Equipment Manual

AutoPress™ 14TL

Platen Press

U.S. and other patents pending.

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Patents

Made under one or more of the following patents:*

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

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Notice of Change

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

Equipment Manual

***AutoPress™ 14TL* Platen Press**

Service Bulletin or Notice #	Dated	Title

Safety (English)

For safety information in Spanish, refer to page xxii.

Be Careful.
Be Safe.

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 xiii.

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 xviii.
- Perform safety tests to ensure all E-stops are working properly before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.
- In case of machine malfunction, stop the machine immediately using an E-stop and report the malfunction to a supervisor.
- Never leave the machine running unattended. Turn 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 xvi.

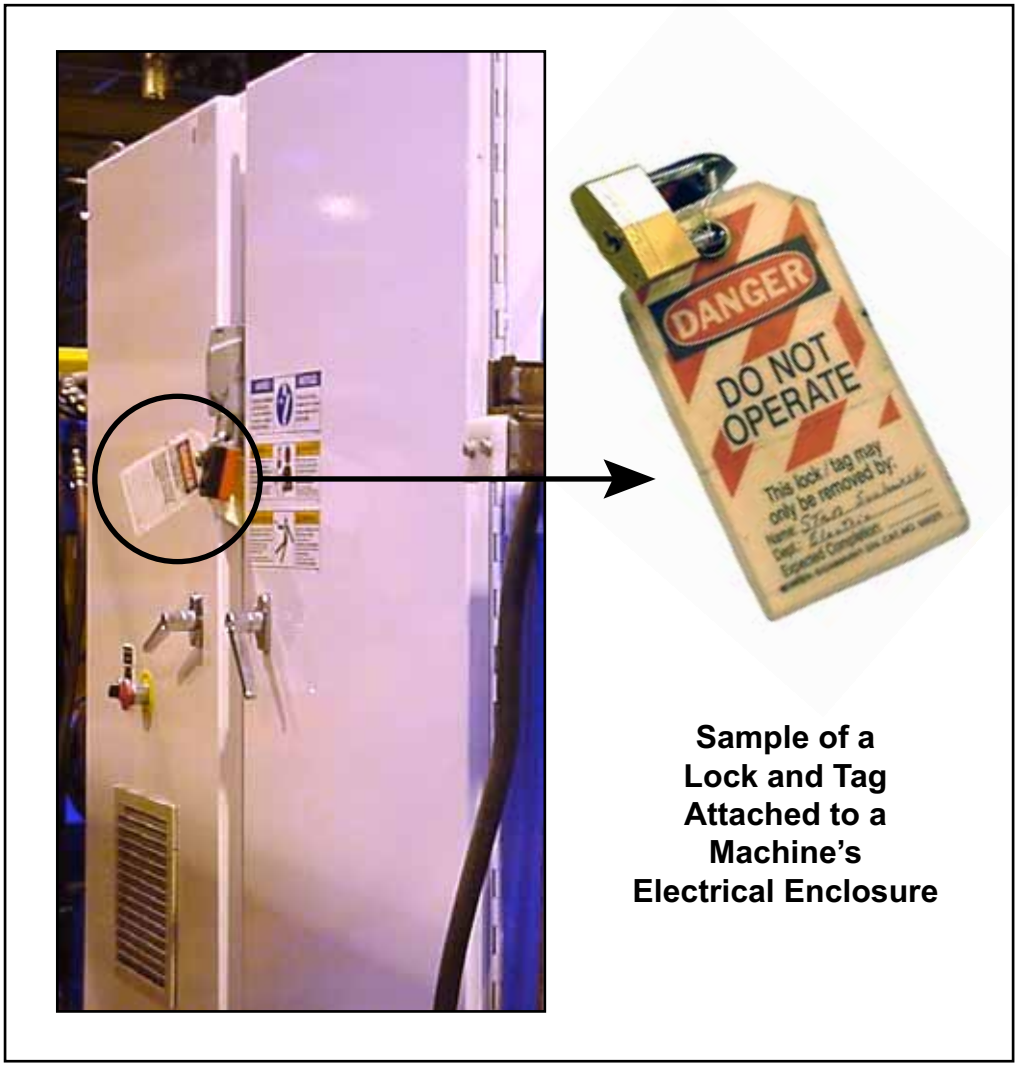
Before performing maintenance on any machine with electrical power, lockout/tagout the machine properly. When working on a machine outside of the machine's main electrical enclosure, not including work on the electrical transmission line to the machine, follow your company's approved lockout/tagout procedures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

1. Engage an E-stop on the machine.
2. Turn the disconnect switch handle to the "off" position. See Figure 4-1.

	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, hydraulic components, and other parts that could have live or stored power.

Figure 4-1: Lockout/Tagout on the Main 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 4-2.
3. Attach a lock and tag that meets OSHA requirements for lockout/tagout.
4. Open the door to the enclosure in which you need access, and using a multimeter, verify that the power is off.

Figure 4-2: Lockout/Tagout on the Power Source Panel

Hydraulic System Lockout/Tagout Procedure

When Lockout/Tagout is Not Required

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

When Lockout/Tagout is Required

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

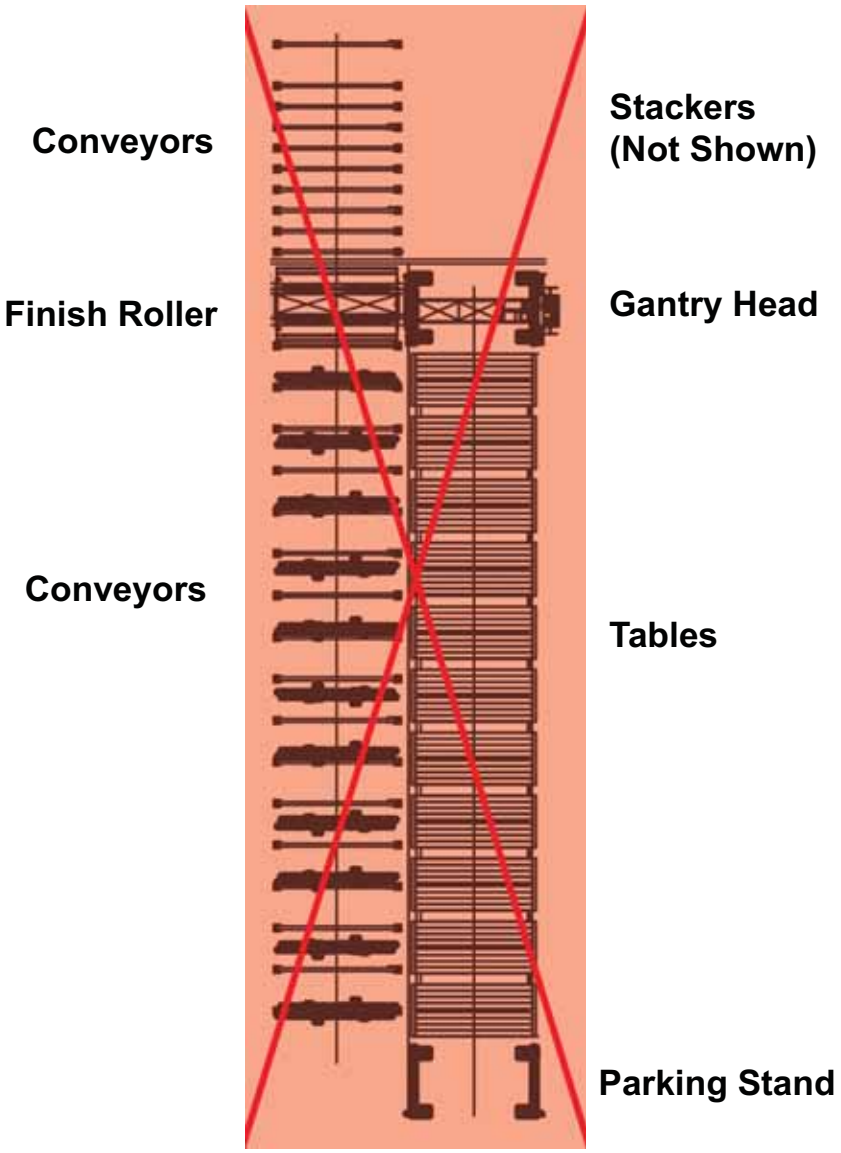
Troubleshooting With an Energized Machine

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

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

Restricted Zone

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

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

Performing the Test

Supplies Required

To perform this test, you will need two (2) pieces of lumber connected in the shape of a T so that the T will independently stand upside down to look like ⊥.

Terminology Used in This Procedure

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

Table 4-1: Definitions of Terminology Used

wooden T	Described in *Supplies Required*
right light bar set	The pair of light bars on the right side of the gantry head when facing it from the operator end
left light bar set	The pair of light bars on the left side of the gantry head when facing it from the operator end
control station	The electrical enclosure where the control buttons and joystick are located

Testing the Light Bars

	DANGER
	**Never stand directly in front of the gantry head!** **If the gantry head fails to stop when expected, serious injury or death may occur.**

1. Ensure the disconnect handle is in the ON position.
2. While the press head is sitting still, place the wooden T upside down so it is freestanding. Place it between the right-hand light bar transmitter and receiver so it interrupts a light beam.
3. Verify that the green indicator light labeled *Right Ready* turns off when the beam is interrupted.
4. Place the wooden T on the table located to the right of the press head and at least 10 ft away from the press head.
5. Press and release the RESET button to reset the safety indicators. This will tell the press that it can resume motion.
6. Verify that the green *Right Ready* light turns on when the RESET button is pressed.
7. Press and hold the joystick button while pushing and holding the joystick to the right.
8. Allow the press head to reach the wooden T. The motion of the machine should stop immediately.
9. Verify that the machine will **not** continue to move to the right by pushing the joystick to the right while also pressing the joystick button.
10. Verify that the brake is working properly by noting any warnings or alarms on the brake monitor.
11. Press the RESET button and repeat this test in the left direction.
12. If any of the light bars fail this test, refer to the *Correcting a Failed Test* section to repair the problem, then repeat the test in both directions.

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

Testing the Bumpers

1. Place a large, heavy, freestanding object (such as a trash can) in the path of the right, operator-side bumper, but at least 10 ft away from the bumper.
2. Press and hold the joystick button and press the joystick to the right until the bumper being tested hits the heavy object in its path. The press head should stop when the bumper retracts halfway from the weight of the object in its path.
3. Test the remaining five (5) bumpers in this manner.
4. If any of the light bars or bumpers fail this test, refer to the *Correcting a Failed Test* section to repair the problem, then repeat the test in both directions

Correcting a Failed Test

If the gantry head moves in the opposite direction from what you expected, and only the light bar on the opposite side stops it:

- Swap any two (2) of the wires at the output side of the VFD.

If the gantry head moves in the expected direction, and only the light bar on the opposite side stops it:

- Check the light bar wiring against the electrical schematic.
- If the wiring does **not** match the drawing, correct it. If the wiring **does** match the drawing, refer to the *Troubleshooting* appendix.

If a retracted bumper fails to stop the motion of the gantry head:

1. Examine the bumper for bent or damaged parts
2. Examine all bearings.
3. Examine the location of the collars.
4. Examine the point of intersection between the bumper and the light bar beam.
5. Repair, re-align, or adjust any questionable components.
6. Repeat the bumper test.

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 xxvii.

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 xxxiii.
- Realice pruebas de seguridad para verificar que todos los frenos de emergencia funcionen adecuadamente antes de utilizar el equipo por primera vez, después de realizar cualquier tarea de mantenimiento y según 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 xxx.

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

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

	**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, componentes hidráulicos y otras piezas que tengan alimentación directa o almacenada.

Figura 5-1: 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 5-2: Bloqueo/Etiquetado del panel de fuente de alimentación

Procedimiento de bloqueo/etiquetado de sistema hidráulico

Cuando no se requiere bloqueo/etiquetado

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

Cuando se requiere bloqueo/etiquetado

Antes de intentar reparar o realizar el mantenimiento de una línea o componente hidráulico, bloquee y etiquete la máquina en forma apropiada. Siga los procedimientos de bloqueo/etiquetado aprobados por la compañía.

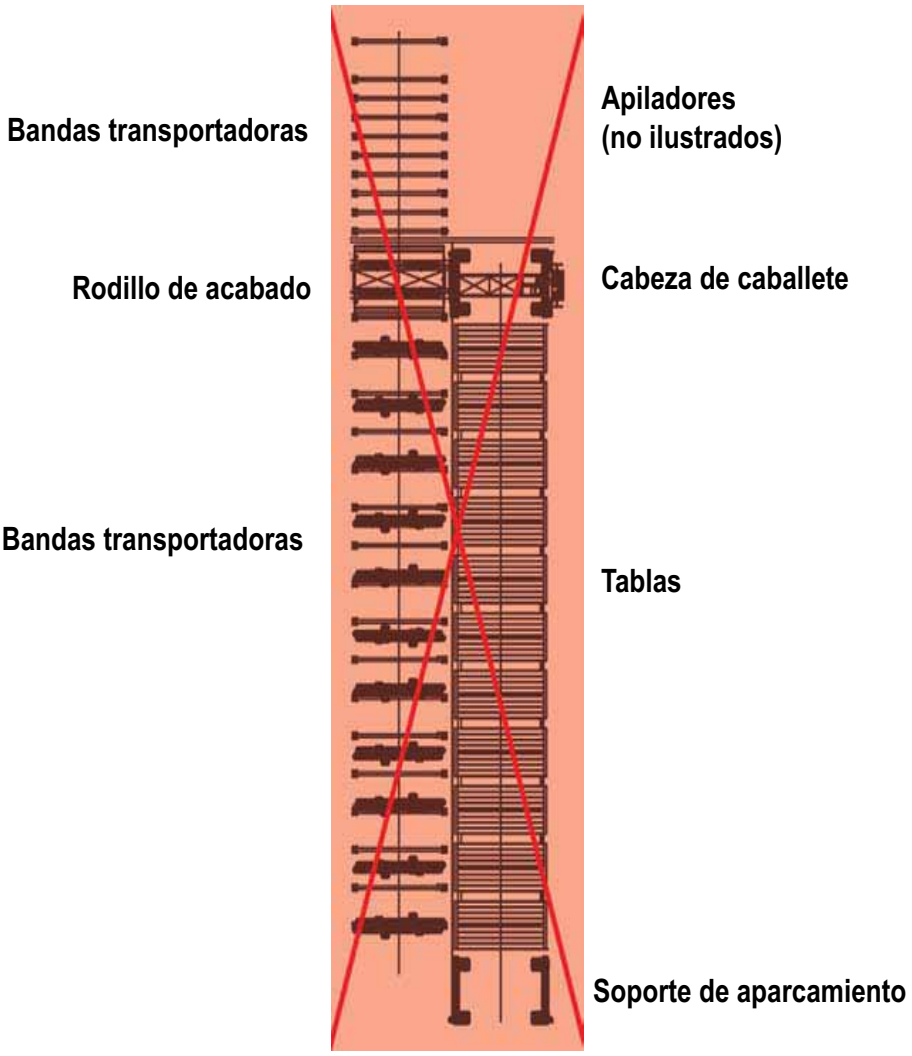
Solución de problemas con una máquina energizada

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

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

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 siguiente procedimiento de prueba **DEBE** ser realizado por personal calificado después de **CUALQUIER** tarea de mantenimiento, ajuste o modificación. La prueba permite verificar que la barra de luz, el sistema de seguridad y el sistema de control de la máquina funcionen bien juntos para detener la máquina en forma adecuada.

Realización de la prueba

Materiales requeridos

Para realizar esta prueba, necesitará dos (2) piezas de madera unidas en forma de T que puedan colocarse y mantenerse por sí solas en posición invertida como se muestra. ⊥.

Terminología utilizada en este procedimiento

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

Tabla 4-1: Definiciones de los términos utilizados

T de madera	Se describe en la sección *Materiales requeridos*
juego de barras de luz derecho	Par de barras de luz del lado derecho del caballete cabeza vista desde el extremo del operador.
juego de barras de luz izquierdo	Par de barras de luz del lado izquierdo del caballete cabeza vista desde el extremo del operador.
estación de control	La caja eléctrica en la que se encuentran los botones de control y el joystick

	PELIGRO
	**¡No se pare nunca delante de la cabeza del caballete!** **Si ésta no se detiene en el momento adecuado, podría sufrir lesiones serias, o incluso la muerte.**

Prueba de las barras de luz

1. Asegúrese de que el mango de desconexión está en la posición ON (encendido).
2. Mientras la cabeza de la prensa está fija, coloque la T de madera de modo tal que interrumpa el haz entre el juego de barras de luz derecho.
3. Verifique que la luz indicadora de color verde identificada como RIGHT READY/ REVERSE START (derecha lista/iniciar marcha atrás) se apague cuando se interrumpe el haz.
4. Coloque la T de madera sobre la mesa en posición invertida y estable. Ubíquela hacia la derecha y a una distancia de al menos 10 pies de la cabeza del caballete.
5. Presione y libere el botón RESET para resetear los indicadores de seguridad. Esto indicará a la prensa que puede reanudar el movimiento.
6. Verifique que la luz RIGHT READY verde se ilumina al presionar START.
7. Presione y mantenga presionado el botón del joystick mientras empuje el joystick en la dirección en que desea que se mueva la cabeza del caballete.
8. Deje que la cabeza de la prensa alcance la T de madera. El movimiento de la máquina debe detenerse inmediatamente.
9. Verifique que la máquina **no** continúe avanzando mientras la T de madera está en su zona de detección presionando el botón START y moviendo el joystick en la dirección en que desea mover la cabeza del caballete.
10. Verifique que el freno está funcionando de forma apropiada y tome nota de cualquier advertencia o alarma en el monitor del freno.

11. Repita esta prueba en la dirección LEFT.

12. Si alguna de las barras de luz no pasa esta prueba, refiérase a la sección *Corrección en caso de no pasar la prueba* para solucionar el problema y luego repita la prueba en ambas direcciones.

El propósito de esta prueba es asegurarse de que el sistema eléctrico esté correctamente conectado de modo tal que el movimiento se detenga cuando se interrumpe el haz de una barra de luz. Es importante realizar la prueba en ambas direcciones.

13. Continúe con la siguiente sección para probar los topes.

Prueba de los topes

1. Coloque un objeto grande, pesado y autoestable (como un bote de basura) en el recorrido del tope derecho del lado del operador, pero a una distancia de al menos 10 pies del tope.

2. Presione y mantenga presionado el botón de dirección RIGHT/REVERSE (o el joystick y el botón blanco) hasta que golpee el objeto pesado en su recorrido. La cabeza del caballete debe detenerse inmediatamente cuando el tope golpea el objeto.

3. Pruebe los cinco (5) topes restantes de la misma manera.

4. Si alguna de las barras de luz o topes no pasa la prueba, refiérase a la sección *Corrección en caso de no pasar la prueba* para solucionar el problema y luego repita la prueba en ambas direcciones

Corrección en caso de no pasar la prueba

Si la cabeza del caballete se mueve en dirección opuesta a la esperada, y sólo la barra de luz del lado opuesto la detiene:

- Cambie cualquiera (2) de los cables del lado de salida del VFD.

Si la cabeza del caballete se mueve en la dirección esperada, y sólo la barra de luz del lado opuesto la detiene:

- Inspeccione la conexión de la barra de luz con el plano correcto.
- Si la conexión **no** coincide con la del plano, corríjala. Si la conexión coincide con la del plano, refiérase al apéndice *Solución de problemas*.

Si un tope retraído no detiene el movimiento de la cabeza del caballete:

1. Examine el tope para verificar que no tenga partes dobladas ni dañadas.
2. Examine todos los cojinetes.
3. Examine la ubicación de los collares.
4. Examine el punto de intersección entre el tope y el haz de la barra de luz.
5. Repare, vuelva a alinear o ajuste cualquier componente cuestionable.
6. Repita la prueba del tope.

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 *AutoPress™ 14TL* press head and table system. For earlier revisions, contact MiTek Machinery Division Customer Service and order the part number listed on the title page. If you are using a *MiTek* conveyor system or Finish Roller with your system, refer to their manuals.

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.
	Indicates how to get to or from the item discussed.
	Refers reader to another section, table, graphic, or drawing for further explanation.

Additional Resources

Supplemental Documentation

In addition to the equipment manual, refer to the manufacturer's documentation for individual components that came with or in your equipment. The supplemental documentation is provided at the time of installation, or it may be found inside an electrical enclosure.

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

Chapter 2

Purpose of Chapter

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

Introduction to the Equipment

Purpose of the Equipment

The primary function of the *AutoPress™ 14TL* platen press is to partially embed truss connector plates into lumber to create wooden roof trusses. It must be used with a finishing machine, such as MiTek's Finish Roller, to achieve complete embedment of the plates.

Description of the Equipment

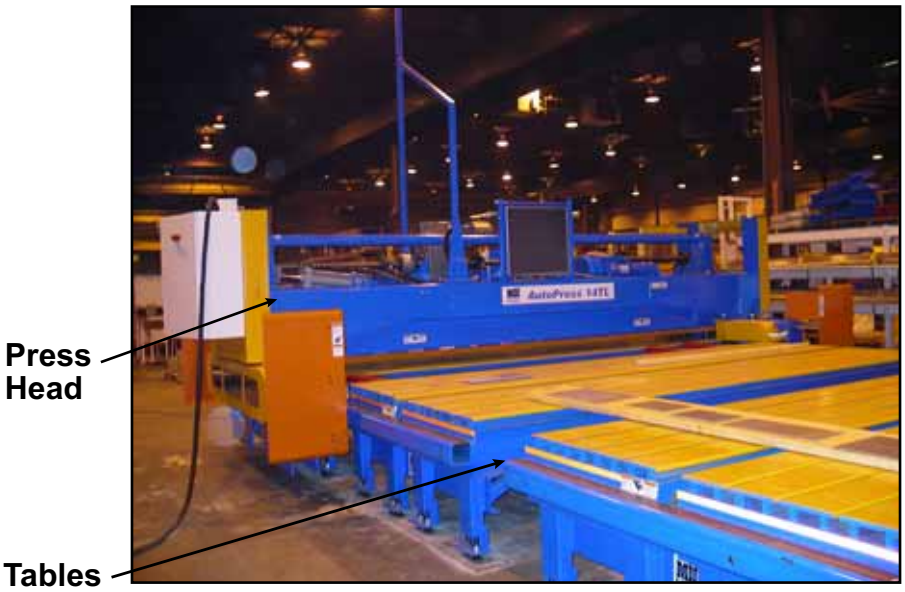
The *AutoPress 14TL* platen press system consists of a press head and tables. They are shown in Figure 2-1 and Figure 2-2. The HPU is partially enclosed inside the press head. The press head moves along the *STT™* tables by riding on a track on the side of the tables, which leaves the floor free of trip hazards. The press head stops, and a platen lowers to partially embed the plates into both sides of the lumber. The press head moves to the next location on the truss and repeats this cycle until all plates have been pressed. A finishing machine, such as the *MiTek* Finish Roller, is required to completely embed the plates.

This system features a high pressure mode and a low pressure mode to accommodate varying grades and sizes of lumber more efficiently.

Safety interlocks allow for multiple press heads to be used on one *AutoPress 14TL* table system. The press heads may consist of all *AutoPress 14TL* press heads or *AutoPress 14TL* press heads may be used in combination with *MiTek RoofGlider™* or *MiTek RoofTracker®* press heads and tables. The *Table Integration Options*section describes this integrated feature further.

Figure 2-1: *AutoPress 14TL* **System, Right-Hand Side**

Figure 2-2: *AutoPress 14TL* **Machine, Left-Hand Side**



Main Components and Optional Equipment

Main Components

The main components of this system are listed in Table 2-1. The components covered in this manual are shown and labeled in Figure 2-1.

Table 2-1: Main Components

Press head	A traveling head that houses a platen which lowers to press connector plates into both sides of a roof truss
Table system	Tables with jigging slots that allow quick setup of trusses. The table system has its own manual.
Off-feed conveyor system and finishing roller	These components are not addressed in this manual.They are separate machines with their own manuals.

Options Available

Press Head Options

The press head can be designed with the options described in Table 2-2.

Table 2-2: Optional Features on the Press Head

Interlocked operating system	Safety interlocks allow multiple press heads to be used, in any combination of *RoofGlider*®, *RoofTracker*™ and *AutoPress*™ heads
Voltages	Electrical system available in 208, 230, 460, and 575 VAC

Table Integration Options

The *AutoPress 14TL* platen press system is designed to be used as an independent table and pressing system, but it can also be integrated with your existing *MiTek RoofGlider* or *MiTek RoofTracker* truss presses. All three (3) press heads can travel and press on the *AutoPress 14TL* tables. The *AutoPress 14TL* press head can travel on any of the three (3) table designs, but can only press on an *AutoPress 14TL* table. Other tables will not withstand the pressing force exerted by the platen press. By combining *AutoPress 14TL* tables with *RoofGlider* or *RoofTracker* tables, you will have one area of your table system where *AutoPress 14TL* trusses will be built, and the *AutoPress 14TL* must be parked on an *AutoPress 14TL* parking stand. The advantage to this system is that the tables may still be utilized for your *RoofTracker* or *RoofGlider* trusses.

System Identification

Table 2-3 lists the models available for this equipment and the part numbers that identify each model.

Table 2-3: Available Models

AutoPress Component	Used With	MiTek Part #
PRESS HEAD WITH VOLTAGE OPTIONS		
Press head, 208 V, single press head	*AutoPress* tables	63305-501-208V
Press head, 230 V, single press head	*AutoPress* tables	63305-501-230V
Press head, 460 V, single press head	*AutoPress* tables	63305-501-460V
Press head, 575 V, single press head	*AutoPress* tables	63305-501-575V
SAFETY INTERLOCK OPTION FOR MULTIPLE PRESS HEADS		
Left side, prior to purchase	*RoofGlider* head	91266-501
Right side, prior to purchase	*RoofGlider* head	91266-502
Left side, field installation	*RoofGlider* head	91266-601
Right side, field installation	*RoofGlider* head	91266-602

General Specifications

Table 2-4: General Specifications

PERFORMANCE DATA			
Pressure Capacity	Max 50 tons (100% duty cycle)		
Lumber Capacity	Any size up to 5-1/2" thick that will fit on the width of the tables		
Variable Drive Speed	0-125 feet per minute		
Primary Operating Control Mechanism	Joystick		
Plate Embedment	60-80% embedment—Requires a finishing roller to complete		
Direction of Movement	Press head: left/right Press platen: up/down		
Platen Size	16’ 6-3/4" x 30" x 1-1/2"		
Platen Opening	Up to 5-3/4"		
Camber on Platen	1/16" max down at midpoint		
HYDRAULIC SYSTEM DATA			
Operating Pressure	High-Pressure Mode	2000 psi	50 tons
	Low-Pressure Mode	1500 psi	40 tons
Hydraulic Pump Motor	20 hp		
Temperature Control	Automatic heater and cooler		
Pressure switch for filter replacement notification and float switch for hydraulic oil level			
DRIVE SYSTEM DATA			
Drive Motor	10 hp		
Drive Shaft	2-3/4"		
Drive Wheels	Quantity 8, 10" diameter		
Guide Wheels	Quantity 8, 5" diameter		
SAFETY DATA			
Light Bars	1 set on each side of press head, across platen opening		
Bumpers	1 on each corner of the press head		
Interlock Control Circuit	Allows multiple press heads to operate safely together		
ELECTRICAL DATA			
See Table 3-2.			
DIMENSIONS AND WEIGHT			
See Table 3-4.			

Truss Terminology

Table 2-5: Truss Terminology

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

Figure 2-3: Terminology Diagram

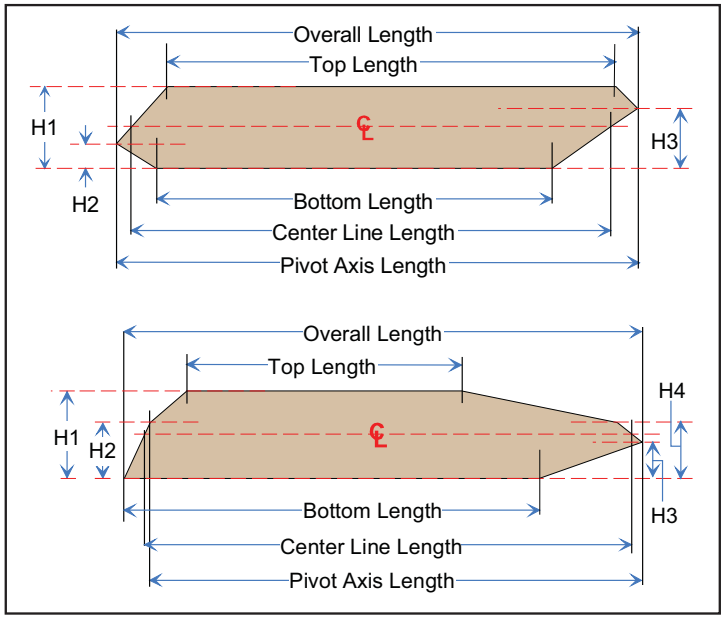
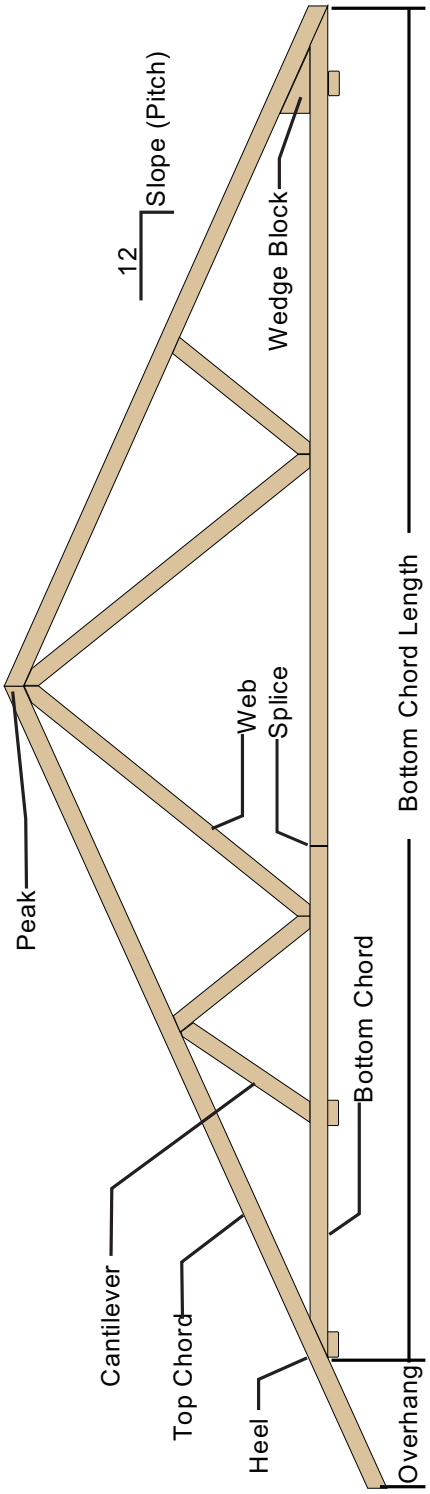


Figure 2-4: Parts of a Truss



Chapter 3

Purpose of Chapter

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

MiTek's Responsibilities

Prior to Installation

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, specifically prepared for your building.

During Installation

A MiTek Customer Service Technician (CST) will be present to manage the installation of your equipment.

Customer 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.

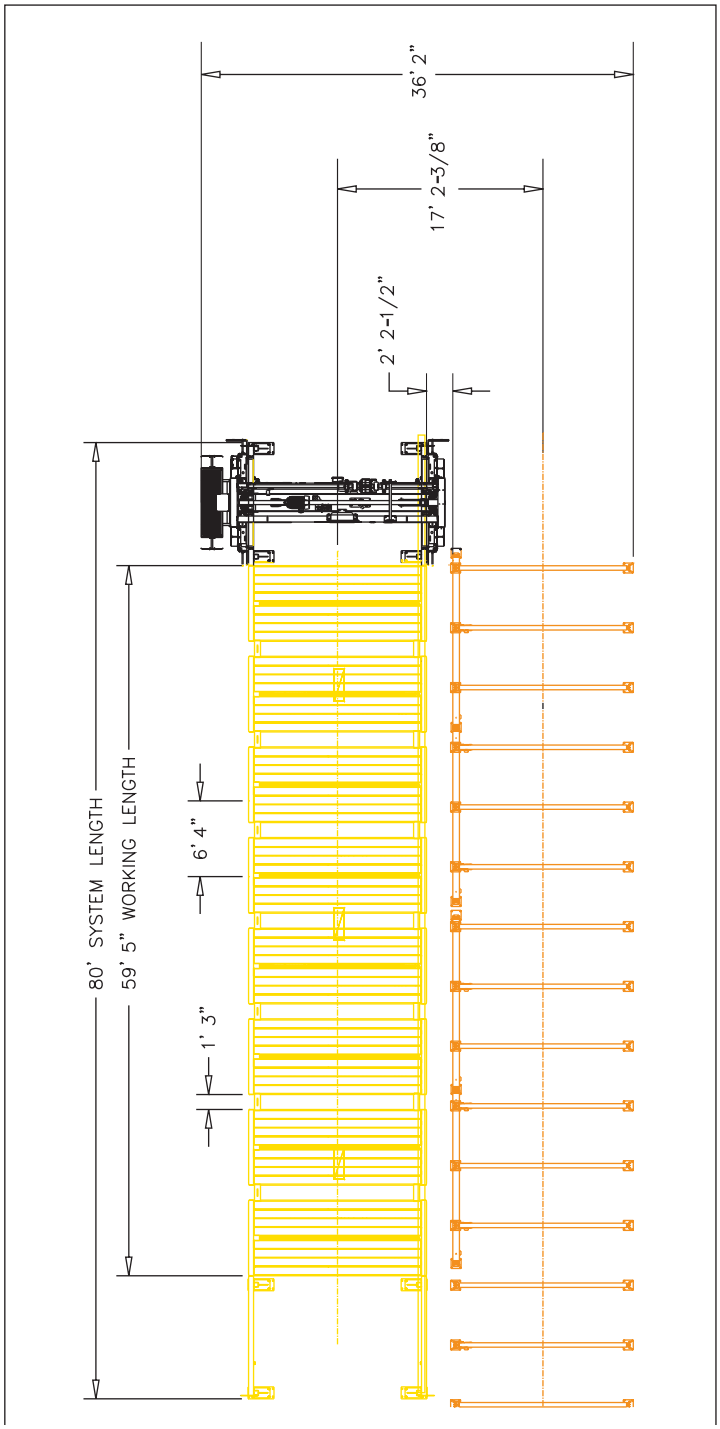
Table 3-1: Summary of Customer Responsibilities

Space Requirements	This equipment requires enough space to allow for the machine dimensions shown in your individual layout, plus additional working space for operation and maintenance. Space should have adequate lighting.
Location Requirements	Concrete, a minimum of 6 in. thick 5000 psi, is required under the weight of the press head, tables, and stand-alone conveyors. The equipment discussed in this manual must be used in dry conditions under a roofed area according to Type 1 electrical enclosure requirements.
Electrical Requirements	The standard electrical requirements are shown in Table 3-2. Contact your MiTek representative immediately if custom power specifications need to be arranged.
Hydraulic System Requirements	Hydraulic fluid that meets the requirements in Table 3-3 must be on-hand during the installation process.
Shipping Requirements	See Table 3-4 for shipping weights.
Customer-Supplied Items	The customer is responsible for having the supplies listed in Table 3-5 available at the time of installation.

Space Requirements

Refer to these guidelines in this section when planning your space allocation. MiTek can provide help with plant layout and space utilization upon request. Figure 3-1 shows a sample of a typical layout for this equipment. Refer to your own layout when planning exact locations.

Figure 3-1: SAMPLE Layout



Space for the Equipment

It is the customer's responsibility to provide adequate space for the installation, operation, and protection of the equipment. Refer to your individual layout for exact dimensions.

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 press head, tables, stand-alone conveyors, and Finish Roller. Five thousand (5000) psi concrete is recommended. Refer to your layout drawing.

Environment

The press head, ejectors, and receivers must be located in a covered area at all times. Under no circumstances should the electrical enclosures be wet.

Lighting must be adequate for safe operation and maintenance.

Electrical Requirements

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

Table 3-2: Electrical Requirements Prior to Installation

Horsepower of Largest Motor	20 hp
Voltage	208/230/460/575 VAC
FLA Plus Control Amperage	101/92/46/37 amps
Equipment Disconnect Protection	150 / 125 / 70 / 50 amps
Cycles (Frequency)	60 Hz
Phases	3

Hydraulic System Requirements

100 gallons of hydraulic fluid must be on hand before the machine can be started. Use an oil recommended in Table 3-3.

Table 3-3: Recommended Hydraulic Fluid

ISO		32
Base Component		Hydrocarbon-based
Temperature	At Startup	> 68°F
	During Operation	86° to 120°F
Reservoir Capacity	90 gallons	
Brand and Type	Mobile Oil Company	DTE 24
	American Oil Company	Rykon 15
	Humble Oil & Refining Company	Nuto H Grade #44
	Shell Oil Company	Tellus #927, Code 65224
	Sun Oil Company	Sunvis #816
	Texaco Oil Company	Bando HD A Code 729

Shipping Information

Table 3-4 shows the weight of the individual components of a typical *AutoPress 14TL* system.

Table 3-4: Shipping Information

Contents of Shipment	Weight
Press Head	18,000 lb

Customer-Supplied Parts Required

The customer must supply the parts shown in Table 3-5, Table 3-6 and Table 3-7. 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 and Services

Item	When Needed	Description
Electrical Equipment	Prior to installation and during installation	All electrical requirements to provide power to the disconnect enclosure on the press head are the customer's responsibility Electrical requirements for the stand-alone conveyors include hard conduit, junction boxes, flex conduit, and 1/2-in. connectors
Transport Equipment	At delivery and during installation	Forklift, chains, and spreader bars appropriate for carrying 16,000 lb
Tools That May Need to be Rented	During installation	Transit with measuring stick Industrial hammer-drill Hydraulic jack Welding equipment and welder Oil pump

Table 3-6: Hand Tools Required for Installation

Hand Tools		
Allen wrenches: 1/8”, 5/32”	Hydraulic jack	Sledge Hammer
Air Nozzle	Lifting Chain	Snap Ring Pliers
Brass Brush	Lockout	Socket Set with 1/2" Drive, Sizes 3/8" to 1-1/4"
C-clamps (2)	Padlock	Vise
Drill, 1/2” Concrete Bit	Pipe Clamp	Wrench, Adjustable Wrench, 16-24"
Grease Gun	Pliers to cut skid bands	Wrench, Hex Head, Long Handle, 1-1/2”
Hammers (2)	Pliers, Channel-Lock	Wrench, Hex Head, Short Handle, 1-1/2”
Hex Key Set 1/16" to 3/8"	Pry bars, 6’, wedge on one end (2)	Wrench Set, Hex Head, 3/8" to 2"
Hydraulic Jacks (2)	Screwdriver Set	Wrench, Pipe Wrench, 16-24"

Table 3-7: Additional Tools and Supplies Required for Installation

Measuring Devices	Personal Protective Equipment	Power Tools	Consumables
Caliper, 6"	Hearing Protectors	Angle Grinder	Anti-Seize Compound
Chalk Line	Safety Glasses	Compressed Air Source	Electrical Tape
Level	Work Gloves	Hand Drill	Loctite #262 (Permanent)
OHM/Voltmeter	Respirator	Oxy/Acetylene Torch	Loctite #242 (Servicable)
Stopwatch	Welding Helmet	Hammer Drill, Industrial	Non-Flammable Solvent
Straight Edge	Welding Gloves	Welder	Plastic Set Screw Plug
String Line and Soft Tape Measures (longer than length of tables)		Welding equipment and welder	Teflon Tape
Torque Wrench 250 ft-lb		Oil pump	Track Shims
Transit with measuring stick			
Tape Measures (2)			

Chapter 4

Purpose of Chapter

This chapter describes the entire installation process in detail. The instructions assume that the prior-to-installation requirements are satisfied.

Responsibilities During Installation

MiTek will provide installation supervision to ensure that the system is installed properly and operates correctly. We will also provide operating and maintenance training at the time the equipment is installed. The customer is responsible for providing all labor and equipment needed to complete the installation. These requirements are explained in the *Prior To Installation* chapter.

All customer responsibilities before and during installation are described in the *Prior To Installation* chapter!

	DANGER
	**This machine is intended to be installed and set up by factory - trained personnel only. Incorrect installation may cause component failure which can result in serious personal injury or death. If you have any questions, please contact MiTek.**

Delivery

Checking for Damage

All shipments from MiTek are covered with tarps. When your shipment arrives, check to ensure 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 equipment on the 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.

Unloading

Refer to the *Prior To Installation* chapter for information regarding preparing for the delivery.

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.

	WARNING
	**CRUSH HAZARD.** **Failure to lift the equipment in the prescribed manner may cause serious injury, including death, or equipment damage.** **Personnel not involved in the off-loading from the truck shall remain clear of the area.** **Transport and lifting equipment such as forklifts and cranes must be designed and rated for the load and application.**

	CAUTION
	**Chains and spreader bars used to lift and unload the equipment must be rated appropriately. See Table 3-4 on page 15 for the weight of each component. If a chain breaks while moving equipment, personal injury and equipment damage may result.**

- A heavy-duty forklift or truck wrecker is required to move the equipment during unloading and placement of the machine. Only experienced forklift operators, using machinery with sufficient capacity, should be permitted to unload and move the equipment.
- Be sure all personnel are standing at a safe distance when the equipment and its components are unloaded and transported to the desired location.

Unloading the Press Head

Lift the press head by wrapping a chain around each of the four (4) lifting lugs (two (2) on each end frame), or use a clevis through the lifting lugs and attach a chain. Use a spreader bar on both ends between the two (2) chains.

	WARNING
	**CRUSH HAZARD.** **Ensure all personnel are standing at a safe distance before unloading the press head.**

Machinery Location

The *AutoPress 14 TL* machine is typically located inside the building and parallel to a wall. Trusses are built from the operator's side (front side). In a side-ejection application, the machine must be located an exact distance away from the truss conveyor, for the proper transfer of trusses.

Equipment Layout

A sample layout is shown in Figure 3-1 on page 13, but refer to your own layout during installation. Your MiTek representative will provide your layout to you before the equipment is installed.

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

Installing the Parking Stands and Gantry Head

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

When installing the parking stands, the sides of the stands must be even with the sides of the tables. Place each parking stand up to 15 in. from the end of the first (or last) table. The anchor plates are already attached to the parking stands. Drill and anchor them to the floor using the same anchors and procedure used to install the table anchors.

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

Releasing the Manual Brake

The installation of the gantry head should be supervised by a MiTek representative. When sliding the gantry head onto the tables, it is necessary to manually release the brake.

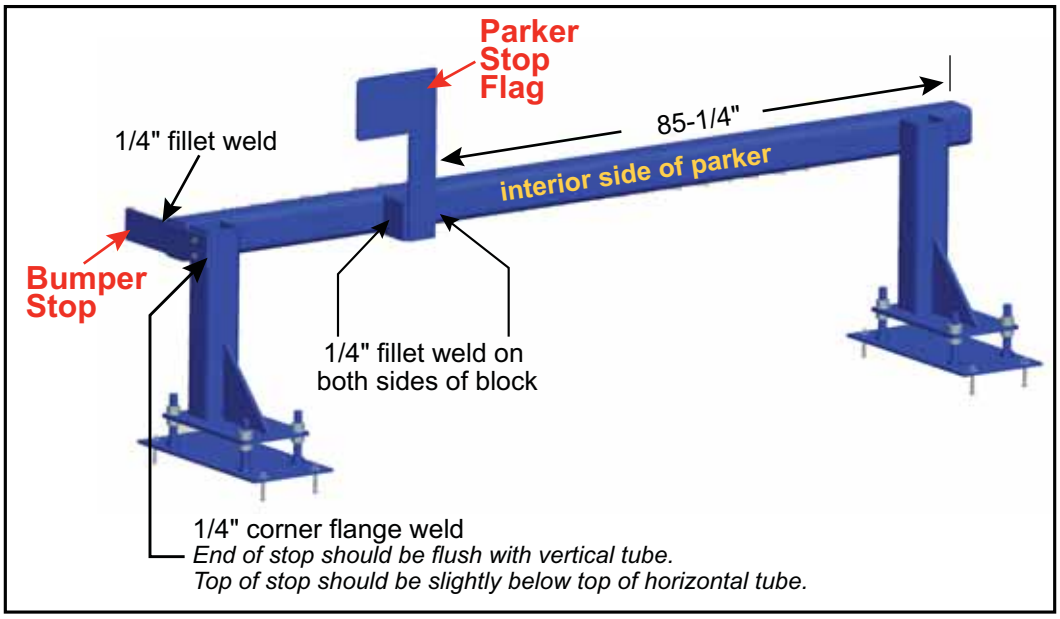
Aligning the Light Bars

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

Assembling the Parking Stands

A parker stop flag and a bumper stop were shipped loose for each parking stand.

Figure 4-1: Attaching the Loose Items to your Parking Stands



Attaching the Parker Stop Flags

The parker stop flags are different for the right-hand parkers and the left hand parkers. The flag should be pointing away from the gantry head.

Weld 1 parker stop flag to each of the 4 parking stand as shown in Figure 4-1. The flag interrupts the light beam when the press head nears the edge of the parking stand to keep the press head from traveling off the edge.

Attaching the Bumper Stop

	WARNING
	CRUSH HAZARD! **The parker stop flags and bumper stops must be welded to all 4 parking stands to prevent the gantry head from traveling off the end of the table.**

Attach 1 bumper stop to each of the 4 parking stand as shown in Figure 4-1. The bumper stop is a secondary stop. If the gantry head gets near the edge of the parking stand, this stop will depress the bumper, which activates the light bar to stop the press head.

Temporarily attach the bumper stop using the 3/8x16-1" hex head cap screws and lock washers supplied. Weld the bumper stop in place as described in Figure 4-1 to ensure its stability.

Bus Bar System

Overview of the Bus Bar System

The trolleys in the bus bar assembly ride along the conductor bars and provide constant power to the machine without the need for a cable.

Installing the Bus Bar System

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

1. Once the hanging brackets are ready, determine the exact location of the bus bar system.
2. Hang the brackets from the ceiling at the spaces indicated on your drawing. A typical example is shown in Figure 4-2.
3. Attach the adjustable feet to a 2x6 board. The board is the gang bracket mount labeled in Figure 4-3. The height will be adjusted in a later step.
4. Attach the conductor bars to the gang bracket mount board using the hanger clamps at the intervals specified on your drawings. The typical spacing is 5 ft center-to-center.
5. Mount the trolley assembly to the mast.
6. Adjust the height of the hanging bracket feet so the conductor bars are at the correct height to hold the trolleys in place.
7. Figures 3-5 and 3-6 show a standard bus bar system. Your system may vary slightly.

Figure 4-2: Bus Bar System Overview

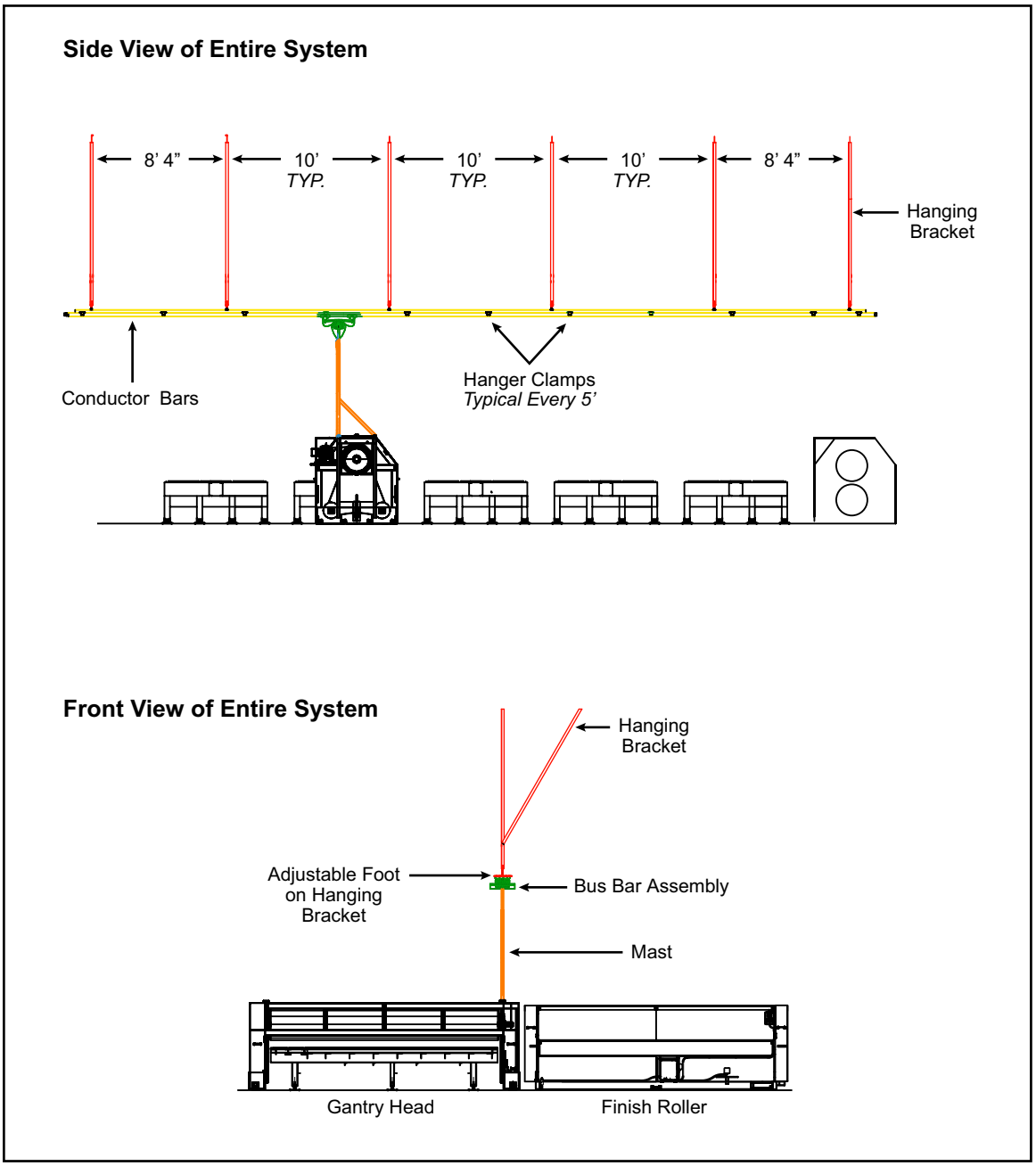
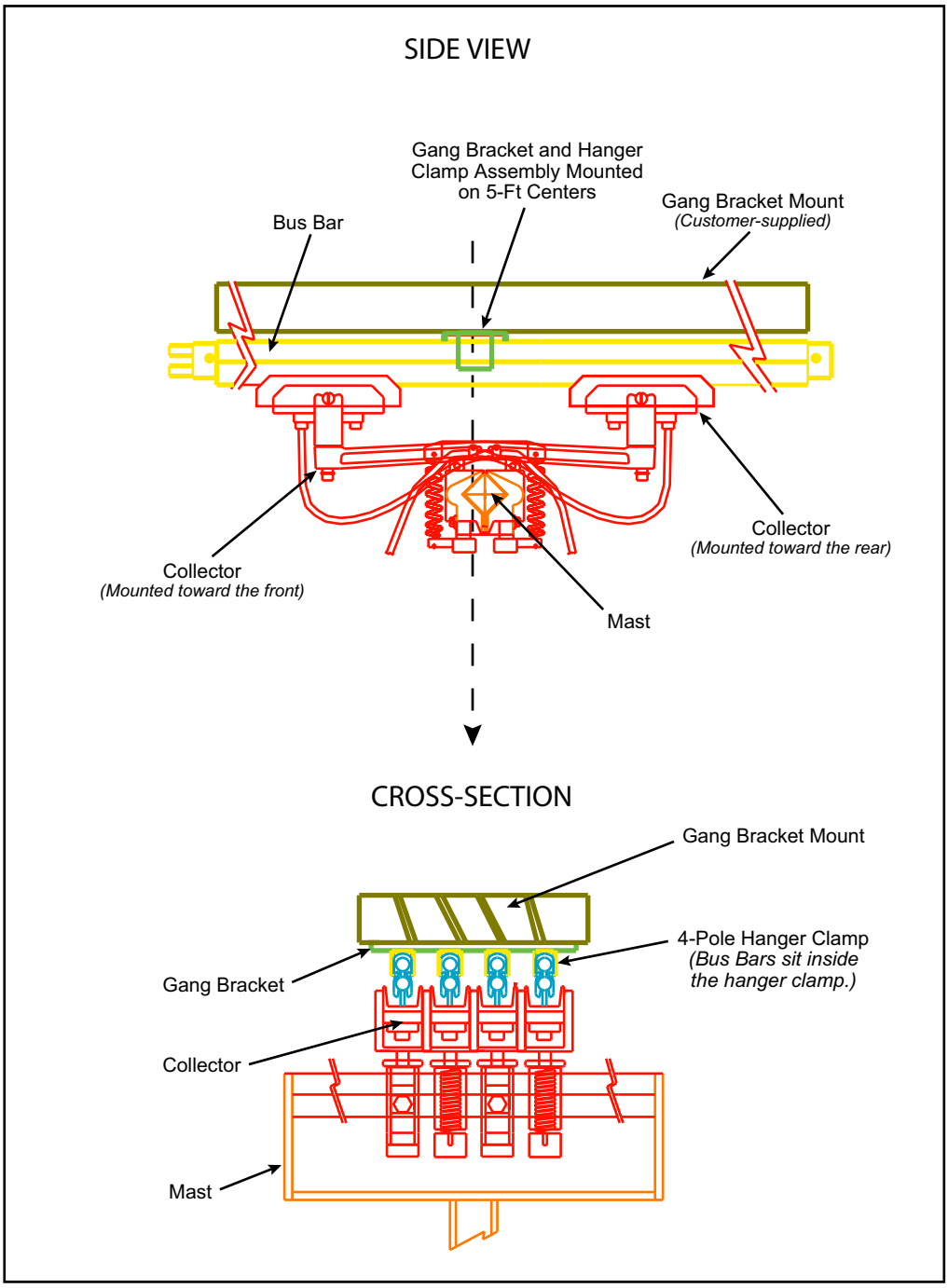


Figure 4-3: Components of a Bus Bar System



Electrical

	WARNING
	**ELECTROCUTION HAZARD!** **All electrical work must be performed by a qualified electrician and must conform to national and local electrical codes.** **Follow approved lockout and tagout procedures (OSHA 29 CFR 1910.147).**

Connecting Power to the Equipment

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

Before connecting power, you must install the bus bar that supplies power to your machine.

The disconnect switch is located on the main electrical enclosure.

Bring power into the disconnect enclosure and connect it to the terminals on top of the fuses. The order in which they are connected is irrelevant because you will perform a test later and switch the appropriate wires, depending on which motor is rotating incorrectly. Refer to your electrical schematic for detailed wiring instructions.

Assembling the Light Bars & Beacon

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

The beacon and horn sounding device must also be attached to the gantry head during installation. Refer to Drawing 90547.

	WARNING
	**DO NOT ATTEMPT TO START THE SYSTEM WITHOUT A MITEK REPRESENTATIVE PRESENT! Serious injury and/or equipment damage may result.**

Purpose of Chapter

This chapter describes the procedures required before operating your equipment.

	WARNING
	**ELECTROCUTION, HIGH PRESSURE, CRUSH, CUT, AND CHEMICAL HAZARDS!** **Do not attempt to start the system without a MiTek representative present!** **Serious injury and/or equipment damage may result.**

Preparing the Hydraulic System

Filling the Reservoir With Hydraulic Fluid

Fill the hydraulic reservoir with a recommended oil listed in Figure 3-3 on page 15. The reservoir should be filled to within 2 in. from the top. Watch the sight gauge on the operator end of the reservoir for the fill level. Approximately 100 gallons of oil will be needed to fill the 90-gallon tank and lines.

Priming the Pump

Before running the motor, prime the pump to ensure hydraulic fluid is circulating throughout hydraulic system. Refer to the procedure on page 64 in the *Maintenance* chapter.

Checking Motor Rotation

CAUTION
You must fill the hydraulic fluid before checking the motor rotation. Do not turn on a motor until the proper amount of hydraulic fluid is in place.

Check the motor rotation of the hydraulic system motor and the drive system brake motor to ensure they are rotating in the same direction as the arrow on their housing. Refer to the electrical schematic in Drawing 90547 to remedy a motor rotating in the wrong direction.

Purpose of Chapter

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

Things to Know Before You Begin

	WARNING
	**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 economic loss, property damage, and/or personal injury.** **This manual must always be available to personnel operating and maintaining this equipment.**

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

Stopping the Machine

Emergency Stop (E-Stop) Methods

Activate an E-stop to cease power transmitting to the control circuit. Do not use the E-stops as a standard stopping method when cutting is complete. Overuse may cause certain components to wear faster. When the press head travel stops due to an emergency stopping method, it stops abruptly. When the press head travel stops under normal operating conditions, it comes to a gradual stop.

E-Stop Pushbuttons

There is one (1) red, mushroom-shaped E-stop pushbutton on the control station for this machine. To activate the red pushbutton, press firmly on its surface. To release the E-stop pushbutton, pull it straight up. It will return to its extended position and the machine will operate again.

When the E-stop pushbutton is activated, the red *E-Stop* light on the control enclosure illuminates and electrical power stops at the fused disconnect in the main electrical enclosure, except for the power to the heater. The *E-Stop* light stays lit until the pushbutton returns to its extended position.

Perimeter Access Guarding

Two (2) sets of light bars are used as perimeter access guarding to protect personnel from the press head and also to prevent unwanted objects from entering the press head area. To stop the machine using the light bars, a solid object must pass through the light beam, interrupting the transmission of the beam between the transmitter bar and receiver bar.

When a light bar beam is interrupted, the hydraulic system immediately shuts off. The machine still has electrical power, but the press head can only move in the direction opposite the side of the interrupted light bar set. The operator must press the *Reset* button on the control enclosure before turning the hydraulic system back on.

	WARNING
	**CUT AND CRUSH HAZARD.** **Keep hands and fingers away. The light bars are for detection of personnel and equipment entering a restricted area. They will not detect smaller objects such as hands and fingers.**

Bumpers

A bumper is located on each corner of the gantry head and on both sides of the operator platform to provide additional safety control. The press head will stop traveling when something causes a bumper to retract.

The machine responds to the actuation of a press head bumper exactly as it responds to the light bar interruption. The operator must press the *Reset* button on the control enclosure before turning the hydraulic system back on.

When a platform bumper actuates, the operator must step down from the platform and pull the bumpers set back to it's original position, until the switch under the platform rests inside the notch at the center of the bumpers' shaft.

Operation of the light bars and bumpers is discussed later in this chapter.

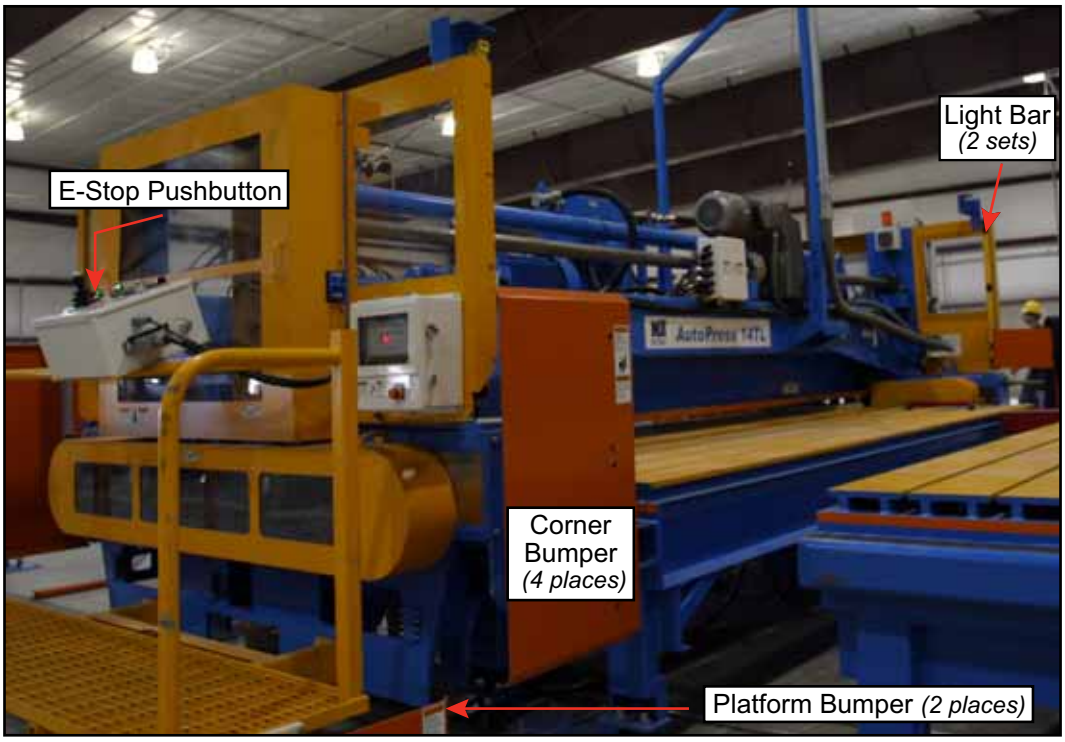
Disconnect Switch

	DANGER
	**ELECTROCUTION HAZARD.** **The disconnect switch controls only the control circuit power. Be sure to shut-off and lock out the main electrical power feeding the machine before opening the electrical enclosure. Only a qualified electrician should perform any electrical work.**

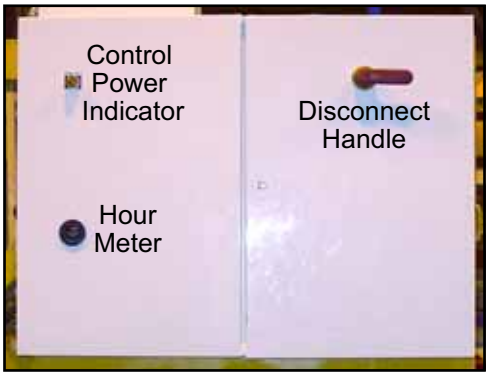
The disconnect switch controls the power supplied to the machine. Turning the disconnect handle to the ON position supplies electrical power to the entire machine, including the heater. To remove power to the machine from the fused disconnect, turn the disconnect handle to the OFF position. The disconnect handle should always be turned off when the machine is not in use.

Figure 6-1: How to Stop the Gantry Head

E-Stops on Operator End



Electrical Disconnect and Indicators on Main Electrical Enclosure



Indicators

Indicators

Table 6-1: Functions of Indicator Lights

Label	Location	Color When Energized	Electrical Schematic
Control Power	Main Electrical Enclosure	Yellow	LT1
Brake Warning	Brake Monitor	Yellow	LT2
E-Stop	Control Station	Red	LT3
Left-Ready	Control Station	Green	LT4
Right-Ready	Control Station	Green	LT5
Start HPU	Control Station	Green	LT6

Control Power

The Control Power light indicates that the power is turned on at the main electrical enclosure. Power is reaching the fused disconnect from the secondary side of the transformer and the disconnect handle is in the ON position, allowing power to flow throughout the machine.

Brake Warning

The brake warning indicator light is on the outside of the brake monitor enclosure. Refer to the Brake Monitor section for details on the braking system.

Control Station Indicator Lights

See Table 6-1 for a description and Figure 6-3 for their locations.

Indication of Movement (Beacon)

A combined horn and beacon sits high on the enclosure-end of the press head. The horn sounds and the beacon lights up when the press head is told to travel left or right. After a brief delay, the press head begins movement, and the beacon stays lit until the press head stops traveling.

Hour-Meter

The hour-meter on the front of the main electrical enclosure indicates the number of hours the drive system brake motor is actually running. Use this indicator to plan preventive maintenance schedules.

Overview of Equipment Operation

Pressing Method

The *AutoPress 14 TL* machine is intended for use in a two-stage pressing operation. The press head will only partially seat the connector plates into the lumber. The final seating must be done by a finishing machine such as the *MiTek* Finish Roller. Do not try to fully embed the connector plates with the *AutoPress 14TL*. The connector plates may not embed properly, which will reduce their holding capacity and, therefore, the strength of the truss.

Capacities

Although the *AutoPress 14 TL* press is most efficiently used with dimensional softwood lumber with a nominal thickness of 1-1/2 in., is designed to be used with any lumber that will fit within the opening of the platen head, which can open up to 5-3/4-in.

When using the high-pressure setting, large connector plates with high gauges and hardwood lumber can be pressed much more effectively than most roller presses can accomplish.

Tips

The following tips will assist you when operating this equipment:

- All lumber components must be of the same thickness.
- The truss must not overhang the table.
- All joints which require a connector plate should fall upon a solid portion of the table or on an aisle pad or slider pad.
- Adequate jigging must be used to hold the truss components securely in place to prevent movement during the pressing operation.
- The truss must be manufactured exactly according to all details of the approved engineered truss drawing and to current industry standards.

Modes of Operation (Pressure Modes)

Both modes have 100% duty cycle, which means the machine can be operated in either mode 100% of the time. For the most efficient use of the machine, the operator should choose the mode most appropriate to the job at that time. Table 6-1 will help you determine which mode should be used.

The mode is chosen by turning the selector switch labeled *Pressure* to *Low* for the low-pressure mode or to *High* for the high-pressure mode.

Operating in Low Pressure Mode

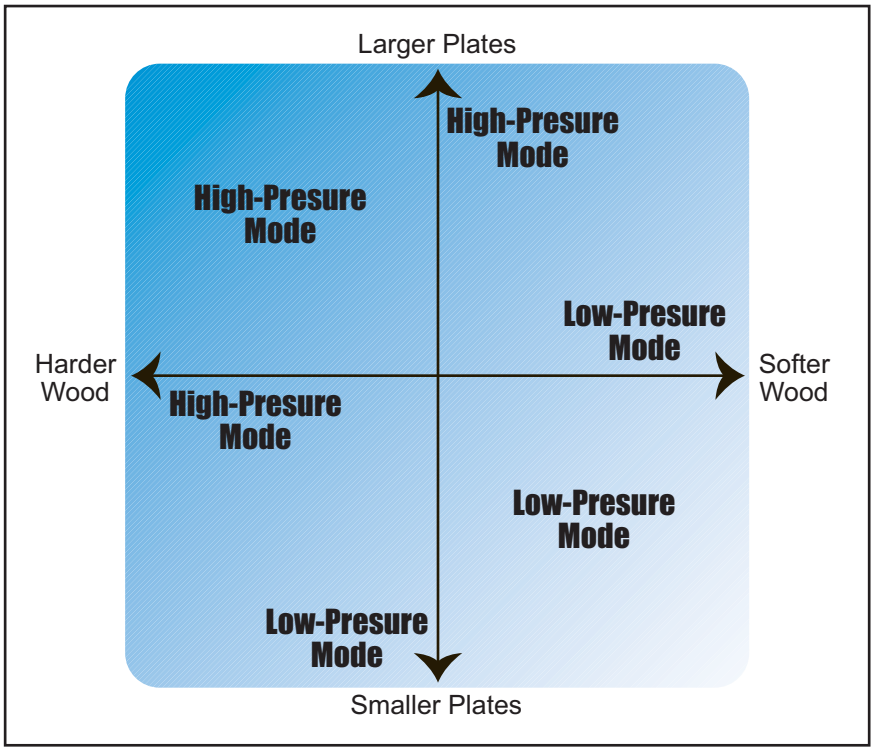
The low-pressure mode generates approximately **40** tons of pressing force. Always use the low-pressure mode when pressing small plates into softwood 2x4 lumber.

Operating in High Pressure Mode

The high-pressure mode generates approximately **50** tons of pressing force. Use the high-pressure mode when pressing large plates or using hardwood or wood of large dimensions.

Using high-pressure mode a large percentage of the time may cause components to wear faster or require more frequent preventive maintenance.

Figure 6-2: Choosing Which Mode to Use



Control Mechanisms

Overview

The machine is controlled by a joystick and a panel of pushbuttons, all located on the control station. The control station is shown in Figure 6-3 and a brief description of each is in Table 6-2. The text following the table provides further details of the operating functions.

Figure 6-3: Control Station

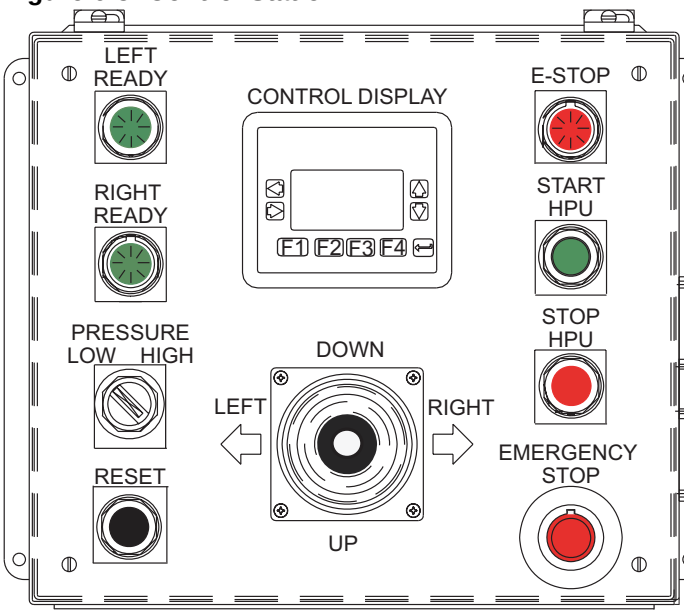


Table 6-2: Control Station Functions

Control Station Label	Type	Function
E-STOP	Indicator light	Indicates that an E-stop is activated and must be released before operation begins
START HPU	Pushbutton and indicator light	Press to start the HPU; green light in the center of the button stays lit while HPU is on
STOP HPU	Pushbutton	Stops the HPU motor which stops the pressing cycle; platen stops in place if HPU stops
EMERGENCY STOP	Mushroom pushbutton	Stops all motion and control power from the fuse disconnect (except heater).
LEFT READY	Indicator light	Indicates that safety devices are functioning on the left side and the press head can operate in that direction
RIGHT READY	Indicator light	Indicates that safety devices are functioning on the right side and the press head can operate in that direction
PRESSURE HIGH-LOW	Selector switch	Selects the pressing mode which affects the amount of pressure placed on the plates
RESET	Pushbutton	Must be pressed to reset the circuit after light bars or bumpers are actuated
Control Display *(not labeled on enclosure)*	Display screen	Communicates faults to the operator
UP-DOWN-LEFT-RIGHT	Joystick with button	UP-DOWN controls platen, LEFT-RIGHT controls the horizontal travel of the press head

Operating the Joystick

The joystick has four (4) standard positions plus a neutral position. It also has a white button on the handle that must be pushed in for the joystick to operate.

The drive system controls the horizontal travel of the press head. A VFD controls the speed of travel. It is possible to operate with variable speeds, but we recommend keeping the default setting that causes it to operate at a single speed. Refer to the *VFD* section in the *Maintenance* chapter for an explanation.

Use the joystick to control the left and right direction of travel of the press, to activate the pressing cycle, and to stop the pressing cycle.

1. Right Travel Position

   Move and hold the joystick to the right to travel the press head to the right. Release the joystick just before the pressing head reaches the desired stopping position as it will coast for a short distance.

   The platen must be in its home position before horizontal travel can begin.

2. Left Travel Position

   Move and hold the joystick to the left to travel the press head to the left. Release the joystick just before the pressing head reaches the desired stopping position as it will coast for a short distance.

   The platen must be in its home position before horizontal travel can begin.

3. Normal Pressing Cycle Position

   Move the joystick to the down position (toward the press head) and release it to start the normal pressing cycle. The platen will move down, press the truss, and return to the up position automatically. The joystick does not have to be held in the down position.

   The press head must be stopped before the platen can be lowered.

4. Up Platen Position

   The up position of the joystick interrupts the automatic pressing cycle and returns the pressing platen to its home position, which is raised to its maximum setting. Move the joystick to the up position (toward the operator) to stop the downward travel of the platen in the event that a connector plate has moved or for safety reasons.

   The press head must be stopped before the platen can be lowered.

Control Display

The control display has three (3) different screens that communicate the status of the machine to the operator.

Main Menu Screen

The Main Menu screen appears when the machine has electrical power. Table 6-3 describes each field or button on the Main Menu.

Figure 6-4: Control Display Showing the Main Menu Screen

Table 6-3: Functions of the Main Menu

Field or Button	Description
Hyd Timer (min)	Tells the operator how many minutes of idle time are left before the hydraulic system will shut itself off
Dwell Timer (sec)	Tells the operator how many seconds the dwell time is set at. Adjust this timer with the top potentiometer on the PLC.
F1—Timer	Affects the beacon/horn; password protected so it can not be changed; DO NOT OVERRIDE
F2—Fault	Displays the Machine Fault screen
F3—Seq	Diagnostic tool for MiTek use only; describes the sequence of events and where in the cycle the machine stopped
F4—Demo	Password protected, for MiTek use only

Machine Faults Screen

Access the Machine Faults screen by pressing the F2 button from the Main Menu. While looking at the Machine Faults screen, press the right arrow key to access the Operation Faults screen. Press the left arrow key to return to the Main Menu.

The faults on the Machine Faults screen are described in this section.

Figure 6-5: Control Display Showing the Machine Faults Screen

Operating Within the Required Temperature Range

The hydraulic fluid must be at a temperature between 68°F and 120°F for the hydraulic system to operate properly. Operating the hydraulic system outside of that temperature range may cause costly damage to the machine. To avoid this possibility, the hydraulic system will not run unless the oil is the proper temperature. A thermometer on the fill gauge provides an approximate temperature of the oil inside the reservoir. The gauge is located on the operator end of the reservoir behind the clear lexan guard on the end frame.

The heater will run as needed when the disconnect switch is in the ON position, even with an E-stop activated. It is **not** recommended that the disconnect switch normally stay on when the machine is not in use, but if the hydraulic fluid is below or above the required temperature:

1. Turn the disconnect switch on
2. Verify that the E-stop button is pushed in
3. Wait until the message on the Machine Faults screen on the control display reads *Oil Temp OK*. This message appears when the oil temperature is at 88°F
4. Begin operating the press.

The cooler will come on and go off automatically when the disconnect switch is in the ON position and no E-stops are activated because the cooler is only needed while the machine is running. The cooler comes on when the temperature is above 120°F and stays on until the temperature reaches 100°F.

Table 6-4: Working With the Temperature Regulation System

Operator's Action	Reaction of Oil/Heater/Cooler	Indicator
Turn off disconnect switch when machine is not in use	Temperature falls outside the 68°F-120°F range	—
Turn disconnect switch on	Heater will automatically come on if the hydraulic fluid is below 68°F	Machine Faults screen on the control display shows *Oil Temp Lo*
Wait	Oil temperature in the reservoir raises until it reached 88°F	Machine Faults screen on the control display shows *Oil Temp OK*
Begin operating the machine as normal	The heater or cooler will automatically start or stop while the machine is operating any time the temperature is outside the 68°F-120°F range	—

**The hydraulic system will not shut down while the press is operating if the temperature goes outside of the range. It will only prevent the startup of the hydraulic system.*

Operating With Low Oil Level

When the oil level reaches a dangerously low level in the hydraulic fluid reservoir, the hydraulic system will automatically shut down. See the *Maintenance* chapter for more details.

The Machine Faults screen on the control display shows *Oil Level OK* when the oil level is acceptable. When the hydraulic system shuts down due to low oil, the Machine Faults screen automatically displays on the control display and the message changes to a *Oil Level Low.*

Verifying the Press Platen is at Its Home Position

The press platen must be completely raised, which is its *home* position, before the press head can travel left or right The message on the control display's Machine Faults screen will change from *Press Home* to *Press Not Home* when the operator pushes the joystick toward the press head. A normal cycle automatically raises the platen to *home* after the plates are pressed, and the message returns to *Press Home*. If a cycle is stopped before its completion, pull the joystick toward the operator to raise the platen back to *home*.

VFD

The VFD (variable frequency drive) is inside the main electrical enclosure. If it experiences a fault, the Machine Faults screen will appear on the control display with the message *VFD Fault.* If this happens:

1. Open the main electrical enclosure.
2. Read the fault number on the LED display on the VFD.
3. Refer to the *Troubleshooting* appendix to remedy the fault.

Resetting the Motor Starter/Overload

In the event that the drive system brake motor has been overloaded, the protective overload device on the overload/motor starter will trip. To reset the motor starter:

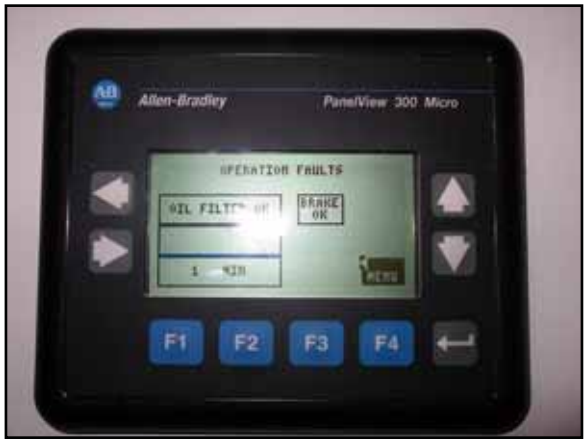
1. Open the main electrical enclosure.
2. Press the blue reset button on the front of the motor starter.
3. If the machine will still not restart, have a licensed electrician locate the problem and repair it.

Operation Faults Screen

Access the Operation Faults screen by pressing the right arrow key from the Machine Faults screen. While looking at the Operation Faults screen, you can return to the Main Menu by pressing the left arrow key.

The faults on the Machine Faults screen are described in this section.

Figure 6-6: Control Display Showing the Operation Faults Screen



Automatic Filter Management System

The automatic filter management system prevents the hydraulic motor from operating with a dirty filter. The control display indicates that the filter must be changed by automatically showing the screen that usually says *Oil Filter OK*. When this happens, the text turns to *Oil Filter Dirty* and indicates how many working minutes before the hydraulic system is rendered inoperable.

The timer starts at eight (8) hours or 480 minutes when the *Oil Filter Dirty* message appears. It keeps track of the amount of time the hydraulic system motor is running. After 480 minutes of running time, the hydraulic system will not start up again after being shut down. The operator can manually run the hydraulic system by holding the HPU ON button, but it will shut off when the button is released. Refer to *the Automatic Filter Management System section* in the *Maintenance* chapter for more details.

Brake Fault

A brake fault occurs when the brake does not release within three (3) seconds from when the PLC tells the drive system to move left or right. This type of fault is not monitored by the brake monitor. If the brake is releasing properly, this message reads *Brake OK*. If the brake fails to release, this screen appears and the message on the right reads *Brake Fault*.

Operating Procedure

Procedure Under Normal Conditions

1. Turn the disconnect handle to the ON (vertical) position.
2. Set up the truss configuration and jigging.
    a) Refer to your tables manual for information on jigging.
    b) With the truss components held securely in place, position the connector plates over and under the joints in the correct orientation, as indicated on the engineered truss drawings.
3. Verify the following:
    a) An E-STOP light is not lit.
    b) The DRIVE FAULT indicator light is not lit.
    c) The brake monitor alarm indicator light is not actuated.
    d) The LEFT READY and RIGHT READY lights are lit.
    e) Light bar detection zones and bumper zones are clear and in normal operating condition.
    f) All personnel are clear of the restricted zone.
4. Set the PRESSURE selector switch to LOW or HIGH.
5. Press the START HPU button.

	WARNING
	**CRUSH HAZARD.** **Ensure aisles and tables are clear of personnel before operating gantry head.**

6. While holding the white button on the tip of the joystick handle, push and hold the joystick in the direction the press head should move.
7. Release the white button or allow the joystick to return to neutral position to stop movement.
8. When the platen is centered over the area to be pressed, hold the white button on the tip of the joystick handle and push the joystick down (toward the operator).

9. When the platen starts moving down, release the joystick and the platen will complete its pressing cycle.

10. After the platen return to its home (raised) position, move the press head to the next area to be pressed and repeat step 6 through step 9.

11. When all plates have been pressed, move the press head away from the completed trusses by pressing the joystick to the right or left.

12. Remove the trusses from the tables.

Refer to the procedure in your table manual for pneumatics operation.

13. To begin another truss setup immediately, follow this procedure again, starting with step 2.

14. If the press will be sitting idle for a period of time,:

    a) Park the press head on an *AutoPress 14TL* system parking stand.

    b) Actuate an E-stop.

    c) Turn the disconnect handle on the main electrical enclosure to the OFF position.

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

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

Restart Procedure

If the machine stopped because the operator released the joystick, both the RIGHT READY and LEFT READY indicator lights should remain lit. The press head can continue motion in either direction by pressing and holding the joystick again.

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

	DANGER
	**Never reset the system to continue moving the gantry head until you know what caused this safety feature to activate and the hindrance is corrected. Ensure all personnel are clear before continuing movement!**

1. Remove the barrier that was detected by the light beam or bumper. If you need to move the gantry head in the opposite direction to do so:

    a) Press and hold the joystick button and the joystick to move the gantry head away from the barrier.

    b) Release the joystick and the gantry head will stop abruptly. The deceleration stop feature is suspended until the system is reset by pressing the START button.

2. Press and release the RESET button to restart all safety monitoring devices.

3. Press and hold the joystick and joystick button to resume operation.

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

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

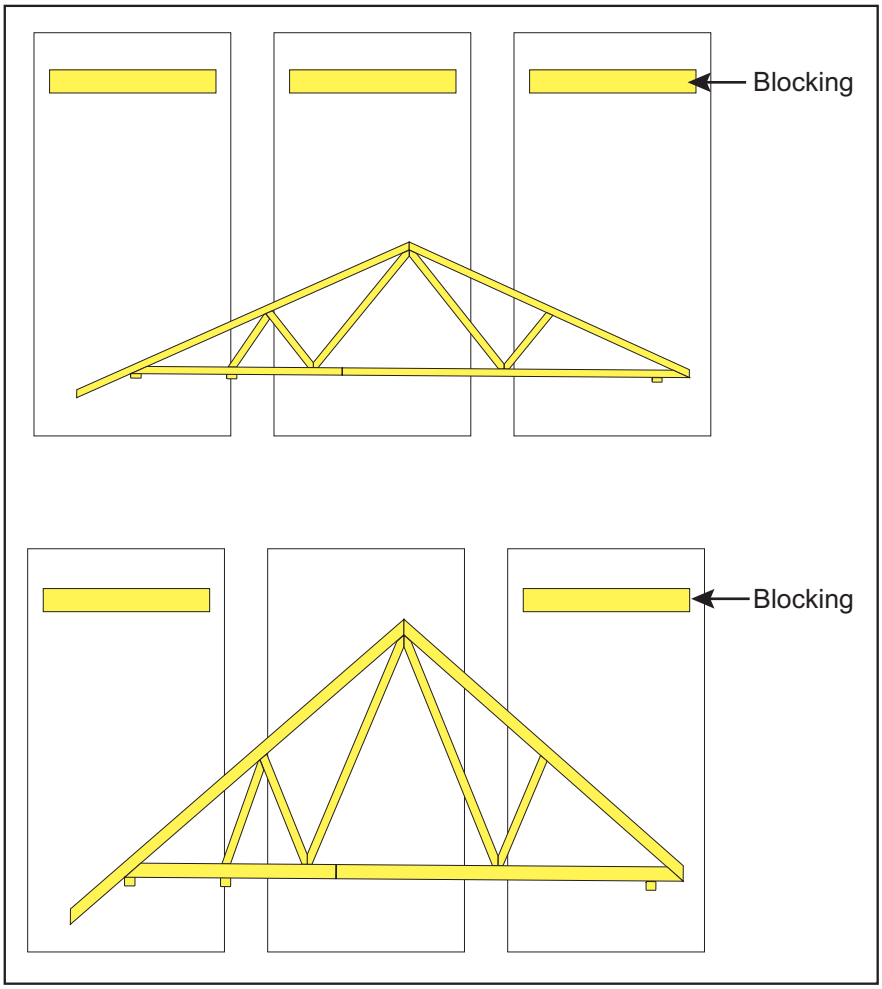
Setting Up for Operation

To set up each truss configuration, blocking and jigging must be used.

Using Blocking

The platen requires a somewhat even distribution of pressure across its surface. Use wood blocks that are the same thickness as the truss and position them as shown in Figure 6-7.

Figure 6-7: Where to Place Blocking on Tables



Using Jigging

Refer to your tables manual for information on using jigging.

Brake Monitor

The brake monitor informs the operator when the brake is getting worn and needs to be replaced. It is located on the motor end of the gantry head. When operating the machine, the key should be in RUN (vertical) position.

After completing a stop, the stopping time is displayed in the LED display area. It is shown in seconds and milliseconds, up to a maximum of 9.99 seconds.

Two (2) time parameters were programmed into the brake monitor during manufacturing.

1. *Warning time:* Warns the operator that the brake is becoming worn and a replacement should be purchased immediately.

2. *Alarm time:* Indicates that the stopping time is at a dangerous level. The machine will shut down at the first indication that stopping time has exceeded the set alarm time.

Figure 6-8: Brake Monitor and Brake Monitor Enclosure

The brake monitor's alarm LED will light up when the braking time exceeds a safe level (the programmed alarm time), and the brake should be changed immediately. To temporarily turn the alarm off and continue operation, reset the key. The alarm will continue to light up every time the gantry head brakes to a stop until the brake is changed. To reset the key, turn it to RESET/SETUP position, and then turn it back to the RUN position. The key lock is located on the right side of the brake monitor, inside the enclosure.

Table 6-5 describes the brake monitor's indicator lights and operation. For information on specific errors or fail codes, refer to the *Troubleshooting* appendix.

Table 6-5: Brake Monitor Operation

Indicator or Button	Function
Chain Break	Indicates that the brake is released but the motor shaft is not turning. The motion detector communicates an error to the brake monitor. It is NOT an indication that a chain is broken.
Warning	Indicates that stopping time has exceeded the pre-set warning time. A light is located on the brake monitor itself and on the outside of its enclosure.
Self Check	When on continuously, indicates an internal failure within the brake monitor has occurred; will blink briefly during each press cycle to indicate the beginning of a stop time measurement.
Stop Time	Indicates that the stopping time is being shown on the display.
Reserve	Indicates that the reserve time (time remaining before a stop alarm will occur) is being shown on the LED display.
1	Press key 1 during normal operation to display stop time.
2	Press key 2 during normal operation to display the remaining reserve time.
Set 3	Not applicable; used for settings that were set at the factory.
Stop Alarm (round LED in right corner)	Indicates that stopping time exceeded the pre-set alarm time; brake monitor must be reset before operation can continue.
Fault Code Appears on LED Display	Refer to the *Brake Monitor Failcodes* in the *Troubleshooting* appendix.

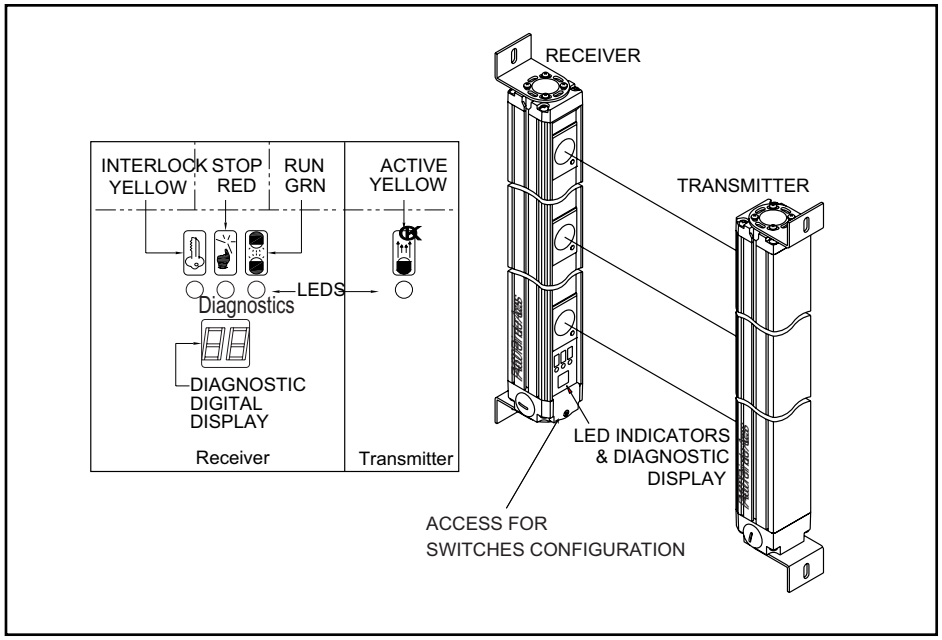
	WARNING
	**Do not change the chain break delay time, warning time, or alarm time. Do not attempt to disable any warning device or to lower the sound level of the horn.** **Modifying these settings will inhibit the safety devices in place and may result in serious personal injury and damage to the machine.**

Perimeter Access Guarding (Light Bars)

	WARNING
	CUT AND CRUSH HAZARD. **Keep hands and fingers away. The light bars are for detection of personnel and equipment entering a restricted area. They will not detect smaller objects such as hands and fingers.** **Tampering with or modifying the light bars or safety bumpers can result in property damage, serious injury, or death.**

Perimeter access guarding is a presence-sensing device designed to guard personnel working around moving machinery. The *AutoPress 14 TL* machine uses a three-beam light bar set on both sides of the gantry head. A light bar set consists of a receiver bar and a transmitter bar, as shown in Figure 6-9.

Figure 6-9: Light Bar System Components and Indicators



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

Bumpers

A bumper located on each corner of the press head and both ends of the operator platform to provide additional safety control. When a bumper collapses, it passes in front of the light bar and causes the machine to stop its motion in the direction associated with the collapsed bumper. The rotation of the Roller also stops at this time.

	WARNING
	**CUT AND CRUSH HAZARD.** **Tampering with or modifying the light bars or safety bumpers can result in property damage, serious injury, or death.**

Chapter 7

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

This manual contains sufficient information for proper operation and maintenance under most conditions. Certain operating environments may necessitate preventive maintenance at more frequent intervals. Because consistent preventive maintenance is so important for keeping mechanical equipment in good operating condition, MiTek recommends that you stock certain replacement parts to minimize downtime. The following appendices will assist you in maintaining and repairing your equipment:

- Troubleshooting
- Parts List
- Maintenance Checklists
- Drawing Set

Refer to Figure 7-1 on page 54 for an overview of component locations that may require maintenance during the life of your equipment.

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

Performing Maintenance Safely

Read the safety pages in the preliminary pages and adhere to all rules and guidelines. This section provides additional safety information specific to maintenance topics.

Before Operating This Equipment

Adhere to these warnings before operating this equipment:

	WARNING
	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 economic loss, property damage, and/or personal injury.** **This manual must always be available to personnel operating and maintaining this equipment.**

Lockout/Tagout

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.

	WARNING
	ELECTROCUTION AND HIGH PRESSURE HAZARDS. **Always turn the power off by activating an E-stop when the equipment is not in operation.** **Always verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures (OSHA 29 CFR 1910.147) before performing any maintenance on this equipment.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.** **Turn off the air switch or shutoff valve if appropriate.** **Bleed pneumatic lines if appropriate.**

Making Adjustments

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

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

Replacing Parts

Special materials have been used for some of the components of this equipment. It is critical to the future performance of this machine that only specified replacement parts are used. Order all replacement parts through MiTek. Do not substitute parts without first consulting MiTek to determine if it is safe and effective. No electrical system component, cable, connector, or device should be modified, removed, disconnected, changed without specific approval and guidance from MiTek.

Wearing Personal Protective Equipment

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

Conducting Safety Tests

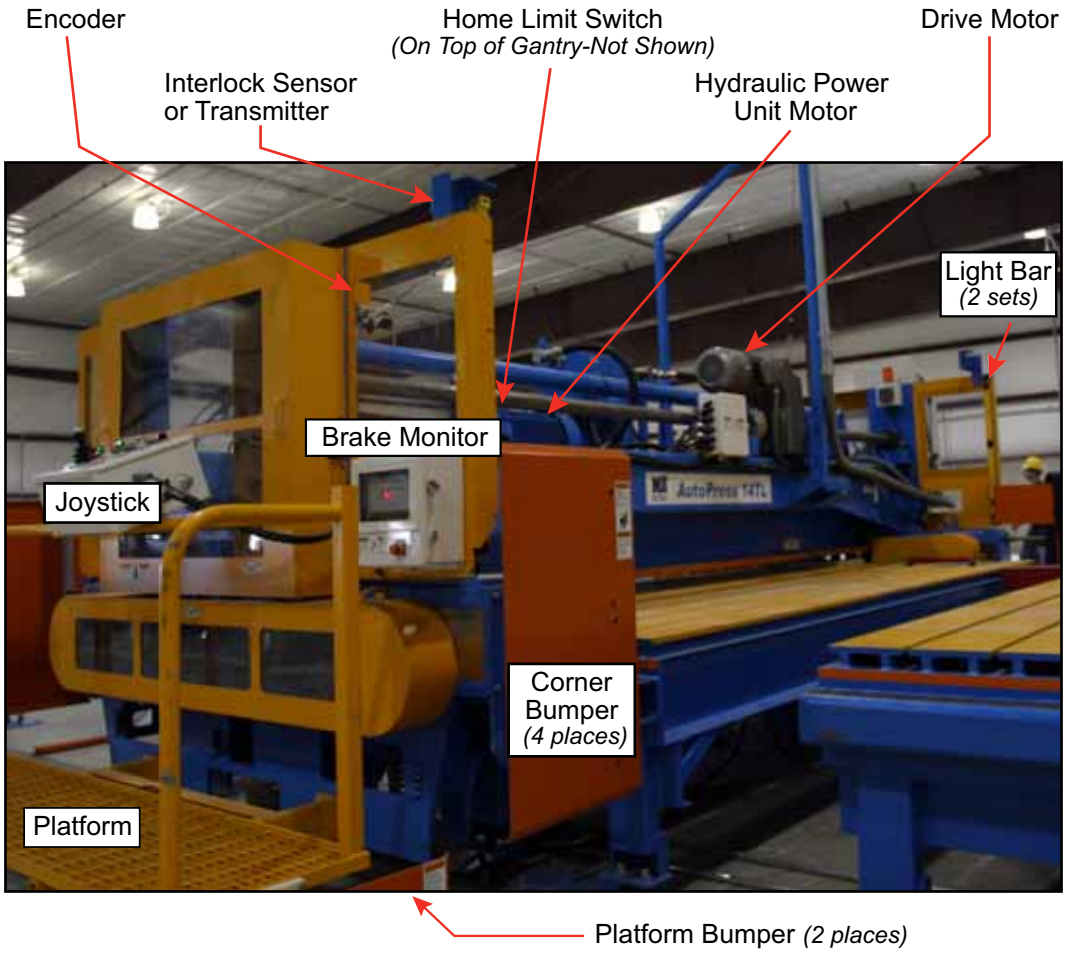
Ensure safety devices are always operating properly.

	WARNING
	**ELECTROCUTION AND HIGH PRESSURE HAZARDS.** **Perform the safety tests described in the *Safety Test* section on page xvii before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.**

Overview Graphics

Figure 7-1 provides an important overview of the equipment to help you better understand the procedures in the *Maintenance* chapter.

Figure 7-1: Components Discussed in the *Maintenance* Chapter



Lubrication

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

CAUTION
Never mix synthetic lubricants with mineral lubricants!

Lubricating With Grease

All bearing grease should be NLGI EP#2 lithium grease. Chain lubricant should be a high-grade, non-detergent, petroleum-base oil. SAE 30 grade is recommended. Refer to the section on a specific component for amount and frequency of greasing.

Refer to Table 7-1 and Figure 7-2 to locate each grease block. Refer to Table 7-2 to locate individual grease fittings. Refer to Table 7-3 to locate chains that require grease.

Table 7-1: Lubrication Accomplished Through Grease Blocks

Grease Block	Port Number	Component	Location
LB1	1-4	Drive bearings	Operator end, 2 wheels
LB2	1-4	Guide wheels	Operator end
LB3	1-4	Drive bearings	Operator end, 2 wheels
LB4	1-4	Drive bearings	Enclosure end, 2 wheels
LB5	1-4	Guide wheels	Enclosure end
LB6	1-4	Drive bearings	Enclosure end, 2 wheels
LB7	1	Press head pivot	Operator end
LB7	2-4	Bell crank pivots	Operator end
LB8	1-2	Bell crank pivots	Operator end
LB8	3-4	Press head pivot	Operator end
LB9	1-2	Cylinder pivots	Enclosure end
LB9	3-5	Bell crank pivots	Enclosure end
LB10	1-2	Bell crank pivots	Enclosure end
LB10	3-5	Press head pivots	Enclosure end

Figure 7-2: Grease Points

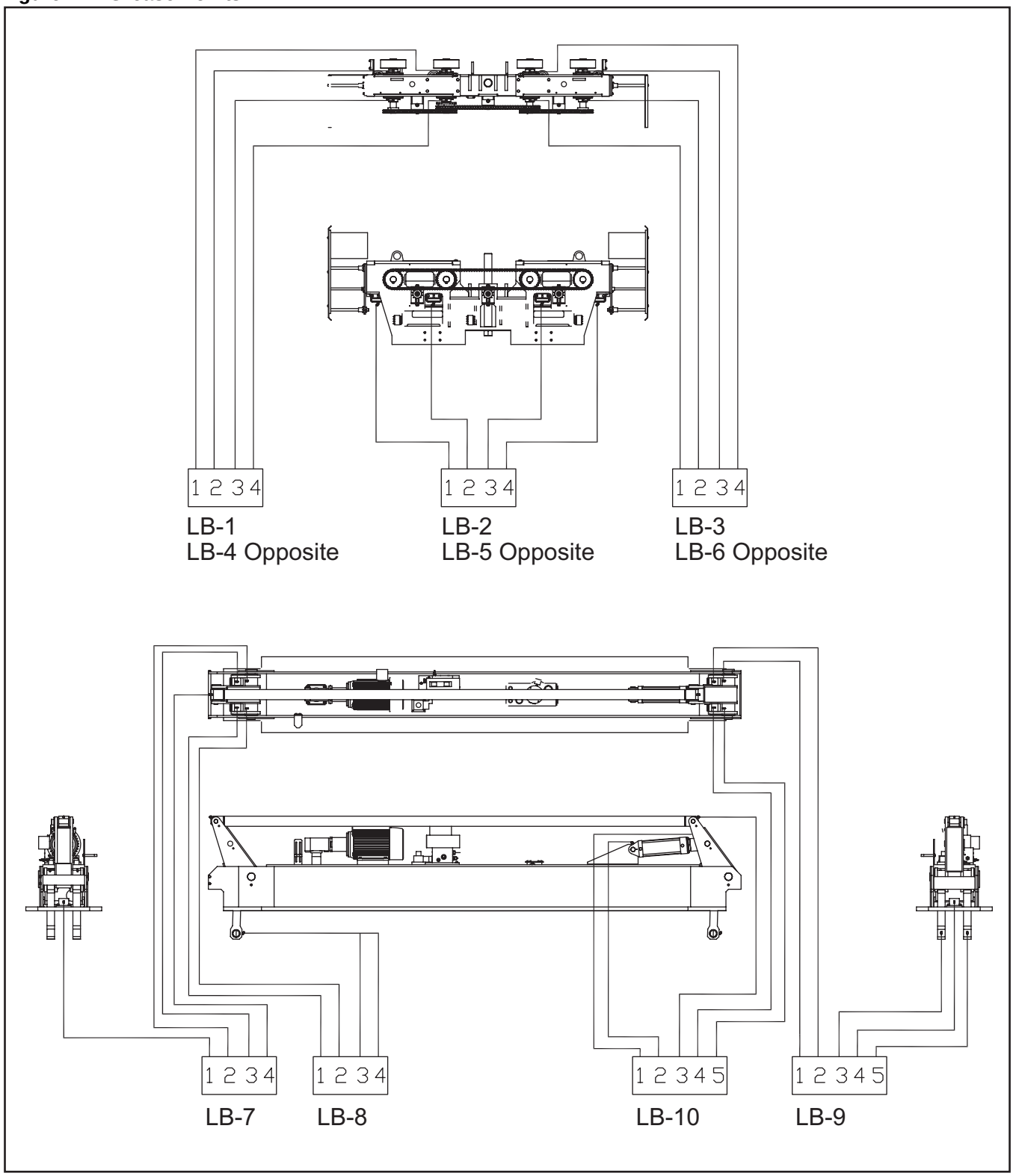


Table 7-2: Lubrication Points That Utilize Individual Fittings

Quantity	Component	Location
4	Pillow block bearings	On drive shaft
2	Chain couplings	On drive shaft
1	Pump	On hydraulic system pump
2	Hydraulic swivels	Near cooler

Table 7-3: Chains to Lubricate

Component	Quantity and Location
Motor drive chains	1 on each end frame
Drive wheel chains	3 on each end frame

Lubricating With Oil

Motor oil for the drive system brake motor and gear reducer must be an ISO VG220 mineral-based oil. The motor was filled with Shell Omala 220 before installation. Table 7-4 shows equivalent motor oils that can be used. Refer to the section on a specific component for the frequency of oil changes and capacity of the reservoir.

Table 7-4: Recommended Motor Oil

ISO		VG220
Base Component		mineral-based
Reservoir Capacity		17.4 quarts
Brand and Type	Shell Oil Company	Omala 220
	Mobile Oil Company	Mobilegear 630
	Castrol	5EP
	BP	Energol GR-XP 220
	Tribol	Tribol 1100/100
	Kluber Lubrication	Kluberoil GEM 1-220

Hydraulic System

	CAUTION
	**HIGH PRESSURE HAZARD.** **Bleed all pressure from the lines before performing any maintenance on the hydraulic components.**

The hydraulic system is comprised of all the typical components of an HPU, but rather than combined into one HPU, each component is installed individually. Technically, there is not an HPU on this machine, but for convenience when communicating, the operating controls refer to the hydraulic system collectively as an HPU.

Most problems with hydraulic equipment are due to a lack of preventative maintenance. Follow all guidelines in this manual carefully to avoid unnecessary downtime.

Hydraulic Fluid Specifications

In hydraulic systems, oil is a vital factor in equipment performance and maintenance. It both lubricates and transfers power. Customer shall have 100 gallons of appropriate hydraulic fluid on hand for initial charge. Oil used in the *AutoPress 14TL* machine's hydraulic power unit must conform to the specifications listed in Table 3-3 on page 15.

CAUTION
Never mix synthetic lubricants with mineral lubricants! **Hydraulic fluid must remain above 68°F to operate the HPU. Operating the hydraulic system with the oil temperature below 68°F may cause serious damage to the hydraulic components.** **The HPU's heating system ensures these requirements are met. Never attempt to override the heating and cooling system.**

Hydraulic fluid

Funnel

Clean rags

Oil pump

Maintaining an Adequate Level of Hydraulic Fluid

Checking the Hydraulic Fluid

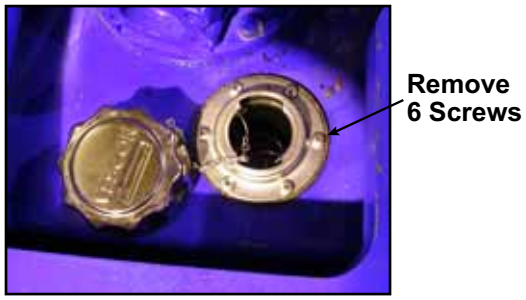
Check the level of the hydraulic fluid every week by viewing the sight gauge on the operator end of the reservoir. It can be easily seen behind the Plexiglas end guard. The amount of fluid in the reservoir should never drop below 90 gallons in order to maintain adequate hydraulic pressure.

Adding Hydraulic Fluid

To fill the reservoir:

1. Unscrew the reservoir cap and move it out of the way.
2. Remove the collar and screen underneath the cap by unscrewing the screws around the collar.

Figure 7-3: Adding Oil



3. Pump a recommended oil into the reservoir until the oil is within two (2) in. from the top of the reservoir.
4. Replace the collar, screen, and cap immediately to prevent debris from falling into the reservoir.

Low Oil Fault

A float switch detects when the hydraulic fluid is nearing a dangerously low level in the reservoir. Once detected, an Oil Low message with flash on the screen on the control station. Once the hydraulic system has been shut down after this message is displayed, the hydraulic system will not start again until hydraulic fluid has been added.

Replacing the Hydraulic Fluid

100 gallons of hydraulic fluid

Oil drum to hold used fluid

Non-flammable solvent

Oil pump

Socket set

Screwdriver set

Drain pan

Clean rags

Overview

The life-cycle of the fluid will vary based on type of oil, ambient conditions, duty cycle of the machine, wear of hydraulic components, and frequency of filter replacements. Always follow the recommendations of the fluid manufacturer.

New hydraulic fluid is not always filtered and may wear out the return line filters quickly. Ensure that you have two (2) filters in stock before replacing the hydraulic fluid.

The reservoir has a drain plug to drain the fluid through. You must have 100 gallons of new fluid on-hand to refill the reservoir and lines.

- It is best to change hydraulic fluid when the system is at operating temperature. This will drain off as much of the impurities in suspension as possible.
- After oil is drained completely, replace and secure the drain plug and fill the reservoir with recommended fluid to the high-level mark.
- To eliminate the possibility of spillage, it is recommended that a suction pump be used to remove the fluid from the reservoir. Some suppliers offer this service.
- Always replace the return line filter when changing the fluid, and shortly thereafter.

Replacing the Hydraulic Fluid

1. Check the fluid temperature on the oil level temperature gauge. Allow the oil to cool down to less than 100°F.
2. Place the fluid pump suction hose into the filler/breather hole until it touches the bottom of the tank.
3. Pump the old fluid into the empty oil drum(s).
4. Replace the filter element.

ENVIRONMENTAL
Dispose of oil in accordance with applicable federal, state, provincial or local regulations.

5. Refill with approved hydraulic fluid.
6. Replace the filler/breather screen and mounting flange.
7. Prime the pump per the instructions in the *Startup* chapter.
8. Dispose of used oil and rags in a safe, approved manner.

Replacing the Hydraulic System Return Line Filter Element

There is one (1) return line filter for the hydraulic system. Always keep a filter element in stock because the filter management system allows only 8 working hours between the warning and preventing the hydraulic system from operating.

Automatic Filter Management System

The hydraulic system is designed to prevent the system from starting when the return line filter is dirty or clogged.

A hydraulic filter pressure switch is located inside the filter housing. It measures the pressure at that point in the system and communicates with the PLC when the pressure indicates that the filter is dirty or clogged. When the PLC learns that the filter is at an unsafe level of contamination, a message appears on the control display and a timer will begin timing the working hours that the hydraulic system motor is running. It counts down from 8 hours. When the timer reaches 0, the system will continue operating as normal until the operator shuts it down. Once it has been shut down after that 8-hour time period expires, the hydraulic system will not start up again until the filter element is replaced.

This system is in place to protect your equipment from damage due to dirty or inaccessible hydraulic fluid. Always keep filter elements in stock to avoid costly down-time.

Filter element

1/2" socket

Drain pan

Clean rags

How to Replace the Filter Element

1. Check the oil temperature on the oil level/temperature gauge. Allow the oil to cool down to less than 100°F.
2. Remove the four (4) hex head cap screws from the filter housing cap using a 1-in. socket.
3. Remove the cap.
4. Pull the filter element out of the canister and place it in a drain pan.
5. Place the new filter element into the canister, being careful not to splash oil.
6. Replace the four (4) hex head cap screws to secure the housing cap back onto the canister.
7. Allow the pump to run for a few minutes, then check for any oil leaks.
8. Check oil level and replenish if necessary.

ENVIRONMENTAL
Never re-use oil. Dispose of used oil, filter element, and rags in a safe, approved manner.

Maintaining the Temperature Controlling System

The temperature of the hydraulic fluid (hydraulic oil) must remain between the values shown in Table 3-3 on page 15. A heater and cooler work together to keep the temperature within range while the disconnect fuses are receiving electrical power, which means the disconnect handle must be in the ON position.

See the *Operation* chapter for more information on how to operate the temperature controlling system.

Components of the Temperature Controlling System

An electronically-controlled thermostat tells the heating and cooling system when the hydraulic fluid temperature is outside of the required range (68°F -120°F). The heater or cooler will automatically activate to bring the temperature back into range.

The heater is located inside the hydraulic fluid reservoir near the operator end. Wires run from the reservoir into a small white junction box, across the press head, and into the main electrical enclosure. They terminate at the relay for the heater and cooler. When the heater or cooler is on, an LED indicator on the applicable relay illuminates.

The cooler is located on top of the press head. Hydraulic fluid is routed through the cooler on the way back to the reservoir so the heat generated during the cycle will not cause the temperature in the reservoir to spike.

View the thermometer on the operator-end of the reservoir to see the temperature inside the reservoir.

Replacing and Cleaning the Filter on the Cooler

CAUTION
Remove the cooler filter before attempting to clean it. Never blow compressed air or water into the cooler system.

The cooler has a filter covering one side. Inspect and clean the filter daily. To clean the filter, remove it from the cooler and either blow it out with compressed air or spray it with a water hose.

Inspecting Hydraulic Hoses and Fittings

Inspect the hoses and fittings every six (6) months.

Hydraulic fluid leaks are most often due to loosened hydraulic fittings, damaged seals in components, or damaged hoses. If oil appears in excess anywhere on the *AutoPress 14 TL* machine, find the source and have a qualified hydraulics person correct it immediately. Clean up any oil on the *AutoPress 14 TL* machine or on the floor, as it is a safety hazard.

Heat causes hoses to deteriorate. Replace any hose which exhibits a lack of flexibility, or has cracks in the outer casing.

	WARNING
	**Never operate the machine with damaged hoses. Severe personal injury may result.** **Use only hoses with the correct pressure rating.**

Hydraulic Components

Refer to Figure 7-5 to locate each hydraulic component.

Hydraulic System Motor

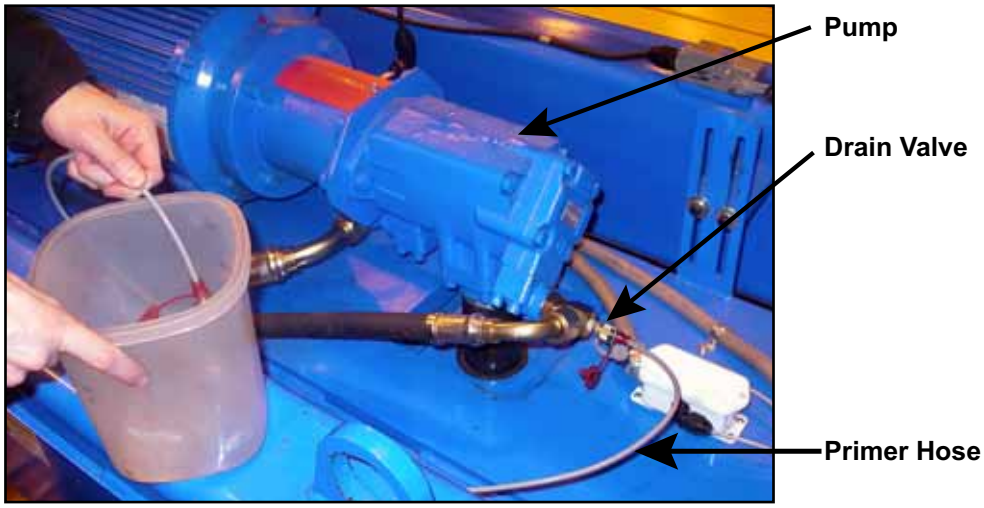
The motor operating the hydraulic system is a 20-hp type FUT motor. It has the capacity of 1800 rpm and has a 256TC frame.

Grease the shaft bearings every three (3) months using the grease fitting on the motor.

Pump

The pump may need to be primed after completely replacing the hydraulic fluid and upon installation of the equipment. To prime the pump, follow this procedure.

Figure 7-4: Priming the Pump



The hydraulic system pump must be primed when first starting up and after draining the reservoir for any reason.

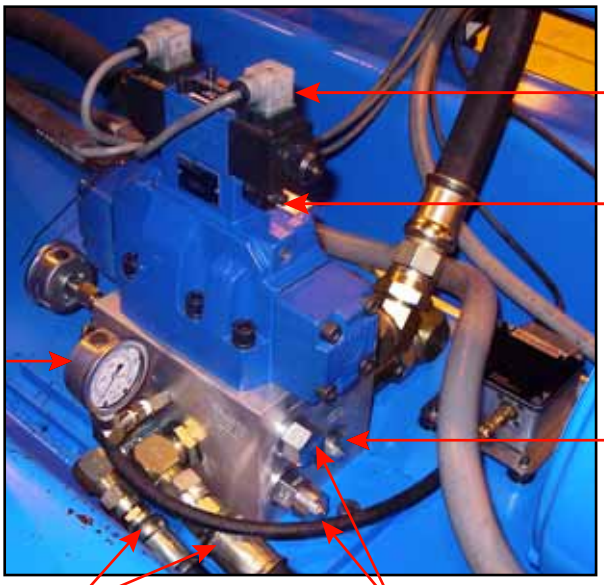
1. Locate the primer hose. It should be looped around the air bleed valve on the end of the pump. See Figure 7-4.
2. Screw either end of the hose onto the air bleed valve.
3. Hold the opposite end of the primer hose in a small bucket to catch hydraulic fluid.
4. Press the START HPU button.
5. Hold the primer hose in the bucket until all air is pushed out of the system.

   When the air is released, the following will occur:

   - A small amount of hydraulic fluid will begin to leak out of the hose.
   - The noise generated by the pump will change to a louder decibel which should be the sound during normal operation.
6. Once the air is released, unscrew the primer hose from the air bleed valve. The valve seals itself, so no oil should leak out from the air bleed valve.
7. Drain any residual oil out of the primer hose and place the primer hose in a safe place for future use. It will be needed the next time the hydraulic fluid is drained for preventive maintenance purposes.

Figure 7-5: Hydraulic Components and Gauges

Operator End and Left-Hand Side



Solenoid (Both Sides)

Pilot Choke (Both Sides)

Gauge for Unloading Valve

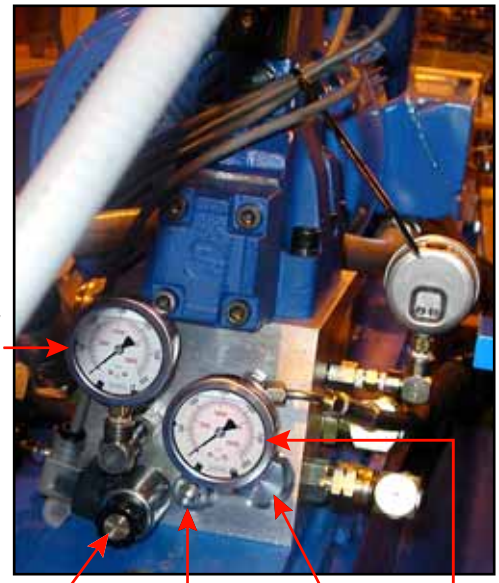
Pressure Switch

Counterbalance Valve

Lines In

Unloading Valve (Combined counterbalance valve and check valve)

Enclosure End



Gauge for Counterbalance Valve

Isolation Valve

Relief Valve for High-Pressure Mode

Gauge for Operating Pressure

Check Valve

Right-Hand Side

Line Out to Cooler

Line Out to Cylinder

Line Out to Cylinder

Relief Valve for Low-Pressure Mode

Hydraulic Valves and Switches

Unloading Valve

The unloading valve is a combination of a counterbalance valve and a check valve. It unloads the flow from the high-flow pump. It is set at approximately 500 psi.

Counterbalance Valve

The counterbalance valve holds the cylinder in place when the hydraulic system shuts off. The platen does not move when the hydraulic system shuts off or turns on. It is set at approximately 1300 psi.

Isolation Valve

The isolation valve allows the press to switch to high-pressure mode on the fly. A solenoid is connected to the isolation valve to control this feature.

Minimum Pressure Check Valve

The minimum pressure check valve controls the acceptable minimum amount of pressure for the system to experience. The valves switch back to their resting position at this pressure. It is set to approximately 75 psi.

Relief Valves

There is one relief valve for the high-pressure mode and a second relief valve for the low-pressure mode.

- High-pressure relief valve is set at approximately 2100 psi
- Low-pressure relief valve is set at approximately 1600 psi

Pressure Switches

There are two (2) pressure switches located in the same box. One switch controls the low-pressure pressing mode and the other switch controls the high-pressure pressing mode. This is the operating mode pressure switch and is shown in Figure 7-6.

Figure 7-6: Operating Mode Pressure Switch

Both adjustment screws are located on the left-hand side of the box, facing it from the operator end.

- High-pressure switch is set at approximately 2000 psi
- Low-pressure switch is set at approximately 1500 psi

A third pressure switch, called the hydraulic filter pressure switch, is inside the return line filter housing to tell the PLC when the filter is dirty or clogged. Refer to the *Automatic Filter Management System* section for details on this pressure switch.

Table 7-5: Operating Pressure for Each Mode

Mode	Approximate Operating Pressure	Approximate Force Exerted on Plates
Low Pressure	1500 psi	40 tons
High Pressure	2000 psi	50 tons

Solenoids

Solenoid switches are used to control the hydraulic valves. Two (2) solenoids are located on top of the valve stack. One is for the up stroke of the platen and the other controls the down stroke of the platen. A light illuminates on the right-hand side of the solenoid when it is in use.

A third solenoid is located on the isolation valve. It is required for the press to operate in high-pressure mode.

Drive System Brake Motor

A 10-hp hollow-shaft brake motor and gearbox allow the press head to move horizontally across the tables. A brake monitor ensures the brake is working properly and is discussed later in this chapter.Certain preventive maintenance is required to keep the motor and gearbox in optimal working order.

Cleaning Electric Motor Vents and Fins

Using compressed air, blow off any sawdust which has accumulated on the electric motor vents and fins. This type of preventive maintenance is recommended weekly.

Wear appropriate protective equipment such as safety glasses; face or dust mask; and hearing protection.

Manual Brake Lever

Release the manual brake lever if you need to manually push the press head to a different location along the tables.

Adding and Changing Oil

Check the oil in the gearbox reducer quarterly. When additional oil is needed, use one of the oils recommended in Table 7-4 on page 57 or a comparable type.

Drain and refill the oil in the gearbox at least once every 2 years.

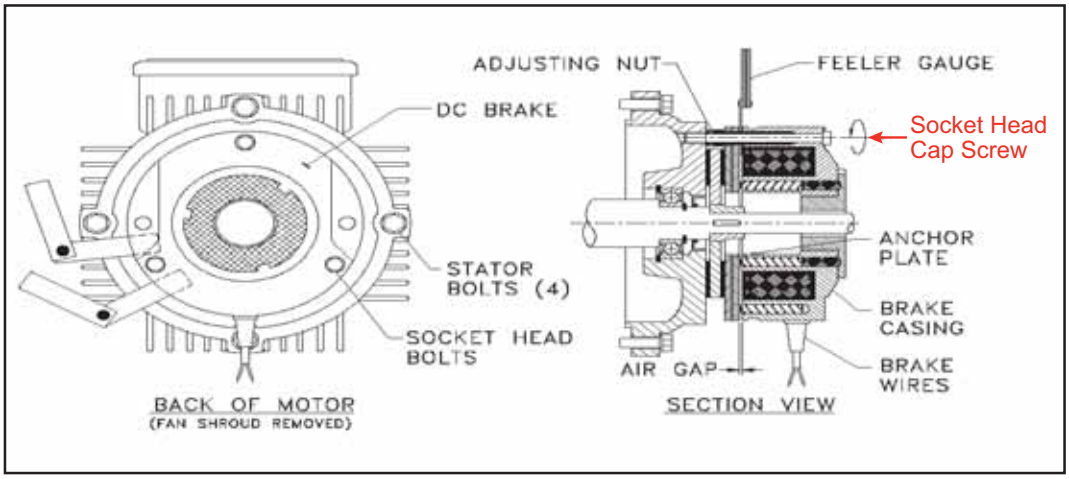
Adjusting the Air Gap

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

If the brake monitor continually trips and other causes have been ruled out, the air gap in the brake motor may need to be adjusted. The recommended air gap allowance is between .012 in. and .039 in. To check the current air gap and to adjust it, refer to Figure 7-7 and the following procedure.

1. Unscrew the manual brake handle extending from the side of the brake motor.
2. Remove the four (4) screws around the circumference of the brake motor and remove the dust cover.
3. Remove the fan blade by prying open the snap ring at its hub.
4. Loosen the socket head cap screw that attaches the brake to the motor end bell. It is labeled in red in Figure 7-7.

Figure 7-7: Brake Disk Air Gap



5. Using a feeler gauge, measure the gap around the socket head cap screws, at the location shown in Figure 7-7.
6. If the measurement is outside the allowance recommended above, turn the adjusting nut using a 1/4 or 1/2 turn of the nut.
7. Check the air gap to ensure it is now within the recommended range.
8. Re-attach the fan blades, dust cover, and handle.

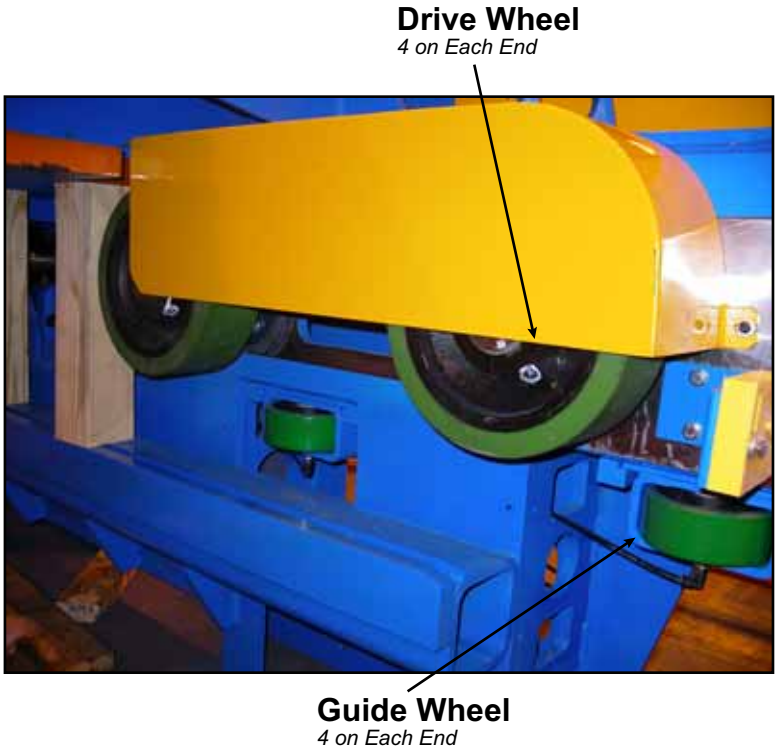
Wheels

Understanding the Wheels

There are a total of 16 wheels in the *AutoPress 14TL* drive system.

- Guide wheels are necessary to keep the gantry head on a straight path when it experiences a force that is not parallel to its forward motion. There are eight (8) guide wheels total, four (4) on each end.
- Drive wheels allow the press head to travel left and right. There are eight (8) drive wheels total, four (4) on each end.

Figure 7-8: Wheels on the Press Head

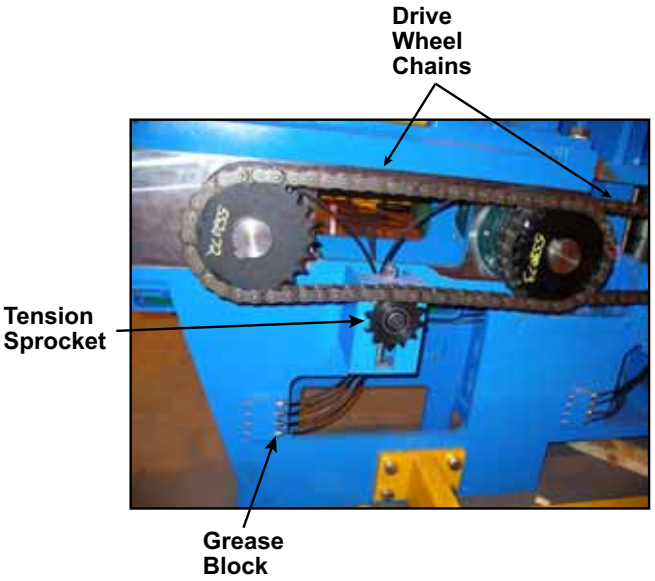


Lubricating the Wheels

Refer to Figure 7-2 to see all seven (7) grease blocks and which components they lubricate. One of the grease blocks are labeled in Figure 7-9. Apply grease to the ports affecting the guide wheels and drive wheels every 300 working hours, according to the hour-meter.

Use a #2 lithium-based grease.

Figure 7-9: End Frame



Wipers

A wiper is located on the outer side of the first and last drive wheel on each side to wipe debris off of the tube that the drive wheels ride on. The wipers must make even contact with the tube in order to push away small debris such as nails and wood chips. When the wipers become worn and fail to make even contact with the tube, replace them immediately.

Figure 7-10: Wiper on Operator End, Right-Hand Side

Chains

Locating the Chains

A total of eight (8) chains are used to control the travel of the press head. There is one (1) motor drive chain on each end and three (3) drive wheel chains (also called slave chains) on each end. All are #80 roller chains that require a manual lubrication.

Lubricating the Chains

The motor drive chains and drive wheel (slave) chains should be lubricated every 8 working hours. The lubricant used should be a high-grade, non-detergent, petroleum-base oil. Anti-foam, anti-rust, and film-strength improving additives are often beneficial. SAE 30 grade is recommended.

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

Adjusting Chain Tension

Check the tension of all eight (8) chains every week. A properly-tensioned chain should have almost no movement when pressed with your hand.

Motor Drive Chains *(PN 63305)*

There is one (1) motor drive chain on each end of the press head.To tension the chain, perform the following steps.

1. Remove the correct end guard from the gantry head.
2. Loosen the four (4) mounting bolts on the motor drive chain tension sprocket take-up mechanism.
3. Relevant to the motor drive chain only: If increasing the tension (tightening the chain), loosen the jam nuts on the two (2) tension bolts.
4. Tighten the tension bolts to push the tension sprocket forward and increase tension or back-out the tension screws to decrease the tension.
5. Re-tighten the mounting bolts on the tension sprocket take-up mechanism.

6. Check the tension of the motor drive chain on the other end of the *AutoPress 14 TL* machine. Repeat steps 1 through 5 if the chain tension does not match the description in the optimum chain tension described above.

Drive Wheel Chains *(PN 63306)*

There are three (3) drive wheel (slave) chains on each end of the press head.

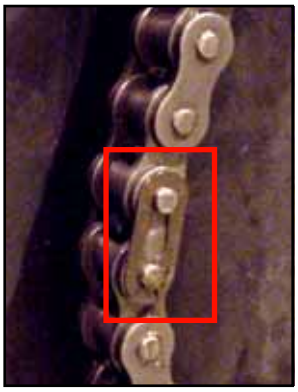
To test the chains, adjust the nut on the 5/8"-11 bolt that is below the guard on each take-up mechanism. All six (6) drive wheel chains have their own tension sprocket.

Replacing a Chain

All of the chains can be replaced using the following procedure.

1. Move the press head to a position where the master link is clear of the sprockets so it can easily be reached. The master link is shown in Figure 7-11.
2. Lockout/tagout the machine.
3. Remove the end guard from the press head.
4. Note how the chain is threaded around the sprockets.
5. Loosen the tension sprocket per the *Adjusting the Chain Tension* section.
6. Remove the master link on the chain by pulling out the two (2) pins using pliers. The chain will come apart and can be removed from the sprockets.
7. Thread the new chain around the sprockets.

Figure 7-11: Master Link on a Chain

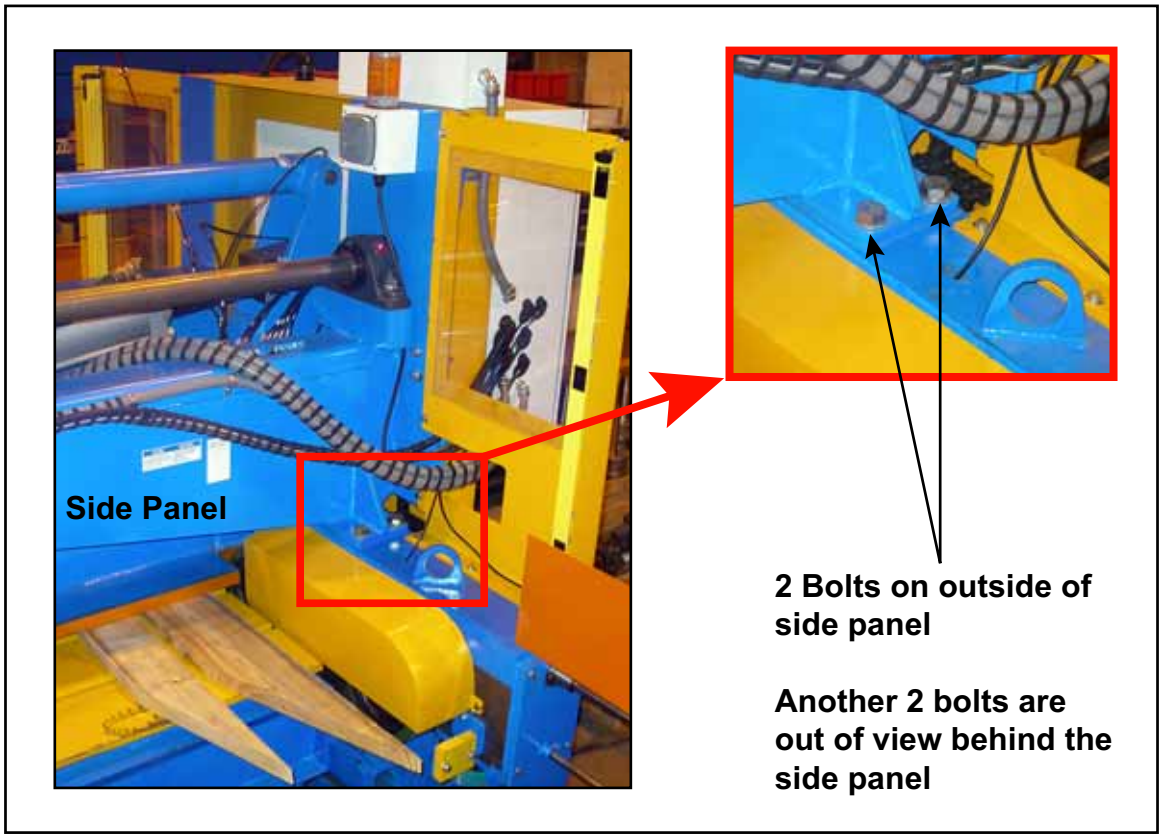


8. Connect the chain to itself by placing the master link between two links and pressing together with pliers.
9. Adjust the tension sprocket. The chain should have should have almost no movement when pressed with your hand.
10. Replace the end guard and remove the lockout/tagout equipment.

Inspecting Tube Crossover Bolts

Every three (3) months, inspect the tube crossover bolts. They are 1-8x2-1/2" bolts that hold the side panels to the cross tubes. They should be tight enough that they don't budge when checking with a hand-turned socket wrench. Figure 7-12 show the bolts located on each corner of the press head for a total of 16 bolts to check.

Figure 7-12: Two of the Tube Crossover Bolts



Timing Belt

A timing belt tells the brake monitor if the motor is turning. It is located on the operator end, above the motor drive chain. There is little resistant force on this belt, so no preventive maintenance is needed. If the belt is damaged or breaks, the part number can be found in the *Replacement Parts* appendix.

When the brake monitor informs the operator that there is a brake malfunction, check the belt. To replace the belt, loosen the socket head bolts on the back of the tension sprocket take-up mechanism mounting tube.

Light Bars

Components

The press head is equipped with two (2) sets of light bars, one set on each side of the gantry head. A set consists of a transmitter bar and a receiver bar. The transmitter bar transmits the signal for the light beam and the receiver bar receives the signal.

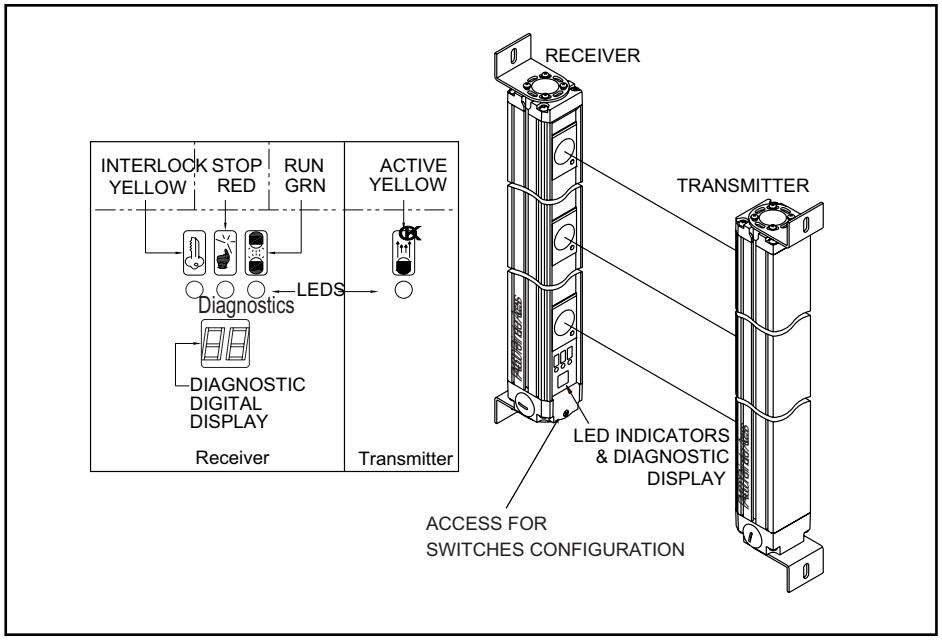
Realigning and Inspecting

Inspect the light bars prior to starting the machine. An LED display area is located on the light bars to notify the operator if an error occurs. Refer toTable 7-7 for information on the error codes and indicators on the light bars.

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

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

Figure 7-13: Light Bar System Components and Indicators



Light Bar Operating States

The indicators on the receiver bar tell the operator what operating state the light bar set is detecting. The different operating states are described in Table 7-6.

Table 7-6: Light Bar Operating States

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

Light Bar Diagnostic and Test Features

	WARNING
	**ELECTROCUTION HAZARD!** **Disconnect power before opening end caps!**

Machine Primary Control Element (MPCE) Monitoring

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

Diagnostic Display

The Receiver unit has a two-digit numeric display that displays diagnostic codes identified by the internal control circuits. This display is visible from the front of the Receiver bar. The diagnostic codes indicate normal operation, dip switch setting faults, safety output faults, MPCE faults, and internal controller faults. See Table 7-7.

Table 7-7: Diagnostic Codes for the Light Bar System

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

Replacing Light Bars

Light bars can be replaced as a set of two, or just the transmitter or receiver may be ordered by itself. Refer to Figure 7-13 for component locations and the *Replacement Parts* appendix for part numbers.

1. Determine if you need to replace a transmitter, receiver, or both.
2. To install a new light bar or set, remove the cable from the bottom of the damaged light bar by unscrewing the quick disconnect.
3. Carefully hold the damaged light bar while unscrewing the two (2) socket head set screws on the light beam mount. Keep the set screws for use with the new bar.
4. Set the damaged light bar aside and hold the new bar in place.
5. Use the same two (2) set screws to attach the new bar to the light beam mount.
6. Whether replacing one or both bars in a set, the dip switches on both bars must be set to match each other. The original dip switch code is shown in Figure 7-14. It can also be found on Drawing 90547.

Figure 7-14: Dip Switch Settings

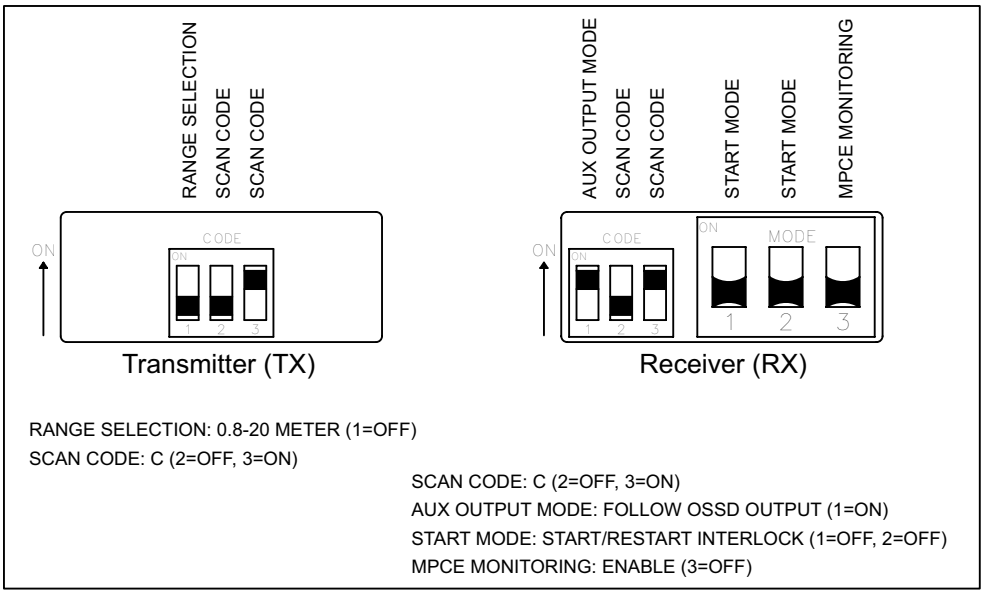
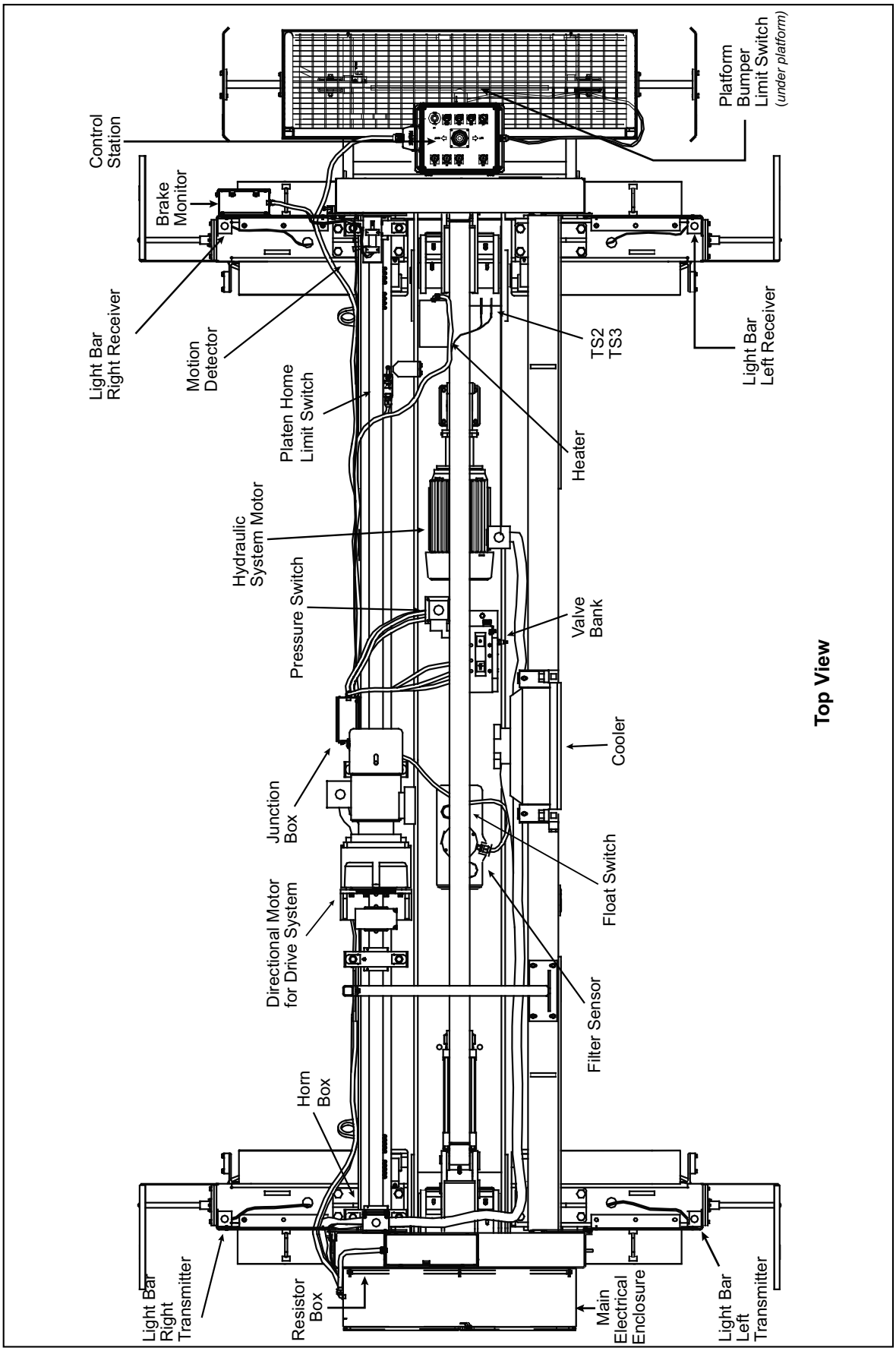


Figure 7-15: Overview of the Main Electrical Components



Electrical System

The main components are shown in Figure 7-15. Also, refer to the electrical drawings.

The main electrical enclosure is located on the top-chord end of the press head. Throughout this manual, this end is referred to as the enclosure end. The main electrical enclosure's interior layout is shown in Drawing 90547.

To Access Behind the Main Electrical Enclosure

To gain access to the mechanical parts behind the main electrical enclosure, remove the two (2) hex head bolts securing the end frame guard on the side opposite the hinges. Swing the end frame guard toward the hinged side.

To Open the Main Electrical Enclosure

To open the main electrical enclosure and access the electrical components inside, perform the following steps.

1. Turn the disconnect handle on the front of the enclosure to the OFF position.
2. Turn the main power source switch off, and lockout and tagout the main electrical power source.
3. Turn the slotted keyhole counterclockwise with a slotted screwdriver.
4. Grasp the bottom of the doors and gently pull them open.

To Clean the Main Electrical Enclosure

Occasionally vacuum inside all electrical enclosures. Never use compressed air.

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

Figure 7-16: Never Use Compressed Air Inside an Electrical Enclosure

Hour-Meter

The hour-meter on the front of the main electrical enclosure logs the amount of time that the drive system brake motor is running. Refer to this meter to schedule preventive maintenance. The hour-meter cannot be reset, but if use exceeds the number of digits on the meter, it will roll back to 0 and continue to log time.

Interlock Sensor (Optional)

Refer to Figure 7-1

An interlock switch shuts the gantry head down if it senses another gantry head within 6.7 ft. The interlock switch is a safety device to be utilized when a table line has more than one gantry head operating on it. It is not designed to sense a person in the path of the gantry head. See Figure 7-1 for the location of the interlock sensor.

The distance at which the gantry head stops when it “sees” another gantry head depends on how the photoelectric sensor is mounted on the bracket. Figure 7-1 on page 54 shows the location of the sensor. To adjust the sensor, loosen the screws and slide the bracket to the left or right. Tighten the screws when the sensor is adjusted properly.

Brake Monitor

Operating the Brake Monitor

Refer to the *Operation* chapter for an explanation of the indicator lights and LED display.

Refer to the *Troubleshooting* appendix for an explanation of error codes.

Refer to your electrical drawings for the proper brake monitor settings.

The brake monitor relies on a motion detector to measure the stopping distance of the gantry head. Refer to page 84 for motion detector information.

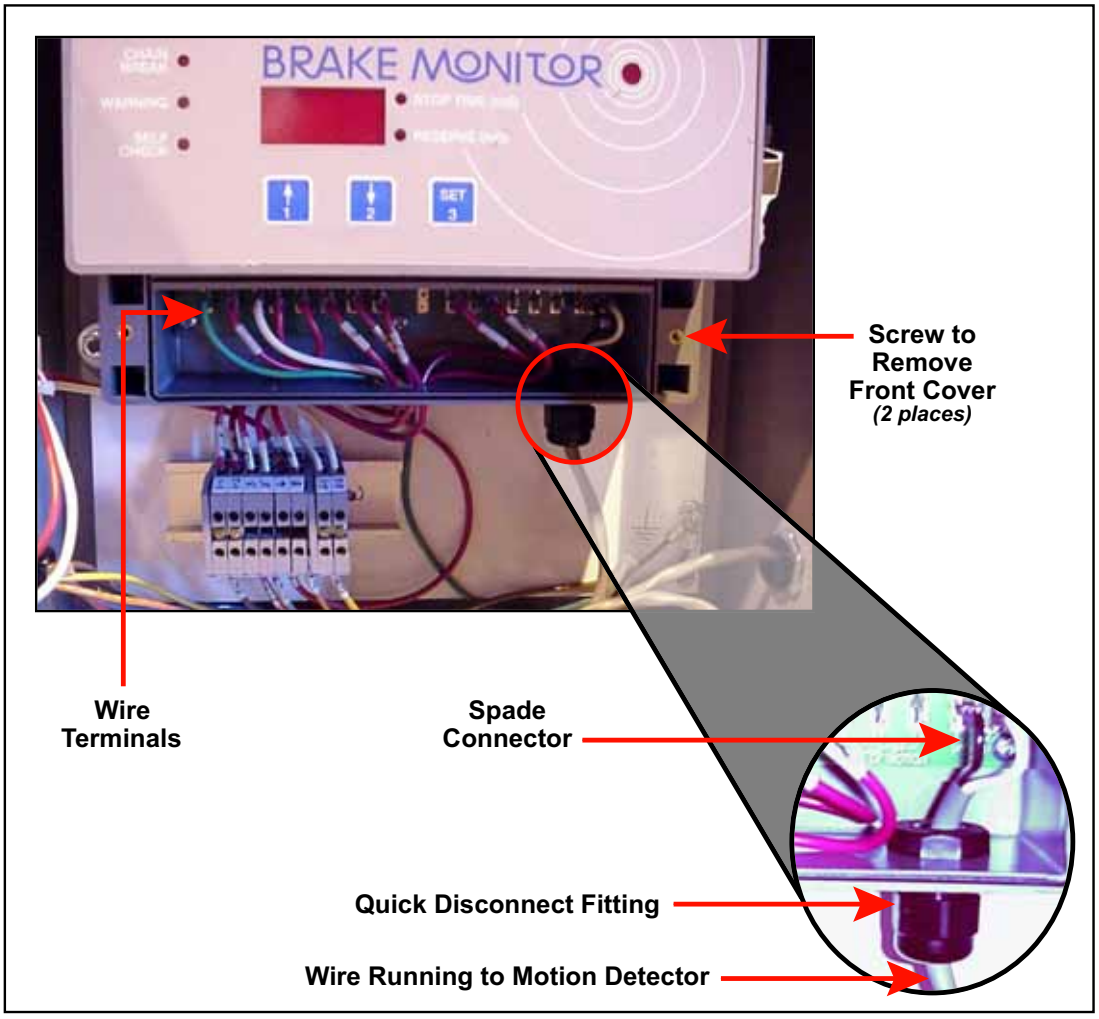
	WARNING
	Never attempt to adjust the brake monitor settings unless instructed to do so by a MiTek technician. Improper brake monitor settings can neutralize and important safety feature.

Replacing the Brake Monitor

Refer to Figure 7-17 and this procedure to replace the brake monitor.

1. Loosen two (2) screws on the bottom half of the front cover and remove the cover.
2. Pull out the spade connector located inside the brake monitor using needle-nose pliers.
3. Remove that end of the wire from its terminal inside the brake monitor. The other end of the wire is connected to the motion detector.
4. Ensure that all wires connected to the terminals labeled in Figure 7-17 have wire labels. If not, refer to your electrical schematic and label them.
5. Remove the wires connected to the terminals labeled *Wire Terminals* in Figure 7-17 from inside the brake monitor.
6. Ensure that the brake monitor is free of all wires before removing it from the enclosure.
7. Remove the four (4) bolts that secure the brake monitor to the back of the enclosure.
8. Install a new brake monitor by reversing the above steps. Refer to your electrical schematic for assistance.

Figure 7-17: Replacing the Brake Monitor



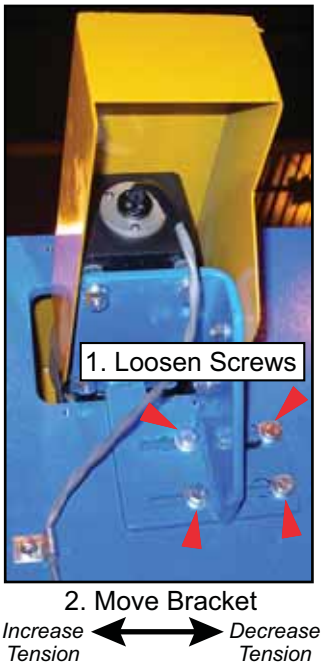
Motion Detector

Refer to Figure 7-1 for location

Adjusting the Location

The brake monitor relies on a motion detector to measure the stopping distance of the gantry head. Figure 7-18 shows how to increase or decrease tension on the motion detector's belt or chain.

Figure 7-18: Adjusting Motion Detector Location



Error Codes

A code on the brake monitor will indicate if the motion detector is malfunctioning. Refer to the *Brake Monitor* section of the *Operation* chapter for the error codes.

Replacing

Follow these steps to replace the motion detector.

1. Remove the wire from the back of the motion detector by pulling it straight out.
2. Remove the four (4) bolts in the mounting plate under the motion detector.
3. Remove the motion detector and replace it with a new one by reversing the steps above.

VFD

The VFD is inside the main electrical enclosure. If it experiences a fault, one of the fault numbers listed in Table 7-8 appears in the LED display. Refer to the *Troubleshooting* appendix to remedy the faults.

Figure 7-19: Controls on the VFD

Reset Button

After the problem is repaired, press the red reset button on the front of the VFD.

Fault Codes

Table 7-8: VFD Fault Codes

Number on LED Display	Fault Description
F2	Auxiliary Input
F3	Power Loss
F4	Under Voltage
F5	Over Voltage
F7	Motor Overload
F13	Ground Fault
F38	Phase U to Ground
F39	Phase V to Ground
F40	Phase W to Ground
F41	Phase UV Short
F42	Phase UW Short
F43	Phase VW Short
F70	Power Unit
F122	I/O Board Fail

PLC (Programmable Logic Controller)

The PLC controls all electrical functions of the machine. There are two (2) potentiometers on the front of the PLC that can be adjusted to control the following:

- Top potentiometer—Adjusts the dwell time of the platen for both pressure modes
- Bottom potentiometer—Adjusts the amount of time allowed for the hydraulic system to sit idle before it automatically shuts off

Replacing Light Bulbs

Changing the Indicator Light Bulbs

The indicator lights on this equipment are listed in the *Operation* chapter. Replace a light bulb immediately upon discovering it is not working. Do not operate the *AutoPress™ 14 TL* machine if this light is not functioning properly.

Replacing the Beacon Light Bulb

The warning beacon should be lit when the machine is travelling. If the beacon doesn't work, replace the bulb will immediately. Do not operate the *AutoPress™ 14 TL* machine if this light is not functioning properly. If neither the light nor the horn work, have an electrician check the control circuit.

Limit Switches

There are two (2) limit switches on this machine.

- One (1) safety circuit limit switch is located under the platform and is actuated when either platform bumper is depressed. For the drive system brake motor to come on, the safety switch must be resting in the notch located in the center of the shaft running between the bumpers.
- One (1) limit switch controls how far the platen opens. The platen is in *home* position when it reaches the limit switch. The platen must be *home* before horizontal travel will begin. See the *Adjusting the Platen Opening Height* section for details on adjusting it.

Adjustments

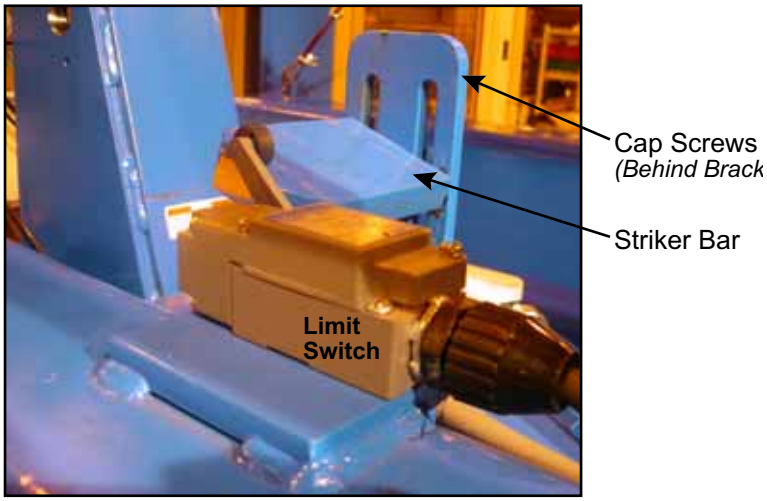
Adjusting the Platen Opening Height

How It Works

The platen opening height ranges from approximately 1-1/4 in. to 5-3/4 in. It was set to approximately 3-1/2 in. at MiTek.

The platen home limit switch controls the platen opening height. Its arm rests on top of a striker bar. When the limit switch arm extends to approximately eight degrees (8°), the limit switch actuates, sending a signal to the PLC to stop the press platen. The platen is then considered to be *home*. To adjust the platen opening height, adjust the location of the striker bar. It is shown in Figure 7-20

Figure 7-20: Adjusting the Platen Home Limit Switch



Which Direction to Move the Striker Bar

Because of how the limit switch and striker bar are mounted to the press head, the direction to move the striker bar is as follows:

- Move the striker bar up to reduce the platen opening height (for thinner lumber).
- Move the striker bar down to increase the platen opening height (for thicker lumber).

How to Adjust the Striker Bar

To adjust the striker bar, follow the steps below.

1. Loosen the two (2) socket head cap screws that are 3/8-16x1.
2. Move the striker bar up or down the same amount the platen height should change.
3. Hold the striker bar in place while tightening the two (2) socket head cap screws.

Adjusting Pressing Force

1. Set both pressure relief valves.
    a) Locate the correct pressure relief valve labeled in Figure 7-5.
    b) Loosen jam nut.
    c) Turn the adjustment screw until the pressure is at the desired level. The recommended settings are:
        - High-pressure mode = 2100 psi
        - Low-pressure mode = 1600 psi
    d) Tighten the jam nut
    e) Repeat for the other relief valve if necessary.
2. Set both pressure switches.
    a) Locate the pressure switch box that houses both pressure switches.
    b) Loosen the jam nut.
    c) Adjust the top adjustment screw until the switch closes at the maximum pressure.
        - High-pressure mode = 2000 psi
        - Low-pressure mode = 1500 psi
    d) Tighten the jam nut.
    e) Repeat for the other relief valve if necessary.

Adjusting Dwell Time

Dwell time is the amount of time that the press platen continues to exert force on the lumber after it has reached its operating pressure. To adjust the dwell time, turn the top potentiometer on the PLC. The dwell time range is from 0 to 6 seconds and the potentiometer range is 3/4 of a circle, so 1/4 turn is equal to 2 seconds. Turning clockwise increases the dwell time and counterclockwise decreases dwell time.

There is only one (1) dwell time setting, so both pressure modes operate with the same dwell time.

Navigating the Troubleshooting Appendix

Refer to...

- *Maintenance* chapter for procedures and graphics
- *General Information* chapter for truss terminology
- *Glossary* for additional terminology
- Figure 1-1 to contact MiTek Machinery Division Customer Service

This appendix is divided into tables according to the nature of the issue that is being addressed. The issues are categorized according the symptoms that can be observed.

The tables are presented in the order listed below.

Table Number	Troubleshooting Category
Table A-1	Troubleshooting the Mechanical System • Drive system/gantry head • Stopping • Plate embedment • HPU • Platen movement • Bushing • Hydraulics
Table A-2	Troubleshooting the Electrical System
Table A-3	Brake Monitor Failcodes

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

Operational Notes for Troubleshooting

Adhere to these guidelines for the most efficient troubleshooting possible:

- Do not use compressed air inside the electrical enclosures! It may force contaminates 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

Safety Notes for Troubleshooting

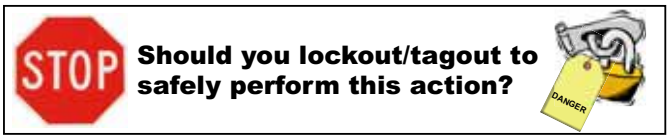
Adhere to these guidelines to ensure a safe troubleshooting experience:

	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.

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



Troubleshooting Charts

Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
Gantry head won't move at all (Refer to Table A-2 for electrical problems)	Gantry head or a wheel is jammed with a foreign object	Check the perimeter of the gantry head and around each wheel for blockage
	All wheels are not riding on table tube	Adjust wheel or align tables
	Brake motor is broken	Repair or replace brake motor
The machine starts but will not press or travel	Joystick is broken	Have an electrician check electrical circuit; Replace joystick
	The machine is stuck in the Up mode	The 'Up' limit switch is not being activated; (See Adjustments Section - Open Height Adjustment, page 207)
	Relief valve has backed off	Have hydraulic personnel check the hydraulic system; (See Adjustments Section - Complete Hydraulic Pressure Setup, page 211)
	Low or no oil in tank	Refill tank to correct level; (See Maintenance Section, page 144)
	The electric motor is running backwards;	Have an electrician check the motor/pump rotation and correct, if necessary; (The direction of rotation is marked on the pump;) This is only applicable if the main power has been disconnected
The machine shuts off abruptly while travelling; (Motor shuts off	Vibration caused by travelling is activating the safety shut-off bars	Re-adjust the safety shut-off bar limit switches actuation distance; (See Maintenance Section, page 164)
Gantry head won't move in one direction after the machine has been stopped	Vibration of stopping causes bumper to trip safety switch temporarily	Press the START button to reset the safety switch
	Bumper spring or bearing is damaged so normal vibration of stopping causes bumper to move and block light beam	Move the bumper away from the light beam, then press the START button to reset the safety switch; to prevent this from continuing, must replace the bumper spring or bearing

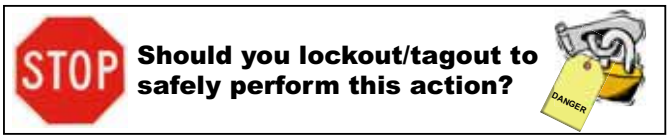


Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
Gantry head is tracking is crooked or unevenly	Guide wheel is damaged or low on lubricant	Replace guide wheel
	Tables out of alignment Tables damaged	Align tables Replace tables
	One drive wheel or motor is not functioning properly	Inspect drive wheels and drive motors; (See Maintenance Section Drive Wheels, page 180)
One drive wheel tends to spin when starting or skid when stopping	The track is dirty on that side	Clean the track and wheels
	The wheels are not the same diameter	Measure the wheels and replace if necessary; (See Maintenance Section, Drive Wheels, page 180)
	One drive wheel or drive motor is defective	Inspect all drive wheels; (See Maintenance Section - Drive Wheel-Inspect, page 181) Inspect both drive motors and spline connection (See Maintenance Section Replacing a Drive Motor, page 178)
The machine is wearing flat spots in the steel drive wheels	The drive pressure is set incorrectly, causing the wheels to spin and skid	Adjust the drive cushion valve setting; (See Adjustments Section-Drive System Adjustment, page 216)
Gantry head crashes against tables	Table is bent or damaged	Replace table
	Table is out of alignment	Align tables
	Table leg is bent or broken	Replace leveling screws in table feet
Gantry head travels the opposite direction of the directional button pressed	The electrical wires are connected to the wrong terminals	Swap the wires on the contactor inside the electrical enclosure; or switch the wires at the motor
Gantry head or roller is making extraordinary noise or vibration as it travels	Take-up bearing is not lubricated	Grease the take-up bearing Replace damaged take-up bearing
	Parts are damaged: guide wheels, Roller shaft	Inspect location of noise for parts damage
The machine starts too slowly and coasts too far	The drive system cushion valve is set incorrectly to a pressure less than 1200 psi	Adjust the cushion valve setting; (See Adjustments Section, page 216)
	The track or drive wheels are dirty or oily	Clean the track and wheels
	Drive wheels are worn out	Inspect the drive wheels; (See Maintenance Section page 181)

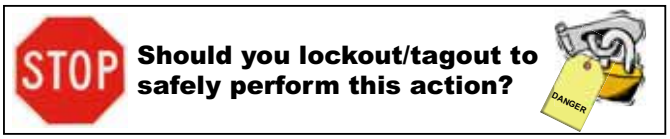


Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
Press is stopping too slowly	Brake motor is worn or damaged	Check lubricants in brake motor Adjust air gap in brake motor Replace brake motor
	Brake pad is worn	Replace brake pad
	Guide Wheels are worn or damaged	Replace guide wheels
Nail plates are not properly embedded into the truss	Platen not providing enough pressure	Check pressure switch (See page 67
	Table surface is damaged	Repair tabletop
Nail plates are not embedded evenly	Platen not providing enough pressure	Check pressure switch (See page 67
	Table surface is damaged	Repair tabletop
Connector plates are not fully seated	Pressing force is set too low	Use "Boost" force; Adjust hydraulic pressure; (See page 211)
	Truss components are of varying thicknesses	Use only lumber of same thickness
Lumber is damaged during pressing operation	Pressing force is too high	Do not use "Boost" force; Lower normal working pressure setting; (See page 209)

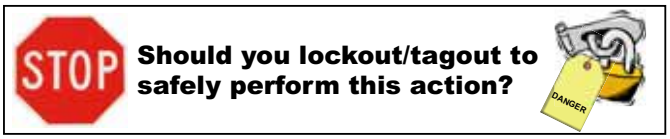


Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
HPU motor and pump will not start	**MAIN POWER** Main power is turned off	Turn on main power
	Main disconnect switch is turned off	Turn on the main disconnect switch
	AT THE AUXILIARY INTERLOCK PANEL Auxiliary interlock panel is not "started"	Depress the "Start" button on the auxiliary interlock panel (Green "On" light will energize)
	One of the jig station "Emergency Stop" buttons is depressed	Pull out the "Emergency Stop" buttons and depress the "Start" button on the auxiliary interlock panel (Green “On” light will energize)
	Another truss machine interlocked with the Auto Press 14/16LT has an “Emergency Stop” function activated	Eliminate interlock "Emergency Stop" and depress the "Start" button on the auxiliary interlock panel (Green “On” light will energize)
	Primary or secondary control auxiliary interlock are blown	Have electrician check fuses and electrical circuit to determine the reason why the fuse has blown Do not simply replace the fuse
	AT THE PRESS HEAD Key switch is turned off	Turn key to On position and depress the "Start" button (Green "Run" light will energize)
	One of the two "Emergency Stop" buttons is depressed	Pull out the "Emergency Stop" button and depress the "Start" button (Green "Run" light will energize)
	One of the safety shut-off bars is in the Up position One or two safety shut-off bar limit switches are not activated	Lower the safety shut-off bar to Down position Adjust the safety shut-off bar limit switch (See Maintenance Section-Safety Shut-Off Bar Actuation Distance, page 164)
	Electric motor has been overloaded and the motor overloads are tripped	Wait 2 to 4 minutes and depress the "Reset" button on the main electrical enclosure
	Primary or secondary control circuit fuses are blown	Have electrician check fuses and electrical circuit to determine the reason why the fuse has blown Do not simply replace the fuse

Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
HPU motor starts for a short time but then shuts off	The machine is not receiving complete 3-phase power from the main shop breaker	Reset the main shop breaker; Have an electrician ensure that all 3-phase power is at the correct voltage
	The machine is not receiving complete 3-phase power from the overhead electrical conductor rail	Turn off and lock out the main power to the machine; Have an electrician check that the four pickup arm shoes are in good condition and are fully contacting the electrical conductor rail; Replace the pickup arm shoes and rail section, if damaged; (See Maintenance Section, page 182;) Check for 3-phase power at the starter
	The electric motor is not receiving complete 3 phase power, due to a loose connection in the auxiliary interlock panel or in the main electrical enclosure	Have an electrician check for 3 phase power at the starters and the motor overloads, to ensure the motor is not single phasing
	The machine is exposed to temperatures lower than 32^{o}F (0^{o}C) The hydraulic fluid is too thick and is causing the electric motor to overload	Change the hydraulic fluid to the correct viscosity for the ambient temperature; (See Specifications Section, page 268;) Install auxiliary in-tank heater; Relocate machine to heated building
	Electric motor is overloading, and the overload heaters are shutting off the power	Have an electrician check the motor, and have the hydraulics personnel check the hydraulic system (See Adjustments Section - Complete Hydraulic Pressure Setup, page 211;)

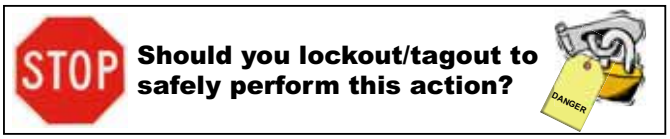


Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
HPU motor trips the motor overloads	Hydraulic relief valve or unloading valve are set too high	Re-adjust complete hydraulic system; (See Adjustments Section, page 211
	Motor is wired to the wrong voltage	Have an electrician check the motor connection
	Motor overloads are set to the wrong amperage	Have an electrician set motor overloads to the correct settings (See Adjustments Section, page 218)
	Motor circuit is "single phasing"	Have an electrician check the 3-phase power source
	The machine is exposed to cold weather/temperature less than 32^{o}F (0^{o}C) and the hydraulic pump is overloading the electric motor	Change the hydraulic fluid to the correct viscosity for the ambient temperature; (See Specifications Section, page 268); Install auxiliary in-tank oil heater;Relocate machine to heated building
	Electrical motor is overloading and motor overloads are shutting off the power	Have an electrician check the amperage draw of the motor
	The machine is not receiving complete 3 phase power from the overhead conductor rail There may be a dead zone in the conductor rail, caused by misalignment or arcing	Turn off and lock out the main power to the machine; Have an electrician check that the four pickup arms shoes are in good condition and are fully contacting the electrical conductor rail; Replace the pickup arm shoes and rail section, if damaged; (See Maintenance Section, page 182); Check for 3 phase power at the starter
	The electric motor is not receiving complete 3 phase power, due to a loose connection in the main electrical enclosure	Have an electrician check for 3 phase power at the starter, the motor overloads, and the electronic soft start, to ensure the motor is not single phasing
	The machine is stuck in the Up mode	The "Up" limit switch is not being activated; (See Adjustments Section - Open Height Adjustment, page 207)
The platen presses the plates but will not come back up (stuck in "down" mode)	The pressure switch is set at a higher setting than the relief valve	Have hydraulic personnel check the hydraulic system; (See Adjustments Section - Complete Hydraulic Pressure Setup, page 211)
Platen comes back up before fully pressing	Pressing guards are interrupting the pressing cycle	Adjust pressing guards; (See Maintenance Section, page 169)

Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
Pressing platen creeps down when not in use	Hydraulic cylinders are worn out	Rebuild cylinder
	Pressing valve seals are worn out	Rebuild/replace valve; NOTE: IT IS RECOMMENDED THAT A PROFESSIONAL COMPANY SPECIALIZING IN HYDRAULIC REPAIRS UNDERTAKE REBUILDING/REPAIRING OF HYDRAULIC CYLINDERS
Broken pin lock on bushing	Insufficient grease causing bushing to bind on pin	Remove pin and check pin and bushing for damage; Replace, if required Remove broken pin lock and install a new one
Brass shavings around linkage pin on bushing	Insufficient greasing has caused bushing to bind on pin	Remove pin and check pin bushing for damage; Replace, if required; Grease daily
Bushing will not take grease	Insufficient greasing has caused bushing to spin in housing	Remove pin; Remove grease fitting; Using a hand drill, drill a new hole through the bushing; Replace grease fitting Grease daily; (See Maintenance Section, page 150)
Excessive movement between bushing and/or pins	Insufficient greasing has caused bushing and/or pins to wear	Replace bushings and pins
Oil leaking at valve mounting surface	Valve mounting bolts are not torqued correctly Damaged or incorrectly positioned a-rings or wrong a-rings	Replace o-rings and re-torque valve mounting bolts Replace a-rings and re-torque valve-
	Hydraulic pressure is set too high	Readjust hydraulic pressure; (See Adjustment Section, page 211)
	Machine is running too hot	Ensure the hydraulic fluid monitoring devices are working properly.
Hydraulic cylinder is leaking around the rod and gland	Rod gland seals are worn	Replace gland seals; Repair/replace cylinder rod
	Rod has burr which damages gland seals	Repair/replace cylinder rod; Replace gland seals
Hydraulic cylinder is leaking around barrel	Tie rods are not torqued correctly	Replace barrel seals and re-torque tie rods

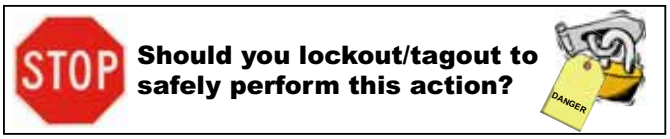


Table A-1: Troubleshooting the Mechanical System

Symptom	Possible Cause	Possible Solution
Back pressure is greater than 200 psi in hydraulic system at idle	Oil filter is plugged	Replace oil filter; (See Maintenance Section, page 157)
	Hydraulic valve is not returning to the neutral position	Check valve operation; Clean/replace valves
	Incorrect valve has been installed	Install new valve to meet factory specifications
Machine is overheating (above 170°F (76°C)	Oil filter is plugged	Replace oil filter; (See Maintenance Section, page 157)
	Low hydraulic fluid	Refill tank to correct oil level; (See Maintenance Section, page 144)
	Relief valve or unloading valve set incorrectly	Reset relief and unloading valves; (See set incorrectly; Adjustments Section, page 211)

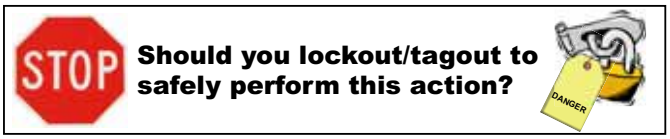


Table A-2: Troubleshooting the Electrical System

Problem	Possible Cause	Possible Solution
E-stop button is depressed, but all indicator lights are not on	Main disconnect switch is in OFF position	Switch the disconnect switch handle to ON position
	Secondary or primary transformer fuses are open	Check primary and secondary transformer fuse
E-stop button is released, but indicator lights are not on	Main disconnect switch is in OFF position	Switch the disconnect switch handle to ON position
	Machine has not been started	Press and release START button
E-stop button is released, but E-stop light is on	DC output fuse is open	Check DC output fuse
Only RIGHT READY/ REVERSE START indicator light is on	An object on the left of the machine is sensed entering the detection zone	Clear the detection zone on the left side of the machine and press and release START button
	Left side light bar receiver has fault	Read LED display on the light bar; refer to light curtain diagnostic code for fault message; check dip switch settings
	Left side light bar transmitter has no power	
Only LEFT READY/FORWARD START indicator light is on	An object on the right of the machine is sensed entering the detection zone	Clear the detection zone on the right side of the machine and press and release START button
	Right side light bar receiver has fault	Read LED display on the light bar; refer to light curtain diagnostic code for fault message; check dip switch settings
	Right side light bar transmitter has no power	
Either LEFT READY/FORWARD START or RIGHT READY/ REVERSE START button is pressed, horn keeps sounding for more than 5 seconds and the machine is not moving	The timing relay has loose connections or is bad	Check timing relay for loose connections or replace the timing relay
Either LEFT READY/FORWARD START or RIGHT READY/ REVERSE START button is pressed, the horn sounds and then stops, but the machine is not moving	The control relay has loose connections or is bad	Check control relay and VFD for loose connections or replace the control relay

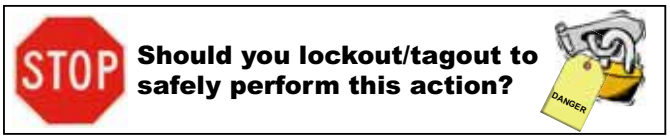


Table A-2: Troubleshooting the Electrical System (Continued)

Problem	Possible Cause	Possible Solution
Electric motor trips the motor overloads	See *HPU motor trips the motor overloads* on page 97	See *HPU motor trips the motor overloads* on page 97
Travel indicator warning beacon does not flash	The light bulb is burnt out	Replace the light bulb
Travel indicator warning beacon and horn do not function	Faulty beacon or loose travel relays	Have an electrician check the beacon and travel relays
The machine shuts off abruptly while travelling; (Motor shuts off	Vibration caused by travelling is activating the safety shut-off bars	Re-adjust the safety shut-off bar limit switches actuation distance; (See Maintenance Section, page 164)

Table A-3: Brake Monitor Failcodes

Failcode	Description
1	The stop relay has failed and the safety relay had to take over. Reset the unit and operate as before. If the stop relay fails again, it must be sent to the factory for repair.
2	The self-check monitor has found a fault with the internal circuitry. Reset the unit. If self-check failure occurs again, the unit must be sent back to the factory for repair.
3	Chain break delay failure. The brake was released, and no motion occurred within the chain break delay period. Make sure the motion detector cable is connected to the motion detector.
4	While the brake is on, motion signal occurred. Motion detector cable is open. Check the motion detector connections.
5	The brake was released and motion started within the chain break delay period. Some time after this, the motion signal was lost. Check for: Broken cam drive chain Broken of loose screw behind the sprocket on the motor shaft Chain has jumped a sprocket Shorted motion detector cable Defective motion detector Electrical noise may cause this symptom
7	Stop Time Alarm Setting Exceeded. The press ran past the brake monitor's Stop Time Alarm setting and continued to free run. Before counting stopped, power was removed from the brake monitor. Reset the brake monitor to clear this fault.
8	EEPROM failure. Note the serial number of the unit and call MiTek.
11	EEPROM failure. Note the serial number of the unit and call MiTek.
12	EEPROM failure. Note the serial number of the unit and call MiTek.
13	Self-check failure, usually due to electrical noise. Unit can be reset by turning power off, then back on. If symptom persists, note serial number of unit and call the factory.
17	Self-check failure. Note serial number of unit and call the factory.

Appendix B

Navigating the Parts List Appendix

The tables that make up this appendix is divided into sections which are presented in the order listed here. Parts are grouped first according to their location and then presented in alphabetical order by part name. The far right column indicates if the part should be kept in stock to minimize downtime.

The check mark in the last column indicates that this part should be kept in stock at all times to minimize downtime.

Safety Notes for Replacing Parts

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

	WARNING
	**ELECTROCUTION AND HIGH PRESSURE HAZARDS.** **Perform the safety tests described in the *Safety Test* section on page xvii before operating the equipment at the initial startup, after performing any maintenance, and in accordance with the maintenance schedule.**

	WARNING
	**ELECTROCUTION 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 or shutoff valve if appropriate.** **Bleed pneumatic and hydraulic lines if appropriate.**

Parts Lists

Table B-1: Mechanical and Hydraulic Replacement Parts

Location of Part	Part Description	*MiTek* Part #	Keep in Stock
Bumper	Bumper housing assembly	63340-501	
Bumper	Bumper flange bearing	416076	
Bumper	Bumper spring	370055	
Bumper	Bumper bearing shaft	63345	
Bumper	Bumper spring shaft	63346	
Bumper	Bumper mounting bar	63347	
Bumper	Bronze spring compression pad	63348	
Drive System	#80 chain	554008	
Drive System	#80 connecting link	554187	
Drive System	#80 off-set link	554188	
Drive System	Double-single sprocket, DS80A23, 2-7/16”B	552073	
Drive System	Drive chain coupling guard	362007	
Drive System	Drive chain coupling, 6022, 2-3/4”B	362003	
Drive System	Drive sprocket, 80SF23H	552075	
Drive System	Gearbelt pulley, 14H100SK	531071	
Drive System	Large gear belt pulley, 48H100SK	531074	
Drive System	Motor coupling 'M30002808	557349	
Drive System	Nord gear motor, SK6382AZ-132M/4 Bre60 HL CUS, 208V	480411	
Drive System	Nord gear motor, SK6382AZ-132M/4 Bre60 HL CUS, 230V	480412	
Drive System	Nord gear motor, SK6382AZ-132M/4 Bre60 HL HW CUS, 460V	480413	
Drive System	Nord gear motor, SK6382AZ-132M/4 Bre60 HL HW CUS, 575V	480414	
Drive System	Pillow block bearing, PBE920-2 3/4SHFT	419606	
Drive System	QD bushing, SF 2 3/4	547137	
Drive System	Sprocket 80BS23HT, 2-7/16”B	552072	
Drive System	Take-up sprocket, B8012H	558131	
Drive System	Timing belt, 390H100	530024	
Drive System	Transfer rod eye connecting pin	63421-501	
Drive System	Triple-single sprocket ES80A23, 2-7/16”B	552074	
Drive System	Wiper, to wipe away debris on drive tube	82692	✔ 4
Gantry Head	Wiper	82692	
Gantry Head	Wiper bracket	63489	
Guards	Guard, side chain, *Lexan* material	63505	
Guards	Guard, end guard, *Lexan* cover	63469	
Guards	Light bar guard assembly, right-hand	63478-501	

Table B-1: Mechanical and Hydraulic Replacement Parts (Continued)

Location of Part	Part Description	*MiTek* Part #	Keep in Stock
Guards	Light bar guard assembly, left-hand	63444-501	
Hydraulics	Bell crank assy	63392-501	
Hydraulics	Bell crank bushing	63399	
Hydraulics	Bell crank connecting arm assy	63412-501	
Hydraulics	Bulb well A-319-ABC-12-01	515308	
Hydraulics	Check valve CXHA-XCN	802244	
Hydraulics	Check valve 'CXHA-XEN	802243	
Hydraulics	Connecting arm bushing	63414	
Hydraulics	Cooler AOC-33-2-30-3 PHASE (208/230/460V)	809035	
Hydraulics	Cooler AOC-33-2-30-575 VOLT	809036	
Hydraulics	Counter balance valve CBGA-LHN	802171	
Hydraulics	Counter balance valve 'CBGA-LIN	802172	
Hydraulics	Coupling insert 'M370H5	557344	
Hydraulics	DIN connector 'CP-P5107-1651000	511642	
Hydraulics	Directional valve 'H-4WEH25G6X/6EW110N9EK4	802165	
Hydraulics	Filter element KZ10, for return line filter on hydraulic system	805250	✔
Hydraulics	Filter 'RT1KZ10S24NNES1, return line filter on hydraulics	805247	
Hydraulics	Fitting 1/8NPT x ¼ tube elbow	426554	
Hydraulics	Float switch 01801	805249	
Hydraulics	Gauge '25-901-3000 W/ORIF	797264-004	
Hydraulics	Guide shaft bushing	63391	
Hydraulics	Guide shaft bushing assy	63388-501	
Hydraulics	Heater 208V BHS725A26-20 (208 VOLT)	526018	
Hydraulics	Heater 230V BHSS25A3 (230 VOLT)	526020	
Hydraulics	Heater 460V BHSS25A5 (460 VOLT)	526021	
Hydraulics	Heather 575V BHSS25A5 (460 VOLT)	526022	
Hydraulics	Cylinder 5HHC12AKY	798532	
Hydraulics	Isolation valve 'DTDA-MHN-211-GAB	802273	
Hydraulics	Long connecting pin weldment	63415-501	
Hydraulics	Pilot choke valve 'Z2FS6-2-4X/2QV	802274	
Hydraulics	Pressure switch 'HED3OA3X/200L110/12	515391	
Hydraulics	Pump coupling 'M30012012	557348	
Hydraulics	Pump motor U20E2DC (208/230/460V)	471334	
Hydraulics	Pump motor U20E2GC (575V)	471335	
Hydraulics	Pump 'PVV21-1X/045-018RA15DDMB	800284	
Hydraulics	Relief valve 'RPGC-LAN	802268	

Table B-1: Mechanical and Hydraulic Replacement Parts (Continued)

Location of Part	Part Description	*MiTek* Part #	Keep in Stock
Hydraulics	Short connecting pin weldment	63410-501	
Hydraulics	Temp control A-319-ABC-24-01	515307	
Platform	Transfer bar bushing	63420	
Table	Hardware for scale bed (need 3 for each scale bed)	349102	
Table	Scale (optional)	563081	
Table	Scale bed (optional)	63649	
Table	Jigging—refer to the Operation chapter	—	
Table	Parker stop flag, left-hand	63832-501	
Table	Parker stop flag, right-hand	63832-502	
Wheel Assembly	10” drive wheel	580203	✔ 4
Wheel Assembly	Drive wheel flange bearing	419856	
Wheel Assembly	Drive wheel shaft	63338	
Wheel Assembly	Side guide wheel	580200	
Wheel Assembly	Guide wheel assembly	63331-501	
Wheel Assembly	Guide wheel mount	63332	

Table B-2: Electrical Spare Parts to Keep in Stock

Location of Part	Part Description	MiTek Part #	Keep in Stock
Electrical System For all other electrical parts, see Drawing 90547	PLC, 504614 programmed by MiTek for *AutoPress 14TL*	92165	✔
	Transformer:208/230/ 460V = 4.35 amp 575V = 4.17 amp	504595 509736	✔
	VFD: 208/230V = 33 amp 460V = 17 amp 575V = 12.2 amp	 509742 509741 509746	✔
	Fuse 1: 208V = 150 amp 230V = 125 amp 460V = 70 amp 575V =50 amp	 516549 516479 516498 516494	✔
	Fuse 2: 208V = 110 amp 230V = 100 amp 460V = 50 amp 575V = 40 amp	 516481 516500 516494 477075	✔
	Fuse 3: 208/230V = 2.5 amp 460/575V = 1.0 amp	 516384 516382	✔
	Fuse 4: 208V = 20 amp 230V = 15 amp 460V = 9 amp 575V = 7 amp	 516614 516613 516615 516612	✔
	Fuse 5: 208V = 60 amp 230V = 50 amp 460/575V = 30 amp	 516496 516494 516492	✔
	Fuse 6: 208/230V =.4 amp 460/575V =.3 amp	 516611 516575	✔
	Fuse 7: 208V = 4 amp 230/460V = 3.5 amp 575V = 2.5 amp	 516389 5163944 516384	✔
	Fuse 8: 208/230/460V = 7 amp575V = 6 amp	516387 516350	✔

Table B-3: Electrical Replacement Parts

Location of Part	Drawing Description	Sheet # That Calls Out Part on Dwg. 90547
Electrical System *Sheet numbers refer to Drawing 90547. Later revisions may slightly differ.*	Schematic	1-5
	Terminal block layout	6
	Parts list for sheets 9-10	7
	Main electrical enclosure layout	8-10
	Operator control station and part numbers	11-12
	Light bars and part numbers (settings shown with electrical assembly)	13
	Horn/beacon *To replace the beacon portion only, purchase SB174KIT*	14
	Brake monitor and part numbers	15-16
	Braking resistor and part numbers	17
	Junction box and part numbers	18
	Electrical assembly (connectors, hardware, cables for entire system, and light bar settings)	19, 24, 25, 26
	Parts list for electrical assembly	20
	2-Head interlock option and part numbers *To replace the photo eye only, purchase part 515858* *To replace the photo eye bracket, purchase part 63453-001 for LH or 63453-002 for RH*	21 and 23
	3-Head interlock option and part numbers	22 and 23

Appendix C

Navigating the Maintenance Checklists

These checklists guide you through all preventive maintenance tasks required to keep this equipment in top working condition.

These pages are supplied with the intent that you will photocopy them and leave the original in the manual for future use. Space is provided in each chart to place the date that the work is done and the initials of the person performing the work.

Safety Notes For Maintenance Checklists

	WARNING
	**ELECTROCUTION, HIGH PRESSURE, CRUSH, AND CUT HAZARDS!** **Perform the safety tests described in the *Safety Test* section on page xvii before operating the equipment at the startup, after performing any maintenance, and in accordance with the maintenance schedule.**

	WARNING
	**ELECTROCUTION AND HIGH PRESSURE HAZARDS.** **Always turn the power off and activate an E-stop when the equipment is not 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 shutoff valve and bleed hydraulic lines if appropriate.**

Maintenance Checklist

Daily Checklist—By Shift

Month and Year: _____Week: _____

Preventive Maintenance Action (write dates at top of column)		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Lubricate motor drive chains and drive wheel chains (approximately every 8 working hours)	Shift 1						
	Shift 2						
	Shift 3						

Daily Checklist

Month and Year: _____Week: _____

Preventive Maintenance Action (write dates at top of column)	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Perform safety test on light bars, bumpers, and e-stop pushbutton						
Drain air filter/regulators						
Inspect hydraulic fluid temperature						
Inspect for loose fasteners & pin locking bolts						
Inspect wipers (4)						
Clean tubing that drive wheels ride on						
Clean cooler filter on hydraulic unit						
Lubricate motor drive chains and drive wheel chains						

Maintenance Checklist

Weekly Checklist

Year: _____Month: _____

Preventive Maintenance Action (write dates at top of column)	Week 1	Week 2	Week 3	Week 4	Week 5
Check oil level in air lubricator					
Check hydraulic fluid level					
Check oil level in pneumatic system reservoir					
Inspect hydraulic hoses					
Inspect hydraulic fluid leakage					
Inspect hydraulic fluid level					
Clean the machine					
Grease pivot points on hydraulic cylinder and bell crank (See the *Lubrication* section in the *Maintenance* chapter to determine which grease blocks to use.)					

Notes **Date**

Checklist by Working Hours

Year: _____

Preventive Maintenance Action	Working Hours	Record Hours on Hour-Meter	Date Performed	Signature
Grease the guide wheels and drive wheels (See the *Lubrication* section in the *Maintenance* chapter to determine which grease blocks to use.)	Every 300			

Quarterly Checklist

Year: _____

Maintenance Action	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter	
	Date	Signature	Date	Signature	Date	Signature	Date	Signature
Inspect and Clean Electric Motor Vents and Fins								
Check Regulator Filter								
Check Oil Level In Brake Motor								
Grease the swivel joint near cooler								
Grease the hydraulic system motor								

Notes **Date**

Every 2 Years Checklist

Year: _____

Maintenance Action		Sign and Date When Action is Performed					
Drain and change gearbox oil	2 years						

Notes **Date**

Appendix D

Drawings are inserted at the back of the manual.

Table D-1: Attached Drawings

Drawing Description	Drawing Number
Top level assembly	63305
Left-hand end frame assembly	63306
Press head assembly	63307
Bumper housing assembly	63340
Hydraulic motor and pump assembly	63351
Hydraulic fluid reservoir assembly	63352
Guide shaft bushing assembly	63388
Bell crank assembly	63392
Bell crank subassembly	63393
Lube point layout	63443
Hydraulic cylinder assembly	63479
Right-hand end frame assembly	63521
Parking stand, left hand	63934
Electrical system	90547

Appendix E

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.

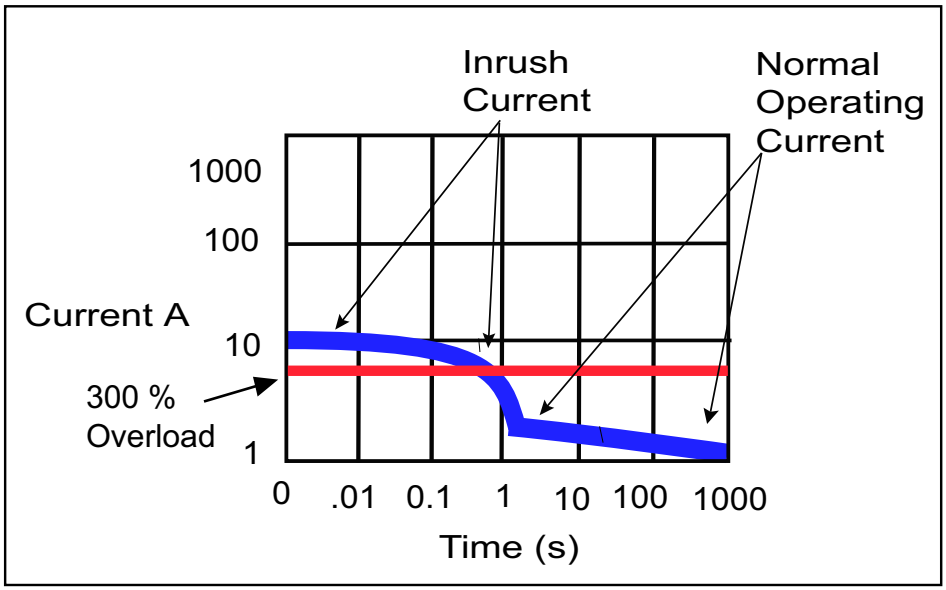
Although the running motor may not draw enough current to blow the fuses or trip circuit breakers, it can produce sufficient heat to burn up the motor. This heat, generated by excessive current in the windings, causes the insulation to fail and the motor to burn out. We use the term “locked rotor amps” 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 E-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

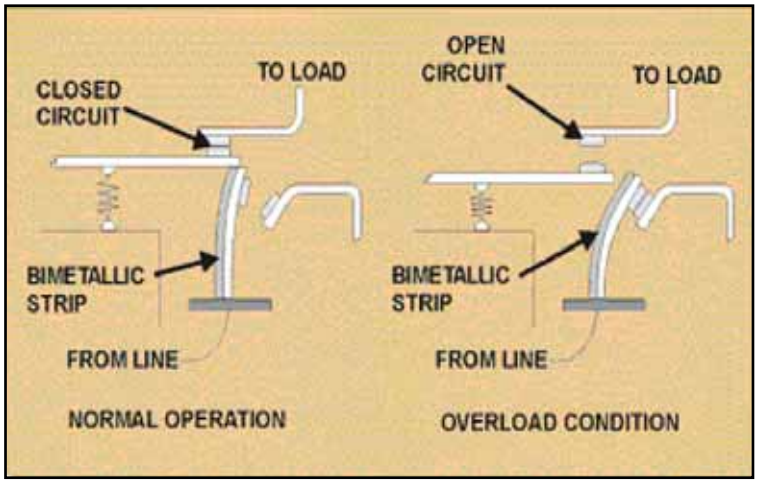
Overload protection is accomplished with the use of a bimetallic strip. This component consists of a small heater element wired in series with the motor and a bimetallic strip that can be used as a trip lever. A bimetallic strip is made of two dissimilar metals bonded together. The two metals have different 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 E-2.

Figure E-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 E-1.

Table E-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 E-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.

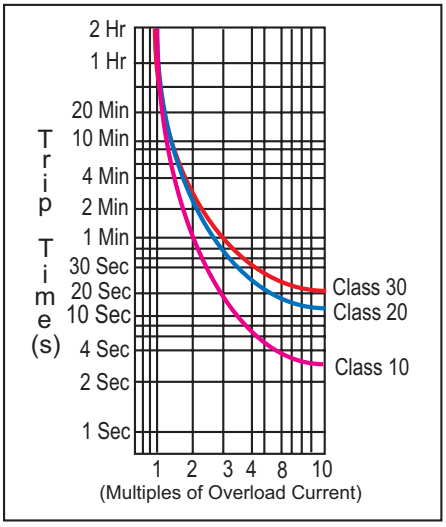
NEMA D

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 E-3: Trip Times for Trip Classes



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.

Understanding Motor Starting Problems

There are three major sources of motor starting problems: voltage source problems, control circuit problems, and drive faults. Diagnosing and resolving these problems can be a time-consuming process, but some time can be saved by using an organized process of elimination. The following sections address the most common sources of motor starter problems.

	WARNING
	**ELECTROCUTION HAZARD.** **Always turn the power off by activating an E-stop when the equipment is not in operation.** **Always verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures (OSHA 29 CFR 1910.147) before performing any maintenance on this equipment.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

Voltage Source Problems

1. Check the incoming power source. Verify that all three phases of power have the proper voltage using a digital multimeter set to voltage mode. If any of the three phases of incoming power are low or missing, disconnect power at the primary disconnect switch and reset the circuit breaker or replace the fuse.

2. Before restoring power at the primary disconnect, verify that there are no phase-to-phase or phase-to-ground shorts at the motor starter line contactors. If necessary, replace starter contacts to correct shorts.

3. Check that motor thermal overloads have not been tripped. Reset the overloads by pressing the reset pushbutton.

4. Check the motor starter leads for phase-to-phase and phase-to-ground shorts. Check for discoloration, hot spots, melted wire or damaged fuses. Correct the motor lead wiring if necessary.

5. Check the motor leads for phase-to-phase and phase-to-ground shorts. Check for discoloration, hot spots, melted wire or damaged fuses. Replace the motor if necessary.

6. Determine if motor windings are breaking down by testing the motor insulation with an insulation tester or taking the motor to a repair shop for testing.

7. Disconnect the motor from its load. Start the motor. If it runs correctly, the problem is associated with the mechanical drive train. If it does not run correctly, replace the motor bearings.

Control Circuit Problems

1. If the incoming power source has all three phases of power, check the motor starter overloads. Reset the motor starter overloads by pressing the reset button.

2. Verify that the control voltage transformer fuse is operating correctly using a digital multimeter set to Ohms. The multimeter should have a low reading. If the multimeter registers no reading or an infinite reading, replace the fuse.

3. Disconnect the motor starter contactor coil. Check for a short or ground. If necessary, replace the motor starter coil.

4. Check the control circuit wiring to the contactor coil while the coil is still disconnected. If a short or ground is present, disconnect the field wiring circuit to the motor starter. Determine whether the problem is with the motor contactor overload circuit or the field control wiring.

5. If a ground is found in the motor starter overloads circuit, replace the overloads. Reconnect the starter coil and control field wiring.

6. If a ground is found in the field wiring circuit, clear the ground. Reconnect the starter coil and control field wiring.

7. Check for an open circuit in the motor overloads or control circuit by using a digital multimeter set for Ohms to verify the motor overloads control circuit is working correctly.

8. Check the PLC contact closure, relay contact closure or start/stop pushbutton circuit that supplies the start signal to the motor starter.

Drive Faults

Before troubleshooting a drive fault, determine whether the fault is a motor, drive, or application fault. Use the fault codes of the drive. If you are unable to locate the source of the fault, contact MiTek Customer Service.

Document Evaluation

Appendix F

This appendix contains a form to provide MiTek with feedback on the usefulness of this manual. Please follow the instructions on the form to provide us with comments or suggestions that will improve the quality of our documentation services.

Document Evaluation Form

We invite your comments to make this document more useful.

Document Identification:

AutoPress™ 14TL Platen Press	Equipment Manual	001081

General Ratings:

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

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

❑ Poor ❑ Fair ❑ Good ❑ Excellent

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.	*AutoPress*™ 14*TL* Platen Press
	Equipment Manual
	001081
Recommendation	
Reason for Recommendation	
Your Name:	Date:
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Glossary

actuate	to activate, put into action
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
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
camber tube	fixed tube welded to top of both sides of table to form an arc; this allows the truss to form an arc when plated. The gantry head also rides on this tube surface.
clamp tube	pneumatically actuates tubes on the top of the table that clamps the sides of the truss against the camber tube
collett	a cone-shaped sleeve used for holding a rod in place; a connector between pieces of tubing
connector plate	the nail-plate that holds the truss members together
CST	Customer Service Technician
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 adjustable stop	adjustable fixture to hold the ends of a truss together
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 be parked on the sloped parking stand
end pneumatic stop	air actuating fixture to hold the end of the truss together
gantry head	the entire traveling weldment that houses the roller to embed the connector plates

Glossary

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
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
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 light beams to detect when something is in the way of the gantry head and stops the machine to prevent injury or damage
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
MPCE	Machine Primary Control Element
motor end	used to indicate which end of the gantry head is being discussed; the end of the gantry head that houses the motor
pendant control station	where the operator stands to use the pendant that controls movement of the gantry head
pilot control valve	a pneumatic hand valve that operates the pilot valve to control the cylinders to clamp and lift on the table

Glossary

pilot valve	air valve that supplies air to various cylinders for clamping or lifting
plate	the nail-plate that holds the truss members together see *connector plate*
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
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
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
solenoid	an assembly used as a switch consisting of a coil and a metal core free to slide along the coil axis under the influence of the magnetic field
tagout	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

Glossary

take-up bearing	adjusts the height of the roller
torque	a turning or twisting force
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
voltage	equal to the difference in electric potential between two points on a conducting wire carrying a constant current of one ampere when the power between the points is one watt

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Equipment Manual

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