



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](http://www.thern.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 Thern Vertical Lead Blocks

## Two-Year Limited Warranty

**Please record the following:**

Date Purchased: \_\_\_\_\_

Model No.: \_\_\_\_\_

Code 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 Thern Vertical Lead Blocks. 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**

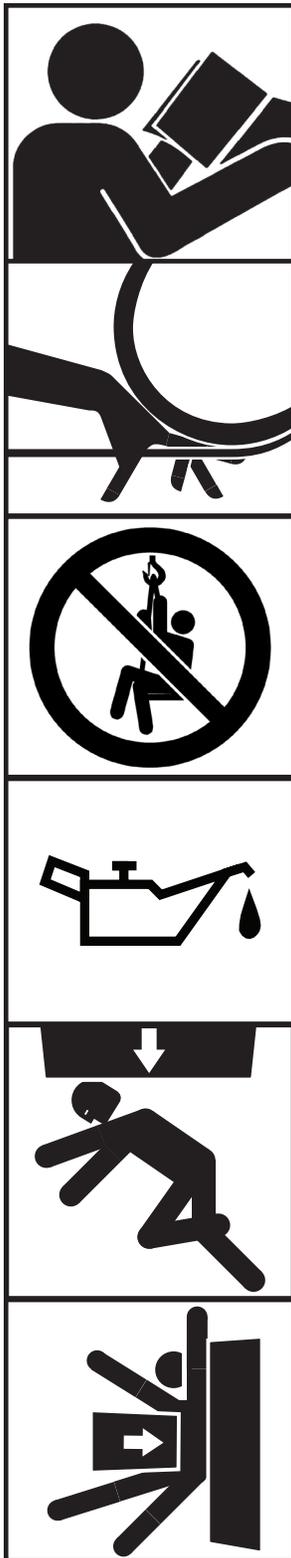
Failure to follow 'WARNING!' instructions may result in equipment damage, property damage, and/or serious personal injury.

**▲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 sheave blocks, readable and with the equipment at all times. Contact Thern, Inc. for replacements.

Keep hands away from the sheaves, rope, winch, drum, and other moving parts of the system.

Equip the winch with a load brake if it is used to lift loads, or drag loads on an incline. Contact Thern Inc. for more information.

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

#### **DO NOT do the following:**

Do not lift people, or things over people. Do not walk or work under a load or in the line of force of any load.

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

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 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.

**Important!**

- Inspect the sheave blocks immediately following installation according to the Instructions for Inspection. This will give you a record of the condition of the products 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 sheave block frame to the foundation or support structure. Welding the frame may void warranty, contact Thern, Inc. Use fasteners as instructed.

**Important!**

- Start an inspection program as soon as you put the equipment 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 the changes in condition or performance.

## 1.1 Installing the Sheave Block

**⚠WARNING**

**Do not install in explosive or hazardous location.**

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

**⚠CAUTION**

**When transporting the sheave block to or from the installation location, always use two hands to carry the product. Alternatively, a sling can be wrapped around the sheave or a shackle can be installed in a mounting bolt hole for moving with a lifting device.**

**Position the sheave block to allow access for proper lubrication without having to reach past the rope and risk entanglement.**

1.1.1 **CONSIDER OPERATING TEMPERATURE RANGE** allowable for the sheave block. Do not install in an environment where this limitation could be exceeded. Allowable operating temperature range is between -30° and 250°F (-34° to 121°C).

1.1.2 **MAINTAIN A FLEET ANGLE** no greater than 2 degrees. The proper fleet angle minimizes rope damage by preventing side loads and rubbing. See Figure 1.

**LOCATE THE SHEAVE BLOCK** in an area clear of traffic and other obstacles. Make sure the block is accessible for maintenance and operation.

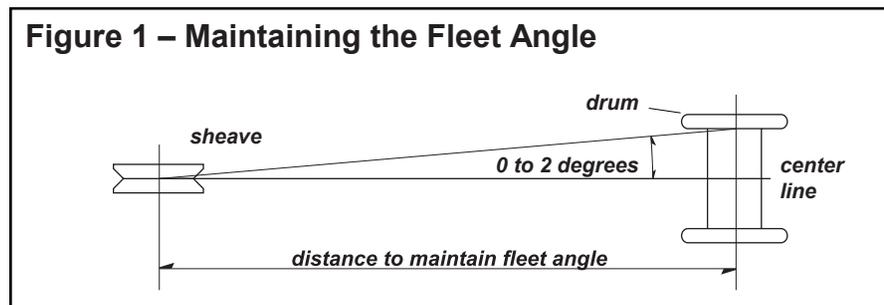
1.1.3 **FASTEN THE SHEAVE BLOCK** securely to an adequate foundation, using recommended hardware. See Table 1. Be sure to use all four provided mounting holes and heavy-duty flat washers with the chosen fasteners.

<sup>a</sup> Non-standard products that vary from the original design may have different fastening requirements. Contact a structural engineer or Thern, Inc. for this information.

**Table 1 – Mounting Fasteners**

VLB-G25	7/16 inch Grade 5 min <b>or</b> M12 grade 8.8 min
VLB-G31	1/2 inch Grade 5 min <b>or</b> M12 grade 8.8 min
VLB-G38	5/8 inch Grade 5 min <b>or</b> M16 grade 8.8 min
VLB-G44	3/4 inch Grade 5 min <b>or</b> M20 grade 8.8 min
VLB-G50	3/4 inch Grade 5 min <b>or</b> M20 grade 8.8 min

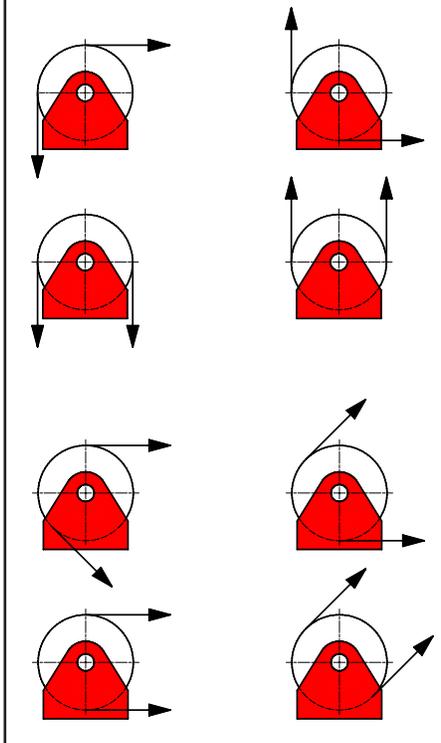
**Figure 1 – Maintaining the Fleet Angle**



**Important!**

- Obey a stop signal from anyone.
- Maintain tension on the wire rope to keep it tightly and evenly wound on the sheave.

**Figure 2 – Example Loading Configurations**



- 1.1.4 INSTALL THE ROPE by reeving it around the sheave groove in the desired configuration. See Figure 2 for examples.
- a THE ROPE SIZE must match the size marked on the product serial tag.
  - b IF A ROPE FITTING is too large to pass between the sheave and cable keeper(s), the keeper(s) can be temporarily removed for installation of the rope.
    1. Use a 7/16" wrench on VLB-G25 only or a 1/2" wrench on all other models to loosen the required cable keeper bolts.
    2. Temporarily remove the required cable keepers for the desired rope installation.
    3. Rig the rope onto the sheave as desired for the system.
    4. Re-install the cable keepers and re-fasten the hex-head cable keeper bolts.
  - c DO NOT USE SYNTHETIC ROPE if the sheave has been used with wire rope previously. If the sheave groove is new and synthetic rope is used, be sure that all of the rope manufacturer's recommendations are followed.

1.1.5 ADJUSTING THE CABLE KEEPER POSITION

**WARNING**

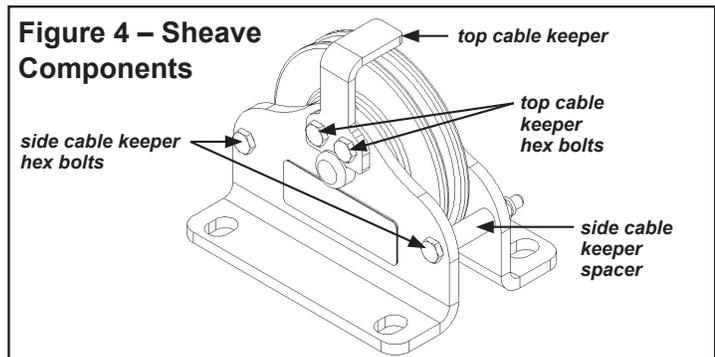
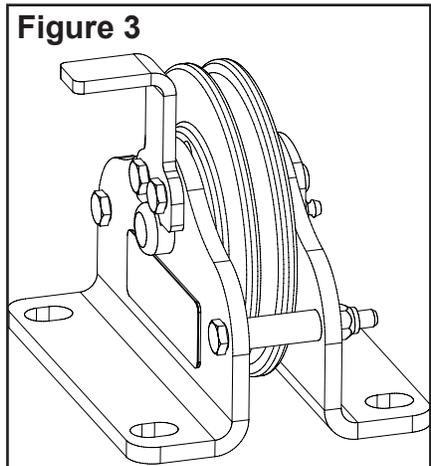
If you remove cable keepers to accommodate a certain rope payout range, you must pay careful attention to make sure that the rope does not derail from the sheave groove before or during operation. A derailed rope can damage equipment and the rope, which may cause the load to escape.

These blocks are designed with three different methods for retaining the rope in the sheave groove, also referred to as "cable keepers." The top cable keeper doubles as an axle retainer, the two side keepers double as spacers for installation, and the flat mounting surface acts as the bottom retainer.

You must determine the full range of rope payout and verify if any positions may lead to rubbing between the rope and a cable keeper. If rubbing is expected to occur, you must remove or re-configure the cable keepers to prevent the risk of rubbing. Follow the instructions below: See figures 3 and 4.

- a FOR THE TOP CABLE KEEPER which also retains the sheave axle, re-configure it by removing the two hex head bolts and reversing the tab direction 180 degrees. Re-fasten the bolts after making this change. See figure 3.
- b ONE OR BOTH OF THE SIDE CABLE KEEPERS can be removed if they lie along the path of the rope. Remove the bolt and pull out the spacer. Keep these components for future applications that may require a different rope payout range.

CONTACT A QUALIFIED PROFESSIONAL FOR MOUNTING INSTRUCTIONS TO COMPLY WITH LOCAL CODES.



**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 the repairs to the equipment.

## 2.1 General Theory of Operation

- 2.1.1 THE FORCE PLACED ON THE EQUIPMENT must not exceed the load rating of the equipment.
- 2.1.2 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 LOAD RATING represents the maximum force that can be placed on new equipment. See load rating information in Table 2.
- 2.1.4 TOTAL LOAD is determined by multiplying the Angle (degrees) Factor by the Line Load. See load factor information on Table 3 and example 1. See diagram figures 5 and 6.
- 2.1.5 DUTY refers to the type of use the equipment is subject to. Consider the following when determining duty rating.
- ENVIRONMENT: harsh environments include hot, cold, dirty, wet, corrosive, or explosive surroundings. **Protect the equipment from harsh environments when possible.**
  - 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.**
  - 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.**
  - FREQUENCY OF OPERATION: frequent or lengthy operations increase wear and shorten the life span of bearings, rope, and other components. **Increase maintenance of the equipment if used in frequent operations.**

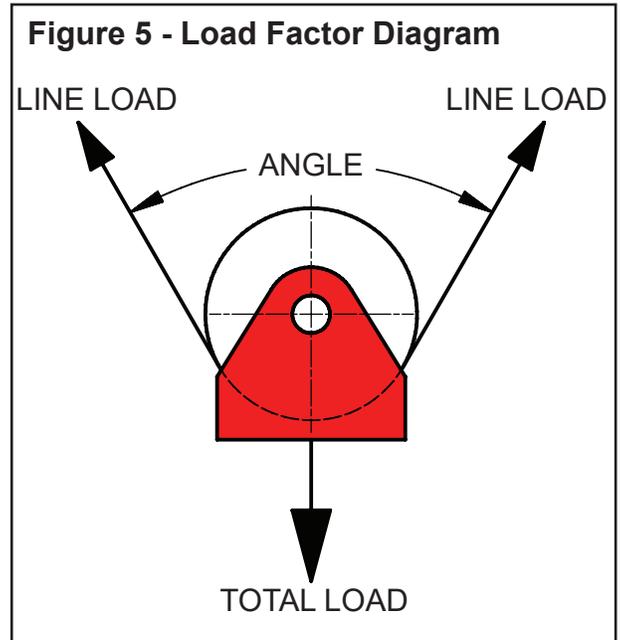
CONTACT THE FACTORY FOR MORE INFORMATION.

**Table 2 - Specifications By Model**

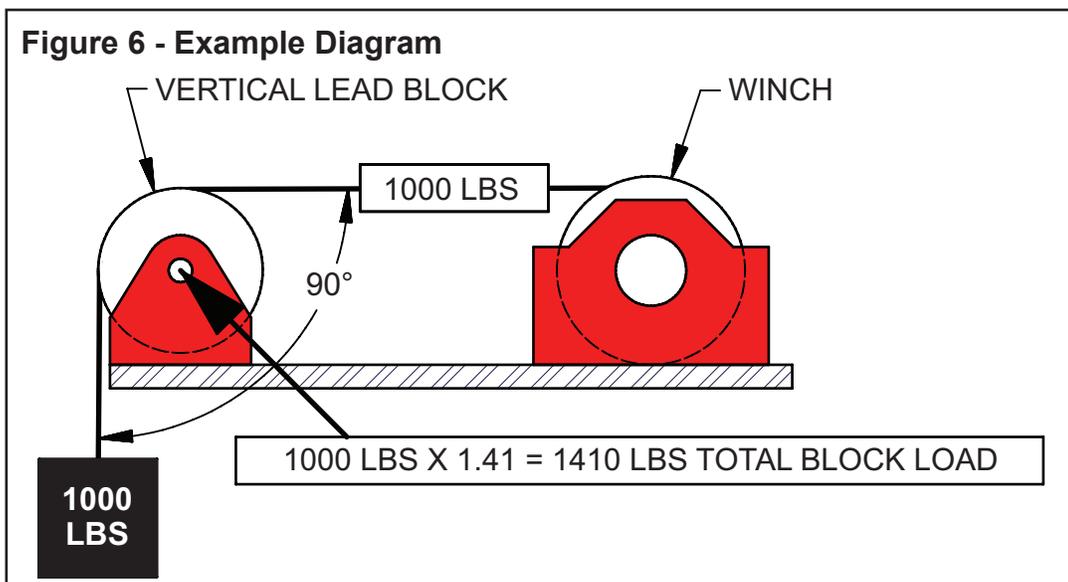
Model Number	Sheave Outer Diameter (inches)	Rope Diameter (Inches)	Total Working Load Limit, R (LBS)	Line Load Limit, L (LBS)
VLB-G25	4 1/2 (114 mm)	1/4 (6 mm)	4000 (1814 kg)	2000 (907 kg)
VLB-G31	6 (152 mm)	5/16 (8 mm)	6000 (2722 kg)	3000 (1361 kg)
VLB-G38	7 (178 mm)	3/8 (10 mm)	9600 (4354 kg)	4800 (2177 kg)
VLB-G44	8 (203 mm)	7/16 (11 mm)	11600 (5262 kg)	5800 (2631 kg)
VLB-G50	9 (229 mm)	1/2 (13 mm)	14000 (6350 kg)	7000 (3175 kg)

**Table 3 - Load Factors**

FACTOR = TOTAL LOAD/LINE LOAD	
ANGLE (DEGREES)	FACTOR
0	2.00
10	1.99
20	1.97
30	1.93
40	1.87
45	1.84
50	1.81
60	1.73
70	1.64
80	1.53
90	1.41
100	1.29
110	1.15
120	1.00
130	0.84
135	0.76
140	0.68
150	0.52
160	0.35
170	0.17
180	0.00



**Example 1:**  
 If Line Load equals 500 LBS, and the ropes are exiting 30 degrees from each other, 500 LBS x 1.93 = 965 LBS total load.



**Important!**

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

---

## 3.1 Preparing for Operation

**⚠WARNING**

**Always maintain visual contact with the sheave block, rope, and the load.**

**Do not allow the rope to rub on any stationary objects or objects that could damage the rope.**

**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.**

3.1.1 INSPECT THE EQUIPMENT according to the Maintenance/Inspection instructions.

---

## 3.2 Moving the Load

**⚠WARNING**

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

**Keep hands away from the sheave, rope, and other moving parts of the equipment.**

**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 leave a suspended load unattended unless specific precautions have been taken to secure the load and keep people away from the winch and out from under the load.**

**Observe the rope as it runs in the sheave groove. If it becomes loose and derails, stop the operation immediately and re-seat the rope before continuing. Operation with a derailed rope can damage equipment or cause the rope to fail.**

**Do not run the load and/or other rigging accessories into the sheave block.**

3.2.1 REFER TO THE WINCH OWNERS MANUAL for further warnings and instructions on operating the winch and moving the load.

**Important!**

- Start an inspection program as soon as you put the equipment 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 the changes in condition or performance.

**Inspect the equipment:**

- Before each operation.
- Every 3 hours during operation
- Whenever you notice signs of damage or poor operation.
- Whenever you return the equipment to service from storage.
- Whenever you have, or think you may have, overloaded or shock loaded the equipment.

**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 4.1.4 d and Figure 7.
- Check the wire rope for reduction of rope diameter from loss of core support, or wear of outside wires. See paragraph 4.1.4 d and Figure 8.
- 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.

## 4.1 Maintenance / Inspection

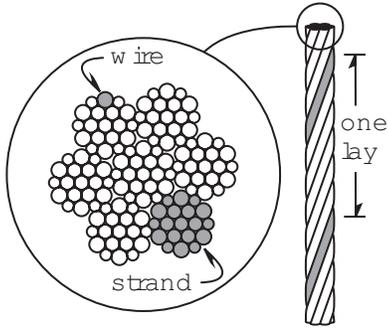
**⚠WARNING**

**Do not use damaged or malfunctioning equipment. Place an “OUT OF ORDER” sign on the sheave block system. Do not use the system until the sign is removed by a qualified maintenance person who has completely corrected the problem.**

**Do not perform maintenance if the block is under load. First relieve all rope tension, then perform maintenance tasks.**

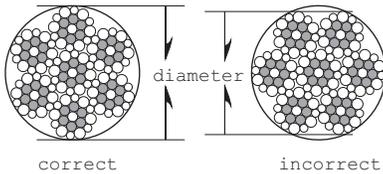
- 4.1.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on inspecting the sheave block.
- 4.1.2 CLEAN THE EQUIPMENT every six months or whenever it is dirty. Use a rag to remove dirt and grease. Leave a light film of oil to protect against rust and corrosion. Wipe off excess oil to avoid the accumulation of dirt.
- 4.1.3 LUBRICATE THE SHEAVE BEARING once a month or more, depending on usage. Use a grease gun to insert NLGI no. 2 grease into the supplied grease fitting in the axle shaft. Rotate the sheave to thoroughly distribute the grease within the roller bearing, and stop adding grease when it begins to appear at the seals. Wipe off excess grease to avoid dirt accumulation.
- 4.1.4 INSPECT THE EQUIPMENT to detect signs of damage or poor operation before they become hazardous. See Table 4.
- a VISUALLY INSPECT the equipment.
- Check all equipment for rubbing, cracks, dents, bending, rust, wear, corrosion and other damage.
  - Make sure the rope is installed correctly.
  - Make sure all fasteners are tightened securely.
  - Check all fasteners for stripped threads, wear, bends, and other damage.
  - Make sure the foundation is in good condition, and capable of supporting the sheave block and its load under all load conditions.
  - Check the finish for wear, flaking, or other damage.
  - Make sure all labels and plates are legible, firmly attached, free of damage and clean. Replacements are available from the factory.
- b TEST PERFORMANCE by operating the equipment.
- Listen for unusual noises, and look for signs of damage.
  - Make sure the rope winds smoothly over the sheave. If it is rough, inspect and repair as necessary.

**Figure 7 – 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 8 – Rope Diameter**



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

wire rope size	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 (.3437 in)
7/16 in	13/32 in (.4062 in)
1/2 in	15/32 in (.4687 in)

- c. INSPECT A SYNTHETIC ROPE according to the rope manufacturer's recommendations.
- d. INSPECT A WIRE ROPE according to the wire rope manufacturer'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 7.
  - Place enough weight to keep the wire rope straight and tightly drawn and measure the diameter of the wire rope, especially in areas where wear is noticeable. Replace the wire rope if the diameter measures below the minimum diameter at any point. See Figure 8.
- e. INSPECT THE FOUNDATION AND RIGGING
  - Check mounting fasteners for stripped threads, wear, and other damage.
  - Check the foundation for cracks, corrosion, and other damage.

**Completely correct all problems before continuing. Use the troubleshooting chart to help determine the cause of certain problems. See Table 5.**

## 5.1 Repair

- 5.1.1 GET FACTORY AUTHORIZATION for all repairs. Unauthorized repairs will void the warranty, and may lead to damage or failure of the equipment.
- 5.1.2 REPLACE DAMAGED OR POORLY OPERATING PARTS with Thern repair parts.
- 5.1.3 TO ORDER REPAIR PARTS, contact your local dealer. Include the following information when ordering.
  - model number





**Thern**  
**Winches & Cranes**

Thern, Incorporated  
5712 Industrial Park Road  
Winona, MN 55987

PHN 507-454-2996  
FAX 507-454-5282

EMAIL: [info@thern.com](mailto:info@thern.com)  
[www.thern.com](http://www.thern.com)