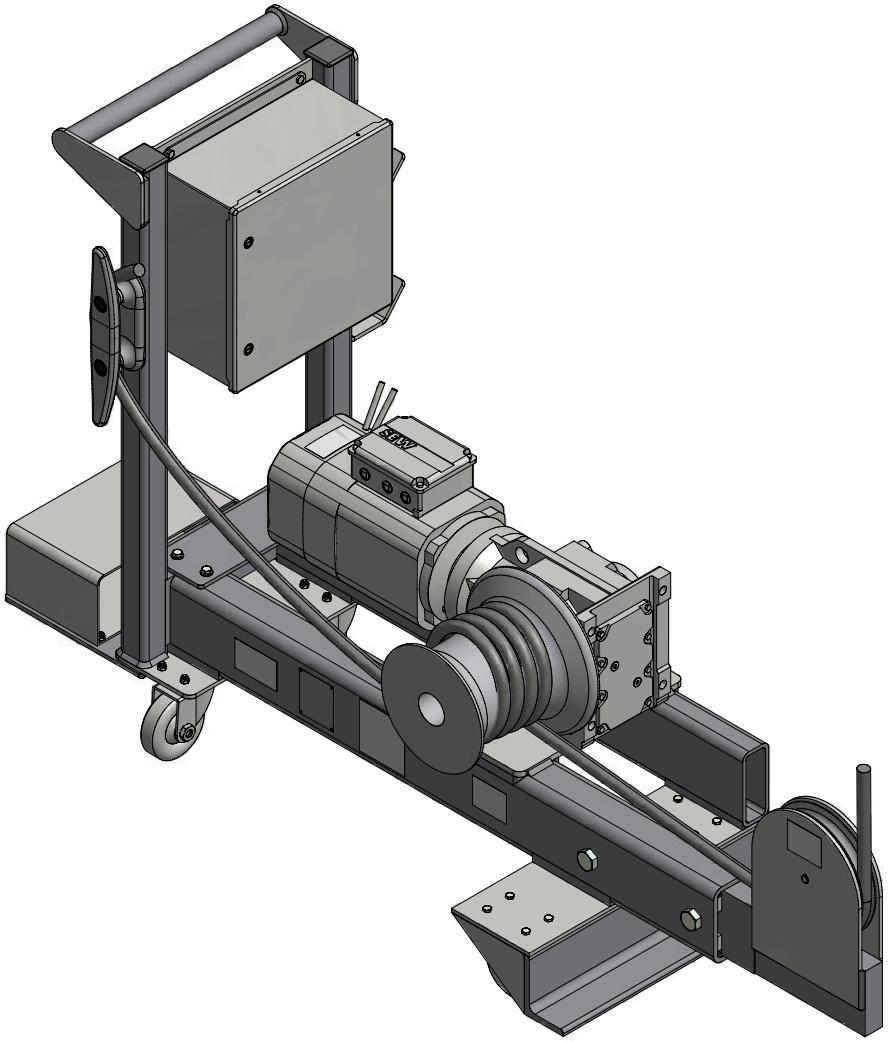
THERN STAGE EQUIPMENT

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

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

ORIGINAL TEXT



Owner's Manual

For

DW1M1-S4 Capstan

SA9895A-0316

Two-Year Limited Warranty

Please record the following:

Date Purchased:

Model No.:

Serial No.:

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 DW1M1-S4 Capstan. 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.

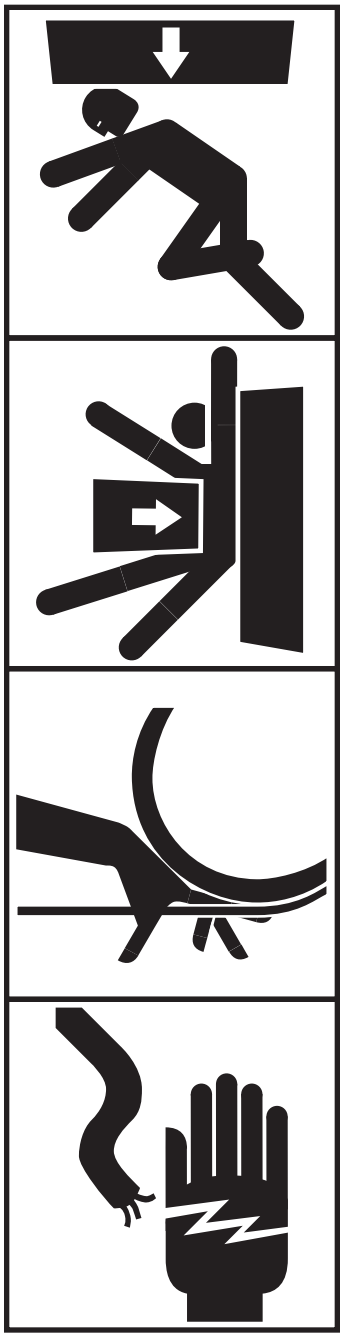
⚠CAUTION

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 unit, readable and with the equipment at all times. Contact Thern, Inc. for replacements.

Check gearbox for lubrication or leakage before use.

Install the synthetic fiber rope securely to the unit drum. Keep at least 3 wraps of synthetic fiber rope wound on the drum at all times, to serve as anchor wraps. With less than 3 wraps on the drum the synthetic fiber rope could come loose, causing the load to escape.

Keep hands away from the pinch points between the drum and the synthetic fiber rope, and other moving parts of the equipment.

The unit is equipped with a load brake as it is used to lift loads. Contact Thern Inc. for more information.

Keep all unnecessary personnel away from unit while in operation. Keep out of the path of the load.

Disconnect electric power before servicing the equipment.

DO NOT do the following:

Do not lift people or things over people.

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

Do not use more than one unit to move a load unless each unit was designed for a multiple unit 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 synthetic fiber rope around the load. This damages the synthetic fiber rope and could cause the load to escape. Use approved rigging connectors to secure the synthetic fiber rope to the load.

Do not operate the unit with drive guards or gear covers removed or improperly installed.

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 rely on unit to hold unattended loads. Do not leave a suspended load unattended unless specific precautions have been taken to secure the load and keep people away from the unit and out from under the load.

Do not adjust the brake with the unit holding a load. Accidental release of the brake could allow the load to escape.

1.1 Installing the Unit

Important!

- Inspect the unit immediately following installation according to the Instructions for Periodic Inspection. This will give you a record of the condition of the unit with which to compare future inspections.
- A qualified professional should inspect or design the reaction bar to insure that it will provide adequate support.
- Locate the unit so it will be visible during the entire operation.
- Do not attempt to lift or position unit by using frame brace. This may cause damage to unit.
- Do not attempt to lift or position unit by using lifting hole on reducer. This hole is designed to lift reducer only.

⚠WARNING

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

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

Attach the unit to a rigid and level foundation that will support the unit 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 UNIT in an area clear of traffic and other obstacles. Make sure the unit is accessible for maintenance and operation.

1.1.3 LOCATE THE UNIT in an area with adequate temperatures. Check the motor and reducer manufacturer’s information for ambient temperature ratings.

1.1.4 POSITION THE UNIT to insure proper lubrication.

1.1.5 INSTALL THE UNIT on a horizontal surface. The unit is designed and assembled for horizontal base mounting.

1.1.6 MAINTAIN A FLEET ANGLE between 1/2 and 1-1/2 degrees. The proper fleet angle minimizes synthetic fiber rope damage by helping the synthetic fiber rope wind uniformly onto the drum.

1.1.7 MAKE SURE THE REACTION BAR and lock rail are secured to a solid foundation able to support the reaction bar, lock rail and the load under all conditions with design factors based on accepted engineering practices. See Section 2.4

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

1.2 Installing the Breather Plug

Important!

- Save the O-Ring for use when the unit is removed for storage or transport.

Figure 1 – O-Ring

⚠CAUTION

Install the breather plug to vent heat and pressure. Failure to do so could result in pressure buildup which could damage the reducer.

For shipment, the reducer is filled with lubricant and sealed to prevent lubrication loss.

1.2.1 REMOVE THE O-RING(S) from the breather plug hole. See Figure 1.

1.2.2 CHECK THE LUBRICANT LEVEL in the reducer to make sure no lubricant was lost during shipment. Refer to the reducer manufacturer's instructions.

1.3 Connecting Electric Power

Important!

- Use electrical equipment with the correct rating and Underwriter's Laboratory (UL) approved.
- Always disconnect electric current when the unit is not in use.

⚠WARNING

Install proper branch circuits, disconnect devices, protection, and grounding as required by article 430 of the National Electric Code.

All electrical work must be performed by a licensed electrician. Failure to do so could result in electric shock or poor unit operation.

1.3.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on electrical installation.

1.3.2 INSTALL A FUSE or circuit breaker in the power supply circuit, as required by the National Electric Code.

1.3.3 INSTALL A DISCONNECT DEVICE in the power supply circuit, as required by the National Electric Code. This should be a switch you can lock in the OFF position to prevent unauthorized use of the unit.

1.3.4 CONNECT ELECTRIC POWER SUPPLY, with ground wire, to the electric starter control box. Check the component manufacturer's information for a wiring diagram.

1.3.5 CONNECT OTHER ELECTRIC EQUIPMENT to the proper terminals in the electric control box.

1.3.6 CHECK THE CURRENT at the motor and make sure it agrees with the current rating marked on the unit nameplate. If current rating is incorrect, have the circuit inspected by a licensed electrician.

1.3.7 TEST ELECTRICAL CONNECTIONS by operating the unit.

a ROTATION OF THE DRUM must agree with the labels on the control device, either UP and DOWN, or FORWARD and REVERSE. If reversed, swap 2 of 3 power legs.

b CHECK THE LOAD BRAKE, make sure it releases when the motor is ON, and engages when the motor is OFF. **Make sure the fast brake function operates correctly on brakemotors that include this feature.**

CONTACT THE FACTORY OR A QUALIFIED PROFESSIONAL FOR HELP.

1.4 Installing the Synthetic Fiber Rope

Important!

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

⚠WARNING

Wrap the synthetic fiber rope securely to the unit drum. A poorly secured synthetic fiber rope could slip and allow the load to escape. See Figure 2.

1.4.1 DETERMINE WHICH DIRECTION the drum must rotate to wind and unwind synthetic fiber rope.

1.4.2 PURCHASE THE PROPER SYNTHETIC FIBER ROPE for your application. Keep the following in mind when selecting a synthetic fiber rope. Contact a reputable synthetic fiber rope supplier for help.

a BREAKING STRENGTH of new synthetic fiber rope should be at least 8 times greater than the hoist rating. These are minimum values and will vary with the type of load and how you are moving it.

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

c WE RECOMMEND 3/4 inch three braid synthetic fiber rope or kernmantle synthetic fiber rope.

1.4.3 PASS THE SYNTHETIC FIBER ROPE under the sheave between the sheave plates.

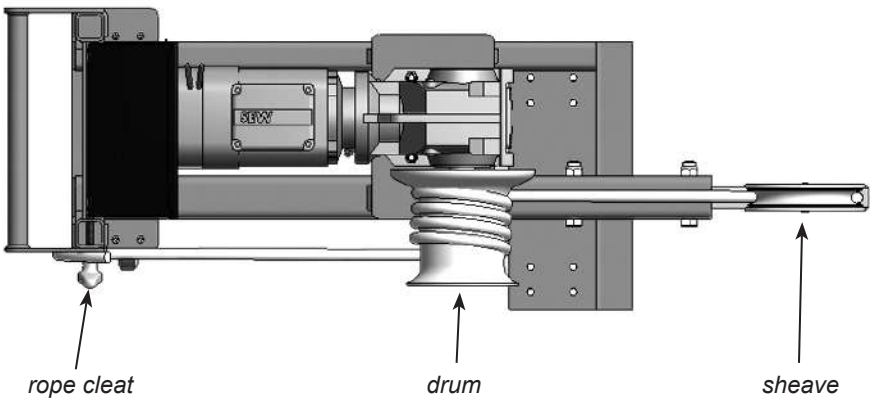
1.4.4 WIND THREE FULL WRAPS of synthetic fiber rope onto the drum by operating the unit while holding the synthetic fiber rope taut. **These wraps serve as anchor wraps and must remain on the drum at all times.**

1.4.5 SECURE THE SYNTHETIC FIBER ROPE to the rope cleat to help secure the load or when not in use.

Important!

- Use a sheave or roller guide to direct the synthetic fiber rope to the drum whenever possible.
- Install sheaves, tracks 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 synthetic fiber rope. Follow the recommendations of the sheave manufacturer.

Figure 2 – Installing the Synthetic Fiber Rope



TOP VIEW

2.1 General Theory of Operation

Important!

- Limit nonuniform winding by keeping tension on the synthetic fiber rope.
- To help insure rated performance, make sure voltage at the motor is equal to the motor's voltage rating.
- It is your responsibility to detect and account for different factors affecting the condition and performance of the equipment.

2.1.1 THE PULL REQUIRED to move the load must not exceed the load rating of the unit. 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 and in the component manufacturer's information.

2.1.3 **THIS HOIST CONTAINS A LOAD BRAKE IN ADDITION TO HELICAL-WORM GEARING TO HOLD THE LOAD IN PLACE.**

2.1.4 PERFORMANCE RATINGS of the equipment are affected by the amount of synthetic fiber rope wound on the drum, the way in which it is wound, the way the unit is used, and tension on the dead end of the rope.

a LOAD RATING represents the maximum pull that can be placed on new equipment.

2.1.5 DUTY RATINGS refer to the type of use the equipment is subject to. Consider the following when determining duty rating.

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 start and stop functions increase wear and shorten the life span of the gear train and load brake components. Lengthy operations cause lubrication to become hot, which also decreases the life span of the gear train. **Increase maintenance of the equipment if used in frequent operations.**

CONTACT THE FACTORY FOR MORE INFORMATION.

2.2 Breaking-In the Unit

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 UNIT following break-in according to the Instructions for Periodic Inspection. See section 3.3 - 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 INSPECT ALL COMPONENTS of the system.

a INSPECT THE UNIT and other equipment according to the Instructions for Frequent Inspection.

b OPERATORS must be in good health, alert, thoroughly trained in operating the equipment, and properly clothed (hard hat, safety shoes and safety glasses, no loose clothing).

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

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

2.4 Attaching the Load

⚠WARNING

Do not wrap the synthetic fiber rope around the arbor. This damages the synthetic fiber rope and could cause the load to escape. Use an 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 ROLL CAPSTAN into space adjacent to the floor block of the desired lineset until the reaction bar anchor is fully engaged to the reaction bar. See Figure 3.

2.4.3 ATTACH THE FIBER ROPE TO THE LOAD using a rated lifting shackle, or other approved lifting device. Follow the recommendations of the shackle manufacturer.

2.4.4 DO NOT ATTEMPT to move an arbor that is not directly above the capstan lead sheave. Reposition the capstan to achieve the least amount of fleet angle between the lead sheave and the arbor.

2.5 Moving the Load

Important!

- Obey a stop signal from anyone.
- Maintain tension on the synthetic fiber rope to keep it tightly and evenly wound on the drum.
- If the unit 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.

⚠CAUTION

Ensure reaction bar anchor is properly engaged to the reaction bar. See Figure 3.

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 USE THE FOOT PEDAL CONTROL to operate the unit. The foot pedal control should be a momentary contact type, so the unit will stop when the operator releases the control.

2.5.3 OBSERVE THE SYNTHETIC FIBER ROPE as it winds onto the drum. Keep tension on dead end of rope. If it becomes loose, uneven, or overlapped, stop the operation and rewind the synthetic fiber rope before continuing. **Continued operation with overlapped or uneven synthetic fiber rope can damage the synthetic fiber rope and shorten its life.**

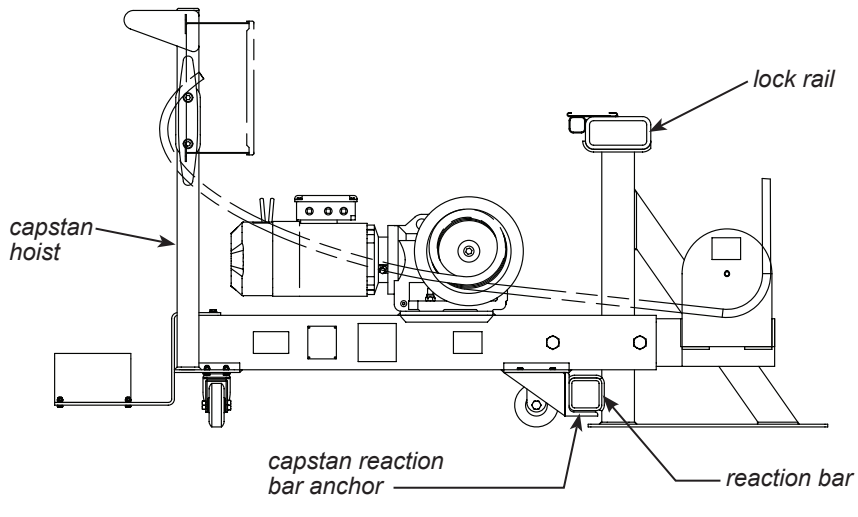
A rope cleat can be used to temporarily hold dead end of rope. **DO NOT LEAVE LOAD UNATTENDED.**

2.5.4 OBSERVE THE REDUCER during operation for signs of overheating. **Frequent overheating may be a sign of damage, or may indicate the need for a larger power unit.**

a WATCH FOR SMOKE, the smell of burnt lubricant, and other signs of overheating. Use a thermocouple or other device to monitor reducer temperature.

b STOP THE OPERATION if the reducer overheats, and allow the unit to cool. **Continued operation may cause damage.**

Figure 3 – Reaction Bar



3.1 Cleaning the Unit

Important!

Increase the frequency of maintenance procedures if the unit is:

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

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

3.1.1 CLEAN THE UNIT every six 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 around the unit.

3.2 Lubricating the Unit

Important!

- Do not leave plug holes in the reducer open. Open plug holes will allow dirt and moisture to contaminate the lubrication.
- Make sure lubricant has a temperature rating appropriate for the ambient temperatures of the operation.
- Replace the motor bearings if the motor is disassembled for any reason.

⚠CAUTION

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

Fill the speed reducer to the proper level without overfilling. Too much or too little lubricant will cause overheating and result in damage to seals, bearings, and gears.

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

3.2.1 MOTOR BEARINGS are typically lubricated for life by the manufacturer. Some motors require periodic lubrication. Refer to the motor manufacturer's information for specific instructions.

3.2.2 LUBRICATE THE REDUCER according to the manufacturer's instructions.

a CHECK OIL LEVEL before every operation and every 10 hours during operation. Remove the level plug and make sure oil is even with the plug hole.

b FILL THE REDUCER according to the manufacturer's instructions. Fill the reducer until oil reaches the level plug. **Do not mix different lubricants.**

c CHANGE REDUCER LUBRICANT at least every 2 years, or whenever it is dirty or contaminated.

3.3 Inspecting the Equipment

Important!

- Start an inspection program as soon as you put the unit 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:

- Monthly.
- Whenever you notice signs of damage or poor operation.

⚠WARNING

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

Inspect the unit to detect signs of damage or poor operation before they become hazardous. See Table 1 - Inspection Checklist.

3.3.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on inspecting the unit and other equipment.

3.3.2 CHECK COMPONENT MANUFACTURER'S INSTRUCTIONS for inspecting the motor, brake, reducer, bearings, synthetic fiber rope, and other equipment.

3.3.3 **Instructions for Frequent Inspection**

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

- Check all equipment for cracks, dents, bending, rust, wear, corrosion and other damage.
- Check the reducer for signs of leakage.
- Make sure the entire unit is properly lubricated.
- Make sure the breather plug is clean, open, and installed correctly.
- Make sure mounting fasteners are tightened securely.
- Make sure the foundation is in good condition, and capable of supporting the reaction bar and lock rail and its load under all load conditions.
- Check electrical wiring and connections for wear, corrosion, cuts, and other damage.

b TEST UNIT PERFORMANCE by operating the unit with a load not exceeding the load rating.

- Listen for unusual noises, and look for signs of damage as you operate the unit.
- Make sure the synthetic fiber rope winds evenly and tightly onto the drum. If it is loose or uneven, apply more tension to the dead end.
- Make sure the load moves smoothly, without hesitation or strain.
- Make sure the unit responds to the foot pedal control. It must rotate as shown on the control labels, and it must turn off when you release the control.
- 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 under normal operating conditions, the brake needs adjustment. Refer to brake manufacturer's instructions.

Completely correct all problems before continuing. Use the Troubleshooting Chart to help determine the cause of certain problems. See Table 2.

Perform periodic inspections:

- Every 12 months.
- Whenever you return the unit 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 unit.

3.3.4 Instructions for Periodic Inspection

a VISUALLY INSPECT the unit 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 and 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 SYNTHETIC FIBER ROPE.**
- Check all fasteners for stripped threads, wear, bends, 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 gear reducer is properly lubricated.
- Make sure all labels and plates are readable, firmly attached, free of damage and clean. Replacements are available from the factory.

b DRAIN A SMALL AMOUNT OF LUBRICANT from the reducer into a clean container.

- Check the lubricant for dirt, metal particles, water, and other signs of contamination. Completely drain the reducer if lubricant is contaminated.

Frequent Rope Inspection:

- Use Cordage Institute International Guidelines CI2001-04 as a guideline for rope inspection, replacement and maintenance.

c INSPECT ROPE. Refer to rope manufacturer's guidelines for inspection.

d MOVE THE DRUM with your hands.

- Check for excessive movement indicating worn or loose gears or bearings. Excessive movement is caused by overloading or overheating, and is a sign that your application may require a larger power unit.
- Disassemble the unit if necessary. Inspect keys, bearings, seals, and shafts for wear, distortion, and other damage.

e INSPECT FOUNDATION AND RIGGING.

- Check mounting fasteners for stripped threads, wear, and other damage.
- Check the foundation for cracks, corrosion, and other damage.

f TEST UNIT PERFORMANCE by operating the unit with a test load equal to the load rating.

- Listen for unusual noises, and look for signs of damage as you operate the unit.
- Observe the rotating drum, look for signs of loose or misaligned bearings.
- Make sure the unit responds to the control device. It must rotate as shown on the control labels, and it must turn off when you release the control.
- Make sure the load moves smoothly without hesitation or strain.
- 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 under normal operating conditions, the brake needs adjustment. Refer to brake manufacturer's instructions.

g DISCONNECT ELECTRIC POWER and inspect electrical equipment.

- Check electrical wires for worn insulation, cuts, corroded connections, and other damage.
- Make sure the electrical control box is securely installed. Look inside the control box for signs of moisture, corrosion, burn marks, cracks, and other damage.

h CONNECT ELECTRIC POWER.

- Check voltage of electrical supply with a UL approved voltmeter. If voltage is low, have a licensed electrician inspect the circuit.
- Check power supply at the motor and make sure it agrees with the motor rating. Do not operate the unit until proper power is supplied to the motor.

Completely correct all problems before continuing. Use the troubleshooting chart to help determine the cause of certain problems. See Table 2.

Table 1 – Inspection Checklist

checked boxes indicate damage or problem in need of repair

	damages	problems
general	☐ finish weathered, flaking, otherwise damaged	☐ unit 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 proper torque
reducer	☐ gears, bearings, or shafts loose, worn, otherwise damaged	☐ not properly lubricated
	☐ lubricant leakage	☐ lubricant contaminated
end connections	☐ corroded, rusted, worn, otherwise damaged	☐ not securely attached
shackle	☐ twisted, bent, worn, otherwise damaged	☐ shackle does not hold load
drum	☐ worn, distorted, otherwise damaged	☐ excessive movement or backlash
motor	☐ motor corroded, burnt out, otherwise damaged	☐ motor is sluggish, or operates poorly
brake	☐ brake worn, corroded, otherwise damaged	☐ brake does not operate properly
control device	☐ electric components corroded, burnt, otherwise damaged	☐ fails to control unit properly
electric circuit	☐ electric wires worn, cut, corroded, otherwise damaged	☐ wires unprotected, obstructing traffic
	☐ connections loose, corroded, otherwise damaged	voltage at motor =
labels and plates	☐ dirty, illegible, otherwise damaged	☐ loosely attached or missing

comments _____

authorized signature _____ **date** _____

Table 2 – Troubleshooting Chart

Contact the factory for assembly/disassembly instructions. Disassembly of the gearbox before contacting Thern, Inc. voids all warranties.

problem	cause	correction
motor won't run	• circuit breaker tripped or fuse blown	reset circuit breaker or replace fuse
	• electrical connections loose or damaged	inspect, repair and tighten as necessary
	• electric power supply failure	contact power company
	• motor burnt out or damaged	repair or replace as necessary
motor runs, drum doesn't turn	• loose or broken gear keys	inspect and replace as necessary
	• loose, stripped or broken gears	inspect and replace as necessary
motor tries to turn but can't	• unit overheated	allow to cool
	• load too heavy	lighten load
	• voltage at motor too low	inspect supply circuit and rewire as needed
	• electric brake not operating properly	inspect and repair as necessary
	• gears or bearings broken or locked	inspect and replace as necessary
brake does not operate properly	• brake release lever in release position	move to lock position
	• voltage to brake incorrect	check voltage at control box, repair as needed
	• brake adjusted incorrectly	adjust brake
	• brake discs or solenoid worn or damaged	inspect and replace as necessary
	• brake components seized up or damaged	inspect and repair as necessary
lubricant leakage	• worn bearings	inspect and replace as necessary
	• damaged oil seals or gaskets	inspect and replace as necessary
	• cracked or damaged reducer	inspect and repair as necessary
excessive end play on drive shaft	• loose or damaged keys or keyways	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 reducer 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 unit
	• broken gears or bearings	inspect and replace as necessary
whining motor	• load too heavy	lighten load
	• motor overheated	allow to cool
	• motor bearings burnt out	replace motor or bearings
rattling noise	• loose fasteners or set screws	tighten all fasteners and screws
	• worn or loose drag brake	inspect and repair or tighten as necessary
heavy thump during operation	• contaminants in lubricant	drain, clean and lubricate the unit
	• loose set screws or keys in gears or shafts	inspect and repair as necessary
	• bearings defective	inspect and replace as necessary

3.4 Repairing the Unit

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.
- Appoint a qualified person to be responsible for all repairs to the equipment.

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

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

3.4.3 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.

3.4.4 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 Unit

Important!

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

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

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

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

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

d PACK LOOSE PARTS in small boxes or ship separately.

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

4.2 Storing the Unit

4.2.1 FILL THE REDUCER with lubricant, and make sure the breather plug is clean and properly installed. Add a rust preventative for long term storage. Follow the reducer manufacturer’s instructions.

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

4.2.3 STORE THE UNIT 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. Release the brake to rotate the drum.

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

4.2.6 TEST INSULATION RESISTANCE in the motor to detect moisture damage. Refer to the motor manufacturer’s instructions.

4.2.7 DRAIN THE REDUCER and fill with proper lubricant prior to operation. See section 3.2 - Lubricating the Unit.

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