

TSE 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 Thern Stage Equipment, PO Box 347, Winona, MN 55987, 800-553-2204. www.thernstage.com

ORIGINAL TEXT



Owner's Manual For **Thern Brickhouse** **RL Series Rope Locks**

Two-Year Limited Warranty

Please record the following:

Date Installed:

Model Numbers:

Arbor:

Rope Lock:

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.

Information contained in this Owner's Manual is applicable only to Thern Brickhouse RL Series Rope Locks. 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 equipment, readable and with the equipment at all times. Contact Thern, Inc. for replacements.

Keep sets in balance during operation. This means the weight of the load equals the arbor and counterweights. Operators must completely understand methods of maintaining system balance.

Keep hands away from moving parts of the equipment and other pinch points.

Keep rope lock handle in the securely closed position when not in use. Engage plunger pin to further prevent accidental opening of the rope lock.

When necessary, use padlocks to lock handle in the fully closed position to prevent unauthorized use.

DO NOT do the following:

This product is designed for positional holding of counterweight sets using 5/8 inch to 1 inch fiber operating line. Do not use this product for any other purpose.

Do not operate stage rigging without proper supervision, training and authorization. Know the limitations of your system.

Do not exceed the load rating of the equipment or any other component in the system. To do so could result in failure of the 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 operate with guards or covers removed or improperly installed.

Do not load or unload the arbor when anyone is below the arbor or load batten.

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

Do not leave an out of balance load unattended and keep people clear of the batten and the lock rail while the load is out of balance.

Do not attempt to stop a run away set. If an out of balance set begins to fall, move away and clear the area until the set has stopped moving.

Do not use rope locks to hold out-of-balance loads greater than 50 pounds.



1.1 Theory of Operation

Important!

- Rope locks should be adjusted by authorized personnel to hold an out of balance load not exceeding 50 pounds.
- Adjustments should be checked regularly as temperature, humidity, load and wear can change rope diameter.
- For significantly out of balance sets, they should be tied off in a manner that will securely hold the load, until the set can be brought into balance once again.
- Exact balance is only achieved midway during load travel due to the weight of the wire rope passing over the head and loft blocks.
- If the set cannot be balanced exactly, it is suggested to set the arbor heavy to prevent accidental lowering of the batten.

A counterweight set is a mechanical system designed to move stage and lighting equipment vertically by means of arbors and loft blocks. Counterweights located in an arbor are used to balance a load over the stage which reduces the amount of force required to raise and lower the load.

When the arbor is at its lowest point and the batten is at its maximum height just below the loft blocks, the set is said to be 'FULL OUT'. When the arbor is at its maximum height and the batten is at the lowest position, the set is said to be 'FULL IN'.

The load is in balance when the force of the counterweights is equal to the force of the load. If the load is greater than the counterweight directly below the head block, it is referred to as being 'batten heavy'. If the counterweight is greater than the load below the loft blocks, it is referred to as being 'arbor heavy'. When the system is in balance, the force required to move the set should only be the amount needed to overcome friction and inertia.

- 1.1.1 THE LOAD consists of any batten, scenery or lighting equipment and wire rope located below the loft blocks.
- 1.1.2 THE ARBOR holds the counterweights used to counterbalance the load. The line used to operate the set is routed to the top and bottom of the arbor.
- 1.1.3 COUNTERWEIGHTS are made from steel or other metal. Arbor gates have a spring return feature to ensure they are in the correct position. These gates provide added security to prevent the weights from coming out of the arbor.
- 1.1.4 HEAD BLOCKS collect and change direction of lift lines. They are located between the arbor and the loft blocks. Head blocks carry the full load of the set. They also support and direct the hand line.
- 1.1.5 LOFT BLOCKS are used to support lift lines and direct movement of load travel. They are located between the head block and the load.
- 1.1.6 FLOOR BLOCKS maintain hand line tension and change hand line direction. They are located below the arbor.
- 1.1.7 HAND LINE is used to control movement of the arbor and the load. If the hand line is pulled down, the arbor rises and the batten lowers.
- 1.1.8 ROPE LOCKS are used to hold balanced loads in position.
- 1.1.9 BATTENS are pipes, trusses or other rigging supported by the lifting cables. Stage and lighting equipment is clamped or tied to the batten.
- 1.1.10 SINGLE PURCHASE ARBOR SYSTEM, or 1:1 system, means that the line sets are rigged in such a manner that the batten travels the same distance the arbor travels. This also means the arbor must carry the same load as the batten. For every pound of batten weight, there should be one (1) pound of arbor weight. See Figure 1.
- 1.1.11 DOUBLE PURCHASE ARBOR SYSTEM, or 2:1 system, means that the line sets are rigged in such a manner that the batten travels twice the distance the arbor travels. This also means the arbor must carry twice the load of the batten. For every pound of batten weight, there should be two (2) pounds of arbor weight. See Figure 2.

1.2 Preparing for Operation

Important!

- Keep people clear of areas under the arbor, loading gallery and load batten during operation.
- The batten counterbalances the empty arbor. If the batten is too light, the empty arbor could move uncontrollably.

The key to successful operation of a counterweight system is to maintain balance and stability. The system must either be 'in balance' or the system should be set slightly arbor heavy to prevent accidental lowering of the batten.

- 1.2.1 CONSIDER THE OPERATION. Do not begin until you are sure you can perform the entire operation without hazard.
- 1.2.2 INSPECT ALL PARTS of the system.
 - a OBSERVE THE SYSTEM and look for signs of problems. See Section 2.1.2.
 - b OPERATORS must be in good health, alert, thoroughly trained in operating the equipment and properly clothed. Wear heavy-duty gloves, safety shoes, and remove any loose jewelry.
 - 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 other way move uncontrollably.
- 1.2.3 KNOW YOUR LOAD and make sure you do not exceed the load rating of the equipment or any other component in the system.
- 1.2.4 IT IS UP TO THE OPERATOR to determine the best method of operation. When making this determination, keep the following factors in mind:
 - a The design of your system.
 - b Personnel training and competency.
 - c Equipment resources.
 - d The degree of out of balance that might be encountered.
- 1.2.5 THE SET SHOULD BE ASSESSED for hazards, their severity and possible protective action.

Figure 1 – Single Purchase

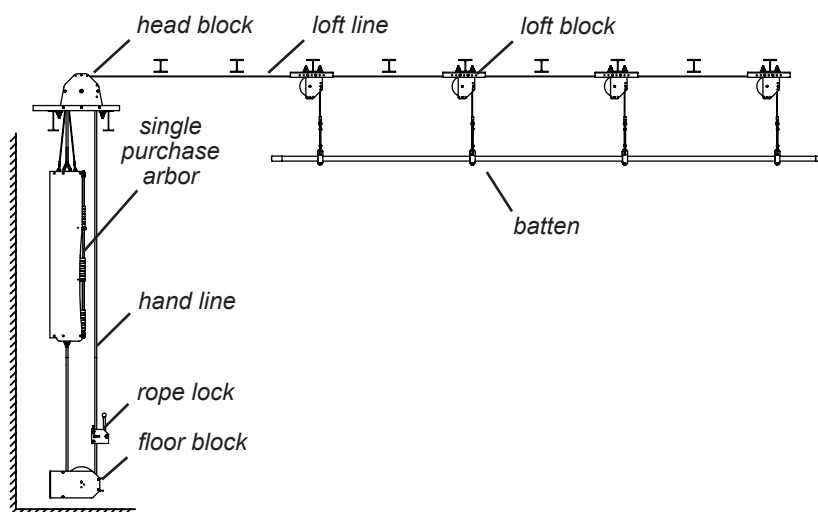
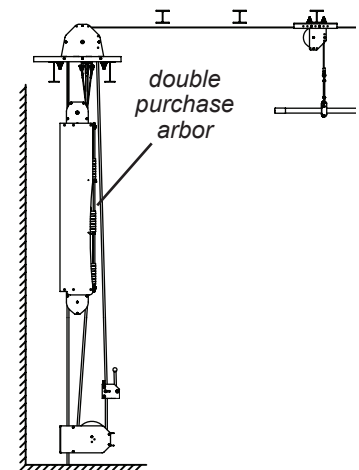


Figure 2 – Double Purchase



1.3 Operating the Counterweight Set

Important!

- Obey a stop signal from anyone.
- Appoint a supervisor if more than one person is involved in the operation. This will reduce confusion and increase safety.
- An established protocol of communication between workers on the load floor and at the lock rail should be implemented to reduce confusion and confirm actions and movements.
- Due to friction inherent with set operation, it may be necessary to pull a balanced set both up and down. If excessive pull is required, or operation becomes unusual, stop operation immediately, engage the rope lock and determine the problem.

⚠WARNING

Always check for people or obstructions before operating. People must not be near or under moving arbors or battens.

Out of balance loads may cause equipment damage and serious injury.

The operator is responsible for identifying and evaluating any hazards and determining the correct and most secure operation method to be used, especially when operating an out-of-balance system.

- 1.3.1 IDENTIFY THE ROPE LOCK, arbor and load batten visually.
- 1.3.2 LOOK FOR OBSTRUCTIONS that may disrupt operation before beginning operation.
- 1.3.3 OBSERVE THE FRONT AND BACK HAND LINES to help determine condition of the set balance. When the front line is taut and the rear is loose, the line set is arbor heavy; if the rear is taut and the front is loose, the line set is batten heavy. If the set is out of balance, correct it before continuing. If you are unable to correct the balance, consult a competent individual and perform a hazard assessment before continuing.
- 1.3.4 WHEN PROPERLY BALANCED the counterweight set will be close to neutral balance at the halfway point of travel. When at full in or full out travel position, the counterweight set out of balance should not exceed 50 pounds.
- 1.3.5 TO OPERATE THE SET release the rope lock handle slowly until set balance can be determined.
- 1.3.6 WHEN THE BATTEN reaches its desired position, engage the rope lock. If a position must be found repeatedly, the hand line can be marked by stabbing string through or wrapping with spike tape. Avoid using adhesive tape as it will leave a sticky residue.
- 1.3.7 OUT OF BALANCE SYSTEMS must be operated with great care. Some loads experience changes to the load as they are raised. Loads such as tall curtains increase as they are raised and weight is taken from the floor. Also, systems without loading bridges or that have poor access to the arbors may require operators to work with out of balance loads.
- 1.3.8 HAND LINE MAY STRETCH OR SHRINK due to changes in load or humidity. The set may become harder to operate. The system has an adjustable floor block to compensate for slack or relieve extra tension. **We recommend periodic tightening of the hand line at the bottom termination or by adjusting the position of the tension floor block.**

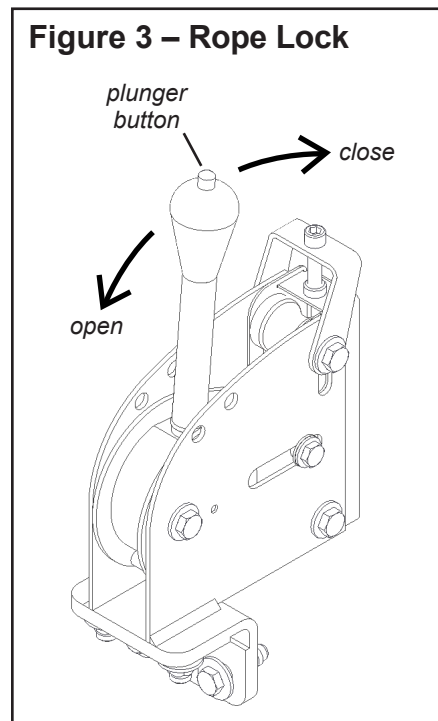
1.4 Operating the Rope Lock

⚠WARNING

Always check for people or obstructions before operating. People must not be near or under moving arbors or battens.

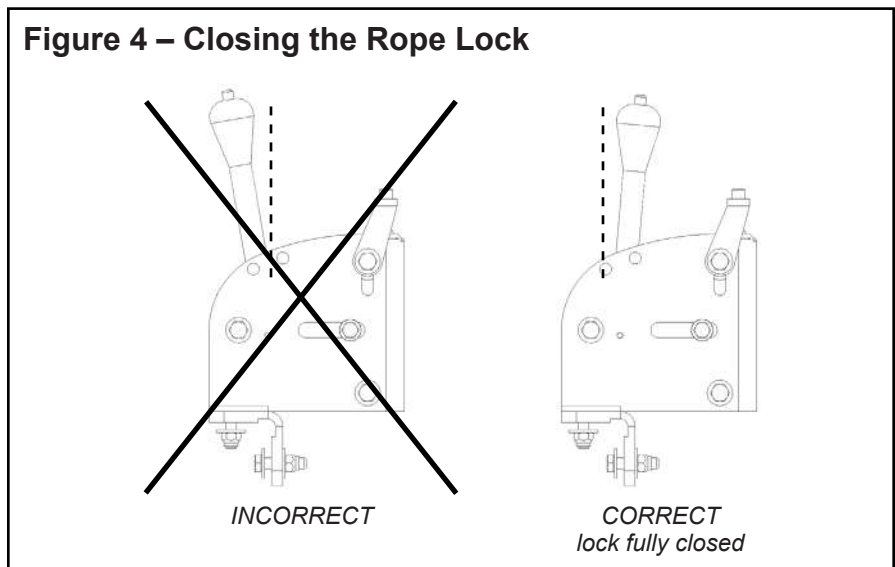
Out of balance loads may cause equipment damage and serious injury.

The operator is responsible for identifying and evaluating any hazards and determining the correct and most secure operation method to be used, especially when operating an out-of-balance system.



- 1.4.1 IDENTIFY THE ROPE LOCK visually.
- 1.4.2 LOOK FOR OBSTRUCTIONS that may disrupt operation before beginning operation.
- 1.4.3 TO OPEN THE ROPE LOCK depress the plunger button located at the top of the handle knob. See Figure 3.
- 1.4.4 ROTATE THE HANDLE down slowly until proper set balance can be determined. Continue to the fully open position to allow the hand line to move freely. See Figure 3.
- 1.4.5 OPERATE THE SET by moving the handline up or down.
- 1.4.6 WHEN THE BATTEN reaches its desired position, rotate the handle back to the fully closed position. The handle must go over-center, which is slightly beyond vertical. See Figure 4.
- 1.4.7 THE PLUNGER BUTTON will automatically re-engage to prevent unintentional operation.

NOTE – Hand line rope may deform when held locked over long periods of time. Properly adjusted rope locks should not permanently deform rope.

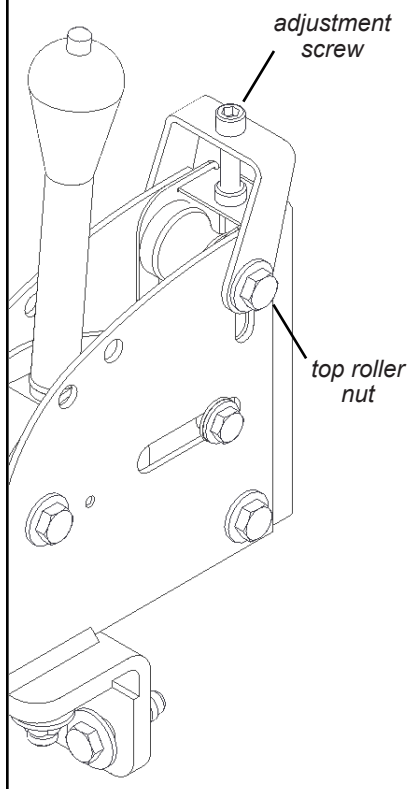


1.5 Installing the Rope Lock

- 1.5.1 REMOVE THE ROPE LOCK from its packaging and inspect it for shipping damage. If there is damage, do not install the rope lock. Contact the factory for return instructions. If there is no sign of damage, proceed to the next step.
- 1.5.2 COMPARE THE MOUNT SPACING of the Rope Lock with the mounting holes on your locking rail. If the holes do not line up properly, do not install the rope lock. Contact the factory for additional application information and support.
- 1.5.3 INSTALLATION should be conducted with an empty batten and the arbor resting securely against the bottom stop. If necessary, load up to 50 pounds of weight onto the arbor to ensure an arbor heavy line set.
- 1.5.4 FOLLOW THESE STEPS when replacing an existing rope lock. Otherwise, skip to 1.5.5.
 - a SLOWLY UNLOCK THE ROPE LOCK. The line set should not move since it should be arbor heavy and resting on the bottom stop. If the line set wants to move, do not proceed with installation. Secure the system and contact a qualified person to review the rigging.
 - b UNTIE THE PURCHASE LINE from the bottom of the arbor and pull the purchase line back thru the tension block and the existing rope lock.
 - c UNBOLT AND REMOVE the existing rope lock.
- 1.5.5 ATTACH the RL Series rope lock into place using factory supplied 3/8" hardware. Torque fasteners to 20 foot-pounds.
- 1.5.6 STRING THE PURCHASE LINE thru the rope lock. The rope will pass between the three rope lock rollers.
- 1.5.7 VERIFY CORRECT INSTALLATION and operation by closing and opening the rope lock. The handle should move freely between the fully open and fully closed positions.
- 1.5.8 STRING THE PURCHASE LINE thru the tension block and tie to the bottom of the arbor. Ensure that the purchase line is routed correctly and is properly tensioned.
- 1.5.9 CLOSE AND SECURE the rope lock.
- 1.5.10 RETURN TO A BALANCED SYSTEM (still with an empty batten) by slowly removing any extra weight that may have been added in Step 3 above. If the line set can not be balanced, do not proceed with operating the line set. Secure the system and contact a qualified person to review the rigging.
- 1.5.11 PROCEED with the steps outlined in Section 1.6 Adjusting the Rope Lock to properly adjust the rope lock before use.

1.6 Adjusting the Rope Lock

Figure 5 – Adjusting the Rope Lock



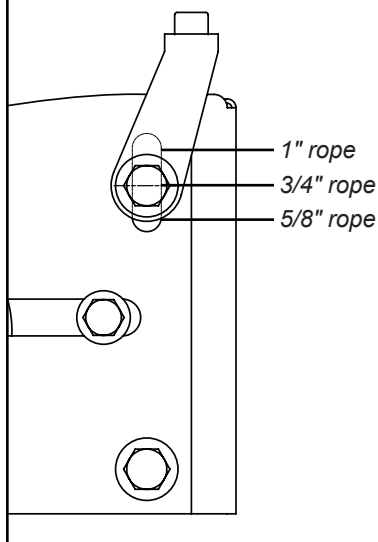
- 1.6.1 WITH A BALANCED SYSTEM, testing should be conducted with an empty batten using 'pipe weight' (only enough weight to balance the empty pipe).
- 1.6.2 RAISE THE BATTEN to its high trim (full out), and then lower until the arbor is about one foot above the bottom stop.
- 1.6.3 CLOSE THE ROPE LOCK and secure the handle.
 - a ADD 50 POUNDS OF WEIGHT to the arbor. If the arbor moves at all before all 50 pounds are added, the lock setting is too loose and should be tightened.
 - b IF YOU CAN ADD MORE THAN 50 POUNDS of weight and the arbor does not move at all, the lock setting is too tight and should be loosened.
- 1.6.4 ADJUST THE ROPE LOCK by following these steps. See Figures 5 and 6.

CAUTION

Moving adjustment screw without prior loosening of top roller nut can result in damage to the adjusting mechanism of the rope lock.

- a RETURN TO A BALANCED SYSTEM by removing weights added previously, to return to pipe weight with an empty batten.
- b LOOSEN TOP ROLLER NUT FIRST to allow adjustment mechanism to work properly.
- c ADJUST ROLLER POSITION by rotating the adjustment screw using a hex key. Clockwise rotation will lower the roller for more holding force. Counter-clockwise rotation will raise the roller for less holding force. Adjustment increment will vary with rope type and diameter. Final adjustment may require less than one rotation.
- d RETIGHTEN TOP ROLLER NUT to secure top roller in the final desired position.
- e REPEAT THESE STEPS as necessary until the lock allows the hand line to slip at about 50 pounds.

Figure 6 – Suggested Starting Positions



2.1 Routine Inspection

Important!

- Start an inspection program as soon as you put the system 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.
- Make sure to properly dispose of old ropes to prevent re-use.

Perform Periodic Inspection

- Every 6 months.
- Whenever you notice signs of damage or poor operation.
- Whenever you have, or think you may have, overloaded or shock loaded the system.

▲WARNING

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

It is the responsibility of the owner to keep up with regular inspection and maintenance of the equipment as well as continuous training of the operators.

An inspection form should be created which covers the components of your system and operation. The following list provides an overview of the items you should be looking for when doing an inspection.

2.1.1 Instructions for Periodic Inspection

A variety of factors, including time, temperature, humidity, and frequency and severity of operation, affect system components creating the need for regular inspection. To help maintain functional equipment and reduce maintenance issues do the following:

- a Keep your equipment and surrounding areas clean. Clean up any dirt, dust and debris.
- b Correct and repair any problems, and replace worn equipment.
- c Keep tension at the floor blocks adjusted to minimize hand line slack.
- d Keep rope locks properly adjusted. See Section 1.5.
- e Check hand line for abrasions, overly smooth or glossy areas, kinking, stress points, rot or dry rot. If rope is damaged, replace before continuing operation.
- f Check that rope lock mounting is secure.
- g Check all components for signs of wear or damage.

2.1.2 Instructions for Frequent Inspection

Frequent inspection should be made in addition to regularly scheduled inspections whenever the system is being operated. Ask the following question each time the set is operated. If the answer to any of these questions is 'no', HALT OPERATION IMMEDIATELY UNTIL THE PROBLEM(S) IS CORRECTED.

- a Is the set correctly balanced?
- b Is the rope lock adjusted properly?
- c Does the system move freely without excessive friction?
- d Is the system too hard to operate?
- e Are there any obstructions present or line problems?

Table 1 – Inspection Checklist

checked boxes indicate damage or problem in need of repair

	problems	defects
general	<input type="checkbox"/> finish weathered, flaking, otherwise damaged <input type="checkbox"/> parts cracked, bent, rusted, worn, otherwise damaged	<input type="checkbox"/> difficult to operate <input type="checkbox"/> unusual noises, other signs of malfunction
fasteners	<input type="checkbox"/> stripped threads, bent, worn, otherwise damaged	<input type="checkbox"/> loose, not tightened to proper torque
rope	<input type="checkbox"/> bent, crushed, frayed, otherwise damaged <input type="checkbox"/> replace if rope is excessively worn	
system balance	<input type="checkbox"/> out of balance by more than 50 pounds	<input type="checkbox"/> hand line slips, difficult to operate
rope lock adjustment	<input type="checkbox"/> rope lock settings too tight or loose	<input type="checkbox"/> hand line slips, difficult to operate
floor block	<input type="checkbox"/> not properly tensioned	<input type="checkbox"/> hand line overly tight or loose
labels and plates	<input type="checkbox"/> dirty, illegible, otherwise damaged	<input type="checkbox"/> loosely attached or missing

comments

authorized signature _____ date _____

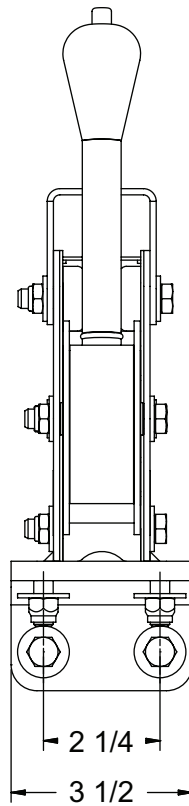
Table 2 – Troubleshooting Chart

Contact the factory for detailed instructions if you are required to disassemble the unit for any reason. Disassembly before contacting Thern, Inc. voids all warranties.

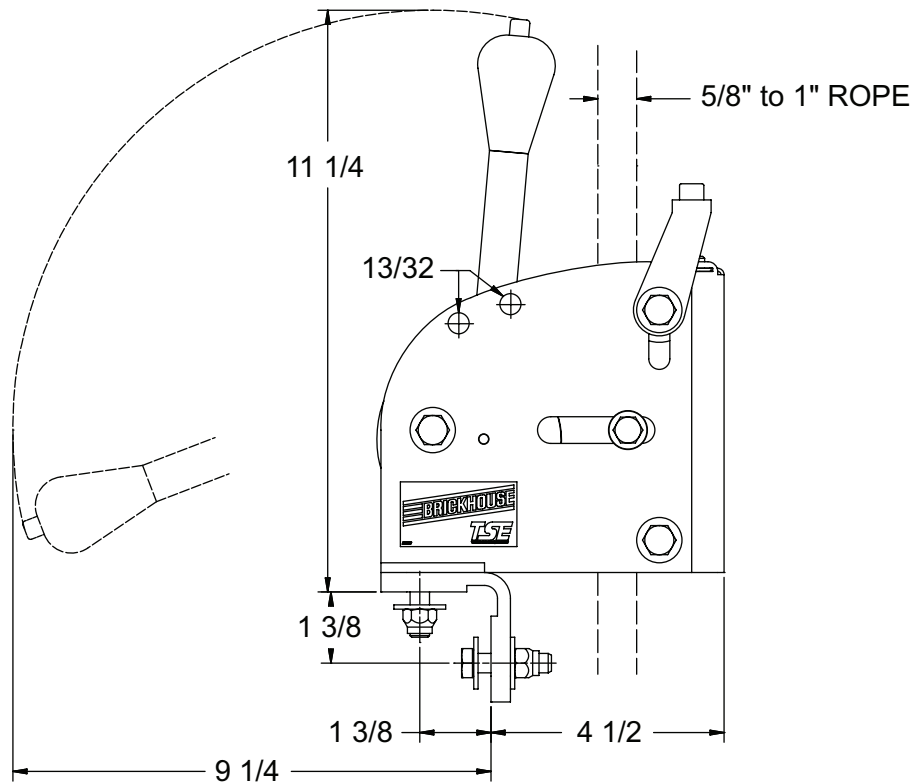
problem	cause	correction
hand line slips thru rope lock	<ul style="list-style-type: none"> • system is out of balance • rope lock is not fully closed • rope lock setting is too loose 	<ul style="list-style-type: none"> adjust arbor weight move handle to closed position adjust rope lock
rope lock will not open	<ul style="list-style-type: none"> • lock plunger is closed • unit padlocked to prevent use • contaminated or damaged 	<ul style="list-style-type: none"> depress lock plunger button to release contact authorized person inspect and repair as necessary
rope lock will not close	<ul style="list-style-type: none"> • rope lock setting is too tight • unit padlocked to prevent use • contaminated or damaged 	<ul style="list-style-type: none"> adjust rope lock contact authorized person inspect and repair as necessary
rope lock adjustment does not work properly	<ul style="list-style-type: none"> • adjustment screw does not turn • screw retaining clip is missing • contaminated or damaged • contaminated or damaged 	<ul style="list-style-type: none"> loosen top roller nut inspect and replace as necessary inspect and repair as necessary position top roller manually, repair as necessary
rope lock difficult to operate	<ul style="list-style-type: none"> • rope lock setting is too tight • components worn or out of position • contaminated or damaged 	<ul style="list-style-type: none"> adjust rope lock inspect and repair as necessary inspect and repair as necessary

2.2 Repairing the Rope Lock

- 2.3.1 GET FACTORY AUTHORIZATION for all repairs. Unauthorized repairs will void the warranty and may lead to damage or failure of the equipment.
- 2.3.2 REPLACE DAMAGED OR POORLY OPERATING PARTS with Thern repair parts.
- 2.3.3 REFINISH AREAS where the paint is worn or flaking. A good finish helps to protect against corrosion.
- 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.
- 2.3.4 TO ORDER REPAIR PARTS, please contact the Thern factory. Include the following information when ordering:
- part number
 - description of what happened, or what is wrong
 - your name and return address



3/8" MOUNTING HARDWARE

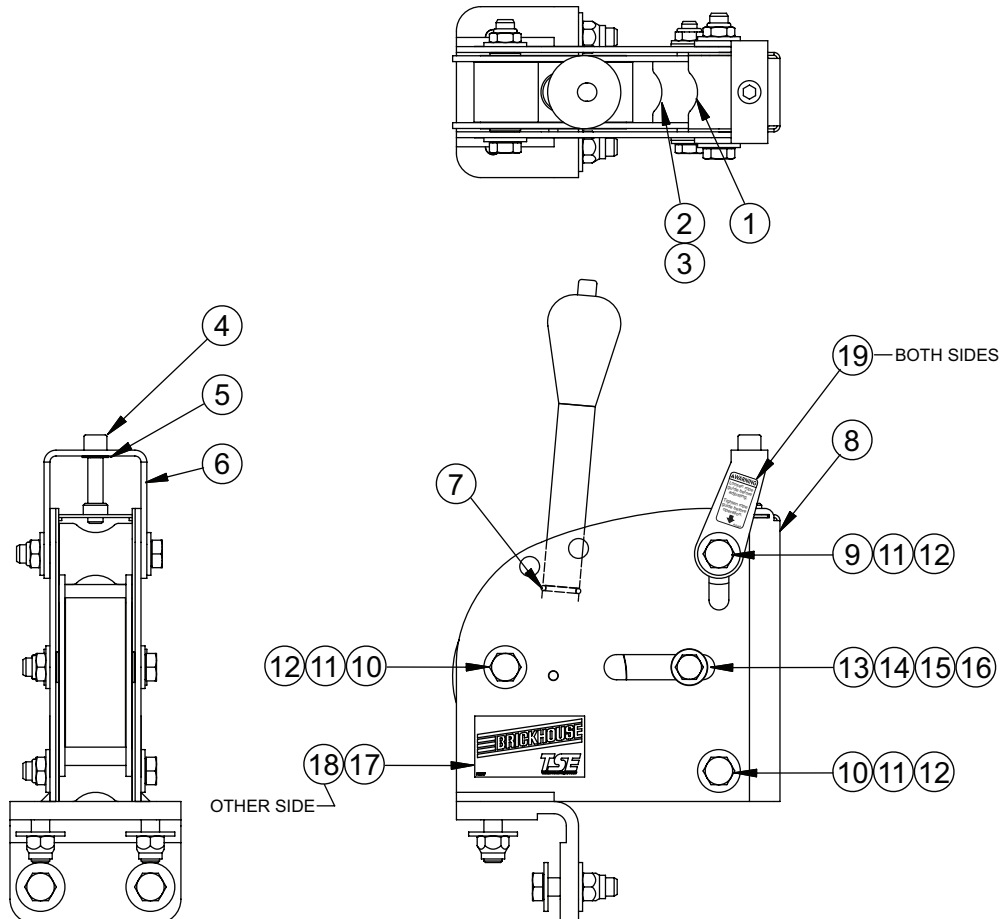


STANDARD MODEL RL1-50E SHOWN

Brickhouse RL Series Rope Locks

item	description	part number	qty.
1	ROLLER ROPE GUIDE 1.250 DIA	A10798	2
2	ROLLER ROPE GUIDE 1.500 DIA	A10797	1
3	CAPSCR SOKFLTHD 10-24NC X .375 SST	A10795	2
4	CAPSCR SOKHD .312-18NC X 1.500 MOD	A10805	1
5	RING RET E-RING EXT .250 BLKOX	A10803	1
6	PLATE ROPE LOCK ADJUSTMENT	B5434	1
7	O-RING .625 X .812 X .094 BUNA-N 70	A10822	1
8	GUARD ROLLER GUIDES	A11048	1
9	CAPSCR HEXHD .375-16NC X 2.750 ZNPL GR5	A3493	1
10	CAPSCR HEXHD .375-16NC X 2.500 ZNPL GR5	A3518	2
11	NUT HEX JAM NYLK .375-16NC ZNPL GR2	A3180	3
12	WASHER FLT STDPLT .312 X .875 X .083 ZNPL	A3575	6
13	WASHER FLT STDPLT .250 X .734 X .065 ZNPL	A3052	2
14	WASHER FLT .500 X .750 X .060 NYLON	A10819	2
15	CAPSCR HEXHD .312-18NC X 2.500 ZNPL GR5	A3516	1
16	NUT HEX JAM NYLK .312-18NC ZNPL GR2	A3249	1
17	LABEL BRICKHOUSE TSE	A10807	1
18	LABEL WARNING	A9913	1
19	LABEL WARNING ROPE GUIDE	A12834	2

Contact factory with model number for service or replacement parts not shown.



LSE THERN **STAGE EQUIPMENT**

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