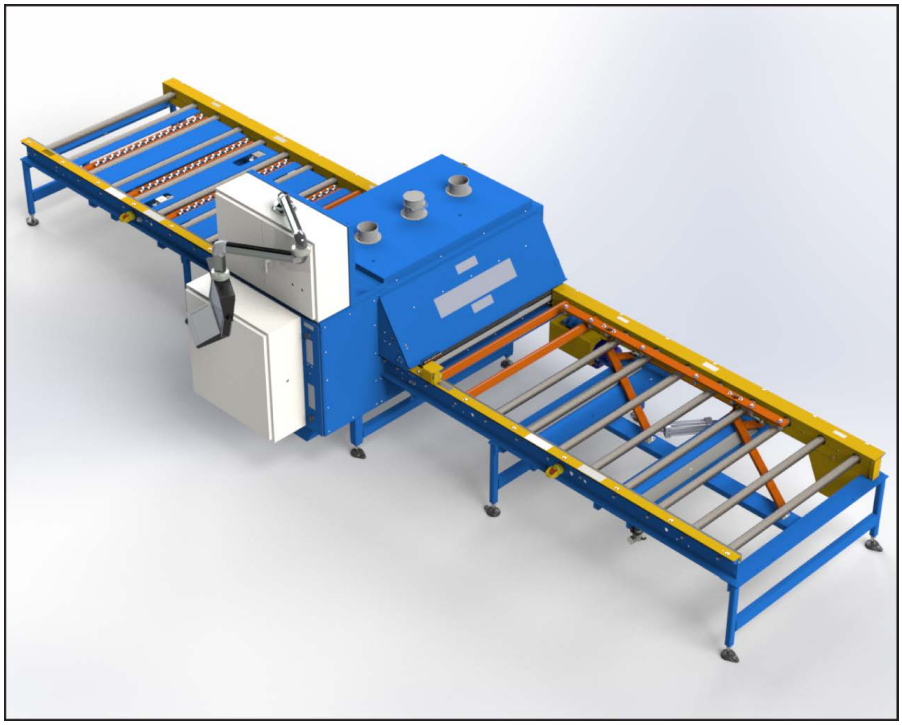
COMPONENT AUTOMATION

MiTek®

Equipment Manual



TWIN-AXIS™

SHEATHING SAW

001059 rev. B

CAUTION: MiTek recommends printing this manual in high resolution using color ink. Many of the graphics may be unclear and may create an unsafe condition if this recommendation is not followed.

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Equipment Manual

TWIN-AXIS™

SHEATHING SAW

Manual applies to United States equipment.

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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	

These patents may apply to saws and infeed or outfeed equipment for saws:

U.S. 6,539,830	U.S. 6,702,096

These patents may apply to presses:

U.S. RE37,797	U.S. 6,079,325	U.S. 6,651,306
U.S. 5,454,687	U.S. 6,145,684	U.S. 6,807,903
U.S. 5,553,375	U.S. 6,330,963	
U.S. 5,468,118	U.S. 6,405,916	

These patents may apply to stackers: U.S. 6,969,054 B2

Other patents pending. Other patents may apply.

Legal Notice

Return Goods Policy

Return goods cannot be accepted without prior authorization and are subject to a restocking charge. The Seller certifies the articles specified herein were produced in compliance with all provisions of the Fair Labor Standards Act of 1938, as amended, including Section 12.—Rev. 6/98.

Corrections and Improvements

To report errors or recommend improvements to this manual, please complete the Document Evaluation Form in the appendices. Mail or fax the form to:

MiTek Machinery Division
301 Fountain Lakes Industrial Drive
St. Charles, MO 63301
Attn: Engineering Manager, Fax: 636-328-9218

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

Number	Date	Title

Table of Contents

Safety (English)

Safety Indicator Signal Words

Refiérase a la página 22 para español.

For safety information in Spanish, refer to 22.

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 starting on page 14, 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.**

Signal words are used in conjunction with safety symbols to give hazard messages throughout this manual. Common safety symbols are defined starting on page 12.

General Safety & Equipment 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.

Safety Rules

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.
- Use proper lifting equipment rated for the proper weight.
- This equipment is not for use in a residential area.

Keeping a Safe Environment

- Pay attention to your surroundings.
- 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:
  a) Shut down electrical power and sources of ignition

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

  b) Vacuum dust prior to blowing with air
  c) 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 13.**
- Perform safety tests to ensure all E-stops are working properly before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.
- Always push an E-stop button before approaching a machine for any reason. An E-stop may cause components to move without warning.
- Only use procedures described in this manual. Any other procedures should be discussed with MiTek to verify it is done safely. For topics not covered in this manual or online, contact MiTek for advice.
- In case of machine malfunction, stop the machine immediately using an E-stop, lockout/tagout, 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.
- Only use exact replacement parts specified. Using unapproved parts may void the warranty and can be a safety risk.
- Keep the hydraulic, pneumatic, and electrical systems in good working order at all times. Repair leaks and loose connections immediately. Never exceed the recommended pressure or electrical power.
- Check that all guards and safety devices are in place and 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.
- Torque bolts and fasteners to the specifications given by MiTek. If no torque specification is given, use industry standards.
- Only qualified maintenance personnel shall make adjustments or remove, repair, or install safety devices. Only qualified electricians should perform electrical work.
- Periodically inspect the quality of the finished product.
- Document all preventive and repair maintenance over the life of the machine to improve machine efficiency and reduce the risk of accidents.

Electrical Safety Notes

- 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.

General Warnings

	⚠ WARNING
	**HIGH VOLTAGE ELECTRICITY!** **May cause serious personal injury or death. Ensure only qualified electricians perform electrical service work.**

	⚠ WARNING
	**Read the equipment manual, safety labels, and all safety information provided before operating or maintaining this equipment.**

	⚠ WARNING
	**CRUSH OR CUT 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
	**Many components are manufactured from high carbon, heat-treated steel. Do not attempt to straighten, bend, or weld these components, as they may fail under load causing serious personal injury or death.**

E-Stop Locations

Refer to *Emergency Stops (Hardware)* on page 50 for location of E-stops.

Lockout/Tagout

Lockout/Tagout Guidelines

Lockout/tagout all energized systems before performing maintenance on them.

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, such as a keyed padlock, 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 7 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.
- Before performing maintenance on the pneumatic or hydraulic systems, bleed the lines prior to lockout/tagout to eliminate pressure.

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

Working on a Machine Outside the Machine's Main Electrical Enclosure

If you are working on the electrical transmission line to the machine, follow the procedure on page 9.

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 1-1.

	⚠ WARNING
	**ELECTROCUTION HAZARD.** **When the disconnect switch is off, there is still live power within the disconnect switch's enclosure. Always turn off the power at the building's power source to the equipment before opening this electrical enclosure.**

Figure 1-1: Disconnect Switch in Off Position

3. Attach a lock and tag that meet OSHA requirements for lockout/tagout. See Figure 1-2.
4. Restrain or de-energize all pneumatic components, hydraulic components, and other parts that could have live or stored power.

Figure 1-2: Sample of a Lockout/Tagout Mechanism on an 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 1-3.
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 1-3: Sample of a Lockout/ Tagout Mechanism on a Power Source Panel

Hydraulic or Pneumatic System Lockout/Tagout Procedure

Before working on or near hydraulic or pneumatic components, bleed the lines of pressure. See *Filter/Regulator* for further instruction.

When Lockout/Tagout Is Not Required

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

When Lockout/Tagout Is Required

Before attempting repair or performing maintenance on a hydraulic or pneumatic line or component, lockout/tagout the machine properly. Follow your company's approved lockout/tagout procedures.

Figure 1-4: How to Lockout/Tagout the Pneumatic System-

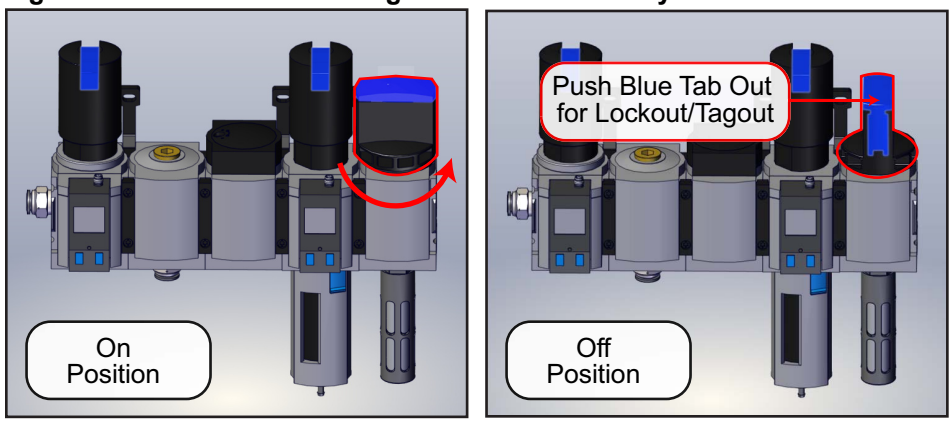


Figure 1-5: Sample of a Lockout/Tagout on a Pneumatic System

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 stop the machine properly.

Inspecting the *Twin-Axis* Sheathing Saw

1. Lockout/tagout the machine.
2. Check the *Twin-Axis* Sheathing Saw for debris or tools that would block the path of parts. Remove any that you may find. The following locations are especially important:
   - Infeed conveyor and aligner
   - Outfeed conveyor and ejectors
   - Saw chamber
3. Check the physical condition of the *Twin-Axis* Sheathing Saw. The following are especially important:
   - Both the cross-cut and the rip saw blades should be in the home position
   - The infeed aligner and the outfeed ejector should be in a retracted position
   - The conveyor chain should be on the guide and properly tensioned (see *Conveyor Chain* on page 78)
   - The carriage chains (2) should be on the guides and properly tensioned (see *Carriage Chains* on page 78)
4. Remove lockout/tagout and return electrical power and pneumatic pressure to the machine.
5. Press the blue Reset button. Verify the machine has power by checking if E-stops are illuminated green.

6. The filter / regulator gauge should match the pressure recommendation specified in *Maintaining the Filter / Regulator* on page 80.
7. Verify the blow-off and air knife are supplying dry air.
8. Verify all doors are closed and locked.

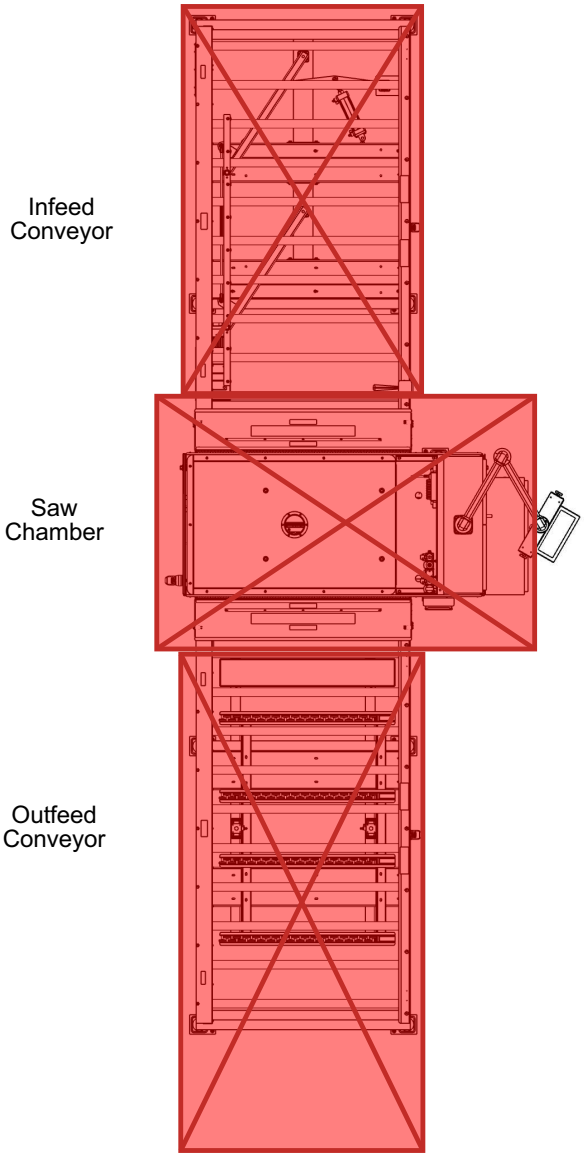
E-Stop Test

1. Verify there is no material on the infeed end of the saw or inside the saw chamber.
2. Initiate a cut cycle in Semi Auto mode. The conveyors and the saw blades will begin to rotate.
3. Activate an E-stop. Verify that the following happens when the pushbutton is depressed:
   - The conveyors and the saw blades stop moving
   - The active E-stop should blink red
   - All other illuminated E-stops should turn solid red
4. Twist the E-stop to release it. The light should change from blinking to solid red.
5. Press the blue Reset button. The hardware E-stop lights should all be solid green and the software E-stop indicators on the status screen should also be green.
6. Start operation.

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 1-6: 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 46 for more details.

Safety Symbol Definitions

The safety symbols shown in this section are found throughout the manual to indicate hazards related to this machine. All personnel expected to operate or maintain this machine should be familiar with these safety symbols and their meanings.

User caution. It indicates a condition where equipment damage resulting in injury could occur if operational procedures are not followed. To reduce risk of damage or injury, refer to accompanying documents, and follow all steps or procedures as instructed.

Electrical hazard. It indicates dangerous high voltages inside of an enclosure and/or the presence of a power source. 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 equipment 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.

Crush hazard. Keep hands and other body parts clear.

Noise hazard. Equipment produces loud noise in excess of 100 DBA during operation. Use appropriate PPE to protect hearing when in the vicinity of this equipment.

Slip hazard. Use of appropriate footwear is required.

Trip hazard. Pay attention when walking in this area.

Kickback hazard.

Keep hands clear of cutting parts.

Keep hands and body clear.

Crush hazard from above.

Ventilate. Slots and openings in the cabinet are provided for ventilation to ensure reliable operating of the equipment. To protect the equipment from overheating, those openings must not be blocked or covered. This equipment should not be placed in a built-in installation, such as a wall cutout, unless proper ventilation is provided because hot temperatures result.

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

Keep feet away from moving parts.

Keep hands away from moving parts.

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

Equipment has automatic restarting capability. Lockout/tagout on the upstream disconnect before servicing.

Warning. Three man lift required to move this equipment safely. Refer to the installation manual.

The operation of this equipment requires the use of PPE.
Do not operate without wearing the 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 on the upstream disconnect prior to servicing.

Lockout in a de-energized state.

Lift point. In order to decrease the likelihood of damage to the equipment, use only the lift points indicated in the manual.

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

Use of lift equipment is mandatory.

Consult material safety data sheet.

Unplug equipment before servicing.

No smoking in this area.

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

Do not place containers with liquids such as coffee, water, soda, etc. on this equipment.
Do not operate this equipment in a wet environment.
Do not expose to water.

No lift point. Do not lift this device with a hook/crane assembly. Equipment damage occurs. Refer to the installation instructions.

Do not use unapproved lubricants in this equipment.

Do not operate without guards in place.

Do not discard into the municipal waste stream.

Indicates notes regarding lubrication.

Declaration of Safety Conformity

Conforms electrically to the following:

- NFPA 79
- NEC Electrical Code
- Electrical enclosures carry UL 508A and the CUL for Canada
- Safety circuit conforms to Category 4 redundant monitoring

Conforms mechanically to the following:

- 10CFR 1910
- ANSI B 11.19

Declaration of Noise Emissions

Decibel level of ambient and machine operation sound levels:

- Ambient - 76 dB
- Machine operation - 86 dB

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 page 34, 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 paros 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.

Instalació del equipo

- Siga las instrucciones de instalación al pie de la letra.
- Use el equipo de elevación adecuado para el peso adecuado.
- No utilizar este equipo en zonas residenciales.

Cómo manterner un entorno seguro

- Preste atención a su entorno.
- 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:
  a) Apague la alimentación eléctrica y todas las fuentes de ignición

	NOTICE
	**¡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.**

  b) Aspire el polvo antes de soplarlo con aire
  c) 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 34.
- Realice pruebas de seguridad para verificar que todos los paro de emergencia funcionen adecuadamente antes de utilizar el equipo al principio de la puesta en marcha y después de realizar cualquier tarea de mantenimiento.
- Presione siempre el pulsador de un paro de emergencia antes de acercarse a una máquina por cualquier motivo. Un paro de emergencia puede causar que los componentes se muevan sin previo aviso.
- Use solamente los procedimientos descritos en este manual. Cualquier otro procedimiento debe analizarse con MiTek para verificar que sea seguro.

Para los temas que no se traten en este manual o en línea, póngase en contacto con MiTek para recibir asesoramiento.

- 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.
- Use solamente las piezas de repuesto exactas que se especifican. El uso de piezas no aprobadas puede anular la garantía y plantear un riesgo de seguridad.
- 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.
- Apriete los pernos y tornillos al par de apriete especificado por MiTek. Si no se especifica el par de apriete, use los estándares de la industria.
- Solo el personal de mantenimiento calificado puede quitar o instalar los dispositivos de seguridad. Solo electricistas calificados deben realizar trabajos eléctricos.
- Inspeccione periódicamente la calidad del producto terminado.
- Documente todas las tareas de mantenimiento preventivo y de reparación durante la vida útil de la máquina para mejorar su eficiencia y reducir el riesgo de accidentes.

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.

Ubicación de un paro de emergencia

Refiérase a la página 50 para ubicación de un paro de emergencia.

Advertencias generales

	⚠ WARNING
	**¡ELECTRICIDAD DE ALTO VOLTAJE!** **Puede causar lesiones personales graves o la muerte. Asegúrese de que solo electricistas calificados realicen trabajos de servicio eléctrico.**

	⚠ WARNING
	**Lea el manual del equipo, las etiquetas de seguridad y toda la información de seguridad suministrada antes de operar o hacerle mantenimiento a este equipo.**

	⚠ WARNING
	**RIESGO DE APLASTAMIENTO O CORTE** **Los protectores siempre deben estar colocados durante la operación para evitar lesiones graves y posiblemente la muerte.** **Reemplace siempre los protectores después de terminar las tareas de mantenimiento y antes de quitar el dispositivo de bloqueo/etiquetado.**

	⚠ WARNING
	**Muchos componentes se fabrican en acero duro tratado térmicamente. No intente enderezar, doblar ni soldar estos componentes, ya que pueden fallar al someterse a cargas y causar lesiones personales o la muerte.**

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 28 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.

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 page 30.

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.

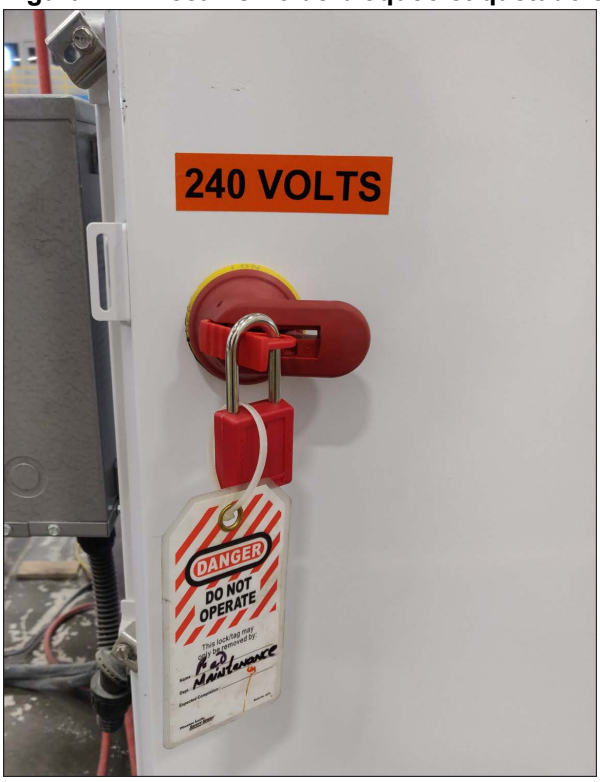
1. Coloque un paro de emergencia sobre la máquina.
2. Coloque el mango del interruptor con fusibles en la posición "apagado". Vea la Figure 2-1.

	⚠ WARNING
	**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!**

Figure 2-1: El gabinete eléctrico principal

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 2-2: 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 paro 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 Figure 2-3 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 2-3: Ejemplo de un mecanismo de Bloqueo/Etiquetado en un panel de entrada de suministro eléctrico

Procedimiento de bloqueo/etiquetado del sistema hidráulico o neumático

Antes de realizar el mantenimiento de los sistemas neumáticos, purgue las líneas para eliminar la presión.

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. Siga los procedimientos de bloqueo/etiquetado aprobados por la compañía.

Figura 2-4: Cómo bloquear y etiquetar el sistema neumático

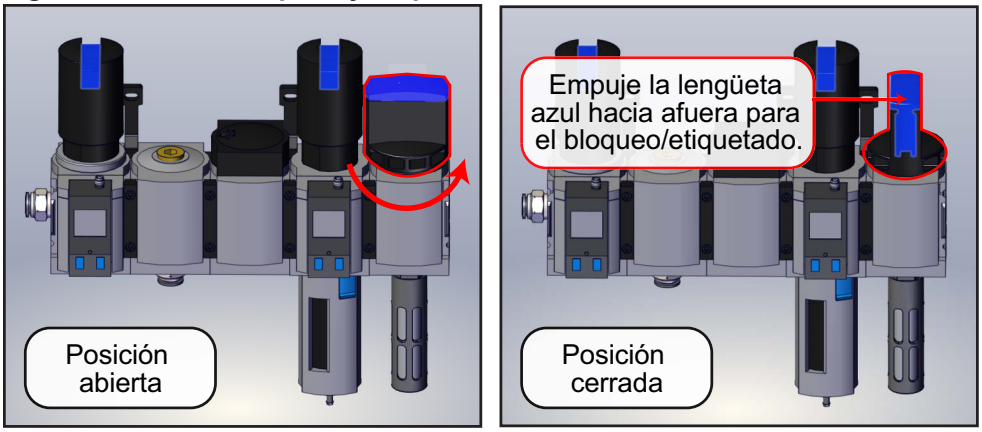


Figura 2-5: Cómo bloqueo/etiquetado el sistema neumático

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 durante la puesta en marcha y después de CUALQUIER tarea de mantenimiento, ajuste o modificación. La prueba permite comprobar si el sistema de seguridad y el sistema de control de la máquina funcionan juntos y detienen la máquina de manera adecuada.

Inspección de la sierra *Twin-Axis* Sheathing Saw

1. Realice el procedimiento de bloqueo/etiquetado de la máquina.
2. Verifique que la sierra *Twin-Axis Sheathing Saw* no tenga desechos ni herramientas que puedan obstruir sus piezas. Retire todo lo que encuentre. Los siguientes lugares son especialmente importantes:
   - Banda transportadora y alineador de alimentación
   - Banda transportadora y expulsores de salida
   - Cámara de la sierra
3. Revise el estado de la sierra *Twin-Axis* Sheathing Saw. Lo siguiente es especialmente importante:
   - Las cuchillas de la sierra de corte longitudinal y de corte transversal deben estar en la posición inicial
   - El alineador de alimentación y el expulsor de salida deben estar en posición retraída
   - La cadena de la banda transportadora debe estar en la guía y correctamente tensada (refiérase a la página 78)
   - Las cadenas de los carros (2) deben estar en las guías y correctamente tensadas (refiérase a la página 78)

4. Quite el bloqueo y etiquetado y restablezca la energía eléctrica y la presión neumática a la máquina.
5. Presione el botón “Reset” de color azul. Verifique que la máquina tenga energía comprobando si los paros de emergencia están encendidos en color verde.
6. La presión del manómetro del filtro o regulador debe cumplir con la recomendación de presión especificada en la página 80.
7. Verifique que todas las puertas estén cerradas y bloqueadas.

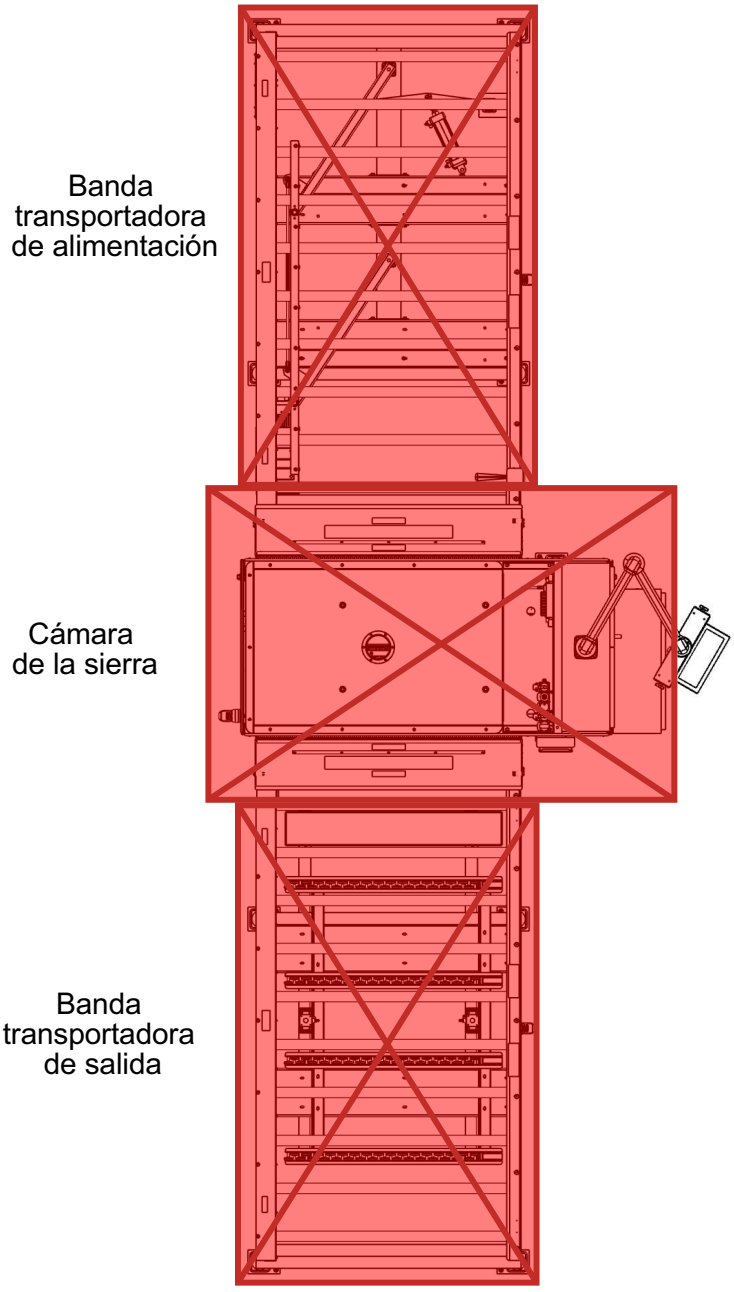
Prueba de los paros de emergencia

1. Compruebe que no haya materiales en el extremo de la alimentación de la sierra ni dentro de la cámara de la sierra.
2. Inicie un ciclo de corte en modo semiautomático. Las bandas transportadoras y las cuchillas de las sierras comenzarán a girar.
3. Active un paro de emergencia. Verifique que suceda lo siguiente al presionar el pulsador:
   - las bandas transportadoras y las cuchillas de las sierras dejan de moverse
   - el paro de emergencia activado debe parpadear en color rojo
   - todos los demás paros de emergencia iluminados deben cambiar a color rojo fijo
4. Gire el paro de emergencia para liberarlo.
5. Presione el botón “Reset” de color azul. Las luces de los paros de emergencia del equipo deben estar de color verde fijo y los indicadores del software de los paros de emergencia en la pantalla de estado también deben estar de color verde.
6. Comience la operación.

Zona Restringida

	**⚠ DANGER** **Manténgase afuera de la zona restringida cuando el equipo esté en uso. Pueden producirse lesiones graves o incluso la muerte si el personal está en la zona restringida.** **Asegúrese que no haya personal en la zona restringida antes de operar el equipo.**

Figura 2-6: Conocer la zona restringida



Marcar 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. Refiérase a la página 46.

Información adicional

Definiciones de los símbolos de seguridad (Safety Symbols Definitions)	página 14
Declaraciones de Cumplimiento (Declarations of Conformity)	página 21
Declaración de emisión de ruidos (Declaration of Noise)	página 21

Introduction

Introduction to the Manual

	⚠ WARNING
	**Read this manual completely before using this equipment.** **Do not operate this equipment 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.**

In order for this manual to be useful, the appropriate sections must be easily accessible by operators and maintenance personnel.

This manual addresses the most recent version of the equipment as of the date listed on the title page. For earlier revisions, contact MiTek as described on page 39.

Understanding the Manual

Hyperlinks

References to page numbers throughout the manual can be selected to immediately take you to the relevant section.

The Drawing Set

A list of drawings can be found in the back of this equipment manual or in a separate 11x17 binder.

Navigational Aids

The graphics used in Table 3-1 are used throughout the manual to communicate a specific type of information quickly.

Table 3-1: Navigational Aids

Graphic	Definition
	This icon is an important safety note. It indicates that you must lockout/tagout at the disconnect switch located on the equipment using approved methods described in OSHA CFR 1910.147 before continuing with the procedure.
	This icon specifies that certain tools are needed before a procedure begins.
	This icon provides additional information to supplement the main text.
	This icon indicates how to locate additional relevant information or resources.

Operator Training Outline

This training outline is intended to help MiTek Installation Technicians guide the training of machine operators during initial installation of a machine. Click on text in (parentheses) to jump to a specific section.

Subject	Training and Related Links
Using the Manual	• Show the operator how to access the manual on the MiTek website (or search for “Mitek Twin Axis Manual” via Google).
Safety	• Review the lockout/tagout procedures for all machine systems (*Lockout/Tagout* on page 6). • Walk the operator through all procedures in the Safety Tests section (*Safety Tests* on page 11). • Instruct the operator to read the entire Safety chapter before operating the machine for the first time (*Safety (English)* on page 1).
Operation	• Walk the operator through all procedures in the Safety-Related Operating Procedures section and make note of the location of all E-stops (*Safety-Related Operating Procedures* on page 48). • Walk the operator through the use of Semi-Auto and Auto operating modes in the Operating Procedure section (*Operating Procedure* on page 60).
Maintenance	• Walk the operator through the process of replacing a saw blade (*Replacing a Saw Blade* on page 73). • Instruct the operator to review the Maintenance chapter to learn more about the necessary maintenance to keep their machine running optimally (*Maintenance* on page 67). • Walk through the Maintenance Checklist with the operator. Make note of the daily, weekly, and monthly/annual task structure and demonstrate how selecting the page numbers will take you to the related section (*Maintenance Checklist* on page 104)

Additional Resources

Website

Visit the MiTek website for up-to-date information on all MiTek equipment. You may also find the following information there:

- The latest revisions of this manual
- Service bulletins pertaining to your equipment
- Support, safety, and training information
- Part numbers for ordering parts

Contact Us

MiTek Automation Customer Support
301 Fountain Lakes Industrial Drive
St. Charles, MO 63301

Parts Orders (with part number)
Email: mitekparts@mii.com

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

Website
mitek-us.com

Videos
Search for “MiTek Inc” to find us on YouTube

General Information

Introduction to the Equipment

Purpose of the Equipment

The *Twin-Axis* Sheathing Saw is designed to cut wall panel sheathing to the correct size.

Description of the Equipment

This equipment uses one saw blade to rip sheathing material to the correct width as the material moves through the saw chamber. A second saw blade cuts up to six cross-cuts per sheathing sheet. The material then moves out of the saw box and is raised off the conveyor for easy removal. It can then be sent to the next step in the wall-building process.

Safety Compliance of the Equipment

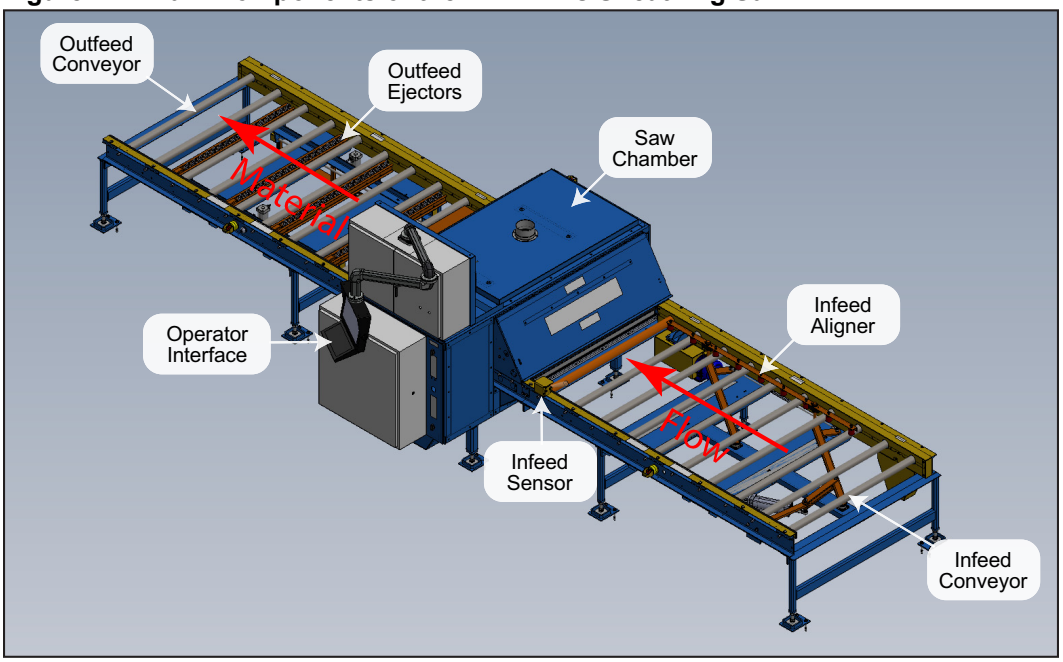
Equipment shipped to a U.S. destination is compliant NFPA 79, NEC 2009, and applicable OSHA regulations.

Equipment shipped to an international destination is compliant with CSA regulations.

Main Components

Graphical Overview

Figure 4-1: Main Components of the *Twin-Axis* Sheathing Saw



The right-to-left configuration is shown in Figure 4-1. The option for a left-to-right configuration is also available.

Main Component Descriptions

Table 4-1 lists the main components that are included with all versions of this equipment.

Table 4-1: Main Components

Name	Description
Infeed conveyor	Feeds the material into the saw chamber
Infeed aligner	Holds material in place as it is fed into the saw chamber
Infeed sensor	Determines position of material to control conveyor movement
Saw chamber	Where cutting takes place
Outfeed conveyor	Moves the material out of the saw chamber
Outfeed ejectors	Lift cut material for easy removal
Operator Interface	Includes a touch screen PC and hardware keyboard and touchpad

Technical Specifications

Table 4-2: General Specifications

Specification	Technical Data
Saw blades	Qty: 2, 13.8" diameter (350 mm) Carbide tip, negative hook
Supported Material	Length: 10' maximum Width: 50" maximum Height: 7/16" minimum and 2-1/4" maximum
Minimum rip cut	4" wide
Accuracy	+/- 1/16"
Cut capacity	Up to 6 cross-cuts per pass
Conveyor speed	80 ft/min (Normal), 40 ft/min (Reduced), 100 ft/min (Recycle)

Table 4-3: Motor Specifications

Specification	Technical Data
Saw blade rotation (1 rip and 1 cross-cut)	5 hp, 3500 RPM
Saw blade transport (1 rip and 1 cross-cut)	.75 hp
Conveyor	1.5 hp

Table 4-4: Pneumatic Specifications

Specification	Technical Data
Air source tank (min.)	min. of 60 gallons
Volume	9 cfm at 90 psi
Pressure	Low Pressure Regulator at 30 psi High Pressure Regulator at 65 psi
Minimum line	3/8" diameter
Recommended line	3/8" diameter

Table 4-5: Dust Collector Specifications

Specification	Technical Data
Airflow Rate	2100 cfm

Table 4-6: Electrical Specifications

Specification	Technical Data
Voltage	240 VAC
FLA plus controls	40.6 amps
Disconnect switch fuses	60 amps
Cycles	60 Hz

Specification	Technical Data
Phases	3

Table 4-7: Dimensional Specifications

Specification	Technical Data
System Dimensions	26' L x 8' 8" W x 7' 2" H

Table 4-8: Weight Specifications

Specification	Technical Data
Saw box and conveyors	5800 lbs

Table 4-9: Environmental Requirements

Specification	Technical Data
Operating temperature	32 to 122 degree Fahrenheit (0 to 50 degrees Celsius)
Relative humidity	45 to 85 percent humidity
Transportation and storage	-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

Use ONLY a NEGATIVE HOOK saw blade!

A positive hook will pull the sheet, leading to inconsistent cut lengths and possible sheet grabbing by the rip blade

Installation & Startup

Requirements to Meet for Installation

Refer to your original Pre-Installation document for all requirements that must be met before or during installation.

Refer to the General chapter for machine specifications and requirements.

Moving the Equipment Into Place

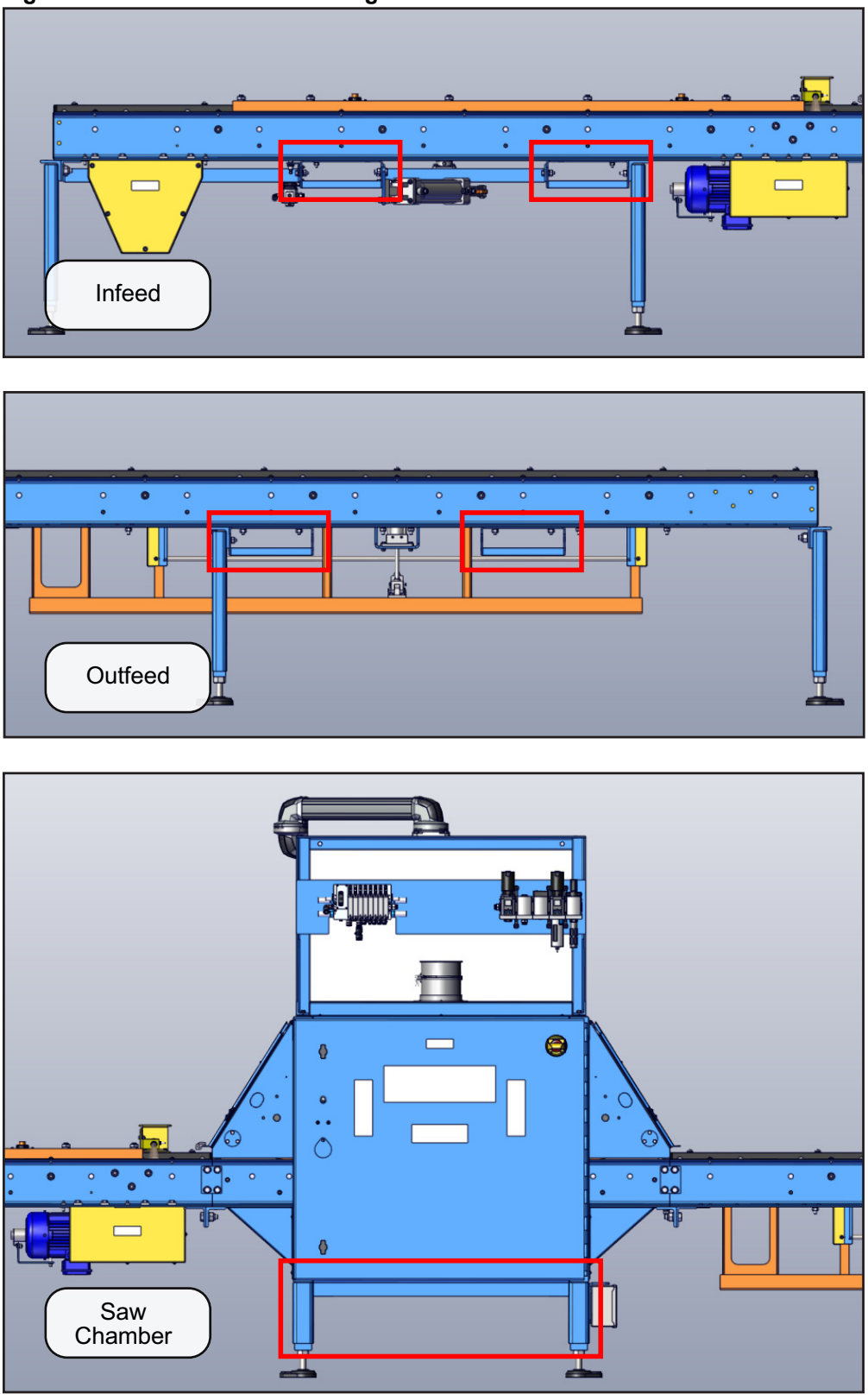
Follow these guidelines to safely move this equipment with a forklift or crane.

Transportation Equipment Requirements

The forklift, crane, chains, clevises, and all moving equipment must be rated for 150% of the weights listed in *Technical Specifications* on page 42 to abide by general safety rules.

Lift Points

Figure 5-1: Lift Points When Using a Forklift



Your Responsibilities

During Installation

MiTek supervises the installation to ensure that the 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.

Before Selling or Re-Installing

If you determine that you want to move your equipment to another location or you want to sell your system to another company, refer to the Pre-Installation document received when you first purchased this equipment. If you need another copy of that document, request it from MiTek.

	⚠ WARNING
	**Moving the system without proper planning may result in equipment damage or serious injury.**

Startup Procedures

Before operating your new equipment for the first time, perform these procedures.

Marking Restricted Zone

The restricted zone must be marked and maintained so everyone near the equipment can clearly see the area where danger may exist. The customer is responsible for marking the restricted zone prior to startup, and maintaining the markings so it is clearly visible throughout the life of the machine.

Your equipment arrived with Service Bulletin SB181, which includes restricted zone tape and instructions for installing it. Additional restricted zone kits can be ordered as needed using the contact information found in *Ordering Parts* on page 109.

Safety Tests

Perform all tests listed in *Safety Tests* on page 11.

	⚠ WARNING
	**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.**

Operation

Safety Operating Notes

	⚠ WARNING
	**ELECTROCUTION, HIGH PRESSURE, CRUSH, CUT, AND CHEMICAL HAZARDS.** **Read this section AND the safety section in the preliminary pages before operating or maintaining this machine.** **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 machine.**

	⚠ WARNING
	**CRUSH AND CUT HAZARD.** **Before turning on the machine, make sure that all personnel and other machines are out of the restricted zone (see *Marking the Restricted Zone* on page 13).**

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

Safety-Related Operating Procedures

Stopping Methods

This equipment may be stopped by using a controlled stop or an emergency stop (E-stop). A controlled stop may be slower than an E-stop, but a controlled stop is

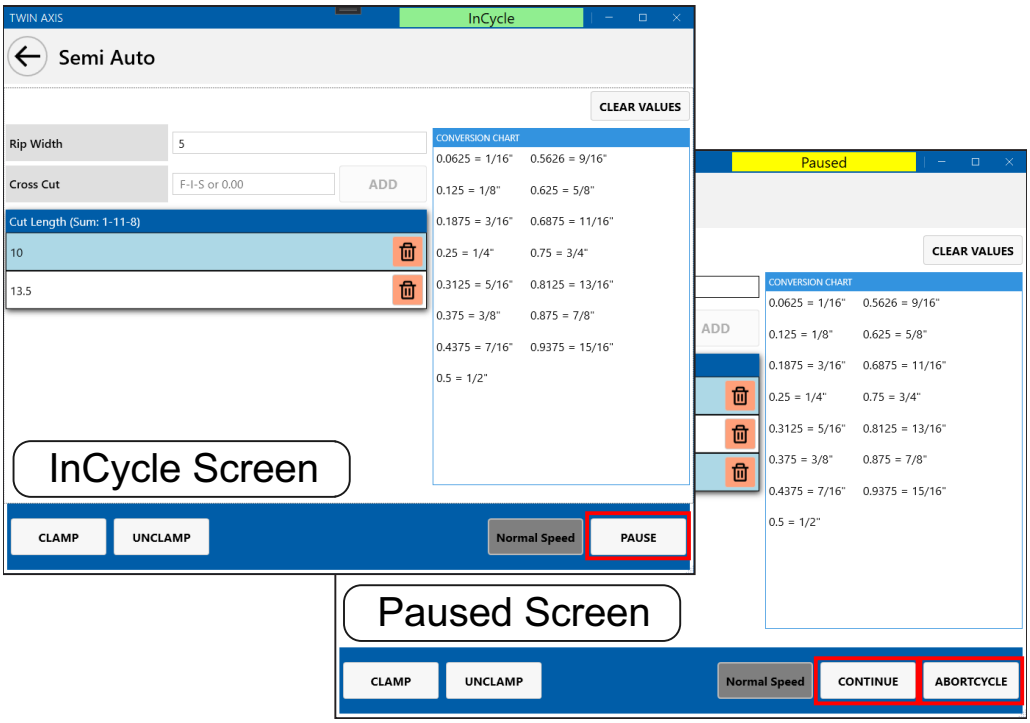
the preferred stopping method unless there is a safety emergency. Using an E-stop to stop the machine regularly causes excessive wear on components.

Controlled Stops (Software)

In the *Twin-Axis* software, operators can select to pause a cut cycle. Once a cycle has been paused, the option to continue or abort becomes available. See Figure 6-1.

- **PAUSE** pauses the current cycle but allows the saw blades to keep spinning to quickly re-initiate.
- **CONTINUE** resumes the current cut cycle
- **ABORTCYCLE** stops all blade movement and cancels the current cycle.

Figure 6-1: Pause and Abortcycle Buttons



Emergency Stops (Hardware)

There are four E-stops located on the *Twin-Axis* Sheathing Saw.

Figure 6-2: E-Stops and Electrical Disconnect Switch

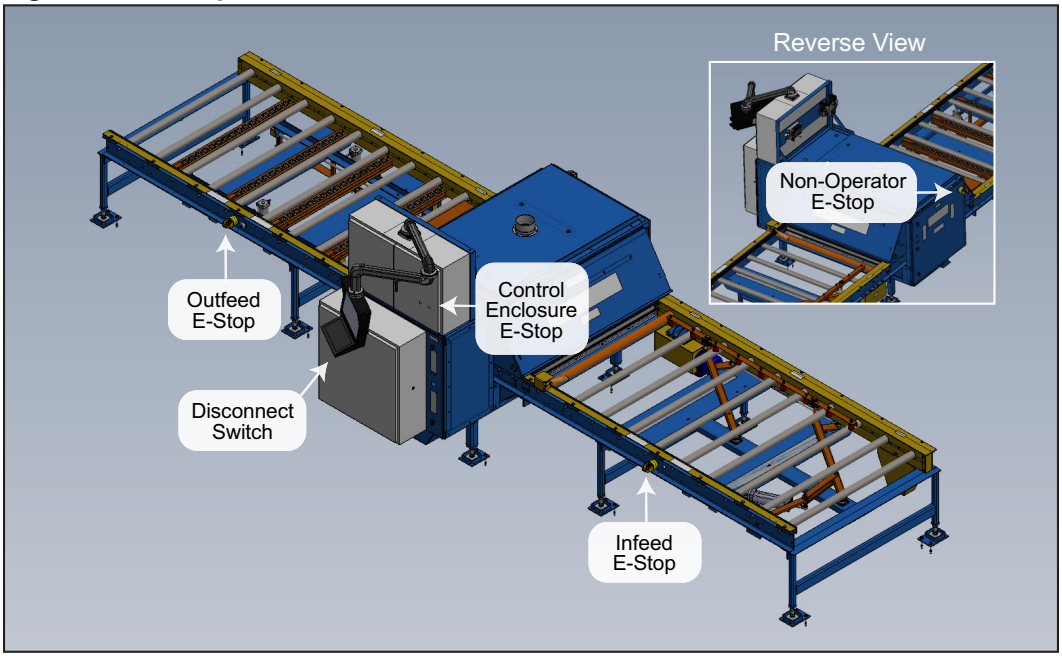


Figure 6-3: How to Operate an E-Stop Pushbutton

To activate a pushbutton, push the button in. The machine no longer operates.

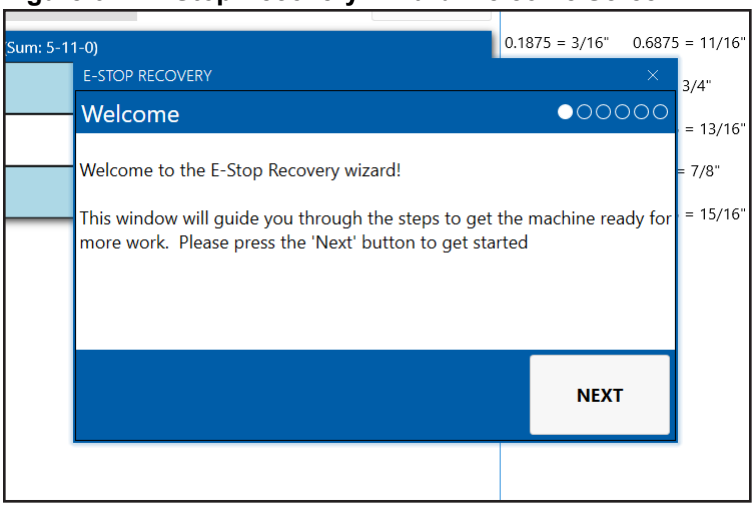
To release a pushbutton, twist to release.

Restart After E-Stop Procedure

E-Stop Recovery Wizard (during a cut cycle)

If an E-stop is activated while a cut cycle is in progress, the E-stop Recovery wizard will appear.

Figure 6-4: E-Stop Recovery Wizard Welcome Screen



Follow the instructions in each prompt to restore the saw to normal operation.

E-Stop Recovery Procedure (outside a cut cycle)

If an E-stop is activated while outside of a cut cycle, follow these instructions to restore the saw to normal operation.

1. Release the activated E-stop.
2. Reset the safety controller by pressing the RESET button on the control enclosure.
3. Clear all faults. See *Using the Status Screen* on page 58.
4. The indicator lights on the E-stops will change from red to green once the E-stop has been cleared.

Disconnect Switch

There is one disconnect switch located on the main electrical enclosure.

Figure 6-5: Everything You Need to Know About Disconnect Switches

Turning the disconnect handle to the On position supplies electrical power to the entire machine. To remove power to the machine, turn the disconnect handle to the Off position. The disconnect handle should be turned off when the machine is not in use.

	**⚠ WARNING** **Always turn off power at the main power source before opening the electrical enclosure.** **Even when the disconnect switch is turned to the Off position, there is still live power to the enclosure where the disconnect switch is mounted. This live power may cause severe electric shock.**

Interlocked Doors or Guards

Overview

Four doors located on the saw chamber are interlocked with the safety system to prevent entry while components are moving. The doors may be opened via two methods.

Open-Door Pushbuttons

If an electrical lockout/ tagout is in place, the push-buttons will not function.

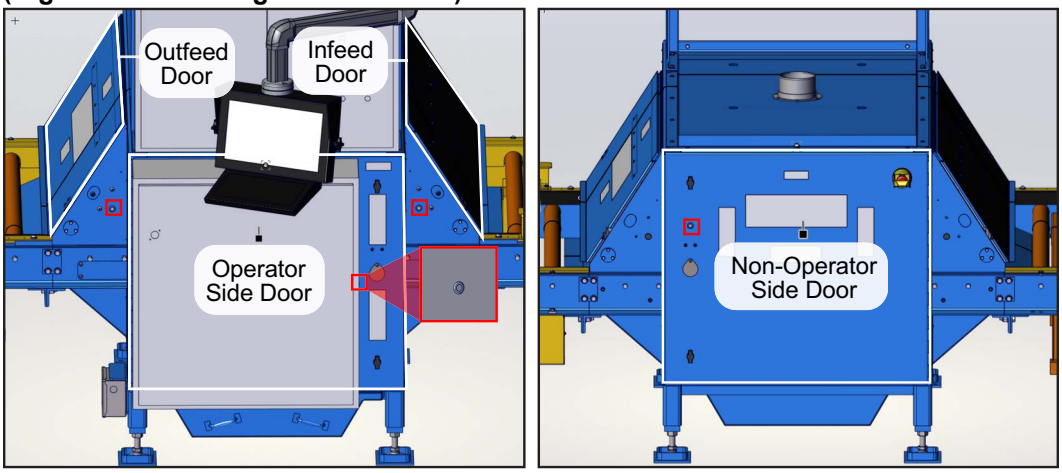
Each door includes an open-door pushbutton that, when pressed for 1 second, will unlock the door if the following requirements are met:

- An E-stop is activated
- A cut cycle is not in progress
- Pneumatic power is shut off
- Both saw blades are not in motion

If the listed requirements are not met, the open-door pushbuttons will not work.

See Figure 6-6 for the location of each door and pushbutton.

Figure 6-6: Saw Chamber Doors and Pushbutton Locations (Right-To-Left Configuration Shown)



Operator door push-button is located on the side of the main electrical enclosure.

Manual Door Locks

Each door may also be opened manually by qualified maintenance personnel with the use of a bypass key. All manual locks must be re-engaged (locked) for the machine to operate.

Operational Indicators on the Machine

The blue Reset button on the control enclosure will light up if any issues are detected by the machine safety controller.

Figure 6-7: Reset Button

Hardware Overview

Operator Hardware Controls

Figure 6-8: Operator Hardware Controls

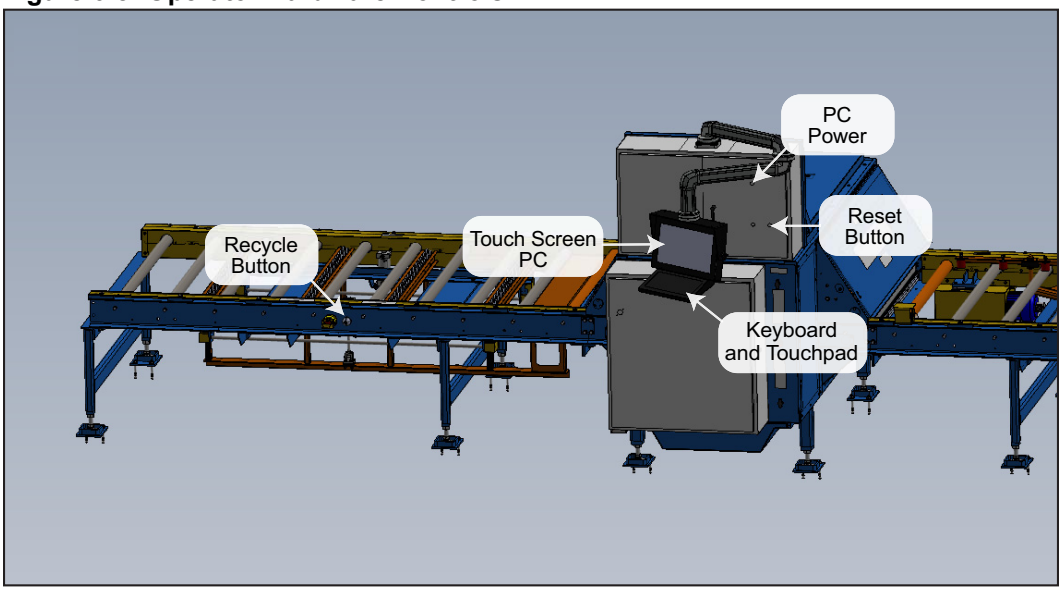


Table 6-1: Description of Operator Hardware Controls

Name	Function
Recycle	Returns the saw blades to their home positions, and the remaining material automatically travels backward through the saw until it stops on the infeed conveyor to be cut again.
PC Power	Turns the Operator Interface PC power on or off
Reset	Restores the safety controller and re-enables main power to the system

Powering Up or Down

Daily Startup

Any time the saw is without power, perform this procedure to restore power:

1. Turn on the electrical disconnect switch (see *Electrical Lockout/Tagout Procedures* on page 7).
2. Activate an E-stop.
3. Open the infeed and outfeed doors and verify there is no material inside the saw chamber.
4. Close all doors.

5. Apply air to the machine by opening the pneumatic disconnect valve and verify the incoming air pressure is approximately 30 psi on the low pressure reg and 65 psi on the high pressure regulator (see *Adjusting the Pressure on the Filter / Regulators* on page 80).
6. Verify PC is powered.
7. At the *Windows* startup screen, enter the computer password.
8. Open the *Twin-Axis* software. It is recommended that a shortcut be kept on the computer's desktop.
9. Verify that E-stops are deactivated and status button shows **Ready** (see Figure 6-9).
10. If using Auto, start *ShopNet* software (see *Using Auto Mode* on page 61).

Daily Shut Down

After the last cut of the day:

1. Remove any material from the conveyors.
2. Press the Recycle button on the home screen to back out any material in the saw chamber. Remove the material.
3. Close the pneumatic disconnect valve (see *Filter/Regulator* on page 80).
4. Activate an E-stop.
5. Open the infeed and outfeed doors and verify there is no material inside the saw chamber.
6. Shut down the computer using the **Power > Shut down** method in *Windows*.
7. After the computer has shut down, turn off the electrical disconnect switch. (see *Electrical Lockout/Tagout Procedures* on page 7)
8. Use vacuum or compressed air to clean interior and exterior of the saw chamber.
9. Close all doors.
10. Empty the dust bin on the operator side of the machine (see *Dust Removal*).

Software Overview

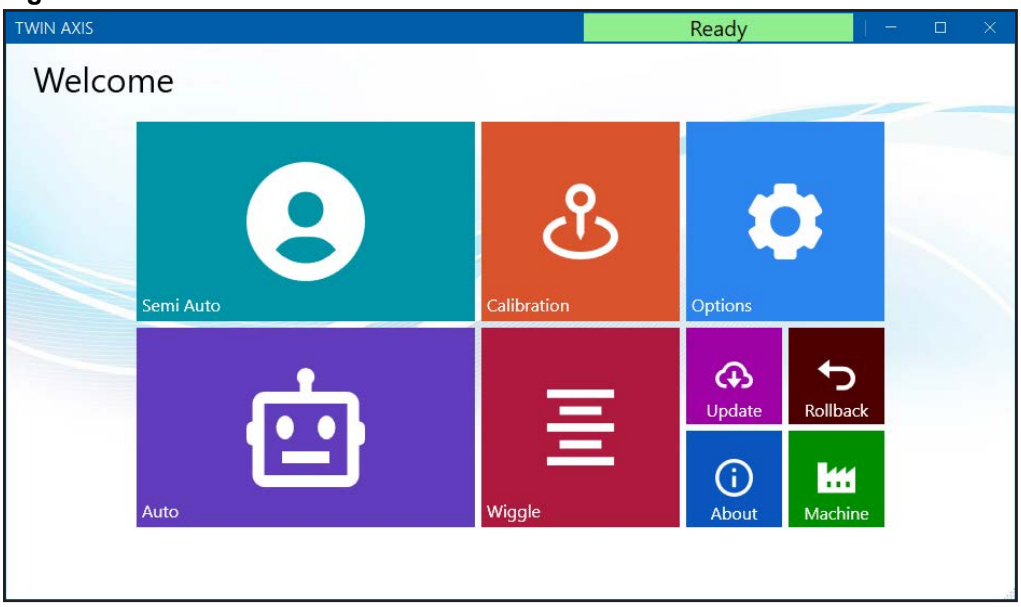
This manual only addresses the use of the *Twin-Axis* Sheathing Saw. It does not address methods of designing or building of the finished product.

Home Screen Overview

Welcome Menu: Select a button to access an operating mode or other menu

Status Indicator: This button displays machine status (ex: Ready) and can be selected to view a detailed overview of machine status and faults.

Figure 6-9: Twin-Axis Home Screen



Welcome Screen Overview

Semi Auto

Pressing the Semi Auto button takes you to the Semi Auto screen (see Figure 6-13).

Use Semi Auto when you are not using *ShopNet* software to access cut data, or when you need to enter cut data manually for testing or troubleshooting purposes. It allows the operator to manually enter all the data for cutting that sheet of sheathing material, then makes all the cuts without further interaction for that sheet.

Auto

Pressing the Auto button takes you to the Auto screen (see Figure 6-14).

Use Auto when you are using *ShopNet* software to bring in cut data. It allows the operator to bring in the data and make all cuts needed. *ShopNet* instructions are not found in this manual.

Calibration

A password must be entered to access the Calibration menu. If you feel that the saw needs to be re-calibrated, see the *Calibration Procedure* for further instruction.

Wiggle

Set the machine to make consistent over or under cuts in 1/32" increments.

Options

Opens the Options menu.

Update

Checks for and automatically installs the latest version of the *Twin-Axis* Sheathing Saw software.

About

Displays the software version number and change log for the most recent update.

Machine

A password must be entered to access the Machine menu. Qualified maintenance personnel or MiTek customer support may access this menu as part of required maintenance or troubleshooting.

Using the Toolbar

The toolbar is the same on the Semi Auto screen and the Auto screen. The **STARTCYCLE** button appears only when cut data is entered or imported.

Figure 6-10: Toolbar Buttons

CLAMP: The infeed aligner extends and secures the wall panel sheet.

UNCLAMP: The infeed aligner retracts.

STARTCYCLE: The material enters the infeed side of the saw, is cut, and exits the outfeed side of the saw chamber.

Normal Speed: This button displays the current speed setting for the saw blades and conveyors. The saw operates by default at normal speed. Select this button to enable **Reduced Speed** mode.

- Use **Reduced Speed** mode to reduce friction based heat (caused by the saw blades) for synthetic sheathing materials not rated for high temperatures or prone to melting.

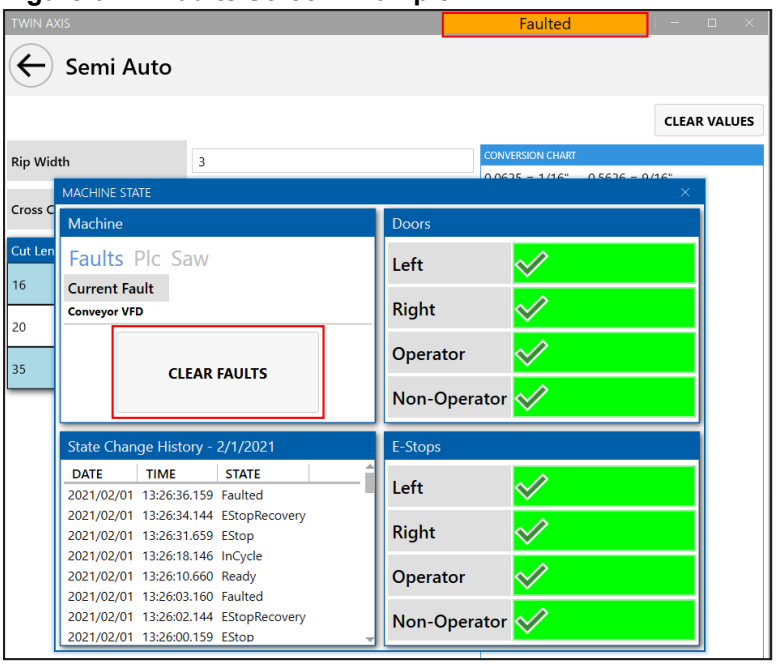
RECYCLE: The saw blades return to their home positions, and the remaining material automatically travels backward through the saw until it stops on the infeed conveyor to be cut again.

Using the Status Screen

The status screen displays faults and the current status of each saw chamber door and E-stop.

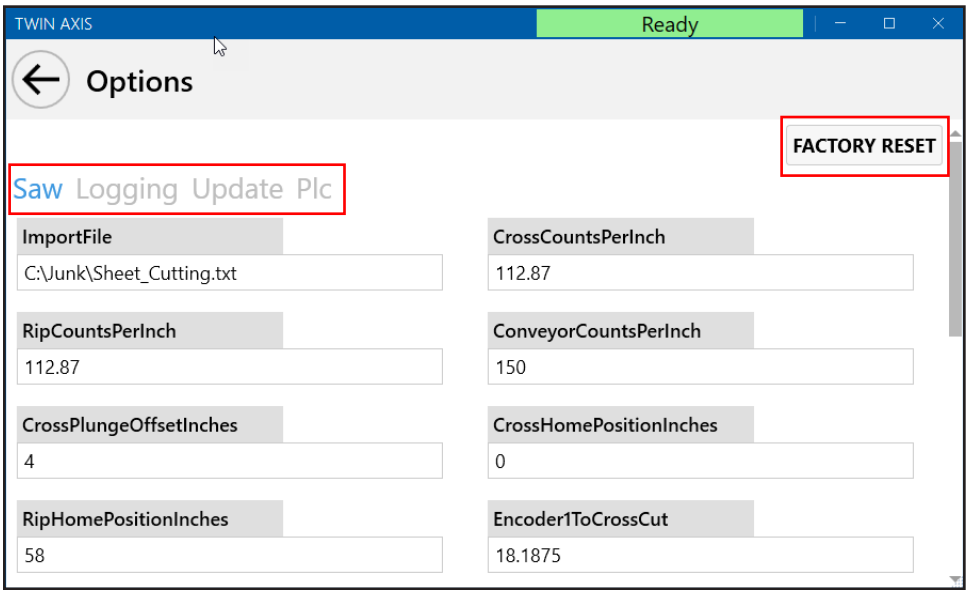
If a fault is detected, the status button will display **Faulted.** Clicking the status button will display a list of present faults. Select **CLEAR FAULTS** to clear the most recent fault.

Figure 6-11: Faults Screen Example



Options Menu Overview

Figure 6-12: Options Menu



Settings Tabs

The option menu tabs display information about saw settings. The values can not be adjusted here and are for informational purposes only.

Factory Reset

Resets the *Twin-Axis* Sheathing Saw to default settings.

Resetting the saw to factory settings, will require recalibration (see *Calibration Procedure*)

Software Tips

- If the sheathing panel chosen contains multiple pieces, press **Next Cut** to scroll down through the list.
- You can only scroll downward. If you need to go up in the list, press **Get Cut File** to re-import the same file.
- The active set of cuts has asterisks next to it.
- If a rip cut is not needed:
  - In Semi Auto, enter 48 in the Rip Width field to indicate the maximum width of sheathing material.
  - In Auto, no action is necessary.
- If you miss a cut during a Next Cut sequence, the cut is deleted from the saw's memory. Press Get Cut File to re-download data to the saw, and then press Next Cut as necessary until the cut appears.

Operating Procedure

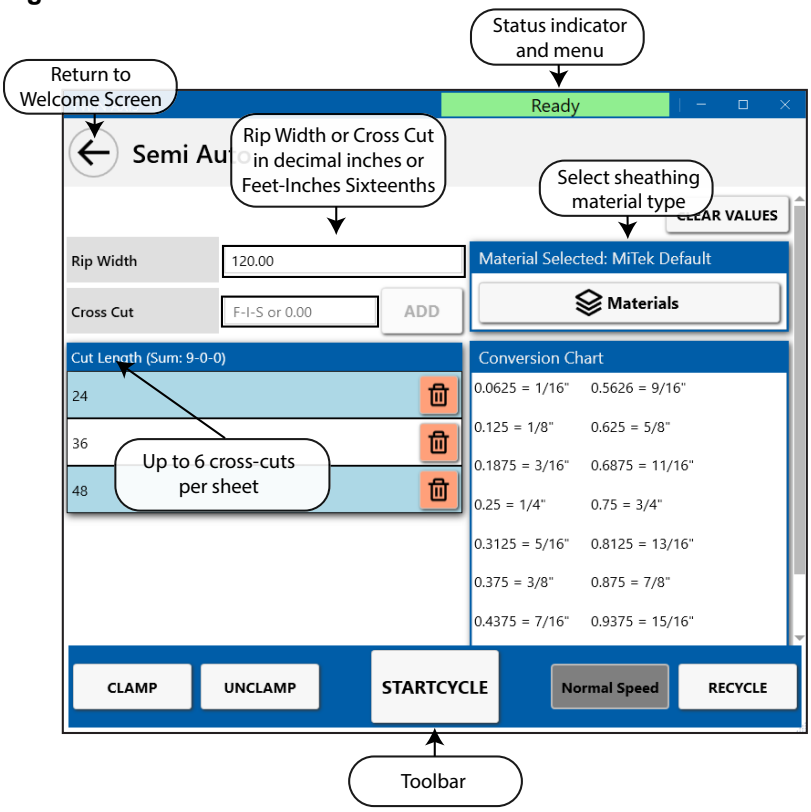
This section instructs operators how to use the *Twin-Axis* Sheathing Saw in Semi Auto and Auto modes.

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

Using Semi Auto Mode

Figure 6-13 shows the Semi Auto screen with example measurements included.

Figure 6-13: Semi Auto Main Screen



Operating in Semi Auto

1. Complete the Daily Startup steps at the beginning of each shift (page 54).
2. Verify that there is no sheathing material inside the saw.

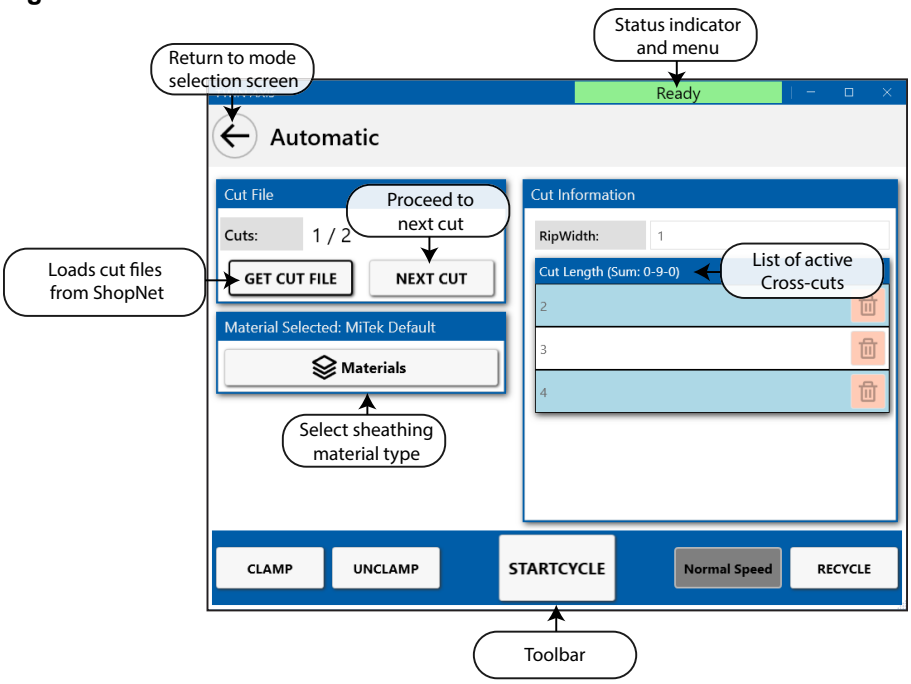
3. Select **Semi Auto** on the home screen.
4. Enter the dimensions for one finished piece.
5. Leave material selection as MiTek Default or select the appropriate material type: Plywood, Zipboard, or OSB.
   - Note that these material type selections will not function properly unless properly setup as part of *Calibration Procedure*.
6. Load the correct material onto the infeed conveyor at or behind the marked line.
7. Select **ClampSheet** to push the material against the fence.
8. Select **StartCycle** and wait for the material to be processed. The ejectors will automatically lift the material once it leaves the saw chamber.
9. When ejection movement has stopped, remove the cut material from the outfeed conveyor and transport it to the next stage in your process.
10. If there is remaining material, either:
    - Manually remove it or;
    - Select **Recycle** to return the material via the conveyors to infeed side for further processing.

To restore the material selection to MiTek Default, close and reopen the *Twin-Axis* software.

Using Auto Mode

Figure 6-14 shows the Auto screen with example measurements included.

Figure 6-14: Auto Main Screen



Operating in Auto

1. Complete the Daily Startup steps at the beginning of each shift (page 54).
2. Verify that there is no sheathing material inside the saw.
3. Find the cut file in *ShopNet* and select it to create a new cut file.
4. Select **Auto** on the home screen.
5. Select **Get Cut File** to load the data into the saw.
6. Leave material selection as MiTek Default or select the appropriate material type: Plywood, Zipboard, or OSB.
   - Note that these material type selections will not function properly unless properly setup as part of *Calibration Procedure*.
7. Load the correct material onto the Infeed Conveyor at or behind the marked line.
8. Select **ClampSheet** to push the material against the fence.
9. Select **StartCycle** and wait for the material to be processed. The ejectors will automatically lift the material once it leaves the saw chamber.
10. When the ejection movement has stopped, remove the cut material from the outfeed conveyor and transport it to the next stage in your process.
11. If there is remaining material, either:
    - Manually remove it or;
    - Select **Recycle** to return the material via the conveyors to infeed side for further processing.
12. If there are more cuts in the current file, select **Next Cut** and repeat steps 7 through 11 as needed.
13. To create a new cut file in ShopNet, mark the current cut file as complete and select the next file. Repeat all steps.

To restore the material selection to MiTek Default, close and reopen the *Twin-Axis* software.

Calibration Procedure

The *Twin-Axis* Sheathing Saw offers Fine-Tune and Automatic calibration options.

- Fine Tune calibration should be carried out after tensioning of the conveyor or carriage chains or whenever the saw is otherwise not producing accurate cuts (see *Fine Tune Calibration*).
- Automatic Calibration should only be used after the occurrence of major, non-routine maintenance events (such as the replacement of critical mechanical or electrical components) as it resets the saw to default settings (see *Automatic Calibration*). A Fine Tune Calibration should always be carried out after an Automatic Calibration to ensure cut accuracy.

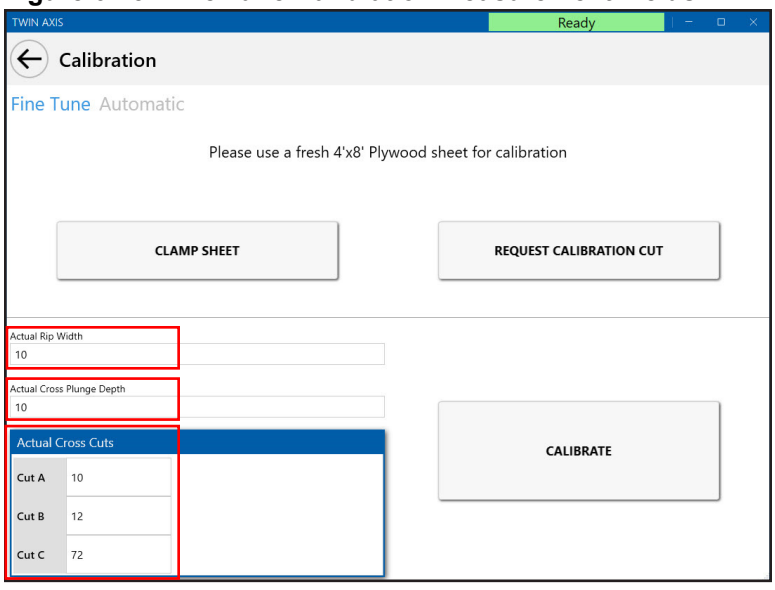
A video guide to the calibration process is also available (search for “MiTek Twin-Axis Calibration” on the MiTek YouTube channel).

Fine Tune Calibration

Automation support is available at 800-523-3380

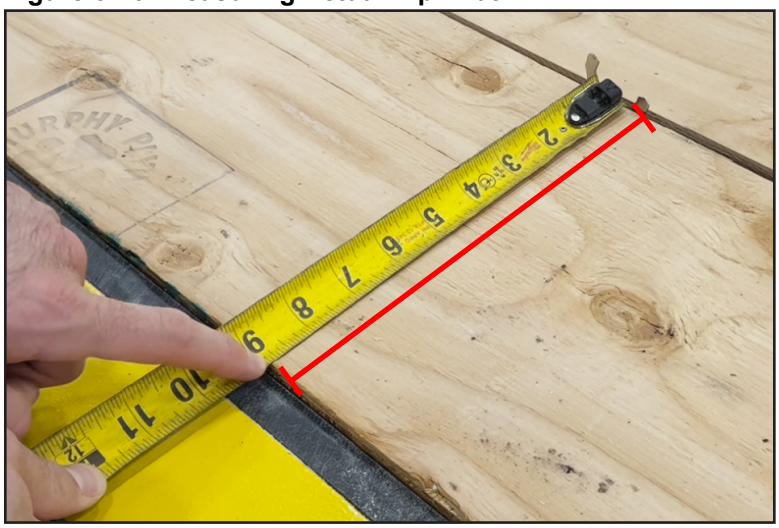
1. Select **Calibration** from the home screen and enter the password. If you do not know the password, contact MiTek Automation Support before proceeding.
2. Select **Fine Tune**
3. Select the material to calibrate: **Plywood**, **Zipboard**, or **OSB**.
   - Make sure to calibrate for all different material types that will be cut by the saw. The calibration settings will be saved for each type.
4. Load a fresh 4’ x 8’ sheet onto the infeed conveyor at or behind the marked line.
   - MiTek recommends using a full 4’ x 8’ high quality sheet (square, good edges, and not much bow) as the weight, dimensions, and texture will provide the most accurate calibration results.
5. Select **Clamp Sheet**.
6. Once the clamp has secured the sheet, select **Request Calibration Cut** and the sheet will enter the saw chamber to be cut.
7. Once the material exits the saw chamber, you can begin measuring the calibration values for **Actual Rip Width**, **Actual Cross Plunge Depth**, and **Actual Cross Cuts**. Measure the cuts to 1/32 of an inch to ensure 1/16 of an inch accuracy. The cuts must be entered on the Fine Tune screen in decimal inch form (for example 8 ¾ = 8.75 inches).

Figure 6-15: Fine Tune Calibration Measurement Fields



8. For **Actual Rip Width,** measure the rip width at the middle of the board and enter the value in the matching field.

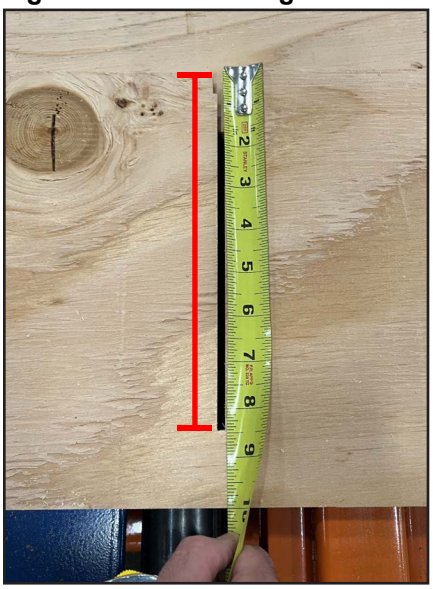
Figure 6-16: Measuring Actual Rip Width



9. For **Actual Cross Plunge Depth,** the method of determining the value will vary based on whether the saw undercuts or overcuts the material.

   a) If the blade undercuts (meaning it did not complete the cross-cut), measure the length of the cut and enter the value in the Actual Cross Plunge Depth field. This can be made easier by flipping over the cut material and measuring from the bottom as shown in Figure 6-17.

Figure 6-17: Measuring Actual Cross Plunge Depth



   b) If the blade overcuts, (meaning it completes the cross-cut and proceeds to cut the remainder of the sheet), the following formula

Actual Rip Width + Cut Thickness + Plunge

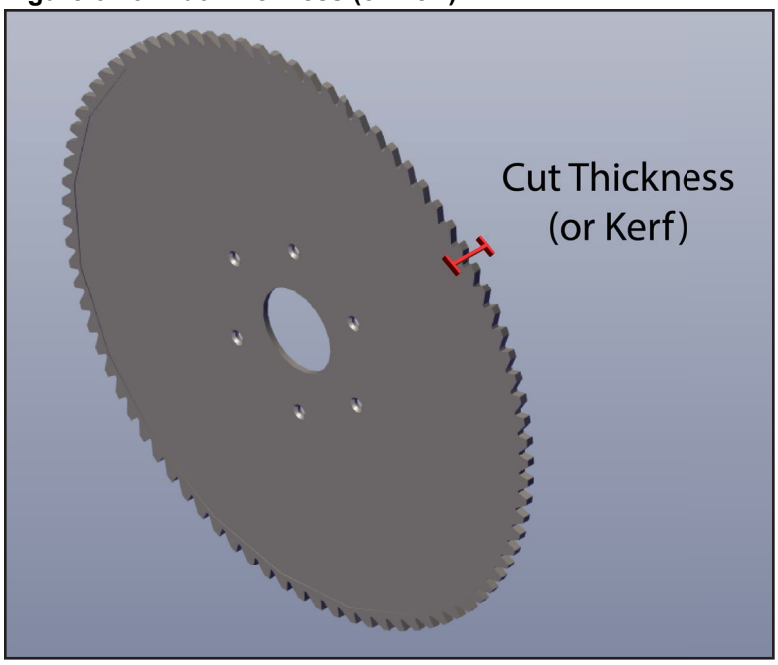
must be used to determine the Actual Cross Plunge Depth.

1) Actual Rip Width is the value determined in Step 8.
2) Plunge is the amount the blade overcuts the material.

Figure 6-18: Measuring Overcut for Plunge

3) Cut thickness (or kerf) is the size of the cut made by the blade. A MiTek approved blade for the Twin Axis Sheathing Saw should have a cut thickness of .12 inches (see *Specs for New or Used Saw Blades*).

Figure 6-19: Cut Thickness (or Kerf)



10. For **Actual Cross Cuts**, measure the cross-cuts from shortest to the longest pieces and enter the values in the respective **Cut A, B, and C** fields.

11. Select **Calibrate** to save settings. You will be returned to the material selection screen.
12. Repeat the calibration process shown for the different material types as needed to ensure accuracy.

Automatic Calibration

Automation support is available at 800-523-3380

1. Select **Calibration** from the home screen and enter the password. If you do not know the password, contact MiTek Automation Support before proceeding.
   - Note that Automatic Calibration will reset the saw to default settings.
2. Select **Automatic** to access Automatic calibration screen.
3. Select **Home Blades**. A pop-up will appear when the homing process is complete.
4. Once the blades have returned to home position, the **Calibrate Machine** button will become available. Select **Calibrate Machine** to reset to the best-known settings for the rip and cross-cut blades.
5. Carry out a Fine Tune calibration (see *Fine Tune Calibration*).

Maintenance

Introduction to Maintaining Your Machine

This manual contains information for common repair maintenance and all preventive maintenance. Additional maintenance instruction and videos can be found on our web site or video storage site.

Read the safety section starting on page 1.The safety test procedures in the safety section MUST be performed by qualified personnel after ANY maintenance, adjustment, or modification. Note these safety reminders:

	⚠ WARNING
	**ELECTROCUTION, HIGH PRESSURE, CRUSH, CUT, AND CHEMICAL 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.**

	⚠ CAUTION
	**This icon is an important safety note.** **It indicates that you must lockout/tagout at the appropriate disconnect switch using approved methods described in OSHA CFR 1910.147 before continuing with the procedure.**

- Note the proper way to clean inside an enclosure:

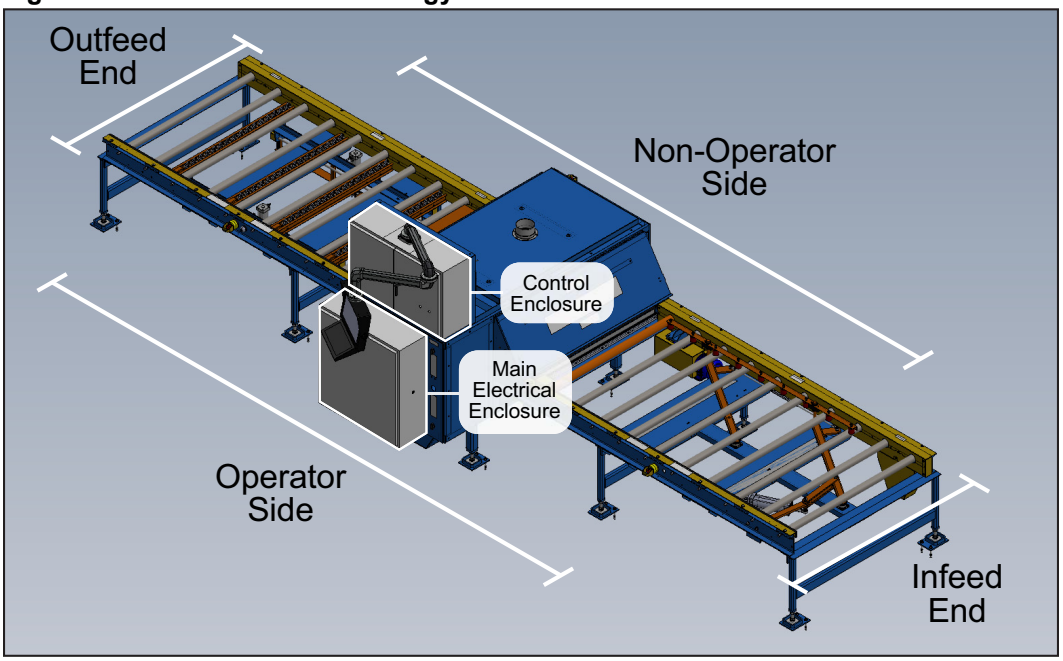
	NOTICE
	**Never use compressed air inside an electrical enclosure. It may force contaminants into electrical connections.** **Use a vacuum to remove dust from electrical enclosures. Canned air is acceptable after vacuuming.**

- Certain parts should be kept in stock at your facility. These parts are listed in the *Parts List* appendix.

Overview Graphics

The orientation terminology in Figure 7-1 will be utilized throughout the maintenance section. For a graphical depiction of the major components of the *Twin-Axis* Sheathing Saw, see *Main Components* on page 41.

Figure 7-1: Orientation Terminology



Cleaning and Inspecting

Cleaning

If it should become necessary to clean this machine, disconnect it from its power source first. Do not use liquid cleaners, aerosols, abrasive pads, scouring powders or solvents, such as benzene or alcohol. Use a soft cloth lightly moistened with a mild detergent solution. Make sure the surface cleaned is fully dry before reconnecting power.

	⚠ CAUTION
	**CRUSH AND CUT HAZARD** **Always replace guards after completing maintenance and before removing the lockout/tagout device.** **Operating a machine with guards removed may result in serious injury or death.**

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

Inspecting

Work Area

Make sure any sharp objects are clear of all pneumatic and electrical systems.

Inspecting the Ejectors

Check clevis pins and all bolts for wear every 3 months

Calibrating

Calibration should rarely be required. If you feel that the saw needs to be re-calibrated, see *Calibration Procedure* on page 62 for further instruction.

Lubricating

Lubrication of various items is required to keep the machine operating properly and to prevent costly replacements. See the respective mechanical sections for instructions on lubrication.

Motors and Gearboxes

Figure 7-2: Motor Locations

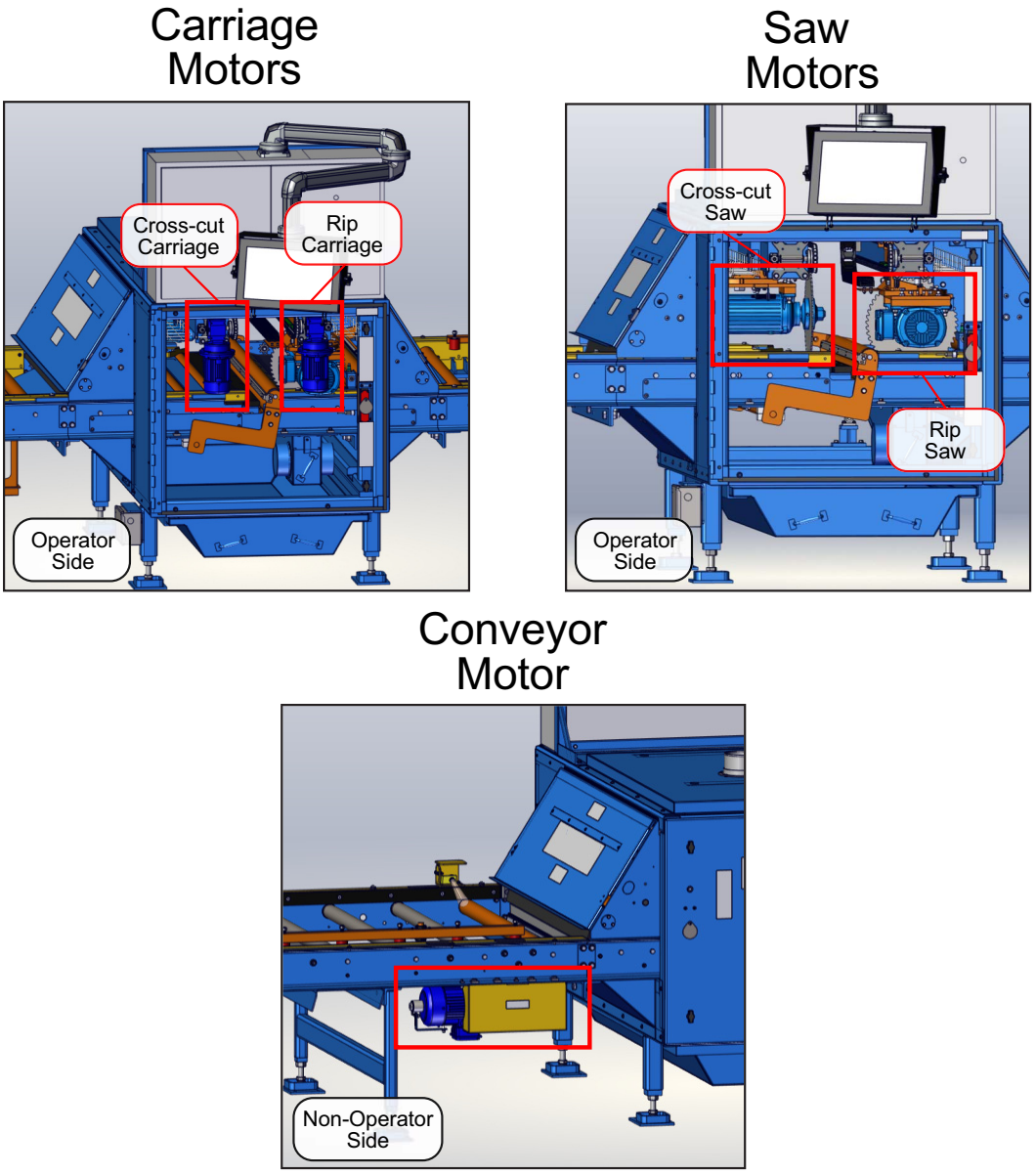


Table 7-1: Overview of Motor Maintenance

Motor	Gearbox (if present)	Requires Grease	Requires Oil
Carriage (Rip)	Nord Gearmotor	No	Yes
Carriage (Cross-cut)	Nord Gearmotor	No	Yes
Conveyor	Nord Gearmotor	No	Yes
Saw (Rip)	No	No	No
Saw (Cross-cut)	No	No	No

Checking and Changing Gearbox Oil

Hex key set

Socket wrench set

Oil

Funnel with soft plastic tubing

Container for used oil

Check the oil in the carriage and conveyor gearboxes once every 12 months (one shift) or every 6 months (two shifts). When additional oil is needed, use the oil recommended in Table 7-2 or a comparable type.

Table 7-2: Oil Used by the Manufacturer

Attribute	standard
ISO viscosity	VG680 SYN-FG-PG
Oil type	Synthetic, polyalkylene glycol
Ambient temperature	-4° to 176°F (-20° to 80°C)
Manufacturer / type	Mobil Glygoyle 680

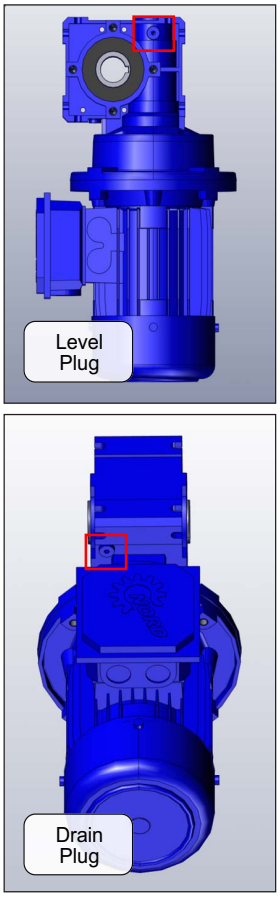
The oil in each gearbox must be drained and refilled **every 20,000 hours or 4 years**. See Figure 7-3 for the location of the oil level and oil drain plug.

The approximate amount of oil is listed in Table 7-3. This amount of oil should be enough to reach the oil level bolt, shown in Figure 7-3.

Table 7-3: Approximate Oil Fill Level

Motor(s)	quarts	liters
Carriage	.058	.054
Conveyor	.100	.094

Figure 7-3: Oil Level Plug and Oil Drain



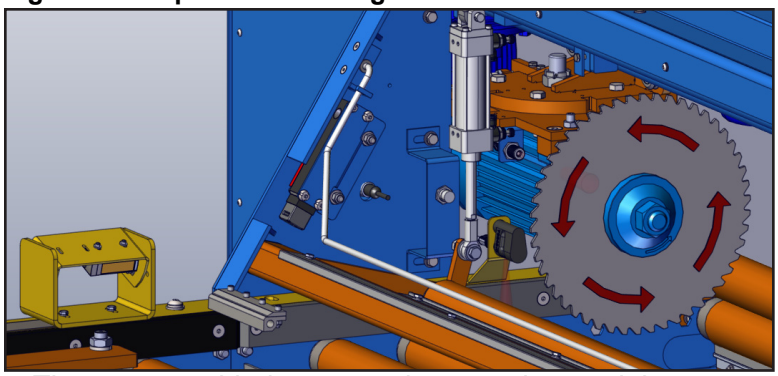
Saw Blades

Direction of Blade Teeth

The blade teeth of a replacement rip or cross-cut blade must match the following orientation.

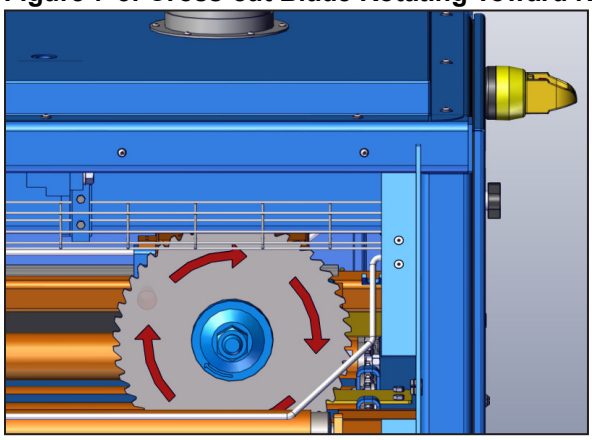
- The rip saw blade rotates downward toward the infeed end.

Figure 7-4: Rip Blade Rotating Toward Infeed End



- The cross-cut blade rotates downward toward the non-operator side.

Figure 7-5: Cross-cut Blade Rotating Toward Non-Operator Side



Specs for New or Used Saw Blades

Use ONLY a NEGATIVE HOOK saw blade!

A positive hook will pull the material, leading to inconsistent cut lengths and possible material grabbing by the rip blade

A re-tipped carbide blade must meet the following criteria.

- 13.8" (350 mm) = blade diameter
- 3 mm = kerf
- 70 = # of teeth
- 15 = hook angle
- 5 = face angle

- 15 = back angle
- 5 = top angle

When to Replace the Saw Blades

Depending on the type and size of sheathing material, one blade may wear more quickly than the other. The frequency of blade changes and of repairs also depends on the number of hours the saw is running each week.

Never use a saw blade with a diameter less than 13.5" (342 mm). Immediately discard any used saw blades that do not meet this criteria.

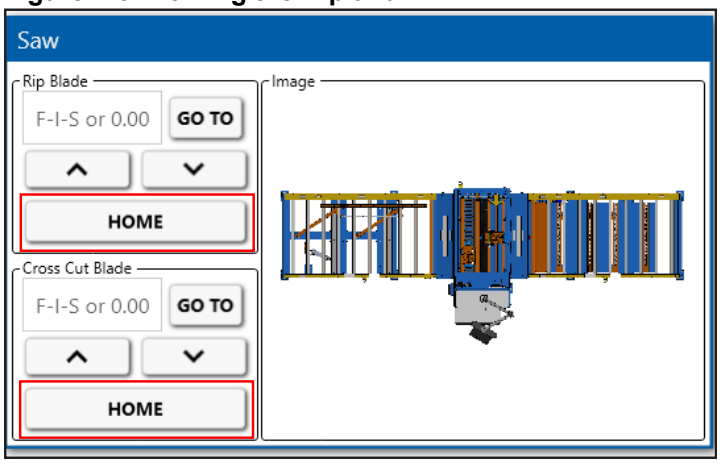
Check each blade (rip and cross-cut) weekly for signs of wear and replace accordingly.

	⚠ WARNING
	**Keep saw blades sharp and in good condition. Have the saw blade re-tipped if carbide tips become chipped or come off. Dull blades cause high kickback forces which can cause injury.**

Replacing a Saw Blade

1. Gather the following supplies:
   - New or sharpened saw blade
   - 46-mm wrench
   - 3/8" spanner wrench
2. Select and enter the password for the Machine screen on the home screen.
3. Select the **HOME** button for the rip and cross-cut blades to ensure they are in the home position.

Figure 7-6: Homing the Rip and



4. Activate an E-stop and lockout/tagout the pneumatic system.
5. To enable access to the blades, use the open-door pushbuttons to open the operator and non-operator side doors.
   - The cross-cut blade can be accessed from the operator side door.
   - The rip-cut blade can be accessed from non-operator side door.
6. Before beginning to replace either blade, lockout/tagout the electrical system.

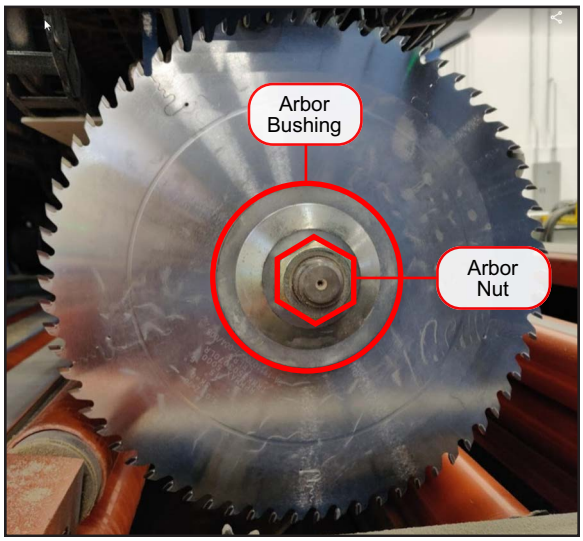
	⚠ CAUTION
	**CUT HAZARD.** **Saw blades are sharp. Wear gloves and eye protection when handling blade.**

7. After lockout/tagout of the electrical system, use the spanner wrench to hold the blade in place (Figure 7-7) and the 46-mm wrench to loosen the arbor nut.

Figure 7-7: Spanner Wrench Placement

8. Remove the arbor nut and arbor bushing.

Figure 7-8: Arbor Nut and Bushing



9. Remove the old saw blade and place in a safe location for re-tipping or disposal.
10. Place the saw blade and the arbor bushing onto the shaft. Verify the blade teeth are facing the right direction (see *Direction of Blade Teeth* on page 72).
11. While holding the blade in place with the spanner wrench, use the 46-mm wrench to tighten the arbor nut until you encounter resistance.
12. Once blade replacement is complete, close all saw chamber doors.
13. Remove the electrical and pneumatic lockout/tagouts and power on the machine.

Bearings

The location of all bearings that require lubrication are listed in this section. All bearings should be lubricated every 12 months (one shift) or every 6 months (two shifts).

Applying Bearing Lubricant

Manual grease gun

No.2 lithium-based grease

To lubricate bearings, use the following steps.

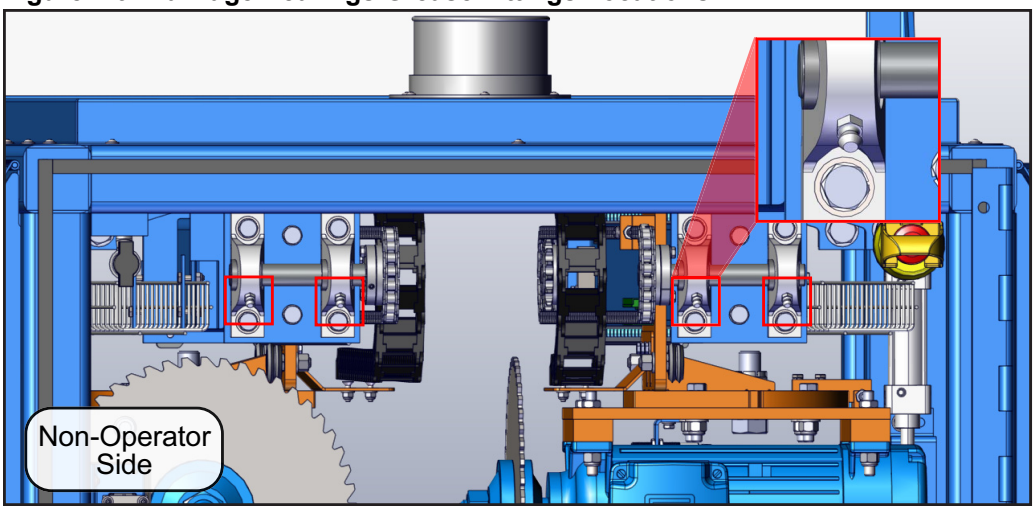
1. Lockout/tagout machine.
2. Locate the grease fitting on the bearing. See Figure 7-9 for carriage bearings and Figure 7-10 for aligner bearings.
3. Clean the fitting thoroughly to remove any dirt or old grease.
4. Place the manual grease gun over the fitting.
5. Add grease to the bearing until you feel resistance. Adding more grease after you encounter resistance may damage the bearing.

Repeat steps 1 through 4 until all bearings are greased.

Carriage Bearings

The locations of the grease fittings (4 total) are displayed in Figure 7-9.

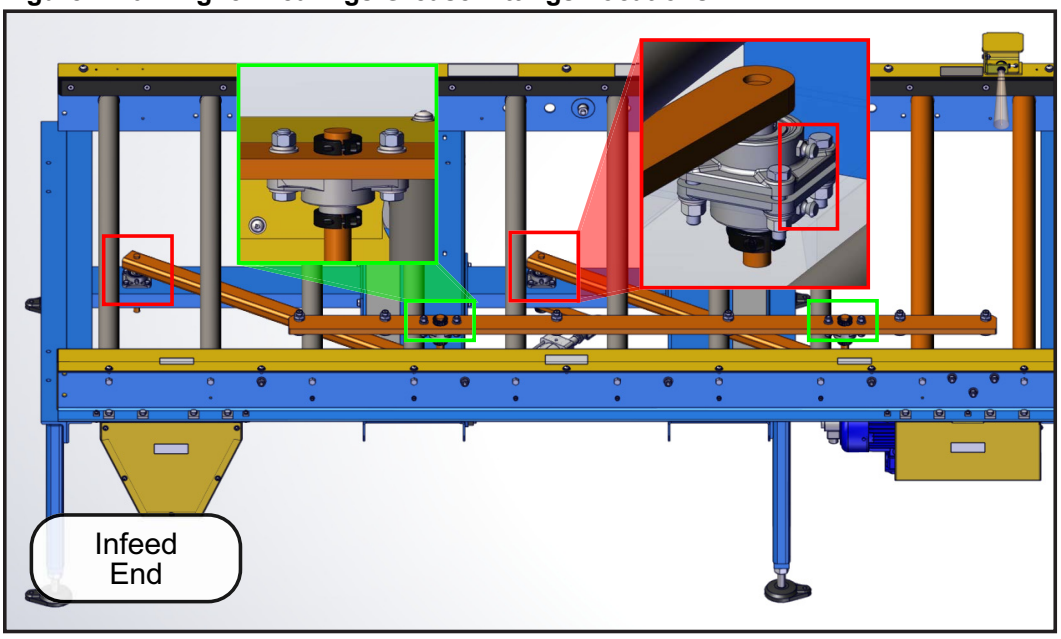
Figure 7-9: Carriage Bearings Grease Fittings Locations



Aligner Bearings

The locations of the grease fittings (6 total) are displayed in Figure 7-10.

Figure 7-10: Aligner Bearings Grease Fittings Locations



Chains

Lubricating Chains

Oil

Brush

Rag

The chains should be lubricated every 2 months (one shift) or every month (two shifts). The lubricant should be a high-grade, non-detergent, petroleum-base oil. Anti-foam, anti-rust, and film-strength improving additives are often beneficial. SAE 30 grade is recommended.

Apply oil to the edges of the link plates of the chain near where the chain makes contact with a sprocket and to the inside of the chain generally.

Chains are located in the following places:

Figure 7-11: Carriage Chains

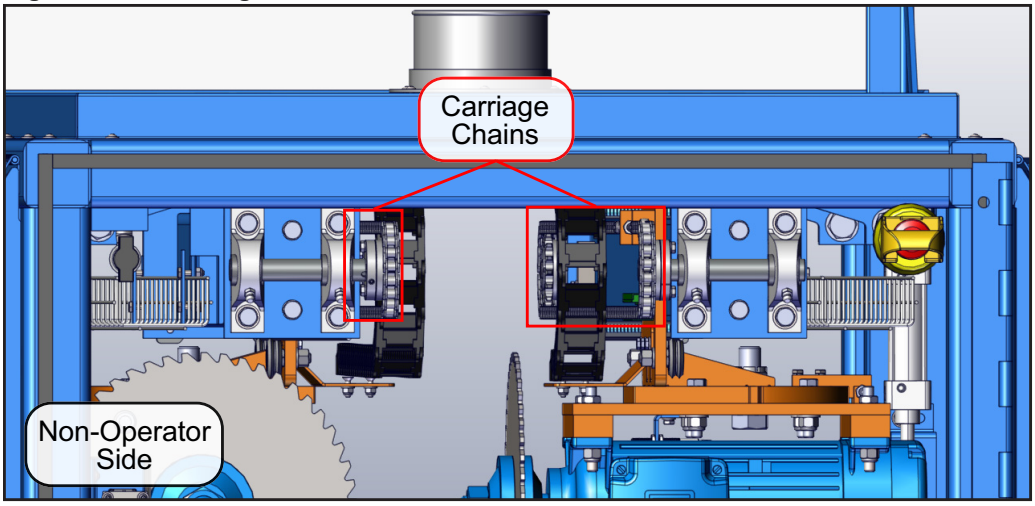
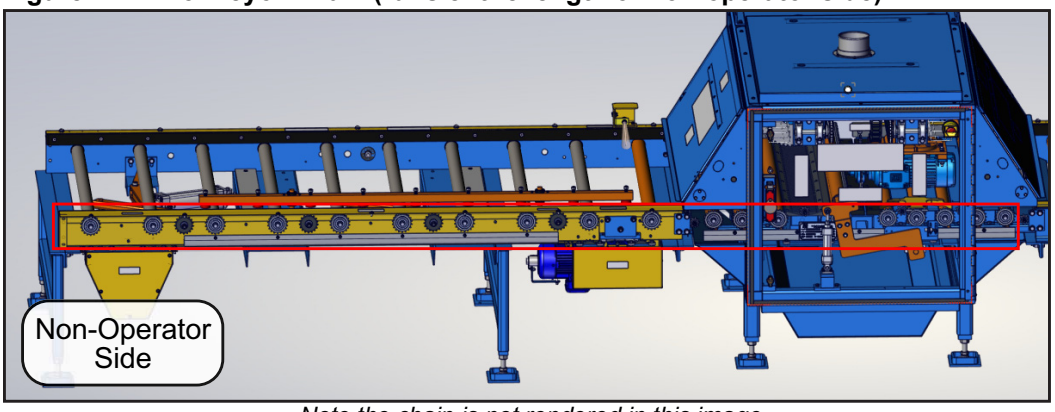


Figure 7-12: Conveyor Chain (runs entire length of non-operator side)



Note the chain is not rendered in this image

Adjusting Chain Tension

Socket wrench set

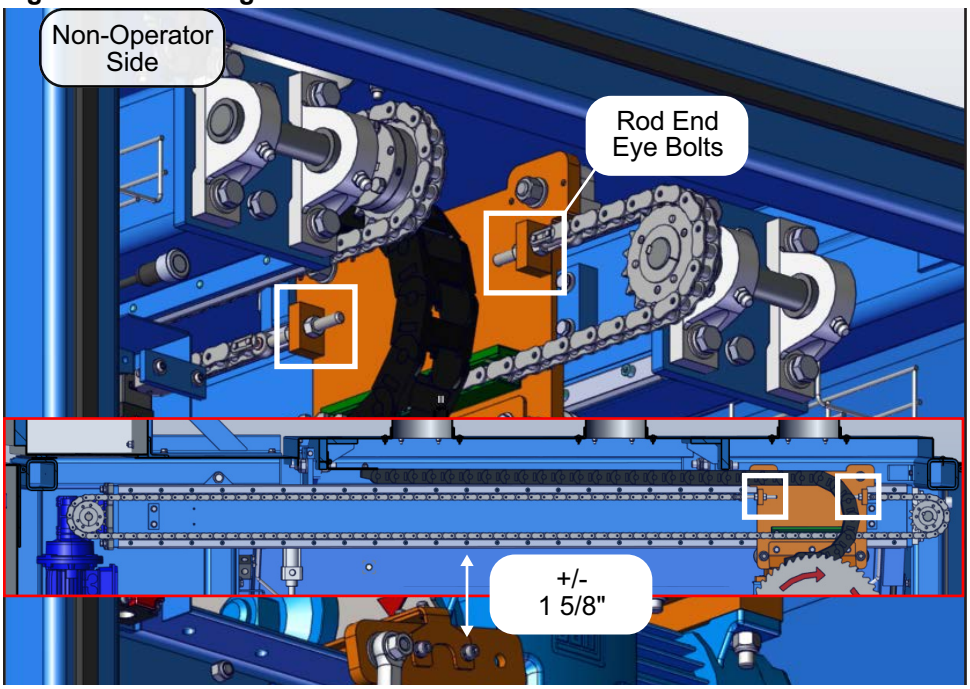
Carriage Chains

There are two carriage chains, one for the rip carriage and one for the cross-cut carriage. The carriage chain tension should be checked once a month at the halfway point between two sprockets.

How to tighten a carriage chain:

1. Lockout/tagout machine.
2. Use the nuts on the rod end eye bolts to tension the carriage chain according to Figure 7-13. Measure the tension in the carriage chain as close as possible to the midpoint between the sprockets.
3. Re-tighten the nut on the tensioner to ensure the bolt does not become loose during operation.

Figure 7-13: Carriage Chain Tensioner Mechanism



Conveyor Chain

Socket wrench set

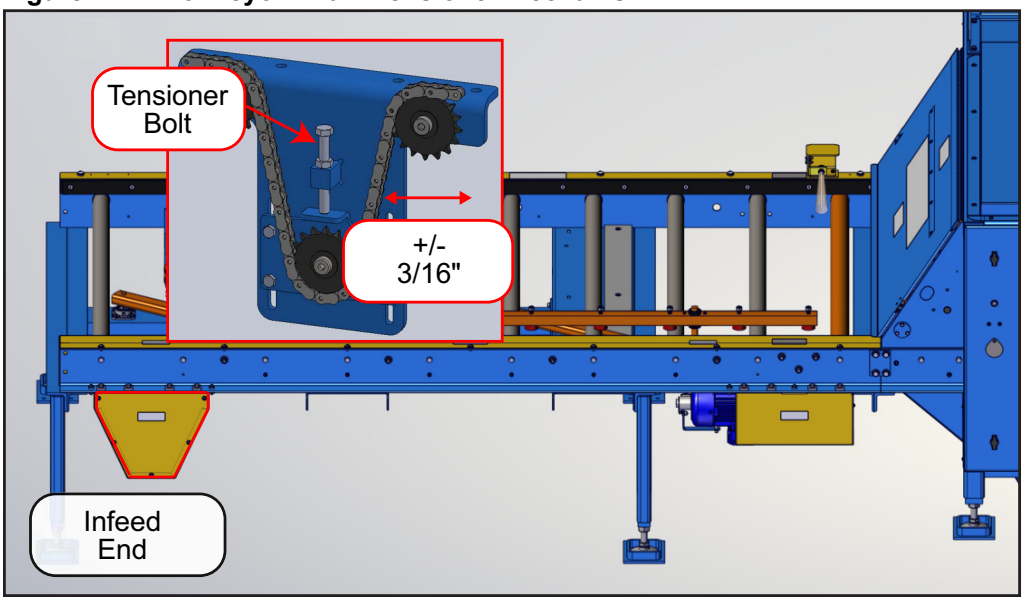
The mechanism to adjust the conveyor chain can be found behind the cover on the infeed end of the machine. The conveyor chain tension should be checked every week at the halfway point between two sprockets (see Figure 7-14).

How to tighten the conveyor chain:

1. Lockout/tagout machine.
2. Loosen the nut on the tensioner bolt to allow the bolt to be adjusted.
3. Use the bolt to tension the conveyor chain according to Figure 7-13.

4. Re-tighten the nut on the tensioner to ensure the bolt does not become loose during operation.

Figure 7-14: Conveyor Chain Tensioner Mechanism



Pneumatic System

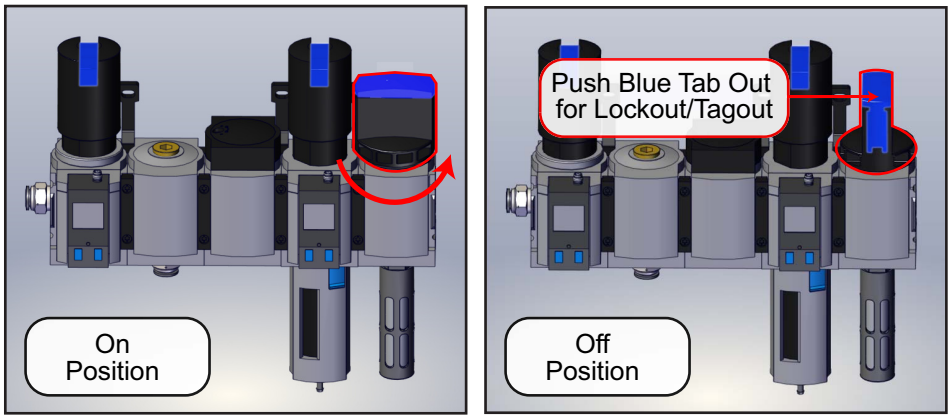
	⚠ CAUTION
	**HIGH PRESSURE HAZARD.** **Bleed all pressure from pneumatic lines before performing maintenance on pneumatic components.** **Pressurized components may move suddenly or vent air to atmosphere, causing injury.**

Removing Pressure from the Pneumatic System

Most procedures involving the pneumatic system require the removal of pressure. Use the following procedure to remove pressure from the system.

1. Turn the switch to the off position and push the blue slide outward so the lockout/tagout hole is visible.

Figure 7-15: Pneumatic Airflow On and Off Positions



2. Lockout/tagout through the hole on the slide. See Figure 1-5 on page 10 for example.

Filter/Regulator

The filter/regulator can be purchased directly from MiTek. Refer to the *Parts List* appendix for instructions on ordering parts.

Maintaining the Filter / Regulator

Adjusting the Pressure on the Filter / Regulators

The pressure adjustment knob on a regulator controls the operating pressure for a pneumatic system. This machine utilizes two filter / regulators that must be set at different pressures (see Table 7-4)

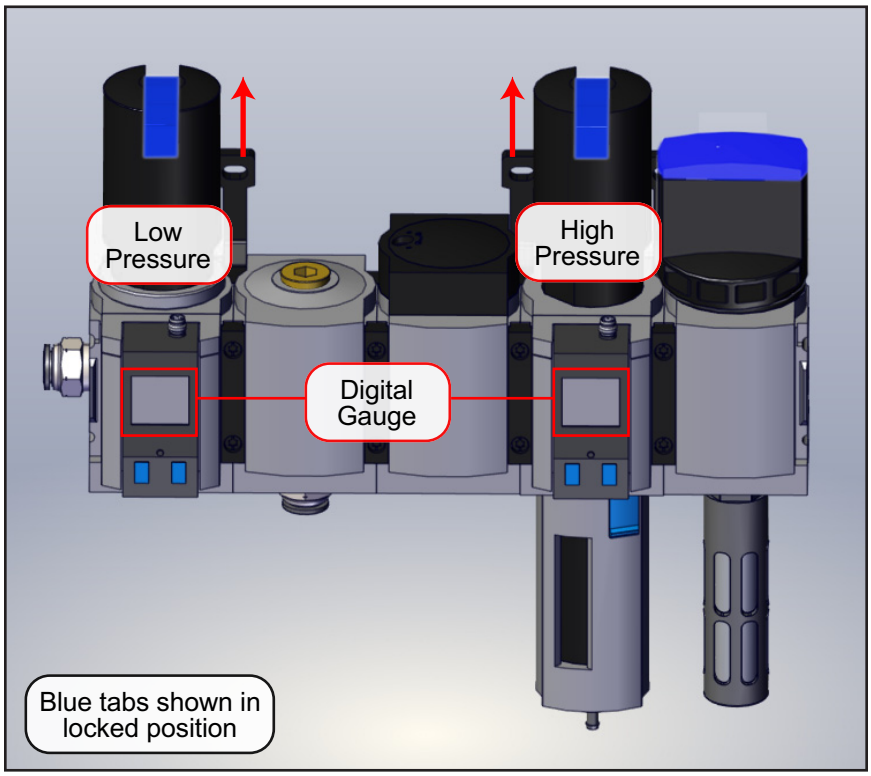
Table 7-4: Filter / Regulator Operating Pressure Settings

Action	Pressure
Low Pressure Regulator	30 psi
High Pressure Regulator	65 psi

Use the following procedure to adjust operating pressure.

1. Push the blue tab inward to unlock the adjustment knob. See Figure 7-16

Figure 7-16: Pressure Adjustment Knobs



2. Turn the knob to adjust the pressure.
   - Turning the knob clockwise increases pressure
   - Turning the knob counterclockwise decreases pressure.
3. Once the digital gauge shows the correct pressure, pull the blue tab outward so it is no longer flush with the adjustment knob.

Replacing a Filter Element on a Filter / Regulator

The regulator uses a filter that must be replaced every 6 months. Refer to the *Parts List* appendix for instructions on ordering parts. Use the following procedure to replace a filter element.

Figure 7-17: Regulator/ Filter Element

1. Remove pressure from the lines by following the procedure in *Filter/Regulator* on page 80.
2. Pull downward on the blue tab and twist clockwise to remove the bowl from the regulator.
3. Unscrew the black plastic baffle holding the filter element and remove it from the regulator.
4. Replace the filter element. Screw the black plastic baffle back into place.
5. Place the bowl back onto the regulator body by pushing up and turning counterclockwise. Make sure bowl is secure and the blue tab is in the locked position before returning pressure to the lines.

Infeed Aligner Regulators

The infeed aligner on this machine utilizes two air pressure regulators, one for the clamp and one for the unclamp action.To adjust the pressure, turn the knob clockwise to increase pressure and turn counterclockwise to decrease pressure (Figure 7-18).

The default operating pressure for each regulator is listed Table 7-5, but the optimal pressure settings will vary based on sheathing material weight and other factors. See *Infeed Aligner Adjustment* for more information on adjusting the aligner for optimal performance.

Figure 7-18: Infeed Aligner Regulators Pressure Adjustment

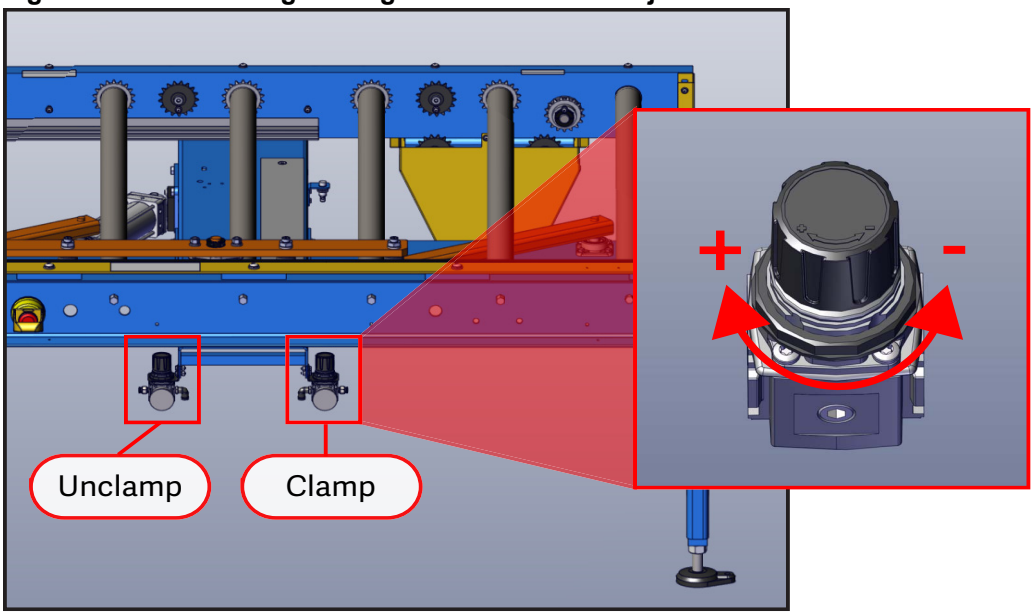


Table 7-5: Infeed Aligner Default Pressure Settings

Action	Pressure
Clamp	30 psi
Unclamp	40 psi

Infeed Air-Knife

This machine utilizes an infeed air-knife to clear dust and debris from the surface of sheathing material as it enters the saw chamber. For optimal performance, the air-knife must supply only dry air. If droplets of water are being ejected from the air-knife. the external pneumatic system that supplies air pressure to the *Twin-Axis* Sheathing Saw may require adjustment or maintenance.

Cylinders

The *Twin-Axis* Sheathing Saw utilizes pneumatic cylinders for the infeed aligner and the outfeed ejectors. Observe the operation of the pneumatic systems every 3 months and adjust as needed.

Figure 7-19: Aligner Cylinder Adjustment Screws

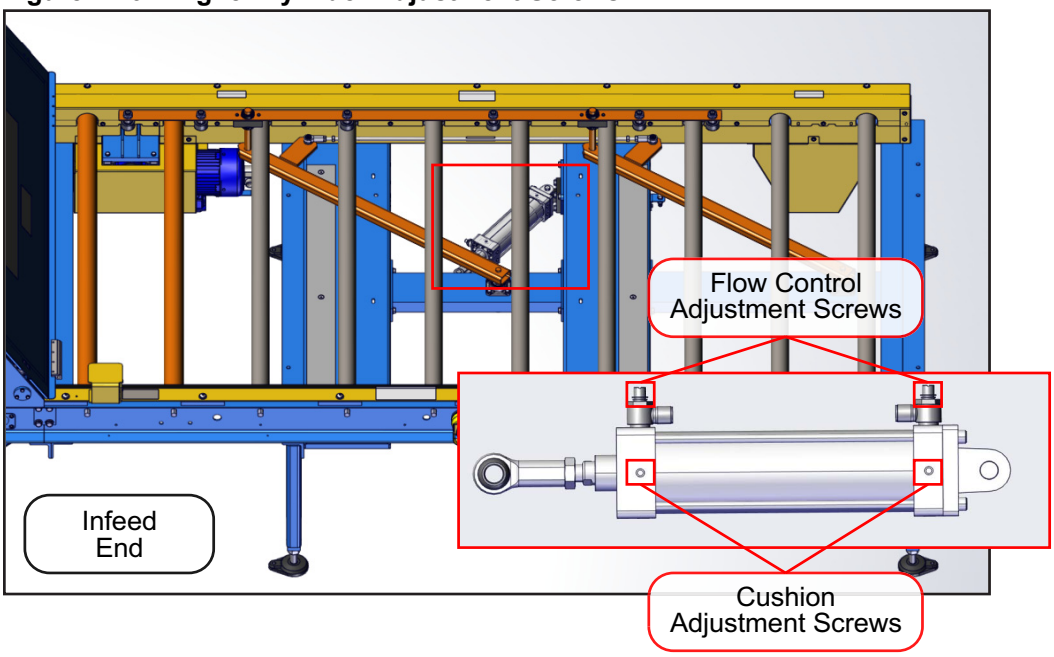
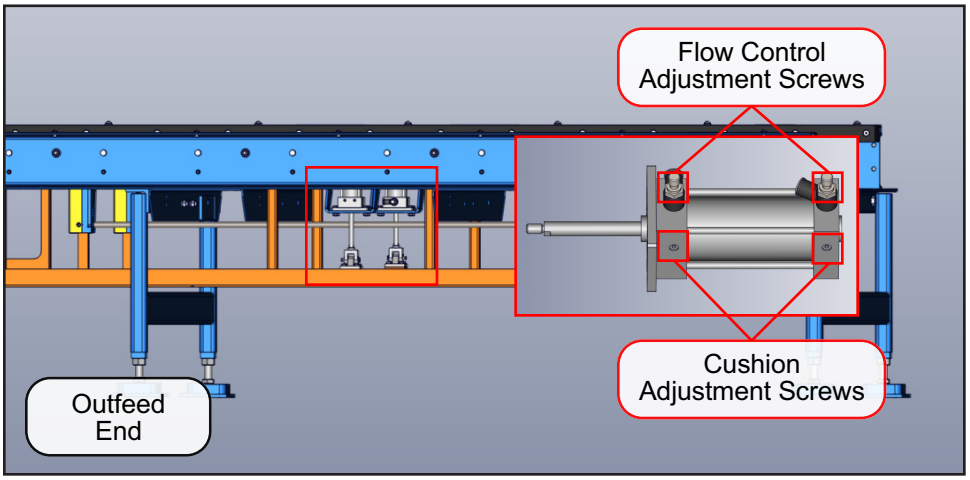


Figure 7-20: Ejector Cylinder Adjustment Screws



Adjusting Cushion Valves

Some cylinders have adjustable cushion valves to decelerate the load and reduce potentially destructive energy. These cushion valves sometimes need fine tuning to find their ideal cushioning between the completely closed and completely open positions.

- A completely closed cushion valve causes the cylinder to slow abruptly near the end of its stroke, increasing the cycle time.
- A completely open cushion valve prevents the cylinder from decelerating the load, producing a jarring end impact.

If cylinders with cushion valves are not adjusted properly, adjust the cushion valve using the following steps.

Flathead screwdriver

Hex key set

1. Lockout/tagout the pneumatic system and drain the lines of pressure in order to prevent cylinder motion.
2. Slide underneath the table.
3. Turn the adjusting screw clockwise until the valve is completely closed. See Figure 7-19 and Figure 7-20 for the location of the screw.s
4. Turn the adjusting screw counterclockwise a 1/2 turn.
5. Slide out from underneath the table and re-pressurize the system.
6. Actuate the cylinder using a normal load at normal speed.
7. Repeat steps 4-6 until the cylinder decelerates the load without the increased cycle time that occurs with a completely closed valve or the jarring end impact that occurs with a completely open valve.
   - You may need to fine-tune the cylinder by 1/8 turns when you approach ideal cushioning.
   - Failure to properly maintain and calibrated the cushion valves may shorten the lifespan of the cylinders.

Adjusting Flow Control Valves

Both ends of some cylinders have flow control valves to adjust the speed at which the cylinders extend and retract. If cylinders with flow control valves move too slowly or quickly (and produce jarring end impacts), adjust the flow control valves. The location of the flow control valve that needs adjustment depends on whether the adjustment is needed on the extending or retracting stroke. See Figure 7-19 and Figure 7-20 for the location of the flow control valves.

Table 7-6: Adjusting the Flow Control Valves

Stroke	Valve Location	Increase Speed	Decrease Speed
Extend	Rod end of cylinder	Turn the adjusting screw counterclockwise	Turn the adjusting screw clockwise
Retract	Cap end of cylinder	Turn the adjusting screw counterclockwise	Turn the adjusting screw clockwise

Electrical System

Electrical Enclosure

Cleaning Inside Electrical Enclosures

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

Over time, sawdust may accumulate inside of the electrical enclosures. Once every week, use a vacuum to remove sawdust from each electrical enclosure. Removing sawdust helps prevent problems with electrical components.

Sensors

This section of contains a list of all sensors and recommended maintenance.

Infeed Sensor

The Infeed Sensor detects the presence of sheathing material being fed into the saw chamber. It should be positioned to ensure sensor visibility.

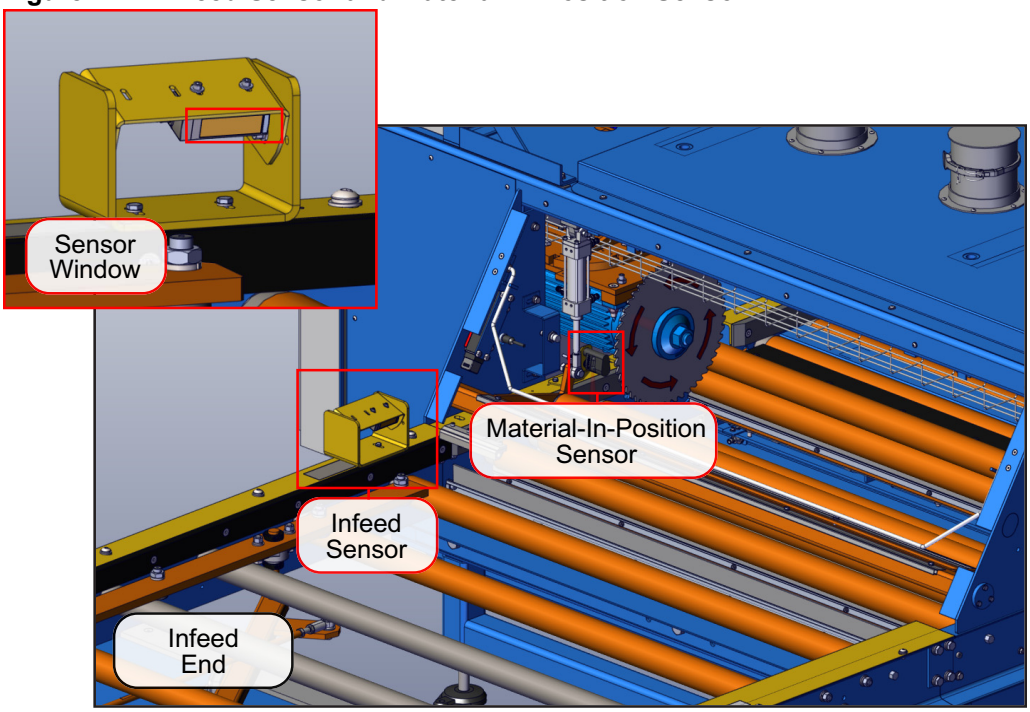
The Infeed Sensor window should be cleaned on a daily basis (see Figure 7-21). It is recommended that the window be cleaned using a common glass/plastic cleaner. The window should be sprayed and wiped down with a soft cloth to prevent damage to the surface. Do NOT use benzene, acetone, or a thinner as it will damage the surface.

Material-in-Position Sensor

The Material-in-Position sensor verifies the presence of material inside the saw chamber.

The Material-in-Position sensor should be cleaned on a daily basis or multiple times a day with heavy usage. Use a vacuum or dry cloth to remove sawdust that may accumulate around the sensor over time (see Figure 7-21).

Figure 7-21: Infeed Sensor and Material-in-Position Sensor

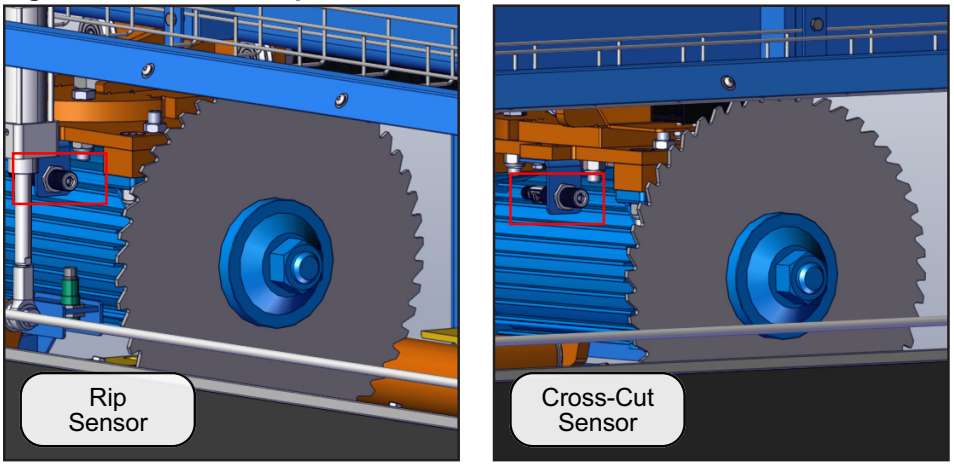


Blade Temperature Sensors

Each saw blade has a temperature sensor that will shut down the saw if the blade becomes overheated (see Figure 7-22). If this happens, inspect your saw blade and material, and replace them if needed. If the problem does not lie there, it could be an electrical problem and must be solved immediately.

When a sensor trip occurs, the safety controller, located in the controls enclosure, displays which sensor is tripped. If the safety controller displays Rip Blade Temp or CC Blade Temp, turn off power to the saw and allow the blade cool down until temperature sensor resets. Under no circumstances should you attempt to manually cool the blade. Restore operation by following the *Restart After E-Stop Procedure* on page 50.

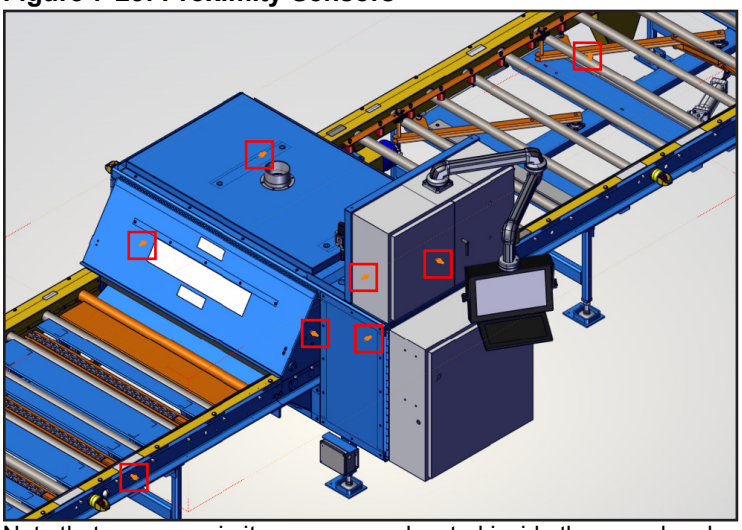
Figure 7-22: Blade Temperature Sensors



Proximity Sensors

Proximity sensors (8) that detect material at various points are located along the length of the machine. Check the locking nuts and sensor tightness every 6 months.

Figure 7-23: Proximity Sensors



Note that some proximity sensors are located inside the saw chamber

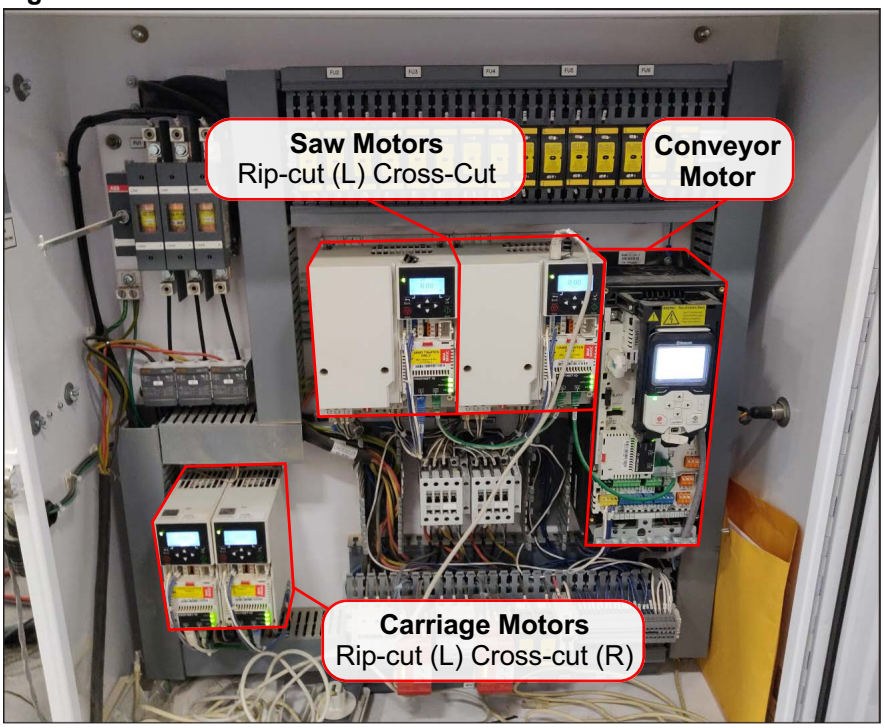
Sensor Blow-Offs

The infeed photoeye and ultrasonic sensors utilize a pneumatic blow-off to keep it clear of sawdust. For optimal performance, the blow-off must supply only dry air. Moisture in the air supply can cause sawdust to stick to the sensor. If droplets of water are being ejected from the blow-offs, the external pneumatic system that supplies air pressure to the *Twin-Axis* Sheathing Saw may require adjustment or maintenance.

VFD (Variable Frequency Drive)

A VFD is an important part of several electrical circuits in the *Twin-Axis* Sheathing Saw. Verifying the voltage of the VFD is always a good first step in the electrical troubleshooting process. See Figure 7-24 for the location of each VFD located inside the main electrical enclosure.

Figure 7-24: VFD Location and Function



If a VFD experiences a fault, the error code will display on the VFD display (Figure 7-25). See the **Fault messages** section of the VFD manual for a list of fault codes, causes, and solutions. Please contact customer support for assistance.

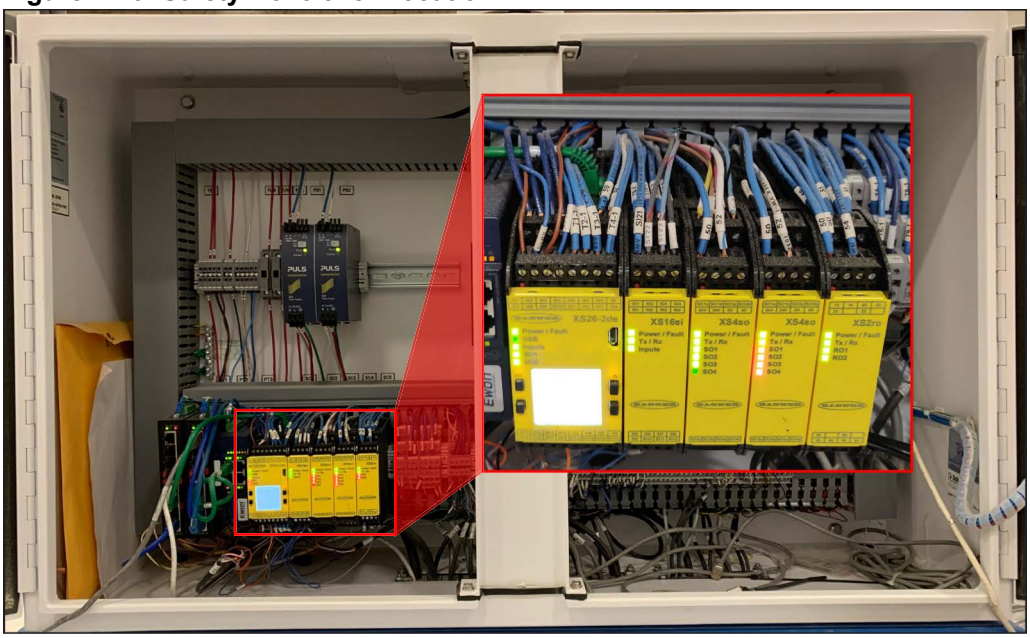
Figure 7-25: VFD Fault

Automation support is available at 800-523-3380

Safety Controller

The safety controller is located inside of the control enclosure. See **Finding and Fixing Faults** section of the safety controller manual for a list of fault codes, causes, and solutions.

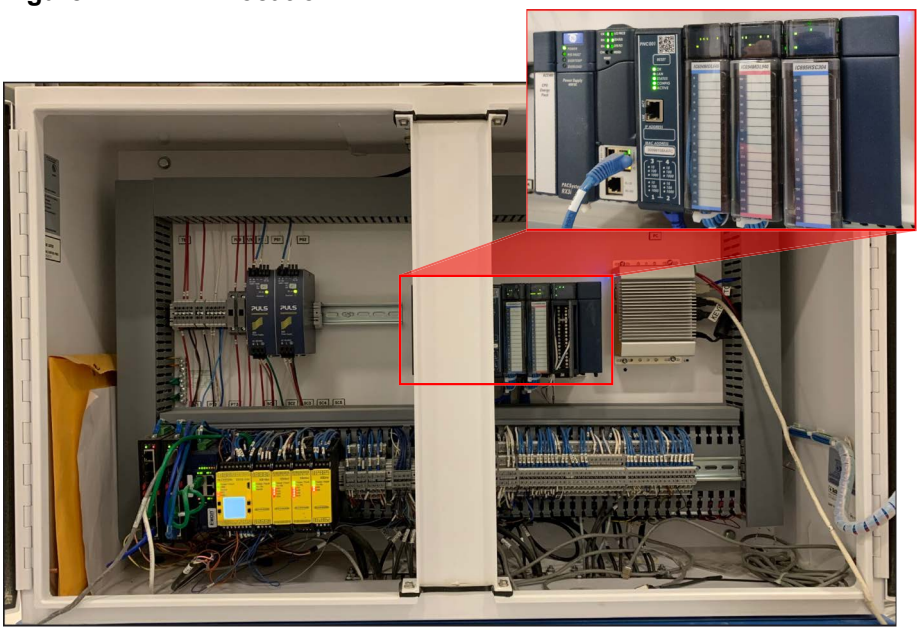
Figure 7-26: Safety Controller Location



PLC (Programmable Logic Controller)

The PLC is located inside of the control enclosure. See the PLC CPU and PLC Profinet manuals for a list of diagnostic codes, causes, and solutions. Please contact customer support for assistance with clearing unknown faults.

Figure 7-27: PLC Location



Other Maintenance

Infeed Aligner Adjustment

When properly adjusted, the infeed aligner should smoothly push material toward the infeed fence and smoothly retract without producing jarring end impacts. If the infeed aligner is not performing optimally, follow these instructions to adjust performance.

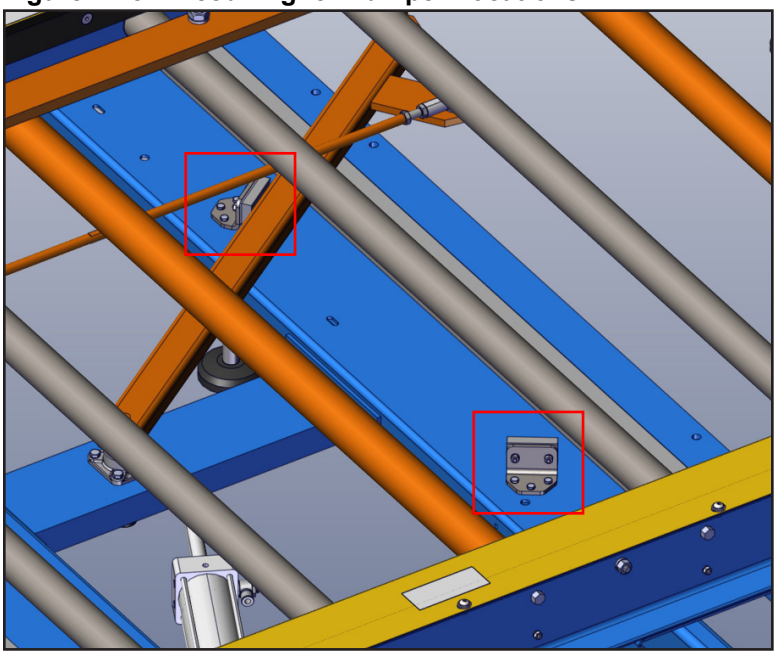
1. Set the pressure for the infeed aligner regulators to the recommended settings found in *Infeed Aligner Regulators*.
2. Adjust the cushion valves for the infeed aligner cylinder according to instructions in *Adjusting Cushion Valves*.
3. Adjust the flow control valves according to instructions in *Adjusting Flow Control Valves*.
4. Once adjustments in Steps 1-3 have been carried out, place a full sheet of sheathing material (Plywood, Zipboard, or OSB) onto the infeed conveyor so that it is not touching the infeed fence.
   - MiTek recommends using as a sample the most common sheathing material the machine is expected to cut to ensure the infeed aligner will apply sufficient force to push the material toward the fence.
5. From either the Semi Auto or Auto operating screen, select **CLAMP** to push the material toward the fence and then select **UNCLAMP** to retract the aligner.
6. If the infeed aligner now performs optimally, the adjustment has been successful.
7. If the infeed aligner still does not successfully push material toward the fence or produces jarring end impacts, adjust the pressure for the infeed regulators and/or adjust the flow control vales until optimal performance is achieved.

The aligner may need to be readjusted for optimal performance with different material types

Infeed Aligner Bumpers

Two bumpers are present to safeguard the infeed aligner against potentially jarring end impacts. Any bumpers showing visible cracks should be replaced immediately. The bumpers should be inspected every 6 months.

Figure 7-28: Infeed Aligner Bumper Locations

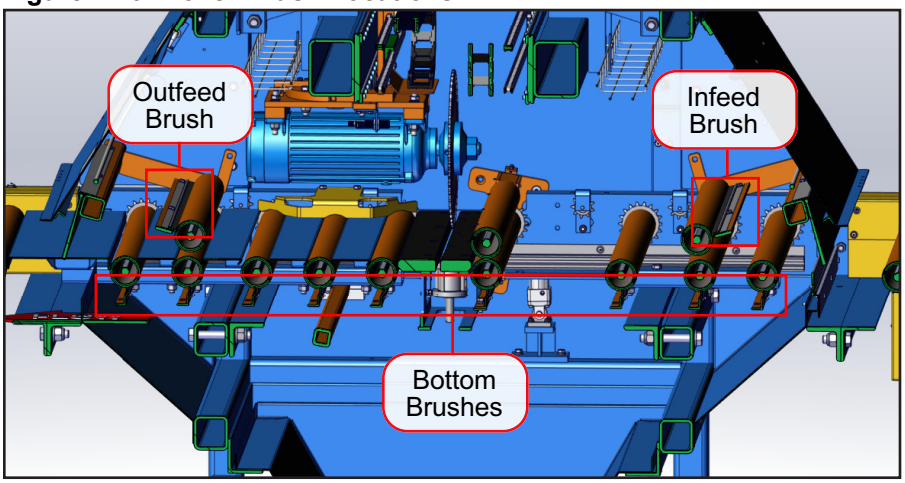


Roller Brushes

Socket wrench set

Over time, the roller brushes may become loose or otherwise degrade and need to be replaced. Roller brushes should be checked every month (one shift) or every 2 weeks (two shifts). Refer to the *Parts List* appendix for instructions on ordering parts. See Figure 7-29 for all brush locations.

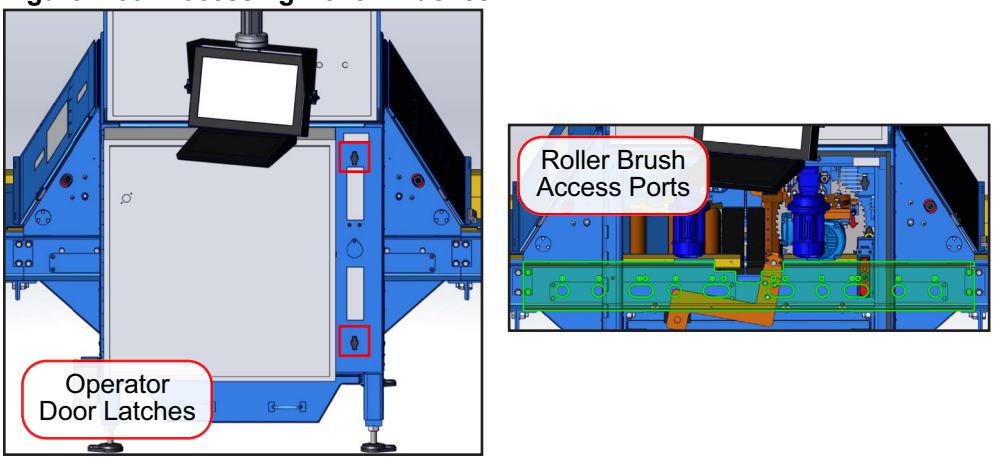
Figure 7-29: Roller Brush Locations



How to replace a brush:

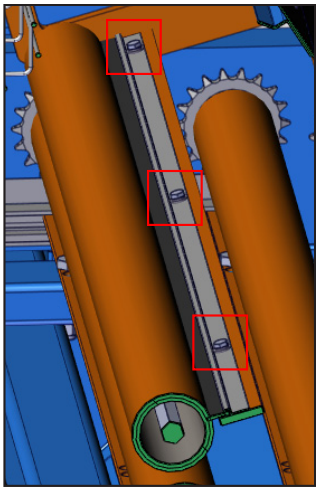
1. Lockout/tagout machine.
2. To access the brushes, release both switches and open the operator side door. (Figure 7-30)
3. Remove a port guard cover (highlighted in green in Figure 7-30) to access a specific brush.

Figure 7-30: Accessing Roller Brushes



4. Loosen the bolts holding the brush in the place.
5. Remove the old brush and install a new brush.
6. Tighten the bolts to secure the brush in place.

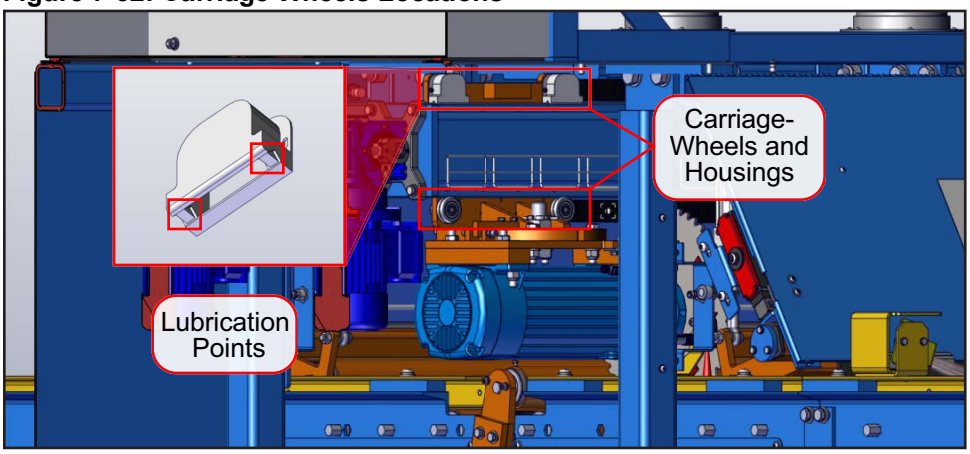
Figure 7-31: Brush Bolts



Carriage Wheels

The are 4 wheels attached to each blade motor (cross-cut and rip) that enable the blades to move along each carriage. Each wheel is contained in a housing that contains two felt strips that should be lubricated with a synthetic lubricant every 2 months (one shift) or 1 month (two shifts). See Figure 7-32 for the location of each wheel and lubrication points.

Figure 7-32: Carriage Wheels Locations

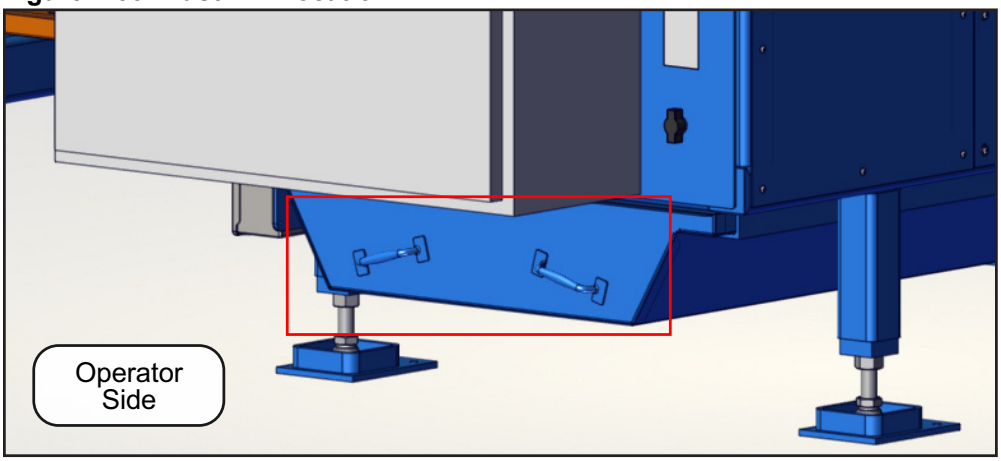


Dust Removal

Dust Bin

Saw dust should be removed from the dust bin on a daily basis. Use the two handles on the operator side of the saw to remove and empty the dust bin.

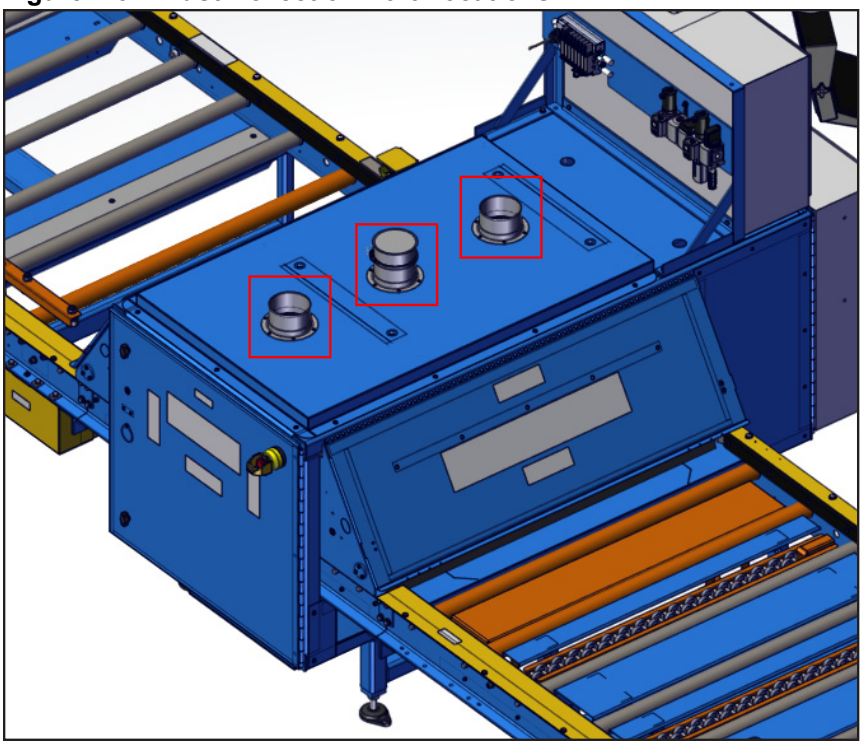
Figure 7-33: Dust Bin Location



Dust Collection Ports

A industrial dust collector can be connected to one or more of the ports on the top of the saw chamber. Ports not in use must be capped.

Figure 7-34: Dust Collection Port Locations



Troubleshooting

Navigating the Troubleshooting Appendix

The troubleshooting appendix is divided into tables according to system of the *Twin-Axis* Sheathing Saw that is experiencing problems. See Table 8-1 for a list of systems.

Table 8-1: Troubleshooting by System

System	Page
Mechanical	101
Pneumatic	102
Electrical	103

If you have reviewed the information in the *Maintenance* chapter and this chapter but have not solved your problem, please call MiTek Machinery Division Customer Service for assistance.

Getting Started with Troubleshooting

Safety Notes for Troubleshooting

Read the safety section starting on page 1. The safety test procedures in the safety section MUST be performed by qualified personnel after ANY maintenance, adjustment, or modification. Note these safety reminders:

	⚠ WARNING
	**ELECTROCUTION, HIGH PRESSURE, CRUSH, CUT, AND CHEMICAL 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.**

	⚠ CAUTION
	**Always lockout/tagout unless it is absolutely necessary to have an energized machine for troubleshooting.** **This icon indicates that you must lockout/tagout at the appropriate disconnect switch using approved methods described in OSHA CFR 1910.147 before continuing with the procedure. In the absence of this icon, it is still your responsibility to lockout/tagout when possible.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

Tools Required

When the toolbox shown in the margin appears, you should gather the tools listed below it before beginning the procedure next to which it appears.

Before beginning the troubleshooting process or calling MiTek Machinery Division Customer Service, gather the following tools:

- Insulated slotted screwdriver
- Insulated Phillips screwdriver
- Equipment manual and drawings, including any electrical schematics
- Pen and notepad
- Multimeter

  A multimeter is an electronic measuring instrument. The analog versions were referred to as a volt-ohm-meter (VOM). Digital models are referred to as digital multimeters (DMM). Your multimeter should have the following features:

  - Voltage (volts) measurement
  - Resistance (ohms) measurement
  - Current (amps) measurement
  - Ability to measure both AC and DC power
  - Autoranging feature
- PPE as required by NFPA 70e

First Steps

Mechanical Troubleshooting

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

Electrical Troubleshooting

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

	NOTICE
	**Never use compressed air inside an electrical enclosure. It may force contaminants into 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 *Twin-Axis* Sheathing Saw again. If that did not solve 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
	**ELECTRICUTION 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.
   - Determine if you are working with AC (alternating current) or DC (direct current) before checking voltage.
   - Measure incoming and outgoing voltage to and from components. Proceed in a logical order determined by your machine's specific problem, and write down the order that you check each component and the amount of voltage that the multimeter registers.

Should you lockout/tagout to perform this action safely?

Mechanical Problems and Solutions

Problem	Possible cause	Possible solution	Page
Cross-cut is inconsistent	Conveyor chain tension not set correctly	Properly set chain tension	78
	Conveyor encoder issues	Reseat encoder connector and / or check for faulty cables	
Cuts are not clean or jagged	Blade is dull	Replace blade	73
Cuts are inaccurate	Slippage on the conveyor rollers	Perform cleaning tasks on daily checklist	105
	Carriage chain tension not set correctly	Properly set chain tension	78
	Carriage encoder issues	Reseat encoder connector and / or check for faulty cables	
	Calibration issue	Recalibrate the machine	62

Should you lockout/tagout to perform this action safely?

Pneumatic Problems and Solutions

Problem	Possible cause	Possible solution	Page
End fitting blown off of hose	Improper assembly procedures, improper skiving, incorrect hose-end series, mixing incompatible components	Ensure that the hose-end is the correct fitting and is properly installed; do not intermix incompatible components	
Hose has burst or cracked	Abrasion, hose is twisted or kinked	Remove possible abrasives and twists or kinks in the hose	
	Excessive pressure	Check pressure relief for damage or improper setting	
	Hose punctured by sharp object	Check for damage and replace hose	
Ejectors are not moving smoothly or do not have enough power to move material	System pressure set improperly	Adjust system pressure	80
	Cylinder flow controls or cushions need adjustment	Adjust cylinder flow controls or cushions	84
Infeed aligner is not moving smoothly or does not have enough power to move material	System pressure or infeed regulator pressure set improperly	Follow infeed aligner adjustment process.	91
	Cylinder flow controls or cushions need adjustment	Follow infeed aligner adjustment process.	91
Air leak at tube fittings	Loose connection	Ensure system is depressurized. Disconnect tube from fitting and re-connect. Ensure hose has clean 90° cut	
Air leak in hose	Hose damaged	Replace hose; ensure area is free and clear of debris	

Should you lockout/tagout to perform this action safely?

Electrical Problems and Solutions

Problem	Possible cause	Possible solution	Page
System will not power up	Bad fuses, tripped circuit breakers	Check/replace fuses, reset circuit breakers	
Machine powers on but does not respond to operator commands	PLC or comms issues	See PLC section	90
VFD faults	Motor related issues	See VFD section	89
Safety controller faults	Safety controller issues	See safety controller section	89
Blade temperature sensor error	Worn blade or electrical issue	See *Blade Temperature Sensors*	88
Signal issues	Faulty wiring, loose connections	Check for faulty wiring and make certain all connections are secure	
	Faulty sensor or instrument	Replace sensor or instrument	
Sensor faults	Faulty wiring, loose connections	Check for faulty wiring and make certain all connections are secure	
	Sensor not properly adjusted	Properly adjust sensor	
	Sensor covered by dust, machine not cleaned regularly	Perform cleaning tasks on daily checklist	105
	Inadequate dust collection system	Install adequate dust collector	

Maintenance Checklist

Using the Maintenance Checklists

Copy these checklists and place the copies with the *Twin-Axis* Sheathing Saw. Leave the original checklists in this manual for future use.

Checklist
“Daily Checklist” on page 105
“Weekly Checklist” on page 106
“Monthly / Annual Checklist” on page 107

Safety Notes for the Maintenance Checklists

	⚠ WARNING
	**CUT AND CRUSH HAZARD.** **Perform the safety tests described starting on page 11 before operating the machine after performing maintenance or repairs.**

	⚠ WARNING
 	**ELECTROCUTION AND HIGH PRESSURE HAZARDS.** **Always turn the power off by activating an E-stop when the machine is not operating.** **Always verify that all power to the machine is off and followed approved lockout/tagout procedures (OSHA 29 CFR 1910.147) before performing any maintenance.** **Turn off the air switch or shutoff valve if appropriate. Bleed pneumatic lines if appropriate.**

Should you lockout/tagout to perform this action safely?

Daily Checklist

Month and year _____

Week of _____

⚠ WARNING

Lockout/tagout before performing maintenance.

If power is required, make sure all personnel are clear of the restricted zone.

Action	Shift	Page	Initials / Date					
Perform Safety Test	1	11						
	2							
	3							
Empty dust bin (every shift)	1	92						
	2							
	3							
Use a vacuum to clean inside saw chamber (every shift)	1							
	2							
	3							
Clean infeed sensor window	1	86						
	2							
	3							
Clean material-in-position sensor (multiple times per day with heavy usage)	1							
	2							
	3							

Should you lockout/tagout to perform this action safely?

Weekly Checklist

Year _____

	⚠ WARNING
	**Lockout/tagout before performing maintenance.** **If power is required, make sure all personnel are clear of the restricted zone.**

Action	Page	Initials / Date					
Check each blade (rip and cross-cut) for signs of wear and replace accordingly	72						
Check conveyor chain tension	78						
Use a vacuum to clean the primary electrical enclosure and the control enclosure	86						

Date	Notes

Should you lockout/tagout to perform this action safely?

Monthly / Annual Checklist

Year _____

	**⚠ WARNING** **Lockout/tagout before performing maintenance.** **If power is required, make sure all personnel are clear of the restricted zone.**

Action	Months (one shift)	Months (two shifts)	Page	Initials / Date			
Check the clevis pin in the bell crank and all bolts for wear every three (3) months	3	3	69				
Check the oil in the carriage and conveyor gearboxes	12	6	70				
Drain and change gearbox oil (every 20,000 hours minimum)	48	24	70				
Lubricate the carriage bearings	12	6	75				
Lubricate the aligner bearings	12	6	75				
Lubricate the carriage chains	2	1	77				
Lubricate the conveyor chain	2	1	77				
Check carriage chain tension	1	1	78				
Replace filter/regulator filter	6	6	82				
Purchase and install new filter/regulator service kits	24	12	80				
Observe the operation of the pneumatic infeed aligner and outfeed ejectors and adjust as needed	3	3	80				

Should you lockout/tagout to perform this action safely?

Action	Months (one shift)	Months (two shifts)	Page	Initials / Date			
Check proximity sensor locking nut and sensor tightness	6	3	88				
Check infeed aligner bumpers for visible cracking	6	6	92				
Check roller brushes for degradation	1	.5	92				

Date	Notes

Parts List

Ordering Parts

Use the MiTek web site to locate parts and part numbers, then order them using one of these methods:

By E-Mail	By Phone
Send an e-mail to mitekparts@mii.com with all relevant information, including the part number.	Call 1-800-523-3380.

Stocking Spare Parts

This appendix lists the names of the parts that should be kept in stock at your facility to greatly reduce maintenance down-time.

Safety Notes for Replacing Parts

	NOTICE
	**Use only replacement parts purchased from MiTek.** **Parts from other sources may cause damage to your machine .**

	⚠ WARNING
 	**ELECTROCUTION AND HIGH PRESSURE HAZARDS.** **Always turn the power off by activating an E-stop when the machine is not operating. Follow approved lockout/tagout procedures (OSHA 29 CFR 1910.147).** **All electrical work must be performed by a licensed electrician.** **Always verify that all power to the machine is off and followed approved lockout/tagout procedures (OSHA 29 CFR 1910.147) before performing any maintenance.** **Turn off the air switch or shutoff valve if appropriate. Bleed pneumatic lines if appropriate.**

List of Parts to Keep in Stock

1. Filter/regulator (filter element for regulator)

Drawing Set

Drawings are inserted in the back of the manual or included in a separate binder, depending on the machine.

Description	Drawing Number
Mechanical	
Top-level assembly	77725-501
Saw cabinet assembly	77726-501
Feed conveyor assembly (Right)	77727-501
Feed conveyor assembly (Left)	77728-501
Electrical	
Schematic	90705
Electrical Assembly	90705-501
Main electrical enclosure	90705-102
Control Enclosure	90705-103
Pneumatic	
Sheet aligner assembly	78218-501
Ejector assembly	78314-501
Pneumatic assembly	78339-501

Glossary

affected employee	an employee whose job requires him or 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 or her to work in an area in which such servicing or maintenance is being performed
amperage	the strength of an electric current, expressed in amperes
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
cushion	an attribute of a hydraulic cylinder that allows for adjustment of pressure at the end of a stroke
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
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 case 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
operator control interface	the method in which the operator controls the machine; it may be a touch screen, a control panel, etc.
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
proximity switch	a switch that uses an electromagnetic field to detect when an object is near, there is no physical contact between the object and the switch; inductive proximity switches detect only metal objects, capacitive proximity switches can sense both metallic and non-metallic objects
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
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

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
torque	a turning or twisting force
VFD	(variable frequency drive) controls the speed of the machine
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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