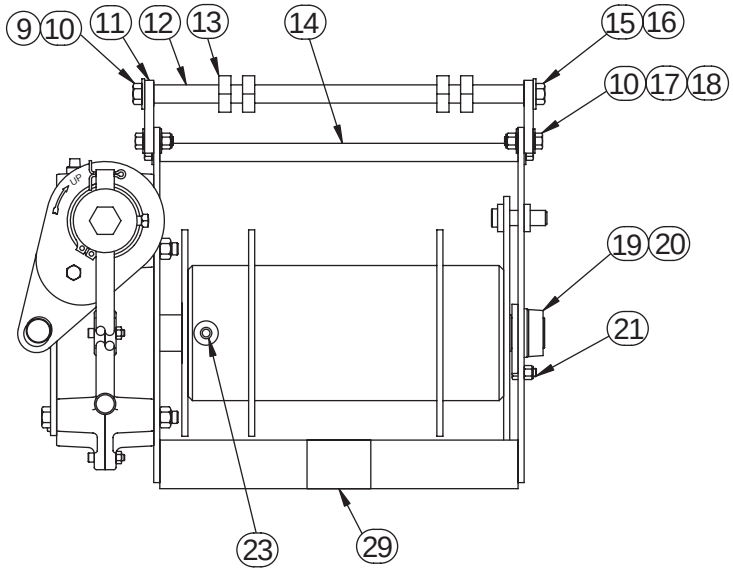
CW-1100 Series Handle Medallion Assembly		B4218	
item	**description**	**part number**	**qty.**
1	HANDLE ASSEMBLY	B4187	1
2	THUMB SCREW .312-18NC X .750 SST	A8167	1
3	MEDALLION MACHINING STL	B4189	1
4	SLOTTED SPRING PIN .187 X .750 SST	A4282	1

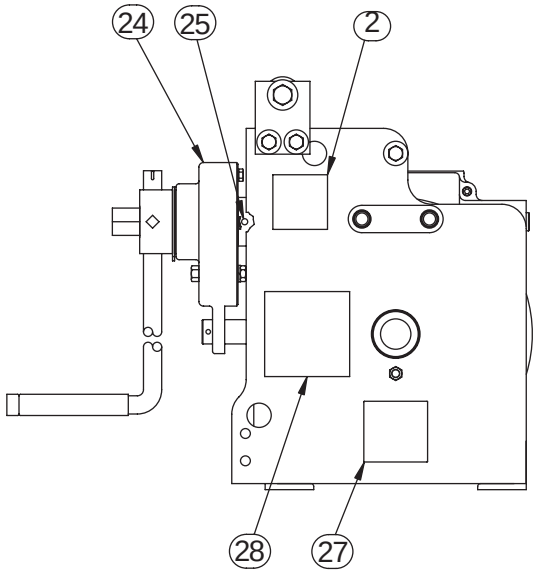


CW-2500 Series Clew Winches		CWH1-2500		CWH2-2500	
item	description	part number	qty.	part number	qty.
1	GEARCASE ASSEMBLY	SD3750	1	SD3750	1
2	FRAME	SC4107	1	SC4107	1
3	DRUM	SC4049	1	SC4081	1
4	LOCKING PIN PLATE WELDMENT	B4205	1	B4205	1
5	LOCKING PIN PLATE	A8063	1	A8063	1
6	KEY .375 X .375 X 2.000 4140 HT BER	A4129	2	A4129	2
7	BRAKE MOUNTING BRACKET	SC4104	1	SC4104	1
8	BREATHER PLUG .375-18NPT X .48 PLN STL	A3408	1	A3408	1
9	CAPSCREW HEXHD .375-16NC X 1.000 ZNPL GR5	A2922	2	A2922	2
10	FLAT WASHER STDPLT .375 X 1.000 X .083 ZN	A3114	10	A3114	10
11	CLEW MOUNTING PLATE	SA5790	2	SA5790	2
12	CLEW MOUNTING SHAFT	SB5560	1	SB5560	1
13	SHAFT COLLAR 2PC .750ID X 1.500OD X .50	A8110	4	A8110	4
14	CROSS BRACE	SA5766	1	SA5766	1
15	CAPSCREW HEXHD .500-13NC X 1.250 ZNPL GR5	A2928	2	A2928	2
16	FLAT WASHER STDPLT .500 X 1.375 X .109 ZN	A3600	2	A3600	2
17	CAPSCREW HEXHD .375-16NC X 1.250 ZNPL GR5	A3112	4	A3112	4
18	HEX NUT NYLK .375-16NC ZNPL GR2	A3113	4	A3113	4
19	BEARING HOUSING	A1503	1	A1503	1
20	BEARING SLEEVE 1.250ID X 1.375OD X 1.250 BRZ	A3636	1	A3636	1
21	CAPSCREW HEXHD .312-18NC X .750 ZNPL GR5	A3032	1	A3032	1
22	HEX JAM NUT NYLK .312-18NC ZNPL GR2	A3249	1	A3249	1
23	SETSCREW SOKHD NYLK .375-16NC X .625 BLKOX	A3128	1	A3128	1
24	BRAKE ASSEMBLY	C3903	1	C3903	1
25	SLOTTED SPRING PIN .250 X 2.000 STL	A4048	1	A4048	1
26	LABEL WARNING CLEW WINCH	A8193	1	A8193	1
27	LABEL CLEW WINCH NAMEPLATE	A8195	1	A8195	1
28	LABEL WARNING	SA5756	1	SA5756	1
29	LABEL WARNING KEEP HANDS AWAY FROM DRUM	A2659	2	A2659	2
30	THERN LOGO NAMEPLATE	A6889	1	A6889	1

Model CWH1-2500 shown with Single Compartment Drum

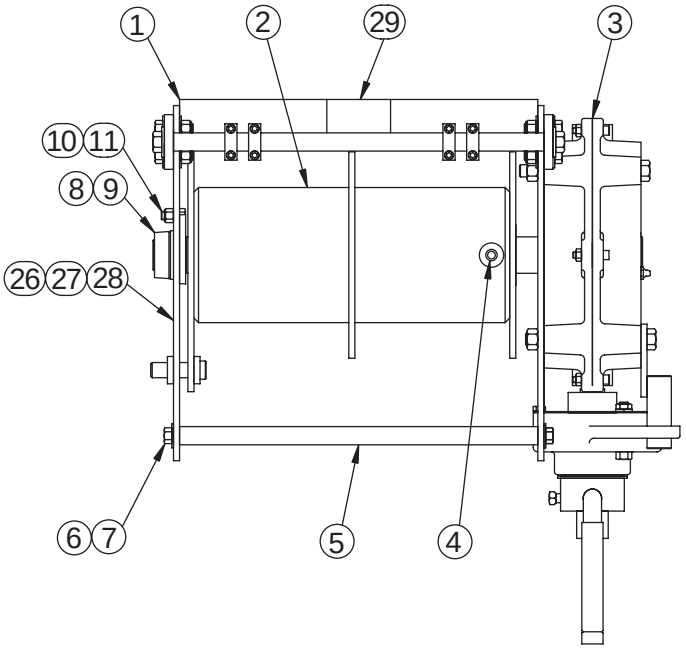


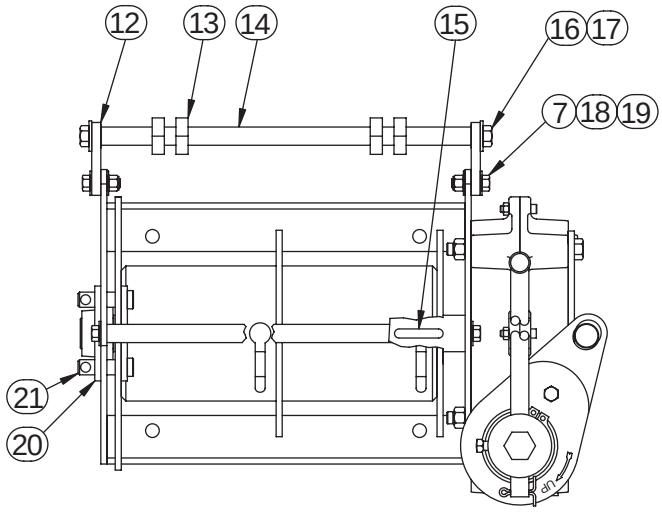


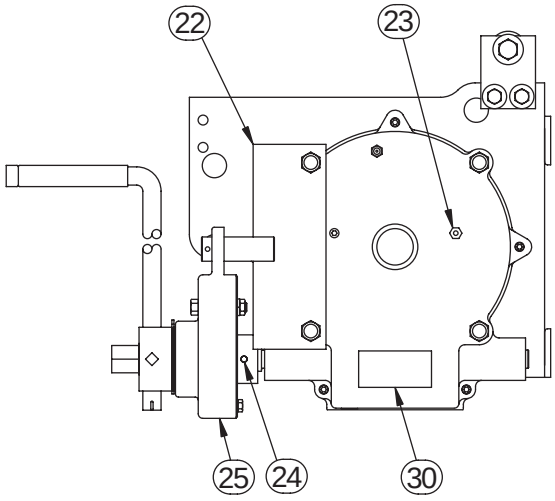


CW-2500 Series Clew Winches		CWV1-2500		CWV2-2500	
item	**description**	**part number**	**qty.**	**part number**	**qty.**
1	FRAME	SC4107	1	SC4107	1
2	DRUM	SC4049	1	SC4081	1
3	GEARCASE ASSEMBLY	SD3750	1	SD3750	1
4	SETSCREW SOKHD NYLK .375-16NC X .625 BLKOX	A3128	1	A3128	1
5	FRAME BRACE	SA5766	1	SA5766	1
6	CAPSCREW HEXHD .375-16NC X 1.000 ZNPL GR5	A2922	2	A2922	2
7	FLAT WASHER STDPLT .375 X 1.000 X .083 ZN	A3114	10	A3114	10
8	BEARING HOUSING	A1503	1	A1503	1
9	FLAT WASHER STDPLT .375 X 1.000 X .083 BRZ	A3636	1	A3636	1
10	CAPSCREW HEXHD .312-18NC X .750 ZNPL GR5	A3032	1	A3032	1
11	HEX JAM NUT NYLK .312-18NC ZNPL GR2	A3249	1	A3249	1
12	CLEW MOUNTING PLATE	SA5790	2	SA5790	2
13	SHAFT COLLAR 2PC .750ID X 1.500OD X .50	A8110	4	A8110	4
14	CLEW MOUNTING SHAFT	SB5560	1	SB5560	1
15	KEY .375 X .375 X 2.000 4140 HT BER	A4129	2	A4129	2
16	CAPSCREW HEXHD .500-13NC X 1.250 ZNPL GR5	A2928	2	A2928	2
17	FLAT WASHER STDPLT .500 X 1.375 X .109 ZN	A3600	2	A3600	2
18	CAPSCREW HEXHD .375-16NC X 1.250 ZNPL GR5	A3112	4	A3112	4
19	HEX NUT NYLK .375-16NC ZNPL GR2	A3113	4	A3113	4
20	LOCKING PIN PLATE	A8063	1	A8063	1
21	LOCKING PIN PLATE WELDMENT	B4205	1	B4205	1
22	BRAKE MOUNTING BRACKET	SC4104	1	SC4104	1
23	PIPE VENT PLUG .125-27NPT	A6336	1	A6336	1
24	SLOTTED SPRING PIN .250 X 2.000 STL	A4048	1	A4048	1
25	BRAKE ASSEMBLY	C3903	1	C3903	1
26	LABEL CLEW WINCH NAMEPLATE	A8195	1	A8195	1
27	LABEL WARNING	SA5756	1	SA5756	1
28	LABEL WARNING CLEW WINCH	A8193	1	A8193	1
29	LABEL WARNING KEEP HANDS AWAY FROM DRUM	A2659	2	A2659	2
30	THERN LOGO NAMEPLATE	A6889	1	A6889	1

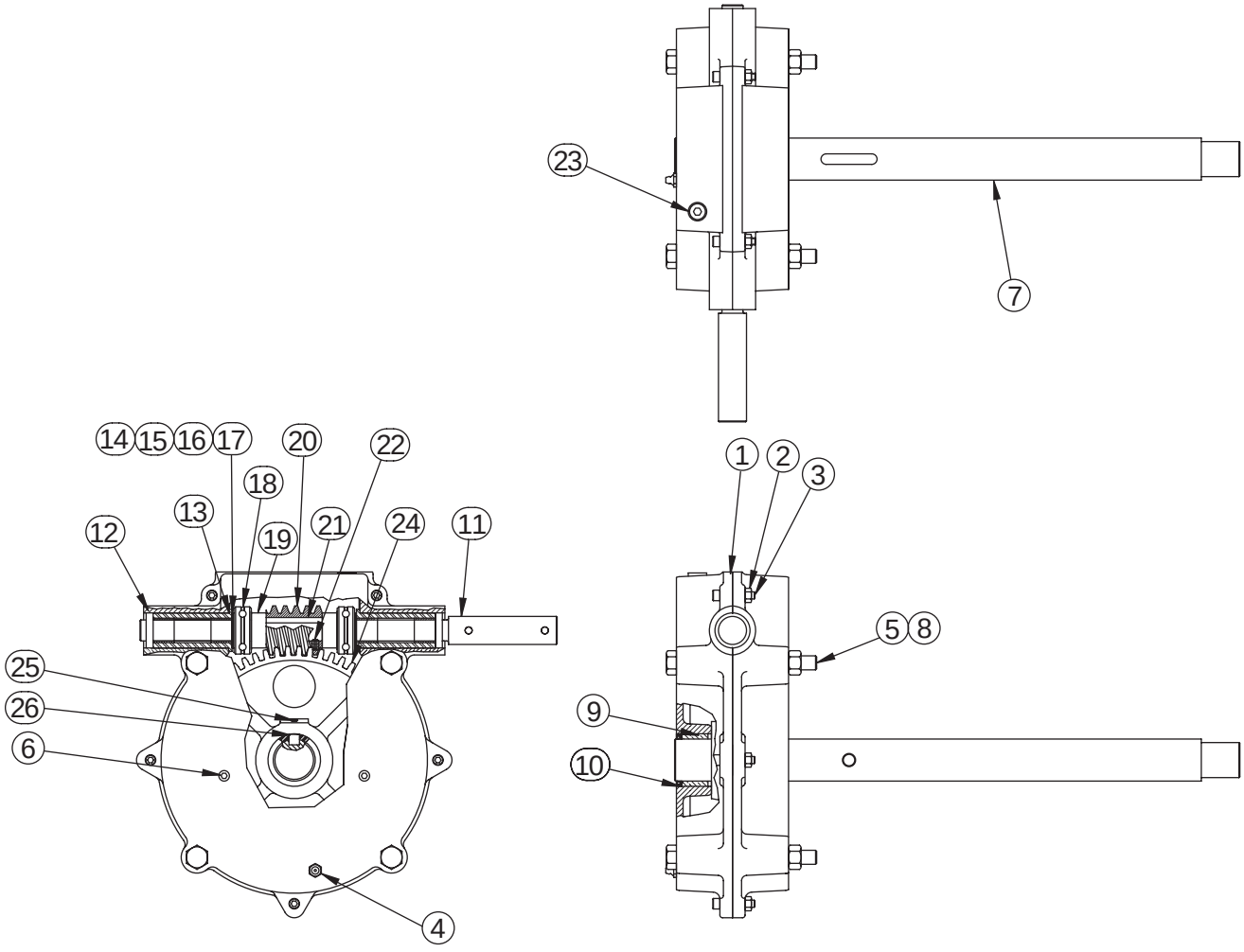
Model CWV2-2500 shown with Double Compartment Drum





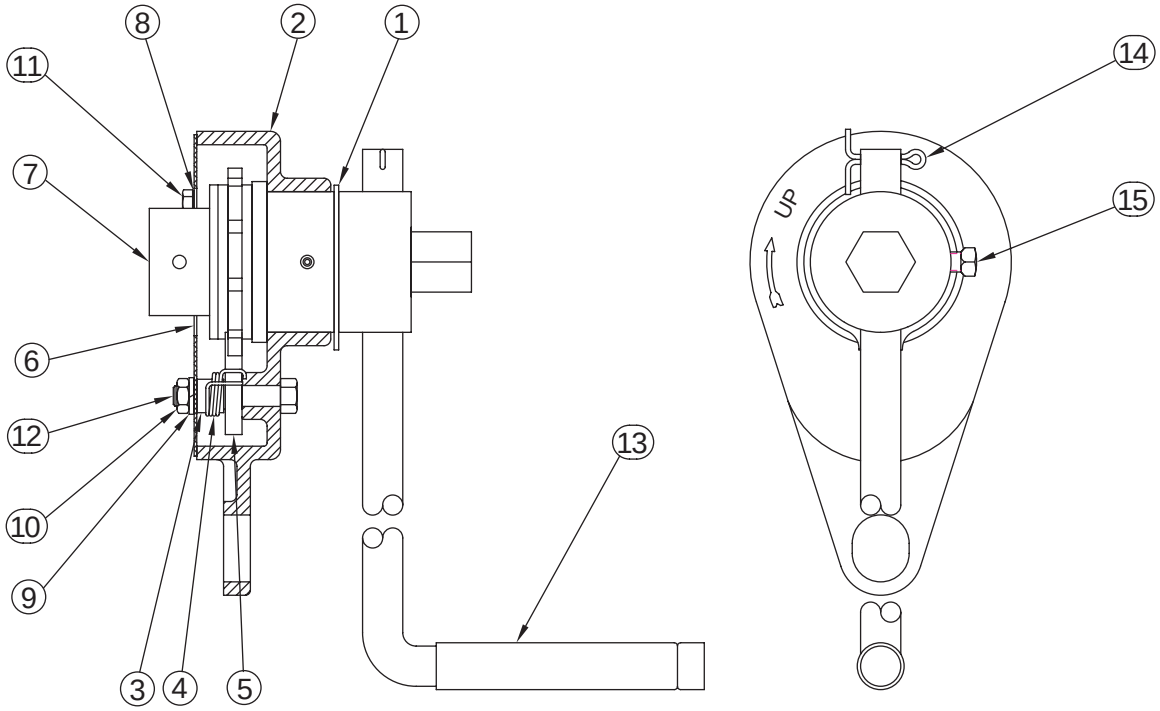


CW-1100 Series Gearcase Assembly		SD3750	
item	**description**	**part number**	**qty.**
1	GEARCASE MACHINING	D2273	1
2	HEX NUT .250-20NC ZNPL GR2	A3200	5
3	CAPSCREW SOKHD .250-20NC X 1.250 ALYSTL	A3288	5
4	ZERK .125-27NPT	A3196	1
5	HEX NUT .500-13NC ZNPL GR2	A3227	4
6	PIPE PLUG HEXSOC .125-27NPT X .31 SAE	A3405	4
7	DRUM SHAFT	SC4050	1
8	CAPSCREW HEXHD .500-13NC X 5.000 ZNPL GR5	A3247	4
9	BEARING SLEEVE 1.500ID X 1.875OD X .937 BRZ	A3631	2
10	OIL SEAL 1.500ID X 1.875OD X .187 TROSTE	A4378	2
11	INPUT SHAFT	B4271	1
12	OIL SEAL .750ID X 1.250OD X .250 NITRILE	A4377	2
13	BUSHING ASSEMBLY	A4159	2
14	SHIM .760/.786 X 1.235/1.265 X .004/.006	A4387	2
15	SHIM .760/.786 X 1.235/1.265 X .013/.017	A4388	2
16	SHIM .760/.786 X 1.235/1.265 X .018/.024	A4389	2
17	SHIM .760/.786 X 1.235/1.265 X .030/.040	A4390	2
18	BEARING BALL THRUST .753ID X 1.685OD X .625	A1498	2
19	SPACER .752/.754ID X 1.25OD X .531/.526	A1134	2
20	WORM 1.75OD X 1.500PD X 1.22RD 2 LEAD	A1612	1
21	KEY .188 X .188 X 2.000 4140 HT BER	A3255	1
22	SETSCREW SOKHD NYLK .250-20NC X .250 BLKOX	A3260	1
23	PIPE PLUG HEXSOC .375-18NPT X .425 SAE	A3290	1
24	WORM GEAR 8.12OD X 7.750PD X 7.469RD	C1026	1
25	SETSCREW SOKHD NYLK .250-20NC X .375 ALYST	A3259	1
26	KEY .375 X .375 X 1.500 4140 HT BER	A3253	2



CW-2500 Series Disc Brake Assembly		**C3903**	
item	**description**	**part number**	**qty.**
1	RETAINING RING EXT 2.625 SST	A4397	1
2	BRAKE HOUSING MACHINING	C1009	1
3	SPACER .391ID X .625OD X .844	A1068	1
4	SPRING TOR .875OD X .063WD SST	A1364	1
5	RATCHET PAWL ZNPLIRDI	A1047	1
6	BRAKE HOUSING COVER	B1019	1
7	BRAKE DRIVE ASSEMBLY	B4273	1
8	WASHER SPLK INT .250 X .478 X .025 SST	A3352	2
9	WASHER HELSPRLK .375 X .683 X .094 SST	A3357	1
10	HEX JAM NUT .375-16NC SST	A3330	1
11	CAPSCREW HEXHD .250-20NC X .500 SST	A2951	2
12	CAPSCREW HEXHD .375-16NC X 2.000 SST	A4183	1
13	HANDLE ASSEMBLY	B1015	1
14	COTTER PIN .187 X 1.250 SST	A4309	1
15	SETSCREW SQHD .375-16NC X 1.000 SST	A4267	1
16 [1]	LABEL OIL W/ARROW .5 X .75	A2176	3

[1] item 16 not shown



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