Equipment Manual

RailRider Pro®

Floor Truss Press System

001040 rev. A

Manual applies to U.S. equipment.

If printing this manual from a file, it is highly recommended that it be printed in high resolution in color ink. Many of the graphics will be unclear and could create an unsafe condition if this recommendation is not followed.

Equipment Manual

RailRider Pro®

Floor Truss Press System

U.S. and other patents pending.

Manual applies to U.S. and International equipment.

MiTek Machinery Division
301 Fountain Lakes Industrial Drive
St. Charles, MO 63301
Phone: 800-523-3380
Fax: 636-328-9218
www.mii.com

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Legal Notice

Patents

Made and sold under one or more of the following patents:

U.S. 4,986,052	U.S. 5,837,014	U.S. 6,219,975
U.S. 5,385,339	U.S. 5,854,747	U.S. 6,260,263
U.S. 5,493,834	U.S. 5,873,567	U.S. 6,317,980
U.S. 5,568,862,	U.S. 5,884,448	U.S. 6,389,762
U.S. 5,630,697	U.S. 5,885,731	U.S. 6,401,422
U.S. 5,636,494	U.S. 5,906,264	U.S. 6,412,246
U.S. 5,638,658	U.S. 5,934,866	U.S. 6,418,601
U.S. 5,640,832	U.S. 5,947,460	U.S. 6,539,615
U.S. 5,655,399	U.S. 5,987,828	U.S. 6,666,367
U.S. 5,678,395	U.S. 5,996,303	U.S. 6,702,269
U.S. 5,702,095	U.S. 6,048,165	U.S. 6,758,022
U.S. 5,707,204	U.S. 6,112,968	U.S. 6,817,392
U.S. 5,735,087	U.S. 6,134,775	U.S. 6,834,470
U.S. 5,810,341	U.S. 6,170,688	U.S. 6,907,820
U.S. 5,819,412	U.S. 6,205,637	Other patents may apply
U.S. 5,833,222	U.S. 6,212,849	

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Notice of Change

Use this page to record service bulletins and notices that you receive to keep your manual updated.

RailRider Pro™
Floor Truss Press System

Service Bulletin or Notice #	Dated	Title

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Safety (English)

Safety Indicators: Signal Words

Refiérase a la página xxviii para español.

For safety information in Spanish, refer to page xxviii.

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 xxii, 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

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

NOTICE

Calls attention to information that is significant to understanding the operation at hand or the potential for property damage.

ENVIRONMENTAL

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

General 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 (e.g., safety glasses and hearing protection.) 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 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 xi.

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.
- Minimize dust clouds and protect your equipment by cleaning dust in this manner:

	NOTICE
	**Never use compressed air inside the electrical enclosures! It may force contaminants into the electrical connections.** **Use a vacuum to remove dust from electrical enclosures. Canned air is acceptable after vacuuming.**

  - Vacuum dust prior to blowing with air
  - Shut down electrical power and sources of ignition
  - If using compressed air, it should be a low compression (no more than 15 psi)
  - Powered cleaning equipment such as vacuums must be consistent with local governmental codes for use in dusty conditions.

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 xxi.
- Perform safety tests to ensure all E-stops are working properly before operating the equipment at the initial startup and after performing any maintenance.
- 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 the power off! Do not leave the machine 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 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 the chance of 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 page xiii 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.

Whenever you see this symbol, lockout/tagout!

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 xiv.

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 on page xiii.

	⚠ WARNING
	**ELECTROCUTION HAZARD.** **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!**

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

Figure SAFETY-1: Lockout/Tagout Mechanism on Main Electrical Enclosure

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 an Electrical Service Entry Panel

Pneumatic System Lockout/Tagout Procedure

When Lockout/Tagout is Not Required

If working on components other than the pneumatic system, but that requires you to be near the vicinity of movable pneumatic components, you must, at a minimum, physically restrain the pneumatic components from moving. If this is not possible, lockout/tagout the entire pneumatic system.

When Lockout/Tagout is Required

Before attempting repair or maintenance on a pneumatic line or component, lockout/tagout the machine properly. See step 1 on page 68 for more detail of pneumatic lockout/tagout procedures. Follow your company's approved lockout/tagout procedures.

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

This test procedure MUST be performed by qualified personnel at startup and after ANY maintenance, adjustment, or modification. Testing ensures that the safety system and machine control system work together to properly stop the machine.

Preparing for the Safety Test

Understanding the Controls

The operator controls consist of two pendants (standard) or four pendants (optional) suspended from masts on the sides of the gantry head.

The pendants have two buttons and an indicator light. See Figure SAFETY-3.

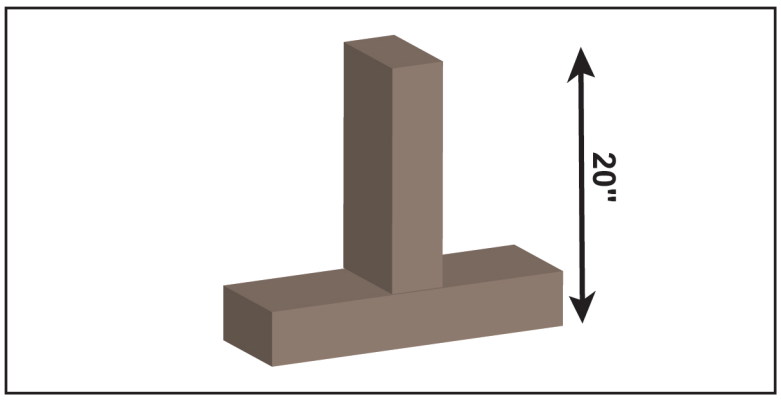
- A directional button controls the movement of the gantry head in the direction indicated.
  Press and hold this button to operate it.
- A Reset button resets the safety circuit after a laser scanner detects an obstruction and triggers an E-stop.
  Press the button to operate it.
- An indicator light illuminates when the laser scanner triggers an E-stop.

Figure SAFETY-3: Pendant

Creating a Wooden T

For the safety test, permanently fasten two pieces of wood together to form a T. The T should be a minimum of 20" tall. The T should be able to stand upside down on its own. See Figure SAFETY-4.

Figure SAFETY-4: Wooden T



Inspecting the Gantry Head

	**DANGER** **If the gantry head fails any part of this safety test, fix the problem before proceeding to the next step.** **Operating a gantry head that has failed any part of the safety test may result in serious injury or death.**

1. Lockout/tagout on the electrical service entry panel. See page xiv for an example of an electrical service entry panel.

2. Make sure that all safety labels are legible.

3. Check for signs of external damage to the laser scanner, the guards, the electrical cables, and the wiring.

4. Clean dust and fingerprints from the scanner windows using a soft, lint-free cloth and a common glass / plastic cleaner. Do NOT use thinner, benzene, or acetone for cleaning because it could damage the window. See page 41 for the location of a scanner window on a scanner.

5. Check chain tension by using the following steps.

    a) Remove the guards from the motor end and operator end.

    b) Check the chain tension to make sure the tension is correct. See step e on page 45 for detailed instructions.

    c) Replace the guards on both the motor end and operator end.

6. Check the conditions of the drive, pressure, and guide wheels to make sure that they are intact.

7. Check the track channels where the wheels meet the table to make sure they are free of debris.

Testing the Safety Controller

1. Remove the lock and tag. Restore power to the gantry head.

	**DANGER** **Make sure that the only person near the machine during the test is the operator.** **Other people remaining in the restricted zone (shown in page xxi) may result in death or serious injury.**

2. Verify that the safety controller (in the main electrical enclosure) doesn't have any faults. These faults would be indicated by the ERR/ALM red light blinking or turning solid. See page 35 for the location of the safety controller.

3. Verify that the braking system is working properly by using the following steps.

   a) Press the Reset button.

   b) Press the directional arrow button and allow the gantry head to reach full speed.

   c) Press an E-stop and make sure the gantry head stops. The gantry head should not skid during the stop. Skidding may indicate a problem with the chain tension, condition of the wheels, or condition of the track channels.

      Do not use the E-stop button as the usual method of stopping the gantry head. Overuse of the E-stop button may result in premature wear to mechanical components.

   d) Repeat step a through step c with the gantry head moving in the other direction.

   e) If the gantry head is equipped with four pendants, it has a second E-stop located on the motor end near the other two pendants. Repeat step a through step d using the other pendants and E-stop.

Testing the Laser Scanners

1. Engage an E-stop.
2. Place the wooden T on the table at least 10 feet from one scanner. It should be placed with one end sticking in the air like the wooden T in Figure SAFETY-4 on page xvi.
3. Disengage the E-stop.
4. Move the gantry head by using the following steps.
    a) Press the Reset button. Press and hold the directional button on the same side as the wooden T.
    b) Keep the directional button held as you approach the wooden T. Do not release the directional button until after the gantry head stops completely.
5. Check to make sure the following events happen when the gantry head approaches the wooden T.
    a) The gantry head should slow down when the wooden T reaches the warning zone. See page xx for a graphic of the warning zone.
    b) It should initiate an emergency stop when the wooden T reaches the safety zone. See page xx for a graphic of the safety zone.

	⚠ DANGER
	**If the gantry head hits the wooden T, immediately lockout/tagout and call MiTek Machinery Division Customer Service.** **Operating the gantry head after it hits the wooden T may result in serious injury or death.**

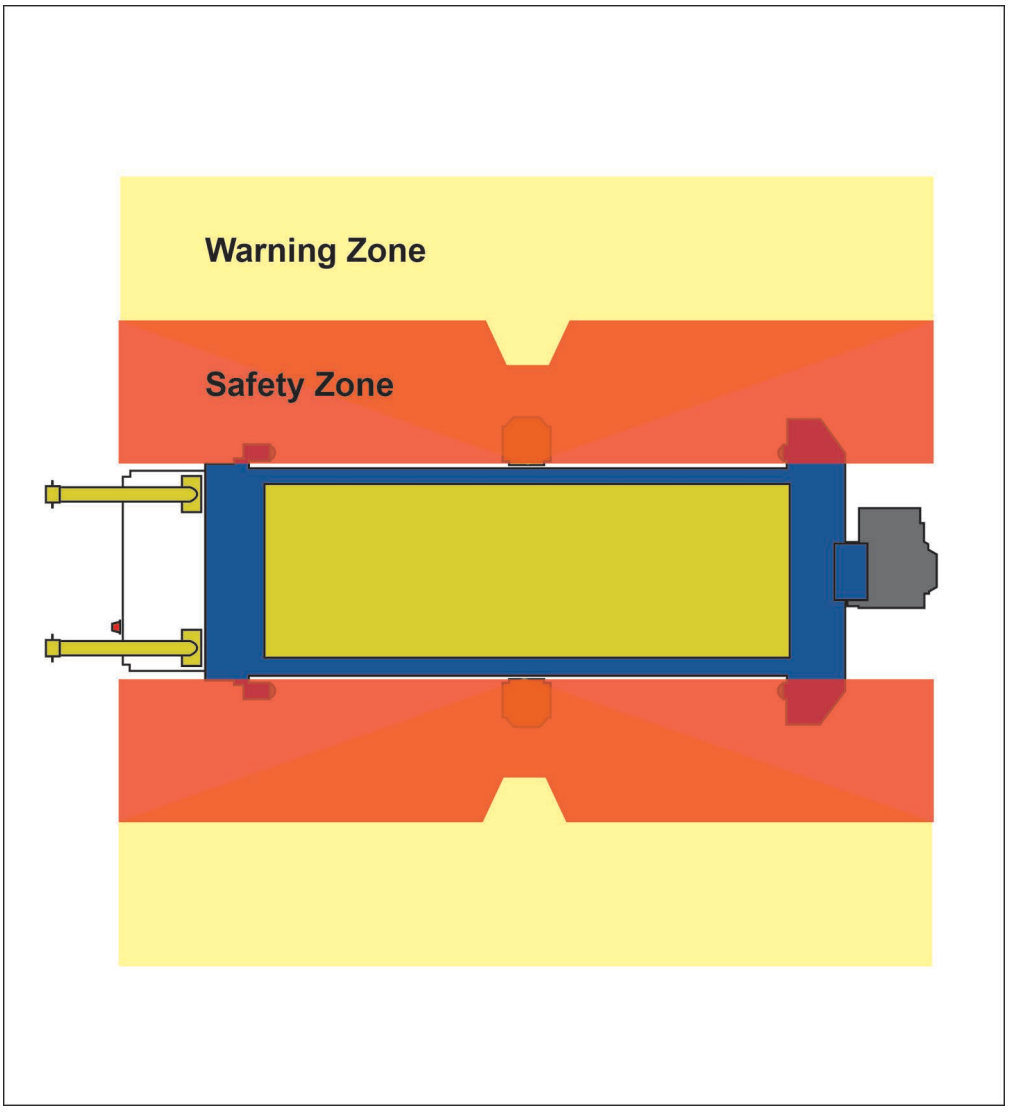
    c) It should stop without skidding.
    d) The beacon should turn red.
    e) The indicator light on the pendant closest to the wooden T should stay illuminated.
6. After the gantry head stops completely, release and press the directional button on the pendant closest to the wooden T again. The gantry head should not move.
7. Press the directional button on the pendant farthest from the wooden T to move the gantry head away from the wooden T. The gantry head should move away from the wooden T.
8. Repeat step 1 through step 7 using the scanner on the other side of the gantry head.

Safety and Warning Zones

The *RailRider Pro* gantry head has two scanners that continuously look for obstructions in the path of the gantry head. The scanners each have two zones. See Figure SAFETY-5.

- An obstruction in the warning zone causes the scanners to slow the gantry head.
- An obstruction in the safety zone causes the scanners to trigger an emergency stop.

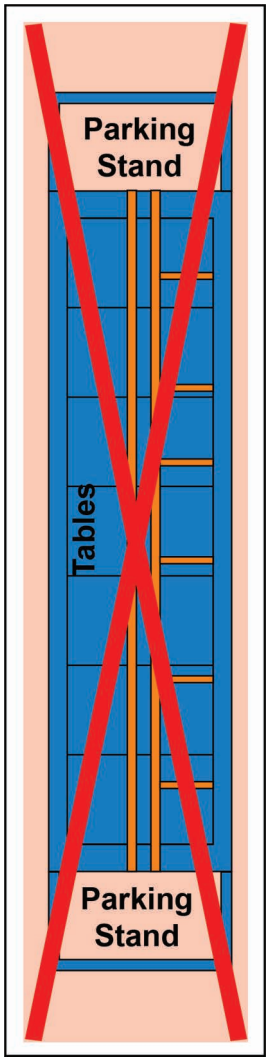
Figure SAFETY-5: Scanner Zones



Restricted Zone

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

Figure SAFETY-6: 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. See page 11 for more details.

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.

This is the Electrical Hazard Symbol. It indicates that there are dangerous high voltages present inside the enclosure of this product and/or that a power source is present. 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.

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.

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.

Operation of this equipment may result in flying debris and excessive noise. To reduce the risk of injury, wear only approved PPE.

Crush hazard! Keep hands clear.

Keep hands away from moving parts.

High pressure hose. Use appropriate PPE when working on equipment. Maintain safe pressure levels at all times.

Equipment produces loud noise in excess of 100 DBA during operation. Use appropriate hearing protection when in vicinity of this equipment.

Do not use sling equipment rated for less than ____ lbs/___kgs when lifting this equipment.

Keep hands and body clear.

Slip hazard! Use of approved footwear is required.

The operation of this equipment requires the use of PPE.

Do not operate without wearing required protective clothing.

Refer to manual—After installation, read the user's guide carefully before operating. Follow all operating and other instructions carefully.

Circuits are live—Lockout/tagout the upstream disconnecting means prior to opening for service.

Lockout in a de-energized state

Open switch before adjusting equipment.

To reduce the risk of personnel or equipment damage, maintain pressure at safe levels.

Read all safety warnings and instructions before proceeding.

Unplug equipment before servicing.

Hazardous moving parts are located behind this access panel. Do not operate this equipment without all guards and covers in place.

Do not use non-approved lubricants in this machine.

Unauthorized persons are not allowed beyond this point.

Do not operate without guards and covers in place

oil drop

Declaration of Safety Conformity

Conforms electrically to:

- NFPA 79
- NEC Electrical code
- Electrical enclosures carry UL508A and the CUL for Canada
- Safety circuit conforms to Category 4 redundant monitoring

Conforms mechanically to:

- 10CFR 1910
- ANSI B11.19

Seguridad (Español)

Indicadores de seguridad: Palabras de aviso

Las siguientes palabras y colores de aviso se utilizan a lo largo de este documento para indicar riesgos de seguridad. Preste suma atención cuando los vea. El nivel de gravedad es diferente por cada palabra o color de aviso.

Las palabras de aviso van acompañadas por gráficos que muestran al personal lo que deben y no deben hacer. Los gráficos se llaman símbolos de seguridad y se definen en la página xxii, pero se proporciona un texto más específico cada vez que se utiliza un gráfico por todo el manual. Todas las personas que estén cerca de una máquina tienen que ser capacitadas en cómo leer estos indicadores de seguridad.

No cumplir las instrucciones que acompañan cada palabra de aviso 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 peligro inminente que, si no se evita, ocasionará la muerte o graves lesiones.

ADVERTENCIA

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

PRECAUCIÓN

Indica una situación potencialmente peligrosa que, si no se evita, puede producir lesiones menores o moderadas.

AVISO

Llama la atención a información importante para entender la operación que se desea realizar o daños a la propiedad probables.

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 para el equipo de general

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/o 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

- Use siempre lentes 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, lentes 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.

Instalación del equipo

- Siga las instrucciones de instalación al pie de la letra.
- No utilizar este equipo en zonas residenciales.

Bloqueo/Etiquetado

- Antes de realizar el mantenimiento de los sistemas neumáticos, 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 xxxii.

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.
- Minimice las nubes de polvo y proteja su equipo quitando el polvo de la siguiente manera:

	AVISO
	**¡No utilice nunca aire comprimido dentro de una caja eléctrica! Puede forzar sustancias contaminantes hacia el interior de las conexiones eléctricas.** **Utilice un aspirador para eliminar polvo de las cajas eléctricas. Es aceptable utilizar aire comprimido después de aspirar.**

- Aspire el polvo antes de soplarlo con aire
- Apague la alimentación eléctrica y todas las fuentes de ignición
- Si usa aire comprimido, debe ser a compresión baja (no más de 15 psi)
- El equipo eléctrico de limpieza como las aspiradoras debe cumplir con los códigos del gobierno local para uso en condiciones polvorientas.

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 xlv.
- Realice pruebas de seguridad para verificar que todos los frenos de emergencia funcionen adecuadamente antes de utilizar el equipo al principio de la puesta en marcha y después de realizar cualquier tarea de mantenimiento.
- 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 la abandone 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 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 antes de comenzar 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.
- Solo el personal de mantenimiento calificado puede quitar o instalar los dispositivos de seguridad.
- 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 lentes 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 en la página xxxiv 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.

Siempre que vea este símbolo, ¡Bloquee/Etiquete!

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 xxxv.

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". Vea la Figura SEGURIDAD-1.

	⚠ ADVERTENCI
	**RIESGO DE ELECTROCUCIÓN.** **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!**

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

Figura SEGURIDAD-1: Mecanismo de bloqueo/etiquetado en un 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 etiquete 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 SEGURIDAD-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: Ejemplo de un mecanismo de Bloqueo/Etiquetado en un panel de entrada de suministro eléctrico

Procedimiento de bloqueo/etiquetado del sistema neumático

Cuando no se requiere bloqueo/etiquetado

Si trabaja con componentes que no son del sistema neumático pero que requieren su presencia en la proximidad de componentes neumáticos móviles, debe, como mínimo, trabar físicamente estos componentes para que no se muevan. Si no es posible, bloquee/etiquete todo el sistema neumático.

Cuando se requiere bloqueo/etiquetado

Antes de intentar reparar o realizar el mantenimiento de una línea o componente neumático, bloquee/etiquete la máquina en forma apropiada. Vea el paso en 1 en la página 69 para más detalles sobre procedimientos de bloqueo/etiquetado neumático. Siga los procedimientos de bloqueo/etiquetado aprobados por la compañía.

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

Este procedimiento de prueba DEBE ser realizado por personal calificado al momento de iniciar el sistema y después de CUALQUIER tarea de mantenimiento, ajuste o modificación. Las pruebas permiten comprobar que el sistema de seguridad y el sistema de control de la máquina funcionan juntos y detienen la máquina correctamente.

Preparativos para la prueba de seguridad

Descripción de los controles

Los controles del operador incluyen dos colgantes (estándar) o cuatro colgantes (opcionales) suspendidos de postes a los lados de la cabeza del pórtico.

Los colgantes tienen dos botones y una luz indicadora. Vea la Figura SEGURIDAD-3.

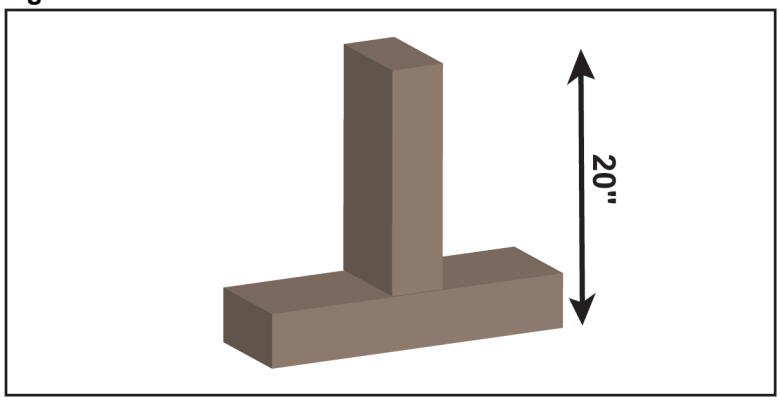
- Un botón direccional controla el movimiento de la cabeza del pórtico en la dirección indicada.
  Presione este botón y manténgalo así para operarla.
- Un botón “Reset” (Restablecer) restablece el circuito de seguridad después de que un escáner láser detecta una obstrucción y activa un paro de emergencia.
  Presione el botón para activarlo.
- Una luz indicadora se enciende cuando el escáner láser activa un paro de emergencia.

Figura SEGURIDAD-3: Colgante

Formación de una pieza de madera en “T”

Para la prueba de seguridad, sujete permanentemente dos piezas de madera para formar una “T”. La “T” deberá ser de al menos 20 pulgadas de alto y ser capaz de mantenerse boca abajo por su cuenta. Vea la Figura SEGURIDAD-4.

Figura SEGURIDAD-4: Pieza de madera en “T”



Inspección de la cabeza del pórtico

	**⚠ PELIGRO** **Si la cabeza del pórtico falla cualquier parte de esta prueba de seguridad, corrija el problema antes de proceder al siguiente paso.** **Operar una cabeza del pórtico que ha fallado cualquier parte de la prueba de seguridad podría resultar en una lesión grave o la muerte.**

1. Bloqueo y etiquetado del panel de entrada de suministro eléctrico. En la página xxxv encontrará un ejemplo de un panel de entrada de suministro eléctrico.

2. Verifique que todas las etiquetas de seguridad sean legibles.

3. Busque signos de daño externo en el escáner láser, los protectores, los cables eléctricos y las conexiones eléctricas.

4. Elimine el polvo y las huellas digitales de los cristales del escáner usando un trapo suave y sin pelusas, con un limpiador común para plástico y vidrio. NO utilice diluyente, benceno ni acetona para la limpieza debido a que pueden dañar los cristales. En la página 41 encontrará la ubicación de los cristales del escáner.

5. Revise la tensión de la cadena siguiendo estos pasos:

    a) Retire los protectores del extremo del motor y del extremo del operador.

    b) Revise la tensión de la cadena para verificar que sea la correcta. Vaya al paso e de la página 45 para ver las instrucciones detalladas.

    c) Vuelva a colocar los protectores tanto en el extremo del motor como en el extremo del operador.

6. Verifique las condiciones de la transmisión, la presión y las ruedas guía para asegurar que estén intactas.

7. Revise los canales por donde las ruedas tocan la mesa para verificar que estén libres de desechos.

Prueba del controlador de seguridad

1. Retire el bloqueo y la etiqueta. Reconecte la electricidad a la cabeza del pórtico.

	**⚠ PELIGRO** **Verifique que la única persona que esté cerca de la máquina durante la prueba sea el operador.** **La presencia de otras personas en la zona restringida señalada en la página xlv puede resultar en una lesión grave o la muerte.**

2. Verifique que el controlador de seguridad (en el gabinete eléctrico principal) no indique ninguna falla (estas fallas podrían ser indicadas por una luz roja de ERR/ALM, ya sea parpadeando o continua). En la página 35 verá la ubicación del controlador de seguridad.

3. Siga estos pasos para verificar que el sistema de frenado esté funcionando correctamente:

    a) Presione el botón “Reset”.

    b) Presione el botón direccional y permita que la cabeza del pórtico alcance su máxima velocidad.

    c) Presione el botón de paro de emergencia y asegúrese de que la cabeza del pórtico se detenga; no debe deslizarse al detenerse. Un deslizamiento puede indicar un problema con la tensión de la cadena o con la condición de las ruedas o de los canales.

        No use el botón de paro de emergencia como el método usual de paro para la cabeza del pórtico. El uso excesivo de este botón puede causar el desgaste prematuro de los componentes mecánicos.

    d) Repita el paso a al paso c con la cabeza del pórtico moviéndose en la otra dirección.

    e) Si la cabeza del pórtico está equipada con cuatro colgantes, tiene un segundo botón de paro de emergencia en el extremo del motor, cerca de los otros dos colgantes. Repita el paso a al paso d usando los otros colgantes y el otro botón de paro de emergencia.

Prueba de los escáneres láser

1. Presione el botón de paro de emergencia.
2. Coloque la pieza de madera en “T” sobre la mesa a cuando menos 10 pies de un escáner. Se debe colocar con un extremo al aire, como la pieza de madera en “T” en la Figura SEGURIDAD-4 en la página xxxix.
3. Suelte el botón de paro de emergencia.
4. Mueva la cabeza del pórtico siguiendo estos pasos:
    a) Presione el botón “Reset”. Presione (sin soltar) el botón direccional del mismo lado de la pieza de madera en “T”.
    b) Mantenga presionado el botón direccional conforme se acerca a la pieza de madera en “T”. No lo suelte sino hasta después de que la cabeza del pórtico se haya detenido por completo.
5. Verifique que suceda lo siguiente cuando la cabeza del pórtico se acerque a la pieza de madera en “T”:
    a) La cabeza del pórtico debe reducir la velocidad cuando la pieza de madera en “T” llegue a la zona de advertencia. En la página xliv encontrará una imagen de la zona de advertencia.
    b) Deberá iniciar un paro de emergencia cuando la pieza de madera en “T” llegue a la zona de seguridad. En la página xliv encontrará una imagen de la zona de seguridad.

	⚠ PELIGRO
	**Si la cabeza del pórtico golpea la pieza de madera en “T”, bloquee y etiquete de inmediato, y llame al departamento de Servicio a Clientes de la División de Maquinaria de MiTek.** **Operar la cabeza del pórtico después de que ha golpeado la pieza de madera en “T” podría resultar en una lesión grave o la muerte.**

    c) La cabeza del pórtico deberá detenerse sin deslizarse.
    d) La luz deberá cambiar a rojo.
    e) La luz indicadora en el colgante más cercano a la pieza de madera en “T” deberá permanecer encendida.

6. Luego de que la cabeza del pórtico se detenga por completo, suelte y presione el botón direccional en el colgante más cercano a la pieza de madera en “T”. La cabeza del pórtico no deberá moverse.

7. Presione el botón direccional en el colgante más alejado de la pieza de madera en “T” para mover la cabeza del pórtico y alejarla de dicha pieza. La cabeza del pórtico deberá alejarse de la pieza de madera en “T”.

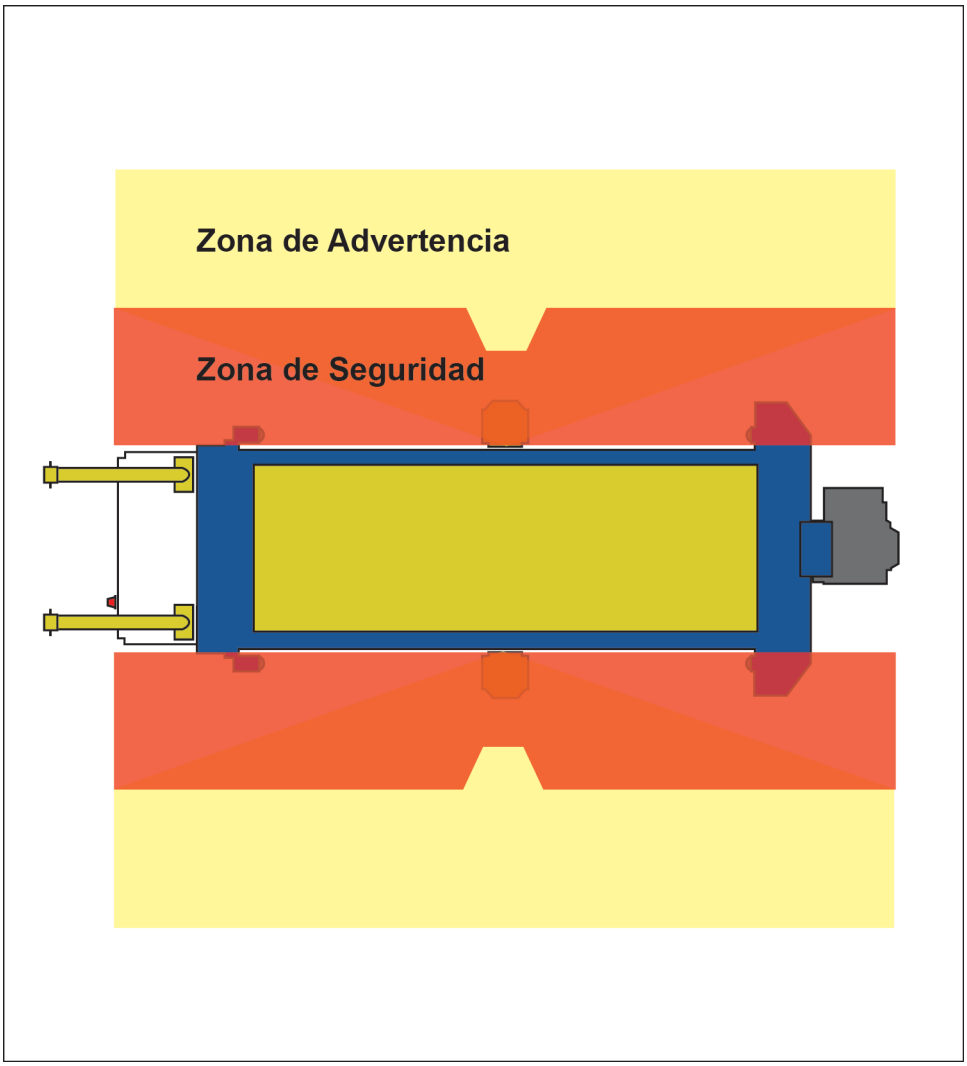
8. Repita el paso 1 al 7 usando el escáner al otro lado de la cabeza del pórtico.

Zonas de advertencia y de seguridad

La cabeza del pórtico *RailRider Pro* tiene dos escáneres que buscan continuamente obstrucciones en el paso de esta máquina. Los escáneres cuentan con dos zonas. Vea la Figura SEGURIDAD-5.

- Una obstrucción en la zona de advertencia causa que los escáneres reduzcan la velocidad de la cabeza del pórtico.
- Una obstrucción en la zona de seguridad causa que los escáneres activen un paro de emergencia.

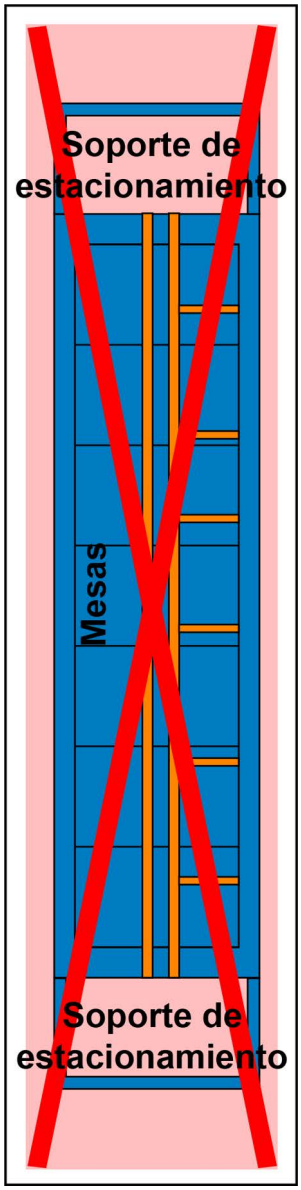
Figura SEGURIDAD-5: Zonas de un escáner



Zona restringida

	**⚠ PELIGRO** **Manténgase alejado 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.** **Siempre observe que no haya personal en la zona restringida antes de operar el equipo.**

Figura SEGURIDAD-6: Conozca la zona restringida



Marcación de la zona restringida

La zona restringida deberá marcarse de tal manera que todas las personas que se encuentren cerca del equipo puedan ver claramente el área donde pueda haber peligro.

MiTek ofrece la cinta de zona restringida, que es fácil de aplicar y tiene texto tanto en inglés como en español. Algunos equipos incluyen la cinta de zona restringida. Si su máquina no incluía esta cinta, puede pedirla al departamento de Servicio a Clientes de la División de Maquinaria de MiTek.

Encontrará las instrucciones sobre dónde y cómo aplicar la cinta de zona restringida en el "Service Bulletin Kit 181" en la página web de MiTek Machinery.

Introduction

Chapter 1

Purpose of Chapter

This chapter explains how to navigate through the manual and how to contact MiTek.

Introduction to the Manual

	⚠ WARNING
	**Read this manual completely before using this equipment!** **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.** **All hazard instructions must be read and observed. Failure to do so may result in economic loss, property damage, and/or personal injury.** **This manual must always be available to personnel operating and maintaining this equipment.**

Purpose and Scope of This Equipment Manual

In order for this manual to be useful, it must be accessible.

This manual addresses the most recent version of the equipment as of the date listed on the title page. For earlier revisions, contact MiTek Machinery Division.

This manual can be a valuable tool for training.

- The *Introduction* and *General Information* chapters discuss contact information for MiTek, explain truss terminology, and provide basic information about the equipment.
- The *Operation* chapter teaches operators how to operate the machine efficiently.
- The *Maintenance* chapter is written specifically for maintenance personnel.
- The appendices provide training materials and technical information to keep your equipment running.

Extent of Coverage for This Manual

This Manual

This manual address the *RailRider Pro* system, which includes the gantry head, table, and parking stands.

Additional Manuals

Some end-eject systems have an optional powered exit roller. The power exit roller has its own manual that is included when the system ships. If the powered exit roller manual is misplaced, a replacement is available on the Roach Conveyor website. Look for the manual for chain-driven live rollers, which applies to the powered exit roller.

Navigation

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

Table 1-1: Navigational Tools Used Throughout the Manual

Graphic	Explanation
	Important safety note!
	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.
	Indicates tools required before beginning a procedure.
	Provides additional information for the steps or text.
	Indicates how to get to or from the item discussed.
	Refers the reader to additional pages or resources.
PN	Indicates that the part number is listed in the *Parts List* appendix.

Additional Resources

Supplemental Documentation

In addition to the manual, refer to the documentation provided by original manufacturers of components. The supplemental documentation is provided at the time of installation, usually inside an electrical enclosure. Refer to these documents when you need more detailed information on components than the MiTek manual provides.

Website

Visit the MiTek Web site at www.mitek-us.com for up-to-date information on all MiTek equipment as well as the following information:

- The latest revision of this manual and most service bulletins.
- Support, safety, and training information.
- Part numbers for ordering maintenance parts.

Contacting Us

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

Figure 1-1: Contacting MiTek

MiTek Machinery Division
Customer Service Department
301 Fountain Lakes Industrial Drive
St. Charles, MO 63301

Parts Orders (with part number)
E-mail: mitekparts@mii.com

Technical Assistance
Phone: 800-523-3380
Fax: 636-328-9218
machinerysupport@mii.com

Web Site
www.mitek-us.com

Chapter 2

Purpose of Chapter

This chapter provides an overview of the equipment and the means to identify it.

Purpose of the *RailRider Pro* System

The primary purpose of the *RailRider Pro* floor truss press system is to embed connector plates completely into floor trusses.

Overview of the *RailRider Pro* System

Overview of the System Components

The *RailRider Pro* floor truss press system consists of three parts: the gantry head, table, and parking stands. Options are available for the gantry head and table.

Table 2-1: Components of System

Component	Description
Gantry head	Contains the roller that presses the connector plates into the floor truss. Available in different sizes that accommodate different size rollers.
Table	Supports the floor trusses as the gantry head passes over them and provides a track for the gantry head. Available in many lengths with options for handling and ejecting floor trusses.
Parking stands	Located at the ends of the table. Provide a place for the gantry head to park so that the entire tabletop is accessible.

Overview of the Gantry Head

The *RailRider Pro* gantry head contains a roller that embeds connector plates. The gantry head has the following features:

- A pair of pendants that move the gantry head left and right to embed connector plates.
- An emergency stop that an operator depresses to stop the gantry head in an emergency.
- A pair of laser scanners, one on each side of the gantry head, that detect obstructions and trigger an emergency stop if necessary.
- A main electrical enclosure that has the disconnect switch and E-stop on the outside and a VFD (variable frequency drive) and other electrical parts on the inside.

Graphics showing the gantry head and the locations of key parts of the gantry head are located on page 6.

Table 2-2: Gantry Head Specifications

Specification	Technical Data
Speed	125 ft/min
Direction of movement	Left and right
Roller diameter	24"
Roller wall thickness	1"
Baffles per roller	3
Roller shaft diameter	4" middle | 3-7/16" end
Acceptable wood thickness	4" (nominal)
Additional specifications	See page 7

Figure 2-1: Gantry Head

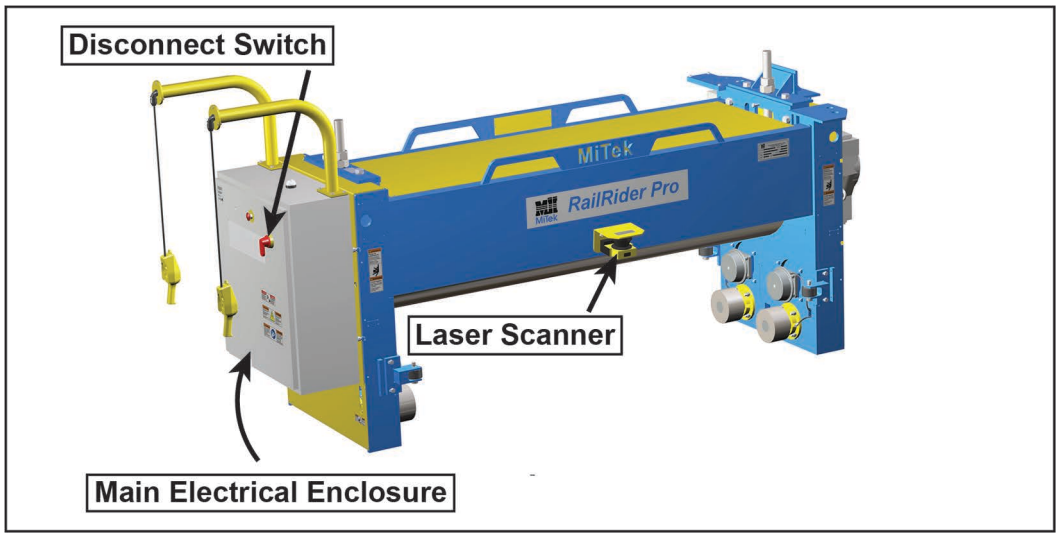
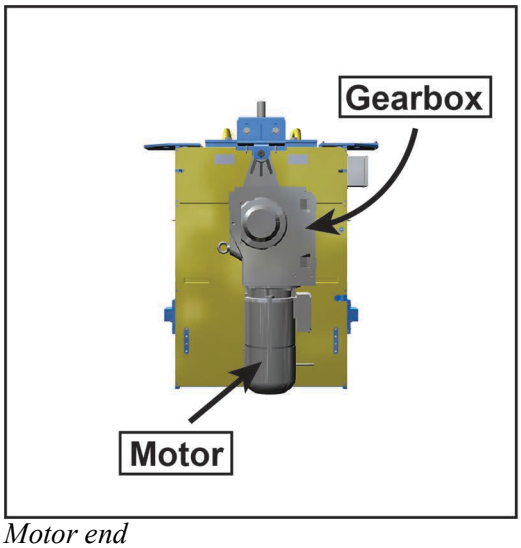
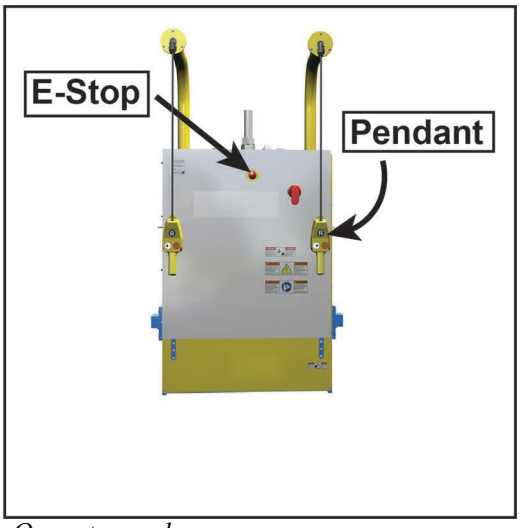


Figure 2-2: Gantry Head



Motor end



Operator end

Specifications of the Gantry Head

Table 2-3: Dimensional Specifications for the Gantry Head (Approximate)

Dimension	Standard	Optional	Optional
Roller	7'	7' 6"	8'
Throat opening	7' 4-3/16"	7' 10-3/16"	8' 4-1/4"
Overall length	4' 2"	4' 2"	4' 2"
Overall width	11' 11"	12' 4-1/2"	12' 10-3/4"
Overall height	5' 9" (without mast)	5' 9" (without mast)	5' 9" (without mast)
Part No.	82581-501-xxxV	82568-501-xxxV	82310-501-xxxV

Table 2-4: Weight Specifications of the Gantry Head (Approximate)

Component	7' Roller	7'6" Roller	8' Roller
Gantry head	10,000 lbs	10,250 lbs	10,450 lbs

Table 2-5: Electrical Specifications for the Gantry Head

Voltage (VAC)	208	230	415	460	575
Horsepower (hp)	10	10	10	10	10
FLA plus controls (amps)	29	29	16.2	17.5	13.8
Disconnect switch fuses on gantry head (amps)	50	50	20	25	20
Cycles (Hz)	60	60	50	60	60
Phases	3	3	3	3	3

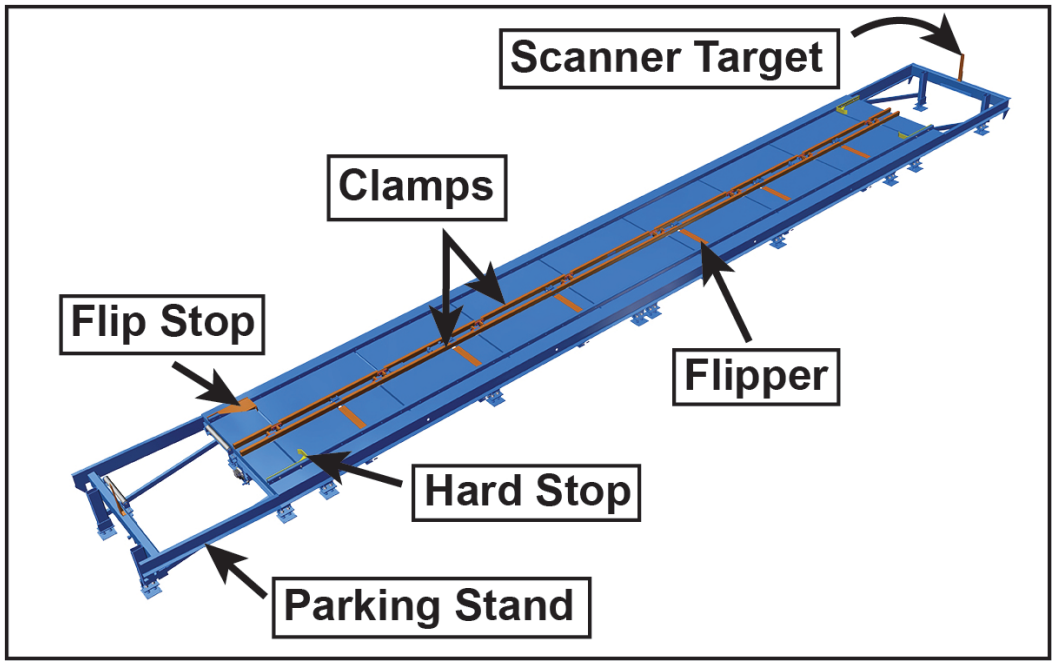
Overview of the Table

The table for the RailRider Pro system provides a surface for truss assembly. It has clamps for keeping the trusses in place. It has parking stands at either end equipped with scanner targets to prevent the gantry head from moving too far. In addition, the table has options available. These options include the following:

- The option to use a wider table with splicing pads to splice lumber while pressing trusses.
- The option of pneumatic components to move trusses from the infeed side of the table to the outfeed side and to remove finished trusses. See Table 2-6 on page 9.
- The option to add a powered exit conveyor for end-eject systems.

The graphic in Figure 2-3 shows the major components of a sample table. Note that the table shown in this graphic does not include all options.

Figure 2-3: Sample Table with Clamps and Flippers



End-eject system with flippers (other ejection options not shown here)

The options listed in Table 2-6 include pneumatic components that may be included in the system. The only pneumatic components that come standard with the table are the clamps, which secure the truss before the gantry head passes over it.

Table 2-6: Optional Pneumatic and Electric Components

Component	Side of Table	Description
Pop-ups	Infeed	Lift the truss from infeed side so that it may be moved to the outfeed side
Flippers	Infeed	Flip the truss from the infeed side to the outfeed side
Pop-ups	Outfeed	Lift the truss slightly from the outfeed side for removal *(side-eject systems only)*
Side-ejectors	Outfeed	Lift the truss from the outfeed side for removal *(side-eject systems only)*
End-eject rollers	Outfeed	Allows the truss to eject under gantry head parallel to table *(end-eject systems only)*
Powered rollers	Outfeed	Eject the truss from the outfeed side for removal *(end-eject systems only)*

Table 2-7: Additional Optional Components

Component	Description
Overhead plate rack	A free-standing rack that stores connector plates in easy reach of operators
Splicing pads	Adjustable supports that allow on-table splicing without using table space

Specifications of the Table

Dimensional Specifications of the Table

Dimensions vary greatly depending on the width of the gantry head and the inclusion of optional components. Custom table lengths are also available. Therefore, the dimensions of every possible configuration are too numerous to list here.

Table 2-8: Electrical Specifications of the Table

Specification	Description
Power requirements	Protected 120 VAC, 15-amp circuit with 24 VDC, 5-amp power supply

Purpose of Chapter

This chapter provides a brief overview of responsibilities in the installation process.

Installation Requirements

The *RailRider Pro* is intended to operate in an industrial environment that is enclosed and protected from the elements. In addition, the building that houses the *RailRider Pro* must satisfy certain requirements to ensure proper function.

Operating Temperature

The *RailRider Pro* operates properly in its intended ambient temperature, from 40 to 122 degrees Fahrenheit (4 to 50 degrees Celsius).

Relative Humidity

The *RailRider Pro* operates properly in an atmosphere with 45 to 85 percent relative humidity.

Transportation and Storage

The *RailRider Pro* withstands or has been protected against transportation and storage temperatures from -13 to 158 degrees Fahrenheit (-25 to 70 degrees Celsius). It has been packaged to prevent damage from the effects of normal humidity, vibration, and shock.

Ambient Conditions

The *RailRider Pro* uses laser scanners that must be operated in an environment free from the following conditions:

- Rain
- Fog or mist
- Sand
- Bright sunlight

The *RailRider Pro* may suffer interruptions if exposed to these conditions.

Flooring

The *RailRider Pro* needs to be installed on a floor made of 3500 PSI concrete that is a minimum of 6" thick. The floor needs to be level within 3" across the area of installation.

Responsibilities During Installation

MiTek supervises the installation to ensure that the *RailRider Pro* system is installed properly and operates correctly. MiTek will also provide operating and maintenance training at the time the equipment is installed. The customer is responsible for providing all labor and equipment needed to complete the installation.

Responsibilities Before Moving or Selling

	⚠ WARNING
	**Call MiTek Machinery Division Customer Service before moving the system.** **Moving the system without proper planning may result in equipment damage or serious injury.**

Customer Service is available at **800-523-3380** Monday through Friday.

If you determine that you want to move your *RailRider Pro* system to another location or you want to sell your system to another company, please call MiTek Machinery Division Customer Service. Customer Service provides detailed information that is needed before installing the system elsewhere.

Marking Restricted Zone

Marking Area On Your Own

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

Installing MiTek Restricted Zone Tape

Your equipment arrived with Service Bulletin SB181, which includes restricted zone tape and instructions for installing it. The part number is listed on page 100.

The service bulletin is available online (www.mitek-us.com) as well as through the MiTek Machinery Division Customer Service Department. Follow the instructions contained in SB181 to install the restricted zone tape.

Purpose of Chapter

This chapter lists the procedures required before operating your equipment.

Startup Procedures

	**DANGER** **Do NOT attempt to start the system without a MiTek representative present.** **Starting the system without a MiTek representative present may result in equipment damage, serious injury, and/or death.**

Before your *RailRider Pro* operates for the first time, these procedures are performed. See Table 4-1 to determine MiTek's responsibilities and your responsibilities.

Table 4-1: Startup Procedures

Component	Procedure	Responsibility	Page
Gantry head	Adjust guide wheels for proper tracking	MiTek	52
Gantry head	Check motor rotation for proper rotation	MiTek	—
Tables	Set pressure for the pneumatic system	MiTek	69
Tables	Weld scanner targets	Customer	—
Tables	Weld end stops	Customer	—

If you decide to move your *RailRider Pro* system or sell it to another company, please contact MiTek Machinery Division Customer Service. Customer Service provides information that is important for reinstalling the system.

Purpose of Chapter

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

Before You Begin

Safety Operating Notes

	⚠ WARNING
	**ELECTROCUTION, HIGH PRESSURE, CRUSH HAZARDS!** **Read this section AND the safety section in the preliminary pages before operating or maintaining this equipment.** **Do not operate this machine until you have a thorough understanding of all controls, safety devices, E-stops, and operating procedures outlined in this manual.** **Read and observe all warnings. Failure to do so may result in economic loss, property damage, and/or personal injury.** **This manual must always be available to personnel operating and maintaining this equipment.**

	⚠ WARNING
	**CRUSH HAZARD.** **Before turning on the equipment, make sure that all personnel and equipment are out of the restricted zone (see page xxi).**

	⚠ WARNING
	**Do not operate unless all guards and safety devices are in place.** **Only qualified maintenance personnel shall repair, remove, or replace guards and safety devices.**

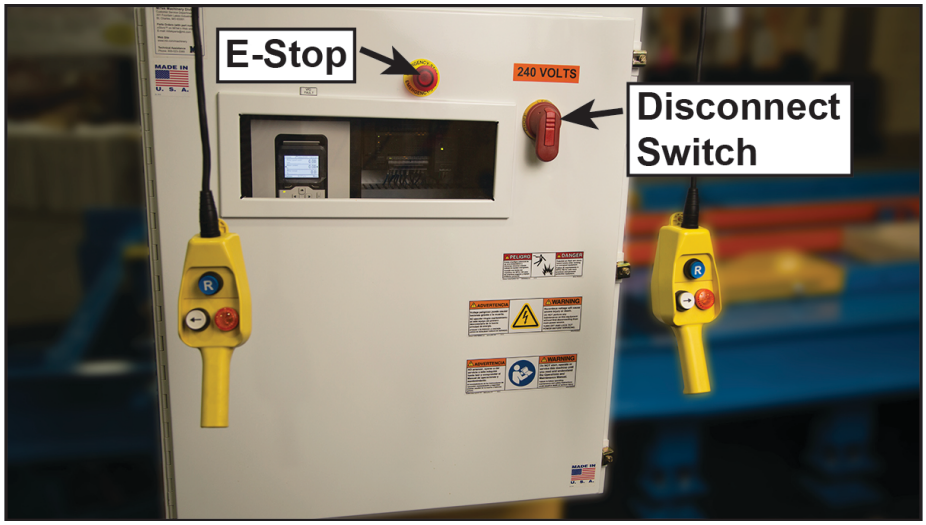
Stopping the Machine

The *RailRider Pro* stops in three ways.

- The directional arrow button on one of the pendants is released under normal operating conditions. The gantry head coasts to a stop.
- The E-stop pushbutton is pressed to prevent the gantry head from hitting an obstruction. The gantry head stops quickly.
- A laser scanner detects an obstruction and triggers an E-stop on its own. The gantry head stops quickly.

Use the E-stop only in emergencies. Using the E-stop to stop the machine regularly causes excessive wear on components.

Figure 5-1: E-Stop Location



E-Stop Pushbutton

An E-stop pushbutton is shown in Figure 5-2. Push the button to stop the gantry head in an emergency.

After the E-stop is pushed, it requires resetting before operating the gantry head again. To reset a pushbutton E-stop, pull the pushbutton or twist it, depending on the style of pushbutton.

Before pushing a directional arrow button on one of the pendants, press the Reset button on that pendant.

Figure 5-2: Example of an E-Stop Pushbutton

Disconnect Switch

Figure 5-1 on page 14 shows the location of the disconnect switch that controls the power supplied from that switch to the rest of the machine.

Turning the disconnect switch to the On position supplies electrical power to the gantry head. To remove power from the gantry head, turn the disconnect switch to the Off position.

The disconnect switch should be turned off when the machine is not in use.

	⚠ WARNING
	**ELECTRICAL HAZARD!** **When the disconnect switch is off, there is still live power to the disconnect switch's enclosure. Always turn off power at the main power source before opening the electrical enclosure!**

Indicators on Gantry Head

Beacon

The beacon is mounted on the top of the main electrical enclosure. It displays two colors.

- The beacon turns red when the gantry head is not moving.
- The beacon turns yellow when the gantry head is moving.
- The beacon turns red when an E-stop occurs.

Horn

The horn is located on the underside of the main electrical enclosure. It sounds shortly before the gantry head moves to alert anyone nearby.

Safety Controller Indicator Lights

The indicator lights on the safety controller in the main electrical enclosure provide the operator with information about the status of the gantry head. See Figure 5-3 for the location of the indicator lights. See Table 5-1 for information about the safety controller indicator lights.

Figure 5-3: Safety Controller Indicator Lights

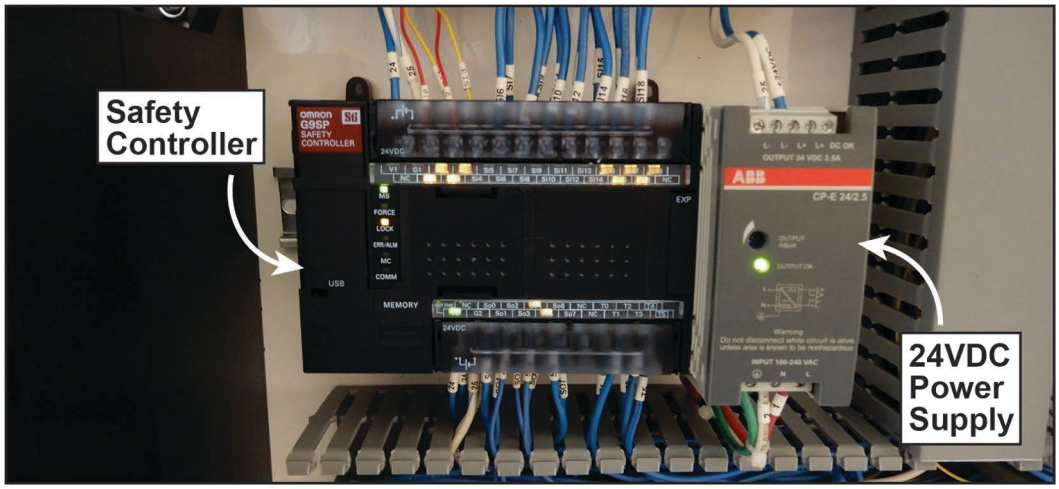


Table 5-1: Safety Controller Indicator Lights

Operating Mode	MS Indicator Light	MC Indicator Light
Run mode	Lit green	Off
Idle mode	Flashing green	Off
Configuring mode	Flashing green / red	Off
Abort mode	Flashing red	Off
Memory cassette mode	Off	Flashing or lit yellow
Critical error (system failure)	Lit red	Off
Initialization mode	Flashing green / red	Off

VFD (Variable Frequency Drive) Fault Indicator Light

The VFD fault indicator light is located above the main electrical enclosure window. Any faults in the VFD cause the light to illuminate. If the VFD experiences a fault, record any fault code that appears and call MiTek Machinery Division Customer Service.

Customer Service is available at **800-523-3380** Monday through Friday.

Operator Controls

Gantry Head Operator Controls

Two pendants that hang near the main electrical enclosure control the movement of the *RailRider Pro* gantry head. (Some gantry heads have two additional pendants on the motor end as well.) One pendant is used to move left, and the other is used to move right. Each pendant features the following:

- A directional arrow button. Pushing and holding this button moves the gantry head in the direction indicated.
- A Reset button. Pushing this button resets a tripped laser scanner or a VFD fault and allows a gantry head to move in that direction again.

  The Reset button only resets a tripped scanner when the obstruction that caused the scanner to trip is removed.
- An indicator light. When the light is illuminated, the gantry head does not move in the direction indicated by the light.

Figure 5-4: Pendants

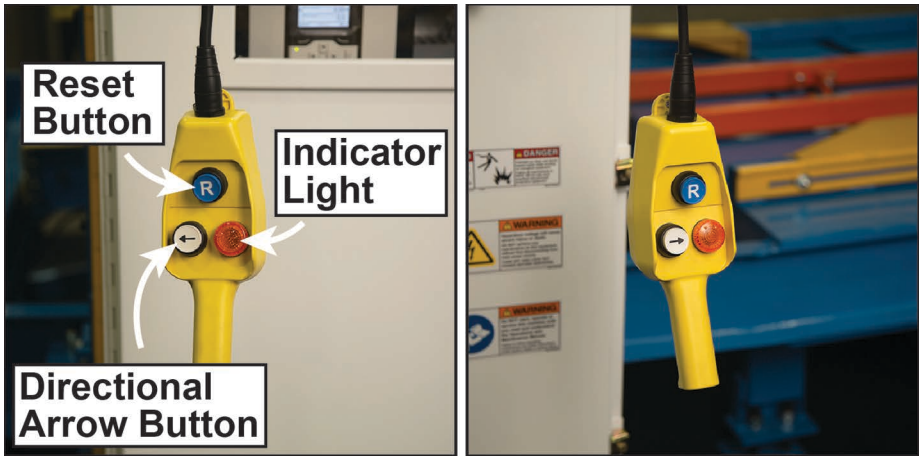


Table Operator Controls

Remote controls operate the clamps and other options on the *RailRider Pro* table. The number of remote controls varies with the size of the system.

A remote control consists of the following:

- A red button to turn the remote control off.
- A green button to turn the remote control on.
- A pair of yellow buttons to actuate ejectors (if the system has them).
- A pair of yellow buttons to actuate clamps.

Figure 5-5: Remote Control

Operating the Gantry Head and Table

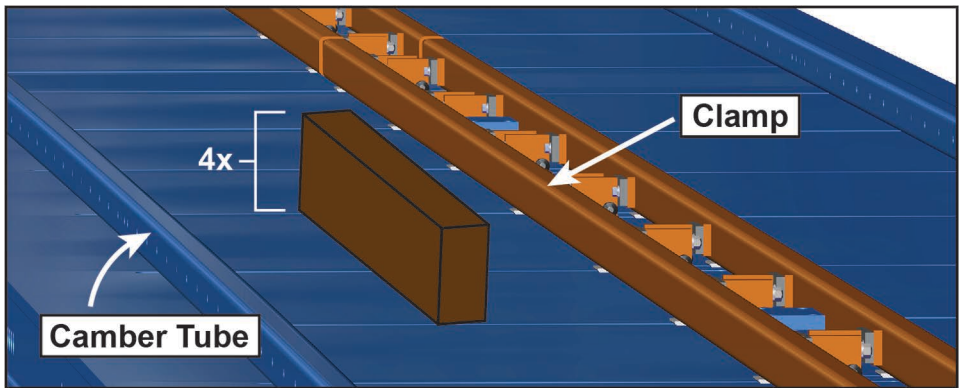
This manual does not address methods for designing or building a floor truss. It only addresses the use of the *RailRider Pro* gantry head and table.

	⚠ WARNING
	**CRUSH HAZARD.** **Before turning on the equipment, make sure that all personnel and equipment are clear.**

Setting Up the Truss

1. Place the truss as specified in your drawings on the infeed side of the table. Orient the boards so that the 4x face is vertical, as shown in Figure 5-6. The bottom chord of the truss should rest against the camber tube on the outside of the table. The top chord of the truss should face the clamps in the center.
   If large sections of the table are unused, insert a spare 2x4 of the same width as the floor truss to prevent the clamps from closing on a space without boards.

   Figure 5-6: Board Orientation on the Table

2. If desired, place the end stops at the ends of the truss. See page 24 for detailed instructions.

3. If building a truss with a top chord and bottom chord of different lengths, use a wooden block placed against the stop to compensate for the difference.

4. Use the infeed-side remote control to close the clamp that holds the boards in place.

5. Check the boards to make sure they are level and aligned properly. If boards have risen or become misaligned, use a hammer to tap them back into place.

6. Place the connector plates on the floor truss. Hammer them once to keep them in place during embedment.

Embedding Connector Plates

1. Go to the operator end of the gantry head. Check the E-stop button on the main electrical enclosure to make sure it is not engaged.

2. Press the blue Reset button on the pendant.

3. Press the directional arrow button to move the gantry head and embed the plates in the floor trusses.

   The indicator light on top of the main electrical enclosure turns from red to yellow while the gantry head moves.

	NOTICE
	**Do not allow the laser scanner to trigger an E-stop when moving the gantry head onto the parking stand.** **Triggering E-stops unnecessarily to stop the gantry head causes damage.**

4. Release the directional arrow button as the gantry head nears the parking stand to allow the head time to coast to a stop.

Flipping the Truss

1. Open the clamps by using Unclamp button on the infeed-side remote control.

2. Move the floor truss from the infeed side to the outfeed side of the table. Your options vary based upon the system that you ordered.

Table 5-2: Infeed Ejection Options

Option	Actions
Manual	Use the claw on a hammer to lift the truss slightly from the table. Then flip it to the outfeed side so that connector plates are on the underside of the truss.
Flippers	Use the remote control to actuate the flippers. Adjust the truss if necessary. The connector plates should be on the underside of the truss.
Pop-ups	Use the remote control to actuate the pop-ups. Flip the truss to the outfeed side of the table so that the connector plates are on the underside of the truss.

3. Prepare the next truss on the infeed side of the table.

4. Move the gantry head the other direction using the other pendant.

Ejecting the Truss

1. Open the clamps by using the Unclamp button on the outfeed-side remote control.
2. Remove the truss from the table. Your options vary based upon the system that you ordered.

Table 5-3: Outfeed Ejection Options

Option	Action
Manual	Pull the truss from the table.
Pop-ups	Use the remote control to actuate the pop-ups. Then pull the truss from the table.
End-eject rollers	Pull the flip stop up and away from the table. Use the remote to actuate the rollers and lift the truss slightly from the table. Push or pull the truss from the table.
End-eject powered rollers	Pull the flip stop up and away from the table. Use the remote control to actuate the rollers and lift the truss slightly from the table. Push the truss onto the powered rollers.
Side-ejectors	Use the remote control to actuate the side ejectors. Remove the truss from the table.

3. Continue the process by moving the second floor truss to the outfeed side of the table and starting a new truss on the infeed side.

Using End Stops

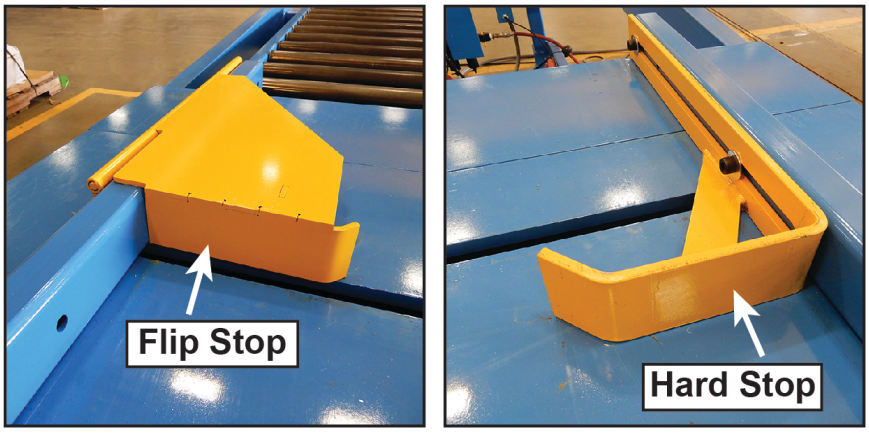
Types of End Stops

The *RailRider Pro* table uses end stops to hold the ends of trusses. There are two types of stops:

- Hard stops are used on both the infeed and outfeed side of side-eject systems, as well as the infeed side of end-eject systems.
- Flip stops are used on the outfeed side of the end-eject system.

Both hard stops and flip stops may be moved up and down the camber tube to accommodate trusses of different lengths.

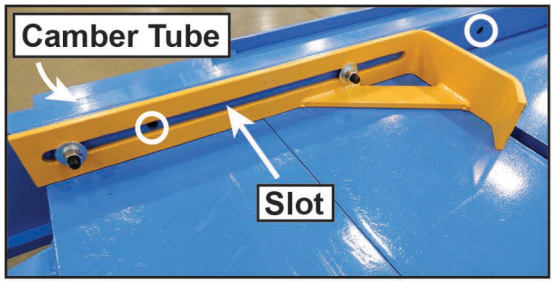
Figure 5-7: Flip Stops and Hard Stops

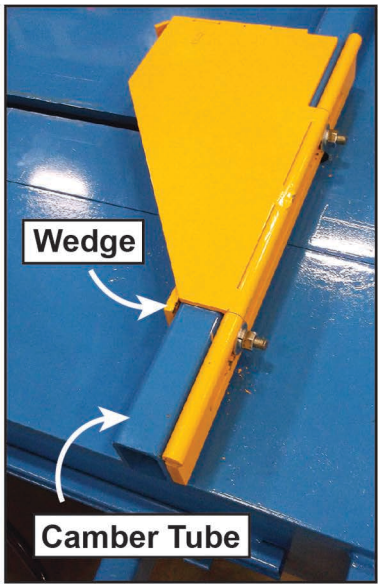


Placing and Adjusting Stops

1. Remove the hardware connecting the stop to the camber tube.
   - The hardware for the hard stop comprises washers, nuts, and cap screws.
   - The hardware for the flip stop comprises wedges with threaded rods, washers, and nuts.
2. Place the stop with its face next to the end of the truss on the table.
3. Insert the screws or threaded rods into the appropriate holes on the camber tube. Note the orientation of the cap screws and wedges as shown in Figure 5-8. Push them through so that they stick through the stop's slot.
   Some holes on the camber tube are circled in white in Figure 5-8.

Figure 5-8: Stop Attached to Camber Tubes





Above: hard stop
Right: flip stop

4. Adjust the stop so that it sits in the exact location desired.
5. Replace the hardware connecting the stop to the camber tube.
   - With a hard stop, the washers and nuts are on the inside of the camber tube, on the side closest to the clamps.
   - Wit a flip stop, the washers and nuts are on the outside of the camber tube, on the side farthest from the clamps.

Operating the Pneumatic System

	**⚠ WARNING** **Bleed pressure from the pneumatic lines before working on any components. See step 1 on page 68 for details on bleeding pressure from the lines.** **Working on pressurized components may cause injury.**

Using the Whole System

The remote control shown on page 19 operates the pneumatic system. The pneumatic system controls the operation of the infeed clamps, outfeed clamps, and optional ejection components.

Procedures for maintaining and adjusting pneumatic components start on page 66.

Deactivating Individual Flippers

Tables equipped with flippers to move the trusses from the infeed side to the outfeed side have the ability to remove pressure to individual flippers. Removing pressure to a single flipper keeps it still when the remote control actuates the other flippers.

Turn the shut-off valve 90 degrees to remove pressure to the flipper. The shut-off valve position shown in Figure 5-9 shows an open valve.

Figure 5-9: Flipper Shut-Off Valve

Chapter 6

Purpose of Chapter

This chapter provides step-by-step instructions as well as information to help you to make repairs and perform preventive maintenance.

Introduction to Maintaining Your Equipment

This manual contains sufficient information for proper maintenance under most conditions. Certain environments may require preventive maintenance more frequently.

Review the table of contents and utilize the index to locate the information you need. The following appendices will also assist in maintaining and repairing your equipment:

- Troubleshooting
- Parts List
- Maintenance Checklists
- Drawing Set

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. See the *Parts List* appendix starting on page 91.

Read the *Performing Maintenance Safely* section before beginning maintenance on this equipment.

Performing Maintenance Safely

Read the safety section starting on page vii and adhere to all rules and guidelines. This section provides additional safety information specific to maintenance topics.

Before Operating This Equipment

Adhere to these warnings before operating this equipment:

	⚠ WARNING
	**ELECTRICAL, HIGH PRESSURE, AND CRUSH HAZARDS!** **Read this section AND the safety section in the preliminary pages before operating or maintaining this equipment.** **Do not operate this machine until you have a thorough understanding of all controls, safety devices, E-stops, and operating procedures outlined in this manual.** **Read and observe all hazard instructions. Failure to do so may result in economic loss, property damage, and/or personal injury.** **This manual must always be available to personnel operating and maintaining this equipment.**

	⚠ WARNING
	**CRUSH HAZARD** **Guards must always be in place during operation to avoid serious injury and possibly death.** **Always replace guards after completing maintenance and before removing the lockout/tagout device.**

	⚠ WARNING
	**CRUSH HAZARD.** **Before turning on the equipment, make sure that all personnel and equipment are clear.**

Lockout/Tagout

The lock and tag symbol shown to the left indicates that proper lockout/tagout procedures must be used prior to starting the procedure where the symbol occurs.

	⚠ WARNING
  	**ELECTROCUTION AND HIGH PRESSURE HAZARDS.** **Always turn the power off by activating an E-stop when the equipment is not in operation.** **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.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E or the governing regulations at your location for proper procedures and personal protective equipment.** **The components on this machine can cause severe injury if adjusted improperly. Follow all procedures in this manual and do not make adjustments to the machine without guidance from MiTek or MiTek documentation.** **Only trained personnel should make mechanical adjustments to this machine.**

Important Safety Information

Your Responsibilities

Detailed descriptions of standard workshop procedures, safety principles, and service operations are not included in this manual. Although this manual contains some warnings and cautions against specific service methods which could cause personal injury or damage to the machine, it does not cover all conceivable ways of service which might be done or the possibility of hazardous consequences of each conceivable way. If you intend to handle, operate, or service the unit by a procedure or method not specifically recommended by the manufacturer, first make sure that such a procedure or method will not render this equipment unsafe or pose a threat to you and others.

It is the responsibility of the mechanic performing the maintenance or service on a particular machine to:

1. Inspect the machine for abnormal wear and damage;

2. Choose a procedure which will not endanger his/her safety, the safety of others, the equipment, or the safe operation of the machine;

3. Fully inspect and test the machine and the hydraulic, pneumatic and electrical systems to ensure that the service to the machine has been properly performed and that the machine, hydraulic, pneumatic and electric systems will function properly; and

4. Ensure only qualified electricians perform electrical service work.

	⚠ WARNING
	**This machine uses high-voltage electricity, which may cause serious personal injury or death.**

General Service Rules

1. The design may change or upgrades may occur for any particular component. Always contact the factory before replacing components.

2. If inspection or testing reveals evidence of abnormal wear or damage to the machine or if you encounter circumstances not covered in the equipment manual, STOP and consult MiTek. The machine must be repaired and serviced according to the current specifications and procedures of MiTek, using replacement parts with properties equal to or greater than those specified by MiTek.

3. Use the correct tools and procedures on this machine, to avoid damage and incorrect assembly.

	NOTICE
	**Never use compressed air inside the electrical enclosures! It may force contaminants into the electrical connections.** **Use a vacuum to remove dust from electrical enclosures. Canned air is acceptable after vacuuming.**

4. Always install new gaskets, O-rings, cotter pins, etc., and place Loctite on bolts, if required.

5. Torque bolts and fasteners to the correct specifications.

6. Clean parts in a nonflammable or high-flash-point solvent only.

7. Lubricate any sliding surfaces before assembly.

8. Many components are manufactured from high carbon, heat-treated steel. Do not attempt to cold straighten, hot straighten, bend, or weld these components, as they may fail under load causing serious personal injury or death.

9. After re-assembly, check all parts for proper installation and operation before putting the machine back into service.

10. It is beneficial to record all major maintenance and testing. This allows recurring problems to be predicted and addressed before any production time is lost. Typical reports and records should include:
    - Date
    - Serial number of machine
    - Description of problem or symptoms
    - Corrective action taken
    - Parts required

11. MiTek will, from time to time, mail out service bulletins and updates for this machine. Follow the service bulletins and updates accordingly and file them in this equipment manual.

Making Adjustments and Replacing Parts

Be careful when making mechanical adjustments. Untrained personnel may damage the machine or cause harm to themselves and others.

	⚠ WARNING
	**CRUSH HAZARDS.** **Always replace guards after servicing.** **Only qualified maintenance personnel shall repair, remove, or replace guards and safety devices.**

	NOTICE
	**Failure to follow the step-by-step procedure may result in incorrect adjustment of this machine and could cause incorrect setups. Only trained personnel should make mechanical adjustments to this machine.** **Use the exact replacement parts that are specified.**

Special materials have been used for some of the components of this equipment. It is critical to the future performance of this machine that only specified replacement parts are used. Order all replacement parts through MiTek. Do not substitute parts without first

consulting MiTek to determine if they are safe and effective. No electrical system component, cable, connector, or device should be modified, removed, disconnected, or changed without specific approval and guidance from MiTek.

Wearing Personal Protective Equipment

	⚠ CAUTION
	**Follow OSHA guidelines to utilize the proper personal protective equipment (PPE) while performing maintenance. The most common include eye protection, hearing protection, dust masks while blowing off sawdust, gloves while working with solvents, and fire retardant clothing when troubleshooting an energized machine.**

Safety Test

The test procedure in the Safety Tests section starting on page xvi MUST be performed by qualified personnel after ANY maintenance, adjustment, or modification. Testing makes sure that the safety system and machine control system work together to stop the gantry head properly. The test should be performed before each shift starts to make sure that the safety features remain in working order.

Selected Component Overviews

The following pages contain overviews of important components and assemblies discussed or referenced in maintenance procedures. Maintenance procedures begin on page 38.

Laser Scanners

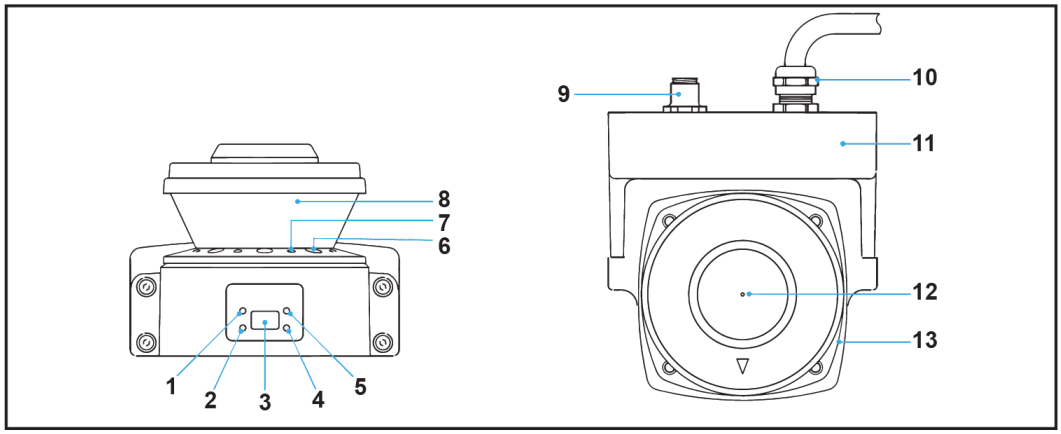
The *RailRider Pro* has one scanner on each side of the gantry head. See Figure 6-1. They are used to detect obstructions.

Figure 6-1: Laser Scanner

When a scanner senses an obstruction in its warning zone, the E-stop circuit causes the gantry head to slow. When a scanner senses a closer obstruction, in its safety zone, the E-stop circuit causes the gantry head to stop.

Laser Scanner Components

Figure 6-2: Laser Scanner Components



Front view *Top view*

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 the Laser Scanner

After powering on, the laser scanner enters the interlock state if no fault or obstruction 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 enters the interlock state, and the Reset button must be pressed before the gantry head begins motion in the same direction it was going when the fault occurred.

Table 6-1: Descriptions of Operating States of 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.

VFD (Variable Frequency Drive)

The VFD is located inside the main electrical enclosure See Figure 6-3 for its location.

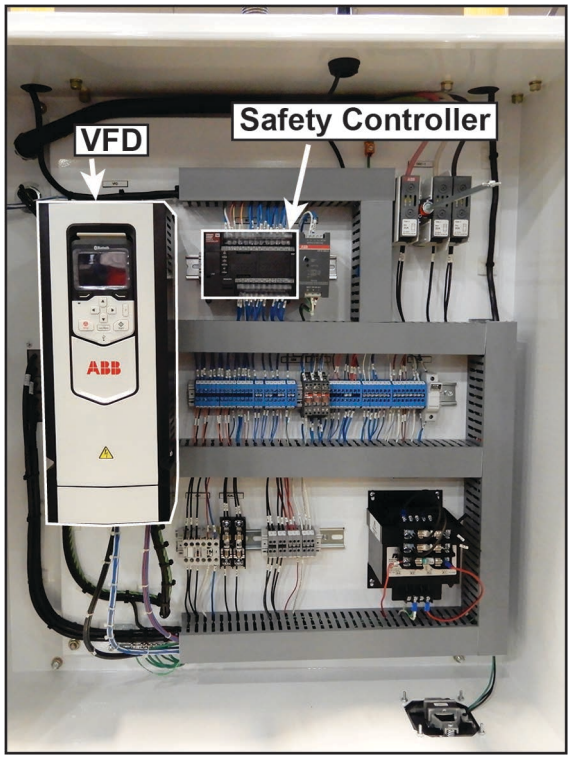
If the VFD experiences a fault, the beacon light turns red, and a fault description appears on the VFD display. In addition, the VFD fault indicator light on the main electrical enclosure illuminates.

A VFD is one of the first links in the electrical circuit, so verifying voltage in and out of the VFD is always a good first step in an electrical troubleshooting process.

For help with troubleshooting VFD faults, call MiTek Machinery Division Customer Service.

Customer Service is available at **800-523-3380** Monday through Friday.

Figure 6-3: Main Electrical Enclosure



Safety Controller

See page 81 to troubleshoot the safety controller.

The safety controller is located inside of the main electrical enclosure. See Figure 6-3 on page 35 for its location. See Table 6-2 for its operating states.

Table 6-2: Operating States of the Safety Controller

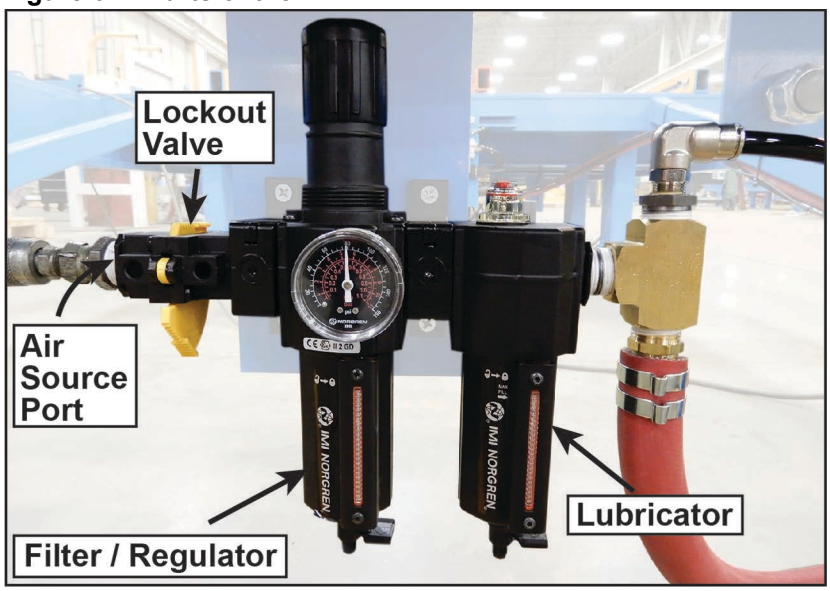
Operating Mode	Description	MS Indicator	MC Indicator
Run mode	All functions are supported, including the program.	Lit green	Off
Idle mode	Initialization has been completed. The safety controller is waiting to move to Run Mode.	Lit green	Off
Configuring mode	Safety controller is waiting for the configuration to be downloaded.	Flashing green/red	Off
Abort mode	Minor error occurred: • An unsupported Expansion I/O Unit is connected • More than two Expansion I/O Units are connected • An unsupported Option Board is connected Cycle the power supply, or reset from the safety controller configurator to return to Run Mode.	Flashing red	Off
Memory Cassette mode	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, and safety controller enters the safe state.	Lit red	Off
Initialization	Self-diagnosis is being performed.	Flashing green/red	Off

The safety controller makes sure that safety features on the gantry head are working properly. If the *RailRider Pro* gantry head does not operate, the safety controller provides a good place to start troubleshooting the electrical system.

FRL (Filter / Regulator / Lubricator)

The FRL is an assembly for the pneumatic system. The air that provides pressure for the pneumatic system enters at the air source port labeled in Figure 6-4. After proceeding through the lockout valve, the air reaches the filter / regulator unit of the assembly, which filters out contaminants and regulates the amount of air getting through to the system. As the air passes through the lubricator, a light fog of lubrication mixes with the air.

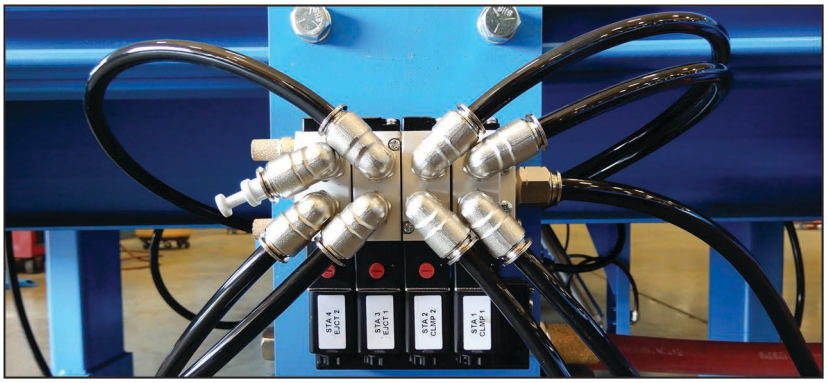
Figure 6-4: Parts of the FRL



Valve Bank

The valve bank supplies the moving air to operate pneumatic components, such as the cylinders that operate the clamp rails. See Figure 6-5.

Figure 6-5: Valve Bank



Gantry Head Maintenance

One of the most important ways to keep your *RailRider Pro* gantry head operating smoothly is by keeping it properly oiled and greased.

Lubrication guidelines are given in this chapter for each part or system that requires lubrication.

The type of lubrication used, frequency of application, oxidation, and contamination of the lubricant affect service life and parts efficiency of gears and bearings.

NOTICE

Never mix synthetic lubricants with mineral lubricants!

Manually Releasing a Brake on the Gantry Head

The gantry head has a motor with a manual brake lever that releases the brake. See Figure 6-6. The manual brake level is referenced in several of the following procedures.

Figure 6-6: Manual Brake Lever

Lubricating the Take-Up Bearing

The take-up bearing holds the roller shaft and allows it to turn freely. The take-up bearing requires grease every twelve months (one shift) or six months (two shifts).

Manual grease gun

No. 2 lithium-based grease

1. Locate the grease fitting for the take-up bearing. There is a fitting on each end of the gantry head. See Figure 6-7 and Figure 6-8.

Figure 6-7: Motor End Grease Fitting Location

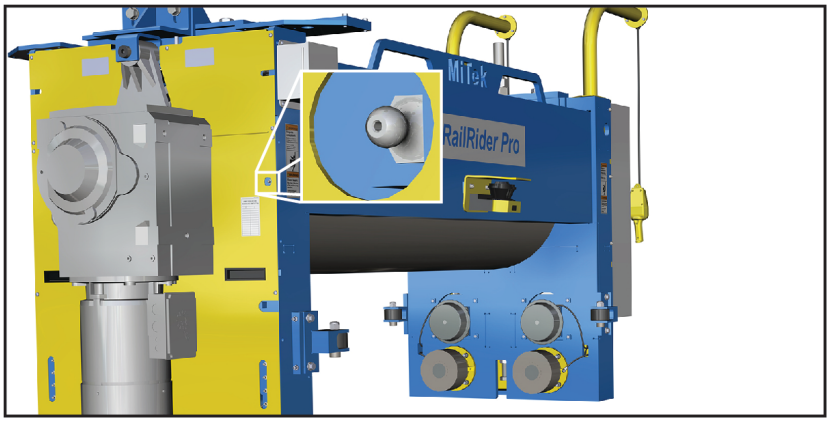
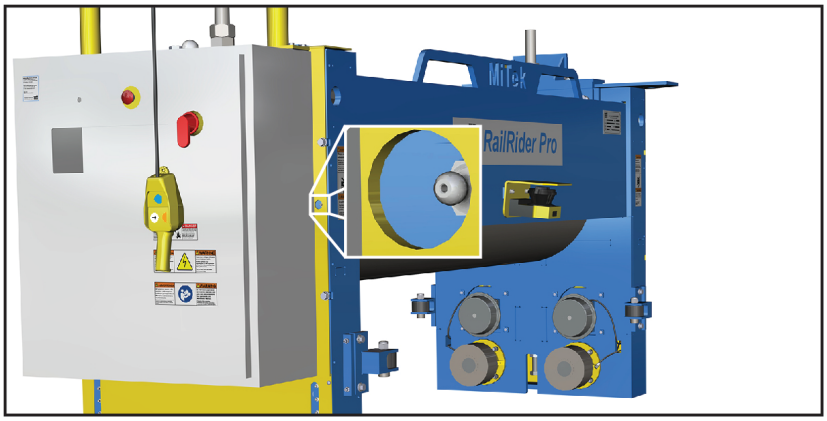


Figure 6-8: Operator End Grease Fitting Location



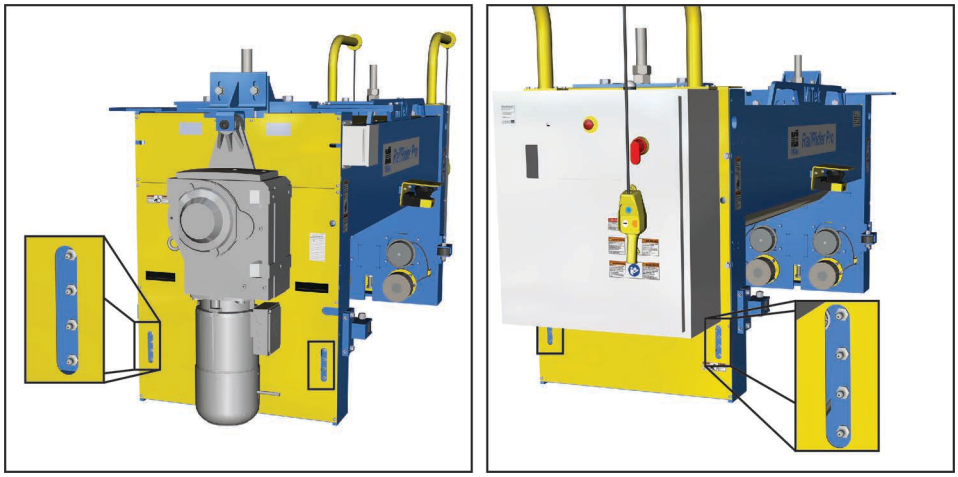
2. Clean the fitting throughly to remove any dirt or old grease.
3. Place a manual grease gun with No. 2 lithium-based grease over the fitting.
4. Add grease to the take-up bearing.
   Pump until you encounter resistance. Adding more grease after you encounter resistance may add too much grease to the bearing.
5. Locate the fitting for the take-up bearing on the opposite side and repeat.

Lubricating Drive and Pressure Wheels

The drive wheels move the gantry head, while the pressure wheels keep the gantry head from lifting as it embeds connector plates. The drive and pressure wheels require grease every twelve months (one shift) or six months (two shifts).

1. Locate the grease fittings for the drive and pressure wheels. There are eight fittings in two locations on each end of the gantry head. See Figure 6-9.

Figure 6-9: Drive and Pressure Wheel Bearing Grease Fittings



Motor end *Operator end*

2. Clean the fittings thoroughly to remove any dirt or old grease.

3. Place a manual grease gun with No. 2 lithium-based grease over the first fitting.

4. Add grease to the wheel.
   Pump until you encounter resistance. Adding more grease after you encounter resistance may add too much grease to the bearing.

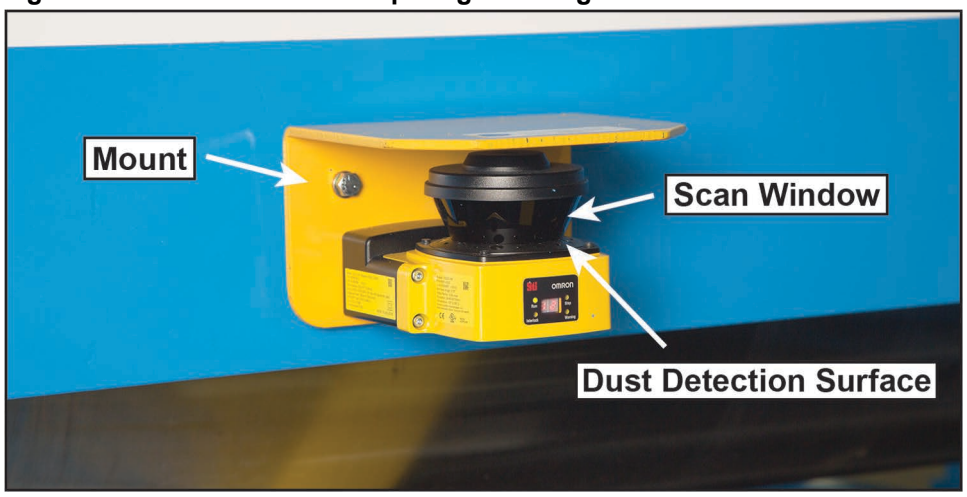
5. Continue with each fitting until all eight fittings have received grease. Then repeat the process with the fittings on the other side.

Cleaning the Laser Scanner

For an overview of the laser scanner, see page 32 and the following pages.

The laser scanner requires periodic cleaning of the scan window and dust detection surface on the base of the window. See Figure 6-10 for the locations of the scan window and dust detection surface. The interval of cleaning depends on how quickly dust collects on the scan window and dust detection surface.

Figure 6-10: Scanner Parts Requiring Cleaning



Clean the scan window and dust detection surface with a common glass / plastic cleaner. Do NOT use benzene, acetone, or a thinner because these damage the surfaces.

- Spray the scan window and dust detection surface.
- Wipe them down with a soft cloth to prevent damage to the surfaces.

Maintaining Stability of the Laser Scanner

Check the tightness of the laser scanner's mount every six months (one shift) or three months (two shifts). Tighten if necessary to reduce vibration. Vibration could cause the scanner to detect an obstruction that does not exist.

Lubricating the Drive Chains

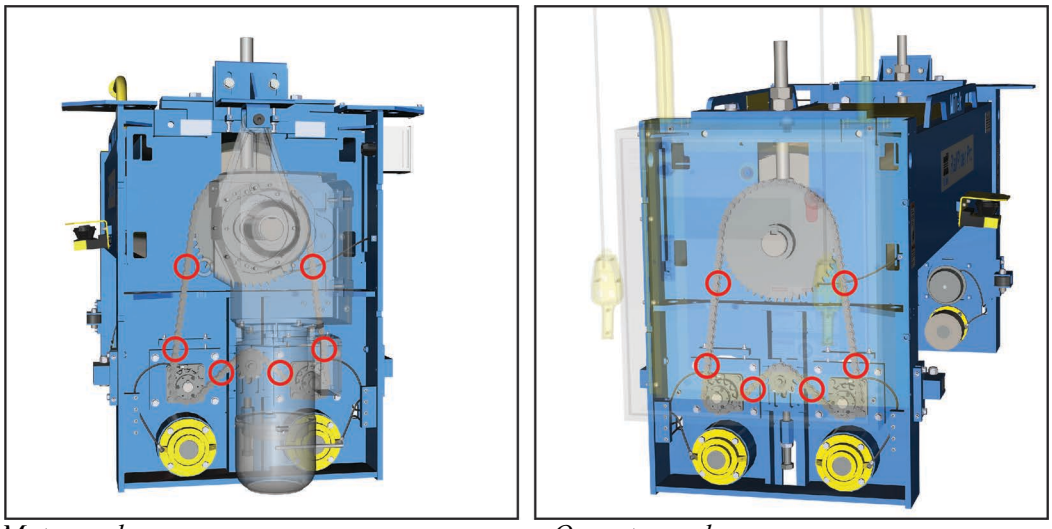
The drive wheel chains should be lubricated once every month (one shift) or once every two weeks (two shifts). Use a high-grade, non-detergent, petroleum-based oil. Anti-foam, anti-rust, and film-strength improving additives are often beneficial. SAE 30 grade is recommended.

Drive chains are located in the following places:

- The drive chains on the motor end are located behind guards behind the motor. Remove the guards to access the drive chains.
- The drive chains on the operator end are located behind the main electrical enclosure. The enclosure mounts to a guard with a left-hand hinge. Remove the two bolts on the right-hand side of the guard to swing the enclosure away and reveal the chains.

Apply oil to the edges of the link plates of the chain near where the chain makes contact with a sprocket (see the red circles in Figure 6-11) and to the inside of the chain generally.

Figure 6-11: Drive Chain Lubrication Points



Motor end *Operator end*

Some parts removed or altered for clarity

Lubricating the Motor and Gearbox

The motor and gearbox allow the gantry head to start and stop moving. Preventative maintenance is required to keep the motor and gearbox working and to prevent costly replacement of the motor and gearbox.

Adding and Changing Oil

Check the oil in the gearbox reducer once a month (one shift) or once every two weeks (two shifts). When additional oil is needed, use the oil recommended in Table 6-3 or a comparable type.

Table 6-3: Oil Used by Manufacturer

Attribute	Standard
ISO Viscosity	VG220
Oil Type	Mineral oil with EP additive
Ambient Temperature	32 to 104°F (0 to 40°C)
Manufacturer / Type	Mobilgear 600XP220

The manufacturer recommends Shell Omala S2 G 220 or Castrol Alpha SP220 as well.

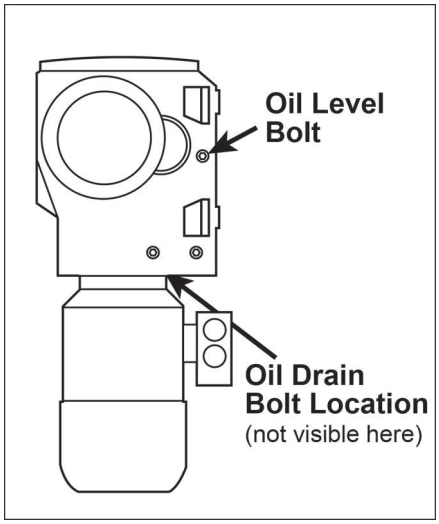
Drain and refill the oil every two years (one shift) or every year (two shifts). The oil drain is a socket-head cap screw located underneath the gearbox. See Figure 6-12.

The approximate amount of oil to use is shown in Table 6-4. However, the amount may vary based on the gear ratio, so oil should be filled to the level of the oil level bolt, which is shown in Figure 6-12.

Table 6-4: Approximate Oil Fill Level

Quarts	Liters
17.4	16.5

Figure 6-12: Oil Level Bolt and Oil Drain Bolt



Adjusting Drive Chain Tension

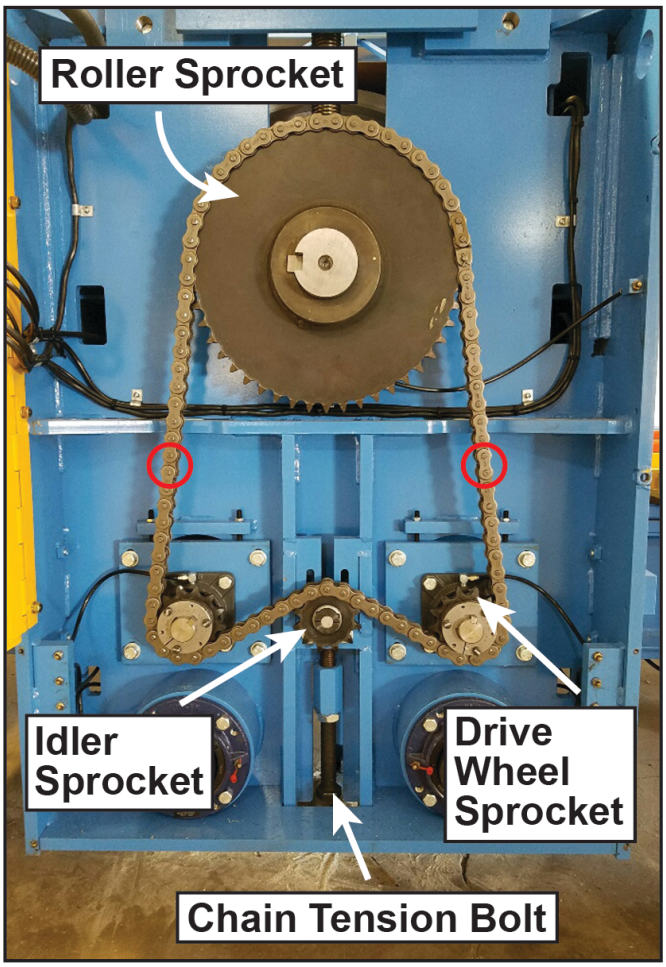
The drive chain needs proper tension. A drive chain with too little tension causes the gantry head to jerk while operating. A drive chain with too much tension causes damage to the sprockets.

1. Lockout/tagout on the gantry head's disconnect switch.
2. Remove the guards to access the drive chain.
3. Adjust the tension by using the following steps. Refer to Figure 6-13.

Adjustable wrench

Rubber mallet

Figure 6-13: Drive Chain and Sprockets



a) Loosen the two bolts behind the idler sprocket.
Loosen the bolts just enough for the idler sprocket to move. Loosening the bolts excessively makes tensioning the chain again more difficult.

b) Loosen the nut on the chain tension bolt.

c) Adjust the chain tension bolt to adjust the chain tension.

	**⚠ CAUTION** **Do not make the chain taut using only the chain tension bolt. Tightening the two bolts behind the idler sprocket slightly increases chain tension.** **Overtightening may cause the failure of the idler sprocket or chain.**

- To decrease chain tension, turn the chain tension bolt counterclockwise, and then tap the top of the sprocket with a rubber mallet to move the sprocket down.
- To increase chain tension, turn the chain tension bolt clockwise.

d) Tighten the nut on the chain tension bolt. Tighten the bolts behind the idler sprocket.

e) Check the chain tension on both sides of the chain about halfway between the large roller sprocket and the two drive wheel sprockets. See the red circles in Figure 6-13. There should be 1/4" or 1/2" of play on each side. If there is not, readjust the chain tension.

Because of residual torque on the chain, there may be uneven tension between the two sides. As long as average tension on the drive chain is between 1/2" and 1", the drive chain should function.

4. Replace the guards, remove the lock and tag, and restore power to the gantry head. Perform the safety test on page xvi. If the gantry head successfully completes the safety test, resume operation.

Replacing the Drive Chain

PN Drive chains may become worn due to unnecessary and excessive use of the E-stop button or improper chain tension. See page 93 for the part number of the drive chain.

Socket wrench

Allen wrench

Ruler

Rubber mallet

1. Prepare the drive chain for removal by using the following steps.

    a) Remove the end guard from the gantry head.

    b) Make sure that the master link, shown in Figure 6-14, is free of the sprockets so that it can easily be reached. If the master link is free of the sprockets, skip to step d.

    c) If the master link is touching a sprocket, replace the guard and move the gantry head. Remove the guard and check again.

    d) Lockout/tagout on the gantry head's disconnect switch

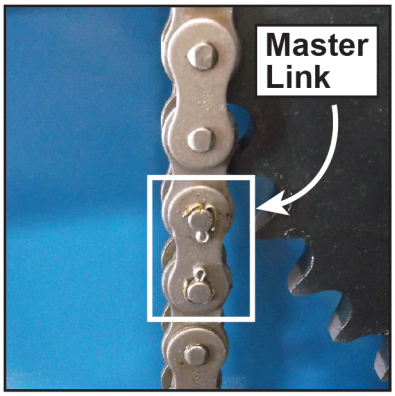
2. Note how the chain is routed around the sprockets. See Figure 6-14 for reference.

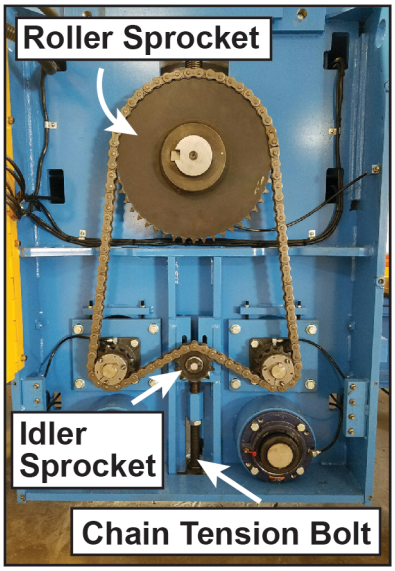
3. Decrease tension on the chain by using the following steps. Refer to Figure 6-14 as needed.

    a) Loosen the two bolts behind the idler sprocket.

    b) Loosen the nut on the chain tension bolt under the idler sprocket.

Figure 6-14: Master Link and Drive Chain





    c) Turn the chain tension bolt counterclockwise.

    d) Tap the top of the idler sprocket with a rubber mallet to move it down. Tapping the top of the idler sprocket should decrease chain tension.

4. Remove the master link on the chain by pulling out its two cotter pins using pliers. The chain will come apart and can be removed from the sprockets.

5. Route the new chain around the sprockets. Refer to Figure 6-14. Trim the chain to length. Connect the ends of the new chain with the master link.

6. Tension the new chain properly using step 3 of the Adjusting Chain Tension procedure on page 44.

7. Replace the end guard and remove the lockout/tagout equipment.

Adjusting Roller Height

The height of the roller determines how deeply connector plates are embedded into trusses. MiTek sets the height of the roller before the gantry head leaves the factory.

If the connector plates are not being embedded deeply enough, adjust the height of the roller by adjusting the height of the take-up bearing.

1. Place a truss without connector plates on the table. Move the gantry head over the truss. Lockout/tagout on the gantry head's disconnect switch.

2. Make sure that the wheels properly grip the track channels and rails on the table.

    a) Go to the motor end of the gantry. Remove the yellow guards from the motor end.

    b) Decrease tension on the chain by using the following steps. Refer to Figure 6-15 if necessary.

        1) Loosen the two bolts behind the idler sprocket.
        2) Loosen the nut on the chain tension bolt under the idler sprocket.
        3) Turn the chain tension bolt counterclockwise five or six turns.
        4) Tap the top of the idler sprocket with a rubber mallet to move it down.

            Tapping the top of the idler sprocket makes sure that the sprocket moves down, decreasing chain tension and preventing damage.

Socket wrenches (1/4", 3/8", and 1/2" drives)

Allen wrenches

Adjustable wrench

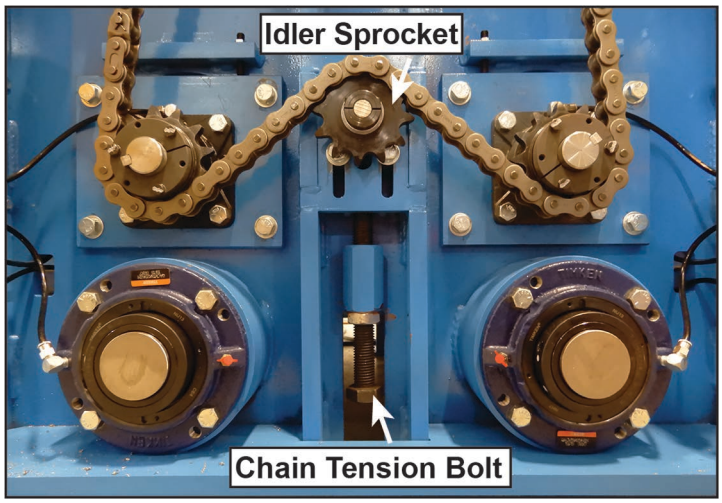
MiTek-supplied wrench (PN 68172) for 2-5/8" nuts

Torque wrench (capable of 282 ft-lbs of torque)

Bottle jacks (2)

1/16" shims (4)

Figure 6-15: Chain Tension Bolt and Idler Sprocket



    c) Go to the operator end of the gantry. Remove the bolts from the right side of the yellow guard to swing the main electrical enclosure to the left. Remove the remaining guard.

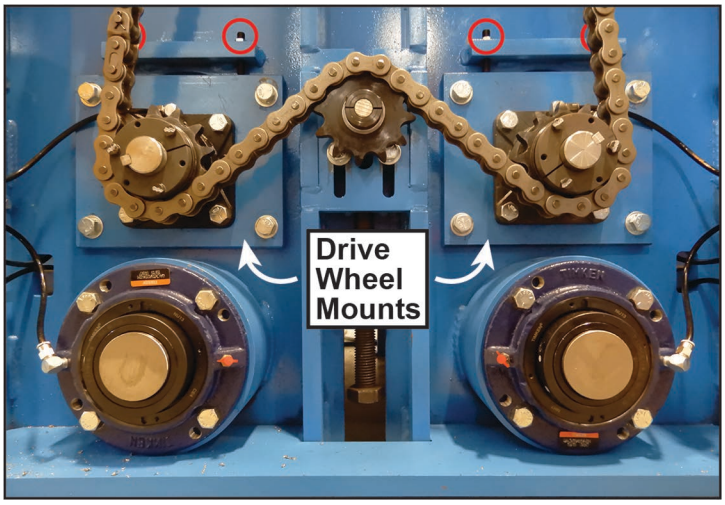
d) Repeat step b with the chain tension bolt on the operator end.

e) Place 1/16" shims on top of the pressure wheels on both ends.
The pressure wheels are the bottommost wheels, which run on the underside of the track rail.

f) Use a bottle jack on each end to lift the gantry head so that the shims on the pressure wheels touch the underside of the track rail.
Make sure to lift the gantry head equally on both sides to prevent misalignment.

g) Move a drive wheel down to touch the track channel by using the following steps. Use Figure 6-16 for reference.

Figure 6-16: Drive Wheel Mounts



1) Loosen the four bolts that hold the drive wheel mount.
2) Loosen the jam nuts on the two set screws above the drive wheel mount. The jam nuts are circled in red in Figure 6-16.
3) Screw each set screw down an equal distance until the drive wheel touches the track channel.
4) Tighten the jam nuts.
5) Tighten the four bolts that hold the drive wheel mount.
6) Repeat step 1 through 5 above with the other three drive wheels.

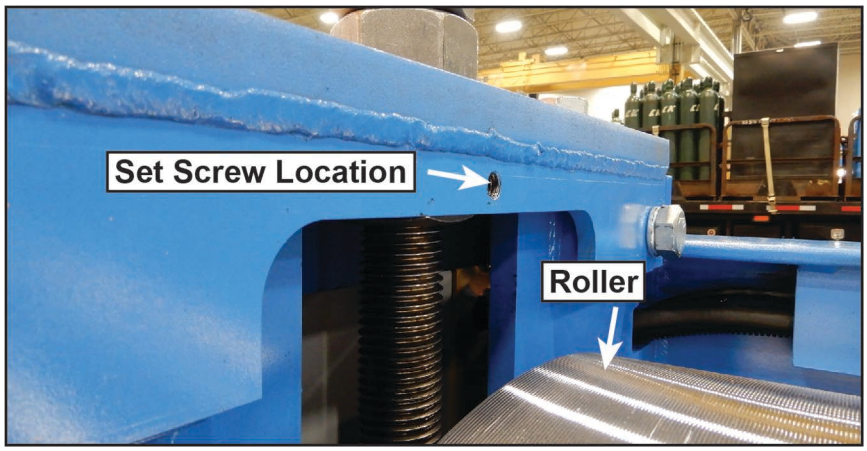
h) Remove the bottle jacks from the gantry head.

3. Prepare the take-up bearing for adjustment by using the following steps.

   a) Remove the guard from the top of the gantry head to expose the roller.

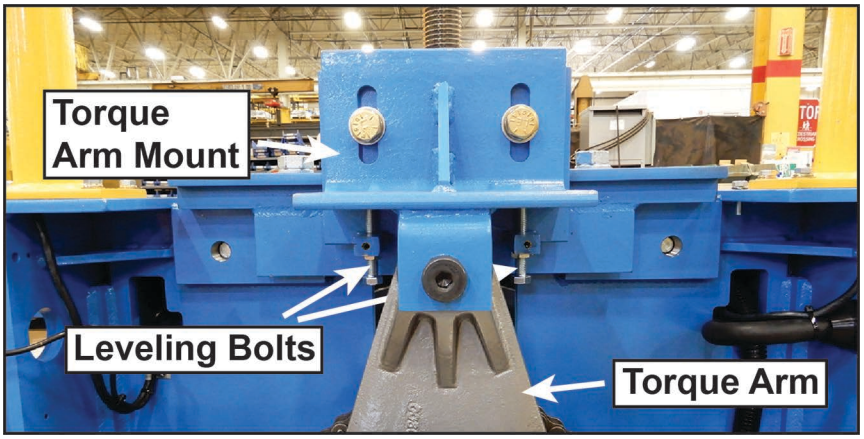
   b) Go to the motor end of the gantry head. Remove the set screw from the inside of the frame above the roller. See Figure 6-17.

Figure 6-17: Set Screw Removed from Frame



   c) Loosen the nuts on the leveling bolts under the torque arm mount, which is shown in Figure 6-18. Back the leveling bolts out eight to ten turns.

Figure 6-18: Leveling Bolts and Torque Arm Mount



   d) Loosen the nuts on the bolts attaching the torque arm mount to the bracket on the frame. See Figure 6-18.

   e) Go to the operator end of the gantry head. Remove the set screw from the inside of the frame above the roller.

4. Adjust the take-up bearing to lower the roller on the operator end by using the following steps. Refer to Figure 6-19 for reference.

    a) Turn nut A counterclockwise nine or ten times.

    b) Turn nut B counterclockwise enough times to lower the roller until it presses the top of the truss clamped underneath it.

        Remember the amount of turns that you used for this step.

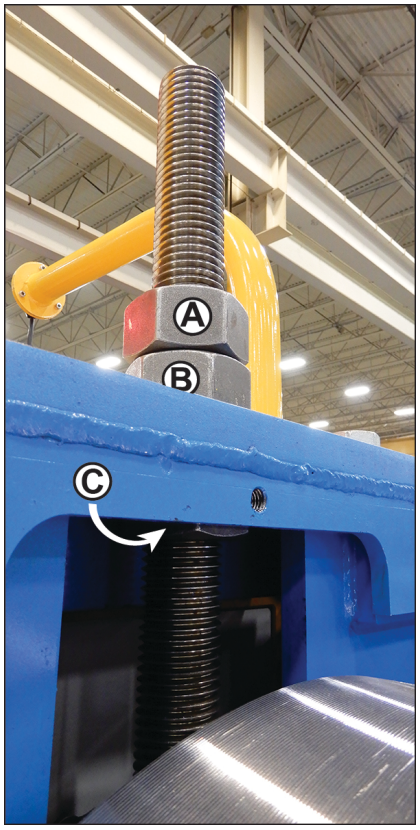
    c) Turn nut C counterclockwise until it touches the frame.

    d) Turn nut A clockwise until it is tight against nut B.

    e) Replace the set screw.

    f) Repeat step a through step e with the take-up bearing on the motor end of the gantry head. You should most likely turn nut B the same amount as nut B on the operator end.

Figure 6-19: Take-Up Bearing Nuts



5. Level the gearbox and motor using step c on page 61.

6. Adjust chain tension using step 3 on page 44.

7. Replace the roller guard on the top of the gantry head. Replace the guards on the motor end of the gantry head. Replace the guard on the operator end. Then swing the main electrical enclosure shut and replace the bolts on the guard behind it.

8. Remove the lock and tag. Perform the safety test on page xvi. If the gantry head successfully completes the safety test, resume operation.

Adjusting Guide Wheels

The guide wheels keep the gantry head tracking straight on the table. If the gantry head is not tracking straight, the guide wheels may need adjustment.

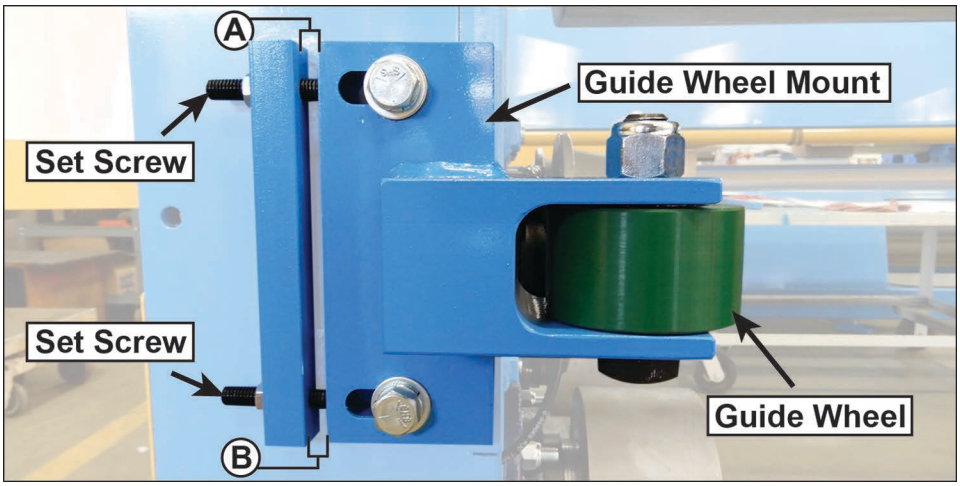
Adjustable wrench

Allen wrench

Ruler

1. Lockout/tagout on the gantry head's disconnect switch.
2. Loosen the hex head cap screws that hold the guide wheel mount to the frame. See Figure 6-20.

Figure 6-20: Guide Wheel and Guide Wheel Mount Plate



3. Loosen the nuts on the set screws.
4. Adjust the guide wheel by using the following steps.
    a) Adjust the set screws to move the guide wheel. You should be just able to rotate the wheel by hand against the track channel when it reaches the proper position.
        - Tighten the set screws to move the guide wheel closer to the table.
        - Loosen the set screws to move the guide wheel away from the table. Move the guide wheel bracket so that the set screws touch it.

    b) Check distances A and B shown in Figure 6-20 to make sure they are identical. Adjust the set screws as necessary to make sure the distances are identical.
        Variances between distance A and distance B prevent the gantry head from tracking properly.
5. Tighten the nuts on the set screws.
6. Tighten the hex head cap screws.
7. Remove the lock and tag and restore power to the gantry head.

Replacing a Brake Pad

Slotted screwdriver

Phillips screwdriver

External snap ring pliers

Metric wrench or pliers

Metric socket head wrench set

1. Lockout/tagout on the gantry head's disconnect switch
2. Unscrew the manual brake handle extending from the side of the brake motor, if there is one.
3. Remove the fan cover. The fan cover is attached to the motor end shield.
4. Remove the fan snap ring.
5. Remove the fan, key, and second snap ring.
6. Remove the three socket head cap screws that hold the brake onto the motor end shield.
7. Slide the brake off of the brake hub. The hub is attached to the shaft.
8. Slide the brake pad off of the brake hub.
9. Slide the new brake pad onto the brake hub.
10. Place the brake on the motor end shield in the same manner it was removed.
11. After the three socket head cap screws are tightened, measure the air gap for proper distance. The procedure for measuring and adjusting the air gap is described on page 54.
12. Replace the fan, snap rings, and key. Then replace the fan cover.
13. Remove the lock and tag. Resume operation.

Figure 6-21: Brake and Brake Pad

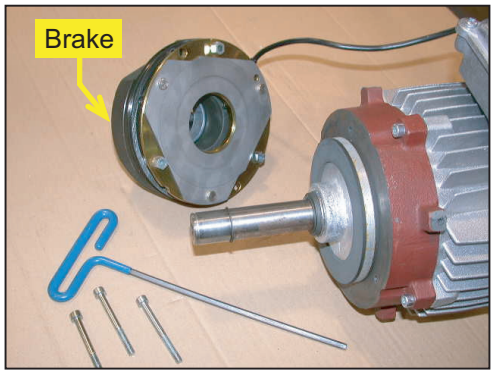


Figure 6-22: Removing the Brake Pad

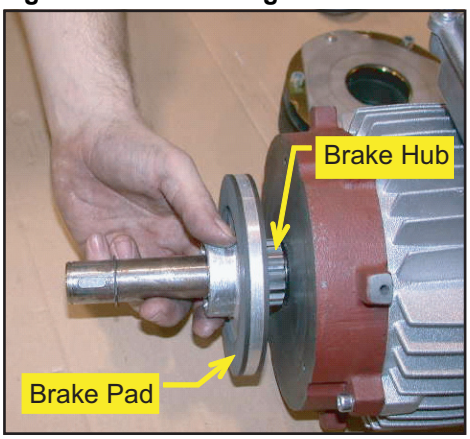
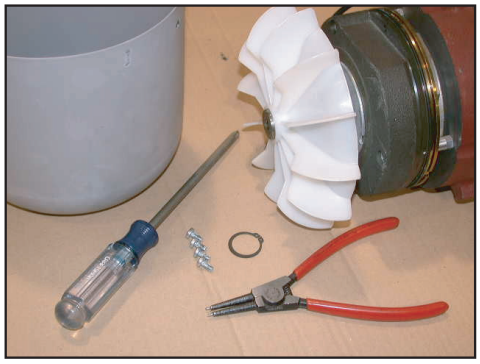


Figure 6-23: Fan and Fan Cover



Adjusting the Air Gap

	Adjusting the air gap improperly may damage the motor. **Do not attempt to make this adjustment unless the measured gap is outside the recommended allowance.**

If the brake monitor continually trips and other causes have been ruled out, the air gap in the brake motor may need to be adjusted. The recommended air gap is 0.016". The maximum air gap is 0.043".

To check the current air gap and to adjust it, refer to Figure 6-24 and the following procedure.

1. Lockout/tagout on the gantry head's disconnect switch.

1. Unscrew the manual brake lever extending from the side of the brake motor. See Figure 6-6 on page 38 for the manual brake lever location.

2. Remove the fan cover.

3. Using a feeler gauge, measure the gap between the armature disk and brake coil housing, shown in Figure 6-24. Measure completely around the brake and record any variations in the gap measurement.

Feeler gauges

Slotted and Phillips screwdrivers

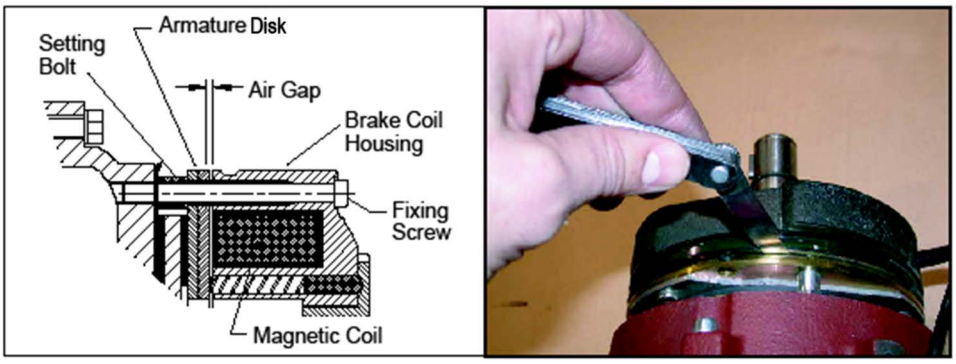
External snap ring pliers

Metric wrench or pliers

Metric socket head wrench set

Torque wrench

Figure 6-24: Measuring the Air Gap



4. 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:

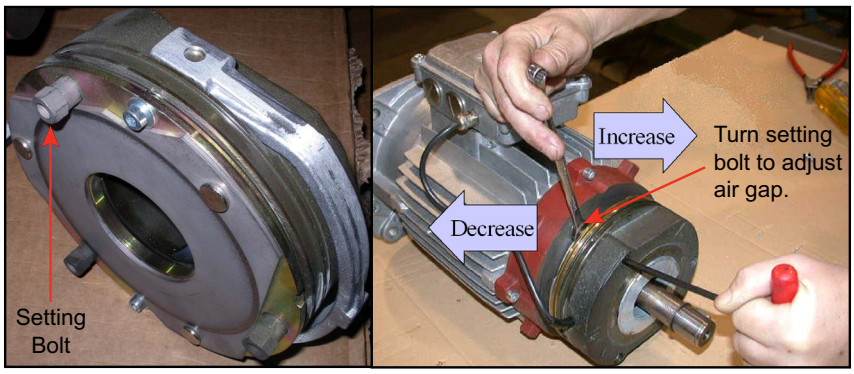
    a) Remove the fan snap ring.

    b) Remove the fan, key, and second snap ring.

c) Loosen the fixing screws that attach the brake to the motor's end shield by about half a turn.

d) Adjust the setting bolts as needed to reach the recommended gap. A 1/4 or 1/2 turn is usually sufficient for adjusting purposes. See Figure 6-25.

Figure 6-25: Adjusting the Setting Bolt



5. 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!

6. Torque all of the fixing screws to 18 ft-lbs.

7. Re-attach the fan, snap rings, key, fan cover, and handle.

8. Remove the lock and tag. Restore power and resume operation.

Replacing a VFD

For an overview of the VFD, see page 35.

If a VFD needs replacing, order a new one by calling MiTek Machinery Division Customer Service. Customer Service must set parameters for VFDs before shipping them. Parameters are then locked and may not be adjusted by anyone other than MiTek.

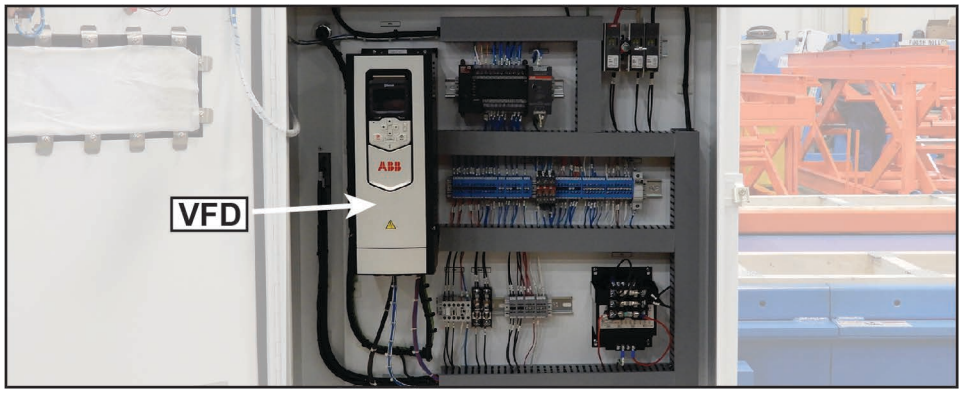
1. Lockout/tagout on the gantry head's disconnect switch. Open the main electrical enclosure door.

Phillips screwdriver

Torx 20 driver

2. Remove the VFD cover. See Figure 6-26 for the location of the VFD.

Figure 6-26: Main Electrical Enclosure with VFD



Customer Service is available at **800-523-3380** Monday through Friday.

3. Make sure all wire labels are legible. If not, refer to your electrical drawings and use masking tape and a permanent marker to label wires.
   Taking pictures of the location of the terminal blocks before removing them makes placing them on the new VFD easier.

4. Pull the terminal blocks from the front of the VFD. Do not disconnect the control wires from their terminal blocks.

5. Disconnect the 3-phase wires and ground wire from the VFD.

6. Remove the four mounting screws located at the corners of the VFD.

7. Install the new VFD by reversing the procedure above.
   Refer to electrical drawing 90633 if necessary.

8. Remove the lock and tag. Restore power and resume operation.

Replacing a Gearbox and Motor

Removing the Old Gearbox and Motor

1. Lockout/tagout on the gantry head's disconnect switch.

2. Remove the top left and right guards.

3. Prepare the gearbox and motor for removal by using the following steps. Use Figure 6-27 as a reference.

Lifting straps and equipment rated for 1200 lbs

Adjustable wrench

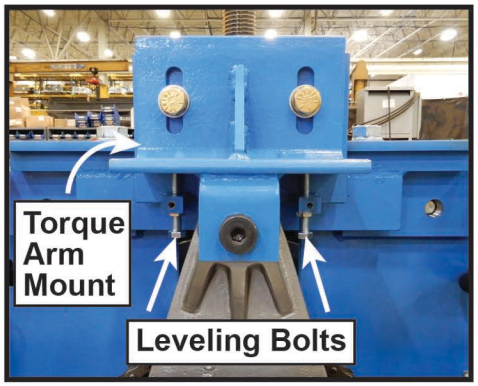
Allen wrenches

Copper-based anti-seize lubricant

Torque wrench (capable of 282 ft-lbs of torque)

Slotted screwdrivers

Figure 6-27: Gearbox and Motor



Above: detail view
Left: shown with two guards removed

a) Open the cover on the junction box. Remove the wires from their terminals and pull them through the 90° elbow.

b) Remove the bolts, washers, and nuts from the torque arm mount. Save them.

c) Loosen the nuts on the leveling bolts. Loosen the leveling bolts.

d) Remove the nut and bolt attaching the torque arm mount to the torque arm. Save the bolt and torque arm mount.

e) Remove the bolts attaching the shaft cover (see Figure 6-27) to the gearbox.

f) Remove the retaining ring from the roller shaft.

4. Remove the large eye bolt from the new gearbox. Insert the eye bolt into the right side of the old gearbox.

5. Remove the old gearbox and motor by using the following steps.

   a) Run straps rated for 1200 lbs through the eye bolts on the gearbox.

   b) Lift slightly on the gearbox and motor with lifting equipment rated for 1200 lbs.

   c) Remove the gearbox and motor from the shaft. Dispose of it in accordance with all laws and regulations.

   d) Remove the key from the keyway on the shaft if necessary.

Installing a New Gearbox and Motor

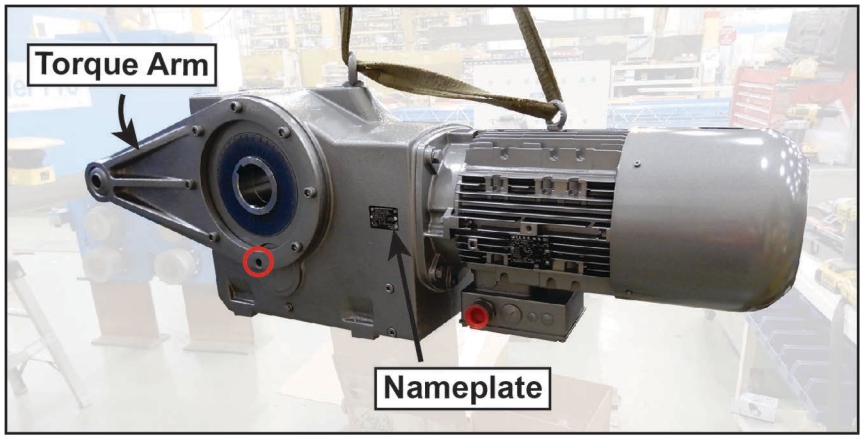
1. Prepare the gearbox and motor for placement onto the roller shaft by using the following steps.

   a) Remove the two bolts from the shaft cover on the side of the gearbox. Remove the shaft cover to reveal the shaft hole.

   b) Remove the retaining ring from the inside of the shaft hole.

   c) Place the torque arm on the side of the gearbox that has the nameplate, shown in Figure 6-28. Using thread adhesive, torque each of the seven bolts that attach the torque arm to the gearbox to 68 ft-lbs. One of the holes on the torque arm, circled in red in Figure 6-28, does not have a bolt.

Figure 6-28: Torque Arm Orientation



   d) Check to make sure the key slides into the keyway.

   e) Place a light coating of copper-based anti-seize lubricant on the roller shaft on the gantry head.

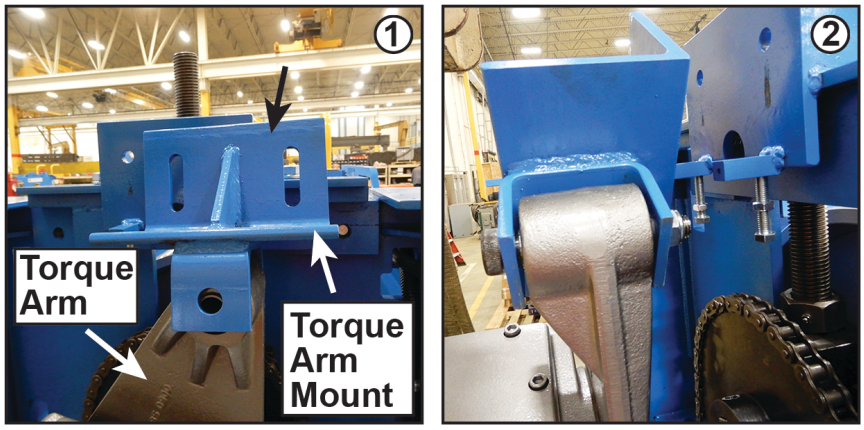
2. Place the gearbox and motor onto the shaft by using the following steps. Note that the junction box for the motor should be on the right when the gearbox and motor are placed on the shaft.

   a) Replace the eye bolt on the new gearbox. Run straps rated for 1200 lbs through the eye bolts on the gearbox and the motor.

   b) Lift the gearbox and motor with lifting equipment rated for 1200 lbs. Push the motor onto the shaft.

   c) Place the torque arm mount over the top of the torque arm. See No. 1 in Figure 6-29.

Figure 6-29: Bolting the Torque Arm to the Torque Arm Mount



   d) Slide the bolt through the hole on the torque arm mount and the hole at the top of the torque arm. Tighten the nut on the back of the bolt. See No. 2 in Figure 6-29.

   e) Remove the straps.

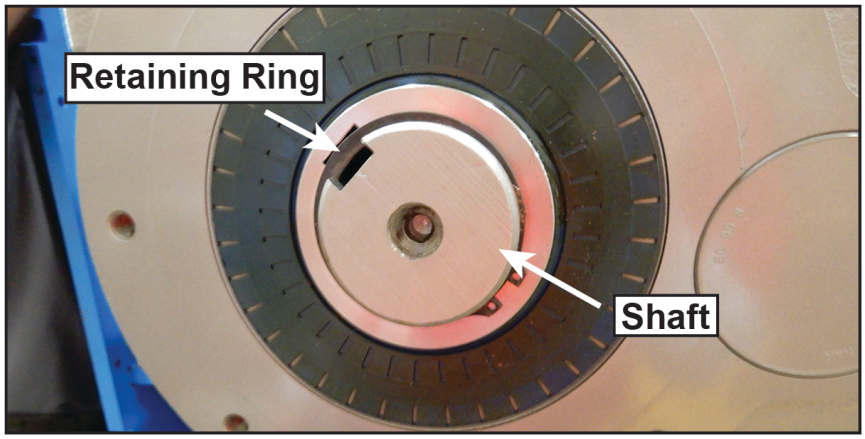
3. Secure the gearbox and motor to the frame by using the following steps.

   a) Push the motor the rest of the way onto the shaft until the torque arm mount touches the bracket on the frame.

      If the gearbox and motor are difficult to push onto the shaft, insert the large eye bolt from the old gearbox onto the opposite side of the new gearbox. Use the straps and lifting equipment to lift the gearbox and motor slightly to push them onto the shaft.

   b) Snap the retaining ring into place on the end of the shaft.

Figure 6-30: Retaining Ring

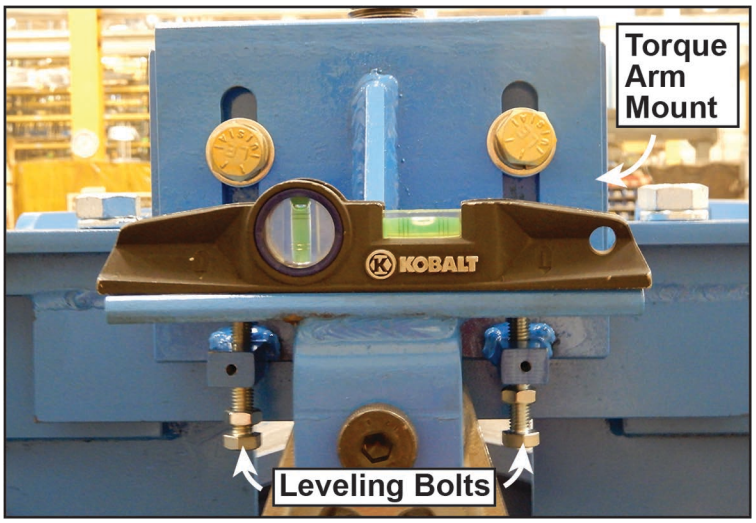


c) Level the gearbox and motor by using the following steps.

1) Using the washers and lock washers, insert the two bolts through the torque arm mount and the bracket on the frame. Place nuts on the bolts but do not tighten yet.

2) Place a level on the torque arm mount. Level the torque arm mount using the leveling bolts on its underside. Refer to Figure 6-31.

Figure 6-31: Leveling the Torque Arm Mount



3) Tighten the nuts on the leveling bolts.

4) Torque the bolts attaching the torque arm mount to the bracket on the frame to 282 ft/lbs.

d) Replace the shaft cover on the gearbox. Tighten the two bolts on the shaft cover.

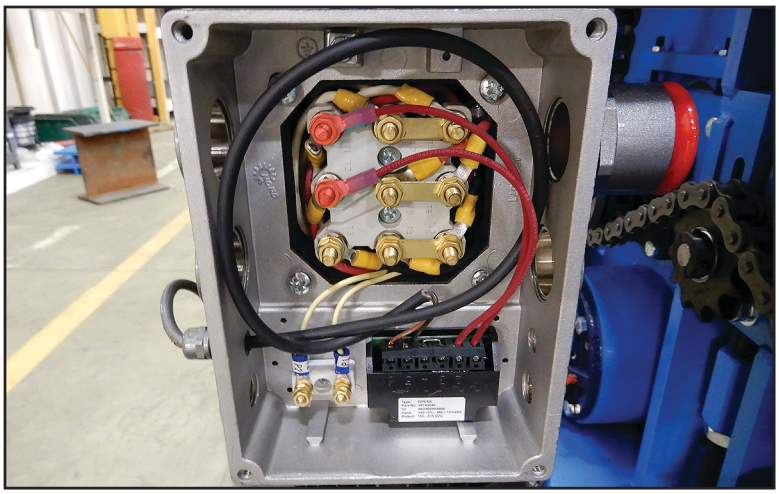
e) Place the manual brake lever on the motor opposite the junction box.

4. Wire the junction box on the motor by using the following steps.

    a) Remove the cover and plug from the junction box. Discard the plug.

    b) Remove the black wires running to the brake resistor and discard them. The wires are highlighted in red in Figure 6-32.

Figure 6-32: Wires to Remove



    c) Tighten the fitting on the outside of the junction box.

    d) Tighten the nut onto the 90° elbow. Then insert the 90° elbow into the fitting. Tighten it so that it points downward.

    e) Pull the wires through the 90° elbow into the junction box.

f) Check the diagram on the inside of the junction box cover to make sure the jumpers are correct.

g) Run wires as shown by using the following steps. Use the wired junction box in Figure 6-33 for reference.

1) Connect the black 3-phase wires to the terminals (circled in red in Figure 6-33) on the left-hand side of the junction box.
2) Connect the ground wire to the ground terminal at the top of the junction box.
3) Connect the wires listed in Table 6-5 into brake resistor at the bottom of the junction box.

A black wire and a brown wire should already be inserted into terminals 6 and 5 on the brake resistor.

Figure 6-33: Junction Box

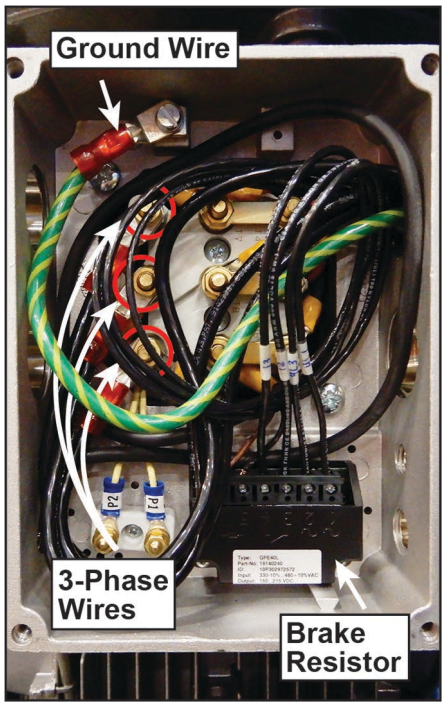


Table 6-5: Brake Resistor Wires

Wire	Brown	Black	13	12	4L3	4L1
Terminal	6	5	4	3	2	1

4) Replace the cover and tighten screws.

5. Remove the lock and tag. Check to make sure the motor is turning in the correct direction. If it is not, lockout/tagout and switch two of the 3-phase wires in the junction box.

6. Perform the safety test on page page xvi. Resume operation after a successful safety test.

Table Maintenance

Mechanical System

Replacing Wear Pads

Plastic wear pads under the clamp rail reduce friction between the clamp rail and the table surface. These wear pads are located on the underside of the clamp rails next to clamp rollers.

These pads wear over time. They need replacement once a year (one shift) or once every six months (two shifts).

	**⚠ WARNING** **Bleed all pressure from pneumatic lines before replacing wear pads.** **Performing maintenance on components with pressurized pneumatic lines may result in injury.**

1. Use the remotes to set both clamp rails in the unclamped position.

2. Remove pressure from the pneumatic system by pressing the lockout valve on the FRL (filter / regulator / lubricator) down. Lockout/tagout on the valve.

3. Press the red buttons on the black valves on the valve bank to bleed any residual air from the system. See page 37 to identify the valve bank.

Allen wrenches

Socket wrenches

4. Go to the infeed side of the table. Remove the hex head cap screws and washers that attach each clamp roller to the clamp rail. Repeat for each clamp roller. See Figure 6-34.

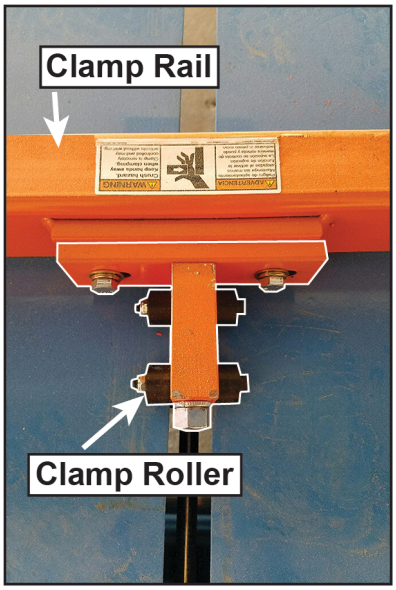
   Save all hardware during removal for reuse later.

5. Turn the clamp rail upside down.

6. Replace the wear pads using the following steps.

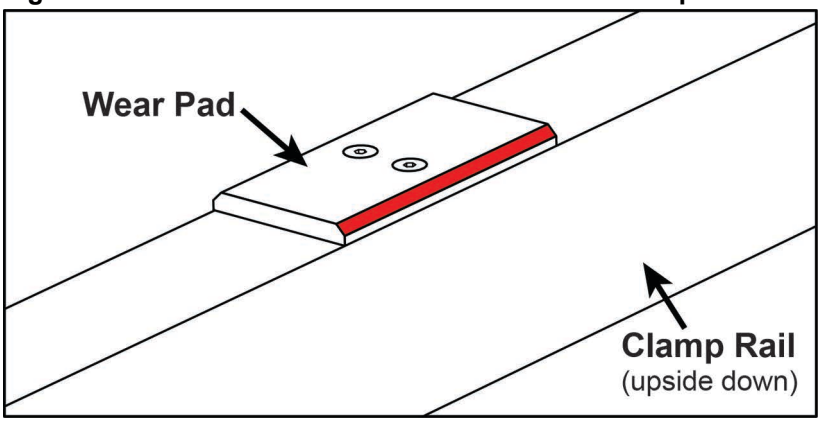
   a) Remove the two flathead socket head screws holding each wear pad to the bottom of the clamp rail to remove each wear pad.

Figure 6-34: Clamp Roller



b) Replace each wear pad. Make sure that each replacement wear pad is oriented as shown in Figure 6-35 with the bevel (shown in red) facing upward.

Figure 6-35: Wear Pad Orientation on Bottom of Clamp Rail



c) Insert the flathead socket head screws into each wear pad. Tighten them so that they are below the surface of the wear pad.

7. After replacing every wear pad, turn the clamp rail over and use the hex head cap screws and washers to reattach the clamp rail to the clamp rollers.

8. Repeat step 4 through step 7 on the outfeed rail.

Pneumatic System

The pneumatic system for the table includes an FRL (filter / regulator / lubricator). See page 37 for an overview of the role of the FRL.

	⚠ WARNING
	**Bleed all pressure from pneumatic lines before performing any maintenance on pneumatic components. Do not remove the lubricator reservoir until all pressure is bled.** **Performing maintenance on pressurized pneumatic lines may result in injury.**

	⚠ WARNING
	**Make sure that the reservoir is securely attached to the lubricator before returning pressure to the lines.** **Pressurizing the lines before securing the reservoir may result in injury.**

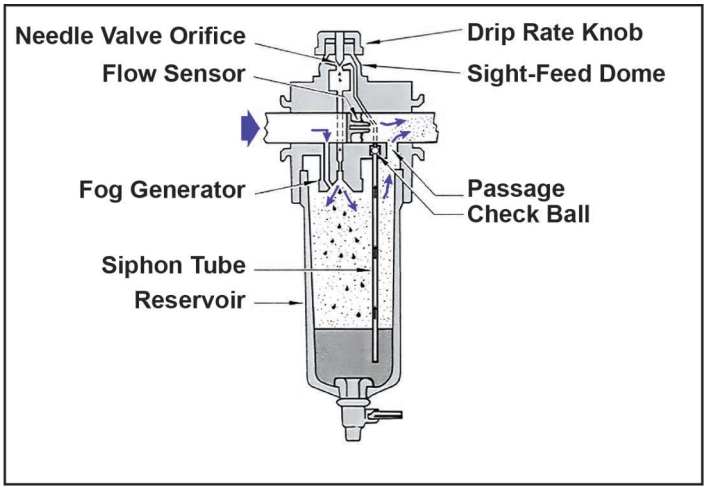
Maintaining the Lubricator

Checking the Lubricator's Reservoir

Check the oil level by viewing the sight gauge located on the reservoir every week. The sight gauge glass turns red where the oil touches it.

Refill or top off the oil when the oil drops below the maximum fill line on the lubricator. The exact amount of time depends on the density of the fog injected into the system.

Figure 6-36: Lubricator Cutaway



	⚠ WARNING
	**Bleed all pressure from pneumatic lines before performing any maintenance on pneumatic components. Do not remove the lubricator reservoir until all pressure is bled.** **Performing maintenance on pressurized pneumatic lines may result in injury.**

Filling the Oil Reservoir

Use a misting type oil rated 50 to 220 SSU that is compatible with the materials of construction.

1. Remove pressure from the lines by using the following steps.

   a) Push the yellow lockout valve on the FRL down. Lockout / tagout through the valve. See page 37 for the location of the lockout valve if necessary.

	⚠ CAUTION
	**Clamps, flippers, pop-ups, and ejectors may move suddenly as residual air is bled from the system. Keep clear of these parts.** **Coming into contact with moving parts while bleeding residual air may result in injury.**

   b) Press the red buttons on the black valves on the valve bank to bleed any residual air from the system. See page 37 to identify the valve bank if necessary.

   c) Wait at least two minutes to allow the air to bleed from the lines.

2. Remove the reservoir from the lubricator by twisting a quarter turn counterclockwise while pushing up on the reservoir. Pull down and remove the reservoir.

3. Pour oil into the reservoir to the maximum fill line. Do not overfill the lubricator.

	⚠ WARNING
	**Make sure that the reservoir is securely attached to the lubricator before returning pressure to the lines.** **Pressurizing the lines before securing the reservoir may result in injury.**

4. Place the reservoir back onto the lubricator by pushing up and turning clockwise. Make sure that the reservoir is securely attached and that the sight gauge is easy to see.

Adjusting the Lubricant Fog

The pneumatic system lubricator is a Micro-Fog Lubricator. It injects a finely divided fog of oil into a flowing stream of compressed air to provide internal lubrication. The density of the lubricant is controlled by the drip rate knob, shown in Figure 6-36 on page 67. Use an Allen wrench to turn the knob counterclockwise to increase the density of the lubrication or clockwise to decrease it.

Maintaining the Filter / Regulator

Adjusting the Pressure on the Filter / Regulator

The pressure adjustment knob on the regulator controls the operating pressure for the entire pneumatic system. The operating pressure of the pneumatic system should be set between 90 and 100 psi. The lower end of that range should be used with a table that has only clamps, while the upper end of the range should be used with a table that has flippers or other pneumatic options.

Adjustments to individual cylinders can be made using the flow control valve on each cylinder. See page 72 for the procedure to adjust individual cylinders.

1. Pull the pressure adjustment knob up to unlock it. See Figure 6-37 for the location of the pressure adjustment knob.

2. Turn the knob to adjust the pressure.
   - Turning the knob clockwise increases pressure
   - Turning the knob counterclockwise decreases pressure

Once the gauge reads 90 to 100 psi, push the knob down to lock it in place.

Figure 6-37: Regulator

Draining the Filter / Regulator

Condensation can form in the pneumatic lines due to temperature changes. This condensation appears in the bowl's sight glass. The sight glass turns red where water touches it to indicate the water level.

	⚠ CAUTION
	**Use a bowl to prevent water from spilling onto the floor when draining the filter / regulator.** **Water from the filter / regulator may create slick conditions resulting in injury.**

A petcock at the bottom of the regulator operates a drain. Drain the regulator at least once a day.

Replacing a Filter Element on a Filter / Regulator

PN The regulator uses a 40-micron filter that must be replaced every six months (one shift) or three months (two shifts). This filter can be purchased from MiTek. Refer to the *Parts List* appendix on page 95 for the part number.

1. Bleed pressure from the system.

   a) Push the yellow lockout valve on the FRL down. Refer to Figure 6-4 on page 37 for the location of the valve.

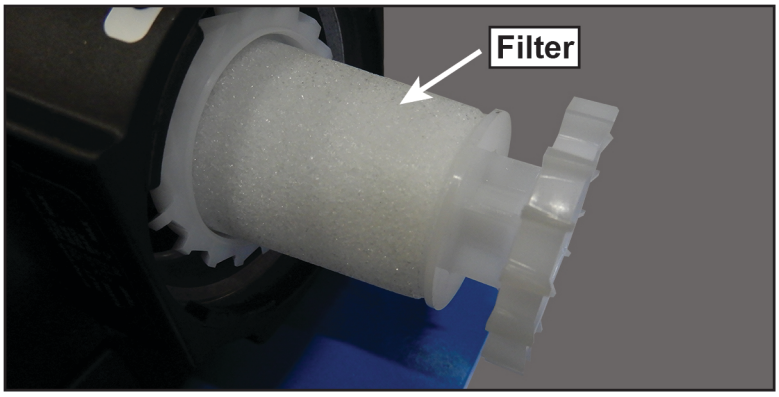
	⚠ CAUTION
	**Clamps, flippers, pop-ups, and ejectors may move suddenly as residual air is bled from the system. Keep clear of these parts.** **Coming into contact with moving parts while bleeding residual air may result in injury.**

   b) Press the red buttons on the black valves on the valve bank to bleed any residual air from the system.

2. Remove the bowl from the regulator body by twisting approximately 1/4 turn clockwise while pushing up on the bowl. Then pull down and remove the bowl from the body.

3. Unscrew the white plastic baffle (see Figure 6-38) holding the filter element and remove it from the regulator.

Figure 6-38: Regulator Filter



4. Replace the filter element. Screw the white plastic baffle back into place.

5. Place the bowl back onto the regulator body by pushing up and turning counterclockwise. Make sure it is secure before returning pressure to the lines.

Maintaining Cylinders

Pneumatic cylinders control the moving parts on the table. All tables have cylinders to operate the clamp rails. Some tables have cylinders that operate optional components as well.

PN Refer to the *Parts List* appendix on page 95 to order a new cylinder.

Table 6-6: Cylinder Adjustment Ability

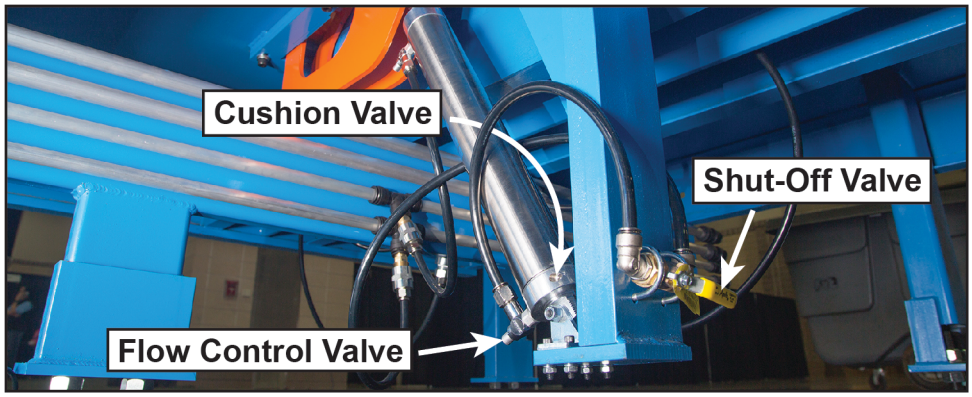
Cylinder	Flow Control Adjustment	Cushion Adjustment
Clamp rails	Yes	No
Flippers	Yes	Yes
Pop-ups	No	No
End-eject	No	No
Side-eject	Yes	No

NOTICE

All cylinders should work in unison. The adjustment described below should rarely be necessary.

If you adjust a cylinder, make sure that the timing of that cylinder works smoothly with the other cylinders.

Figure 6-39: Flipper Cylinder with Flow Control and Cushion Adjustment



Adjusting the Cushion Valve

Some cylinders have adjustable cushion valves to decelerate the load and reduce potentially destructive energy. See Table 6-6 to determine what cylinders have cushion valves.

If the components with cushion valves stop exceedingly hard, adjust the cushion valve, shown in Figure 6-39.

- Turn the screw counterclockwise to lessen the amount of cushion.
- Turn the screw clockwise to increase the amount of cushion.

Adjusting the Flow Control Valves

Both ends of some cylinders have flow control valves to adjust how fast the cylinders extend and retract. If the components with the flow control valves move too slowly or too quickly, adjust the flow control valves.

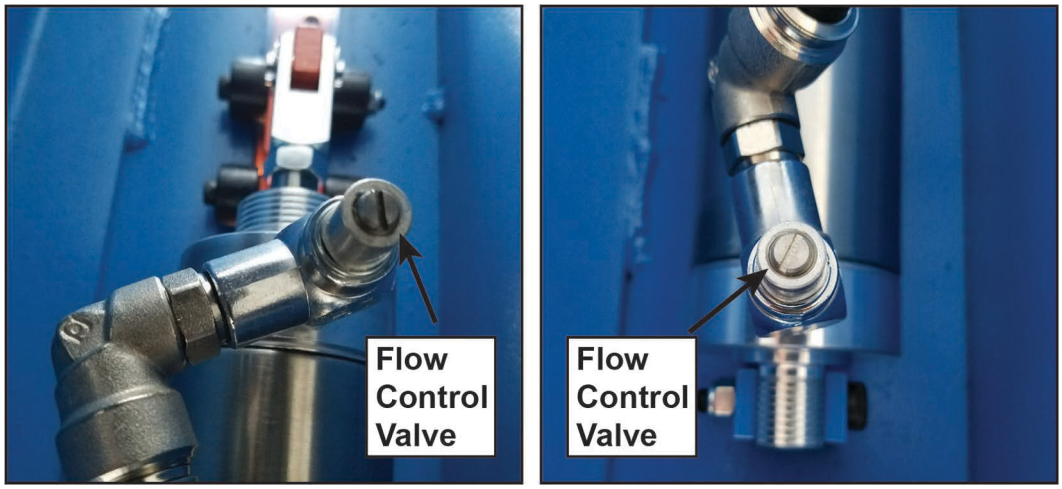
The flow control valve at the rod end of the cylinder controls how quickly the cylinder extends.

- To increase speed during the extending stroke, turn the screw counterclockwise.
- To decrease speed during the extending stroke, turn the screw clockwise.

The flow control valve at the cap end of the cylinder controls how quickly the cylinder retracts.

- To increase speed during the retracting stroke, turn the screw counterclockwise.
- To decrease speed during the retracting stroke, turn the screw clockwise.

Figure 6-40: Rod-End Flow Control Valve and Cap-End Flow Control Valve



Rod end *Cap end*

Navigating the Troubleshooting Appendix

Refer to...

Maintenance chapter for procedures

Glossary for additional terminology

This appendix is divided into tables according to the system or components that are showing troublesome symptoms. The tables are presented in the order listed here.

Troubleshooting the Gantry Head

Table Number	Trouble Topic	Page
Table A-1	Mechanical	78
Table A-2	Electrical (general)	79
Table A-3	Electrical (safety controller)	82
Table A-5	Electrical (laser scanner)	88

Customer Service is available at **800-523-3380** Monday through Friday.

Troubleshooting the Table

Table Number	Trouble Topic	Page
Table A-6	Pneumatic	90

If you continue to have problems after performing all applicable troubleshooting steps and reviewing the topic in the *Maintenance* chapter, call MiTek Machinery Division Customer Service for assistance.

Safety Notes for Troubleshooting

General Troubleshooting Safety Tips

	⚠ WARNING
	**ELECTROCUTION, HIGH PRESSURE, AND CRUSH HAZARDS!** **Read all notes in this section AND the safety section in the preliminary pages before operating or maintaining this equipment.** **Most solutions are described in more detail in the *Maintenance* chapter and may have more safety notes included there.**

- **Read all warnings** located in the safety section in the preliminary pages and adhere to them at all times.
- **When this graphic appears, 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 or troubleshooting.
- If the lockout/tagout graphic does not appear, it is recommended that you still **de-energize the machine** unless energy is required for the troubleshooting process. If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.
- **All electrical work must be performed by a licensed electrician.**
- **Read this manual** for information and procedures related to the specific maintenance or troubleshooting issue before attempting any maintenance!
- **Safety goggles and a dust mask** must be worn for all cleaning steps outlined in this manual. When using cleaning and lubrication solutions, a respirator rated for use with those solutions must be worn as well as gloves resistant to the solution.

Electrical Troubleshooting Safety Tips

- **Make sure you have the proper tools needed for the job.** See *Tools Needed* on page 76.
- **Ensure the person performing the troubleshooting is qualified** from an electrical knowledge standpoint. If you feel uncertain about troubleshooting electrical power, remember, the cost of hiring an electrician far outweighs the cost of an injury.
- **Remove rings and watches that you are wearing.** They are extremely conductive material and may catch on small components.
- **Get a helper**. You are most likely going to need a third hand at some point, and you shouldn't perform electrical work without someone close by to help if you get hurt.
- **Be patient.** Take your time and stay alert. Never shortcut or become too confident in what you are doing; electrical power will always be stronger than you.
- **Take notes** recording what you have checked, and what the readings were. This is also a good way to check your work when you are finished. Sometimes, the machine won't work because a wire was removed for testing, and overlooked when cleaning up. Having proper notes will make the process go much more smoothly.
- **ALWAYS turn the power off** if you are checking for ohms or swapping PLC cards.
- **ALWAYS push an E-stop button** before approaching a machine for any reason, but if you are working with the encoders it is especially important. An interruption to a powered encoder may cause components to move without warning.
- **Wear appropriate personal protective equipment** (PPE) for working with live power.

Getting Started With Troubleshooting

Tools Needed

Gather these tools before beginning the troubleshooting process and before calling MiTek for technical assistance.

1. Slotted screwdriver, insulated
2. Phillips screwdriver, insulated
3. Equipment manual and drawings, specifically electrical schematics
4. Pen and paper to take notes and record settings
5. Multimeter

   A multimeter is an electronic measuring instrument. The analog versions were referred to as an analog volt-ohm-meter (VOM). A newer, digital model is called a digital-multi-meter (DMM). There are a large variety of volt-measuring devices available, but at a minimum, it should have these features:

   - Voltage (volts) measurement
   - Resistance (ohms) measurement
   - Ability to measure both AC and DC power
   - Autoranging feature
   - It is highly beneficial to also have the ability to measure current (amps)

6. Additional tools depending on which parts are in question
7. Personal protective equipment as dictated by NFPA 70e

The First Steps

For Mechanical Troubleshooting

Always clean and lubricate the equipment as a first step in most troubleshooting processes. Most mechanical malfunctions are caused by inadequate preventive maintenance.

For Electrical Troubleshooting

1. Lockout/tagout at the disconnect switch located on the equipment.

	**Never use compressed air inside the electrical enclosures! It may force contaminants into the electrical connections.** **Use a vacuum to remove dust from electrical enclosures. Canned air is acceptable after vacuuming.**

2. Vacuum and dust the electrical enclosure.

3. Remove the lockout/tagout equipment and attempt to run the machine again. If that didn't fix the problem, proceed with the next step.

4. Adhere to all regulations and guidelines given in NFPA 70e and in your company's energy control program.

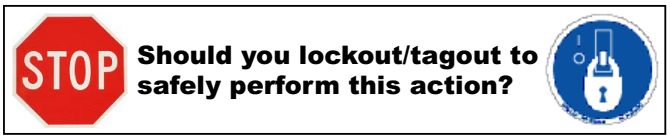
	⚠ WARNING
	**ELECTROCUTION HAZARD!** **All electrical work must be performed by a licensed electrician.** **If it is absolutely necessary to troubleshoot an energized machine, follow appropriate guidelines.**

5. Determine where the electrical problem begins. To do this, you need a multimeter. If you are unfamiliar with your multimeter, consult the manufacturer's manual.
   - Determine if you are working with AC (alternating current) or DC (direct current) before checking for voltage. Your multimeter should measure both, but you'll have to tell it which one to measure.
   - Measure incoming and outgoing voltage to specific components. Proceed along a logical order determined by your machine's specific problem, and write down the order that you check each item and the amount of voltage that it registers.

Mechanical Symptoms and Solutions

Table A-1: Mechanical Symptoms and Solutions

Problem	Possible Cause	Possible Solution	See Page
Gantry head does not move (see page 79 for electrical problems)	Drive chain loose, broken, or improperly routed	Replace chain Tension chain properly	46
	Sprocket broken	Replace sprocket; then tension chain	44
	Motor damaged	Replace motor	57
Gantry head becomes stuck on table	Guide wheels misaligned	Align guide wheels	52
	Drive wheels slipping	Clean track; replace drive wheels	—
	Drive wheels too low	Adjust drive wheels upward	—
Gantry head stops too slowly	Brake worn	Replace brake pad	53
	Brake air gap adjusted improperly	Bring air gap back within tolerances	54
	Drive wheels slipping	Clean track channel and drive wheels	—
Gantry head roller not turning smoothly	Take-up bearings not lubricated	Lubricate take-up bearings	39
Connector plates not embedding completely	Roller adjusted too high	Adjust take-up bearings to move roller down	48
	Pressure wheels damaged	Replace pressure wheels	—
Connector plates embedding unevenly	Roller adjusted too high on one side	Adjust take-up bearings to level roller	48



Electrical Symptoms and Solutions

Table A-2: General Electrical Symptoms and Solutions

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.	15
	Secondary or primary transformer fuses are open	Check primary and secondary transformer fuse.	
E-stop button is released, but beacon is red, and VFD fault indicator light is illuminated	VFD fault has occurred	Note fault code on VFD display. Press Reset button. Call MiTek Machinery Division Customer Service if problem persists.	
Directional button is pressed and held, horn keeps sounding for more than 1 second, and the machine is not moving	Control relay has loose connection or control relay is bad	Check wires 3L1 and 3L2 on control relay CR1 for looseness; check fuse FU4 or FU5; or replace control relay CR1.	
Gantry head travels the opposite direction of the directional button pressed	The 3-phase wires are connected to the wrong terminals.	Swap two 3-phase wires in the junction box on the motor. Swap two 3-phase wires on the contactor inside the electrical enclosure.	63
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 MiTek Machinery Division Customer Service.	
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.	41
	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.	

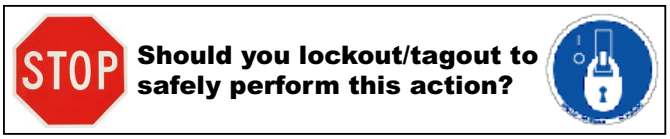
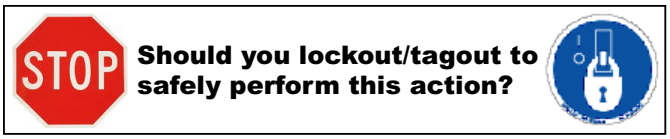


Table A-2: General Electrical Symptoms and Solutions (Continued)

Problem	Possible Cause	Possible Solution	See Page
Safety output OFF state while there is no intrusion by an object	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!	
	An additional measurement error may need to be added due to reflective backgrounds.	Call MiTek Machinery Division Customer Service.	
	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 MiTek Machinery Division Customer Service.	
	Ambient light, including high-density factory lighting, may directly affect the scanner.	Dim lighting and reduce ambient light.	
	Dirty environment, (e.g. 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).	41
	Dirty window	If the status/diagnostic display shows error code 80, clean the scan window.	41



Safety Controller Diagnostics and Troubleshooting

Safety Controller Diagnostics

The indicators shown in Figure A-3, located on the front of the safety controller, communicate its status and operating mode.

Refer to page 36 for more 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
☼	●	---	◐	●	●	---	---	---	---	Normal operating status during user testing
Stopped but no error detected										
●	●	---	---	●	●	---	---	---	---	Internal power not supplied
◐	●	---	---	●	●	---	---	---	---	Stopped in IDLE Mode
◐	◐	---	---	●	●	---	---	---	---	Stopped in CONFIGURATION Mode
●	●	---	---	●	☼ ◐	---	---	---	---	Memory Cassette operation in progress (backup/restore)
Fatal error detected										
●	☼	---	---	---	---	---	---	---	---	Critical status: System error detected
●	◐	---	---	☼	---	---	---	---	---	Abort status: Minor error detected
●	●	---	---	☼	☼	---	---	---	☼	Error detected in Memory Cassette operation (backup/restore)
Non-fatal error detected										
---	---	---	---	◐	---	---	---	---	---	Non-fatal error detected

● : Not lit ◐ : Flashing ☼ : Lit ---: Not relevant

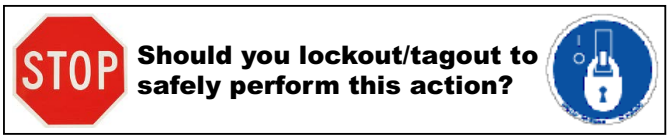


Table A-3: Diagnostic Definitions for the Safety Controller

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	Check the following before supplying the rated power: • 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 V1/G1 is normal. In that case, replace the Unit.
4	Stopped in Idle Mode	Stopped, but no error detected	1. If the system starts in Idle Mode when it was previously operated in Run Mode, see the manufacturer's manual for the safety controller. 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.
6	Memory cassette operation in progress (backup/ restore)	Stopped, but no error detected	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. • 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. Call MiTek Machinery Division Customer Service for assistance. • 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.

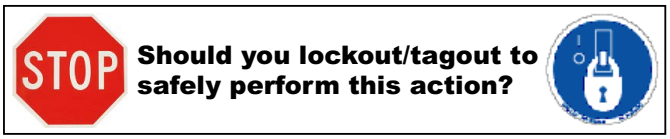


Table A-3: Diagnostic Definitions for the Safety Controller (Continued)

Row	Problem	Status	Possible Solution
8	Abort status: Minor error detected	Fatal error detected	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. 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. Back up data to the memory cassette. Call MiTek Machinery Division Customer Service for assistance.
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 36.

Table A-4: Safety Controller Error Names

Error Name	Possible Cause	Possible Solution
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.	**Restoring Data:** 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. If the error occurs again after this measure is taken, replace the memory cassette or the safety controller. **Not Restoring Data:** 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.
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.

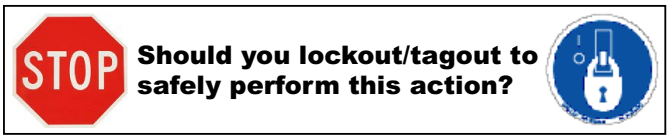


Table A-4: Safety Controller Error Names (Continued)

Error Name	Possible Cause	Possible Solution
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.
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.

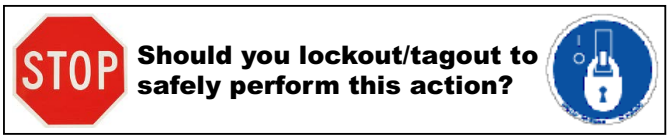


Table A-4: Safety Controller Error Names (Continued)

Error Name	Possible Cause	Possible Solution
Output PS voltage low	The correct output power is not being supplied.	Check the following before supplying the rated power. • 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.
Output PS OFF circuit error	An error has been detected in the output power supply Off test.	
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. Failure of connected device. Incorrect set value for discrepancy time.	Check the external wiring. Replace the externally connected device. Review the discrepancy time.
Overload detected at test output	Output signal line ground fault. Failure at externally connected device.	Check the external wiring. 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. Internal circuit failure.	Check the external wiring. Cycle the power supply. If the error occurs again, replace the unit.
Undercut detected using muting lamp	Output signal line is disconnected. Externally connected device failed.	Check the external wiring. 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.

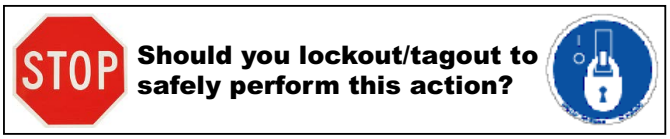
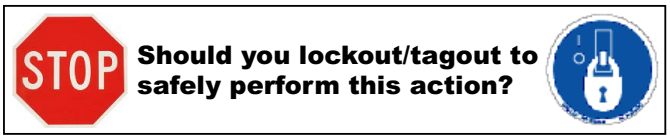


Table A-4: Safety Controller Error Names (Continued)

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. Internal circuit failure. Output power supply is outside of specifications.	Check the external wiring. 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.



Laser Scanner Diagnostic Codes

Table A-5: Laser Scanner Diagnostics

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

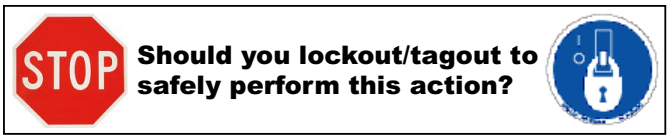


Table A-5: Laser Scanner Diagnostics (Continued)

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	
	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

Pneumatic System Symptoms and Solutions

Table A-6: Pneumatic System Symptoms and Solutions

Problem	Possible Cause	Possible Solution	See Page
Pneumatic components not moving in unison	Flow control valve(s) adjusted incorrectly	Adjust flow control valve(s)	72
Pneumatic components underpowered	Pneumatic system pressure set too low	Increase pneumatic system operating pressure	69
	Air leak in pneumatic system	Check and repair any leaking connection or hose	
Flipper not working	Shut-off valve turned off	Turn shut-off valve on	25

Appendix B

Finding a Part Number

The parts list comprises lists for the mechanical, electrical, and pneumatic systems. Each list includes a part number, a description, a drawing location, and an indication of whether that part should be stocked.

Ordering the Parts With Your Part Number

Each column in Table B-1 describes a method for ordering parts.

Table B-1: How to Order Your Part Using the Part Number

Using E-Mail	Using the Phone
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

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

	⚠ WARNING
	CRUSH HAZARD Perform the safety tests described on page xvi before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.

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

	⚠ WARNING
 	ELECTROCUTION AND HIGH PRESSURE HAZARDS. Always turn the power off by activating an E-stop when the equipment is not in operation. 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. Lockout/tagout on the lockout valve on the FRL (filter / lubricator / regulator). Bleed pneumatic lines after lockout/tagout.

Part Numbers

Gantry Head Mechanical Parts

MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
554008	Drive chain (order 8' and trim to 93") (order with 554187)	82581-501	1
554187	Drive chain master link (order with 554008)	82581-501	1
See below	Gearmotor	82581-501	
480479	Gearmotor (208V)	82581-501	—
480480	Gearmotor (230V)	82581-501	—
480482	Gearmotor (415V)	82581-501	—
480481	Gearmotor (460V)	82581-501	—
480483	Gearmotor (575V)	82581-501	—
551307	Roller shaft sprocket	82581-501	—
558131	Idler sprocket	82581-501	—
549050	Drive wheel sprocket	82581-501	—
580192	Guide wheel (polyurethane)	82581-501	2
82644-501	Drive wheel with shaft	82138-501	—
419803	Drive wheel pillow block bearing (two per wheel)	82138-501	—
82138-501	Drive wheel with shaft and pillow block bearing	82138-501	4
82641-501	Pressure wheel with shaft	82581-501	4
419855	Pressure wheel bearing (two per wheel)	82581-501	8
82603	Roller with shaft	82581-501	—
68510	Take-up bearing assembly for roller	68510	—

Gantry Head Electrical Parts

MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
515972	Laser scanner cable	90633-501	—
82611	Laser scanner mount	82581-501	—
See below	Laser scanner	90633-501	—
92284-503	7' roller	—	—
92284-511	7'6" roller	—	—
519508	Pendant	90633-503	—
516382	Brake fuse	90633-502	2
See below	Transformer fuse	90633-502	2
516390	Transformer fuse (primary) (208V)	90633-502	
516389	Transformer fuse (primary) (230V)	90633-502	
516384	Transformer fuse (primary) (415V)	90633-502	
516383	Transformer fuse (primary) (460V / 575V)	90633-502	
516132	Transformer fuse (secondary)	90633-502	1
516629	DC power supply fuse	90633-502	1
See below	Disconnect fuse	90633-502	3
516494	50A LPJ disconnect fuse (208V / 230V)	90633-502	
516490	20A LPJ disconnect fuse (415V / 575V)	90633-502	
516491	25A LPJ disconnect fuse (460V)	90633-502	
92289-501	G9SP safety controller	90633-502	—
94019	Memory cassette for G9SP safety controller	90633-502	—
See below	Variable frequency drive	90633-502	—
92286-501	Variable frequency drive (208V)	90633-502	—
92286-502	Variable frequency drive (230V)	90633-502	—
92287-502	Variable frequency drive (415V)	90633-502	—
92287-501	Variable frequency drive (460V)	90633-502	—
92288-501	Variable frequency drive (575V)	90633-502	—
513504	Beacon (light)	90633-502	—
513584	Beacon (cover)	90633-502	—
513587	Beacon (extension)	90633-502	—
513586	Beacon (base)	90633-502	—

Note: the electrical schematic for the gantry head is Drawing 90633.

Table Pneumatic Parts

Part Location	MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
Clamp rail	63599-501	Cylinder assembly	63599-501	—
Clamp rail	423024	Cylinder	63599-501	—
Clamp rail	779122	Tubing (1/2" nylon) (sold by the foot)	63599-501	—
Clamp rail	426070	Clevis and nut for cylinder rod	63599-501	—
End-eject	64579-501	Cylinder assembly	64573-501	—
End-eject	423535	Cylinder	64579-501	—
End-eject	426070	Clevis and nut for cylinder rod	64579-501	—
Flipper	63571-501	Cylinder assembly	63571-501	—
Flipper	423009	Cylinder	63571-501	—
Flipper	426070	Clevis and nut for cylinder rod	63571-501	—
Flipper	779122	Tubing (1/2" nylon) (sold by the foot)	63571-501	—
Flipper	430035	Shut-off valve	63571-501	—
FRL	438822	Filter / lubricator / regulator assembly	64585-501	—
FRL	438575	Replacement filter (40 micron)	—	1
FRL	63597	Mounting plate	64585-501	—
Pop-up	64570-501	Cylinder assembly	64570-501	—
Pop-up	423532	Cylinder	64570-501	—
Pop-up	426070	Clevis and nut for cylinder rod	64570-501	—
Pop-up	779125	Tubing (3/8" polyurethane)	—	—
Side-eject	64995-501	Cylinder assembly	64995-501	—
Side-eject	423028	Cylinder	64995-501	—
Side-eject	426070	Clevis and nut for cylinder rod	64995-501	—
Side-eject	779122	Tubing (1/2" nylon) (sold by the foot)	64995-501	—
Side-eject	430035	Shut-off valve	64995-501	—

Table Mechanical Parts

Part Location	MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
Clamp rail	63542	Wear pad	—	Varies
Clamp rail	63584-501	Clamp roller	63584-501	—
Jigging	See below	Stops	—	2
Jigging	66064-501	End stop (left hand)	64594-501	
Jigging	66069-501	End stop (right hand)	64594-501	
Jigging	66494-502	Flip stop (right hand)	64594-501	
Jigging	66494-501	Flip stop (left hand)	64594-501	
End-eject	64573-501	Roller assembly	64573-501	—
End-eject	591060	Roller only	64573-501	—
Flipper	63562-501	Flipper assembly (24")	63562-501	—
Flipper	63570	Flipper arm only (24")	63562-501	—
Flipper	62755-501	Flipper assembly (26")	62755-501	—
Flipper	62756	Flipper arm only (26")	62755-501	—
Flipper	62738-501	Flipper assembly (30")	62738-501	—
Flipper	62739	Flipper arm only (30")	62738-501	—
Pop-up	67625-501	Pop-up assembly	67625-501	—
Pop-up	67624-501	Pop-up lifter only	67625-501	—
Side-eject	67622-501	Side-eject assembly (24")	67622-501	—
Side-eject	67621	Side-eject arm only (24")	67622-501	—
Side-eject	655047-24.25	Side-eject glide strip (24")	67622-501	—
Side-eject	62758-501	Side-eject assembly (26")	62758-501	—
Side-eject	62761	Side-eject arm only (26")	62758-501	—
Side-eject	655047-26.25	Side-eject glide strip (26")	62758-501	—
Table	63553	Lifting tube	63526-501	4

Table Electrical Parts

Part Location	MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
—	SB214KIT-XX	Remote transmitter with keypad with Service Bulletin 214	90619 90619-501 90619-502	—

Restricted Zone Tape Part Numbers

MiTek Part #	Part Description	Yards
SB181KIT-A	Service bulletin and restricted-zone tape (one roll)	100
SB181KIT-B	Service bulletin and restricted-zone tape (two rolls)	200
SB181KIT-C	Service bulletin and restricted-zone tape (three rolls)	300
SB181KIT-D	Service bulletin and restricted-zone tape (four rolls)	400

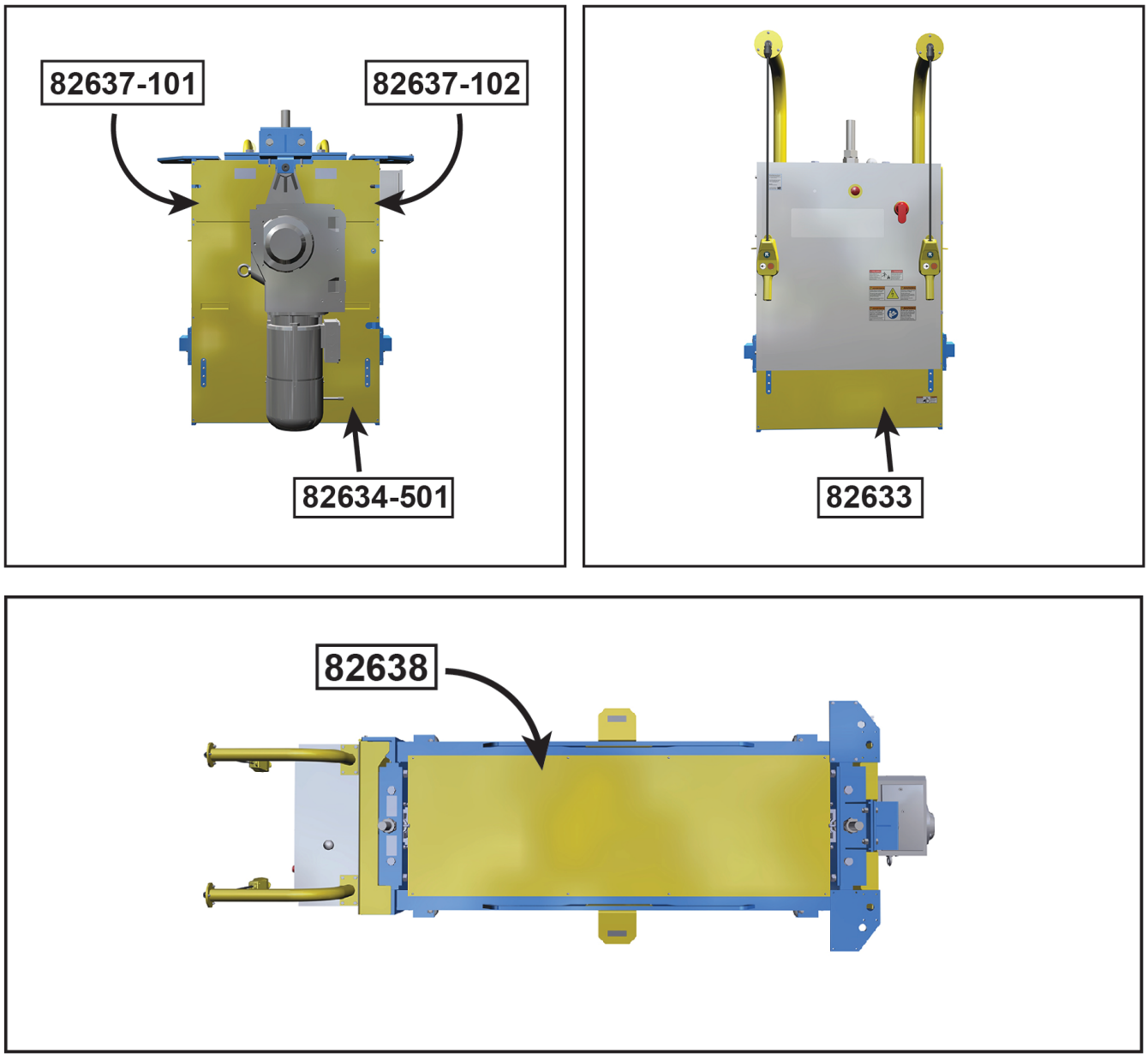
Documentation Part Numbers

MiTek Part #	Part Description	Refer to Drawing #	Keep in Stock
001040	Manual for gantry head and tables	—	1

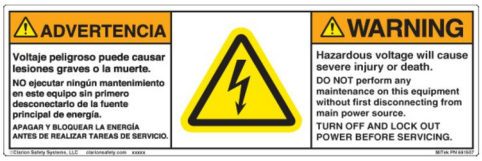
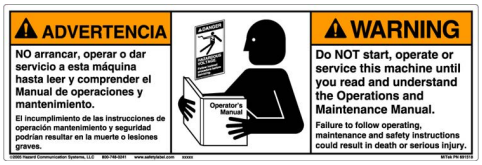
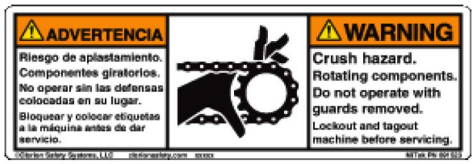
Guards Part Numbers

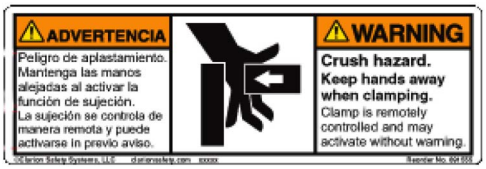
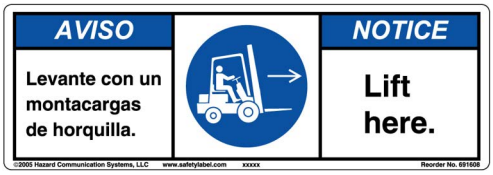
The main guards are shown in Figure B-1.

Figure B-1: Guards



Labels Part Number

MiTek Part #	Part Description
691238	
691411	
691522	
691507	
691518	
691523	

MiTek Part #	Part Description
691555	
691556	
691557	
691608	
691821	
691851	

Navigating the Maintenance Checklists

These checklists 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 leave the original in the manual for future use. Space is provided in each chart to place the date that the work is done and the initials of the person performing the work.

Safety Notes For Maintenance Checklists

	⚠ WARNING
	**ELECTROCUTION, CRUSH, AND HIGH PRESSURE HAZARDS.** **Perform the safety tests on page xvi before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.**

	⚠ WARNING
 	**ELECTROCUTION AND HIGH PRESSURE HAZARDS.** **Always turn the power off and activate an E-stop when the equipment is not in operation.Turn off the lockout valve and bleed pneumatic lines.** **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.**

RailRider Pro

Daily Checklist

Date _____

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

ACTION	PAGE	SHIFT	MON.	TUES.	WED.	THUR.	FRI.	SAT.	SUN.
Perform safety test.	xvi	Shift 1							
		Shift 2							
		Shift 3							
Clean dust from laser scanner.	41	Shift 1							
		Shift 2							
		Shift 3							
Check filter / regulator for moisture and drain if necessary.	69	Shift 1							
		Shift 2							
		Shift 3							
Check lubricator and add lubricant if necessary.	68	Shift 1							
		Shift 2							
		Shift 3							

Notes **Date**

RailRider Pro

Weekly Checklist

Date _____

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

Mechanical Actions	PAGE	Week 1	Week 2	Week 3	Week 4	Week 5
Check drive wheel chain tension—needs 1/2” play	44					
Electrical Actions						
Check the ambient temperature inside the electrical enclosure while machine is cool (not operating): -20 to 75° C	—					
Use a hygrometer to check the ambient humidity inside the electrical enclosure: 10% to 95% with no condensation	—					
Check that the safety controller is not in direct sunlight	—					
Vacuum any accumulation of dust or dirt in the electrical enclosure (do NOT use compressed air to blow dust or dirt in the electrical enclosure)	—					
Make sure that no water, oil, or chemicals are hitting the safety controller and that no corrosive or flammable gases are in the area	—					
Check that all terminal blocks are inserted and locked fully	—					
Check that cable connectors are locked fully	—					
Check for loose screws in external wiring	—					
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%)	—					
Check the ambient temperature inside the electrical enclosure during operation: 0 to 55 deg C	—					

RailRider Pro

Monthly Checklist

Year _____

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

Action	MONTHS (One Shift)	MONTHS (Two Shifts)	PAGE	DATE			
Lubricate drive chains	1	0.5	42				
Check gearbox oil level	1	0.5	43				
Tighten laser scanner mount	6	3	—				
Replace filter on FRL	6	3	70				
Replace wear pads on clamps	12	6	64				
Lubricate drive and pressure wheels	12	6	40				
Lubricate take-up bearing	12	6	39				
Drain and refill gearbox oil	24	12	43				

Notes **Date**

Appendix D

Drawings are inserted at the back of the manual or in a separate binder.

Table D-1: Gantry Head Drawings

Description	Drawing Number
Mechanical	
Top-level mechanical assembly (7' roller)	82581-501
Drive wheel assembly	82138-501
Take-up bearing assembly	68510
Drive-end guard assembly	82634-501
Electrical	
Schematic	90633
Electrical assembly	90633-501
Main enclosure	90633-502
Pendant assembly	90633-503

Table D-2: Table Drawings

Description	Drawing Number
Pneumatic	
Clamp cylinder assembly	63599-501
Flipper cylinder assembly	63571-501
Flipper assembly (24")	63562-501
Flipper assembly (26")	62755-501
Flipper assembly (30")	62738-501
End-eject cylinder assembly	64579-501
End-eject assembly (24")	64573-501
End-eject assembly (30")	62733-501
Pop-up assembly	64570-501
Side-eject assembly (24")	67622-501
Side-eject assembly (26")	62758-501
Side-eject cylinder assembly	64995-501
Filter / lubricator / regulator assembly	64585-501
Mechanical	
Top-level mechanical assembly (sample table)	64594-501
Top-level mechanical assembly (sample table)	63526-501
Clamp roller	63584-501

Table D-2: Table Drawings (Continued)

Description	Drawing Number
Electrical	
Schematic	90619
Remote control enclosure	90619-501
Remote control enclosure	90619-502

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

We appreciate your comments on how we can make this document more useful.

Document Identification:

RailRider Pro® Floor Truss Press System	Operation and Maintenance Manual	001040

General Ratings:

	Poor	Fair	Good	Excellent
Content	❑	❑	❑	❑
Organization	❑	❑	❑	❑
Accuracy	❑	❑	❑	❑
Clarity	❑	❑	❑	❑
Completeness	❑	❑	❑	❑
Examples/Illustrations	❑	❑	❑	❑
Readability	❑	❑	❑	❑

Compared to other truss machinery manufacturers' documentation, how would you rate this document?

❑ Poor ❑ Fair ❑ Good ❑ Excellent

There is room for specific suggestions on the next page. Document general comments here.

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 Division 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
affected employee	an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed
aisle pad	a type of jigging 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
authorized employee	a person who locks out or tags out a machine or equipment in order to perform servicing or maintenance on that machine or equipment; an affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section
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
beacon	a light that displays one of several colors to represent the state of the machine
bus bar	an electrical device that allows multiple gantry heads to be used simultaneously
connector plate	the nail-plate that is embedded into the production material to hold it together
cushion	an attribute of a hydraulic cylinder that allows adjustment of the pressure in each cylinder
directional buttons	buttons located on pendants that control the direction of travel of the gantry head

Glossary

disconnect switch	a handle on the electrical enclosure that cuts power to the machine
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
end stop	a stop bolted to the camber tube that does not move
energized	connected to an energy source or containing residual or stored energy
energy isolating device	a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and in addition, no circuit can be operated independently; a line valve; a block; and any similar device used to block or isolate energy—push buttons, selector switches, and other control circuit type devices are not energy isolating devices
energy source	any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy
flip stop	a stop bolted to the camber tube that may be swung upward so that the truss may exit end-eject systems
gantry head	the entire traveling weldment that houses the roller to embed the connector plates
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 the tables
jigging	any of several devices used to hold the truss in place on the tables

Glossary

laser scanner	a safety device that monitors a defined area in front of a machine for obstructions, slows the machine when it detects a distant obstruction, and triggers an E-stop when it detects a nearby obstruction
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
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 device	a device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment, including blank flanges and bolted slip blinds; should be standardized within the facility in at least one of the following criteria: color; shape; or size; and additionally, in the cae of tagout devices, print and format shall be standardized
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	used to indicate which end of the gantry head is being discussed; the end of the gantry head that houses the motor
operator controls	the method in which the operator controls the machine; it involves pendants for the gantry head and remote controls for the tables
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

Glossary

pendant control station	where the operator stands to use the pendant that controls movement of the gantry head
plate	see *connector plate*
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
potentiometer	a control knob that is a dial; allows a range of values to be set by turning the dial, commonly found on the PLC
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; 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—NEC2002 Handbook
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 embeds the plates into the truss
setup valve	a component of the pneumatic system that control 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
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

Glossary

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
tagout device	a prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed; should be standardized within the facility in at least one of the following criteria: color; shape; or size; and additionally, in the case of tagout devices, print and format shall be standardized
take-up bearing	adjusts the height of the roller
torque	a turning or twisting force
VFD	Variable Frequency Drive; controls the speed of the cycle
voltage	Equal to the difference of electric potential between two point on a conducting wire carrying a constant current of one ampere when the power between the points is one watt

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