Operation and Maintenance Manual

SmartSet® Pro

Component Saw Manual

001048 Rev. A

Operation and Maintenance Manual

SmartSet® Pro

Component Saw Manual

U.S. and other patents pending.

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

Operation and Maintenance Manual

SmartSet Pro ®

Component Saw Manual

Service Bulletin or Notice #	Dated	Title

Safety (English)

For safety information in Spanish, refer to page xxiii.

Safety Indicators

The following safety alert symbols and signal words are used throughout this document to indicate safety hazards. Please pay careful attention when you see them. The level of severity differs for each symbol or signal word. The definitions below can also be found in ANSI z535.4-2002.

Failure to comply with the instructions accompanying each safety alert symbol 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, will result in death or serious injury.

WARNING

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

CAUTION

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

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

NOTICE

NOTICE

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

ENVIRONMENTAL

ENVIRONMENTAL

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

Safety Rules

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

Know Your Equipment

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

> *...a person or persons who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training, or experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work—ANSI B30.2-1983*
>
> *...one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved—NEC 2002 Handbook*

Personal Safety

- Always wear safety glasses and hearing protection in an industrial environment.
- Utilize a filtering facepiece (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.

Lockout/Tagout

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

Keeping a Safe Environment

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

Operating and Maintaining the Equipment

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

Electrical Safety

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

Lockout/Tagout

Lockout/Tagout Guidelines

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

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

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

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

Electrical Lockout/Tagout Procedures

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

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

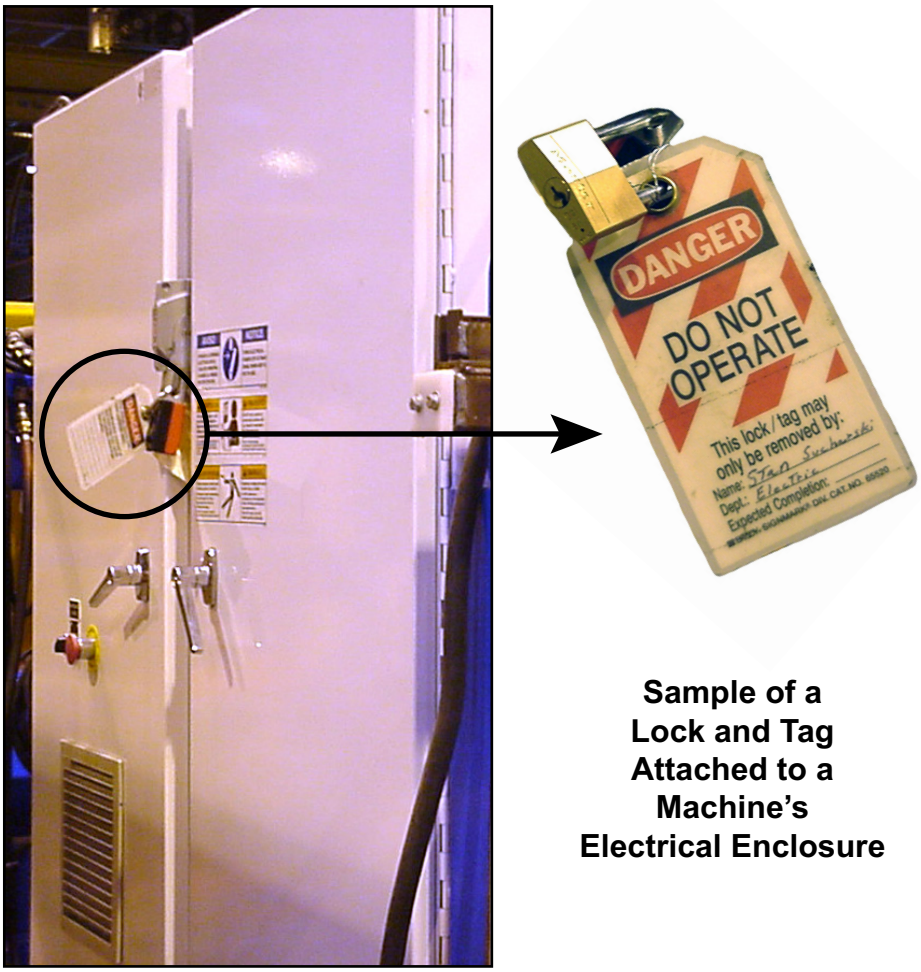
Before performing maintenance on any machine with electrical power, lockout/tagout the machine properly. When working on a machine outside of the machine's main electrical enclosure, not including work on the electrical transmission line to the machine, follow your company's approved lockout/tagout procedures 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 on the machine's main electrical enclosure to the "off" position. See Figure ii-1.

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

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

Figure ii-1: Lockout/Tagout on the Main Electrical Enclosure



Sample of a Lock and Tag Attached to a Machine's Electrical Enclosure

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

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

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

Figure ii-2: Lockout/Tagout on the Power Source Panel

Pneumatic System Lockout/Tagout Procedure

When Lockout/Tagout is Not Required

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

When Lockout/Tagout is Required

Before attempting repair or maintenance on a pneumatic line or component, lockout/tagout the machine properly. Follow your company's approved lockout/tagout procedures which should include, but are not limited to the steps here.

1. Follow instructions in the electrical and hydraulic lockout/tagout sections to lockout/tagout or prevent movement of these components.
2. Attach a lock and tag that meet OSHA requirements for lockout/tagout to the air regulator.
3. De-energize the air source (i.e., compressor)by attaching a lock and tag that meet OSHA requirements for lockout/tagout to the air source.
4. Bleed all pressure from the reservoir.
5. Bleed all pressure from all pneumatic lines by actuating all pneumatic valves associated with that air source.

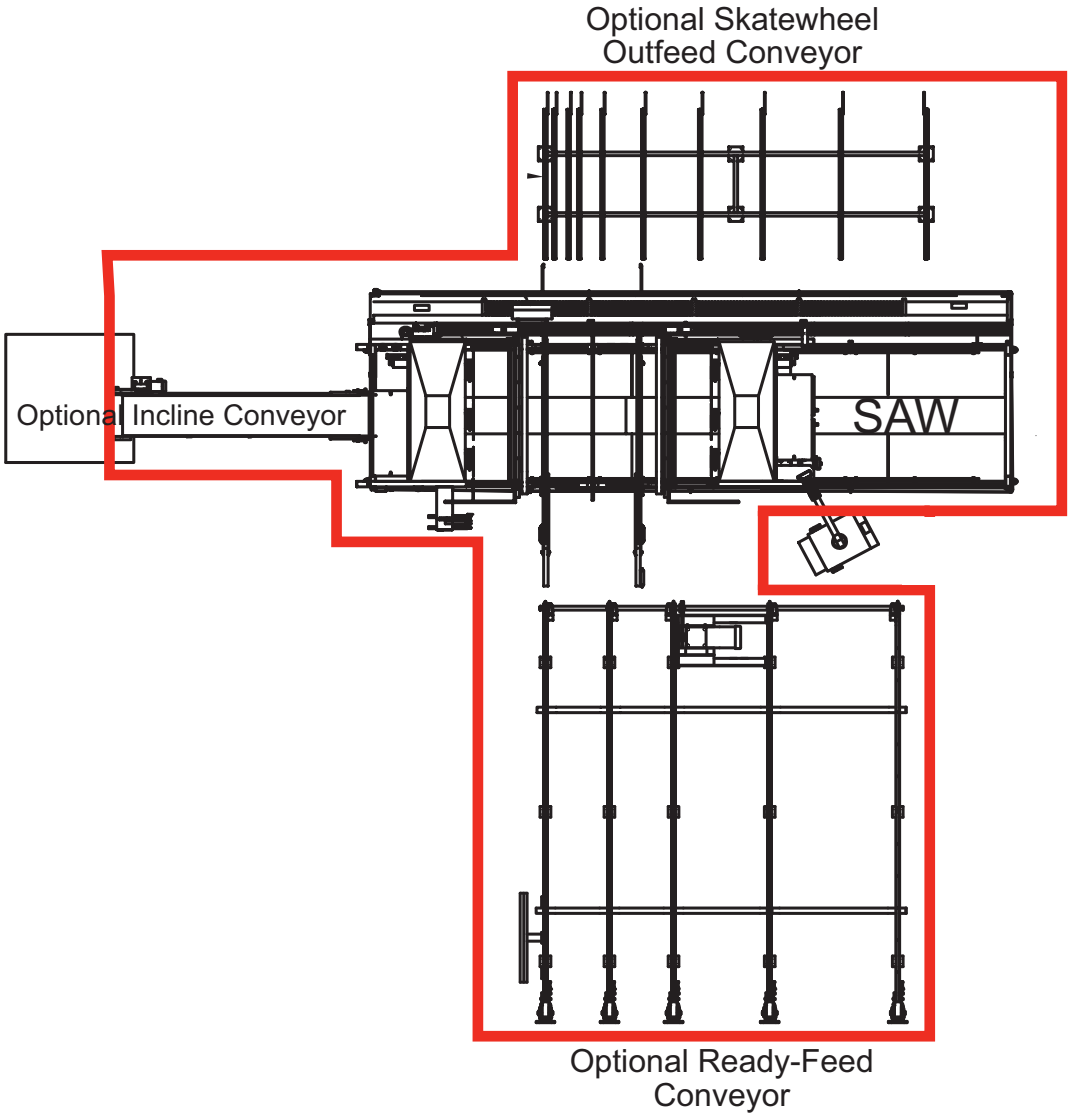
Troubleshooting With an Energized Machine

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.

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.**



Safety Test

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

The test procedure MUST be performed by qualified personnel at startup and after ANY maintenance, adjustment, or modification. Testing ensures that the E-stops and saw blades are working properly.

Testing E-Stops

Test that all E-stops are operating correctly at the beginning of each shift. To do so:

1. Start the blades using any operating mode.
2. Activate one E-stop.
    a) Ensure that all movement stops within 6 seconds. If not, correct the problem and repeat the test.
    b) The E-stop icon in the alarm bar at the top of the screen should blink in red.

    If it did not blink, there is a problem with the saw controls or E-stop circuit wiring.

    c) Try to start one of the saw blades by pressing and holding one of the start buttons.

    If the blade starts, there is a problem with the saw controls or E-stop circuit wiring.

    d) Clear the E-stop.
    e) The emergency stop icon in the alarm bar at the top of the screen should stop blinking.
3. Repeat until all E-stops have been checked.

Checking Saw Blades

	DANGER
	ELECTROCUTION, HIGH PRESSURE, CRUSH, AND CUT HAZARDS! **Disconnect power and remove compressed air using approved lockout/tagout procedures on the power and air supplies before climbing into the saw.** **Failure to properly lockout/tagout this saw and remove the air supply may cause a blade to move causing severe personal injury.**

	CAUTION
	CUT HAZARD. **Saw blades are sharp and can cause severe cuts. Always wear gloves designed for use with sharp objects when handling the blades**

stop watch

1. Check the condition of all saw blades.

   a) Visually inspect all saw blades for missing, broken, or dull teeth.

   b) Rotate the blade in the cutting direction (toward the operator side). The blade should spin freely without touching the brake and have no indication of wobble.

   c) Perform the necessary maintenance to correct any problems found.

   d) Replace all damaged or dull saw blades.

2. Test the saw blade brakes:

   Test how quickly the saw blades stop at the beginning of every shift. To do so, start all saw blades, using any operating mode, and press an E-stop or the stop sign on the touch screen. Using a stop watch, measure the time from the moment the button is pushed until all 5 or 6 saw blades are completely still. All blades must stop within 6 seconds.

Inspecting

1. While still standing in the saw waste conveyor, visually check for cables that may interfere with the proper operation of the saw. Secure cables only as necessary.

2. Check that all guards are in place and secure.

    a) Check the stationary and movable hold-down guards.

    b) Check the lumber stop guard.

    c) Check the left and right feed guards.

    d) Check the stationary and movable operator guards.

    e) Check the rear supports.

	DANGER
	**ELECTROCUTION, HIGH PRESSURE, CRUSH, AND CUT HAZARDS!** **Failure to operate the saw with all safety devices in proper working order and all safety guards in place may result in personal injury, including death.**

Seguridad (Español)

Sea cuidadoso.

Protéjase.

Indicadores de seguridad

Los siguientes símbolos de alerta de seguridad y palabras de advertencia se utilizan a lo largo de este documento para indicar riesgos de seguridad. Preste suma atención cuando los vea. Cada símbolo o palabra indica un nivel de gravedad diferente. Las definiciones incluidas a continuación también pueden consultarse en la norma ANSI z535.4-2002.

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

PELIGRO

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

ADVERTENCIA

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

PRECAUCIÓN

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

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

AVISO

AVISO

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

AMBIENTAL

AMBIENTAL

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

Reglas de seguridad

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

Conozca su equipo

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

> *...una persona o personas que, por el hecho de poseer un título o certificado de capacitación profesional reconocido o que, por sus amplios conocimientos o experiencia, han demostrado con éxito estar capacitados para resolver problemas relacionados con el tema y el trabajo en cuestión —ANSI B30.2-1983*
>
> *...una persona que posee habilidades y conocimientos relacionados con la construcción y uso de equipos e instalaciones eléctricas y que ha recibido capacitación en seguridad sobre los riesgos posibles—NEC 2002 Handbook*

Seguridad personal

- Use siempre anteojos de seguridad y protección auditiva en un entorno industrial.
- Utilice una máscara protectora cuando trabaje cerca de aserrín.
- Utilice ropa adecuada y equipo de protección personal apropiado (por ejemplo, anteojos de seguridad y protección auditiva.) No use ropa suelta ni joyas. Si tiene el cabello largo, áteselo para atrás.
- Proceda con precaución cuando levante piezas o materiales pesados.

Instalación del equipo

- Siga las instrucciones de instalación al pie de la letra.

Procedimientos de Bloqueo/Etiquetado

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

Cómo mantener un entorno seguro

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

Uso y mantenimiento del equipo

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

estar en su lugar antes y durante el uso de la máquina. No desconecte ni evite nunca ningún dispositivo de seguridad ni interbloqueo eléctrico.

- Inspeccione periódicamente la calidad del producto terminado.

Seguridad eléctrica

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

Bloqueo/Etiquetado

Pautas de bloqueo/etiquetado

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

El término "bloqueo", según se utiliza en este manual, se refiere a la colocación de un dispositivo de bloqueo en las fuentes de energía para asegurar que el dispositivo aislador de energía y el equipo controlado por éste no puedan reenergizarse o utilizarse hasta que se retire dicho dispositivo. Las fotos de la página siguiente muestran los lugares en los que se encuentran los interruptores de desconexión eléctrica de esta máquina.

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

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

Procedimientos de bloqueo/etiquetado eléctricos

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

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

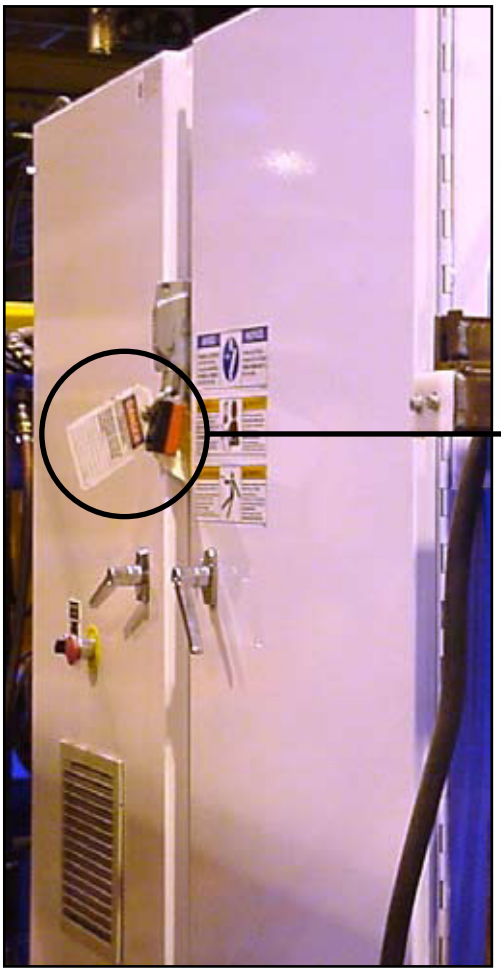
Antes de realizar el mantenimiento de cualquier máquina con alimentación eléctrica, bloquee y etiquete la máquina de forma adecuada. Cuando trabaje en una máquina fuera del gabinete eléctrico principal de la máquina, salvo en el caso de trabajos en la línea de transmisión eléctrica a la máquina, siga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

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

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

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

Figura iii-1: Bloqueo/etiquetado en el gabinete eléctrico principall



Ejemplo de un candado y etiqueta fijados al gabinete eléctrico de una máquina

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

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

1. Coloque un freno de emergencia sobre la máquina.

2. Apague la alimentación a la máquina en la fuente de alimentación, que, por lo general, es un panel de entrada de suministro eléctrico que se encuentra en una pared de las instalaciones. En la figura 2-2 se muestra un ejemplo de panel de fuente de alimentación bloqueado.

3. Coloque un candado y una etiqueta que cumplan con los requisitos de bloqueo/etiquetado de la OSHA.

4. Abra la puerta del gabinete al que necesita acceder y usando un multímetro verifique que la alimentación esté apagada.

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

Procedimiento de bloqueo/etiquetado del sistema neumático

Cuando no se requiere bloqueo/etiquetado

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

Cuando se requiere bloqueo/etiquetado

Antes de intentar reparar o realizar el mantenimiento de una línea o componente neumático, bloquee/etiquete la máquina en forma apropiada. Siga los procedimientos de bloqueo/etiquetado aprobados por la compañía, los cuales deberían incluir, entre otros, los pasos aquí indicados.

1. Siga las instrucciones de las secciones de bloqueo/etiquetado eléctrico y neumático para bloquear y etiquetar o evitar el movimiento de estos componentes.

2. Coloque un candado y una etiqueta que cumplan con los requisitos de bloqueo/etiquetado de la OSHA en el regulador de aire.

3. Desenergice la fuente de aire (por ejemplo, el compresor) colocando un candado y una etiqueta que cumplan con los requisitos de bloqueo y etiquetado de la OSHA en la fuente de aire.

4. Purgue toda la presión del reservorio.

5. Purgue la presión de todas las líneas neumáticas activando las válvulas neumáticas asociadas con dicha fuente de aire.

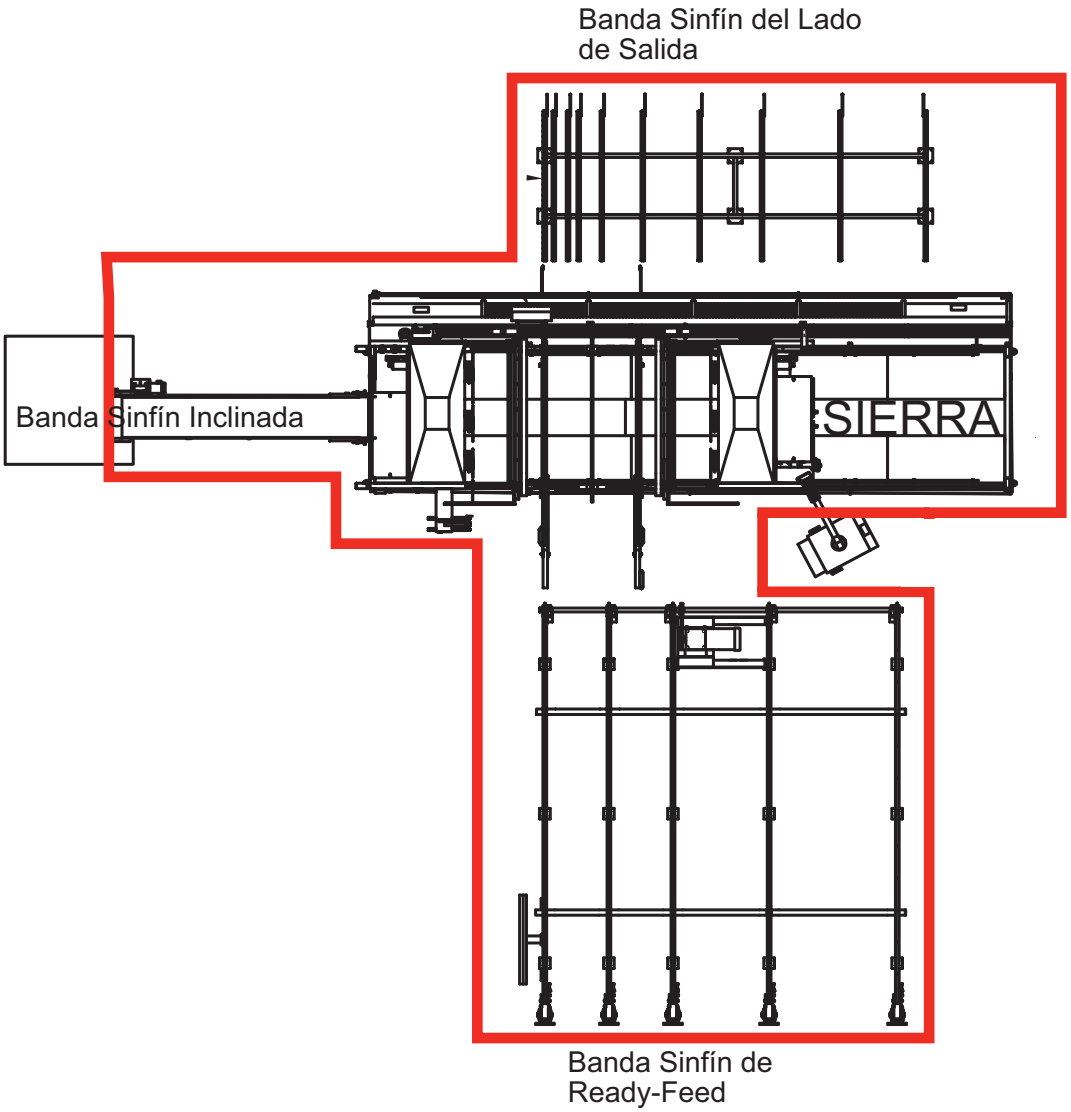
Solución de problemas con una máquina energizada

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.

Zonas restringida

	Manténgase alejado de la zona restringida cuando el equipo esté en uso. Pueden producirse lesiones graves o incluso la muerte si el personal está en la zona restringida.



Prueba de seguridad

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

El procedimiento de prueba DEBE ser realizado por personal calificado durante la puesta en marcha y después de CUALQUIER tarea de mantenimiento, ajuste o modificación. Las pruebas permiten asegurarse de que los frenos de emergencia y las hojas de la sierra estén funcionando correctamente.

Prueba de frenos de emergencia

Verifique que todos los frenos de emergencia estén funcionando correctamente al comienzo de cada turno. Para ello, proceda como se indica a continuación:

1. Ponga en marcha las hojas en cualquier modo de funcionamiento.
2. Active un freno de emergencia.
    a) Asegúrese de que las hojas se detengan completamente dentro de los 6 segundos. Si esto no ocurre, solucione el problema y repita la prueba.
    b) El icono de freno de emergencia en la barra de alarma en la parte superior de la pantalla debería parpadear de color rojo.

    Si no parpadea, hay un problema con los controles de la sierra o con las conexiones del circuito del freno de emergencia.

    c) Intente poner en marcha una de las hojas de la sierra presionando y manteniendo presionado uno de los botones de arranque.

    Si la hoja se pone en marcha, hay un problema con los controles de la sierra o con las conexiones del circuito del freno de emergencia.

    d) Desconecte el freno de emergencia.
    e) El icono de freno de emergencia en la barra de alarma en la parte superior de la pantalla debería dejar de parpadear.
3. Repita el procedimiento hasta haber verificado todos los frenos de emergencia.

Verificación de las hojas de la sierra

	DANGER
	**¡RIESGO DE ELECTROCUCIÓN, ALTA PRESIÓN, APLASTAMIENTO Y CORTE!** **Desconecte la alimentación y elimine el aire comprimido utilizando procedimientos de bloqueo/etiquetado aprobados en el suministro de alimentación y aire antes de subirse a la sierra.** **Si no se realiza el bloqueo/etiquetado adecuado de la sierra y no se elimina el suministro de aire, pueden producirse lesiones personales graves.**

	**RIESGO DE CORTE.** **Las hojas de la sierra son afiladas y pueden producir cortes graves. Use siempre guantes diseñados para trabajar con objetos afilados cuando manipule las hojas**

1. Verifique el estado de todas las hojas de la sierra.

    a) Inspeccione visualmente todas las hojas de la sierra para asegurarse de que no le falte ningún diente y que no tenga dientes rotos o desafilados.

    b) Haga girar la hoja en la dirección de corte (hacia el lado del operador). La hoja debería girar libremente sin tocar el freno y sin tambalearse.

cronómetro

    c) Realice las tareas de mantenimiento necesarias para solucionar cualquier problema que encuentre.

    d) Cambie todas las hojas de sierra que estén dañadas o desafiladas.

2. Pruebe los frenos de la hoja de la sierra:

    Verifique con qué rapidez se detienen las hojas de la sierra al comienzo de cada turno. Para ello, ponga en marcha todas las hojas en cualquier modo de funcionamiento y presione un freno de emergencia o el signo Stop en la pantalla táctil. Con un cronómetro, mida el tiempo transcurrido desde el momento en que presiona el botón hasta que 5 ó 6 hojas de la sierra se hayan detenido completamente. Todas las hojas deben detenerse dentro de los 6 segundos.

Inspección

1. Mientras está de pie en la banda transportadora de desperdicios, inspeccione visualmente que no haya cables que interfieran con el funcionamiento adecuado de la sierra. Fije los cables cuando sea necesario únicamente.

2. Verifique que todos las protectores estén en su lugar y bien fijadose.

    a) Verifique los protectores sujetadores fijos y móviles.

    b) Verifique el protector de tope de la madera.

    c) Verifique los protectores de alimentación izquierdo y derecho.

    d) Verifique los protectores fijos y móviles del operario.

    e) Verifique los soportes traseros.

	DANGER
	**¡RIESGO DE ELECTROCUCIÓN, ALTA PRESIÓN, APLASTAMIENTO Y CORTE!** **Si la sierra no se utiliza con todos los dispositivos de seguridad en perfecto estado de funcionamiento y con todos los protectores de seguridad en su lugar, pueden producirse lesiones personales, incluida la muerte.**

Introduction

Chapter 1

Purpose of Chapter

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

Introduction to the Manual

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

Purpose and Scope of This Equipment Manual

In order for this equipment manual to be useful, it must be kept in a location where operators and maintenance personnel have easy access to it.

This manual addresses the most recent versions of the equipment as of the creation or revision date on the title page. For earlier revisions, contact MiTek Machinery Division Customer Service and order the part number listed on the title page.

This manual can also be a valuable training tool.

- The *General Information* chapter contains information on truss terminology and provides basic information about the equipment.
- The *Operation* chapter teaches operators how to efficiently operate the machine.
- The *Maintenance* chapter is written specifically for maintenance personnel.
- The appendices provide valuable technical information to keep your equipment running.

Navigation

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

Table 1-1: Navigational Tools Used Throughout the Manual

Graphic	Explanation
	Important safety note!
	Indicates that you must lockout/tagout the equipment using approved methods described in OSHA 29 CFR 1910.147 before continuing with the procedure.
	Indicates tools required before beginning a procedure.
	Gives additional information to the steps or text.
	Refers reader to another section, table, graphic, or drawing for further explanation.

Formatting Cues

To follow the procedures in this manual, you must first understand the formatting cues used. Table 1-2 describes how to read the cues provided in this text.

Table 1-2: How to Read the Formatting Cues

If Text Looks Like...	It Indicates...	Example in Text
All caps	Key on keyboard or button on screen	Press ENTER
Initial cap and italic	Menu or field or virtual button that you must find or select	Click on the *File* menu
Initial cap only, no italics	Menu or field or virtual button when simply referring to it	While in the Main Menu
Plus sign (+)	Hold buttons at the same time	CTRL+ALT+DELETE
Greater Than sign (>)	Next selection	*File>Open*

Additional Resources

Supplemental Documentation

In addition to the equipment manual, refer to the manufacturer's documentation for individual components, such as the PLC. The supplemental documentation is provided at the time of installation, or it may be found inside an electrical enclosure. Refer to these documents when you need more detailed information on these components than the MiTek manual provides.

Web Site

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

Contacting MiTek

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

Figure 1-1: Contacting MiTek

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

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

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

Web Site
www.mitek-us.com

General Information

Chapter 2

Purpose of Chapter

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

Introduction to the Equipment

Purpose of the Equipment

The *SmartSet® Pro* saw is a fast, accurate, and economical method of cutting a wide array of components for wood truss manufacturing. It is capable of cutting lumber for all of your roof and floor truss needs, within certain specifications.

Description of the Equipment

The *SmartSet Pro* saw is a self-contained wood cutting machine consisting of up to six (6) blades located in two sets of three (3) blades each. One set is considered the "stationary end." The second set is considered the "carriage end" and moves for different lumber lengths.

Each blade assembly is considered a quadrant. Each quadrant is capable of tilting and elevating to cut lumber to specific angles.

Components

The *SmartSet Pro* saw consists of the following basic components:

- Machine frame with scrap conveyor
- Stationary-end assembly, featuring blades 1 and 2 (and blade 6, optional)
- Carriage-end assembly, featuring blades 3, 4, and 5
- Two feed chain assemblies
- Two hold-down assemblies
- Two dust covers
- Incline scrap conveyor assembly (optional)

Safety Procedures

Saw Blades

Inspect all saw blades twice each day, once in the morning before start-up, and again at noon. Never attempt to operate a saw blade that has chipped or bent teeth, or teeth that are not sharp. The customer has the responsibility of understanding normal wear conditions, and knowing when to change blades that are unsafe.

Alignment

Parallelism between saw blades and feed chain assemblies must be maintained and checked daily. Lumber going through the saw must travel in a straight line at right angles to the saw blades. Never allow side or twisting pressure of the lumber against saw blades.

Rotation

Make sure all blades rotate correctly. Blades must rotate against the direction of the lumber feed direction, cutting the lumber from top to bottom.

Personal Safety Procedures

All operating personnel must be familiar with the functions of the saw. Never attempt to operate this machine without first becoming familiar with all the controls, safety devices, emergency stops and general operating procedures outlined in this manual. Energy source de-energization and lockout procedures must be followed with this machine.

Cutting Material

This saw was designed to cut wood and engineered wood products (EWP). Never use the saw to cut any other material.

Cleaning the Saw

Before cleaning or clearing the saw of wedges or other debris, make sure all blades are stopped as well as conveyor belts, etc. Lockout and tagout all energy sources to the machine.

Keeping Clear of Blades and Moving Parts

Keep body and clothing well clear of saw blades and all moving parts while the machine is in use. Do not place your body in the rotational path of a cutting tool.

Protecting Hearing

Hearing protection is mandatory at all times that machine is in use.

Never Leaving the Saw Unattended

Never leave the saw unattended with the power supply on. Be certain all saw rotation has stopped and all electrical power has been shut off before leaving the machine.

Angulation

Never angulate or move any saw while the blade is in motion.

Guards

All protective guards and safety devices must be in place before and during use of the saw. Never fail to re-install in place any guard removed for maintenance, cleanup, or any other purpose. Never disconnect or bypass any safety device or electrical interlock.

Feed Conveyor and Hold-Down

Do not move the feed conveyor and/or hold-down device with the saw blades or conveyor in motion.

	WARNING
	**ELECTROCUTION, CRUSH, CUT AND PERSONAL INJURY HAZARD.** **Only qualified personnel should perform any repair or maintenance, and only after all energy sources have been de-energized and locked out.** **Failure to exercise caution may result in serious injury or death.**

Features and Options

Table 2-1 lists the main features of the *SmartSet Pro*.

Table 2-1: Main Features

Features
Individual centerline powered adjustment for each of the five saw blades
Powered angulation on all five blades
Powered carriage travel
Powered lateral adjustment for in- and out-of-cut on blade 5
Powered vertical adjustment for in- and out-of-cut on blades 1, 2, 3, and 4
Pneumatic brakes on all saw blades
24" wide full length scrap conveyor belt powered by 1 HP gearmotor
Electronic lumber counter
Heavy duty 2120 feed chains with pusher lugs
Fixed feed chain sprockets for synchronizing pushers
Rack and pinion micro-adjustable lumber stop with scale
Center lumber support
LH scarfing skid bar
RH optional with blade 6
Tru-Cut tracking blade
Master operator shut-off control
Perimeter mounted shut-down cable
Protective guards and shields

Table 2-2 lists the options available with this system.

Table 2-2: Optional Components and Features

Component	Description
Blade 6	10 HP 1725 rpm with 32" carbide tip blade
Incline scrap conveyor	12', can be mounted at either end

General Specifications

Table 2-3: General Specifications

Blades	Specs
Blade 1	7-1/2 HP–3450 rpm with 20" carbide tip blade (16" blade optional)
Blade 2	7-1/2 HP–3450 rpm with 16" carbide tip blade (20" blade optional)
Blade 3	7-1/2 HP–3450 rpm with 16" carbide tip blade (20" blade optional)
Blade 4	7-1/2 HP–3450 rpm with 20" carbide tip blade (16" blade optional)
Blade 5	12 HP–1725 rpm with 32" carbide tip blade
Blade 6 (optional)	12 HP–1725 rpm with 32" carbide tip blade
Angles	**Specs**
Blade 1	+15º through -90º
Blade 2	-15º through +90º
Blade 3	-15º through +90º
Blade 4	+15º through -90º
Blade 5	0º through +90º
Cutting	**Specs**
Maximum lumber size	2" × 12"
Maximum cut length	20'
Minimum cut length	18"
Minimum 2×4 45º cut length	24"
Maximum scarf cut length, 32" blade	29 1/2"
Maximum scarf cut length, 16" blade	10 1/2"
Maximum scarf cut length, 20" blade	16"
Cutting length specifications	± 1/16"
Dimensions of System Components	**Specs**
See Table 2-2	
Weight of System Components	**Specs**
See Table 3-4	

Truss Terminology

Table 2-4: Truss Terminology

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

Figure 2-1: Terminology Diagram

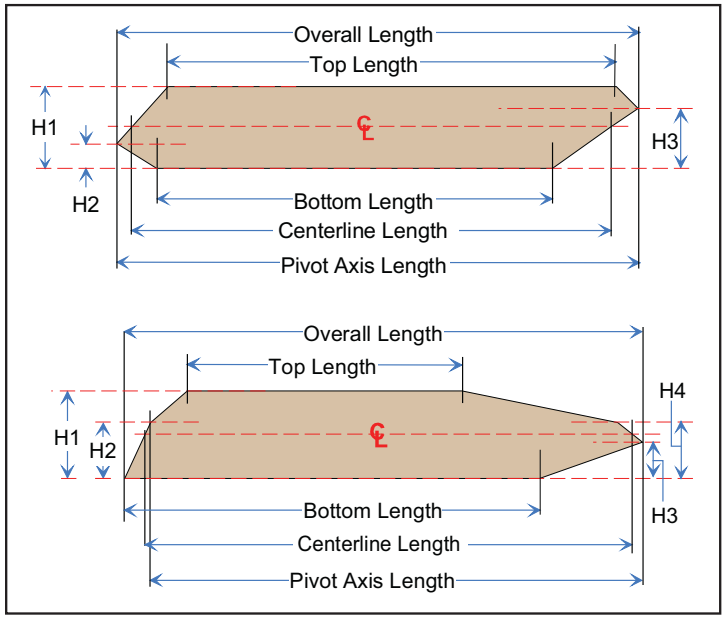
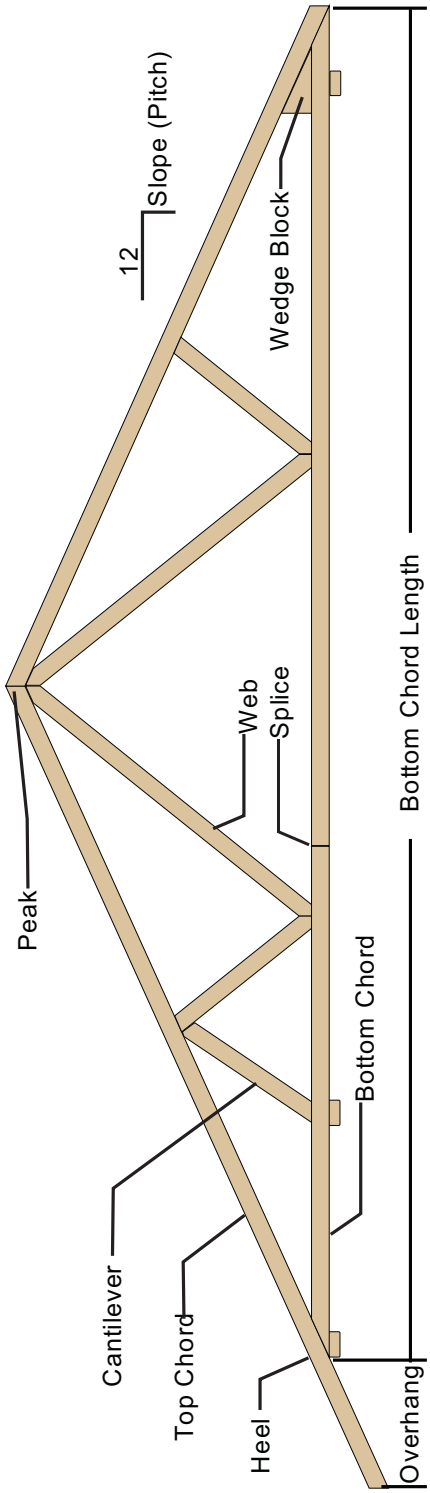


Figure 2-2: Parts of a Truss



Prior to Installation

Chapter 3

Purpose of Chapter

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

MiTek's Responsibilities

MiTek will provide the following items and information prior to the installation date:

1. A Prior to Installation package that:
   - Outlines this chapter and requests your signature of agreement.
   - Gives dates to expect shipment, delivery, and installation.
   - Explains the number of people required to help with installation.
   - Provides guidelines on providing an electrician, welder, and other specialists.
   - Describes payment information.
2. A layout of the equipment.

Customer's Responsibilities

Before the installation of your equipment, the items and procedures in this chapter must be arranged, purchased, or assembled. Table 3-1 provides an overview of these items. Each topic listed in the table is explained in detail in the text following the table.

If these requirements are not satisfied before the scheduled installation date, it may be necessary to reschedule the installation. Any additional cost may be the customer's responsibility.

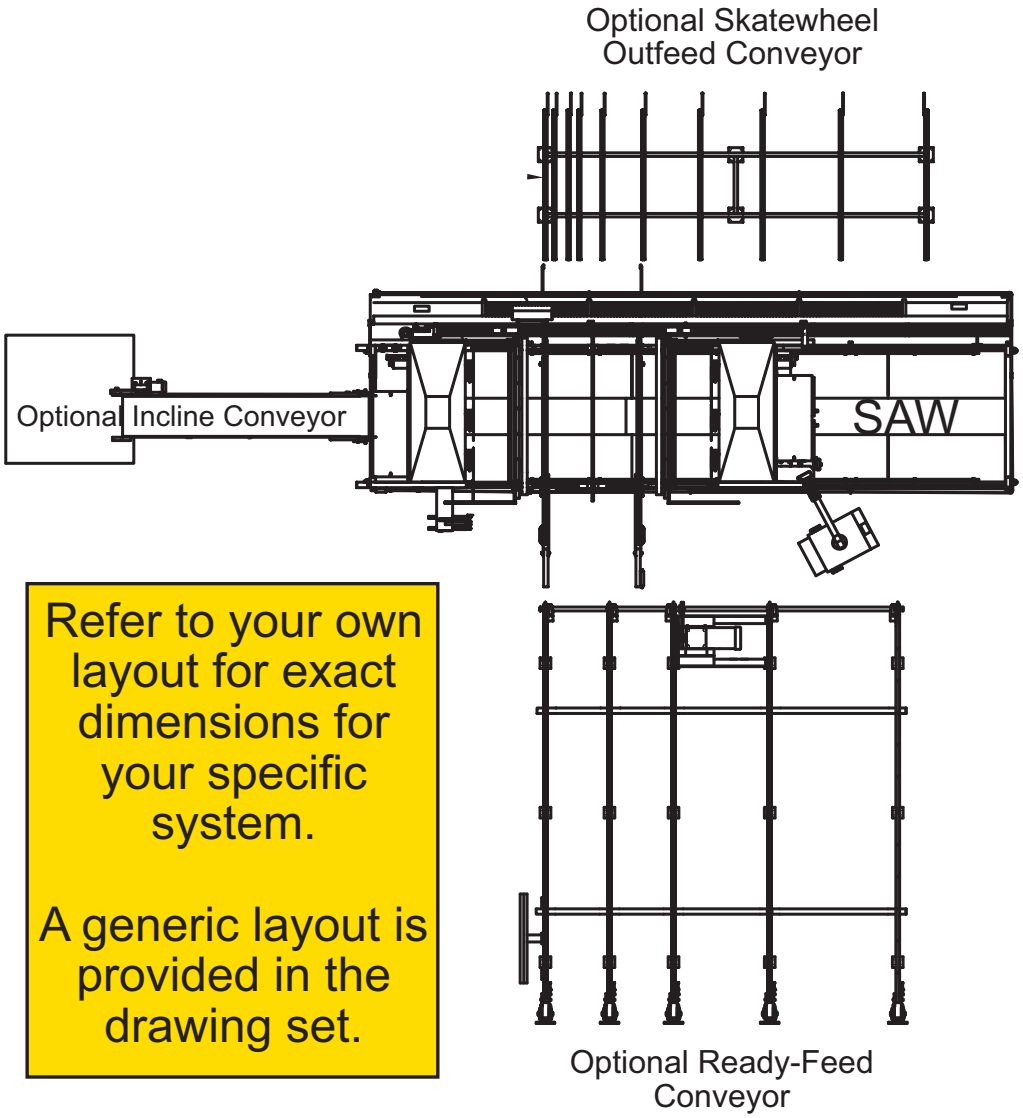
Table 3-1: Summary of the Customer's Responsibility

Space Requirements	This equipment requires enough space to allow for the machine dimensions listed in Table 3-2, plus additional working space for operation and maintenance. Space should have adequate lighting.
Location Requirements	Concrete, a minimum of 6 in. thick 3500 psi, is required under the weight of saw. The equipment discussed in this manual must be used in dry conditions under a roofed area.
Electrical Requirements	The standard electrical requirements are shown in Table 3-3. Contact your MiTek representative immediately if custom power specifications need to be arranged.
Pneumatic Requirements (Compressed Air)	See page 16.
Shipping Weights	See Table 2-6.
Customer-Supplied Items Required	The customer is responsible for having the supplies listed in Table 3-5 available at the time of installation.

Space Requirements

Refer to your individual layout when planning your space allocation. MiTek can provide help with plant layout and space utilization upon request.

Figure 3-1: Sample of a Layout for a Complete System



Space for the Equipment

It is the customer's responsibility to provide adequate space for the installation, operation, and protection of the equipment. The physical dimensions of the equipment are shown in Table 3-2. Additional space is required for operation, maintenance, and optional equipment.

Table 3-2: Approximate Equipment Dimensions

Dimension	Measurement
Overall length of saw without incline scrap conveyor	32'
Overall length of saw and incline scrap conveyor	45'
Overall width	12'
Overall height	6' 7" (with hoods 9' 1")

Space for Operation and Maintenance

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

Location Requirements

Floor Structure

A level and structurally sound concrete slab must be provided for the installation of the equipment. This slab should be designed and installed in accordance with local building code requirements and, if required, under supervision of a professional engineer. Concrete should be a minimum of 6 in. thick under the saw. Three thousand five hundred (3,500) psi concrete is recommended. Refer to your layout drawing.

Environment

The electrical enclosures are NOT for outdoor use. It is recommended that the equipment be operated in a covered area without extreme temperature changes. Under no circumstances should the electrical enclosures be sprayed with a water hose. Lighting should be adequate for safe operation and maintenance.

Electrical Requirements

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

Table 3-3: Electrical Requirements Prior to Installation

Horsepower	150 amps minimum
Voltage	220-240 Volts
FLA Plus Control Amperage	152.1 amps
Cycles (Frequency)	60 Hz
Phases	3

If the facility does not have 230 VAC electrical power, MiTek can supply a transformer to step up facility power from 208 VAC or step down power from 440 or 480 VAC. However, incoming power must be 3-phase power at 60 Hz, regardless of the voltage supplied to the saw or a transformer. Contact a licensed electrician if there is any doubt about the rating or quality of the incoming power, prior to placing your order for a saw.

WARNING

ELECTROCUTION HAZARD!

High voltage power is deadly. Only qualified electricians should perform any installation or maintenance involving electrical power provided to the saw.

When using a transformer to provide 230 VAC to the saw, wire the transformer in accordance with manufacturer's specification (provided with the transformer), in order to have 230 VAC on the output side of the transformer.

Power to the saw must be provided through an electrical disconnect rated for the required incoming power and installed in accordance with all governing regulations and the specifications in this manual. It must be installed by a qualified, licensed electrician.

Power connections at the saw are made through the top of the stationary-end electrical enclosure. Provide a suitable knockout through the enclosure for the power wires. Electrical connection will require four wires including a grounded conductor.

CAUTION

Failure to provide the rated electrical power within the allowed tolerance will cause excessive motor faults and, possibly, premature motor failure. incoming power must be balanced and free of harmonic distortion.

Consult a licensed electrician or your power provider to ensure power requirements are available and adequate.

Compressed Air Requirements

Quick disconnect fittings are not recommended because they reduce air flow, which could reduce the response time of the pneumatic blade brakes.

The saw compressed air connection is a 1/4-in. NPT female port located on the filter-regulator-lubricator (FRL) assembly mounted to the left of the stationary electrical enclosure. Connections can be hard piped to the FRL port. However, for ease of installation, it is recommended that a hose and a hose barb be used to make the final connection to the FRL assembly. This will provide some flexibility in the final placement of the saw.

Minimum pneumatic pressure required: 10 scfm @ 100 psi.

Minimum air capacity: 60 gallons.

	WARNING
	**PNEUMATIC PRESSURE HAZARD.** **Compressed air lines should be installed only by qualified personnel familiar with all governing regulations. Failure to use proper materials and installation practices can result in ruptured lines leading to personal injury, equipment damage, and equipment failure.**

CAUTION
Failure to provide the required compressed air will prevent the saw from operating. Compressed air supply must never drop below 80 psi. **Other demands on the compressed air supply due to other equipment in the facility will cause the compressed air supply to fluctuate. Ensure the air supply remains above 80 psi when other facility equipment is operating.**

Shipping Information

When the equipment arrives, you must have the proper transport and lifting equipment available to remove it from the truck and place it in your facility. Table 2-6 lists the weight of the individual components of a typical system.

	DANGER
	**Transport and lifting equipment such as forklifts and cranes must be designed and rated for the load and application The weight of each major component is given in Table 2-6.** **Inadequate transport equipment may result in property damage, personal injury, or death.**

Table 3-4: Shipping Information

Contents of Shipment	Approximate Weight
SmartSet Pro saw	Approx. 18,000 lb

Customer-Supplied Parts

The customer must supply the parts shown in Table 3-5. Some must be installed before installation occurs and some must be available for use at the time of installation.

Table 3-5: Customer-Supplied Parts

Item	Description
Compressed Air	Supply line from air compressor to air regulator that meets the requirements on page 16 Air compressor that can meet the requirements on page 16 Connector for tube from air source to 1/4" NPT port on the air regulator
Electrical Equipment	All electrical requirements to provide power to the disconnect enclosure on the saw are the customer's responsibility
Transport Equipment	Forklifts, chains and spreader bars capable of carrying the weight indicated in Figure 3-4
Tools That May Need to be Rented	Transit with measuring stick Industrial hammer-drill with 1/2x8" masonry bit

Purpose of Chapter

The purpose of the Installation chapter is to describe the entire installation process in detail. The instructions assume that the prior-to-installation requirements are satisfied.

Delivery

Responsibilities During Delivery

	WARNING
	**CRUSH HAZARD.** **Falling equipment can seriously injure o kill.** **Stand clear of load during loading, off-loading, transport, lifting, and lowering operations.** **Transport and lifting equipment such as forklifts and cranes must be designed and rated for the load and application. The weight of each major component is given in Table 3-4.**

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

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

Checking for Damage

All shipments from MiTek are covered with tarps. When your shipment arrives, check to see that the tarps are in place. Displaced tarps may indicate a potential problem.

After removing the tarps, inspect the shipment for water/moisture, debris, and damage. Report any findings as required by the transport company. Document any findings by taking photographs or a video. Note any and all damage to the saw on the truck bill of lading to ensure proper documentation for insurance claims. Without this note, any damage in transit is the responsibility of the customer to repair.

Notify MiTek Machinery Division Customer Service of any unacceptable findings discovered during the receipt inspection. Although your findings may not appear to be a problem, they may cause premature failure of components, poor performance, or erratic performance.

Do not remove straps used to hold the saw to the tractor trailer until the truck is positioned as close as possible to the point where the saw will be used. If possible, position the truck so that the saw can be lifted, and the truck can be driven out from under the saw.

Once the tractor trailer is in position, remove the shipping straps.

Lifting and Moving Methods

1. Use lifting lugs to lift the machine from the ends with the crane and spread bar. Refer to Figure 3-1 on page 20.
2. Wrap chains or straps around the legs as shown. Lift the machine with the crane. Refer to Figure 3-1 on page 20.
3. Use fork tunnels to lift the machine with the forklift truck. Refer to Figure 3-2 on page 21.

Setup

Positioning the Saw

The saw should be positioned on a flat, level concrete floor or slab with a minimum thickness of 6 in. The floor space required for this machine is 25 ft in width by 40 ft in length with an additional 15 ft in length required for the incline conveyor. After positioning the machine in its designated location, remove the incline conveyor, tail-off arms, and all accessories from the conveyor bed they were shipped in.

Figure 4-1: Lifting Methods

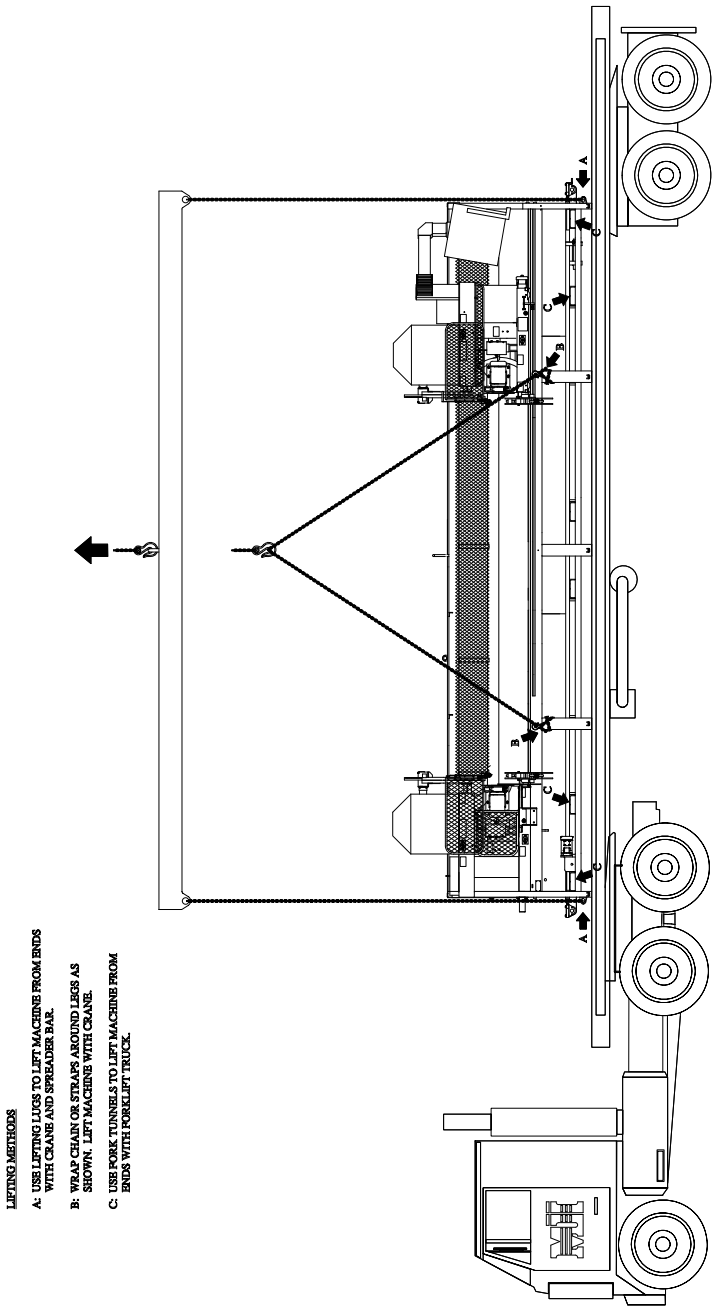
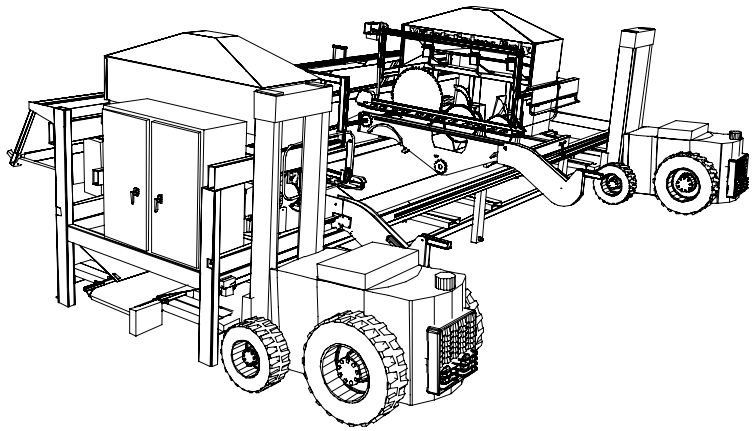


Figure 4-2: Lifting the Saw with a Forklift Truck



Leveling the Saw

To maintain accuracy of the saw it is essential that it be on a level plane. There are five leveling footpads on each side of the machine base frame for the purpose of leveling the saw.

1. After positioning the machine in its designated location, check the level both longitudinally and transversely with a transit.

2. Adjust the leveling footpads to bring the machine base to a perfectly level plane both lengthwise and crosswise.

3. After leveling is completed, lock the footpads in position with the locknut provided.

Installing Tail-Off Arms

There are two tail-off arms, a left and a right. Each one is bolted to the outside of the out-feed assembly.

It is not necessary to install the tail-off arms if you are using an outfeed skatewheel.

Installing the EasyFeed

1. Position the EasyFeed in place using bolt and locknut.
2. Rotate until the mounting screw is aligned.
3. Tighten the bolts and screws, then install the infeed chain and adjust tension 1– 2 in. deflection.
4. Repeat for the other EasyFeed and synchronize lumber pushers.

Use a forklift truck with nylon straps or chain to secure and lift the EasyFeed.

Installing the Lumber Stop

The lumber stop will be assembled using four separate sub-assemblies: the mounting bracket, the rack and guide, the lumber stop, and the pointer.

1. Install the mounting bracket first using the four bolts provided to bolt the bracket to the front panel at the left of the blade 2.
2. Install the rack and guide into the mounting bracket square tube housings from the feed chain side, with the rack gear toward the operator. When the rack engages with the pinion gear, turn the square end shaft with the crank handle for full engagement of the two gears.
3. Bolt the red lumber stop to the rack and guide using the two bolts provided.
4. Bolt the pointer to the lumber stop to the rack and guide using the two bolts provided.

Installing the Incline Conveyor (Optional)

If this is a new conveyor, there are 2 x 6 cross braces on the conveyor used for shipping. **Do not remove these cross braces.** They will be used to assist in raising the conveyor to its incline position.

The incline conveyor is normally mounted at the stationary end of the saw (to operator's left). However, the optional position (to operator's right) is sometimes specified. These instructions will apply to the installation at either end. Since the incline conveyor is rather heavy, a forklift truck should be used.

1. Locate the incline conveyor at the designated end of the saw's base frame with the drive motor and gear reducer pointed away from the saw.

2. Locate the hardware:
   - (2) 3/8-16x1-1/4 hex head cap screws
   - (2) 3/8-in. lock washers
   - (2) 3/8-in. nuts
3. Using a forklift, lift the incline conveyor and attach the leg supports.
4. Lower the incline conveyor, and reposition the forklift truck at the end of the incline farthest from the saw. Pick this end up slowly until the leg supports swing down and takes a vertical position.
5. Attach the longitudinal tie bars to the incline frame with bolts, lock washers, and nuts.
6. Lower the incline and remove the forklift.
7. Move the incline conveyor as close as possible to the main conveyor belt.
8. Attach the two (2) tie bars between the incline conveyor side angle and the vertical mounted angles on the main saw conveyor extension arms, with the bolts.
9. Level using two (2) adjustable footpads and lock the footpads in position.
10. The wiring is ready to be routed to the conveyor. It has been wound up and wire tied to the bottom of the electrical cabinet. Connect the wires to the conveyor.
    a) Cut the wire tie and run the Sealtite cable to the conveyor.
    b) Anchor the Sealtite to the frame.
    c) Connect the Sealtite to the junction box, and connect the wires (color to color). Cap the ends with a wire net.

Installing Guards

Two guards are shipped loose for field installation—one guard for the front left-hand side, and one for the front right-hand side. Both guards are attached to the respective hold-down moveable structure in such a fashion that the guards move up and down together with the hold-down. Each guard is fastened with six socket head cap screws. A rear guard assembly is shipped with the two side braces removed and the lower section of the guard strapped to the saw structure to minimize shipping width. To install the guard, remove the straps and secure the braces with hex head cap screws.

	WARNING
	**CUT HAZARD.** **All guards must be in place and operative before you operate the saws.** **Failure to exercise care may result in severe injury or death.**

The front right-hand side hold-down guard has been designed with sufficient flexibility to actuate the E-stop pushbutton under the hinged guard whenever the right end of the guard is pushed towards the saw.

Electrical

	WARNING
	**ELECTROCUTION HAZARD!** **All electrical work must be performed by a licensed electrician and in conformance with applicable codes.** **Follow approved lockout/tagout procedures.**

Before making electrical connection from the in-house supply, check the following:

- The *voltage nameplate* located on the primary (large) panel box. This is the voltage the saw has been wired for at the factory. If your incoming voltage is different from that of the nameplate, contact the factory for further instructions.
- The *ampere rating* of your service entrance box. The minimum acceptable rating is 150 amperes.

The machine has been completely wired at the factory and is ready for use except for service hookup. The following are general recommendations for conduit size, wire size, length of run, and fuse or circuit breaker size, and should be followed as closely as possible. However, consult and follow all local code requirements, because they supersede this manual.

Table 4-1: General Recommendations for Electrical Service

Electrical Service Chart	230 Volt	460 Volt
Conduit Size	1-1/4"	1"
Wire Size	AWG #3	AWG #6
Length of Run	100'	100'

A 1-3/4 in. knockout punch will be required for service entrance into the primary (large) panel box for 1-1/4 in. conduit. This knockout should be located as conveniently as possible to the disconnect switch located inside the box. Connect the three incoming source wires to the top of the main disconnect switch inside the box where it says, “line”. Close the box and secure the door.

Making Pneumatic Connections

A 3/8 in. air line with quick disconnect fitting should now be connected to the fitting on the filter, regulator, and lubricator located at the stationary end of the saw. Set the regulator to 100 psi. Refer to your pneumatic assembly drawing.

Installation Checklist

- ☐ Floor positioning
- ☐ Leveling
- ☐ Installing tail-off arms
- ☐ Installing pre-feed arms
- ☐ Installing lumber stop
- ☐ Installing incline conveyor
- ☐ Installing guards
- ☐ Electrical connection
- ☐ Pneumatic connection

Purpose of Chapter

This chapter describes the procedures required before operating your equipment.

Checking Motors before Starting

Visual Checks

Before turning the electric power on and starting the various motors, make certain they are ready for use. Make a visual check of the electrical connections and anchoring devices on the following motors:

- Horizontal scrap conveyor
- Incline scrap conveyor (if used)
- Blade 1 centerline motor
- Blade 2 centerline motor
- Stationary-end hold-down motor
- Carriage-end hold-down motor
- Blade 3 centerline motor
- Blade 4 centerline motor
- Blade 5 centerline motor
- Blade 6 centerline motor
- Blade 1 motor
- Blade 2 motor
- Blade 3 motor
- Blade 4 motor
- Blade 5 motor
- Blade 6 motor

Check the ease of rotation on each saw blade to be certain no binding or drag is evident. To do this, disconnect the air line where it plugs into the filter, regulator, and lubricator at

the rear of the main base frame. With all air disconnected, hand rotate each saw blade. They should rotate freely without binding or drag. If they do not rotate freely, chances are the brake needs adjusting. Follow the procedure for air brake adjustment in the *Adjustments and Settings* section in the *Maintenance* chapter on page 105.

Doing Pre-Start Checks

Before turning the electric power on and starting the motors, do the following pre-start checks to make certain all conditions are "go" for startup.

1. Check the emergency perimeter safety cable (pull cable) stop switch to be certain it is not tripped. If the switch has been tripped, it must be manually reset before the saw will start.

2. The swing guard switch must be pulled out to start the saw.

NOTICE

The saw will not start when the emergency limit switch has been tripped. All guards must be in place and operative.

3. Located at the operator control station, at the stationary end electrical enclosure, and at the carriage electrical enclosure are three emergency stop (E-stop) pushbuttons. Each of these pushbuttons must be pulled out to start the saw.

NOTICE

The saw will not start when the E-stop buttons are pushed in.

4. Connect the shop air supply to the machine at the stationary end where it plugs into the filter, regulator, and lubricator.

Starting Up

Whenever the emergency limit switch or emergency pushbuttons are actuated, or the air supply is disconnected, the E-stop button on the operator console indicates this condition.

Initial startup will consist of functional testing of all motion components of the saw except for the main horizontal scrap conveyor and the incline conveyor. Testing of these two items will be covered later in this chapter. See the *Adjusting Scrap Conveyor Belt Tracking* section on page 31. Conduct these tests in the order in which they are presented here to avoid pitfalls that could occur if the sequence is not followed. Before beginning the test, turn the electric power on from the in-house supply to the saw. Then turn the switch on the stationary-end electric panel of the saw to the ON position. When power to the saw is on, a green power on indicator will illuminate.

The green power-on indicator serves to warn the operator that power is on, and to remind the operator that power should be turned off whenever the saw is left unattended. Always padlock the power supply in the OFF position to prevent unauthorized use.

	WARNING
	**CUT AND PERSONAL INJURY HAZARD.** **Make sure all personnel are clear before proceeding with tests.** **Failure to exercise care may result in serious injury or death.**

To correct a failed test, refer to the *Troubleshooting* appendix.

Test 1: Feed Chain Motor

To start the feed chain conveyor, do as follows.

Press the SEMI-AUTO button to go to the Semi-Auto screen. Once there, press the MORE button to go to the Auxiliary screen. The START FEED button will start the feed chains in the forward direction. The chains will run until stopped.

The SET SPEED button will cause a pop-up keypad to open. Enter the desired feed speed as a percentage. The current speed is indicated by the feed speed bar graph. See the *Semi-Automatic Screen* section on page 58.

Test 2: Hold-Down Motors

Press the SEMI-AUTO button on the Main Menu to go to the Semi-Auto screen. On the Semi-Auto screen press the MORE button to go to the Auxiliary screen. The hold-downs stationary UP and hold-downs carriage UP buttons will move the hold-downs up. Press and hold the button until the hold-down is in the desired position. The hold-downs

stationary DOWN and hold-downs carriage DOWN buttons will move the hold-downs down. Press the hold-downs stationary UP button to raise the stationary (left) hold-down. Press the hold-downs stationary DOWN button to lower the stationary hold-down. Repeat the operation for the carriage hold-down.

Test 3: Centerline Motors

1. Press the MANUAL button on the Main Menu to go to the Manual screen.

   On the Manual screen, pressing the C-LINE + (centerline up) button will cause the centerline to move up, and pressing the C-LINE - (centerline down) button will cause the centerline to move down.

2. Press the C-LINE 3+ button.

   The centerline actuator on the blade 3 will raise the complete saw assembly. Raise it until the screen reads at 1.75. It is now set to cut on the centerline of a 2 x 4.

3. Repeat step 2 until all five saw blade centerlines are at the 1.75 reading.

   All five saw blades are now set to cut on the centerline of a 2 x 4.

4. Repeat for saw blade 6 if present.

Test 4: Lateral Adjustment Actuator

1. Press the MANUAL button on the Main Menu to go to the Manual screen.

   On the Manual screen, the 5 OUT and 6 OUT (out-of-cut) and 5 IN and 6 IN (in-cut) buttons operate air cylinders, which will physically move blades 5 and 6 back (out-of-cut) or forward (in-cut). The buttons must be held until the cylinder reaches its limit of travel.

2. Press and hold 5 IN to move blade 5 into the cut. Release the button when the blade has stopped moving.

3. Press and hold 5 OUT to move blade 5 out of the cut. Release the button when the blade has stopped moving.

Blades 5 and 6 IN and OUT buttons will not appear on the Manual screen if the corresponding blade is not installed.

Test 5: Saw Blade Angulation Motors

Press the MANUAL button on the Main Menu to go to the Manual screen.

On the Manual screen, press the ANGLE 3- (angle up) button to angulate the blade 3 up. Return it to 90° and stop. Press the ANGLE 3+ (angle down) button to cause the angle to move down. Repeat this procedure for blade 1, blade 2, blade 4, and blade 5 (and blade 6 if present).

Test 6: Saw Motors

Before this test is begun, all guards must be in place and operative. The feed chains and hold-downs must be clear of the saw blades by a minimum of 6 in. and the shop air supply must be connected to the filter, regulator, and lubricator at the rear of the main frame. Press the MANUAL button to go to the Manual screen. Once there, press the MORE button to go to the Auxiliary screen. Pressing any of the blades START buttons will release the blade brakes and start that saw blade.

1. Press the START 1 button. Blade 1 will start. After starting each blade, quickly check that the rotation is correct.

All saw blades must rotate toward the operator so as to cut lumber from top to bottom.

2. After starting blade 1 and observing correct blade rotation, push STOP at the lower right of the console to stop blade 1.

3. Pull out the STOP button and proceed to start blade 2, then blade 3, blade 4 and blade 5 (and blade 6 if present) stopping each blade before starting the next.

Test 7: Pneumatic Brakes

Every time an E-stop is activated, the blade motor air brake is actuated. The saw blade should stop rotating within 6 seconds. If it does not stop or takes too long to stop, follow the procedure for air brake adjustment in the *Air Brakes for Saw Blades* section in the *Maintenance* chapter.

Adjusting Scrap Conveyor Belt Tracking

The main conveyor belt has been tensioned at the factory before shipment. However, further adjustment is almost always required for correct tracking because of movement and vibration during shipping. If the belt is not tracking correctly, adjustments at each end will be required.

First, start the conveyor belt running by touching the scrap systems waste START button on the Auxiliary screen. See the *Auxiliary Screen* section on page 71. Observe the optional incline scrap conveyor belt to be sure it is running uphill in the right direction. If it is not running in the right direction it will be necessary to re-phase the incline conveyor motor.

Correcting Scrap Conveyor Belt Direction

1. Lock out all electric power to the saw at the main in-house electrical panel to the saw.
2. Turn the saw disconnect switch, located on the primary (large) electrical panel at the stationary end of the saw, to the OFF position.
3. Remove the front cover from the electrical junction box on the side of the incline conveyor.
4. Reverse any two black wires in the junction box.
5. Put connector caps back on the wires and replace the junction box cover.
6. Turn both electrical power switches ON.
7. Turn the scrap conveyor ON.

The belt direction should now be correct.

With the belt running, observe both ends where it goes around the rollers. It should be centered on each roller creating good tracking without rubbing on the sides. However, if the belt wanders from one side to the other and in doing so begins to rub or climb the side guides, adjustment becomes necessary. Each end must be adjusted separately to obtain true tracking.

When the belt is going to one side and climbing the side guides, adjustment to the roller on that side only is necessary. Stop the conveyor belt by pushing E-stop pushbutton. To adjust, loosen the locknut from the rear of the tension adjusting screw. Now using two 15/16 in. open-end wrenches, hold the forward shaft adjuster nut and tighten the intermediate tensioning nut against the bracket. Since this must be a trial and error method, tighten this nut only one turn at a time. Run the conveyor after each adjustment for approximately 5 minutes and observe the tracking. Repeat this at each end of the conveyor making sure the conveyor is locked out during each adjustment.

	WARNING
	**MOVING PARTS CAN CRUSH AND CUT.** **Always verify that power to the machine has been turned off and follow approved lockout/tagout procedures.**

When the adjustment is made at the drive end, it will be necessary to loosen the bolts that hold the reducer gearbox to its mounting plate, thus allowing it to move with the roller as the adjustment takes place. After each adjustment these gearbox bolts must be tightened before conveyor startup. In addition, the drive chain must be checked for proper tension before final lockup of the adjusting bolts. Proper chain tension is 1/4 in. to 3/8 in. give when top and bottom portion is squeezed midway between the sprockets.

Adjust the Optional Incline Conveyor Belt Tracking

The incline conveyor belt tension has been set at the factory, but tracking must be reconfirmed or adjusted. First start the conveyor belt running by touching the waste START button on the Auxiliary screen on page 71 in the *Operation* chapter. Again observe the incline belt as it rolls around each roller to see if it is staying between the ends of the rollers. If it is not tracking correctly, use the following procedure to correct it. If only the top roller needs adjusting, proceed in the same manner as outlined above. However, if both top and bottom or just the bottom needs adjusting, a somewhat different procedure is used.

1. Lockout/tagout the conveyor.
2. Now relax the belt tension by loosening the tension adjusting screws for the top roller.
3. Next loosen the four pillow block bearing bolts at the bottom roller.
4. Use a long screwdriver, or pry the bar to extend the bottom roller toward the saw base frame the full amount of travel that the slotted holes in the pillow block bearing allows. Do one side at a time and tighten the bearing bolts as you go. You will notice that about 1/4 in. of the bearing mounting plate protrudes behind the conveyor frame.
5. Now at the top roller, tighten the tension adjusting screws until you have 4 in. between the adjusting screw brackets.
6. Start the conveyor and observe the bottom roller first. If it is wandering to the left, tap the right pillow block housing protruding behind the frame with a rubber hammer. If it is wandering to the right, tap the left bearing housing. Do this until tracking on the bottom roller is correct.
7. Retighten the bolts. Now observe the top roller and adjust as required. The idler roller on the bottom side of conveyor is also a guide roller. Loosening the screws on the slotted flat bar brackets permits tilting the roller to correct improper tracking of belt.

Settings and Adjustments

Example 1: Bottom Chord

Refer to Figure 3-3: Saw Bottom Chord Data on page 39 and Figure 3-4: Saw Scissors Bottom Chord Data on page 40.

Type Truss:	Howe
Pitch and Span:	3:12 pitch – 24 ft-8 in. span: 1/4 in. heel
Blades used:	2, 3, and 5
Feed Speed:	Approx. middle setting on variable speed control
Lumber Size:	2 x 4
Attachments used:	Heel Cut Skid Bar
	Center Skid Bar

Settings

Blade 1:	Move out-of-cut and do not use.
Blade 2:	Set at 90°.
Blade 3:	Set at 90°.
Blade 4:	Move out-of-cut and do not use.
Blade 5:	Set at 14°.
Carriage:	Set length at 12 ft 4 in.
Centerline:	Set blade 5 at 1 in. linear mark on scale.
Lumber Stop:	Set at 1/2 in. mark to the left of "0" on scale.
Feed Chains:	Position 8–10 in. from the saw blades.
Heel Cut Skid Bar:	Position approx. 2 in. from blades, between blades and feed chain; lock in place.
Hold-downs:	Position approx. 2 in. to the inside of feed chains and set both at the 2 x 4 setting on the scale.
Center Lumber Support:	Position approximately midway between feed chains; lock in place.

To move blades 1 and 4 out-of-cut, angulate blade to 15° with horizontal plane and raise centerline above lumber width.

Trial Run

1. Turn power on.
2. Angulate blade 5–14°.
3. Be sure all other blades are at 90°.
4. Place 2 x 4 on edge in feed conveyor at the root of the lumber pivot arm, and push it against the lumber stop.
5. Press START on the touch screen.
6. The 2 x 4 will be carried into the saw by the feed chains and emerge with a 14° scarf cut and a 1/4 in. heel. It will also be trimmed to a length of 12 ft 4 in.
7. Check all dimensions on the 2 x 4 for accuracy.
8. Repeat as desired.

Example 2: Top Chord

Refer to Figure 3-5: Saw Top Chord Data on page 41.

Type Truss:	Howe
Pitch and Span:	3:12 pitch – 24 ft 8 in. span: 1/4 in. heel
Blades used:	1 and 3
Feed Speed:	Approx. middle setting on variable speed control
Lumber Size:	2 x 4
Attachments used:	Center Skid Bar

Settings

Blade 1:	Angulate to 76°.
Blade 2:	Move out-of-cut and do not use.
Blade 3:	Angulate to 76°.
Blade 4:	Move out-of-cut and do not use.
Blade 5:	Move out-of-cut and do not use.
Carriage:	Set to desired length.
Centerline:	Set blades 1 and 3 to centerline of material.
Lumber Stop:	Set at 1/2 in. mark to the left of "0" on scale.
Feed Chains:	Position 8–10 in. from the saw blades.
Heel Cut Skid Bar:	Do not use.

Hold-downs:	Position approx. 2 in. to the inside of feed chains and set both at the 2 x 4 setting on the scale.
Center Lumber Support:	Position approximately midway between feed chains; lock in place

To move the blade 2 out-of-cut, angulate blade to 15° with horizontal plane and raise centerline above lumber width. To move the blade 4 out-of-cut, angulate blade to 10° past 90° (vertical plane), and raise centerline above lumber width. To move blade 5 out-of-cut, angulate to 90° and raise centerline above lumber width.

Trial Run

1. Turn power on.
2. Angulate blade 1 to 76°.
3. Angulate blade 3 to 76°.
4. Be sure all other blade are out-of-cut.
5. Place 2 x 4 on edge in feed conveyor at the root of the lumber pivot arm, and push it against the lumber stop.
6. Press START on the touch screen.
7. The 2 x 4 will be carried into the saw by the feed chains and emerge with two 76° cuts at the length you have selected.
8. Check all dimensions on the 2 x 4 for accuracy.
9. Repeat as desired.

Example 3: Web

Refer to Figure 3-6: Saw Web Data on page 42.

Type Truss:	Howe
Pitch and Span:	3:12 pitch – 24 ft 8 in. span
Type Web:	Long
Blades used:	1, 2, 3, and 4
Feed Speed:	Approx. middle setting on variable speed control
Lumber Size:	2 x 4

Settings

Blade 1:	Angulate to 28°.
Blade 2:	Angulate to 76°.
Blade 3:	Angulate to 76°.
Blade 4:	Angulate to 14°.
Blade 5:	Move out-of-cut and do not use.
Carriage:	Set to 5 ft 8-5/8 in.
Centerline:	Set all four blades to centerline of material.
Lumber Stop:	Set at 1/2 in. mark to the left of "0" on scale.
Feed Chains:	Position 8–10 in. from the saw blades.
Heel Cut Skid Bar:	Do not use.
Hold-downs:	Position approx. 2 in. to the inside of feed chains and set both at the 2 x 4 setting on the scale.
Center Lumber Support:	Do not use.

To move blade 5 out-of-cut, angulate the blade to 90° and raise centerline above lumber width.

Trial Run

Follow procedures outlined in Trial Run for bottom and top chord. For short webs utilize the same saws and attachments following cutting list for size and cut angles

Example 4: Floor Web

Type Truss:	Howe
Pitch and Span:	3:12 pitch – 24 ft 8 in. span
Type Web:	Long
Blades used:	1, 2, 3, and 4
Feed Speed:	Approx. middle setting on variable speed control
Lumber Size:	2 x 4

Settings

Blade 1:	Angulate to 28°.
Blade 2:	Angulate to 76°.
Blade 3:	Angulate to 76°.
Blade 4:	Angulate to 14°.
Blade 5:	Move out of cut and do not use.*

Carriage:	Set to 5 ft 8-5/8 in.
Centerline:	Set all four blades to centerline of material.
Lumber Stop:	Set at 1/2 in. mark to the left of "0" on scale
Feed Chains:	Position 8–10 in. from the saw blades
Heel Cut Skid Bar:	Do not use.
Hold-downs:	Position approx. 2 in. to the inside of feed chains and set both at the 2 x 4 setting on the scale

To move blade 5 out-of-cut, angulate blade to 90° and raise centerline above lumber width.

Trial Run

Follow procedures outlined in Trial Run for bottom and top chord. For short webs utilize the same saws and attachments, following cutting list for size and cut angles. Please note that some cutting lists use 0° when the saws are vertical. This saw is 90° when saws are vertical.

Figure 5-1: Saw Bottom Chord Data

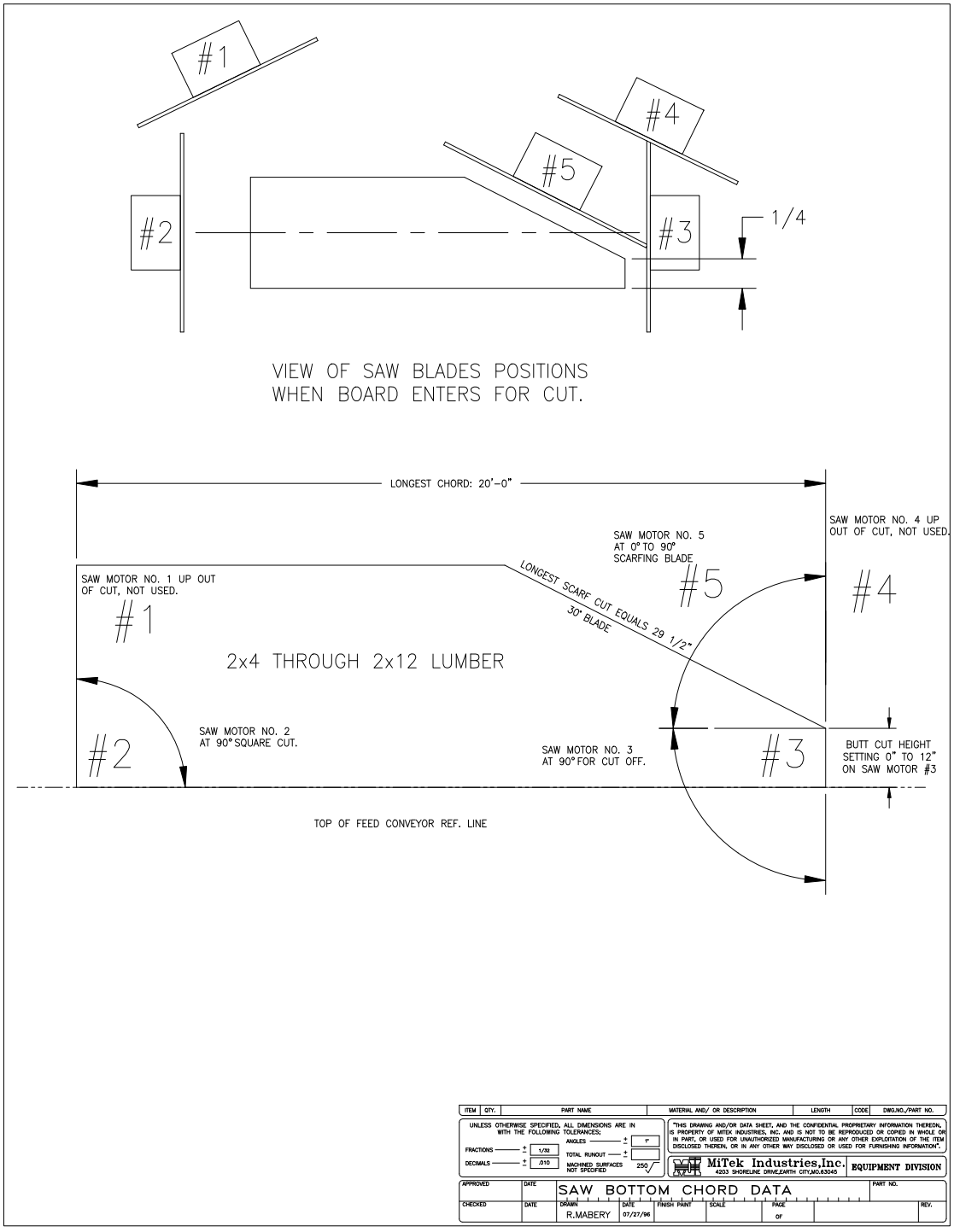


Figure 5-2: Saw Scissors Bottom Chord Data

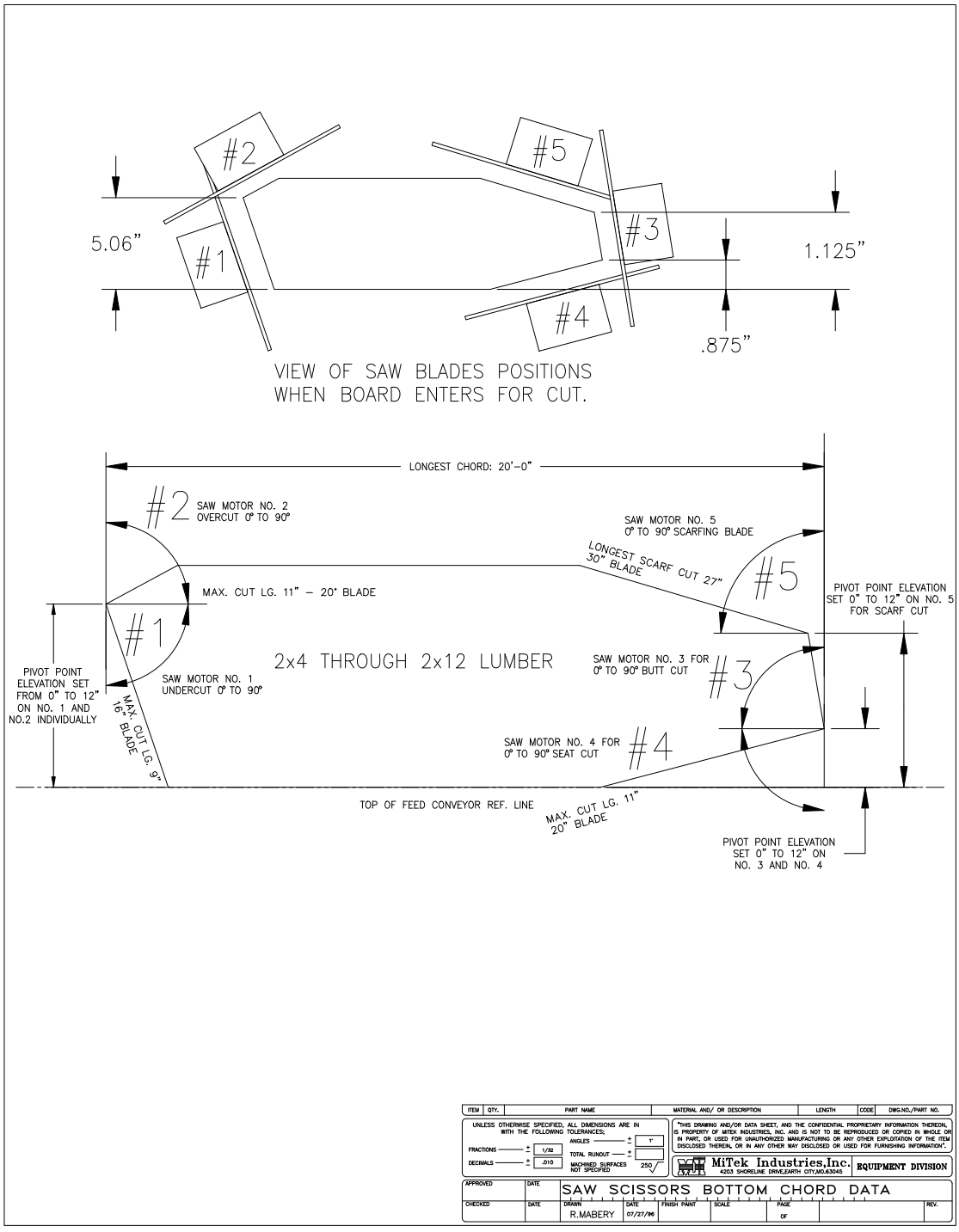


Figure 5-3: Saw Top Chord Data

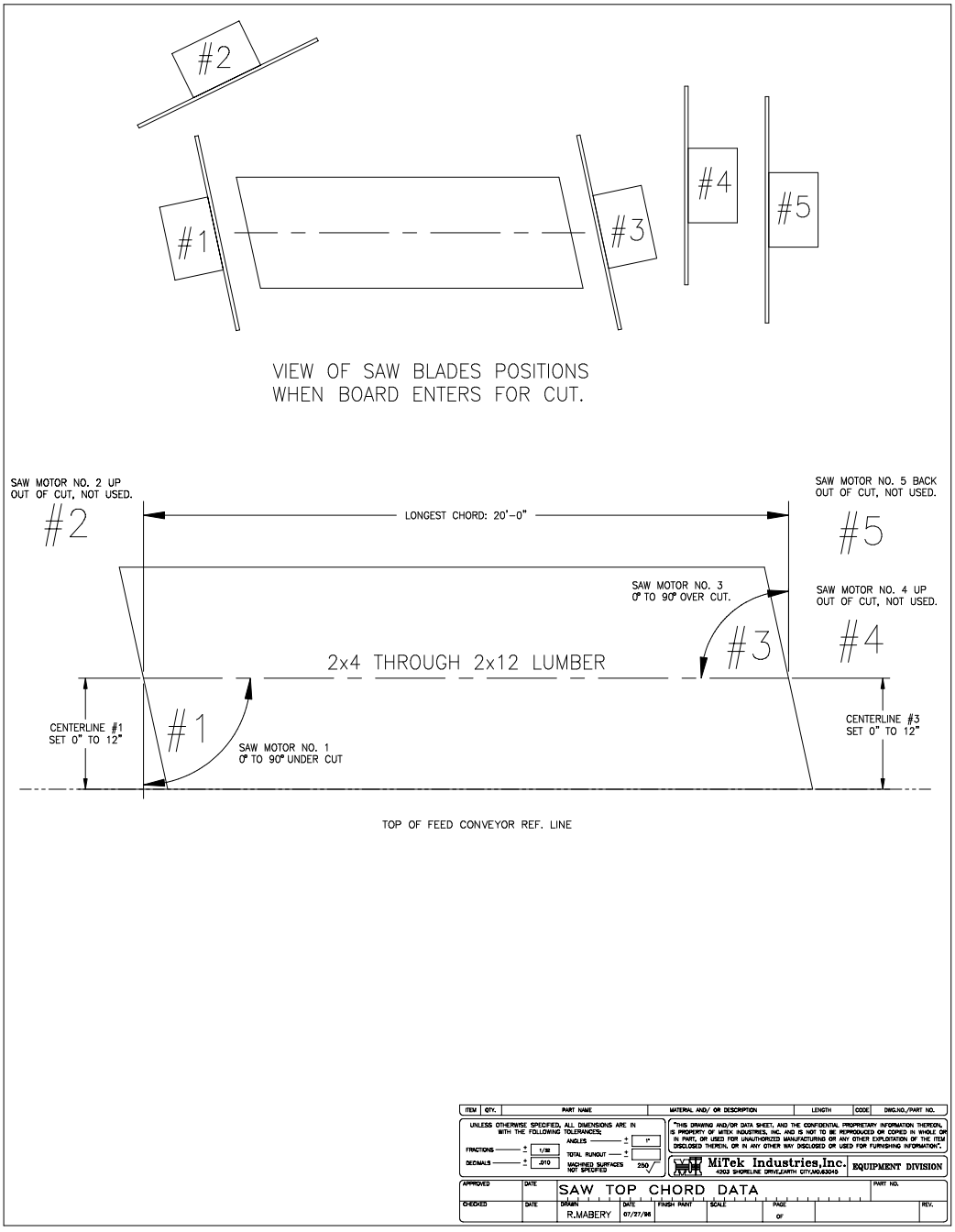
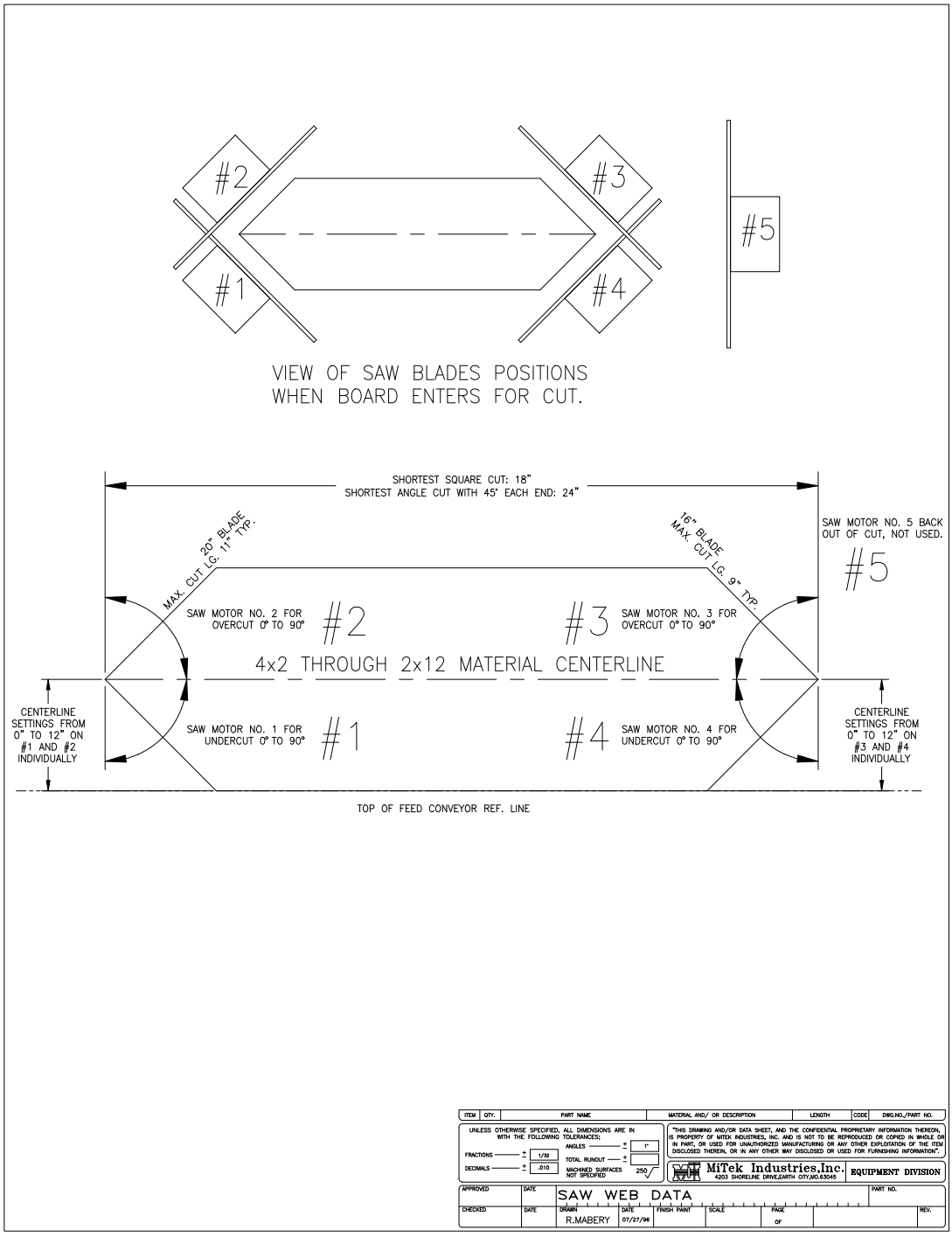


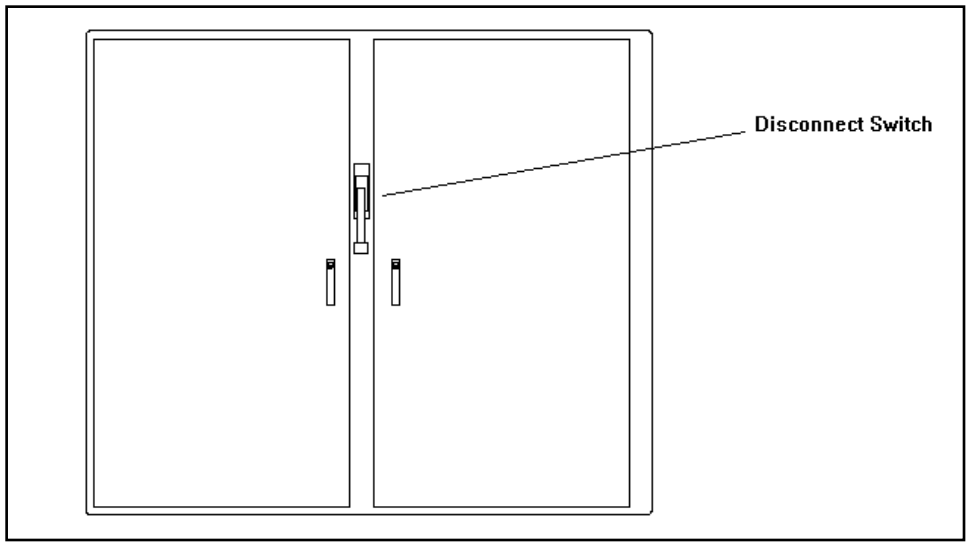
Figure 5-4: Saw Web Data



Startup

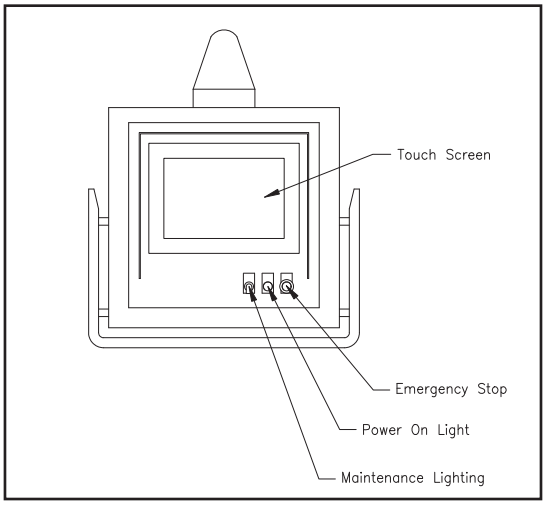
Before starting up the saw, make certain that all safety rules and procedures have been followed to ensure that no unsafe conditions exist. Turn on the compressed air supply to the saw. Make sure the disconnect switch on the carriage-end electrical enclosure is in the ON position. Turn on the main disconnect switch located on the stationary-end electrical enclosure between the doors as shown in Figure 5-1.

Figure 5-5: Disconnect Switch on Stationary-End Electrical Enclosure



The green power on light on the control panel should illuminate. Refer to Figure 5-2.

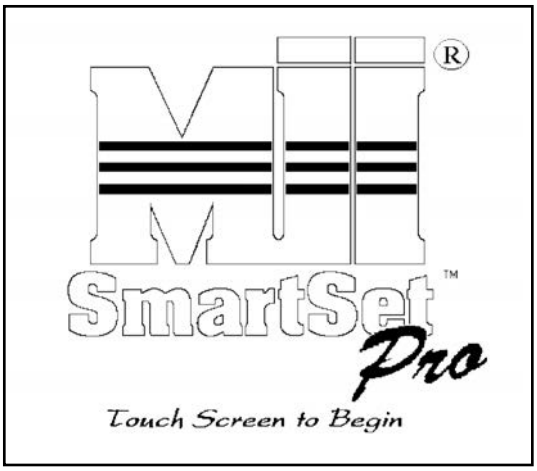
Figure 5-6: Touch Screen Enclosure



The touch screen will go through its startup sequence. Do not touch the screen until the opening page displays. The touch screen will detect the touch cell closure, and register it

as a fault. When the touch screen startup sequence is completed, the screen will display the opening screen as shown in Figure 5-3.

Figure 5-7: Touch Screen



When this screen displays, touch anywhere on the screen to start operation.

Manual Settings Checklist

The *SmartSet Pro* is approximately 3/4 automated, but some settings must be entered manually before initializing a setup. See the checklist below for items that must be entered or verifieds manually.

- ☐ Verify hold-down position and locks
- ☐ Verify infeed position and locks
- ☐ Verify lumber stop position
- ☐ Type in blade angles
- ☐ Type in centerlines
- ☐ Type in lumber size
- ☐ Type in quantity (optional)

After completing all the items in the checklist, you may initiate the setup.

Purpose of Chapter

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

Touch Screen Operation

General Operation

The *SmartSet Pro* saw uses a touch screen as the main operator interface. All electrically operated functions can be controlled either manually or semiautomatically from the touch screen. Alarm or fault conditions are also reported by the touch screen.

The touch screen is a dedicated computer running exclusive software to allow full control of the *SmartSet Pro* saw. The touch screen uses a resistive touch overlay to register operator commands. A light touch is all that is required. The touch screen responds to a "press" of the finger better than a "tap".

CAUTION

Do not use any object other than a glove or ungloved finger to press touch regions on the touch screen. Touch screen damage may result.

All buttons and any area with a border are touch regions. All touch regions will give touch feedback visually, either by flashing the interior of bordered touch regions or by displaying a "depressed" button.

CAUTION

Do not use harsh chemicals or abrasives on the touch screen. Touch screen damage will result.

The touch screen should be cleaned daily with a mild glass cleaner and a soft, lint-free rag.

Shutdown

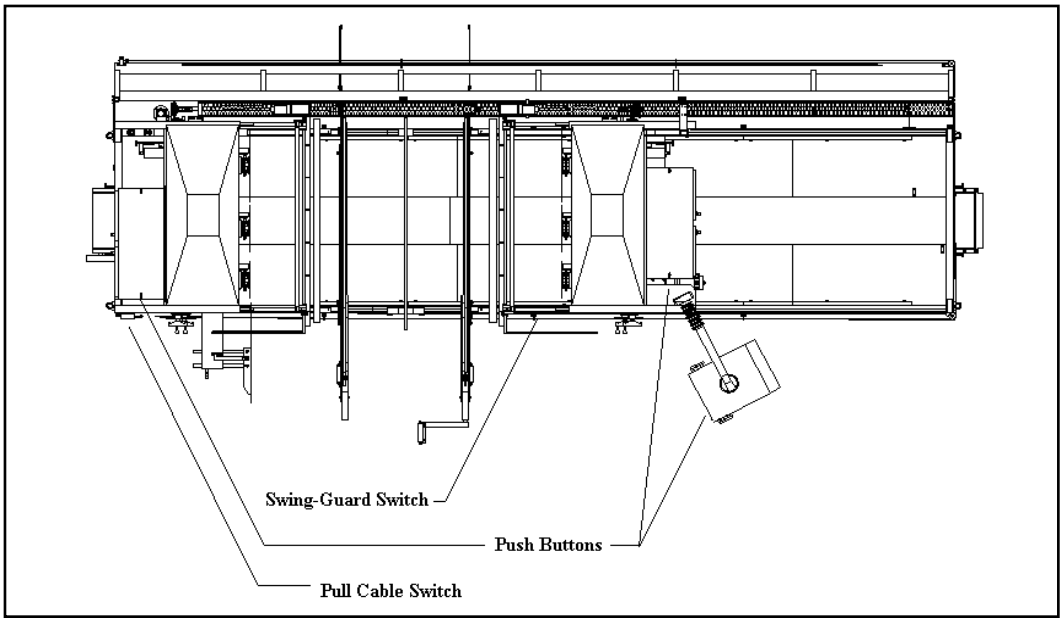
The saw can be shut down at anytime. While the power switch on the touch screen may be used to shut down the screen, it is recommended to use the main power disconnect to power down the saw. A lockout provision is included in the disconnect handles to lock out the saw prior to any maintenance work.

	WARNING
	**ELECTROCUTION HAZARD!** **Verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures before performing any maintenance.** **All electrical work must performed by a qualified electrician.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

Emergency Stop (E-Stop) Operation

	WARNING
	MOVING PARTS CAN CRUSH AND CUT. **Always verify that power to the machine has been turned off and follow approved lockout/tagout procedures.**

Figure 6-1: Operator's Control Station



E-Stop Pushbuttons

The *SmartSet Pro* saw has three E-stop pushbuttons—one located at the electrical enclosures on either end, and one at the operator's control station as shown in Figure 5-4 on page 47. The E-stop pushbutton at the operator's station also has a pilot light in it to inform the operator if any emergency stop has been activated. Pressing any of the pushbuttons will immediately stop all motion and saw blades. The pushbutton that was activated will have to be reset before operation can continue. All pushbuttons are reset by pulling out on the button.

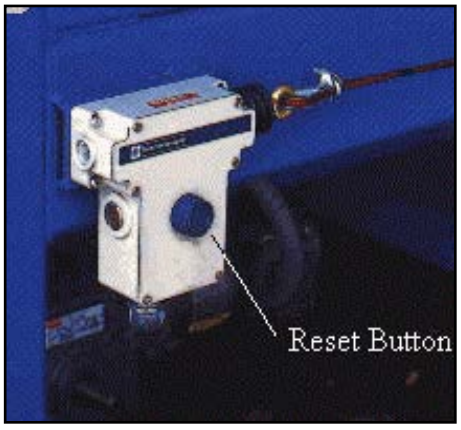
Perimeter Safety Cable

Additionally, there is a full-length perimeter safety cable (pull cable) switch. Refer to Figure 5-4 on page 47. Pull the perimeter safety cable away from the saw to cease power transmitting to the control circuit. The cable should be pulled until a click is felt and the E-stop is triggered. If too much slack is present the two-direction switch will also trigger. Re-tension the cable as necessary.

Reset the perimeter cable switch by pushing the blue reset button on the switch housing as shown in Figure 5-5.

The perimeter safety cable should be checked for proper tension in summer and winter, since the cable expands or contracts based on ambient temperature.

Figure 6-2: Reset Button on Perimeter Safety Cable Switch



Calibration

It is important to follow the correct calibration procedure. Failure to follow this procedure can lead to inaccurate cuts.

The *SmartSet Pro* saw uses second generation auto-calibration technology to maintain cutting accuracy. Each angle and centerline has a home proximity switch mounted in a fixed location (45° for the angles, 7 in. for centerlines 1-4, and 2.5 in. for centerlines 5-6). Anytime an axis passes its home prox while moving in one direction, the controller will recalibrate the axis to this position.

The program in the controller has a routine to validate these home prox positions. If after running past a home prox the axis still has a calibration error, the operator should calibrate the axis manually from the touch screen. The difference between the actual position (the value entered by the operator) and the indicated position (given by the touch screen) is termed the "error." This error is added or subtracted from the value for the location of the home prox.

For example, if after passing the home prox a blade is indicated at 90°, but the blade is actually at 89.5°, the error is .5°. The value for the location of the home prox is .5° too low (the prox is at 44.5° instead of 45°). The controller will subtract .5° from the value for the position of the home prox. This will allow the controller to recalibrate the axis to the correct value the next time it passes the home prox.

Because of this, it is very important that the calibration is not changed from the touch screen unless the axis is run past its home prox first. When an axis is determined to be out of calibration, follow the procedure given.

The angles will auto-calibrate in the following direction:

Blades 1, 4	As blades move from 0° to 90°
Blades 2, 3, 5, 6	As blades move from 90° to 0°

The length does not auto-calibrate. It may be calibrated anytime it is necessary.

For Angles

1. Set the blade in question to 90°.
2. Send the blade to 30°.
3. Return the blade to 90°. Cut a board at this angle and check it for square.
4. If the cut is square the blade auto-calibrated correctly. Stop here.

5. If the cut is not square, use the Manual screen to adjust the blade angle.
6. Make adjustments and test cuts until the cut is square.
7. Enter 90° for the blade on the Calibration screen**.**
8. Send the blade back to 30°, and bring back to 90°.
9. Make another test cut to confirm calibration. If the cut is square, stop here; if not, repeat steps 5–9.

For Centerlines

1. Set the blade in question to 90° and 1–12 in. centerline height.
2. Send the blade to 10–00 in. (6–00 in. for blades 5 or 6)
3. Return the blade to 1–12 in.
4. Using the Auxiliary screen make a cut at these settings.
5. Back the board out far enough to clear the blade. Do not bring the board out from under the hold-downs.
6. Send the blade to 45° and make another cut on the same board.
7. Back the board all the way out of the saw.
8. Using a framing square, measure from the bottom of the board to the place where the 90-degree and 45-degree angles meet.
9. If this measurement is 1–12 in. the centerline auto-calibrated correctly. Stop here.
10. If the measurement is not 1–12 in. enter this measurement for the centerline on the Calibration screen**.**
11. Repeat steps 1–9 to confirm calibration.

For the Length

1. Set the blades 2 and 3 to 90° and 1–12 in. centerline height.
2. Set the length to any desired position.
3. Cut a board at these settings.
4. Measure the board, and enter this measurement for length on the Calibration screen**.**

Screens

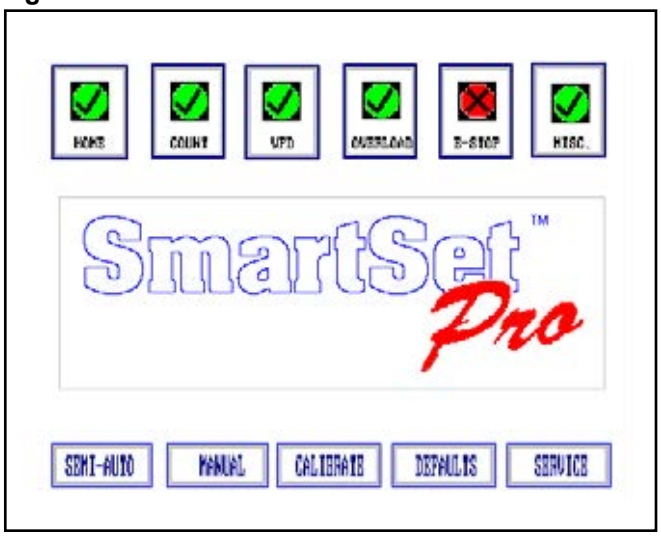
Screen Information

Any area on any screen that has a border is a control. Touching that zone will cause an action to occur.

Main Menu

The initial screen displayed after screen startup is the Main Menu. This screen allows the operator to access various other screens to control each function of the saw. This screen also displays the status indicators for the saw's systems as shown in Figure 5-7.

Figure 6-3: Main Menu Screen



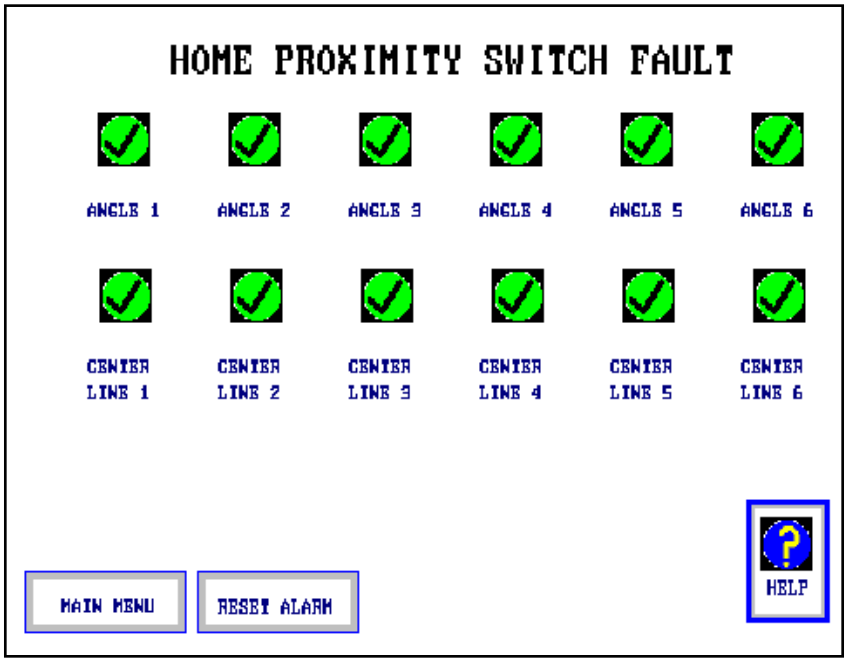
In this manual, screen items that cause an action are termed *controls* or *buttons*, items that show status or faults are called *indicators*, and items that show numerical data are called *displays*.

The status (alarm) indicators will show a green check mark when a system is OK and a red X if a fault exists. Touching the status indicators will take you to the Fault screens**,** which will provide more detailed information.

Touching any of the page controls will take you to that operation screen.

Fault Screens

Figure 6-4: Home Proximity Switch Fault Screen



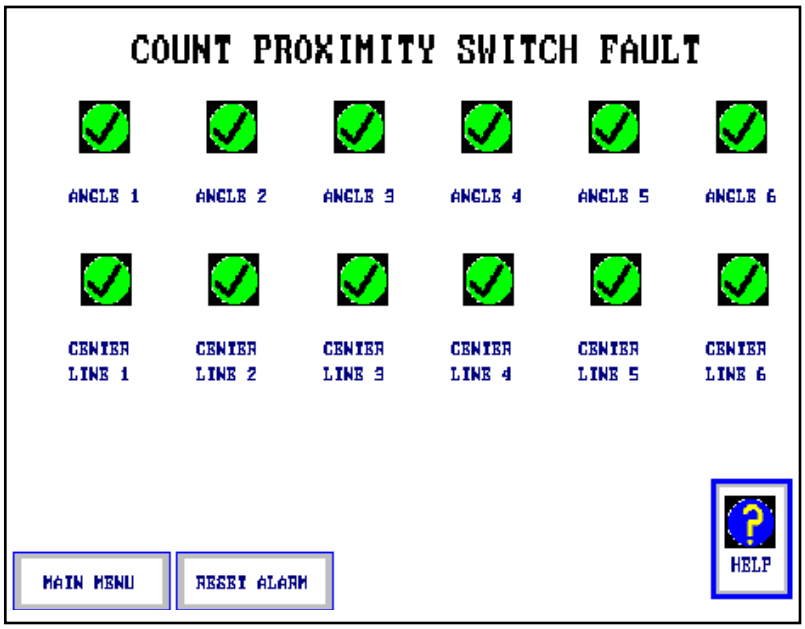
A home proximity fault can occur two ways: if the proximity switch sees the target outside of the home zone, or if the proximity switch does not see the target in the home zone.

If a home proximity fault occurs, press RESET ALARM. If the alarm clears, this indicates a “missed target” home proximity fault. These are usually caused by a proximity switch that is either faulty or not adjusted correctly. If the alarm will not clear, this indicates a “target out of home zone” home proximity fault. These are usually caused by the axis being out of calibration.

Press RESET ALARM to clear the fault.

The HELP button will display the Home Prox Help screen, which will provide additional information on how to clear the fault. The MAIN MENU button will return you to the Main Menu.

Figure 6-5: Count Proximity Switch Fault Screen

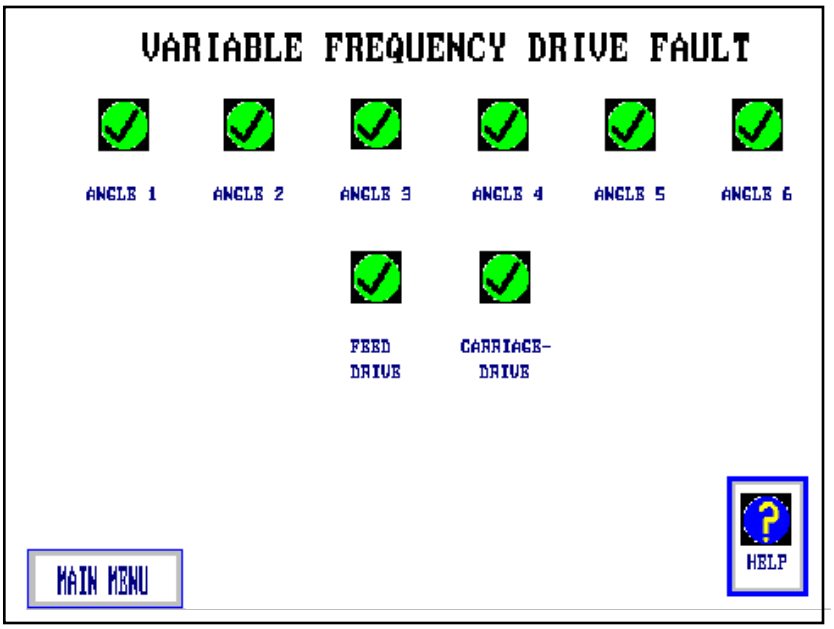


A count fault occurs when an axis is commanded to move, and the controller does not receive any position feedback pulses from the count proximity switch. This can be caused by a faulty proximity switch or by a stalled axis.

Press RESET ALARM to clear the fault.

The HELP button will display the Count Prox Help screen, which will provide additional information on how to clear the fault. The MAIN MENU button will return you to the Main Menu.

Figure 6-6: Variable Frequency Drive Fault Screen



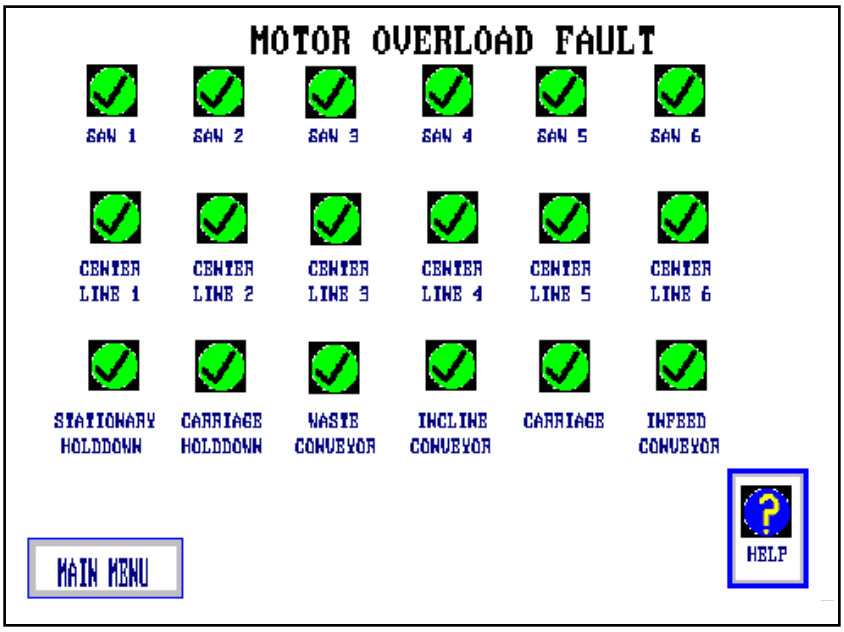
A VFD (Variable Frequency Drive) fault is displayed whenever one of the VFDs has "tripped out". While a variety of conditions can "trip out" a VFD, the most common will be an over-current condition. This is caused by mechanical binding, lack of lubrication, improper chain tension, or, in extreme cases, when an axis stalls.

To clear the angle VFD faults, activate any E-stop, wait 10 seconds, and reset the E-stop.

To clear a feed drive or carriage drive VFD fault, open the carriage side control panel, locate the VFD with the flashing fault code, and press the RESET button located on the keypad of the VFD.

The HELP button will display the VFD Help screen, which will provide additional information on how to clear the fault. The MAIN MENU button will return you to the Main Menu.

Figure 6-7: Motor Overload Fault Screen

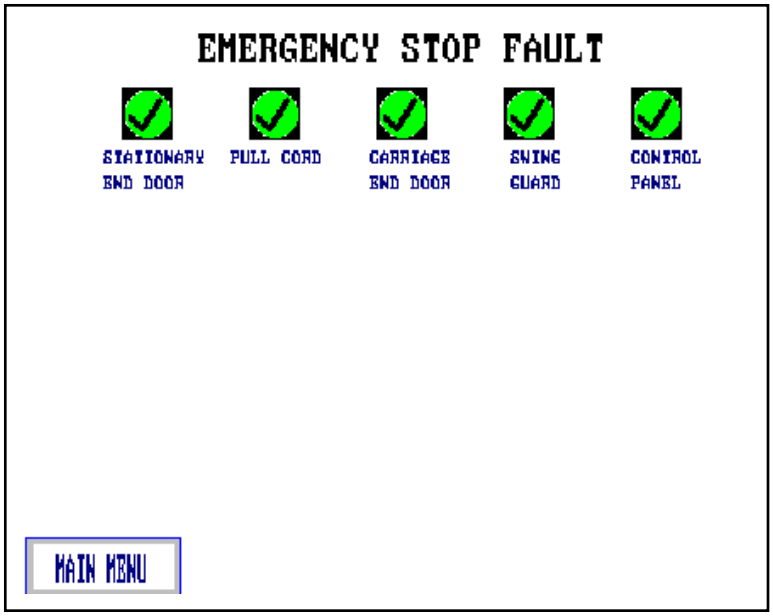


An overload fault is displayed whenever one of the overloads has “tripped out”. While a variety of conditions can “trip out” an overload, most common will be an over-current condition. This is caused by mechanical binding, lack of lubrication, or, in extreme cases, when an axis stalls.

The overloads are set to automatically reset after a brief (2–5 min.) cooling period.

The HELP button will display the Overload Help screen, which will provide additional information on how to clear the fault. The MAIN MENU button will return you to the Main Menu.

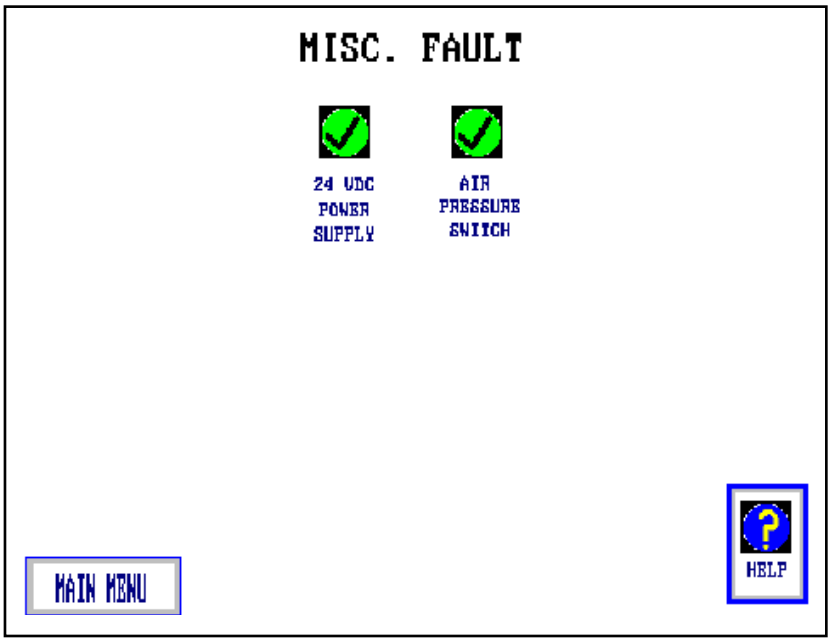
Figure 6-8: Emergency Stop (E-Stop) Fault Screen



An emergency stop fault occurs whenever any E-stop on the machine is activated.

Reset the indicated E-stop to resume operation. The MAIN MENU button will return you to the Main Menu.

Figure 6-9: Miscellaneous Fault Screen



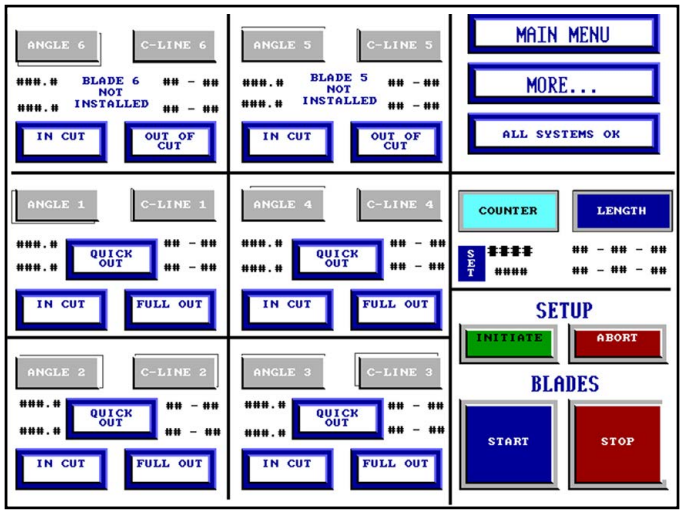
There are two miscellaneous faults: the DC Power Supply fault, and the Air Pressure Switch fault.

The Power Supply fault indicates failure of the 24-VDC power supply. The Air Pressure Switch fault indicates that the incoming air supply pressure has dropped below 85 psi.

The HELP button will display the Misc. Fault Help screen, which will provide additional information on how to clear the fault. The MAIN MENU button will return you to the Main Menu.

Operation Screens

Figure 6-10: Semi-Automatic Screen



Blade Angle and Centerline Buttons

Page Buttons

Board Counter and Length

Setup Initiate and Abort

Blades Start and Stop Buttons

The Semi-Auto screen has controls for each saw blade angulation and centerline setting, for the length and board counter settings, to initiate or abort the setup, to start and stop the saw blades, and to select other screens.

The SET button works only with PLC Version 1.9.

Figure 6-11: Keypad

Pressing certain buttons will cause a floating keypad to pop up on screen. All other functions on the screen are disabled while the keypad is present. The keypad can be moved to any desired location on the screen by touching that location. If the keypad is moved to a different location and closed, it will pop up in the same location the next time

it is called on. The keypad will remain in this location until moved again or until the power is shut off, when it reverts back to the default location (upper right-hand corner).

The DEL (delete) key causes the cursor to backspace and delete the last number entered. The ESC (escape) key closes the keypad without entering any data. The CR (carriage return) key accepts the data and closes the keypad.

The blade angle and centerline controls allow entering data in numeric form. This region also displays setpoint and actual data for the angles and centerlines, and has controls for in-cut and out-of-cut.

Pressing either the ANGLE (angulation control) or C-LINE (centerline control) button will open the pop-up keypad. For angles, enter a number in degrees and tenths of a degree without a decimal point. For example 90.0° would be entered as 900, 57.2° would be 572, and 8.0° would be 80.

Centerlines are entered in the inch-sixteenth format: 1 in. would be 100, 2-1/2 in. would be 208, 4-3/4 in. would be 412, and 10 in. would be 1000.

The maximum angle that can be entered for blades 1–4 is 105.0°. The maximum angle for blades 5–6 is 91.0°, and the minimum angle for all blades is 0°. The maximum centerline height that can be entered is 21 in. for blades 1–4 and 12 in. for blades 5–6. The minimum height for all blades is 0 in.

Entering numbers outside these ranges will cause the data to be rejected and the value of zero (0) to be written to the setpoint instead. Entering a number with a minus sign (-) or a decimal point will cause a “bad data” error on the keypad, and the number will have to be re-entered.

	WARNING
	**CRUSH AND CUT HAZARD.** **Entering invalid data will cause the setpoint to be changed to zero. This can cause unexpected movement.** **Failure to confirm all setpoints are correct before initiating a setup may result in serious injury or death.**

The actual position and the setpoint for angle and centerline is shown for each blade. The actual position readout will be colored red when the actual position is not equal to the setpoint.

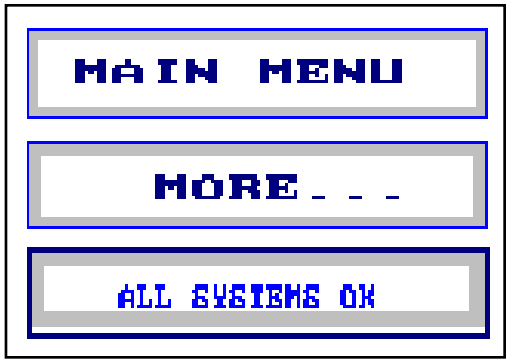
The IN CUT button will cause the blades to set up to 90.0° and 1–12 (1-3/4 in.) centerline height, and to be flagged as in-cut. The FULL OUT button will cause the blade to move to the extreme top of centerline travel and to a preset angle to remove it as fully as possible from the path of lumber through the machine. The blade is then flagged as out-of-cut. The QUICK OUT button will move the blade to a preselected position chosen by the operator, and also flagged as out-of-cut. This feature is used when a certain blade needs to move

only a short distance to clear the board path. Refer to the Defaults Page *screen* section on page 68 for more information. This feature is available only on blades 1–4.

When a blade is flagged as out-of-cut it cannot be started. Blades 1–4 angulation control and centerline control buttons are colored gray as an indicator. Blades 5–6 are physically moved out-of-cut by air cylinders. Either pressing the IN CUT button or changing the setpoint for angles or centerlines will flag the blade as in-cut.

The controls for blades 5 or 6 will not appear if the corresponding blade is not installed.

Figure 6-12: Page Buttons



The MAIN MENU button will return you to the Main Menu. Refer to Figure 5-7 on page 51.

The MORE button will open the Auxiliary screen. This screen contains controls for various auxiliary functions. Refer to the *Auxiliary Screen* section on page 71 for details.

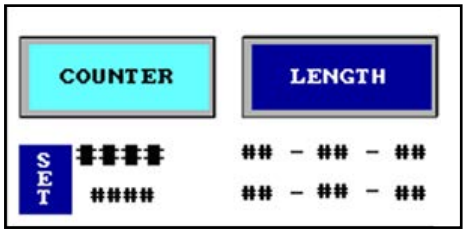
The system monitor indicator alerts the operator when any fault has occurred. During normal operation the system monitor will display the ALL SYSTEMS OK message in blue with a dark blue border as shown in Figure 5-17. When any fault occurs the system monitor will display FAULT EXISTS in red with a red border as shown in Figure 5-18.

Figure 6-13: Fault Exists Message

To make fault detection easier, when the fault first occurs the touch screen will automatically display the fault screen. However, if the operator changes the screen without resetting the fault, the operator will need to manually return to the appropriate fault screen and reset the fault.

Pressing the system monitor will take you immediately to the Main Menu for quick identification of the nature of the fault. The system monitor will reset automatically when the fault is corrected.

Figure 6-14: Board Counter and Length Buttons



Length

Length Actual

Length Setpoint

The board COUNTER and LENGTH buttons allow entering data in a numeric form. Pressing either of these buttons will open the pop-up keypad. Refer to Figure 5-15 on page 58. This region also displays the length actual and setpoint values as well as the number of boards that have been cut and the total number of boards to cut.

The length actual position display will be red whenever the length actual position is not equal to the length setpoint. The board LENGTH button will be colored yellow whenever the length actual value is zero. **The length actual data can be lost after power is turned off to the carriage end of the saw.** Carriage movement will be disabled. The length will have to be calibrated to enable carriage movement. Refer to the *Calibration* section on page 49 for further details.

Enter the length setpoint data in the feet-inches-16th format: for example 16 ft 9-1/2 in. would be entered as 160908; 10 ft is 100000, and 4 ft 2 in. is 40200.

The total quantity of boards to cut must be entered before initiating the setup. A beeper will alert the operator when there are five boards left to cut and again when the last board is cut.

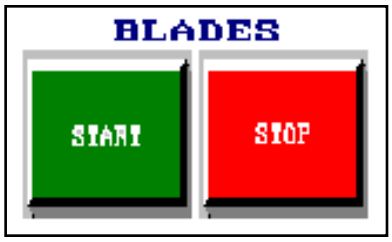
Figure 6-15: Setup Initiate and Abort Buttons

The setup INITIATE control starts the setup cycle. Once pressed, all angles and centerlines as well as the carriage will move to the setpoint position.

	WARNING
	**CRUSH AND CUT HAZARD.** **It is the operator's responsibility to ensure that the feed chains, lumber hold-down, and all other objects are clear of the blade travel paths before initiating a setup.** **Failure to exercise care may result in serious injury or death.**

If a problem is detected during a setup, the setup can be stopped either by pressing the setup ABORT button or by pressing an E-stop button. The setup ABORT button will halt all blade and carriage movement. The setup can be restarted by pressing setup INITIATE again.

Figure 6-16: Blades Start and Stop Button



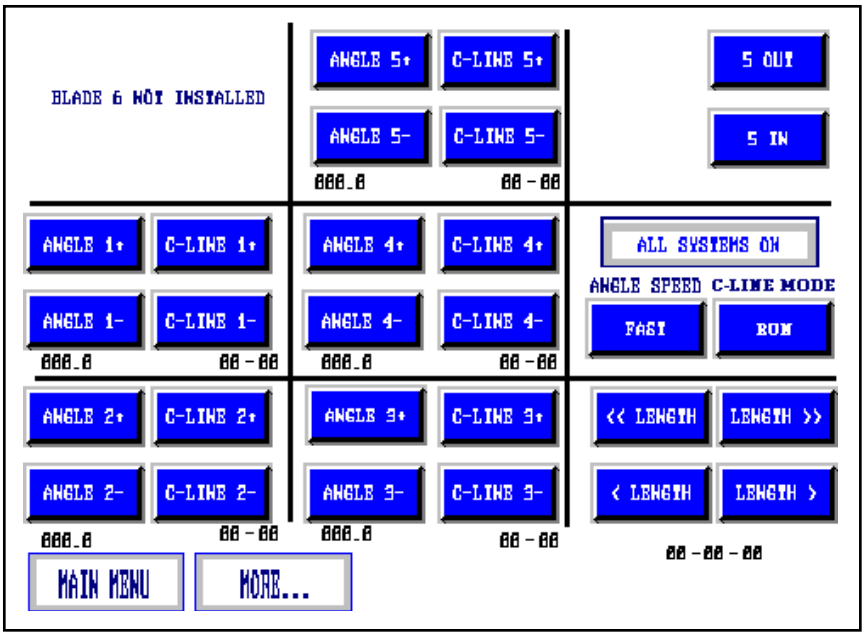
The blades START button will start all in-cut blades in sequence. Pressing the blades START button will release the blade brakes and start the front 2 blades (blades 2 and 3). The middle 2 blades (blades 1 and 4) will start next, and then the back 2 blades (blades 5 and 6), provided they are in the cut. Finally the feed chains will start. The blades START button must be held until the feed chains start. Releasing the button before the feed chains start will shut down all blades and apply the blade brakes.

	WARNING
	CRUSH AND CUT HAZARD. **It is the operator's responsibility to ensure that the saw blades are not in contact with any object prior to starting the saw blades.** **Failure to exercise care may result in serious injury or death.**

If a problem occurs during the blades start sequence, release the blades START button to abort the sequence and shut down all blades. If the sequence is completed (feed chains running) press the blades STOP button or press an E-stop.

The blades STOP button will shut down all blades, stop the feed chains, and apply the blade brakes. Pressing the blades STOP button will also stop all movement during a setup.

Figure 6-17: Manual Screen



The Manual screen allows complete manual control of all axes. Each angle and centerline can be moved up or down, the carriage can be moved, and blades 5 and 6 can be moved into the cut or out of the cut at the touch of a button.

Figure 6-18: Blade Angle and Centerline Buttons

Pressing the ANGLE + button will cause the angle to increase. Pressing the ANGLE - button will cause the angle to decrease. The maximum angle is 105° on blades 1–4 and 91° blades 5 and 6. The minimum angle on all blades is 0°. Over and under travel cutouts will prevent moving beyond these ranges.

Pressing the C-LINE + (centerline up) button will cause the centerline to move up. Pressing the C-LINE - (centerline down) button will cause the centerline to move down.

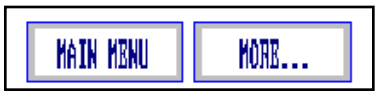
The controls for blades 5 or 6 will not appear if the corresponding blade is not installed.

	WARNING
	**CRUSH AND CUT HAZARD.** **It is the operator's responsibility to ensure that the feed chains, lumber hold-down, and all other objects are clear of the blade travel paths while moving any angle or centerline.** **Failure to exercise care may result in serious injury or death.**

The angle actual and centerline actual displays will indicate the current position of the blade.

The angles and centerlines will pause at their home positions when running in the Manual mode.

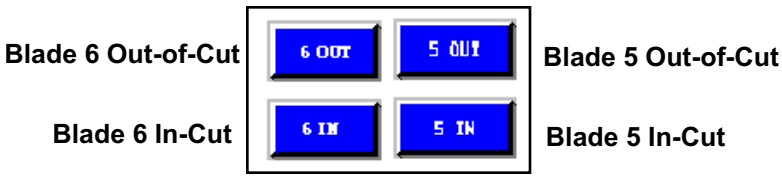
Figure 6-19: Page Buttons



The MAIN MENU button returns you to the Main Menu. Refer to Figure 5-7 on page 51.

The MORE (Auxiliary Function) button opens the Auxiliary screen, which contains controls for various auxiliary functions. Refer to the *Auxiliary Screen* section on page 71 for details.

Figure 6-20: Blades 5/6 In-Cut/Out-of-Cut Buttons



The blades 5 and 6 in-cut/out-of-cut buttons operate air cylinders which will physically move blades 5 and 6 back (out-of-cut) or forward (in-cut). These buttons will not alter the current angle or centerline settings. The buttons MUST be held until the cylinder reaches its limit of travel. Operating the blades at less than their full in-cut positions will lead to inaccurate cuts, while operating the blades at less than their full out-of-cut positions can cause lumber to strike the blades, damaging either the lumber or the blade.

Press and hold blade 6 IN to move blade 6 into the cut. Press and hold blade 6 OUT to move blade 6 out of the cut. Press and hold blade 5 IN to move blade 5 into the cut. Press and hold blade 5 OUT to move blade 5 out of the cut. Release the button when the blade has stopped moving.

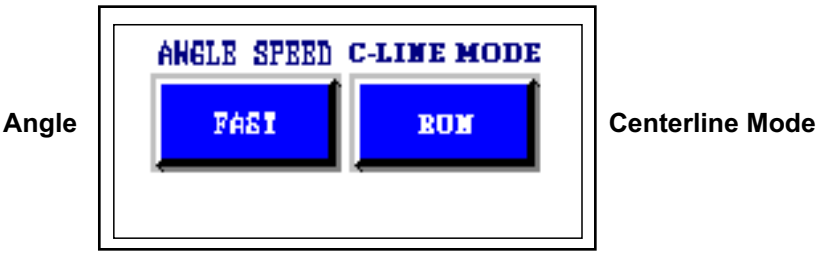
Blades 5 and 6 in/out buttons will not appear if the corresponding blade is not installed.

Figure 6-21: System Monitor Indicator

The system monitor indicator alerts the operator when any fault has occurred. During normal operation the system monitor will display the ALL SYSTEMS OK message in blue with a dark blue border as shown in Figure 5-26. When any fault occurs the system monitor will display FAULT EXISTS in red with a red border as shown in Figure 5-18 on page 60.

Pressing the system monitor indicator will take you immediately to the Main Menu for quick identification of the nature of the fault. The system monitor will reset automatically when the fault is corrected.

Figure 6-22: Movement Mode Buttons

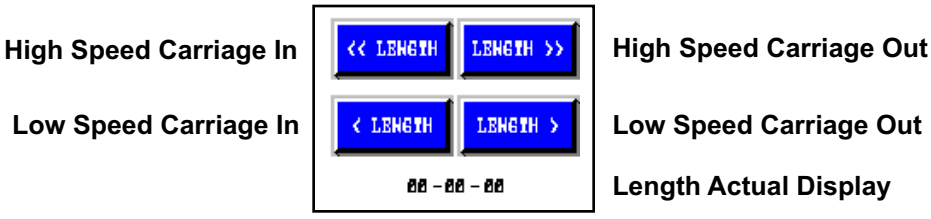


The angles have two operating speeds on the Manual screen: FAST and SLOW. Slow speed is approximately half the speed of fast. Pressing the angle speed button will toggle between slow and fast speeds.

The centerlines have two operating modes on the Manual screen: RUN and STEP. In Run Mode the centerlines will run up or down as long as the up or down button is pressed. In Step Mode the centerlines will move one step (approx. 1/16") each time the up or down button is pressed. The button must be released and pressed again to move another step.

The two movement mode controls are active only on the Manual screen. Leaving them in either SLOW or STEP will not affect operation of the angles or centerlines in the Semi-Auto Mode.

Figure 6-23: Carriage Buttons



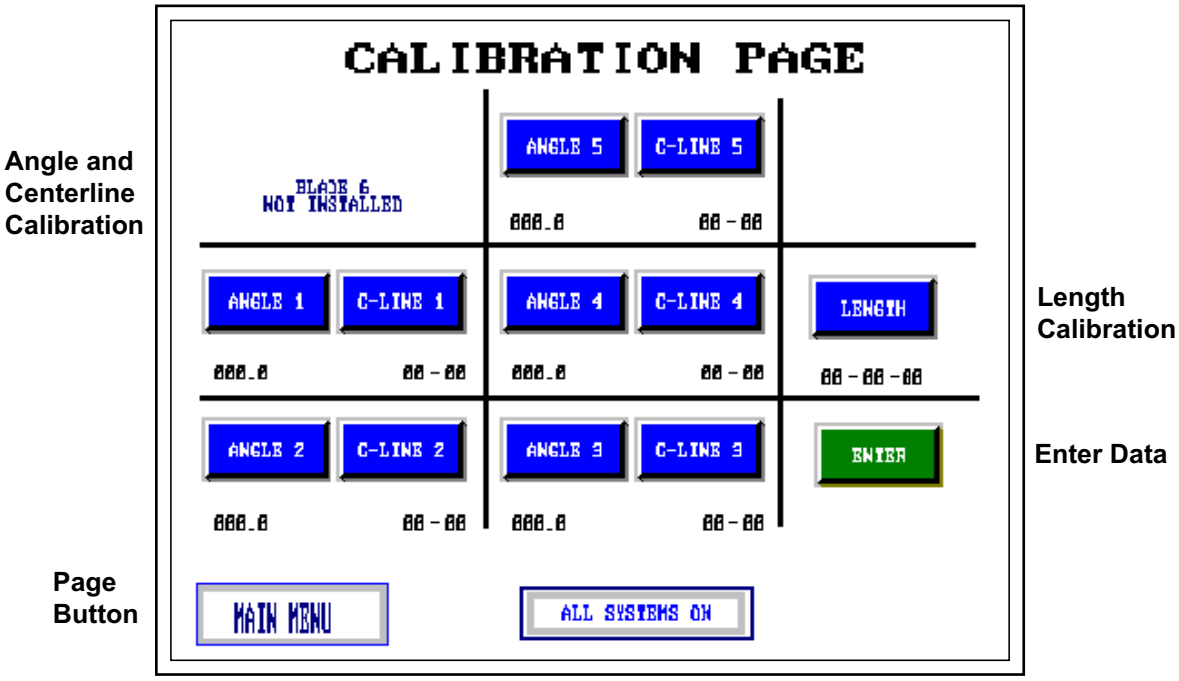
Pressing the << LENGTH (high speed in) or LENGTH >> (high speed out) buttons will cause the carriage to move in (shorter lengths, or toward the stationary end of the saw) or out (longer lengths, or away form the stationary end of the saw) at full speed. The

< LENGTH (low speed in) or LENGTH > (low speed out) buttons will cause the carriage to creep in or out at a minimal speed. This is useful for setting exact positions on the Manual screen.

The length actual display shows the current carriage position in the feet-inches-16ths format.

The carriage control buttons will be colored yellow whenever the length actual value is zero. The length actual data can be lost after power is turned off to the carriage end of the saw. Carriage movement will be disabled. The length will have to be calibrated to enable carriage movement. Refer to the Calibration section on page 49 of this chapter for further details.

Figure 6-24: Calibration Page Screen

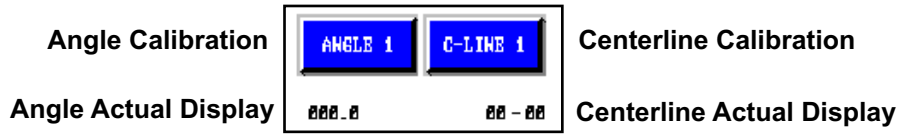


It is important to follow the correct calibration procedure. Failure to follow this procedure can lead to inaccurate cuts. Refer to the Calibration *section on page 49 for full details.*

The Calibration Page screen is used to alter or adjust the calibration of the angles, centerline, and length.

After entering data for any angle, centerline, or length, you must press ENTER to send the new calibration data to the controller. Failure to press ENTER will result in the calibration data being ignored and discarded.

Figure 6-25: Angle and Centerline Calibration Buttons



Pressing the ANGLE (angle calibration) button or the C-LINE (centerline calibration) button will cause the pop-up keypad to open allowing the entry of calibration data. Refer to Figure 5-15 on page 58. The angle actual display and centerline actual display will show the current position of the blade. If calibration data is entered, these values will change to the data entered when ENTER is pressed.

For angles, enter a number in degrees and tenths of a degree without a decimal point: for example, 90.0° would be entered as 900, 57.2° would be 572, and 8.0° would be 80.

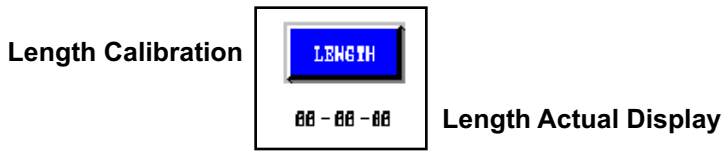
Centerlines are entered in the inch-sixteenth format: 1 in. would be 100, 2-1/2 in. would be 208, 4-3/4 in. would be 412, and 10 in. would be 1000.

The range of acceptable values is 0 to 105° (angle) and 0 to 21 (centerline) for blades 1–4, and 0 to 91° (angle) and 0 to 12 (centerline) for blades 5–6. Entering data outside of these ranges will cause the data to be set to zero.

Figure 6-26: Page Button

Press the MAIN MENU button to return to the Main Menu.

Figure 6-27: Length Calibration Button



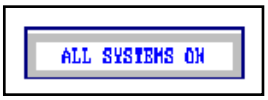
Pressing the LENGTH button will open the pop-up keypad to allow entering length calibration data. Refer to Figure 5-15 on page 58. The length actual display will show the current length position. If calibration data is entered, this value will change to the data entered when ENTER is pressed.

Enter the length setpoint data in the feet-inches-16th format: for example, 16 ft 9-1/2 in. would be entered as 160908; 10 ft is 100000, and 4 ft 2 in. is 40200.

Figure 6-28: Enter Button

The ENTER button must be pressed to send the calibration data to the controller. If calibration data is being entered for more than one axis, it is not necessary to press ENTER after each entry. Simply press ENTER after all calibration data is entered. All data will be sent to the controller at this time.

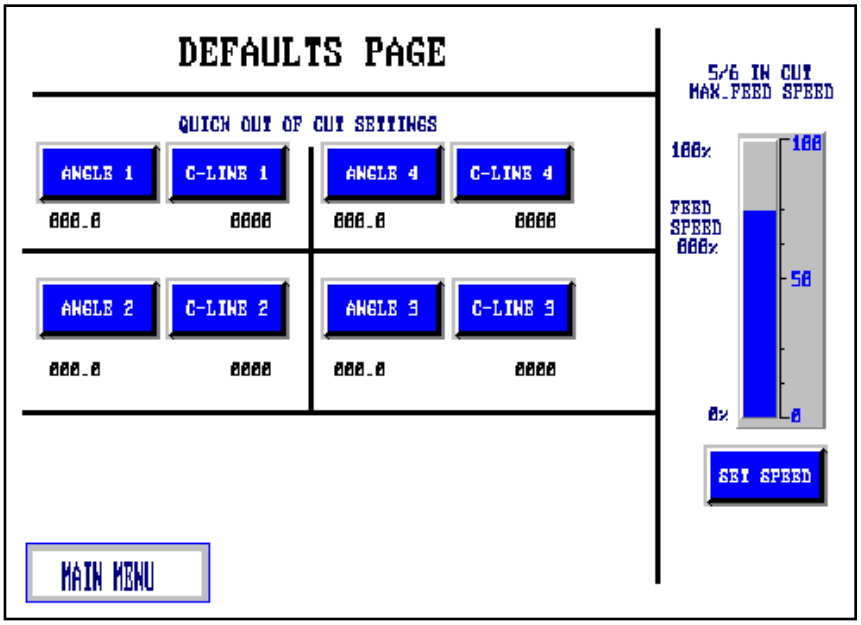
Figure 6-29: System Monitor Indicator



The system monitor indicator alerts the operator when any fault has occurred. During normal operation the system monitor will display the ALL SYSTEMS OK message in blue with a dark blue border, as shown in Figure 5-34. When any fault occurs the system monitor will display FAULT EXISTS in red with a red border, as shown in Figure 5-18 on page 60.

Pressing the system monitor indicator will take you immediately to the Main Menu for quick identification of the nature of the fault. The system monitor will reset automatically when the fault is corrected.

Figure 6-30: Defaults Page Screen



Quick Out-of-Cut Setting

Scarf Cut Feed Speed

Page Button

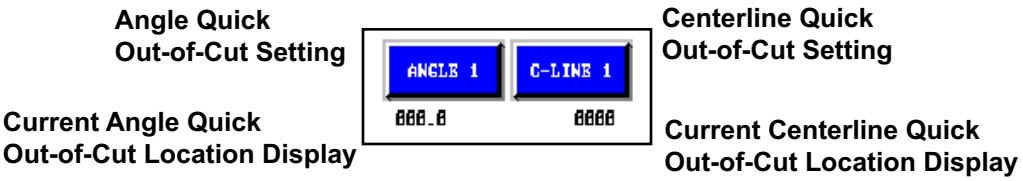
The Defaults Page screen allows the operator to set the angles and centerline values for the quick out-of-cut function. Blades 1–4 can be set to any location in their range of travel.

The blade can quickly be sent to this location by using the quick out-of-cut button. Refer to the *Semi-Auto Screen* section on page 58 for more details.

A toggle switch called CUTTING LENGTH OF SAW exists on saws that have an extended frame. The cutting area selection is 20 ft or 24 ft.

If you own a saw with a physical cutting length of 24 ft and the default is set at 20 ft, the carriage movement will never exceed the cutting limit of 20 ft. If the operator enters a value greater than 20 ft, the screen will default back to zero.

Figure 6-31: Quick Out-of-Cut Setting Buttons



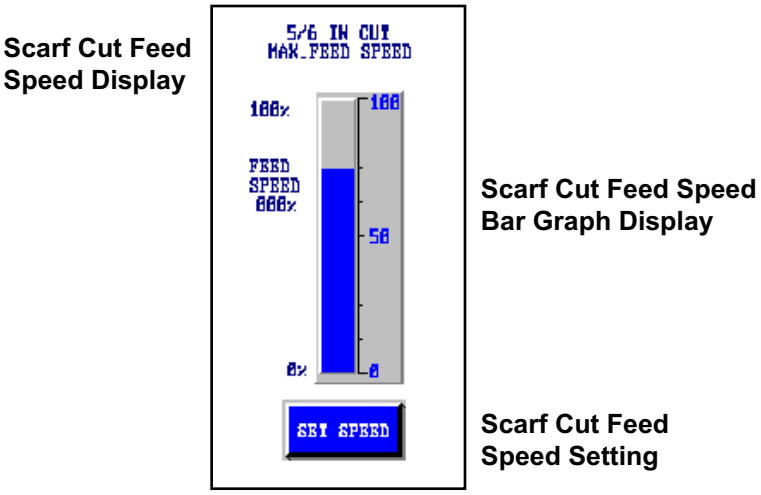
Pressing either the ANGLE (angle quick out-of-cut setting) button or the C-LINE (centerline quick out-of-cut setting) button will open the pop-up keypad, as shown in Figure 5-15 on page 58. Enter the desired value for the quick out-of-cut position. The saw blade will go to this position whenever the quick out-of-cut button is pressed on the Semi-Auto screen.

These values can be changed anytime the operator desires.

Figure 6-32: Page Button

Press MAIN MENU to return to the Main Menu.

Figure 6-33: Scarf Cut Feed Speed Setting

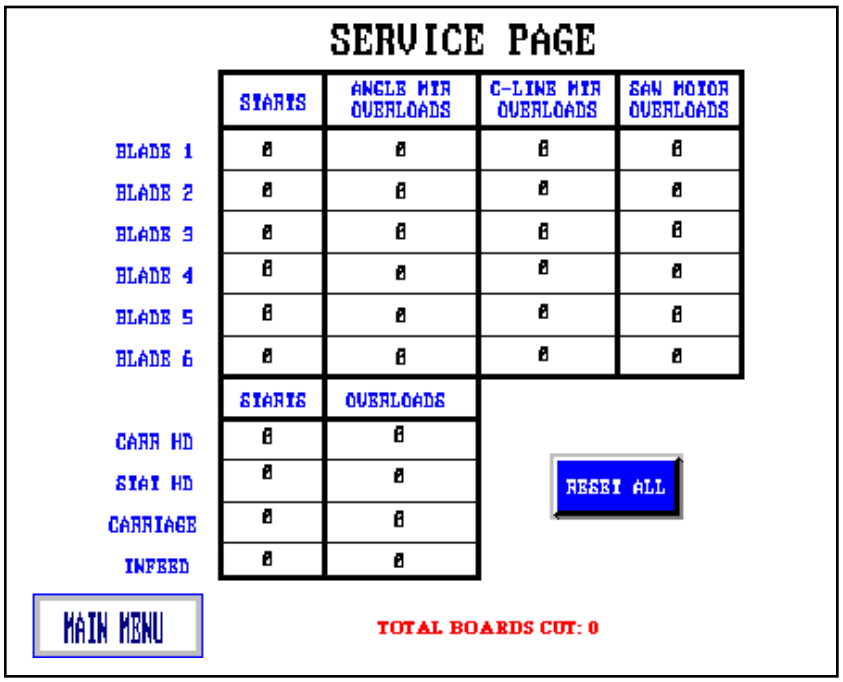


When cutting a long cut (scarf cut) with blades 5 and 6, it is advisable to slow the speed of the feed chains down to obtain the best cut quality. The SET SPEED button is used to set the maximum feed speed when either blade 5 or blade 6 is in the cut. A suggested value for this control is 80%. This figure may need adjusting depending on blade condition, wood type, etc.

When blades 5 and/or 6 are brought into the cut, the feed chains will automatically slow down to the max. scarf cut speed (unless the original speed was lower than the max. scarf cut speed). When blades 5 and 6 are returned to the out-of-cut position, the feed speed will automatically return to the previous value.

Pressing SET SPEED will open the pop-up keypad, as shown in Figure 5-15 on page 58. Enter the percentage of feed speed desired. The scarf cut feed speed displays will show the current value.

Figure 6-34: Service Page Screen



The Service Page screen displays information useful in maintaining the saw. If any axis is tripping out more than occasionally, service may be required.

Figure 6-35: Reset Button

Pressing RESET ALL will zero all the counters.

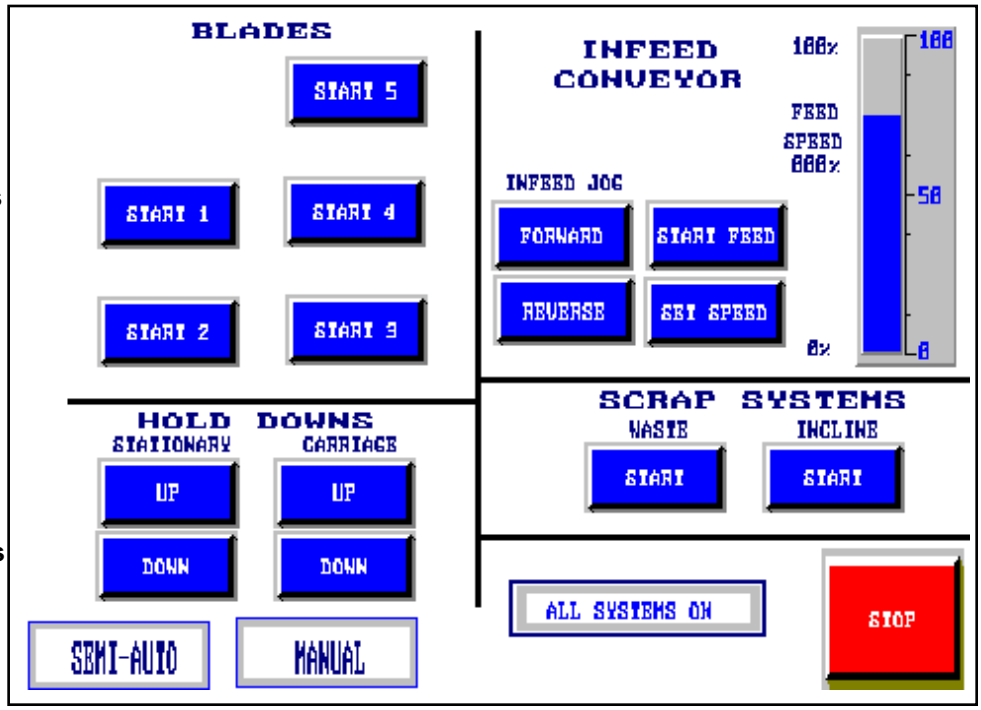
Figure 6-36: Page Button

Press MAIN MENU to return to the Main Menu.

Figure 6-37: Total Boards Cut Display

The total boards cut display indicates the total number of boards cut since the last reset period of the saw.

Figure 6-38: Auxiliary Screen



Blades Start

Hold-Downs

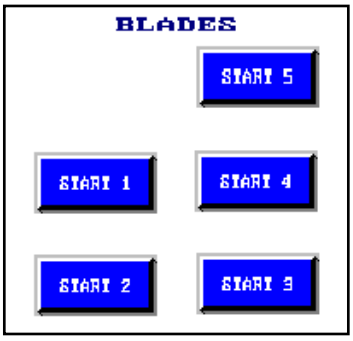
Infeed

Scrap Systems

Stop

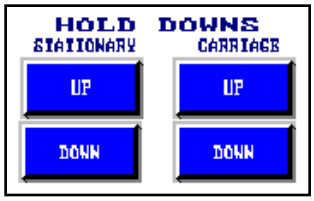
The Auxiliary screen (also known as the MORE page) contains controls for the manual operation of the feed chains and saw motors as well as controls for the operation of the hold-downs and scrap systems.

Figure 6-39: Saw Blade Buttons



Pressing any of the blades START buttons will release the blade brakes and start that saw blade. Saw blades will not start if they are flagged as out-of-cut. Refer to the section on blade angle and centerline controls for further details. When blades 1–4 are out-of-cut, the START button will be gray.

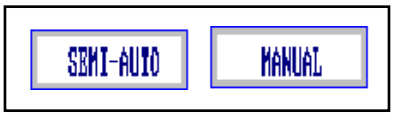
Figure 6-40: Hold-Down Buttons



The hold-down stationary UP and hold-down carriage UP buttons will move the hold-downs up. Press and hold the button until the hold-down is in the desired position. The hold-down stationary DOWN and hold-down carriage DOWN buttons will move the hold-downs down.

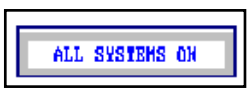
The proper positions are indicated by position indicators mounted on either hold-down. Using improper hold-down pressure can have a negative effect on board quality.

Figure 6-41: Page Buttons



Pressing SEMI-AUTO will return you to the Semi-Auto screen.
Pressing MANUAL will return you to the Manual screen.

Figure 6-42: System Monitor Indicator



The system monitor indicator alerts the operator when any fault has occurred. During normal operation the system monitor will display the ALL SYSTEMS OK message in blue with a dark blue border as shown in Figure 5-47. When any fault occurs, the system monitor will display FAULT EXISTS in red with a red border. Refer to Figure 5-18 on page 60.

Pressing the system monitor indicator will take you immediately to the Main Menu for quick identification of the nature of the fault. The system monitor will reset automatically when the fault is corrected.

Figure 6-43: Stop Button

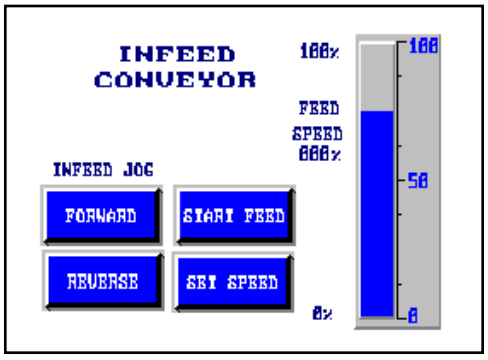
Pressing STOP will shut off all motors, apply the blade brakes, and stop the feed chains.

Figure 6-44: Scrap Systems Buttons

Pressing the scrap systems waste button will toggle the waste conveyor on or off. Pressing the scrap systems incline button will toggle the incline conveyor on or off. Activation of an E-stop will stop the waste and incline conveyors.

When the waste or incline conveyors are running, the buttons will be red with the word “stop” on them.

Figure 6-45: Feed Chain Buttons



The infeed jog FORWARD and infeed jog REVERSE buttons will cause the feed chains to operate in the direction indicated as long as the buttons are held.

The START FEED button will start the feed chains in the forward direction. The chains will run until stopped.

The SET SPEED button will cause a pop-up keypad to open, as shown in Figure 5-15 on page 58. Enter the desired feed speed as a percentage. The current speed is indicated by the feed speed bar graph.

Purpose of Chapter

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

Introduction to Maintaining Your Equipment

	WARNING
	**MOVING PARTS CAN CRUSH AND CUT.** **Always verify that power to the machine has been turned off and follow approved lockout/tagout procedures.**

	WARNING
	**HIGH PRESSURE HAZARD.** **Bleed pneumatic lines before performing any maintenance on the pneumatic system.**

	WARNING
	**ELECTROCUTION HAZARD!** **Verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures before performing any maintenance.** **All electrical work must performed by a qualified electrician.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

Proper maintenance with emphasis on scheduled preventive maintenance is the best way to keep your machine in a safe and first-class operating condition. Proper maintenance will practically eliminate “surprise” breakdowns resulting in unnecessary downtime. This chapter contains scheduled maintenance procedures and a chart outlining what we consider maintenance required to provide safe and reliable operation of your saw. Certain

operating environments, for example, excessive dust or excessive heat or cold, may necessitate additional maintenance at more frequent intervals.

On the pages after the chart, you will find additional information regarding types of lubricants to use, application procedures, and locations. We recommend that you prepare and keep a maintenance log for scheduling all maintenance activities.

Additional Information about Maintenance

It is critical to the future performance of the *SmartSet Pro* saw that only specified replacement parts are used if maintenance replacement is required. Further, no electrical system component, cable, connector, or device should be modified, removed, disconnected or otherwise changed without specific approval and guidance from the manufacturer.

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

Performing Maintenance Safely

Before Operating This Equipment

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

Before Getting Close to Any Parts That Could Move

- The lock and tag symbol shown here indicates that proper lockout/tagout procedures must be used prior to starting the procedure where the symbol occurs.
- Always lock and tag the stationary-end disconnect switch. The carriage-end disconnect switch only shuts off power to the carriage end.

	WARNING
	CRUSH, CUT, ELECTROCUTION AND HIGH PRESSURE HAZARDS. **Always turn the saw off by activating an E-stop when the saw is not in operation.** **Always verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures (OSHA 29 CFR 1910.147) before performing any maintenance on this equipment.** **Turn off the air switch. Bleed lines if appropriate.**

Making Adjustments to the Machine

CAUTION
Failure to follow the step-by-step procedure may result in incorrect adjustment of this machine and could cause blade collisions and incorrect cuts. **Only trained personnel should make mechanical adjustments to this machine.**

Performing Electrical Work

	WARNING
	**ELECTROCUTION HAZARD!** **Always verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures (OSHA 29 CFR 1910.147) before performing any maintenance on this equipment.** **All electrical work must performed by a qualified electrician.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

Wearing Personal Protective Equipment

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

General Maintenance

At the end of each workday, the following maintenance is recommended.

To blow off dust, use compressed air.

To lubricate chains and sprockets, rack and pinions, spur gears,slides, and castings, and Acme screws, use a kerosene and oil mixture:
10 parts kerosene: 1 part 30-weight motor oil

For the carriage V-track and the square drive shaft, use straight kerosene to avoid sawdust buildup.

Do NOT use diesel fuel.

Cleaning the Machine

Use a compressed-air hose to clean and blow off all sawdust and wood chips that have accumulated during the day. Rotate angulation plates to their limits and clean the guide tracks with compressed air. Wear safety goggles and a dust mask during this cleaning.

Lubricating the Machine

Use a mixed solution of 10 parts kerosene and 1 part 30 W motor oil for lubrication of all chains and sprockets. For all other moving parts including but not limited to motor plate guide tracks, feed chains guides, hold-down shoe pivot links, rack and pinions, spur gears, ACME screws, tracks, centerline slides, and square drive shaft, use straight kerosene.

Calibration

Review the section *Changing Calibration Settings* if you are unfamiliar with the calibration process.

Checking Daily Calibration

Check calibration of the saw every day to ensure the accuracy of the cuts. The daily procedure includes checking:

- Angles
- Centerlines
- Lumber stop and carriage positions
- Hold-down position and tension

Summary

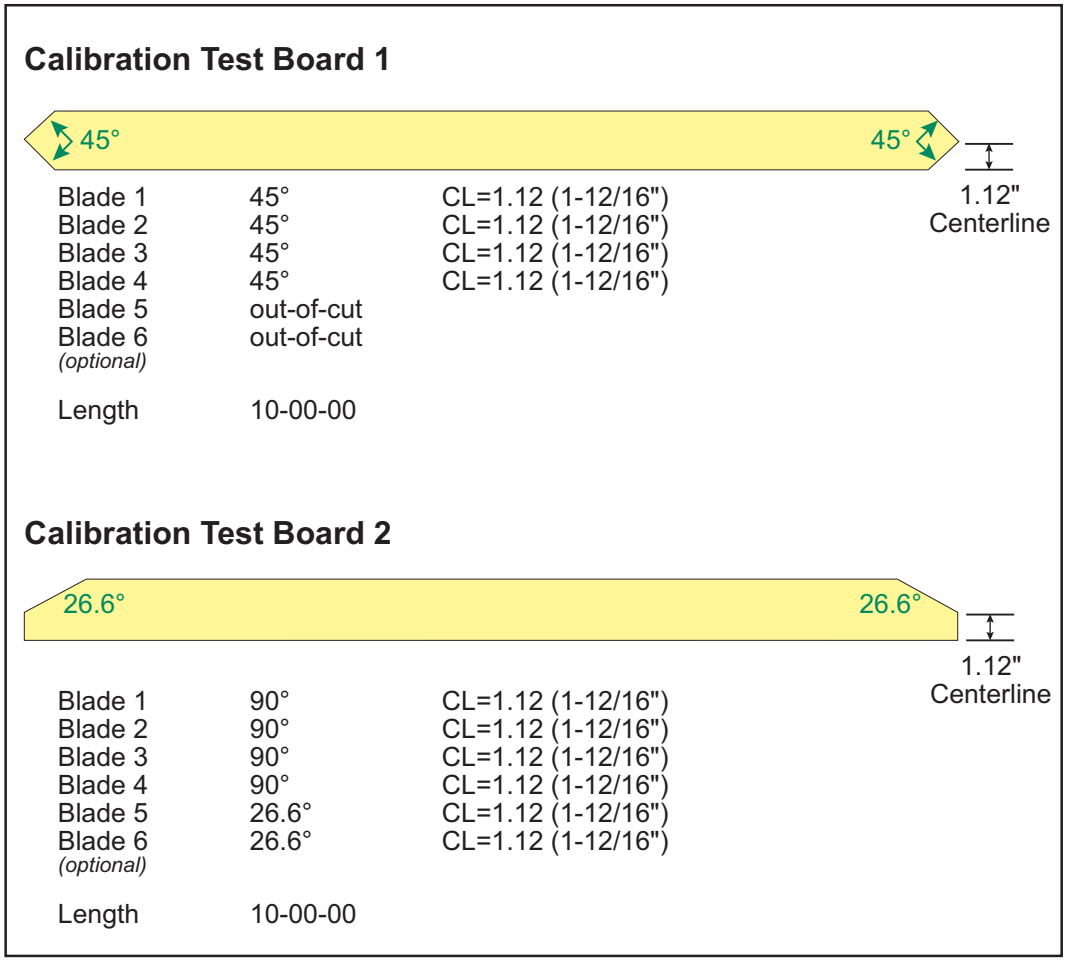
2 straight boards, 2x4x12

framing square

tape measure

Using good, straight lumber, perform a test by cutting two boards as shown in Figure 7-1. Check the angles, centerlines, and length of these cuts. If all measurements are within acceptable tolerances, no further calibration is required. If any measurement is outside of tolerance, see Figure 7-4.

Figure 7-1: Daily Calibration Test Boards



Procedure

1. In Semiauto Mode, set up the angles and centerlines for Test Board 1 as shown in Figure 7-1.
2. Watch the hold-downs as the board passes through the saw. They should hold the board firmly and the hold-down springs should compress slightly.
3. Start the blades and infeed conveyors and run a 2x4x12-in. board through the saw.
4. Set up the angles and centerlines for Test Board 2 as shown in Figure 7-1.
5. Watch the second board as it passes through the saw to verify that the hold-downs are tensioned properly.
6. Start the blades and infeed conveyors and run a 2x4x12-in. board through the saw.

7. Check the length of both boards with a tape measure. Allow 1/16-in. tolerance.
8. Check the angles with a framing square. Allow 1/16-in. tolerance.
9. Check the centerlines with a framing square. Measure from the bottom, which is always the side with the notch in it. Allow 1/16-in. tolerance.

Figure 7-2: Checking Angles on Test Boards

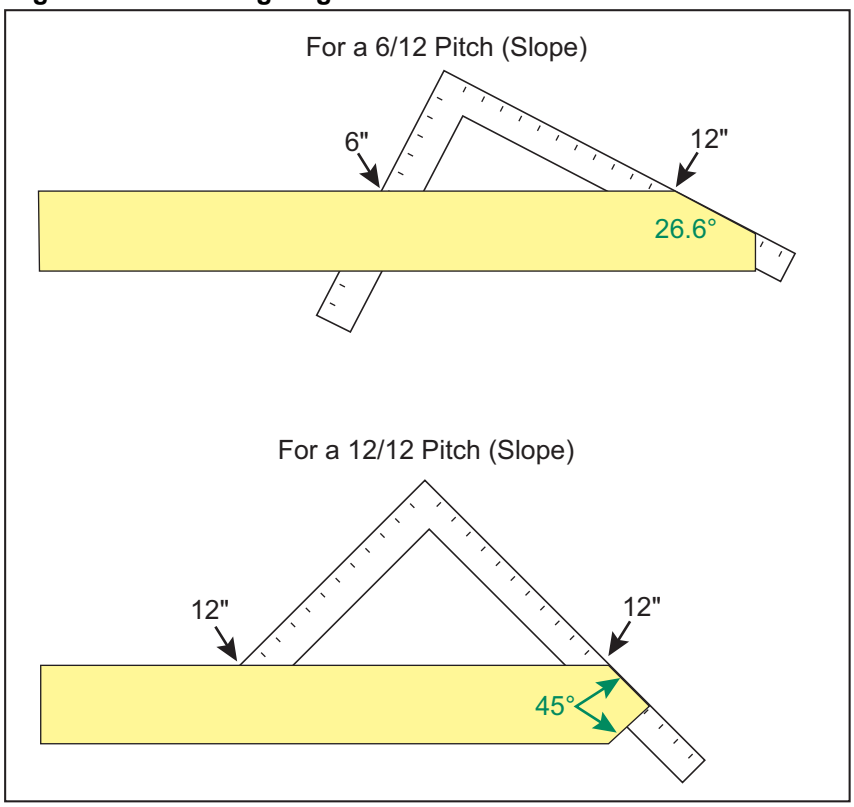
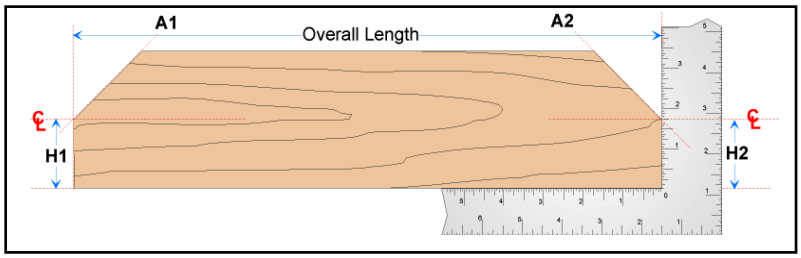


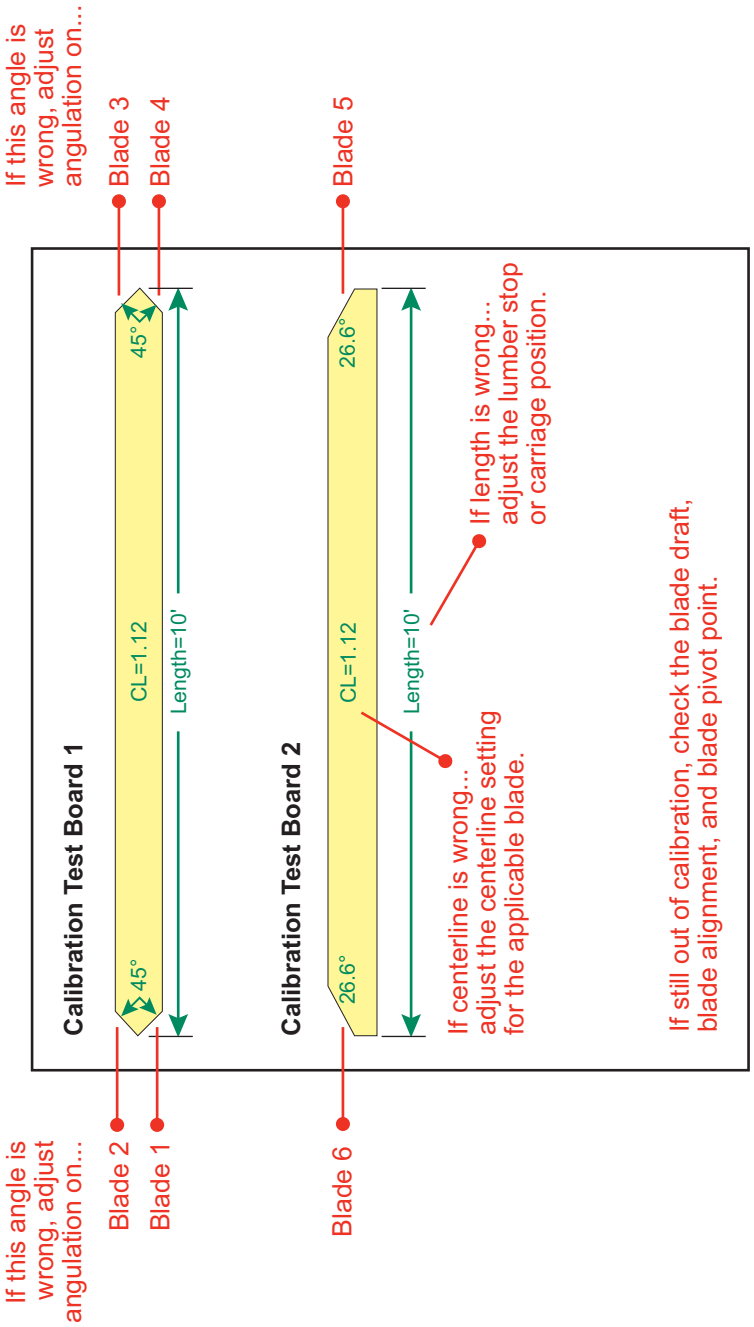
Figure 7-3: Checking Length and Centerline on Test Boards



Always measure the centerline from the bottom of the board.

10. If any of the measurements taken during this check do not match what was expected, refer to the applicable section of this manual for instructions of how to adjust the correct component at fault.

Figure 7-4: Resolving Calibration for a Failed Test



Changing Calibration Settings

If you attempt to adjust a setting before checking these items, the miscalibration may get worse instead of better!

If the numbers displaying on the touch screen do not match the numbers measured on the cut board, change the calibration settings. Before recalibrating:

- Check the quality of the test lumber. If it is bowed, twisted, or distorted in any way, it will make the test unusable.
- Check that you entered the numbers on the touch screen correctly during the calibration test.

Adjusting Angle and Centerline Settings

1. Turn the calibration key switch to ON.
2. Go to the Main Menu.
3. Press the CALIBRATE button.
4. Press the corresponding button for the blade you are checking. This will bring up a box where you can change both the angle and centerline settings for that head.
5. Push the SET button and enter the correct value.
    a) 90° is entered as 900
    b) 1-in. center line is entered as 100
    c) 1-1/2 in. centerline is entered as 108
6. Press OK.
7. Press the green ENTER button to change the value.
8. Press EXIT to return to the Calibration Menu.
9. Ensure the angle scale pointer matches the touch screen reading and the actual measurement. If not, adjust the pointer.

Always measure from the bottom of the board to determine where the blade is cutting the centerline.

Adjusting Hold-Down Settings

1. Turn the calibration key switch to ON.
2. Use the hold-down buttons to move hold-down until it touches the board.
3. Pencil a line on the rack gear under the tube.

4. Lower the hold-down another 1/2 in. downward (as shown).
5. If necessary, adjust the pointer to 2x4.
6. Press the CALIBRATE button.
7. Press the corresponding button for the carriage hold-down. This will open a menu where you can change the height for the hold-down.

   Enter (4) for 2x4.
8. Press SET to display a keypad.
9. Enter the numeric value of the actual location and press OK.
10. Press ENTER to confirm the new location setting and update the calibration point.
11. Ensure the vertical scale pointer matches the touch screen reading and the actual measurement. If not, adjust the pointer.

Adjusting the Centerline Scale and Pointer

If the measured centerline on the board is different than expected:

- Set the calibration (refer to the *Calibration* section for procedure).
- Adjust the pointer to the measured amount.
- Change the computer setting to the measured amount.

Calibrating the Blades

See the sections on *Checking and Adjusting the Blade Draft*, *Checking and Adjusting the Blade Alignment*, and *Checking and Adjusting the Blade Pivot Point* for instructions on adjusting the saw blades to be calibrated with the rest of the saw.

Lubrication

Use a high-quality bearing grease to lubricate the following components.

The *Maintenance Checklists* list cleaning and inspection actions that should be taken at the beginning of each shift, every two (2) hours, weekly, monthly, and quarterly. This section provides more detailed information for the actions on the checklists that require it.

Cleaning and Lubricating

It is the responsibility of saw owners to choose a cleaning and lubrication solution that maintains the saw in good working order, inhibits rust and corrosion, and complies with all governing environmental regulations.

To blow off dust, use compressed air.

To lubricate chains and sprockets, use a kerosene and oil mixture: 10 parts kerosene: 1 part 30-weight motor oil

Do NOT use diesel fuel.

	CAUTION
	AIRBORNE PARTICLES, CHEMICALS, SLIP HAZARD, AND LOUD NOISE HAZARD. **Wear ear and eye protection for all cleaning activities.** **When using cleaning and lubrication solutions, use a properly rated respirator and gloves.** **Clean up overspray from the floor to prevent a slip hazard.** **Do NOT spray electrical parts with lubricant or compressed air. Spraying electrical components will damage them.**

CAUTION
Do not use compressed air inside the electrical enclosures! It may force contaminants into the electrical connections.

Figure 7-5: Never Use Compressed Air Inside an Electrical Enclosure

Every 2 Hours

1. Set all blades to 30°.

2. Lockout/tagout the equipment.
3. Using a 4-ft long wand (with an L-shaped end for the blower), blow off all sawdust and wood chips that have accumulated during the day on the saw. The *Maintenance Checklists* list specific components that are affected.
4. Lubricate all moving axes by spraying with a kerosene and oil mixture. The *Maintenance Checklists* list specific components that are affected.

Every Month

The daily cleaning that occurs using compressed air and a kerosene and oil mixture prevents extreme buildup, but some components should be cleaned by hand every month. To manually clean metal parts on this equipment, wipe the part with a rag and a light solvent. Any household cleaner containing ammonia works well. The components that should be concentrated on are listed in the *Maintenance Checklists* in the appendices.

Inspecting

Every Day

Every day, visually examine the saw for loose components such as sprockets, gears, and bearings. Look at the condition of the blades, guards, chains, and labels. Be aware of the general condition of the saw and fix or replace anything that is damaged.

Quarterly Inspection

Every three months, a maintenance person should perform a thorough inspection of the saw. Look for loose or missing parts including bolts, nuts, screws, and electrical connections. Look at all gears and sprockets and ensure they are clean and lubricated. Ensure that safety devices are in place, working properly, and labels are legible. Watch for loose set screws that hold the keys in gearbox sprockets. Replace or repair anything that requires it.

Lubricating the Gear Reducers

There are eleven worm gear reducers on the saw. There is a square head pipe plug on the side near the top of each gear reducer housing.

Once each month remove these plugs to check the oil level in the gear reducer. When the plug is removed, oil should seep out of the hole indicating the oil level is at the prescribed

level. If oil does not seep out of the hole, oil should be added. Using a small funnel inserted into the hole, add oil to bring the level up to the bottom of the hole. See Table 7-1.

Once each year the oil should be drained and replaced. An Allen-head screw located on the side near the bottom is provided for draining.

Lubricating the Saw Blade Motors

Lubricate the saw blade motors by inserting approximately one pump of oil into the grease zert on the shaft end and bearing end of the motor. Motor bearings should be greased at least every three (3) months. Use Shell Dolium R or Chevron SRI intervals: 5 hp and 10 hp (6 months or 2200 hours).

Table 7-1: Worm Gear-Reducer Oil Specifications

Ambient Temperature	-30°F to 15°F	16°F to 50°F	51°F to 110°F	111°F to 165°F
Max. Operating Temp.	150°F	185°F	200°F	200°F
Viscosity @ 100 F,SUS		1919 to 2346	2837 to 3467	4171 to 5098
ISO Viscosity Grade	320	460	680	1000
Compounded with:	3% to 10% fatty or synthetic fatty oils or mild EP additives			
AGMA Lubricant No.		#7 Comp.	#8 Comp.	#8A Comp.
Cities Service Co.	CITCO EP Comp.68	CITCO Cyl. Oil 680-7	CITCO Cyl. Oil 680-7	CITCO Cyl. Oil 680-7
Fiske Bros. Refining	SPO-233	SPO-277	SPO-288	SPO-288
Gulf Oil Corp.	SL-460 EP	Transgear EP 460	Transgear EP 680	Transgear EP 800
Keystone Div.	KSL-365	KSL-366	K-600	K-620
Mobile Oil Corp.	SHC 629	Mobil 600W	Mobil 600W Super	Mobil Extra Hecla
Shell Oil Corp.	Omala 68	Omala 460	Omala 680	Omala 800
Sun Oil Corp.	Sunep 1050	Sunep 1110	Sunep 1150	Sunoco Gear Oil 8 AC
Texaco, Inc.	Meropa 68	Vanguard Cyl. Oil 140		
American Lub., Inc.	SHC 9065	Ind. Gear Oil 140	AGMA #8 Gear Oil	AGMA #8 Gear Oil
Chevron	NL Gear Comp. 100	NL Gear Comp. 460	NL Gear Comp 680	NL Gear Comp 1500

These instructions also apply when the incline conveyor is optioned.

Lubricating the Angulation Plates

Once a month rotate the six angulation plates to their extreme position, and clean the retaining grooves with a bristle brush and kerosene. This prevents a pitch buildup, which if not removed will make it increasingly difficult to angulate. After cleaning is complete, dry the retaining grooves with an absorbent cloth and spray a light coat of kerosene/oil mixture on the grooves.

Lubricating the Feed Conveyor Extension Rack and Pinion Gear

Once a month thoroughly clean the feed conveyor extension rack and pinion gear and lubricate with a light spray coat of kerosene/oil mixture.

Lubricating the Square Drive Tube

Once a month spray the square drive tube with a light coat of kerosene/oil mixture. Pay particular attention to the telescoping tube that drives the hold-downs.

Lubricating the Hold-Down Extension Rack and Pinion

Once a month clean and spray the hold-down extension rack and pinion with a light coat of kerosene/oil mixture.

Lubricating the Lumber Stop Tubes

Each thirty-day interval lubricate the tube as well as the rack and pinion gear with kerosene/oil mixture.

Lubricating the Sprockets and Chains

Each week clean all sprockets and chains thoroughly with compressed air, and lubricate with kerosene/oil mixture. Pay special attention to the feed chains and sprockets.

Lubricating the Carriage V-Wheels

Each month lubricate the axles of the carriage V-wheels with WD 40 light oil. This should be a light application, because too much oil will attract sawdust.

Lubricating the Air Line Lubricator

Each week fill the pneumatic lubricator at the stationary end of the saw with oil.

Disconnect air supply before filling the pneumatic lubricator.

In temperatures above 40°F, use SAE 5 W oil.

In temperatures below 40°F, use a mixture of 50/50 and light machine oil such as WD40.

Lubricating the Air Brake Cylinders

Each week inject five or six drops of light machine oil such as WD40 into the air line of each pancake cylinder at the drain cock of the cylinder. Disconnect all air to the machine and then systematically disconnect the air line at each cylinder; inject the oil into the cylinder, then reconnect the air line. Do this at all five saw blades. This will lubricate the cylinder and keep the brakes in good working order.

Lubricating the Vertical Acme Screws

Once a day clean and spray the vertical Acme screws with a light coat of kerosene/oil mixture.

Lubricating With Grease

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

CAUTION
Never mix synthetic lubricants with mineral lubricants.

Bearings

Grease flange bearings by pumping two shots of grease into each grease fitting approximately once a month.

Motor bearings should be greased at least every three (3) months.

All other bearings should be monitored and greased at regular intervals according to their needs.

Motors and Gearboxes

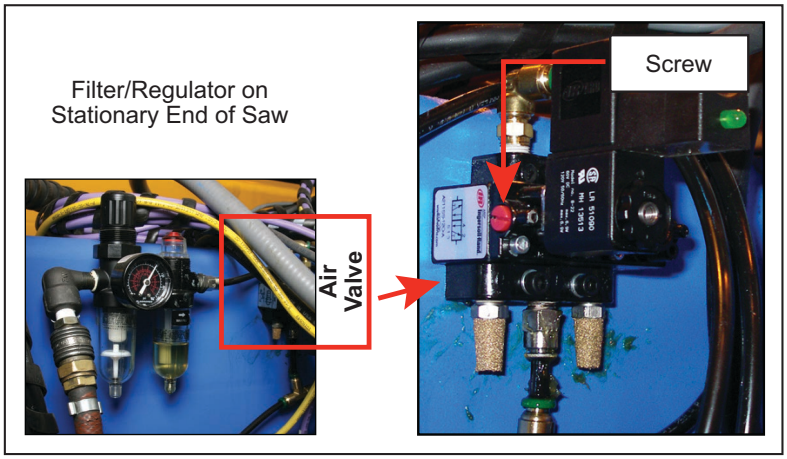
Manually Releasing a Brake

When at rest under normal conditions, the blade brakes are on. If the blade will spin by hand, the brakes are released.

small slotted screwdriver

Motors using pneumatic brakes do not have a manual brake lever, but you can manually release them using the correct air valve. Figure 7-6 shows the air valve for all blade brake motors. The air valve for the carriage motor is under the carriage frame near the motor.

Figure 7-6: Override for Blade Brakes



To release the pneumatic brakes manually:

1. Using a small slotted screwdriver, turn the screw head shown in Figure 7-6 approximately 1/4 turn to release the brakes.
2. Perform the maintenance work.
3. Return the valve to its original position.

Cleaning Motors

Remove motor guards every week to clean and lubricate the motors, gearbox assemblies, chains, and sprockets that are under the guards.

	DANGER
	**CRUSH AND CUT HAZARD** **Guards must always be in place during operation to avoid serious injury and possibly death.** **Always replace guards after maintenance is complete and before removing the lockout/tagout device.**

Lubricating Motors

Greasing Saw Blade Motors

grease gun

Dow Corning 44 medium grease

Older blade motors do not have grease fittings. These instructions apply only if your blade motors have grease fittings on them.

Lubricate saw blade motors every 90 days to prevent motor damage, which can occur from excessive temperatures due to contaminated grease. Motor bearings should be greased at least every three (3) months. Use the grease fitting supplied to administer the grease.

1. Locate both grease fittings on a saw blade motor.
2. Add the recommended amount of Dow Corning 44 medium consistency grease to the motor. See Table 7-2 for quantity specifications.

Table 7-2: Recommended Grease Replenishment Quantities

Bearing Number	Saw Quadrant	Amount of Grease (fl oz)
6206	1-4	0.2
6208	5-6	0.4

CAUTION
Failure to use the specified type and amount of grease can cause motor failure. Take care when lubricating the motors.

3. Grease all of the blade motors at their fittings.

4. Ensure that all personnel are clear and restore power to the saw.
5. Run the motor for 15 to 30 minutes to allow purging of any excess grease.
6. Return motor to normal service.

It is the responsibility of saw owners and operators to choose cleaning and lubrication solutions that comply with all local, state, and federal regulations, especially, environmental regulations. In the event kerosene and oil mixtures are prohibited, select a cleaning and lubrication solution that will remove pitch and protect against rust and corrosion.

Greasing All Other Motors

Most motors on the saw are sealed and do not need to be greased.

Adding and Changing Oil in Gearboxes

When additional oil is needed, use an oil recommended in Table 7-3 or a comparable type.

Table 7-3: Recommended Motor Oils

Ambient Temperature		-30° to 15°F	16° to 50°F	51° to 110°F	111° to 165°F
Max. Operating Temp.		150°F	185°F	200°F	200°F
Viscosity @ 100°F, SUS		—	1,919 to 2,346	2,837 to 3,467	4,171 to 5,098
ISO Viscosity Grade		320	460	680	1000
Compounded with:		3% to 10% fatty or synthetic fatty oils or mild EP additives			
AGMA Lubricant No.		—	#7 Comp.	#8 Comp.	#8A Comp
Recommended Types	Mobil Oil Corp.	SHC 629	Mobil 600W	Mobil 600W Super	Mobil Extra Hecla
	Shell Oil Corp.	Omala 68	Omala 460	Omala 680	Omala 800
	Sun Oil Corp.	Sunep 1050	Sunep 1110	Sunep 1150	Sunoco Gear Oil 8 AC
	Texaco, Inc.	Meropa 68	Vanguard Cyl. Oil 460	Honor Cyl. Oil 680	650T Cyl. Oil 1000
	Chevron	NL Gear Comp. 100	NL Gear Comp. 460	NL Gear Comp. 680	NL Gear Comp. 1500

Adding Oil

Some motors are sealed, but others are not and require the oil to be replenished occasionally. Check the oil level in these gearboxes every month and add oil when necessary.

Replacing Oil

Once a year, follow these steps to completely drain and refill the oil in the unsealed gearboxes:

1. Remove the gearbox from the motor and the bracket holding it to the saw frame.
2. Remove the drain plug and drain the oil into an approved container.
3. Replace the drain plug and open the fill plug on top of the gearbox.
4. Fill until the oil seeps out of the vent plug on the side of the gearbox.
5. Replace square head vent plug on the side of the gear reducer housing.
6. Replace the vent plug.

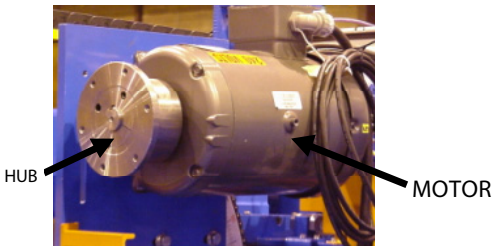
ENVIRONMENTAL
Please recycle used oil.

Replacing Motors

Read Before Replacing a Saw Blade Motor

	DANGER
	**CUT AND PERSONAL INJURY HAZARD.** **The motor assembly, which consists of the motor and hub, is not serviceable by customers. Only MiTek personnel shall make adjustments to the hub on the motor shaft. If service is required, remove the entire motor and call MiTek Customer Service to arrange for service.** **Failure to follow this restriction may result in blades coming loose from the motor shaft, which can result in severe injury, including death.**

Figure 7-7: Blade Motor and Hub



Removing Motors

If you are replacing a Baldor motor with an Emerson (US) motor, additional steps will need to be taken. Request Service Bulletin 155 for these instructions.

The following steps list the basic procedure for replacing any motor on the *SmartSet Pro* saw:

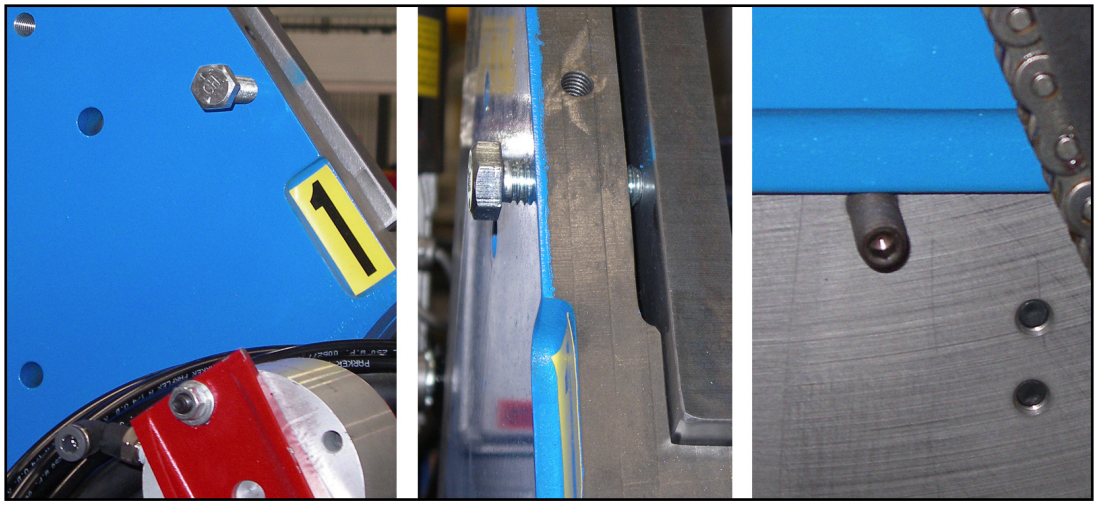
	WARNING
⚠	**CUT HAZARD.** **Lockout/tagout before removing any motor.** **Before removing a blade motor, remove the blade. Never separate the saw blade hub and motor. Only MiTek personnel are trained to re-assemble the hub with a motor.** **Before removing an angulation motor, lock the quad in place.**

7. Disconnect appropriate components and lines per Table 7-4:

Table 7-4: Disconnecting Each Motor

If...	See Warning	Then...
Blade motor	⚠	Remove blade. Disconnect air supply. Remove hub and motor assembly and send to MiTek to assemble new motor with hub. Align the brakes after new motor is in place.
Carriage motor		Disconnect coupler. You will need to remove the plug to view if the coupler is properly seated in the gear reducer when re-assembling.
Angulation motor	⚠	Lock quad in place with a 1/2"-13 hex head cap screw. The screw should be tight against the slide without dislodging or damaging the slide. Disconnect two output shafts from the gear reducer.
Hold-down motor		There may be a coupler to disconnect.
Centerline motor		Disconnect coupler.

Figure 7-8: Lock the Quad in Place



8. Disconnect wiring from the motor.

	CAUTION
	PERSONAL INJURY HAZARD. **The motor is heavy. Use appropriate personnel and proper lifting techniques.**

9. Remove the bolts attaching the motor to the motor plate and remove the motor.

Installing a New Motor

Hold-down and lumber stop motors have high- and low-voltage wiring options. Ensure it's wired for low voltage.

1. Place the motor on the mounting plate and re-install the mounting bolts.
2. Reconnect the wiring.
3. Reconnect all components that were removed per Table 7-4.
4. Start the motor and check the motor rotation (verify that the component is moving in the correct direction).
   - Saw blades should rotate toward the operator.
   - All other components should move in the direction of the arrow that you are pressing on the touch screen (in Manual Mode).

5. If the motor rotation is incorrect:
   a) Reverse any two power leads going to the motor.
   b) Recheck the direction.
6. If replacing a blade motor, continue to the *Additional Steps for Installing a Blade Motor* section. For all other motors, remove the lockout/tagout devices, and restore the air supply.
7. Make test cuts to verify current calibration of the component affected. Refer to the instructions to correct any calibration problems that may occur.

Additional Steps for Installing a Blade Motor

1. Check the brake stopping time.
2. Install the saw blade as directed in the *Saw Blades* section.
3. Make test cuts to verify current calibration of the saw head. Refer to the instructions to correct any calibration problems that may occur.

Changing the Rotation of a Motor

All motors are 3-phase motors. If a motor is rotating in the wrong direction, swap two (2) of the 3-phase wires powering the motor and retest.

Chains

Lubricating Chains

Lubricate the chains with a kerosene and oil mixture (10 parts kerosene: 1 part 30-weight motor oil). Spray the mixture lightly onto the chain. Avoid saturation.

- Lubricate angle chains every 2 hours.
- Lubricate all other chains a minimum of once a week.

Checking and Adjusting Chain Tension

Tension Requirements

The various chains on the equipment have different tension requirements.

- Hold-down chain: Center of chain should just barely touch bottom of channel. There should be no visible sag, but just tight enough to barely touch.
- Infeed chain: Chain should have about 3-4 in. of slack when lifted at the middle of the conveyor.
- Drive chain (connects motor to square drive shaft): Chain should be snug, but slightly move when pushed between the drive shafts.
- Angulation chain: When blade is in its horizontal position, chain should have approximately 1/4 in. of side-to-side movement but can not be pulled away from sprockets.
- Encoders: Centerline encoder chain should be straight and snug. Angulation encoder should have slight movement at the center of the chain.

Checking Tension

Check all the chain tensions approximately once per month. Slack in a chain can cause the saw to fall out of calibration. A chain that is too tight can cause premature motor failure.

1. Adjust the component so you can reach the chain at about the midpoint of its span.

2. Turn off all power to the saw following approved lockout/tagout procedures.
3. Grab the chain in the middle of the open span and determine if the tension is correct per the guidelines in *Tension Requirements* on page 102.

Adjusting the Tension for Chains With a Take-Up Bracket

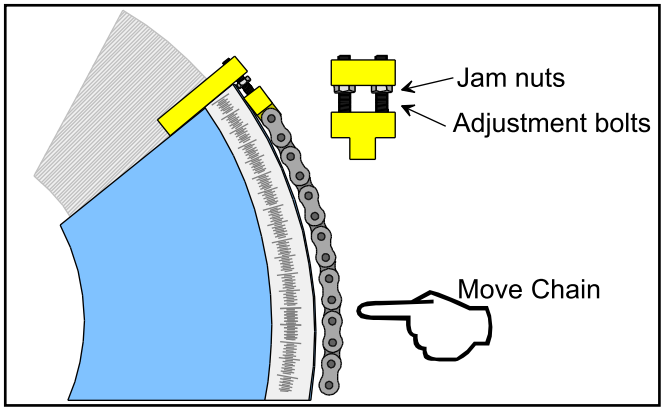
If the chain has too much or too little slack, adjust using these steps. Refer to Figure 7-9 to see the angulation chain.

CAUTION

Do not remove links to adjust the chain tension!

1. Loosen the jam nut(s).
2. Tighten the adjustment bolt(s) evenly until the chain meets the guidelines in *Tension Requirements* on page 102.
3. Tighten the jam nut(s).

Figure 7-9: Adjusting the Tension on the Angulation Chain



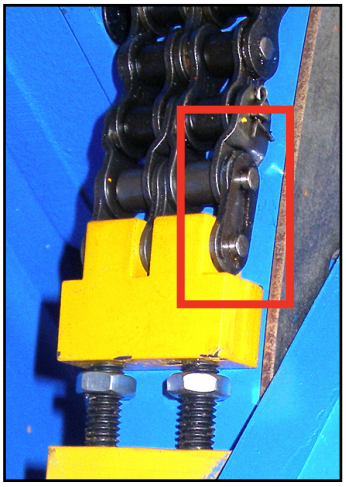
Replacing a Chain

When replacing a chain, pay careful attention to how the chain is threaded before removing it.

1. Lock the quad in place with a 1/2-13 hex head cap screw. The screw should be tight enough to hold the quad in place without damaging or disloding the slide. See Figure 7-8 on page 100.
2. Position the chain so the master link is clear of the sprockets so it can easily be reached. A typical master link is shown in Figure 7-10.

3. Lockout/tagout the machine.
4. Loosen the tension on the chain.
5. Remove the master link on the chain by pulling out the two (2) pins using pliers. The chain will come apart and can be removed from the sprockets.
6. Thread the new chain around the sprockets.
7. Connect the chain to itself by placing the master link between two links and pressing together with pliers.
8. Adjust the tension. Refer to *Tension Requirements* for the tension of each chain.
9. Replace any guards that were removed.

Figure 7-10: Master Link on a Chain



Roll Pins

Roll pins attach spur gears to all rack and pinion drive shafts. To replace a roll pin:

1. Unscrew the bolts on the bearings.
2. Slide the bearing along the shaft.
3. The gear can then be seen and rotated by hand to see if it is securely fixed to the shaft.
4. Inspect the teeth of the gear for signs of damage.

Air Brakes for Saw Blades

Inspecting Air Brakes

1. As you run and stop each blade, watch to determine if all blades are stopping correctly.

   The blade should stop in under 6 seconds. If not, adjust the brakes using the *Aligning Air Brakes* procedure.

2. Lockout/tagout the machine.
3. Inspect the saw blade brake lining:

   a) Turn each blade by hand and visually check:

   - That the brake lining is not rubbing the blade hub.
   - The brake calipers and adjust if necessary (using the *Aligning Air Brakes* procedure)
   - That there is no drag causing the motor to work harder than it should.

   b) Check the brake lining for excessive wear.

   c) Check that the brake lining is not pulling away from the metal it is bonded to.

4. Remove the inlet line to each brake air cylinder and add two drops of oil.

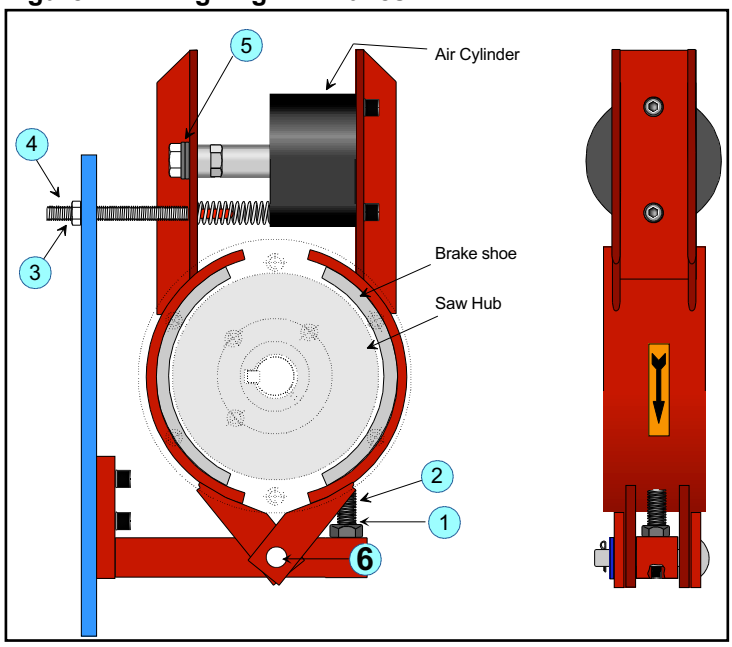
Aligning Air Brakes

Adjust the brakes to get the brake shoes as close to the hub as possible without letting them rub. The adjustment screws hold the shoes close to the hub. As the brakes wear, it may become necessary to adjust the brakes or remove the gap caused by the wearing of the shoe.

All brakes are adjusted in the same basic manner, even though configuration differs from front to rear saws. The procedure below is for blade 1, but the procedure applies to all saw heads. Each half of the caliper brake assembly has its own adjustment. If no adjustment is evident when using the adjustment screws, check that the brake lining is not worn down. When the brakes are adjusted correctly, the brake should stop in under 6 seconds.

1. Disconnect the air supply at the rear of the machine.
2. Remove the saw blade. It is helpful for the brakes to be locked on when doing so.
3. Manually override the brakes (see *Manually Releasing a Brake* on page 94) or disconnect the air lines to release the saw blade brakes.

Figure 7-11: Aligning Air Brakes

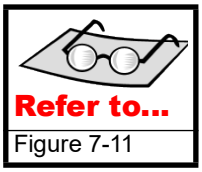


4. Loosen the jam nuts (labeled 1 and 3).
5. Turn in the adjustment bolts (labeled 2 and 4) until the pads touch the hub, then back off the bolt a full turn.
6. Visually verify that the clearance is just enough for hub to spin freely.
7. Tighten the jam nuts (labeled 1 and 3).
8. Make sure the spherical washers (labeled 5) are snug. If loose, the washers will vibrate and create excessive noise.
9. Spin the saw hub by hand to make sure it still rotates freely. If the hub binds on the shoes, back out the adjusting screw until the hub rotates freely.
10. Remove the brake override or reconnect the air lines.
11. Reconnect power to the saw and start the motor without the blade.
12. Test the stopping time before reattaching the saw blades.

13. Lockout/tagout power before reattaching the blades.
14. Reattach the saw blades.

Replacing Brake Pads

The brake lining, or brake pads, should be replaced when the blade stopping time exceeds 6 seconds and adjusting the brakes doesn't solve the problem. Even if the blade stopping time is within 6 seconds, replace the brake lining if the pad or hub has grooves worn in it.



1. Remove the air lines from the pneumatic assembly on the stationary end.
2. Remove the screw in the air cylinder shaft (labeled 5) in Figure 7-11.
    a) Hold the shaft with a wrench to prevent it from turning.
    b) Turn the screw (labeled 6) and remove it from the shaft.
3. Loosen the jam nuts and adjustment screws (labeled 1, 2, 3, 4)
4. Loosen the set screw under the pin (labeled 6).
5. Remove the cotter pin and remove the pin (labeled 6).
6. Remove the right shoe first. The air cylinder will come with it.
7. Remove the left shoe next, being careful not to lose the spring.
8. Install the new left shoe and then the new right shoe by reversing the disassembly steps.
9. Align the brakes by completing the relevant steps in the *Aligning Air Brakes* section on page 105.
10. Reconnect air and power to the saw.
11. Test the stopping time before reattaching the saw blades. Adjust the stopping time by loosening of tightening the bolt in the cylinder shaft.

12. Lockout/tagout power before reattaching the blades.
13. Reattach the saw blades.

Saw Blades

Inspecting Saw Blades

1. Inspect the brakes using the procedure in the *Air Brakes for Saw Blades* section on page page 105.
2. Saw blades must be kept sharp and smooth. Check for the following items on a daily basis, and replace, repair, or re-tip the blades if any of the following characteristics are found.
    - Chipped or missing teeth
    - Dull edges
    - Pitch build-up
    - Bending or warping of the blade

Replacing Saw Blades

When to Replace Blades

Sharp, high-quality blades are essential for proper saw operation.

	CAUTION
	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.** **Motor life and quality of cut also diminish due to dull blades.**

Individual plant circumstances including wood, quality of blades, and actual working hours may require modification of this schedule.

The frequency of blade changes and of repairs depend on the amount of use and the species and grade of lumber that is cut. Certain blades will wear faster than others because of their location to the incoming lumber. Table 7-5 gives minimum recommendations for when to replace the blade on each quad, but you may find your plant needs to change the blades more often for optimum saw operation.

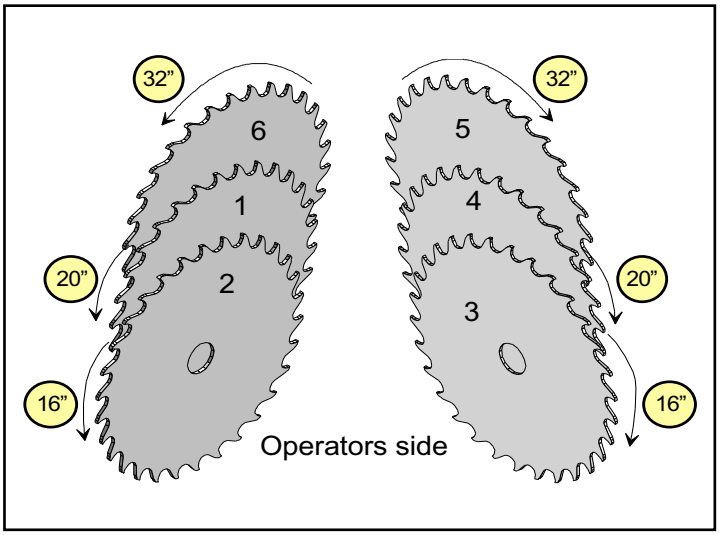
Table 7-5: Recommended Minimum Schedule for Replacing Blades

	40-Hour Work Week	80-Hour Work Week
Every 2 weeks	—	Blades 1-4
Every month	Blades 1-4	Blades 5-6
Every 2 months	Blades 5-6	—

Correct Direction of Blade Teeth

Correct tooth direction is achieved when the tooth at the top of the blade looking from the operator's side of the machine is facing the operator. The location and recommended size of each saw blade is shown in Figure 7-12. Notice the direction of the teeth in relation to the operator's side.

Figure 7-12: Blade Orientation and Typical Size



How to Replace a Saw Blade

	CAUTION
	**CUT HAZARD.** **Saw blades are sharp. Wear gloves when handling blades.**

Some blades are covered with a wax coating over the teeth to make them easier to handle and to protect the teeth from breakage during shipping. Remove this coating before starting the blade

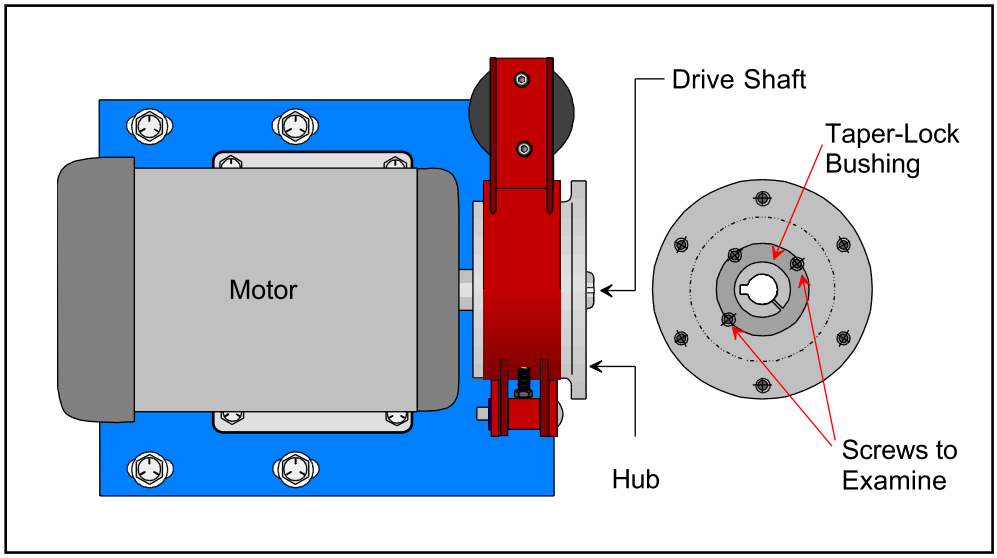
1. Turn off all power to the saw following approved lockout/tagout procedures, but leave the air on so the brakes will hold the hub in place.
2. Using an Allen wrench, remove the screws that attach the blade to the hub.
3. Remove the blade and install a new blade, ensuring the teeth are facing the correct direction, as illustrated in Figure 7-12.
4. Replace the screws.
5. Using a torque wrench fitted with an Allen bit, tighten the screws to a torque between 18 to 20 ft-lb.

Adjusting the Saw Blade Taper-Lock Bushing Screws

	WARNING
	Do not attempt to perform any maintenance that requires the removal or repositioning of the hub from the motor shaft, e.g., replacement of a damaged or worn hub, motor shaft, or motor. This activity must be performed at MiTek's factory to eliminate any risk of the hub and blade coming off the motor shaft during operation due to improper installation. Even with proper installation, the tightness of the screws must be checked regularly. See the *Adjusting the Saw Blade Taper-Lock Bushing Screws* section.

The drive shaft on each blade motor holds a saw hub. They are attached to each other with a taper-lock bushing in the center of the saw hub. The saw blades are then attached to the saw hub face. See Figure 7-13 for clarification.

Figure 7-13: Taper-Lock Bushing Screws



Checking the Tightness

In order to ensure a safe operating environment, MiTek recommends that you check the tightness of all taper-lock bushings on a monthly basis and whenever a saw blade is changed. Use the recommended torque settings in Table 7-6.

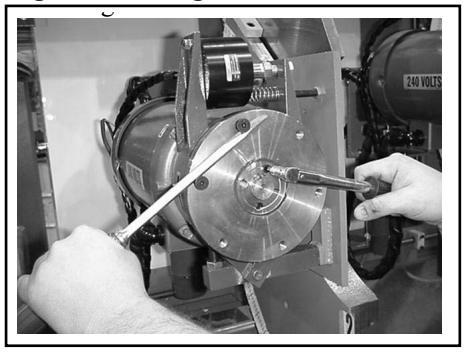
Table 7-6: Recommended Bushing Tightness

Quad on Saw	Bushing ID	in-lbs		ft-lbs	
		Min.	Max.	Min.	Max.
1-4	1215	175	193	14.6	16
5-6	2517	430	473	35.8	39.4

Tightening the Hub to the Motor

1. Set a torque wrench to the appropriate minimum and maximum settings as shown in the table above.

Figure 7-14: Tighten Hub Screws



2. To hold the hub in position, fasten two (2) cap screws to the saw hub. They should be the same size as, but not the same ones used on, the saw blade.

3. Position a large screwdriver between the two (2) cap screws, as shown in Figure 7-14.

4. Hold the hub in place with the screwdriver while tightening the taper lock bushing with the torque wrench set to the appropriate settings.

Adjusting the Angulation

It is important to keep the angulation chain tightened properly. Slack in the chain can cause the angulation of the saw to fall out of calibration. A chain that is too tight can cause premature angulation motor failure. Tension guidelines and adjustment procedures are given in the *Checking and Adjusting Chain Tension* section starting on page 102.

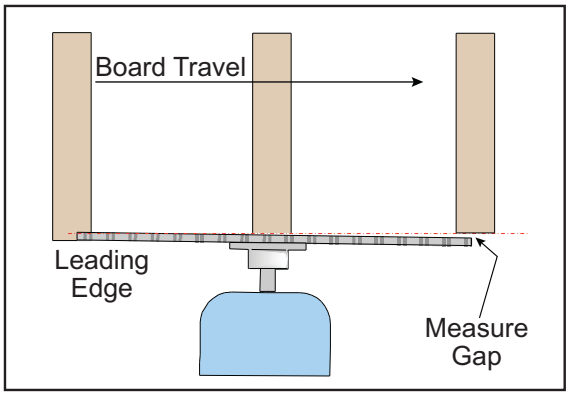
Blade Adjustments

Checking and Adjusting the Blade Draft

Blade draft refers to the correct angle of a saw blade so that the leading edge of the blade contacts the lumber and the trailing edge does not. An accurate blade draft prevents splintering of the lumber. Figure 7-15 illustrates proper blade draft.

The angle should be very slight and is set by MiTek during manufacturing. Small adjustments may be necessary after certain maintenance is performed.

Figure 7-15: Overhead View of Blade Draft

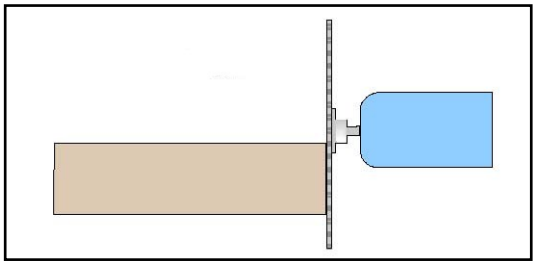


Checking the Blade Draft at 90°

1. Place the saw in the Semiautomatic Mode by pressing the SEMI-AUTO button on the touch screen's Main Menu.

2. Enter 90° for all blade angles.

Figure 7-16: Checking Blade Draft With Blades at 90°



3. Enter 1-3/4 for all the blade centerlines.

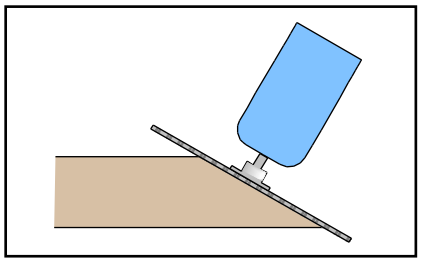
4. Enter the board length.

5. Press the INITIATE SETUP button.
6. Press the START button to start the blades.
7. Using the infeed conveyor FORWARD jog button, cut the board.
8. Press STOP to stop the blades.
9. Using the infeed conveyor FORWARD jog button, move the board to the trailing side of the blade.
10. Measure the distance between the board and the blade. It must measure between 1/32 and 3/32 in.
11. Repeat the check for each blade.
12. Continue to the *Checking the Blade Draft at 30°* section.

Checking the Blade Draft at 30°

1. Place the saw in the Semiautomatic Mode by pressing the SEMI-AUTO button on the touch screen's Main Menu.
2. Set all the blades to 30°.
3. Press the INITIATE SETUP button.
4. Press the START button to start the blades.

Figure 7-17: Checking Blade Draft With Blades at 30°



5. Using the infeed conveyor FORWARD jog button, cut the board.
6. Press STOP to stop the blades.
7. Using the infeed conveyor FORWARD jog button, move the board to the trailing side of the blade.
8. Measure the distance between the board and the blade. It must measure between 1/32 and 3/32 in.
9. Repeat the check for each blade.
10. If the blade draft needs to be adjusted refer to *Checking and Adjusting the Blade Draft* for the procedure.

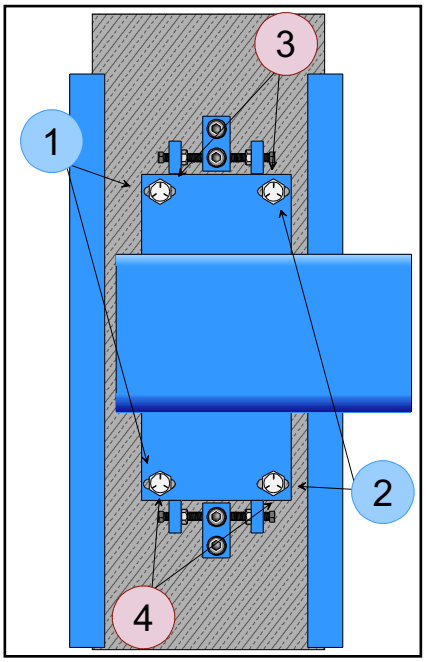
Adjusting the Blade Draft

After checking the blade draft, if an adjustment is required, follow these steps and refer to Figure 7-18.

1. To increase draft in the 90° position add shims to the back (labeled 2).
2. To decrease draft in the 90° position add shims to the front (labeled 1).
3. To increase draft at the 30° position for blades 2,3,5, and 6, add shims to the top (labeled 3).
4. To increase draft at the 30° position for blades 1 and 4, add shims to the bottom (labeled 4).

If using more than 3/16 in. of shim material, use longer mounting bolts.

Figure 7-18: Locations of Shims



Checking and Adjusting the Blade Alignment

Do not adjust the blade alignment until you have checked that the blades are not bent and the draft is set properly.

Blade alignment is how well the blades line up with each other. When blades are aligned properly and in home position, the next blade in line should touch the board but not cut more than 1/64 in. off the board.

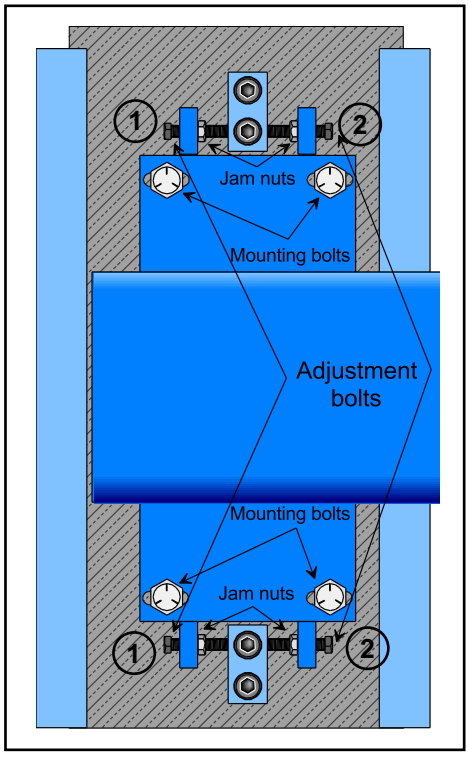
Checking Blade Alignment

1. Check that the blades are not warped.
2. Check the blade draft. See *Checking and Adjusting the Blade Draft*.
3. Place the saw in the Semiautomatic Mode by pressing the SEMI-AUTO button on the touch screen's Main Menu.
4. Enter 90° for all blade angles.
5. Enter 1.12 for all the blade centerlines when using a 2x4.
6. Enter the board length.
7. Press the INITIATE SETUP button.
8. Press the START button to start the blades.
9. Using the infeed conveyor FORWARD jog button, cut the board with blade 3.
10. Continue to move the board toward blade 4, and begin to cut it, but do not go all the way through the board.
11. Press the STOP button to stop the blades.
12. Using the infeed conveyor REVERSE jog button, back the board out of the saw. A properly aligned blade will cut off less that 1/64 in.of the board when it enters the saw. It should not cut off any additional material when the board is backed out.
13. Repeat to check blade 5.
14. Repeat for the stationary end of the saw, using blades 1, 2, and 6.
15. If any blade is out of alignment, make the necessary adjustments as described in this section.

Adjusting the Blade Alignment for Blades 1-4

Follow this procedure and refer to Figure 7-19 to adjust the alignment of blades 1 through 4.

Figure 7-19: Blade Alignment for Blades 1-4



1. Loosen all jam nuts and mounting bolts.

CAUTION

Be careful not to lose any shim material behind the mounting bolts. This material is used for blade draft.

2. To have the blade touch the board more, tighten the bolts labeled 1 in Figure 7-19. Use a level to ensure the bolts are evenly adjusted on top and bottom.

One turn on the adjuster equals 1/16 in. movement in the plate.

3. To have the blade touch the board less, tighten the bolts labeled 2 in Figure 7-19. Use a level to ensure the bolts are evenly adjusted on top and bottom.

4. Tighten all the jam nuts.

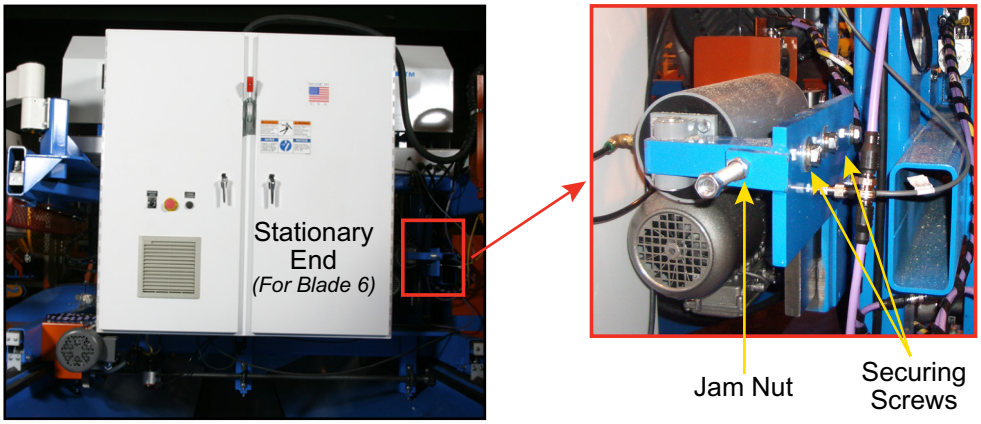
5. Tighten the mounting bolts using 75 ft-lb of torque.

6. Recheck the alignment.

Adjusting the Blade Alignment for Blades 5 and 6

Follow this procedure and refer to Figure 7-20 to adjust the alignment of blade 5 and blade 6.

Figure 7-20: Adjusting Blade Alignment for Blade 6

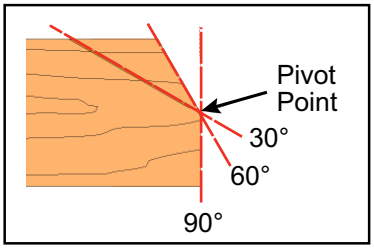


1. Loosen the securing screws and jam nuts.
2. Adjust the adjustment screw located at the jam nuts to move the blade either in or out.
3. Tighten the jam nuts and the securing screws.
4. Recheck the alignment.

Checking and Adjusting the Blade Pivot Point

The pivot point is the point on the lumber where the blade pivots.

Figure 7-21: Blade Pivot Point



Checking Blade Pivot Point

Summary

Make a 90° cut, a 60° cut, and a 30° cut. On the first two cuts, cut all the way through the board. On the third cut, cut only halfway through the board. Make sure the board stays in place under the hold-downs and on the lumber guide as you back it away from the blades.

Procedure

1. Place the saw in the Manual Mode by pressing the MANUAL button on the touch screen's Main Menu.
2. Enter 30° for all blade angles.
3. Enter 1.12 for all the blade centerlines.
4. Enter the board length.
5. Move the blades not being used out of the cut.
6. Press the INITIATE SETUP button.
7. Press the START button to start the blades.
8. Use the infeed conveyor FORWARD jog button to cut the board.
9. Press STOP to stop the blades.
10. Use the REVERSE jog button to back the board out far enough to clear the blade, but do not move it past the end of the hold-downs or lumber guide.
11. Set the angle to 60°, and repeat steps 6-10.
12. Set the angle to 90° and take the following steps:
    a) Press the INITIATE SETUP button.

b) Using the infeed conveyor FORWARD jog button, move the board so that the blade cuts halfway through the board.

c) Press STOP to stop the blades.

d) Using the REVERSE jog button, move the board out of the machine.

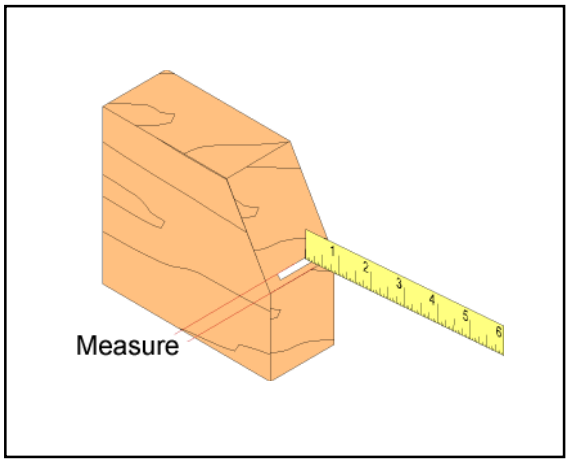
13. All three cuts should intersect at one place. If not, refer to *Checking and Adjusting the Blade Pivot Point* for the procedure.

Adjusting the Blade Pivot Point

Procedure

1. Measure the distance from the inside of the 60° cut to the edge of the board, as shown in Figure 7-22.

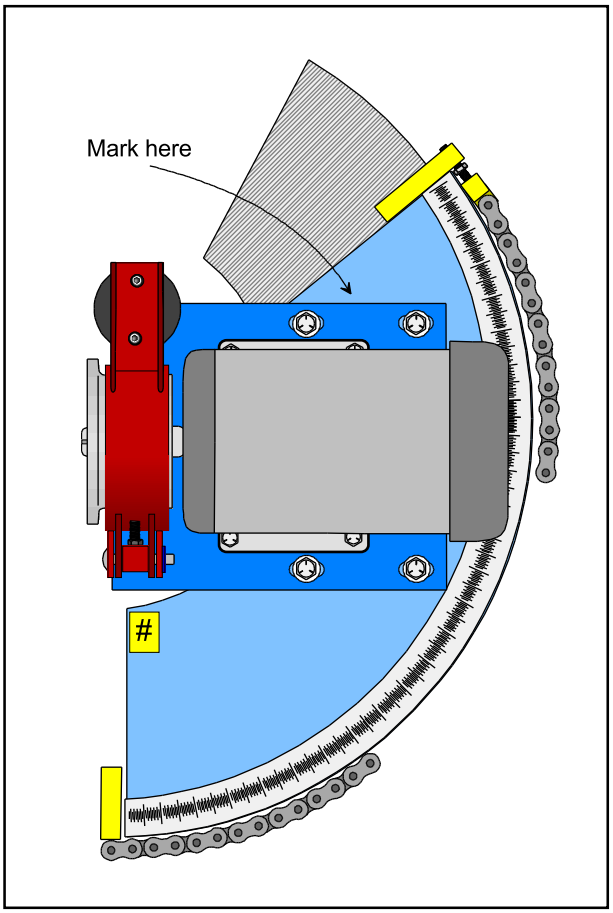
Figure 7-22: Measuring the Pivot Point Discrepancy



2. Multiply this measurement by two (2).

3. Lockout/tagout.

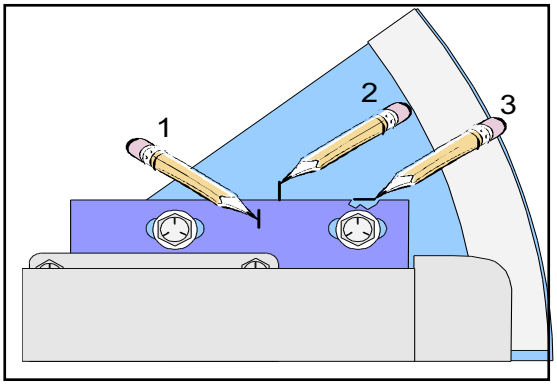
Figure 7-23: Mounting Plate on the Slide



4. Mark the mounting plate for height.

5. Mark the mounting plate for depth (mark 1 on Figure 7-24).

Figure 7-24: Marking the Mounting Plate



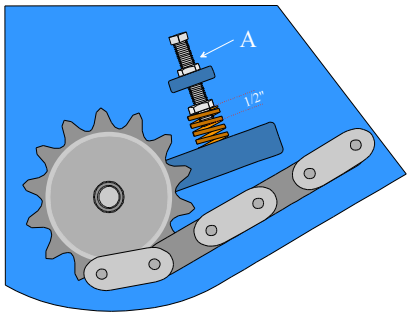
6. Make a second line for the amount needed to move the head (mark 1 on Figure 7-24).
7. Mark along the top of the motor mount as a reference point for alignment (mark 1 on Figure 7-24).
8. Loosen the mounting bolts.
9. Move the plate back to the measured distance from Mark 1 to Mark 2.
10. Ensure the reference line (Mark 3):
    a) Is perpendicular to the plate
    b) Is at the same height as the motor mount plate
11. Tighten the mounting bolts and torque to 75 ft-lb.
12. Recheck the pivot point.

Infeed Conveyors

Adjusting the Infeed Conveyor Chain Tension

The infeed conveyor chain should have enough slack so that you can gently pull up on the chain and see approximately 1 chain link distance of slack. Tension guidelines are given on page 102.

Figure 7-25: Infeed Conveyor Chain Tension Assembly



Adjust as follows:

1. Adjust the bolt (labeled A in Figure 7-25) so it is halfway through the spring.
    a) Loosen the top jam nut.
    b) Loosen the bottom jam nut until the bolt is halfway through the spring.
2. Tighten the top jam nut.
3. Tighten the bottom jam nut to add tension to the chain.

Keeping the Infeed Conveyors Aligned With the Blades

Checking the Infeed Conveyor Alignment

1. Place the saw in the Semiautomatic Mode by pressing the SEMI-AUTO button on the touch screen's Main Menu.
2. Enter 90° for all blade angles.
3. Place a board on the conveyor so that it will not touch the blades as it passes them.
4. Use the infeed conveyor FORWARD jog button to move the board until it is under the hold-down and on the lumber guide.
5. Mark the board on both sides of the flight on both sides of the machine.
6. Move the board to the exit side and stop it before it leaves the lumber guide.
7. Measure the distance between the mark and the flights.
8. If the measurement is more than 1/16 in., adjust to parallel.

Adjusting the Infeed Conveyor Alignment

Always start with the stationary-end infeed conveyor and align the carriage-end infeed conveyors immediately afterward.

1. Move the stationary-end infeed conveyor a comfortable distance away from the saw blades.

2. Lockout/tagout.
3. Choose two points within the cutting chamber of the saw and measure from the frame (under the saw blades) to the conveyor edge to determine how far out of alignment it is from front to back.
4. Loosen the bearing bolts on the front (infeed) side only, and push or pull to make it even with the saw frame.
5. Repeat this procedure for the carriage-end infeed conveyor.

Maintaining the Lumber Guide

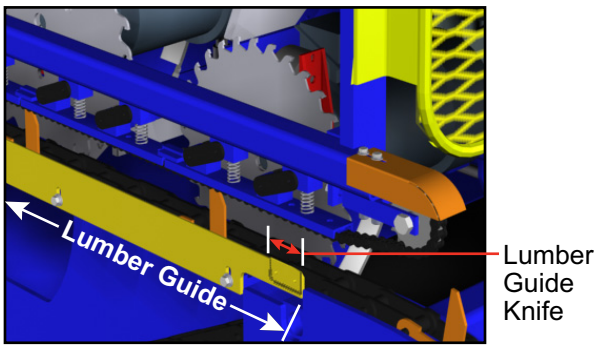
Inspecting the Lumber Guide and Knife

If the knife has a notch, the lumber may “jump” out of position before moving to the next blade.

Inspect the lumber guide weekly. Figure 7-26 shows the location of the lumber guide and lumber guide knife. Check for missing teeth at the beginning of the knife, and ensure that the top of the knife is not notched or chipped. Replace the knife if it shows signs of damage.

Check that the blade edge on the lumber guide knife is the correct height. See Figure 7-27.

Figure 7-26: Location of Lumber Guide and Knife



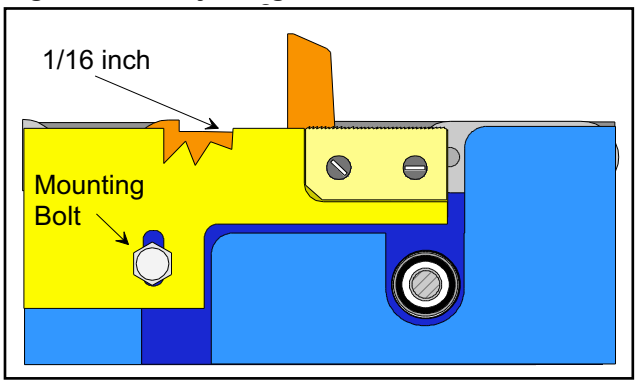
Replacing the Lumber Guide Knife

To replace the lumber guide knife, remove the two (2) bolts holding it to the lumber guide and replace the knife.

Adjusting the Lumber Guide Height

The blade edge should be set at 1/16 in. above the surface of the flight (dog) that supports the board.

Figure 7-27: Adjusting the Lumber Guide and Knife



1. Loosen the five (5) mounting bolts.
2. Use a rule to measure the height of the tracking blade.
3. Tighten the bolt and check the other end and do the same and tighten the bolt.
4. Tighten the three (3) middle bolts.

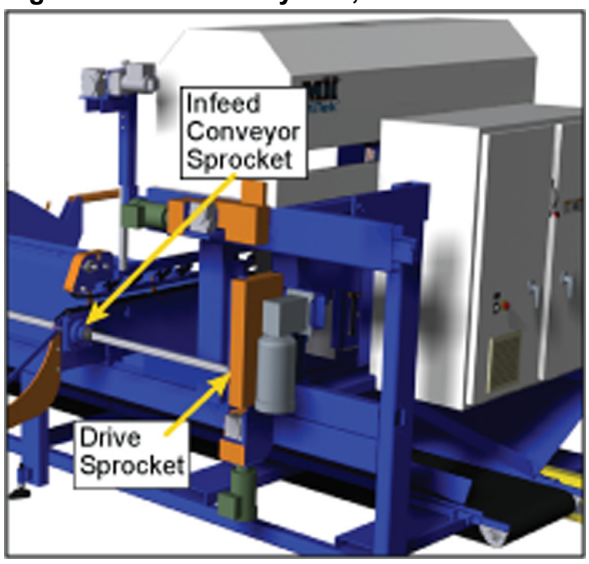
Replacing the Infeed Conveyor Sprocket

The feed chain sprockets should be replaced every three (3) years or sooner, depending on use.

Disassembly

1. Relieve the chain tension at the take-up sprocket.
2. Remove the feed chain.
3. Remove the square tube drive.
4. Remove the bolts holding the drive sprockets.

Figure 7-28: Stationary End, Outfeed Side



Assembly

1. Install new sprockets after coating axle bolts with Lubriplate lubricant.
2. Install the infeed chain.
3. Tension the infeed chain with the take-up sprocket.
4. Adjust the chain tension.

Adjusting the Drive Sprocket Tension

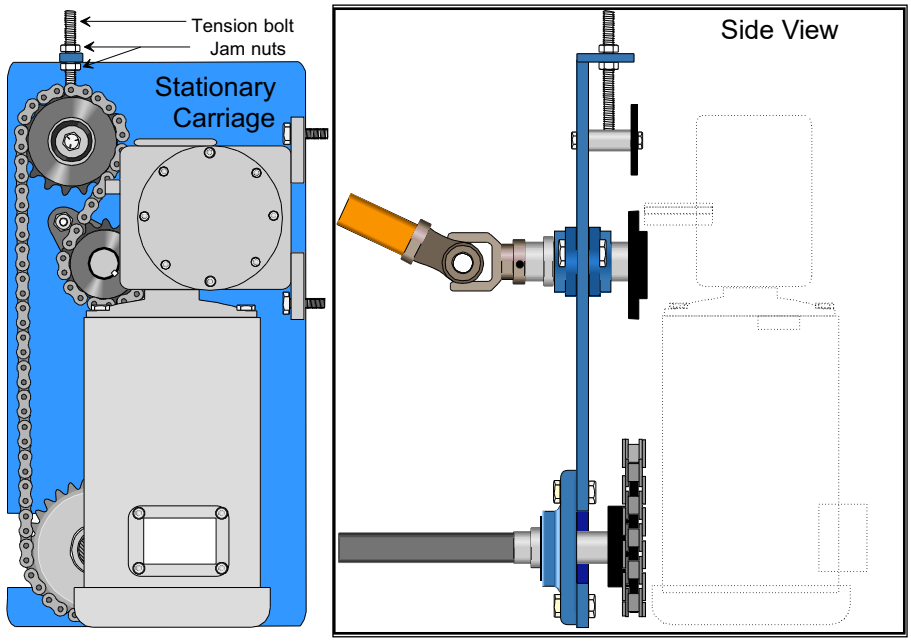
The tension should be set where the drive chain can deflect about 1 chain link when pushed between the drive sprocket and the idler sprocket.

1. Loosen the idler bolt.
2. Loosen the two jam nuts on the adjuster.
3. Use the top jam nut to draw up the idler sprocket until the tension is correct.
4. Tighten the bottom jam nut.
5. Tighten the idler bolt.

Replacing the Drive Sprocket

The drive sprockets are normally replaced at three (3) year intervals. Use the following guide when replacing these sprockets.

Figure 7-29: Drive Sprocket Assembly, Front and Side View



Disassembly

1. Remove the chain from the drive clusters.
2. Loosen the setscrews from the universal joints of the hold-down drive shaft, next to the sprocket drive cluster.

3. Slide the universal joint off the shaft, being careful not to lose the key.
4. Remove the long square drive shaft.
5. Remove the main drive sprocket in the following manner:
    a) Loosen the setscrews on the square shaft drive sprockets.
    b) Slide the sprocket and tube out of the square bore bearings.
6. Remove the hold-down drive sprockets by removing the shaft collar tapping shaft through bearings, being careful not to lose the key from the keyway.
7. Remove the idler (top) sprocket by loosening the nut on the axle bolt and withdrawing the bolt from the cluster assembly.
8. Remove the main gearbox drive sprocket by loosening the set screws and pulling the sprocket from the motor shaft, being careful not to lose the key from the keyway.
9. Repeat this procedure for the other drive sprocket.

Assembly

1. Install the new sprocket on the main gearbox shaft, with the hub of the sprocket toward the motor. Be sure the key is in the keyway and tap the sprocket on the motor shaft until it is flush with the end of the shaft. Tighten the set screws.
2. Install the twin drive sprocket assembly at the motor drive end, through the first square bore bearing. Then, slip the shaft collar over the square tube before going through the second bearing. Slip the second square shaft collar on after going through the second bearing.
3. Install the single drive sprocket assembly at the stationary end, using the same basic procedure.
4. Install the hold-down drive sprocket next, using washer spacers to align it with the square tube sprocket below.
5. Install the idler sprocket with the axle bolt, but do not tighten.
6. Install the square tube drive shaft.
7. Align all sprockets with a straight edge and tighten all the set screws.
8. Slide universal joints onto the hold-down drive shaft with the key in the keyway and tighten the set screws.
9. Install the drive chain.

10. Tension the motor to the main drive shaft sprocket chain, using the slotted holes at the machine end of the motor mounting bracket.

11. Tension the hold-down drive chain pushing the idler (top) sprocket up in the slotted hole and tighten the axle nut.

12. Repeat this procedure for the other drive sprocket.

Inspecting and Replacing Infeed Roll Pins

If the infeed conveyors will not move horizontally or are not calibrating properly, a roll pin that attaches the spur gears to the drive shaft could be sheared. To inspect and replace the roll pin, do the following:

1. Cut the welds on the tabs at the end of the racks.

2. Disconnect the chain that turns the shaft, located on the outfeed side of the saw.

3. With the spur gear disengaged from the racks, pull both racks out of the frame until they completely lose contact with both spur gears.

4. On the infeed end of the shaft, remove the pin from the locking nut and unscrew the locking nut.

5. Loosen the set screws on the infeed-side bearing.

6. On the outfeed end, unscrew the bolts holding the bearings to the frame.

7. Pull bearing and shaft assembly from the outfeed side to reach both spur gears.

8. Try to rotate each spur gear by hand.
   - It a spur gear rotates on the shaft, the roll pin is broken, and you should continue this procedure.
   - If neither spur gear rotates on the shaft, the roll pin is still in place, and you should reverse the steps to re-assemble the saw.

9. If a roll pin is broken, drive the old roll pin out of the spur gear, being careful not to let the spur gear fall.

10. Drive a new roll pin in place.

11. Examine the spur gear to ensure the teeth are in good condition. If the spur gear needs to be replaced, now is the ideal time.

12. Reverse these steps to re-assemble the parts.

13. Weld the tabs back on the end of the racks.

Hold-Downs

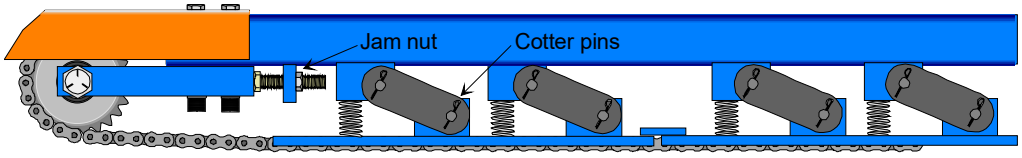
The hold-down chains must be the proper length of 207-1/4 in. Chains that are too long could result in improper tension on the shoes and loose springs.

Adjusting the Hold-Down Chain Tension

Refer to the *Tension Requirements* section on page 102 for the correct tension guidelines. If the tension is incorrect, see Figure 7-30 and perform these steps to adjust the tension:

1. Loosen the jam nut on the tension bolt.
2. Adjust the tension bolt on the hold-down until the chain tension loosens or tightens the desired amount.
3. Tighten the jam nut.

Figure 7-30: Hold-Down Shoes on Hold-Down Assembly



Keeping the Hold-Downs Aligned With the Infeed

Checking the Hold-Down Alignment

1. Place the saw in the Semiautomatic Mode by pressing the SEMI-AUTO button on the touch screen's Main Menu.
2. Enter 90° for all blade angles.
3. Place a board on the conveyor so that it will not touch the blades as it passes them.
4. Use the infeed conveyor FORWARD jog button to move the board until it is under the hold-down and on the lumber guide.
5. Press an E-stop.
6. Mark the board on both sides of the flight on both sides of the machine.
7. Move the board to the exit side and stop it before it leaves the lumber guide.
8. Measure the distance between the mark and the flights.
9. If the measurement is more than 1/16 in., continue with this procedure.

Adjusting the Hold-Down Alignment

1. Move the stationary-end infeed conveyor and hold-down a comfortable distance away from the saw blades.

2. Lockout/tagout.
3. Loosen the bearing bolts on the front (infeed) side only and push or pull to make it perfectly aligned above the infeed conveyor.
4. Repeat this procedure for the carriage-end hold-down.

Replacing Hold-Down Shoes

Disassembly

1. Place the saw in the Manual Mode by pressing the MANUAL button on the touch screen's Main Menu.
2. Use the infeed conveyor FORWARD jog button to move the chain connection link near the front sprocket.

3. Turn off all power to the saw using approved lockout/tagout procedures.
4. Relieve chain tension by loosening the jam nut shown in Figure 7-30.
5. Remove the cotter pins in the chain links in the shoe that needs replacement and remove the link.

Assembly

1. Install the new shoe using the original links and cotter pins.
2. Tension the chain with front sprocket adjustment until the chain has the correct amount of tension as described in the *Tension Requirements* section on page 001048 Rev. A-102.
3. Remove the lockout device.

Replacing Hold-Down Sprockets

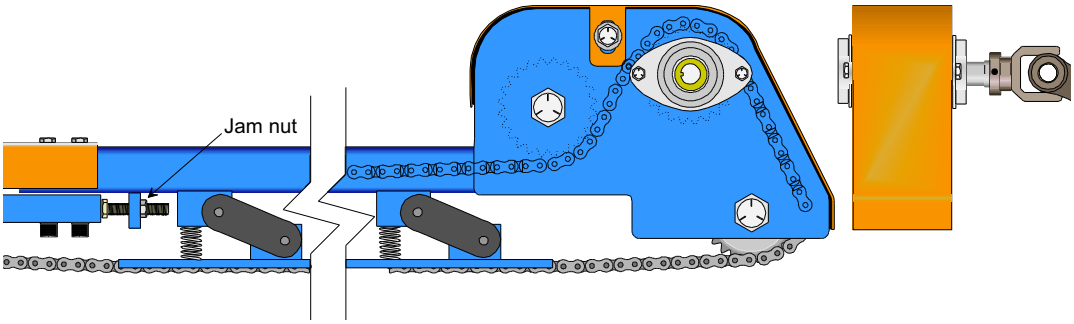
The hold-down sprockets should be replaced every three (3) years or sooner, depending on use.

Disassembly

1. Place the saw in the Maual Mode by pressing the MANUAL button on the touch screen's Main Menu.
2. Use the infeed conveyor FORWARD jog button to move the chain connection link near the front sprocket.

3. Turn off all power to the saw.
4. Relieve chain tension by loosening the jam nut on the tension bolt and loosening the tensioning bolt on the hold-down until the chain droops in the center.
5. Disengage the chain connecting link and allow the chain to hang at each end.
6. Remove the rear sprocket as follows:
    a) Disengage the universal joint by loosening the set screw at the hold-down sprocket shaft
    b) Pull the universal joint off the sprocket shaft, taking care not to lose the key in the keyway.
    c) Loosen the three (3) set screws that hold the shaft to the two shaft collars and sprocket.
    d) Using a 1/2-in. diameter steel rod approximately 6 in. long and a hammer, tap the sprocket shaft out through the bearing and sprocket until the sprocket falls free. Do not lose the key.
7. Remove the front sprocket as follows:
    a) Loosen the hex nut and take the cap screw out of the take-up fork.
    b) Remove the nut, lock, cap screw, and sprocket.

Figure 7-31: Hold-Down Sprocket and Hold-Down Assembly



Assembly

1. Replace the front sprocket as follows:
    a) Place the new sprocket in place and line it up with the bolt hole.
    b) Place the cap screw back in place and attach with the lock washer and nut.
    c) Tighten the cap screw.
2. Replace the rear sprocket as follows:
    a) Insert the shaft from the drive side through the first bearing.
    b) Thread a shaft collar, the new sprocket with the square key stock in the keyway, and the second shaft collar over the shaft before going through the second bearing.
    c) The end of the shaft should be flush with the second (inboard) bearing, leaving approximately 3 in. of the shaft protruding on the drive side.
    d) Position the shaft collars adjacent to the bearing and tighten the set screws. Do not tighten the set screws on the sprocket aligned with the wear strips.
    e) Bring the universal joint up to the protruding shaft and position the key in the keyway.
    f) Slip the universal joint over the shaft making sure the key stays in its position between the two keyways.
    g) Tighten the universal joint set screws.
3. Install the chain as follows:
    a) Bring the chain around both sprockets and connect it with the connecting link.

b) Position the rear sprocket for chain alignment with the rear strips and tighten the set screws.

c) Adjust the chain tension with front adjusting bolts to where the chain is on a horizontal plane with the slack indicated on page 102.

d) Tighten the jam nut on the tension bolt.

e) Remove lockout devices.

Replacing a Roll Pin in the Hold-Down Spur Gears

If a roll pin breaks in a hold-down spur gear, contact Machinery Division Customer Service.

Carriage

Preventive Maintenance for the Carriage

Lubricate the axes of the carriage V-wheels with a light coat of WD-40. (Excessive oil attracts sawdust.)

Replacing a Roll Pin in the Hold-Down Spur Gears

The carriage drive spur gear on the outfeed side has a roll pin that could shear if put in a bind. If the pin breaks, drive the remainder of the broken pin out of the hole and replace it with a new pin.

The carriage drive spur gear on the infeed side is keyed, so there is no roll pin.

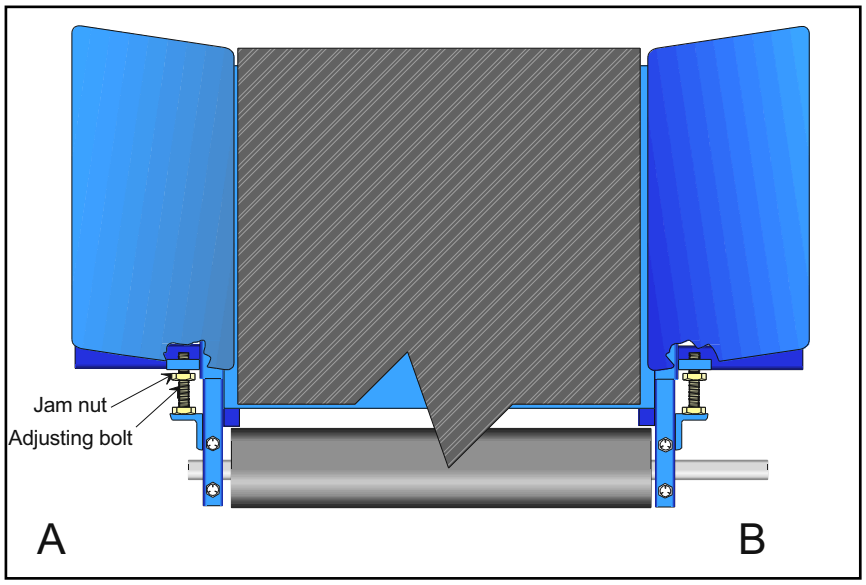
Waste Conveyor and Incline Conveyor

Adjusting the Belt Tracking/Tension

Correct belt tracking (alignment) and tension is achieved when the belt sag between the idler rollers is approximately 1-1/2 in. and the belt tracks in the center of the pan. If the belt is moving toward one side and climbing the side guides, adjust the roller on that side only.

Refer to Figure 7-32 while following the adjustment procedure.

Figure 7-32: Adjusting the Conveyor Belt Tension



1. Place the saw in Manual Mode by pressing the MANUAL button on the touch screen's Main Menu.

2. Activate an E-stop.

3. Using two 15/16-in. open end wrenches, loosen the locknut from the rear of the tension adjusting screw on the side to be adjusted.

4. Tighten the adjusting bolt. Turn the bolt only one (1) turn of the wrench at a time.

When the adjustment is made at the drive end, loosen the bolts that hold the gear reducer to its mounting plate to allow it to move with the roller as the adjustment takes place. Retighten these gear reducer bolts before conveyor start-up. In addition, the drive chain must be checked for proper tension before final tightening of adjusting bolts.

Be careful not to loosen the bolts too much and lose tension in the belt.

5. Start the conveyor by pushing the waste conveyor button. Run the conveyor for approximately 5 minutes, and observe tracking.

   It may take more than a single adjustment to align the belt correctly.

6. Activate an E-stop.

7. Repeat this procedure at each end of the conveyor, making sure the conveyor is off during each adjustment.

8. Check the belt tracking (alignment) every 2 hours until the conveyor remains aligned.

Replacing a Conveyor Belt

The waste conveyor and optional incline conveyor belting usually needs replacing every 3 years, depending on use and maintenance. Use the following steps as a guide for replacing either the main belt or the incline belt.

1. Place the saw in the Manual Mode by pressing the MANUAL button on the touch screen's Main Menu.

2. Use the WASTE CONVEYOR button to run the conveyor until the lacing connection is near the head roller at the drive end.

3. Turn off all power to the saw, following approved lockout/tagout procedures.

4. Relieve the tension on the belt using the tensioning bolts (next to the roller).

5. Using a pair of pliers, remove the wire that is threaded through the lacing and save the wire for reassembly.

6. Remove the old belt.

7. Clean the sawdust and chips from the entire length of the metal conveyor bed.

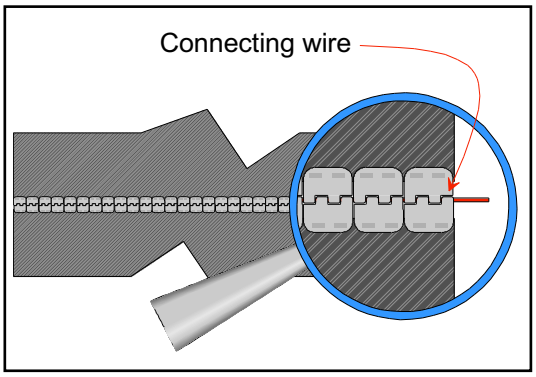
Assembly

1. Install a new belt with the lacing connection near the head roller.

To pull the new belt through the machine more easily, thread the new belt to the old one and pull it through the machine. This will help thread the belt into the rollers on the bottom.

2. Bring the belt together so the lacing intermeshes, and slide the rod or wire through the lacing as shown in Figure 7-33.

Figure 7-33: Connecting Wire on Belt Lacing



3. Bend the ends of the rod or wire to prevent it from coming out.

4. Adjust the belt tension evenly at the head roller adjusting bolts. See the *Adjusting the Belt Tracking/Tension* section for correct tensioning guidelines.

5. Run the conveyor for at least five (5) minutes and check the belt tracking. If the belt does not track correctly, follow the *Adjusting the Belt Tracking/Tension* section.

Pneumatic System Maintenance

Figure 7-34 shows both pneumatic assemblies.

The pneumatic system located on the saw frame controls the saw blade brakes, carriage brakes, and moves blades 5 and 6 out-of-cut.

The pneumatic system located on the PC enclosure operates the PC enclosure's cooler.

Only saws with frame #412 and higher have a PC enclosure.

	WARNING
	**COMPRESSED AIR HAZARD.** **To avoid injury, bleed all pressure from the lines before removing the reservoir.** **Ensure that the reservoir is securely attached to the lubricator body before returning pressure to the lines.**

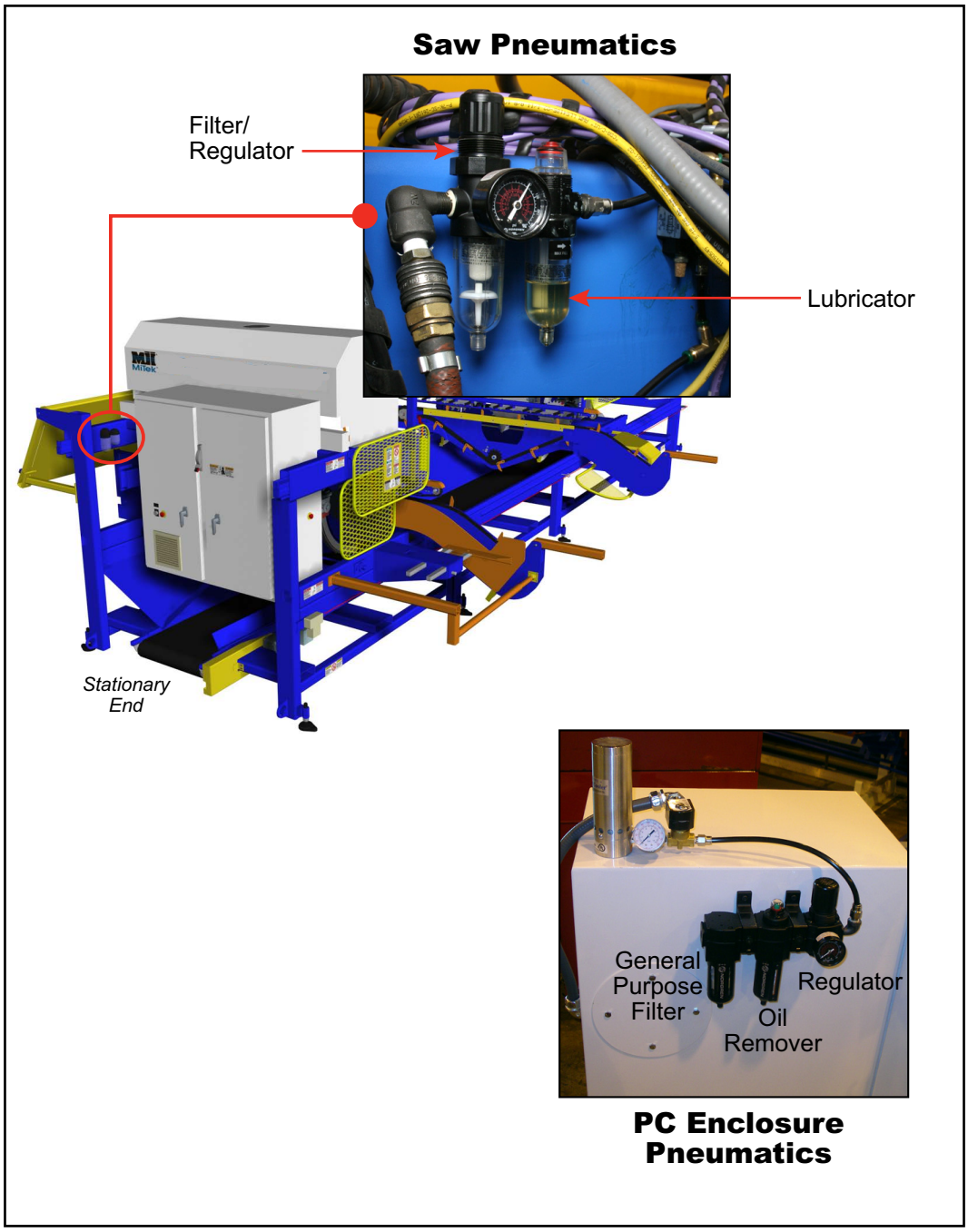
At the beginning of the day, check the saw pneumatics:

- Filter/regulator should read approximately 100 psi
- Lubricator oil level should be 1/4 to 3/4 full
- Ensure the filter is draining the water out of its bowl

At the beginning of the day, check the PC enclosure pneumatics:

- Filter/regulator should read approximately 100 psi
- Ensure the filter is draining the water out of its bowl

Figure 7-34: Pneumatic System Components



Maintaining the Lubricator on the Saw

The saw's pneumatic system uses a lubricator to keep gaskets and seals in good condition.

Checking the Oil Reservoir

Check the oil level daily by viewing the sight gauge located on the reservoir daily. Refill or top off the oil when the reservoir is less than 3/4 full.

Filling the Oil Reservoir

Use a misting type pneumatic oil that is suitable for compressed air tools. To refill the oil reservoir:

	WARNING
	**COMPRESSED AIR HAZARD.** **To avoid injury, bleed all pressure from the lines before removing the reservoir.** **Ensure that the reservoir is securely attached to the lubricator body before returning pressure to the lines.**

1. Depressurize the system.
2. Remove the reservoir from the lubricator body by twisting approximately 1/4 turn clockwise while pushing up on the reservoir. Then pull down and remove the reservoir from the body.
3. Pour the oil into the reservoir to the fill line.
4. Place the reservoir back onto the lubricator body by pushing up and turning counterclockwise. Make sure it is securely attached.

Adjusting the Density of the Lubricant Fog

The pneumatic system lubricator injects a fog of oil into a flowing stream of compressed air to provide internal lubrication. The density of the fog can be controlled. Turn the socket-head fitting counterclockwise to increase the fog density or clockwise to decrease it.

Excessive oil seepage from valves and cylinder seals may be an indication of too much oil being injected. Minor oil seepage from valve exhaust ports is expected.

Additional Maintenance

	WARNING
	**COMPRESSED AIR HAZARD.** **To avoid injury, bleed all pressure from the lines before removing the reservoir.** **Ensure that the reservoir is securely attached to the lubricator body before returning pressure to the lines.**

Proper preventive maintenance for the lubricator also includes replacing the O-rings, seals, and gaskets at regular intervals. We recommend that these items be replaced every 2 years. Contact the lubricator manufacturer to purchase the seal kit components.

To perform maintenance on the lubricator, remove the lubricator from the frame by removing the two (2) screws on the front side.

Maintaining the Regulators

The saw's regulator is combined with the filter assembly.

This section applies to the regulators on the saw and the PC enclosure.

Adjusting the Pressure

The operating pressure of the saw's pneumatic system should be 100 psi or slightly below. To adjust the system pressure to 100 psi:

1. Unlock the pressure adjustment knob on the regulator by pulling it straight up.
2. Turn the knob clockwise to increase pressure or counterclockwise to decrease pressure.
3. Once a pressure of 100 psi is achieved, push the knob down to lock it in place.

The saw regulator gauge must register 80-100 psi at all times! If the pressure drops below 80 psi, the pneumatic system will not function properly.

Additional Maintenance

	WARNING
	**COMPRESSED AIR HAZARD.** **To avoid injury, bleed all pressure from the lines before disassembling the regulator.**

If a regulator is not operating at its optimum capacity, we recommend cleaning the regulator and replacing the O-rings, gaskets, diaphragm, and valve assembly.

Mufflers on the filter/regulator should be replaced periodically, when air pressure becomes inefficient. Keep muffler vents clean and free of dust to extend their lives.

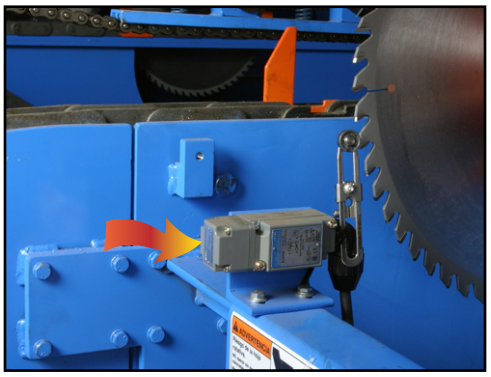
Limit Switches

Finding the Limit Switch

The limit switch counts the number of boards going into the saw.

An infeed count switch is located on the saw frame near the stationary-end infeed conveyor on the infeed side, as shown in Figure 7-35.

Figure 7-35: Infeed Count Limit Switch



Adjusting the Limit Switch

To adjust the location of the limit switch:

1. Loosen the screws in the mounting bracket and move the bracket and limit switch assembly along the slotted holes.

2. Retighten the screws.

Proximity (Prox) Switches

How a Prox Switch Works

Proximity (prox) switches communicate certain information to the PLC regarding the location of components. They use an electromagnetic field to detect when an object is near.

The prox switches on this equipment monitor a shaft or cam with holes drilled at specific points. The prox switch "sees" the metal on the shaft, and when the component moves, the shaft moves. When the hole in the shaft passes by the prox switch, it stops "seeing" metal, which indicates the location of that component.

Finding a Prox Switch

Each prox switch is described in Table 7-7.

Table 7-7: Prox Switch Locations

Prox Switch	Component It Affect	Description
Count	Hold-Down, Vertical Movement, Stationary End	Tracks the distance the stationary-end hold-down moves vertically
Home		Tracks when the stationary-end hold-down has reached its home position
Count	Hold-Down, Vertical Movement, Carriage End	Tracks the distance the carriage-end hold-down moves vertically
Home		Tracks when the carriage-end hold-down has reached its home position
Count	Blade 1 Angle	Tracks the angle of blade 1
Home		Verifies the angle calibration of blade 1
Count	Blade 2 Angle	Tracks the angle of blade 2
Home		Verifies the angle calibration of blade 2
Count	Blade 3 Angle	Tracks the angle of blade 3
Home		Verifies the angle calibration of blade 3
Count	Blade 4 Angle	Tracks the angle of blade 4
Home		Verifies the angle calibration of blade 4
Count	Blade 5 Angle	Tracks the angle of blade 5
Home		Verifies the angle calibration of blade 5
Count	Blade 6 Angle	Tracks the angle of blade 6
Home		Verifies the angle calibration of blade 6
Count	Blade 1 Centerline	Tracks the centerline of blade 1
Home		Verifies the centerline calibration of blade 1

Table 7-7: Prox Switch Locations (Continued)

Prox Switch	Component It Affect	Description
Count	Blade 2 Centerline	Tracks the centerline of blade 2
Home		Verifies the centerline calibration of blade 2
Count	Blade 3 Centerline	Tracks the centerline of blade 3
Home		Verifies the centerline calibration of blade 3
Count	Blade 4 Centerline	Tracks the centerline of blade 4
Home		Verifies the centerline calibration of blade 4
Count	Blade 5 Centerline	Tracks the centerline of blade 5
Home		Verifies the centerline calibration of blade 5
Count	Blade 6 Centerline	Tracks the centerline of blade 6
Home		Verifies the centerline calibration of blade 6
Out-Of-Cut	Blade 5	Tracks when blade 5 is positioned out-of-cut
Out-Of-Cut	Blade 6	Tracks when blade 6 is positioned out-of-cut

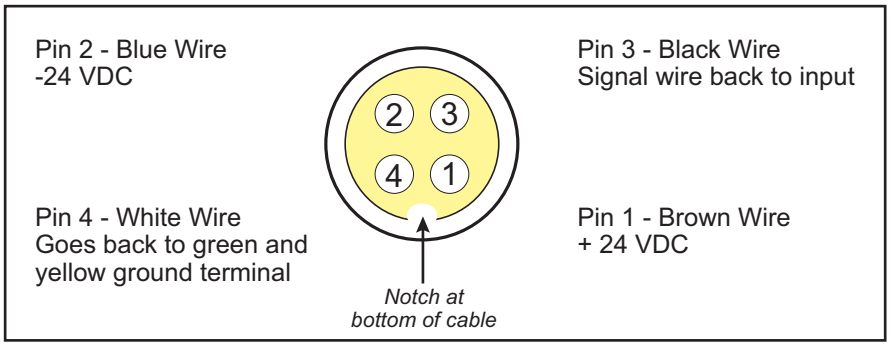
Adjusting a Prox Switch

Each prox switch should be .025 to .040 in. from its target. To adjust this distance, screw the prox switch in or out while using a feeler gauge to establish the desired distance from the target.

Testing a Prox Switch Cable

If a prox switch is not communicating with the PLC, it may be caused by faulty cabling. Using a voltmeter and referring to Figure 7-36, follow these steps:

Figure 7-36: Prox Switch Cable at the Switch



1. Disconnect the cable from the prox switch.

2. Turn the voltmeter to DC VOLTS. If it does not have auto-range, set it to at least 24 VDC.

	WARNING
	ELECTROCUTION HAZARD! **Verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures before performing any maintenance.** **All electrical work must be performed by a qualified electrician.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

3. To determine if voltage is going out to the prox switch:

    a) Place the positive (red) voltmeter lead in pin 1 and the negative (black) voltmeter lead in pin 2.

    b) If the cable is operating to the switch, the voltmeter will display 24 volts.

4. To determine if the cable back to the PLC input is working:

    a) Create a jumper by stripping a piece of wire at both ends.

    b) Place the jumper between pins 2 and 3.

c) Check the appropriate green LED light on the appropriate 24 VDC input card in the PLC rack.

d) If the cable is working, the green LED light will be on.

Electrical Components

The stationary-end disconnect switch shuts off power to the entire saw. The carriage-end disconnect switch shuts off power only to the carriage end.

This equipment relies on highly technical electrical components to operate correctly. Most of the electrical components are located in the stationary-end electrical enclosure and the carriage-end electrical enclosure.

The stationary-end electrical enclosure is the main electrical enclosure. Although the 3-phase wiring enters into this enclosure to power the entire saw, most components in this enclosure control the stationary end of the saw. Likewise, most components in the carriage-end electrical enclosure control only the carriage end of the saw.

	WARNING
	**ELECTRICAL HAZARD!** **Always verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures (OSHA 29 CFR 1910.147) before performing any maintenance on this equipment.** **All electrical work must be performed by a qualified electrician.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

Keeping Electrical Enclosures Clean

CAUTION
Do NOT use compressed air inside electrical enclosures. Remove the filter from the enclosure before blowing out dust.

Cleaning Filters

Clean the filters in all electrical enclosures every week:

1. Remove the filter from the enclosure.
2. Close the enclosure door out and move away from the enclosure to keep dust out.
3. Blow out the filter with compressed air.
4. Place the filter back in the enclosure.
5. Shut the door after all filters are clean.

Replacing Filters

Replace the filters every year.

Vacuuming

Vacuum dust from the electrical enclosures every week.

Checking for Voltage To and From Components

One of the first steps to take when troubleshooting an electrical component problem in the saw is to determine which electrical component is not working properly and why.

Determining If a Component Is Powered

To determine which electrical component is not working, you must first determine if power is getting to the component, then determine if power is proceeding on to the next component in the loop. Here are some pointers:

- Use an auto-ranging digital multimeter or voltmeter to measure the voltage.
- Wires entering the top of a component are generally for incoming power, but read your electrical schematics to confirm.
- Wires exiting the bottom of a component are generally for outgoing power, but read your electrical schematics to confirm.

Using the Maintenance Jumper When Checking Voltage

Some electrical components on the saw receive power only when they are receiving or sending a signal to act which makes troubleshooting more difficult. To work around this constraint, pull the maintenance jumper and the component will think it is receiving a constant signal. The maintenance jumper is discussed further in the *Maintenance Jumper* section on page 155.

PLC and Input/Output Cards

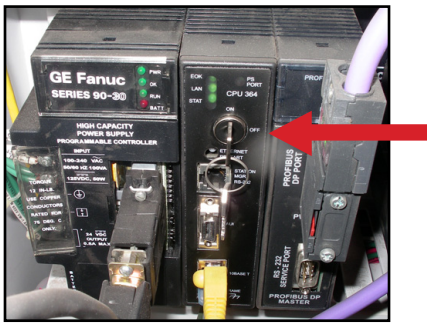
A PLC is a programmable logic controller. It houses input cards that supply information to the PLC and output cards that allow the PLC to supply information to the rest of the saw. It is the “brain” of the entire electrical system.

Placing the PLC into Run Mode

When troubleshooting, one of the first steps is to determine if the PLC is in Run Mode. In Run Mode, all 3 lights should be on: Power, Ok, and Run.

To reset the PLC and place it in Run Mode, refer to Figure 7-37. Turn the key to its horizontal position and back to vertical twice (2 times).

Figure 7-37: Turn Key TWICE to Reset the PLC



Replacing an Input or Output Card

The different types of input and output cards on the saw are NOT interchangeable.

The terminal strips must remain with their original assigned slot.

CAUTION

Turn power off to the PLC before removing an input or output card.

Removing cards while power is on can cause a fatal fault in the PLC and drop it out of Run Mode.

An input card sends messages from components on the saw to the PLC. An output card sends messages from the PLC to the components.

When troubleshooting, start by attempting to move or activate the component in question while another person monitors the indicator light on the input and/or output card to determine if it is receiving input and sending output. If you suspect a card is not working, replace it. Use the electrical drawings to determine which output card to monitor.

To replace an input or output card:

1. Remove the terminal strip:

   Each input and output card has a terminal strip on it so you can replace the card without removing individual wires. Remove the terminal strip by opening the front cover and pushing up on the small lever located at the arrow in Figure 7-38. Tilt the terminal strip downward to remove it.

   Figure 7-38: Push Lever Up to Release Terminal Strip

   Keep each terminal strip with its assigned slot; do NOT move the terminal strip with the card. The saw will not function unless all wires are running to the correct slot.

2. Remove the card:

   Remove the card from its rack by pressing the release latch located on the bottom of the card. Tilt the card upward to remove it from the rack. See Figure 7-39.

   Figure 7-39: Press Release Latch to Remove Card

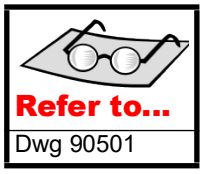
   

   Install the new PLC card by locating the top hinge and tilting the card downward until the catch snaps into place. Then locate the hinge on the terminal strip and tilt the terminal strip upward until the catch snaps into place.

For troubleshooting purposes, you can temporarily switch the suspected bad card with another card of the same type. Use your electrical schematics to determine which slots hold the same type of card.

VFD

Understanding VFDs



A VFD (variable frequency drive) is part of the communication loop between the PLC and electrical components that require variable speed control. Each variable speed electrical component has its own VFD.

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

The VFD display window is helpful when troubleshooting. The following scenarios may exist in the display window:

- When a VFD is powered but is not accepting any commands at that moment, “-000” flashes.
- When a VFD is receiving an input, the Run light comes on and a speed command shows.
- If a VFD experiences a fault, one of the fault numbers listed in Table A-16 in the *Troubleshooting* appendix will appear.

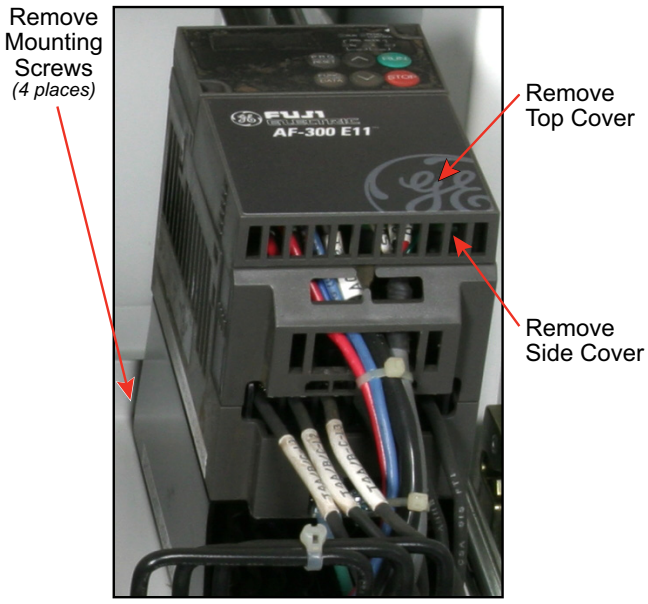
Setting VFD Parameters

Recommended VFD settings are listed in your electrical drawings. Contact MiTek Machinery Division Customer Service before attempting to reset any setting.

Replacing a VFD (Variable Frequency Drive)

There are a minimum of 16 VFDs on the saw. Refer to your electrical drawings and schematic to determine what each VFD controls and the replacement part number.

Figure 7-40: VFD



All VFDs should be ordered through MiTek because they must be programmed before use.

To replace a VFD:

1. Remove the two (2) covers labeled in Figure 7-40.
2. Ensure all wires entering the VFD have wire labels. If not, refer to your electrical drawings and adhere wire labels before disconnecting anything.
3. Remove all wires from the VFD. They will need to be connected to the new VFD in the same way that they were connected to the VFD in need of repair.
4. Remove the four (4) mounting screws.
5. Install the new or repaired VFD by reversing the procedure above.

If MiTek drop ships a VFD directly from the manufacturer, your electrical schematic shows the parameter settings needed. Program the VFD according to these settings. If the new VFD is made by a different manufacturer than the original VFD, call MiTek Machinery Division Customer Service for the new settings. MiTek will provide support only for VFDs purchased through MiTek.

Circuit Breakers

Circuit breakers are used for certain components as an electrical circuit protection device.

Using the Handle

Manually operate the circuit breaker using the handle and the PUSH-TO-TRIP button on the circuit breaker. The handle has three (3) positions: On, Trip, and Off.

Manually Tripping the Circuit Breaker to Test

Manually trip the circuit breaker by pushing the PUSH-TO-TRIP button.

Resetting a Tripped Circuit Breaker

Reset the circuit breaker after it has been tripped by moving the handle to the off position, and then back to the on position.

Motor Starters and Overloads

Motor starters turn motors on and off. Overloads are usually mounted to the output side of the motor starter and act as safety switches. Certain alarms are associated with motor starter problems. A common cause of the alarms is the contacts are not making complete contact. This section describes the alarms and how to clean the contacts.

Environmental Temperature

The air temperature around the saw should never exceed 110°F. In high ambient temperatures, the motors are unable to dissipate heat effectively. When the temperature of the motor windings exceeds a preset value, the motor overload will automatically shut down the motor to prevent it from burning up.

Alarms Associated With Motor Starters

- Motor Thermal Overload Alarm—If an overload trips, reset it by pressing the red button located on the overload. An alarm appears on the touch screen monitor when this condition occurs.
- Motor Starter Safety Fault—A motor starter safety fault occurs when the normally open contact connected to the PLC detects voltage on any of the inputs while that axis should not be moving. Press the reset button on the computer screen to clear the fault. If problem has not been corrected, the alarm will trip again after 2 seconds.

Cleaning Contacts

To clean the motor starter contacts:

CAUTION

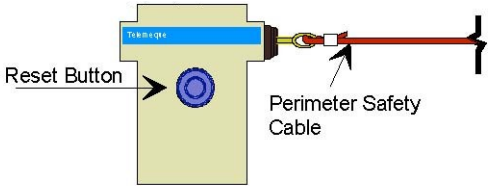
Never use pneumatic air inside electrical cabinets. It will force dust and particles into electrical components causing them to fail.

1. Lockout/tagout at the wall before opening the enclosure.
2. Vacuum dust from the enclosure and around the contacts.
3. Cycle the contacts by pressing the center spring loaded tabs of the starter up and down with a small screw driver while blowing canned air into the chamber. DO NOT USE PNEUMATIC AIR FROM YOUR PLANT!

Maintaining the Perimeter Safety Cable

A properly tensioned perimeter safety cable will trip the E-stop switch when someone pulls it approximately 8 in. from its rest position at the mid-section of the saw.

Figure 7-41: Safety Cable and Switch



Resetting the Switch

Once the cable is pulled, reset the E-stop circuit by pressing the button labeled in Figure 7-41.

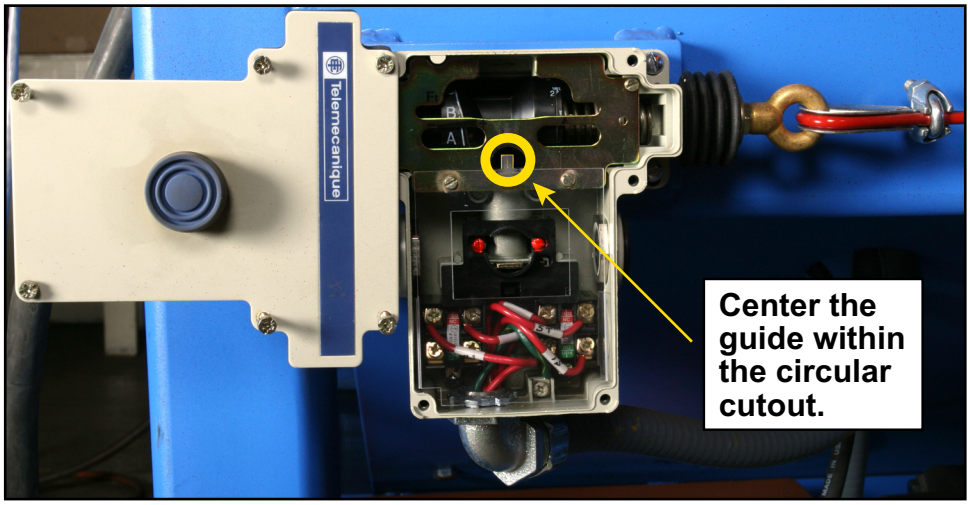
Adjusting the Perimeter Safety Cable

If the perimeter safety cable switch is not adjusted properly, a control power interrupt fault will appear, or the saw will fail to stop quickly enough.

To adjust the perimeter safety cable setting:

1. Remove the cover on the reset box.
2. Loosen the jam nut on the safety cable switch.
3. Turn the tensioning nut until the internal switch is centered in the cam. The internal switch and cam are circled in Figure 7-42.
4. Retighten the jam nut.
5. Replace the cover and tighten the screws.

Figure 7-42: Adjusting the Perimeter Safety Cable Switch



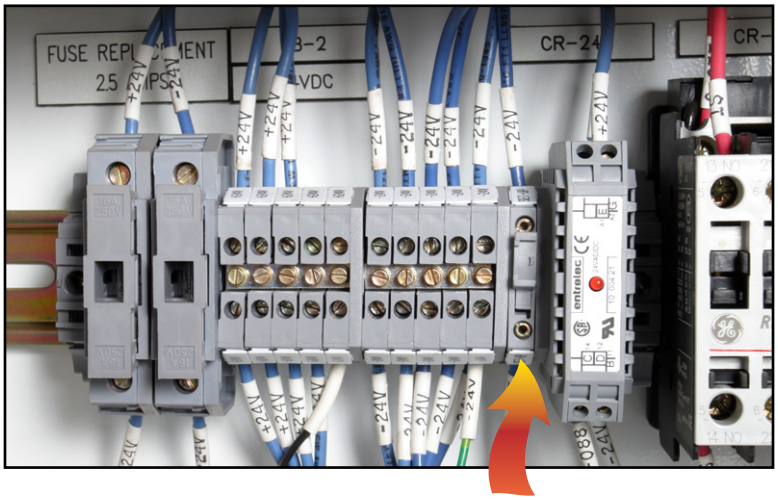
Maintenance Jumper

The maintenance jumper allows the operator to bypass certain features of the saw to make troubleshooting easier. Saw blades will not start while the maintenance jumper is pulled.

The arrow in Figure 7-43 shows the location of the maintenance jumper.

	WARNING
	ELECTROCUTION HAZARD! **The maintenance jumper provides an important safety barrier for operators during normal operation of the saw. If troubleshooting without the maintenance jumper in place, adhere to NFPS 70E guidelines.** **Always return the maintenance jumper to its working position when troubleshooting is complete.**

Figure 7-43: Location of Maintenance Jumper in Stationary-End Enclosure



When to Pull the Maintenance Jumper

Disable the maintenance jumper when you are troubleshooting alarms related to the VFD yellow faults. With the maintenance jumper disabled, the electrical system bypasses this feature and enables you to troubleshoot more easily.

How to Pull the Maintenance Jumper

Pull down the handle on the maintenance jumper to disable it. This is often referred to as “pulling the maintenance jumper.” The component remains intact and the handle stays attached to the component but in its disabled position. Figure 7-43 shows the maintenance jumper in its working position.

Blade-Installed Jumpers

The blade-installed jumpers send input to the PLC to tell it how many blades the saw has that should be operating.

Understanding Control Power Interrupts

The E-stop switches have a normally closed contact that has either “S” numbers or “T” numbers on both sides of it. The “S” numbers relate to stop circuit wires for the stationary end of the saw and the “T” number relate to stop circuit wires for the carriage end of the saw. Both the stationary end control power interrupt and the carriage end control power interrupt circuits use contacts on every emergency stop switch on the saw. If any of these contacts fail to close properly when the switch is reset, a Control Power Interrupt will be generated. If an emergency stop switch is tripped, the emergency stop fault will override any control power interrupt faults.

Outlets in Stationary-End and Carriage-End Enclosures

The outlets in the stationary-end and carriage-end electrical enclosures are standard 110 VAC outlets, but very little power is reserved to operate them. They exist to give MiTek personnel access to an outlet for laptops for troubleshooting purposes. Do not use the outlets for tools, high-powered vacuums, or any other electrical equipment that could draw more than 3 amps of current.

Recommended Preventive Maintenance

Daily Schedule

Every 2 hours (break time), do as follows:

1. Angulate all blades to 30° and blow down the saw motors, chains, and axis with air.
2. Visually check every length, angle, and centerline indicator.
3. Report any scale indicators that are wrong. If required and approved by production manager, the maintenance man will make any necessary adjustments.

At lunchtime and end of shift (twice daily), do as follows:

1. Shut down and lockout/tagout the saw.
2. Thoroughly clean all axes, chains, screws, and inside guards.
3. Lubricate all the moving axes with proper lubrication.
4. Angulate all blades to 30° and blow down the saw motors, chains, and axis with air.
5. Visually check every length, angle, and centerline indicator.
6. Report any scale indicators that are wrong. If required and approved by production manager, the maintenance man will make any necessary adjustments.

Weekly Schedule

	WARNING
	**MOVING PARTS CAN CRUSH AND CUT.** **Always verify that power to the machine has been turned off and follow approved lockout/tagout procedures.** **Bleed air lines if appropriate.**

1. Remove all guards from motors, gearboxes, infeeds, and hold-downs. Blow out all dust and debris. Ensure that the tubes in which the infeeds and hold-downs slide are free of debris.
2. Blow out all dust and debris from all drive sprockets. Lubricate the sprockets with kerosene/oil mixture.

3. Check the air brakes for each saw blade motor. Run and stop each blade, and watch to see if all blades are stopping correctly. Adjust brake calipers if necessary as directed in the *Air Brakes for Saw Blades* section of this chapter.

4. With air switched OFF, turn each blade by hand and visually check if the hub is rubbing on the brake lining while it is spinning. Adjust brake calipers if necessary as directed in the *Air Brakes for Saw Blades* section of this chapter.

5. Check to make sure the brake lining is not worn down.

6. With air switched OFF, remove the inlet line to each air-brake cylinder and squirt two drops of oil (10W) into the line. This stops brakes from sticking.

7. For any problem axes—those that have not been setting up consistently during daily checks—check that the coupling inserts are okay.

8. Check tension on all chains.

9. Synchronize the infeed chains if required. The chain can skip over a tooth or two on the sprockets if an offcut or other debris gets caught in-between the end of the chain and the sprocket, causing the lumber lugs to get out of alignment.

10. Check that no sprocket, gear, or bearing is loose on its shaft or mount.

11. Go to the operator's side of the carriage-end electrical box and locate the two spur gears on the carriage drive. Grab the gears and check that they are fixed securely on the shaft and cannot be moved.

12. Unscrew the bolts holding the flange bearings on the hold-down and infeed shafts for horizontal movement. Remove the jam nut from the shaft at the rear of the saw. Slide the shaft and bearing so that the spur gear can be seen. Inspect the teeth of the gear for signs of damage.

13. Check the knife-edge setting on the carriage-end infeed. The knife should sit above the top of the infeed frame by 1.6 mm (1/16 in.). Check that no teeth at the beginning of the knife have broken off and that the top of the knife is not notched or chipped. If the knife is notched or chipped the lumber will "catch" and may "jump" out of position before moving to the next blade. Replace the knife if it is damaged.

14. Lubricate the infeed chains and sprockets with a garden sprayer and kerosene/oil mixture.

15. Lubricate all racks, carriage tracks, gears, square drive shaft, and centerline screws with straight kerosene/oil mixture.

16. Check conveyor belt tension. Increase the tension by undoing the locknuts on the adjustment screws at the end of the conveyor frame and tightening the screws. If the conveyor is adjusted, the maintenance man must return to the conveyor to

check the belt tracking (alignment) every 2 hours until he is confident that the conveyor is remaining aligned.

17. Check conveyor belt tracking. Realign as necessary using the adjustment procedure described above. If the conveyor is adjusted, the maintenance man must return to the conveyor to check the belt tracking (alignment) every 2 hours until he is confident that the conveyor is remaining aligned.

18. Check that the air-line lubricator and the inlet line are full.

Weekly Test Cut

Conduct the following checks weekly or as required:

1. Set the angles on blades 2 and 3 to 90°, and cut a piece of lumber to length. Do not remove it from the lumber knife. With a tape measure, check to make sure that the length matches the indicator on the length scale. Check that the angle indicators are exactly on 90°. Adjust if necessary.

2. Set the angles on blades 2 and 3 to 45°, then jog the lumber in and out. Check that the centerlines are correct using a square. If there is a problem, take a much wider piece of lumber and cut the 45° angles before making any calibration adjustments.

3. Repeat steps 1 and 2 for blades 1 and 4, then blades 5 and 6. When cutting to length at 90°, make sure that the lumber is also cut by any two blades on the operator side of those blades. That is, for blades 1 and 4, the lumber must be cut first by blades 2 and 3.

4. Also check the blade draft and pivot point for accuracy.

Monthly Schedule

Cleaning and Lubrication

Check the gearbox oil levels following the instructions for lubricating the gear reducers in the *General Maintenance* section on page 79.

1. Clean the infeed, hold-down, and lumber stop sliders. Drive the axis to its extreme in each direction and clean it. Lubricate with straight kerosene.

2. Clean the square drive shaft using a wire brush. Do not use a grinder or sander, because this may take too much material off the shaft. Lubricate with straight kerosene.

3. Clean the angle and centerline slides and ways. A *way* is the steel plate and bracing in which the slide travels. Run the blades to their extremes of travel in

each direction and clean with a wet rag or steel wool. Remove all grease or debris from the slides and lubricate with straight kerosene.

4. Inject grease into all bearings on the saw including, but not limited to, all rack and pinion shafts, centerline screws, and square drive shaft bearings.
5. Lubricate the carriage V-wheels with WD40.
6. Clean all the scales.
7. Clean any debris from the lumber stop.

Open the electrical cabinets and inspect them for dust buildup. Blow all dust off contactors, overloads, etc. with low-pressure air. Vacuum any dust from the shelves with a small vacuum cleaner.

Maintenance for Saw Blades

Refer to Table 7-5 on page 108 for the saw blade replacement schedule.

Six-Month Schedule

Inject grease into the grease fittings at the front and back of each motor. A couple of shots of grease in each is sufficient.

Replacing Parts

Replacing the Hold-Down Shoes

Use the following steps as a guide for replacing hold-down shoes.

Disassembly

1. Run each hold-down until a chain connecting link is on or near the front sprocket.
2. Lock out all energy sources.
3. Remove the clip-type chain connecting link and separate the chain.
4. Drop the chain down away from the shoe.
5. Remove the two connecting links.

Assembly

1. Install the new shoe using the links taken out of the old shoe.
2. Reattach the chain.
3. Tension the chain with front sprocket adjusting bolts until the chain is on a horizontal plane without drooping in the center.

Replacing the Conveyor Belting

The scrap conveyor belting usually needs replacing at three-year intervals or sooner depending on use and maintenance. Use the following steps as a guide for replacing either the main belt or the incline belt.

Disassembly

1. Run the belt until the lacing connection is near the head roller at the drive end.
2. Lock out all energy sources.
3. Relieve the tension on the belt using the head roller adjustment bolts.
4. Remove the rod or wire that connects the lacing and save for reuse. Remove the old belts.
5. Clean sawdust and chips from the entire length of the metal conveyor bed.

Assembly

1. Install the new belt with the lacing connection near the head roller.
2. Bring the belt together so the lacing is intermeshed, and slide the rod or wire through the lacing. Bend the ends of the rod or wire to prevent it from coming out.
3. Adjust the belt tension evenly at the head roller adjusting bolts. Correct belt tension is achieved when the belt sags between the idler rollers approximately 2 inches.
4. Run the conveyor for at least 5 minutes and check the belt tracking. If the belt does not track correctly, follow the instructions outlined in the *Adjusting Scrap Conveyor Belt Tracking* section of the *Startup* chapter.

Replacing the Feed-Chain Sprockets

Replace the feed-chain sprockets every three years or sooner depending on use.

Disassembly

1. Lock out all energy sources.
2. Relieve the chain tension at the take-up sprocket.
3. Remove the feed chain.
4. Remove the square tube drive.
5. Remove the bolts holding the drive sprockets.

Assembly

1. Install the new sprockets after coating the axle bolts with Lubriplate lubricant.
2. Install the feed chain.
3. Tension the feed chain with the take-up sprocket. Correct tension is when the feed chain can be raised 3/4–1 in. when lifting at the midway point on the top of the horizontal portion of the chain..

Replacing the Hold-Down Sprocket

Replace the hold-down sprockets every three years or sooner, depending on use.

Disassembly

1. Run both hold-down drive chains until a chain connecting link is on the lower side, out of the tube.

2. Lock out all energy sources.

3. Relieve the chain tension on the take-up sprockets at the front of the saw until the chain droops in the center.

4. Disengage the chain connecting link and allow the chain to hang at each end.

5. Remove the rear sprocket in the following manner:

    a) Disengage the universal joint by loosening the setscrew at the hold-down sprocket shaft, and pull or pry the universal joint off the sprocket shaft. *Be sure the key in the keyway is not lost.*

    b) Loosen the three set screws that hold the shaft to the two-shaft collars and sprocket.

    c) Using a 1/2-in. diameter steel rod approximately 6 in. long, and a hammer, tap the sprocket shaft out through the bearing and sprocket until the sprocket falls free. *Again, be sure the key in the keyway is not lost.*

6. To remove the front sprocket, loosen the set screws on the shaft collar and the take-up eyebolts adjacent to the sprocket.

7. Remove the axle bolt allowing the old sprocket to fall free. *Be careful not to lose the shaft collars and thrust washers.*

Assembly

1. Assemble the front sprocket using a hex head cap screw, a lock washer. and a hex nut. Be sure to tighten the capscrew.

2. Assemble the rear sprocket using the following procedure:

    a) Insert the shaft from the drive side through the first bearing.

    b) Thread a shaft collar, the new sprocket with the square key stock in the keyway, and the second shaft collar over the shaft before going through the second bearing. The end of the shaft should be flush with the second (inboard) bearing leaving approximately 3 in. of the shaft protruding on the drive side.

    c) Position the shaft collars adjacent to the bearing and tighten the set screws. **DO NOT** tighten the set screws on the sprocket aligned with the wear strips.

d) Bring the universal joint up to the protruding shaft and position the key in the keyway.

e) Slip the universal joint over the shaft making sure the key stays in its position between the two keyways.

3. Tighten the universal joint set screws.

4. Install the chain as follows:

a) Bring the chain around both sprockets and connect them with the connecting link.

b) Position the rear sprocket for chain alignment with the rear strips, and tighten the set screws.

c) Adjust the chain tension with the front adjusting bolts to where the chain is on a horizontal plane and does not droop.

d) Lock the nuts on the adjusting bolts.

Replacing the Infeed Drive Sprockets

The drive sprockets are normally replaced at three-year intervals. Use the following guide when replacing these sprockets.

Disassembly

1. Remove the three chains from the two drive clusters.

2. Loosen the set screws from the universal joints of the hold-down drive shaft next to the sprocket drive cluster at each end.

3. Slide the universal joint off the shaft. *Be careful not to lose the key.*

4. Remove the long square drive shaft tube.

5. Remove the main drive sprockets in the following manner:

a) Loosen the set screws on square shaft drive sprockets.

b) Slide the sprocket and tube out of the square bore bearings.

6. Remove the hold-down drive sprockets by removing the shaft collar tapping the shaft through the bearings. *Be careful not to lose the key from the keyway.*

7. Remove the idler (top) sprocket by loosening the nut on the axle bolt and withdrawing the bolt from the cluster assembly.

8. Remove the main gearbox drive sprocket by loosening the set screws and pulling the sprocket from the motor shaft. *Be careful not to lose key from the keyway.*

Assembly

1. Install the new sprocket on the main gearbox shaft with the hub of the sprocket toward the motor. Be sure the key is in the keyway and the tap sprocket on the motor shaft until it is flush with the end of the shaft. Tighten the set screws.

2. Now install the twin drive-sprocket assembly at the motor drive end, through the one square bore bearing, then slip the shaft collar over the square tube before going through the second bearing. Slip the second square shaft collar on after going through the second bearing.

3. Install the single drive-sprocket assembly at the stationary end. Use the same basic procedure outlined in step 2.

4. Install the hold-down drive sprocket next using the washer spacers to align it with square tube sprocket below.

5. Install the idler sprocket with the axle bolt, but do not tighten.

6. Install the square tube driveshaft.

7. Align all sprockets with a straight edge and tighten all set screws.

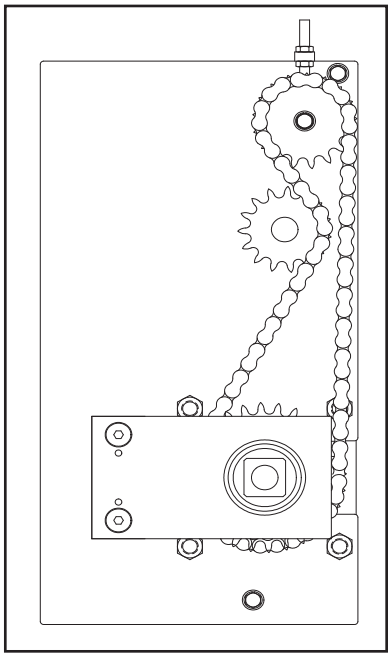
8. Slide the universal joints onto the hold-down drive shaft with the key in the keyway and tighten the set screws.

9. Install the drive chains.

10. Tension the motor to the main drive shaft sprocket chain using the slotted hole at the machine end of the motor mounting bracket.

11. Tension the hold-down drive chain pushing the idler (top) sprocket up in the slotted hole and tighten the axle nut. The completed sprocket cluster is shown in Figure 7-44.

Figure 7-44: Drive Sprocket Cluster



Adjusting the Heel Cut Skid Bar

The height of the heel skid bar is adjustable to ensure that its height is always the same as the top of the feed chains where the lumber rests. To adjust the heel skid bar, do as follows:

1. Place the heel skid bar in position approximately 4 in. from blades 3, 4, and 5.
2. Bring the carriage up close to the stationary end.
3. Place the straight edge across both feed chains and into the heel skid bar location.
4. Adjust the heel skid bar height to the bottom of the straight edge.

Appendix A

Navigating the Troubleshooting Appendix

Refer to...

Maintenance chapter for procedures and graphics

General Information chapter for truss terminology

Glossary for additional terminology

This appendix is divided into tables according to the symptoms the machine is having. Most solutions have a more detailed explanation in the *Maintenance* chapter. If you have an electronic file of this manual, click on any reference to another page or section, and it will take you there.

Symptoms and Solutions

Safety Notes for Troubleshooting

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

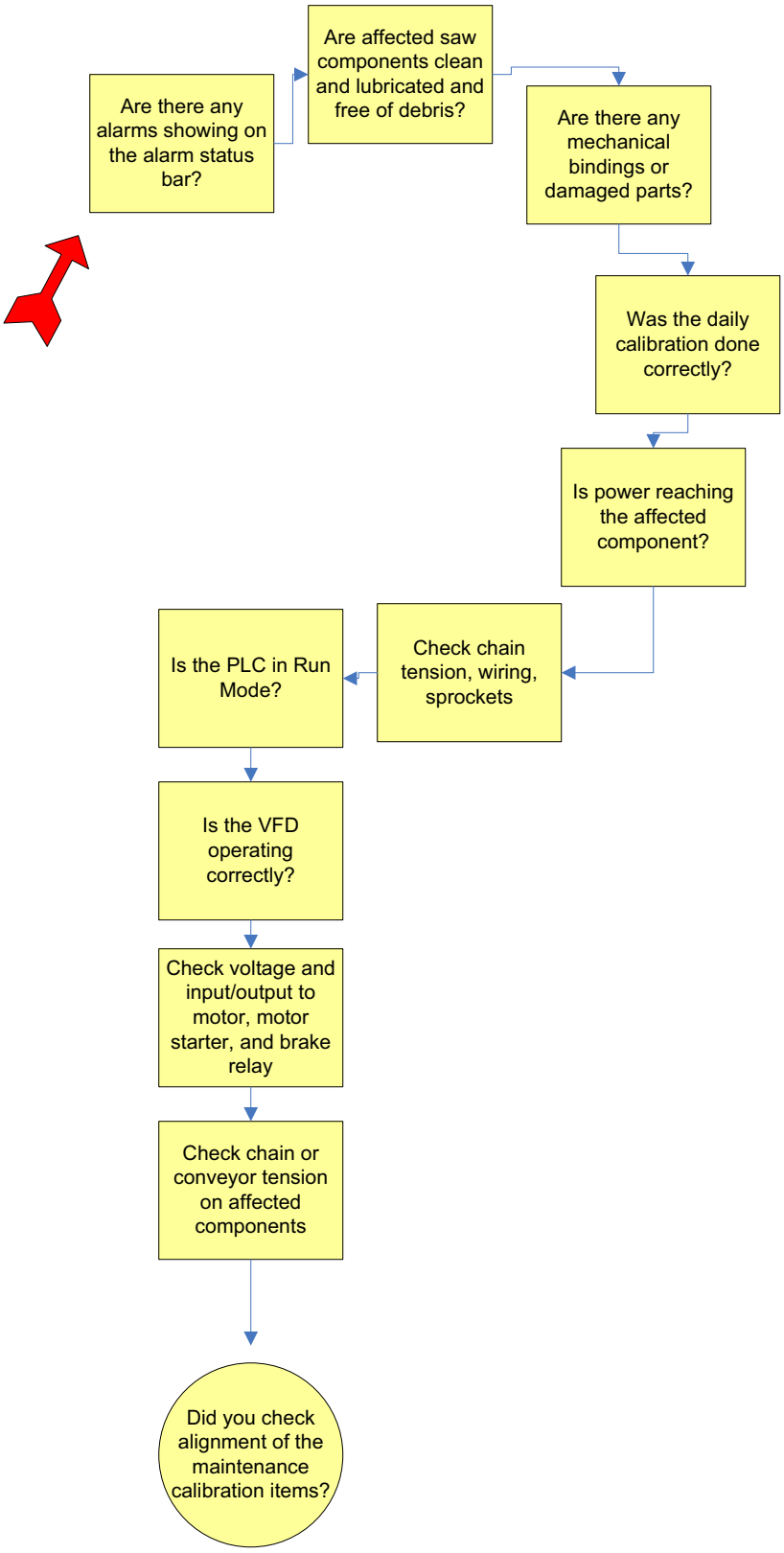
- All warnings located in the safety section in the preliminary pages apply at all times.
- When this graphic appears, you must lockout and tagout the equipment using approved methods described in OSHA 29 CFR 1910.147 before continuing with the procedure or troubleshooting.
- If the lockout/tagout graphic does not appear, it is recommended that you still de-energize the machine unless energy is required for the troubleshooting process. If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.
- All electrical work must be performed by a qualified electrician.
- Read this manual for information and procedures related to the specific maintenance or troubleshooting issue before attempting any maintenance!
- Safety goggles and a dust mask must be worn for all cleaning steps outlined in this manual. When using cleaning and lubrication solutions, a respirator rated for use with those solutions must be worn as well as gloves resistant to the solution.

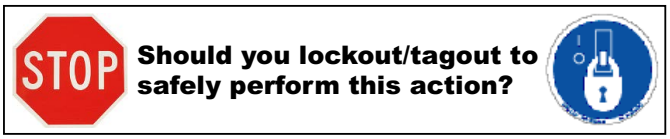
Operational Notes for Troubleshooting

- Do not use compressed air inside the electrical enclosures! It may force contaminants into the electrical connections.
- Clean and lubricate the equipment as a first step in most troubleshooting processes. Most malfunctions are caused by inadequate preventive maintenance.

Figure A-1: Never Use Compressed Air Inside an Electrical Enclosure

Figure A-2: Start Here to Determine Solutions





Symptoms and Solutions

Table A-1: General

Problem	Possible Cause	Possible Solution
Nothing operates–Power ON light not illuminated	No power	Machine or in-house main switch
	Fuse or breaker	Main incoming fuse or breaker
	Circuits open	10 amp fuse in Box 2
Power ON light illuminated, but saws will not start	Airline not connected	Connect airline
	Air pressure too low	Increase air pressure
	Circuits open	Saw setup switch to setup position
		Engage emergency stop switches
One blade will not start	Motor starter overloads	Reset starter overloads
	Air leak	Air leak on break
Saw brakes are not working	Brake adjustment	Adjust brakes
	Air cylinders sticking	Lubricate air cylinders

Mis-Cut Boards

Most problems you will encounter will be due to the machine being out of calibration or adjusted incorrectly. Before spending valuable time searching for a problem, check the following:

Table A-2: Mis-Cut Boards

Problem	Possible Cause	Possible Solution
Overall lengths change from setup to setup or between types of cuts	Lumber is not fully supported	Use the center lumber support for long boards or a heel cut skid bar for log scarfs.
	Lumber is bouncing off the lumber stop	Tighten the lumber stop. There should be little or no play in the lumber stop when you use two hands to rock it back and forth.
	Lumber guide knife is worn or notched	Replace lumber guide knife.
	Blades are cupped	Replace blades.
	Blades are not parallel to the infeed conveyors	Check that infeed conveyor is parallel to blades and to the other infeed conveyor.
	Blade pivot points are incorrect	Check the blade pivot points.
	Carriage is not square	Align carriage properly.

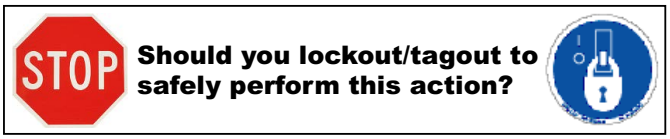


Table A-2: Mis-Cut Boards (Continued)

Problem	Possible Cause	Possible Solution
Angle is wrong	Calibration is wrong	Check angle calibration.
	Angulation chain too tight or loose	Check the angulation chain for proper tension.
	Lumber guide knife dull or at wrong height	Check the lumber guide knife height setting.
	If hold-downs are wearing out on one side and angle is wrong, infeed conveyors not aligned	Check that infeed conveyor is parallel to blades and to the other infeed conveyor.
	Gearbox or spiders are bad	Replace gearbox or spiders
Board has a heel when it should not	Blade alignment is incorrect	Align blades
	Lumber guide knife dull or at wrong height	Check the condition and height of lumber guide knife.
	Center support not used or not adjusted correctly	If the center lumber support was used, ensure the height is adjusted properly. If it was not used, setup for the cut and check the touch screen for indication that the center lumber support should be used.
	Centerline position is wrong	Check centerline actual position on screen compared to set point. Check centerline calibration.
	Lumber stop incorrectly positioned	Check that the lumber stop is calibrated correctly and not set too far back. Check that the lumber stop is secure. There should be little or no play in the lumber stop when you use two hands to rock it back and forth.
Scissor bottom chord heel (butt cut) is too short or tall	Lumber guide knife dull or at wrong height	Check the condition and height of lumber guide knife.
	Blades are not parallel to the infeed conveyors	Check that infeed conveyor is parallel to blades and to the other infeed conveyor.
	Centerline of blade 4 or 5 is wrong	Check centerline actual position on screen compared to set point. Check centerline calibration.

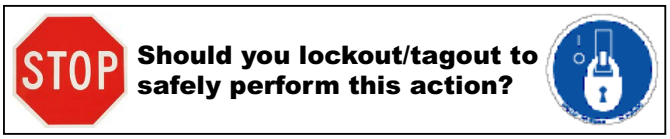
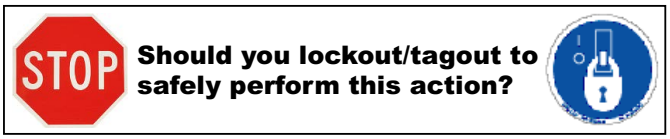


Table A-2: Mis-Cut Boards (Continued)

Problem	Possible Cause	Possible Solution
Height of butt cuts are different within the same setup	Lumber is not fully supported	Use the center lumber support for long boards or a heel cut skid bar for long scarfs.
	Lumber is bowed, twisted, or warped	Use heel cut skid bar. Improve lumber quality in the future.
	Blades are not square at 90°	Check that the vertical dimension of the blades are a true 90° and recalibrate if necessary.
	Blades are not parallel to the infeed conveyors	Check that infeed conveyor is parallel to blades and to the other infeed conveyor.
	Hold-downs not parallel or square to the blades and infeed	Check hold-down alignment.
	Carriage infeed and lumber knife are at the wrong height	Adjust lumber knife Replace knife edge
Scarf cut is too short	Lumber guide knife dull or at wrong height	Check the condition and height of lumber guide knife.
	Blades are not parallel to the infeed conveyors	Check that infeed conveyor is parallel to blades and to the other infeed conveyor.
	If the scarf cut is too short and the butt (heel) cut and lengths are correct, then the actual angle cut is wrong.	
Too many boards were cut for the setup	Boards not consistently hitting infeed and outfeed limit switches	Adjust the limit switch.
When the boards are laid out on assembly table, there are large gaps at joints	Assembly table setup is wrong	Verify jigging is in the correct location. Due to variations in lumber quality, it may be necessary to reposition jigging.
	Lumber is not straight	Check the straightness of the board along all edges. Lumber that is not straight will result in incorrect cuts.
	Accuracy or quality of the cut is not sufficient	Perform the calibration test and correct any miscalibrated components.



Saw Not Operating Correctly

Setup problems specifically related to a centerline, angle, infeed, hold- down are covered in other tables in this appendix.

Table A-3: Saw Not Operating Correctly

Problem	Possible Cause	Possible Solution
Power is reaching saw (maintenance lights come on), but it does not run	E-stop is engaged	Pull any depressed pushbuttons and reset pull cord switch and swing guard switch.
	An alarm condition exists	Check for alarm conditions and reset or correct problem causing alarm. See Table A-10.
	Voltage is not transmitting through a faulty component, cable, or connection	Determine where in the circuit the voltage stops transmitting and troubleshoot those components.
	Control power relay(s) not engaged	Using the electrical schematics, check control power relays for proper operation.
	PLC is faulty or not in Run Mode	See Table A-10.
	Touch screen locked up	Shut down touch screen completely and restart.
Saw will not turn on	Incoming power is turned off	Ensure the main power source from your plant electrical system is on. Ensure the disconnect switches on both the stationary and carriage-end enclosures are on.
	Transformer feeding the saw has failed	Check that there is power on the output side of the transformer using a voltmeter.
No blades will turn ON	E-stop is engaged	Pull any depressed pushbuttons and reset pull cord switch and swing guard switch.
	Loss of control power	Replace burned-out fuses on primary side of transformer or the output of 24 VDC power supply. Make sure 120 VAC is present on the secondary side of transformer and 24 VDC is present on the output of DC power supply.
	No or low air pressure	Make sure air supply valve is connected to saw and correct air pressure is set.
One blade will not turn on	Failed electrical component	Using the electrical schematics, inspect all components and wire connections associated with that blade.
	Blade is out of cut	Pull the maintenance jumper, move axis back to operating zone. Push the maintenance jumper back in.
	Motor locked up	Look for mechanical bindings, dirt build-up, etc. Check to ensure that brake valve is releasing brake.

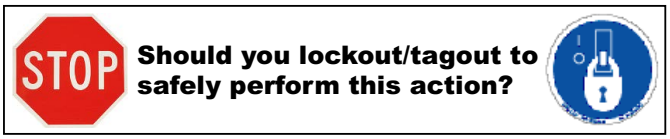


Table A-3: Saw Not Operating Correctly (Continued)

Problem	Possible Cause	Possible Solution
One blade runs in the wrong direction	Wrong connection	Swap any two phases of supply to the motor.
Operation of the carriage end is intermittent or erratic	Loose connection on PLC rack 0 or rack 1	Tighten both ends of the remote rack communication cable.
	Communication loss between rack 0 and rack 1	Check that the end to end communications cable is properly connected at both ends. Check the integrity of the end to end cable by checking continuity of the terminals.
	PLC rack 0 or rack 1 is bad	Replace bad rack.
Blade angle will not move & no alarms exist	Double roller sprocket is full of sawdust	Remove debris
	Blade-installed jumper missing	Blade-installed jumper must be in place. Default screen will show “Blade X Not Installed” if jumper is not in place.
	VFD settings are not properly set	Check VFD settings. Settings are listed on the VFD HELP screen. New drives will have to be set.
	Brake is not released	Check to make sure the angle brake is released.
	Angle is jammed	Remove any debris that may be preventing the axis from moving. Clean and lubricate the quad. Dirt and pitch may be preventing movement.
Carriage will not move & no alarms exist	Carriage is not properly calibrated	Verify carriage calibration.
	Carriage drive VFD settings are incorrect	Check VFD settings. Settings are listed on the VFD HELP screen. New drives will have to be set.
	Carriage mechanical drive components are damaged or worn	Check the carriage drive gears and coupling.
Saw will not do semiautomatic setups	Maintenance jumper has been removed. If so, a system alarm exists.	Replace maintenance jumper.
Infeed Conveyor chains will not run	A blade that is in the cut has not started or does not appear to have started	A safety interlock prevents the Infeed from starting in automatic when a blade that is in-cut is not running. Input to PLC did not function. Use electrical schematics to check the input.
	Chain drive component has become disconnected	Check drive couplings and chains.
	Chains are jammed	Look for debris jamming chains. Clean and lubricate.

Table A-3: Saw Not Operating Correctly (Continued)

Problem	Possible Cause	Possible Solution
Carriage length inaccurate	Encoder spur gear not properly meshed with rack	Ensure that encoder drive spur gear is tight in rack.
	Spur gear or other component is loose	Check set screws that joins encoder to shaft. Check that spur gear is tight on shaft. Check coupling.
	Encoder or encoder wiring is faulty	Check encoder and encoder wire connections.
Several axes will not move	One of the electrical cabinets does not have power	Ensure that power is on to both control panels.
	Proximity switch is not properly adjusted	Check the distance between the proximity switch and cam.
		Check alignment of proximity switch to cam. The proximity switch should be on outside edges of cam.
	E-stop is activated	Ensure that an E-stop is not activated.
	PLC is out of Run Mode	Ensure that PLC is in Run Mode.
	PLC cable connections are loose	Ensure that the PWR, OK, and RUN lights on all four PLC racks are on. Check the end-to-end PLC cable and connections. This cable connects racks 1 & 2 (carriage end).
One PLC rack has no lights on	Power supply is faulty	Replace power supply.
	Power to the PLC is interrupted	Check the 120V input to power supply.
	A PLC module or the PLC power supply is bad	Remove one input/output card at a time from the rack. If lights come on, the last card removed must be replaced.
Infeed conveyor will not go faster	Maximum infeed conveyor speed setting is set too low	Change maximum speed setting on the Default screen.
	VFD setting are incorrectly set	Check VFD settings.
	Infeed chains are bound up	Check that nothing is preventing the chains from moving.
Blades 1 through 4 will not move out of or into the cut	Angle will not move	See Table A-5.
	Centerline will not move	See Table A-5.

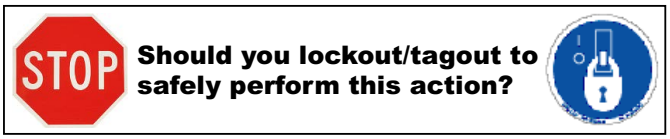
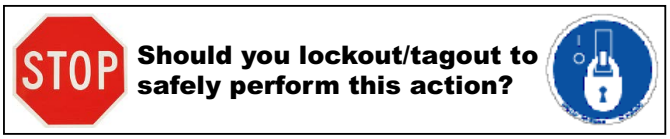


Table A-3: Saw Not Operating Correctly (Continued)

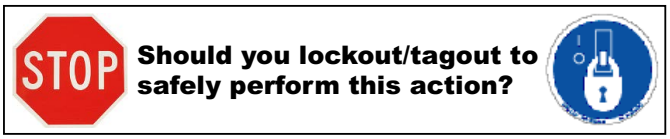
Problem	Possible Cause	Possible Solution
Blades 5 or 6 will not move out of or into the cut	Centerline unable to move to 3"	Check centerline movement by using Manual Mode to move the centerline. Check for obstructions.
	Angle unable to move to 90.0 deg.	Check angle movement by using Manual Mode to move the angle. Check for obstructions.
	Air supply is inadequate	Check for water in the lines or frozen lines. Replace mufflers.
	Air valve not operating properly	Check for debris or other items that may be preventing the slide from moving. Clean and lubricate the horizontal slide. Check air valve manual override is not actuated. Manual override is a red screw on the solenoid. Check air valve solenoid is not bad by checking for continuity across the coil. Check that PLC output turns on and off.
Nothing moves when INITIATE SETUP is pressed	All axes are already in position	Check to see if all axes are in position Re-initiate setup to see if this corrects the problem.
	Alarm condition exists	Correct cause of any faults that exist. See Table A-10.
	E-stop is activated	Ensure that an E-stop is not activated.
	PLC not in Run Mode	Toggle key switch on PLC CPU off and on 2 times to reset the PLC in Run Mode.
One of the axis moves when the main power is on and does not stop until an E-stop is activated.	Output card is faulty	Replace card.



Computer-Related Problems

Table A-4: Computer Related Problems

Problem	Possible Cause	Possible Solution
Touch screen is blank or black	Loose connections	Check all cable connections at components and terminal blocks.
	Power to touch screen or computer is off	Turn power on to the monitor and the computer in the PC enclosure.



Centerlines and Angles

Table A-5: Centerlines and Angles

Problem	Possible Cause	Possible Solution
Centerline will not hold calibration	Spider is bad or coupler is loose	Replace spider Tighten coupler
	Brakes on motor are worn	Replace brake or motor.
	Acme nut loose	Tighten nut.
Centerline hunts for position during automatic or semiautomatic setup	Spider is bad or coupler is loose	Replace spider Tighten coupler
	Axis cannot move freely	Clean and lubricate. Inspect for damage.
	ACME nut loose or misaligned	Check mounting bolts. Check alignment.
Angle hunts for position during automatic or semiautomatic setup	Spider is bad or coupler is loose	Replace spider Tighten coupler
	Axis is dirty	Clean and lubricate. Inspect for damage.
	Speed settings are incorrect	Adjust the VFD speed settings.
	Angle chain tension is incorrect	Check chain tension and chain tensioners.
	Drive sprocket is damaged or not secure to shaft	Check for damage to the sprocket and that the sprocket is secure to the shaft.
Centerline does not move	Axis is already in position	Press INITIATE SETUP. If an “All axes in position” message displays, then the centerline should be in the correct position for the setup. If not, proceed with troubleshooting.
	Spider coupling is not assembled properly	Check insert and set screws.
	Axis cannot move freely	Clean and lubricate. Inspect for damage.
	An alarm condition exists	Check for alarms and fix the fault. SeeTable A-10.
	Motor starter, brake, PLC or motor is faulty	See Table A-10.

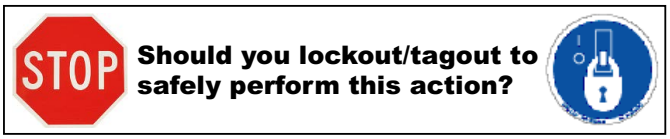
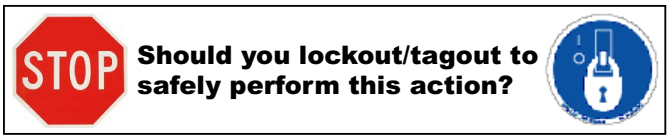


Table A-5: Centerlines and Angles (Continued)

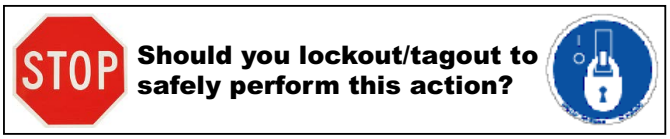
Problem	Possible Cause	Possible Solution
Centerline will only move in one direction	PLC output is not operating	Check that the PLC is in Run Mode. Refer to the electrical schematics. While jogging the centerline in the direction that the centerline will not move, check to see that the output card's indicator light is on Check that there is power to the VFD and it is operating correctly.
During setup, centerline moves and stops but screen indicates "All axes not in position"	Axis cannot move freely	Clean and lubricate. Inspect for damage.
Centerline does not move smoothly or vibrates when moving	Mechanical binding	Clean, lubricate and inspect the slide and acme nut.
	Axis is dirty and needs lubrication	Clean and lubricate. Inspect for damage.
	Slide is damaged	Inspect and repair if needed.
	Acme screw and/or nut is worn	Inspect and replace if needed.
Centerline is abnormally noisy when it moves	Axis cannot move freely	Clean and lubricate. Inspect for damage.
	Motor is not receiving required power or power quality	Check phase-to-phase and phase-to-ground voltage readings of all three legs of power. Readings should be within +/- 10% of each other.
	Motor bearings are damaged	With power removed from the saw, disconnect the motor from its load. Release the brake. Rotate the motor shaft and listen for any abnormal noise. If noise exists in the bearings, replace them.
Centerline moves in the opposite direction than it should be moving	Centerline was improperly calibrated	Verify centerline calibration and correct if necessary.



Infeed Conveyors

Table A-6: Infeed Conveyors

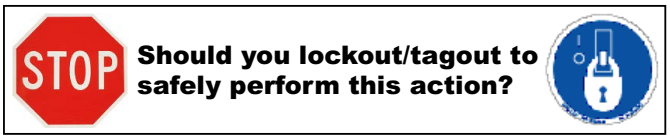
Problem:	Possible Cause:	What To Do:
All blades are running but the infeed conveyor chains do not start	The PLC did not receive a run signal back from each of the blades that are in the cut. Check the following lights to determine which blade is not sending a run signal	Determine which light does not come on. Possible causes are: Loose or broken wire to the input card. Bad input card. Dirty or bad contact on motor starter.
	Bad conveyor motor, motor starter, or overload	Determine which parts are faulty and replace them.
	Loose or broken wiring	Use the electrical schematic to determine which connections to inspect.
Infeed conveyor vibrates when moving	Axis is dirty and needs lubrication	Clean, lubricate and inspect the moving components.
Infeed conveyor does not travel	Axis cannot move freely	Clean, lubricate and inspect the moving components.
Infeed conveyor does not travel smoothly	Axis cannot move freely	Clean, lubricate and inspect the moving components.
Infeed conveyor is abnormally noisy when it moves	Axis mechanical components are dirty or need lubrication	Clean, lubricate and inspect the moving components.
	Infeed conveyor is not parallel to blades (misaligned)	Check for loose bearings on Infeed Conveyor drive shaft.
		Check if infeed conveyor is parallel to blades. Check for loose bearings on the infeed conveyor drive shaft. Determine if the pinion has jumped one or more teeth on the rack. Check the pinions for damaged teeth. Extend the infeed conveyor and inspect the racks for damaged teeth.
	Infeed conveyors bind on square drive shaft	Clean and lubricate square drive shaft.
		Move the carriage back and forth looking for any indication that the square drive shaft is causing excessive drag on the infeed conveyor.
		Check alignment of the square drive shaft.



Hold-Downs

Table A-7: Hold-Downs

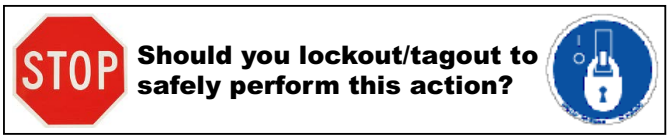
Problem:	Possible Cause:	What To Do:
Hold-down does not move at all	Spider coupling is not assembled properly	Check insert.
		Check set screws.
	Axis cannot move freely	Clean, lubricate and inspect the moving components.
Hold-down is abnormally noisy when it moves	Axis mechanical components are dirty or need lubrication	Clean, lubricate and inspect the moving components.
	Hold-down is not parallel to blades (misaligned)	Check for loose bearings on hold-down drive shaft.
		Extend the hold-down and inspect the racks for damaged teeth. Ensure that the pinion did not jump teeth on the rack.
		Check the pinions for damaged teeth.
Hold-down vibrates when moving	Axis is dirty and needs lubrication	Clean and lubricate.
	For vertical movement: Gear rack is damaged	Inspect and repair if needed.
Hold-down wearing out on one side	Infeed conveyor is crooked	Align infeed conveyors with hold-downs.



Lumber Stops

Table A-8: Lumber Stop

Problem:	Possible Cause:	What To Do:
Lumber stop does not move	Spider coupling is not assembled properly	Check insert.
		Check set screws.
	Axis cannot move freely	Clean, lubricate and inspect the moving components.
		Inspect for damage.
Lumber stop does not move smoothly	Mechanical components are misaligned	Check alignment of rack and pinion and that they are properly meshed.
		Check the drive coupling.
Lumber stop is abnormally noisy when it moves	Axis cannot move freely	Clean, lubricate and inspect the moving components.
	Mechanical components are misaligned	Check alignment of rack and pinion and that they are properly meshed.
		Check the drive coupling.
Lumber stop vibrates when moving	Mechanical components are misaligned	Check alignment of rack and pinion and that they are properly meshed. Check the drive coupling.



Carriage

Table A-9: Carriage

Problem:	Possible Cause:	What To Do:
Carriage does not move	Axis is already in position	Press INITIATE SETUP. If an “All axes in position” message displays, then the carriage should be in the correct position for the setup. If not, proceed with troubleshooting.
	Roll pin broken or spur gear worn.	Inspect spur gears and roll pins and replace if necessary.
	Brake not releasing	Check air pressure. Check for electrical problems (output cards, wire connections, etc.)
	PLC output is not operating	Refer to the electrical schematics. While jogging the carriage, check to see that the indicator light for the output is ON. Do this in both directions.
		Ensure that the PWR, OK, and RUN lights on all four PLC racks are on.
	Drive gear disengaged	Check gear mesh between gearbox and jack shaft.
		Check gear mesh between jackshaft and rack.
	An alarm condition exists	Check for an alarm. See Table A-10.
	Axis cannot move freely	Clean, lubricate and inspect the moving components.
		Move the carriage back and forth looking for any indication that the square drive shaft is causing excessive drag on the carriage or infeed conveyor.
		Check alignment of the square drive shaft.
	Speed setting is too low	Increase low speed setting on the Default screen.
Carriage will only move in one direction	Carriage incorrectly calibrated	Recalibrate.
	Carriage length not entered in defaults	Enter the length of the carriage.
	Square drive shaft worn	Repair damage or replace tube.
During setup, carriage moves and stops but screen indicates “All axes not in position”	Axis cannot move freely	Clean, lubricate and inspect the moving components.
	Speed setting is too low	Increase low speed setting on the Default screen.
	A fault occurred while moving	Correct fault condition. See Table A-10.
Carriage does not move smoothly	Sawdust is stuck in rack	Blow sawdust off rack surfaces including inside the carriage tubes.
	Square drive shaft worn	Repair damage or replace the tube.

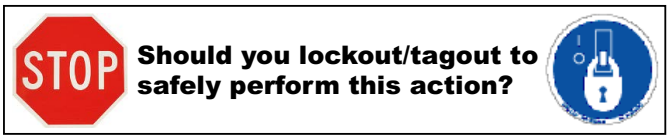
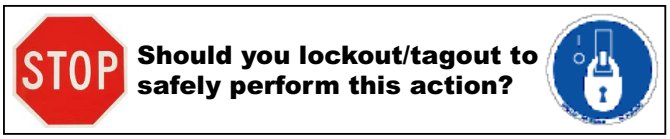


Table A-9: Carriage (Continued)

Problem:	Possible Cause:	What To Do:
Carriage is abnormally noisy or vibrates when it moves	Square drive shaft worn	Repair damage or replace the tube.
	V-wheels or angle are damaged or dirty	Clean, lubricate and inspect the moving components.
		Repair damage or replace the damaged part.
Carriage moves in the opposite direction than it should be moving	Carriage was improperly calibrated	Recalibrate.
	Encoder not counting properly	Check alignment of rack and pinion and that they are properly meshed. Check the pinion for damaged teeth.
		Check the drive coupling.
		Check the pinion shaft for any play which would indicate damaged bearings.
		Check the pinion shaft for any play which would indicate damaged bearings.
VFD trips frequently (OC2)	Axis cannot move freely	Clean, lubricate and inspect the moving components.
		Move the carriage back and forth looking for any indication that the square drive shaft is causing excessive drag on the carriage or infeed conveyor.
		Check alignment of the square drive shaft.
	Carriage brake	Adjust brake so it does not drag on the brake hub. Test the valves and airlines to see if it is fully releasing. Adjust carriage brake advance setting on the Default Speeds screen.
	Carriage speeds not set properly	Adjust carriage speed setting on Default Speeds screen.
	VFD not set properly	Reset them, and prevent them from being changed in the future.
	Loose wiring	Check all connections.
VFD trips frequently (OC3)	Electrical problem	Inspect for loose or broken wires. Remove and inspect the motor starter and contactor. Clean or replace as necessary.
	VFD settings are incorrect	Verify VFD settings per your electrical drawings.



Alarm Conditions

Alarms are specific conditions recognized by the saw that notify the operator something is or could be wrong. An alarm causes an icon on the alarms status bar located at the top of the Main Menu to illuminate.

Table A-10: Alarm Conditions

Problem	Possible Cause	Possible Solution
Motor thermal overload alarm	Mechanical bind	Clean, lubricate, and inspect all axes associated with that overload.
	Chain tension is wrong	Retension the chain that moves the axis associated with that encoder.
	Low incoming voltage	Have the 3 phase power checked by a qualified electrician. Remove and inspect the motor starter and contactor. Clean or replace as necessary.
	Overload is faulty	Swap the overload with another. If the overload trips, then the original overload was OK.
	Power to motor is incorrect	Check phase to phase and phase to ground voltage readings of all three legs of power. Readings should be within +/- 10% of each other.
	Motor is faulty	Check motor for shorted or grounded winding and repair. Remove and inspect the motor starter and contactor. Clean or replace as necessary. Inspect the brakes: For air brakes (blade motors and carriage motor). For electric brakes (all other motors).
	Load on motor has changed	Clean and lubricate all components of the axis. Check and condition of mechanical drive components.
		If motor is a replacement, verify that the rating is the same as the old motor.
		Disconnect the motor from its load and, with the motor running, measure its current draw. It should not exceed the full load amp rating stamped on the nameplate.
	Temporary condition causing overload	Reset overload. If overload recurs, continue with troubleshooting.
	Motor fan is not working (does not apply to blade motors)	Inspect the fan housing for damage that may prevent the fan from turning. Disconnect the load from the motor. Remove the motor fan housing at the rear of the motor. Rotate the motor shaft while holding the fan blades. The fan should not slip on the shaft.
	Ambient temperature is high	Generally, air temperature should remain under 110°F at the operating site. Any temperature higher than 80°F may cause overloads to shut down motors.

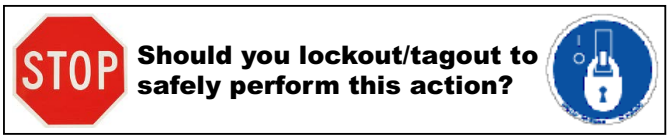


Table A-10: Alarm Conditions (Continued)

Problem	Possible Cause	Possible Solution
Count proximity switch alarm	Proximity switch cable or cable connection is bad	Check if PLC input turns ON and turns OFF. If input is coming on, the proximity switch & cable are okay. If not, replace input card.
		Check cable connection on back of proximity switch. Check cable & proximity switch for damage. Check terminal block wiring connections.
	Proximity switch is not adjusted properly	Check the distance between the proximity switch and cam. The distance should be between 0.025" and 0.040" Check alignment of proximity switch to cam.
	Proximity switch is damaged	Replace proximity switch.
	Mechanical bind	Clean, lubricate, and inspect all axes associated with that overload.
	Coupling between motor and gearbox is damaged	Replace coupling.
	Gearbox is not working	Replace gearbox.
	Loose wiring	Check wiring at terminal blocks.
	Applies to lumber stop and all hold-down motors: Brake on motor not releasing	Check voltage to motor. Motor must be wired for low voltage. Check for loose connections or other electrical problems. Repair or replace motor and brake assembly.
	PLC input card for proximity switch is bad	Check if PLC input is coming on. If input is coming on, the proximity switch & cable are okay.
	Proximity switch wiring is loose at the terminal blocks	Check terminal block wiring connections.
	VFD is faulty	Replace VFD

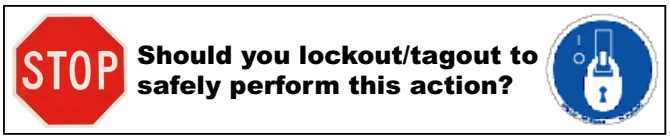


Table A-10: Alarm Conditions (Continued)

Problem	Possible Cause	Possible Solution
Home proximity switch alarm.	Axis is not calibrated properly	Recalibrate.
	Proximity switch cable or cable connection is bad	Check if PLC input turns ON and turns OFF. If input is coming on, the proximity switch & cable are okay. If not, replace input card.
		Check cable connection on back of proximity switch. Check cable & proximity switch for damage. Check terminal block wiring connections.
	Proximity switch is not adjusted properly	Check the gap. The distance should be between 0.025" and 0.040" Check alignment of proximity switch to cam.
	Proximity switch is damaged	Replace proximity switch
	PLC input for proximity switch is bad	Check if PLC input is coming on. If input is coming on, the proximity switch & cable are okay.
	Proximity switch wiring is loose at the terminal blocks	Check terminal block wiring connections.
	The home prox constantly “sees” the target. It does not notice the hole in the cam that indicated “home”.	This alarm cannot be reset as long as it is sensing a solid object (metal). Ensure gap is between .025" and .040". If so, Pull (disengage) the maintenance jumper. Move rack to a different calibration point so prox can “see” the hole in the cam. Engage the maintenance jumper. Reset the alarm and recalibrate.
	The home prox does not “see” a target. (It thinks it is only seeing the hole.)	Reset the alarm from the touch screen. If it continues to happen: Check the sensor and cable and replace if necessary. Ensure gap is between .025" and .040".
Emergency stop alarm	E-stop is activated	Go to E-stop status screen to determine which e-stop button or switch is activated. Reset the activated E-stop.
	Loose wiring in E-stop circuit	Check wiring.

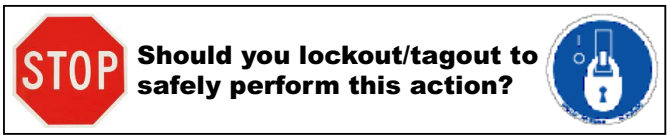
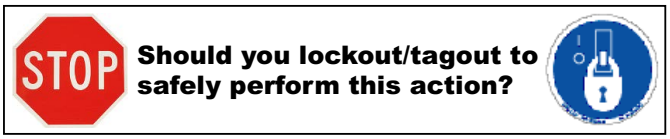


Table A-10: Alarm Conditions (Continued)

Problem	Possible Cause	Possible Solution
VFD has a fault	Brake relay did not energize	Check wire connections to brake relay.
		Clean sawdust and other debris from brake relay.
		Check that the brake relay is functioning properly.
		Check for a signal from the VFD to the brake relay.
	VFD generated a fault	Reset fault on screen or on the VFD itself. If fault recurs, continue with troubleshooting. Read the error code displaying on the VFD and refer to Table A-12 to determine the source of the error.
	Mechanical components of the axis are jammed	Ensure that axis is able to move freely. Check to make sure angle chains are not too loose and no obstructions such as wedge in chain.
	Chain is too tight	Check chain tension.
Low air fault	Low or no air pressure	Ensure that air supply is connected to saw and the air source is working properly. Remove moisture from the lines. Ensure lines are not frozen. Clean air valve. Replace mufflers if necessary. Listen to see if valve is shifting smoothly. If not, replace valve.
DC power supply alarm	No 24 VDC output from DC power supply	Check fuses. Use voltmeter to check for 120 VAC input to power supply and 24 VDC out of power supply. Check input voltage. If needed, replace power supply. Check the drain on the power supply.

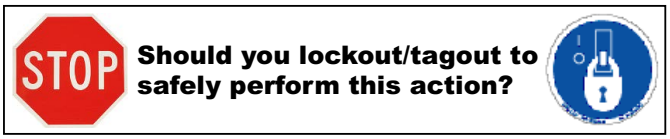


Motors

Refer to the Alarms troubleshooting chart before proceeding with this chart.

Table A-11: Motors

Problem:	Possible Cause:	What To Do:
Motor runs but slows down	Bad motor	Replace motor.
	Motor connections are loose	Check motor connections.
	Low voltage	Check incoming voltage and find source of problem.
	Brake not releasing	Check voltage to motor. Check for loose connections or other electrical issues. Repair or replace motor and brake assembly.
Motor takes too long to reach full speed	Line voltage drops below motor rated voltage	Delay start one motor after another.
	Inertia of load is too high	Check motor for sign of binding. Re-align motor.
At start up, the motor makes a loud rubbing or grinding sound	Thrust from load or misalignment	Re-align coupling.



VFD Faults

The VFDs have many protective functions that occur when there is an error. The name of the alarm will be displayed on the LED when an error occurs and the motor will coast to a stop. Table A-12 lists alarm displays and protective operations.

Table A-12: VFD Protective Operations

Name of Alarm	Display	Description of Operation
Overcurrent protection	OC1 (During acceleration)	Drive output current exceeds the overcurrent detection level due to an overcurrent flowing in the motor, or a short circuit or ground fault in the output circuit. **Remedies:** Clean and lubricate the moving components. Inspect the slide and casting surfaces for damage and repair it. Check and correct VFD settings. Have a qualified electrician check incoming voltage.
	OC2 (During deceleration)	**Remedies:** Check and correct VFD settings. Have a qualified electrician check incoming voltage.
	OC3 (During constant speed)	**Remedies:** Inspect for loose or broken wires. Remove and inspect the motor starter and contactor. Clean or replace as necessary. Check and correct VFD settings.
Overvoltage protection	OU1 (During acceleration) OU2 (During deceleration) OU3 (During constant speed)	The regenerative power from the motor increases, causing the DC link voltage of the main circuit to exceed the overvoltage detection level (400 VDC for 230V input, 800 VDC for 460V input). Although the drive trips due to overvoltage, drive protection against the overvoltage is impossible.
Undervoltage protection	LU	The source voltage drops, causing the DC link voltage in the main circuit to become lower than the undervoltage detection level (200 VDC for 230V input, 400 VDC for 460V input). If F14 Restart after momentary power failure has been selected, or if the voltage drops below the control power maintenance level, no alarm is displayed.
Input phase loss protection	Lin	If input power L1/R, L2/3, L3/T has any phases of the 3 phase power “OPEN” or if there is a significant disparity between phases, the rectifying diode or smoothing capacitors may be damaged.

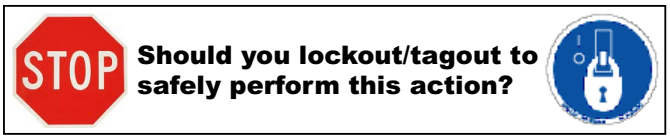


Table A-12: VFD Protective Operations (Continued)

Name of Alarm	Display	Description of Operation
Heat sink overheat	OH1	The temperature of the heat sink of the drive is high, possibly due to a broken cooling fan or other reasons.
External alarm input	OH2	An external device such as the braking unit, braking resistor, and external thermal overload relay connected to the control circuit terminal (THR) has activated an alarm contact, or an overheat protective function is activated by the PTC thermometer.
Braking resistor overheat	dbH	If the electronic thermal overload relay (for the braking resistor) has been selected for code F13, the protective function is activated by a high operation frequency of the braking resistor to prevent the resistor from being burned.
Motor 1 overload	OL1	If electronic thermal overload relay 1 has been selected for code F10, the protective function is activated by a motor current exceeding the set operation level.
Motor 2 overload	OL2	If motor 2 has been selected and driven and electronic thermal overload relay 2 has been selected for code A06, the protective function is activated by the current in motor 2 exceeding the set operation level.
Drive overload	OLU	An output current has exceeded the overload current rating and the protective function has been activated to protect the semiconductor elements in the main circuit of the drive.
Memory error	Er1	A data writing error or other error in the memory has occurred.
Keypad panel communication error	Er2	A data transmission error or transmission stoppage has been detected between the keypad panel and the control section in the keypad operation mode.
CPU error	Er3	Electric noise or other errors have developed in the CPU.
Option error	Er4 Er5	An error has occurred during the operation of an option.
Operating error	Er6	A drive operating error has occurred during drive startup, or FWD or REV connected to terminal AM when Main power is applied to the drive (F02 setting 3 or 4). This error will also display if the STOP key on the keypad is pressed in terminal operation (F02 setting 1 or 3).
Output phase loss	Er7	There is a broken wire, or no connection exists in the drive output circuit during auto tuning.
RS485 communication error	Er8	A communication error has occurred during communication through RS485.

Maintenance Checklists

Appendix C

Checklists for Preventive Maintenance

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

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

SmartSet® Pro

Daily Checklist

Month and Year: _____ Week: _____

_

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

Notes **Date**

SmartSet® Pro

Monthly Checklist

Year: _____

MONTH (first half of year)		JAN	FEB	MAR	APRIL	MAY	JUNE
Replace saw blades	1 month						
Grease the take-up bearing	3 months						
Inspect and dust brake motor	3 months						
Check regulator filter (6 months)	6 months						
Grease the guide wheels	6 months						
Check oil level in brake motor	6 months						
Lubricator service kit	2 years						
Drain and change gearbox oil	10,000 working hours						

MONTH (second half of year)		JULY	AUG	SEPT	OCT	NOV	DEC
Replace saw blades	1 month						
Grease the take-up bearing	3 months						
Inspect and dust brake motor	3 months						
Check filter (6 months)	6 months						
Grease the guide wheels	6 months						
Check oil level in brake motor	6 months						
Lubricator service kit	2 years						
Drain and change gearbox oil	10,000 working hours						

Checklist by Working Hours

Year: _____

Preventive Maintenance Action	Working Hours	Sign and Date When Action is Performed				
Grease the take-up bearing						
Inspect and dust brake motor						
Check filter (6 months)						
Grease the guide wheels						
Check oil level in brake motor						
Lubricator service kit						
Drain and change gearbox oil	10,000 working hours					

SmartSet® Pro

Periodic Checklist

Year: _____

Preventive Maintenance Action		Sign and Date When Action is Performed				
Grease the take-up bearing	3 months					
Inspect and dust brake motor	3 months					
Check filter (6 months)	6 months					
Grease the guide wheels	6 months					
Check oil level in brake motor	6 months					
Lubricator service kit	2 years					
Drain and change gearbox oil	10,000 working hours					

Notes **Date**

Navigating the Parts List Appendix

Finding the Part Number

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

For a complete list of replacement parts, or if you're unsure of which spare part you need and would like to see a picture, use the electronic Parts Guide for this machine. The electronic Parts Guide was included with this manual on a CD-ROM. It can also be found on our web site.

Table C-1: How to Find Your Part Number

Using the Spare Parts List in the Manual	Using Our Web Site: www.mii.com/machinery	Using Your Parts Guide CD-Rom
If it is a part that should be kept in stock, it is listed in the Parts List in the manual and in the electronic Parts Guide. Locate the correct part name and description in the manual to find the part number. If you're unsure of which part you need, use the electronic Parts Guide instead to see a picture.	1. Click *Machinery*, then roll your cursor over *Ordering Parts*. 2. Cick on *Parts Guide* to access the Quick Reference Parts Guide. 3. Choose your equipment name and browse through the pictured parts to find your part number.	1. Place the CD in your computer's CD drive. It should automatically launch a Main Menu screen. 2. Click the graphic for the machine for which you are ordering parts. 3. Browse through the pictured parts to find your part number.

Ordering the Parts With Your Part Number

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

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

Using Our *eStore*™ (an account is required):	Using E-Mail	Using the Phone
Click the *eStore* link from the Web site **OR** Click the *eStore* link from the Parts Guide **OR** Type http://estore.mii.com into your web browser	Send an e-mail to mitekparts@mii.com with all relevant information, including the part number.	Call 1-800-523-3380 and select “Parts Orders”.

Safety Notes for Replacing Parts

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

	WARNING
	CRUSH, CUT, HIGH PRESSURE, ELECTROCUTION, AND PERSONAL INJURY HAZARDS. Perform the safety tests described on page xx in the *Safety (English)* chapter or on page xxxv in the *Seguridad (Español)* chapter before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.

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

	WARNING
	ELECTROCUTION AND HIGH PRESSURE HAZARDS. Always turn the power off by activating an E-stop when the equipment is not in operation. Always verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures (OSHA 29 CFR 1910.147) before performing any maintenance on this equipment. Turn off the air switch if appropriate. Bleed pneumatic lines if appropriate.

Part Numbers

Table C-3: *SmartSet Pro* Replacement Parts

MiTek Part #	Part Description	Keep in Stock
370100	Hold-down springs	6
419118	Bearing	2
423534	Cylinder rebuild seal kits	2
434295	Saw brake air valve	1
480256	Centerline motor	1
480336	Angle motor	1
504307	Carriage encoder	1
504405	PLC-AC output card	1
504424	PLC-AC input card	1
508055	Straight prox cable	2
508056	90-degree prox cable	1
509219	Motor starter	1
509224	Motor starter	1
514160	Thermal overload	1
514176	Thermal overload	1
515831	Prox sensor	5
557392	Angle coupling inserts	5
557456	Centerline coupling inserts	5
703302	Flights	12
78420-513	7-hp saw motor	1
92098	Angle VFD (programmed)	1
92099	Carriage VFD (programmed)	1

This appendix provides general information that will help you better understand how this equipment works.

Understanding Overloads

Purpose and Scope

The information below has been collected to help you understand the role of an overload, how an overload works, and how to calculate the overload setting to protect the motor.

The Importance of Protecting Your Motor

The following statement describes the importance of protecting electric motors and is a good illustration of why we need overloads.

Proper Motor Protection Safeguards Your Investments

> With electric motors driving the majority of today's manufacturing processes, proper motor protection is critical. Not surprisingly, a significant amount of effort and resources have recently been invested in motor protection technology, resulting in cost-effective solutions to many of today's common motor problems.
>
> Motors fail for a number of reasons—moisture and contamination, short circuits, mechanical problems and old age—but the primary reason is excessive heat, caused by excess current (greater than normal motor full load current), high ambient temperatures, and poor ventilation of the motor. If a motor is continuously overheated by only 10 degrees, its life can be reduced by as much as 50%.
>
> Steve Zimmerman
>
> Control Engineering
>
> December 1, 1997

What is an Overload?

So, what is an overload? The term literally means that too much load (what the motor is driving) has been placed on the motor. A motor is designed to run at a certain speed, called its synchronous speed. If the load on the motor increases, the motor draws more current to continue running at its synchronous speed.

It is quite possible to put so much load on a motor that it will draw more and more current without being able to reach synchronous speed. If this happens for a long enough period of time, the motor can melt its insulation and burn out, resulting in damage to the motor windings. This excessive load condition is called an overload.

In fact, the motor could stop turning altogether (called a locked rotor) under a large enough load. This is another example of an overload condition. Even though the motor shaft is unable to turn, the motor continues to draw current, attempting to reach its synchronous speed.

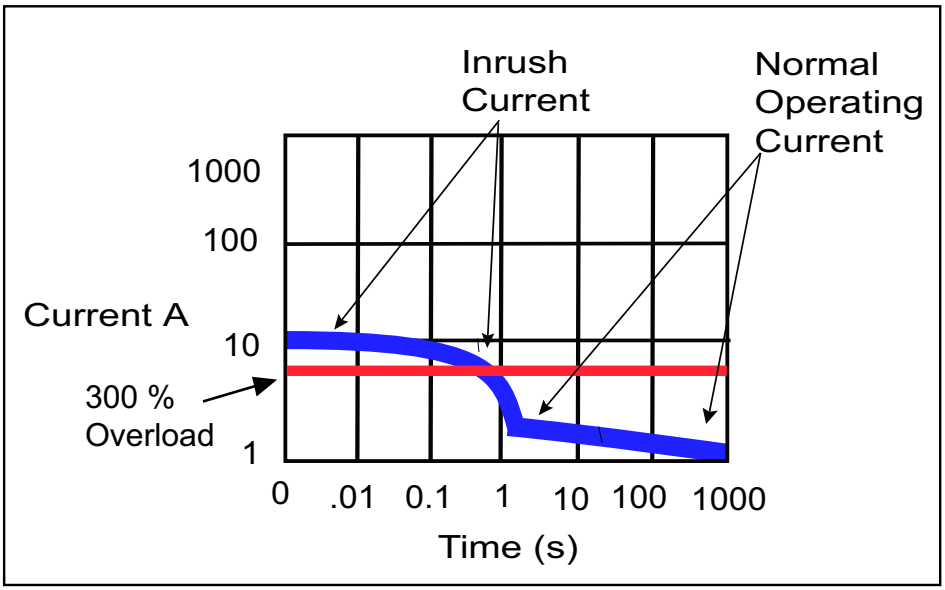
Although the running motor may not draw enough current to blow the fuses or trip circuit breakers, it can produce sufficient heat to burn up the motor. This heat, generated by excessive current in the windings, causes the insulation to fail and the motor to burn out. We use the term “locked rotor amps” to describe when the motor is in this state and is drawing the maximum amount of current.

Due to the possibility of excessive current draw, an overload protection device is required that does not open the circuit while the motor is starting, but opens the circuit if the motor gets overloaded.

Starting Current

When a motor is started, it must perform work to overcome the inertia of the rotating portion of the motor and the attached load. The starting current measured on the incoming line is typically 600% of full-load current when rated voltage and frequency is first applied to a NEMA B motor. The stationary portion of the motor current decreases to its rated value as the rotor comes up to speed.

Figure D-1: Motor Inrush Curve



An overload condition will occur when the rotor has difficulty turning and draws more current than it normally would need to keep it turning. When an overload occurs the current being drawn is usually between 2 to 6 times the normal operating current.

For example if a conveyor belt becomes jammed and does not allow the rotor to turn, the motor will draw about as much amperage as it would on startup to try to get the rotor to turn. As long as the rotor does not turn, this increased current will continue to flow. The key thing to remember in an overload condition is that the current flows through the normal circuit path. Continued overload current will cause excess heating in the motor and the motor circuit. If the over current protective device does not operate in a timely manner, the motor could short out a winding, or cause insulation damage to a winding which could lead to a short circuit later.

Overload Relays

The overload relay is the device used in starters for motor overload protection. It limits the amount of current drawn to protect the motor from overheating.

An overload relay consists of:

- A current sensing unit (connected in the circuit to the motor)
- A mechanism to break the circuit, either directly or indirectly

Overload relays have the following features:

- A time delay which ignores harmless temporary overloads caused by normal motor starting, without breaking the circuit
- A means of resetting the circuit once the overload is removed

- A design that meets the special protective needs of motor control circuits
- Allow harmless temporary overloads, such as motor starting, without disrupting the circuit
- Will trip and open a circuit if current is high enough to cause motor damage over a period of time
- Can be reset once the overload is removed

Bimetallic Overload Relays

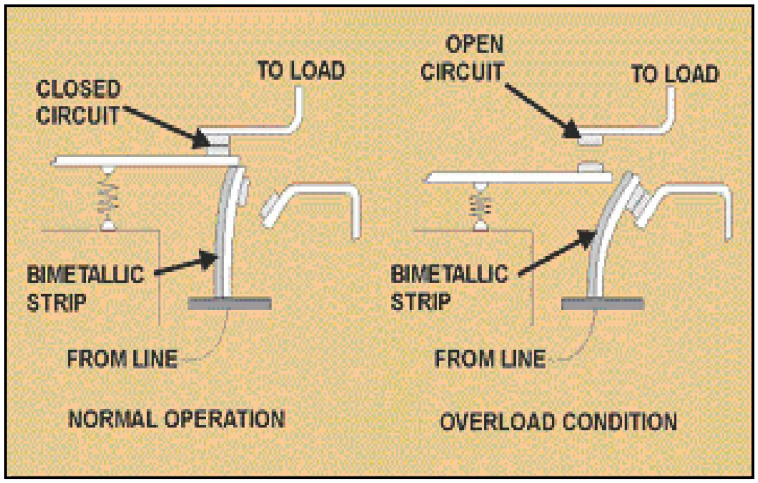
Overload protection is accomplished with the use of a bimetallic strip. This component consists of a small heater element wired in series with the motor and a bimetallic strip that can be used as a trip lever. A bimetallic strip is made of two dissimilar metals bonded together. The two metals have different thermal expansion characteristics, so the bimetallic bends at a given rate when heated.

Under normal operating conditions the heat generated by the heater element will be insufficient to cause the bimetallic strip to bend enough to trip the overload relay.

As current rises, heat also rises. The hotter the bimetallic becomes, the more it bends. In an overload condition the heat generated from the heater will cause the bimetallic strip to bend until the mechanism is tripped, stopping the motor.

If heat begins to rise, the strip bends, and the spring pulls the contacts apart, breaking the circuit, as shown in Figure D-2.

Figure D-2: The Warping Effect of the Bimetallic Strip



Once the tripping action has taken place, the bimetallic strip cools and reshapes itself, automatically resetting the circuit. The motor can be restarted even when the overload condition has not been cleared, and will trip and reset itself again and again. (This assumes an automatic reset and can also be equipped with a manual reset.)

Electronic Overload Relay

Electronic overload relays are another option for motor protection. The features and benefits of electronic overload relays vary but there are a few common traits. One advantage offered by electronic overload relays is heater-less design. This reduces installation cost and the need to stock a variety of heaters to match motor ratings. Electronic overload relays can detect a phase loss and disconnect the motor from the power source. This feature is not available on mechanical types of overload relays.

Overload Classifications

Overload relays also have an assigned trip class. The trip class is the maximum time in seconds at which the overload relay will trip when the carrying current is at 600% of its current rating. Bimetallic overload relays can be rated as Class 10, meaning that they can be counted on to break the circuit no more than ten seconds after a locked rotor condition begins. Melting alloy overload relays are generally *Class 20*.

American industry has standardized on Class 20 overload protection.The Europeans have standardized on Class 10.

Class 20 will give a nominal 590-second trip (9.83 minutes) at an overload of 125% of full load amps, a 29-second trip at a 500% overload, and a 20-second trip at a 600% overload. Thus, a motor that is stalled and drawing locked rotor amperage will be taken off-line in 20 to 29 seconds. However, a motor that draws a continuous locked rotor current can be expected to burn out before 20 seconds.

Class 10 will give a nominal 230-second trip (3.83 minutes) at 125% overload, 15 seconds at 500% overload, and 10 seconds at 600% overload.

Class 30 has a longer time delay to be used on high inertia loads that require a long acceleration or have shock loading that causes repetitive motor inrush.

The overload class that MiTek normally specifies for equipment is a Class 10. Since it is possible to burn out a motor in less than 20 seconds, we have chosen to protect the motor with the highest degree of protection.

Codes And Standards

NFPA 79—Electrical Standard for Industrial Machinery, 2002

7.3.1.1 Motors. Motor overload protection shall be provided to each motor in accordance with Article 430, Part III, of NFPA 70, *National Electrical Code*.

NEC 2002—National Electrical Code

430.32 (A) (1) Separate Overload Device. A separate overload device that is responsive to motor current. This device shall be rated at no more than the percentages shown in Table D-1.

Table D-1: Full Load Current Tolerances

Nameplate Full Load Current Rating	% Allowed Above Full Load Current Rating
Service Factor of 1.15	125%
Motors with a marked temperature rise of 40°C or less	125%
All other motors	115%

Example 1

15 hp, 208V, 3 phase, induction motor, 40°C rise, *design B*, *FLA* 48 amps. Overload Protection = 48 amps times 125% = 60 amps

Example 2

25 hp, 208V, 3 phase, induction motor, 1.15 s.f., *design C*, *FLA* 72A. Overload Protection = 72 amps times 125% = 90 amps

Example 3

40 hp, 208V, 3 phase, wound rotor motor, FLA 118 amps. Overload Protection = 118 amps times 115%=136 amps

The motor overloads must be calculated using the nameplate current and not from Tables 430-148 or 430-150 of the National Electrical Code.

In Example 1, the motor has a 40°C rise, the O.L. unit is sized at 125% of the full load motor current.

In Example 2, the motor has a s.f. (service factor) of 1.15. The O.L. unit is sized at 125% of the full load motor current.

In Example 3, where neither of the two conditions exists, it is sized at 115%.

Glossary of Overload Terms

Full Load Amps (FLA)

This is the current flow required by a motor during normal operation under normal loading to produce its designated horsepower. Motors having nothing attached to their shaft will draw less than the FLA current.

Insulation Class

The National Electrical Manufacturers Association (NEMA) has established insulation classes to meet motor temperature requirements found in different operating environments. The four insulation classes are A, B, F, and H. Class F is commonly used. Class A is seldom used. Before a motor is started, its windings are at the temperature of the surrounding air. This is known as ambient temperature. NEMA has standardized on an ambient temperature of 104°F, or 40°C for all motor classes.

Temperature rises in the motor as soon as it is started. The combination of ambient temperature and allowed temperature rise equals the maximum winding temperature in a motor. A motor with Class F insulation, for example, has a maximum temperature rise of 221°F (105°C). The maximum winding temperature is 293°F (145°C) [104°F (40°C) ambient plus 221°F (105°C) rise]. A margin is allowed for a point at the center of the motor's windings where the temperature is higher. This is referred to as the motor's hot spot.

The operating temperature of a motor is important to efficient operation and long life. Operating a motor above the limits of the insulation class reduces the motor life expectancy. A 50°F (10°C) increase in the operating temperature can decrease the life expectancy of a motor by as much as 50%.

Table D-2: Motor Operating Temperature

	Class A	Class B	Class F	Class H
Rise	176°F (80°C)	176°F (80°C)	320°F (160°C)	176°F (80°C)
Hot Spot	41°F (5°C)	50°F (10°C)	50°F (10°C)	59°F (15°C)

Locked Rotor Amps

Also known as inrush current, locked rotor amps is the amount of current the motor can be expected to draw under starting conditions when full voltage is applied. This is the current taken from the supply line at rated voltage and frequency with the rotor at rest.

Motor Load

A motor provides the conversion of electrical energy to mechanical energy that enables a machine to do work. The energy that a machine requires from a motor is known as the motor load. The motor load “seen” by a motor is dependant upon how the load is connected to the motor, the dimensions of the load, and the weight of the load.

A load connected to a motor by a gearbox reduces the load by the square of the gear ratio. If a load is attached to a motor through a 3:1 gear ratio, the load is 1/9 of the load the motor would see if the load were attached directly to the motor.

A round object attached to the motor shaft has a load related to the square of the radius of the object. If a 16" saw blade is a load of weight multiplied by the radius squared, the load is 8^2 x weight = 64 x weight. A 20" saw blade is a load of 10^2 x weight = 100 x weight. The 20" saw blade is 56% more load than the 16" saw blade due to the dimensions.

A motor load is directly related to the weight of an object. A 16" blade weighs 9.28 pounds. A 20" blade weighs 14.61 pounds, or 5.33 pounds more. The 20" blade is 56% more load than the 16" blade due to weight. Remember, weight is the volume of an object times its density, so weight is also related to the dimensions.

In the example of the saw blades, the combined effect of the longer radius, and longer weight means the 20" saw blade is approximately 125% more load on a motor than a 16" saw blade, which partially explains why motors on quads 1 and 4 are more likely to burn out or trip an overload.

NEMA Design Ratings

NEMA ratings refer to the torque ratings. The following ratings apply to motors:

NEMA B

The NEMA B motor's percentage of slip ranges from 2 to 4%. It has medium values for starting or locked rotor torque, and a high value of breakdown torque.

NEMA A

The NEMA A motor is similar in many ways to the NEMA B motor. It typically has a higher value of locked rotor torque and its slip can be higher.

NEMA C

The NEMA C motors are well suited to starting high-inertia loads. This is because they have high locked rotor torque capability. Their slip is around 5%, and their starting current requirement is average.

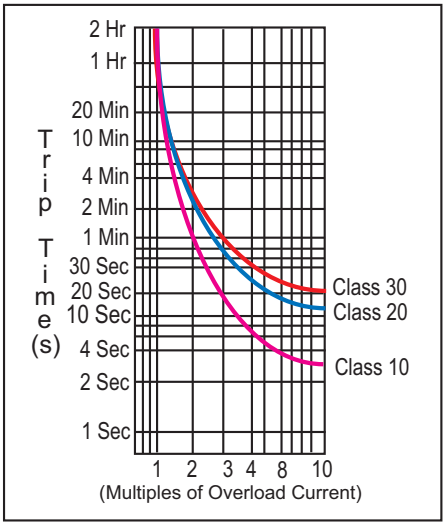
NEMA D

The NEMA D motor is found in heavy duty, high-inertia applications. It has high values of slip (up to 8%), and very high locked rotor torque capability.

Service Factor (s.f.)

A motor designed to operate at its nameplate horsepower rating has a service factor of 1.0. Some applications may require a motor to exceed the rated horsepower. In these cases a motor with a service factor of 1.15 can be specified. The service factor is a multiplier that may be applied to the rated power. A 1.15 service factor motor can be operated 15% higher than the motor's nameplate horsepower.

Figure D-3: Trip Times for Trip



Trip Class

Overload relays are rated by a trip class, which defines the length of time it will take for the relay to trip in an overload condition. The most common trip classes are Class 10,

Class 20, and Class 30. Class 10, for example, has to trip the motor off-line in 10 seconds or less at 600% of the full load amps. This is usually sufficient time for the motor to reach full speed.

Appendix E

Drawings are inserted at the back of the manual.

Table E-1: Attached Drawings

Description	Drawing Number
SmartSet/Incline Layout	L0269
Carriage Wheel Assembly	64515
Hold-Down Carriage Assembly	77146
Infeed Guard Stationary/Carriage	77370
Hold-Down Motor Cover – RH	77436
Hold-Down Motor Cover – LH	77440
Conveyor Chain Guard	77457
Cover Infeed Rack	77458
5 HP Motor Brake Assembly	77513
5 HP Quadrant Assembly – Blade 1	77518
5 HP Quadrant Assembly – Blade 2	77531
5 HP Quadrant Assembly – Blade 3	77532
5 HP Quadrant Assembly – Blade 4	77533
10 HP Quadrant Assembly – Blade 5	77540
Quadrant Centerline Assembly – Blade 6	77555
Lumber Conveyor LH Assembly	77754
10 HP Motor Brake Assembly	77764
Lumber Conveyor RH Assembly	77765
Powered Hold-Down Assembly – RH	77776
Carriage, Drive and Conveyor Adj. Assembly	77806
Hold-Down Stationary Assembly	77809
Powered Hold-Down Assembly – LH	77810
Carriage Conveyor Guard	77908
Proxy Switch Cover Weldment	77992
Outfeed Operator Guard	77993
Smartset Pro Final Assembly	78500
Smartset Pro Mechanical Assembly	78505
Vertical Adjustment Cam Cover	78508
Safety Devices & Guards Assembly	78555
Lumber Stop Assembly	78560

Table E-1: Attached Drawings (Continued)

Description	Drawing Number
Electrical Assembly	78595
Infeed Guard Carriage	78667
Pneumatic Assembly – 5 Blade	79745
Blade Guard Stationary	79801
Emergency Stop Guard	79810
Electrical	90129
Electrical, 460V	90175
Swingarm, Enclosure	519663
Pivot Rear Guard Sub-Assembly	7008127
Brace Rear Guard Sub-Assembly	7008130
Incline Conveyor Assembly, 24"	7022100

Document Evaluation

Appendix F

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

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

Document Evaluation Form

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

Document Identification:

SmartSet® Pro Saw Operation and Maintenance Manual 001048

General Ratings:

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

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

❑ Poor ❑ Fair ❑ Good ❑ Excellent

Rate the quality of service you were given on the following topics:

	Poor	Fair	Good	Excellent
Delivered on time	❑	❑	❑	❑
Installation process	❑	❑	❑	❑
Service technician	❑	❑	❑	❑
Does the machine work as promised?	❑	❑	❑	❑
Does it handle the production load?	❑	❑	❑	❑

General Comments:

Document Evaluation Form (cont'd)

Instructions	***Identification Information***
Please provide as much information as possible. Identify the page and paragraph, and include a proposed rewrite if possible. Attach extra sheets as needed.	*SmartSet*® Pro Saw
	Operation and Maintenance Manual
	001048
Recommendation	
Reason for Recommendation	
Your Name:	Date:
Company Name:	Address:
Phone:	Email:
Please mail this form to: MiTek Machinery Operations 4203 Shoreline Drive Earth City, MO 63045 Attn: Engineering Manager	***Or fax this form to:*** 314-298-3439 Attn: Engineering Manager

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

Glossary

actuate	to activate, put into action
aisle pad	a type of jigging used when a connector plate needs to be embedded where the table surface gives way to a walk-through aisle
amperage	the strength of an electric current, expressed in amperes
anchor plate	a steel plate that holds the tables in place; it is anchored to the concrete floor and the tables are welded to it
auto-eject	a pneumatic system that raises the truss off the tables and automatically places the truss on the stand-alone conveyors with the use of a transfer roller
bumper	a safety device on each corner of the gantry head (for a total of 4); when the bumper is depressed, the gantry head motion stops
bus bar	an electrical device that allows multiple gantry heads to be used simultaneously
connector plate	the nail-plate that is embedded into the ends of the tie
cushion	an attribute of a hydraulic cylinder that allows adjustment of the pressure in each cylinder
directional buttons	the 2 black buttons on the pendant control station that tell the gantry head which direction to move
end-eject	a pneumatic system that raises the truss off the tables and allows the truss to be manually pushed or pulled off the end of the tables; this system requires that the gantry head rolls back over the truss or a device must be installed to raise the gantry head when it is parked
gantry head	the entire traveling weldment that houses the Roller to embed the connector plates
hour-meter	a gauge on the gantry head on a 1-enclosure system that tells the amount of time the motor is actually turning and the gantry head is moving; 2-enclosure systems do not have an hour-meter

Glossary

inner side	refers to the end of the gantry head housing; the side closest to the tables; both ends have an inner side—one can see the inner side of both ends when standing on or between the tables
jigging	any of several devices used to hold the truss in place on the tables
joystick	an option that replaces the pendant control station to control movement of the gantry head
layout	a scaled diagram of the location of components and the space that they occupy
leveling screws	large cap head screws that thread into the table legs and allow the table height to be adjusted and leveled
light bar	the perimeter access guarding device that uses multiple light beams to detect when something is in the way of the gantry head and stops the machine to prevent injury or damage; the RoofTracker uses a set of 3-beam light bars on both sides of the gantry head
limit switch	an electro-mechanical device that consists of an actuator mechanically linked to a set of contacts; when an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection
lockout/tagout	a means of isolating a piece of equipment from its energy source so maintenance can safely occur; guidelines provided in OSHA 29 CFR 1910.147
lubricator	a device that allows controlled amounts of lubricants into the pneumatic system
motor end	used to indicate which end of the gantry head is being discussed; the end of the gantry head that houses the motor
outer side	refers to the end of the gantry head housing; the side farthest from the tables; both ends have an outer side—one can see the outer side of the one end when standing at the pendant control station

Glossary

pendant control station	where the operator stands to use the pendant that controls movement of the gantry head
pilot valve	a pneumatic valve that operates the setup valve to control the release or cessation of air in each setup; it is located on the bottom-chord end of one table in each setup
plate	see *connector plate*
PLC	Programmable Logic Controller; a solid-state control device that can be programmed to control process or machine operations. It consists of five basic components: processor, memory, input/output module, the power supply, and the programming device.
port	a connection point for a peripheral device
proximity switch	a switch that uses an electromagnetic field to detect when an object is near, there is no physical contact between the object and the switch; inductive proximity switches detect only metal objects, capacitive proximity switches can sense both metallic and non-metallic objects
puck	a type of jigging that is small and round
qualified person	a person or persons who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training, or experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work—ANSI B30.2-1983; 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
receiver bar	the light bar that receives the signal from the transmitter bar; every light bar set consists of a receiver bar and a transmitter bar
regulator	a component of the pneumatic system that connects to the main air source and regulates the air pressure allowed into the system

Glossary

Roller	the large roller inside the gantry head that innately embeds the plates into the truss
setup valve	a component of the pneumatic system that control the flow of air to the rest of the setup
side-eject	a pneumatic system that raises the truss off the tables and allows the truss to be manually pushed or pulled off the side of the table and onto the stand-alone conveyors
slider pad	a type of jigging used when a connector plate needs to be embedded where the table surface gives way to a slot for the Ejector
solenoid	an assembly used as a switch consisting of a coil and a metal core free to slide along the coil axis under the influence of the magnetic field
stand-alone conveyor	the conveyor system that carries the truss from the tables to the Finish Roller and out to the stacker
stop	a type of jigging that is long and straight
take-up bearing	adjusts the height of the roller
torque	a turning or twisting force
transfer roller	a motorized roller sitting perpendicular to the tables on an auto-eject system; it automatically transfers the truss from the Ejectors to the stand-alone conveyors
transmitter bar	the light bar that transmits the signal to the receiver bar; every light bar set consists of a receiver bar and a transmitter bar
VFD	Variable Frequency Device; controls the speed of the cycle
voltage	Equal to the difference of electric potential between two point on a conducting wire carrying a constant current of one ampere when the power between the points is one watt

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