

Equipment Manual



*RoofTracker II*TM

Roof Truss Roller Press

Equipment Manual

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U.S. and other patents pending.

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Part Number	001100
Revision	A
Date Revised	22 March 2012
Created By	R. Tucker
Approved By	M. Kanjee
Print Date	16 January 2024
Applicability	67540-501-xxxV
Effectivity	June 2011, frame #214

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Use this page to record Service Bulletins and Notices that you receive to keep your manual updated.

Equipment Manual
RoofTracker II™
Roof Truss Roller Press

Service Bulletin or Notice #	Dated	Title

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Safety (English)



Refiérase a la página xx para español.

For safety information in Spanish, refer to page xx.

Safety Indicators: Signal Words

The following signal words and colors are used throughout this document to indicate safety hazards. Pay careful attention when you see them. The level of severity differs for each signal word and color.

Signal words are accompanied by graphics showing what personnel should or should not do. The graphics are called safety symbols and are defined on page xxvii, but more specific text is provided every time a graphic is used throughout the manual. Everyone near the machine must be trained on how to read these safety indicators.

Failure to comply with the instructions accompanying each signal word may result in property damage, personal injury, or even death. Personnel must follow all safety procedures and practices to ensure the safest possible operation of this equipment. However, at no time is this document a substitute for common sense. Personnel must ensure that the work environment is safe and free of distractions.

DANGER

Indicates an imminently hazardous situation which, if not avoided, is likely to result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

CAUTION

When CAUTION is used **with** the safety alert symbol shown here, it indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

When CAUTION is used **without** the safety alert symbol shown here, it indicates a potentially hazardous situation which may result in equipment damage.

NOTICE

Calls attention to information that is significant to understanding the operation at hand.

ENVIRONMENTAL

Applies to conditions that may affect the environment but do not have an immediate, direct effect on personnel or equipment.

Safety Rules

Because it is impossible to anticipate every circumstance that might involve a hazard, the safety information provided in this equipment manual and on the machine is not all-inclusive. If this machine is operated or serviced using a procedure not specifically recommended by the manufacturer, the procedure shall be approved by a professional engineer to ensure it will not render the equipment unsafe. Use extreme caution and common sense at all times!

Know Your Equipment

- Read this manual completely before using or maintaining the equipment. Do not operate this machine unless you have a thorough knowledge of the controls, safety devices, emergency stops, and operating procedures outlined in this manual.
- Read and follow all safety notes. Failure to comply with these instructions may result in economic loss, property damage, and/or personal injury including death.
- Refer to the lockout/tagout guidelines on the following pages to safely perform maintenance and troubleshooting of this equipment.
- Observe and obey all safety labels. Replace worn labels immediately.
- Use this equipment solely for the purpose described in this manual.
- Only qualified personnel should attempt to operate or perform maintenance on this equipment. “Qualified personnel” is defined as:

...a person or persons who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training, or experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work—ANSI B30.2-1983

...one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved—NEC 2002 Handbook

Personal Safety

- Always wear safety glasses and hearing protection in an industrial environment.
- Utilize a filtering face piece (dust mask) when working near sawdust.
- Wear proper clothing and appropriate personal protective equipment. Do not wear loose clothing or jewelry. Confine long hair by tying it back.
- Use caution when lifting heavy parts or material.

Installing the Equipment

- Follow installation instructions completely.
- This equipment is not for use in a residential area.

Lockout/Tagout

- Before performing maintenance on the pneumatic or hydraulic systems, bleed the lines to eliminate pressure.
- Lockout/tagout all energized systems before performing maintenance on them. Refer to the *Lockout/Tagout Guidelines* section on page xii.

Keeping a Safe Environment

- Keep children away. All visitors should be kept a safe distance from the work area. Hazards may not be apparent to individuals unfamiliar with the machine.
- Keep work areas well lit.
- Keep the work area clean and free of any trip or slip hazards.
- Do not use the equipment in damp or wet locations, or expose it to rain or snow.

Operating and Maintaining the Equipment

- Ensure that all people, tools, and foreign objects are clear of the restricted zones before operating this equipment. The restricted zones are shown on page xxv.
- Perform safety tests to ensure all E-stops are working properly before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.
- In case of machine malfunction, stop the machine immediately using an E-stop and report the malfunction to a supervisor.
- Never leave the machine running unattended. Turn power off! Do not leave until all parts have come to a complete stop and all electrical power has been shut off.
- Check for worn or damaged parts regularly. Repair or replace them immediately.
- Keep the hydraulic, pneumatic, and electrical systems in good working order at all times. Repair leaks and loose connections immediately. Never exceed the recommended pressure or electrical power.
- Check that all safety devices are in working order before each shift starts. All protective guards and safety devices must be in place before and during use of the machine. Never disconnect or bypass any safety device or electrical interlock.
- Only qualified maintenance personnel shall remove or install safety devices.
- Periodically inspect the quality of the finished product.

Electrical Safety

- Do not use any liquids in the interior of electrical cabinets.
- When using solvents on and around the machine, remove power to the machine to eliminate sparking, resulting in explosion or fire. Wear a respirator approved for use with solvents. Wear protective clothing, gloves, and safety glasses.

Lockout/Tagout

Lockout/Tagout Guidelines

All lockout/tagout guidelines must be met according to OSHA 29 CFR 1910.147. A specific procedure should be included in your company's energy control program. This manual is not intended to replace your company's de-energizing or lockout/tagout procedure required by OSHA, but merely to provide general guidance.

The term “lockout,” as used in this manual, means placing a lockout device on any and all energy sources to ensure that the energy isolating device and the equipment being controlled cannot be re-energized or operated until the lockout device is removed. The photos on the next page show where the electrical disconnects are located for this machine.



- Energy sources include electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.
- In the case of electrical energy sources, the main power and control power to the machinery must be turned off and physically locked in the “off” position.
- A lockout device is usually a keyed padlock.
- If more than one person is working in a restricted zone, use a group lockout device that will allow each person to use a lock that can be removed only by the person performing the maintenance.

“Tagout” means that a prominent warning is securely fastened to an energy-isolating device to indicate that the equipment shall not be operated.

Electrical Lockout/Tagout Procedures

When Working on a Machine Outside the Machine’s Main Electrical Enclosure



If working on the electrical transmission line to the machine, follow the procedure on page xv.

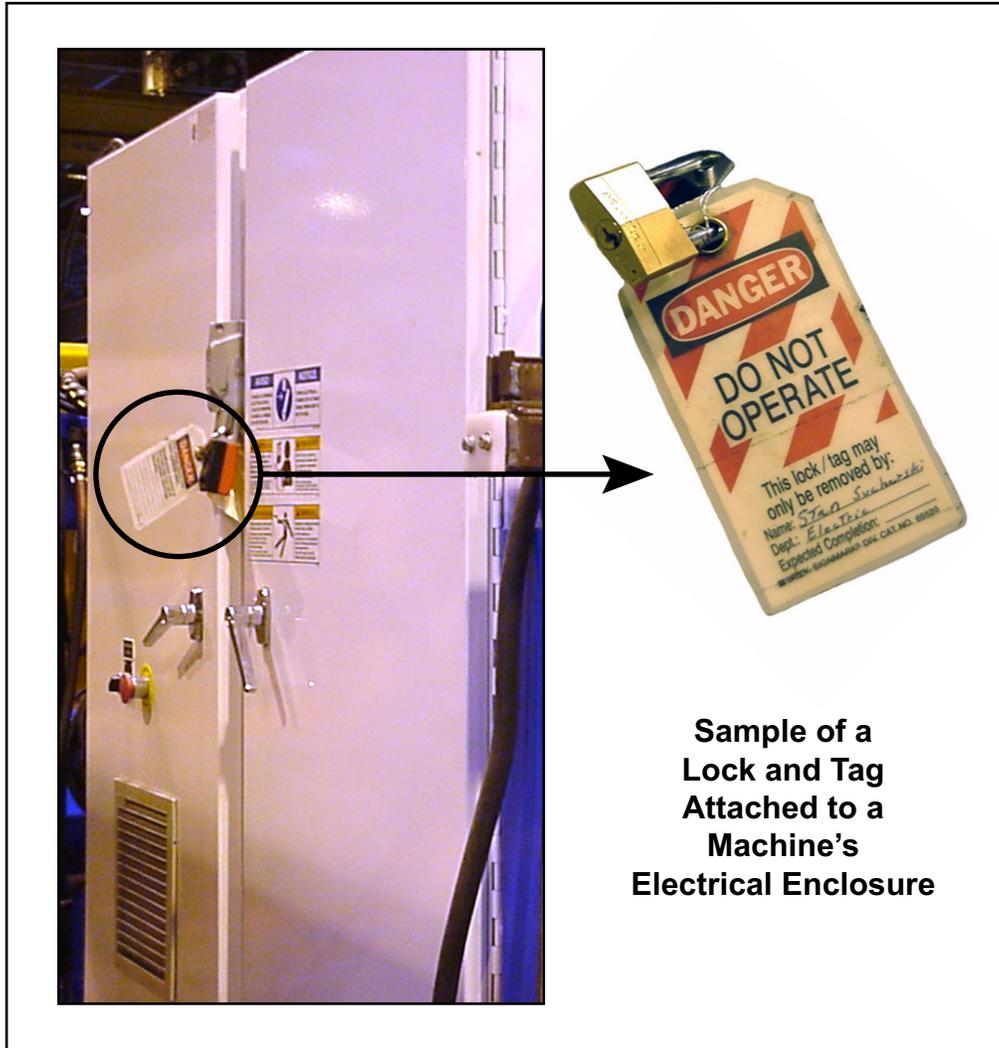
Before performing maintenance on any machine with electrical power, lockout/tagout the machine properly. When working on a machine outside of the machine’s main electrical enclosure, not including work on the electrical transmission line to the machine, follow your company’s approved lockout/tagout procedures which should include, but are not limited to the steps here.

1. Engage an E-stop on the machine.
2. Turn the disconnect switch handle to the “off” position. See Figure SAFETY-1.

 WARNING	
	<p>ELECTROCUTION HAZARD.</p> <p>When the disconnect switch is off, there is still live power within the disconnect switch’s enclosure. Always turn off power at the building’s power source to the equipment before opening this electrical enclosure!</p>

3. Attach a lock and tag that meet OSHA requirements for lockout/tagout.
4. Restrain or de-energize all pneumatic components, hydraulic components, and other parts that could have live or stored power.

Figure SAFETY-1: Sample of a Lockout/Tagout Mechanism on an Electrical Enclosure



When Working on a Machine Inside the Machine's Main Electrical Enclosure or in the Electrical Transmission Line to the Machine

Before opening the main electrical enclosure, or attempting to repair or replace an electrical transmission line to the machine, lockout/tagout the machine properly. Follow your company's approved lockout/tagout procedures which should include, but are not limited to the steps here.

1. Engage an E-stop on the machine.
2. Shut the power to the machine off at the machine's power source which is usually an electrical service entry panel on the facility wall. One example of a locked-out power source panel is shown in Figure SAFETY-2.
3. Attach a lock and tag that meets OSHA requirements for lockout/tagout.
4. Open the door to the enclosure in which you need access, and using a multimeter, verify that the power is off.

Figure SAFETY-2: Sample of a Lockout/Tagout Mechanism on a Power Source Panel



Troubleshooting With an Energized Machine

Only a qualified electrician, using the personal protective equipment and following the procedures recommended in NFPA 70E should ever attempt service or repair of or near an energized area or component of the machine.

Whenever maintenance is performed while the equipment is electrically energized, there is a potential electric arc flash hazard. Refer to NFPA 70E for the personal protective equipment required when working with electrically energized components. Pneumatic and hydraulic components may move unexpectedly if not de-energized. Physically restrain any components capable of movement when working on or near those components.

Safety Tests

	 WARNING
	<p>CRUSH HAZARD.</p> <p>Perform the safety tests described before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.</p>

The following test procedure **MUST** be performed by qualified personnel after **ANY** maintenance, adjustment, or modification. Testing ensures that the light bar, safety system, and machine control system work together to properly stop the machine.

Before Starting the Tests

Supplies Required

To perform this test, you will need:

- 2 pieces of lumber connected in the shape of a T so that the T will independently stand upside down to look like .
- A large, heavy object, such as a full trash can, preferably weighing at least 100 lbs.

Terminology Used in This Procedure

You must be familiar with the following terms to follow this test procedure.

Table -1: Definitions of Terminology Used

wooden T	Described in <i>Supplies Required</i>
heavy object	A trash can or something of similar size, weighing at least 100 lbs, that will not skid easily on the floor; it is used for testing the bumpers
reference board	Any 2x board that can be set on the table to use as a point of reference for measuring from
right light curtain set	The pair of light curtain units on the right side of the gantry head when facing it from the operator end
left light curtain set	The pair of light curtain units on the left side of the gantry head when facing it from the operator end
safety controller	Ensures that all safety features on the machine are working properly
laser scanner	An optional feature for machines with a High Bottom-Chord Platform that detects objects or people in the path of the platform

Testing the Safety Controller

1. Take precautions to ensure only the person performing the test will be near the machine during this test. Power must remain on to perform the test.
2. Verify that the safety controller (in the main enclosure) doesn't have any faults (ERR/ALM red light, blinking or solid).
3. Verify that the machine braking system is working properly using these steps:

	 WARNING
	<p>Never stand directly in front of the gantry head!</p> <p>Operators must ensure no other personnel are in the safety zone or restricted zone when performing these tests!</p> <p>If the gantry head fails to stop when expected, serious injury or death may occur.</p>

- a) Start the gantry head moving to the right and run until it is at full speed.
- b) Press an E-stop and ensure the gantry head stops.
- c) Repeat this step with the gantry head moving to the left.

Testing the Light Curtains



The LEEFT-READY and RIGHT-READY lights are located on each side of the horn.

1. Take precautions to ensure only the person performing the test will be near the machine during this test. Power must remain on to perform the test.
2. Ensure the disconnect handle is in the ON position.
3. Verify that the RIGHT-READY and LEFT-READY lights are on (see page 30).
4. On the **right** side of the gantry head, move your hand between the light curtain units to break a beam.
5. Verify that the green RIGHT READY light turns off when the beam is interrupted.
6. Place the wooden T (see page xvi) on the table so the T is upside down and it is freestanding. Locate it to the right and at least 10 ft away from the gantry head.
7. Press the RESET button on the operator control station.
8. Verify the green RIGHT READY light illuminates.

	 WARNING
	<p>Never stand directly in front of the gantry head!</p> <p>Operators must ensure no other personnel are in the safety zone or restricted zone when performing tests!</p> <p>If the gantry head fails to stop when expected, serious injury or death may occur.</p>



The purpose of this test is to ensure that the electrical system is wired correctly so motion stops when a light curtain beam is interrupted. It is important that both directions are tested.

9. Using the joystick, move the gantry head to the right at full speed.
10. Allow the gantry head to reach the wooden T without letting go of the joystick. The control of the machine should stop before the wooden T makes contact with any fixed part of the gantry head.
11. Move the wooden T so that the beam stays blocked.
12. Verify that the machine will **not** continue to move in the direction of the wooden T while the beam is blocked:
 - a) Press the RESET button.
 - b) Move the joystick toward the wooden T while also pressing the white button on the joystick.
 - c) The gantry head should **not** move.

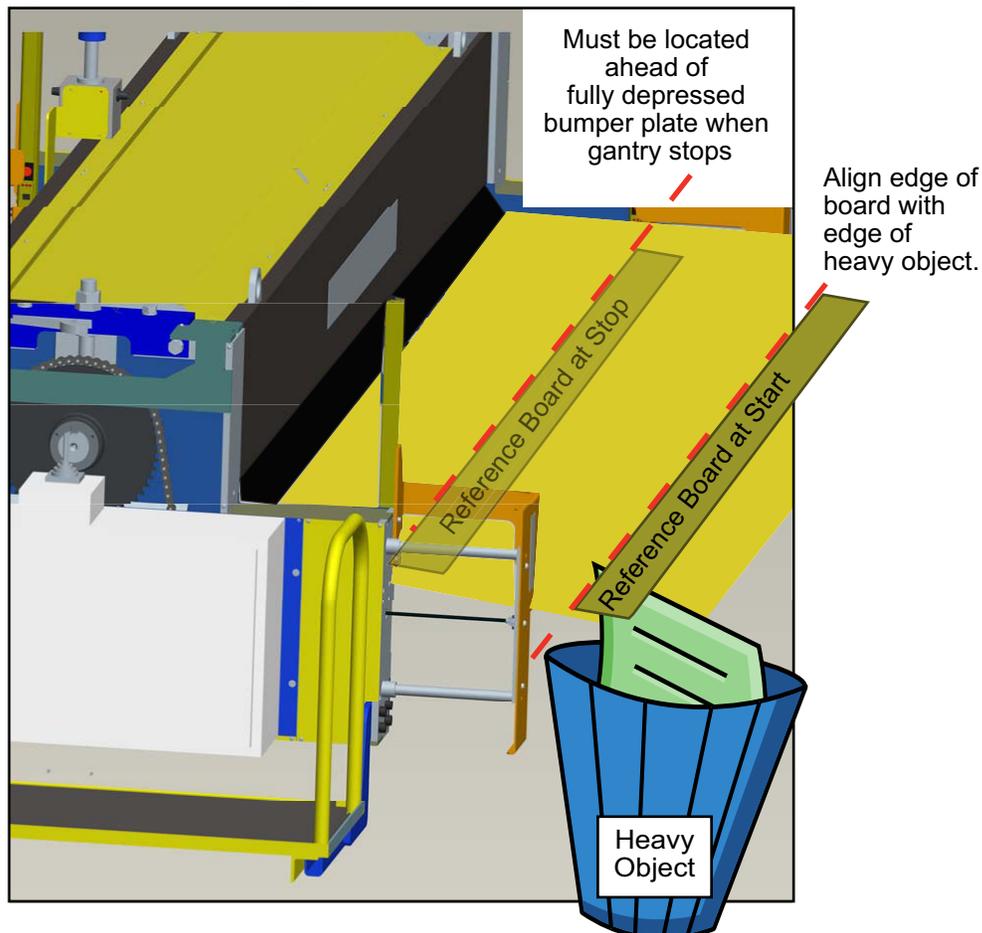
13. Verify that the gantry head is still able to move in the opposite direction (away from the wooden T):
 - a) Move the joystick away from the wooden T while also pressing the white button on the joystick.
 - b) The gantry head should move away from the wooden T to allow the operator room to remove the barrier.
14. Repeat this test in the **left** direction, looking for the LEFT READY light.
15. If any of the light curtains fail this test, repair the problem before operating the equipment, then repeat the test in both directions.
16. Continue to the next section for additional safety tests.

Testing the Bumpers



1. Lockout/tagout.
2. Check the location of each bumper flag in relation to its light bar sensor:
 - a) Each bumper flag should be aligned with its light bar sensor so there is no space between the edge of the flag and the edge of the sensor. A slight overlap is acceptable. They should be as close together as possible without causing nuisance trips during normal operation.
 - b) See page 63 to adjust the location of the bumper flag.
3. Place a large, heavy, freestanding object (such as a heavy trash can) in the path of the right, operator-side bumper, but at least 10 ft away from the bumper. The object must be heavy enough so it doesn't significantly move when the bumper makes contact, but sturdy enough that it will not break, splinter, or shatter when hit by the bumper. It is called a *heavy object* in the remainder of this procedure.

Figure SAFETY-3: Using a Reference Board to Test Bumpers





The reference board will be your point of reference for noting the stopping distance because the heavy object may move, but the board will not.

4. Place a board (any 2-in. thick board) flat on the table in the same plane as the heavy object. See the image on page xx for clarification. The board is called a *reference board* in the remainder of this procedure.
5. Remove the lockout/tagout device.

 WARNING	
	<p>Never stand directly in front of the gantry head!</p> <p>Operators must ensure no other personnel are in the safety zone or restricted zone when performing these tests!</p> <p>If the gantry head fails to stop when expected, serious injury or death may occur.</p>

6. Move the gantry head toward the reference board:
 - a) Press the RESET button on the operator control station.
 - b) Verify the green RIGHT READY light illuminates.
 - c) Using the joystick, move the gantry head to the right at full speed.
7. Allow the gantry head to reach the heavy object without letting go of the joystick. The gantry head should stop before the reference board reaches the point where it is past the fully depressed position of the bumper surface.



If it is not stopping in time, watch the heavy object to ensure it is depressing the bumper enough to interrupt the light curtain sensor. If it is not, a heavier or more stationary object is required. It should mimic the behavior of a person when hit by the bumper.

8. Verify that the machine will not continue to move in the direction of the heavy object after it has stopped:
 - a) Press the RESET button.
 - b) Move the joystick toward the heavy object while also pressing the white button on the joystick.
 - c) The gantry head should not move.

9. Verify that the gantry head is still able to move in the opposite direction (away from the heavy object):
 - a) Move the joystick away from the heavy object while also pressing the white button on the joystick.
 - b) The gantry head should move away from the heavy object to allow the operator room to remove the barrier.
10. Repeat this test on all bumpers. When testing the bumpers on the left side of the gantry head, the LEFT READY light should illuminate.



When the bumpers actuate an E-stop, the gantry head should stop within 11-1/2". That leaves over 1" of travel left in the bumper bearing rods. While performing this test, look at the bumper bearing rods to verify they are not bottoming out. If they are, bottoming out, the gantry head is not stopping quickly enough to protect all personnel. It will also cause the bumpers to fail prematurely.

11. If any of the bumpers fail the test, repair the problem before operating the equipment, then repeat the test in both directions.
12. Continue to the next section for additional safety tests.

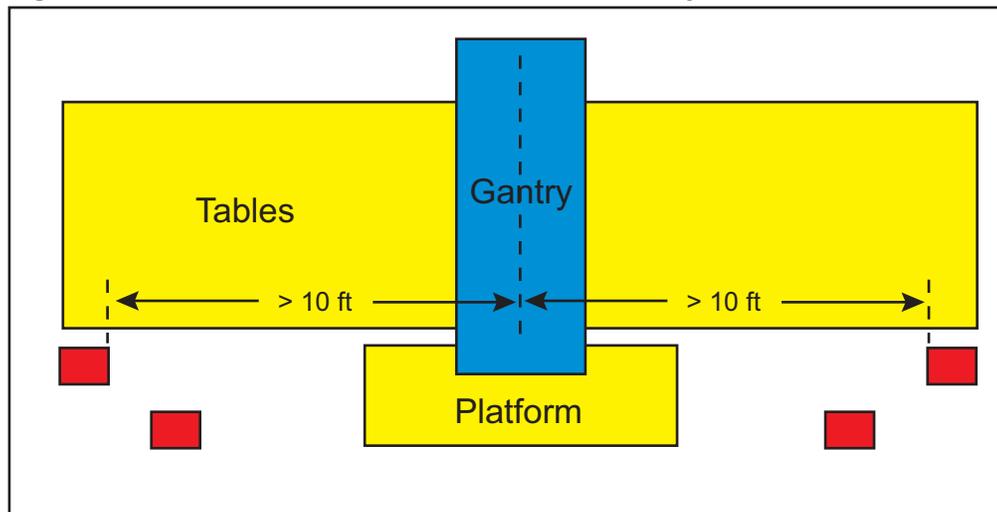
Testing the Laser Scanner (optional equipment)



1. Lockout/tagout.
2. Verify that all safety labels are legible.
3. Check for signs of external damage to the laser scanner, the guarded machine, the electrical cables and wiring.
4. Clean dust and fingerprints off the scan surface using a soft cloth and glass cleaner.
5. Verify that the connections between the control system of the guarded machine and the laser scanner are correct.
6. Remove the lockout/tagout devices.
7. Place the wooden T (see page xvi) inside the perimeter of the safety zone at the approximate location of one of the red blocks in Figure SAFETY-4.

 WARNING	
	Never stand directly in front of the gantry head!
	Operators must ensure no other personnel are in the safety zone or restricted zone when performing these tests!
	If the gantry head fails to stop when expected, serious injury or death may occur.

Figure SAFETY-4: Test Points for Laser Scanner Safety Test



 = Test Spots for setting the free-standing wooden T

8. Start the gantry head moving toward the wooden T and:
 - a) Verify that the green RIGHT READY light (located on the horn) turns off when the beam is interrupted.
 - b) Press the RESET button on the operator control station.
 - c) Verify the green RIGHT READY light illuminates.
 - d) Using the joystick, move the gantry head to the right.
 - e) While standing outside of the safety and restricted zones, set the wooden T so it enters the safety zone.
 - f) Ensure the gantry head stops before the wooden T makes contact with any fixed part of the operator platform.
 - g) Press the RESET button.
 - h) Verify that the machine will **not** continue to move forward while the wooden T is in its detection zone.
 - i) Verify the machine **will** move in the opposite direction.
9. Repeat step 8 at all red block locations in Figure SAFETY-4.

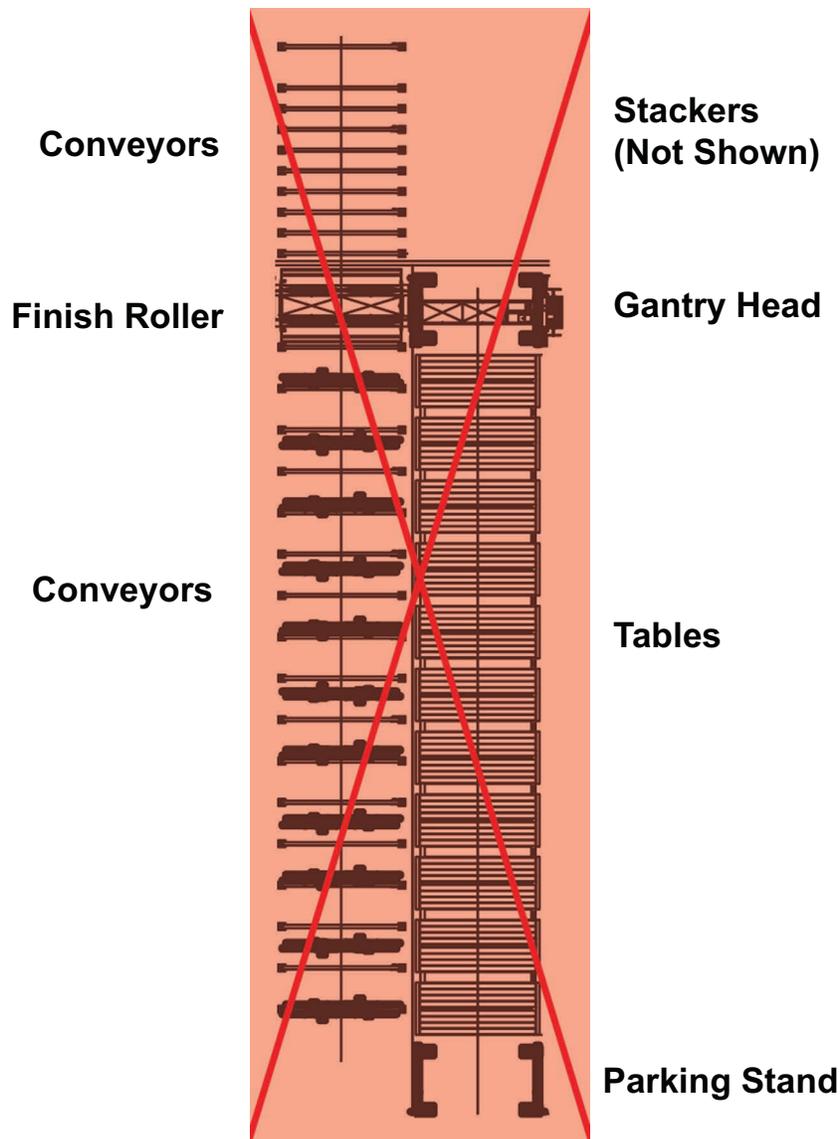


The purpose of this test is to ensure that the electrical system is wired correctly so motion stops when a light curtain beam is interrupted. It is important that both directions are tested.

Restricted Zone

	 DANGER
	<p>Stay out of the restricted zone when equipment is in use. Serious injury or death may result if personnel are in the restricted zone.</p> <p>Always look for personnel in the restricted zone before operating equipment.</p>

Know the Restricted Zone





Marking the Restricted Zone

The restricted zone must be marked so everyone near the equipment can clearly see the area where danger may exist.

MiTek offers Restricted Zone Tape that is easy to apply and has text in English and Spanish. Some equipment comes with restricted zone tape. If your machine did not come with restricted zone tape, you may order it from MiTek Machinery Division Customer Service.

Instructions for where and how to apply restricted zone tape can be found in the gantry manual that came with your system (see xx) or by obtaining Service Bulletin 181 from the MiTek Machinery Web site.

Safety Symbol Definitions

The safety symbols shown in this section can be found throughout the manual to indicate hazards that are related to this equipment. All personnel expected to operate or maintain this equipment should become familiar with these safety symbols and what they mean.

	<p>This is the Electrical Hazard Symbol. It indicates that there are dangerous high voltages present inside the enclosure of this product. To reduce the risk of fire or electric shock, do not attempt to open the enclosure or gain access to areas where you are not instructed to do so. Refer servicing to qualified service personnel only.</p>
	<p>This is the user caution symbol. It indicates a condition where damage to the equipment resulting in injury to the operator could occur if operational procedures are not followed. To reduce the risk of damage or injury, refer to accompanying documents, follow all steps or procedures as instructed.</p>
	<p>Power sources - This product should be operated only from the type of source indicated on the manufacturer's identification label. Installation should be in compliance with applicable sections of the national electric code. Consult your local building code before installing.</p>
	<p>Operation of this equipment may result in flying debris and excessive noise. To reduce the risk of injury, wear only approved PPE.</p>
 	<p>Crush hazard! Keep hands clear.</p>
	<p>Keep hands away from moving parts.</p>

	<p>Do not use sling equipment rated for less than ___ lbs/___ kgs when lifting this equipment.</p>
	<p>Crush hazard from above</p>
	<p>Trip hazard! Pay attention when walking in this area.</p>
	<p>Keep hands and body clear.</p>
	<p>WARNING! ___ MAN LIFT REQUIRED TO SAFELY MOVE THIS EQUIPMENT. REFER TO INSTALLATION MANUAL.</p>

      	<p>The operation of this equipment requires the use of PPE. Do not operate without wearing required protective clothing.</p> 
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

 	<p>Refer to manual- After installation, read the user's guide carefully before operating. Follow all operating and other instructions carefully.</p>
	<p>Circuits are live -lockout/tagout the upstream disconnecting means prior to opening for service.</p>
	<p>Lockout in a de-energized state</p>
  	<p>Lift Point - In order to reduce the likelihood of damage to the equipment, use only the lift points indicated in the manual.</p>
	<p>Use of lift equipment is mandatory.</p>

	<p>Consult material safety data sheet.</p>
	<p>Read all safety warnings and instructions before proceeding.</p>
	<p>Unplug equipment before servicing.</p>
	<p>Hazardous moving parts are located behind this access panel. Do not operate this equipment without all guards and covers in place.</p>
 	<p>Do not place containers with liquids such as coffee, water, sodas, etc. on this unit.</p> <p>Do not operate this equipment in a wet environment.</p> <p>Do not expose to water</p>
	<p>Use of fork lift equipment when moving this equipment will result in serious equipment damage. Refer to installation procedures.</p>

	<p>Do not use non-approved lubricants in this machine.</p>
	<p>Do not operate without guards and covers in place</p>
	<p>Do not weld</p>
	<p>Do not discard into municipal waste stream</p>
	<p>oil drop</p>

Declarations of Conformity

Gantry Standards

All safety devices on this equipment are compliant with United States safety regulations and conform to current NEC, NFPA79, OSHA 21 CFR 1910, and UL regulations.

Electrical components also adhere to international safety codes including, but not limited to, IEC 6149, EN 954 and/or ISO 13849.

E-Stop Pushbutton Standards

According to the *Rockwell Automation™* document with document control number LCC-0100-F-EN:

The *Allen-Bradley™* 800F Series, identified as IEC 22.5 mm pushbuttons and enclosure, is in conformity with the essential requirements of the following EC directives:

- 2006/95/EC
- 2004/108/EC
- 98/37/EC and 2006/42/EC

The standards and/or technical specifications below have been applied:

- EN 60947-1:2007
- EN 60947-5-1:2004
- EN 60947-5-5:1997 + A1:2005
- EN ISO 13850:2008

Year of CE Marking (Low Voltage Directive): 2003

Safety Controller Standards

The safety controller, as a stand-alone unit, conforms to the following standards per *OMRON™* Cat No. Z922-E1-01, page xxvi-xxvii (as of 12 October 2011):

- EMC Directive (2004/108/EC)
- Machinery Directive (2006/42/EC)
- EN ISO 13849-1:2008 and IEC/EN 62061 SIL CL3
- EN 61000-6-4

Light Curtain Standards

The light curtains (PA4600), as a stand-alone unit, conforms to the following standards per OSTI 1109 PN99689-0010 Rev. L, page 42 (as of 12 October 2011):

Figure SAFETY-5: Light Curtain Standards

OMRON SCIENTIFIC TECHNOLOGIES INCORPORATED

OMRON Scientific Technologies Incorporated (at 6550 Dumbarton Circle, Fremont, CA 94555-3605, U.S.A.), hereby declares that the following series manufactured products listed below conform with the relevant Essential Health and Safety Requirements (EHSRs) of the European **Machinery Directive** (06/42/EC), with the relevant requirements of the **Low Voltage Directive** (06/95/EC), with the essential protection requirements of the **Electromagnetic Compatibility (EMC) Directive** (2004/108/EC), and with the **RoHS Directive** (2002/95/EC) - the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Perimeter Access PA4600 Series (Single & Multiple Beam Safeguard)

Electro-sensitive protection equipment (ESPE) for perimeter access and area guarding, Type 4

The PA4600 Series products have been type-examined per

EC Type Examination Certificate,
Registration No.: 01/205/0733/10

issued by notified body TUV Rheinland Industrie Service GmbH, Certification Body for Machinery (NB No. 0035).

The following transposed harmonized European and IEC Standards were used to form the basis for the requirements and tests:

EN 61496-1:2004 + 2008 - Safety of machinery – Electro Sensitive Protective Equipment, Part 1: General requirements and tests.

IEC 61496-2:2006 - Safety of machinery – Electro Sensitive Protective Equipment, Part 2: Particular Requirements using Optoelectronic Protective Devices.

EN ISO 13849-1:2008 - Safety of machinery – Safety-related parts of control systems, Part 1: General principle for design.

EN 60204-1:2006: Safety of machinery – Electrical equipment of machines, Part 1: General requirements.

EN 50178:1997: Electronic equipment for use in power installations.

IEC 61508, Parts 1 – 7:1999 – 2000 - Functional Safety Of Electrical/Electronic/Programmable electronic Safety-Related Systems.

EN 62061:2005 – Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems.

Martin D. Krikorian
Quality Director
OMRON Scientific Technologies, Inc.
Fremont, CA, USA
April 2010

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Laser Scanner Standards

The laser scanner, model OS32C series, conforms to the following standards per *OMRON STI* Manual No. Z296-E1-04, page i (as of 12 October 2011):

1. This product is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex IV, B, Safety Components, Item 1.
2. This product complies with the following legislation and standards:
 - a) EU legislation
 - Machinery Directive 2006/42/EC
 - EMC Directive 2004/108/EC
 - Low Voltage Directive (2006/95/EC)
 - RoHS Directive (2002/95/EC)
 - b) European & International Standards
 - EN 61496-1:2004 + A1:2008 (Type 3 ESPE)
 - EN 62061:2005
 - EN 50178:1999
 - EN ISO 13849-1:2008 + AC:2009
 - IEC 61496-3:2008 (Type 3 AOPDDR)
 - IEC 61508, Parts 1-7:1998/2000 (SIL-2)
 - EN 60204-1:2006
 - c) North American Standards: per UL File E241445, US and C-UL approvals (CNN: NIPM/NIPM7).
 - ANSI/UL 508 (Industrial Control Equipment)
 - ANSI B11.19:2003
 - ANSI/RIA R15.06:1999
 - NFPA 79:2007
 - Code of Federal Regulations CFR29:1990
 - IEC 61496-1 (Type 3 ESPE)
 - IEC 61496-3 (Type 3 AOPDDR)
 - UL 1998 (Software in Programmable Components)
 - IEC 61508 (Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems)

- IEC 61508-3 (Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems - Part 3: Software Requirements)
 - CAN/CSA-C22.2 No. 14 (Industrial Control Equipment)
 - CAN/CSA-C22.2 No. 0.8 (Safety Functions Incorporating Electronic Technology)
- d) JIS standards JIS B 9704-1:2006, JIS B 9704-3:2004 (Type3 ESPE)
3. This product received the following approvals from TÜV Rheinland of the EU.
- EC Type-Examination in accordance with the EU Machinery Directive, Type 3 ESPE (IEC61496-1), Type 3 AOPDDR (IEC61496-3)

The laser scanner, model OS32C series, also conforms to the following standards per *OMRON STI* Manual No. Z296-E1-04, page 137 (as of 12 October 2011):

Figure SAFETY-6: Laser Scanner Conformity

OMRON SCIENTIFIC TECHNOLOGIES INCORPORATED

OMRON Scientific Technologies Incorporated (at 6550 Dumbarton Circle, Fremont, CA 94555-3605, U.S.A.), hereby declares that the following series manufactured products listed below conform with the relevant Essential Health and Safety Requirements (EHSRs) of the European **Machinery Directive** (2006/42/EC), with the relevant requirements of the **Low Voltage Directive** (2006/95/EC), with the essential protection requirements of the **Electromagnetic Compatibility (EMC) Directive** (2004/108/EC) and with the **RoHS Directive** (2002/95/EC) - the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Laser Scanner, OS32C Series

The OS32C Series Devices are Electro Sensitive Protective Equipment (ESPE), Active Optoelectric Protective Device responsive to Diffuse Reflections (AOPDDR), Type 3, designed to detect persons as part of a safety related system.

The OS32C Series products have been type-examined per

EC Type-Examination Certificate

issued by notified body TUV Rheinland Industrie Service GmbH, Alboinstr. 56, 12103 Berlin/Germany, Certification Body for Machinery (NB No. 0035).

The following Standards were used to form the basis for the requirements and tests:

EN 61496-1:2004 + A1:2008 - Safety of machinery – Electro Sensitive Protective Equipment, Part 1: General requirements and tests.

IEC 61496-3:2008 - Safety of machinery – Electro Sensitive Protective Equipment, Part 3: Particular requirements for Active Optoelectric Protective Device responsive to Diffuse Reflections (AOPDDR).

EN ISO 13849-1:2008 - Safety of machinery – Safety-related parts of control systems, Part 1: General principle for design.

IEC 61508, Parts 1 – 7:1998 – 2000 - Functional Safety Of Electrical/Electronic/Programmable electronic Safety-Related Systems.

EN 62061:2005 – Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems.

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RoofTracker II™ Roller Press

Seguridad (Español)

**Sea cuidadoso.
Protéjase.**



Indicadores de seguridad

Los siguientes símbolos de alerta de seguridad y palabras de advertencia se utilizan a lo largo de este documento para indicar riesgos de seguridad. Preste suma atención cuando los vea. Cada símbolo o palabra indica un nivel de gravedad diferente.

El no cumplimiento de las instrucciones que acompañan a cada símbolo de alerta de seguridad puede producir daños a la propiedad, lesiones personales e incluso la muerte. El personal debe seguir todos los procedimientos y prácticas de seguridad establecidos para asegurar el uso más seguro posible de este equipo. No obstante, en ningún caso este documento reemplaza el sentido común. El personal debe asegurarse de que el entorno de trabajo sea seguro y esté libre de distracciones.



PELIGRO

Indica una situación de riesgo inminente que, si no se evita, pudiera producir la muerte o lesiones graves.



ADVERTENCIA

Indica una situación potencialmente peligrosa que, si no se evita, puede producir la muerte o lesiones graves.



PRECAUCIÓN

Cuando la PRECAUCIÓN se utiliza **con** el símbolo de alerta de seguridad aquí ilustrado, indica una situación potencialmente peligrosa que, si no se evita, puede producir lesiones menores o moderadas.

Cuando PRECAUCIÓN se utiliza **sin** el símbolo de alerta de seguridad aquí ilustrado, indica una situación potencialmente peligrosa que podría producir daños al equipo.

AVISO

AVISO

Llama la atención a información importante para entender la operación que se desea realizar.

AMBIENTAL

AMBIENTAL

Se aplica a condiciones que pueden afectar el entorno pero que no tienen un efecto inmediato o directo sobre el personal o el equipo.

Reglas de seguridad

Debido a la imposibilidad de anticipar todas las circunstancias que podrían constituir un riesgo, la información de seguridad suministrada en este manual del equipo y sobre la máquina no es exhaustiva. Si se utiliza o realiza el mantenimiento de esta máquina utilizando un procedimiento no recomendado específicamente por el fabricante, el procedimiento deberá ser aprobado por un ingeniero profesional para asegurarse de que no afecte la seguridad del equipo. ¡Manéjese! siempre con suma precaución y sentido común!

Conozca su equipo

- Lea este manual en su totalidad antes de utilizar o mantener el equipo. No utilice esta máquina a menos que esté perfectamente familiarizado con los controles, los dispositivos de seguridad, los frenos de emergencia y los procedimientos operativos que se describen en este manual.
- Lea y siga todas las notas de seguridad. El no cumplimiento de estas instrucciones podría producir pérdidas económicas, daños a la propiedad y lesiones personales, incluida la muerte.
- Refiérase a las pautas de bloqueo/etiquetado proporcionadas en las siguientes páginas para realizar el mantenimiento y solucionar problemas de este equipo en forma segura.
- Observe y cumpla con todas las etiquetas de seguridad. Cambie las etiquetas gastadas inmediatamente.
- Utilice este equipo únicamente para el propósito que se describe en este manual.
- Sólo personal calificado debe intentar utilizar o realizar el mantenimiento de este equipo. Por “personal calificado” se entiende:

...una persona o personas que, por el hecho de poseer un título o certificado de capacitación profesional reconocido o que, por sus amplios conocimientos o experiencia, han demostrado con éxito estar capacitados para resolver problemas relacionados con el tema y el trabajo en cuestión—ANSI B30.2-1983

...una persona que posee habilidades y conocimientos relacionados con la construcción y uso de equipos e instalaciones eléctricas y que ha recibido capacitación en seguridad sobre los riesgos posibles—NEC 2002 Handbook

Seguridad personal

- Siga las instrucciones de instalación al pie de la letra.
- Use siempre anteojos de seguridad y protección auditiva en un entorno industrial.
- Utilice una máscara protectora cuando trabaje cerca de aserrín.
- Utilice ropa adecuada y equipo de protección personal apropiado (por ejemplo, anteojos de seguridad y protección auditiva.) No use ropa suelta ni joyas. Si tiene el cabello largo, áteselo para atrás.

- Proceda con precaución cuando levante piezas o materiales pesados.

Procedimientos de Bloqueo/Etiquetado

- Antes de realizar el mantenimiento de los sistemas neumáticos o hidráulicos, purgue las líneas para eliminar la presión.
- Bloquee y etiquete todos los sistemas energizados antes de realizar tareas de mantenimiento en ellos. Refiérase a la sección *Pautas de bloqueo/etiquetado* en la página xliv.

Cómo mantener un entorno seguro

- Mantenga alejados a los niños. Todos los visitantes deben mantenerse a una distancia segura del área de trabajo. Los riesgos pueden no ser evidentes a las personas no familiarizadas con la máquina.
- Mantenga las áreas de trabajo bien iluminadas.
- Mantenga el área de trabajo limpia y libre de cualquier riesgo de tropiezo o resbalamiento.
- No utilice el equipo en lugares húmedos o mojados y no lo exponga a la lluvia o a la nieve.

Uso y mantenimiento del equipo

- Asegúrese de que no haya personas, herramientas y objetos extraños en las zonas restringidas antes de utilizar este equipo. Las zonas restringidas se indican en la página lix.
- Realice las pruebas de seguridad recomendadas en la sección Prueba de seguridad en la página xlix antes de utilizar el equipo por primera vez, después de cualquier tarea de mantenimiento y conforme a la frecuencia de mantenimiento establecida.
- En caso de que la máquina no funcione correctamente, deténgala inmediatamente utilizando un freno de emergencia e informe el problema a un supervisor.
- No deje nunca la máquina encendida si no está junto a ella. ¡Apáguela!. No abandone la máquina hasta que todas las piezas se detengan completamente y hasta que se haya apagado la alimentación eléctrica.
- Verifique periódicamente que no haya piezas gastadas o dañadas. Repárelas o cámbielas inmediatamente.
- Mantenga los sistemas hidráulicos, neumáticos y eléctricos en buen funcionamiento en todo momento. Repare las fugas y las conexiones sueltas inmediatamente. No exceda nunca la presión ni potencia eléctrica recomendadas.
- Verifique que todos los dispositivos de seguridad estén en buen funcionamiento al comienzo de cada turno. Todos los dispositivos protectores y de seguridad deben estar en su lugar antes y durante el uso de la máquina. No desconecte ni evite nunca ningún dispositivo de seguridad ni interbloqueo eléctrico.

- Inspeccione periódicamente la calidad del producto terminado.

Seguridad eléctrica

- No utilice líquidos en el interior de los gabinetes eléctricos.
- Cuando utilice disolventes sobre o alrededor de la máquina, desconecte la alimentación para eliminar las probabilidades de chispas, que pueden producir una explosión o incendio. Use un respirador aprobado para el uso con disolventes. Use ropa protectora, guantes y anteojos de seguridad.

Bloqueo/Etiquetado

Pautas de bloqueo/etiquetado

Deben cumplir con todas las pautas de bloqueo/etiquetado conforme a la norma OSHA 29 CFR 1910.147. El programa de control de energía de la compañía debe incluir un procedimiento específico. El objetivo de este manual no es reemplazar el procedimiento de desenergización o bloqueo/etiquetado requerido por la OSHA, sino proporcionar pautas orientativas generales.

El término “bloqueo”, según se utiliza en este manual, se refiere a la colocación de un dispositivo de bloqueo en las fuentes de energía para asegurar que el dispositivo aislador de energía y el equipo controlado por éste no puedan reenergizarse o utilizarse hasta que se retire dicho dispositivo.

Las fotos de la página siguiente muestran los lugares en los que se encuentran los interruptores de desconexión eléctrica de esta máquina.



- Las fuentes de energía incluyen energía eléctrica, mecánica, hidráulica, neumática, química, térmica y otras.
- En el caso de fuentes de energía eléctrica, la alimentación principal y la alimentación de control a la maquinaria deben apagarse y bloquearse físicamente en la posición OFF (apagado).
- Por lo general, como dispositivo de bloqueo se utiliza un candado con llave.
- Si hay más de una persona trabajando en una zona restringida, utilice un dispositivo de bloqueo grupal que permita a cada persona utilizar un candado que sólo pueda ser retirado por la persona que realiza el mantenimiento.

“Etiquetado” significa que debe colocarse una advertencia fácil de ver en un dispositivo aislador de energía que indique que el equipo no debe utilizarse.

Procedimientos de bloqueo/etiquetado eléctricos

Cuando trabaja en una máquina fuera del gabinete eléctrico principal de la máquina



Si trabaja en la línea de transmisión eléctrica a la máquina, siga el procedimiento de la página xvii.

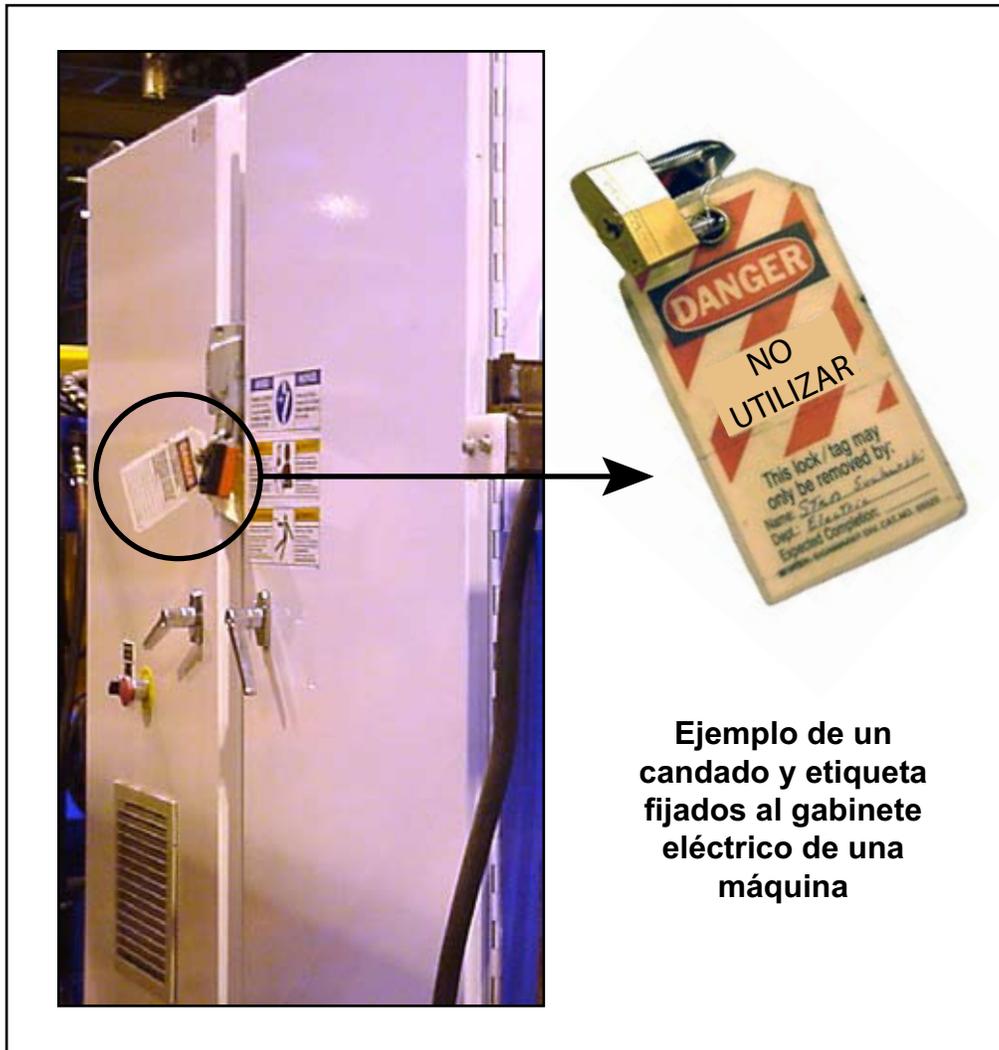
Antes de realizar el mantenimiento de cualquier máquina con alimentación eléctrica, bloquee y etiquete la máquina de forma adecuada. Cuando trabaje en una máquina fuera del gabinete eléctrico principal de la máquina, salvo en el caso de trabajos en la línea de transmisión eléctrica a la máquina, siga los procedimientos de bloqueo/etiquetado aprobados por la compañía, los cuales deberían incluir, entre otros, los pasos aquí indicados.

1. Coloque un freno de emergencia sobre la máquina.
2. Coloque el mango del interruptor con fusibles en la posición “apagado/apagada”.
Vea la figura 2-1.

	 ADVERTENCIA
	<p>RIESGO DE ELECTROCUCIÓN.</p> <p>Cuando el interruptor con fusibles está apagado, sigue habiendo energía dentro del gabinete del interruptor. ¡Apague siempre la alimentación en la fuente de alimentación del edificio antes de abrir este gabinete eléctrico!</p>

3. Coloque un candado y una etiqueta que cumplan con los requisitos de bloqueo/etiquetado de la OSHA.
4. Trabe o desenergice todos los componente neumáticos, componentes hidráulicos y otras piezas que tengan alimentación directa o almacenada.

Figura SEGURIDAD-1: Bloqueo/etiquetado en el gabinete eléctrico principal



Cuando trabaje en una máquina dentro del gabinete eléctrico principal de la máquina o en la línea de transmisión eléctrica a la máquina

Antes de abrir el gabinete eléctrico principal o intentar reparar o reemplazar una línea de transmisión eléctrica a la máquina, bloquee y etiqueta la máquina en forma adecuada. Siga los procedimientos de bloqueo/etiquetado aprobados por la compañía, los cuales deberían incluir, entre otros, los pasos aquí indicados.

1. Coloque un freno de emergencia sobre la máquina.
2. Apague la alimentación a la máquina en la fuente de alimentación, que, por lo general, es un panel de entrada de suministro eléctrico que se encuentra en una pared de las instalaciones. En la figura 2-2 se muestra un ejemplo de panel de fuente de alimentación bloqueado.
3. Coloque un candado y una etiqueta que cumplan con los requisitos de bloqueo/etiquetado de la OSHA.
4. Abra la puerta del gabinete al que necesita acceder y usando un multímetro verifique que la alimentación esté apagada.

Figura SEGURIDAD-2: Bloqueo/Etiquetado del panel de fuente de alimentación



Solución de problemas con una máquina energizada

Sólo un electricista calificado que utilice el equipo de protección personal y siga los procedimientos recomendados en la norma NFPA 70E debe intentar realizar tareas de reparación o mantenimiento en un área o componente energizados de la máquina o en su proximidad.

Cada vez que se realizan tareas de mantenimiento mientras el equipo está eléctricamente energizado, existe un riesgo potencial de formación de un arco eléctrico. Consulte en la norma NFPA 70E el equipo de protección personal requerido para trabajar con componentes eléctricamente energizados. Los componentes neumáticos e hidráulicos pueden moverse de manera imprevista si no se desenergizan. Trabe físicamente cualquier componente que pueda moverse cuando deba trabajar en ellos o en su proximidad.

Pruebas de seguridad

 ADVERTENCIA	
	<p>RIESGO DE APLASTAMIENTO.</p> <p>Realice las pruebas de seguridad que se describen antes de utilizar el equipo por primera vez, después de cualquier tarea de mantenimiento y conforme con la frecuencia de mantenimiento establecida.</p>

El siguiente procedimiento de prueba **DEBE** ser realizado por personal calificado después de **CUALQUIER** tarea de mantenimiento, ajuste o modificación. La prueba permite comprobar que la barra de luz, el sistema de seguridad y el sistema de control de la máquina funcionan juntos y detienen la máquina correctamente.

Antes de comenzar las pruebas

Suministros necesarios

Para realizar esta prueba, usted necesitará:

- 2 trozos de madera conectados en forma de T de manera que la T pueda mantenerse de pie, invertida, sin apoyo, y se vea así: \perp
- Un objeto grande y pesado, como un bote de basura lleno, de preferencia que pese más de 100 lbs.

Terminología usada en este procedimiento

Usted debe estar familiarizado con los siguientes términos para realizar este procedimiento de prueba.

Tabla -1: Definiciones de la terminología usada

T de madera	Se describe en <i>Suministros necesarios</i>
objeto pesado	Un bote de basura u otro objeto de tamaño similar, que pese por lo menos 100 lbs. y que no se deslice fácilmente por el piso; se usa para probar los parachoques
tabla de referencia	Cualquier tabla de 2x que pueda colocarse sobre la mesa y usarse como punto de referencia para medir
juego derecho de cortinas de luz	Par de unidades de cortinas de luz en el lado derecho de la cabeza del pórtico cuando se mira de frente desde el extremo del operador
juego izquierdo de cortinas de luz	Par de unidades de cortinas de luz en el lado izquierdo de la cabeza del pórtico cuando se mira de frente desde el extremo del operador
controlador de seguridad	Asegura que todos los dispositivos de seguridad en la máquina estén funcionando correctamente
escáner láser	Dispositivo opcional para las máquinas con una plataforma de cuerda inferior alta que detecta objetos o personas en el camino de la plataforma

Prueba del controlador de seguridad

1. Tome precauciones para que únicamente la persona que realice la prueba esté cerca de la máquina durante esta prueba. Hay que mantener la máquina encendida para realizar la prueba.
2. Compruebe que el controlador de seguridad (en la caja principal) no tenga fallas (luz roja ERR/ALM, fija o intermitente).
3. Siga los siguientes pasos para comprobar que el sistema de frenos de la máquina funcione correctamente:

 ADVERTENCIA	
	<p>¡Nunca se pare directamente delante de la cabeza del pórtico!</p> <p>¡Los operadores deben asegurarse de que no hay otros empleados en la zona de seguridad o zona restringida cuando realicen estas tareas!</p> <p>Si la cabeza del pórtico no se detiene cuando se supone que lo haga, pueden ocurrir lesiones graves o muerte.</p>

- a) Comience a mover la cabeza del pórtico hacia la derecha y llévela hasta la velocidad máxima.
- b) Presione el freno de emergencia o E-stop y asegúrese de que la cabeza del pórtico pare.
- c) Repita este paso moviendo la cabeza del pórtico hacia la izquierda.

Prueba de las cortinas de luz



Las luces LEFT-READY y RIGHT-READY están localizadas a cada lado del claxon.

1. Tome precauciones para que únicamente la persona que realice la prueba esté cerca de la máquina durante esta prueba. Hay que mantener la máquina encendida para realizar la prueba.
2. Asegúrese de que la palanca de desconexión esté en la posición de encendido (ON).
3. Compruebe que las luces RIGHT-READY y LEFT-READY estén encendidas (vea la página 30).
4. En el lado **derecho** de la cabeza del pórtico, mueva su mano entre las unidades de cortinas de luz para interrumpir el haz de luz.
5. Compruebe que la luz verde RIGHT READY se apague cuando se interrumpa el haz de luz.
6. Coloque la T de madera (vea la página xvi) sobre la mesa, de manera que la T esté invertida y sin apoyo. Póngala a la derecha y a una distancia de por lo menos 10 pies de la cabeza del pórtico.
7. Presione el botón RESET en la estación de control del operador.
8. Compruebe que la luz verde RIGHT READY se ilumine.

 ADVERTENCIA	
	¡Nunca se pare directamente delante de la cabeza del pórtico!
	¡Los operadores deben asegurarse de que no hay otros empleados en la zona de seguridad o zona restringida cuando realicen estas tareas!
	Si la cabeza del pórtico no se detiene cuando se supone que lo haga, pueden ocurrir lesiones graves o muerte.

9. Use la palanca de mando para mover la cabeza del pórtico hacia la derecha a toda velocidad.
10. Permita que la cabeza del pórtico alcance la T de madera sin soltar la palanca de mando. El control de la máquina debe detenerse antes de que la T de madera haga contacto con cualquier parte fija de la cabeza del pórtico.
11. Mueva la T de madera de manera que el haz de luz permanezca bloqueado.



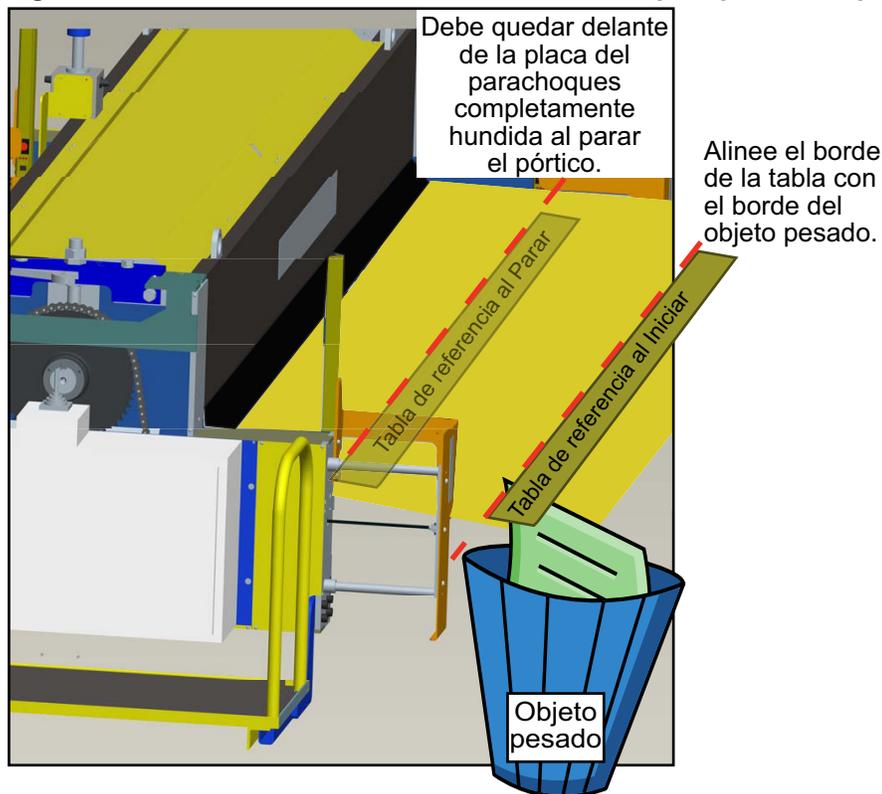
El propósito de esta prueba es comprobar que el sistema eléctrico esté debidamente cableado de manera que se detenga el movimiento cuando se interrumpa un haz de la cortina de luz. Es importante hacer la prueba en ambas direcciones.

12. Compruebe que la máquina **no** continúe moviéndose en la dirección de la T de madera mientras esté bloqueado el haz de luz:
 - a) Presione el botón de RESET.
 - b) Mueva la palanca de mando hacia la T de madera mientras presiona el botón blanco en la palanca de mando.
 - c) La cabeza del pórtico **no** debe moverse.
13. Compruebe que la cabeza del pórtico todavía pueda moverse en la dirección contraria (lejos de la T de madera):
 - a) Mueva la palanca de mando en sentido contrario a la T de madera mientras presiona el botón blanco en la palanca de mando.
 - b) La cabeza del pórtico debe alejarse de la T de madera para que el operador tenga espacio para quitar el obstáculo.
14. Repita esta prueba en dirección a la **izquierda** y compruebe la luz LEFT READY.
15. Si alguna de las cortinas de luz no pasan esta prueba, repare el problema antes de operar el equipo y luego repita la prueba en ambas direcciones.
16. Continúe a la siguiente sección para realizar pruebas de seguridad adicionales.

Prueba de los parachoques

1. Procedimiento de bloqueo/etiquetado.
2. Compruebe la localización de cada bandera del parachoques con respecto al sensor de su barra de luz.
 - a) Cada bandera del parachoques debe estar alineada con el sensor de su barra de luz de manera que no haya espacio entre el borde de la bandera y el borde del sensor. Puede haber una ligera superposición. Deben estar tan cerca como sea posible sin causar caídas molestas durante la operación normal.
 - b) Consulte la página 63 para ajustar la localización de la bandera del parachoques.
3. Coloque un objeto grande, pesado y sin apoyo (como un bote de basura pesado) en el camino del parachoques derecho del lado del operador, pero a una distancia de por lo menos 10 pies del parachoques. El objeto debe ser suficientemente pesado para no moverse mucho al hacer contacto con el parachoques, pero suficientemente resistente para no romperse, astillarse o destruirse al ser golpeado por el parachoques. Se llamará *objeto pesado* en el resto de este procedimiento.

Figura SEGURIDAD-3: Usar una tabla de referencia para probar los parachoques





La tabla de referencia será su punto de referencia para fijarse en la distancia de frenado, porque el objeto pesado puede moverse, pero la tabla no se moverá.

4. Coloque una tabla (cualquier tabla de 2 pulgadas de grosor) plana sobre la mesa al mismo nivel que el objeto pesado. Consulte la imagen en la página xx para aclarar dudas. La tabla se llamará *tabla de referencia* en el resto de este procedimiento.
5. Quite el dispositivo de bloqueo/etiquetado.

	 ADVERTENCIA
	<p>¡Nunca se pare directamente delante de la cabeza del pórtico!</p> <p>¡Los operadores deben asegurarse de que no hay otros empleados en la zona de seguridad o zona restringida cuando realicen estas tareas!</p> <p>Si la cabeza del pórtico no se detiene cuando se supone que lo haga, pueden ocurrir lesiones graves o muerte.</p>

6. Mueva la cabeza del pórtico hacia la tabla de referencia:
 - a) Presione el botón de RESET en la estación de control del operador.
 - b) Compruebe que la luz verde RIGHT READY se ilumine.
 - c) Use la palanca de mando para mover la cabeza del pórtico hacia la derecha a toda velocidad.
7. Permita que la cabeza del pórtico alcance el objeto pesado sin soltar la palanca de mando. La cabeza del pórtico debe parar antes de que la tabla de referencia llegue al punto donde ha pasado la posición completamente hundida de la superficie del parachoques.



Si no se detiene a tiempo, vigile el objeto pesado para ver si está hundiendo el parachoques lo suficiente para interrumpir el sensor de la cortina de luz. Si no es así, se necesita un objeto más pesado o más fijo. Este debe imitar la conducta de una persona cuando es golpeada por el parachoques.

8. Compruebe que la máquina no continúe moviéndose en la dirección del objeto pesado después que se haya detenido.
 - a) Presione el botón de RESET.
 - b) Mueva la palanca de mando hacia el objeto pesado mientras presiona el botón blanco en la palanca de mando.
 - c) La cabeza del pórtico no debe moverse.

9. Compruebe que la cabeza del pórtico todavía pueda moverse en la dirección contraria (lejos del objeto pesado):
 - a) Mueva la palanca de mando en sentido contrario al objeto pesado mientras presiona el botón blanco en la palanca de mando.
 - b) La cabeza del pórtico debe alejarse del objeto pesado para que el operador tenga espacio para quitar el obstáculo.
10. Repita esta prueba con todos los parachoques. Cuando haga la prueba con los parachoques del lado izquierdo de la cabeza del pórtico, debe iluminarse la luz LEFT READY.



Cuando los parachoques se accionan con el freno de emergencia o E-stop, la cabeza del pórtico debe parar dentro de 11-1/2 pulgadas. Esto deja más de 1 pulgada de juego en la varilla de apoyo del parachoques. Al realizar esta prueba, fíjese que las varillas de apoyo del parachoques no estén gastadas. Si están gastadas, la cabeza del pórtico no se detendrá con la rapidez suficiente para proteger al personal. Además, provocará que los parachoques fallen prematuramente.

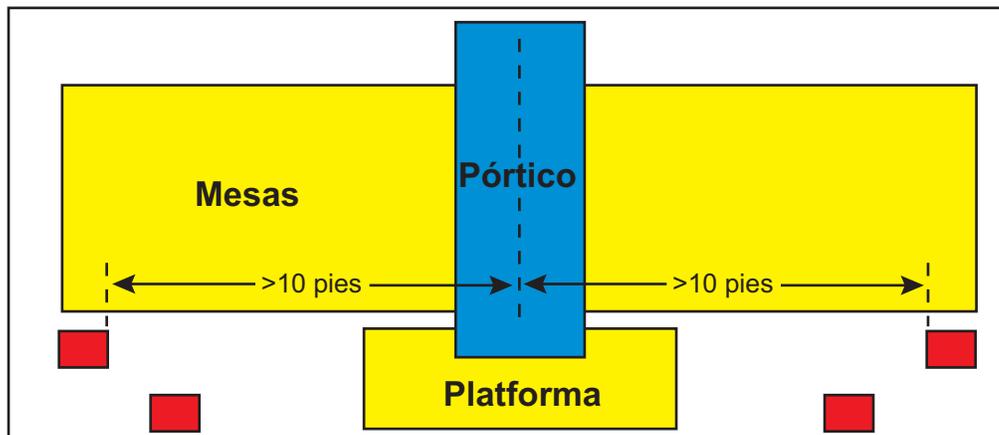
11. Si alguno de los parachoques no pasa la prueba, repare el problema antes de operar el equipo y luego repita la prueba en ambas direcciones.
12. Continúe a la siguiente sección para realizar pruebas de seguridad adicionales.

Prueba del escáner láser (equipo opcional)

1. Procedimiento de bloqueo/etiquetado.
2. Compruebe que todas las etiquetas de seguridad sean legibles.
3. Compruebe que no haya señales de daño externo al escáner láser, la máquina protegida, los cables eléctricos y el cableado.
4. Limpie el polvo y las marcas de dedos de la superficie del escáner con un trapo suave y detergente para limpiar vidrios.
5. Compruebe que las conexiones entre el sistema de control de la máquina protegida y el escáner láser estén correctas.
6. Quite los dispositivos de bloqueo/etiquetado.
7. Coloque la T de madera (consulte la página xvi) dentro del perímetro de la zona de seguridad aproximadamente en el lugar de uno de los bloques rojos en la Figura SEGURIDAD-4.

 ADVERTENCIA	
	<p>¡Nunca se pare directamente delante de la cabeza del pórtico!</p> <p>¡Los operadores deben asegurarse de que no hay otros empleados en la zona de seguridad o zona restringida cuando realicen estas tareas!</p> <p>Si la cabeza del pórtico no se detiene cuando se supone que lo haga, pueden ocurrir lesiones graves o muerte.</p>

Figura SEGURIDAD-4: Puntos de prueba para la Prueba de seguridad del escáner



 = Lugares de prueba para colocar la T de madera sin apoyo

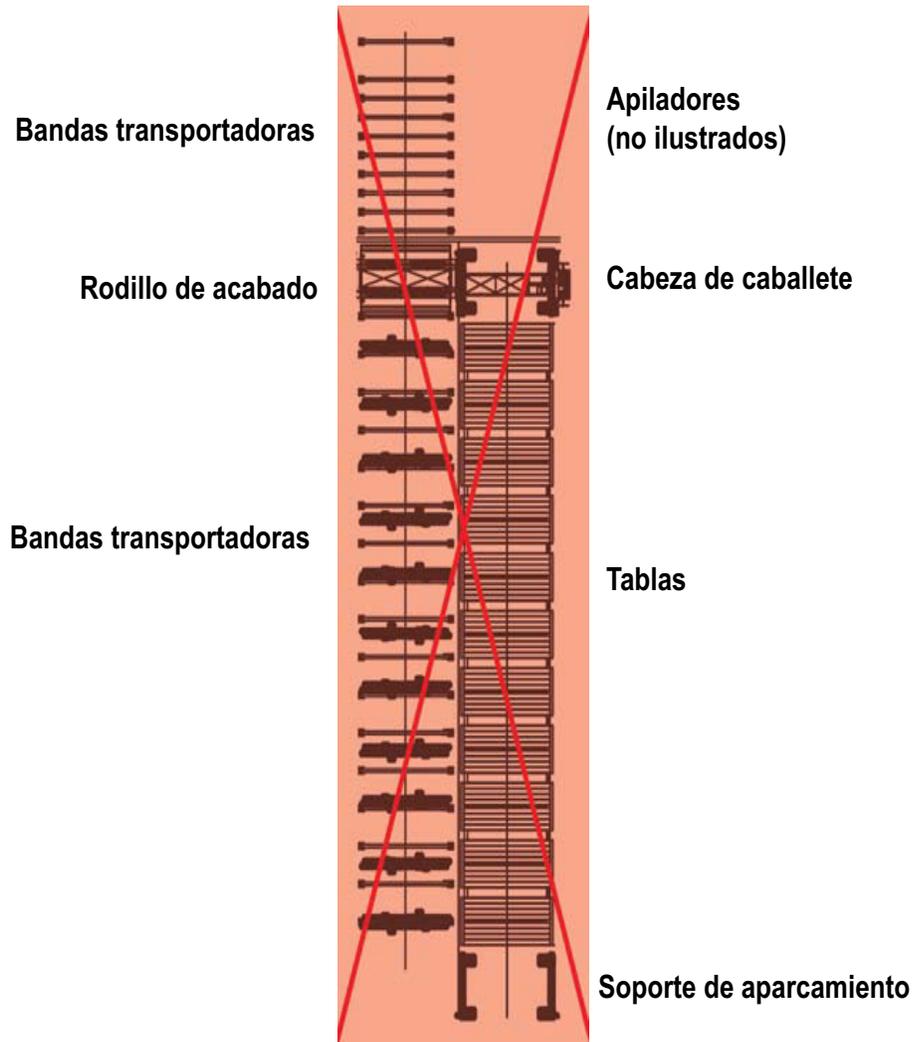
8. Comience a mover la cabeza del pórtico hacia la T de madera y:
 - a) Compruebe que la luz verde RIGHT READY (localizada en el claxon) se apague cuando se interrumpa el haz de luz.
 - b) Presione el botón de RESET en la estación de control del operador.
 - c) Compruebe que la luz verde RIGHT READY se ilumine.
 - d) Use la palanca de mando para mover la cabeza del pórtico hacia la derecha.
 - e) Párese fuera de la zona de seguridad y la zona restringida y coloque la T de madera de manera que quede dentro de la zona de seguridad.
 - f) Asegúrese de que la cabeza del pórtico se detenga antes de que la T de madera haga contacto con una parte fija de la plataforma del operador.
 - g) Presione el botón de RESET.
 - h) Compruebe que la máquina **no** continúe moviéndose hacia adelante mientras la T de madera esté en la zona de detección.
 - i) Compruebe que la máquina **sí** se mueva en la dirección contraria.
9. Repita el paso 8 en todos los lugares de los bloques rojos en la figura 4.



El propósito de esta prueba es comprobar que el sistema eléctrico esté debidamente cableado de manera que se detenga el movimiento cuando se interrumpa un haz de la cortina de luz. Es importante hacer la prueba en ambas direcciones.

Zonas restringida

	 PELIGRO
	<p>Manténgase afuera de la zona restringida cuando el equipo esté en uso. Pueden producirse lesiones graves o incluso la muerte si el personal está en la zona restringida.</p> <p>Asegúrese que no haya personal en la zona restringida antes de operar el equipo.</p>



Marcar la zona restringida

Deberá marcarse la zona restringida de manera que todas las personas cerca del equipo puedan ver claramente el área donde pueda existir peligro.

MiTek ofrece la cinta de zona restringida o “Restricted Zone Tape”, fácil de aplicar y con texto en inglés y en español. Algunos equipos traen la cinta de zona restringida. Si su máquina no trajo la cinta de zona restringida, puede pedirla a MiTek Machinery Division Customer Service (Servicio al cliente de la división de maquinaria de MiTek).

Puede encontrar las instrucciones sobre dónde y cómo aplicar la cinta de zona restringida en el manual de su mesa o pórtico incluido con su sistema o pedir el Service Bulletin Kit 181 en la página web de MiTek Machinery.

Información adicional

Definiciones de los símbolos de seguridad (<i>Safety Symbol Definitions</i>)	página xxvii
Declaraciones de Cumplimiento (<i>Declarations of Conformity</i>)	página xxxiii

Purpose of Chapter

This chapter introduces you to this manual and provides an overview of your equipment and the means to identify it.

Introduction

	 DANGER
	<p>Read this manual completely before using this equipment!</p> <p>Do not operate this machine until you have a thorough understanding of all controls, safety devices, emergency stops, and operating procedures outlined in this manual.</p> <p>All warnings must be read and observed. Failure to do so may result in economic loss, property damage, and/or personal injury.</p> <p>This manual must always be available to personnel operating and maintaining this equipment.</p>

The graphics in Table 1-1 are used throughout the manual to quickly communicate a specific type of information.

Table 1-1: Navigational Tools Used Throughout the Manual

Graphic	Explanation
	<p>Important safety note!</p> <p>Indicates that you must lockout/tagout at the disconnect switch located on the equipment using approved methods described in OSHA 29 CFR 1910.147 before continuing with the procedure.</p>
	<p>Indicates tools required before beginning a procedure.</p>
	<p>Gives additional information to the steps or text.</p>
	<p>Indicates how to get to or from the item discussed.</p>
	<p>Refers reader to another section, table, graphic, or drawing for further explanation.</p>

Additional Resources

Supplemental Documentation

In addition to the equipment manual, each MiTek machine comes with additional manufacturer's documentation on certain electrical components. These documents may be found in the electrical enclosure. Refer to these documents when you need more detailed information on highly-technical components.

Web Site

Visit the MiTek Web site at www.mii.com for up-to-date information on all MiTek equipment. View the latest revision of this manual and all Service Bulletins, or order parts on-line through our *eStore*™.

Contacting MiTek

For technical assistance or to order parts, contact the Machinery Division Customer Service Department using one of the methods listed in Figure 1-1.

Figure 1-1: Contacting MiTek

<p>MiTek Machinery Division Customer Service Department 301 Fountain Lakes Industrial Drive St. Charles, MO 63301</p> <p>Parts Orders (with part number) E-mail: mitekparts@mii.com</p> <p>Technical Assistance Phone: 800-523-3380 Fax: 636-328-9218 machinerysupport@mii.com</p> <p>Web Site www.mitek-us.com</p>	 The MiTek logo, consisting of the letters 'MII' in a bold, black, sans-serif font with three horizontal blue lines passing through the letters.
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Introduction to the Equipment

Purpose

The primary function of the *RoofTracker II*™ roof truss roller press system is to press *MiTek*® connector plates into roof trusses to connect roof truss components.

Overview

The *RoofTracker II* roof truss roller press system consists of a gantry head, which houses the roller that causes the initial embedment of the connector plates; a set of tables that holds and supports the truss and gantry head; a Stand-Alone Conveyor system; and a Finish Roller that completes the plate embedment process. The system components can be seen in Figure 1-2. Refer also to Table 1-2 on page 5.

What This Manual Covers

This manual addresses the *RoofTracker II* gantry head. Separate manuals exist for the Finish Roller, Stand-Alone Conveyors, assembly tables, and for any gantry heads used along with the *RoofTracker II* gantry head.

Throughout this manual, the term “press” or “machine” is used to refer to the entire system, and “gantry head” is used to refer to the gantry head labeled in Figure 1-2.

Figure 1-2: RoofTracker II Press



Main Components

Table 1-2: Main Components of the RoofTracker II Press

Component	Description	Part # to Order
Gantry Head	Moves across the tables for the initial plate embedment, includes operator platform and joystick control station	67400-501-(xxx)V
Tables	Support the truss material while being pressed by the gantry head; feature slotted tops for jiggling and several choices for ejection system configuration	See your Tables manual for part numbers, or speak to a MiTek Sales Representative
Parking Stands	Areas to park the gantry head to allow all working surfaces of the tables to be accessible	63630-501 (left-hand) 63630-502 (right-hand)

Platform Options

A platform is attached to the gantry head for the operator(s) to stand on during operation. The standard platform is the bottom-chord platform listed in Table 1-3, but several other options are available.

Table 1-3: Platforms Available

Platform Name	Description	Top-Chord Safety	Bottom-Chord Safety	Part #
Bottom-Chord Platform	The most common platform used; it is slightly raised off the floor; located on the bottom-chord end of the gantry head. The electrical enclosure is adjacent to platform.	Bumpers	Bumpers	67557-501 (67540-501)
High Bottom-Chord Platform	Platform floor is even with the table tops; can be used on continuous-top table system only; located on the bottom-chord end of gantry head. The electrical enclosure is on top of gantry.	Bumpers	Scanner	67546-501 (67540-601)
Top-Chord Platform	Platform is located on the top-chord end of the gantry. Electrical enclosure is on bottom-chord end.	N/A	Bumpers	67546-501 (67540-701)
Top-Chord Platform w/ Top Enclosure	Platform is located on the top-chord end of the gantry head. The electrical enclosure is on top of gantry.	N/A	Bumpers	67546-501 (67540-801)



Operating Options

If your workflow builds multiple trusses on the same table line, you may want to install multiple gantry heads that use the same tables and conveyor system to give your plant more flexibility.

The table design allows a *RoofTracker II* press to be used in conjunction with a *RoofTracker* press, *RoofGlider*® press or an *AutoPress*™ machine to add capabilities to an existing press system.

A 12-ft and a 16-ft gantry head is also available. Contact your MiTek Sales Representative for more information.

General Specifications

Table 1-4: General Specification of the *RoofTracker II* Press

Name of Spec	Technical Data
Speed	up to 145 ft/min
Direction of Movement	Left and right (forward and reverse)
Height Adjustment	4-1/2" up to 6" from table
Roller Diameter	24"
Roller Wall Thickness	3/4"
Baffles Per Roller	4
Throat Opening	14-1/2 ft wide
Bearing Size for Roller	3-7/16"
Acceptable Wood Member Thickness	3/4" to 6"
Electrical Specifications	See Table 2-3
Physical Dimensions	See Table 2-2
Weight of Equipment	See Table 2-5

Truss Terminology

Table 1-5: Truss Terminology

Length Types	Height Types	
Overall length	H1	Board height
Centerline length	H2	Centerline height
Top length	H3	Centerline height
Bottom length	H4	Centerline height

Figure 1-3: Terminology Diagram

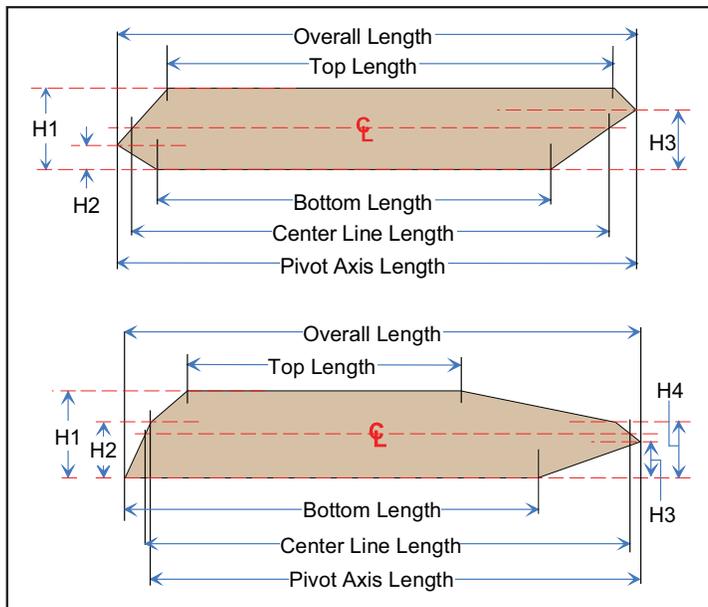
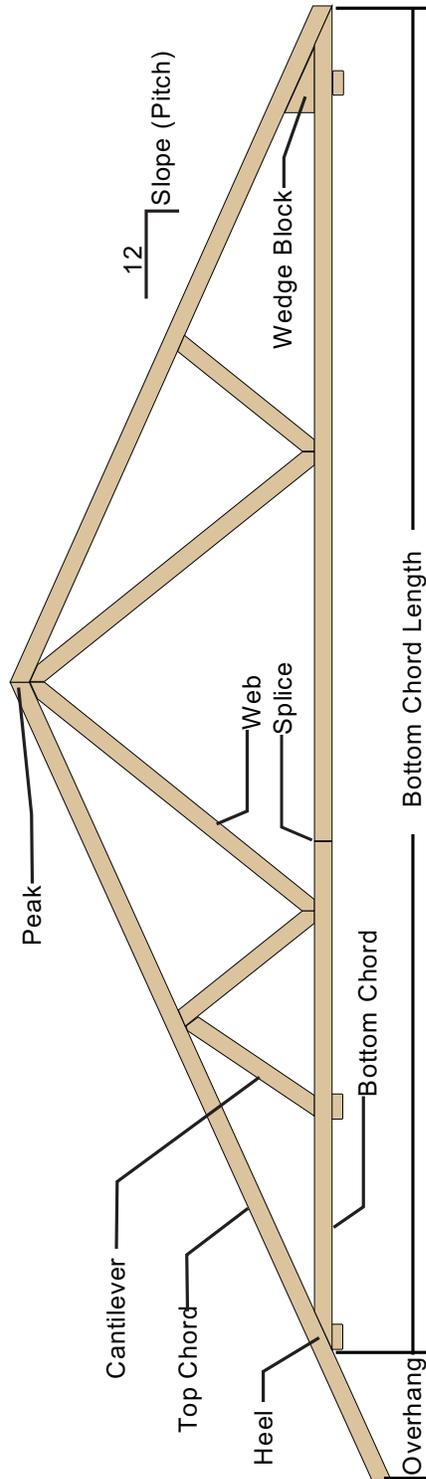


Figure 1-4: Parts of a Truss



Purpose of Chapter

This chapter covers what you must consider or complete before this equipment can be installed.

Pre-Installation Overview

Before the installation of your equipment, the items and procedures in this chapter must be arranged, purchased, or assembled. Table 2-1 provides an overview of the items that must be taken care of before your machine is installed. Each topic is explained in detail in the text following the table.

If a MiTek representative is managing the installation of your equipment, the requirements in Table 2-1 must be satisfied before the scheduled installation date, or the installation may need to be rescheduled. Refer to your Pre-Installation Agreement for more details.

Table 2-1: Pre-Installation Requirements

Space	This equipment requires enough space to allow for the machine dimensions listed in Table 2-2, plus additional working space for operation and maintenance. Operation space should ensure safety, freedom of movement, storage, and a free flow of materials. Space should have adequate lighting.
Location	Concrete, a minimum of 6" thick 5000 psi, is required under the weight of the <i>RoofTracker II</i> system. The gantry head is made to be durable, but not weather proof. It should be operated in a covered area without extreme temperature changes.
Electrical	The standard electrical requirements are shown in Table 2-3. Contact your MiTek representative if custom power specifications need to be arranged.
Customer-Supplied Parts	The customer is responsible for having the supplies listed in Table 2-4 at the time of installation.

Space Requirements

Space must be allocated for the following:

- Physical dimensions of the gantry head, tables, Stand-Alone Conveyors, Finish Roller, and all accessories.
- Space between tables, between Stand-Alone Conveyors, and between components.
- Adequate space for safe operation and maintenance of the equipment.

Refer to the guidelines in this section when planning your space allocation. MiTek can provide help in plant layout and space utilization, on request.

Space for Operation and Maintenance

Additional space must be allocated for operation and maintenance. Operation space should provide safety, freedom of movement, storage space, and free flow of raw and finished materials. There must also be adequate space for safe handling of the raw and finished materials throughout the process.

Electrical enclosures must have the required amount of space clear in front of them (usually 3 ft).

Space for the Equipment

It is the customer’s responsibility to provide adequate space for the installation, operation, and protection of the equipment. Use Figure 2-1 in combination with Table 2-2 to determine the physical dimensions of your equipment. Additional space is required for operation, maintenance, and optional equipment.

Refer to your specific layout, provided by your MiTek representative for exact measurements. The dimensions in this manual is intended for general space planning

Figure 2-1: Terminology for Dimensioning

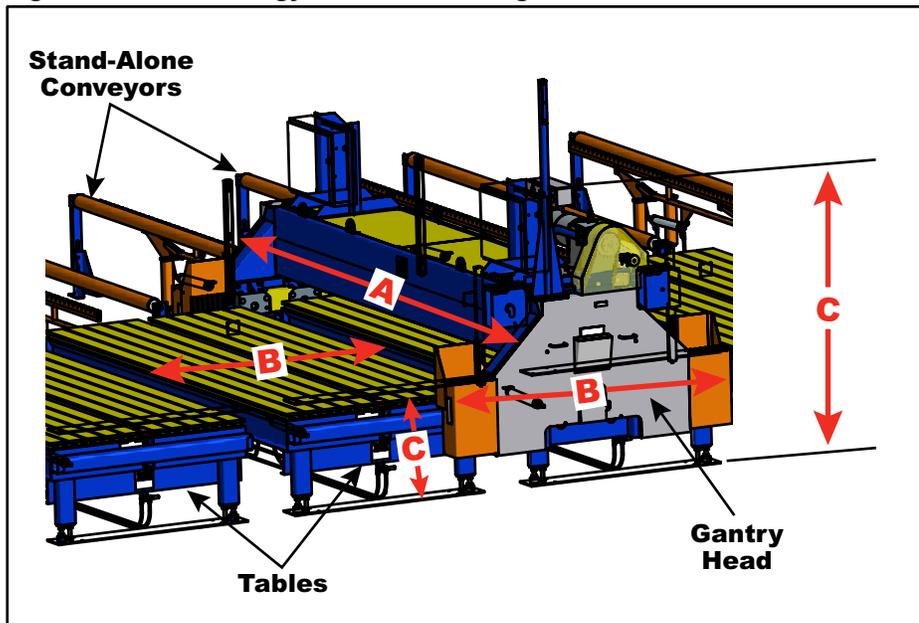


Table 2-2: Approximate Equipment Dimensions

	Dimension A (Length)	Dimension B (Width)	Dimension C (Height)	Space Between
Gantry Head	18' 5" w/ platform	8' 4"	approx. 10'	N/A
Parking Stand	14' 11"	8'	even with tables	up to 15"
Tables	Refer to the table manual			

Location Requirements

Floor Structure

A level and structurally sound concrete slab must be provided for the installation of the equipment. This slab should be designed and installed in accordance with local building code requirements and, if required, under supervision of a professional engineer. Concrete should be a minimum of 6 in. thick under the *RoofTracker II* system. Five thousand (5000) psi concrete is recommended. Refer to your layout drawing.

Environment

The gantry head is made to be durable, but not all electrical enclosures are for outdoor use. It is recommended that the equipment be operated in a covered area without extreme temperature changes. Under no circumstances should the electrical enclosures be sprayed with a hose. Lighting should be adequate for safe operation and maintenance.

Electrical Requirements

Standard Electrical Requirements

The standard electrical requirements are shown in Table 2-3. Each machine can be designed for any of the incoming voltages listed.

Table 2-3: Electrical Requirements Prior to Installation

Voltage (VAC)	208	230	415	460	575
Horsepower (hp)	10	10	10	10	10
FLA Plus Control Amps (amps)	33.30	30.14	17.00	15.08	12.04
Electrical Protection on Machine at Disconnect Switch: Time-Delay Fuses (amps)	50	50	20	25	20
Cycles (Frequency in Hz)	60	60	50	60	60
Phases	3	3	3	3	3

Electric Cable or Bus Bar

Most systems utilize an electric cable held in place by cable trolleys to supply power to the gantry head, but a bus bar can be used instead. Depending on the length of your system and several other variables, a bus bar may be required. Discuss these options with your MiTek representative before the installation date.

Customer-Supplied Parts

The customer must supply the parts shown in Table 2-4. Some must be installed before installation occurs and some must be available for use at the time of installation.

Table 2-4: Customer-Supplied Parts

Item	Description
Electrical Equipment	All electrical requirements to provide power to the disconnect enclosure on the gantry head are the customer's responsibility Electrical requirements for the Stand-Alone Conveyors include hard conduit, junction boxes, flex conduit, and 1/2" connectors
Transport Equipment	Forklift, chains, and spreader bars capable of carrying 8 tons
Tools That May Need to be Rented	Transit with measuring stick Industrial hammer-drill
General Tools	Tape measures (2) Pliers to cut skid bands Chalk line Sledge/mallet for concrete anchors
	Hammers (2) Sockets: 3/4", 9/16" Allen wrenches: 1/8", 5/32" 1/2" masonry drill bit

Shipping Information

Table 2-5 shows the weight of the individual components of a typical *RoofTracker II* gantry head.

Table 2-5: Shipping Information

Contents of Shipment	Weight
Gantry Head	approximately 10,000 lb

MiTek will provide installation supervision to ensure that the system is installed properly and operates correctly. We will also provide operating and maintenance training.

Delivery

Unloading

Even if a MiTek representative is present, it is the customer's responsibility to provide equipment and labor for unloading, placement, and wiring of the *RoofTracker II* gantry. Exercise extreme caution to avoid damage or misalignment during unloading. Do not apply pressure on any moving parts or fittings. Support the weight at the bottom of the machine base.

A heavy-duty forklift is required to move the equipment during unloading and placement of the machine. If there are any questions regarding the unloading or placement process, please contact your MiTek representative.

Unpacking

After successful unloading, remove the protective crating material from the pallets. Detach and set aside all loose parts. Move the equipment to the desired location using a forklift or crane appropriate to the weight of each unit. See Table 2-5 for the weight of each main component.

Lift the equipment to remove the pallet, and gently place each unit in its new location.

Equipment Layout

The components of the *RoofTracker II* system must be located in specific locations. Refer to your own layout during installation for specific measurements. Your MiTek representative will provide your layout to you before the equipment is installed.

Installing the Finish Roller

Refer to your Finish Roller manual for information on installing the Finish Roller.

Installing the Tables and Stand-Alone Conveyors

Refer to your tables manual and Stand-Alone Conveyor manual for information on installing the table line and conveyor system.

Installing the Gantry Head

Installing the Parking Stands and Gantry Head



Supplies needed are listed on page 14

Discuss with your *MiTek* representative when to install the parking stands. Your options vary depending on the amount of space available at either end of the tables for placing the gantry head. It may be necessary to install the gantry head before one of the parking stands is installed.

When installing the parking stands, the sides of the stands must be even with the sides of the tables. Place each parking stand up to 15 in. from the end of the first (or last) table. The anchor plates are already attached to the parking stands.

1. Install the first anchor plate.
 - a) Determine the anchor configuration and locate the hardware.
 - 1) The anchor plates must be attached using all four holes.
 - 2) Concrete anchors (1/2 in. x 4-1/2 in.), washers, and nuts are supplied (50 of each per box).
 - 3) Additional boxes can be ordered if needed.
 - b) Install four (4) concrete anchors per anchor plate
 - 1) Using an industrial hammer drill and a 1/2-in. drill bit, drill a hole at least 6 in. deep. For best results, drill the hole completely through the concrete pad.



If you do not drill completely through the concrete, you must vacuum out the concrete dust before proceeding with the next steps.

- 2) Assemble a concrete anchor so one washer is placed onto the anchor, and a nut is screwed onto the anchor, flush with the end.
- 3) Place the anchor in the hole, flanged end first.
- 4) Use a mallet or hammer to pound the anchor into the hole until the nut reaches the anchor plate.

- 5) Use an industrial hammer-drill and 3/4-in. hex head socket to tighten the nut onto the anchor. The nut should be slightly above the threads.
2. Place the second anchor plate.



Always measure subsequent anchor plates from the first anchor plate installed in that row!

3. Install the remaining anchor plates using the same procedure as for the first two. Refer to your individual layout for anchor plate locations.

After the parking stands are installed, the parker flags need to be welded onto the inside edge of the track tube. For a standard parking stand, the flags should be welded perpendicular to the tube, 85-1/4 in. from the leading edge of the track tube. Refer to Drawing 63630-501. For all other parking stands, contact your MiTek Customer Service Representative for the correct dimensions.

Releasing the Manual Brake

The installation of the gantry head should be supervised by a *MiTek* representative. When sliding the gantry head onto the tables, it is necessary to manually release the brake. The manual brake lever is shown in Figure 6-2 in the *Maintenance* chapter.

Aligning the Light Curtains

The gantry head will not operate properly unless the light curtains in each set are perfectly aligned with each other. This procedure is discussed in the *Assembling the Light Curtains & Beacon* section under *Electrical* later in this chapter.

Adjusting the Roller Height

Once the gantry head is in place, you may need to adjust the height of the roller to accurately embed the connector plates. Plates should be embedded approximately 80-90 percent by the roller press. To adjust the roller height, follow the instructions in the *Adjusting the Roller Height* section in the *Maintenance* chapter.



Do not allow the gantry head to sit in one place for a long period of time after installing it on the table and parking stand assembly. This may cause flat spots to form on the polyurethane wheels.

Move the gantry head at least every three (3) days to prolong the life of the wheels.

Festoon Cable or Bus Bar

Most systems utilize an electric festoon cable held in place by cable trolleys to supply power to the gantry head, but a bus bar can be used instead. Depending on the length of your system and several other variables, a bus bar may be required. Discuss these options with your *MiTek* representative before installation.

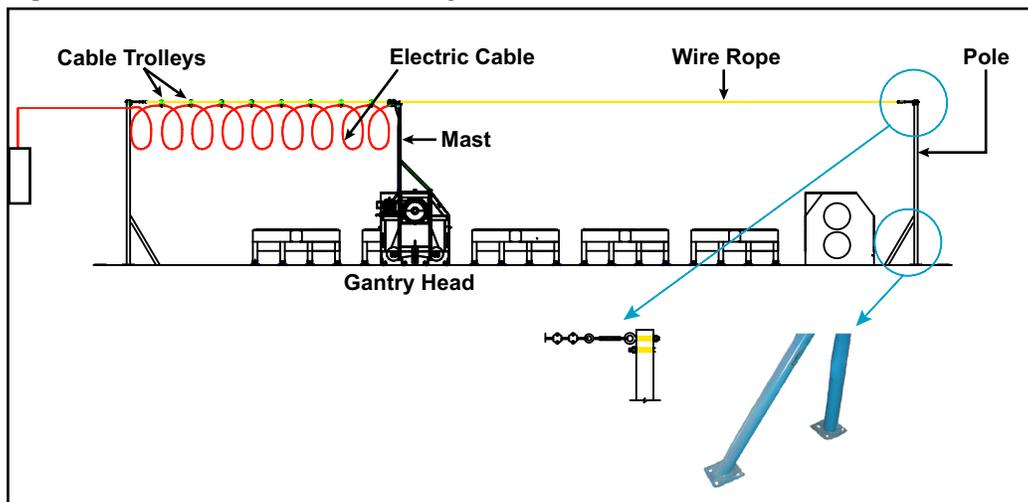
Overview of the Festoon Cable System

If your system is using a festoon cable, the gantry head receives its power from a traveling cable running from the appropriate electrical enclosure to the top of the gantry head. See Figure 3-1. The cable is attached to a wire rope by trolleys that allow the cable to easily extend when the gantry head is at the opposite end of the table and neatly gather it to prevent it from hanging too low when the gantry head is at the end closest to the electrical enclosure. The wire line holding these trolleys can be attached directly to the wall or to a pole designed for this purpose.

Installing the Festoon Cable

Refer to your layout to determine the minimum amount of space the cable trolleys will require between the pole or the wall and the mast on the gantry head.

Figure 3-1: Festoon Cable Assembly



If using the pole, it is installed in the same manner that the parking stand anchor plates were installed. The pole has two (2) anchor plates, each with four (4) holes. The same anchor bolts used on the tables and conveyors will work here.

If attaching the wire rope directly to the wall, use an eye-hook bolt to penetrate completely through a wooden or metal stud, and fasten the eye-hook with washers and a nut on the opposite side of the wall.



Table 3-1: Wire Rope and Cable Trolley Requirements for a Festoon Cable System

# of Tables	Length of Wire Rope (feet)	# of Cable Trolleys (See your layout for space required.)
1	50	9
2	50	9
3	60	9
4	60	9
5	70	10
6	70	10
7	80	10
8	90	11
9	100	12
10	100	12
11	110	13
12	120	14
13	120	14
14	130	15
15	140	16
16	140	16
17	150	17
18	160	18
19	170	19
20	170	19
21	180	20
22	180	21
23	180	21
24	200	22
25	210	23

Overview of the Bus Bar System

If your system is using a bus bar system, the cable configuration will differ from that shown in Figure 3-1. Instead of the cable trolleys and wire rope, mount a junction box to the mast and the conductor bars that are attached to the ceiling. The trolleys in the bus bar assembly ride along the conductor bars and provide constant power to the machine without the need for a cable. A system overview is shown in Figure 3-2 and a close-up look at the components is shown in Figure 3-3.

Figure 3-2: Bus Bar System Overview

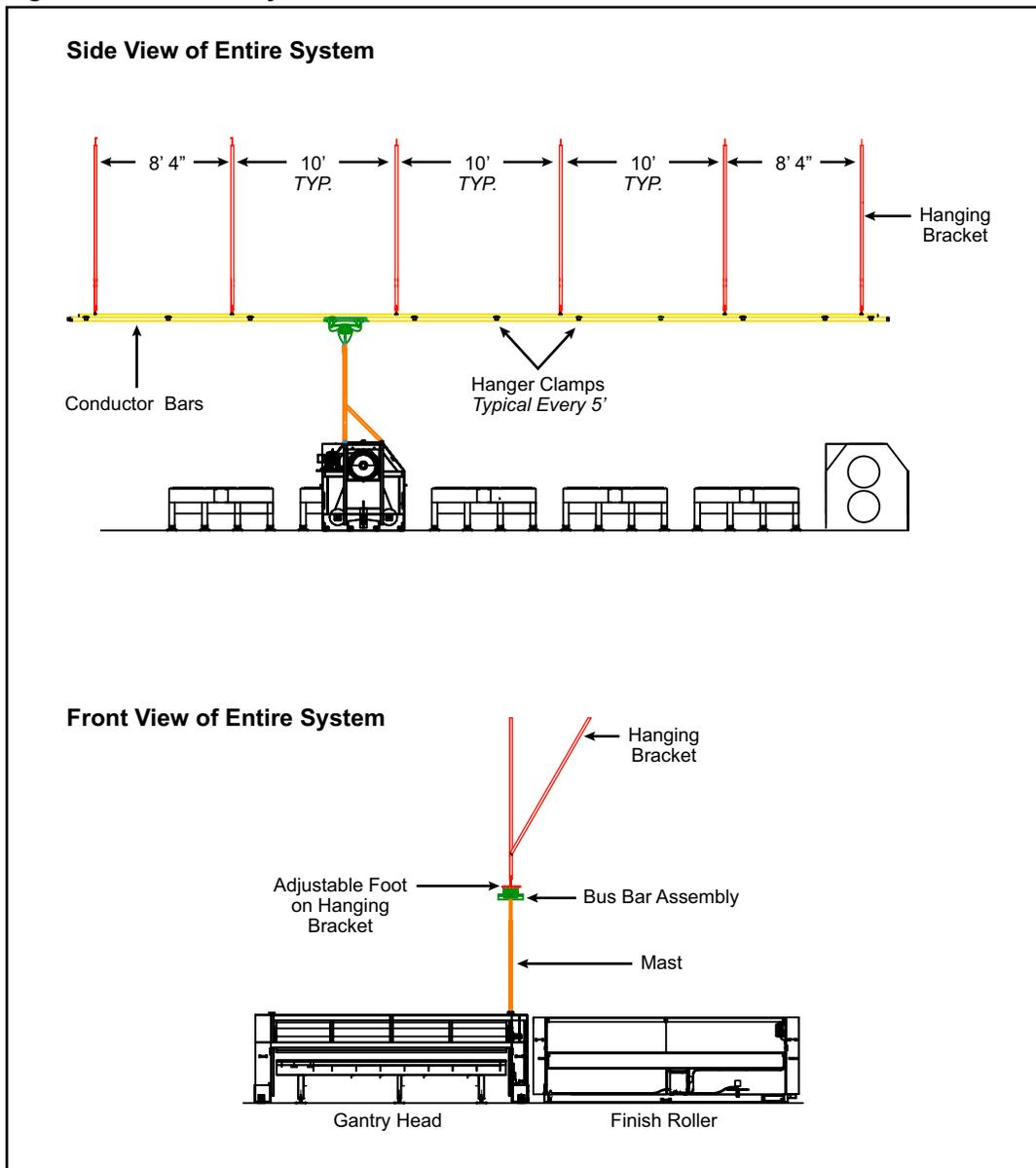
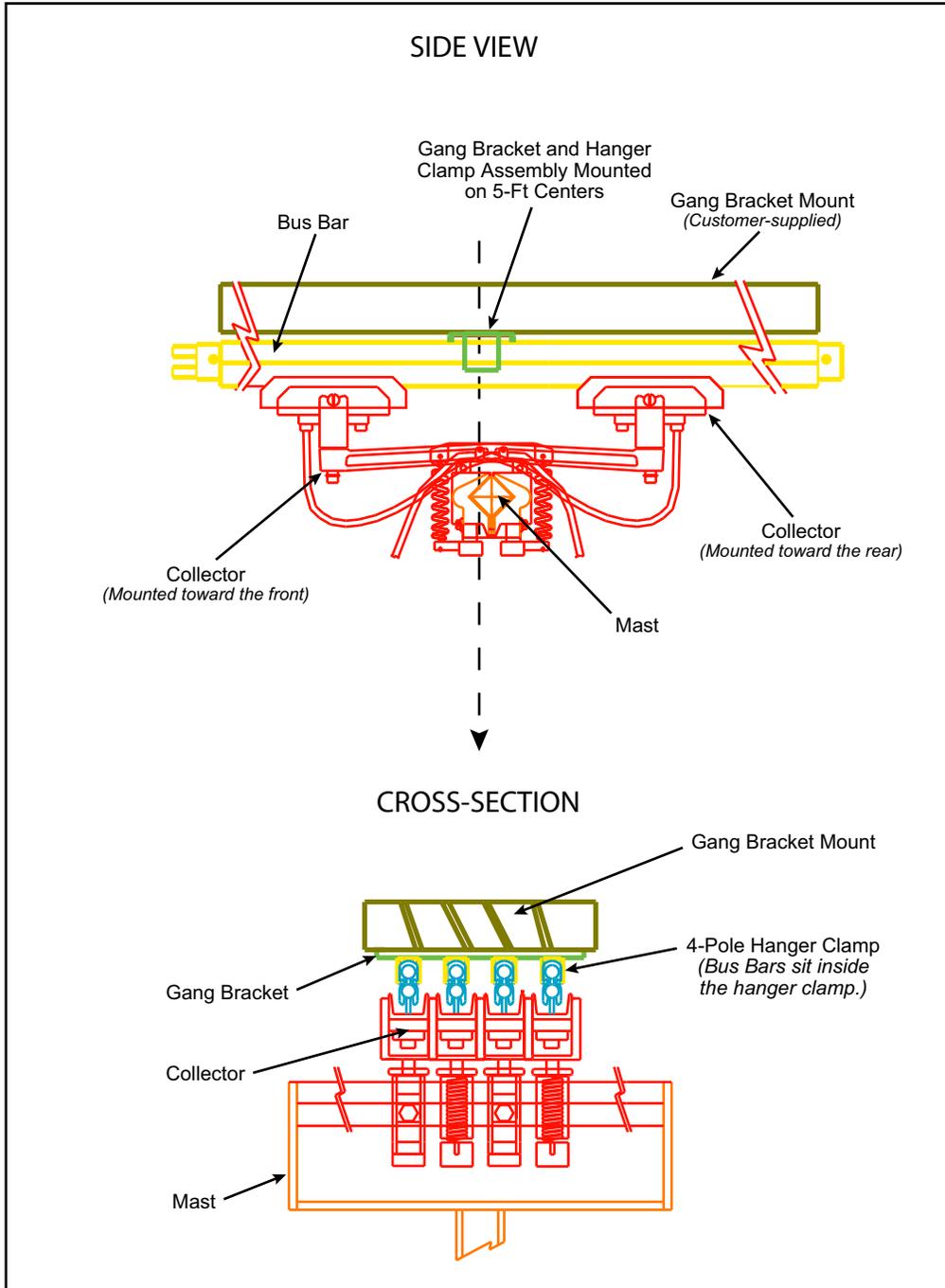


Figure 3-3: Components of a Bus Bar System



Installing the Bus Bar System

The customer must supply the hanging brackets. MiTek will provide drawings with the requirements for each bracket. The brackets consist of an upright, a gusset, and an adjustable foot. The instructions below address the installation of the components. The electrical needs are addressed in the *Electrical* section later in this chapter.

1. Once the hanging brackets are ready, determine the exact location of the bus bar system.
2. Hang the brackets from the ceiling at the spaces indicated on your drawing. A typical example is shown in Figure 3-2.
3. Attach the adjustable feet to a 2x6 board. The board is the gang bracket mount labeled in Figure 3-3. The height will be adjusted in a later step.
4. Attach the conductor bars to the gang bracket mount board using the hanger clamps at the intervals specified on your drawings. The typical spacing is 5 ft center-to-center.
5. Mount the trolley assembly to the mast.
6. Adjust the height of the hanging bracket feet so the conductor bars are at the correct height to hold the trolleys in place.
7. Push the newly cut tubes into the tee, one on each side, until the tube reaches the tube stop inside the tee. Turn the locking nut until the compression fitting is adequately tightened.

Electrical

	 DANGER
	<p>ELECTRICAL HAZARD.</p> <p>All electrical work must be performed by a qualified electrician.</p> <p>Follow approved lockout and tagout procedures (OSHA 29 CFR 1910.147).</p>

Connecting Power to the Gantry Head

All electrical work is the customer's responsibility and must be performed by a qualified electrician. The machine design addresses electrical components starting with the disconnect enclosure. Installation and maintenance of all electrical requirements between the power source and the disconnect enclosure are the responsibility of the customer.

Before connecting power, you must install the festoon cable or the bus bar that supplies power to your machine. Refer to the section titled *Festoon Cable or Bus Bar* on page 18.

The disconnect enclosure is located on the operator end of the gantry head.

Power is brought into the disconnect enclosure and connected to the terminals on top of the fuses. In the *Startup* chapter, it describes how to test that the motor is turning in the correct direction. These wires can be easily switched if the motor is turning the wrong direction. Refer to your electrical schematic for detailed wiring instructions.

Connecting Power to a Bus Bar System

If your system has a bus bar instead of a festoon cable, an additional enclosure mounts to the end of the conductor bars. Run cables from your power source to this enclosure.

The trolley assembly mounts to the top of the mast on the gantry head. Run the wires from that assembly down the mast into the disconnect enclosure shown in Figure .

Assembling the Light Curtains & Beacon

There are 4 light curtains (2 sets of 2 each) on the gantry head that were disassembled for shipping purposes. The light curtains must be mounted in place and connected to its respective cable that is clamped to the gantry head frame. Once mounted, the 2 light curtains in each set must be aligned with each other. Detailed instructions for mounting, connecting, and aligning the light curtains can be found in the *Maintenance* chapter in the *Light Curtains* section.

The beacon and horn sounding device must also be attached to the gantry head during installation. Refer to electrical drawings for exact placement.



More scanner information can be found starting on page 79.

Connecting the Laser Scanner (optional equipment)

The laser scanner is an optional piece of equipment located under the operator platform on machines with a High Bottom-Chord Platform. Final wire connections may need to be made at the installation site.

- Make sure to perform wiring while the power supply is OFF. Otherwise, the laser scanner may fail to operate due to the diagnostics function.
- Do not operate the control system until 8.5 seconds or more after turning ON the power of the OS32C.

To connect the laser scanner:

1. Locate the cable with the quick disconnect fitting, and connect it to the machine.
2. The possibility exists that sunlight, ambient light, or another laser scanner may interfere with the operation of this scanner and provide false trips. To avoid this:
 - Shade or block the interfering light
 - Install a barrier to block the direct path of possible signal crossing with another laser scanner.
 - Do NOT adjust the angle or location of the laser scanner. It is configured in the exact location needed to detect personnel.

	 WARNING
	<p>CRUSH HAZARD. Never adjust the angle or location of a laser scanner!</p>

Purpose of Chapter

This chapter describes the procedures required before operating your equipment.

 DANGER	
	<p>Do not attempt to start the system without a <i>MiTek</i> representative present.</p> <p>Serious injury and/or equipment damage may result.</p>

Checking Motor Rotation

Check the motor rotation of the brake motor to ensure it is rotating in the same direction as the arrow on its housing. If the motor is rotating in the wrong direction, switch any two lead wires to reverse the direction.

Setting Pneumatic Pressure for Gantry Lifter

If your press is equipped with an optional Gantry Lifter, the pneumatic pressure must be correctly set before operating.

Safety Tests

Perform the safety tests in the *Safety Tests* section on page xvi at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.

Purpose of Chapter

This chapter describes the operating mechanisms on this equipment and the procedure to operate it in most circumstances.

Before You Begin

Understanding This Chapter

Once the installation and startup procedures are complete, the equipment is ready to operate. The following sections provide instructions for everyday operation of the *RoofTracker II* press.

Important Notes



Do not allow the gantry head to sit in one place for a long period of time after installing it on the table and parking stand assembly. This may cause flat spots to form on the polyurethane wheels. Move the gantry head at least every three (3) days to prolong the life of the wheels.

	 DANGER
	<p>Read this manual completely before using this equipment!</p> <p>Do not operate this machine until you have a thorough understanding of all controls, safety devices, emergency stops, and operating procedures outlined in this manual.</p> <p>All warnings must be read and observed. Failure to do so may result in economic loss, property damage, and/or personal injury.</p> <p>This manual must always be available to personnel operating and maintaining this equipment.</p>

	 DANGER
	<p>Before turning on the machine, make sure that all personnel and equipment are clear.</p>

Stopping the Machine

Stopping During Normal Operation

To significantly increase the life of machine components (such as brake pad, bearing, chain, wheels, motor, etc.), follow these guidelines when stopping the gantry head during normal operation:

- To stop the gantry head during normal operation, release the joystick and let the gantry head coast to a stop. Do not use the E-stop for routine stopping as this will cause unnecessary wear on components.
- To park the gantry head on the parking stands, release the joystick with sufficient time for the gantry head to stop. Do not allow the parking stand flag to break the light beam as this will imitate an E-stop and cause unnecessary wear on components.

Stopping for Emergencies or to Cease Power

During normal operation, the gantry head decelerates to a stop when you release the directional button. For safety reasons, the following methods can also be used to stop the machine, or the disconnect switch can be used to turn off power when the machine is not in use.

Emergency Stop

Push the red emergency stop (E-stop) button next to the joystick to cease power transmitting to the control circuit and stop motion of the gantry head. To release the E-stop, pull up on the pushbutton so it returns to its raised position. The E-stop button on the joystick control panel is shown in Figure 5-5. When an E-stop pushbutton is actuated, the center is illuminated in red.

Light Curtains

Operation of the light curtains is discussed later in this chapter. To stop the machine using the light curtains, a solid object must pass through the light beam, interrupting the transmission of the beam between the transmitter bar and receiver bar.



Refer to page 40 and page 75 for more information on the light curtains.

Figure 5-1: Light Curtain and Bumper





Laser Scanner

Refer to page 79 for more information on the laser scanner.

The laser scanner is provided only if the equipment has the optional High Bottom-Chord Platform that is at the same height as the table tops. In this instance, a safety device scans the predetermined safety zone to ensure that the platform does not come into contact with other people who may be inside the restricted zone area. The gantry head will stop if a solid object passes through the scanner’s light beam inside the scanner’s safety zone.



Bumpers

Refer to page 28 for a photo of a bumper.

The machine will stop when something causes a bumper to retract. A bumper is located on each corner of the gantry head to provide additional safety control. The gantry head bumpers automatically reset themselves when fully extended.

If your machine has a Top-Chord platform (optional item) or a High Bottom-Chord platform, the bumpers have been removed on the end with the platform.

 WARNING	
	<p>CRUSH HAZARD.</p> <p>The light curtains are for detection of personnel and equipment entering a restricted area. It is not for the detection of hands and fingers only.</p>

Disconnect Switch

The disconnect switch is located on the main electrical enclosure. See Figure 5-2.

Turning the disconnect switch to the ON (vertical) position supplies electrical power to the entire machine. To remove power to the machine, turn the disconnect handle to the OFF (horizontal) position. The disconnect switch should always be turned off when the machine is not in use.

Figure 5-2: Front of Main Enclosure



Indicators

Light Stack and Horn

Light Stack

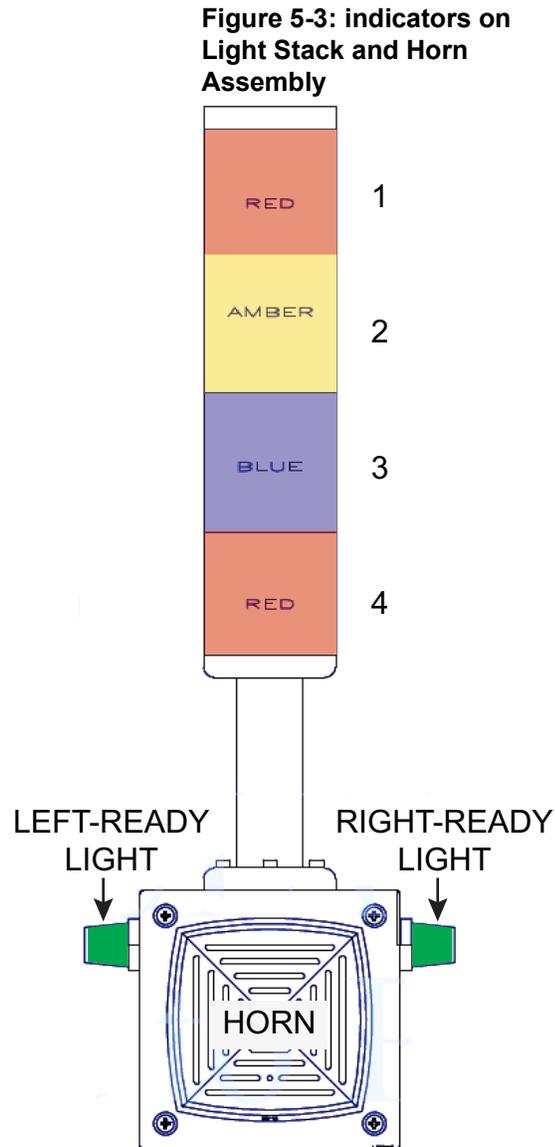
There is a light stack located on top of the gantry head. It has 4 different beacon lights that visually show the status of the machine. Refer to Figure 5-3.

For solutions to faults, refer to the appropriate component section.

1. Red indicates an E-stop is actuated.
2. Amber (yellow) indicates the gantry head is in motion, either direction.
3. Blue **blinks** when warning that the drive chain's motion is **nearing** an unsafe condition.

The light is **solid** blue when the drive chain is **in** an unsafe condition which could affect stopping capabilities.

4. Red: Indicates a VFD fault.



Ready Indicator Lights

The two lights on either side of the horn are the “Ready” indicator lights. If the gantry is ready to move in that direction, the appropriate light stays illuminated. If one or both of those lights are off, the gantry can not move in that direction. Begin by checking for other faults, or a barrier blocking the light beam.

Horn

The horn sounds for a few seconds prior to machine movement. When the horn stops, the gantry head will begin motion. The beacon remains blinking while the gantry head is moving.

Hour-Meter

An hour-meter is located on the main enclosure. See Figure 5-4. It records the number of operating hours, which is the time the gantry head is in motion. Refer to this meter to determine a maintenance schedule.

Safety Controller Indicator Lights

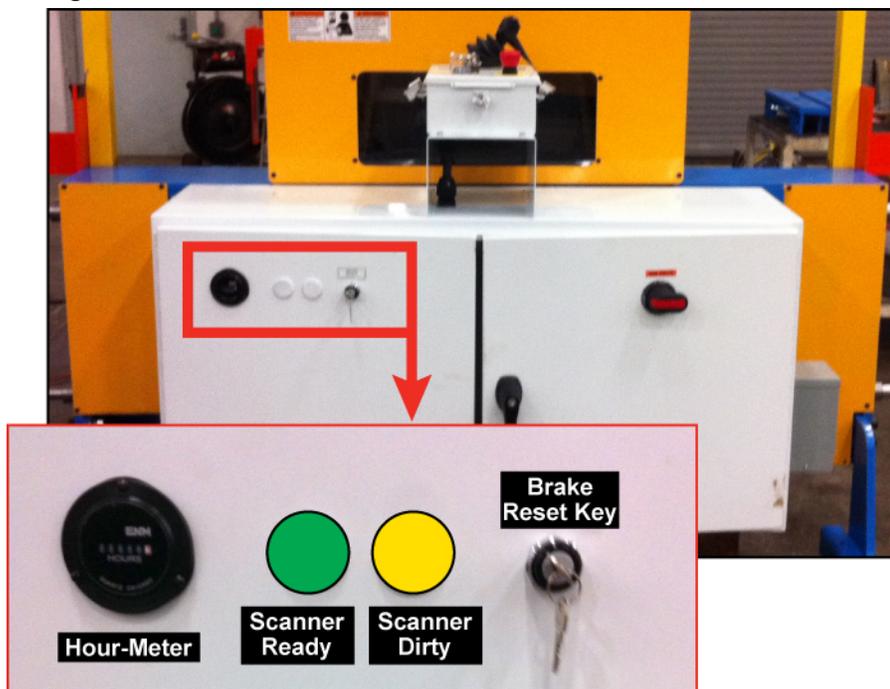
The safety controller ensures that the safety features on this machine are working properly. It is located in the main electrical enclosure. Indicator lights on the front of the safety controller unit communicate the Operating Mode and errors that may occur. Refer to page 64 for more information.

Laser Scanner Indicator Lights

There are 2 lights or light covers on the front of the main electrical enclosure. See Figure 5-4. For machines equipped with a laser scanner under a table-top-high operator's platform, these lights illuminate to show when the laser scanner is ready, or when it is dirty and needs to be cleaned. For machines that do not have a laser scanner, the light covers are present on the front of the main electrical enclosure, but the lights are not connected to power and will not be used unless a laser scanner is installed later.

There are additional indicator lights on the laser scanner itself. For more information about the laser scanner, refer to page 79.

Figure 5-4: Indicators on Front of Main Enclosure



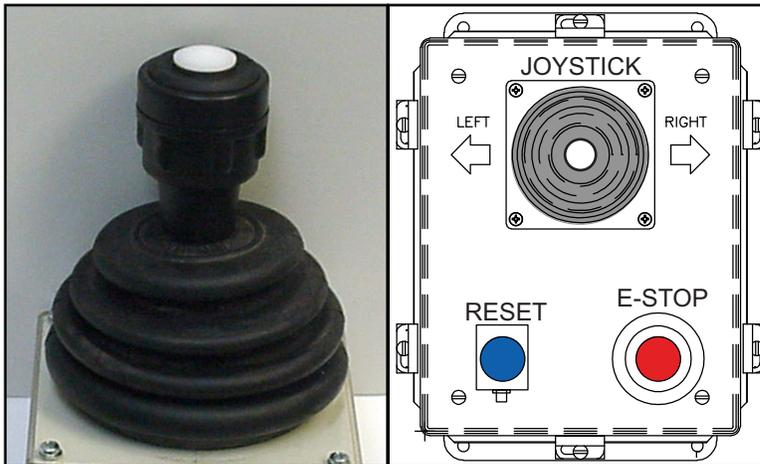
Operator Control Interface Mechanisms

Getting Familiar With the Operation

Your *RoofTracker II* press is operated by a joystick. The joystick is mounted on a panel attached to the gantry head called the operator control station (or operator station).

A platform is attached to the gantry head for the operator to stand on.

Figure 5-5: Joystick and Control Panel



Reset

The blue RESET button enables all safety monitoring devices. The operator must press RESET before the directional indicator lights will come on.

The RESET button shall be pressed and released for the gantry head to work. If the RESET button is continually held in, the gantry head will coast to a stop.

 WARNING	
	Always ensure the restricted zone area is clear of personnel and obstructions prior to pressing the Reset button or pushing the joystick.



Joystick

To operate the equipment with a joystick, press the blue RESET button on the operator control station. Then, press and hold the white button on the joystick handle while pushing the handle in the direction the gantry head should move. The operator must keep the white button on the joystick depressed for movement to continue.

To stop motion, release the white button on the joystick handle. The gantry head decelerates and comes to a complete stop.

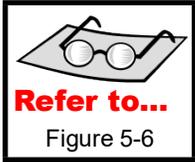
Operator Platform

The operator platform is a required feature for a gantry using a joystick operator control interface. It is a raised platform that the operator(s) stands on, allowing the operator(s) to ride along with the gantry head as it travels.

The standard platform is located on the bottom-chord side of the table line. See Table 1-3 for other platform options.

Operating Procedure

Operating Under Normal Conditions



1. Turn the disconnect handle to the ON (vertical) position.
2. Set up the truss configuration and jiggging. Refer to the *Setting Up for Operation—Jiggging* section.
3. Verify the following:
 - a) No fault lights are lit on the light stack.
 - b) Both of the Ready indicator lights are lit.
 - c) Safety detection zones are clear and all safety devices are in normal operating condition.

	 DANGER
	<p>Before turning on the machine, make sure that all personnel and equipment are clear.</p>

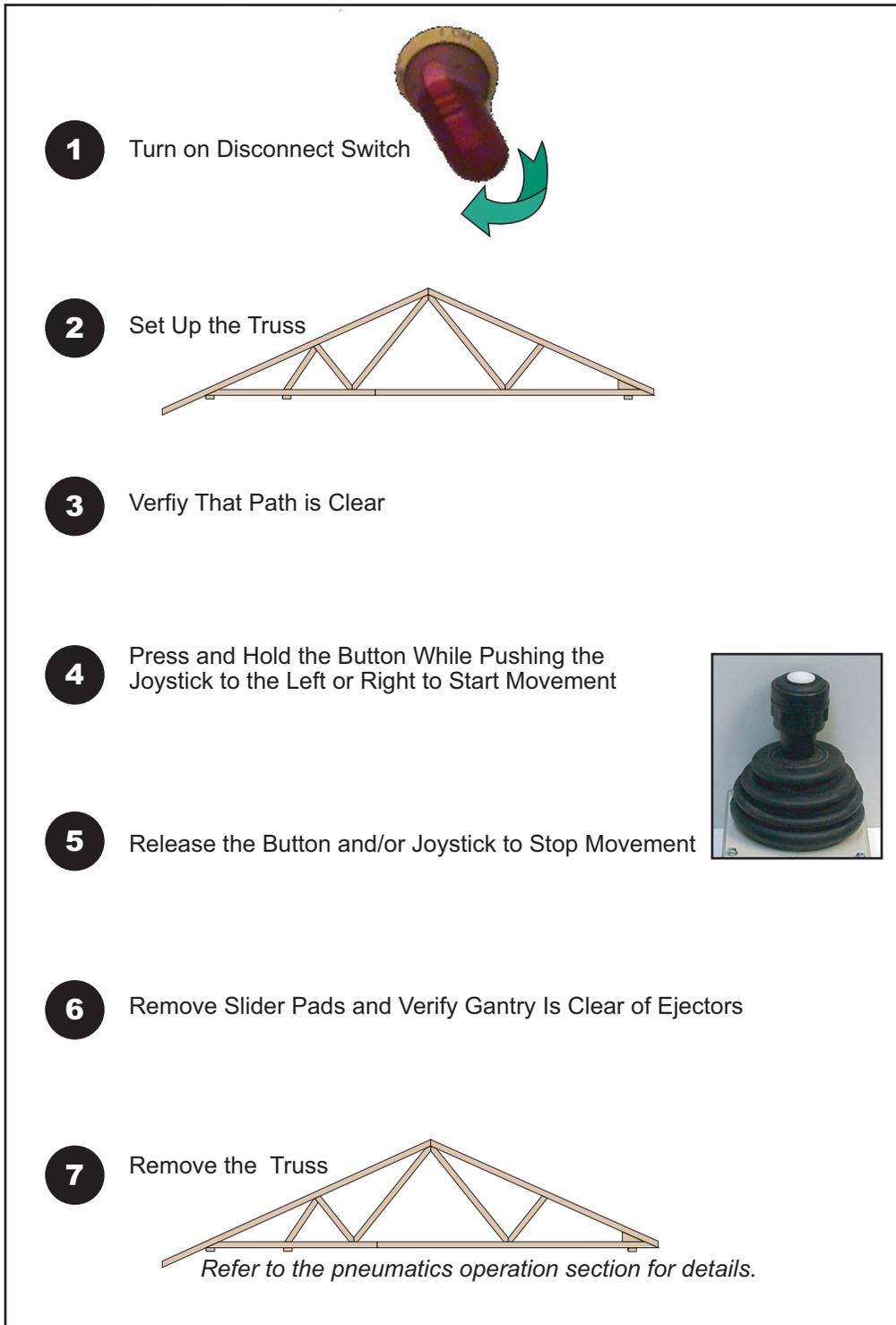
4. Press and release the RESET button.
5. Move the gantry head in the desired direction:
 - a) Press and hold the white button on top of the joystick.
 - b) Push or pull the joystick in the direction the gantry head should move.
 - c) Release the white button or the joystick to bring the gantry head to a gradual stop.

6. Remove the truss from the table and place it on the Stand-Alone Conveyors.
 - a) For systems **without** ejectors, manually slide the truss over onto the conveyors.
 - b) For systems using pneumatic ejectors and receivers:
 - 1) Remove all slider pads and ensure the gantry head is not parked on top of an ejector.
 - 2) Turn the setup's pilot valve handle. Refer to the *Pneumatics Operation* section for more detail.
 - With end-eject systems (or side-eject that is not an auto-eject), manually push the truss from the ejectors to the receivers or conveyor.
 - With an auto-eject system, the truss will slide onto the Stand-Alone Conveyors automatically.
 - 3) Turn the setup's pilot valve handle back to its original position.
7. Repeat the steps above for the next truss.



Move the gantry head at least every three (3) days to prolong the life of the wheels. Sitting in one place may cause flat spots to form on the polyurethane wheels.

Figure 5-6: Operating Procedure



Restarting Operation

If the machine stopped because you released the joystick, both Ready indicator lights should still be on. You can continue motion in either direction by pressing the joystick button and moving the joystick in the direction the gantry should go.

	 WARNING
	<p>Moving parts can crush or cut.</p> <p>Never reset the system to continue moving the gantry head until you know what caused this safety feature to activate and the hindrance is corrected.</p>

If the machine stopped because a safety device was activated, remove the barrier and reset the system by following the procedure below. When the light beam or bumper experiences an interference on one side of the gantry head, the gantry head can still be operated in the opposite direction.

1. Remove the barrier that was detected by the light beam or bumper. To move the gantry head in the opposite direction:
 - a) Press and hold the white button on top of the joystick.
 - b) Push or pull the joystick in the direction the gantry head should move.
 - c) Release the white button or the joystick to stop the gantry head's travel. The deceleration stop feature is suspended until the system is reset by pressing the RESET button.
2. Press and release the RESET button.

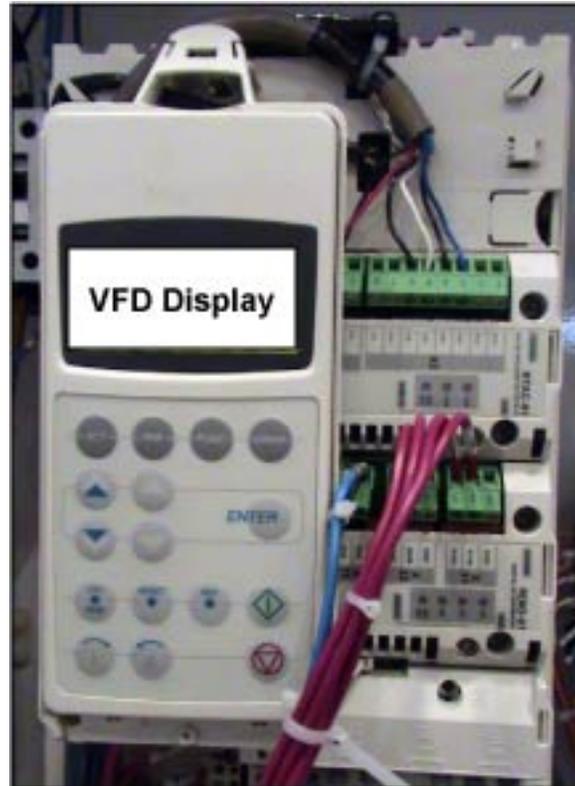
Verify that the two Ready indicator lights (on the horn) are illuminated. If they are not, there is a physical barrier or electrical problem.

3. Resume operation as normal.

VFD and Brakes

Figure 5-7: VFD and Cards

The VFD (variable frequency drive) is inside the VFD enclosure. It is the enclosure to the right of a bottom-chord operator platform. If the VFD experiences a fault, a fault description will appear on the VFD display, but the beacon stack may also provide clues.




Refer to...
For maintenance instructions, refer to page 72 in the *Maintenance* chapter.

Maintenance personnel should refer to page 72 for help with the faults.

The fault that needs to be understood by operators is the motion fault.

Motion Faults

When a drive chain's motion is **nearing** an unsafe condition, the blue beacon on the light stack **flashes** to notify the operator that this matter should be addressed as soon as possible. If this happens:

1. Contact your maintenance department to schedule the necessary maintenance.
2. Press the RESET button on the operator control station.
3. Continue operating the machine as normal until the problem is fixed.

When a drive chain's motion indicates the machine **is in** an unsafe condition, the blue beacon on the light stack illuminates **solid blue** and the machine will not operate. If this happens:

1. Contact your maintenance department to determine the problem.
2. Refer to page 72 for maintenance information.



The air gap in the brake motor may need to be adjusted as the brake pad wears down. The air gap does not affect the stopping distance, but a worn brake pad will burn up the motor. See page 47.



The maximum safe stopping distance in an emergency stop situation is 11-1/2 inches.

Other VFD Faults

For other VFD faults, refer to your electrical schematic for VFD settings and jumper details. All VFD faults are explained in the VFD manual from the VFD manufacturer. The VFD manual was provided when your equipment was purchased and installed.

Bumpers

The bumpers located on the corners of the gantry head provide additional safety control. One is shown in Figure 5-1 on page 28. When a bumper collapses, it passes in front of the light curtain and causes the machine to stop its motion in the direction associated with the collapsed bumper. The rotation of the roller also stops at this time.

 DANGER	
	Tampering with or modifying the safety bumpers or light curtains can result in property damage, serious injury, or death.



See page 64 for maintenance.

See page 99 for diagnostic indicators.

Safety Controller

The safety controller ensures that all safety features on this machine are working properly. It should not require any additional operation, outside of the normal operating procedures. If the machine will not operate, the safety controller is a good place to start troubleshooting.



See page 79 for maintenance.

See page 107 for diagnostic codes.

Scanner (optional)

Some machines are equipped with an optional laser scanner. It is an optical safety sensor that determines the location of objects in the pre-determined zone. It does so by emitting a laser light, which is reflected back to it, so no additional receiver is required.

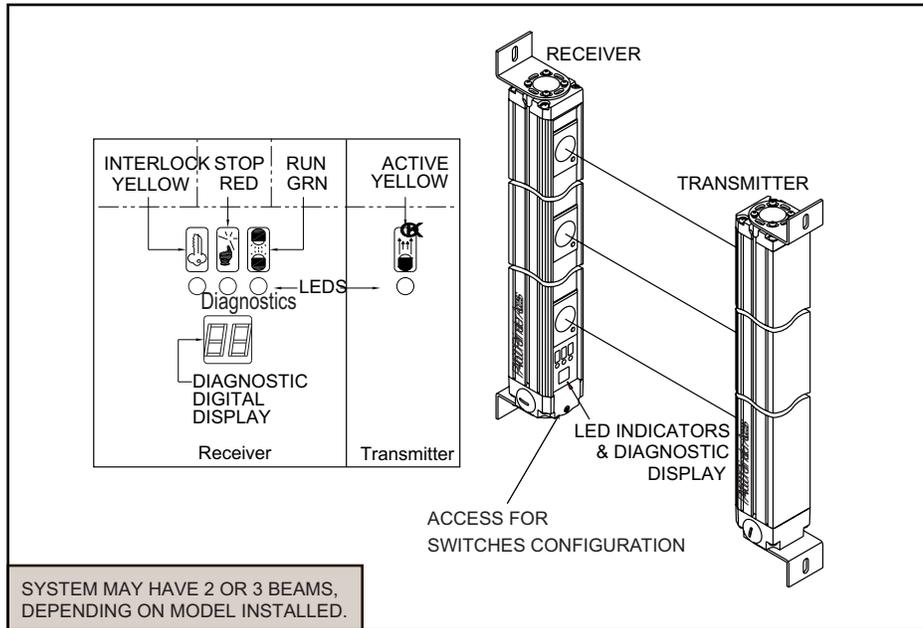
 WARNING	
	Never adjust the angle or location of the laser scanner. If the laser scanner's bracket becomes bent or damaged, it must be fixed before operating the machine.

Light Curtains

DANGER	
	This safety device is intended for detection of personnel and equipment entering a hazardous area and not for the detection of hands and fingers.
	Tampering with or modifying the light curtains or safety bumpers can result in property damage, serious injury, or death.

Light curtains are presence-sensing devices designed to guard personnel working around moving machinery. *RoofTracker II* presses use a two-beam light curtain set on both sides of the gantry head. Refer to Figure 5-1 on page 28 for a photograph of a light curtain. A light curtain set consists of a receiver bar and a transmitter bar. The diagram in Figure 5-8 shows a typical light curtain system. Although this diagram shows a three-beam light curtain set, the concept and indicators are the same.

Figure 5-8: Light Curtain System Components and Indicators



When a beam between the two bars is broken, the machine will stop its motion in the direction associated with the interrupted light curtain set. The rotation of the roller also stops at this time. Once the interruption has been removed, the operator must press the RESET button and the directional button to restart the machine. When a light beam interruption occurs, the gantry head is still able to move in the opposite direction.

Refer to page 106 for diagnostic codes.

Purpose of Chapter

This chapter provides step-by-step instructions as well as information to help you understand how your equipment works to enable you to make repairs and perform preventive maintenance.

This manual contains sufficient information for proper operation and maintenance under most conditions. Certain operating environments may necessitate preventive maintenance at more frequent intervals. Because consistent preventive maintenance is so important for keeping mechanical equipment in good operating condition, MiTek recommends that you stock certain replacement parts to minimize downtime. The recommended parts list is in the *Replacement Parts* appendix.

	 DANGER
	<p>Read this manual completely before using this equipment!</p> <p>Do not operate this machine until you have a thorough understanding of all controls, safety devices, emergency stops, and operating procedures outlined in this manual.</p> <p>All warnings must be read and observed. Failure to do so may result in economic loss, property damage, and/or personal injury.</p> <p>This manual must always be available to personnel operating and maintaining this equipment.</p>

	 DANGER
	<p>This equipment can crush or cut. Safety devices reduce the risk of injury.</p> <p>Do not use the equipment unless all safety features are performing correctly.</p>



Refer to page 88 through page 92 for graphics that will assist with understanding this equipment.

Safety Test

The test procedure in the *Safety Tests* section on page xvi **MUST** be performed by qualified personnel after ANY maintenance, adjustment, or modification. Testing ensures that the light curtain, safety system, and machine control system work together to properly stop the machine.

It is recommended that this test be performed weekly to ensure the safety features remain in working order.

Lubrication

Proper amounts of motor oil and grease must be maintained at all times. The type of lubrication used, frequency of application, oxidation, and contamination of the lubricant affect service life and parts efficiency of gears and bearings. Improved performance will be obtained by following the guidelines in this manual. Lubrication guidelines are given in this chapter for each part or system that requires lubrication. See Figure 6-28 and Figure 6-29 for lubrication points.

Lubrication points and grease fittings are shown in Figure 6-28 and Figure 6-29.

NOTICE

Never mix synthetic lubricants with mineral lubricants!

Brake Motor and Gearbox



The brake motor and gearbox allow the gantry head to start and stop motion. The VFD monitors the drive chain and is discussed later in this chapter.

Refer to the VFD section on page 72 for assistance with monitoring the brake.

Certain preventive maintenance is required to keep the motor and gearbox in optimal working order.

Adding and Changing Oil

Check the oil in the gearbox reducer at least once a year. When additional oil is needed, use one of the oils recommended in Table 6-1 or a comparable type.

Table 6-1: Recommended Gearbox Oil

ISO VG	Brand and Type			
	Operating Temperature of 23°F to 104°F (-5°C to 40°C)		Operating Temperature of 22°F to 176°F (-30°C to 80°C)	
220	Shell	Omala EP220	Shell	Omala HD220
	Mobil	Mobilgear 630 or XMP220		

Drain and refill the oil in the gearbox every 10,000 working hours. Working hours is the amount of time the motor is actually running and is indicated by the hour-meter located on the main electrical enclosure. When refilling the oil, use one of the oils shown in Table 6-1 or a comparable type.

Refer to Table 6-2 for the oil capacity of the gearbox on your machine. Figure 6-1 shows the fill line.

Figure 6-1: Brake Motor Oil Maintenance

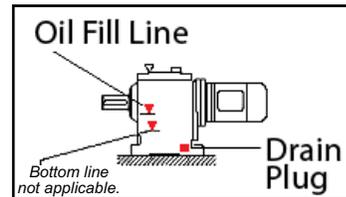


Table 6-2: Gearbox Oil Capacity

Voltage	Capacity (quarts)
208	13.74
230	10.57
400	13.74
460	10.57
575	13.74

Using the Manual Brake Lever

Release the manual brake lever if you need to manually push the gantry head to a different location along the tables. See Figure 6-2.

Replacing the Motor



Socket set (metric and English)

Slotted screwdriver

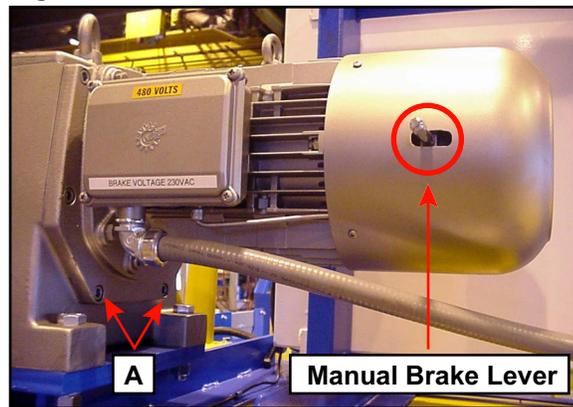
Phillips head screwdriver

Rubber mallet

Pry bars

1. Lockout/tagout all power to the machine.
2. Verify that there is no load on the reducer so when the brake is removed, the load is not released.
3. Drain oil from the gearbox or rotate motor so oil will not leak out.
4. Remove the bolts holding the motor on the gearbox. Two (2) of the bolts are labeled “A” in Figure 6-2.
5. Remove the existing motor.
6. Remove and clean the gasket surface of the gearbox. Make sure no debris falls into the gearbox during this time.
7. Place the clean gasket back in the gearbox.
8. Slide the new motor into position, making sure the input pinion gear teeth properly mesh with the input gear teeth.
9. Rotate the motor as needed to seat the flange surface and make sure the bolt holes are properly aligned.
10. Re-install the bolts labeled “A” in Figure 6-2.
11. If needed, fill the reducer with an oil recommended in Table 6-1.
12. Reconnect power and remove lockout/tagout devices.

Figure 6-2: Brake Motor



Replacing a Brake Pad



Slotted screwdriver

Phillips head screwdriver

External snap ring pliers

Metric wrench or pliers

Metric socket head wrench set

1. Unscrew the manual brake handle extending from the side of the brake motor, if there is one.
2. Remove the fan cover.
3. Remove the fan snap ring.
4. Pry the fan off of the motor shaft.
5. Remove the three (3) fixing screws that hold the brake onto the endbell.
6. Slide the brake off of the brake hub.
7. Slide the brake pad off of the brake hub.
8. If it is a metal inner hub, apply silicone grease to the female spline to reduce metal to metal chattering.
9. Slide the new brake pad onto the brake hub.
10. Place the brake onto the motor endbell in the same manner it was removed.
11. After the three (3) fixing screws are tightened, measure the air gap for proper distance. The procedure is described in the *Adjusting the Air Gap* section.
12. Replace the fan, snap ring and fan cover.

Figure 6-3: Steps 1 through 5

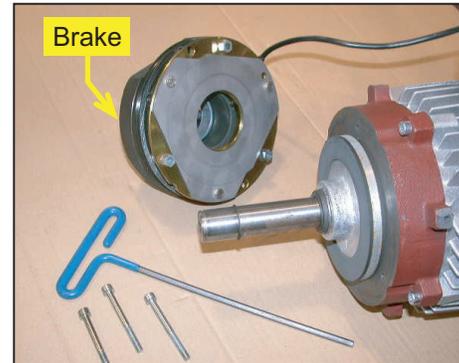


Figure 6-4: Steps 7 and 9

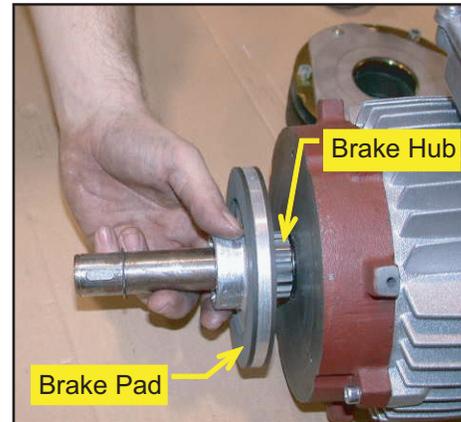


Figure 6-5: Step 12



Maintaining the Air Gap

NOTICE

Adjusting the air gap improperly may damage motor.

Do not attempt to make this adjustment unless the measured gap is outside the recommended allowance.

Keeping the Correct Air Gap



Slotted screwdriver

Phillips head screwdriver

External snapping pliers

Metric wrench or pliers

Metric socket head wrench set

The air gap in the brake motor may need to be adjusted as the brake pad wears down. The air gap does not affect the stopping distance, but a worn brake pad allows extreme friction on the metal components and will burn up the motor. Check the air gap every 6 months to prevent this costly mistake.

Ways to significantly increase the life of the brake pad:

- To stop the gantry head during normal operation, release the joystick and let the gantry head coast to a stop. Do not use the E-stop for routine stopping as this will cause unnecessary wear on the brake pad.
- To park the gantry head on the parking stands, release the joystick with sufficient time for the gantry head to stop. Do not allow the parking stand flag to break the light beam as this will imitate an E-stop and cause unnecessary wear on the brake pad.

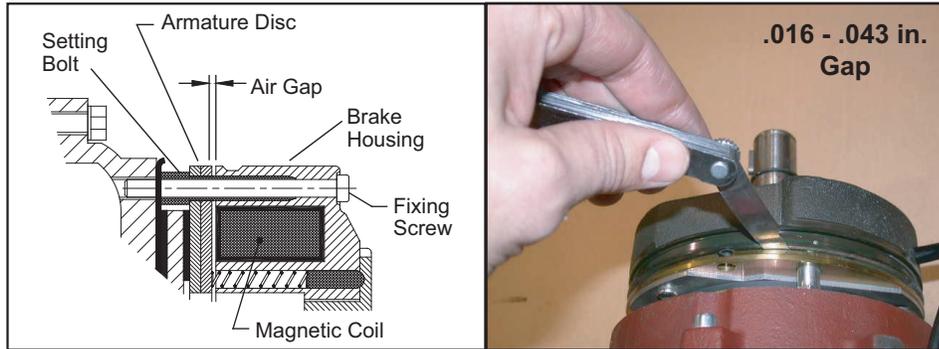
Adjusting the Air Gap

The recommended air gap allowance is between .016 in. and .043 in. To check the current air gap and to adjust it, refer to Figure 6-6 and the following procedure.

1. Unscrew the manual brake handle extending from the side of the brake motor, if there is one.
2. If the measurement is outside the allowance recommended at any point around the circumference of the brake, adjust the brake disk air gap using the following steps:
 - a) Remove the fan cover.
 - b) Remove the fan snap ring.
 - c) Pry the fan off of the motor shaft.

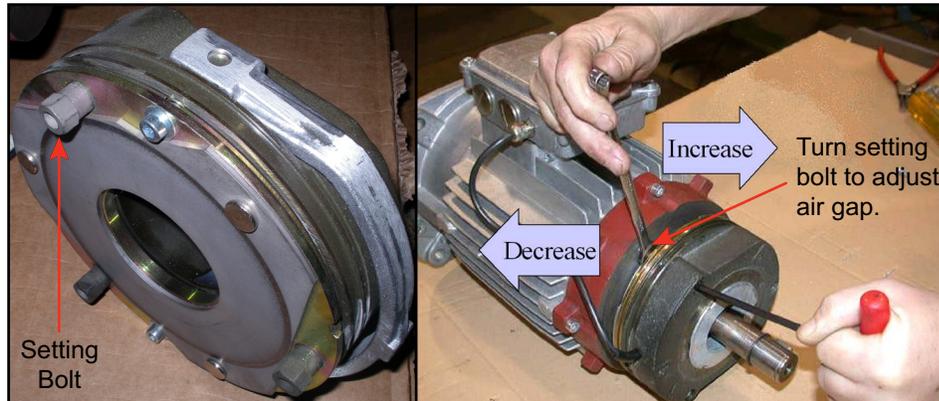
- Using a feeler gauge, measure the gap between the armature disc and brake housing, shown in Figure 6-6. Measure completely around the brake and record any variations in the gap measurement.

Figure 6-6: Measuring the Brake Disk Air Gap



- Adjust the setting bolt as needed to reach the recommended gap. A 1/4 or 1/2 turn is usually sufficient for adjusting purposes. See Figure 6-7.

Figure 6-7: Adjusting the Setting Bolt



- Check the air gap again to ensure it is now within the recommended range. It may be necessary to adjust a setting bolt more than once because the other setting bolts may affect it.



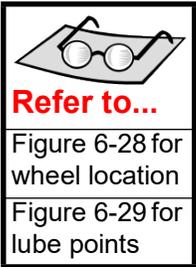
The air gap distance must be uniform in all three (3) places!

- Tighten all of the fixing screws.
- Re-attach the fan blades, snap ring, fan cover, and handle.

Drive Wheels and Idler Wheels

Drive wheels control the movement of the gantry head. They are driven by the drive chain. The idler wheels are in-line with the drive wheels and assist in supporting the gantry head. There are 2 drive wheels and 2 idler wheels on each end of the gantry head.

Lubricating



All 4 drive wheel shafts (2 on each end of gantry) and all 8 drive/idler wheel bearings (4 on each end of gantry) must be greased approximately every 300 working hours with a #2 lithium-based grease. Grease points are shown in Figure 6-29 at the end of the *Maintenance* chapter.

1. Park the gantry head in a parking area.
2. Remove power and lockout/tagout the machine.
3. Using a standard grease gun, grease the fitting on the shaft of each drive wheel from the roller side of the gantry head. Each of these 4 grease fittings must be greased individually. Do NOT over-grease.
4. From the outer side, remove both end guards and grease the bearings on all 8 drive/idler wheels.
5. Replace the guards and remove the lockout/tagout devices.

Replacing a Drive Wheel (Wheel Only)

Use this procedure to replace a drive wheel inside an existing drive wheel block. If you need to replace the entire wheel block, refer to the next section.

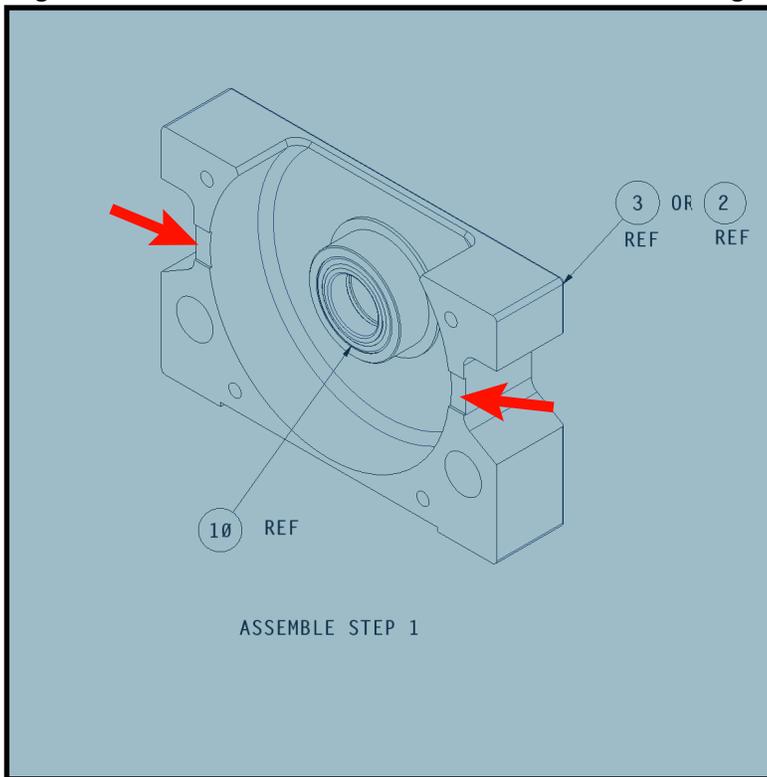
Removing the Existing Wheel

To replace an existing wheel, you must first disassemble the wheel block. Refer to Figure 6-8 to accomplish the procedure below.

1. Remove the 2 mounting/alignment pins (not shown in drawing) that secure the wheel block to the gantry frame and take the entire wheel block off of the gantry frame. Save the pins for re-use.
2. Remove each of the 4 hex nuts (361605) and cap screws (326947) that secure the housing cover. Save the hardware for re-use. You can NOT remove the cover yet because it is pressed on.
3. Remove the forward snap ring (379016) from the shaft (63705-501). It is the snap ring closest to the grease fitting.
4. Remove the shaft bearing assembly (63705-501) from the wheel housing (63734) and wheel assembly (63733-501).

5. Gently pry the cover (63775-501) off of the wheel housing (63734). Figure 6-8 shows the wheel housing without a cover.
 - a) Place a slotted screwdriver in the slots pointed out in Figure 6-8.
 - b) Gently pry the cover off of the housing. Pry up gently and evenly on both sides to avoid damaging the housing.

Figure 6-8: Slots to Disassemble the Wheel Block Housing



6. Remove the wheel assembly (63733-501) from the wheel housing (63734). The wheel assembly was pressed into the wheel housing, so you may need to tap it from the back side to remove it from its housing.

The spacer (63791) and/or inner ring of the bearing (415512) may come out with the shaft. Save them for re-use.

Installing a New Wheel in the Existing Wheel Block

To replace the wheel in the wheel block, follow the procedure below.

1. Install the wheel assembly (63733-501) into the wheel housing (63734). This is a press fit. Use caution. The inside hole of the wheel must be in line with the outside diameter of the wheel housing while pressing.
2. Install the square key (15000240024-1.32) into the wheel assembly (63733-501) from the open side of the housing. Ensure the key is completely seated in the keyway before continuing.
3. Install the shaft bearing assembly (63705-501) through the back of the wheel housing (63734) and into the wheel assembly (63733-501).
4. Locate the spacer (63791) that was removed during disassembly.
5. Install the spacer (63791) over the shaft bearing assembly (63705-501) from the open side of the wheel housing.
6. If the inner ring of the bearing came out during disassembly, install the inner ring of the bearing (415512) over the shaft (63705-501) from the open side of the wheel housing.
7. Place the cover (63775-501) onto the open side of the wheel housing (63734). This is a press fit. Use caution. The inside hole of the wheel must be in line with the outside diameter of the wheel housing while pressing.
8. Place the snap ring (379016) onto the shaft (63705-501) to hold the cover in place.
9. Carefully align the housing and cover before installing hardware.
 - a) Locate the mounting/alignment pins (not shown on drawing) that are used to mount the wheel block assembly to the gantry frame.
 - b) Place the two (2) alignment/mounting pins through the 2 large holes in the cover and wheel housing.
 - c) When the pins are straight and the cover and wheel housing are perfectly aligned, proceed to the next step.
 - d) Install and tighten four (4) each of the hex nut (361605) and the cap screw (326947) to press the wheel assembly into place and secure the cover to the wheel housing.
10. Attach the wheel block to the gantry using the 2 mounting/alignment pins.
11. Grease the bearings using the grease fitting on the wheel block and a recommended grease according to your Equipment Manual.

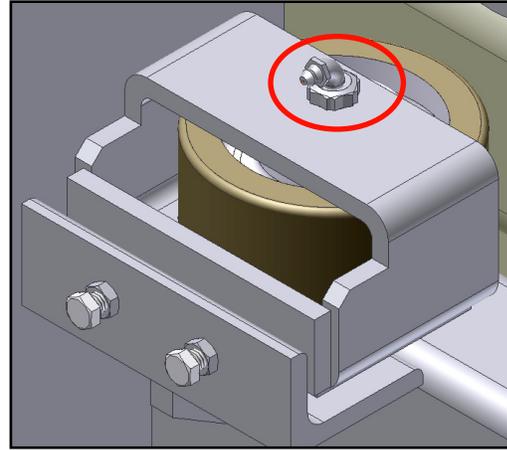
Replacing the Entire Drive Wheel Block

1. Park the gantry head in one of the parking areas so the wheel block is accessible from the inside of the gantry head, and the drive wheel chain master link is accessible.
2. Remove the end guard.
3. Loosen the drive wheel chain. Refer to the *Replacing a Chain* section on page 58.
4. Remove the QD bushing and the sprocket from the drive wheel being replaced.
5. Remove the bearing.
6. Remove the tie-bolt nut labeled in Figure 6-26 that is associated with the drive wheel you are replacing.
7. Position yourself at the inner side of the gantry head and remove the guard(s) that is adjacent to the wheel block you are replacing. See Figure 6-27.
8. If the wheel block you are replacing is the second or third wheel block, remove the mounting angle above the wheel block.
9. While still on the inner side of the gantry head, pull out the 2 tie bolts and remove the drive wheel block along with the attached shaft.
10. Attach the new drive wheel block (63735-501).
 - a) Insert the shaft on the new drive wheel block into the shaft hole.
 - b) Place the 2 tie bolts in place and tighten the nuts with a torque of 200 ft-lbs.
 - c) Replace the mounting angle, if it was removed.
 - d) Replace the guard on the inner side of the gantry head.
 - e) Replace the bearing.
 - f) Replace the QD bushing and tighten using 15 ft-lbs of torque.
 - g) Ensure that the drive wheel sprocket is in an even plane with the other drive wheel sprockets so the chain will travel smoothly across all of them.
 - h) Replace the drive wheel chain.
 - i) Replace the end guard.
11. Restore power to the machine and remove all lockout/tagout equipment.

Guide Wheels

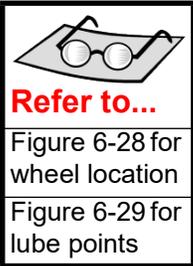
Refer to Figure 6-28 at the back of this chapter for a diagram of the wheels on the gantry head.

Figure 6-9: Guide Wheel and Grease Fitting



Lubricating

Guide wheels are necessary to keep the gantry head on a straight path when it experiences a force that is not parallel to its forward motion. There are 4 guide wheels on each end (for a total of 8). The guide wheel bearings must be greased approximately every 300 working hours. Working hours is the amount of time the motor is actually running.



Use a #2 lithium-based grease. One (1) grease fitting is located in the center of each guide wheel and is circled in Figure 6-26.

Replacing Guide Wheels

To replace a guide wheel:

1. Remove the bolt in the center of the wheel.
2. Remove the old wheel.
3. Insert the new wheel.
4. Insert and tighten the bolt in the center of the wheel.

Pressure Wheels

Refer to Figure 6-28 at the back of this chapter for a diagram of the wheels on the gantry head.

Lubricating

Pressure wheels keep the gantry head at a level position when it encounters the start of the truss on the tables. There are 4 pressure wheels on each end of the gantry head (for a total of 8). The wheels do not require lubrication.



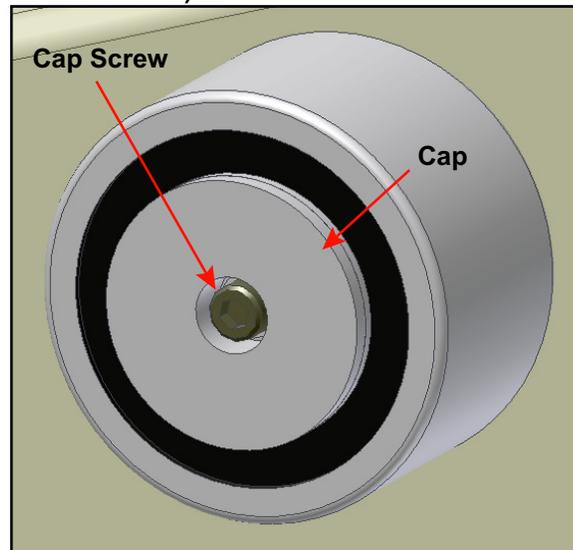
Refer to...

Figure 6-28 for wheel location

Replacing Pressure Wheels

1. Remove the socket-head cap screw shown in Figure 6-10. You may need to heat it to loosen the Loctite.
2. Remove the cap.
3. Pull the wheel off the shaft and replace it with a new wheel.
4. Replace the cap.
5. It is recommended that you use red Loctite on the cap screw before securing the wheel block.
6. Replace the cap screw and tighten it to a torque of 85 ft-lbs.

Figure 6-10: Replacing Pressure Wheel (Steel Wheel Shown)



Take-Up Bearing

Lubricating



Refer to...

Figure 6-29 for lube points

The take-up bearing allows the roller to turn, resulting in smooth embedment of the connector plates. It should be greased approximately every 150 working hours.

Use a #2 lithium-based grease to lubricate the grease block for each take-up bearing. The general location of a grease block is shown in Figure 6-29 on page 92. There is one grease block on each end of the gantry head, for a total of 2.

Adjusting

The procedure for adjusting the take-up bearing to change the height of the roller is described on page 59.

Chains

Three (3) chains are used to operate the gantry head. Two are drive wheel chains and one is a motor drive chain. All are #80 roller chains that require manual lubrication.

Lubricating the Chains



Refer to...

Figure 6-28 for lube points

The drive wheel chains and the motor drive chain should be lubricated every eight (8) working hours as indicated by the hour-meter on the main electrical enclosure. See Figure 5-2 for the location of the hour-meter. The lubricant used should be a high-grade, non-detergent, petroleum-base oil. Anti-foam, anti-rust, and film-strength improving additives are often beneficial. SAE 30 grade is recommended.

To apply the oil, brush it on the inside surface of the chain as indicated in Figure 6-28. Apply it to the upper edges of the link plates in the lower span of the chain at a point close to where the chain engages a sprocket. Gravity and centrifugal force will aid in carrying the lubricant to the critical pin and bushing surfaces. Do not be concerned about surplus lubricant spilling over the link plate edges as it will lubricate the roller and bushing surfaces.

Adjusting Chain Tension

There is 1 motor drive chain on the motor end of the gantry and 1 drive wheel chain on each end of the gantry head. Check the tension of all 3 chains every week. The optimum chain tension should allow 1/2-in. play (1/4-in. movement to both sides of center).

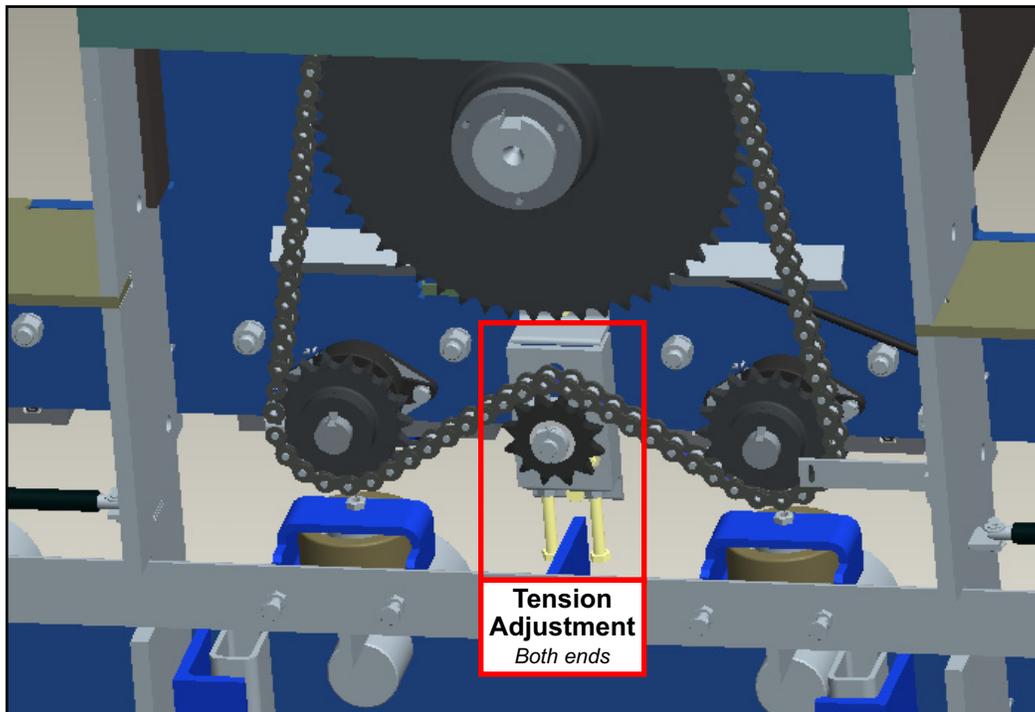
Adjusting the Drive Wheel Chain Tension

Adjust the chain tension on the drive chains by performing the procedure below while referring to Figure 6-11.



1. Remove the end guard from the gantry head.
2. Tighten the tension bolts to push the tension sprocket forward and increase tension or back-out the tension screws to decrease the tension. Motor drive chain play should be approximately 1/2 in. (1/4 in. movement to both sides of center).
3. Check the tension of the motor drive chain on the other end of the *RoofTracker II*. Repeat steps if the chain tension does not match the description in the optimum chain tension described above.

Figure 6-11: Drive Wheel Chain Tensioning

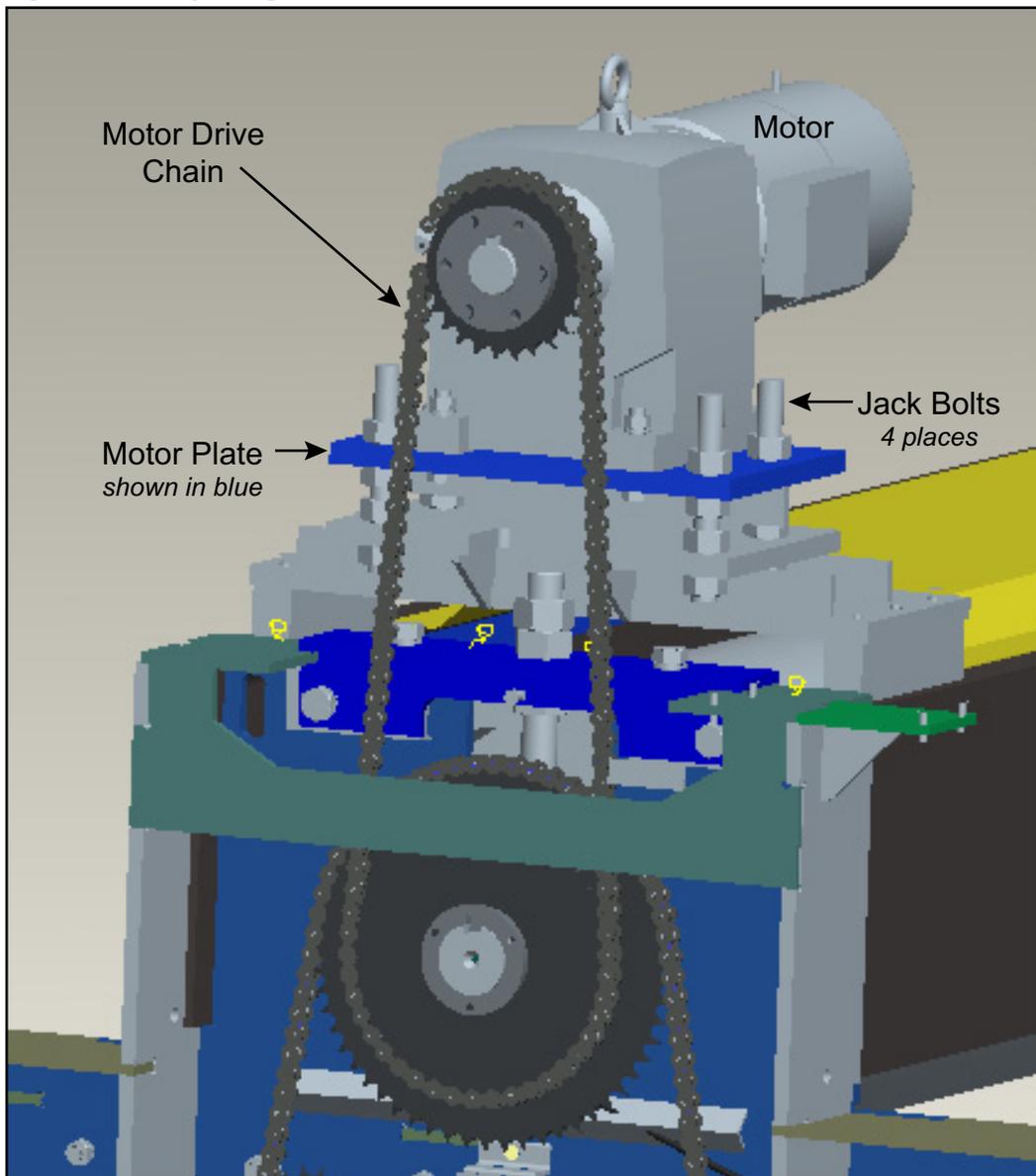




Adjusting the Motor Drive Chain Tension

1. Loosen the top nuts on each of the jack bolts shown in Figure 6-12.
2. Raise the middle nut on each jack bolt to raise the motor plate. Ensure they are even and the motor plate is level.
3. Tighten the top nuts snug against the top of the motor plate.
4. Tighten the bottom nuts snug against the middle nuts.

Figure 6-12: Adjusting the Motor Drive Chain

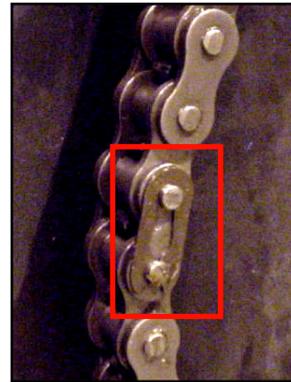


Replacing a Chain

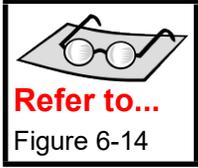
Both of the drive wheel chains and the motor drive chain can be replaced using the following procedure. Refer to Figure 6-12 on page 57 for a close-up view of the motor drive chain and Figure 6-11 on page 56 for the drive wheel chain.

1. Move the gantry head to a position where the master link is clear of the sprockets so it can easily be reached. The master link is shown in Figure 6-13.
2. Lockout/tagout the machine.
3. Remove the end guard from the gantry head.
4. Note how the chain is threaded around the sprockets. It is diagrammed on page 56 and on page 57.
5. Loosen the tension sprocket per the *Adjusting the Chain Tension* section.
6. Remove the master link on the chain by pulling out the two (2) pins using pliers. The chain will come apart and can be removed from the sprockets.
7. Thread the new chain around the sprockets. Refer to Figure 6-28 on page 57.
8. Connect the chain to itself by placing the master link between two links and pressing together with pliers.
9. Adjust the tension sprocket so the chain has approximately 1/2 in. play (1/4 in. movement to both sides of center). Refer to the Figure 6-11 or Figure 6-12 instruction on adjusting chain tension.
10. Replace the end guard and remove the lockout/tagout equipment.

Figure 6-13: Master Link on a Chain



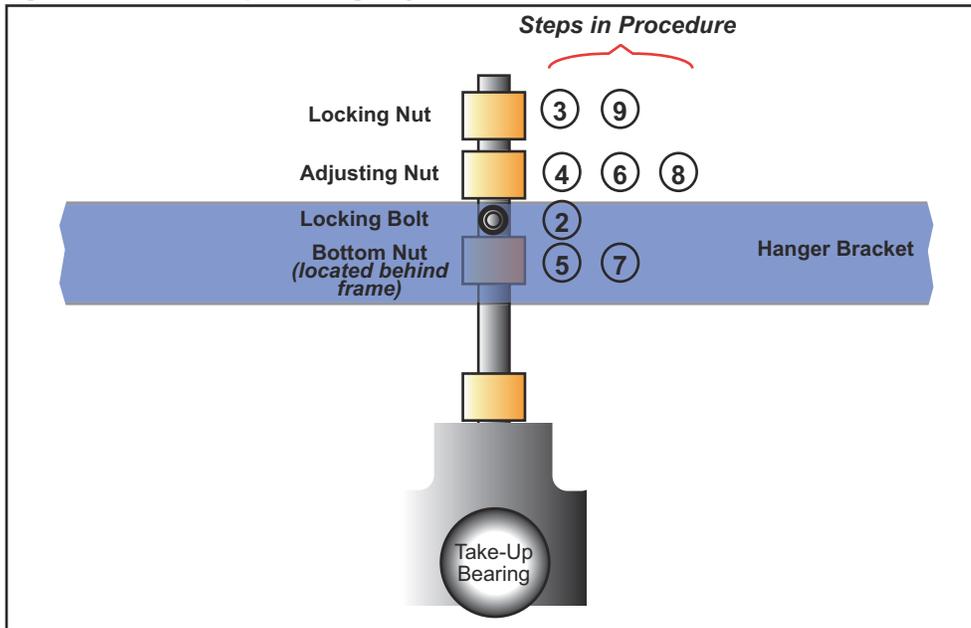
Adjusting the Roller Height



Check the roller setting with a standard 2x4 (1-1/2 in. thick) piece of lumber and 1/16 in. shim. The shim should slide between the bottom of the roller and the 1-1/2 in. thickness of the 2x4 at each end of the roller. If satisfactory plate embedment (75% into top and 50% into bottom of the truss) is not achieved, repeat with only the 2x4 lumber.

1. Place a truss on the table and move the gantry head over the truss. Stop the machine while the head is on the truss. Lockout/tagout all power to the machine.
2. Remove the guard on the chain drive end of the gantry head.
3. Loosen the locking bolt.
4. Loosen the locking nut.
5. Loosen the adjusting nut to make room for adjustment.
6. Back out the bottom nut located behind the hanger bracket. This nut should be loose enough to back-out by hand.
7. Tighten or loosen the adjusting nut to set the roller to the desired height. Slide a piece of 2x4 lumber under the same end of the roller that is being adjusted to check the desired height.
8. Hand-tighten the bottom nut until it is touching the hanger bracket.
9. Tighten the adjusting nut with a wrench until it is snug.
10. Tighten the locking nut against the adjusting nut to hold it in place.
11. Check the roller setting adjustment on the opposite end of the gantry head and repeat the steps.

Figure 6-14: Take-Up Bearing Adjustment



Bumpers



Replacing a Bumper Plate (Weldment)

1. Remove the bumper plate hardware shown in Figure 6-15 and set aside the bumper plate. Keep all hardware.
2. Mount the new bumper plate with the original hardware.
3. Check the position of the bumper plate flag and the light curtain per Figure 6-15.



Replacing a Bumper Bearing

1. Remove the shaft collar on both the upper shaft and lower shaft.
2. Pull out on the bumper plate so the plate and 2 shafts come off the gantry head.
3. Remove the bearing hardware on the damaged bearing. Keep all hardware.
4. Mount the new bearing in place with the original hardware.
5. Insert the shafts with bumper plate back through the bearings.
6. Re-install the shaft collars.
7. Check the position of the bumper plate flag and the light curtain per Figure 6-15.



Replacing a Bumper Shaft

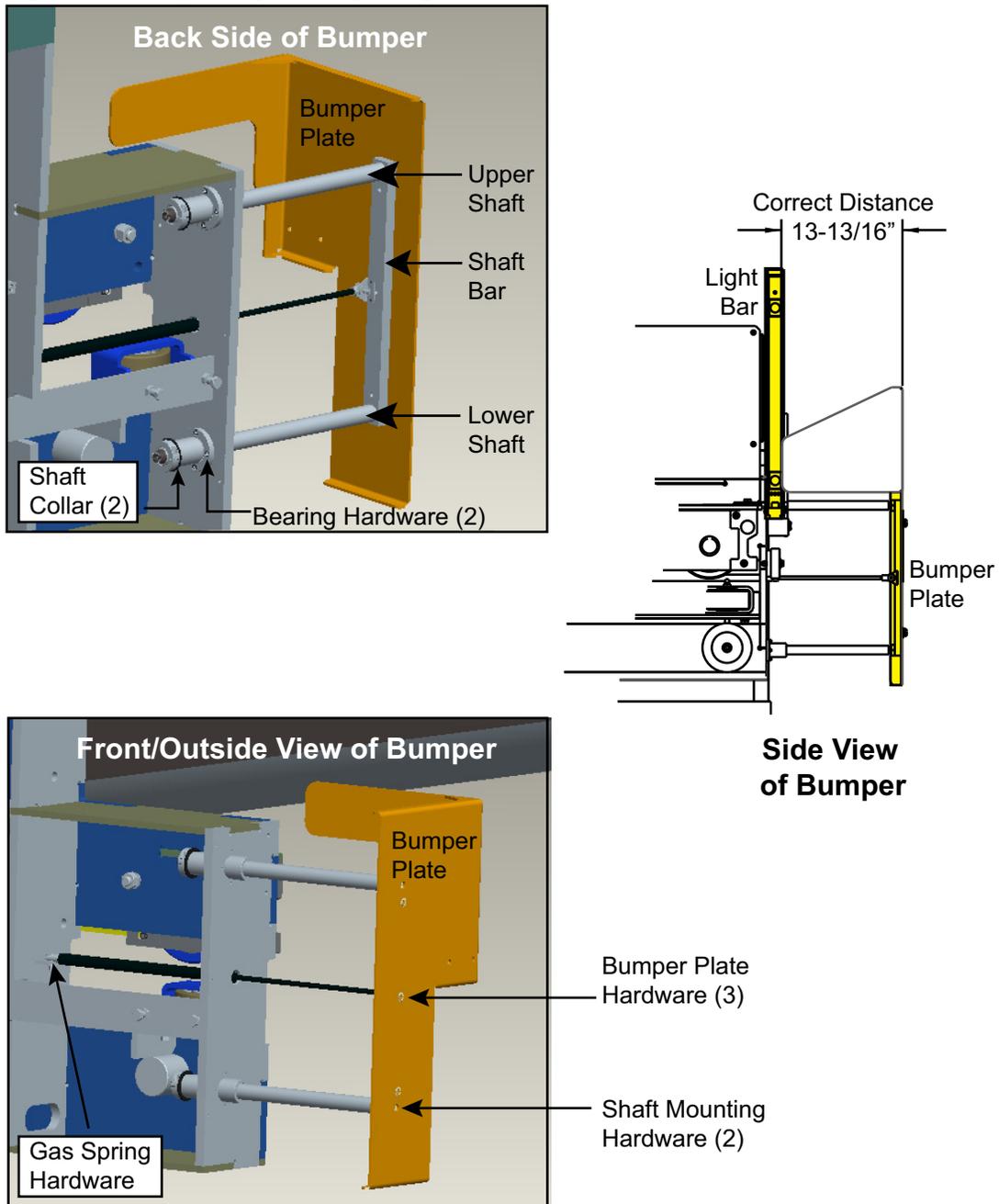
1. Remove the shaft collar on both the upper shaft and lower shaft. Keep all hardware.
2. Pull out on the bumper plate so the plate and 2 shafts come off the gantry head.
3. Remove the bumper plate hardware shown in Figure 6-15 and set aside the bumper plate.
4. Remove the damaged shaft from shaft bar.
5. Mount the new shaft to the shaft bar using the original hardware.
6. Insert the shafts into their bearings and remount the shaft collars on each.
7. Remount the bumper plate with the original hardware.
8. Check the position of the bumper plate flag and the light curtain per Figure 6-15.



Replacing a Gas Spring

1. Remove the gas-spring hardware and discard the damaged gas spring.
2. Mount the new gas-spring with the original hardware.
3. Check the position of the bumper plate flag and the light curtain per Figure 6-15.

Figure 6-15: Replacing and Adjusting the Bumper



Adjusting the Bumper Flag

The bumper flag, located above each bumper, interrupts the light curtain light beam sensor when the bumper compresses. To reduce the amount of time it takes to stop, each bumper flag should be aligned with its light bar sensor so there is no space between the edge of the flag and the edge of the sensor. A slight overlap is acceptable. They should be as close together as possible without causing nuisance trips during normal operation.

To adjust the bumper flag location, adjust both shaft collars in the direction needed. See Figure 6-15 for the location of the shaft collars.

Joystick

Periodic lubrication of the joystick is recommended. A light grease should be applied to active components, such as spring return arms, yokes, gear drives, and detent rollers. Periodically inspect the assembly for torn or damaged boots and loose screws/bolts. Replace or tighten them immediately.

Safety Controller

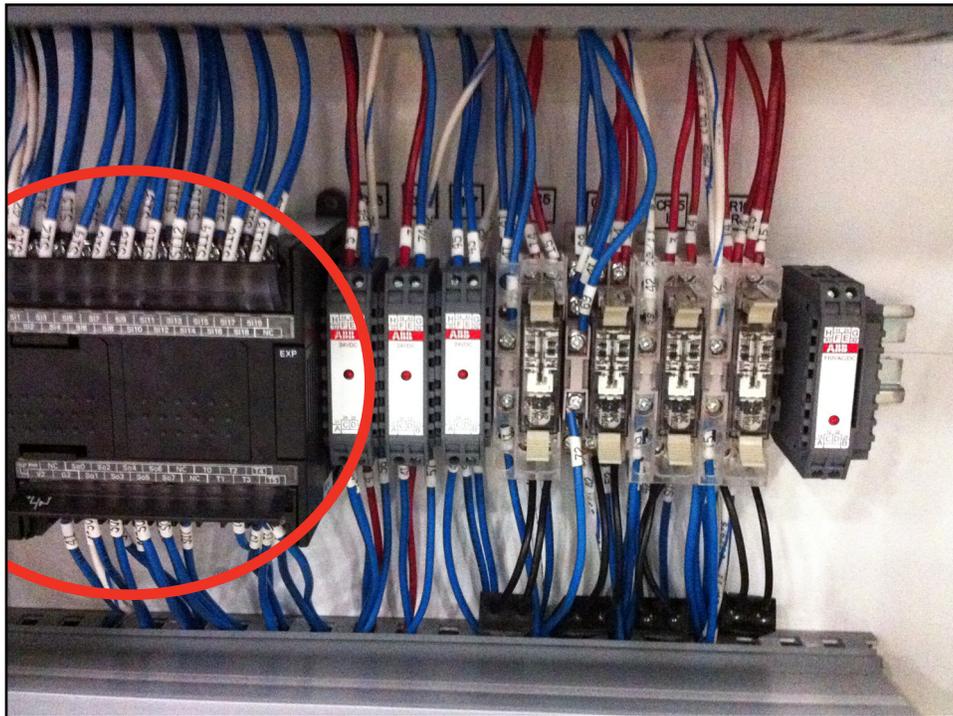
This information applies to the safety controller used in 2010. It can also be found in the Omron catalog number Z922-E1-01. This section contains text protected by Omron copyrights.

The safety controller ensures that all safety features on this machine are working properly. The safety controller is circled in Figure 6-16.

Inspecting the Safety Controller

Perform the inspection that is included in the Weekly Checklist on page 115. It can be performed daily or weekly. Any inspection task that is not within acceptable limits should be fixed immediately.

Figure 6-16: Safety Controller, Inside Main Electrical Enclosure



Safety Controller Operating States

The indicator lights on the front of the safety controller show which Operating Mode the safety controller is in. Additional diagnostics are described on page 99 in the *Troubleshooting* appendix.

Table 6-3: Operating Modes for the Laser Scanner System

Operating Mode	Description	MS Indicator	MC Indicator
Run	All functions are supported, including the program	Lit green	Off
Idle	Initialization has been completed; safety controller is waiting to move to Run Mode.	Lit green	Off
Configuring	Waiting for the configuration to be downloaded	Flashing green/red	Off
Abort	An unsupported Expansion I/O Unit is connected	Flashing red	Off
	More than two Expansion I/O Units are connected		
	An unsupported Option Board is connected		
	The power supply must be cycled or a reset performed from the safety controller Configurator to return to Run Mode		
Memory Cassette	Data is being backed up or restored to/from a memory cassette.	Off	Flashing or lit yellow
Critical Error (system fail)	A critical error has occurred, all operation stops, safety controller enters the safe state	Lit red	Off
Initialization	Self-diagnosis is being performed.	Flashing green/red	Off

Replacing the Safety Controller or Memory Cassette

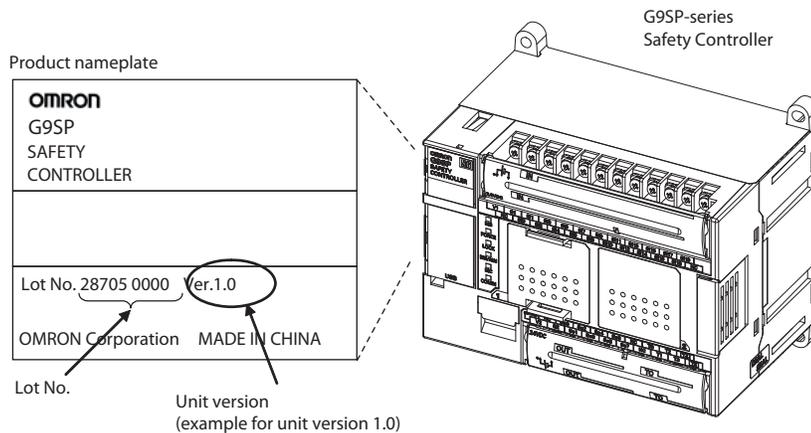
A safety controller is comprised of two parts:

- Safety controller unit
- Memory cassette

Either part can be replaced, but they must be purchased through MiTek so the software and configuration can be installed first.

To identify your safety controller model, refer to the nameplate described in Figure 6-17.

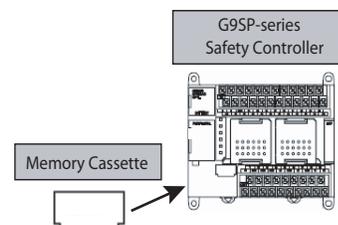
Figure 6-17: Reading the Safety Controller's Nameplate



Replacing Only the Memory Cassette

1. Turn off the safety controller power when inserting or removing the memory cassette. Inserting or removing the memory cassette while the power is on may damage the component.
2. Remove the faulty memory cassette from the safety controller.
3. Insert the new memory cassette into the safety controller.
4. Restore the configuration data (see page 70).
5. Perform the safety tests starting on page xvi.

Figure 6-18: Memory Cassette



Replacing the Safety Controller

When replacing a safety controller, pay attention to these points:

- Do not attempt to disassemble, repair, or modify the units in any way. Doing so may impair the original safety functions.
- Make sure that safety can be assured when replacing the unit.
- To prevent electric shock or unexpected operation, always turn OFF the power before replacing the unit and lockout/tagout the press system.
- After replacing the unit, check the new unit to make sure that there are no errors.

Follow these steps to replace a safety controller unit:



1. Remove the faulty safety controller, noting the wire locations.
2. Install replacement safety controller.
3. Reconnect wires, using electrical schematics and notes to ensure it is wired correctly.
4. Set the configuration data using one of these methods:
 - If replacing only the safety controller, and the memory cassette is still operable, insert the memory cassette into the replacement safety controller and start the safety controller. The updated configuration data will be loaded to the safety controller.

Once restoring the data has been completed, the replacement safety controller will automatically start to operate in the same way as the previous safety controller.
 - If replacing the safety controller and the memory cassette, the components will be sent from MiTek with the configuration preprogrammed.
5. Perform the safety tests starting on page xvi.

Loading Software Upgrades

If updating the safety controller's configuration data is required due to a version upgrade of existing equipment, the new configuration data can be sent from MiTek on a new memory cassette. Follow the instructions on page 66 to insert the new cassette.

The old cassette can be discarded or kept as a spare.

Backing Up Data to the Memory Cassette

This section describes the conditions and procedures for backup. Backing up data needs to occur only if a new program is supplied for the memory cassette or safety controller.

Conditions

The configuration data of the safety controller must be locked.

To ensure safety after restoring, it is necessary to use configuration data for which safety validation testing (i.e., user testing) has been completed.

Procedure

1. Turn OFF the power supply to the safety controller, and then insert the memory cassette.
2. Turn ON DIP switch pin 4 on the front of the safety controller, and then turn ON the power supply to the safety controller.
3. The safety controller will start using the following indicators.
4. In this status, press the Push Switch on the front of the safety controller for at least 1 s to start backup. During backup, the Safety Input terminal indicators will sequentially light from right to left in yellow.
5. The following indicators will light when backup has been completed. At this point, the ID of the backup configuration will be sequentially lit on the Safety I/O terminal indicators. This ID is called the configuration ID and consists of a four-digit decimal number to identify the configuration data.

This completes the backup procedure. To return to the normal operating mode, turn OFF DIP switch pin 4, and then cycle the power supply to the safety controller.

Errors

If an error occurs during the backup operation, the ERR/ALM indicator will light red, and the terminal number will light red on the Safety Input terminal indicators to indicate the error details.

- Backing up data to the memory cassette can be performed only when the safety controller's configuration data is locked. Conduct a safety confirmation test (i.e., user test) and lock the configuration data before performing the backup.
- Complete backup in advance, before using the safety controller if the memory cassette is going to be used for efficient replacement of the safety controller in the event of failure. Backup may not be performed correctly after failure of the safety controller.



- Performing a backup overwrites the data on the memory cassette. Be sure to confirm that the memory cassette contains no required data before performing backup.
- Formatting the memory cassette is not required.
- The contents of the memory cassette can be checked by verifying the configuration ID to prevent setting incorrect configuration data when restoring data to the safety controller is performed from the memory cassette. To enable performing this verification, record the configuration ID when performing backup.

Restoring Data to the Safety Controller

If the safety controller is replaced or if new data is placed on the memory cassette, the configuration data must be moved from the memory cassette to the new safety controller.

- **Device Password Match**

The device password for the safety controller must match the device password that is on the memory cassette. If the new cassette has a password that doesn't match the safety controller unit, contact MiTek.

- **Prohibit Restore Setting Disabled**

The restore prohibition setting made for the safety controller was disabled before it was shipped to you or placed in the equipment. It must be disabled to perform a restore to the safety controller.

Procedure for Restoring Data to Safety Controller

1. Turn OFF the power supply to the safety controller, and then insert the memory cassette.
2. Turn OFF DIP switch pin 4 on the front of the safety controller, and then turn ON the power supply to the safety controller.

The system will start in restore standby status at step 3 if the configuration data stored in the memory cassette does not match the configuration data stored in the safety controller.

3. After startup, the ID of the configuration data on the memory cassette will light sequentially on the Safety Input terminal indicators of the safety controller.
 - The configuration I/O of the configuration data stored in the memory cassette is displayed. The I/O indicators will light yellow one at a time. They will light for the four digits of the ID.
4. Once the display configuration ID has been verified and it is confirmed that the intended configuration data has been stored in the memory cassette, press the Push Switch on the front of the safety controller for at least 1 sec to start restoring data. During the restore operation, the Safety Input terminal indicators will be sequentially lit from left to right in yellow.
5. Once the restore operation has been completed, the safety controller will restart and operate in RUN Mode with the configuration locked.

If an error occurs during the restore operation, the ERR/ALM indicator will light red, and a terminal number will light red to indicate the error details on the Safety Input terminal indicators.

- Operation will always start in restore waiting status when startup is performed with the memory cassette inserted into the safety controller using the default settings. Make sure the memory cassette is not inserted when downloading the configuration data from a computer.
- Verification of the configuration ID is performed to prevent restoring incorrect configuration data.

 WARNING	
	Serious injury may occur due to loss of required safety functions. Once the data has been restored from the memory cassette, check that the configuration data of the safety controller is correct and that it operates properly.

Managing Voltage Drops

The safety controller monitors the power supply voltage to ensure safe operation. If a voltage over the upper limit or under the lower limit is detected, the following operations will be performed.

- If a voltage error occurs in the internal circuit power supply, the safety controller will stop operation and turn OFF the outputs.
- The safety controller will restart operation when the power supply voltage returns to normal.

VFD and Encoder

The VFD (Variable Frequency Device) is located in the main electrical enclosure. The VFD controls the speed that the gantry head travels and stops. A built-in PLC allows the VFD to monitor the drive chains motion during braking and alerts the operator when the gantry is not stopping as expected.

The most common warnings and errors are indicated by the light stack and are discussed on page 30 in the Operation chapter. The resolutions are discussed here.

Table 6-4: Problems Tracked by the VFD

Symptom	Primary Cause	See Page...
Stopping distance too long	Loose chain	page 72
Gantry head starts slowly	Loose chain	page 72
Gantry head does not start movement	Broken chain or faulty encoder	page 74

Unsafe Stopping Indicator

An encoder is coupled onto one of the idler sprockets (a sprocket that meets an idler wheel). The encoder and the VFD work together to tell the operator of the following unsafe conditions:

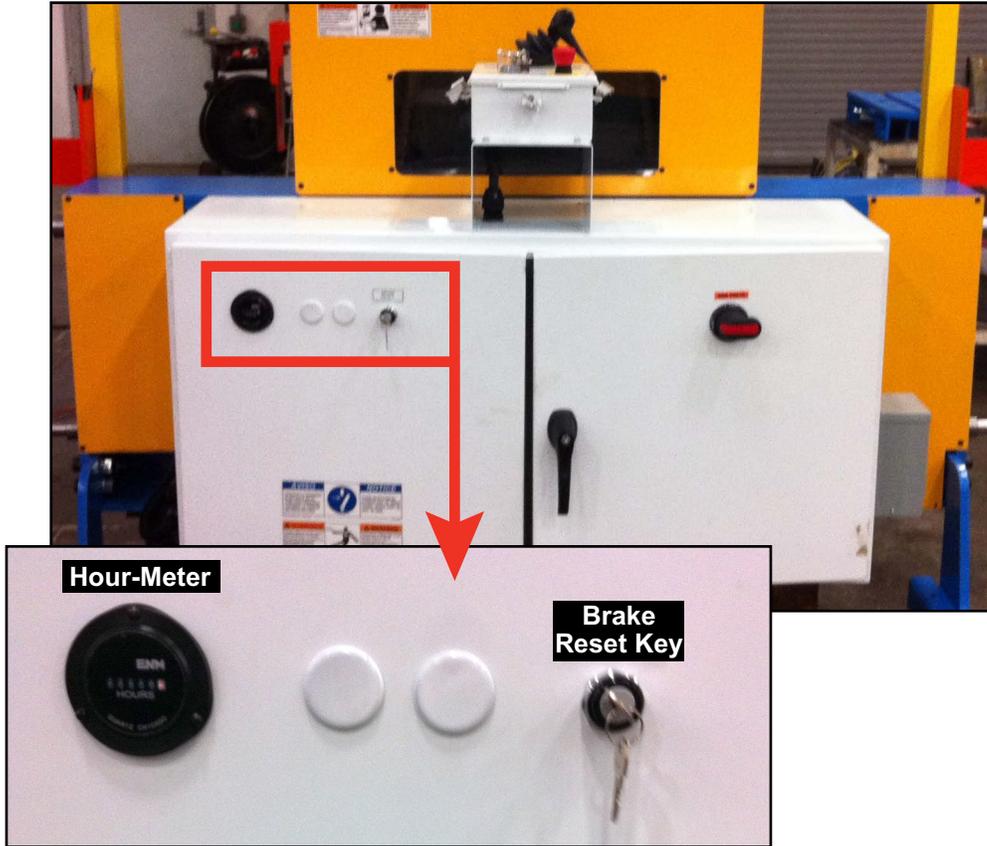
1. When a drive chain’s motion is **nearing** an unsafe condition, the blue beacon on the light stack **flashes** to notify the operator that this matter should be addressed as soon as possible. If this happens:
 - a) Immediately schedule the necessary maintenance. It is most likely a loose drive chain or motor drive chain, but refer to the *Troubleshooting* section to determine the exact cause.
 - b) Press the RESET button on the operator control station.
 - c) Continue operating the machine as normal until the problem is fixed.

2. When a drive chain’s motion indicates the machine **is in** an unsafe condition, the blue beacon on the light stack illuminates **solid** blue and the machine will not operate.



The maximum safe stopping distance in an emergency stop situation is 11-1/2 inches.

Figure 6-19: Brake Reset Key (Main Electrical Enclosure)



- a) Lock and tag the machine until maintenance is complete. It is most likely a loose drive chain or motor drive chain, but refer to the *Troubleshooting* section to determine the exact cause.
- b) If it is necessary to move the gantry head, reset the VFD to allow one more cycle of movement.
 - 1) Insert the Brake Reset key (that should be managed by the maintenance department) into the key hole marked *Brake Reset* shown in Figure 6-19 on page 73.
 - 2) Turn the key, then turn back to its original position and remove it.
 - 3) Press the RESET button on the operator control station.



The machine will **NOT** operate with the brake reset key in RESET position.

 WARNING	
	CRUSH HAZARD!
	Gantry may take longer to stop than normal when braking system is not working properly.

- 4) The machine will operate until the next time it stops.

Broken Chain or Faulty Encoder

When a chain breaks or the encoder does not register chain movement, the operator control station sends a message to the VFD that the gantry head should be moving, but the encoder sends a message to the VFD that the gantry head is not moving.

- Refer to page 58 to replace a chain.
- If the encoder is not sending a message at all, it may be a faulty encoder.

Light Curtains

	 DANGER
	<p>CRUSH HAZARD.</p> <p>Moving parts can crush or cut.</p> <p>Never deactivate a safety device! Death or serious injury may result.</p>



Refer to diagram on page 40.

Components

The *RoofTracker II* is equipped with 2 sets of light curtains, one set on each side of the gantry head. Each set consists of a transmitter bar and a receiver bar. The transmitter bar transmits the signal for the light beam and the receiver bar receives the signal.

Realigning and Inspecting

Inspect the light curtains prior to starting the machine. An LED display area is located on the light curtains to notify the operator if an error occurs. Refer to page 106 for information on the error codes and indicators on the light curtains.



When a set of light curtains is out of alignment, the light curtains assume there is an object blocking the beam. An IBI lights up and a diagnostic code of -0 displays on the receiver bar.

Each light beam mount has a slotted mounting hole to allow for adjustment. Loosen the screws, move the bar until the -0 on the receiver bar turns to a -1. Tighten the screws and press the green RESET button on the pendant control station or joystick panel to reset the light curtains.

Light Curtain Operating States

The indicators on the receiver bar tell the operator what operating state the light curtain set is detecting. The different operating states are described in Table 6-5.

Table 6-5: Light Curtain Operating States

Operating State	Description
Machine Run	The two receiver bar safety outputs are in the ON state, the green machine run indicator is lit, diagnostic displays "--", and the auxiliary output is in a state consistent with its configuration. The protected machine is allowed to operate.
Machine Stop	The two receiver bar safety outputs are in the OFF state, the red machine stop indicator is lit, diagnostic displays "-0", and the auxiliary output is in the OFF state. The protected machine is not allowed to operate.
Interlock	The two receiver bar safety outputs are in the OFF state, the red machine stop indicator and yellow interlock indicator are lit, diagnostic displays "-1", and the auxiliary output is in the OFF state. The protected machine cannot operate until the detection zone is clear of obstructions and the start button is pressed and released.
Alarm	The two receiver bar safety outputs are in the OFF state, the red machine stop indicator is lit, and the yellow interlock indicator is flashing. The auxiliary output is in a state consistent with its configuration. The diagnostic displays a diagnostic code to aid in troubleshooting. The alarm state does not allow the protected machine to operate. The primary difference between alarm and interlock is that the light curtain system will remain in the alarm state until the fault is corrected, regardless of power cycling or if the start button is pressed and released.

Light Curtain Diagnostic and Test Features

	 DANGER
	<p>ELECTROCUTION HAZARD.</p> <p>Disconnect power before opening end caps!</p>

Individual Beam Indicators (IBI)



Refer to diagram on page 40.

The light curtain system has a visible, red individual beam indicator (IBI) adjacent to each receiver bar infrared beam. An IBI will light when the infrared beam fails to meet the conditions necessary to remain in the machine-run state. When the synchronization beam is broken, all of the IBIs will light. An IBI failure will not cause an alarm condition and the light curtains will continue to operate, but the gantry head will fail to move in the same direction it was moving when the safety device was activated.

Synchronization Beam

Synchronization between the transmitter bar and receiver bar is optical. The beam closest to the cable connector supplies this signal. When this beam is blocked, the system will enter a machine-stop state and all of the IBIs will light. When the beam is cleared, the system will re-synchronize itself and enter a state consistent with its operating mode.

Machine Primary Control Element (MPCE) Monitoring

MPCE monitoring is an important safety function. It monitors the light curtain system interface to the guarded machine and checks to ensure that the control elements (switching devices such as contactors) are responding correctly. The MPCE function is hard-wired in the machine. Do NOT attempt to change the setting.

Diagnostic Display



See page 106 for diagnostic codes.

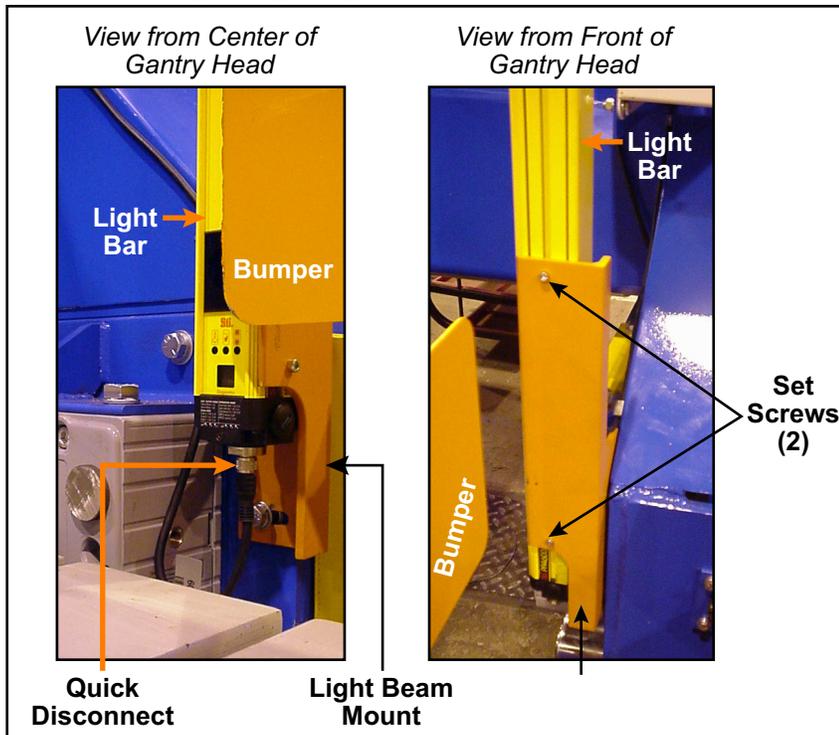
The receiver unit has a two-digit numeric display that displays diagnostic codes identified by the internal control circuits. This display is visible from the front of the receiver bar. The diagnostic codes indicate normal operation, dipswitch setting faults, safety output faults, MPCE faults, and internal controller faults. See page 106 for the diagnostics definitions.

Replacing Light Curtains

Light curtains can be replaced as a set of two, or just the transmitter or receiver may be ordered by itself. Refer to the *Replacement Parts* appendix for part numbers.

1. Determine if you need to replace a transmitter, receiver, or both. Locate the part number in the *Replacement Parts* appendix.
2. To install a new light curtain or set, remove the cable from the bottom of the damaged light curtain by unscrewing the quick disconnect shown in Figure 6-20.
3. Carefully hold the damaged light curtain while unscrewing the two (2) socket head set screws on the light beam mount. Keep the set screws for use with the new bar.
4. Set the damaged light curtain aside and hold the new bar in place.
5. Use the same two (2) set screws to attach the new bar to the light beam mount.
6. Whether replacing one or both bars in a set, the dip switches on both bars must be set to match each other. The original dip switch code is shown in Figure . It can also be found on your electrical drawings.

Figure 6-20: Replacing a Light Curtain



Laser Scanner (optional)

Machines with a High Bottom-Chord Platform are equipped with a laser scanner to sense people or obstacles that are in the path of the platform. When the scanner sensing something in its safety zone, the E-stop circuit causes the gantry head to stop moving.

Figure 6-21: Laser Scanner



Maintaining the Laser Scanner

Cleaning

The laser scanner requires periodic cleaning of the scan window and dust detection surface on the base of the window. The interval of the cleanings will depend on the environment in which it is used.

It is recommended that the window be cleaned using a common glass/plastic cleaner. The window should be sprayed and wiped down with a soft cloth to prevent damage to the surface. Do NOT use benzene, acetone, or a thinner as it will damage the surface.

Maintaining Stability

Check the tightness of the laser scanner's brackets periodically to reduce unnecessary vibration. Extreme vibration could cause the scanner to register an intrusion that does not exist.

	 WARNING
	<p>Never adjust the angle or location of the laser scanner.</p> <p>If the laser scanner's bracket becomes bent or damaged, it must be fixed before operating the machine.</p>

Laser Scanner Components

Figure 6-22: Laser Scanner Components

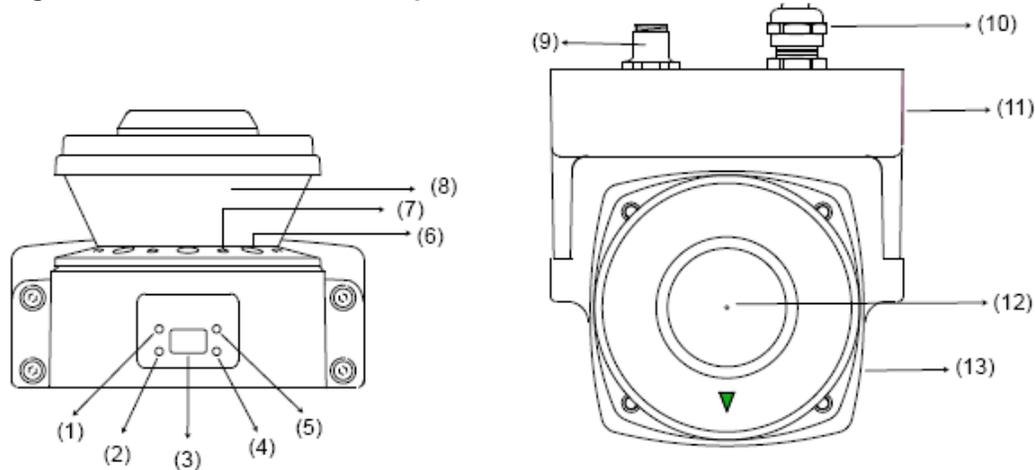


Table 6-6: Laser Scanner Components Defined

1	RUN indicator (green)	Will turn ON when safety zone is clear and OSSDs are ON
2	Interlock Indicator (yellow)	Will turn ON when in interlock state, blink under lockout, and blink in case of a failure
3	Status/Diagnostic Display	The scanner's status ,configuration/operation, or failure is displayed
4	Warning Output Indicator (orange)	Will turn ON when the warning output is ON
5	STOP indicator (red)	Will turn ON when safety zone is blocked, OSSD are OFF or under interlock state
6	Dust Ring	Dust detection cover with reflective surface, for dust accumulation detection
7	Individual Sector Indicators	Will turn ON when intrusion is detected in the safety zone, 8 sectors total. 1 sector =33.75°
8	Scan Window	The window where the laser light is emitted and received
9	Communication Connector	Provides for Ethernet interface
10	Power Connector	For power connections, 18-pin connector (pigtail)
11	I/O Block	Connector module
12	Center of rotation	Indicates the location of the axis around which the laser irradiates from
13	Sensor	Sensor head; field replaceable

Operating States of Laser Scanner

Operating Mode

After powering on, the laser scanner enters the interlock state if no fault or intrusion (object) is detected within the safety zone. Press the RESET button on the operator station to release the interlock state and enter the run (ON) state. If an object enters the safety zone, the scanner will stop the gantry head. During this stage, it is capable of moving in the opposite direction. Once the safety zone is clear, the sensor will enter the interlock state, and the RESET button must be pressed before the gantry head will begin motion in the same direction it was going when the fault occurred.



See page 107 for diagnostic codes.

Indicators Lights

Refer to page 87 for an explanation of the indicator lights on the main electrical enclosure.

Table 6-7 describes the indicators on the scanner assembly. Knowing what these indicators are communicating to the operator will assist in quick troubleshooting efforts. For more troubleshooting guidance, refer to the *Troubleshooting* appendix starting on page 107.

Table 6-7: Indicators on Laser Scanner

Indicator Name	Color of LED	Status	Definition
RUN indicator	Green	On	Signal switch is ON
		Off	Signal switch is OFF
STOP indicator	Red	On	Signal switch is OFF
		Off	Signal switch is ON
Interlock indicator	Yellow	On	Interlock state (need to press RESET on operator station)
		Flashing	Lockout state (@ 1Hz) Configuration state (@ 4 Hz)
Warning output indicator	Orange	On	When any warning zone is intruded
		Flashing	Dust is detected on scan window
		Off	No warning present
Status/Diagnostic display		□□	
Individual sector indicators	Red	On	Shows which zone is intruded (only 1 zone is used)
		Flashing	Dust is on scan window
		Off	Zones are clear and window is clean



Status/Diagnostic Display of Laser Scanner

Refer to Figure 6-22 on page 80 for location of scanner parts.

See page 107 for diagnostic codes.

See page 96 for troubleshooting guidance.

1. When powered up, the Status/Diagnostic display area will display:
 - a) The minimum object resolution
 - L3 = 30 mm
 - L4 = 40 mm
 - L5 = 50 mm
 - L7 = 70 mm
 - b) The ethernet configuration
 - SP = static IP addressing
 - dP = DHCP IP addressing

2. During normal operation, the seven-segment display indicates the current zone set and response time of each.
 - Code 24 indicates zone set 2 with a response time of 160 ms.
 - When the display is inverted, a decimal will be shown in the corner.
 - The response times longer than 400 ms are represented by zero.

Table 6-8: Operating States for the Laser Scanner

State	Description
On	The two safety outputs are in the ON state, and the machine run (green) indicator is lit. The protected machine is allowed to operate. The state/diagnostic display indicates a state of monitoring zone set selection and a response time.
Off	An object exists in a safety zone and it is being detected. The two safety outputs are in the OFF state, and the machine stop (red) indicator and the intrusion indicators in the affected region(s) are lit. The protected machine is not allowed to operate. The status/diagnostic display shows "- -".
Interlock	This state waits for a start input. The two safety outputs are in the OFF state, the red STOP indicator and yellow interlock indicator are lit. The protected machine is not allowed to operate. The status/diagnostic display shows "01".
Lockout	A failure is being detected and the guarded machine is being stopped. The two safety outputs are in the OFF state, the machine stop (red) indicator is lit and yellow interlock indicator is flashing. The protected machine is not allowed to operate. The status/diagnostic display shows the error code that caused the lockout. The system will remain in the lockout state until the problem is corrected and a start input is applied or power on the unit is cycled.

Scanning Regions and Scanner Limitations

The boundaries of the scanned safety zone are configured by MiTek as shown in Figure 6-23.

Keep the following points in mind when operating and maintaining the laser scanner:

- The laser scanner scans directly underneath the platform when the gantry head is sitting still. When the gantry head is moving, the laser scanner scans directly underneath and 2 ft out in the direction the gantry is moving.
- Scanning region (safety zone) should not be within 100 mm of a wall or fixed object.
- The scanner transmission can interfere with personal radio reception.
- Scanners mounted side-by-side can interfere with each other's scanning regions. Refer to page 24 for guidance in this instance.
- Extreme vibration can cause the laser scanner to register an intrusion.
- It is possible for ambient light to interfere with normal operation of the laser scanner. Ambient light is the light from the surrounding environment: overhead lights, sunlights, etc.
- Light interference DOES NOT lead to a loss of safety. It may, however, cause false nuisance stops of the guarded equipment.

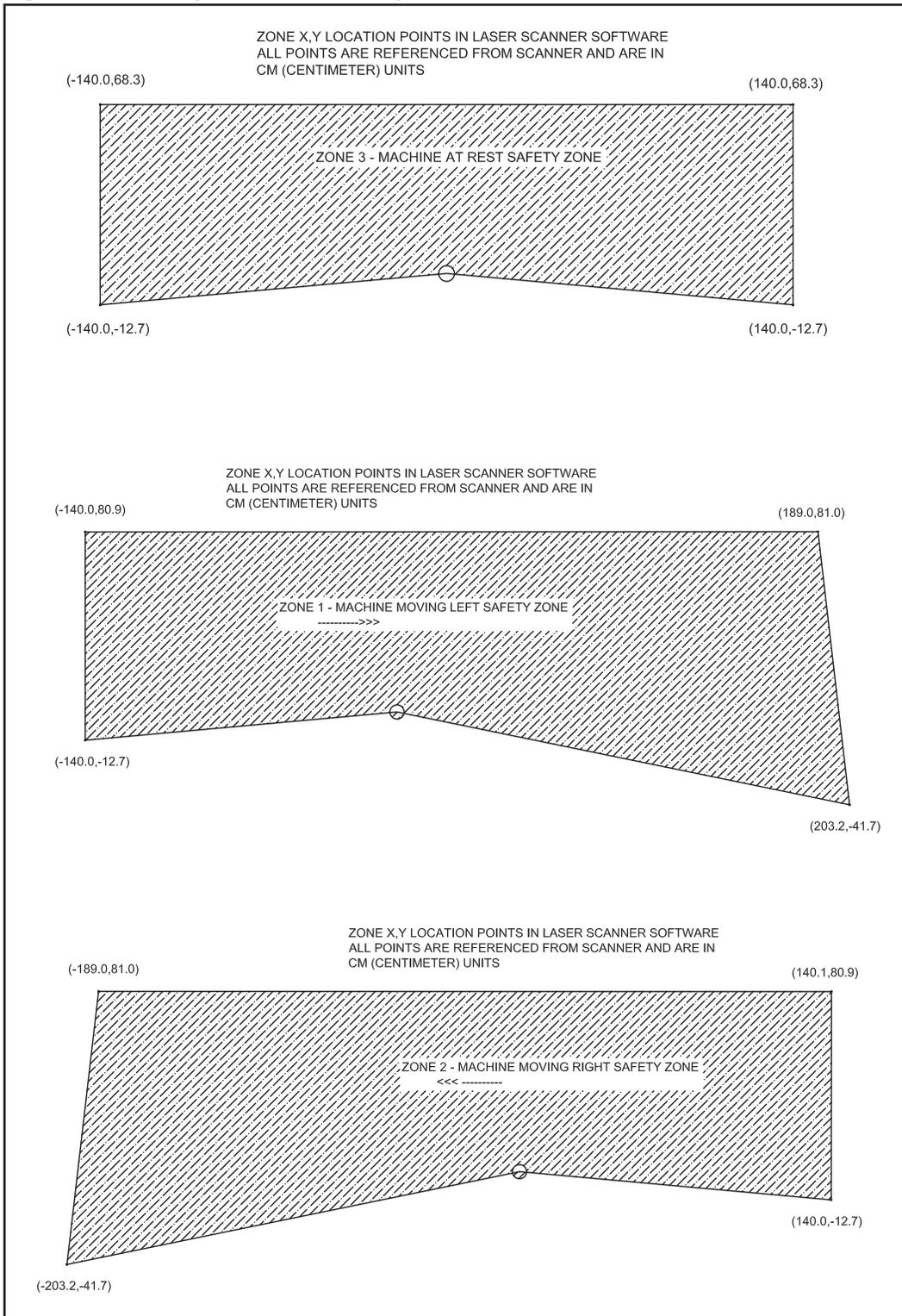
	 WARNING
	<p>Never adjust the angle or location of the laser scanner.</p> <p>If the laser scanner's bracket becomes bent or damaged, it must be fixed before operating the machine.</p>



Replacing a Laser Scanner

1. Unplug the quick-disconnect cable.
2. Remove the damaged laser scanner from the bracket. If the bracket is bent or damaged, replace it also.
Part numbers are located in the Parts List appendix.
3. Connect the replacement safety scanner to the bracket.
4. Connect the quick-disconnect cable.
5. Perform the safety test starting on page xvi.

Figure 6-23: Safety Zone Scanned by Laser Scanner



Replacing the Scan Window

If the scan window of the laser scanner gets scratched or damaged, it must be replaced to prevent faulty trips. Contact Machinery Division Customer Service for the scan window part number and to place an order.



1. Wipe off dirt and dust from the laser scanner and surrounding area.
2. Remove the 4 screws and washers on the sides of the window. Set aside for later use.
3. Gently pry up on the window edge to remove the window.

NOTICE



Do not allow dirt to fall into the laser scanner when the electrical components are exposed.

Never use industrial compressed air to clean electrical components.

4. Locate the new window and verify that the gasket is seated properly.
5. Set the new window in place, with the arrow on top pointing toward the front of the scanner.
6. Reinstall the 4 screws and washers, gently tightening them in an alternating pattern. Do not overtighten, or the window will crack!
7. Clean the window thoroughly using a soft cloth and common glass cleaner.
8. Restore power to the scanner and perform the safety test on page xxiii.
9. If the scanner is not working properly, check the following items:
 - a) Verify that all fingerprints and dust have been cleaned from the window.
 - b) Verify there are no obstructions (such as tools left out) in the scanner's zone.
 - c) Verify that dirt did not fall into the scanner when it was open.



Tighten the screws to approximately 5.0 in.-lb.

If it still will not function, calibration may be necessary. Call MiTek Machinery Customer Service to assist with laser scanner calibration.

Multiple-Head Interlock

Some truss assembly lines have more than one gantry head on a table line. When this occurs, a multiple-head interlock is attached to each head to prevent collisions. Even if the gantry head has a laser scanner under the platform, a multiple-head interlock is required.

Indicator Lights and Sounding Device

Figure 6-24: Light Stack and Horn



For more information on the light stack and horn, see page 30.

Light Stack Bulbs

If a bulb in the light stack burns out, remove the appropriate beacon cover and replace the bulb. Refer to the *Replacement Parts* appendix for a part number.

The most common warnings and errors are indicated by the light stack and are discussed on page 30 in the Operation chapter.

Horn

A sounding device is shown in Figure 6-24. For safety reasons, they must be kept in working order. To replace the sounding device, refer to your electrical drawing for part numbers and an electrical schematic.

	 DANGER
	<p>Do NOT attempt to change the time delay between the horn and movement or the volume of the horn. Without these safety features, serious injury or death could occur.</p>



For more information on the indicators, see page 31.

Hour-Meter

The hour-meter on the main electrical enclosure logs the amount of time that the motor is running. It is shown in Figure 5-2 on page 29. Refer to this meter to schedule preventive maintenance. The hour-meter cannot be reset, but if use exceeds the number of digits on the meter, it will roll back to 0 and continue to log time.

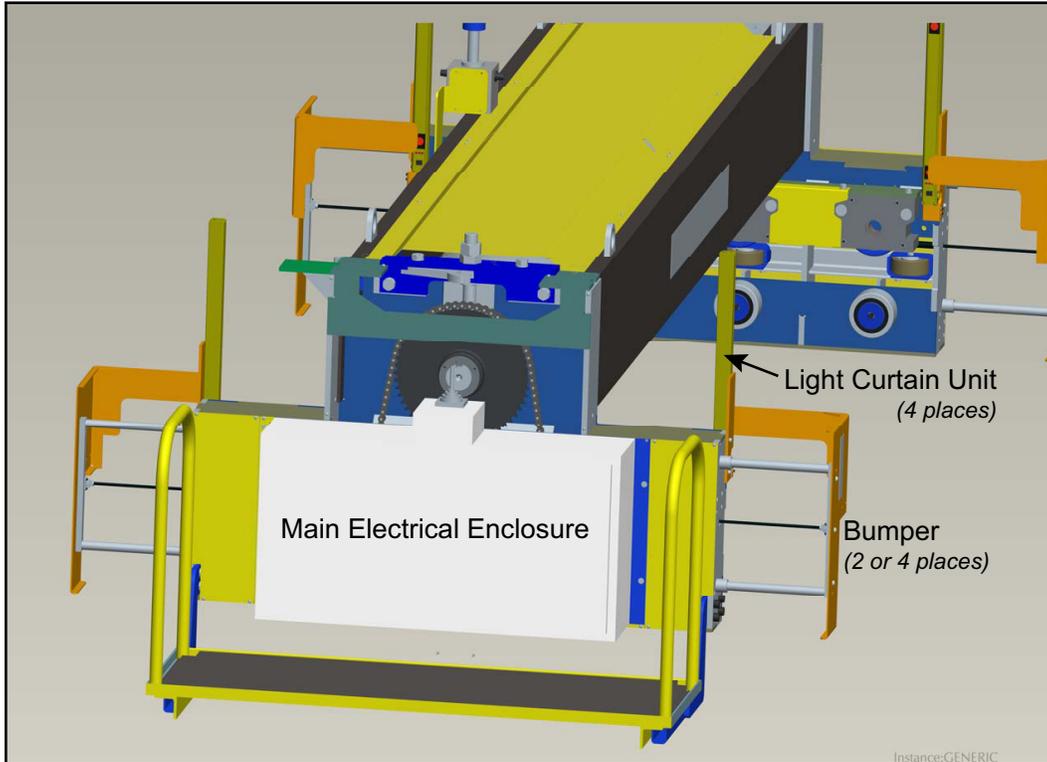
Laser Scanner Indicator Lights

Some machines are equipped with an optional laser scanner. Two indicator lights on the front of the main enclosure show when that scanner is ready or when it requires cleaning. If your equipment does not have the scanner, these light covers and labels will be present, but not functioning.

Graphics

General Graphics

Figure 6-25: Electrical Enclosure and Safety Features, Operator End of Gantry



Drive System and Wheels

Figure 6-26: Drive System on Outer Side of Gantry Head

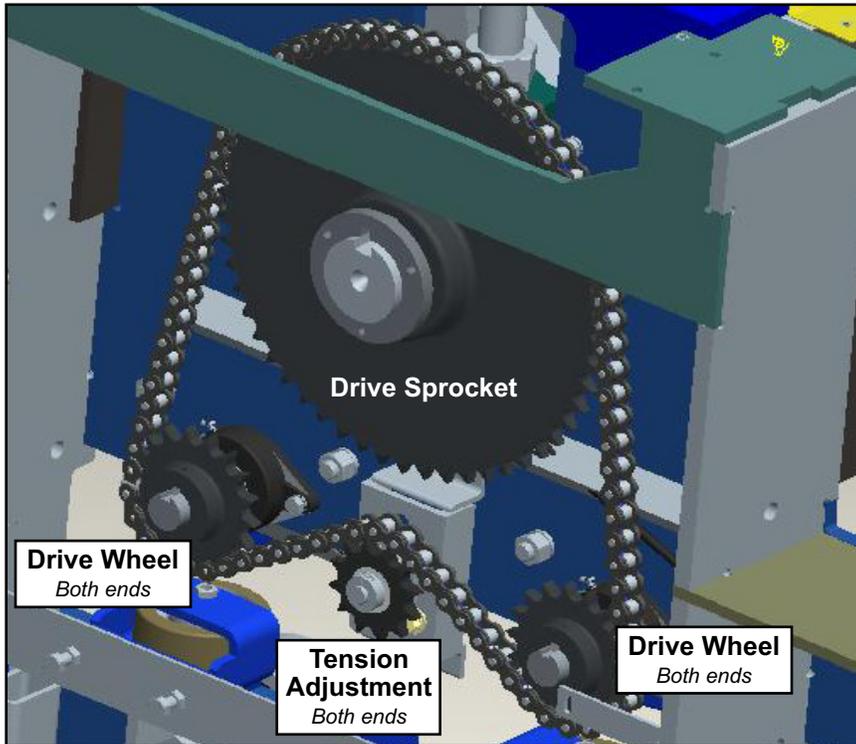
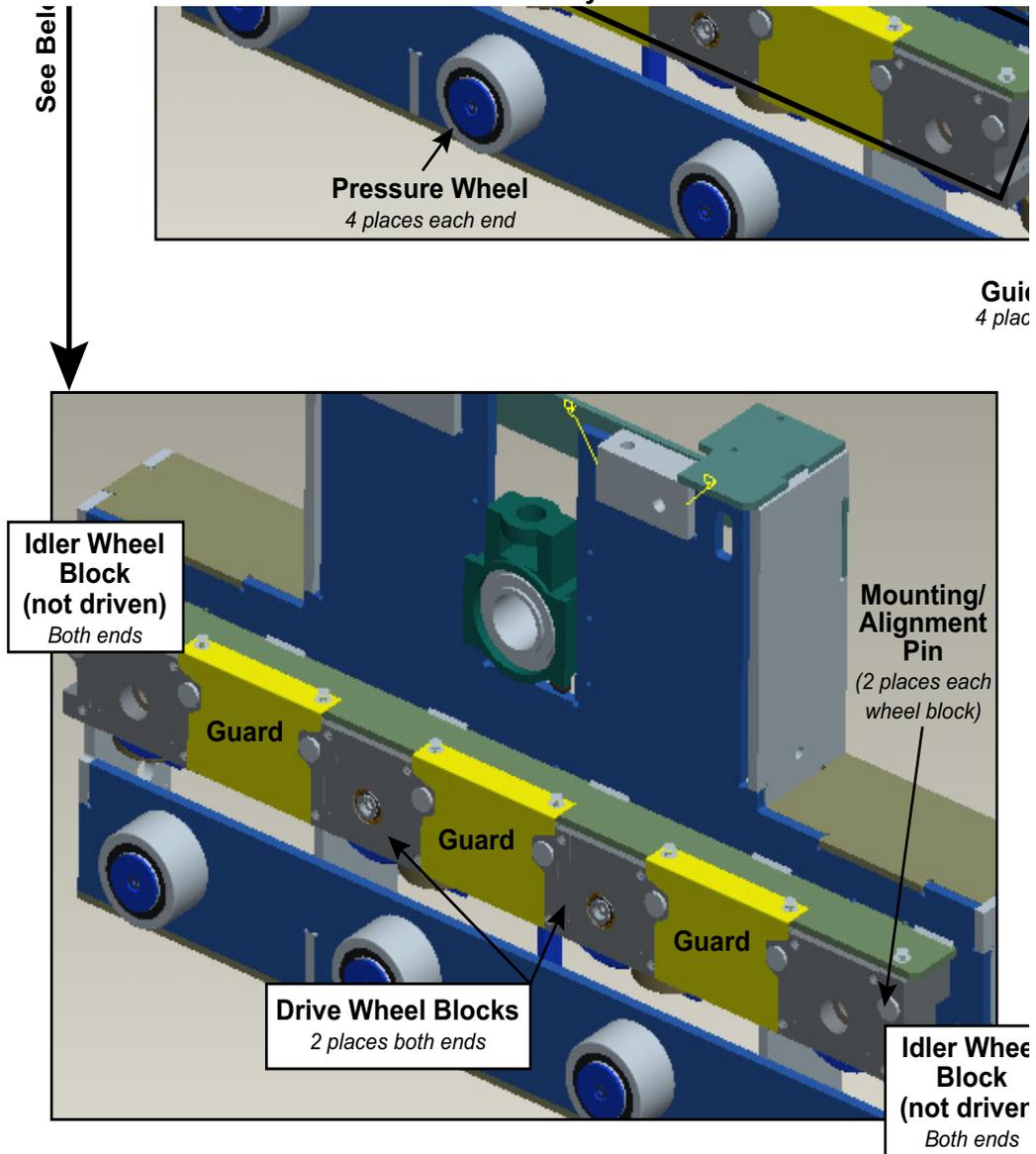


Figure 6-27: Wheel Locations on Inner Side of Gantry Head



Lubrication Graphics

Figure 6-28: Wheel Locations and Chain Lubrication Points

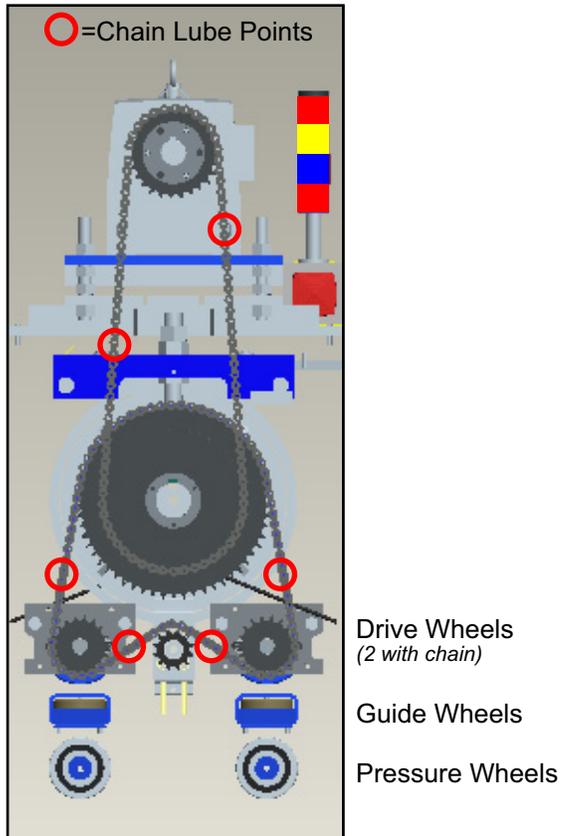
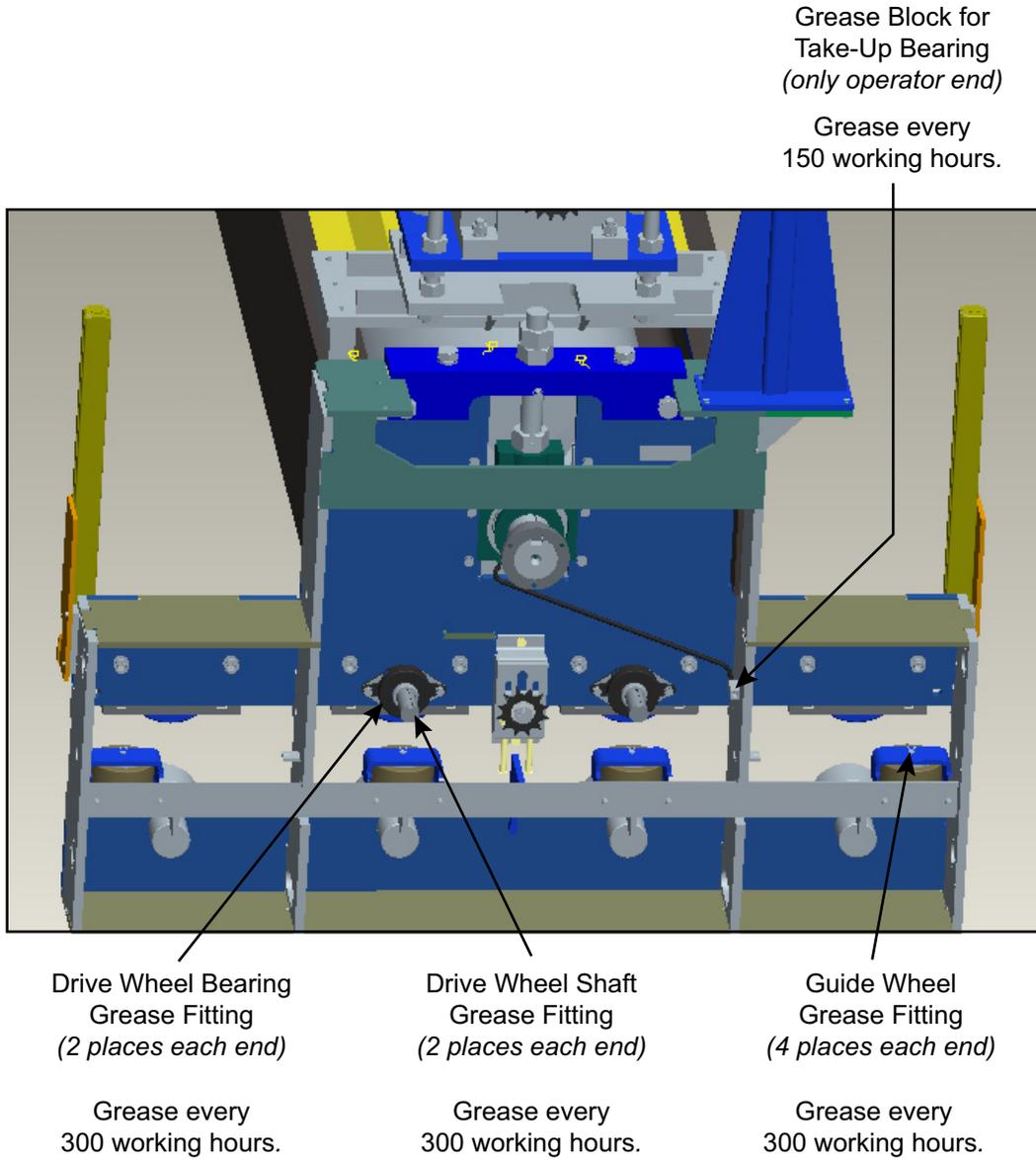


Figure 6-29: Wheel and Bearing Lubrication Points



Navigating the Troubleshooting Appendix

This appendix is divided into tables according to the nature of the issue that is being addressed. The tables are presented in the order listed below.

Table A-1: Troubleshooting Appendix Quick Reference Guide

Page #	Troubleshooting Category
page 94	<i>Troubleshooting the Mechanical System</i>
page 96	<i>Troubleshooting the Electrical System and Perimeter Guarding</i>
page 99	<i>Safety Controller Diagnostics and Troubleshooting</i>
page 106	<i>Light Curtain Diagnostic Codes</i>
page 107	<i>Laser Scanner Diagnostic Codes</i>

Mechanical Troubleshooting

Table A-2: Troubleshooting the Mechanical System

Problem	Possible Cause	Possible Solution	See Page
Gantry head won't move at all (Refer to Table A-3 for electrical problems.)	Motor drive chain loose or broken	Adjust the tension or replace chain	56 58
	Drive wheel chain loose or broken	Adjust the tension or replace chain	56 58
	Gantry head or a wheel is jammed with a foreign object	Check the perimeter of the gantry head and around each wheel for blockage	
	One or more of the drive wheels are not riding on table tube	Check both drive wheels and both idler wheels for wear. Less worn wheels may prevent worn wheels from making contact. Replace worn wheels. It is recommended to replace all four wheels at the same time. Check alignment of tables	49
	Brake motor is damaged	Repair or replace brake motor	43
Gantry head won't move in one direction after the machine has been stopped	Vibration of stopping causes bumper to trip safety switch temporarily	Press the RESET button on the operator control station to reset the safety switch	
	Bumper spring or bearing is damaged so normal vibration of stopping causes bumper to move and block light beam	Move the bumper away from the light beam, then press the RESET button to reset the safety switch; to prevent from continuously happening, must replace the bumper spring or bearing	
Gantry head is tracking crookedly or uneven	Guide wheel is damaged or low on lubricant	Grease guide wheels Replace guide wheel	53
	Drive wheel is damaged or low on lubricant	Grease drive wheels Replace drive wheel	53
	Tables out of alignment	Align tables	
	Tables damaged	Replace tables	
	Drive wheel chain not tensioned properly	Adjust the tension	56
	Drive gear slipping on roller shaft	Adjust the QD bushing	

Table A-2: Troubleshooting the Mechanical System (Continued)

Problem	Possible Cause	Possible Solution	See Page
Press stops slowly	Gantry is sliding to a stop	Drive wheels are worn or damaged Track tube is slippery (may be due to lubricant residue)	49
	Drive Motor Chain tension is loose	Adjust tension	57
	Drive System Chain tension is loose	Adjust tension	56
	Brake motor is worn or damaged	Check lubricants in brake motor Replace brake motor	43
Nail plates are not properly embedded into the truss	Roller height is not correct	Adjust roller height with the take-up bearing	59
	Table surface is damaged	Repair tabletop	
	Tables are not level	Refer to the <i>Installation</i> chapter to re-level the tables	
Nail plates are not embedded evenly	Roller height on one end differs from the opposite end	Level the roller height	59
	Table surface is damaged	Repair tabletop	
	Tables are not level	Refer to the <i>Installation</i> chapter to re-level the tables.	
First nail plate pressed is not embedded correctly	Pressure wheels are worn out	Replace pressure wheels	54
Drive wheels or Idler wheels are consistently damaged	Debris on the tube	Remove objects that were left on the table tube Clean debris occasionally If problem persists, contact Customer Service for a custom wiper	
Gantry head or roller is making extraordinary noise or vibration as it travels	Take-up bearing is not lubricated	Grease the take-up bearing Replace damaged take-up bearing	55
	Parts are damaged: drive wheels, guide wheels, pressure wheels, roller shaft	Inspect location of noise for parts damage	
Roller is not turning smoothly	Take-up bearing is not lubricated	Grease the take-up bearing Replace damaged take-up bearing	55
Gantry head crashes against tables	Table is bent or damaged	Replace table	
	Table is out of alignment	Align tables	

Electrical and Perimeter Guarding Troubleshooting



Check all bulbs on indicator lights to ensure they are still in working order before attempting to do any troubleshooting.

Table A-3: Troubleshooting the Electrical System and Perimeter Guarding

Problem	Possible Cause	Possible Solution	See Page
E-stop button is depressed, but all indicator lights are not on	Main disconnect switch is in OFF position	Switch the disconnect switch handle to ON position	29
	Secondary or primary transformer fuses are open	Check primary and secondary transformer fuse	
E-stop button is released, but indicator lights are not on	Main disconnect switch is in OFF position	Switch the disconnect switch handle to ON position	29
	Machine has not been started	Press and release RESET button	32
E-stop button is released, but E-stop light is on	DC output fuse is open	Check DC output fuse	
Drive fault light is on	Check VFD fault code	Note fault code on VFD display (see VFD fault code); press the Stop key to clear fault	39
Only RIGHT READY indicator light is on	An object on the left of the machine is sensed entering the detection zone	Clear the detection zone on the left side of the machine and press and release RESET button	
	Left side light curtain receiver has fault	Read LED display on the light curtain; refer to light curtain diagnostic code for fault message; check dip switch settings	75 106
	Left side light curtain transmitter has no power		
Only LEFT READY indicator light is on	An object on the right of the machine is sensed entering the detection zone	Clear the detection zone on the right side of the machine and press and release RESET button	
	Right side light curtain receiver has fault	Read LED display on the light curtain; refer to light curtain diagnostic code for fault message; check dip switch settings	75 106
	Right side light curtain transmitter has no power		
Joystick and button are pressed, horn keeps sounding for more than 5 seconds, and the machine is not moving	The timing relay has loose connections or is bad	Check timing relay for loose connections or replace the timing relay	

Table A-3: Troubleshooting the Electrical System and Perimeter Guarding (Continued)

Problem	Possible Cause	Possible Solution	See Page
Joystick and button are pressed, horn sounds and then stops, but the machine is not moving	The control relay has loose connections or is bad	Check control relay and VFD for loose connections or replace the control relay	
Press head travels the opposite direction of the directional button pressed	The electrical wires are connected to the wrong terminals.	Swap the wires on the contactor inside the electrical enclosure. The wires may be switched at the motor instead of on the contactor also	
Safety output OFF state while there is no intrusion by an object	Mutual interference. This may happen if light from another scanner or other type of photoelectric sensor such as a safety light curtain, is transmitted into the laser scanner. In such a case, install the sensor so that its scanning plane does not receive light from the other sensor.	When positioning the laser scanner downward, the laser scanner may be affected by reflection from the floor surface. Effect of reflection may increase depending on the material of the screen. Be sure to check surrounding environment before installing the scanner.	24
	Incorrect monitoring zone configuration. A safety zone may have been configured too close to any objects.	Since the maximum measurement error of the laser scanner is 100mm, the safety zone must be configured at least 100mm away from any objects. Call MiTek if reconfiguration is necessary. Password is required!	84
	An additional measurement error may need to be added due to reflective backgrounds.	Additional Error due to Reflective Background	24
	Incorrect zone delay setting. The laser scanner will turn OFF if the zone set select input pattern does not fit to any of the patterns configured with the configuration tool within the configured zone delay time.	Call Customer Service to set the zone delay time to adjust to the specified zone set select input pattern within the given zone delay time.	
	Ambient light including high density factory lighting and strobe flash may directly affect the scanner.	An angle of +/-5 degrees must be maintained from the laser scanning plane. Never change the angle!	24
	Dirty environment, for instance fog, smoke, steam or other small flying particles may cause the incorrect switching of a Machine Stop state.	To avoid the operation failure, keep the monitoring area clean., specifically the scan window or dust detection surface (on the base of the window).	79
	Dirty window	If the status/diagnostic display shows error code 80, clean the scan window.	

Table A-3: Troubleshooting the Electrical System and Perimeter Guarding (Continued)

Problem	Possible Cause	Possible Solution	See Page
Slow response of the safety output turning ON	The scanner will turn OFF if the zone set select input pattern does not fit to any of the patterns configured with the configuration tool within the configured zone delay time.	Call Customer Service to set the zone delay time to adjust to the specified zone set select input pattern within the given zone delay time.	
Constant Safety Output OFF	Dirty window: If the status/diagnostic display shows error code 80, the scan window may be dirty or scratched.	Clean the scan window. Replace the scan window.	85
	Safety zone layout change	Verify that no objects are intruding in the configured safety zone. If the scanner is detecting something, the intrusion indicator will turn ON. The configuration software can also be used to monitor the scanning information of the scanner.	
If the configuration software cannot receive configuration from the laser scanner	The communication cable is not properly connected.	Check connections of the communication cable and the ethernet cable	

Safety Controller Diagnostics and Troubleshooting

Safety Controller Diagnostics

The indicators shown in Figure A-1, located on the front of the safety controller, communicates its status and Operating Mode. An explanation of each numbered row can be found on

Refer to page 64 for maintenance information about the safety controller.

Figure A-1: Diagnostics Display for Safety Controller (from Omron Cat. No. Z922-E1-01)

MS		FORCE	LOCK	ERR/ ALM	MC	COMM	OUT PWR	I/O		Status	
Green	Red	Yellow	Yellow	Red	Yellow	Yellow	Green	Yellow	Red		
Normal operating status											
○	●	---	○	●	●	---	---	---	---	Normal operating status after completing user testing	1
○	●	---	○	●	●	---	---	---	---	Normal operating status during user testing	2
Stopped but no error detected											
●	●	---	---	●	●	---	---	---	---	Internal power not supplied	3
○	●	---	---	●	●	---	---	---	---	Stopped in IDLE Mode	4
○	○	---	---	●	●	---	---	---	---	Stopped in CONFIGURATION Mode	5
●	●	---	---	●	○	---	---	---	---	Memory Cassette operation in progress (backup/restore)	6
					○						
Fatal error detected											
●	○	---	---	---	---	---	---	---	---	Critical status: System error detected	7
●	○	---	---	○	---	---	---	---	---	Abort status: Minor error detected	8
●	●	---	---	○	○	---	---	---	○	Error detected in Memory Cassette operation (backup/restore)	9
Non-fatal error detected											
---	---	---	---	○	---	---	---	---	---	Non-fatal error detected	10

● : Not lit ○ : Flashing ○ : lit --- : Not relevant

Table A-4: Diagnostic Definitions for Safety Controller (Use With Figure A-1)

Row	Problem	Status	Possible Solution
1	Normal operating status after completing user testing	Normal operating status	User testing has been completed, and normal operation is being performed in automatic operating mode. No particular measures are required.
2	Normal operating status during user testing	Normal operating status	User testing has not been completed, and so operation is being performed with the configuration unlocked. The present operation is normal, but the system will start in IDLE Mode at the next startup. Change the operating mode from the safety controller Configurator at every startup until user testing has been completed.
3	Internal power not supplied	Stopped, but no error detected	<p>Check the following before supplying the rated power:</p> <ul style="list-style-type: none"> • Is the power supply voltage within the specifications? • Is the wiring correct or connected properly? <p>The Unit may have failed if the measured voltage at terminal V1/G1 is normal. In that case, replace the Unit.</p>
4	Stopped in Idle Mode	Stopped, but no error detected	<ol style="list-style-type: none"> 1. Refer to 9-3 Configuration Lock and Automatic Operation if the system starts in IDLE Mode when it was previously operated in RUN Mode. 2. The mode will change from RUN Mode to IDLE Mode when the Force Mode times out. Take suitable measures, such as starting Force Mode again.
5	Stopped in Configuration Mode	Stopped, but no error detected	Configuration data has not been downloaded to the safety controller. Refer to SECTION 8 Connecting Online and Downloading to the safety controller and download the configuration data.
6	Memory cassette operation in progress (backup/restore)	Stopped, but no error detected	<p>The safety controller will start by performing a Memory Cassette operation if it is started under any of the following conditions. This is normal, and the safety controller will resume normal operation when it completes.</p> <ul style="list-style-type: none"> • The safety controller is in default status (i.e., waiting for configuration) and a memory cassette is inserted—wait until it is complete. • The data stored on the inserted memory cassette is different from the configuration data in the safety controller—perform a data restore (see page 70). • DIP switch pin 4 is ON.
7	Critical status: System error detected	Fatal error detected	A fatal error has occurred (e.g., hardware failure or assert error). If this occurs again after the power supply is cycled, hardware failure is probable. Replace the safety controller.

Table A-4: Diagnostic Definitions for Safety Controller (Use With Figure A-1)

Row	Problem	Status	Possible Solution
8	Abort status: Minor error detected	Fatal error detected	<p>A minor error (e.g., unsupported Unit mounted) from which recovery is possible has occurred. Check the following, confirm proper system configuration, and then cycle the power supply.</p> <ol style="list-style-type: none"> 1. Is an unsupported Expansion I/O Unit mounted? 2. Are three or more Expansion I/O Units mounted? 3. Is an unsupported Option Board mounted? (In particular, only unit version 2.0 or later of the CP1W-CIF41 Ethernet Option Board is supported.)
9	Error detected in memory cassette operation (backup/restore)	Fatal error detected	An error has been detected in a backup or restore operation using the memory cassette. See page 102 to clear error.
10	Non-fatal error detected	Non-fatal error detected	An error has been detected, but operation can continue.

Safety Controller Error Names and Solutions

More information on the safety controller can be found in the Maintenance chapter, starting on page 64.

Table A-5: Troubleshooting the Safety Controller

Error Name	Possible Cause	Possible Solution
System failure	A hardware error has been detected in hardware self-diagnosis. A memory error has been detected (may be a software error).	Cycle the power supply. If the error occurs again, replace the unit.
Internal NVS access error	An error has been detected when writing the internal NVS.	Cycle the power supply. If the error occurs again, replace the unit.
Unsupported expansion I/O unit	The safety controller was started with an unsupported expansion I/O unit connected.	With the power supply off, adjust the system to the proper unit configuration, then turn on the power supply.
Too many expansion I/O units	The safety controller was started with three or more expansion I/O units connected.	With the power supply off, adjust the system to the proper unit configuration, then turn on the power supply.
Unsupported option board	The safety controller was started with an unsupported option board mounted.	With the power supply off, adjust the system to the proper unit configuration, then turn on the power supply.
Force Mode timeout	The Force Mode has timed out and program execution has stopped.	-
Memory cassette not inserted or incorrect memory cassette Si1 lit red	Backup was started with a memory cassette not inserted securely. The safety controller was started in Restore Mode with a memory cassette formatted using the CP1@ or a memory cassette containing incorrectly formatted data.	<p>Restoring Data:</p> <ol style="list-style-type: none"> 1. With the power supply OFF, insert a memory cassette securely, and then turn ON the power supply again. 2. With the power supply OFF, insert the correct memory cassette, and then turn ON the power supply again. <p>If the error occurs again after this measure is taken, replace the memory cassette or the safety controller.</p> <p>Not Restoring Data:</p> <p>The safety controller will attempt to restore data if it is waiting for configuration (i.e., default status) or the configuration data that is held does not match data on the memory cassette. If restoring the data is not required, remove the memory cassette and cycle the power supply.</p>

Table A-5: Troubleshooting the Safety Controller (Continued)

Error Name	Possible Cause	Possible Solution
Memory cassette removed or access error Si2 lit red	The memory cassette was removed during execution of a memory cassette operation. Hardware error in safety controller or memory cassette.	With the power supply OFF, insert the Memory Cassette again, and then turn ON the power supply again. If the error occurs again, replace the safety controller or Memory Cassette.
Internal NVS access error during execution of memory cassette functions Si3 lit red	Controller hardware failure	Cycle the power supply. If the error occurs again, replace the unit.
Restore model information mismatch Si4 lit red	The model information in the configuration data stored on the memory cassette does not match the model information in the safety controller.	With the power supply off, insert the correct memory cassette, then turn on the power supply.
Device password mismatch between restore memory cassette and unit Si5 lit red	The device password stored in the memory cassette does not match the device password in the safety controller.	With the power supply off, insert the correct memory cassette, then turn on the power supply.
Restore prohibit error Si6 lit red	An attempt was made to restore data to a safety controller for which restore prohibition has been set.	Using the safety controller Configurator, 1) overwrite the configuration data or 2) reset to the default settings, and then insert the memory cassette again and cycle the power supply.
Incorrect configuration data at restore Si7 lit red	Incorrect data was detected when checking the configuration data stored in the memory cassette.	With the power supply off, insert the correct memory cassette, then turn on the power supply.
Unconfigured unit at backup Si8 lit red	The safety controller contains no configuration data, and so backup to the memory cassette cannot be performed.	-
Unlocked unit at backup error Si9 lit red	The safety controller's configuration data is not locked, and so backup to the memory cassette cannot be performed.	-
Expansion I/O unit configuration mismatch	The system started with a configuration different from configuration set using the safety controller Configurator.	With the power supply OFF, adjust the system to the proper Unit configuration, and then turn ON the power supply again.
Expansion I/O unit bus error	Failure occurred when refreshing the expansion I.O unit due to unit failure, improper contact, or noise interference.	With the power supply OFF, check the connection to the Expansion I/O Unit. If the error occurs again, replace the Expansion I/O Unit or take measures against noise.

Table A-5: Troubleshooting the Safety Controller (Continued)

Error Name	Possible Cause	Possible Solution
Function block status error	A logic error was detected in function block execution.	Reference the safety controller's manual
Option board communications error, communications timeout	The option board became loose after startup.	With the power supply off, check the connection to the option board, then turn on the power supply.
Output PS voltage low	The correct output power is not being supplied.	Check the following before supplying the rated power.
Output PS OFF circuit error	An error has been detected in the output power supply Off test.	<ul style="list-style-type: none"> Is the power supply voltage within the specifications? Is the wiring correct or connected properly? The Unit may have failed if the measured voltage at terminal V2/G2 is normal. In that case, replace the Unit.
External test signal failure at safety input	Contact of input signal lines to positive side of power supply lines. Short-circuit between input signal lines.	Check the external wiring.
	Failure of externally connected device.	Replace the externally connected device.
Internal circuit error at safety input	An error was detected in the internal circuits.	Cycle the power supply. If the error occurs again replace the unit.
Discrepancy error at safety input	Input signal line ground fault or disconnection.	Check the external wiring.
	Failure of connected device.	Replace the externally connected device.
	Incorrect set value for discrepancy time.	Review the discrepancy time.
Overload detected at test output	Output signal line ground fault.	Check the external wiring.
	Failure at externally connected device.	Replace the externally connected device
Stuck-at-high detected at test output	Contact made from output signal lines to positive side of power supply lines.	Check the external wiring.
	Internal circuit failure.	Cycle the power supply. If the error occurs again, replace the unit.
Undercut detected using muting lamp	Output signal line is disconnected.	Check the external wiring.
	Externally connected device failed.	Replace the device.
Internal circuit error at test output	An error was detected in the internal circuits.	Cycle the power supply. If the error occurs again, replace the unit.
Overcurrent detected at safety output	Externally connected device failed.	Replace the device.

Table A-5: Troubleshooting the Safety Controller (Continued)

Error Name	Possible Cause	Possible Solution
Short-circuit detected at safety output	A fault in output signal lines was detected.	Check the external wiring.
Stuck-at-high detected at safety output	Contact made from output signal lines to positive side of power supply lines.	Check the external wiring.
	Internal circuit failure. Output power supply is outside of specifications.	Cycle the power supply. If the error occurs again, replace the unit. Check the output power supply.
Internal circuit error at safety output	an error was detected in the internal circuits.	Cycle the power supply. If the error occurs again, replace the unit.

Light Curtain Diagnostic Codes

Table A-6: Diagnostic Codes for the Light Curtain System

Code Group	Code Number	Description of Diagnostic Code
Normal Operation	88/V#	When powered-up, all of the segments are lit and then the software version number is displayed
	--	RUN state
	-0	STOP state
	-1	In the Interlock state and waiting for Start Input
Configuration Switch Faults	21	Invalid Mode selection setting
	22	Switch settings changed during operation
	26	Invalid Code setting
Safety Output (OSSD) Faults	31	Safety Output A & B are shorted together
	32	Safety Output A shorted to Power
	33	Safety Output B shorted to Power
	34	Safety Output A shorted to Ground
	35	Safety Output B shorted to Ground
MPCE Faults	41	MPCE signal was in Wrong state BEFORE entering the Machine RUN state
	42	PCE signal was in Wrong state AFTER entering the Machine RUN state
	43	MPCE signal was in Wrong state during power-up of the PA4600
Receiver Fault	50	A fault internal to the PA4600 was detected
Setup Error	60	Receiver in view of multiple transmitters set to same scan code

Laser Scanner Diagnostic Codes

Table A-7: Diagnostic Codes for the Laser Scanner System

Status	Code Number	Description	Corrective Action
Normal Operation	88	Power up indication	
	--	Normal operation (guarded machine stop)	
	-- blinking slowly	Standby mode (guarded machine stop); the rate of blinking depends on mode	
	01	Interlock state (waiting for start input)	
	02	Configuration mode (guarded machine stop)	
	80	Window contamination indication (guarded machine stop)	The window is dirty or scratched; clean or replace as necessary
	70	Incorrect number of active zone set select inputs (guarded machine stop)	Check zone set select input wiring, zone configuration selection, zone set select input switching time, and zone delay configuration
	71	Invalid or undefined zone set select input combination but correct number of active zone set select inputs (guarded machine stop)	Check zone set select input wiring, zone configuration selection, zone set select input switching time, and zone delay configuration.
	□□	Call scanner manufacturer	
Safety Output Fault	30	Safety output fault	Check output connection and wiring.
	32	Safety output A is short-circuited to 24 V	
	33	Safety output B is short-circuited to 24 V	
	34	Safety output A is short-circuited to 0 V	
	35	Safety output B is short-circuited to 0 V	
External Device Monitoring Fault	40	EDM (External Device Monitoring) fault	Check output external device monitoring connection and wiring
	41	External device monitoring fault before sensor is turning on	Check that the NC-contact status of the external device is changing state before the sensor is turning on
	42	External device monitoring fault after sensor is turning on	Check that the NC-contact status of the external device is changing state after the sensor is turning on
	43	External device monitoring fault during power on	Check the output configuration, connections, and wiring

Table A-7: Diagnostic Codes for the Laser Scanner System

Status	Code Number	Description	Corrective Action
Other Faults	50	Affected by noise or disturbance light or internal fault	Check the environment if any noise or disturbance light is coming in
	51	Mutual interference	See page 24
	52-58	Possible electrical noise interference or internal fault	Check the environment for electrical noise sources or repair the unit.
	59	The unit was possible jarred or bumped	Check the environment if any jarring occurs
	60	Invalid configuration in unit	Reconfigure unit or check current configuration
	72	Incorrect number of active zones set select inputs (hard fault code after diagnostic code 70 persists for more than 10 minutes)	Check zone set select input wiring and zone configuration selection
	73	Invalid or undefined zone set select input combination, but correct number of active zone set elect inputs (hard fault code after diagnostic code 71 persists for more than 10 minutes)	Check zone set select input wiring and zone configuration selection
	74	Standby input or zone set select inputs voltage too high	Check zone set select inputs or standby input wired at more than system power (24 VDC)
	75	Scanner chassis connect to power (24 VDS)	Scanner chassis should be grounded to 0 VDC
	82	Window not detected or entire dust detection surface is dirty or blocked	Check that the window is properly mounted and clean the dust detection surface
90	Internal temperature fault	The scanner internal temperature exceeds the operating limit: add ventilation	

Navigating the Parts List Appendix

Finding the Part Number

The parts list provided here shows spare parts that should be kept in stock at all times. Use one of the methods shown in Table B-1 to locate your part number.

For a complete list of replacement parts, or if you're unsure of which spare part you need and would like to see a picture, use the electronic Parts Guide for this machine. The electronic Parts Guide can be found on our Web site.

Table B-1: How to Find Your Part Number

Using the Spare Parts List in the Manual	Using Our Web Site: www.mii.com/machinery	Using Your Parts Guide CD-Rom
If it is a part that should be kept in stock, it is listed in the Parts List in the manual. Locate the correct part name and description to find the part number. If you're unsure of which part you need, use the electronic Parts Guide online to see a picture.	<ol style="list-style-type: none"> 1. Click <i>Machinery</i>, then roll your cursor over <i>Ordering Parts</i>. 2. Click on <i>Parts Guide</i> to access the Quick Reference Parts Guide. 3. Choose your equipment name. Browse through the pictured parts to find your part number. 	<ol style="list-style-type: none"> 1. Place the CD in your computer's CD drive. It should automatically launch a Main Menu. 2. Click the graphic for the machine for which you are ordering parts. 3. Browse through the pictured parts to find your part number.

Ordering the Parts With Your Part Number

There are three easy ways to order your part after you determine the part number. Each column in Table B-2 describes one of the methods

Table B-2: How to Order Your Part Using the Part Number

Using Our eStore™ (an account is required):	Using E-Mail	Using the Phone
Click the eStore link from the Web site, OR Click the eStore link from the Parts Guide	Send an e-mail to mitekparts@mii.com with all relevant information, including the part number.	Call us at 1-800-523-3380 and select "Parts Orders".

Safety Notes for Replacing Parts

	 WARNING
	<p>CRUSH, CUT, AND PERSONAL INJURY HAZARD.</p> <p>Perform the safety tests described in the <i>Safety Tests</i> section on page xvi before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.</p>

	 WARNING
	<p>ELECTROCUTION HAZARD!</p> <p>All electrical work must be performed by a licensed electrician.</p> <p>Follow approved lockout/tagout procedures (OSHA 29 CFR 1910.147).</p>

	 WARNING
	<p>ELECTROCUTION HAZARD.</p> <p>Always turn the power off by activating an E-stop when the equipment is not in operation.</p> <p>Always verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures (OSHA 29 CFR 1910.147) before performing any maintenance on this equipment.</p>

NOTICE	
<p>Only use the exact replacement parts that are specified by MiTek. Substitutions may harm your equipment.</p>	



Part Numbers

Mechanical Parts

Table B-3: Mechanical Replacement Parts

MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
554008	Drive wheel chain, #80 (Qty of 2 at 157" ea)	63750 or 63826	1
554008	Motor drive chain (Qty of 1 at 98")	63750 or 63826	1
63733-501	Drive wheel, wheel only	63750 or 63826	8
580200	Guide wheel, 5"x2", rubber	63750 or 63826	8
691900	Restricted zone tape, 100 yards	—	

Electrical Parts

Table B-4: Electrical Replacement Parts

MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
208/230 V—516382 415/460 V—516388 575 V—516383	Brake fuses (2)	90944	2
208/230 V—516494 460 V—516491 415/575 V—516490	Disconnect fuses (3)	90944	3
208 V—516389 230/415/460 V—516394 575 V—516384	Transformer fuses—primary side (2)	90944	2
208/230/460 V—516387 415/575 V—516350	Transformer fuses—secondary side (1)	90944	1
Red: 514026 Yellow: 514027 Blue: 514028	Colored assemblies for stack light	90944	
514032	Green lens (cover) for Right-Ready and Left-Ready lights	90944	
514038	Green light bulb for Right-Ready and Left-Ready lights	90944	
67651-501 67562-501 515971	Laser scanner assembly <i>(incl scanner & bracket)</i> Bracket assembly only Laser scanner only	—	
515982	Safety controller, G9SP series	90944	
515974	Memory cassette for safety controller	90944	



Maintenance Checklists

Appendix C

Checklists for Preventive Maintenance

Use the checklists in this appendix to schedule preventive maintenance. The checklists will guide you through all preventive maintenance tasks required to keep this equipment in top working condition.

These pages are supplied with the intent that you will photocopy them and document the date that maintenance is done on the copies, leaving the original in the manual for future use.

***RoofTracker II™* Press**

Daily Checklist	page 114
Weekly Checklist	page 115
Checklist by Working Hours	page 116

RoofTracker II

Daily Checklist

Week of: _____

Year: _____

	⚠ WARNING
	<p>Lockout/tagout before performing any maintenance!</p> <p>If power is required, ensure all personnel are clear.</p>

Action		MON	TUE	WED	THU	FRI	SAT	SUN
Lubricate the drive wheel chain (every 8 working hours)	Shift 1							
	Shift 2							
	Shift 3							
Lubricate the motor drive chain (every 8 working hours)	Shift 1							
	Shift 2							
	Shift 3							
Inspect light curtains	Shift 1							
	Shift 2							
	Shift 3							

Notes

Date

RoofTracker II

Weekly Checklist

Month: _____

Year: _____

	WARNING
	<p>Lockout/tagout before performing any maintenance!</p> <p>If power is required, ensure all personnel are clear.</p>

Mechanical Actions	Lockout/ Tagout	Week 1	Week 2	Week 3	Week 4	Week 5
Check tension of the drive wheel chain—needs 1/2" play	YES					
Check tension of the motor drive chain—needs 1/2" play	YES					
Safety Controller Actions						
Check the ambient temperature inside the control panel while machine is cool (not operating): -20 to 75 deg C	YES					
Use a hygrometer to check the ambient humidity inside the control panel: 10% to 95% with no condensation	YES					
Check that the safety controller is not in direct sunlight	YES					
Check for accumulation of dust, dirt, etc.	YES					
Ensure that no water, oil, or chemicals are hitting the safety controller and that no corrosive or flammable gases are in the area	YES					
Check that all terminal blocks are inserted and locked fully	YES					
Check that cable connectors are locked fully	YES					
Check for loose screws in external wiring	YES					
Use a voltage tester to check for voltage fluctuations at the power supply terminals: Must be within 20.4 to 26.4 VDC (-15% to +10%)	NO					
Check the ambient temperature inside the control panel during operation: 0 to 55 deg C	NO					

RoofTracker II

Checklist by Working Hours

Year: _____

	⚠ WARNING
	<p>Lockout/tagout before performing any maintenance!</p> <p>If power is required, ensure all personnel are clear.</p>

Action	WORKING HOURS	Date					
Grease take-up bearing	100						
Grease gantry lifter bearings <i>(if equipped with this option)</i>	100						
Inspect and dust brake motor	100						
Grease the drive wheels and idler wheels bearings (8 wheels total)	300						
Grease drive wheel shafts (4 wheels total)	300						
Grease the guide wheels	300						
Check oil level in brake motor	300						
Drain and change gearbox oil	10,000						

Notes

Date

Appendix D

Drawings may be in a separate binder accompanying this manual or at the end of this manual.

Table D-1: Attached Drawings for a RoofTracker II System

Drawing Description	Drawing Number
Parking stand assembly	63630-501
Drive wheel block assembly	63735-501
Idler wheel block assembly	65571-501
Power transmission parts, left side	67420-501
Power transmission parts, right side	67421-501
Wheel installation	67423-501
Take-up bearing assembly	67429-501
Bumper assembly	67460-501
Bumper assembly	67470-501
Top level mechanical assembly	67540-501
Control parts installation	67541-501
Top chord platform assembly	67546-501
Flat cable festoon, single head	69565
Gantry Lift	TBD
Electrical assembly	All 90944 and 90544 dwgs



Document Evaluation

Appendix E

A form is included in this appendix so you can provide MiTek with feedback on the usefulness of this manual. We make an ongoing effort to improve the value of our documentation, and your views are important to us.

Please follow the instructions on the form to provide us with comments or suggestions that will help us improve the quality of our documentation services.

Document Evaluation Form (cont'd)

Identify any inaccuracies in the document.

What are the three best features of the document?

What are the three worst features of the document?

What did you like/dislike about the illustrations?

Your Name:

Date:

Company Name:

Address:

Phone:

E-mail:

Please mail this form to:

MiTek
Machinery Operations
301 Fountain Lakes Industrial Drive
St. Charles, MO 63301
Attn: Engineering Manager

Or fax this form to:

636-328-9218
Attn: Engineering Manager

If you do not receive a reply within 45 days, please call our Customer Service Department and ask for the Documentation Specialist or Engineering Manager: 800-523-3380.

Glossary

actuate	to activate, put into action
aisle pad	a type of jiggging used when a connector plate needs to be embedded where the table surface gives way to a walk-through aisle
amperage	the strength of an electric current, expressed in amperes
anchor plate	a steel plate that holds the tables in place; it is anchored to the concrete floor and the tables are welded to it
auto-eject	a pneumatic system that raises the truss off the tables and automatically places the truss on the Stand-Alone Conveyors with the use of a transfer roller
bumper	a safety device on each corner of the gantry head (for a total of 4); when the bumper is depressed, the gantry head motion stops
bus bar	an electrical device that allows multiple gantry heads to be used simultaneously
connector plate	the nail-plate that is embedded into the ends of the tie
cushion	an attribute of a hydraulic cylinder that allows adjustment of the pressure in each cylinder
directional buttons	the 2 black buttons on the pendant control station that tell the gantry head which direction to move
drive wheel	one of 4 wheels that are driven by the motor using a drive train system
ejector	also table ejector; raises the truss off of the table using pneumatic power
end-eject	a pneumatic system that raises the truss off the tables and allows the truss to be manually pushed or pulled off the end of the tables; this system requires that the gantry head rolls back over the truss or a device must be installed to raise the gantry head when it is parked
festoon	a string or garland suspended in a loop between two points; the electric cable suspended over the gantry head that is gathered in loops when not completely extended
Finish Roller	a piece of equipment separate from the <i>RoofTracker</i> but required for the connector plates to be completely embedded; the Stand-Alone Conveyors take the truss through the Finish Roller after the <i>RoofTracker</i> gantry head has rolled across the plates.

Glossary

gantry head	the entire traveling weldment that houses the roller to embed the connector plates
hour-meter	a gauge that tells the amount of time the motor is actually turning and the gantry head is moving
idler wheel	one of four wheels that assist the drive wheels but are not driven by the motor
inner side	refers to the end of the gantry head housing; the side closest to the tables; both ends have an inner side—one can see the inner side of both ends when standing on or between the tables
jigging	any of several devices used to hold the truss in place on the tables
joystick	an option that replaces the pendant control station to control movement of the gantry head
layout	a scaled diagram of the location of components and the space that they occupy
leveling screws	large cap head screws that thread into the table legs and allow the table height to be adjusted and leveled
light curtain	the perimeter access guarding device that uses multiple light beams to detect when something is in the way of the gantry head and stops the machine to prevent injury or damage; the <i>RoofTracker</i> uses a set of 3-beam or 2-beam light curtains on both sides of the gantry head
limit switch	an electro-mechanical device that consists of an actuator mechanically linked to a set of contacts; when an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection
lockout/tagout	a means of isolating a piece of equipment from its energy source so maintenance can safely occur; guidelines provided in OSHA 29 CFR 1910.147
lubricator	a device that allows controlled amounts of lubricants into the pneumatic system
motor end	also “operator end”, used to indicate which end of the gantry head is being discussed; the end of the gantry head that houses the motor and the user control interface

Glossary

operator end	also “motor end”, used to indicate which end of the gantry head is being discussed; the end of the gantry head that houses the motor and the user control interface
OSSD	Output Signal Switching Device for safety scanner; provides “on” output when no object is interrupting the sensor within safety zone
outer side	refers to the end of the gantry head housing; the side farthest from the tables; both ends have an outer side—one can see the outer side of the one end when standing at the pendant control station
pendant control station	where the operator stands to use the pendant that controls movement of the gantry head
pilot valve	a pneumatic valve that operates the setup valve to control the release or cessation of air in each setup; it is located on the bottom-chord end of one table in each setup
plate	see <i>connector plate</i>
PLC	Programmable Logic Controller; a solid-state control device that can be programmed to control process or machine operations. It consists of five basic components: processor, memory, input/output module, the power supply, and the programming device.
port	a connection point for a peripheral device
proximity switch	a switch that uses an electromagnetic field to detect when an object is near, there is no physical contact between the object and the switch; inductive proximity switches detect only metal objects, capacitive proximity switches can sense both metallic and non-metallic objects
puck	a type of jigging that is small and round
qualified person	a person or persons who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training, or experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work —ANSI B30.2-1983
receiver	also receiver stand; sits between the Stand-Alone Conveyors in a side-eject system and raises to meet the ejector so the truss can be pushed onto the receiver and lowered onto the Stand-Alone Conveyors; uses pneumatic power

Glossary

receiver bar	the component of the light curtain that receives the signal from the transmitter bar; every light curtain set consists of a receiver bar and a transmitter bar
regulator	a component of the pneumatic system that connects to the main air source and regulates the air pressure allowed into the system
roller	the large roller inside the gantry head that initially embeds the plates into the truss
setup valve	a component of the pneumatic system that controls the flow of air to the rest of the setup
side-eject	a pneumatic system that raises the truss off the tables and allows the truss to be manually pushed or pulled off the side of the table and onto the Stand-Alone Conveyors
slider pad	a type of jigging used when a connector plate needs to be embedded where the table surface gives way to a slot for the ejector
solenoid	an assembly used as a switch consisting of a coil and a metal core free to slide along the coil axis under the influence of the magnetic field
Stand-Alone Conveyor	the conveyor system that carries the truss from the tables to the Finish Roller and out to the stacker
stop	a type of jigging that is long and straight
table valve	the pneumatic valve on the bottom-chord end of every table that can be closed to remove the table ejector and associated receiver from operating with the rest of the setup
take-up bearing	adjusts the height of the roller
torque	a turning or twisting force
transfer roller	a motorized roller sitting perpendicular to the tables on an auto-eject system; it automatically transfers the truss from the ejectors to the Stand-Alone Conveyors
transmitter bar	the component of the light curtain that transmits the signal to the receiver bar; every light curtain set consists of a receiver bar and a transmitter bar
VFD	Variable Frequency Device; a computer inside the electrical system that controls the speed of the cycle, monitors braking distance, and communicates errors

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RoofTracker II™

Roller Press



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